

Nidec

SMALL SIZE PRESSURE GAUGE

PG-35 / PG-30

CE marking
(Compliance with EMC Standards)

UK
CA

Instruction Manual Ver.10.0

Thank you for purchasing a
NIDEC COMPONENTS CORP. product.
In order to use the product correctly and most
appropriately, please completely read this manual before
use and keep it for future reference.

For more detailed information please ask for the nearest
distributor or the following sales center.

NIDEC COMPONENTS CORPORATION

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Important Information and Warnings



CAUTION

These products (pressure sensors, pressure switches, pressure gauges, pressure indicators, leakage sensors, etc.) are designed and manufactured as general industrial parts. Therefore, a person with sufficient knowledge and experience shall confirm the conditions and environments described in the catalog, specifications, and instruction manual of each product, check the suitability of the product for the machine, device, or system which you use, and ensure safety before use.

These products are not intended to be used for applications particularly requiring high reliability (These include, but are not limited to, nuclear power control, aerospace and military purposes).

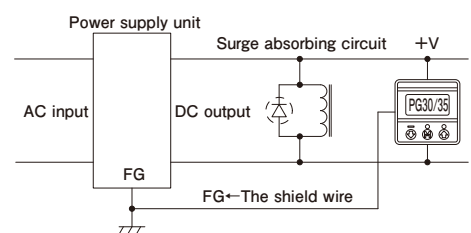
The details of warranty shall be as per the descriptions in this document and we shall not be liable for any damage on you resulting from the use of any equipment or device (including control systems) which is not in accordance with this document (hereinafter referred to as "use in violation"). In the case where you resell our products, we shall not be liable for any damage on a third party resulting from use in violation by the third party, and even if we make payment to the third party in connection with such use in violation regardless of the name by which such payment may be called, we may demand the whole amount thereof from you.

- ① Select either the PG-30 or the PG-35 depending upon the type of pressurized media.
- ② The maximum impressed pressure of the PG-30-102R at the time of vacuum break is 500kPa.
- ③ For stability, use a regulated direct current power supply.

Surge absorbing devices (diodes, varistors, etc.) are necessary if inductive loads such as relays or solenoids are connected to the same circuit as the PG-30/PG-35.

If using a DC power supply unit such as a switching power supply, the FG terminal should be earthed. Do not wire in parallel to high tension cables or power lines, or use cable ducts which contain high tension cables or power lines.

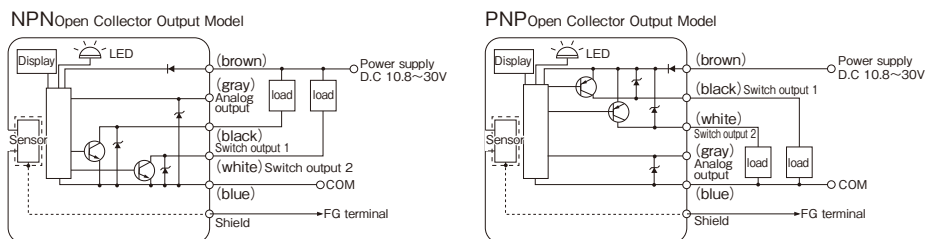
- ④ Be careful not to crimp any wires during handling, or put any pressure on the display area of the main body while assembling piping. The fitting torque of sealing screws and M5 fitting screws should be 3.0N·m maximum.
- ⑤ Use pH neutral detergents to clean the body. Do not use solvents such as thinners.
- ⑥ This product is dust proof and drip proof (to IP65 of IEC standards) and is not suitable for use in environments requiring higher standards.
- ⑦ Do not use pointed objects such as pens to press the setting buttons on the display panel, as this may push holes in the setting buttons and damage them.
- ⑧ Do not insert wires, etc. in the pressure port, as this may damage the internal diaphragm and cause malfunctioning.
- ⑨ PG-35 G3/8 type:
Do not touch or scratch the diaphragm at the edge of the fitting, as this may alter the performance characteristics or damage the diaphragm, and cause malfunctioning.
- ⑩ PG-35 gasket type:
Do not touch or scratch the edge of the fitting, as this may damage the sealing and cause leakage.
- ⑪ The PG-30/35 series do not have an explosion proof structure. Do not use it for the detection of flammable gases.
- ⑫ When analog output is supplied to a noise-sensitive device, a low-pass filter is requested in a customer's circuit.
- ⑬ Counter measures for noise interference.
Please connect the shielded wire of this product to FG terminal of the power line. (The shield wire is connected with the metal part inside of the product.)



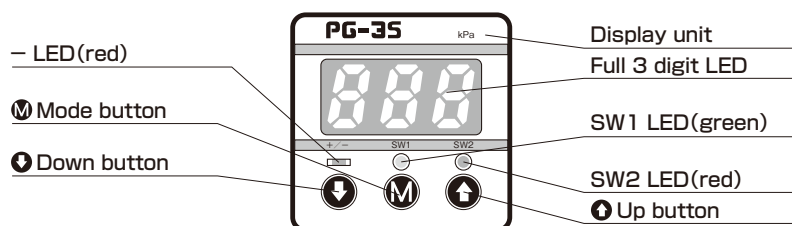
Specifications

Model		PG-35			PG-30				
		102R	103R	102A	101R	102R	103R		
Type		Gauge pressure		Absolute pressure		Gauge pressure			
Rated pressure range		−100~100kPa	−100~1000kPa	0~100kPa(abs)	−10~10kPa	−100~100kPa	−100~1000kPa		
Maximum pressure		200kPa	2000kPa	200kPa(abs)	20kPa	200kPa	1500kPa		
Break-down pressure		300kPa	3000kPa	300kPa(abs)	50kPa	500kPa	2000kPa		
Acceptable media		Liquids or gases that do not corrode SUS316L			Non-corrosive gases				
Operating voltage		10.8~30VDC (including ripple)							
Current consumption		50mA maximum							
Switch outputs		Two outputs NPN/PNP : Transistor open collector Switch rating : 30VDC/100mA maximum Residual voltage : 1.2V maximum (NPN) / 2.2V maximum (PNP) at 100mA.							
		Hysteresis		0~300 counts setting (adjustable)					
		Repeatability		±0.2%FS±1digit					
		Response		Approx.5ms (Digital Filter : "F-0")					
		Short circuit protection		Exists					
Analog output		Output voltage 1~5V / Pin(L)~Pin(H), Output impedance : 10kΩ, Resolution : 1 / 204 Only R / G mode is available on 103R, Only G mode is available on 102A.							
		Output mode		Pressure range Pin(L)~Pin(H)					
		R	−100~100kPa	−100~1000kPa			−10~10kPa	−100~100kPa	−100~1000kPa
		G	0~100kPa	0~1000kPa	0~100kPa(abs)	0~10kPa		0~100kPa	0~1000kPa
		V	0~100kPa				0~10kPa	0~100kPa	
		Output mode		Output voltage accuracy (Vzero=Pin=0, Vspan=Pin=0~Pin(H))					
		R	3±0.2V 2±0.2V	1.36±0.2V 3.64±0.2V			3±0.2V 2±0.2V	1.36±0.2V 3.64±0.2V	
		G	±				1±0.2V 4±0.2V		
		V	1±0.2V 4±0.2V				1±0.2V 4±0.2V		
		Display		Full 3 digit LED display (display cycle : 4 times per second)					
Negative pressure display				− LED is lit					
Display accuracy				±1%FS					
Operation display		SW1 LED (green) and SW2 LED (red) light up when switch outputs are ON							
Operating conditions		IP protection		Meets IP65 (pressure gauge main body) of IEC					
		Operating temperature		−10 ~50℃ (storage −20~70℃)					
		Operating humidity		35~85% RH					
		Insulation resistance		100MΩ minimum at DC500V between bundled leads and pressure port					
		Dielectric strength		One minute at AC500V between bundled leads and pressure port (1mA maximum leakage)					
		Vibration resistance		10~500HZ 1.5mm maximum / 98.1 ^{m/s} ², three directions, two hours each					
		Shock resistance		490m/s², three directions, three times each					
EMC		EMI : EN5501 Group 1, Class B / 1998							
		EMS : EN61326-1 / 1997 : The permissible change of display counts, set value of switch output and zero / span voltage of analog output during the test not exceed ±5%FS.							
Thermal error		±3%FS (0~50℃)							
Fitting part types		R1/4, G3/8, G1/4, gasket fitting 9/16-18UNF			Aluminum die-cast Rc1/8				
Materials at pressure receiving area		SUS316L			Single crystal silicon				
Net Weight		Approx. 150g (incl. 2m cable)			Approx. 80g (incl. 2m cable)				
Accessories		O-ring (G3 / 8:P18, G1 / 4:P15)			Plastic sealing screw, M5 fitting screw				

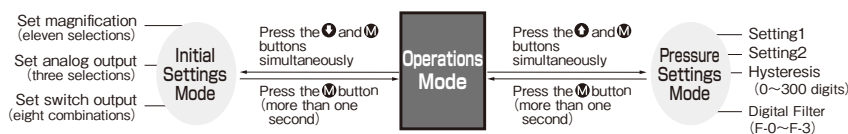
Output Electrical Diagram (Wire colors correspond to IEC standards)



Function Names

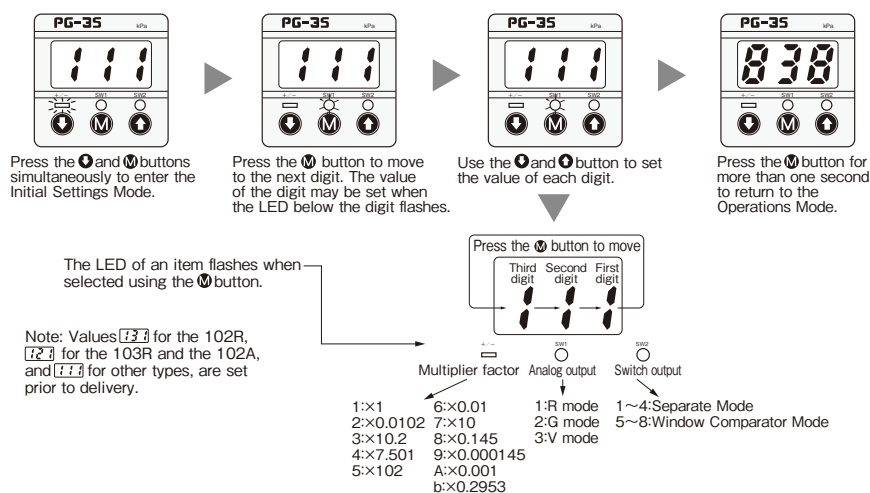


Operating Procedures



When the power is switched on, the Operations Mode is automatically selected. Settings remain in effect after switching off the power.

Initial Settings Mode



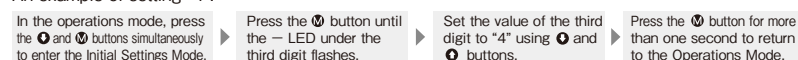
Multiplier factor Setting

The multiplier factor setting is determined by the value of the third digit : the red -LED should be flashing during the setting.

Value selected	Multiplier factor	Pressure range (-Pr~+Pr)			
		101R	102R	103R	102A
1	×1	-9.99~9.99	-99.9~99.9	-100~999	0.0~99.9(abs)
2	×0.0102	-99.9~99.9	-999~999	-1.02~9.99	0~999(abs)
3	×10.2	-75.0~75.0	-750~750		0~750(abs)
4	×7.501	-999~999			
5	×102				
6	×0.01	-99.9~99.9	-999~999	-1.00~9.99	0~999(abs)
7	×10	-1.45~1.45	-14.5~14.5	-14~145	0.0~14.5(abs)
8	×0.145				
9	×0.000145				
A	×0.001			-0.10~1.00	
b	×0.2953	-2.95~2.95	-29.5~29.5	-29~295	0.0~29.5(abs)

Sections containing an oblique stroke are multiplier factor that cannot be selected because of resolving power or display digits. (Values will not be displayed automatically.)

An example of setting "4".



Note: "1" is set prior to delivery.

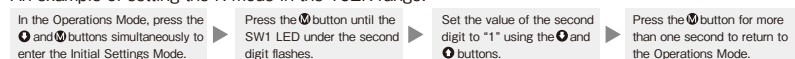
※ Change of magnification setting is effective only for pressure reading. Set values for switching are not scaled automatically.

Analog Output Setting

The analog output setting is determined by the value of the second digit: the green SW1 LED should be flashing during the setting.

Value selected	Mode	-Pr		0	+Pr	
		1V		(Vzero)	5V	
1	R mode(Compound pressure output)					
2	G mode(Positive pressure output)					
3	V mode(Negative pressure output)	5V		1V		

An example of setting the R mode in the 102R range.



Notes: V mode for 102R and R mode for 101R are set prior to shipment. R/G mode for 103R and G mode for 102A can only be selected.

Switch Output Setting

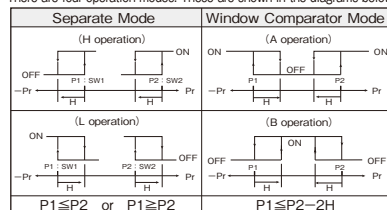
The switch output setting is determined by the value of the first digit : the red SW2 LED should be flashing during the setting.

Value selected	Output		SW1 output				SW2 output			
	Mode		Separate		Window comparator		Separate		Window comparator	
	Operation		H	L	A	B	H	L	A	B
1										
2										
3										
4										
5										
6										
7										
8										
			Setting 1		Minimum:Setting1 Maximum:Setting2		Setting 2		Minimum:Setting1 Maximum:Setting2	
			Note 1		Note 2		Note 1		Note 2	

Note 1. In the Separate Mode, setting 1 corresponds to SW1, and Setting 2 corresponds to SW2.

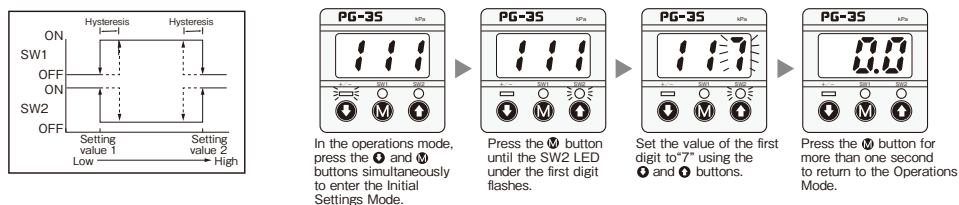
Note 2. In the Window Comparator Mode, the minimum value for SW1 and SW2 corresponds to Setting 1 and the maximum value corresponds to Setting 2.

There are four operation modes. These are shown in the diagrams below.

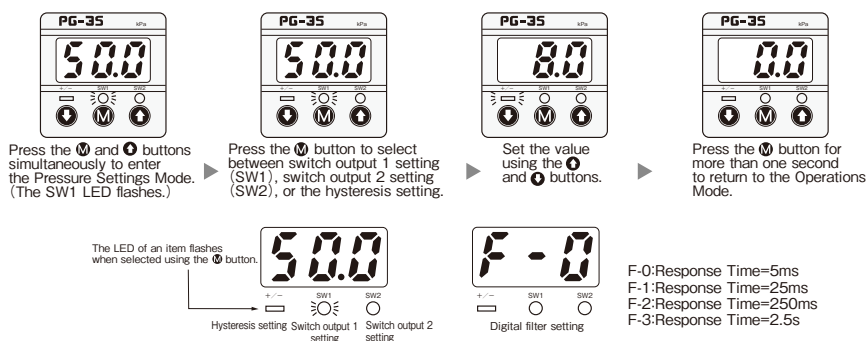


Window Comparator Mode

An example of setting the value "7" for the mode shown in the diagram.

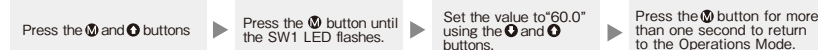


Pressure Settings Mode



Switch Output Setting

To set switch output 1 the SW1 LED should be flashing. (To set switch output 2 the SW2 LED should be flashing.)
An example of setting 60kPa for switch output 1 (SW1 LED is flashing) with 102R.



Note: +50%F.S. is set prior to delivery.

Hysteresis Setting

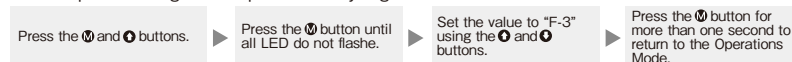
To set hysteresis the "—"LED should be flashing.
An example of setting a hysteresis value of 8.0kPa with the 102R (kPa).



Note: 20digits is set prior to delivery.

Digital Filter Setting

To set Digital Filter all LED should be not flashing.
An example of setting 2.5s response time by Digital Filter.



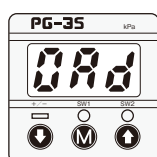
Note: "F-0" is set prior to delivery.

Troubleshooting

■ If the following error messages are displayed, follow the procedures in the table.

Display and problem	Cause	Solution
E-1	Output current is exceeding 100mA.	Turn off the power and verify the load connected switch output 1 and 2.
E-2	Pressure was applied at the zero point adjustment.	Press M button and return the applied pressure to the atmospheric pressure and try zero-point adjustment again.
E-3,E-4	Failure of the internal circuit.	Please contact us. Please use a regulated DC power supply and measures for the power line noise.
999 Flashing	Pressure values exceed the display range.	Normal state
Flashing of the pressure value	Pressure values exceed the rated pressure range.(110%FS)	Normal state
Black out of the display	Non-display mode	Normal state (See Non-display mode.)
Disable the key operation	Key protection mode	Normal state (See Key protection mode.)

Zero point Adjustment



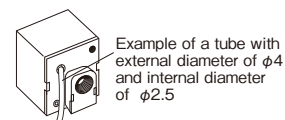
Pressing **0** the **0** and buttons simultaneously in the Operations Mode displays **0.00** on the screen. One second later this change to **0** than the **0** and **0** buttons are released. (If the pressure port is opened to the atmosphere.)

Note: You have to adjust Zero under open air condition.
Otherwise you can be seen E - 2 error as you adjusted Zero with residual pressure.
102A mode Zero point is adjusted prior to delivery.(0.3kPa abs max.)

Others

■ Tube at atmospheric pressure intake

If there is any possibility that the sensor may become wet with oil or water, which may enter the case through the air intake, connect a silicon tube, or similar, to the intake and position the end of the tube in a suitably safe place. Be sure not to bend the tube or block the end of the tube.



■ Piping

Use a wrench (13mm) on the aluminum die-casting. Do not hold the plastic case when tightening. Apply sealing tape at the male screw area to protect against air leaks. If mounting with an angled bracket, the maximum torque of the M3 screws should be less than 0.3N·m.

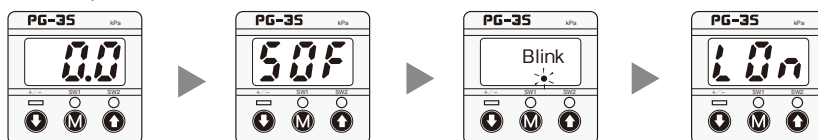
When using the accessories sealing or fitting screw, bind up the seal tape around the sealing screw one and a half or two turns, and screw it in the pressure port by hand without damaging the screw thread. After then, tighten the screw sufficiently with wrench. (Recommended torque: Plastic screw 3.0N·m, Metal screw 10.0N·m)

■ Non-Display Mode

<Non-Display [Temporary] Mode>

- When the keys are not operated for more than 10 seconds during Operation Mode, the system will automatically select Non-Display [Temporary] Mode and the display will turn off.
- Decimal point LED shown in the figure below will blink during Non-Display [Temporary] Mode.
- Using the EEPROM, the PG-30/35 series can retain preset values even if the power is turned off.
- If an error message is detected, the display will comeback and show the error message.
- You can change any functions during Non-Display [Temporary] Mode.

(How to set)

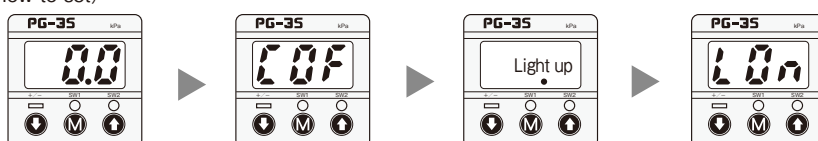


- To enable Non-Display [Temporary] Mode, press **0** key for more than 4 seconds. **50F** will be displayed and Non-Display [Temporary] Mode will be set. After 10 seconds, display will go off.
- To disable Non-Display [Temporary] Mode, press **0** key for more than 4 seconds. **L0n** will be displayed and Non-Display [Temporary] Mode will be canceled.

<Non-Display [Full-time] Mode>

- In Non-Display [Full-time] Mode, the display will be turned off and the Keys will be locked.
- Decimal point LED shown in the figure below will light up during Non-Display [Full-time] Mode.
- Using the EEPROM, PG-30/35 series can retain the preset values even if the power is turned off.
- If an error message is detected, the display will comeback and show the error message.
- You cannot change any functions during Non-Display [Full-time] Mode.

(How to set)



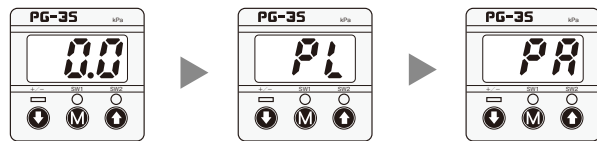
- To enable Non-Display [Full-time] Mode, press **M** key for more than 4 seconds. **COF** will be displayed and Non-Display [Full-time] Mode will be set. Display will turn off in a second.
- To disable Non-Display [Full-time] Mode, press **M** key for more than 4 seconds. **L0n** will be displayed and Non-Display [Full-time] Mode will be canceled.

Key Protection Mode

<Key Protection Mode>

- Key Protection Mode is used to lock the front panel key in order to prevent preset values from being accidentally changed.
- Using EEPROM, the PG-30/35 series can retain the preset values even if the power is turned off.

(How to set)

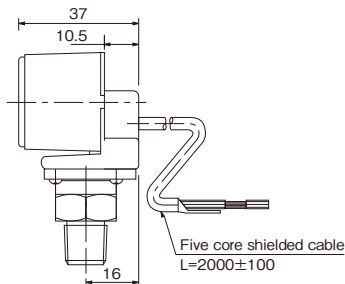
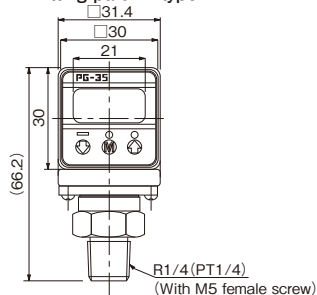


- To enable Key Protection Mode, press **M** key for more than 4 seconds. **PL** will be displayed and the keys will be locked.
- To disable Key Protection Mode, press **M** key for more than 4 seconds. **PR** will be displayed and the keys will be unlocked.

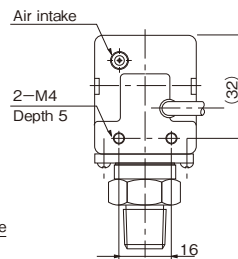
Outline Dimensions

PG-35 Outline Dimensions

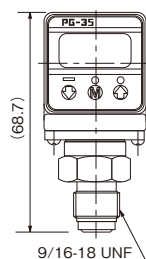
Fitting part: R2 type



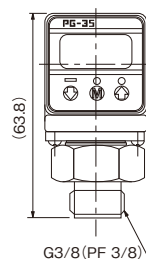
Unless otherwise specified tolerance : ± 0.5 (Unit:mm)



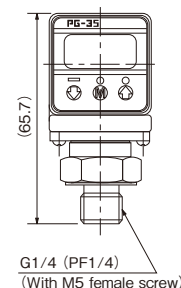
Fitting part: VC type



Fitting part: GF type

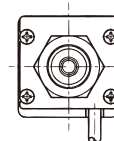
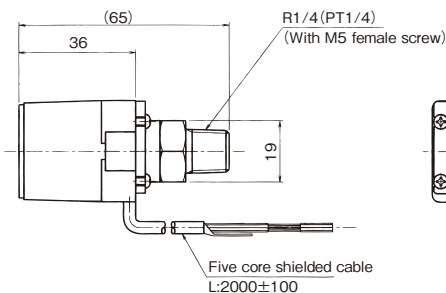
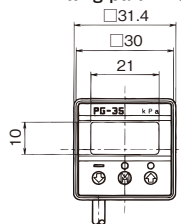


Fitting part: G2 type

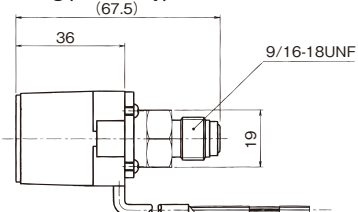


PG-35-B Outline Dimensions

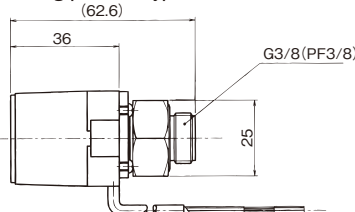
Fitting part: R2 type



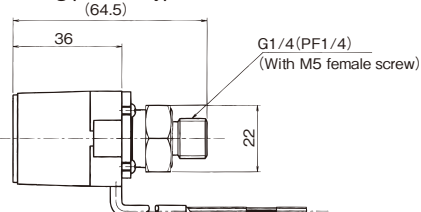
Fitting part: VC type



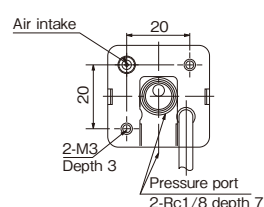
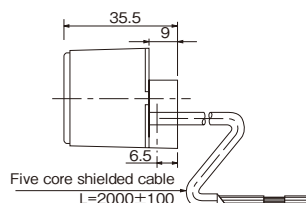
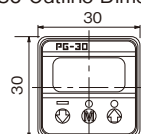
Fitting part: GF type



Fitting part: G2 type

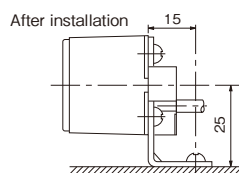
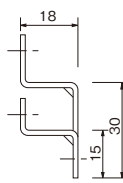
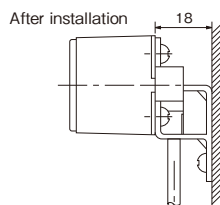
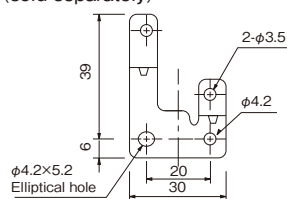


PG-30 Outline Dimensions

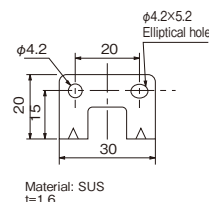
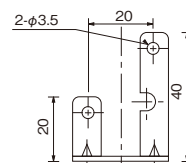


Brackets (Option)

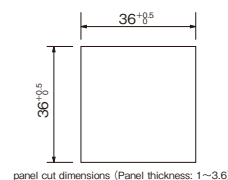
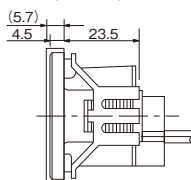
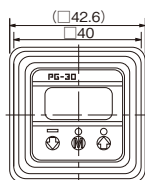
■PG30 bracket for wall attachment (sold separately)



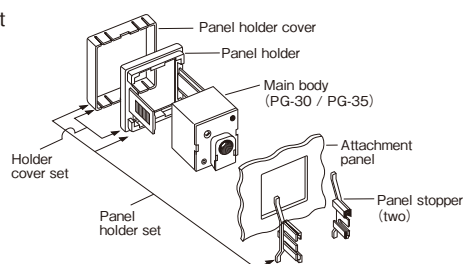
■PG-30 bracket for floor attachment (sold separately)



■PG-35/PG-30 Panel holder set · holder cover (sold separately)



Panel holder set



■Accessories (Sold separately)

Product name	Model no.	Description	Applicable model
Bracket for wall attachment	ACPG-001	Bracket for wall attachment, two M3×4 male screws	PG-30
Bracket for floor attachment	ACPG-002	Bracket for floor attachment, two M3×4 male screws	PG-30
Panel holder set	ACPG-003	Panel holder cover, panel holder, two panel stoppers	PG-30 PG-35
Holder cover set (for protection of gauge sides)	ACPG-004	Panel holder cover, panel holder	PG-30 PG-35
Holder stopper set	ACPG-007	Panel holder, panel stopper(2pcs.)	PG-30 PG-35

Warranty and Disclaimer

- 1) The warranty period of these products is one year after delivery to a designated place. The warranty mentioned here is limited to the warranty of a delivered product itself, and it does not cover consumables such as batteries. Each product has its own specifications such as durability (pressure cycles). Therefore, check with each service office.
- 2) If a failure or damage of the product occurs during the warranty period, for which we are responsible, we will promptly replace or repair the product free of charge. The warranty mentioned here means the warranty of the product itself and does not cover any damage induced by a failure of the product.
- 3) The warranty does not cover when any of the following items is applicable:
 - The failure is caused by conditions, environments, or handling not described in the catalogue and agreed specifications and other documents.
 - The product has been modified, adjusted, or repaired by a person/company other than our company after delivery.
 - The failure cannot be foreseen by the scientific and technological knowledge at the time of delivery.
 - The failure is caused by force majeure such as disasters.

Model Numbers

Pressure ranges 101 : -10to10kPa (PG-30 only) 102 : -100to100kPa(0~100kPa for absolute pressure type) 103 : -100to1000kPa	PG-35-102 R-N R2 B	Fitting part types(PG-35 only) R2 : R1/4 (With M5 female screw) GF : G3/8 (Flash diaphragm type) G2 : G1/4 (With M5 female screw) VC : 9/16-18 UNF (Gasket fitting)
Model names PG-30 : Non-corrosive gas type PG-35 : High corrosion resistance type	Pressure reference R : Compound pressure (negative pressure~positive pressure) A : Absolute pressure (absolute vacuum~barometric pressure) [PG-35 only]	Port Blank : Stem mount B : Back mount
	Switch output type N : NPN open collector P : PNP open collector	