Digital pressure sensor **PPX Series**

Set values can be changed while viewing present values!

Comparison output 1
Operation indicator lamp
Communication operation indicator lamp for IO-Link-type

Comparison output 2
Operation indicator lamp
High-function-type has analog voltage output operation indicator lamp

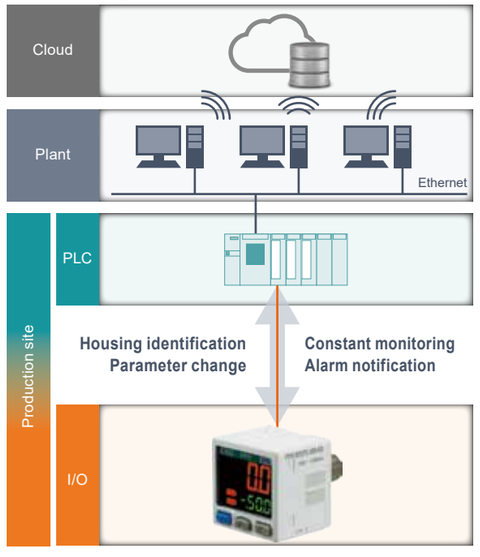
Mode switching key
UP key
DOWN key

Present value [Main display]
3-color display (red/green/orange)
Main display section changes between green and red in conjunction with output ON/OFF and shows orange during setting.

Set value [Sub-display]
Sub-display section can be customized
Arbitrary alphanumeric characters other than set values can be displayed.

IO-Link model available

IO-Link is a digital communication standard for sensors/actuators at factory sites. (IEC 61131-9)
Unlike analog communication, it enables the transmission of parameters and event data.



Features of IO-Link

Constant monitoring via digital data is possible.

Parameters can be set and changed via the network, enabling remote equipment operation.

Models, serial numbers, etc., can be confirmed on the network.

The settings can be copied from the master, making parameter reconfiguration after maintenance obsolete.

Device failure and disconnection can be confirmed.

It can also be converted to Ethernet networks and connected, enabling devices to be IoT-ready.

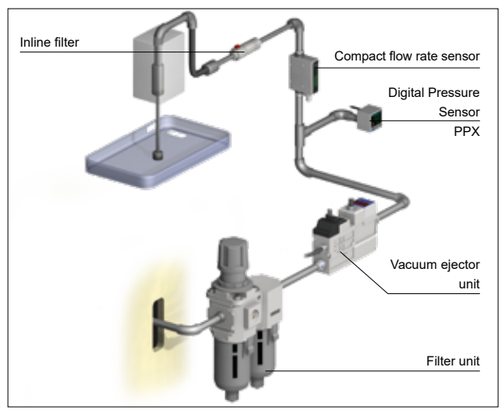
Selectable output

Select from comparison output, analog output and IO-Link. 3 output types in the lineup to match applications.

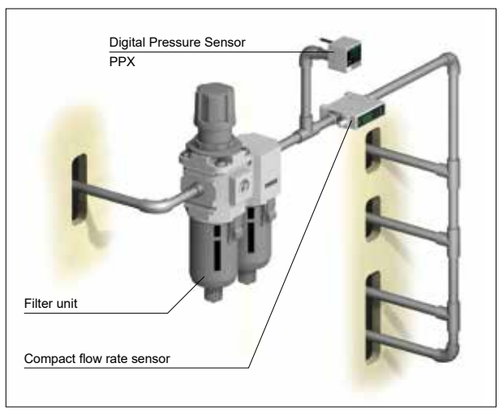
	Standard	High-function	IO-Link
Output 1	Comparison output (NPN/PNP)	Analog Output (Voltage/current)	IO-Link
Output 2	Comparison output (NPN/PNP)	Comparison output (NPN/PNP)	Control output (PNP)

Examples of applications

Workpiece suction confirmation



Checking equipment source pressure



Oil-free gas-contact section

PPX-P12 Series

- **Gas-contact section is Oil-free**
- **Ideal for applications susceptible to grease, including semiconductors and medical use.**

Handy functions for ease of use

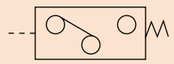
- **Easy-to-read alphanumeric display**

- **Peak/bottom hold function**
  The max. and min. values of pressure fluctuation are displayed using 2 screens.
- **10 increments of response time can be set. (2.5 ms to 5000 ms)**
- **The setting descriptions can be displayed by code number**

Space saving contact mounting is possible.

Digital pressure sensor standard

PPX Series

Circuit diagram Symbol 

Refer to the CKD website for detailed compatible model Nos.

Model No. Notation Method

[Model No. Notation Method in Japan]

PPX - R01 N - 6M - ( )

- PPX: Model No.
- R01: ❶ Pressure range
- N: ❷ Output
- 6M: Piping shape: R1/8, M5 female thread
- ( ): ❸ Connector cable

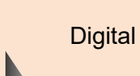
❶Pressure range

Code	Description
R01	−100.0 to 100.0 kPa
R10	−0.100 to 1.000 MPa

❷Output

Code	Description
N	NPN transistor output 2 point (Standard)
P	PNP transistor output 2 point (standard)
NH	NPN transistor output 1 point + analog voltage output or external input (high-function)
PH	PNP transistor output 1 point + analog voltage output or external input (high-function)

❸Connector cable

	Code	Description	
	Blank	2 m connector cable attached	
Note	J	Without connector cable	

Note: ❷ Selectable only when "N" or "P" is selected for output.

[Model No. Notation Method for overseas markets]

PPX - R01 N - 6M - ( ) - KA

- PPX: Model No.
- R01: ❶ Pressure range
- N: ❷ Output format
- 6M: ❸ Piping shape
- ( ): ❹ Connector cable
- KA: With unit change function

In compliance with the new Measurement Law, export models with unit select function cannot be used in Japan.

❶Pressure range

Code	Description
R01	−100.0 to 100.0 kPa
R10	−0.100 to 1.000 MPa

❷Output

Code	Description
N	NPN transistor output 2 point (Standard)
P	PNP transistor output 2 point (standard)
NH	NPN transistor output 1 point + analog voltage output or external input (high-function)
PH	PNP transistor output 1 point + analog voltage output or external input (high-function)

❸Piping shape

	Code	Description
*1	6M	R1/8, M5
	6N	NPT1/8, M5
*2	6G	G1/8, M5

*1: ❷ Selectable only when "N" or "NH" is selected for output.
*2: ❷ Selectable only when "P" or "PH" is selected for output.

❹Connector cable

	Code	Description	
	Blank	2 m connector cable attached	
*	J	Without connector cable	

*: ❷ Selectable only when "N" or "P" is selected for output.

Destination	Switch Output NPN	Switch Output PNP	Unit	Unit Change Function	Unit seal label included Note	Piping port
Domestic	○	○	kPa/MPa	−	−	R1/8(M5)
Asia	○	−	kPa/MPa	○	○	R1/8(M5)
Europe	−	○	kPa/MPa	○	○	G1/8(M5)
North America	○	○	kPa/MPa	○	○	NPT1/8(M5)

Note: For the included unit sealant, Page 39.

Type	Model No.	Port size	Output	Remarks
Standard	PPX-R01N-6M-(J)-KA	M5 female thread + R (PT) 1/8 male thread	NPN transistor/open collector	For Asia
	PPX-R10N-6M-(J)-KA			
High-function	PPX-R01NH-6M-KA			
	PPX-R10NH-6M-KA			
Standard	PPX-R01P-6G-(J)-KA	M5 female thread + G1/8 male thread	PNP transistor/open collector	For Europe
	PPX-R10P-6G-(J)-KA			
High-function	PPX-R01PH-6G-KA			
	PPX-R10PH-6G-KA			
Standard	PPX-R01N-6N-(J)-KA	M5 female thread + NPT1/8 male thread	NPN transistor/open collector	For North America
	PPX-R01P-6N-(J)-KA		PNP transistor/open collector	
	PPX-R10N-6N-(J)-KA		NPN transistor/open collector	
	PPX-R10P-6N-(J)-KA		PNP transistor/open collector	
High-function	PPX-R01NH-6N-KA		NPN transistor/open collector	
	PPX-R01PH-6N-KA		PNP transistor/open collector	
	PPX-R10NH-6N-KA		NPN transistor/open collector	
	PPX-R10PH-6N-KA		PNP transistor/open collector	

Specifications for rechargeable battery (Catalog No.CC-1226AA)

Conforms to CKD P4 Series equivalent specifications as standard.

Discrete option model No.

PPX - C1

- C1: ❶ Option

❶Option

Code	Description		
C1	Cable with connector	1 m	
C2		2 m	
C3		3 m	
C5		5 m	
CN	Connector set (×10 set)		
KL	Mounting bracket (mounting screw attached)		
KHS	Panel bracket		
KCB	Front protective cover (when using panel bracket)		

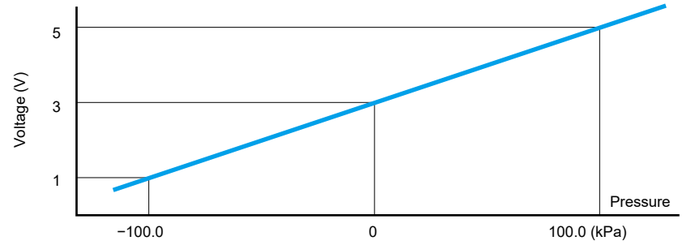
Specifications

Item		Standard		High-function	
		For low pressure PPX-R01□	For high pressure PPX-R10□	For low pressure PPX-R01□H	For high pressure PPX-R10□H
Type of pressure		Gauge pressure			
Rated pressure		−100.0 to +100.0 kPa	−0.100 to +1.000 MPa	−100.0 to +100.0 kPa	−0.100 to +1.000 MPa
Pressure setting		−101.0 to +101.0 kPa	−0.101 to +1.010 MPa	−101.0 to +101.0 kPa	−0.101 to +1.010 MPa
Proof pressure		500 kPa	1.5 MPa	500 kPa	1.5 MPa
Applicable fluid		Air/non-corrosive gas			
Power supply voltage		12 to 24 VDC ±10%, Ripple P-P 10% or less			
Power consumption		Normal: 720 mW or less (current consumption 30 mA or less at 24 V power supply voltage) ECO mode: 480 mW of less at STD (current consumption 20 mA or less at power supply voltage 24 V), 360 mW or less at FULL (current consumption 15 mA or less at power supply voltage 24 V)			
Comparison output (Comparison output 1, Comparison output 2)		[NPN output] NPN transistor/open collector • Max. inrush current: 100 mA • Applied voltage: 30 VDC or less (comparison output - 0 V interval) • Residual voltage: 2 V or less (at inrush current 100 mA)		[PNP output] PNP transistor/open collector • Max. outflow current: 100 mA • Applied voltage: 30 VDC or less (comparison output - +V interval) • Residual voltage: 2 V or less (at outflow current 100 mA)	
	Output operation	Select NO/NC with key operation			
	Output mode	EASY mode/hysteresis mode/window comparator mode			
	Hysteresis	Min. 1 digit (variable)			
	Repeatability	±0.1% F.S. (within ±2 digits)	±0.2% F.S. (within ±2 digits)	±0.1% F.S. (within ±2 digits)	±0.2% F.S. (within ±2 digits)
	Response time	2.5 ms, 5 ms, 10 ms, 25 ms, 50 ms, 100 ms, 250 ms, 500 ms, 1000 ms, 5000 ms select by key operation			
	Short-circuit protection	Equipped			
External input (auto reference/remote zero adjusting)		———		[NPN output] ON voltage: 0.4 VDC or less OFF voltage: 5 to 30 VDC or release Input impedance: 10 kΩ Input time: 1 ms and over	[PNP output] ON voltage: 5 V to+VDC OFF voltage: 0.6 VDC or less or release Input impedance: 10 kΩ Input time: 1 ms and over
Analog voltage output		———		Output voltage: 1 to 5 V Zero point: Within 3 V±5%F.S. Span: Within 4 V±5%F.S. Linearity: Within ±1%F.S. Output impedance: 1 kΩ	Output voltage: 0.6 to 5 V Zero point: Within 1 V±5%F.S. Span: Within 4.4 V±5%F.S. Linearity: Within ±1%F.S. Output impedance: 1 kΩ
Analog current output		———		Output current: 4 to 20 mA Zero point: Within 12 mA ±5% F.S. Span: Within 16 mA ±5% F.S. Linearity: Within ±1%F.S. Load resistance: 250 Ω (max.)	Output current: 2.4 to 20 mA Zero point: Within 4mA±5%F.S. Span: Within 17.6 mA±5%F.S. Linearity: Within ±1%F.S. Load resistance: 250 Ω (max.)
Indicator		4-digit + 4-digit 3-color LCD display (display updating cycle: 250 ms, 500 ms, 1000 ms select by key operation)			
	Indicator pressure range	-101.0 to +101.0 kPa	-0.101 to +1.010 MPa	-101.0 to +101.0 kPa	-0.101 to +1.010 MPa
Indicator lamp		Orange LED (comparison output 1 operation indicator lamp, comparison output 2 operation indicator lamp: Lit when comparison output is ON)		Orange LED (comparison output 1 operation indicator lamp: Lit when comparison output is ON, analog voltage output operation indicator lamp: Lit at setup)	
Environment conditions	Degree of Protection	IP40 (IEC)			
	Ambient temperature	-10 to +50°C, at the time of storage: -10 to +60°C			
	Ambient humidity	35 to 85%RH (no condensation or freezing), when stored: 35 to 85%RH			
	Withstand voltage	1000 VAC for 1 minute applied to all charged sections/between cases			
	Insulation resistance	50 MΩ and over with 500 VDC megger overall charging section/between cases			
	Vibration resistance	Durability of 10 to 500Hz double amplitude 3 mm XYZ 2 hours in each direction (Panel mounting: Endurance 10 to 150 Hz double amplitude 0.75 mm XYZ 2 hours in each direction)			
	Shock resistance	Durability of 100 m/s^2 (approx. 10 G) 3 times in each direction of XYZ			
Temperature characteristics (characteristics at +20°C are taken as standard)		Within ±0.5% F.S.	Within ±1% F.S.	Within ±0.5% F.S.	Within ±1% F.S.
Port size *1		M5 female thread + R (PT) 1/8 male thread			
Material		Case: PBT (glass fiber included), LCD display part: acrylic resin, pressure port: SUS303, mounting screw part: brass (nickeling), switch part: silicone rubber			
Connection		Connector connection			
Wire length		Up to 100 m (less than 30 m when CE marked) with 0.3 mm^2 or larger cable			
Unit change function		For overseas (-Only compatible with KA (MPa, kPa.kgf/c)m^2, bar, psi, mmHg, inchHg)			
Weight		Body weight: approx. 40 g, weight including package: 130 g			
Accessory *2		PPX-C2 (2 m cable with connector): 1 pc. Unit seal label (-KA with unit change function): MPa, kPa.kgf/cm^2, bar, psi, mmHg, inchHg			

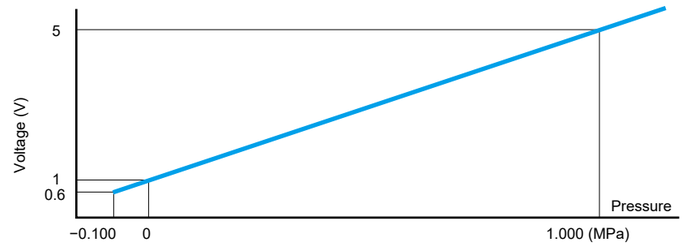
*1: Refer to page 11 for export use.
*2: For "-J", connector cable is not attached.

Analog output voltage - pressure characteristics

●PPX-R01NH
R01PH

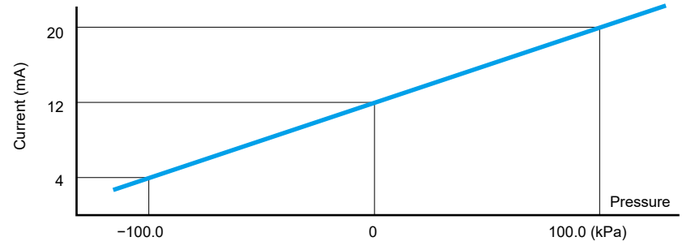


●PPX-R10NH
R10PH

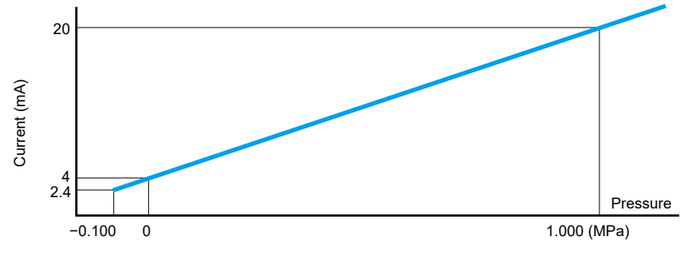


Analog output current - pressure characteristics

●PPX-R01NH
R01PH

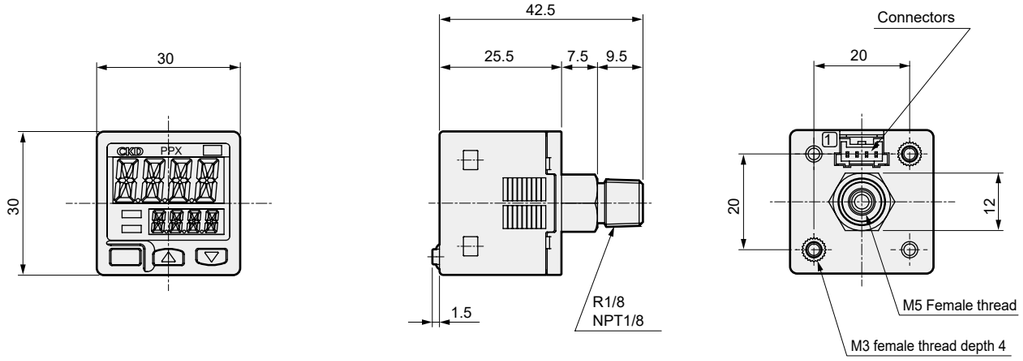


●PPX-R10NH
R10PH

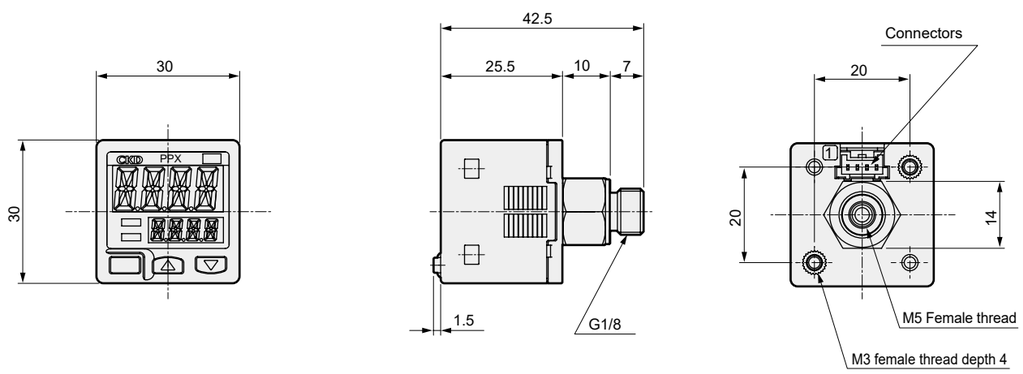


Dimensions

●PPX-R□□-6M/6N (R thread/NPT thread)

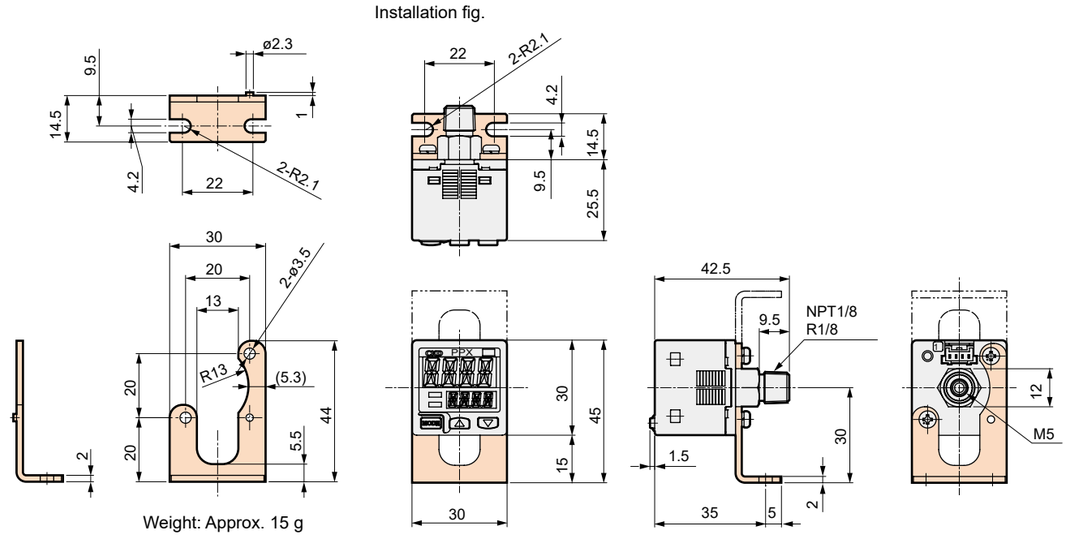


●PPX-R□□-6G (G thread)



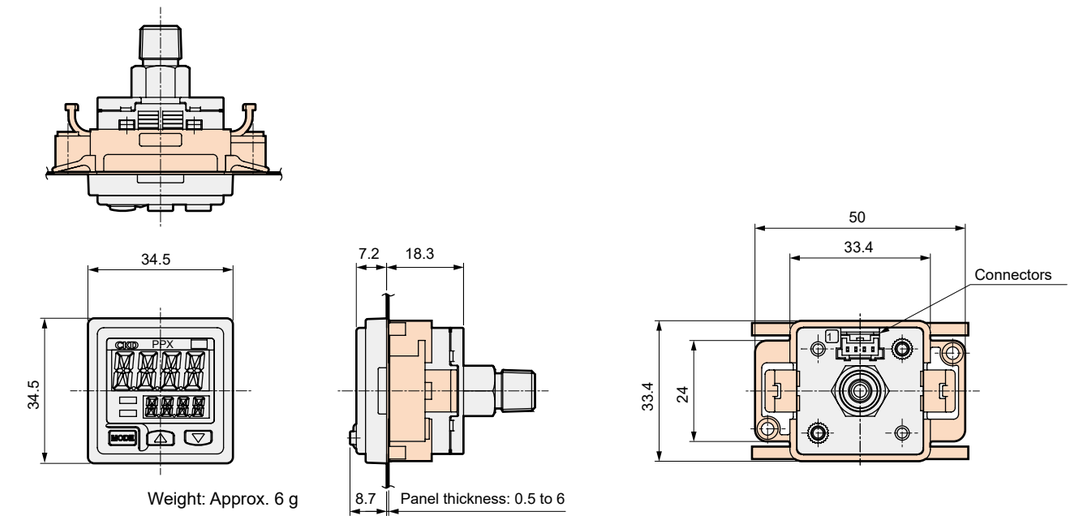
Optional dimensions

●Mounting bracket (PPX-KL)



Weight: Approx. 15 g

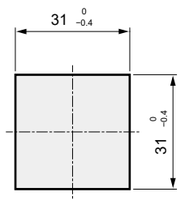
●Panel bracket (PPX-KHS) installation fig.



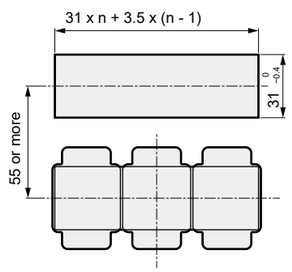
Weight: Approx. 6 g

Panel cut dimension

When installing 1 pc.

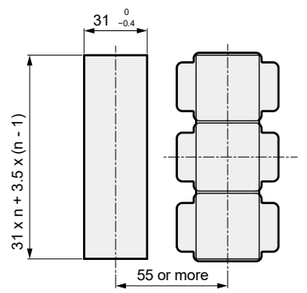


When installing consecutive n pcs. horizontally



Note: Panel thickness must be 0.5 to 6 mm.

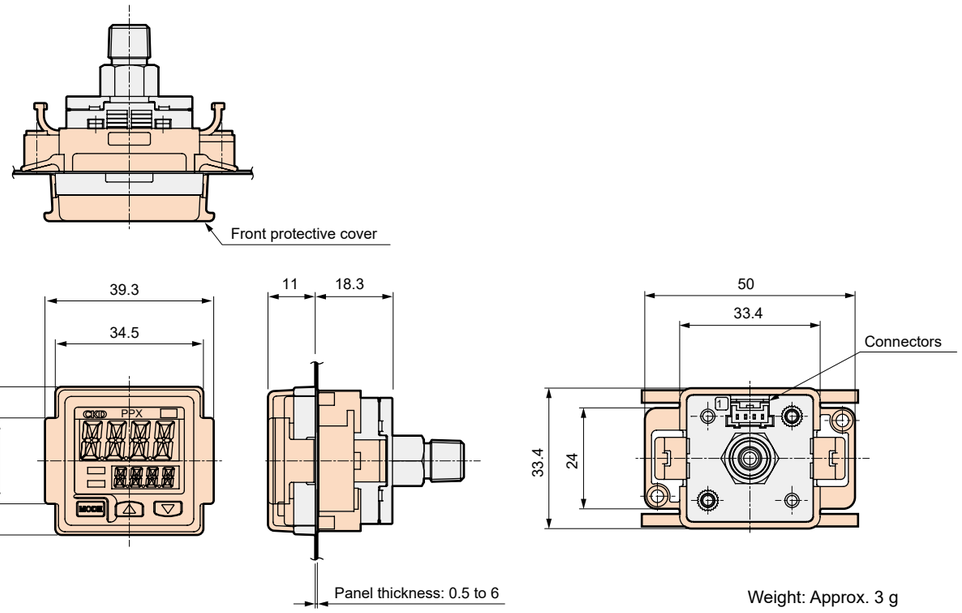
When installing consecutive n pcs. vertically



Note: Panel thickness must be 0.5 to 6 mm.

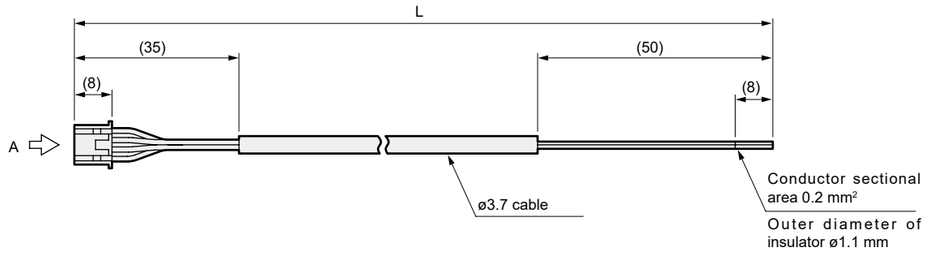
Optional dimensions

●Front protective cover (PPX-KCB) installation fig.



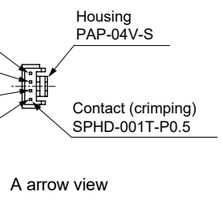
Weight: Approx. 3 g

●Cable with connector (PPX-C□)



(J.S.T.)

0 V	Blue	4
Standard: Comparison output 2 High-function: Analog voltage output or external input	White	3
Comparison output 1	Black	2
+V	Brown	1
Terminal name	Insulator color	Terminal No.



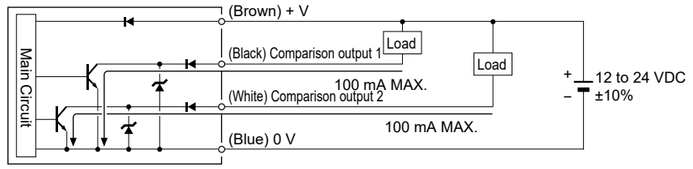
Model No.	Cable length	Weight g
PPX-C1	1 m	Approx. 20
PPX-C2	2 m	Approx. 40
PPX-C3	3 m	Approx. 60
PPX-C5	5 m	Approx. 100

●Connector set (PPX-CN)
- Housing: JST MFG CO. LTD. PAP-04V-S
- Contact: J.S.T. Mfg. Co., Ltd. SPHD-001T-P0.5

Circuit and connection method

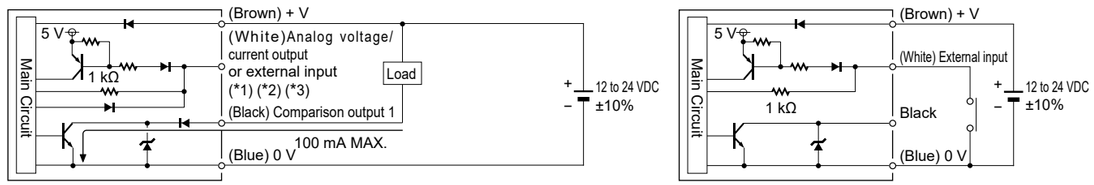
NPN output

●Standard



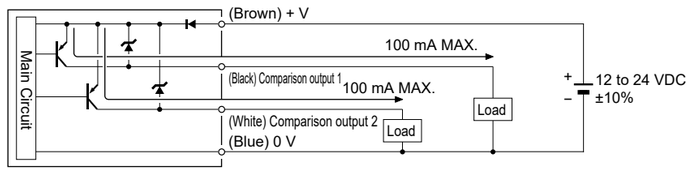
●High-function

[Example of external input connection]



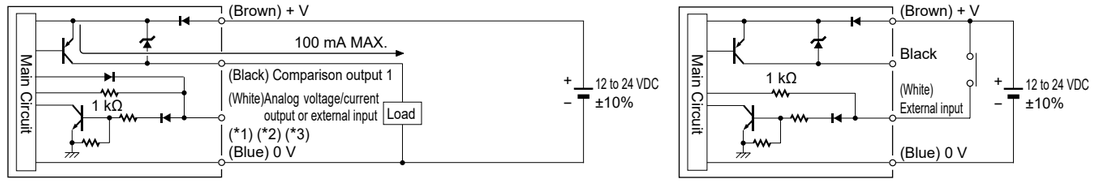
PNP output

●Standard



●High-function

[Example of external input connection]



*1: Use 250 Ω (max.) for output load resistance at the time of analog current output.
*2: Note that voltage of 5 V and over is generated at the time of analog current output.
*3: Be careful of input impedance of the connection device when using analog current output. In addition, note that the voltage is reduced by the resistance of cable at cable extension.

Digital pressure sensor oil-free type

PPX-P12 Series

Circuit diagram symbol

Refer to the CKD website for detailed compatible model Nos.

Overview

- Oil-free treatment (degreasing) at gas contact areas (piping ports, etc.)
- Silicone grease-free at gas contact areas (Grease is not used on the gas contact areas)

Features

- Ideal for applications susceptible to grease, including liquid crystal, semiconductors, foodstuffs, medical use, and electronic parts.
- Because grease is not used, this type is suitable for pressure detection of paint lines.

Model No. Notation Method

PPX - R01 N - 6M - P12

- PPX: Model No.
- R01: ❶Pressure range
- N: ❷Output
- 6M: Piping shape: R1/8, M5 female thread
- P12: Oil-free

Note: 2 m connector cable included.

❶Pressure range

Code	Description
R01	−100.0 to 100.0 kPa
R10	−0.100 to 1.000 MPa

❷Output

Code	Description
N	NPN transistor output 2 point (Standard)
NH	NPN transistor output 1 point + analog voltage output or external input (high-function)

Discrete option model No.

PPX - C1

❶Option

❶Option

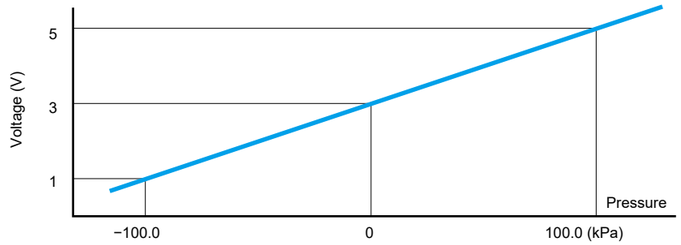
Code	Description		
C1	Cable with connector	1 m	
C2		2 m	
C3		3 m	
C5		5 m	
CN	Connector set (×10 set)		
KL	Mounting bracket (mounting screw attached)		
KHS	Panel bracket		
KCB	Front protective cover (when using panel bracket)		

Specifications

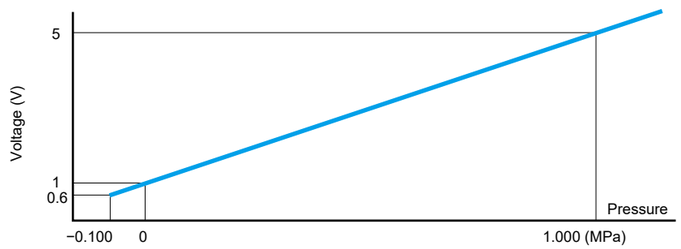
Item		Standard		High-function	
		For low pressure PPX-R01N	For high pressure PPX-R10N	For low pressure PPX-R01NH	For high pressure PPX-R10NH
Type of pressure		Gauge pressure			
Rated pressure		−100.0 to +100.0 kPa	−0.100 to +1.000 MPa	−100.0 to +100.0 kPa	−0.100 to +1.000 MPa
Pressure setting		−101.0 to +101.0 kPa	−0.101 to +1.010 MPa	−101.0 to +101.0 kPa	−0.101 to +1.010 MPa
Proof pressure		500 kPa	1.5 MPa	500 kPa	1.5 MPa
Applicable fluid		Air/non-corrosive gas			
Power supply voltage		12 to 24 VDC ±10%, Ripple P-P 10% or less			
Power consumption		Normal: 720 mW or less (current consumption 30 mA or less at 24 V power supply voltage) ECO mode: 480 mW of less at STD (current consumption 20 mA or less at power supply voltage 24 V), 360 mW or less at FULL (current consumption 15 mA or less at power supply voltage 24 V)			
Comparison output (Comparison output 1, Comparison output 2)		[NPN output] NPN transistor/open collector • Max. inrush current: 100 mA • Applied voltage: 30 VDC or less (comparison output - 0 V interval) • Residual voltage: 2 V or less (at inrush current 100 mA)			
	Output operation	Select NO/NC with key operation			
	Output mode	EASY mode/hysteresis mode/window comparator mode			
	Hysteresis	Min. 1 digit (variable)			
	Repeatability	±0.1% F.S. (within ±2 digits)	±0.2% F.S. (within ±2 digits)	±0.1% F.S. (within ±2 digits)	±0.2% F.S. (within ±2 digits)
	Response time	2.5 ms, 5 ms, 10 ms, 25 ms, 50 ms, 100 ms, 250 ms, 500 ms, 1000 ms, 5000 ms select by key operation			
	Short-circuit protection	Equipped			
External input (auto reference/remote zero adjusting)		———		[NPN output] ON voltage: 0.4 VDC or less OFF voltage: 5 to 30 VDC or release Input impedance: 10 kΩ Input time: 1 ms and over	
Analog voltage output		———		Output voltage: 1 to 5 V Zero point: Within 3 V±5%F.S. Span: Within 4 V±5%F.S. Linearity: Within ±1%F.S. Output impedance: 1 kΩ	Output voltage: 0.6 to 5 V Zero point: Within 1 V±5%F.S. Span: Within 4.4 V±5%F.S. Linearity: Within ±1%F.S. Output impedance: 1 kΩ
Analog current output		———		Output current: 4 to 20 mA Zero point: Within 12 mA ±5% F.S. Span: Within 16 mA ±5% F.S. Linearity: Within ±1%F.S. Load resistance: 250 Ω (max.)	Output current: 2.4 to 20 mA Zero point: Within 4mA±5%F.S. Span: Within 17.6 mA±5%F.S. Linearity: Within ±1%F.S. Load resistance: 250 Ω (max.)
Indicator		4-digit + 4-digit 3-color LCD display (display updating cycle: 250 ms, 500 ms, 1000 ms select by key operation)			
	Indicator pressure range	-101.0 to +101.0 kPa	-0.101 to +1.010 MPa	-101.0 to +101.0 kPa	-0.101 to +1.010 MPa
Indicator lamp		Orange LED (comparison output 1 operation indicator lamp, comparison output 2 operation indicator lamp: Lit when comparison output is ON)		Orange LED (comparison output 1 operation indicator lamp: Lit when comparison output is ON, analog voltage output operation indicator lamp: Lit at setup)	
Environment conditions	Degree of Protection	IP40 (IEC)			
	Ambient temperature	-10 to +50°C, at the time of storage: -10 to +60°C			
	Ambient humidity	35 to 85%RH (no condensation or freezing), when stored: 35 to 85%RH			
	Withstand voltage	1000 VAC for 1 minute applied to all charged sections/between cases			
	Insulation resistance	50 MΩ and over with 500 VDC megger overall charging section/between cases			
	Vibration resistance	Durability of 10 to 500Hz double amplitude 3 mm XYZ 2 hours in each direction (Panel mounting: Endurance 10 to 150 Hz double amplitude 0.75 mm XYZ 2 hours in each direction)			
	Shock resistance	Durability of 100 m/s^2 (approx. 10 G) 3 times in each direction of XYZ			
Temperature characteristics (characteristics at +20°C are taken as standard)		Within ±0.5% F.S.	Within ±1% F.S.	Within ±0.5% F.S.	Within ±1% F.S.
Port size		M5 female thread + R (PT) 1/8 male thread			
Material		Case: PBT (glass fiber included), LCD display part: acrylic resin, pressure port: SUS303, mounting screw part: brass (nickeling), switch part: silicone rubber			
Connection		Connector connection			
Wire length		Up to 100 m (less than 30 m when CE marked) with 0.3 mm^2 or larger cable			
Weight		Body weight: approx. 40 g, weight including package: 130 g			
Accessory		PPX-C2 (2 m cable with connector): 1 pc.			

Analog output voltage - pressure characteristics

●PPX-R01NH

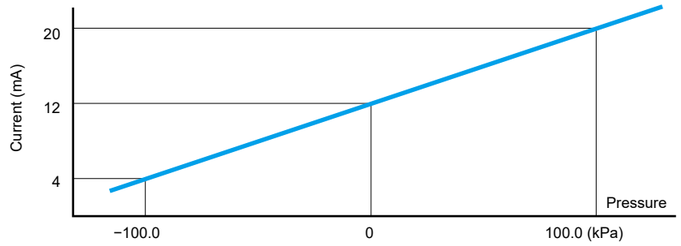


●PPX-R10NH

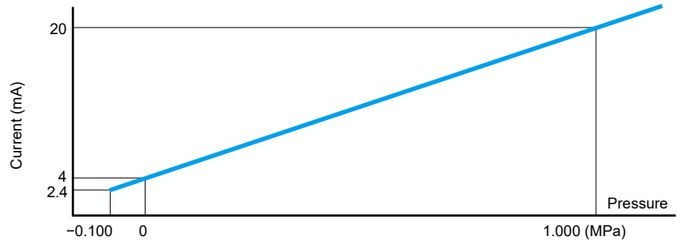


Analog output current - pressure characteristics

●PPX-R01NH

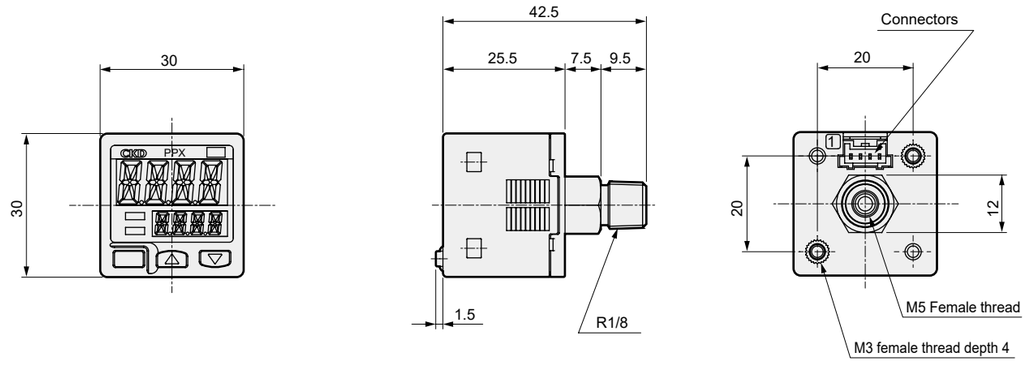


●PPX-R10NH



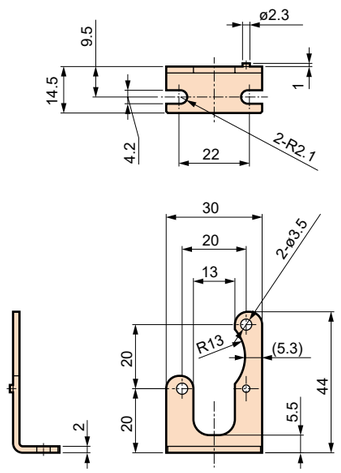
Dimensions

●PPX-R□□-6M (R thread)

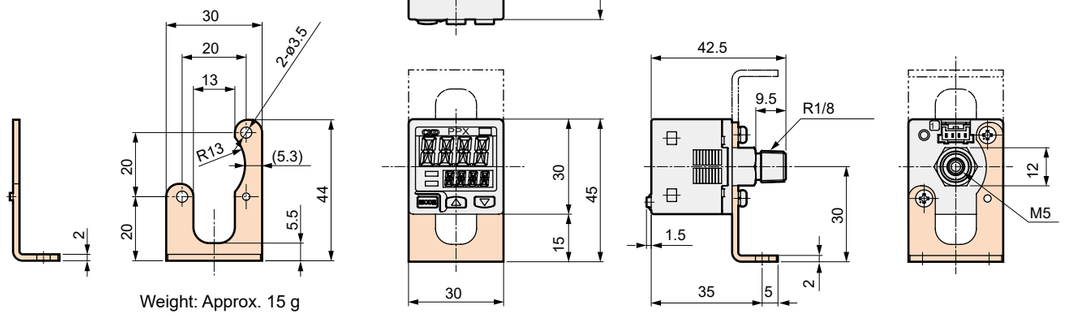


Optional dimensions

●Mounting bracket (PPX-KL)

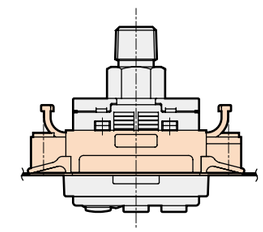


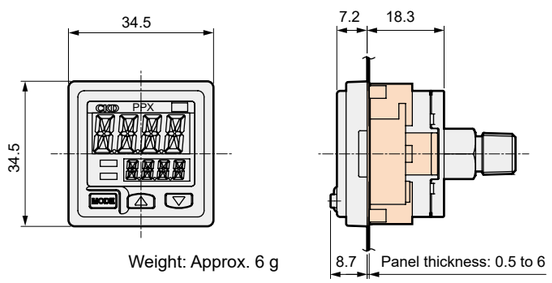
Installation fig.



Weight: Approx. 15 g

●Panel bracket (PPX-KHS) installation fig.

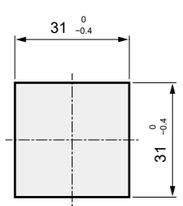




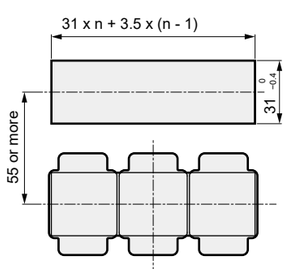
Weight: Approx. 6 g

Panel cut dimension

When installing 1 pc.

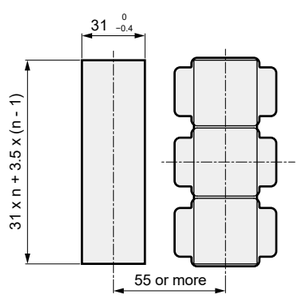


When installing consecutive n pcs. horizontally



Note: Panel thickness must be 0.5 to 6 mm.

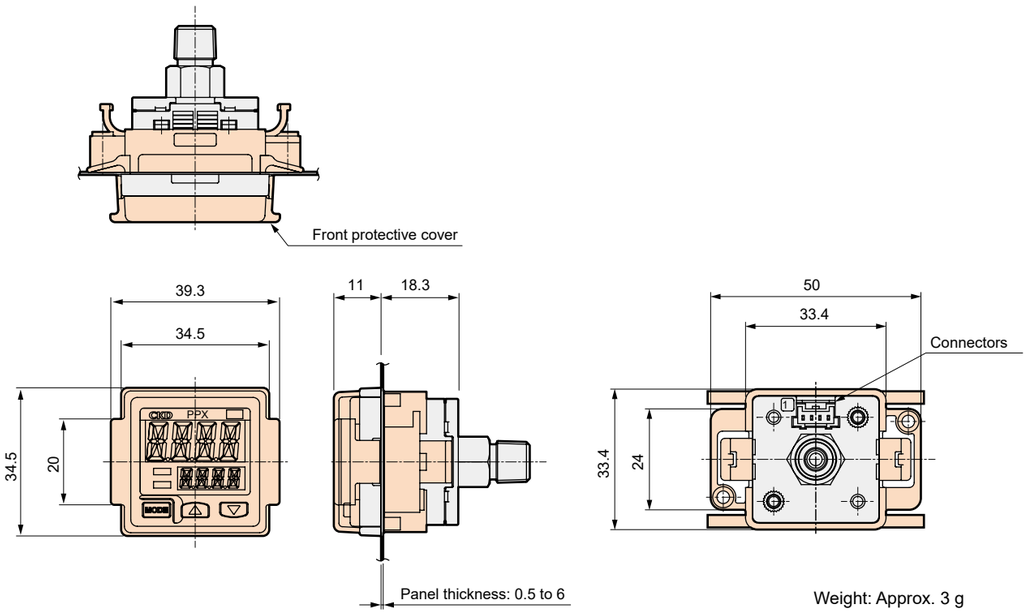
When installing consecutive n pcs. vertically



Note: Panel thickness must be 0.5 to 6 mm.

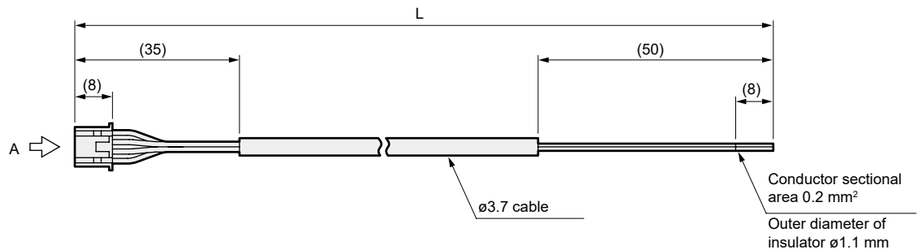
Optional dimensions

●Front protective cover (PPX-KCB) installation fig.



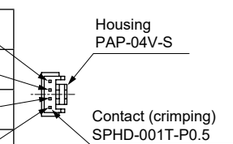
Weight: Approx. 3 g

●Cable with connector (PPX-C□)



(J.S.T.)

0 V	Blue	4
Standard: Comparison output 2 High-function: Analog voltage output or external input	White	3
Comparison output 1	Black	2
+V	Brown	1
Terminal name	Insulator color	Terminal No.

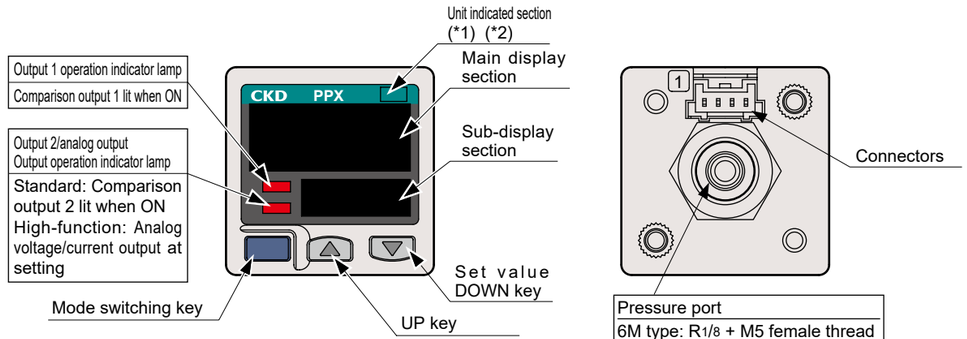


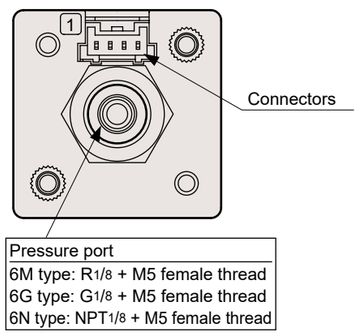
A arrow view

Model No.	Cable length	Weight (g)
PPX-C1	1 m	Approx. 20
PPX-C2	2 m	Approx. 40
PPX-C3	3 m	Approx. 60
PPX-C5	5 m	Approx. 100

●Connector set (PPX-CN)
- Housing: JST MFG CO. LTD. PAP-04V-S
- Contact: J.S.T. Mfg. Co., Ltd. SPHD-001T-P0.5

Names of display/operation section





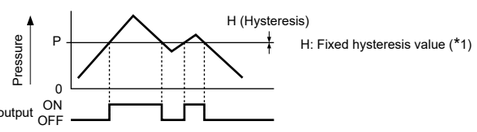
*1: For outside Japan, attach the accompanying unit switching plate corresponding to the set pressure unit.
*2: For outside Japan, the pressure unit can only be set to "MPa" or "kPa".

Operation mode and output operation

The selectable output modes include EASY mode, hysteresis mode, or window comparator mode for comparison output 1 and comparison output 2.

EASY mode

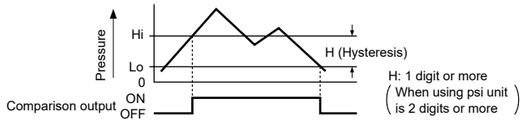
Mode in which comparison output ON/OFF is controlled.



*1: Hysteresis can be set to eight stages.
*2: In case of comparison output 1, "P-1", and in case of comparison output 2, "P-2" are indicated on the sub-display.

Hysteresis mode

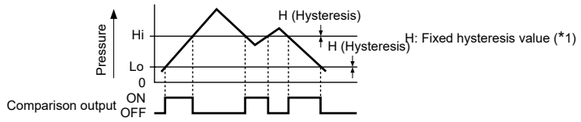
In this mode, the comparison output hysteresis is randomly set to control ON/OFF.



*1: In case of comparison output 1, "Hi-1", "Lo-1", and in case of comparison output 2, "Hi-2", "Lo-2" are indicated on the sub-display.

Window comparator mode

This mode is used to turn comparison output ON or OFF within the setting range.



*1: Hysteresis can be set to eight stages.
*2: For comparison output 1, "Hi-1", "Lo-1", and for comparison output 2, "Hi-2", "Lo-2" are indicated on the sub-display.
*3: The setting interval between the Lo and Hi sides should be at least the fixed hysteresis value or greater.

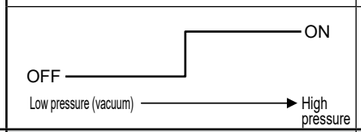
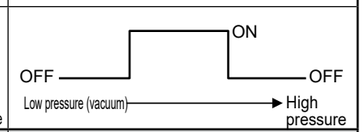
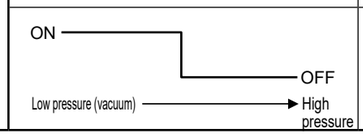
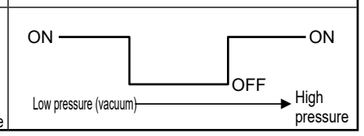
About RUN Mode

Item	Description	Initial state	
Threshold setting	Threshold setting is performed on the sub-display. The main display is not switched.	Standard (low pressure) OUT1: EASY OUT2: OFF NO/NC: NC OUT1 Threshold: -50.0 Standard (high pressure) OUT1: EASY OUT2: OFF NO/NC: NO OUT1 Threshold: .500	High-function (low pressure) OUT1: EASY Analog voltage output NO/NC: NC OUT1 Threshold: -50.0 High-function (high pressure) OUT1: EASY Analog voltage output NO/NC: NO OUT1 Threshold: .500
Zero adjustment	The zero adjustment function forcibly sets the pressure display to "zero" when the pressure port is released to atmospheric pressure.	—	
Key lock function	The key lock function disables key operations so that conditions set for setting modes cannot be mistakenly changed.	—	
Peak/bottom hold function	The peak and bottom hold function is to display the peak and bottom values of varying pressure.	—	

Menu setting mode

Setting items	Initial state	Description	
Comparison output 1 output Mode setting	EASY	Set comparison output 1 output mode.	OFF EASY HYS WCMP
Setting comparison output 2 output mode (Only standard)	OFF	Set comparison output 2 output mode.	OFF EASY HYS WCMP
Switching analog voltage output/ external input (Only high-function)	Vout	The item can be selected from analog voltage output, automatic reference input, or remote zero adjustment input.	Vout AREF ZERO tout
Switching NO/NC	Low pressure: Nc High pressure: No	Set normally open (NO) or normally closed (NC).	—
Setting response time	25	Set the response time. Response time can be selected from 2.5 ms, 5 ms, 10 ms, 25 ms, 50 ms, 100 ms, 250 ms, 500 ms, 1,000 ms, or 5,000 ms.	—
Switching main display color	R-ON	Colors on the main display can be changed.	R-ON G-ON RED GREN
Unit switching	Low pressure: kPA High pressure: MPA	The pressure unit can be changed. (MPa, kPa, kgf, bar, psi, mmHg, inHg)	MPA kPA kgF bAr PSI MMHG inHG

*NO ./N.C. Behavior

NO (normally open)	EASY mode & HYS mode	WCMP MODE
	Switch is turned ON when the pressure reaches or exceeds the set value.	Switch is turned ON when the pressure is within the set value.
		
NC (normally closed)	EASY mode & HYS mode	WCMP MODE
	Switch is turned ON when the pressure reaches or falls below the set value.	Switch is turned OFF when the pressure is within the set value.
		

PRO mode

Setting items	Initial state	Description
Switching sub-display	Std	Set the sub-display for the RUN mode [OFF]: Nothing is displayed. [Unit]: Displays the current pressure unit. [No**]: Displays a random number. [Cust]: Displays a random number, alphabetic character (some characters cannot be displayed), and code.
Switching display speed	250	Set the speed of the pressure displayed on the main display. (250 ms, 500 ms, 1000 ms)
Switching fixed hysteresis value	111	Set hysteresis for the EASY mode and window comparator mode. (8 stages)
Switching linked with display color (Only standard)	Out1	Interlinking the settings made with the main display color switching in the menu setting mode can be done with either comparison output 1 or comparison output 2.
Setting ECO mode	OFF	Power consumption can be reduced. [OFF]: Normal (ECO mode OFF) [Std]: Display is dimmed if no key is pressed for 5 seconds in RUN mode. [FULL]: Display is turned OFF if no key is pressed for 5 seconds in RUN mode. The normal display appears temporarily if any key is pressed.
Setting confirmation code	0000	Currently set details can be confirmed. Check codes in the List of Codes.
Setting copy mode	OFF	Details set for the master sensor can be copied to the device unit sensor. Refer to "Setting copy function" for details. [ON]: Set details are copied. [ON-L]: Set details are copied and device side sensor keys are locked.
Setting reset	OFF	Settings are returned to defaults. Pressing the mode changeover key when "ON" is pressed will return to the initial state (factory default).

Code list

Code	1st digit		2nd digit			3rd digit	4th digit	
			Standard		High-function			Standard only
	Comparison output 1 output mode	Switching NO/NC	Comparison output 2 output mode	Switching NO/NC	Analog voltage output/external input	Threshold display	Main display section display color	Display color interlock
0	EASY	NO	OFF	OFF	Analog voltage output	P-1, Lo-1	Red when turned ON	Comparison output 1
1		N.C.	EASY	NO	Auto-reference	Hi-1		Comparison output 2
2	Hysteresis	NO		N.C.	Remote zero adjustment	P-2, Lo-2	Green when turned ON	Comparison output 1
3		N.C.	Hysteresis	NO	Analog current output	Hi-2		Comparison output 2
4	Window comparator	NO		N.C.	—	ADJ.	Normally red	Comparison output 1
5		N.C.	Window comparator	NO	—	—		Comparison output 2
6	—	—		N.C.	—	—	Normally green	Comparison output 1
7	—	—	—	—	—	—		Comparison output 2

Code	5th digit	6th digit	7th digit	8th digit
	Response time	Unit switching	Indicator speed	Eco mode
0	2.5 ms	MPa	250 ms	OFF
1	5 ms	kPa	500 ms	Std
2	10 ms	kgf/cm²	1,000 ms	Full
3	25 ms	bar	—	—
4	50 ms	psi	—	—
5	100 ms	mmHg	—	—
6	250 ms	inchHg	—	—
7	500 ms	—	—	—
8	1,000 ms	—	—	—
9	5,000 ms	—	—	—

Limited to export models with unit select functions

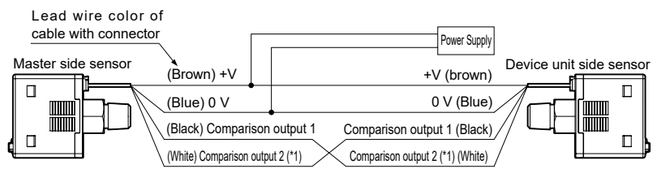
Setting copy function

This function copies settings from the master sensor to the device unit sensor.

●Settings can be copied only between the same models. Data cannot be copied between different models.
●The setting copy function can copy settings for one master sensor to one device unit sensor.

[Installation procedure]

①Set the master sensor setting copy mode to Copy ON or ON-L, and press the mode select key to prepare for copying.
②Turn master sensor power OFF.
③Connect the master sensor to the device unit sensor as shown below.



*1: Analog voltage output and external input are connected for the high-function type.

④ Turn ON the power for the master sensor and device unit sensor simultaneously. (*2) (*3)
⑤ Setting details are encoded in 16-bit code and displayed in orange on the main sensor display, after which copying begins.
⑥ The same code as in the procedure ⑤ is displayed in green on the device unit sensor's main display, and "OK" is displayed on the sub-display when copying finishes.
⑦ Turn master sensor and device unit sensor power OFF, and disconnect wires.
*To repeatedly copy settings to another sensor, follow steps ③ to ⑥ .

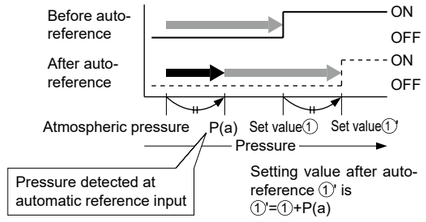
*2: Set details may not be copied if sensor power is not turned ON simultaneously.
*3: Pulse output is output to comparison output 1 when power is turned ON.

[Canceling master sensor setting copy mode]

①Turn the master sensor power ON (with device unit sensor wiring disconnected).
②Press the mode select key for 2 seconds.

Automatic reference function (high-function only)

The automatic reference function compensates for the setting using the pressure detected at automatic reference input as the reference pressure. Setting value ①' is automatically compensated for as "Setting value ①+ P (a)" using pressure value P (a) detected during automatic reference input as the reference.



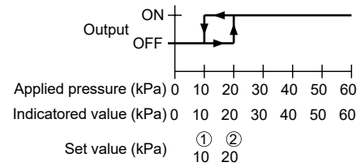
Valid setting range and set pressure range after compensation

The set pressure range is wider than the rated pressure range to comply with the automatic reference function.

When using automatic reference input, if the compensated setting value exceeds the set pressure, the setting is automatically compensated to within the set pressure range. Check that the set pressure is not exceeded.

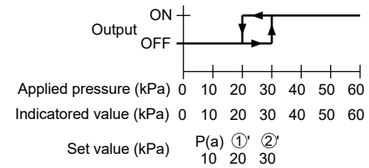
Operation chart

[Normal (NO setting for each comparison output)]



〈Auto-reference input (NO setting for each comparison output)〉

Detection pressure when auto-reference input: 10 kPa
• Output mode: hysteresis mode



*1: For EASY mode and window comparator mode, the setting values are corrected in the same way.

●The pressure detected at automatic reference input is set to zero when the setting for the analog voltage output/external input select function is set or power is turned ON again.
●The automatic reference input can be confirmed when the RUN mode threshold is set.

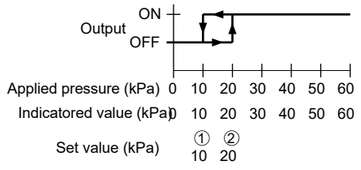
Remote zero adjusting (high-function only)

●The remote zero adjustment function forcibly sets the pressure to zero when the external signal is input.

The setting is not compensated for when remote zero adjustment is input. Check that pressure and setting for the remote zero adjustment function do not exceed the set pressure.

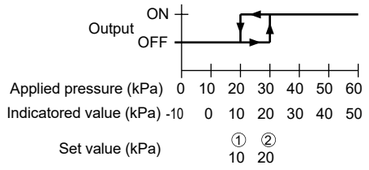
Operation chart

[Normal (NO setting for each comparison output)]



〈Remote zero adjusting input (NO setting for each comparison output)〉

Pressure for remote zero adjusting input: 10 kPa
• Output mode: hysteresis mode



*1: The same setting values are not corrected for EASY mode and window comparator mode.

●The remote zero adjustment function is cleared to zero when the setting for the analog voltage output/external input select function is set or power is turned ON again, and operation returns to normal using atmospheric pressure as a reference. The remote zero adjustment can be confirmed when the RUN mode threshold is set.

For details on operation and setting method, refer to CKD Components Product website (https://www.ckd.co.jp/kiki/en/) → "Model No."→Instruction manual

Digital pressure sensor IO-Link

PPX Series

Circuit diagram symbol

Refer to the CKD website for detailed compatible model Nos.

Model No. Notation Method

[Model No. Notation Method in Japan]

PPX - R01 PC - 6M

- PPX: Model No.
- R01: ❶Pressure range
- PC: Output: PNP output + IO-Link
- 6M: Piping shape: R1/8, M5

❶Pressure range

Code	Description
R01	−100.0 to 100.0 kPa
R10	−0.100 to 1.000 MPa

Note: A one-sided loose wire 2 m connector cable (model No.: PPX-C2) is attached. M12 cable with connector is a separately-sold optional item.

[Model No. Notation Method for overseas markets]

In compliance with the new Measurement Law, export models with unit select function cannot be used in Japan.

PPX - R01 PC - 6M - KA

- PPX: Model No.
- R01: ❶Pressure range
- PC: Output: PNP output + IO-Link
- 6M: ❷Piping shape
- KA: With unit change function

Note: A one-sided loose wire 2 m connector cable (model No.: PPX-C2) is attached. M12 cable with connector is a separately-sold optional item.

❶Pressure range

Code	Description
R01	−100.0 to 100.0 kPa
R10	−0.100 to 1.000 MPa

❷Piping shape

Code	Description
6M	R1/8, M5
6N	NPT1/8, M5
6G	G1/8, M5

❶Option

Code	Description		
CN1	With M12 connector Cable	1 m	
CN2		2 m	
CN3		3 m	
KL	Mounting bracket (mounting screw attached)		
KHS	Panel bracket		
KCB	Front protective cover (when using panel bracket)		

Discrete option model No.

PPX - CN1

- PPX: Model No.
- CN1: ❶Option

Specifications for rechargeable battery

(Catalog No.CC-1226AA)

Conforms to CKD P4 Series equivalent specifications as standard.

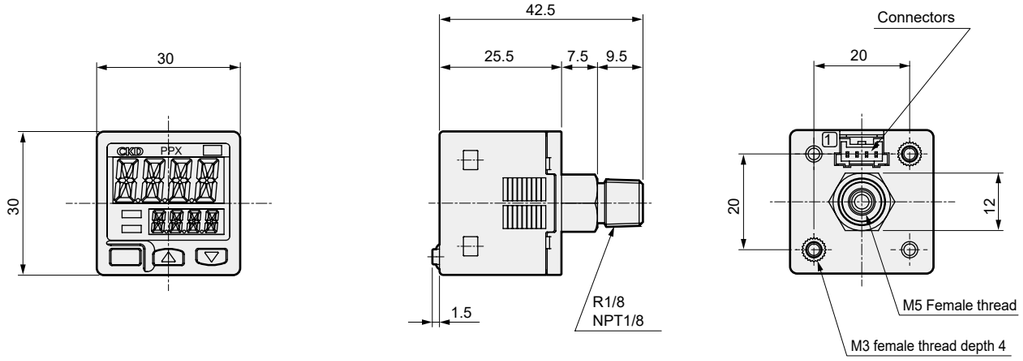
Specifications

Item		IO-Link	
		For low pressure PPX-R01PC	For high pressure PPX-R10PC
Type of pressure		Gauge pressure	
Rated pressure		−100.0 to +100.0 kPa	−0.100 to +1.000 MPa
Pressure setting		−101.0 to +101.0 kPa	−0.101 to +1.010 MPa
Proof pressure		500 kPa	1.5 MPa
Applicable fluid		Air/non-corrosive gas	
Power supply voltage		12 to 24 VDC ±10%, Ripple P-P 10% or less	
Power consumption		Normal: 720 mW or less (current consumption 30 mA or less at 24 V power supply voltage) ECO mode: 480 mW of less at STD (current consumption 20 mA or less at power supply voltage 24 V), 360 mW or less at FULL (current consumption 15 mA or less at power supply voltage 24 V)	
Communication output (C/Q) *1	IO-Link communication	IO-Link Specification V1.1	
	Transmission bit rate	COM3 (230.4kbps)	
	Process data	4 byte	
	Minimum cycle	1.0 ms	
Control output (DO)		[PNP output] PNP transistor/open collector • Max. outflow current: 50 mA • Applied voltage: 30 VDC or less (control output -/+V interval) • Residual voltage: 2 V or less (at outflow current 50 mA)	
	Output operation	Select from NO and NC	
	Output mode	EASY mode/hysteresis mode/window comparator mode	
	Hysteresis	Min. 1 digit (variable)	
	Repeatability	±0.1% F.S. (within ±2 digits)	±0.2% F.S. (within ±2 digits)
	Response time	2.5 ms, 5 ms, 10 ms, 25 ms, 50 ms, 100 ms, 250 ms, 500 ms, 1000 ms, 5000 ms	
	Short-circuit protection	Equipped	
Indicator		4 digit + 4 digit 3-color LCD display (display updating cycle: 250 ms, 500 ms, 1000 ms)	
	Indicator pressure range	-101.0 to +101.0 kPa	-0.101 to +1.010 MPa
Indicator lamp		Orange LED	
		Output operation indicator lamp blinks during 1: IO-Link communication, turns ON during control output in non-IO-Link communication (synchronized with output operation indicator lamp 2)	
		Output operation indicator lamp 2: Turns ON when control output is ON	
Environment conditions	Degree of Protection	IP40 (IEC)	
	Ambient temperature	-10 to +50°C, at the time of storage: -10 to +60°C	
	Ambient humidity	35 to 85%RH (no condensation or freezing), when stored: 35 to 85%RH	
	Withstand voltage	1000 VAC for 1 minute applied to all charged sections/between cases	
	Insulation resistance	50 MΩ and over with 500 VDC megger overall charging section/between cases	
	Vibration resistance	Durability of 10 to 500Hz double amplitude 3 mm XYZ 2 hours in each direction (Panel mounting: Endurance 10 to 150 Hz double amplitude 0.75 mm XYZ 2 hours in each direction)	
	Shock resistance	Durability of 100 m/s^2 (approx. 10 G) 3 times in each direction of XYZ	
Temperature characteristics (characteristics at +20°C are taken as standard)		Within ±0.5% F.S.	Within ±1% F.S.
Port size *2		M5 female thread + R (PT) 1/8 male thread M5 female thread + G1/8 male thread M5 female thread + NPT1/8 male thread	
Material		Case: PBT (glass fiber included), LCD display part: acrylic resin, pressure port: SUS303, mounting screw part: brass (nickeling), switch part: silicone rubber	
Connection		Connector connection	
Wire length		Total length up to 20 m (less than 20 m for CE mark conformance) with 0.3 mm^2 or larger cable	
Unit change function		Only supported for overseas (-KA) (MPa, kPa.kgf/c) m^2, bar, psi, mmHg, inchHg)	
Weight		Body weight: approx. 40 g, weight including package: 130 g	
Accessory		PPX-C2 (2 m cable with connector): 1 pc. Unit seal label (with unit change function for -KA): MPa, kPa.kgf/cm^2, bar, psi, mmHg, inchHg	

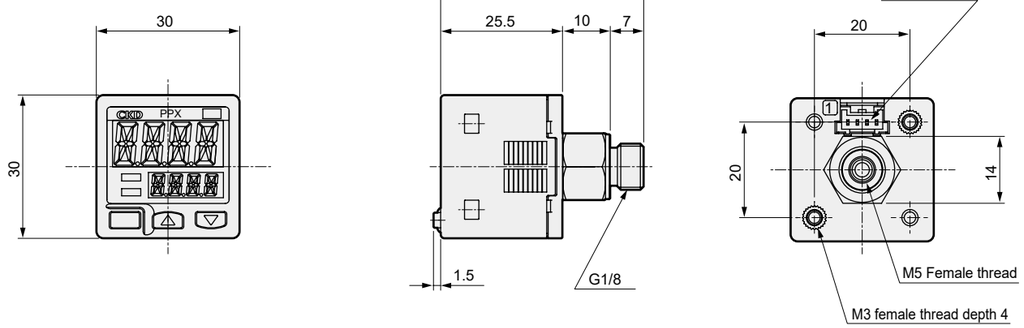
*1: When used as a standard sensor, communication output (C/Q) will be the same output operation as control output (DO).
*2: Only "M5 female thread + R (PT) 1/8 male thread" is available for Japan. All-types are available for overseas.

Dimensions

●PPX-R□□PC-6M/6N (R thread/NPT thread)

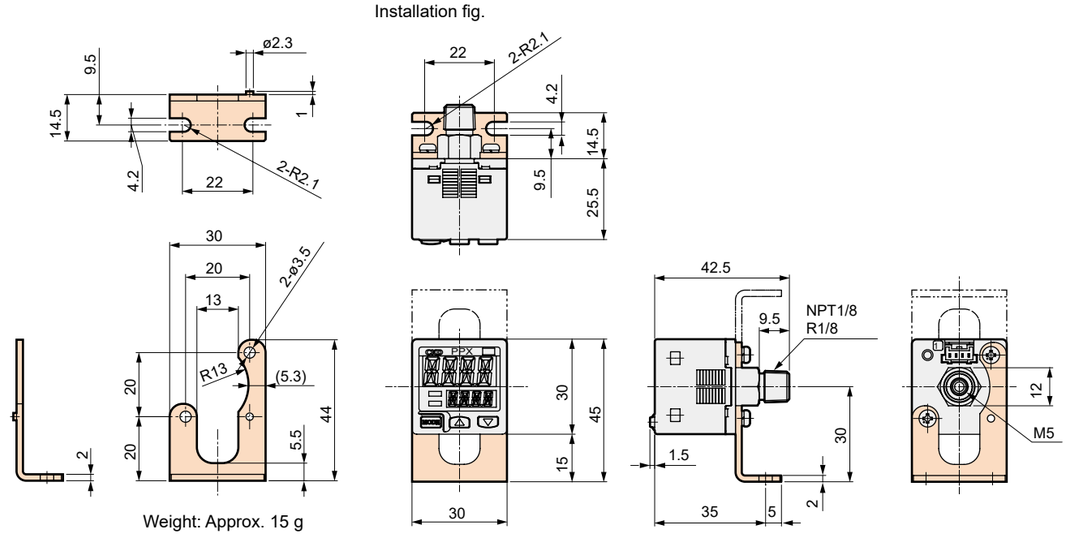


●PPX-R□□PC-6G (G thread)



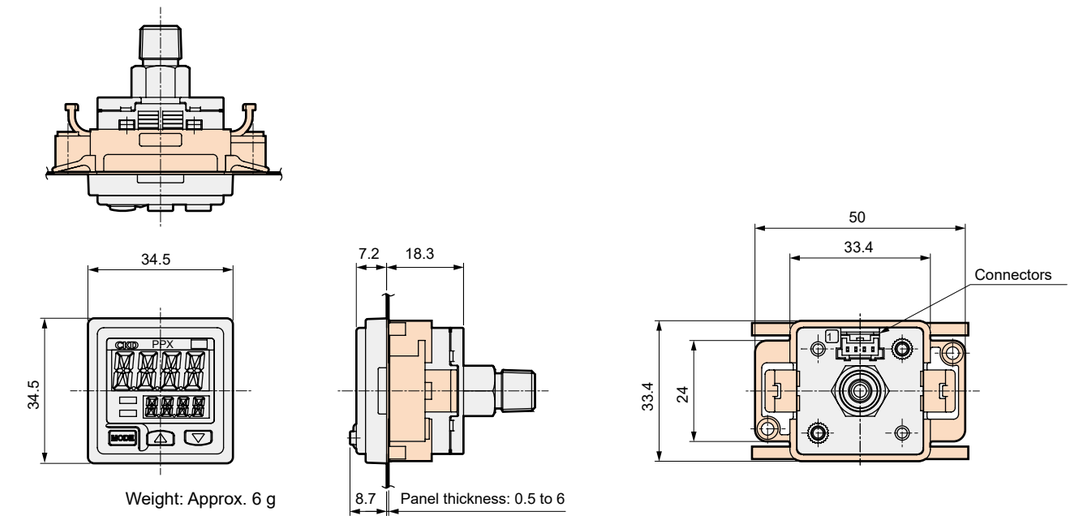
Optional dimensions

●Mounting bracket (PPX-KL)



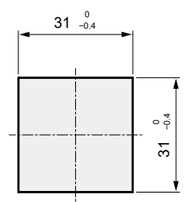
Weight: Approx. 15 g

●Panel bracket (PPX-KHS) installation fig.

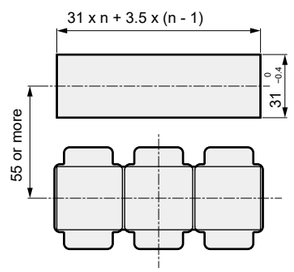


Panel cut dimension

When installing 1 pc.

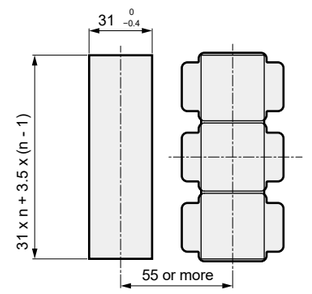


When installing consecutive n pcs. horizontally



Note: Panel thickness must be 0.5 to 6 mm.

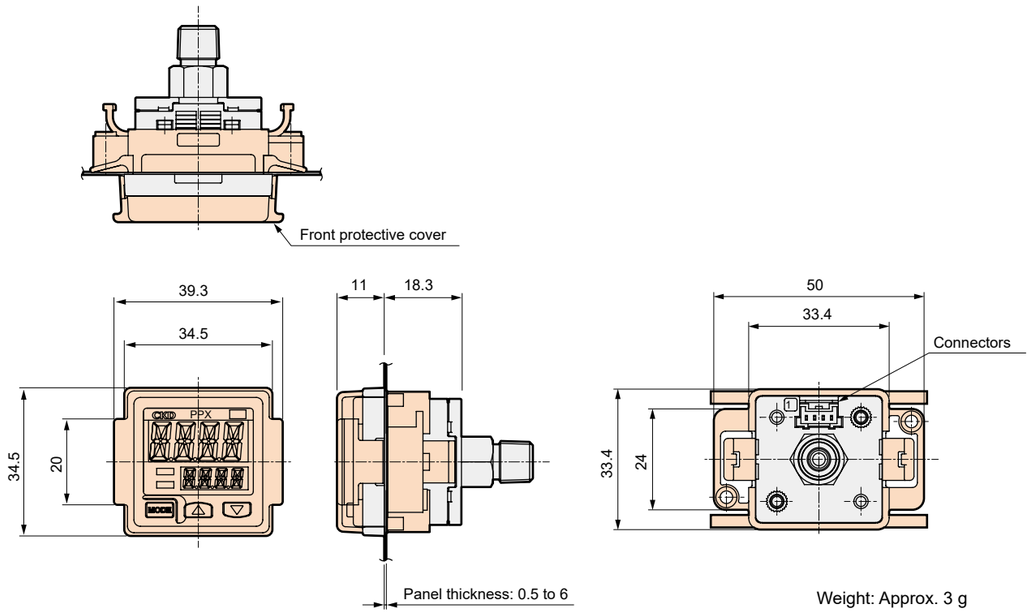
When installing consecutive n pcs. vertically



Note: Panel thickness must be 0.5 to 6 mm.

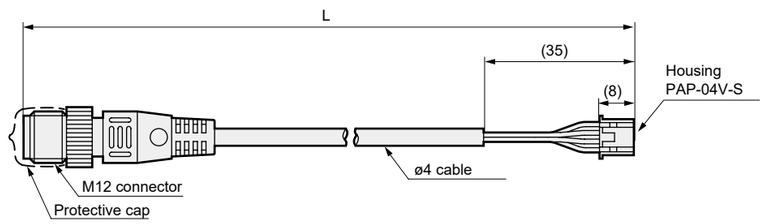
Optional dimensions

●Front protective cover (PPX-KCB) installation fig.



Weight: Approx. 3 g

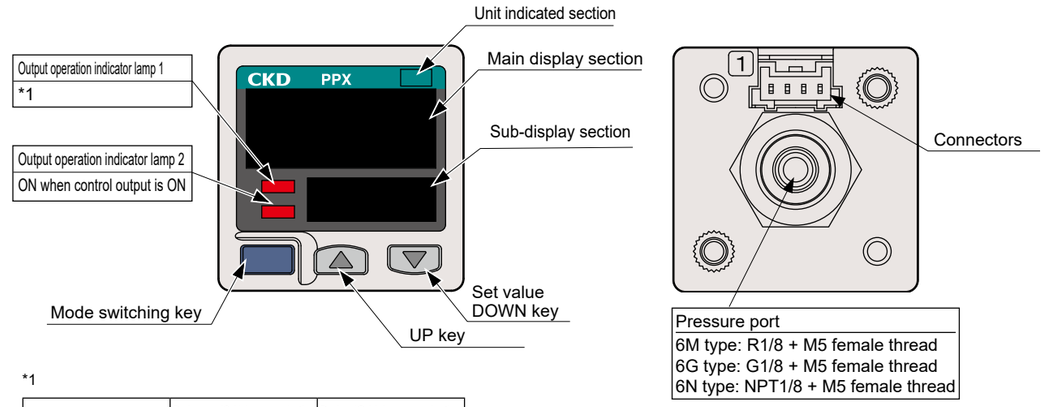
●Cable with connector (PPX-CN*)



M12 connector pin No.	Lead wire color	Housing terminal No.	Applications
1	Brown	1	+V
2	White	3	DO
3	Blue	4	0 V
4	Black	2	C/Q

Model No.	Cable length	Weight (g)
PPX-CN1	1m	Approx. 40
PPX-CN2	2m	Approx. 70
PPX-CN3	3m	Approx. 100

Names and functions of display/operation section (IO-Link)



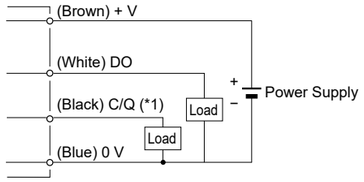
*1

	During non-IO-Link communication	During IO-Link communication
Indicator lamp operation	Control output lit when ON *2	Blinking operation

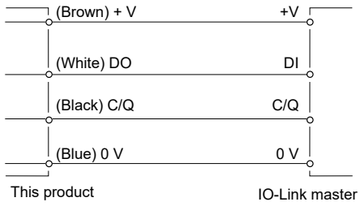
*2: Synchronized with operation output display lamp 2

Connection

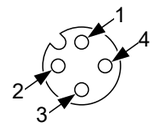
●When used as a standard sensor



●When used connected to IO-Link master



[M12 connector cable terminal array]



Terminal No.	Terminal name
1	+V
2	Control output (DO)
3	0 V
4	IO-Link communication (C/Q) (*1)

*1: When used with general sensors, IO-Link communication (C/Q) has the same output operation as control output (DO).

M12 connector mounting

The connector will detach if the fixing ring loosens, resulting in a communication error from this product. Be sure to confirm before use that the fixing ring is not loose.

Communication specifications

• Common to all models

Item	Details
Communication protocol	IO-Link
Communication protocol version	V1.1
Transmission bit rate	COM3(230.4kbps)
Port	Class A
Process data length (input)	4 byte
Process data length (output)	0 byte
Minimum cycle time	1 ms
Data storage	15 byte
SIO mode support	Yes
Vendor ID	855

• Device ID for each model

	Device ID
PPX-R01PC-6M	2179072
PPX-R10PC-6M	2179073
PPX-R01PC-6M-KA	2179074
PPX-R01PC-6N-KA	2179075
PPX-R01PC-6G-KA	2179076
PPX-R10PC-6M-KA	2179077
PPX-R10PC-6N-KA	2179078
PPX-R10PC-6G-KA	2179079

Process data (PD)

	bit							
	7	6	5	4	3	2	1	0
PD0	Upper byte of pressure value							
PD1	Lower byte of pressure value							

PD2 bit	Allocation	Remarks
7 6 5 4 3 2 1 0	Control output (DO)	0: OFF 1: ON
	Fixed	0
	Fixed	0
	Fixed	0
	Fixed	0
	Notifications	0: No notification 1: Notification
	Error level	0: Normal 1: Caution 2: Error

PD3	Scale Low pressure sensor: -1 High pressure sensor: -3 (with MPa selected) 0

	PD0 (31-24bit)	PD1 (23-16bit)
Low pressure	Pressure value [Pa] (-1010 to 1010)	
High pressure	Pressure value [Pa] (-100 to 1010)	

Function list

Function	Body side setting	IO-Link communication setting
Control output mode setting	Select from EASY mode/hysteresis mode/window comparator mode	Index61_2
Threshold setting	EASY mode: Threshold setting, Hysteresis mode/window comparator mode: Low side threshold setting	Index60_1
	Hysteresis mode/window comparator mode: Hi side threshold setting	Index60_2
Zero adjustment	Run/Cancel	Index2
Key lock function	Set/Cancel	Index12
Peak/bottom hold function	Setting	Index82_4
Control output operation setting	NO./N.C.	Index61_1
Setting response time	Select from 10 levels	Index66
Main display section color setting	Select from 4 modes	Index82_1
Pressure unit setting	Select from MPa/kPa/kgf/bar/psi/mmHg/inchHg [List of units that can be set] • For Japan/low pressure: kPa • For Japan/high pressure: MPa, kPa • For overseas/low pressure: kPa, kgf, bar, psi, mmHg, inchHg • For overseas/high pressure: MPa, kPa, kgf, bar, psi	Index83
Sub-display section display setting	Select from 5 modes	Index82_2
	No. display setting	Index84_1
	Customized display setting	Index84_2
Indicator speed setting	Select from 3 levels	Index82_3
Hysteresis setting	Select from 8 levels	Index61_3
Setting ECO mode	Select from 3 modes	Index80
Setting confirmation code	8-digit display	—
Setting reset	Run	Index2
Remote zero adjustment setting	—	Index2
Zero adjustment notification	—	Index85
Auto-reference setting	—	Index2
Operation time	—	Index163
No. of memory write cycles	—	Index164
Notification flag setting	—	Index168
Notification event code reading	—	Index169

Note: IO-LinkDownload the setting file (IODD) from the CKD website (https://www.ckd.co.jp/en/).

MEMO

Pressure switch
Electronic pressure Switch
Contact Confirm Switch
For Coolant Pressure Switch
Ending

Pneumatic components (electronic pressure switch and sensor)

Safety Precautions

Be sure to read this section before use.
For general pneumatic components precautions, refer to Intro 17 for details.

Product-specific cautions: Digital pressure sensor PPX Series

During Design and Selection

⚠WARNING

■Use this product in accordance with specifications.
Use for applications, or at load currents, voltages, temperatures, impacts or sites excluded from the specifications could result in damage or malfunctions.

■Do not use oxygen, corrosive or combustible gas, or toxic fluid for this product.

■Never use this product in an explosive gas atmosphere.
The pressure switch does not have an explosive-proof structure. Never use in an explosive gas atmosphere as explosions or fires could result.

■Avoid installing this product in a sealed control box or indoors.
If the fluid should leak due to any trouble, the pressure in the sealed chamber could change and recreate a hazardous state. Use this product in the control box having safety device to control internal pressure, or indoors with no pressure differential from the outsidePlease.

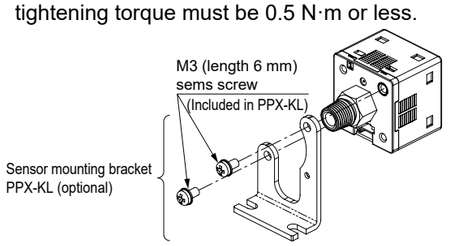
■Power supply voltage
Do not use this product at levels exceeding the power supply voltage. If voltage exceeding this range or AC power supply (100 VAC) is applied, the controller could rupture or burn.

■DC power not insulated from the AC primary side may damage the product and power, possibly leading to electric shock. Do not use the product in this case.

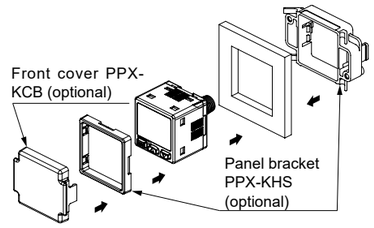
■Load short-circuit
Do not short-circuit the load. Failure to observe this could result in rupture or burning.

■Incorrect wiring
Avoid incorrect wiring such as mistaken power source polarities, etc. Failure to observe this could result in rupture or burning.

■Sensor mounting bracket PPX-KL is available. If a sensor is installed with a mounting bracket, etc., tightening torque must be 0.5 N·m or less.



■Panel bracket PPX-KHS (optional) and front cover PPX-KCB (optional) are also available.



⚠CAUTION

■Applicable fluid
When using applicable fluid other than air; nitrogen gas, etc., oxygen deficiency could be caused. Observe the following instructions.
- Use in well ventilated locations.
- Ventilate the work area when nitrogen gas is being used.
- Inspect nitrogen gas piping regularly to avoid leaks.
- Non-corrosive gas means substances such as nitrogen or carbon dioxide contained in air and inert gases such as argon or neon.
- When using this product for compressed air containing water or oil, use the PPD3-S (stainless steel diaphragm sensor specifications) with increased corrosion resistance.

■If this product is used for vacuum suction confirmation, care must be taken for following matters.
When applying positive pressure for vacuum burst onto the product, check that it does not exceed the specified proof pressure.

■Working environment
- Avoid use in locations subject to vibration or shock of 100 m/s^2 or more.
- Check the temperature of fluid being measured and the environmental temperature in piping.
- When using a type that does not have the corresponding degree of protection, do not use for applications in which water or oil could be applied.

■Determine the setting, taking error caused by accuracy limitations and temperature characteristics into consideration.

■Take care when using this product for an interlock circuit.
When using the pressure switch for an interlock signal requiring high reliability, provide a double interlock by installing a mechanical protection function or a switch (sensor) other than a pressure switch as a safeguard against breakdown. Regularly inspect and confirm that the interlock activates correctly.

■Response time is affected by working pressure and load volume. If reproducibility with stable response time is required, install a regulator in the proceeding stage.

■Take the following countermeasures to prevent malfunction caused by noise.
- Insert a line filter in the AC power supply line.
- Do not share power with an inverter or components causing motor noise, etc.
- Use a surge suppressor such as a CR or diode on the inductive load (solenoid valve, relay, etc.) and remove noise from the source.
- When using a components (switching regulator, inverter motor, etc.) that could generate noise near the sensor, be sure to ground the components frame ground (F.G.) terminal.
- Separate wiring to the sensors from strong magnetic fields.
- Components Connect wiring to the sensors with a shield wire.
- Ground the shield wire on the power supply side.

■Care must be taken for protection of body and lead wire.
- Do not bump or drop the body, or apply excessive bending or tensile strength to the lead wire. This may lead to disconnection.
- Connect and wire bending-resistant material, such as robot wire material, for the movable sections.

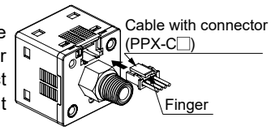
■Avoid connecting the output for a relay contact, operation switch, or other components output in parallel with the PLC to the product's output, or short-circuiting the input terminal of the PLC to which this product is connected with the power supply cable's negative side to test the input device. This product's output circuit could be damaged.

■When releasing the secondary control pressure, such as air blowing, into the atmosphere, the pressure could fluctuate depending on the piping and flow conditions. Test with actual working conditions, or contact CKD.

■Components When selecting dryer, air filter, oil mist filter or regulator, select a device with a flow rate higher than that used by proportional pressure controls.

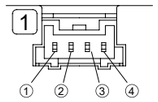
■CE-compliance working conditions
The standard for the immunity for industrial environments applied to CE conforming product is EN61000-6-2, but the following requirements must be satisfied in order to conform to this standard.
Conditions
- The evaluation of this product is performed by using a cable that has a power supply line and a signal line paired to assess the product's performance.
- This product is not equipped with surge protection. Implement surge protection measures on the system side.

■Connector wiring
- Connect by inserting the cable with connector PPX-C□ into the product connector as shown at right.
- To remove, press down on the pawl of the cable with a connector and pull out the connector.
- Do not pull on the cable without pressing down on jaws. The cable could break or the connector could be damaged.



[Connector]
Contact: SPHD-001T-P0.5
Housing: PAP-04V-S
[Manufactured by J.S.T. Mfg. Co., Ltd.]

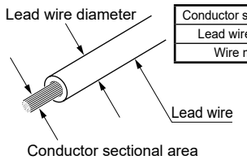
[Connector pin array drawing]



Connector pin No.	Terminal name
①	+V
②	Comparison output 1
③	Standard: Comparison output 2 High-function: Analog voltage output or external input
④	0 V

- When wiring with a connector set (PPX-CN), be sure to use a compatible cable and crimp tool specialized for housing and contacts.

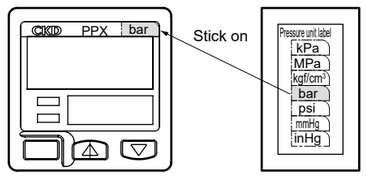
[Conforming cable]



Conductor sectional area	0.12 to 0.32 mm² (AWG26 to 22)
Lead wire diameter	ø1.0 to ø1.5 mm
Wire material	Annealed copper twisted wire

Housing	J.S.T. Mfg. Co., Ltd. PAP-04V-S
Contact	J.S.T. Mfg. Co., Ltd. SPHD-001T-P0.5
Recommended crimping tools	J.S.T. Mfg. Co., Ltd. YC-610R (AWG26 to 24)
	J.S.T. Mfg. Co., Ltd. YC-611R (AWG22)

■When using the unit change function
If using export models (for outside Japan), when changing the units other than MPa or kPa, make sure to attach the unit seal attached and attached to the product to the unit indication section on the operation section.



[Unit seal label]

For precautions during mounting, installation, adjustment, use and maintenance, refer to the CKD Components Product Site (https://www.ckd.co.jp/kiki/en/) → "Model No.→ Instruction Manual