

# Manostar Electronic Micro Differential Pressure Measurement System

**NEW**

## Manosys controller EMA3

RoHS compliant

This instrument is used combination with Manosys pressure transmitter.

Subject to pressure, differential pressure, airflow control and so on. If there are errors to the target value, this instrument send the control signal to correct automatically the control target value by varying the rotation speed of the fan motor and so on.

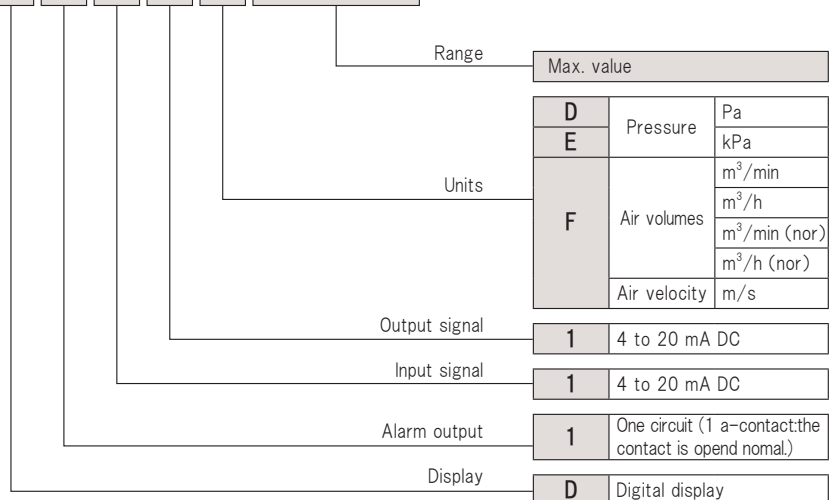
- Manosys controller EMA3 is equipped with auto-tuning function.
- Alarm output is configurable each action by suitable use
- Two kinds of setting value is switched over by external operation.
- IP66 construction in front panel part



EMA3

### Product code

EMA3 **D** **1** **1** **1** **D** **300** (example)



**<Example of main use field>**  
 Air conditioning control system of factories  
 Measuring negative pressure in bag filter and differential pressure in air conditioning  
 Monitoring of pressure loss in filter  
 Production lines of precision machine  
 Air conditioning control system of buildings

**<Example of use>**  
 Detector of a pressure loss in an air filter  
 Measuring the inside pressure of clean rooms  
 Detector of a pressure loss in a bag filter  
 Measuring of dynamic pressure in a ventilator and an exhauster

- ◆ If you order or ask, specify the product code and the pressure range code.
- ◆ In case of measuring air volume and velocity, specification of pressure detection side is needed.
- ◆ We combine the digital controller JCD-33A-A/M,BK T1900 produced SHINKO TECHNOS CO.,LTD. with the pressure transmitter produced by our company and adjust them to measure pressure, air volume and velocity.

\*(refer to p.93)

- 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

## Specification

Type	EMA3	
<b>Displays</b>	Digital four digits (-1999 to 9999) PV (process variable) is red. Character size 18 × 8 mm (height × width) ± 0.2 % FS ± 1 digit SV (setting value) is green. Character size 12.6 × 6 mm (height × width)	
<b>Sampling cycle</b>	0.25 seconds	
<b>Input signal</b>	4 to 20 mA DC (input resistance 50 Ω, The accessory is installed outside) Allowable current 50 mA DC or less However, in case of the air volume and velocity meters, input signal is after extraction of square root.	
<b>Output signal</b>	4 to 20 mA DC (load resistance 550 Ω or less)	
<b>Control actions</b>	PID action with auto-tuning function PI action When the setting derivative time is zero. PD action with auto-reset function When the setting derivative time is zero. P action with auto-reset function When the setting derivative time and integral time are zero. On and Off action When the proportional band is zero.	
<b>Range of setting control item</b>	Proportional band (P) 0.0 to 100.0 % Integral time (I) 0 to 1000 seconds Derivative time (D) 0 to 300 seconds ARW function 0.0 to 100.0 % On and Off hysteresis 1 to 1000 (A decimal point is omitted.) Output limit -5 to 105 % (In running On and Off action, setting is not available.)	
<b>Alarm output</b>	Output type relay contact Electrical life: one hundred thousand times contact capacity( resistive load) Max. value 3 A, 250 V AC and 3 A, 30 V DC Min. value 100 mA, 5 V DC(reference value)	
<b>Power supply voltage</b>	100 to 240 V AC 50 / 60 Hz (tolerance variation range: 85 to 264 V AC)	
<b>Electric power consumption</b>	Approximately 8 VA	
<b>Insulation resistance</b>	10 MΩ or more (500 V DC) Between each terminal (power supply terminal, grounding terminal, input terminal, output terminal)	
<b>Withstand voltage</b>	1.5 kV AC one minute Between each terminal (power supply terminal, grounding terminal, input terminal, output terminal) It is except between input and output terminal	
<b>Medium and ambient temperature</b>	0 to 50 °C (no freezing)	
<b>Ambient humidity</b>	35 to 85 % RH (no dewing)	
<b>Material of the outer case</b>	Flame retardant resin (color: black)	
<b>Mass</b>	Approximately 370 g	
<b>Protection degree</b>	IP66 (front panel part)	
<b>Accessory</b>	Connector installed by screw is one set. Input resistance 50 Ω is one piece.	
Pressure range codes	Pressure ranges	
	Pa, kPa	
D 10	0 ~ 10 Pa	0.0 ~ 10.0
D 20	0 ~ 20 Pa	0.0 ~ 20.0
D 30	0 ~ 30 Pa	0.0 ~ 30.0
D 50	0 ~ 50 Pa	0.0 ~ 50.0
D 100	0 ~ 100 Pa	0.0 ~ 100.0
D 200	0 ~ 200 Pa	0.0 ~ 200.0
D 300	0 ~ 300 Pa	0.0 ~ 300.0
D 500	0 ~ 500 Pa	0.0 ~ 500.0
D 1000	0 ~ 1000 Pa	0 ~ 1000
E 2	0 ~ 2 kPa	0.000 ~ 2.000
E 3	0 ~ 3 kPa	0.000 ~ 3.000
E 5	0 ~ 5 kPa	0.000 ~ 5.000
E 10	0 ~ 10 kPa	0.00 ~ 10.00
E 20	0 ~ 20 kPa	0.00 ~ 20.00
E 30	0 ~ 30 kPa	0.00 ~ 30.00
E 50	0 ~ 50 kPa	0.00 ~ 50.00
D +- 10	- 10 ~ + 10 Pa	- 10.0 ~ 0.0 ~ 10.0
D +- 20	- 20 ~ + 20 Pa	- 20.0 ~ 0.0 ~ 20.0
D +- 30	- 30 ~ + 30 Pa	- 30.0 ~ 0.0 ~ 30.0
D +- 50	- 50 ~ + 50 Pa	- 50.0 ~ 0.0 ~ 50.0
D +- 100	- 100 ~ + 100 Pa	- 100.0 ~ 0.0 ~ 100.0
D +- 200	- 200 ~ + 200 Pa	- 200 ~ 0 ~ 200
D +- 300	- 300 ~ + 300 Pa	- 300 ~ 0 ~ 300
D +- 500	- 500 ~ + 500 Pa	- 500 ~ 0 ~ 500
D +- 1000	- 1000 ~ + 1000 Pa	- 1000 ~ 0 ~ 1000
E +- 2	- 2 ~ + 2 kPa	- 2.00 ~ 0.00 ~ 2.00
E +- 3	- 3 ~ + 3 kPa	- 3.00 ~ 0.00 ~ 3.00
E +- 5	- 5 ~ + 5 kPa	- 5.00 ~ 0.00 ~ 5.00
<b>Air volume and velocity range code</b>	<b>Air volume and velocity range (*1)</b>	
-	Zero to a [Numerical value] [Amplification] [Unit]	

(\*1) [Numerical value]: Arbitrary value (rounding off), [Amplification]: × 10, × 100, × 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  
Please tell us the data for calculating air volume or velocity to make the air volume or velocity meter.

WO81

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EMD7

EMT6

EMT1

EMTGP1

EMT1H

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# Manostar Electronic Micro Differential Pressure Measurement System

## Manosys controller EMA3

### Outline drawing

EMA3 Unit

Gasket Installation bracket by screw Terminal cover(option)

**Crimping terminal form of lead wire**

As shown below, use the crimping terminal with the insulation sleeve that conforms to the M3 screw.

Crimping terminal	Maker	Model name
Y form type	Nichifu Terminal Industries CO.,LTD	TMEV1.25Y-3
	Japan Solderless Terminal MFG CO.,LTD	VD1.25-B3A
Round type	Nichifu Terminal Industries CO.,LTD	TMEV1.25-3
	Japan Solderless Terminal MFG CO.,LTD	VV1.25-31.25-3

φ 3.2 mm  
5.8 mm or less

φ 3.2 mm  
5.8 mm or less

**Panel cut size**

When the instrument is installed closely on horizontal n : number of instruments

**Caution** Do not apply excessive torque more than necessary, otherwise it will damage the instrument body.  
Tightening torque of the terminal screw:0.63 N·m.  
Tightening torque of the installation screw:approximately 0.12 N·m.

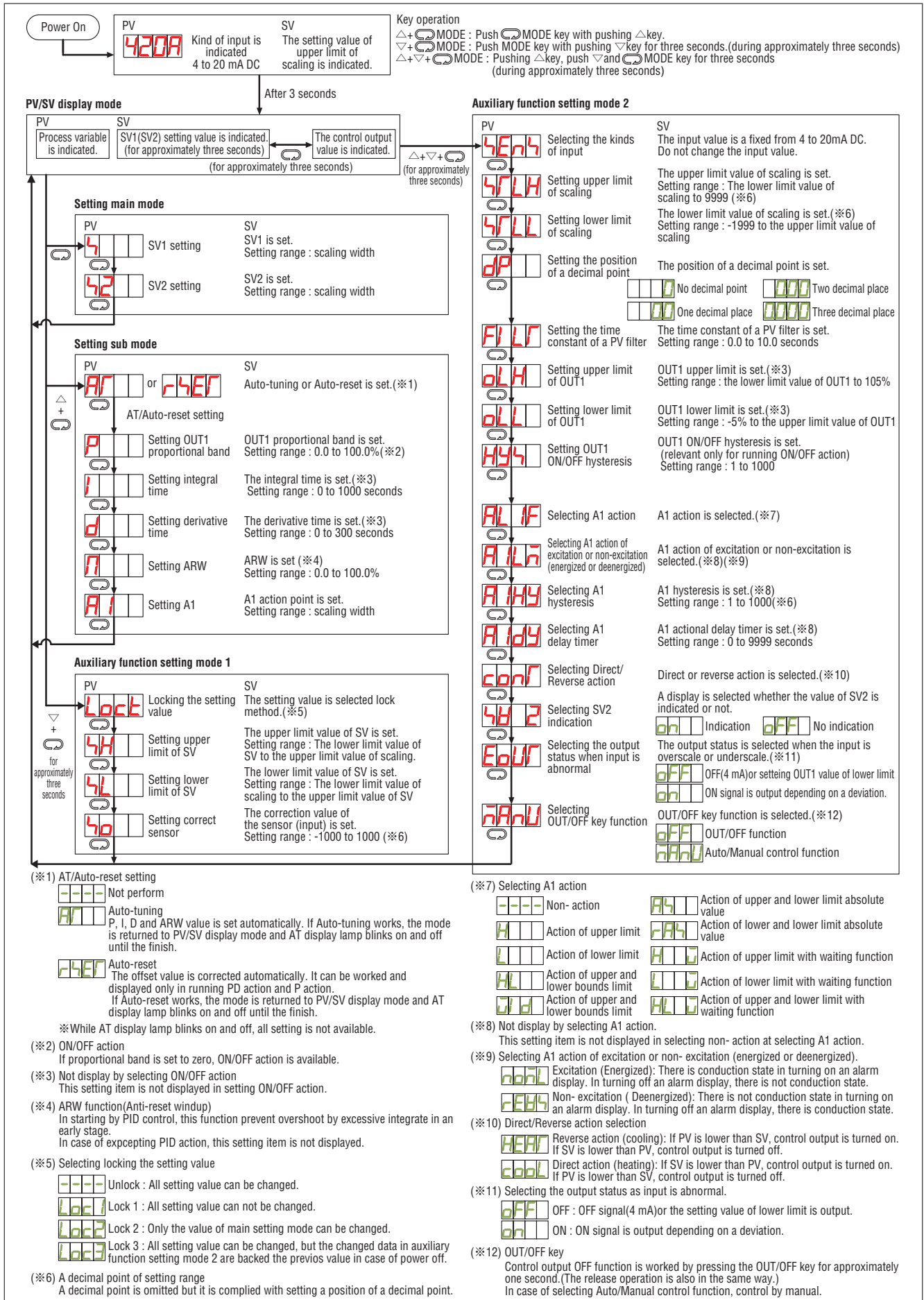
Specification IP66 of dust and drip proof is not satisfied in installing closely on horizontal.

### Operation panel

- ① PV display :In setting mode, the process variable or the setting value are displayed in red.
- ② SV display :In setting mode and in indicating the desired value or the control output value, the setting value is displayed in green.
- ③ SV1 display lamp :In selecting SV1, the green LED is put on .
- ④ SV2 display lamp :In selecting SV2, the yellow LED is put on.
- ⑤ OUT1 display lamp :In turning on OUT1, the green LED is put on.  
(In case of a direct current output type, it blinks on and off a period of 0.25 seconds depending on the control input value.)
- ⑥ OUT2 display lamp :In turning on OUT1, the yellow LED is put on.  
(In case of a direct current output type, it blinks on and off a period of 0.25 seconds depending on the control input value.)
- ⑦ HB display lamp : In turning on alarm output of breaking the heater or the sensor, the red LED is put on.  
(In case of pertaining the alarm of heater-disconnection, the red LED is also put on when the scaling value is higher or lower than the scaling range. )
- ⑧ AT display lamp : In running Auto-tuning or Auto-reset, the yellow LED blinks on and off .
- ⑨ TX/RX display lamp : In transmitting TX output of serial communication, the yellow LED is put on.
- ⑩ A1 display lamp : In turning on A1 output , the red LED is put on.
- ⑪ Up key :Setting value is increased.
- ⑫ Down key :Setting value is decreased.
- ⑬ Mode key :Setting mode is switched and the setting value is registered.  
(The setting value and the selecting value are registered by pushing the mode key.)
- ⑭ OUT/OFF key  
  - When OUT/OFF function is selected, control output can be turned on or off. BY pressing OUT/OFF key for approximately one second from any mode, control output OFF function works.
  - Once the control output OFF function is enabled, the function cannot be released even if the power supply is turned off and on again. Control output OFF function keeps working. To cancel the function, press the OUT/OFF key again for approximately one second.
  - If Auto/Manual control function is selected, Auto or Manual control is changed each time OUT/OFF key is pressed. However, Auto/Manual function can be switched only in the PV/SV display mode.
  - When the power supply is turned on, the function is controlled automatically.

\*EMA3 do not use this function.

## Operation flow diagram



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EMP5

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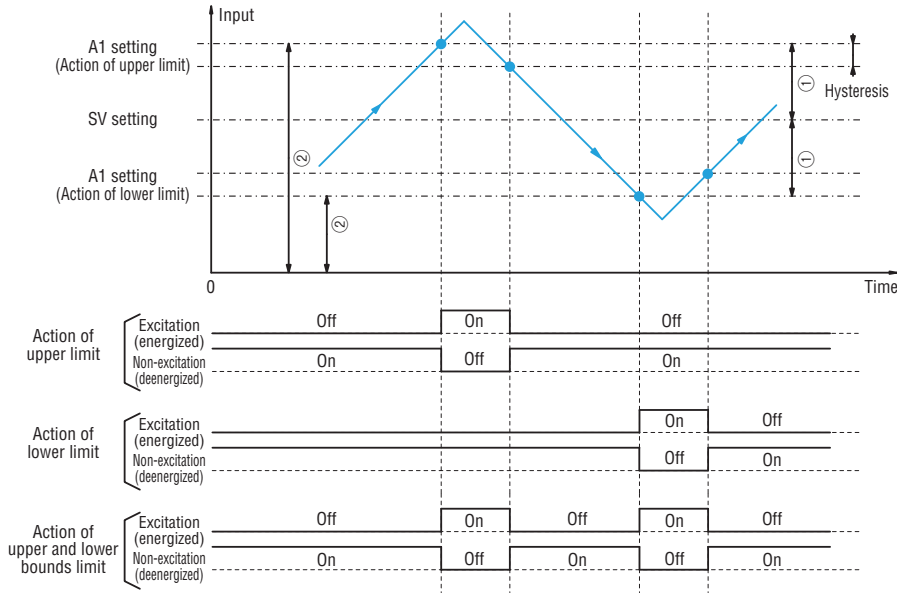
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## Alarm action diagram

Action of upper limit / Action of lower limit / Action of upper and lower bounds limit  
 Action of upper limit by the absolute value / Action of lower limit by the absolute value  
 Action of upper limit with waiting function / Action of lower limit with waiting function  
 Action of upper and lower bounds limit with waiting function



Explanation of operation:When the scaling value is higher or lower than A1 setting value, the alarm output is turned on. (In case of excitation, it is turned off.)

Action of upper limit / Action of lower limit / Action of upper and lower bounds limit As for A1 setting

As the basis for SV setting value, A1 setting value is determined. (refer to upper diagram ①)

As for action of upper and lower bounds limit, A1 setting value is set by plus-minus sign

Action of upper limit by the absolute value / Action of lower limit by the absolute value As for A1 setting

As the basis for zero, A1 setting value is determined. (refer to upper diagram ②)

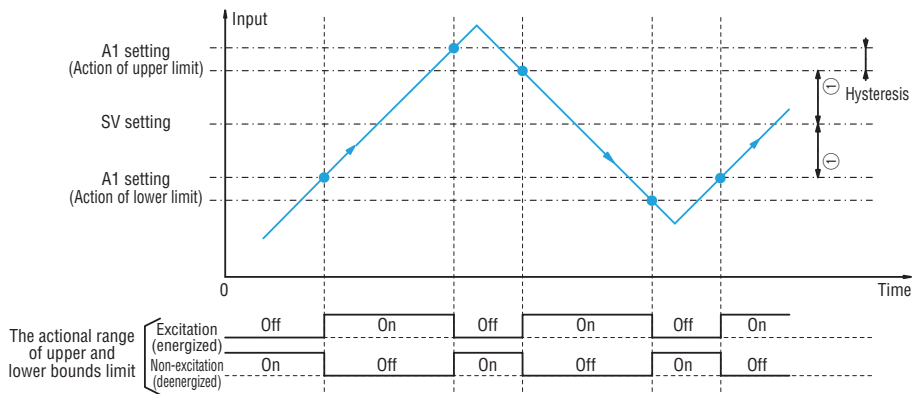
### Waiting function

On turning on power supply, the alarm will not be output even if the input value is in the area of the alarm action.

If the alarm setting value is get within the area of alarm action in the middle of manipulating the alarm setting value, the alarm is not output.

When the input exceed the alarm operating point after that, waiting function is canceled

## The actional range of upper and lower bounds limit



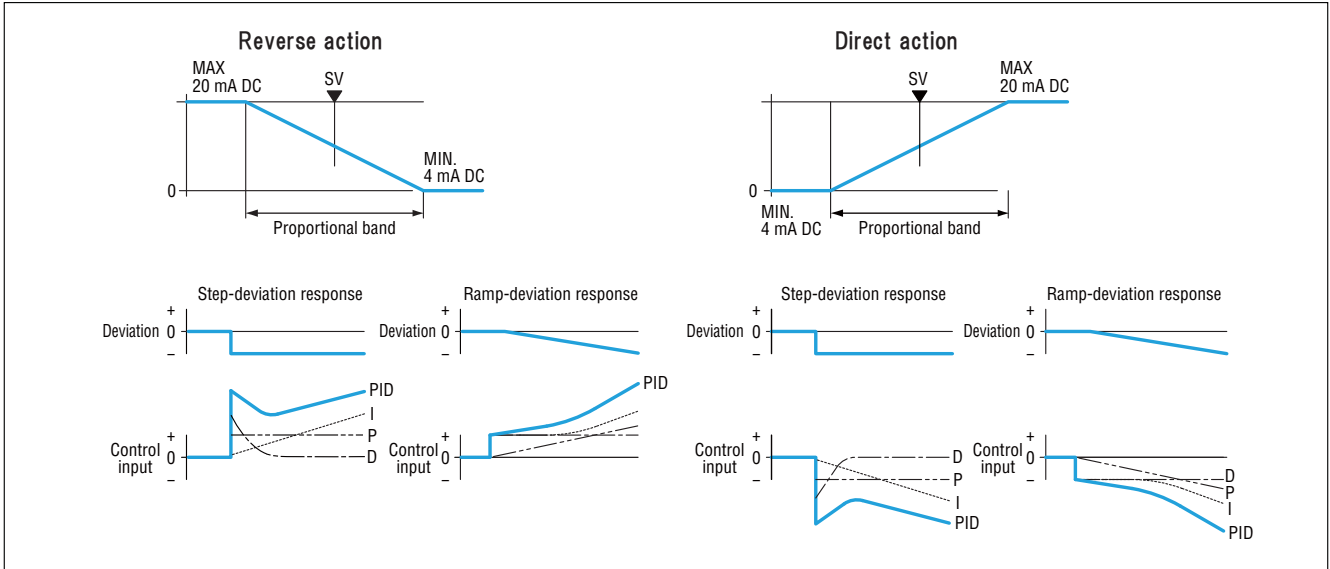
Explanation of operation:When the scaling value is higher or lower than A1 setting value, the alarm output is turned on. (In case of excitation, it is turned off.)

Actional range of upper and lower bounds limit As for A1 setting

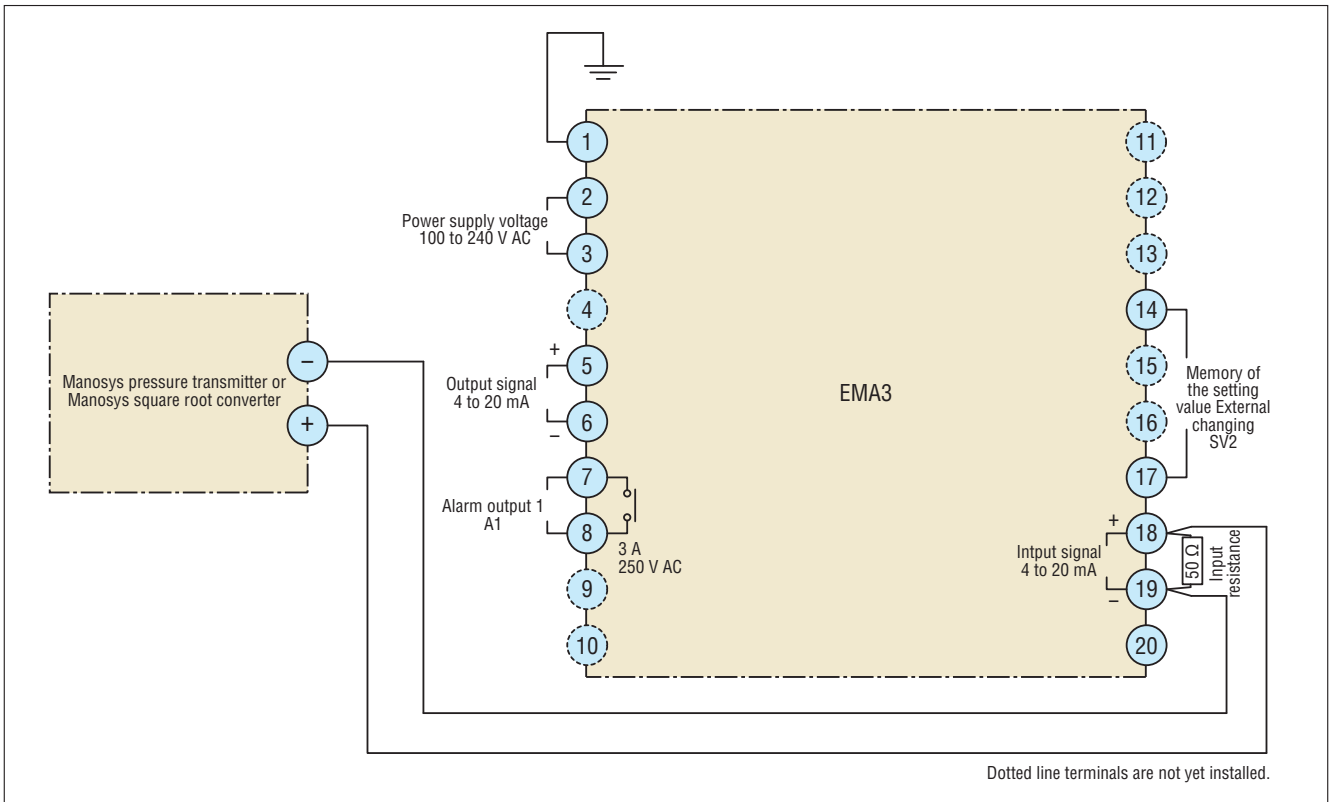
As the basis for SV setting value, A1 setting value is determined. (refer to upper diagram ①)

As the basis for SV setting, A1 setting value is set by plus-minus sign.

## Actional explanation of control action



## Wiring



## Accessory for EMA3

### Terminal cover

EMA3 needs two covers per one instrument.



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## 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.

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