

# Differential pressure gauge with electrical contact type

## Model: P650 series

Spec. sheet no. PD06-03

### Service intended

The P650 series are designed to measure a differential pressure from 25 kPa to 2.0 MPa at Max. working pressure up to 10 MPa, and have electrical contact. A set of two stainless steel bellows mounted on a force balance allows direct reading of the actual differential pressure. These models are designed to control and alarm for a differential pressure.



### Nominal diameter

160 mm

### Accuracy

±1.0 % of full scale

±1.6 % of full scale

### Scale range (MPa, kPa, bar, mbar)

0 ~ 25 kPa to 0 ~ 0.25 MPa (P651 model)

0 ~ 0.4 MPa to 0 ~ 2.0 MPa (P652 model)

### Max. working pressure (Static pressure)

Max. 10 MPa

### Working temperature

Ambient : -20 ~ 65 °C

Fluid : Max. 100 °C

### Degree of protection

EN60529/IEC529/IP65

### Temperature effect

Accuracy at temperature above and below the reference temperature (20 °C) will be effected by approximately ±0.5 % per 10 °C of full scale



## Standard features

### Pressure connection

Stainless steel (316SS), Monel and Hastelloy-C

### Element

Bellows

Stainless steel (316L SS), Monel and Hastelloy-C

### Case

Stainless steel (304SS)

### Bezel ring

Stainless steel (304SS)

Bayonet type

### Window

Polycarbonate

### Dial

White aluminium with black graduations

### Pointer

Black painted aluminium alloy

### Conduit connection

M20 x 1.5

### Process connection

¼" NPT(F)

½" NPT(F) at 3-way and 5-way manifold valve

### Standard accessories

Mounting bracket for 2" pipe  
mounting with silver gray finished steel

### Certificates

Pressure equipment directive (2014/68/EU) Annex III Module H

### Option

- Remote seal
- Mounting bracket with 316SS for 2" pipe mounting
- 3-way manifold valve (316SS, Monel)
- 5-way manifold valve (316SS, Monel)

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**1. Base model**

- P651** Electrical contact type pressure gauge  
(0 ~ 25 kPa to 0 ~ 0.25 MPa)
- P652** Electrical contact type pressure gauge  
(0 ~ 0.4 MPa to 0 ~ 2.0 MPa)

**2. Nominal diameter (mm)**

- 6** 160

**3. Type of mounting**

- D** Bottom connection, mounting bracket for 2" pipe

**4. Contact function**

- X** Refer to contact function table

**5. Process connection**

- C** ¼" NPT(F)
- E** ½" NPT(F) (only at 3-way and 5-way manifold valve)

**6. Mounting bracket**

- D** Standard bracket
- E** 304SS mounting bracket
- F** 316SS mounting bracket
- W** Wall mounting bracket (316SS)
- N** None

**7. Unit**

- H** bar
- I** MPa
- J** kPa
- S** mbar

**8. Range**

- 041** 0 ~ 0.1 MPa
- 133** 0 ~ 0.16 MPa
- 134** 0 ~ 0.25 MPa
- 044** 0 ~ 0.4 MPa
- 045** 0 ~ 0.6 MPa
- 047** 0 ~ 1 MPa
- 143** 0 ~ 1.6 MPa
- 051** 0 ~ 2.0 MPa
- 118** 0 ~ 25 kPa
- 121** 0 ~ 40 kPa
- 125** 0 ~ 60 kPa

**9. Dial color**

- 3** 2 colors

**10. Option**

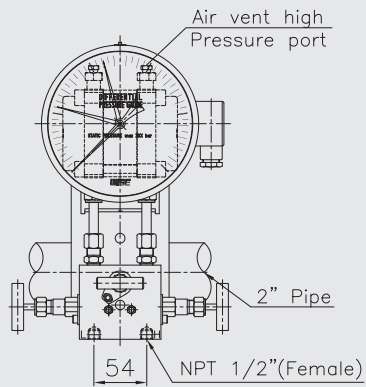
- 0** None
- 1** Manifold valve
- 8** ½" or ¾" NPT(F) conduit connection

1	2	3	4	5	6	7	8	9	10
P651	6	D	4	E	D	I	047	3	1

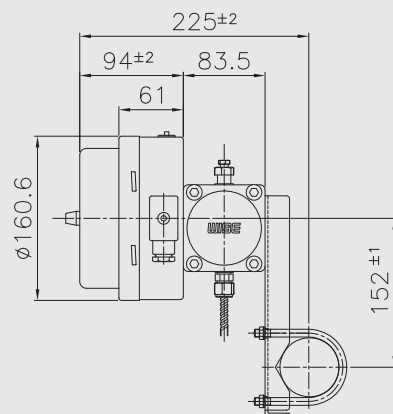
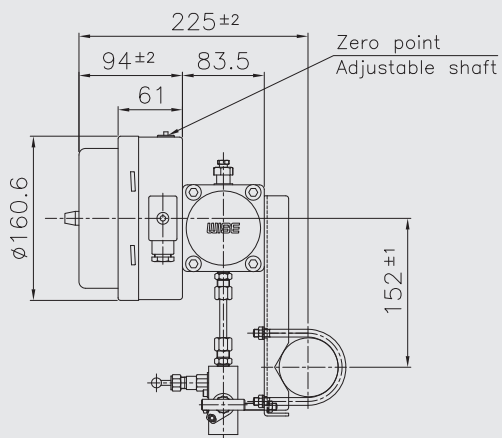
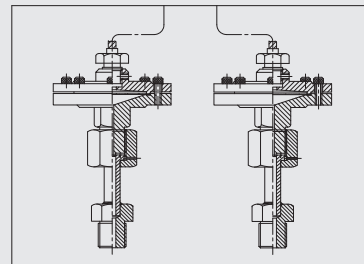
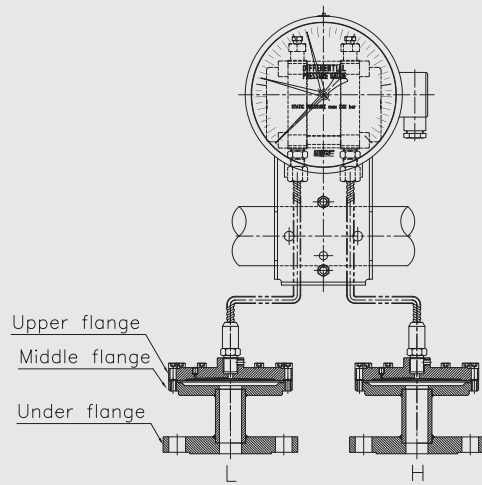
Sample  
ordering code

## P65X : Type of mounting

Code:(D) P650



Code:(D) P650(Remote seal)



## Snap - action contacts

### General

Electromechanical limit switches in pointer type measuring instruments are auxiliary current switches which open or close electrical circuits at set limit values by means of a contact arm which is moved by the actual value pointer.

The snap action contact is a mechanical contact for switching capacities up to 30 W 50 VA max.

Contact making will be delayed and or advanced in relation to the movement of the actual value pointer.

To closed the circuit, the contact pin of the movable contact arm is attracted in a jump by the permanent magnet fastened to the supporting arm shortly before the set value has been reached.

Due to the retention force of the magnet, snap action contacts are more resistant against shock and vibration.

The switching safety is increased by the increased contact pressure.

When the circuit is opened, the magnet keeps the contact arm in its place until the restoring force of the measuring element exceeds the magnetic force, and the contact opens in a jump.

### Specifications

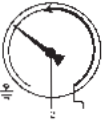

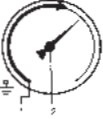




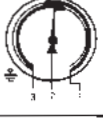
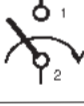
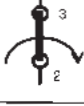
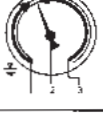


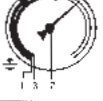


Maximum contact rating with non-inductive (ohmic) load		Electrical contacts type pressure gauge model P650 series	
		Dry gauges	Liquid filled gauges
Maximum voltage		250 V	250 V
Current ratings	Make ratings	1.0 A	1.0 A
	Break ratings	1.0 A	1.0 A
	Continuous load	0.6 A	0.6 A
Maximum load		30 W 50 VA	20 W 20 VA
Material of contact points		Silver-nickel alloy (80 % Ag / 20 %Ni / 10 µm) gold-plated	
Ambient operating temperature		-20 ... +70 °C	
Max. no. of contacts		2	
Voltage test		Circuit / protective earth conductor - 2,000 vac 1 minute Circuit /circuit - 2,000 vac 1 minute	

### Recommended contact ratings with ohmic and inductive load

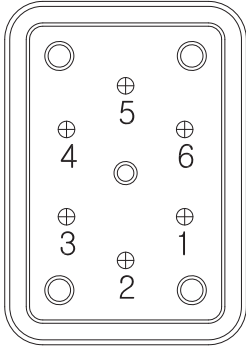
Voltage (DIN IEC 38) DC / AC	Electrical contacts type pressure gauge model P650 series					
	Dry gauges			Liquid filled gauges		
	Ohmic load		Inductive load	Ohmic load		Inductive load
	DC	AC		DC	AC	
			cosØ > 0.7			cosØ > 0.7
V	mA	mA	mA	mA	mA	mA
220 / 230	100	120	65	65	90	40
110 / 110	200	240	130	130	180	85
48 / 48	300	450	200	190	330	130
24 / 24	400	600	250	250	450	150

In order to ensure a high switching reliability of the contacts the switching voltage should not be below 24 V, also taking environmental influences in the long term into account.

## Contact function table

Code	Wiring scheme	Contact function		Wiebrock code no.	Remark	
		1 <sup>st</sup> contact	2 <sup>nd</sup> contact			
<b>Single Contact</b>						
<b>1</b>	Contact make when pointer reachse setpoint (Normal open - NO)				S/M-1	Normal use high alarm system
<b>3</b>	Contact break when pointer reachse setpoint (Normal close - NC)				S/M-2	Normal use low alarm system
<b>Double Contact - Common Circuit</b>						
<b>4</b>	1 <sup>st</sup> and 2 <sup>nd</sup> contact make when pointer reaches setpoint				S/M-11	Normal use high and hihigh alarm system
<b>6</b>	1 <sup>st</sup> contact make 2 <sup>nd</sup> contact break when pointer reaches setpoint				S/M-12	Normal use failsafe high and low alarm system
<b>2</b>	1 <sup>st</sup> contact break 2 <sup>nd</sup> contact make when pointer reaches setpoint				S/M-21	Normal use high and low alarm system
<b>5</b>	1 <sup>st</sup> and 2 <sup>nd</sup> contact break when pointer reaches setpoint				S/M-22	Normal use low and lolow alarm system

## Terminal block arrangement



### 1. High alarm (S/M-1)

- ① Normal open
- ② Common
- ④ Ground

### 2. High and low alarm (S/M-21)

#### Low alarm

- ① Normal close
- ② Common
- ④ Ground

#### High alarm

- ② Common
- ③ Normal open

### 3. Low alarm (S/M-2)

- ① Normal close
- ② Common
- ④ Ground

### 4. Two high alarm (S/M-11)

#### No.1 High alarm

- ① Normal open
- ② Common
- ④ Ground

#### No.2 High alarm

- ② Common
- ③ Normal open

### 5. Two low alarm (S/M-22)

#### No.2 Low alarm

- ① Normal close
- ② Common
- ④ Ground

#### No.1 Low alarm

- ② Common
- ③ Normal close

### 6. Failsafe high and low alarm (S/M-12)

#### High alarm

- ② Common
- ③ Normal close
- ④ Ground

#### Low alarm

- ① Normal open
- ② Common