

Heavy Duty Industrial Pressure Sensor

RUGGED, VERSATILE, AND HIGHLY VISIBLE

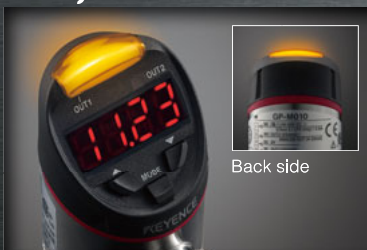
For Hydraulic and Pneumatic Applications

Actual size



STEP FLUSH DIAPHRAGM
Standard equipment

Easy to See



Easy to Mount



Advantage of using digital pressure sensor

Conventional: Bourdon tube & Mechanical type

- Values are difficult to understand
- Require more space due to large size
- More potential for leaks and damage
- No outputs provided



GP-M Series

- Anyone can understand the large numerical display
- Outputs can easily be seen at a glance from any direction
- Space-saving design
- Includes an adjustable range analog function.



Large Display

Easy to see the current operation status from any viewing direction.



Inverse display function

The digital display can be inverted 180 degrees, which allows installation in nearly any orientation.

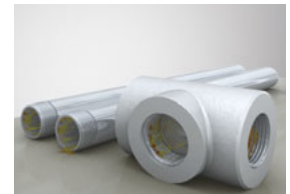
Clog resistant. No disassembly required for cleaning.

STEP FLUSH DIAPHRAGM DESIGN

The GP-M features a step flush diaphragm design that prevents foreign materials from clogging the unit.

Easy Maintenance

Clogging inside of the sensor may lead to a delayed response or errors in detection values. The GP-M can be removed and cleaned when couplings or other connecting parts become clogged. The step flush diaphragm design simplifies debris removal.



Prevent unauthorized changes

Key Lock and Password Protection settings are available to prevent unauthorized changes from being made.

2

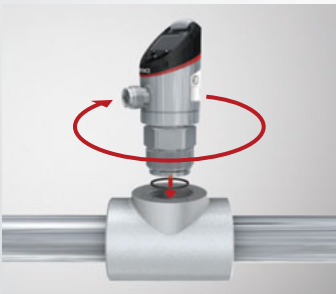
Easy to install

The sensor display can be rotated after mounting the sensor



3 SIMPLE STEPS FOR INSTALLATION

- 1 Mount the sensor to the coupling



- 2 Adjust the display orientation

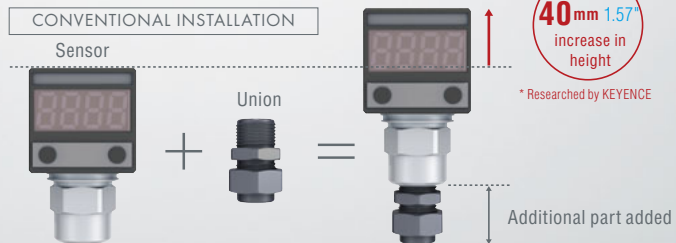


- 3 Attach the cable



Rotating head = No union required

Installation does not require a union in order to adjust the display orientation. Therefore, the number of parts can be reduced by eliminating the need for this adapter.

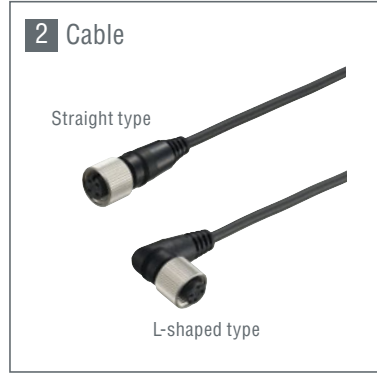


Space saving is possible because the union is unnecessary

3

Easy to select

Simple lineup



• It is recommended to attach a throttle (KEYENCE optional accessory) when an exceptionally large pulse or surge pressure is expected.

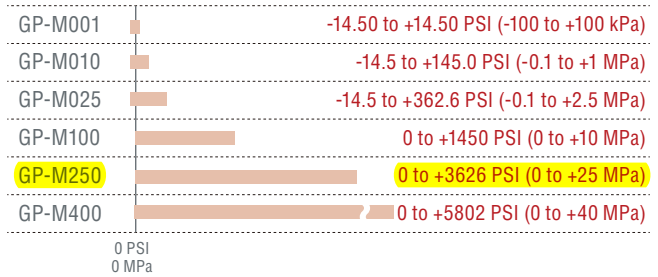
NPN/PNP selectable

Selectable between [2 outputs] or [1 output + analog output]

Various cables and adapter accessories are available



Range Selection



Rugged durability and environmental resistance

Vibration resistance
20G

Shock resistance
50G

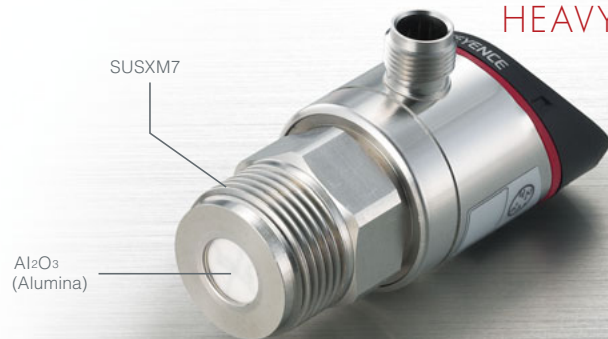
Light weight
150g

Fluid temperature range
-20 to +100°C*
-4 to +212°F

High chemical resistance and hardness
Ceramic diaphragm:
Alumina

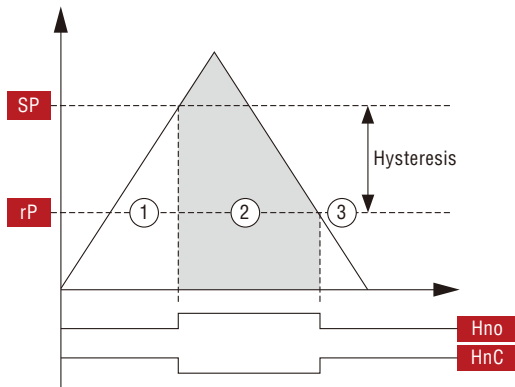
* No freezing or condensation

TOUGH & HEAVY-DUTY



SELECTABLE FUNCTIONS ACCORDING TO THE APPLICATION

Initial setting of the hysteresis mode (Hno/Hnc)



Pressure is likely to fluctuate from factors such as pressure spikes. This mode allows for free adjustment of hysteresis in order to prevent chattering due to fluctuating pressure.

Assume that $SP - rP = \text{Hysteresis}$

The mode turns ON when a measurement value rises above SP. ①▶②

The mode turns OFF when a measurement value falls below rP. ②▶③

* The "hysteresis mode" and "window mode" can be selected for control outputs 1 and 2 respectively.

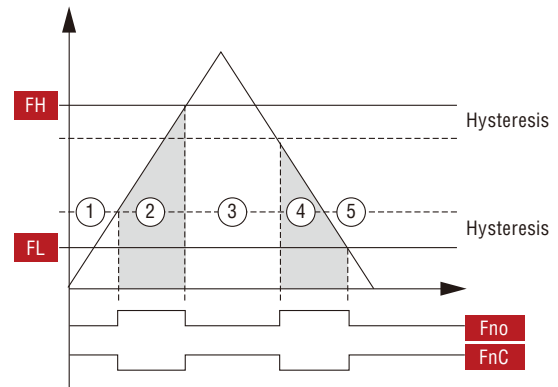
Free range analog

The data is output within the range of 4 to 20 mA in correspondence with the upper and lower limit values of the required pressure range. The pressure range can be adjusted as desired to maximize resolution.

Response speed (chattering prevention)

This function ignores rapid changes due to such factors as pressure spikes by increasing the response time. The time can be adjusted from 3 to 5000 ms.

Window mode (Fno/Fnc)



This mode is used to judge whether or not a measurement value is inside or outside of a specified zone.

The mode turns ON when a measurement value rises above FL + Hysteresis. ①▶②

The mode turns OFF when a measurement value rises above FH. ②▶③

The mode turns ON when a measurement value falls below FH - Hysteresis. ③▶④


The mode turns ON when a measurement value falls below FL. ④▶⑤

Hold function





This function displays the peak value and bottom value measured since the GP-M Series was turned on. Users can check the peak and bottom values easily by quickly pressing the ▲ or ▼ button while pressing the MODE button.

LINEUP








1 Sensor

Appearance	Model	Rated pressure range	Fluid type	Thread diameter
	GP-M001	-14.50 to +14.50 PSI (-100 to +100 kPa)	Gas Liquid	G3/4
	GP-M010	-14.5 to +145.0 PSI (-0.1 to +1 MPa)		
	GP-M025	-14.5 to +362.6 PSI (-0.1 to +2.5 MPa)		
	GP-M100	0 to +1450 PSI (0 to +10 MPa)	Liquid	
	GP-M250	0 to +3626 PSI (0 to +25 MPa)		
	GP-M400	0 to +5802 PSI (0 to +40 MPa)		

2 Cable



Appearance	Model	Material	Connector type	Cable termination	Length (m ft)
	OP-75721	PVC (Vinyl chloride)	M12 4 pins Straight	Loose wire	2 6.56'
	OP-87272				5 16.40'
	OP-85502				10 6.56'
	OP-75722		M12 4 pins L-shape		2 32.81'
	OP-87273				5 16.40'
	OP-87274				10 6.56'
	OP-85505	PUR (Polyurethane)	M12 4 pins Straight		2 6.56'
	OP-87275				5 16.40'
	OP-85506				10 6.56'
	OP-87276		M12 4 pins L-shape		2 6.56'
	OP-87277				5 16.40'
	OP-87278				10 6.56'

3 Adapter (Select from the following adapters.)

Appearance	Model	Type
	OP-87281	R male 1/8
	OP-87282	R male 1/4
	OP-87280	R male 3/8
	OP-87283	G female 1/4
	OP-87284	NPT male 1/8
	OP-87285	NPT male 1/4
	OP-87286	Rc female 1/2


Do not use unauthorized items. Refer to Page 14 "PIPING/INSTALLATION" for details.

Throttle (Attach to the adapter before use.)

Appearance	Model	Material	Applicable adapter
	OP-87311	SUS303	OP-87280/OP-87281 OP-87282/OP-87284 OP-87285
	OP-87312	SUS303	OP-87283

It is recommended to attach a throttle to the GP-M100/M250/M400.
For the other models, use it when excessive pulses or surge pressure is expected.


Display protection cover

Appearance	Model	Material
	OP-87289	Polysulfone


Replacement parts

(Available for the following model numbers. Sold separately.)

O-ring (for GP-M001/M010/M025)


Appearance	Model	Material
	OP-87287	FKM

O-ring set (for GP-M100/M250/M400)

Appearance	Model	Material
	OP-87288	O-ring: FKM
		Backup ring: PTFE

Use the set in combination: O-ring (black) and the backup ring (white)

O-ring (for OP-87283)

Appearance	Model	Material
	OP-87310	FKM

SPECIFICATIONS



Model	GP-M001	GP-M010	GP-M025	GP-M100	GP-M250	GP-M400
Rated pressure	-14.50 to +14.50 PSI (-100 to +100 kPa)	-14.5 to +145.0 PSI (-0.1 to +1 MPa)	-14.5 to +362.6 PSI (-0.1 to +2.5 MPa)	0 to +1450 PSI (0 to +10 MPa)	0 to +3626 PSI (0 to +25 MPa)	0 to +5802 PSI (0 to +40 MPa)
Possible display range	-17.40 to +17.40 PSI (-120.0 to +120.0 kPa)	-30.5 to +161.0 PSI (-0.210 to +1.110 MPa)	-52.2 to +400.3 PSI (-0.360 to +2.760 MPa)	-145 to +1595 PSI (-1.00 to +11.00 MPa)	-363 to +3989 PSI (-2.50 to +27.50 MPa)	-580 to +6382 PSI (-4.00 to +44.00 MPa)
Zero-cut pressure value	±0.5% of F.S.					
Allowable pressure	58 PSI (400 kPa)	580 PSI (4 MPa)	1450 PSI (10 MPa)	4351 PSI (30 MPa)	7252 PSI (50 MPa)	7252 PSI (50 MPa)
Burst pressure	217.5 PSI (1500 kPa)	2175 PSI (15 MPa)	5075 PSI (35 MPa)	14504 PSI (100 MPa)	14504 PSI (100 MPa)	14504 PSI (100 MPa)
Display resolution	kPa	0.1	1	1	None	None
	MPa	None	0.001	0.001	0.01	0.01
	PSI	0.01	0.1	0.1	1	1
	bar	0.001	0.01	0.01	0.1	0.1
	kgf/cm ²	0.001	0.01	0.01	0.1	0.1
Fluid type	Gas or liquid that will not corrode the liquid contact part			Liquid that will not corrode the liquid contact part		
Type of pressure	Gage pressure					
Precision* ¹	±1.0% of F.S. or less					
Repeatability* ²	±0.3% of F.S. or less					
Temperature characteristics	±0.6% of F.S./10°C 50°F					
Connection port	G3/4 (Changes to the R male 1/8, R male 1/4, R male 3/8, G female 1/4, NPT male 1/8, and NPT male 1/4 option adapters are available.)					
Box rotation angle	Maximum 330°					
Medium temperature	-20 to +100°C -4°F to +212°F (no freezing/condensation)* ^{3,6}					
Power voltage	10-30 VDC, Ripple (P-P): 10% max, Class 2 or LPS					
Current consumption	50 mA or less (when 24 V: 32 mA or less, when 12 V: 48 mA or less. Not including load)* ⁴					
Display method	4 column, digital LED, red/Vertical inversion display possible					
Operation display light	Operation indicator (output 1) (orange), Operation indicator (output 2) (orange)					
Hysteresis	During hysteresis mode: variable (Difference between switch-on point and switch-off point is hysteresis) During window mode: fixed (0.5% of F.S.)					
Response	Control output	Selectable from 3 to 5000 ms				
	Analog output	As above + 2 ms (90% response)				
Output	Output 1 control output	NPN/PNP open collector (Selectable), Max. 250 mA (30 V max) Main unit residual voltage 1 V max.N.O./N.C. selectable				
	Output 2 replacement type	Control output	4-20 mA, maximum load resistance 500 Ω (When the electric voltage is more than 20 V)* ⁵			
Environmental resistance	Ambient temperature	-20 to +80°C -4°F to +176°F (no freezing/condensation)* ⁶				
	Relative humidity	35 to 85% RH (no condensation)* ⁶				
	Vibration	IEC60068-2-6 20 G (10 to 2000 Hz, 2 hours each in the X, Y, and Z axis)				
	Shock	IEC60068-2-27 50 G (11 ms, 3 times for each of X, Y and Z axis)				
	Enclosure rating	IP67				
Material properties	Wetted part	Pressure port: SUSXM7, Diaphragm pressure port: Al ₂ O ₃ (Alumina), O ring: FKM				
	Other parts	Housing metal portion: SUS304, SUS303, Housing plastic portion: PPSU, Air hole* ⁷ : PTFE, nickel-plated brass.				
Applicable cable	M12 connector 4 pin					
Weight	App. 150 g					

*1 This is the value when considering linearity + hysteresis + repeatability in a stable environment of 23°C 73.4°F.

*2 The repeatability, based on consistent conditions, is the variation in the value that will be displayed.

*3 When the temperature of the piping exceeds 80°C 176°F, do not connect the cable.

*4 Consumption current including output is 0.6 A and under.

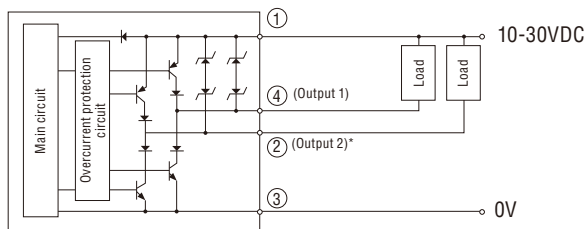
*5 The maximum load resistance R will be the values below in response to the electric voltage E. When 10-23V: R = (38 x (E-10) + 128) Ω. When 23-30V: R = 622 Ω

*6 For measures to prevent condensation, refer to Page 14 "Other precautions" 7.

*7 Only for the GP-M001/M010/M025

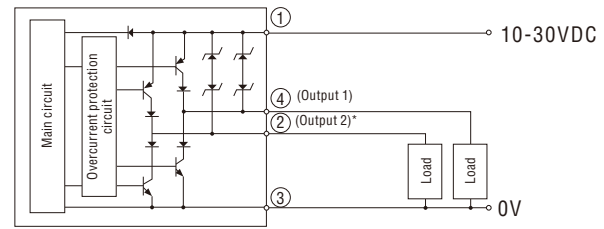
WIRING, OUTPUT DIAGRAM

When selecting an NPN output



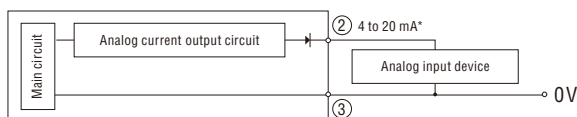
* When selecting "Out"(control output) of the function of output 2 only.

When selecting a PNP output



* When selecting "Out"(control output) of the function of output 2 only.

Analog output diagram



* When selecting "AnLG"(Analog output) of the function of Output 2 only.

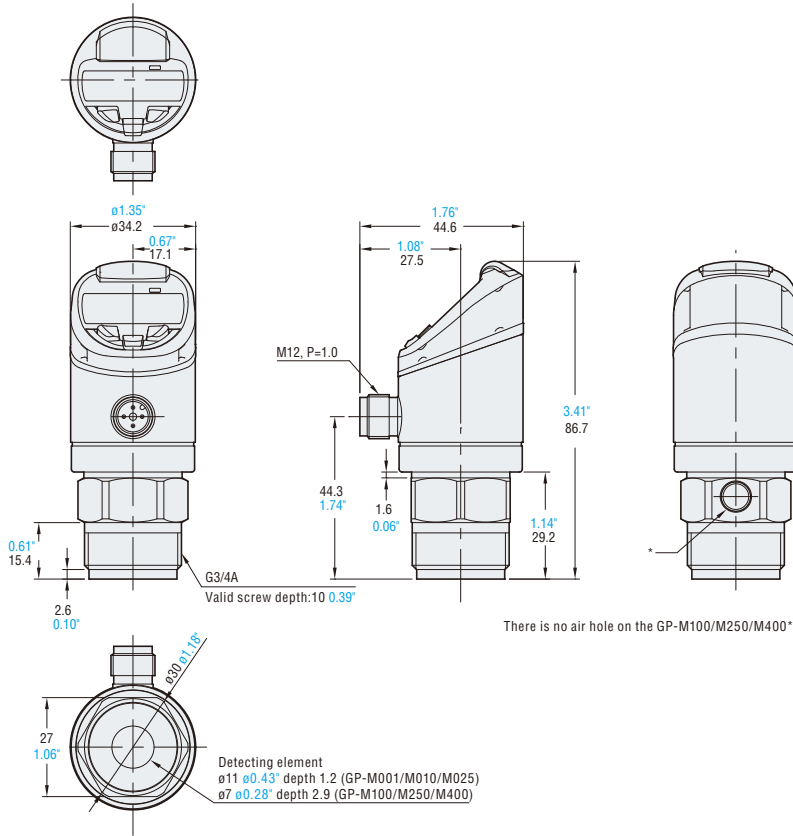
M12 Connector Cable (Optional) Pin Position



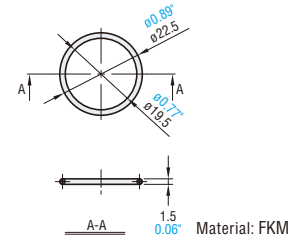
DIMENSIONS

Sensor

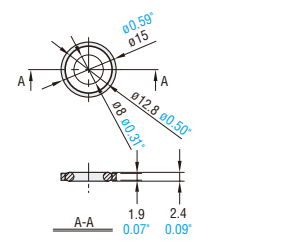
GP-M001/M010/M025/M100/M250/M400



O-ring* for GP-M001/M010/M025 use (OP-87287)



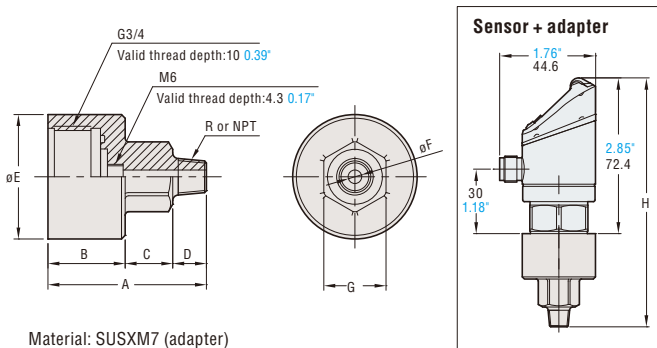
O-ring set* for GP-M100/M250/M400 use (OP-87288)



* O-ring/O-ring set is included with the sensor. They are available as OP-87287/87288 when purchasing separately for replacement.

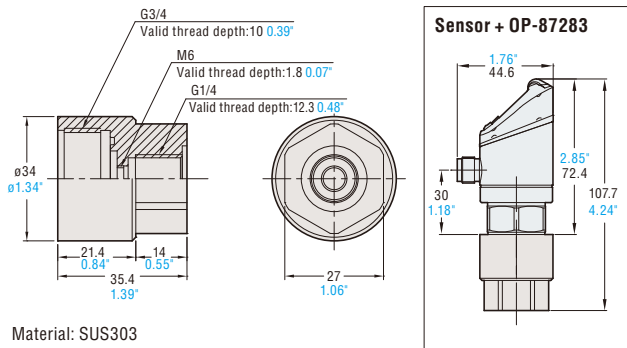
Adapter - male

OP-87280/87281/87282/87284/87285



Adapter - female

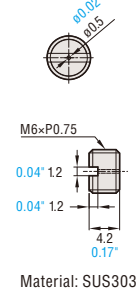
OP-87283



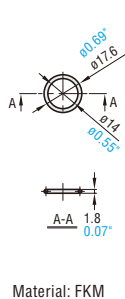
Material: SUSXM7 (adapter)

Material: SUS303

Dedicated throttle (optional) OP-87311

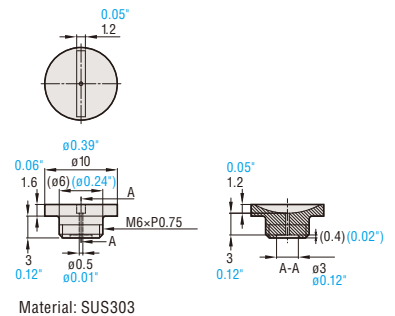


O-ring (included)*



* When replacing the O-ring for OP-87283, it is available as OP-87310.

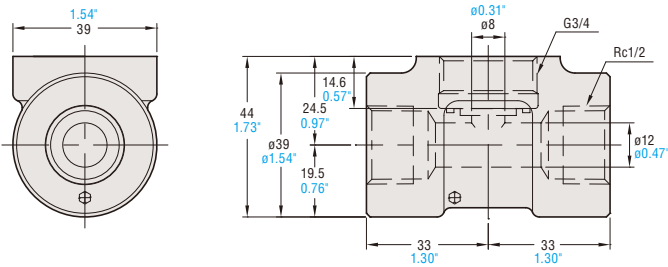
Dedicated throttle (optional) OP-87312



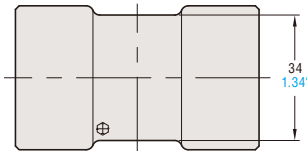
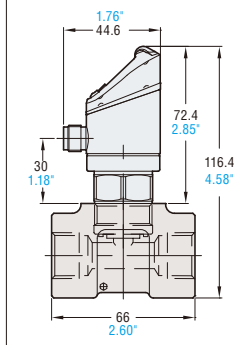
Model	OP-87281	OP-87282	OP-87280	OP-87284	OP-87285					
Screw	G3/4×R1/8	G3/4×R1/4	G3/4×R3/8	G3/4×NPT1/8	G3/4×NPT1/4					
A	43.3	1.70"	47.1	1.85"	47.6	1.87"	43.3	1.70"	47.1	1.85"
B	21.1	0.83"	21.1	0.83"	21.1	0.83"	21.1	0.83"	21.1	0.83"
C	13	0.51"	13	0.51"	13	0.51"	13	0.51"	13	0.51"
D	9.2	0.36"	13	0.51"	13.5	0.53"	9.2	0.36"	13	0.51"
E	34	1.34"	34	1.34"	34	1.34"	34	1.34"	34	1.34"
F	3.7	0.15"	4.8	0.19"	5	0.20"	3.7	0.15"	4.8	0.19"
G	17	0.67"	17	0.67"	19	0.75"	17	0.67"	17	0.67"
H	115.7	4.56"	119.5	4.70"	120	4.72"	115.7	4.56"	119.5	4.70"

Tee adapter

OP-87286



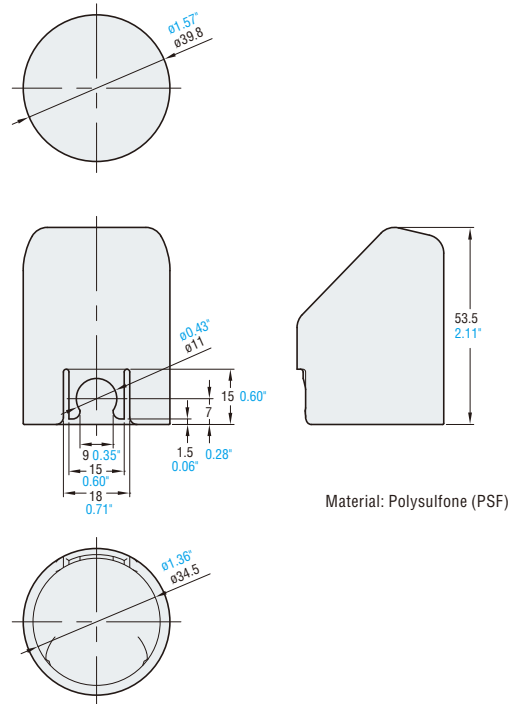
Sensor + OP-87286



Material: SUS304

Protective cover

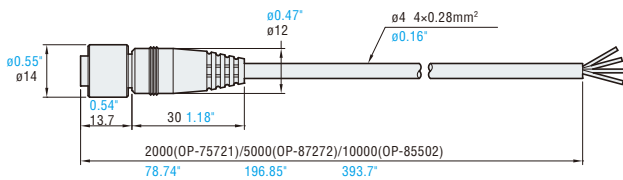
OP-87289



Material: Polysulfone (PSF)

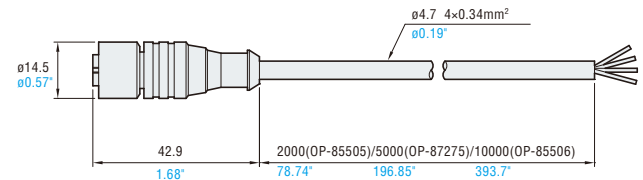
M12 connector cable PVC (vinyl chloride)

OP-75721/87272/85502

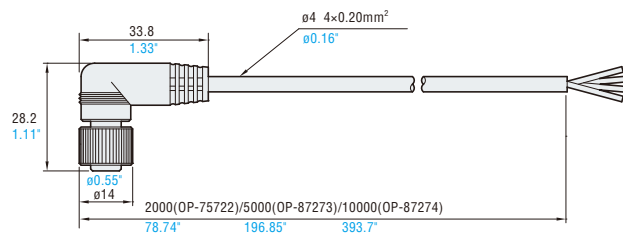


M12 connector cable PUR (polyurethane)

OP-85505/87275/85506



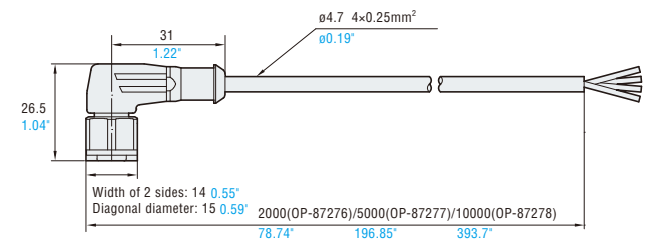
OP-75722/87273/87274



Pin

No.	Color
①	Brown
②	White
③	Blue
④	Black

OP-87276/87277/87278



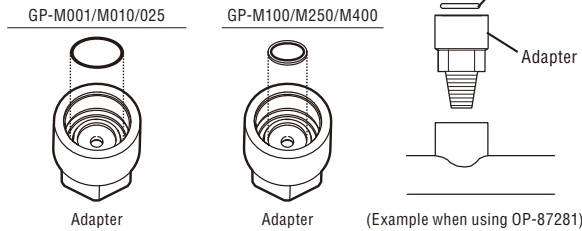
Pin

No.	Color
①	Brown
②	White
③	Blue
④	Black

PIPING/INSTALLATION

Piping

- Use the adapter to match the diameter of the piping.
- When using the adapter, fit the O ring attached to the main body to the screw threads of the Adapter G3/4. (Refer to the diagram below.)



- When using a self-made adapter instead of the optional adaptor, or when attaching the main body directly to piping or the tank, specific steps are needed in order to fit the GP-M Series and O ring to the equipment. Please contact KEYENCE for details.
- The body may be rotated horizontally to 330°. When rotating, hold the clasp in place with a wrench.

Precautions when installing

Attaching the coupling

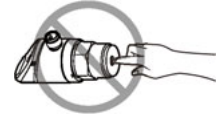
The recommended tightening torque when installing the adapter to the main body of the sensor is 20 N•m. It is recommended to apply grease to the G3/4 threaded part in order to avoid thread damage.

Grounding of metal parts

The metal parts of the main body and the internal circuits are 0 V insulated.

Other precautions

- Regardless of whether the power of the device is ON or OFF, do not touch the main part of the pressure detector. If the pressure detector is touched, damage may occur due to static electricity.
- If using a non-conductive liquid such as oil with plastic piping, the risk of an offset change will become greater. In such a case, it is recommended to ground the metal housing.
- In the case that noise causes malfunction, grounding the metal housing may improve performance.
- After installation, conduct an atmospheric correction by making the applied pressure the same as regular room pressure.
- When condensation occurs on piping, place the cooling pipe away from the sensor by 30 cm 11.81" or more using a connecting pipe.



SAFETY INFORMATION FOR GP-M SERIES

General precautions

WARNING	<ol style="list-style-type: none"> 1. Do not use this product for the purpose of protecting a human body or a part of human body. 2. This product is not intended for use as an explosion-proof product. Do not use this product in hazardous locations and/or potentially explosive atmospheres. 3. The GP-M Series is not designed to sanitary specifications. Do not use the product for applications such as drinks, foods, or medical liquids. 4. Do not use the GP-M Series for applications requiring safety measures, such as any nuclear, railroad, aircraft, vehicle, or playground equipment.
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CAUTION	<ol style="list-style-type: none"> 1. You must verify that the GP-M Series is operating correctly in terms of functionality and performance before the start and operation of the GP-M Series. 2. We recommend that you take all the necessary safety measures to avoid any damage in the unlikely event of a problem occurring. 3. Do not use the GP-M Series with corrosive liquids.
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NOTICE	<ol style="list-style-type: none"> 1. We cannot guarantee the functions and/or performance in the event that the product is used outside the standards of the specification, or if the product is modified. 2. When using our product in combination with another product, based on such factors as conditions of use and surrounding environment, sometimes functions and performance may not be fully realized. In such a case, use after adequate examination.
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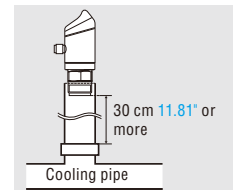
Caution when handling

CAUTION	<ol style="list-style-type: none"> 1. When detecting the temperature of the fluid, the housing of the product will be hot, and there is the danger of a burn injury. Do not touch the metal housing while the product is in operation. 2. The screw part of the main unit is sharp, take care to avoid injury.
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NOTICE	<ol style="list-style-type: none"> 1. Do not drop or hit the device, and avoid any other large shock to the device. 2. Do not use a sharply pointed object to press the setting keys. 3. If the detection portion is pushed with a sharp object, damage may occur to the detection surface. Also, for devices where the measuring range is low, the detection portion is thin and easy to break. Touch as little as possible.
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Other precautions

CAUTION	<ol style="list-style-type: none"> 1. The power ON reset time for the GP-M Series is 2 seconds after power is turned on. Do not use outputs from the sensor during this period. 2. Initial drift may occur after supplying power to the GP-M Series. To detect a minute difference in the pressure, let the GP-M Series warm up for approximately 15 to 30 minutes. 3. Do not bring a strong magnet or magnetic field close to the main body of the GP-M Series. 4. Do not remove the seal of the air hole of the GP-M001/M010/M025. It will no longer be waterproof. 5. When conducting maintenance, use a soft brush so as not to damage items such as the detection surface or the O ring. 6. When replacing the O ring, clean all of the debris from the surface that will be in contact with the O ring. 7. Condensation may cause measurement failure or breakage. To prevent this, take the following measures: <ul style="list-style-type: none"> • Make sure the ambient temperature is same as the fluid temperature or less. • Use an A/C for dehumidification. • Keep the cooling pipe away from the sensor by 30 cm 11.81" or more using a connecting pipe.
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The recommended ambient temperatures and relative humidities are within the highlighted area of the graph below.

