

# Micro Differential Pressure Gage

- WO81
- WO70
- FR51A
- MS30
- MS61A
- MS65
- EB3C
- EMD8
- EMD7
- EMT6
- EMT1
- EMTGPI
- EMT1H
- EMP5
- EMA3
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- Combination of Manosys
- Accessories
- Application Cautions for use Maintenance

## Manostar Gage WO81 General purpose type Air volume and velocity meters



**WO81FN**

(surface installation type with non flag pointer)

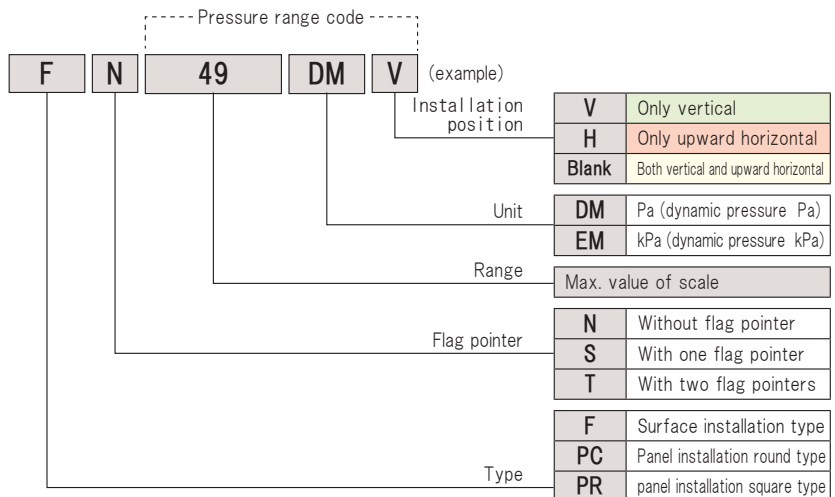
### Display unit

Air volume				Air velocity
m <sup>3</sup> /h	m <sup>3</sup> /h(nor)	m <sup>3</sup> /min	m <sup>3</sup> /min(nor)	m / s
m <sup>3</sup> /h ×10	m <sup>3</sup> /h(nor) ×10	m <sup>3</sup> /min ×10	m <sup>3</sup> /min(nor) ×10	
m <sup>3</sup> /h ×1000	m <sup>3</sup> /h(nor) ×1000	m <sup>3</sup> /min ×1000	m <sup>3</sup> /min(nor) ×1000	
m <sup>3</sup> /h ×10000	m <sup>3</sup> /h(nor) ×10000	m <sup>3</sup> /min ×10000	m <sup>3</sup> /min(nor) ×10000	

This and next page is introduction pages for air volume and velocity meter of WO81.  
Refer to p.3, p.4 for low differential pressure gage of WO81.

### Product code

W O 8 1



◆If you order or ask, please specify the product code and the pressure range code.

### Data sheet for calculating air volume or velocity.

(Please inform us data sheet ① or ② for calculating air volume or velocity. Base on data sheet, we issue you specification of air volume or velocity scale.)

To make out the specification based on gas condition (temp, humidity, static pressure, density), size of the duct and medium flow rate. →①

To make out the scale specification based on the relationship between air volume (or velocity) and dynamic pressure.(If the detector is a orifice and so on.) →②

For calculating air volume or velocity ①	<b>Gas to be measured data</b>	Working regular air volume (velocity) value <input style="width: 80%;" type="text"/>	Gas temperature <input style="width: 60%;" type="text"/> °C	Gas density <input style="width: 60%;" type="text"/> kg/m <sup>3</sup>
	<b>Used pressure detector</b>	Max. air volume (velocity) value <input style="width: 80%;" type="text"/>	Gas humidity <input style="width: 60%;" type="text"/> % RH	* Air density is 1,200 kg/m <sup>3</sup> at normal state.
		Duct size <input style="width: 80%;" type="text"/> I.D. ( ) mm or square duct ( ) mm × ( ) mm	Please fill in the value of the point to be measured to installing the pressure detector.	
		In case of mixed gas, please specify the density of mixed gas.		
		<input type="checkbox"/> Total static pressure tube (Pitot tube) <input type="checkbox"/> Total pressure tube + Static pressure tube <input type="checkbox"/> Multi-pitot tube (corrected air volume coefficient)		
For calculating air volume or velocity ②	<b>Using condition</b>	When air volume (velocity) <input style="width: 80%;" type="text"/> value is at <input style="width: 60%;" type="text"/> dynamic pressure Pa		
			Max. air volume (velocity) <input style="width: 80%;" type="text"/> is measured till ( )	

- ◆If you order the air volume and velocity meter, please tell us the data for calculating air volume and velocity.
- ◆The max. value of air volume and velocity is rounding off to our printing scale.
- ◆The max. pressure value correspond to the max. value of air volume (velocity) is written in scale plate.

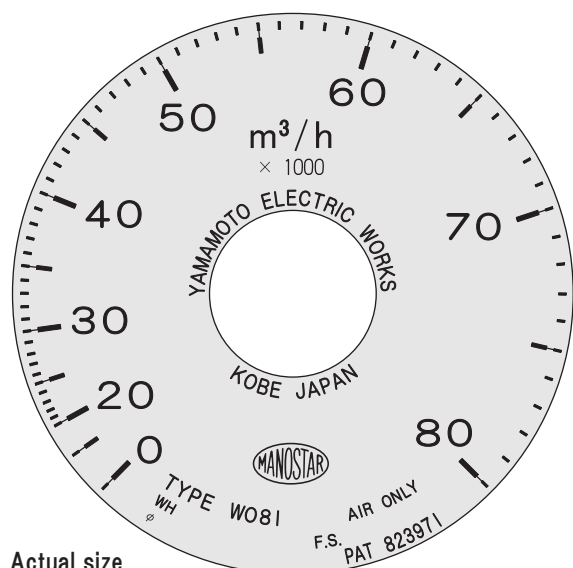
## Specification

Types	Bodies		Surface installation type	Panel installation round type	Panel installation square type
	Flag pointers		F	PC	PR
	Non flag pointer	N	W081 F N	W081 PC N	W081 PR N
	One flag pointer (red)	S	W081 F S	W081 PC S	W081 PR S
	Two flag pointers (red and green)	T	W081 F T	W081 PC T	W081 PR T
<b>units</b>	Air volume and air velocity		<b>Applicable piping</b>	· Vinyl, plastic or rubber tube (I.D. 6) ...The resinous piping connectors (installed) for vinyl or plastic tube.	
<b>Pressure measuring method</b>	Measuring differential pressure		<b>Piping connector polarity</b>	· Metal tube (O.D. 6 ± 0.1) ...Metal type piping connector (option) is needed.	
<b>Pressure receiving element</b>	Diaphragm			· Hard plastic tube (O.D. 6 × I.D. 4) ...Metal type piping connector (option) and inner sleeve set (XIN6 × 4) are needed.(refer to p.92)	
<b>Gas to be measured</b>	Air or non-corrosive gas (not liquid)		<b>Mass</b>	· The piping connector indicated red color is high pressure side and blue color is low pressure side.	
<b>Scale indicating angle</b>	Approximately 270 ° Wide-angle indication			· Enabling to convert the polarity by changing piping connectors of high pressure side for low pressure side.	
<b>Medium and ambient temperature</b>	- 10 to + 50 °C (no freezing)				
<b>Ambient humidity</b>	90 % RH or less (no dewing)				
<b>Withstanding pressure of instrument body</b>	200 kPa (refer to p.104)				
<b>Material of outer case</b>	Polycarbonate and polyamide				
<b>Withstanding impact</b>	100 m/s <sup>2</sup> (each 6 times on triaxial directions)				
<b>Withstanding vibration</b>	5 to 10 Hz Amplitude : 10 mm 10 to 50 Hz Acceleration : 39 m/s <sup>2</sup> (each two hours on triaxial directions)				
<b>Accessories</b>	One set of screws for installation		Two sets of adaptors for installation (with main body)	One set of nuts for installation (with main body)	
	W081F		W081PC	W081PR	
<b>Pressure range codes</b>	<b>Air volume and air velocity range (example scale)</b>	<b>Standard installation positions (refer to p.10)</b>	<b>Accuracies (at 20 °C)</b>	<b>Material of pressure receiving element</b>	<b>Withstanding pressures of receiving element (refer to p.104)</b>
49 DMH	It is depend on specification of air velocity and air volume scale.	Upward horizontal (fixed)	± 5 % FS or less	Silicone rubber	10 kPa
49 DMV		Vertical (fixed)			
70 DMH		Upward horizontal (fixed)			
70 DMV		Vertical (fixed)			
100 DMH		Upward horizontal (fixed)	± 2.5 % FS or less		
100 DMV		Vertical (fixed)			
130 DMH		Upward horizontal (fixed)			
130 DMV		Vertical (fixed)			
180 DMH		Upward horizontal (fixed)	± 1.5 % FS or less		
180 DMV		Vertical (fixed)			
250 DM		Installation position from upward horizontal to vertical is available.			
300 DM					
400 DM					
580 DM					
1000 DM					
1.8 EM					
3.2 EM					
4.5 EM					
8.5 EM					
10 EM					
					150 kPa

(Note) [Number] : Rounding off, [Magnification] : × 10, × 1000, × 10000, [Unit] : m<sup>3</sup>/h, m<sup>3</sup>/min, m<sup>3</sup>/h (nor), m<sup>3</sup>/min (nor), m/s

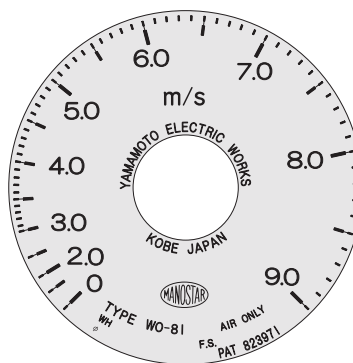
◆ In ordering out of above mentioned installation position, please order us or our agency beforehand. It must be adjusted before the factory shipment.

### Air volume or velocity range(example scale)



Actual size

Air volume scale



Air velocity scale

W081

W070

FR51A

MS30

MS61A

MS65

EB3C

EMD8

EMD7

EMT6

EMT1

EMTGPI

EMT1H

EMP5

EMA3

EMRT1

HWS15

Combination of Manosys

Accessories

Application Cautions for use Maintenance

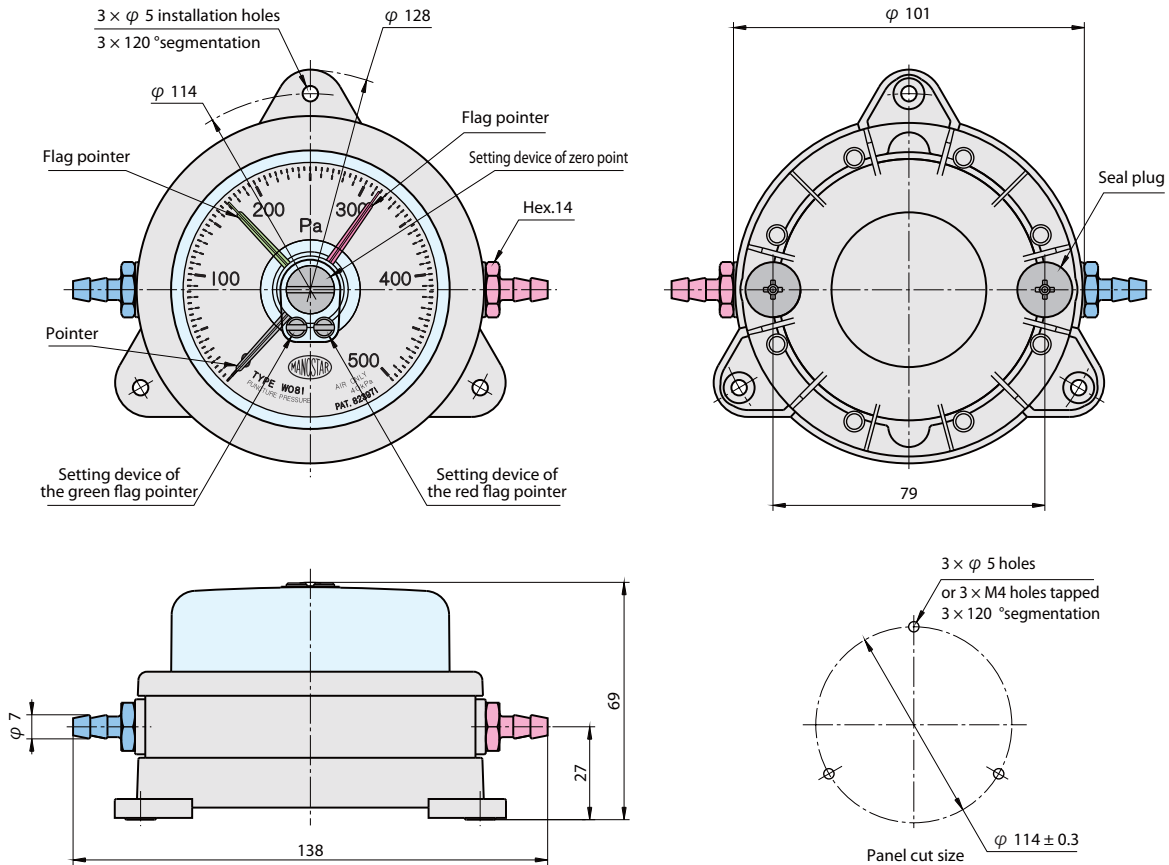
# Micro Differential Pressure Gage

## Manostar Gage W081F

### Outline drawing

The piping connector installed on side view (in factory-setting)

VT connector for vinyl or plastic tube



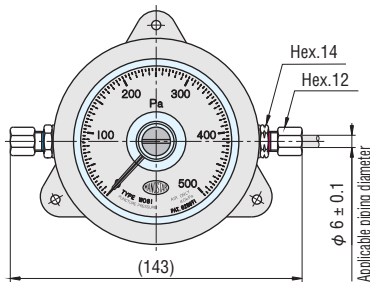
**Caution**

Tighten the piping connectors with the torque of 1 N · m.  
 Tighten the seal plugs with the torque of 0.5 N · m.  
 Do not apply excessive torque more than necessary, otherwise it will damage the instrument body.  
 (Be sure to use a locking spanner at connectors to tighten the cap nut of metal tube. Be careful not to let the tightening torque directly load to the main body of the instrument.)

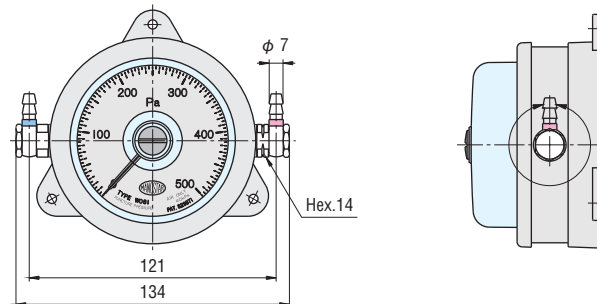
## W081F Arrangement of the piping connectors

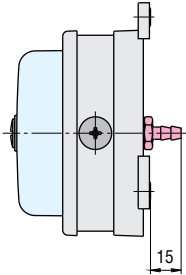
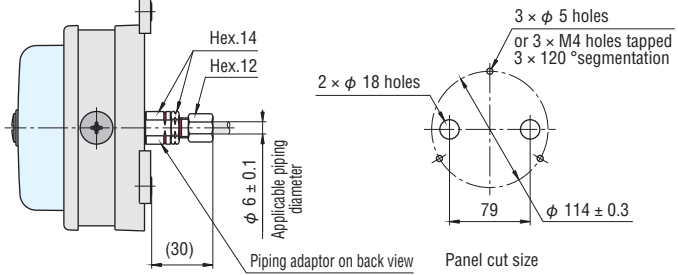
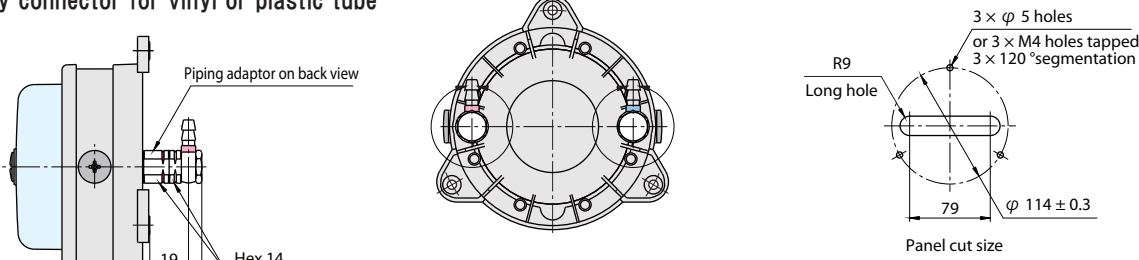

Side arrangement of piping connectors

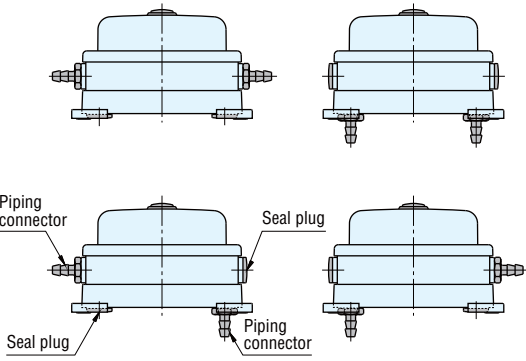
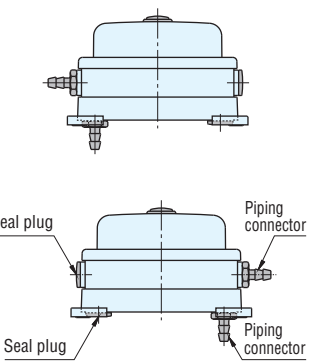

MT connector for metal tube



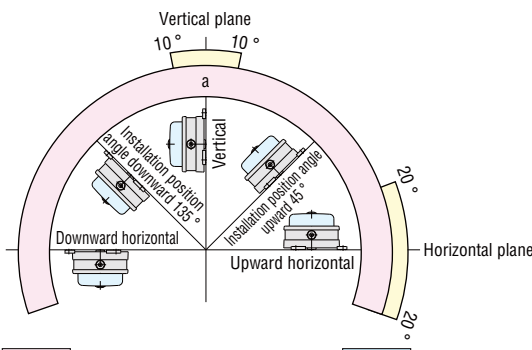
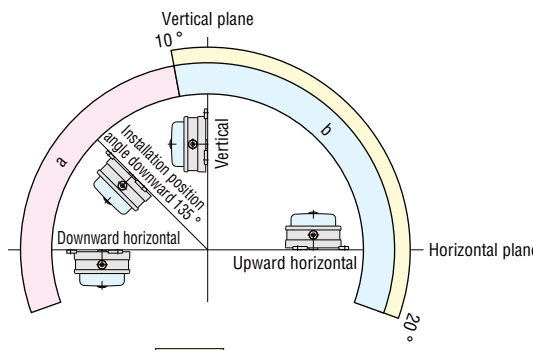
VR rotary connector for vinyl or plastic tube



Rear arrangement of the piping connector	
<p><b>VT connector for vinyl or plastic tube</b></p> 	<p><b>MT connector for metal tube</b></p> 
<p><b>VR rotary connector for vinyl or plastic tube</b></p> 	
<div style="display: flex; align-items: center;"> <div style="text-align: center; margin-right: 10px;">   <b>Caution</b> </div> <div> <p>Tighten the piping connectors with the torque of 1 N·m.                      Tighten the seal plugs with the torque of 0.5 N·m.                      Do not apply excessive torque more than necessary, otherwise it will damage the instrument body.                      Be sure to use a locking spanner at connectors to tighten the cap nut of metal tube. Be careful not to let the tightening torque directly load to the main body of the instrument.</p> </div> </div>	

To change arrangement of piping connectors of W081F	Possible arrangement of piping connectors	Impossible arrangement of piping connectors
<p>W081F have two piping connector ports on side and back view. It is possible to four kinds of arrangement by combination of piping.</p>		
<div style="display: flex; align-items: center;"> <div style="text-align: center; margin-right: 10px;">   <b>Caution</b> </div> <div> <ol style="list-style-type: none"> <li>1. Use set of piping connectors, which is set of a red connector on high pressure side and a blue connector on low pressure side.</li> <li>2. Be careful that there is impossible arrangement as shown on the right figure.</li> <li>3. With seal plugs, be sure to close the two piping connector ports where connectors are not attached.</li> </ol> </div> </div>		

## W081 Installation position

<p>Pressure range specified vertical or upward horizontal that is standard installation position.</p> <div style="border: 1px solid black; padding: 2px; text-align: center; background-color: #d9ead3;"> <p>0 ~ 50 Pa, 0 ~ 100 Pa, - 50 ~ + 50 Pa</p> </div> <p>The gage that pressure range is from 0 ~ 50 Pa is impossible to install on downward horizontal.</p>	<p>Installation position from upward horizontal to vertical is available.</p> <div style="border: 1px solid black; padding: 2px; text-align: center; background-color: #d9ead3;"> <p>All other ranges except for the following</p> </div>
	
<div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;"> <div style="background-color: #d9ead3; width: 20px; height: 10px; margin: 0 auto;"></div> <p><b>a</b> Specified installation position</p> </div> <div style="text-align: center;"> <div style="background-color: #d9ead3; width: 20px; height: 10px; margin: 0 auto;"></div> <p><b>b</b> Following installation position is available</p> </div> <div style="text-align: center;"> <div style="background-color: #d9ead3; width: 20px; height: 10px; margin: 0 auto;"></div> <p><b>c</b> Standard installation position</p> </div> </div>	

- ◆ In ordering out of above mentioned installation position, please order us or our agency beforehand. It must be adjusted before the factory shipment.
- ◆ In case of ordering standard installation position, you do not specify installation position. Please specify pressure range code in the specification table.

- W081
- WO70
- FR51A
- MS30
- MS61A
- MS65
- EB3C
- EMD8
- EMD7
- EMT6
- EMT1
- EMTGP1
- EMT1H
- EMP5
- EMA3
- EMRT1
- HWS15
- Combination of Manosys
- Accessories
- Application Cautions for use Maintenance

# Micro Differential Pressure Gage

WO81

WO70

FR51A

MS30

MS61A

MS65

EB3C

EMD8

EMD7

EMT6

EMT1

EMTGPI

EMT1H

EMP5

EMA3

EMRT1

HWS15

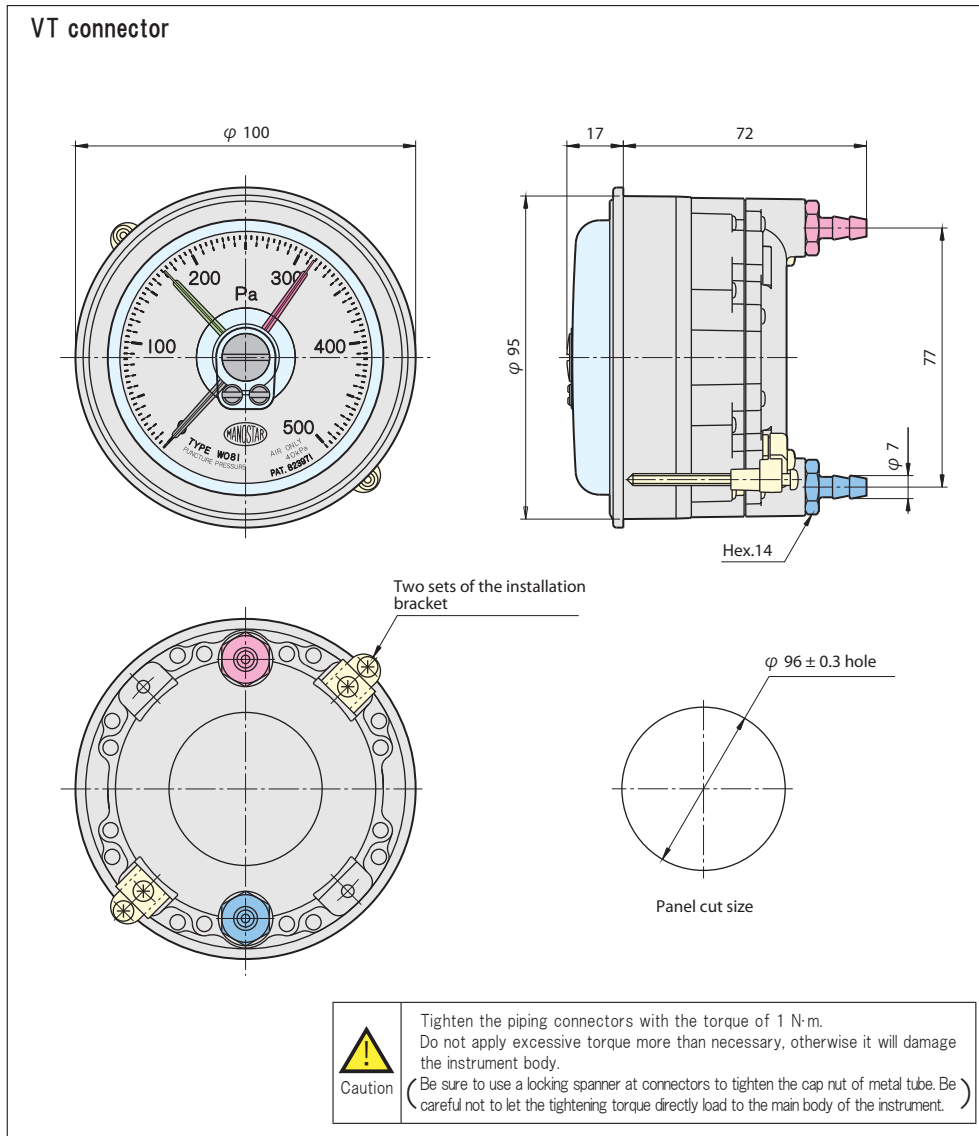
Combination of Manosys

Accessories

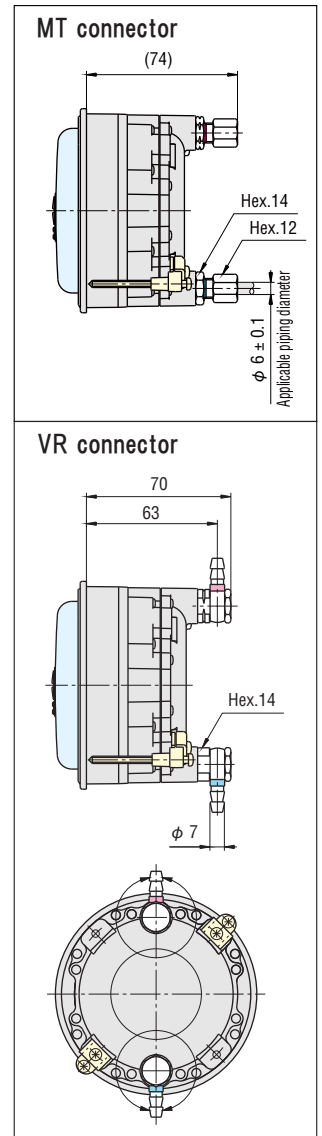
Application Cautions for use Maintenance

## Manostar Gage WO81PC

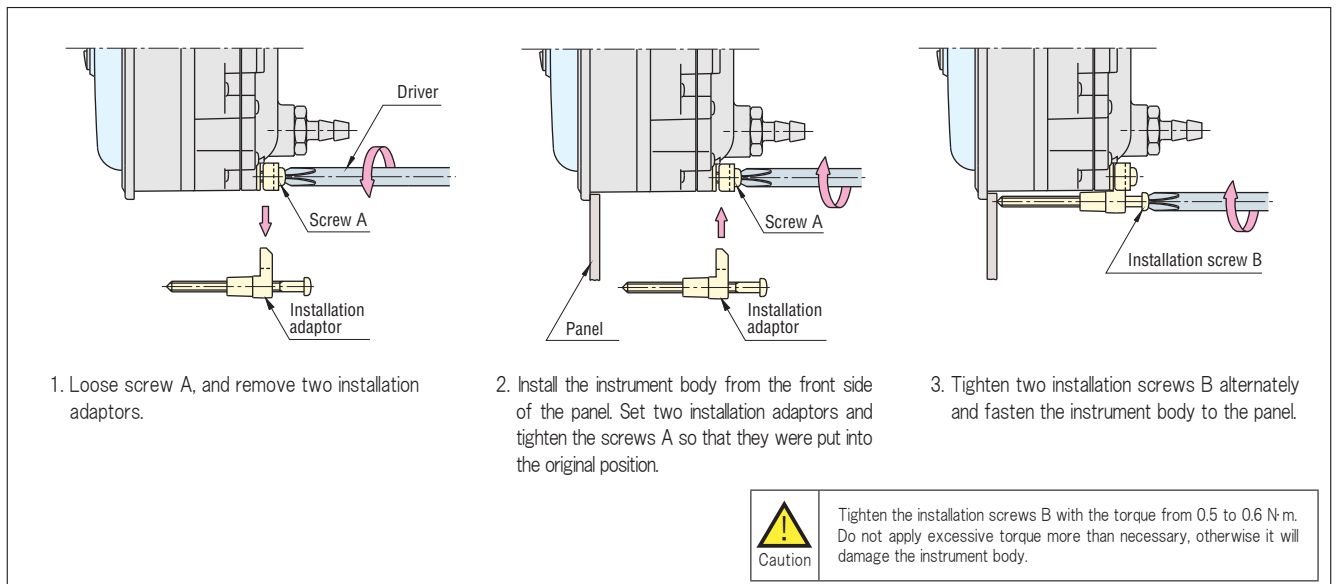
### Outline drawing



### Arrangement of piping connector (example)

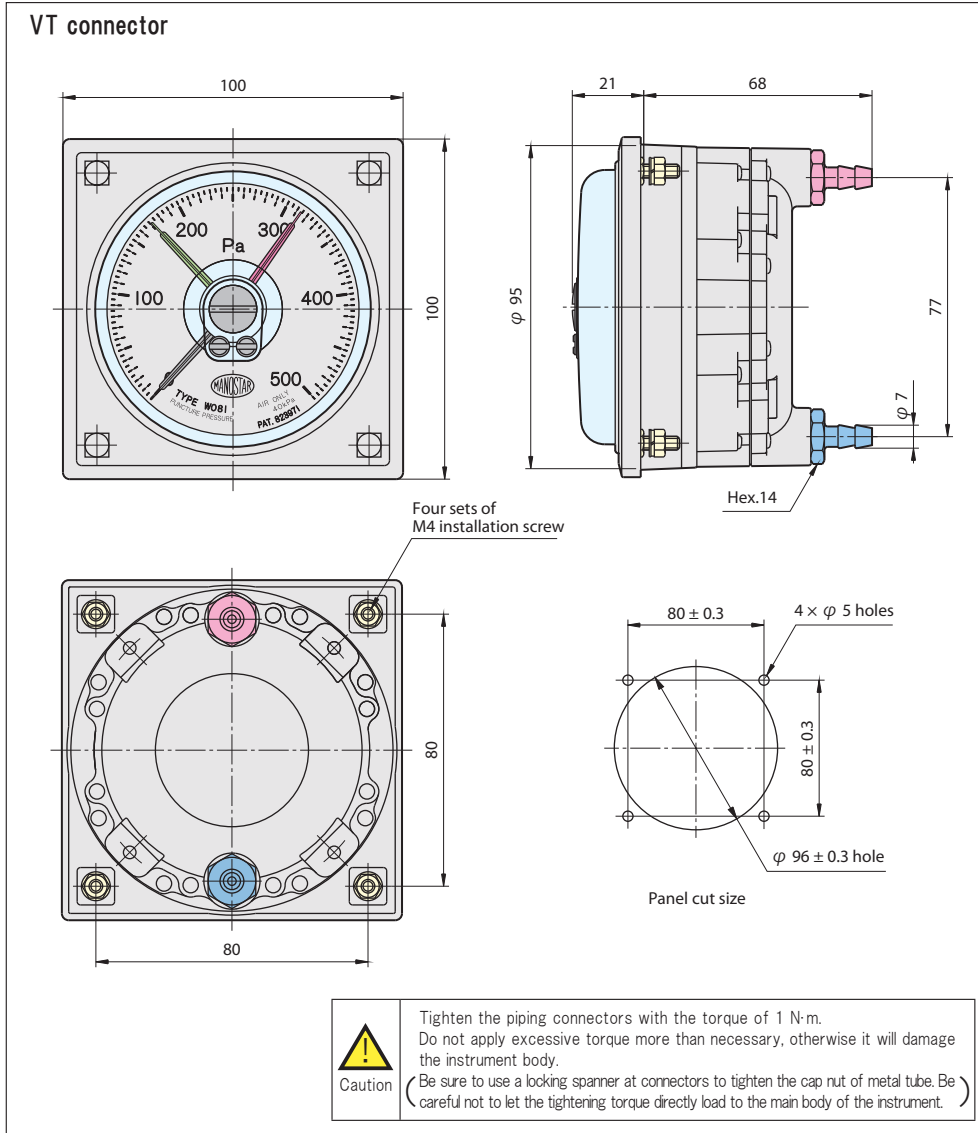


### How to install WO81PC

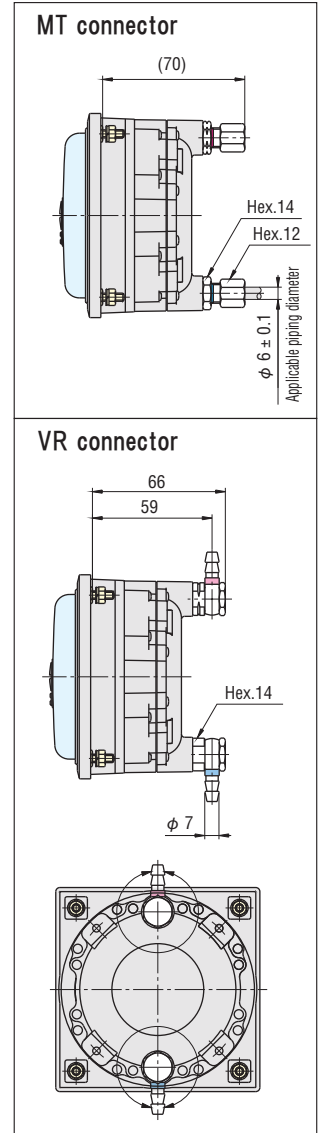


## Manostar Gage W081PR

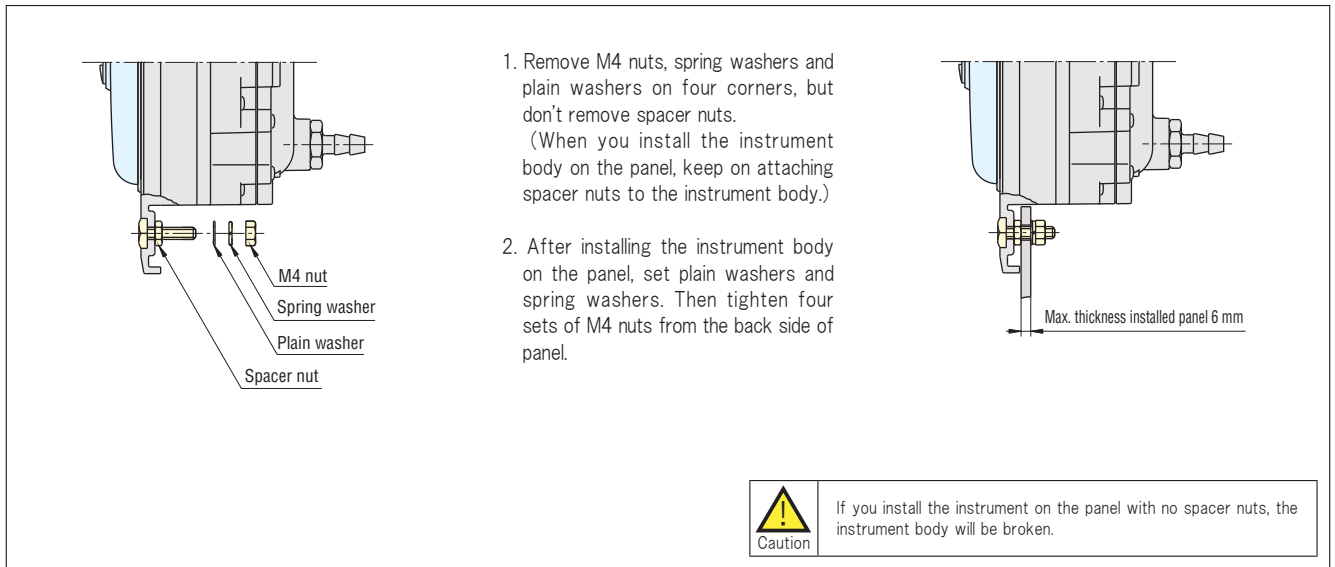
### Outline drawing



### Arrangement of piping connector (example)



### How to install W081PR



W081

W070

FR51A

MS30

MS61A

MS65

EB3C

EMD8

EMD7

EMT6

EMT1

EMTGPI

EMT1H

EMP5

EMA3

EMRT1

HWS15

Combination of Manosys

Accessories

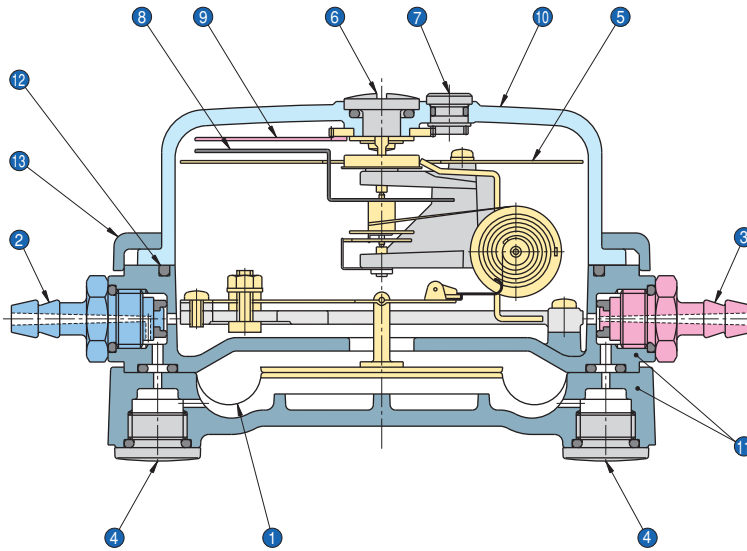
Application Cautions for use Maintenance



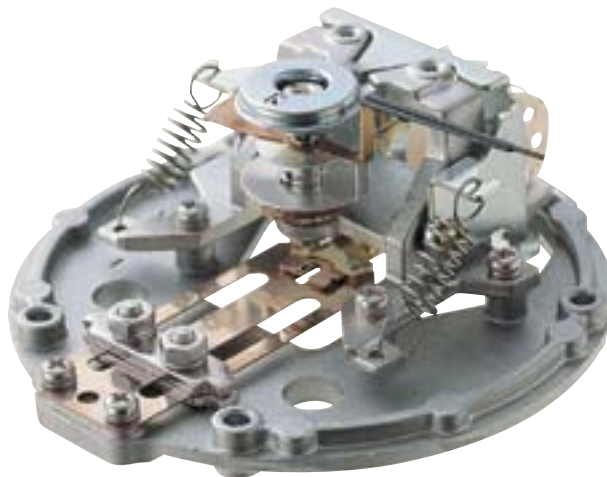
# Micro Differential Pressure Gage

## Manostar Gage W081

### Main structure



No.	Name
1	Diaphragm
2	Low pressure side piping connector (blue)
3	High pressure side piping connector (red)
4	Seal plug
5	Scale plate
6	Setting device of zero point
7	Setting device of the flag pointer
8	Pointer
9	Flag pointer
10	Clear cover
11	Housing
12	Cover packing
13	Cover ring



### Accessory for W081 RoHS compliant

Installation bracket to set for W081 PC type



The combination shown in the above photo is a set of the installation adaptor.  
This set is intended for reserve. These two sets are attached to the body as standard accessory.

Product code TKA81PC

Portable box for W081 model



(The gage is not included.)

Product code PB-01

WO81

WO70

FR51A

MS30

MS61A

MS65

EB3C

EMD8

EMD7

EMT6

EMT1

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EMA3

EMRT1



HWS15



Combination of Manosys



Accessories



Application Cautions for use Maintenance



Accessory for W081 RoHS compliant



VT connector	
High pressure side  Product code KGA81VT-H-P	Low pressure side  Product code KGA81VT-L-P
<b>VT connector</b> To attach vinyl, plastic or rubber tube to the instrument body (spare parts)	



VR connector	
High pressure side  Product code KGA81VR-H	Low pressure side  Product code KGA81VR-L
<b>VR connector</b> These connectors are rotary elbow type and can be connected to vinyl, plastic and rubber tube of I.D.6.	



PT connector	
High pressure side  Product code KGA81PT-H	Low pressure side  Product code KGA81PT-L
<b>PT connector <span style="color: red;">NEW</span></b> The joint installed tube is push-in type. Use the optional tube (NT4-6, refer to p.88) or the applicable tube (JIS B8381-1).	

PR connector	
High pressure side  Product code KGA81PR-H	Low pressure side  Product code KGA81PR-L
<b>PR connector <span style="color: red;">NEW</span></b> The joint installed tube is push-in and rotary elbow type.	

MT connector	
High pressure side  Product code KGA81MT-H	Low pressure side  Product code KGA81MT-L
<b>MT connector(ring joint type)</b> This connector can be connected to the metal tube made from copper, aluminum and so on (O.D. 6, the tolerance $\pm 0.1$ ). In case of connecting with stainless tube, use MTW connector. When this connector is connected to hard plastic tube (O.D. 6, I.D. 4), remove the brass-made sleeve and use the resinous inner sleeve set (XIN6 $\times 4$ , refer to p.88) that is the optional accessory.	

MR connector	
High pressure side  Product code KGA81MR-H	Low pressure side  Product code KGA81MR-L
<b>MR connector</b> This connector is rotary elbow type and can be connected to the metal tube (made from copper and aluminum and so on). Applicable piping material is the same as MT connector. When this connector is connected to hard plastic tube (O.D. 6, I.D. 4), remove brass-made sleeve and use the resinous inner sleeve set (XIN6 $\times 4$ , refer to p.88) that is the optional accessory.	

MTW connector	
High pressure side  Product code KGA81MTW-H-S	Low pressure side  Product code KGA81MTW-L-S
<b>MTW connector(double ring joint type)</b> This connector can be connected to stainless tube (O.D. 6, the tolerance $\pm 0.1$ ). This connector is made of stainless steel. (SUS316)	

Piping adaptor on back view	
(for F type on back view) High pressure side  Product code KGA81FBA-H	(for F type on back view) Low pressure side  Product code KGA81FBA-L
<b>Piping adaptor on back view</b> When you install MT, VR and MR connector (except for MTW connector) on back side port of W081F type, this adaptor is necessary to avoid interference with connectors and panel. It is also necessary as a spacer to use a locking spanner at this adaptor.	

Seal plug
 Product code KGA81PLG

\* Because of quality improvement or any reason, some specifications are possibility of changing without notice.

W081

W070

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HWS15

Combination of Manosys

Accessories

Application Cautions for use Maintenance



## Product Warranty

### Warranty Period

This product warranty is valid for one year from the date of delivery to a place specified by an ordering party who has transacted directly with Yamamoto Electric Works Co., Ltd.

### Coverage

If a product breaks down due to a reason for which we are responsible during the warranty period and you return the product to us, we will either repair or replace the product free of charge.

This warranty does not cover:

- (1) Usage of the product under any inappropriate conditions or environment contrary to what is described in our product catalog, specifications or manual.  
Handling or usage of the product other than as described in our product catalog, specifications or manual.
- (2) Breakdown due to a reason other than a fault within our product.
- (3) Any product that has been modified or repaired by a party other than us.
- (4) Any breakdown due to a reason that was not foreseeable based on scientific and technical standards applied at the time of shipment.
- (5) Any breakdown due to a reason not attributable to us such as a natural calamity or other disaster.

These terms of warranty represent our entire liability with respect to the product, and we shall have no liability for any other loss arising in connection with a breakdown of the product.

\*This product warranty is only valid within Japan.

This document is a translation from the original Japanese version, and the original Japanese version has priority over this translation.

Be sure to refer to the original Japanese for the details of this warranty.



Caution

The Japanese original document shall always take precedence over the translated versions.

You should be sure to refer to the Japanese original document.

Sole Agent  **Manostar CO.,LTD.**

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Hyogo 653-0031 JAPAN  
TEL. +81 (78) 621-7000 FAX. +81 (78) 621-7788

Manufacturer

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