

# USER MANUAL

PRODUCT NAME : DIFFERENTIAL PRESSURE INDICATION SWITCH

MODEL : P680



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## Instructions for proper and safe operation

Please read instructions carefully prior to using the instrument for proper and safe operations.

Mishandling could cause device malfunctions and result in disastrous injuries or accidents.

### WARNING

1. Do not exceed the pressure range allowed.
2. Do not use it to measure the pressure of corrosive fluid.  
Damage or rupture of pressure gauge may cause release of fluid which could lead to bodily injury or destroy surrounding area.
3. Do not apply excessive load, vibration or impact.
4. Please use within the specified temperature ranges.  
Exceeding the temperature range may cause disruption in nearby area due to damage to the temperature indicator.
5. Please use this within the rated input and output specification range stipulated in the specification, or it may cause equipment trouble.
6. Please use a compression terminal with insulation sheath at the end of wire.
7. Please use a cable gland of the same class or upper class.
8. Please construct wiring in accordance with consumers' electrical installation guide and electrical facilities technical standards.
9. Make sure to turn off the valve to prevent the measuring fluid leak when dismounting the gauge.
10. Use a pressure gauge with no oil in an environment with hydrocarbon or oxygen.  
Oil contained in the gauge may react with oxygen which may be flammable or explosive.
11. Please always follow the mounting instructions in the manual in cases of field installation.
12. Do not make any modifications to the product or to add more functions.  
Please consult with us for any repair.
13. Please be sure to close a valve and cut off pressure in advance in opening the case of this product.  
Please be sure to cut off power because there is a risk of electric shock if wiring
14. Work is carried out while electricity is applied.  
This product cannot be used in explosion proof area.  
Please use P970, P990( explosion proof type electric contact pressure indicator ) that is the product of our company, if necessary.

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## **1. Introduction**

P640, P680 Series is a differential pressure indication switch product with a built-in micro switch, and is so designed that it can be used for corrosive fluid or high pressure process. The switch is divided into a sensor part under pressure, a control part that regulates the set value and inflow pressure, and a micro switch that gives contact output. Micro switch is a high-precision product designed so that it can be operated by minute pressure change, and has various rated current values. Please correctly use this product after having thorough knowledge of this instruction manual that states how to use it respectively in case of intending to use this product.

## **2. Features**

This product can be used for turning on an abnormality alarm or warning light, or process control according to ON-OFF signal in case of reaching the set differential pressure. And it cannot be used in explosion proof area.

## **3. Specification and standards**

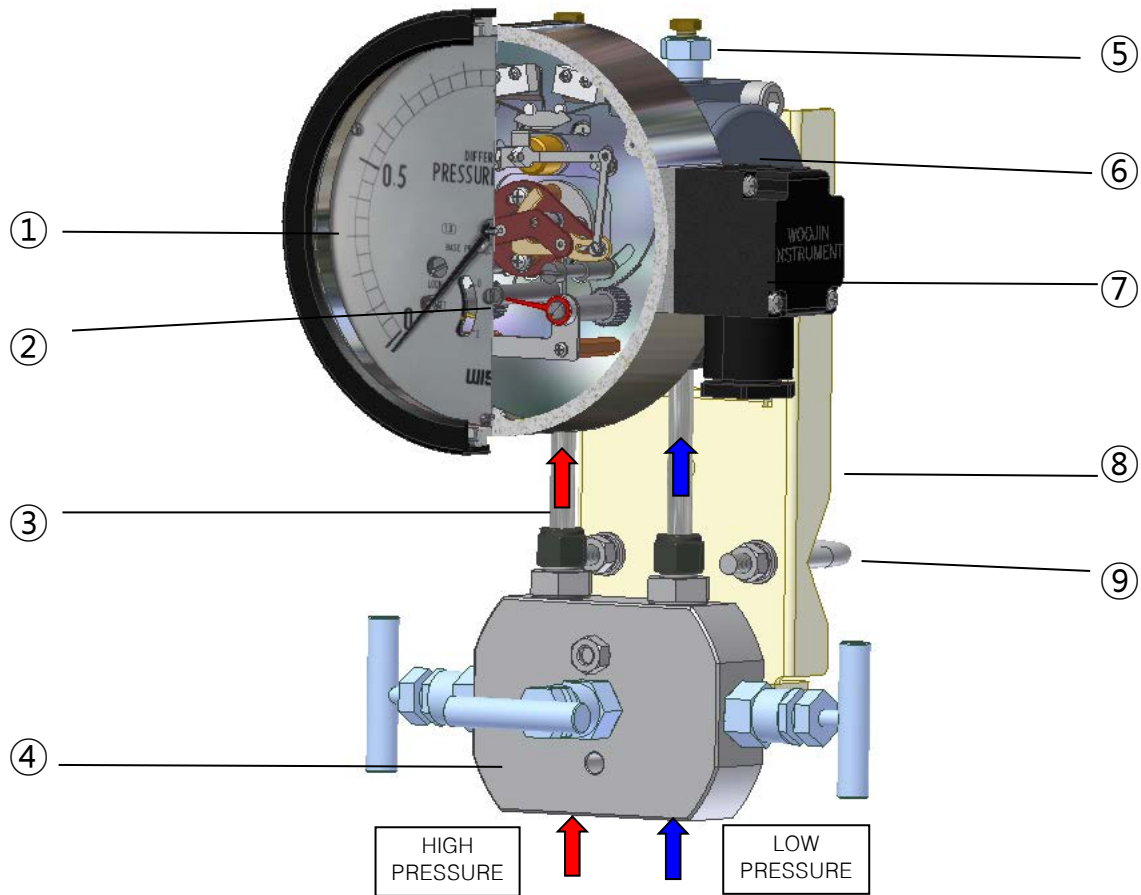
- 1) Nominal diameter : 160mm
- 2) Accuracy :  $\pm 1.0\%$ ,  $\pm 1.5\%$  of Full Scale
- 3) Repeatability :  $\pm 1.0\%$ ,  $\pm 1.5\%$  of adjustable range
- 4) Static pressure : Max. 100 bar
- 5) Number of contacts : 1 X SPDT or 2 X SPDT
- 6) Notes in accordance with Pressure Equipment Directive 97/23/EC
  - The pressure gauges are "Pressure accessories" in accordance with Article 1, Paragraph 2.1.4
  - The pressure gauges carry CE marking for Fluid Group 1G in accordance with Annex 2, Table 1.
  - Pressure gauges that do not carry the CE marking are manufactured in accordance with Article 3, Paragraph 3 "Sound engineering practice".

## 7) Electrical properties

### ■ P680 Series

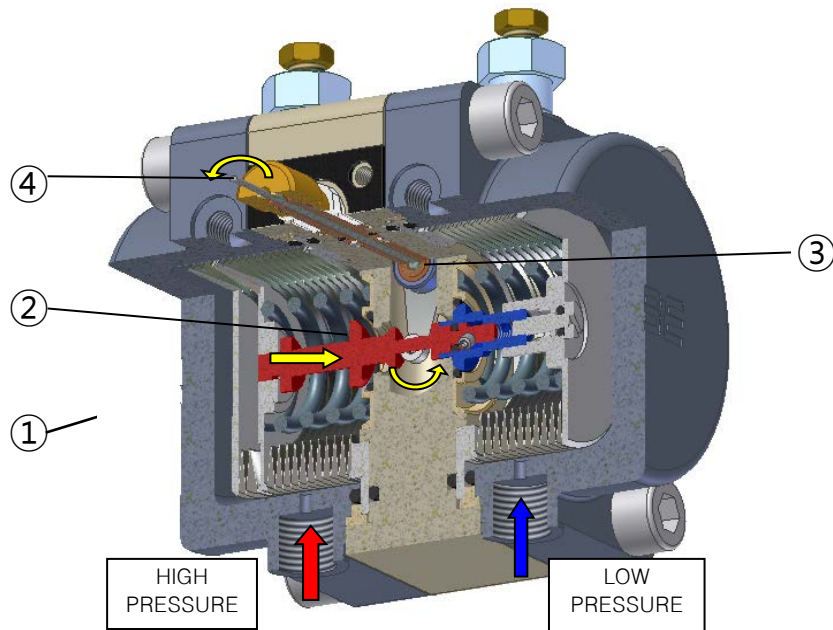
Switch	Rating	Withstand voltage	Insulation resistance
Reed switch	AC 110V/0.5A DC 200V/0.25A DC 100V/0.7A (Resistance load)	Between noncontiguous terminals AC 400V for 1minute Between terminals and case AC 600V for 1minute	DC 500V 100M $\Omega$ or over  Between terminals and case
<b>Summary</b>			
* A contact protection circuit is required when using an inductive load or a load (capacitive load, long cable, etc) through which a surge current (inrush current) flows as the reed switch load.			
* These gauges cannot be used with AC 220V.			

#### 4. Structure and Function



NO.	NAME	FUNCTION	REMARKS
①	Differential pressure scale plate	Indicate pressure difference between two points, and flow rate.	160mm
②	Zero adjustment screw	Adjust zero point according to the mounting position.	
③	Impulse pipe	Connection tube for the differential pressure gauge body and 3-way manifold	
④	3-WAY MANIFOLD	A device that enables valve to be opened in consecutive order in pressure transducing, in order to prevent a differential pressure gauge from being damaged.	
⑤	Air vent	A device that releases air from the piping to the outside in pressure transducing.	
⑥	Differential pressure gauge body	Pressure measurement equipment to which a measurement device is mounted.	
⑦	Terminal Box	Box to which a terminal is mounted.	
⑧	Mounting bracket	A device used in case of intending to mount a differential pressure gauge on measurement position	
⑨	U- bolt	A device that fastens the mounting bracket to 2-inch pipe	

## 5. Operating Principle



- 1) If pressure comes in the pressure transducing part of high pressure side and the pressure transducing part of low pressure side, ① bellows will shrink by differential pressure between two points. Then, ② ROD connected to the bellows moves in the right and left direction. And ③ SHAFT and ④ POST, which is connected to the indicating part of differential pressure gauge, rotates by this moving distance, and indicates differential pressure.
- 2) In case of bellows, high pressure side and low pressure side is made to be separated. And a uniform moving distance is made to occur by combination with spring according to the differential pressure range.

## 6. Transport, storage, and opening

- 1) Attention in case of transportation  
Please pay sufficient attention to transportation because damage can be caused in terms of performance, in case of being impacted by a fall.
- 2) Attention in case of storage  
Please store it at the place with little humidity and the place where there is no vibration and dust.  
In case of multi-level stacking, the weight should be to a degree where packing box isn't deformed. And always store the product so that it cannot fall.

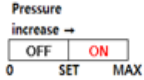
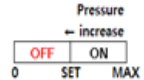
### 3) Attention in case of opening a package

Please carefully handle the object in case of opening a package.

Please take out the product at the sufficiently wide place in order not to drop the object by mistake in taking out it.

## 7. Contact Point Working Type and Connection

### 1) P680

Model	Type of contacts	MARK	Operation system and operation diaphragm	connection terminal number	Setting pointer
PN680	Upper limit type with one contact (Reverse lower limit type with one contact)	H (LR)	When the differential pressure increases (decreases) to the set pressure, the contacts operate and turn ON (OFF) the circuit. 	① - ②	Red pointer
	Lower limit type with one contact (Reverse upper limit type with one contact)	L (HR)	When the differential pressure increases (decreases) to the set pressure, the contacts operate and turn ON (OFF) the circuit. 	③ - ④	Yellow pointer
	Upper and lower limit type with two contacts (Reverse upper and lower limit type with two contacts)	H L (H R L R)	Combines two upper limit type and lower limit type (reverse lower limit type) and lower limit type (reverse upper limit type). Each type operates independently	① - ② ③ - ④	Red pointer Yellow pointer
	Upper limit type with two contact (Reverse lower limit type with one contact)	2 H (2 L R)	Combines two upper limit type and lower limit type (reverse lower limit type). Each type operates independently	① - ② ③ - ④	Red pointer Yellow pointer
	Lower limit type with two contact (Reverse lower limit type with one contact)	2 L (2 H R)	Combines two upper limit type and lower limit type (reverse lower limit type). Each type operates independently	① - ② ③ - ④	Red pointer Yellow pointer



## 8. Installation

- 1) Store this product free of moisture, vibration, dust or corrosive gas.
- 2) Avoid higher temperature than specified in this manual.
- 3) Be prepared for lightning or vapor.
- 4) Avoid direct sunlight.
- 5) Use M5 bolts when fixing the product to the panel or wall through fixing holes.

When you use fittings, fix them firmly.

- 6) Use a flexible tube for the impulse line to prevent excessive force on the pressure gauge.
- 7) For pipe connection, do not grab and turn the product case, rather use a designated spanner.

## 9. Wiring

- 1) Please be careful not to overstrain the body.
- 2) Please use vinyl sheathed wire, cabtyre cable, etc. suitable for load.
- 3) Please firmly wire a terminal block by using a compression terminal for M3.
- 4) Please carry out wiring after checking the contact type in the mark of wiring diagram.
- 5) Please use waterproof sealing fitting in case of conduit type.
- 6) Please use waterproof cable gland in case of cable gland type.
- 7) You should use a ground wire with a thickness of 0.7sq or over.

## 10. Maintenance and Operation

- 1) The commercial pressure shall be below 75% of the max graduation.
- 2) Do not impose a pressure beyond the allowable limit.
- 3) Avoid sudden pressure surge or drop.
- 4) If there is a risk of pulsation or impact pressure, install overpressure protection device like dampener or gauge protector.
- 5) Do not grease the operation parts in the pressure gauge.
- 6) The regular inspection shall be made once or twice in 6 months to check contact operation.
- 7) If the indication instrument makes a big error, remove it from the product for inspection.  
It may have been caused by wear, corrosion, external shock, vibration, or shock of a part.  
In this case, you must remove, adjust, or exchange the part.
- 8) Standard rated current is based on 3.6). However, it may be different in case of having

a MICRO S/W built-in. Therefore, please use it with a tolerance in consideration of inrush current etc. within the rated current marked on this product.

- 9) The contact resistance of micro switch increases little by little, as time passes.

Especially, in case of small load, contact resistance increases in a short period of time because " $\text{SiO}_2$ " accompanied with contact operation is accumulated at the contact part in the environment where "Si" is contained. Therefore, please carry out ventilation or use it in the clean environment. In particular, in case of using it for inputting sequence for control, a contact fault may occur for this reason. Therefore, please use bufferrelay for AC 110/220V between contact and sequence.

- 10) Please open and close the cover surely after cutting off power, in case of carrying out work in order to repair or check the pressure gauge.