

Nidec

HIGH VACUUM CORRESPONDENCE
SMALL SIZE PRESSURE GAUGE

PG-35L

CE marking
(Compliance with EMC Standards)

UK
CA

INSTRUCTION MANUAL Ver.3.0

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

Nishi-Shinjuku Prime Square bldg., 7-5-25
Nishi-Shinjuku, Shinjuku-ku, Tokyo 160-0023, Japan
Phone: +81-3-3364-7055 Fax: +81-3-3364-7098
URL: <https://www.nidec-components.com>

Important Information and Warnings



This caution mark describes when there is a possibility that user may suffer from damage or physical damage may occur if the product is used improperly.



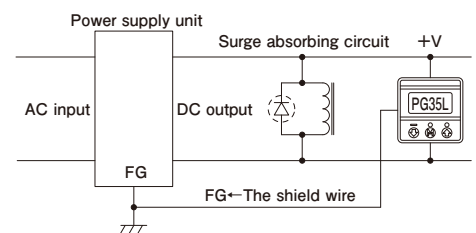
CAUTION

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 The type of pressure media for PG-35L should be used liquid and gas that don't corrode for SUS316L.
- ② 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-35L.
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.
- ③ Be careful not to crimp any wires during handling, or put any pressure on the display area of the main body while assembling piping.
- ④ Use pH neutral detergents to clean the body. Do not use solvents such as thinners.
- ⑤ This product is dust proof and drip proof (IP65 of IEC standards) and is not suitable for use in environments requiring higher standards.
Also, do not use this product in an environment with a possibility of product being covered by liquids other than water (Such as oil, solvent, and etc.) and outdoor.
- ⑥ 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.
- ⑦ Do not insert wires, etc. in the pressure port, as this may damage the internal diaphragm and cause malfunctioning.
- ⑧ gasket type:
Do not touch or scratch the edge of the fitting, as this may damage the sealing and cause leakage.
- ⑨ The PG-35L do not have an explosion proof structure. Do not use it for the detection of flammable gases.
- ⑩ When analog output is supplied to a noise-sensitive device, a low-pass filter is requested in a customer's circuit.
- ⑪ Countermeasures for noise interference:
Please connect either the shield wire or the metal part of the product to frame ground (FG) of the power source.
- ⑫ In case a wire extension is needed, please use a shielded wire.

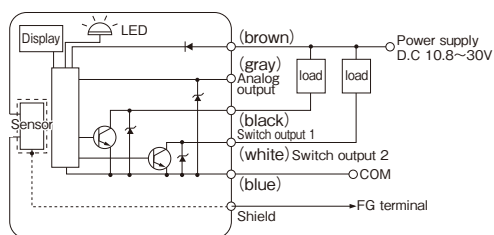


Specifications

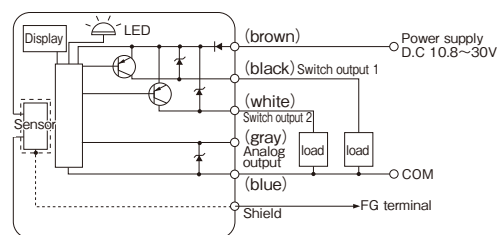
Model		PG-35L	
		102R	103R
Type		Gauge pressure	
Rated pressure range		−100~100kPa	−100~1000kPa
Maximum pressure		200kPa	1500kPa
Break-down pressure		300kPa	2000kPa
Acceptable media		Liquids or gases that do not corrode SUS316L	
Operating voltage		10.8~30VDC (including ripple)	
Current consumption		50mA maximum	
Switch outputs	Two outputs NPN/PNP:Transistor open collector Switch rating: 30VDC100mA 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.	
	Output mode	Pressure range Pin(L) ~Pin(H)	
	R	−100~100kPa	−100~1000kPa
	G	0~100kPa	0~1000kPa
	V	0~−100kPa	
	Output mode	Output voltage accuracy Vzero (upper) / Vspan (Lower) (Vzero : Pin=0, Vspan : Pin=0~Pin(H))	
	R	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	
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	50MΩ minimum at DC125V between bundled leads and pressure port	
	Dielectric strength	One minute at DC125V 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/s, 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℃)	
Enclose liquid		Nonexistence	
Fitting part types		R1/4, G1/4, gasket fitting 9/16-18UNF	
Materials at pressure receiving area		SUS316L	
Net Weight		150±30g (incl. 2m cable)	
Accessories		O-ring (G1 / 4 : P15)	

Output Electrical Diagram (Wire Colors correspond to IEC standards)

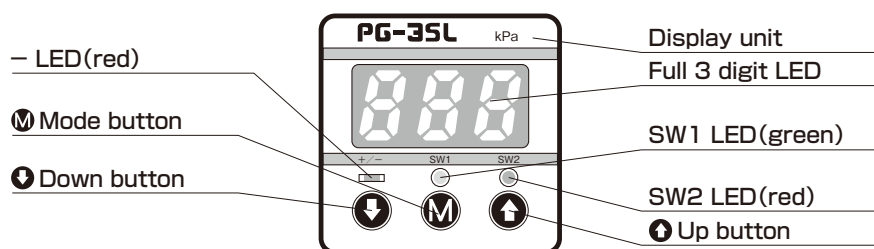
NPN Open Collector Output Model



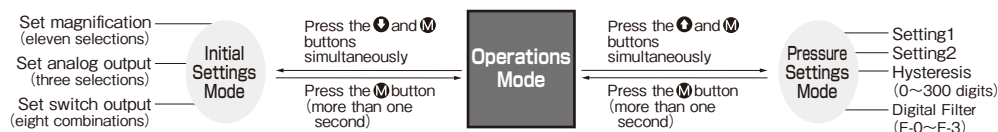
PNP Open Collector Output Model



Function Names

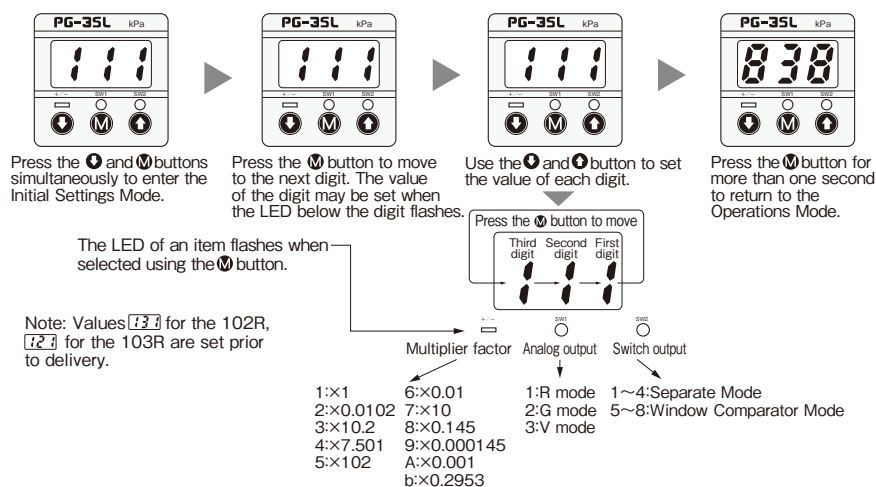


Operating Procedures



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

Initial Settings Mode



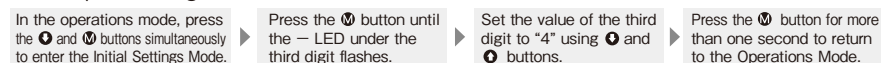
Multiplier factor Setting

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

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

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.

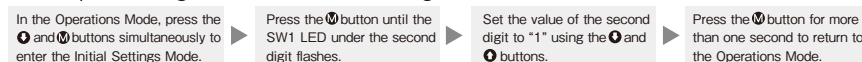
※Change of magnification setting is effective only for pressure reading. Set values for switching are not scaled automatically.

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		
		←		→
1	R mode (Compound pressure output)	1V	----- (Vzero) -----	5V
2	G mode (Positive pressure output)		1V	----- 5V
3	V mode (Negative pressure output)	5V	----- 1V	

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



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

Switch Output Setting

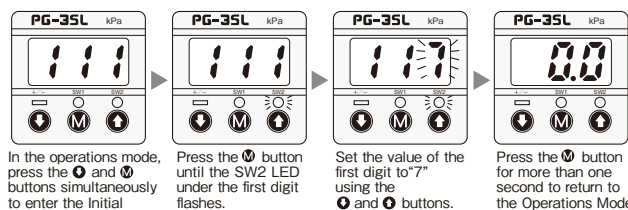
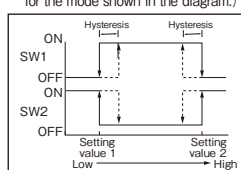
The switch output setting is determined by the value of the first digit : the red SW2 LED should be flashing during the setting.

Value selected	Output Mode		SW1 output				SW2 output			
			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: Setting 1 Maximum: Setting 2		Setting 2		Minimum: Setting 1 Maximum: Setting 2	
			Note 1		Note 2		Note 1		Note 2	

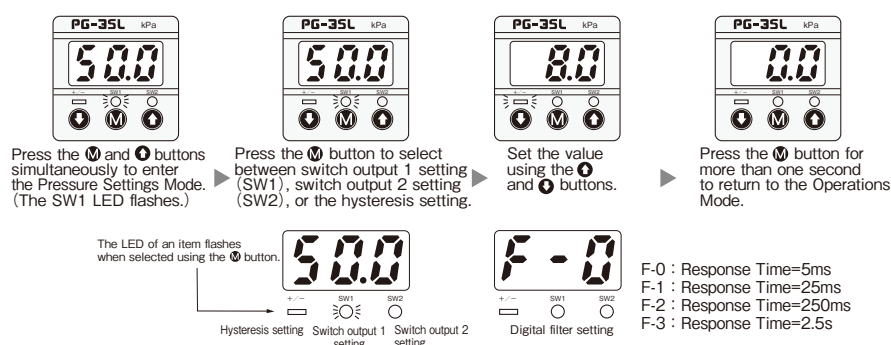
Note 1. In the Separate Mode, setting 1 corresponds to SW1, and Setting 2 corresponds to SW2.

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.

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.



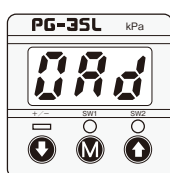
Note:"F-0"is set prior to delivery.

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



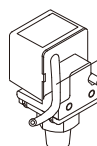
Pressing **F** the **M** and buttons simultaneously in the Operations Mode displays **0.00** on the screen. One second later this change to **0** than the **F** and **M** buttons are released.(If the pressure port is opened to the atmosphere.)

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.

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.



Example of a tube with external diameter of $\phi 4$ and internal diameter of $\phi 2.5$

Piping

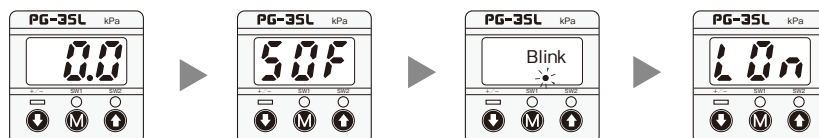
Use a wrench on a hexagon of fitting part. Do not hold the main body when tightening.

■ 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-35L 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)

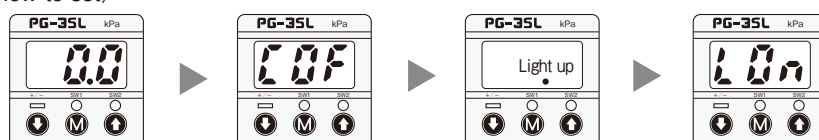


- To enable Non-Display [Temporary] Mode, press **M** key for more than 4 seconds. **50F** will be displayed and Non-Display [Temporary] Mode will be set. After 10 seconds, display will go off.
- To disable Non-Display [Temporary] Mode, press **M** key for more than 4 seconds. **LOn** will be displayed 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, the PG-35L 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)



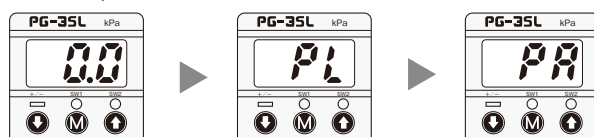
- To enable Non-Display [Full-time] Mode, press **M** key for more than 4 seconds. **COf** will be displayed and Non-Display [Full-time] Mode will be set. Display will turn off in a second.
- To disable Non-Display [Full-time] Mode, press **M** key for more than 4 seconds. **LOn** will be displayed and 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-35L can retain the preset values even if the power is turned off.

(How to set)

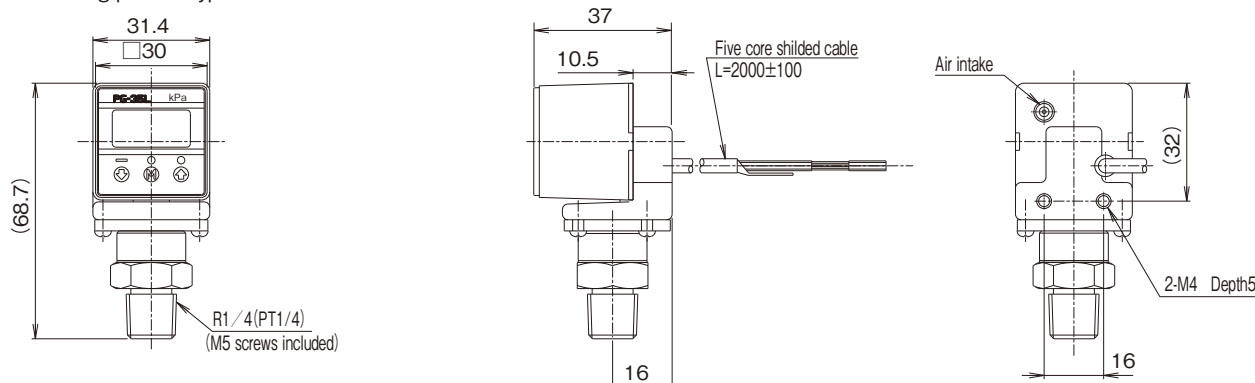


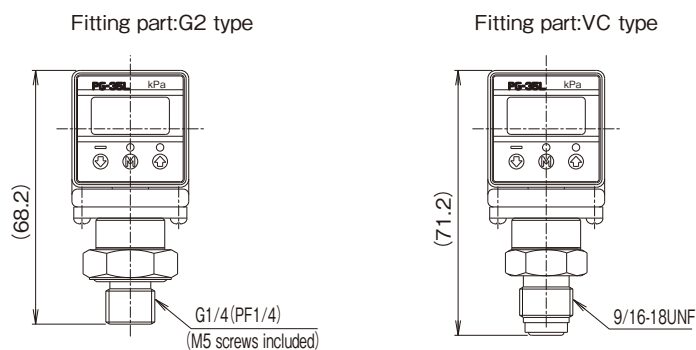
- To enable Key Protection Mode, press **M** key for more than 4 seconds. **PL** will be displayed and the keys will be locked.
- To disable Key Protection Mode, press **M** key for more than 4 seconds. **PR** will be displayed and the keys will be unlocked.

Outline Dimensions (Unit : mm)

■ PG-35L Outline Dimensions

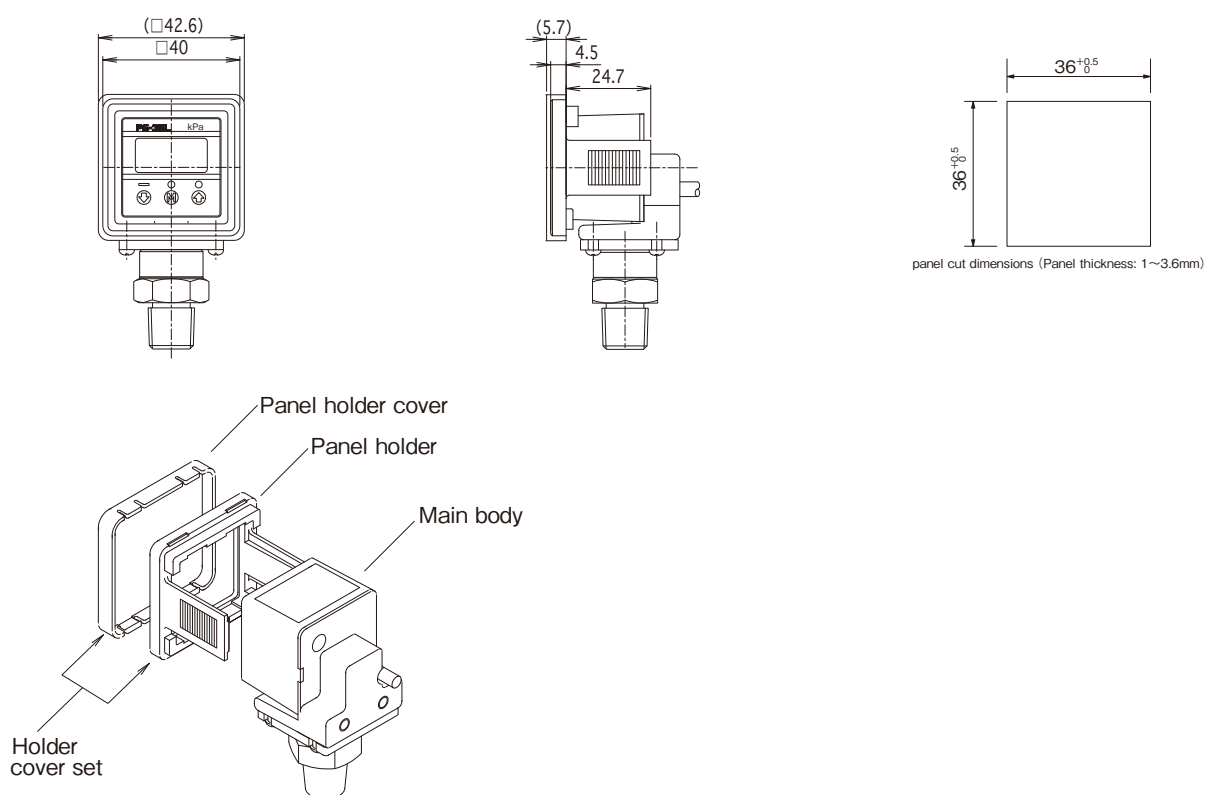
Fitting part: R2 type





Brackets (Option)

■ PG-35L Holder cover set (sold separately)



■ Accessories (Sold separately)

Name	Series name	Contents	Applicable model
Panel holder set	ACPG-003	Panel holder cover Panel holder Panel stopper (2pcs.)	PG-30 · PG-35 · PG-75 PG-35H · PG-35L · PS30
Holder cover set (For protecting gauge operating panel)	ACPG-004	Panel holder cover Panel holder	PG-30 · PG-35 · PG-75 PG-35H · PG-35L · PS30
Holder stopper set	ACPG-007	Panel holder Panel stopper (2pcs.)	PG-30 · PG-35 · PG-75 PG-35H · PG-35L · PS30

(Note) Since this product contains small components, please handle this product carefully.
Product can be damaged if an unwanted force is applied.

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

