

### Edgewise type micro differential pressure gauge

- Small-size/lightweight type that can be installed anywhere you like
- Unique mechanism less subject to abnormal high pressure inrush
- High-performance silicone rubber diaphragm with small hysteresis
- Band-link mechanism that prevents the pointer from vibrating



**Model FR51AHV**  
(Horizontal scale type)



**Model FR51AVV**  
(Vertical scale type)



**Model FR51ACV**  
(Color-coded horizontal scale type)

**<Main application fields>**

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

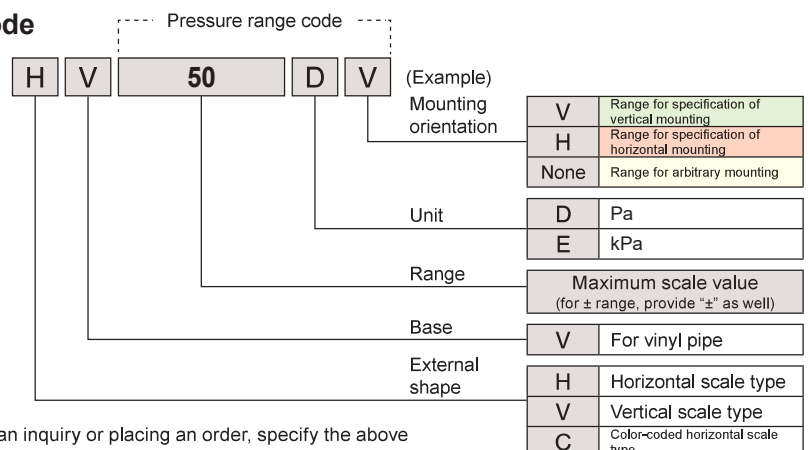
**<Usage>**

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

\*(Refer to pages 114 to 117)

### Product code

**FR51A**



◆When making an inquiry or placing an order, specify the above product code.

List of products

WO81

WO71

FR51A

MS99

MS99S

MS61A-RA

QDP33

EMD8A

EMD7

EMT1

EMTGP1

EMT1H

EMT6

EMP5A

EMRT1

HWS15A

Accessories

Application

Precautions

Maintenance

### Specifications

| Model  | Horizontal scale type                                |  | Vertical scale type                 |  | Color-coded horizontal scale type   |                    |
|--|--|--|-------------------------------------|--|---|--------------------|
|  | FR51AHV  |  | FR51AVV                             |  | FR51ACV   |                    |
| <b>Pressure unit</b>                         | Pa, kPa  |  | <b>Exterior material</b>            | Polycarbonate  |   |                    |
| <b>Pressure measurement method</b>           | Differential pressure method                         |  | <b>Durable vibration</b>            | 5 to 10 Hz, amplitude of 10 mm,<br>10 to 50Hz, acceleration of 39 m/s <sup>2</sup> (two hours each for three axial directions) |   |                    |
| <b>Pressure-receiving element</b>            | Diaphragm  |  | <b>Durable impact</b>               | 100 m/s <sup>2</sup> (six times each for three axial directions)   |   |                    |
| <b>Measured gas</b>                          | Air and noncorrosive gas (liquid cannot be measured) |  | <b>Compatible pipe</b>              | Vinyl pipe or rubber pipe (inner diameter of 4 mm)   |   |                    |
| <b>Scale shape</b>                           | Edgewise shape (scale length: approx. 45 mm)         |  | <b>Piping connection part</b>       | Integrated with main body  |   |                    |
| <b>Operating ambient temperature</b>         | -10°C to +50°C (no freezing allowed)                 |  | <b>Polarity of piping connector</b> | Indicating high-pressure side and low-pressure side with "H" and "L" marks, respectively, at the piping connection part.       |   |                    |
| <b>Operating ambient humidity</b>            | 90% RH or below (no condensation allowed)            |  | <b>Mass</b>                         | Approx. 90 g   |   |                    |
| <b>Instrument body withstanding pressure</b> | 50 kPa (refer to page 118)                           |  |                                     |  |   |                    |
| <b>Accessories</b>                           | Mounting nut set                                     |  |                                     |  |   |                    |
| <b>Pressure range code</b>                   | <b>Pressure range</b>                                | <b>Mounting orientation</b><br>(Refer to below)                                  | <b>Accuracy (Note)</b><br>(at 23°C) | <b>Pressure-receiving element material</b>   | <b>Withstanding pressure of pressure-receiving element</b><br>(Refer to page 118) |                    |
| 50 DH  | 0-50 Pa  | Horizontal (specification)   | ±2.5% FS                            | Silicone rubber  | 20 kPa  |                    |
| 50 DV  |  | Upright (specification)  |                                     |  |   |                    |
| 100 DH                                       | 0-100 Pa   | Horizontal (specification)   |                                     |  |   |                    |
| 100 DV                                       |  | Upright (specification)  |                                     |  |   |                    |
| 200 D  | 0-200 Pa<br>0-300 Pa<br>0-500 Pa<br>0-1000 Pa        | From horizontal through upright to downward and horizontal                       |                                     |  |   |                    |
| 300 D  |  |  |                                     |  |   |                    |
| 500 D  |  |  |                                     |  |   |                    |
| 1000 D                                       |  |  |                                     |  |   |                    |
| 2 E  |  |  |                                     |  |   | Arbitrary mounting |
| 3 E  |  |  |                                     |  |   |                    |
| 5 E  |  |  |                                     |  |   |                    |
| + - 50 DH                                    | -50 to +50 Pa  | Horizontal (specification)   |                                     |  |   |                    |
| + - 50 DV                                    |  | Upright (specification)  |                                     |  |   |                    |
| + - 100 D                                    | -100 to +100 Pa                                      | From horizontal through upright to downward and horizontal<br>Arbitrary mounting |                                     |  |   |                    |

(Note) Accuracy in full span (refer to page121)

◆For use environment, refer to page 118.

### Mounting orientation and range

**Range for the specification of horizontal and upright mounting**

0 to 50 Pa, 0 to 100 Pa, -50 to +50 Pa

It is necessary to specify the mounting orientation (horizontal, upright, and others) at the time of order placement.

**Range for mounting orientation arbitrary mounting in the range from horizontal through upright to downward and horizontal**

Whole range other than on the left

Can be arbitrarily mounted at an angle in the range from horizontal through upright to downward and horizontal.

## FR51A

List of products

WO81

WO71

FR51A

MS99

MS99S

MS61A-RA

QDP33

EMD8A

EMD7

EMT1

EMTGP1

EMT1H

EMT6

EMP5A

EMRT1

HWS15A

Accessories

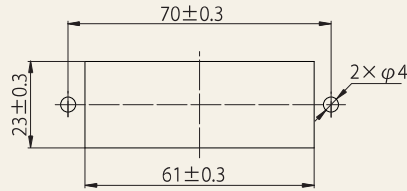
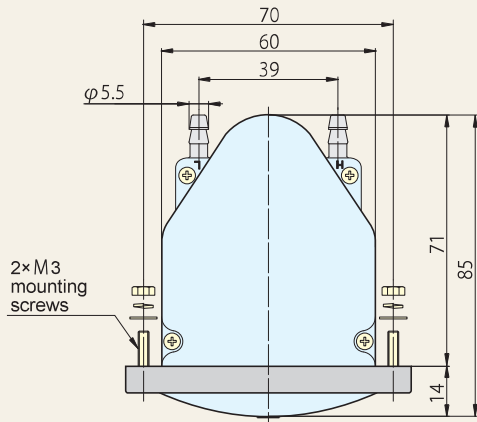
Application

Precautions

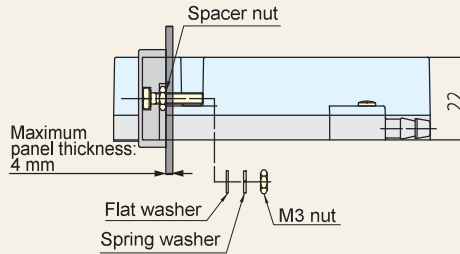
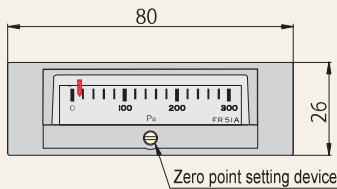
Maintenance

### External dimension drawing

#### Model FR51AHV (horizontal scale type)



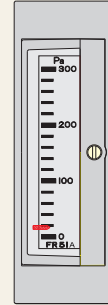
Panel cutting



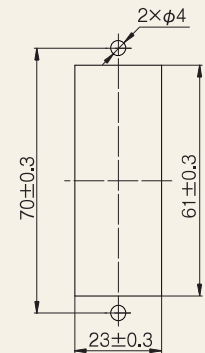
Caution

- Do not remove the spacer nut because doing so may break the gauge.
- M3 nut tightening torque: 0.8 N·m
- Do not tighten to a torque that exceeds the specified value because doing so breaks the instrument body.

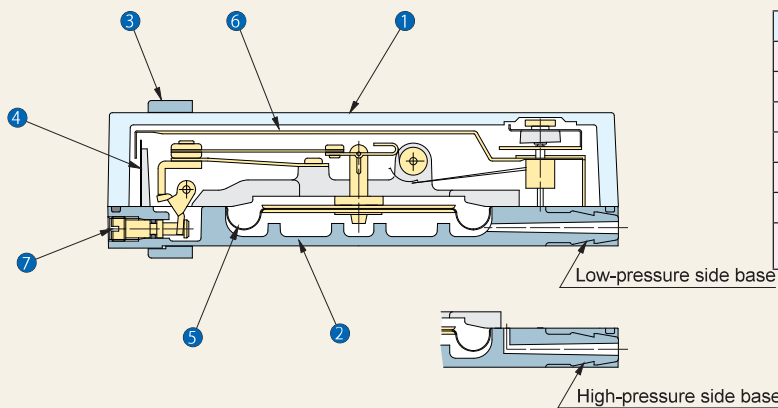
#### Model FR51AVV (vertical scale type)



The external dimensions of model FR51AVV are same as those of model FR51AHV.



### Overview of structure

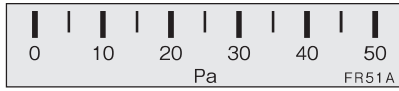


| Number | Name                      |
|--------|---------------------------|
| 1      | Transparent cover         |
| 2      | Base                      |
| 3      | Grill                     |
| 4      | Scale plate               |
| 5      | Diaphragm                 |
| 6      | Pointer                   |
| 7      | Zero point setting device |

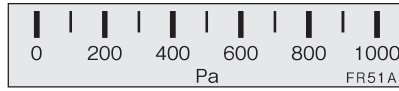
## FR51A List of scales

### Model FR51AHV/CV (horizontal scale type)

#### Single pressure range



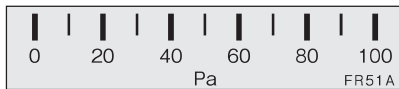
| Pressure range | Minimum scale |
|----------------|---------------|
| 0-50 Pa        | 5 Pa          |



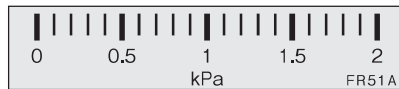
| Pressure range | Minimum scale |
|----------------|---------------|
| 0-1000 Pa      | 100 Pa        |



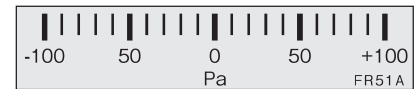
| Pressure range | Minimum scale |
|----------------|---------------|
| -50 to +50 Pa  | 10 Pa         |



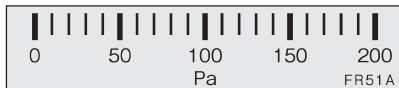
| Pressure range | Minimum scale |
|----------------|---------------|
| 0-100 Pa       | 10 Pa         |



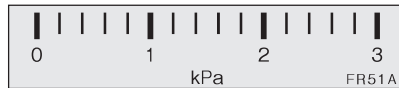
| Pressure range | Minimum scale |
|----------------|---------------|
| 0-2 kPa        | 0.1 kPa       |



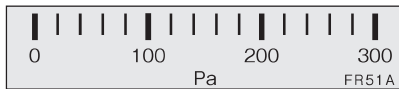
| Pressure range  | Minimum scale |
|-----------------|---------------|
| -100 to +100 Pa | 10 Pa         |



| Pressure range | Minimum scale |
|----------------|---------------|
| 0-200 Pa       | 10 Pa         |



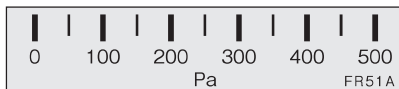
| Pressure range | Minimum scale |
|----------------|---------------|
| 0-3 kPa        | 0.2 kPa       |



| Pressure range | Minimum scale |
|----------------|---------------|
| 0-300 Pa       | 20 Pa         |

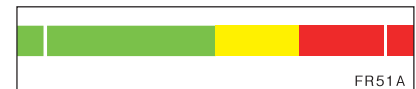


| Pressure range | Minimum scale |
|----------------|---------------|
| 0-5 kPa        | 0.5 kPa       |



| Pressure range | Minimum scale |
|----------------|---------------|
| 0-500 Pa       | 50 Pa         |

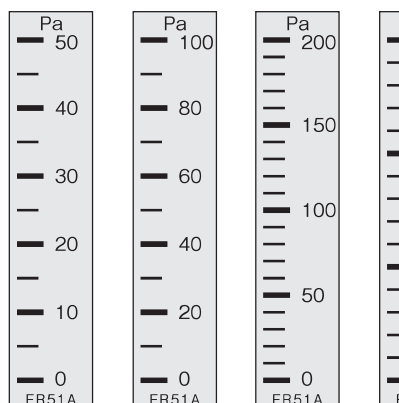
#### Color-coded horizontal scale



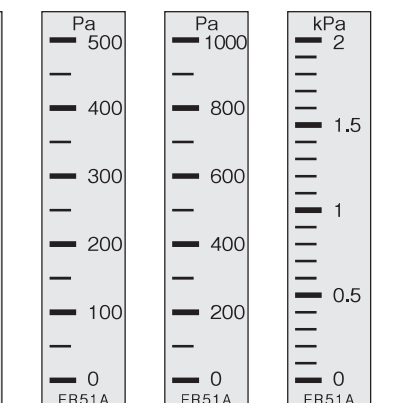
| Pressure range               | Color coding            |
|------------------------------|-------------------------|
| Single pressure range target | Green 0 50%FS 75%FS Red |

### Model FR51AVV (vertical scale type)

#### Single pressure range

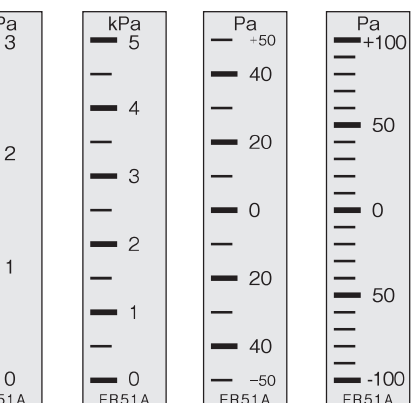


| Pressure range | Pressure range | Pressure range | Pressure range | Pressure range | Pressure range |
|----------------|----------------|----------------|----------------|----------------|----------------|
| 0-50 Pa        | 0-100 Pa       | 0-200 Pa       | 0-300 Pa       | 0-500 Pa       | 0-1000 Pa      |



| Pressure range | Pressure range | Pressure range |
|----------------|----------------|----------------|
| 0-2 kPa        | 0-3 kPa        | 0-5 kPa        |

#### Zero center range



| Pressure range | Pressure range  |
|----------------|-----------------|
| -50 to +50 Pa  | -100 to +100 Pa |

- List of products
- WO81
- WO71
- FR51A
- MS99
- MS99S
- MS61A-RA
- QDP33
- EMD8A
- EMD7
- EMT1
- EMTGP1
- EMT1H
- EMT6
- EMP5A
- EMRT1
- HWS15A
- Accessories
- Application
- Precautions
- Maintenance

## 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 Co., Ltd.**

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