

## QDP33

**NEW**



RoHS

### 30×30 type digital fine differential pressure sensor

- Mounted with our originally developed electrostatic capacity type pressure sensor.
- Industry's smallest size with a sensor, a display, and output function incorporated in 30 mm square size.
- Close-contact mounting is possible.
- Employs easily visible large 12-segment LCD.
- Product compliant with UL standard and EU directive.
- An ultra-low pressure range product is newly added to the product lineup. Product with 0 to 10 Pa range is optimum for room pressure measurement of clean rooms compliant with the CDC guideline and negative pressure rooms.



QDP33

### Installation example



Horizontal connection



Vertical connection

#### <Main application fields>

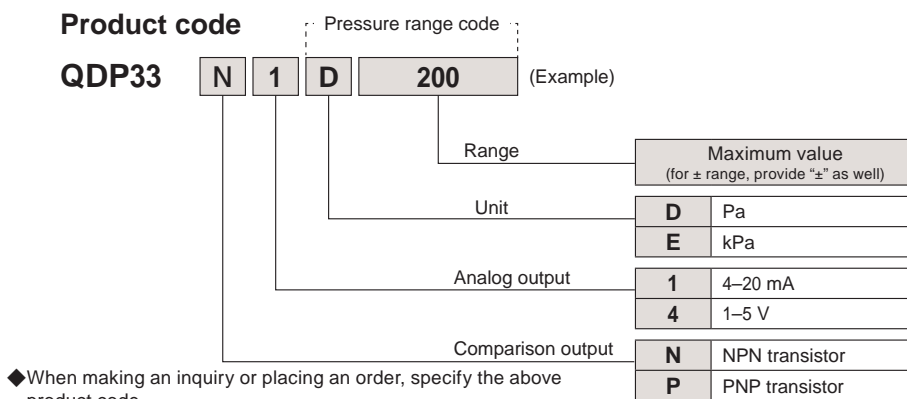
- General factory management equipment
- Negative pressure for dust collector/differential pressure of air conditioner
- Filter pressure loss management
- Precision machine manufacturing line
- Building air conditioning control equipment

#### <Usage>

- Detection of clogging of air filter
- Room pressure measurement in a clean room
- Measurement of clogging of bug filter
- Measurement of dynamic pressure at ventilation/exhaust device

#### Product code

QDP33 **N** **1** **D** **200** (Example)



\*(Refer to pages 114 to 117)

### Specifications

Model	QDP33	
<b>Pressure unit</b>	Pa, kPa	
<b>Pressure measurement method</b>	Differential pressure method	
<b>Measured gas</b>	Air and noncorrosive gas (liquid cannot be measured)	
<b>Sensor method</b>	Electrostatic capacity type	
<b>Pressure-receiving element</b>	Diaphragm (silicone)	
<b>Mounting orientation</b>	Mounting on vertical surface	
<b>Operating ambient temperature</b>	D10, D25, D ± 10, D ± 25: 0°C to 50°C (no freezing allowed) Other pressure range codes: 0°C to 60°C (no freezing allowed)	
<b>Operating ambient humidity</b>	35% to 85% RH or below (no condensation allowed)	
<b>Instrument body withstanding pressure</b>	10 kPa (refer to page 118)	
<b>Withstanding pressure of pressure-receiving element</b>	10 kPa (refer to page 118)	
<b>Display</b>	Main display 12-segment LCD (white/red), four digits Sub display 12-segment LCD (orange), four digits Accuracy D10, D25, D ± 10, and D ± 25: ± 1.5% FS ± 1 digit (at 23°C) Other pressure range codes: ± 1.0% FS ± 1 digit (at 23°C) Temperature characteristics ± 0.15% FS/°C (zero + span)	
<b>Zero adjustment method</b>	Push-type automatic zero return (The displayed value and analog output are adjusted to zero at the same time.)	
<b>Comparison output</b>	Setting method: push-type digital setting Output display Red LCD × 2 Output type • QDP33N Two systems of NPN open collector Maximum load current: 100 mA or lower (per output) Maximum load voltage: 30 V DC or lower Output saturated voltage: 1 V DC or lower (at load current of 100 mA) • QDP33P Two systems of PNP open collector Maximum load current: 100 mA or lower (per output) Maximum load voltage: 30 V DC or lower Output saturated voltage: 2 V DC or lower (at load current of 100 mA)	
<b>Analog output</b>	Accuracy Pressure range codes D10, D25, D ± 10, and D ± 25: ± 1.5% FS (at 23°C) Other pressure range codes: ± 1.0% FS (at 23°C) Temperature characteristics ± 0.15% FS/°C (zero + span) Output type • QDP33□1 4 to 20 mA (biased pressure: 0 to FS, ±: at pressure of -50 to +50% FS) Load resistance: 0 to 250 Ω • QDP33□4 1 to 5 V (biased pressure: 0 to FS, ±: at pressure of -50 to +50% FS) Load resistance: 10 kΩ or higher	
<b>Power voltage</b>	12 to 24 V DC ± 10% (ripple of 10% or below)	
<b>Maximum consumption current</b>	Normal mode 25 mA (at power voltage of 24 V) Low power consumption mode 20 mA (at power voltage of 24 V) *Excluding consumption currents in analog output and comparison output	
<b>Insulation resistance</b>	Between terminal and case 10 MΩ or higher (500 V DC megger)	
<b>Withstand voltage</b>	Between terminal and case 500 V AC, 50/60 Hz, for one minute	
<b>Installation category</b>	Standard IEC 60664 level II (However, this product must be connected to the secondary side of a safety insulation transformer, such as DC switching power.)	
<b>Operating altitude</b>	Altitude of 2000 m or below	
<b>Protection level</b>	Standard: IEC 60529 Grade code: IP40	
<b>Degree of contamination</b>	Standard: IEC 60664 Grade code: 2 (If it is not possible to install this product at a dry clean location, house it in a housing.)	
<b>Durable vibration</b>	5 to 10 Hz, amplitude of 10 mm 10 to 50 Hz, acceleration of 39 m/s <sup>2</sup> (two hours each for three axial directions)	
<b>Durable impact</b>	100 m/s <sup>2</sup> (six times each for three axial directions)	
<b>Exterior material</b>	PBT and polyamide	
<b>Pressure port</b>	M5 internal thread Metallic barb fitting (already installed on main body) Applicable tube size: internal diameter of 4 mm	
<b>Base polarity</b>	Indicating high-pressure side and low-pressure side with "H" and "L" marks, respectively, at pressure port.	
<b>Connector</b>	RITS Connector 6P (TE Connectivity)	
<b>Mass</b>	Approx. 30 g	
<b>Accessories</b>	None (wiring-side connector and mounting parts are sold separately)	

Pressure range code	Rating pressure range	LCD display	Comparison output	Analog output
D 10	0-10 Pa	0.00-10.00		
D 25	0-25 Pa	0.00-25.00		
D 50	0-50 Pa	0.0-50.0		
D 100	0-100 Pa	0.0-100.0		
D 200	0-200 Pa	0-200		
D 300	0-300 Pa	0-300		
D 500	0-500 Pa	0-500		
D 1000	0-1000 Pa	0-1000		
E 1	0-1 kPa	0.00-1.00	NPN transistor	4-20 mA
E 2	0-2 kPa	0.00-2.00	or	or
D +- 10	-10 to +10 Pa	-10.00 to 10.00	PNP transistor	1-5 V
D +- 25	-25 to +25 Pa	-25.0 to 25.0		
D +- 50	-50 to +50 Pa	-50.0 to 50.0		
D +-100	-100 to +100 Pa	-100 to 100		
D +-200	-200 to +200 Pa	-200 to 200		
D +-300	-300 to +300 Pa	-300 to 300		
D +-500	-500 to +500 Pa	-500 to 500		
D +-1000	-1000 to +1000 Pa	-1000 to 1000		
E +-1	-1 to +1 kPa	-1.00 to 1.00		
E +-2	-2 to +2 kPa	-2.00 to 2.00		

◆ For use environment, refer to page 118.

<p><b>Conforming standards</b></p> <p>1. EU directive This product is compliant with the EMC directive of EU. EMC directive basic requirements Standard No. ....EN 61326-1 This product in combination with HWS15A-24/A (TDK-Lambda Corporation) is confirmed to be compliant with the EMC directive. When using this product with other power unit, have the final system go through the EMC test.</p> <p>2. UL standard This product is certified as an UL standard recognition part. It is also certified with Canada Standard (C-UL). However, use this product in accordance with the installation conditions shown in (3) below. (1) Requirements standard No.....UL 61010-1 (2) File No. ....E220685 (3) Installation condition .....As the DC power source to be connected to this product, use the NEC (National Electrical Code) Class 2 power source or LPS (Limited Power Source) power source.</p>
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List of products

WO81

WO71

FR51A

MS99

MS99S

MS61A-RA

QDP33

EMD8A

EMD7

EMT1

EMTGP1

EMT1H

EMT6

EMP5A

EMRT1

HWS15A

Accessories

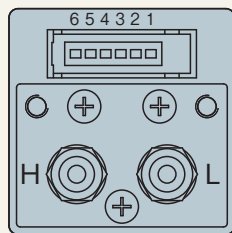
Application

Precautions

Maintenance



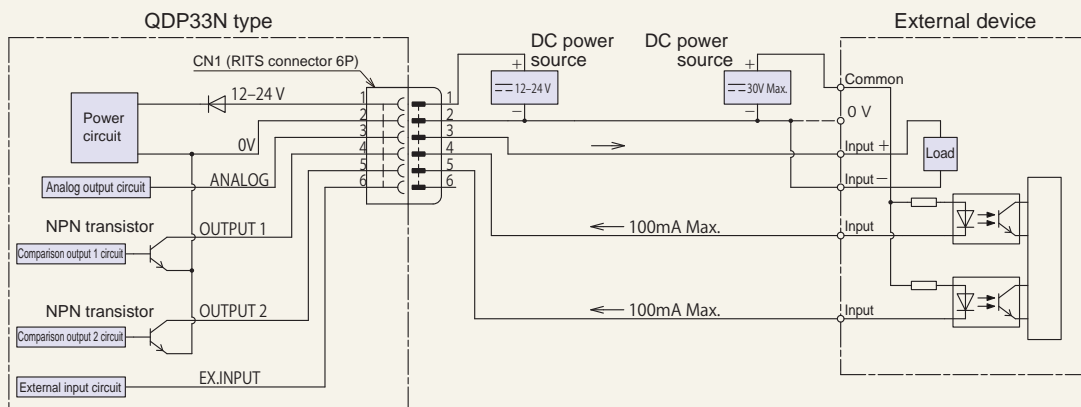
### Terminal arrangement drawing



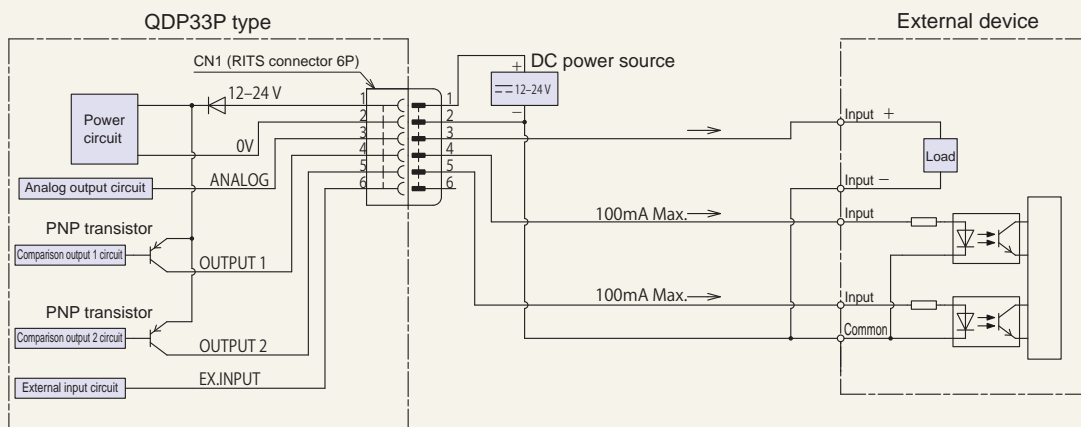
- Pin 1: Power + (12 to 24 V DC)
- Pin 2: Power - (0 V)
- Pin 3: Analog output +
- Pin 4: Comparison output 1
- Pin 5: Comparison output 2
- Pin 6: NC (unused terminal)

### Connection example

#### Comparison output: NPN transistor type



#### Comparison output: PNP transistor type



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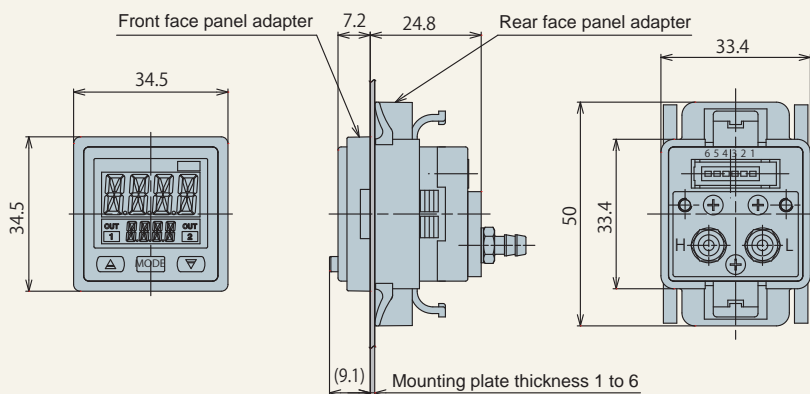
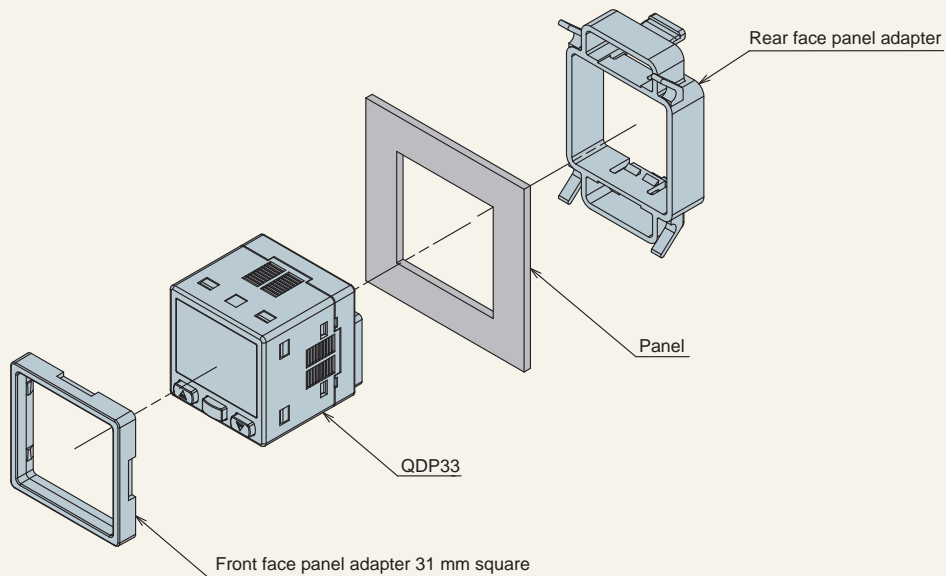
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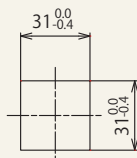
### Panel mounting diagram and panel cutting dimensions

Panel cutting 31 mm

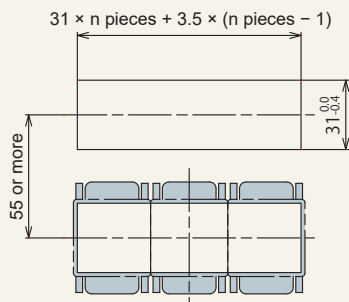


Panel cutting dimensions

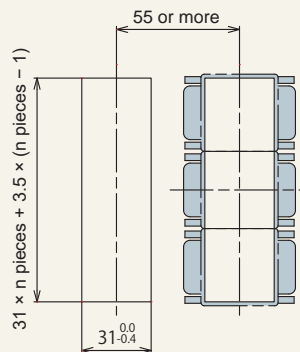
For mounting one piece



When n pieces are installed horizontally

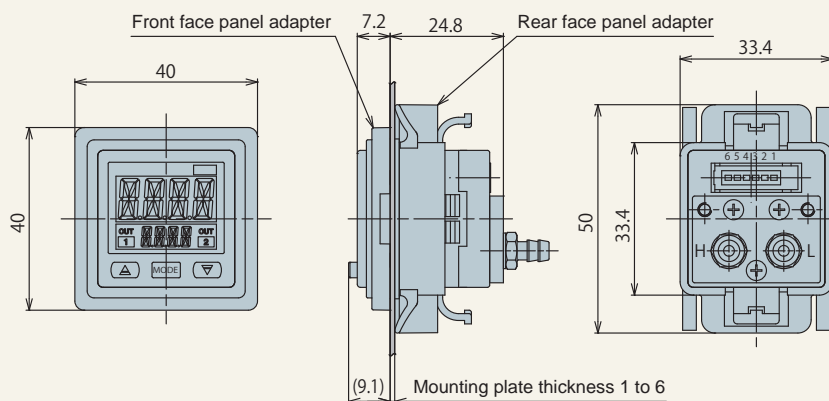
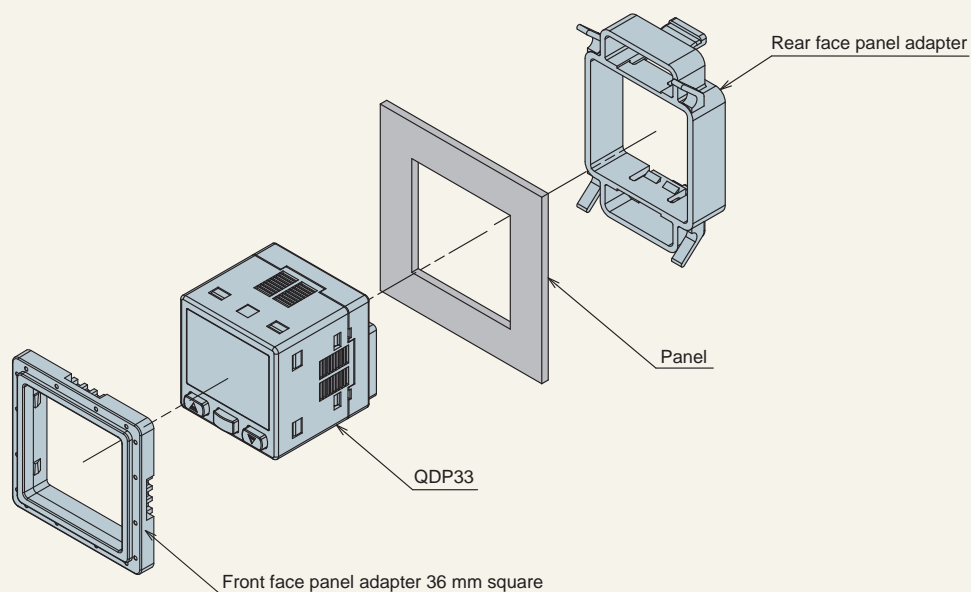


When n pieces are installed vertically



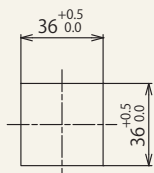
### Panel mounting diagram and panel cutting dimensions

Panel cutting 36 mm

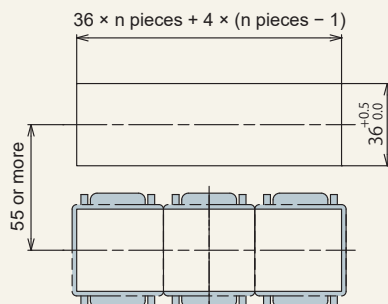


Panel cutting dimensions

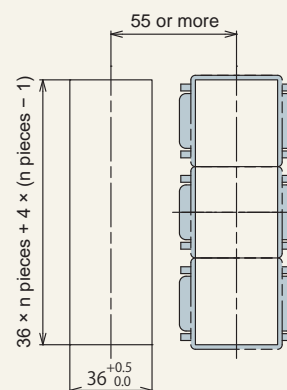
For mounting one piece



When n pieces are installed horizontally

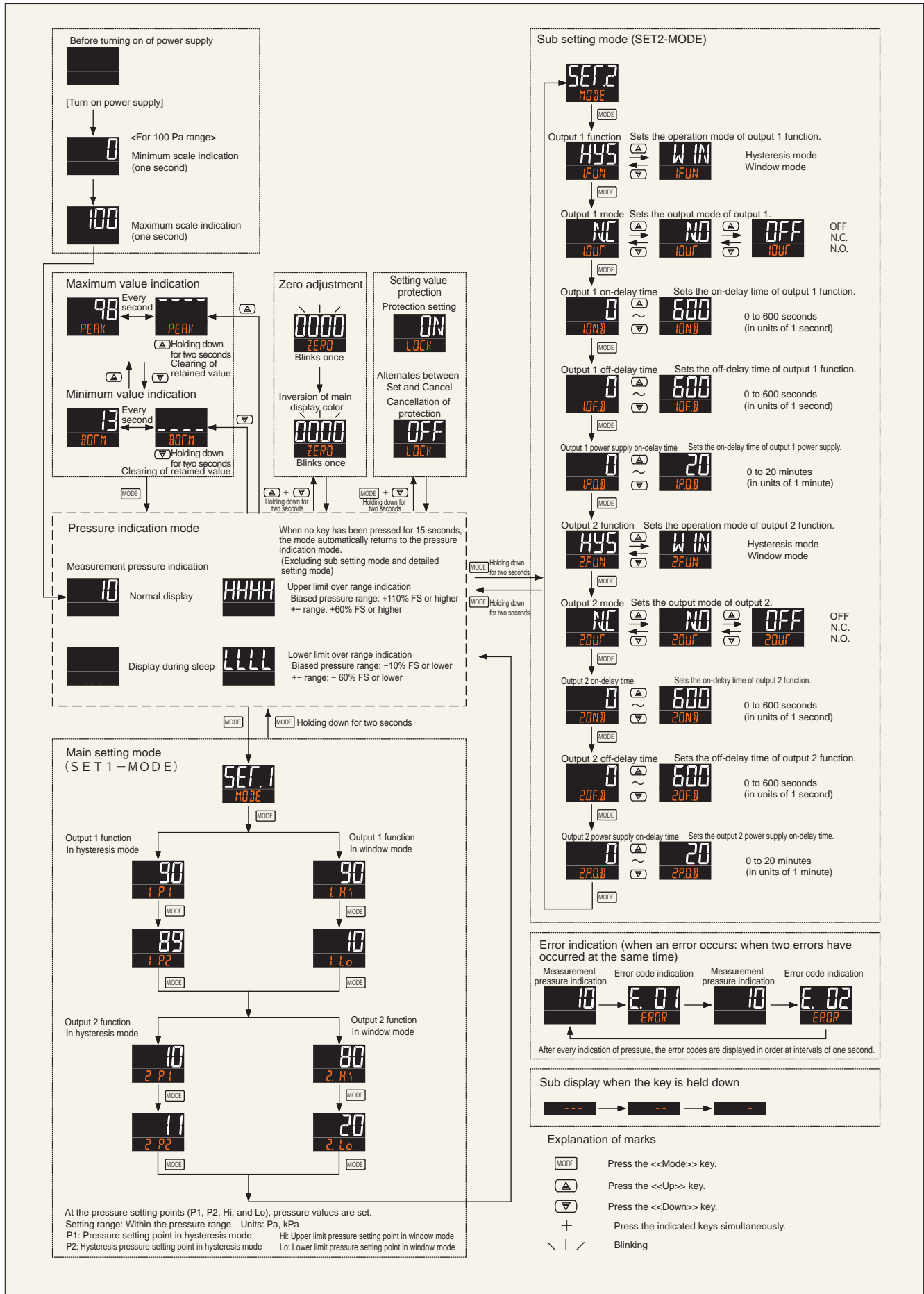


When n pieces are installed vertically





### Mode changeover (1)





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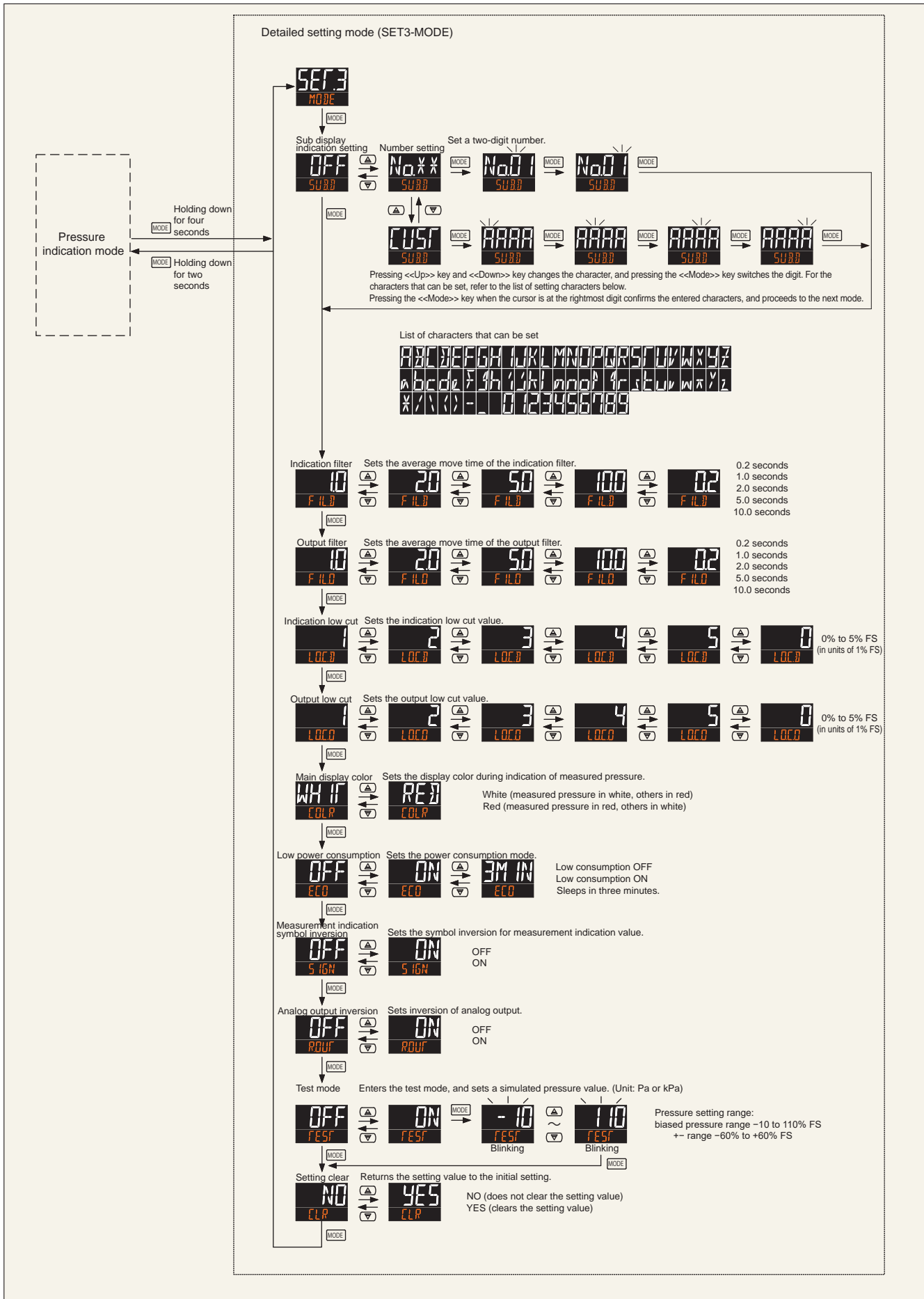
Accessories

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### Mode changeover (2)



### Comparison function operation diagrams

**Comparison function**  
Hysteresis mode: upper limit setting ( $P1 > P2$ )

Pressure condition: Normal → Abnormal → Normal

**Comparison output condition**

Output mode	OFF	Normally open (OFF)		
N.C.	Close (ON)	Open (OFF)	Close (ON)	Close (ON)
N.O.	Open (OFF)	Close (ON)	Open (OFF)	Open (OFF)

Operation explanation: Detects an abnormal pressure rise, and activates comparison output.  
When the output mode is set to N.C., the output will open (OFF) when the applied pressure exceeds the setting value P1, and will close (ON) when the pressure falls below P2.

Power on-delay timer: During the operation of the timer, the comparison output will forcefully open (OFF).

**Comparison function**  
Hysteresis mode: lower limit setting ( $P1 < P2$ )

Pressure condition: Normal → Abnormal → Normal

**Comparison output condition**

Output mode	OFF	Normally open (OFF)		
N.C.	Close (ON)	Open (OFF)	Close (ON)	Close (ON)
N.O.	Open (OFF)	Close (ON)	Open (OFF)	Open (OFF)

Operation explanation: Detects an abnormal pressure drop, and activates comparison output.  
When the output mode is set to N.C., the output will open (OFF) when the applied pressure falls below the setting value P1, and will close (ON) when the pressure exceeds P2.

Power on-delay timer: During the operation of the timer, the comparison output will forcefully open (OFF).

**Comparison function**  
Window mode: internal area ( $Hi > Lo$ )

Pressure condition: Abnormal → Normal → Abnormal → Normal → Abnormal

**Comparison output condition**

Output mode	OFF	Normally open (OFF)				
N.C.	Open (OFF)	Close (ON)	Open (OFF)	Close (ON)	Open (OFF)	Close (ON)
N.O.	Close (ON)	Open (OFF)	Close (ON)	Open (OFF)	Close (ON)	Open (OFF)

Operation explanation: The comparison operation is performed in the range of the set pressure area from Lo to Hi (window).  
When the output mode is set to N.C., the output will close (ON) when the applied pressure is within the range (window) and will open (OFF) when the pressure is out of the range.

Power on-delay timer: During the operation of the timer, the comparison output will forcefully open (OFF).

**Comparison function**  
Window mode: external area ( $Hi < Lo$ )

Pressure condition: Normal → Abnormal → Normal → Abnormal → Normal

**Comparison output condition**

Output mode	OFF	Normally open (OFF)				
N.C.	Close (ON)	Open (OFF)	Close (ON)	Open (OFF)	Close (ON)	Open (OFF)
N.O.	Open (OFF)	Close (ON)	Open (OFF)	Close (ON)	Open (OFF)	Open (OFF)

Operation explanation: The comparison operation is performed in the range outside the set pressure area from Hi to Lo.  
When the output mode is set to N.C., the output will close (ON) when the applied pressure is out of the range, and will open (OFF) when the pressure is within the range.

Power on-delay timer: During the operation of the timer, the comparison output will forcefully open (OFF).

**Comparison output delay (On, Off, Power supply on)**

Power supply ON

Result of internal comparison: Close (ON) → Open (OFF) → Close (ON)

Comparison output: Open (OFF) → Close (ON) → Open (OFF) → Close (ON)

Power ON delay time: 0 to 20 minutes

ON delay time: 0 to 600 seconds

OFF delay time: 0 to 600 seconds

Operation explanation: Regardless of the output mode setting (N.C., N.O.), the close and open (ON and OFF) timings of output transistor are delayed by the set delay time.

Power on-delay timer: During the operation of the timer, the comparison output will forcefully open (OFF).

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### QDP33 accessories

RoHS

RITS 5P cable w/connector			
<p>This is a cable with connector used for connection with QDP33. In the sheath cable and other constituting parts of this product, vinyl chloride is not intentionally used. RITS plugs and connectors are products of TE Connectivity.</p>			
Item number	Cover color	Core wire insulation sheath color	Terminal number
CAB-RITS5-15	Yellow	Brown	①
		Blue	②
		Pink	③
		Black	④
		White	⑤
<p>This product is not UL-certified.</p>		<p>Core wire sheath outer diameter: 1.0 mm Standard: AWG#24</p>	

RITS plug/connector 5P (TE Connectivity)			
<p>This is a wiring side plug/connector used on QDP33.</p>			
Item number	Color	Applicable wiring	
		Nominal cross-section area	Finish outer diameter
1473562-5	Yellow	0.1–0.5 mm <sup>2</sup>	1.0–1.15 mm
<p>When crimping of connector is performed, use the dedicated tool (item number: 1729940-1 from TE Connectivity). For other RITS connectors and details, contact TE Connectivity.</p>		<p>*Cable is not supplied.</p>	

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**VT base (Nihon Pisco Co., Ltd.)**



Item number	Material
KGAVT-M5	Brass

It is possible to connect a vinyl pipe or rubber pipe with an inner diameter of 4 mm. This is already installed at the time of purchase of the instrument.


**PT base (Nihon Pisco Co., Ltd.)**



Item number	Material
KGAPT-M5	Brass, PBT, NBR

The tube mounting part is a push-in joint. For piping, use the separately sold tube or a tube compliant with JIS B 8381-1. (Outer diameter of connectable tube: 6 mm) For mounting, a hex wrench with a width across flats of 2.5 mm is necessary.

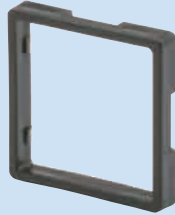
**PR base (Nihon Pisco Co., Ltd.)**



Item number	Material
KGAPR-M5	Brass, PBT, NBR

The tube mounting part is a rotary elbow push-in joint. The piping is same as that for PT base. For mounting, a hex wrench with a width across flats of 3 mm is necessary.

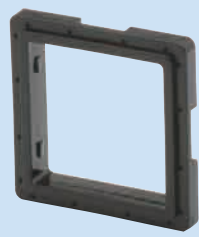
**Front face panel adapter 31 mm square**



Item number	Material
ADP33-31	Polypropylene

For panel cutting 31×31 mm  
When installing the instrument body in a panel, this product is used in combination with the rear face panel adapter.


**Front face panel adapter 36 mm square**



Item number	Material
ADP33-36	Polypropylene

For panel cutting 36×36 mm  
When installing the instrument body in a panel, this product is used in combination with the rear face panel adapter.


**Rear face panel adapter**



Item number	Material
ADP33-B	Polypropylene

When installing the instrument body in a panel, this product is used in combination with the front face panel adapter.

**Metallic bracket set for mounting use**




Item number	Material
BRKT-QDP	Steel

This is used when installing the instrument body on a floor surface or ceiling surface.


**Color cap for PT base/PR base (Nihon Pisco Co., Ltd.)**

**High-pressure side**



Item number	Material
KGACAPM6-H	Polyacetal

**Low-pressure side**



Item number	Material
KGACAPM6-L	Polyacetal

This helps identify the high-pressure side and low-pressure side and prevents the tube from being disconnected because of an erroneous operation.

## Warranty

### Warranty period

The warranty period for our product is one (1) year from delivery to the location specified by the orderer who makes a direct transaction with us.

### Scope of warranty

If any failure or defect attributable to us becomes clear during the above warranty period, we will repair the product or supply a substitute product free of charge. However, even during the warranty period, we will exclude the product from the scope of the warranty if the failure or defect corresponds to any of the following:

- (1) The failure or defect was caused by an unreasonable condition, environment, handling, or usage not mentioned in the instruction manual, specifications, and our product catalog.
- (2) The failure or defect was caused by a factor other than our product.
- (3) The failure or defect was caused by a modification or repair conducted by a party other than us.
- (4) The failure or defect was caused by an event that could not be foreseen at the scientific and technical levels at the time of product shipment from us.
- (5) The failure or defect was caused by an external factor not attributable to us, such as acts of God and disasters.

Please note that the warranty mentioned here means the warranty for our individual product, and damage provoked by a failure or defect of the product is excluded from the scope of the warranty.

\*This warranty is valid only in Japan.

## Application and usage

Our products are designed and manufactured as general-purpose instruments for general industries.

Therefore, our products are not intended for the following uses, and our products used in such a manner are outside the scope of application.

- (1) Equipment that is anticipated to greatly affect lives and properties, such as nuclear power generation, aviation, railways, marine vessels, vehicles, and medical devices
- (2) Utilities that include electricity, gas, and service water
- (3) Use in outdoor locations and under similar conditions or environments other than those stipulated in the instruction manual
- (4) Usage to which considerable safety consideration and attention equivalent to (1) and (2) above need to be given

## Service

### Scope of service

Because the product price does not include service expenses, such as the dispatch of engineers, we will separately charge for the expenses in the following cases:

- (1) Instruction for installation and adjustment and a witnessed test run
- (2) Maintenance inspection, adjustments, and repairs
- (3) Technical guidance and technical education
- (4) Witnessed inspections of products at our factory

<<Note>> The product specifications and information in this catalog are subject to change without prior notice for product improvement or other reasons.

● For order placement, contact

General agent  **Manostar Shop Co., Ltd.**

1-2-3 Nishishiriike-cho, Nagata-ku, Kobe City, Hyogo 653-0031  
TEL. +81-78-621-7000 FAX. +81-78-621-7788

Manufacturer  **Yamamoto Electric Works Co., Ltd.**

1-2-3 Nishishiriike-cho, Nagata-ku, Kobe City, Hyogo 653-0031  
TEL. +81-78-631-6000 FAX. +81-78-631-6020