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

FIBER SENSORS

General terms and conditions...... F-3 Related Information ■ Glossary of terms P.1563~

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Selection Guide Digital Display













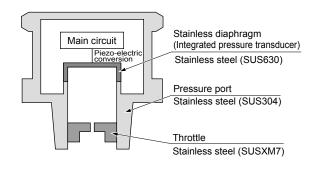
High-precision detection of fluid and air pressure

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

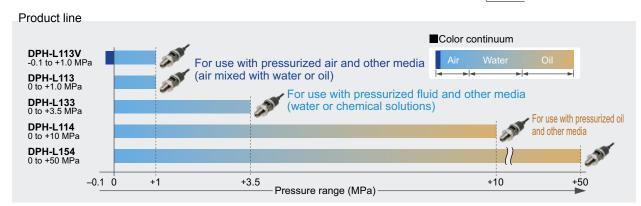
Compact size of HEX. 22 × 59 mm 0.866 × 2.323 in (excluding the screws). The body is also stainless so it can be used in various environments.



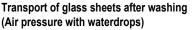
Strong against pressure surges from throttle loading

Controls pressure surges and reduces sensor failure.





APPLICATIONS









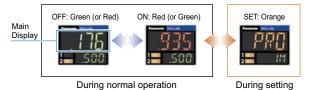
The dual display means that the "current value" and the "threshold value", it makes direct setting of threshold value

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 (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

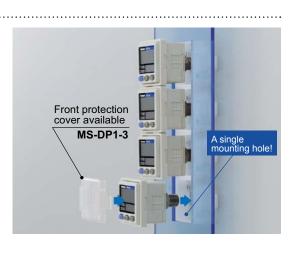
The controller's digital display (current value) is held while external input is on. By activating external input the moment you wish to capture the pressure value, you can pause and verify the display.

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.





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DPS-400/ DPH-100 DPC-100/ DPH-100

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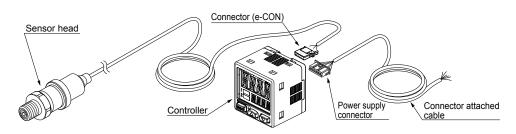
MACHINE VISION SYSTEMS

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Selection Guide Pressure/ Digital Display Pressure/ Head-separated



PRODUCT CONFIGURATION



ORDER GUIDE

Sensor heads

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

Controllers

Appearance	Model No.	Comparative output			
335	DPC-L101	NPN open-collector transistor			
* CN-66A-C2 (Connector attached cable 2 m 6.562 ft) is attached.	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	CN-66A-C2 (Note 2)	Length 2 m 6.562 ft	Controller power supply I/O cable.		
attached cable	CN-66A-C5	Length 5 m 16.404 ft	0.2 mm² 6-core oil-resistant cabtyre cable with connector		
Power supply connector			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 close			
Front protection cover MS-DP1-3		Protects the adjustment surfaces of controllers. (Can be attached when using the panel mounting bracket)			

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.

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.

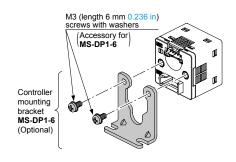
Power supply connector

· CN-66A



Controller mounting bracket

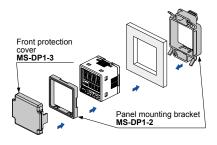
• MS-DP1-6



Panel mounting bracket, Front protection cover

• MS-DP1-2

• MS-DP1-3



Recommended e-CON

Model No.: 1473562-4 (Manufactured by Tyco Electronics Japan G.K.) 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.

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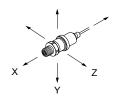
Flow

SPECIFICATIONS

Sensor heads

		Compound pressure Positive pressure						
		Type	-0.1 to 1 MPa type	1 MPa type	3.5 MPa type	10 MPa type	50 MPa type	
Iter	m Mod	del No.	DPH-L113V	DPH-L113	DPH-L133	DPH-L114	DPH-L154	
CE marking directive compliance		npliance	EMC Directive, RoHS Directive					
Тур	e of pressure			Se	aled gauge pressure (No	te 4)		
Rat	ed pressure range		-0.1 to +1 MPa	0 to +1 MPa	0 to +3.5 MPa	0 to +10 MPa	0 to +50 MPa	
Pre	ssure withstandabili	ty	2 MPa	2 MPa	7 MPa	20 MPa	75 MPa	
App	licable fluid		Gases and fluids that do not corrode stainless steel SUS630, SUS304, or SUSXM7					
Sup	ply voltage		9 to 36 V DC [9 to 32 V DC when using the attached connector (e-CON)]					
Cur	rent consumption		20 mA or less					
Analog voltage output			Accuracy: ±2	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)			(over rated pressure range) 3 ±2 °C +73.4 ±35 °F) 1 to +125 °C -4 to +257 °F) hysteresis and repeatability)	
Response time		1 ms or less						
resistance	Protection		IP67 (IEC)					
	Ambient temperatu	ıre	-20 to +70 °C -4 to +158 °F (No dew condensation or icing 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 or icing 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)		
ental	Ambient humidity		35 to 85 % RH, Storage: 35 to 85 % RH					
Environmental	Medium temperatur	re range	-20 to +70 °C -4 to +158 °F -20 to +125 °C -4 to +257 °F					
≣nvir	Voltage withstanda	bility	150 V AC for one min. between all supply terminals connected together and enclosure					
ш	Insulation resistance	ce	100 M Ω , or more, with 50 V DC megger between all supply terminals connected together and enclosure					
	Vibration resistance	е	10 to 2,000 Hz frequency, acceleration 200 m/s², in X direction 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 three times each					
Gro	unding method		Capacitor earth (Enclosure-supply terminal)					
Pre	ssure port		R1/4 male thread (throttle embeded)					
Material		Diaphragm: Stainless steel (SUS630), Pressure port: Stainless steel (SUS304), Throttle: Stainless steel (SUSXM7)						
Connecting method		Connector						
Cal	ole		0.2 mm ² 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.					
Acc	essory				Connector (e-CON): 1 pc	2.		

- 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

	No.	NPN output	DPC-L101					
Item PNP output		PNP output	DPC-L101-P					
CE marking directive compliance		ve compliance	EMC Directive, RoHS Directive					
App	olicable sensor	head	DPH-L113V	DPH-L113	DPH-L133	DPH-L114	DPH-L154	
Rat	ed pressure ra	ange	-0.1 to +1 MPa	0 to +1 MPa	0 to +3.5 MPa	0 to +10 MPa	0 to +50 MPa	
Set	pressure rang	je	-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	
Dis	play		4 digits + 4 digits 3	-color LCD display (Displa	y refresh rate: 250 ms, 50	0 ms, 1,000 ms, selectabl	e by key operation)	
	Displayable p	ressure 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	
Sup	ply voltage			12 to 24 V	DC ±10 % Ripple P-P 10	% or less		
Pov	ver consumpti	on	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) </pnp></npn>					
Output operation NO/NC, selectable by key operation				ation				
Output modes EASY mode / Hysteresis mode / Window c			omparator mode					
	Hysteresis		Minimum 1 digit (variable) (however, 2 digits when using psi unit)					
Repeatability Response time Short-circuit protection Analog output		,	Within ±0.2 % F.S.					
		ne	5 ms, 10 ms, 25 ms, 50 ms, 100 ms, 250 ms, 500 ms, 1,000 ms, 5,000 ms, selectable by key operation					
		protection	Incorporated					
			 < 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. Span: within 4 V ±0.5 % F.S. Linearity: within ±0.1 % F.S. 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. Linearity: within ±0.1 % F.S. Linearity: within ±0.1 % F.S. Load resistance: 250 Ω (max.) 					
	Sensor head	input	Input voltage range: 1 to 5 V DC (over rated pressure range)					
Inputs	External inpu	t	<npn output="" type=""> <pnp output="" type=""> ON voltage: 0.4 V DC or less ON voltage: 5 V to +V DC OFF voltage: 5 to 30 V DC, or open OFF voltage: 0.6 V DC or less, or open Input impedance: 10 kΩ approx. Input time: 1 ms or more Input time: 1 ms or more Input time: 1 ms or more</pnp></npn>					
Operation indicator Orange LED (Comparative output 1 operation indicator, comparative output 2 operation indicator: Lights up when each		h comparative output is ON)						
d)	Protection				IP40 (IEC)			
ance	Ambient tem	perature	-10 to +50 °C +14 to +122 °F (No dew condensation or icing allowed), Storage: -10 to +60 °C +14 to +140 °F					
esist	Ambient hum	nidity	35 to 85 % RH, Storage: 35 to 85 % RH					
ıtal	Voltage withs	standability	500 V AC for one min. between all supply terminals connected together and enclosure					
mer	Insulation res	sistance	50 MΩ, or more, with 500 V DC megger between all supply terminals connected together and enclosure					
Environmental resistance	Vibration resi		10 to 500 Hz frequency, double 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, double amplitude 0.75 mm 0.030 in or maximum acceleration 49 m/s², in X, Y and Z directions for two hours each)					
_	Shock resista		100 m/s² acceleration in X, Y and Z directions three times each					
Temperature characteristics		acteristics	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					
	nnecting metho	od	Connector					
	ole length		Total length up to 100 m 328.084 ft (less than 30 m 98.425 ft when conforming to CE marking) is possible with 0.3 mm², or more, cable.					
We	ight		Net weight: 25 g approx. (excluding connector attached cable), Gross weight: 140 g approx.					
Acc	essories		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.

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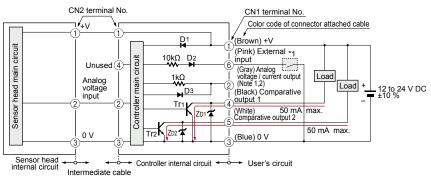
Selection Guide Pressure/ Digital Display Pressure/ Head-separated

DPC-L100/ DPH-L100 DPS-400/ DPH-100 DPC-100/ DPH-100

I/O CIRCUIT AND WIRING DIAGRAMS

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 ...D₁ to D₃: Reverse supply polarity protection diode Z_{D1}, Z_{D2}: Surge absorption zener diode T_{r1} , T_{r2} : NPN output transistor

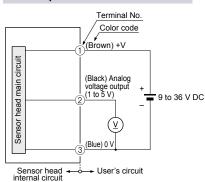
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Non-voltage contact or NPN open-collector transistor

or

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

For independent use of sensor head

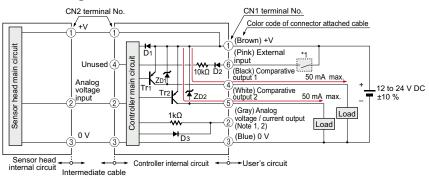


Notes:1) When the sensor head is used independently, devices connected to the analog output must have an input impedance set at 10 k Ω or more and load capacity 1,000 pF or less.

- No short-circuit protection circuit is provided for analog voltage output. Do not connect directly to a power supply.
- 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-P PNP output type

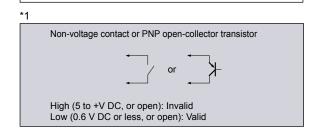
I/O circuit diagram



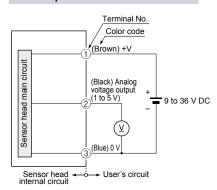
Notes: 1) Set the output load resistance during analog current output to 250 Ω (max.).

2) Note that a voltage of 5 V or higher is generated during analog current output.

Symbols ...D₁ to D₃: Reverse supply polarity protection diode Z_{D1}, Z_{D2} : Surge absorption zener diode T_{r1}, T_{r2} : PNP output transistor



For independent use of sensor head



Notes:1) When the sensor head is used independently, devices connected to the analog output must have an input impedance set at 10 k Ω or more and load capacity 1,000 pF or less.

- No short-circuit protection circuit is provided for analog voltage output. Do not connect directly to a power supply.
- 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.
- The transparent tube attached to the cable is not used and should be cut off at the base.

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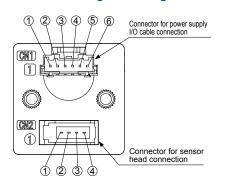
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PARTICULAR USE SENSORS SENSOR OPTIONS

I/O CIRCUIT AND WIRING DIAGRAMS

Terminal arrangement diagram



Connector for power supply I/O cable (CN1)

- ② Analog voltage / current output
- ③ 0 V ④ Comparative output 1
- © Comparative output 2
- © External input

auto-reference function / remote zero-adjustment function / current value hold function

Others

Connector for sensor head (CN2)

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

· Do not apply pressure exceeding the pressure

and correct operation shall not be maintained.

· Use within the rated pressure range.

Refer to p.1566 for general precautions.

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• 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.

· Never remove the throttle.

· Take care that the sensor does not come in direct contact with water, oil, grease, or organic solvents, such as, thinner, etc.

withstandability value. The diaphragm will get damaged

- · 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.

PRECAUTIONS FOR PROPER USE

 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.

Flow

PHOTO-ELECTRIC SENSORS MICRO PHOTO-

AREA SENSORS SAFETY LIGHT CURTAINS /

COMPONENTS

INDUCTIVE PROXIMITY SENSORS PARTICULAR USE SENSORS

SENSOR OPTIONS SIMPLE WIRE-SAVING UNITS

SYSTEMS

MEASUREMENT
SENSORS

STATIC CONTROL DEVICES LASER MARKERS

PLC

MACHINE INTERFACES ENERGY MANAGEMENT SOLUTIONS

MACHINE VISION SYSTEMS

CURING SYSTEMS

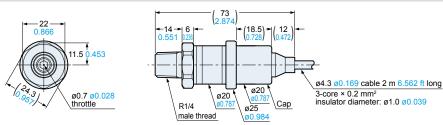
Selection Guide Pressure/ Digital Display Pressure/ Head-separated Flow

DPC-L100/ DPH-L100 DPS-400/ DPH-100 DPC-100/ DPH-100

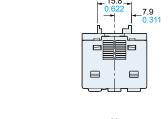
DIMENSIONS (Unit: mm in)

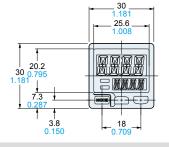
The CAD data can be downloaded from our website.

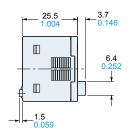
DPH-L1□ Sensor head

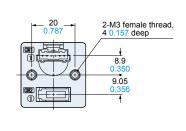


DPC-L101(-P) Controller





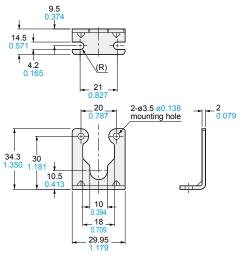




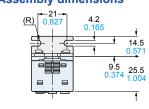
Controller mounting bracket (Optional)

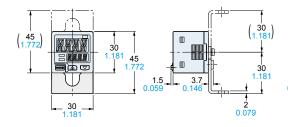
MS-DP1-6

Assembly dimensions









DIMENSIONS (Unit: mm in)

The CAD data can be downloaded from our website.

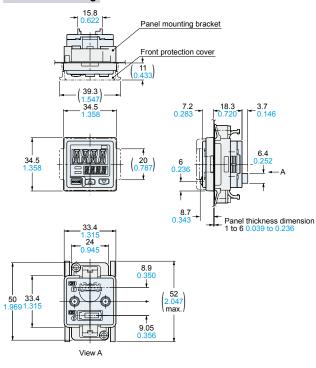
MS-DP1-2 MS-DP1-3

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

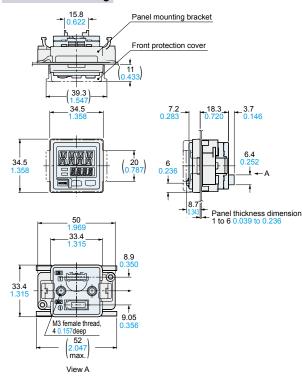
Assembly dimensions

Mounting drawing with DPC-L101(-P)

Vertical mounting



Horizontal mounting



Material: Polyacetal (Panel mounting bracket)
Polycarbonate (Front protection cover)

31_0.4

Panel cut-out dimensions

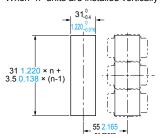
When 1 unit is installed

31_0.4

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

When "n" units are installed horizontally in series

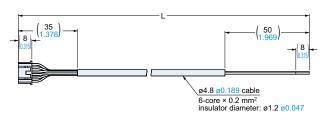
When "n" units are installed vertically in series



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	

FIBER

LASER SENSORS

PHOTO-ELECTRIC SENSORS MICRO PHOTO-

AREA SENSORS

SAFETY LIGHT CURTAINS / SAFETY COMPONENTS PRESSURE / FLOW

INDUCTIVE PROXIMITY SENSORS

PARTICULAR USE SENSORS

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HUMAN MACHINE INTERFACES ENERGY MANAGEMENT

FA COMPONENTS

> MACHINE VISION SYSTEMS

CURING SYSTEMS

Selection Guide

Head-separated

DPC-L100/ DPH-L100 DPS-400/ DPH-100 DPC-100/ DPH-100