Head-separated Dual Display Digital Pressure Sensor **For Liquid & Gas**

DPC-L100 SERIES DPH-L100 SERIES

Related Information
■ General terms and conditions..... F-17
■ Glossary of terms ..... P.1373~
■ Sensor selection guide ..... P.661~
■ General precautions..... P.1405

NEW

panasonic-electric-works.net/sunx

CE Conforming to EMC Directive

LCD Digital
AUTO Auto reference
With analog output

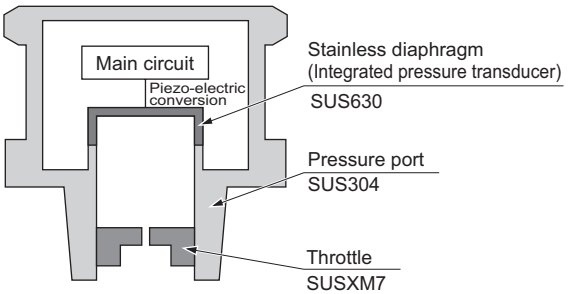
High-precision detection of fluid and air pressure

Allows high-precision fluid pressure management

The analog voltage output of the sensor head can achieve a high-precision sensing of ±1 % F.S. (at a normal temperature of 23 °C 73.4 °F).

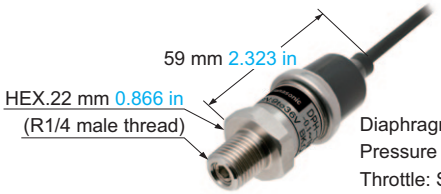
Oil-less single-layer diaphragm

Oil is not encapsulated in the diaphragm of the pressure sensing portion. No need to worry that oil will leak into the medium when the sensor head is damaged.



Compact stainless body

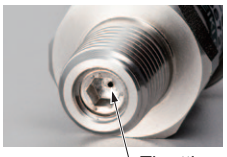
Compact size of HEX. 22 × 59 mm 0.866 × 2.323 in (excluding the screws). The body is also stainless so it can be used in various environments.



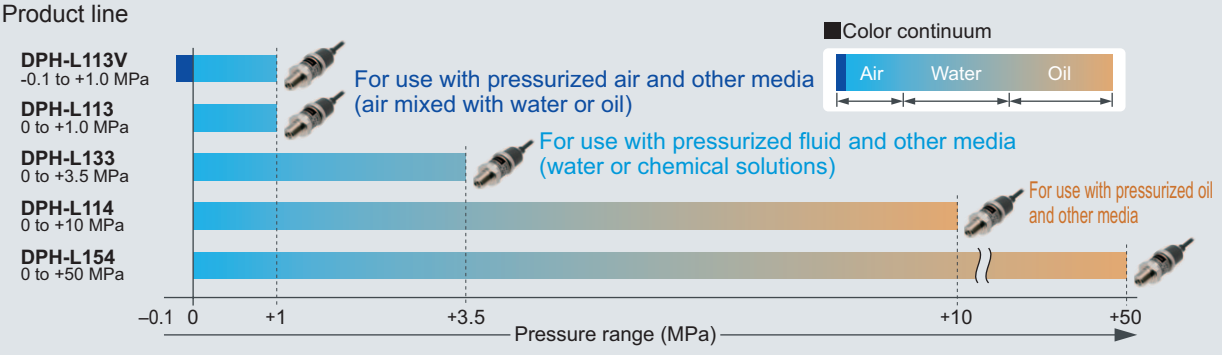
Diaphragm: SUS630
Pressure port: SUS304
Throttle: SUSXM7

Strong against pressure surges from throttle loading

Controls pressure surges and reduces sensor failure.



Product line



APPLICATIONS

Transport of glass sheets after washing

Management of plastic filling machine pressure

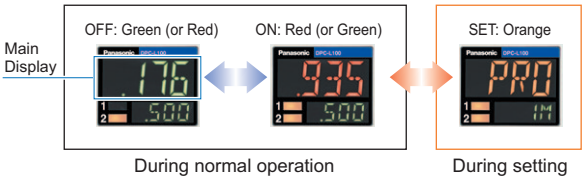
Management of press pressure

The dual display means that the “current value” and the “threshold value”, it makes direct setting of threshold value

Equipped with a 30 mm 1.181 in square compact-sized dual display. Because the current value and the threshold value can be checked at the same time, the threshold value can be set and checked smoothly without having to switch screen modes. ON / OFF operations are still carried out while the threshold values are being set, so setting to the same sensitivity as dial control-type sensors is possible. And naturally a key lock function is also equipped.

3-color display (Red, Green, Orange)

The main display changes color in line with changes in the status of output ON / OFF operation, and it also changes color while setting is in progress. The sensor status can therefore be understood easily, and operating errors can be reduced.



Equipped with new functions optimal for fluid pressure

Equipped with functions optimal for fluid pressure management while inheriting the operability of the **DP-100** series.

• Peak / Bottom hold 2 (output-linked)

When output turns on (or off), the controller’s digital display (current value) is reset and peak / bottom hold operation starts. For example, this functionality could be used to verify the peak pressure for an industrial press each time a workpiece is loaded.

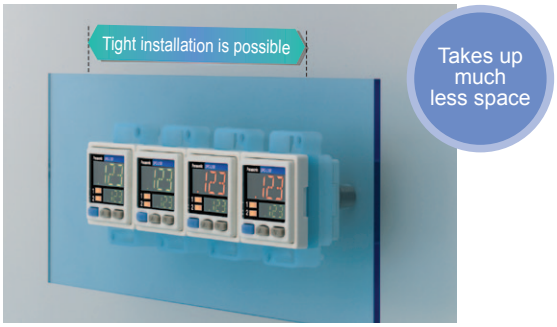
• Current value hold

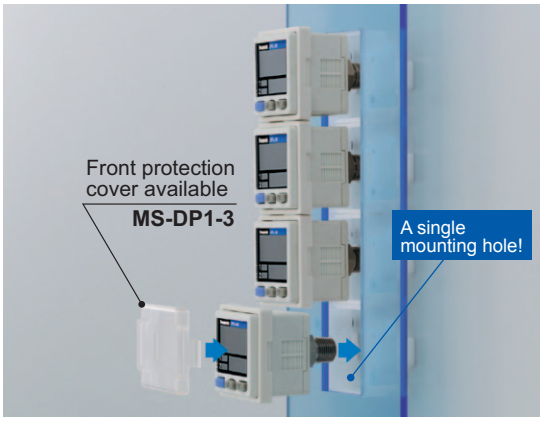
The controller’s digital display (current value) is held while external input is on. By activating external input the moment you wish to capture the pressure value, you can pause and verify the display.

MOUNTING

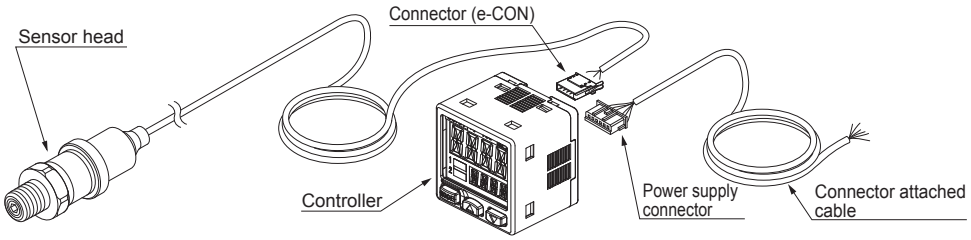
Tight installation to panels is possible

An exclusive mounting bracket **MS-DP1-2** that is suitable for 1 to 6 mm 0.039 to 0.236 in panel thickness is available.





PRODUCT CONFIGURATION



ORDER GUIDE

Sensor heads

Type	Appearance	Rated pressure range	Model No.	Pressure port	Applicable fluid
Compound pressure		-0.1 to +1.0 MPa	**DPH-L113V**	R1/4 male thread	Gases and fluids that do not corrode stainless steel SUS304, SUS630, or SUSXM7
Positive pressure		0 to +1.0 MPa	**DPH-L113**		
		0 to +3.5 MPa	**DPH-L133**		
		0 to +10 MPa	**DPH-L114**		
		0 to +50 MPa	**DPH-L154**		

Controllers

Appearance	Model No.	Comparative output
 * **CN-66A-C2** (Connector attached cable 2 m 6.562 ft) is attached.	**DPC-L101**	NPN open-collector transistor
	DPC-L101-P	PNP open-collector transistor

Type without connector attached cable

Type without connector attached cable is available. When ordering this type, suffix "**-J**" to the Model No.
(e.g.) Type without connector attached cable of **DPC-L101-P** is "**DPC-L101-P-J**".

Accessory

• **CN-66A-C2** (Connector attached cable 2 m 6.562 ft)

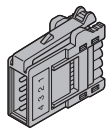
OPTIONS

Designation	Model No.	Description	
Sensor head connector (e-CON)	**CN-EP2** (Note 1) 5 pcs. per set	Connector for connecting sensor head controller	
Connector attached cable	**CN-66A-C2** (Note 2)	Length 2 m 6.562 ft	Controller power supply I/O cable. 0.2 mm² 6-core oil-resistant cabtyre cable with connector
	CN-66A-C5	Length 5 m 16.404 ft	
Power supply connector	**CN-66A** 5 pcs. per set	Connector for controller power supply I/O cable.	
Controller mounting bracket	**MS-DP1-6**	Allows sensors to be installed on the wall. Multiple sensors can also be mounted closely.	
Panel mounting bracket	**MS-DP1-2**	Allows installation to panels with thickness of 1 to 6 mm 0.039 to 0.236 in. Multiple sensors can also be mounted closely.	
Front protection cover	**MS-DP1-3**	Protects the adjustment surfaces of controllers. (Can be attached when using the panel mounting bracket)	
Copy unit (Note 3)	**SC-SU1**	Copies controller setting details to other controllers.	

Notes: 1) One is attached to each sensor head according to standard.
2) The connector attached cable **CN-66A-C2** is supplied with the controller according to standard.
3) Fur further details, refer to the copy unit **SC-SU1** pages.

Sensor head connector (e-CON)

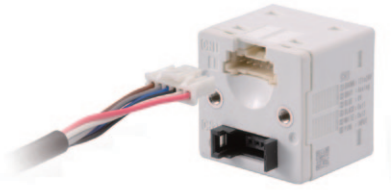
• **CN-EP2**



Note: One is attached to each sensor head according to standard.

Connector attached cable

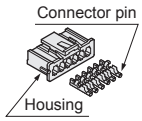
• **CN-66A-C2**
• **CN-66A-C5**



Note: The connector attached cable **CN-66A-C2** is supplied with the controller according to standard.

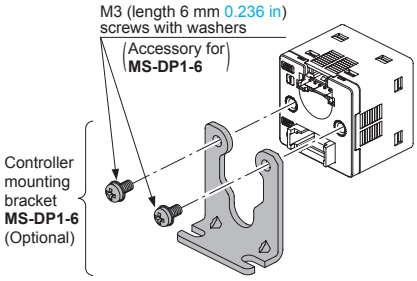
Power supply connector

• **CN-66A**



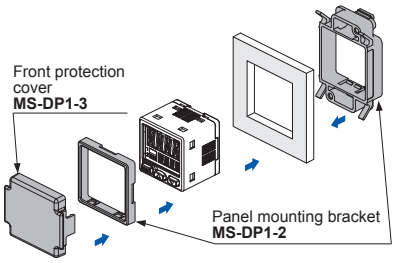
Controller mounting bracket

• **MS-DP1-6**



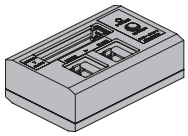
Panel mounting bracket, Front protection cover

• **MS-DP1-2**
• **MS-DP1-3**



Copy unit

• **SC-SU1**



Recommended e-CON

Model No.: 1473562-4 (Manufactured by Tyco Electronics)
Note: Contact the manufacturer for details of the recommended products.

Recommended power supply connector

Contact: SPHD-001T-P0.5, Housing: PAP-06V-S (Manufactured by J.S.T. Mfg. Co., Ltd.)
Note: Contact the manufacturer for details of the recommended products.

Recommended crimping tool

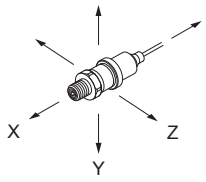
Model No.: YC-610R (Manufactured by J.S.T. Mfg. Co., Ltd.)
Note: Contact the manufacturer for details of the recommended products.

SPECIFICATIONS

Sensor heads

Item \ Type		Compound pressure	Positive pressure			
		-0.1 to 1 MPa type	1 MPa type	3.5 MPa type	10 MPa type	50 MPa type
Model No.		**DPH-L113V**	**DPH-L113**	**DPH-L133**	**DPH-L114**	**DPH-L154**
Type of pressure		Sealed gauge pressure (Note 4)				
Rated pressure range		-0.1 to +1 MPa	0 to +1 MPa	0 to +3.5 MPa	0 to +10 MPa	0 to +50 MPa
Pressure withstandability		2 MPa	2 MPa	7 MPa	20 MPa	75 MPa
Applicable fluid		Gases and fluids that do not corrode SUS630, SUS304, or SUSXM7				
Supply voltage		9 to 36 V DC [9 to 32 V DC when using the attached connector (e-CON)]				
Analog voltage output		Output voltage: 1 to 5 V DC (over rated pressure range) Accuracy: ±1.0 % F.S. (at 23 ±2 °C +73.4 ±35 °F) ±2.0 % F.S. (at -20 to 70 °C -4 to +158 °F) (including linearity, hysteresis and repeatability)			Output voltage: 1 to 5 V DC (over rated pressure range) Accuracy: ±1.0 % F.S. (at 23 ±2 °C +73.4 ±35 °F) ±2.0 % F.S. (at -20 to 125 °C -4 to +158 °F) (including linearity, hysteresis and repeatability)	
Environmental resistance	Protection	IP67 (IEC)				
	Ambient temperature	-20 to +70 °C -4 to +158 °F (No dew condensation allowed), Storage: -30 to +70°C -22 to +158 °F			-20 to +80 °C -4 to +176 °F (Pressure port: -20 to +125 °C -4 to +257 °F, No dew condensation allowed),Storage: -30 to +100 °C -22 to +212 °F e-CON connector (accesory): -20 to +75 °C -4 to +167 °F (Storage: -30 to +75 °C -22 to +167 °F)	
	Ambient humidity	35 to 85 % RH, Storage: 35 to 85 % RH				
	Medium temperature range	-20 to +70 °C -4 to +158 °F			-20 to +125 °C -4 to +257 °F	
	Voltage withstandability	150 V AC for one min. between all supply terminals connected together and enclosure				
	Insulation resistance	100 MΩ, or more, with 50 V DC megger between all supply terminals connected together and enclosure				
	Vibration resistance	10 to 2,000 Hz frequency, acceleration 200 m/s², in X derection for four hours, in Y and Z directions for two hours each (Note 5)				
	Shock resistance	1,000 m/s² acceleration in X, Y and Z directions for three times each				
Grounding method		Capacitor earth (Enclosure-supply terminal)				
Pressure port		R1/4 male thread (throttle embeded)				
Material		Diaphragm: Stainless steel (SUS630), Pressure port: Stainless steel (SUS304), Throttle: Stainless steel (SUSXM7)				
Connecting method		Connector				
Cable		0.2 mm² 3-core heat resistant cabtyre cable 2 m 3.562 ft long				
Cable extension		Extension up to total 10 m 32.808 ft is possible with 0.2 mm², or more, cable.				
Weight		Net weight: 100 g approx., Gross weight: 150 g approx.				
Accessory		Connector (e-CON): 1 pc.				

Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +23 °C +73.4 °F.
2) The sensor head can be used independently.
3) Oil is used in the factory inspection process for models **DPH-L114** and **DPH-L154**. There may be some residual oil inside the pressure port.
4) The sensor's internal mechanism is sealed based on an air pressure of 1,013 hPa.
5) The X, Y, and Z directions are defined as follows:



SPECIFICATIONS

Controllers

Item	Model No.	DPC-L101				
	NPN output					
	PNP output	DPC-L101-P				
Applicable sensor head		**DPH-L113V**	**DPH-L113**	**DPH-L133**	**DPH-L114**	**DPH-L154**
Rated pressure range		-0.1 to +1 MPa	0 to +1 MPa	0 to +3.5 MPa	0 to +10 MPa	0 to +50 MPa
Set pressure range		-1.177 to +1.177 MPa -12.00 to +12.00 kgf/cm² -11.77 to +11.77 bar -170.6 to +170.6 psi	-1.070 to +1.070 MPa -10.91 to +10.91 kgf/cm² -10.70 to +10.70 bar -155.2 to +155.2 psi	-3.74 to +3.74 MPa -38.1 to +38.1 kgf/cm² -37.4 to +37.4 bar -542 to +542 psi	-10.70 to +10.70 MPa -109.1 to +109.1 kgf/cm² -107.0 to +107.0 bar -1552 to +1552 psi	-53.5 to +53.5 MPa -545 to +545 kgf/cm² -535 to +535 bar -1980 to +7760 psi
Set resolution		0.001 MPa	0.001 MPa	0.01 MPa	0.01 MPa	0.1 MPa
Display		4 digits +4 digits 3-color LCD display (Display refresh rate: 250 ms, 500 ms, 1,000 ms, selectable by key operation)				
	Displayable pressure range	-0.155 to +1.022 MPa -1.58 to +10.42 kgf/cm² -1.55 to +10.22 bar -22.4 to +148.2 psi	-0.050 to +1.020 MPa -0.51 to +10.40 kgf/cm² -0.50 to +10.20 bar -7.2 to +148.0 psi	-0.17 to +3.57 MPa -1.7 to +36.4 kgf/cm² -1.7 to +35.7 bar -24 to +518 psi	-0.50 to +10.20 MPa -5.1 to +104.0 kgf/cm² -5.0 to +102.0 bar -72 to +1480 psi	-2.5 to +51.0 MPa -25 to +520 kgf/cm² -25 to +510 bar -360 to +7400 psi
Supply voltage		12 to 24 V DC ±10 % Ripple P-P 10 % or less				
Power consumption		Normal operation: 960 mW or less (Current consumption 40 mA or less at 24 V supply voltage) ECO mode (STD): 720 mW or less (Current consumption 30 mA or less at 24 V supply voltage) ECO mode (FULL): 600 mW or less (Current consumption 25 mA or less at 24 V supply voltage) Excluding the current consumption of sensor head and analog output current				
Comparative outputs (Comparative output 1, 2)		<NPN output type> NPN open-collector transistor (2 outputs) • Maximum sink current: 50 mA • Applied voltage: 30 V DC or less (between comparative output and 0 V) • Residual voltage: 1 V or less (at 50 mA sink current)		<PNP output type> PNP open-collector transistor (2 outputs) • Maximum source current: 50 mA • Applied voltage: 30 V DC or less (between comparative output and +V) • Residual voltage: 1 V or less (at 50 mA source current)		
	Output operation	NO / NC, selectable by key operation				
	Output modes	EASY mode / Hysteresis mode / Window comparator mode				
	Hysteresis	Minimum 1 digit (variable) (however, 2 digits when using psi unit)				
	Repeatability	Within ±0.2 % F.S.				
	Response time	5 ms, 10 ms, 25 ms, 50 ms, 100 ms, 250 ms, 500 ms, 1,000 ms, 5,000 ms, selectable by key operation				
	Short-circuit protection	Incorporated				
Analog output		<Analog voltage output> • Output current: 1 to 5 V DC • Zero point: within 1 V ±0.5 % F.S. (excluding **DPH-L113V**) within 1.364 V ±0.5 % F.S. (**DPH-L113V**) • Span: within 4 V ±0.5 % F.S. • Linearity: within ±0.1 % F.S. • Output impedance: 1 kΩ approx.		<Analog current output> • Output current: 4 to 20 mA • Zero point: within 4 mA ±1.0 % F.S. (excluding **DPH-L113V**) within 5.455 mA ±1.0 % F.S. (**DPH-L113V**) • Span: within 16 mA ±1.5 % F.S. • Linearity: within ±0.1 % F.S. • Load resistance: 250 Ω (max.)		
Inputs	Sensor head input	Input voltage range: 1 to 5 V DC (over rated pressure range)				
	External input	<NPN output type> ON voltage: 0.4 V DC or less OFF voltage: 5 to 30 V DC, or open Input impedance: 10 kΩ approx. Input time: 1 ms or more		<PNP output type> ON voltage: 5 V to +V DC OFF voltage: 0.6 V DC or less, or open Input impedance: 10 kΩ approx. Input time: 1 ms or more		
Operation indicator		Orange LED (Comparative output 1 operation indicator, comparative output 2 operation indicator: Lights up when each comparative output is ON)				
Environmental resistance	Protection	IP40 (IEC)				
	Ambient temperature	-10 to +50 °C +14 to +122 °F (No dew condensation or icing allowed), Storage: -10 to +60 °C +14 to +140 °F				
	Ambient humidity	35 to 85 % RH, Storage: 35 to 85 % RH				
	Voltage withstandability	500 V AC for one min. between all supply terminals connected together and enclosure				
	Insulation resistance	50 MΩ, or more, with 500 V DC megger between all supply terminals connected together and enclosure				
	Vibration resistance	10 to 500 Hz frequency, amplitude 3 mm 0.118 in or maximum acceleration 196 m/s², in X, Y and Z directions for two hours each (when panel mounting bracket is mounted: 10 to 150 Hz frequency, amplitude 0.75 mm 0.030 in or maximum acceleration 49 m/s², in X, Y and Z directions for two hours each)				
	Shock resistance	100 m/s² acceleration in X, Y and Z directions for three times each				
Temperature characteristics		Within ±0.5 % F.S. (ambient temperature range based on +20 °C +68 °F)				
Material		Enclosure: PBT (glass fiber reinforced), LCD display: Acrylic, Mounting threaded part: Brass (nickel plated), Switch part: Silicone rubber				
Connecting method		Connector				
Cable length		Total length up to 100 m 328.1 ft (less than 30 m 98.4 ft when conforming to CE marking) is possible with 0.3 mm², or more, cable.				
Weight		Net weight: 25 g approx. (excluding connector attached cable), Gross weight: 140 g approx.				
Accessories		**CN-66A-C2** (Connector attached cable 2 m 6.562 ft), Pressure unit label: 1 set				

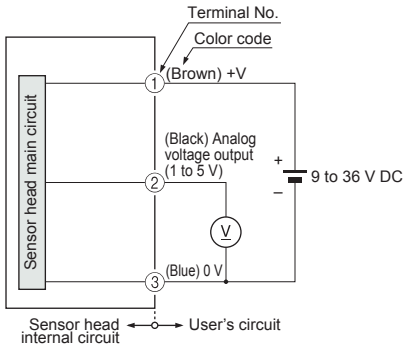
Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +20 °C +68 °F.
2) The values specified above are applied only to the controller.

I/O CIRCUIT AND WIRING DIAGRAMS

DPH-L1□

For independent use of sensor head

I/O circuit diagram

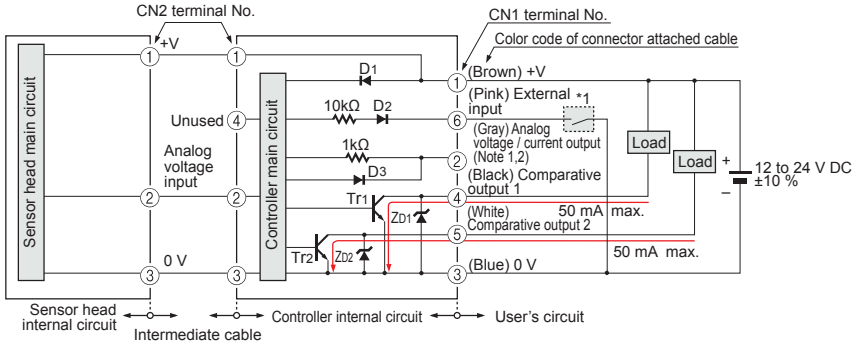


Notes: 1) When the sensor head is used independently, devices connected to the analog output must have an input impedance set at 10 kΩ or more and load capacity 1,000 pF or less.
2) No short-circuit protection circuit is provided for analog voltage output. Do not connect directly to a power supply.
3) The pressure port and internal circuitry are connected by a capacitor. Do not apply voltage in excess of the specifications' dielectric strength between the pressure port and wiring.
4) The transparent tube attached to the cable is not used and should be cut off at the base.

DPC-L101

NPN output type

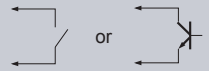
I/O circuit diagram



Notes: 1) Set the output load resistance during analog current output to 250 Ω (max.).
2) Note that a voltage of 5 V or higher is generated during analog current output.

Symbols …
D_1 to D_3 : Reverse supply polarity protection diode
Z_{D1}, Z_{D2} : Surge absorption zener diode
Tr_1, Tr_2 : NPN output transistor

*1
Non-voltage contact or NPN open-collector transistor

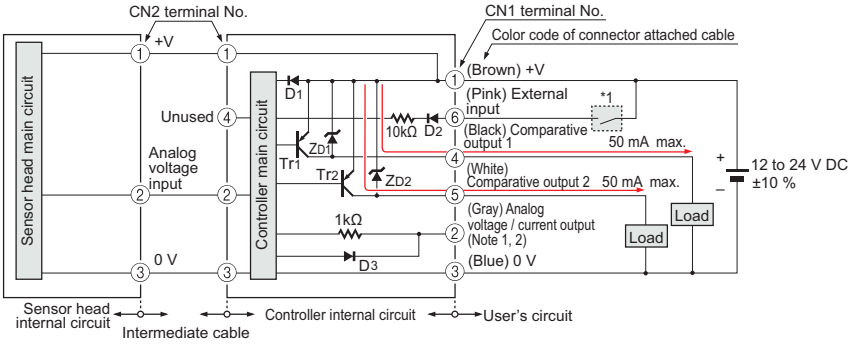


High (5 to 30 V DC, or open): Invalid
Low (0.4 V DC or less): Valid

DPC-L101-P

PNP output type

I/O circuit diagram



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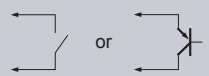
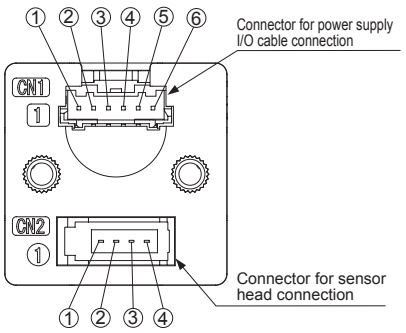


High (5 to +V DC, or open): Invalid
Low (0.6 V DC or less, or open): Valid

Terminal arrangement diagram



Connector for power supply I/O cable (CN1)

① +V
② Analog voltage / current output
③ 0 V
④ Comparative output 1
⑤ Comparative output 2
⑥ External input
(auto-reference function / remote zero-adjustment function / current value hold function)

Connector for sensor head (CN2)

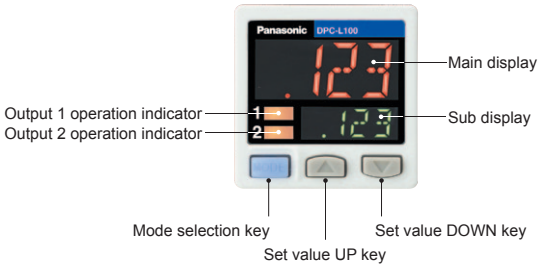
① Sensor head supply voltage
② Analog voltage input
③ 0 V
④ Unused

PRECAUTIONS FOR PROPER USE

Refer to General precautions.

- Never use this product as a sensing device for personnel protection.
- In case of using sensing devices for personnel protection, use products which meet laws and standards, such as OSHA, ANSI or IEC etc., for personnel protection applicable in each region or country.
- The **DPH-L100** series is designed for use with air and non-corrosive gas. It cannot be used with liquid or corrosive and inflammable gases.

Part description



Wiring

- Make sure that the power supply is off while wiring.
- Verify that the supply voltage variation is within the rating.
- If power is supplied from a commercial switching regulator, ensure that the frame ground (F.G.) terminal of the power supply is connected to an actual ground.
- In case noise generating equipment (switching regulator, inverter motor, etc.) is used in the vicinity of this sensor, connect the frame ground (F.G.) terminal of the equipment to an actual ground.
- Do not run the wires together with high-voltage lines or power lines or put them in the same raceway. This can cause malfunction due to induction.
- Incorrect wiring will cause problems with operation.

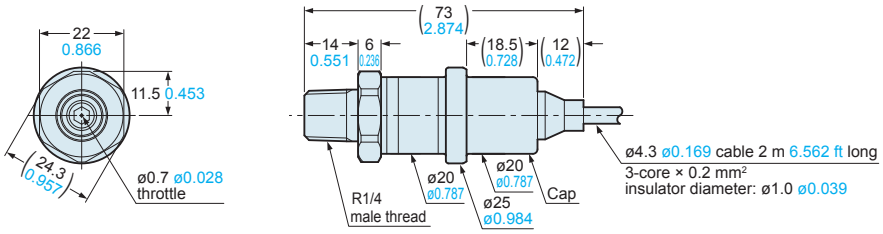
Others

- Never remove the throttle.
- Use within the rated pressure range.
- Do not apply pressure exceeding the pressure withstandability value. The diaphragm will get damaged and correct operation shall not be maintained.
- Do not use during the initial transient time (controller: 0.5 sec. approx, sensor head: 50 ms approx.) after the power supply is switched on.
- Avoid dust, dirt, and steam.
- Take care that the sensor does not come in direct contact with water, oil, grease, or organic solvents, such as, thinner, etc.
- Do not insert wires, etc., into the pressure port. The diaphragm will get damaged and correct operation shall not be maintained.
- Do not operate the keys with pointed or sharp objects.

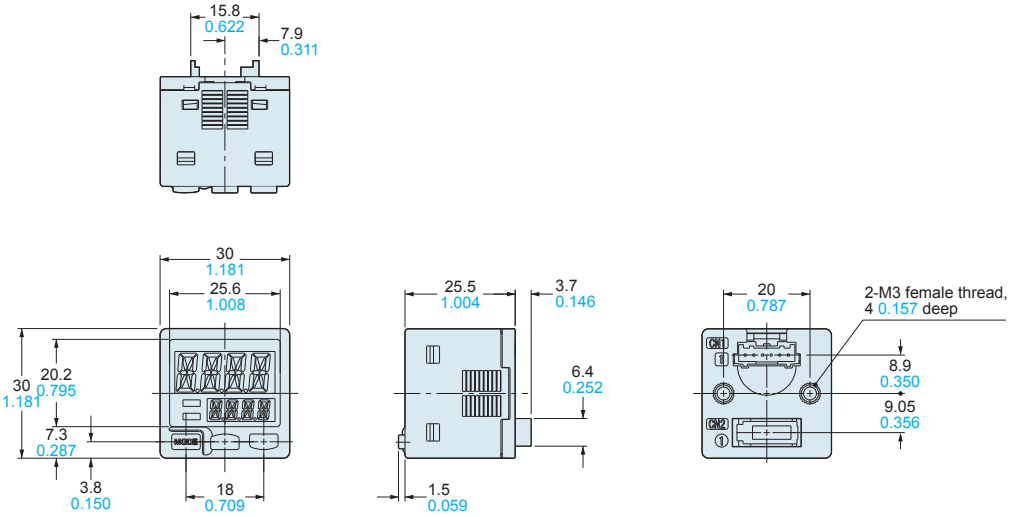
DIMENSIONS (Unit: mm in)

The CAD data in the dimensions can be downloaded from our website.

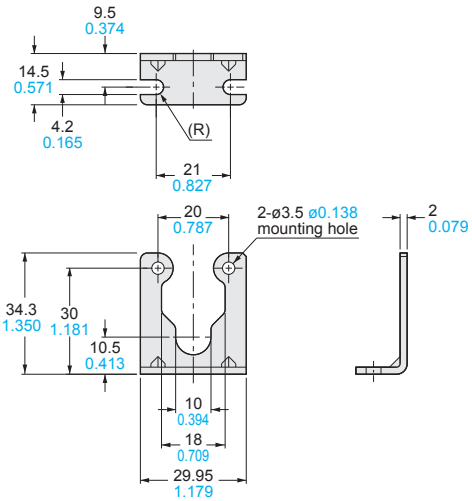
DPH-L1□ — Sensor head



DPC-L101(-P) — Controller

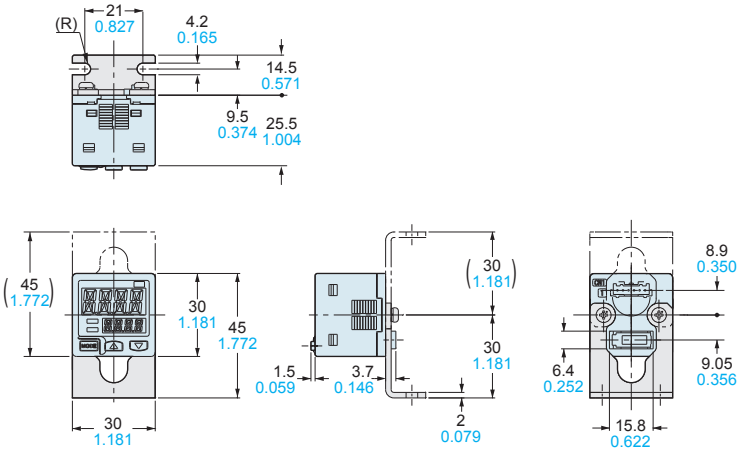


MS-DP1-6 — Controller mounting bracket (Optional)



Material: Cold rolled carbon steel (SPCC)
(Trivalent uni-chrome plated)
Two M3 (length 6 mm 0.236 in) screws with washers are attached.

Assembly dimensions



DIMENSIONS (Unit: mm in)

The CAD data in the dimensions can be downloaded from our website.

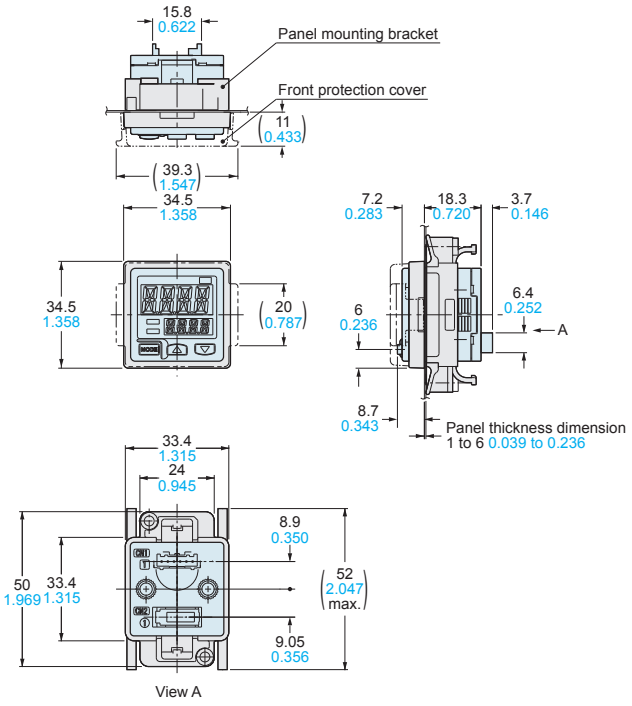
MS-DP1-2 MS-DP1-3

Panel mounting bracket (Optional), Front protection cover (Optional)

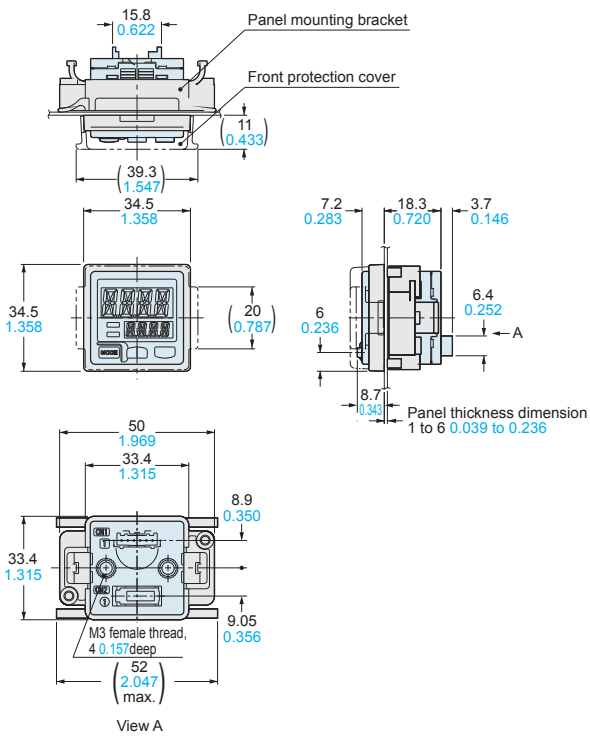
Assembly dimensions

Mounting drawing with **DPC-L101(-P)**

Vertical mounting

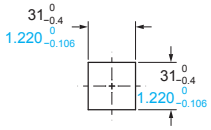


Horizontal mounting

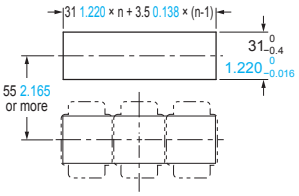


Panel cut-out dimensions

When 1 unit is installed

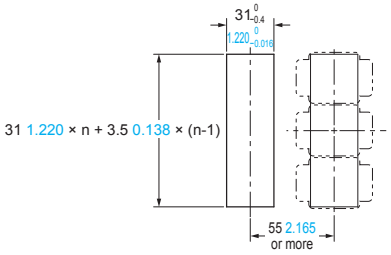


When “n” units are installed horizontally in series



Note: The panel thickness should be 1 to 6 mm 0.039 to 0.236 in.

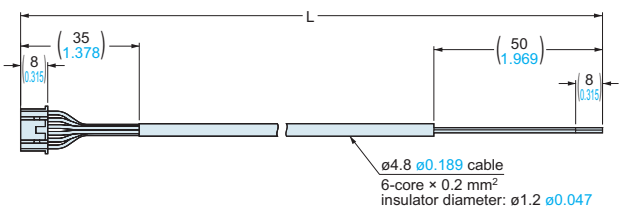
When “n” units are installed vertically in series



Note: The panel thickness should be 1 to 6 mm 0.039 to 0.236 in.

CN-66A-C2 CN-66A-C5

Connector attached cable (Optional, **CN-66A-C2** is attached to the controller)



• Length L

Model No.	Length L
CN-66A-C2	2,000 78.740
CN-66A-C5	5,000 196.850