

# PRESSURE SENSOR

## CZ-200P

### Resin Pressure Sensor



**Max.550°C**

(Inconel, SPRON Diaphragm Type)



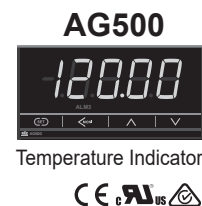
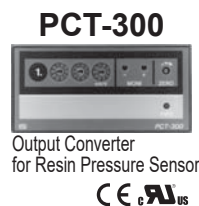
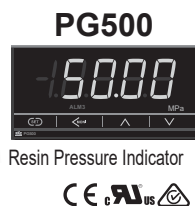
RoHS Compliant  
(Except RZB-001)

**RKC**® **RKC INSTRUMENT INC.**

# Push Rod Pressure Sensor with Built-in Temperature Sensor



Max.550°C



## Environmentally friendly

The CZ-200P pressure sensor is a push rod lead-type sensor and thus there is no concern of resin contamination, even if a diaphragm rupture occurs.

## Supports high temperatures

A "Inconel", "SPRON" diaphragm with a maximum operating temperature of 550°C and excellent corrosion resistance on the level of Hastelloy C has been added to our lineup. Suitable for pressure measurement of high-function resins (high-temperature melted resins) such as polymer resins.

\* 450°C when using a J-type thermocouple temperature sensor.

## Built-in thermocouple

A built-in thermocouple temperature sensor type is available as an option. Temperature and resin pressure can be measured using a single mounting hole. The temperature measurement contact is located 2 mm from the diaphragm surface, enabling measurement of a temperature closer to the actual resin temperature. (Thermocouple K/J, Class:2)

## High Reliability and Stability

The three-layer structure of the lead unit and an optional lead-pipe cover reduce indication fluctuations due to external heat and tightening. In addition, when combined with an indicator with built-in linearization and a converter, high-accuracy pressure measurement to a maximum accuracy of 0.5% FS is possible. (Linearization is an option.)

\* Standard 1.0% FS becomes 0.5% FS. Standard 2.0% FS becomes 1.0% FS.

\* When placing your order, specify the special indicator with linearization support together with the converter. (Except HASTELLOY C or More than 70MPa.)

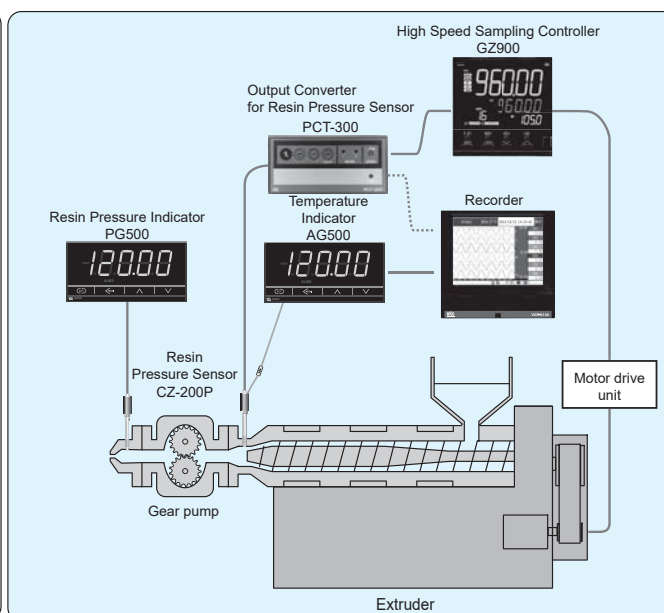
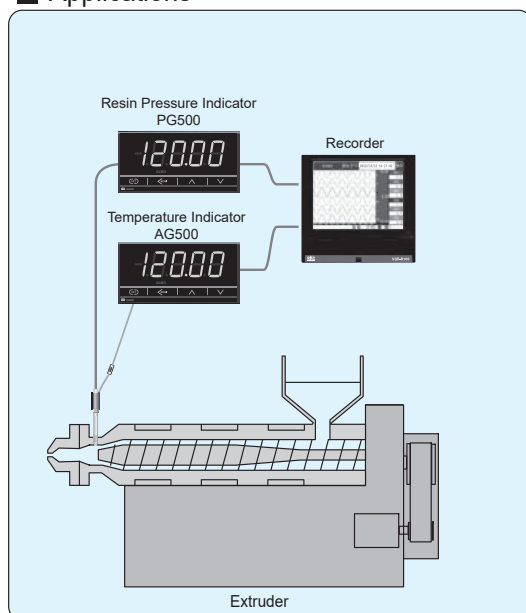
## Resin Pressure Control

Monitoring and control of resin pressure is performed using a Pressure Sensor (CZ-200P), Pressure Sensor Indicator (PG500), Pressure Sensor Converter (PCT-300), Digital Indicator (AG500), and High Speed Sampling Controller (GZ900/400). (The application below shows an example of this combination.)

## GZ900/400



## Applications



• Inconel is a registered trademark of Special Metals Corporation.

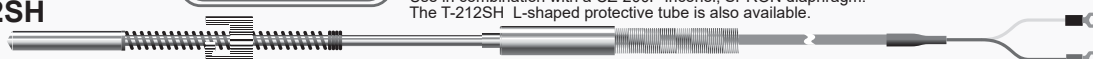
• SPRON is a registered trademark of Seiko Instruments Inc.

• Company names and product names used in this manual are the trademarks or registered trademarks of the respective companies.

## Temperature Sensor for High Temperature T-202SH

Max.550°C

Temperature sensor for high temperature using structural material of each part. A maximum operating temperature of 550°C enables use in molds, adapters, and barrels of extrusion molding machines for high-temperature melted resin. Use in combination with a CZ-200P Inconel, SPRON diaphragm. The T-212SH L-shaped protective tube is also available.



**CZ-200P**

Resin Pressure Sensor

RoHS Compliant

**Max.550°C****A Inconel diaphragm****A SPRON diaphragm**

## ● Name of Parts (CZ-200P-H type)

### Diaphragm

Pressure port of CZ-200P resin pressure sensor.  
In addition to the SUS630, high-temperature corrosion resistant Inconel, SPRON is available, as well as Hastelloy C and ceramic kanigen plating.

### Thermocouple connector

The connector is made of the same material as the thermocouple wires.

### Diaphragm material and surface treatment

#### SUS630 (Standard)

High-strength stainless steel is used standard.

#### Inconel

A maximum operating temperature of 550°C has been achieved.

#### SPRON

A maximum operating temperature of 550°C has been achieved.

Attains the same corrosion resistance as Hastelloy C.

#### Hastelloy C

Ideal when using corrosive resin.

#### Ceramic kanigen plating

Plating that increases abrasion resistance.

\* Cannot be used on Inconel and SPRON.

### Outer tube

The outer tube has a completely sealed double-layer structure that minimizes the effects of external temperature changes.

### Connector

Connector for the converter. A water-proof connector type and water-proof direct-connection cable type are also available.

## ● Specifications

### ● Standard Specifications

Specifications	Construction	4 sides adhered strain gauge type wheatstone bridge
	Rated Pressure	See Pressure range code
	Rated Output *1	1.0 to 1.8mV/V [ At 150°C of diaphragm temperature] •SPRON, Inconel type: At 250°C
	Bridge Impressed Voltage	10V DC (at PCT-300) 7.7V DC (at PG500, REX-PG410)
	Accuracy	SUS630 type (At At 150°C of diaphragm temperature) Within ±1% of full scale Within ±2% of full scale (Over 70 MPa ) Inconel, SPRON type: Within ±1% of full scale More than 480°C of 10,20MPa :Within ±2% of full scale HASTELLOY C type Please contact RKC agent
	Linearity	SUS630 type (At At 150°C of diaphragm temperature) Within ±1% of full scale Within ±2% of full scale (Over 70 MPa ) Inconel, SPRON type: Within ±1% of full scale More than 480°C of 10,20MPa :Within ±2% of full scale HASTELLOY C type Please contact RKC agent
	Hysteresis	SUS630 type Within ±0.5% of full scale Within ±1% of full scale (Over 50 MPa ) Within ±2% of full scale (Over 70 MPa ) Within ±0.2% of full scale (1MPa type) Inconel, SPRON type: Within ±1.0% of full scale More than 480°C of 10,20MPa :Within ±2.0% of full scale HASTELLOY C type Please contact RKC agent
	Reproducibility	Within ±0.2% of span • SPRON, Inconel type: More than 480°C of 10,20MPa :Within ±0.4% of full scale
	Zero Balance	±0.6mV/V (Within ±40% of span)
	Bridge Resistance	350Ω±5Ω (Input resistance), 350Ω±5Ω (Output resistance)

Temperature characteristics	Maximum Temperature of the Diaphragm	400°C (Inconel, SPRON type : 550°C)
	Maximum Temperature of the Strain Gauge	200°C *2
	Zero Point Temperature Effect • To the temperature of the diaphragm	±0.2%/10°C of span ±0.3%/10°C of span(10MPa, 150MPa) • Inconel type : ±0.3%/10°C • SPRON type : 0.1±0.2%/10°C • HASTELLOY C type : Please contact RKC agent
	Output Temperature Effect	Output temperature effect is an equal value as zero point. • Inconel type : ±0.3%/10°C • SPRON type : 0.15±0.2%/10°C
Mechanical characteristics	Effect of Wind • Without lead pipe cover	Within ±1% of full scale (at wind of 4m/sec)
	Allowable Overload	Within 120% of span (Within 500% of 1MPa type, Within 1000% of 0.5MPa type)
	Marginal Overload	Within 150% of span (Within 1000% of 1MPa type, Within 2000% of 0.5MPa type)
	Lead pipe cover material	SUS630
	Recommended tightening torque Output effect of tightening torque	Fixed nut type: 30 N·m (300 kgf·cm), Loose nut type: 60 N·m (600 kg·cm) Within ±0.2% of full scale (at recommended tightening torque) • M14, PF1/4, 1/2-UNF screw type : ±1%

\*1 The output of each sensor becomes a specific value within the range of 1.0 to 1.8 mV/V.

\*2 When the temperature at the bottom of outer tube (nut side) is more than 180°C, the temperature at the strain gauge exceed 200°C.

If the temperature at the strain gauge exceed 200°C, the performance cannot be assured. Therefore, cover the heat source with a heat insulating material so that the above temperature does not exceed 200°C.

The temperature at the strain gauge can be expected not to rise when:

- the long type of sensor is used or
- the sensor is installed a slant or transversely.

If any of the above measures can be taken, take it.

### ● Optional Specifications

Temperature measurement section	Sensor type	Thermocouple : K or J ( Ungrounded junction, Class 2 )
	Temperature detection position	Internally 2mm from a diaphragm
	Maximum Temperature	550°C (Thermocouple K), 450°C(Thermocouple J)
	Response time	Approx. 90 sec (room temperature to 100°C, 98 % response)
	Cable length	Approx. 100mm (Standard)

## ● Pressure Range #

Nut type	Range
Fixed Nut type *1	0 to 10MPa, 0 to 20MPa, 0 to 35MPa, 0 to 50MPa, 0 to 70MPa, 0 to 100MPa, 0 to 150MPa
Loose Nut type *2	0 to 1MPa, 0 to 2MPa, 0 to 3MPa, 0 to 5MPa, 0 to 10MPa, 0 to 20MPa, 0 to 35MPa, 0 to 50MPa, 0 to 70MPa, 0 to 100MPa

# kgf/cm<sup>2</sup> type is available. Please contact RKC agent.

The maximum pressure range for Hastelloy C diaphragms is 100MPa.

The maximum pressure range for Inconel and SPRON diaphragms is 50MPa.

Inconel diaphragms with 70MPa and 100MPa are custom-made products. Please contact RKC agent.

Loose nut type 0.5MPa (D05P) and fixed nut type 5MPa (D05P) can be custom-made. Please contact RKC agent.

(Rated output of 0.5 to 0.9mV/V requires a dedicated amplifier and has different specifications.)

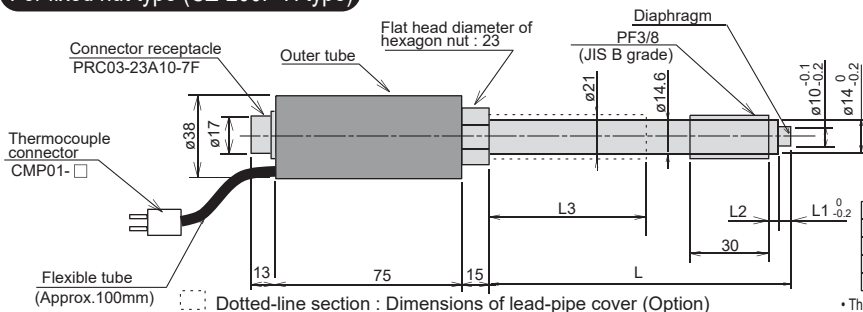
The minimum pressure range for Hastelloy C, SPRON and Inconel diaphragms is 10MPa.

## Resin Pressure Sensor



## ● External Dimensions and Mounting Hole

For fixed nut type (CZ-200P-H type)

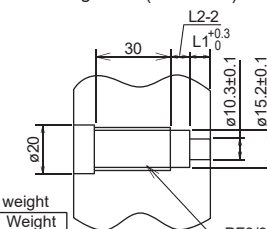


Dotted-line section : Dimensions of lead-pipe cover (Option)

	L	L1	L2	L3	Weight
HA	120	8	6	60	Approx.430g
HB	150	8	6	90	Approx.470g
HC	180	8	6	120	Approx.510g
HD	210	8	6	150	Approx.550g

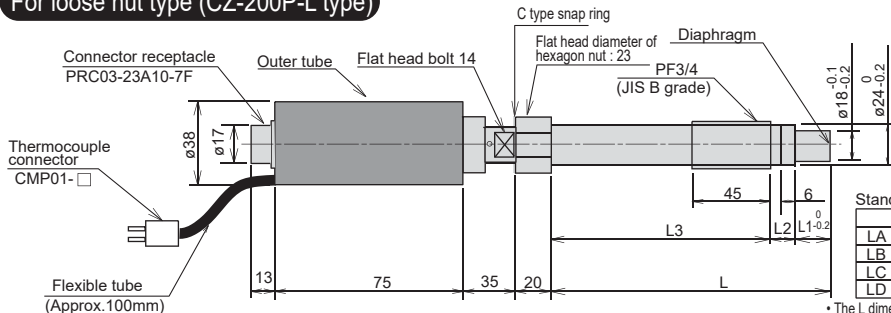
- The L dimension can be up to a maximum of 300 mm.  
(Please contact RKC agent)

Mounting hole (Unit : mm)



- Element finished to JIS B grade.  
Install the sensor so that each screw is smoothly inserted.

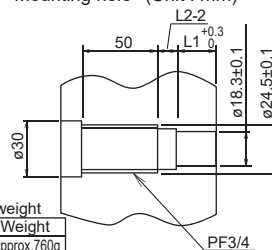
For loose nut type (CZ-200P-L type)



Standard dimensions and weight					
	L	L1	L2	L3	Weight
LA	120	20	10	90	Approx.760g
LB	150	20	10	120	Approx.850g
LC	180	20	10	150	Approx.940g
LD	210	20	10	180	Approx.1030g

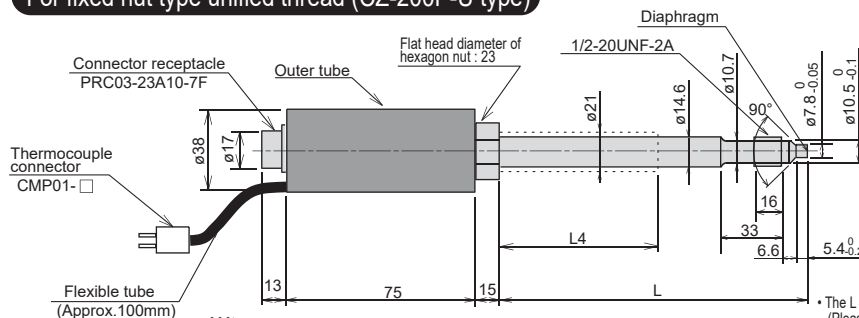
- The L dimension can be up to a maximum of 270 mm.  
(Please contact RKC agent)

Mounting hole (Unit : mm)



- Element finished to JIS B grade.  
Install the sensor so that each screw is smoothly inserted.

For fixed nut type unified thread (CZ-200P-U type)

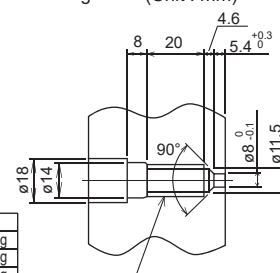


--- Dotted-line section : Dimensions of lead-pipe cover (Option)

	L	L4	Weight
UA	120	60	Approx. 410g
UB	150	90	Approx. 450g
UC	180	120	Approx. 490g
UD	210	150	Approx. 530g

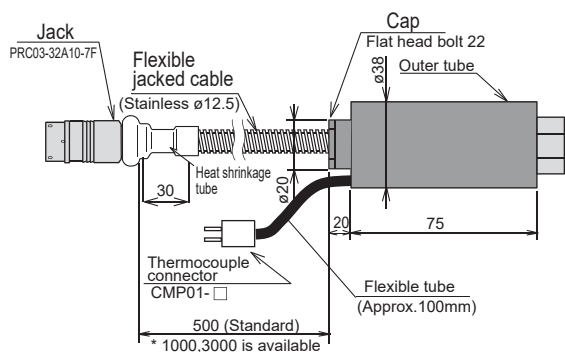
- The L dimension can be up to a maximum of 300 mm.  
(Please contact RKC agent)

Mounting hole (Unit : mm)



- Element finished to JIS B grade.  
Install the sensor so that each screw is smoothly inserted.

- When the diaphragm material is Inconel and SPRON , the cable type is direct connection.



\* 1000,3000 is available

- Mounting hole dimensions are the same as on the standard product.
- Unit dimensions are the same as the dimensions of the standard product; however, the lead unit (L) dimension 120 mm (Inconel, SPRON) is not possible.
- The fixed-nut type is only available with a lead-pipe cover.

Reference : Screw dimension tolerances

Class	Screw type	PF1/4,PF3/8	PF1/2,PF3/4	M14 x 1.5, M16 x 1.5	1/2-20UNF
JIS B grade (Class 2, 2B) Inner diameter tolerances of female screw		0 to +0.445	0 to +0.541	0 to +0.300	0 to +0.278
JIS B grade (Class 2, 2B) Effective diameter tolerances of female screw		0 to +0.250	0 to +0.284	0 to +0.150	0 to +0.141



CE **UL** 

# PCT-300

## Output Converter for Resin Pressure Sensor



RoHS Compliant

### Specifications

#### Input

Input type	: RKC's resin pressure sensor GZ-200P (CZ-100P)
Input range	: a) Standard type : 0 to 19.99mV b) Safe explosion proof type : 0 to 11.6mV • Excepting zero point adjustment range
Input impedance	: More than 1MΩ
Input break action	: Up scale(The sensor power supply break is the same)

#### Sensor Power Supply

Applied voltage	: a) Standard type : 10V DC b) Safe explosion proof type : 8.2V DC
Accuracy	: +0.1 to -0.4%
Temperature drift	: Less than 30ppm/°C

#### Zero point

Adjustment range	: a) Standard type : ±7mV (Input conversion) b) Safe explosion proof type : ±6mV (Input conversion)
Temperature drift	: ±0.02%/°C of span

#### Gain

Setting range	: a) Standard type : 10.00 to 19.99mV can be used as rating (10V etc.) b) Safe explosion proof type : 5.08 to 11.60mV can be used as rating (10V etc.)
Setting accuracy	: ±0.2%/°C of span
Temperature drift	: Less than ±100ppm/°C
Optional function	: Gain selector switch (Selection 1x/2x)

### Output

Output signal	: 0 to 10V DC (Load resistance : More than 2kΩ) 0 to 10mV DC (Load resistance : More than 10kΩ) 1 to 5V DC (Load resistance : More than 1kΩ) 4 to 20mA DC (Load resistance : Less than 600Ω)
Monitor voltage	: 0 to 10V DC (Pin size of tester confirming: 2.0)

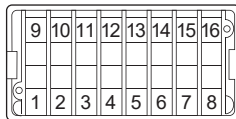
### General Specifications

Linearity	: ±0.01% of span
Noise	: 0.1%p-p of span (0.1 to 10Hz)
Response	: 10Hz/100Hz selectable (Factory shipment : 10Hz)
Power supply	: 90 to 264V AC (Including supply voltage variation) [Rating : 100 to 240V AC] (50/60Hz common use)
Power consumption	: 100 to 240V AC : Less than 7.5VA (at 100V) Less than 12.5VA (at 240V)
Insulation resistance	: More than 100MΩ (500V DC) between input/output terminals and power terminals More than 100MΩ (500V DC) between input/output terminals and ground More than 100MΩ (500V DC) between power terminals and ground
Dielectric voltage	: 2300V AC for one minute between input/output terminals and power terminals 2300V AC for one minute between input/output terminals and ground 2300V AC for one minute between power terminals and ground
Weight	: Approx 290g

### Operating Environments

Ambient temperature	: 0 to +50°C (32 to 122°F)
Ambient humidity	: 45 to 85% RH (Non condensing)
Ambient atmosphere	: Free from corrosive and flammable gas and dust. Free from external noise, vibration, shock, and exposure to direct sunlight.

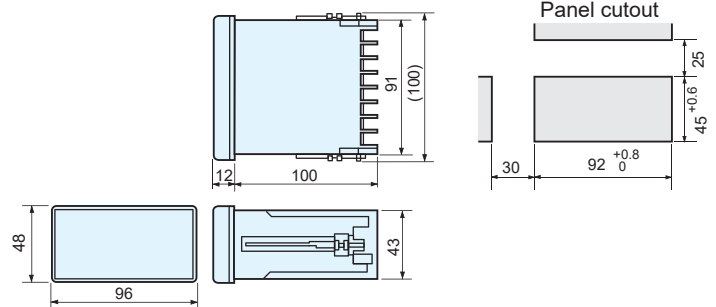
### Rear Terminals



No.	9	10	11	12	13	14	15	16
Contents	 0-10mV DC 0-10V DC			SHD EXC+ EXC- SIG+ SIG- (Red) (Brown) (Blue) (Black)				
	Analog output			Sensor input				
No.	1	2	3	4	5	6	7	8
Contents	 100-240V AC			 1-5V DC 4-20mA DC				
	Ground Power supply			Analog output				

### External Dimensions

Unit:mm



### Model Code

Specifications	Model and Suffix Code			
	PCT-300			
Type	Standard type			
	Intrinsically safe explosion proof construction pass type	N	E	
Number of output	2 outputs (0 to 10V DC, 0 to 100mV DC)		2	
	3 outputs (0 to 10V DC, 0 to 100mV DC, 1 to 5V DC)		3	
	4 outputs (0 to 10V DC, 0 to 100mV DC, 1 to 5V DC, 4 to 20mA DC)		4	
Option	Not supplied			N
	Gain change switch (x1 or x2)			G
	Linearization function			L

Power supply voltage	100 to 240V DC
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#### GZ900

High Speed Sampling  
Controller



#### PCT-300



High-resolution inputs with a sampling cycle of 0.01 seconds and PID constants that can be set in increments of 0.01 seconds enable this controller to control process quantities that change rapidly.  
Used as a set with Output Converter for Resin Pressure Sensor PCT-300.

## Intrinsic Safety

# Intrinsically Safe Explosionproof Construction Resin Pressure Meter (For Indoor, outdoor)

The qualification No. of the intrinsically safe explosionproof construction resin pressure meter obtained from the ministry of Labor, Japan, is T55821 (For indoor use) T56658 (For outdoor use). The explosion class and ignition group of the objective gases and steam are i2G3. The qualified consists of the pressure sensor CZ-200P and safety barrier (RZB-001), but the output converter is not subject to qualification testing as a general sending/receiving instrument. For indoor use, the standard connector or the waterproof connector can be selected. For outdoor use, the waterproof connector must be used.

## ● Sensor Specifications

### ● Standard Specifications

Specifications	Construction	4 sides adhered strain gauge type wheatstone bridge
	Rated Pressure	See Pressure range code
	Rated Output *1	1.0 to 1.8mV/V [At 150°C of diaphragm temperature] •SPRON, Inconel type: At 250°C
	Bridge Impressed Voltage	10V DC (at PCT-300) 7.7V DC (at PG500, REX-PG410)
	Accuracy	SUS630 type (At At 150°C of diaphragm temperature) Within ±1% of full scale Within ±2% of full scale (Over 70 MPa) Inconel, SPRON type: Within ±1% of full scale More than 480°C of 10,20MPa :Within ±2% of full scale HASTELLOY C type Please contact RKC agent
	Linearity	SUS630 type (At At 150°C of diaphragm temperature) Within ±1% of full scale Within ±2% of full scale (Over 70 MPa) Inconel, SPRON type: Within ±1% of full scale More than 480°C of 10,20MPa :Within ±2% of full scale HASTELLOY C type Please contact RKC agent
	Hysteresis	SUS630 type Within ±0.5% of full scale Within ±1% of full scale (Over 50 MPa) Within ±2% of full scale (Over 70 MPa) Within ±0.2% of full scale (1MPa type) Inconel, SPRON type: Within ±1.0% of full scale More than 480°C of 10,20MPa :Within ±2.0% of full scale HASTELLOY C type Please contact RKC agent
	Reproducibility	Within ±0.2% of span • Inconel, SPRON type: More than 480°C of 10,20MPa :Within ±0.4% of full scale
	Zero Balance	±0.6mV/V (Within ±40% of span)
	Bridge Resistance	350Ω±5Ω (Input resistance), 350Ω±5Ω (Output resistance)

Temperature characteristics	Maximum Temperature of the Diaphragm	400°C (Inconel, SPRON type : 550°C)
	Maximum Temperature of the Strain Gauge	200°C *2
	Zero Point Temperature Effect • To the temperature of the diaphragm	±0.2%/10°C of span ±0.3%/10°C of span (10MPa, 150MPa) • Inconel type : ±0.3%/10°C • SPRON type : 0.1±0.2%/10°C • HASTELLOY C type : Please contact RKC agent
	Output Temperature Effect	Output temperature effect is an equal value as zero point. • Inconel type : ±0.3%/10°C • SPRON type : 0.15±0.2%/10°C
Mechanical characteristics	Effect of Wind • Without lead pipe cover	Within ±1% of full scale (at wind of 4m/sec)
	Allowable Overload	Within 120% of span (Within 500% of 1MPa type, Within 1000% of 0.5MPa type)
	Marginal Overload	Within 150% of span (Within 1000% of 1MPa type, Within 2000% of 0.5MPa type)
	Lead pipe cover material	SUS630
	Recommended tightening torque	Fixed nut type: 30 N·m (300 kgf·cm), Loose nut type: 60 N·m (600 kgf·cm)
	Output effect of tightening torque	Within ±0.2% of full scale (at recommended tightening torque) • M14, PF1/4, 1/2-UNF screw type : ±1%

\*1 The output of each sensor becomes a specific value within the range of 1.0 to 1.8 mV/V.

\*2 When the temperature at the bottom of outer tube (nut side) is more than 180°C, the temperature at the strain gauge exceed 200°C.  
If the temperature at the strain gauge exceed 200°C, the performance cannot be assured. Therefore, cover the heat source with a heat insulating material so that the above temperature does not exceed 200°C.  
The temperature at the strain gauge can be expected not to rise when:  
• the long type of sensor is used or  
• the sensor is installed a slant or transversely.  
If any of the above measures can be taken, take it.

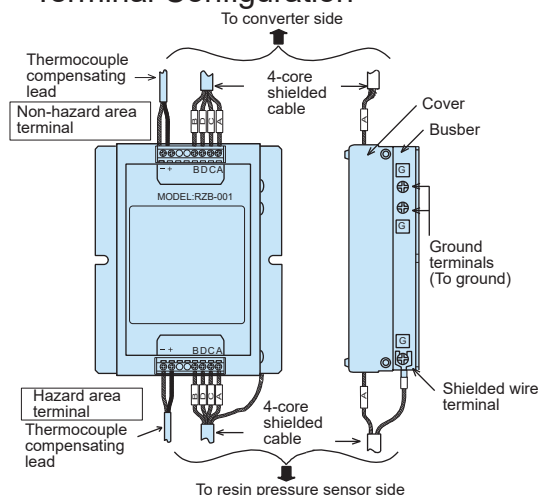
### ● Optional Specifications (For indoor type only)

Temperature measurement section	Sensor type	Thermocouple : K or J ( Ungrounded junction, Class 2 )
	Temperature detection position	Internally 2mm from a diaphragm
	Maximum Temperature	550°C (Thermocouple K), 450°C (Thermocouple J)
	Response time	Approx. 90 sec (room temperature to 100°C, 98 % response)
	Cable length	Appropx. 100mm (Standard)

## ● Safety Barrier Specifications

Explosionproof construction : Intrinsically safe explosionproof construction (i2G3)  
Use rated : Power supply circuit 9V 50mA,  
Signal circuit 6V 50mA,  
Thermocouple circuit 6V 50mA  
Rating for maintaining safety : 250V AC, 50/60Hz, 250V DC  
Allowable inductance : Wiring between the resin pressure sensor and safety barrier : 0.6 mH or less  
Allowable capacitance : Wiring between the resin pressure sensor and safety barrier : 0.1μF or less  
Ambient temperature : -10 to +40°C (14 to 104°F)  
Ambient humidity : 45 to 85% RH (Non condensing)  
Cover : Iron (Coating)  
Busbar : Brass (Nickel plating)  
Ground requirement : Ground this safety barrier so that its grounding resistance will be less than the grounding reference resistance value of shunt diode type safety barriers (e.g. less than 1Ω) conforming to each national standard. (Requirements)  
Weight : Approx. 850g

## ● Terminal Configuration

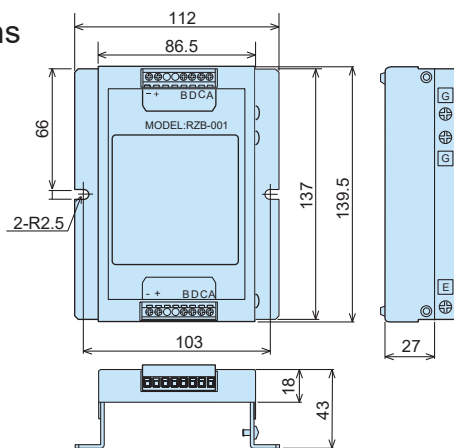


## ● Model Code

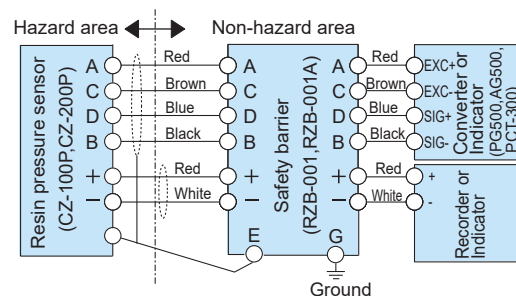
Specification	Model Code
Intrinsic Safety (For indoor)	RZB-001A1
Intrinsic Safety (Built-in thermocouple circuit, For indoor)	RZB-001N1
Intrinsic Safety (For outdoor)	RZB-001A2

## ● External Dimensions

Unit:mm



## ● External Wiring



Specification	Model Code
Intrinsically safe circuit side (Hazard area) CZ-200P ↔ RZB-001 (5m)	W-AB-YG-PB-5000
Non-intrinsically safe circuit side (Non hazard area) RZB-001 ↔ PG500, AG500 (1m) or PCT-300(1m)	W-AB-NV-DA-1000

\* This product has passed the qualification test of intrinsically safe explosion proof when combined with our resin pressure sensor (CZ-100P/CZ-200P).  
Always combine and use this product with our resin pressure sensor.

[illegible]

\*5 : For Inconel diaphragms, 1/2-20UNF threads, PF1/4 threads, and M14×1.5 threads are custom-made products. Please contact RKC agent.


Specifications	Range
Fixed nut type	0 to 10MPa (010P), 0 to 20MPa (020P), 0 to 35MPa (035P), 0 to 50MPa (050P), 0 to 70MPa (070P), 0 to 100MPa (100P), 0 to 150MPa (150P)*1
Loose nut type	0 to 1MPa (001P), 0 to 2MPa (002P), 0 to 3MPa (003P), 0 to 5MPa (005P), 0 to 10MPa (010P), 0 to 20MPa (020P), 0 to 35MPa (035P), 0 to 50MPa (050P), 0 to 70MPa (070P), 0 to 100MPa (100P)

The minimum pressure range for Hastelloy C and Inconel diaphragms is 10MPa.

Specifications			Model Code
Compensation wire (Stainless steel shielded cable)	CZ-200P ↔ Temperature controller/Indicator (Length : 5m)	Type K	W-BL-K2EXA-TMA-Y3-5000
		Type J	W-BL-J2EXA-TMA-Y3-5000

Specifications		Model Code
Standard Type	CZ-200P $\longleftrightarrow$ PG500 or PCT-300 (Length : 5m) : Y-shaped terminal lugs (M3)	W - AB - N <input type="checkbox"/> - PA - 5000

G : Heat-resistant glass coated cable, V : Vinyl coated cable, S : Silicon coated cable

 Safety Warning	<ul style="list-style-type: none"><li>• Before operating this product, read the instruction manual carefully to avoid incorrect operation.</li><li>• This product is intended for use with industrial machines, test and measuring equipment. It is not designed for use with medical equipment.</li><li>• If it is possible that an accident may occur as a result of the failure of the product or some other abnormality, an appropriate independent protection device must be installed.</li></ul>	<table><tr><td>Caution for the export trade</td></tr><tr><td>All transactions must comply with laws, regulations, and treaties.</td></tr><tr><td>Caution for imitated products</td></tr></table>	Caution for the export trade	All transactions must comply with laws, regulations, and treaties.	Caution for imitated products
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Caution for imitated products					
	As products imitating our product now appear on the market, be careful that you don't purchase these imitated products. We will not warrant such products nor bear the responsibility for any damage and/or accident caused by their use.				

