OPERATING MANUAL

BARGRAPH INDICATING ALARM
(with 4-digit digital meter, LED bar indicator)

MODEL **SD10**

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BEFORE USE ....

Thank you for choosing us. Before use, check the contents of the package you received as below.
If you have any problems or questions with the product, please contact our sales office or representatives.

- This product is for use in general industrial environments, therefore may not be suitable for applications which require higher level of safety (e.g. safety or accident prevention systems) or of reliability (e.g. vehicle control or combustion control systems).
- For safety, installation and maintenance of this product must be conducted by qualified personnel.

■ PACKAGE INCLUDES:

Bargraph indicating alarm ..... (1)
Mounting bracket ..... (2)

■ MODEL NO.

Confirm that the model number described on the product is exactly what you ordered.

■ OPERATING MANUAL

This manual describes necessary points of caution when you use this product, including installation, connection, basic maintenance procedures and detailed operations.

POINTS OF CAUTION

■ POWER INPUT

- Locate the power input rating marked on the product and confirm its operational range as indicated below:
  Rating 100 – 240V AC: 85 – 264V, 47 – 66 Hz,
  approx. 14VA at 100V
  approx. 17VA at 200V
  approx. 19VA at 264V
  Rating 24V DC: 24V ±10%, approx. 7.3W
- Supplying any level of power other than specified above can damage the unit or the power source.
- Power supply start-up characteristics must reach within 5 seconds to the operational voltage range of the unit.
- Power cables and signal I/O cables for the unit must be located separately.
- Power cables and signal I/O cables for the unit should not be bundled together.
- To increase noise resistance of the power input wires, twist the strands before connecting.

■ GENERAL PRECAUTIONS

- Before you remove the unit, turn off the power supply and I/O signal for safety.
- Do not disassemble or modify the unit in any way. Doing so may result in a fire or an electrical shock.
- Do not block the unit's ventilation openings or use it in areas where heat accumulates.
  Additionally, do not store or use it under high-temperature conditions.
- Do not use this unit in an environment where flammable/corrosive gases are present.
- Do not store or use this unit in locations subject to direct sunlight, or where excessive dust, dirt or metal particles are present.
- This unit is a precision instrument. Do not store or use it where large shocks or excessive vibration can occur.
- Do not store or use this unit in environments subject to chemical evaporation (such as that of organic solvents), or where there are chemicals and/or acids present in the environment.
- Do not use paint thinner or organic solvents to clean this unit.
- Observe the environmental conditions when using this unit.
- Wait at least 30 seconds before turning on the power supply after it was tuned off.

■ ENVIRONMENT

- Indoor use
- This unit is designed to be mounted on a vertical panel. It is not suitable for a slanted or a horizontal panel surface.
- Environmental temperature must be within -5 to +55°C (23 to 131°F) with relative humidity within 5 to 90% RH in order to ensure adequate life span and operation.

■ GROUNDING

- Be sure to determine in advance the most stable grounding point in the environment and earth the unit's FG terminal and that of connected devices to it in order to protect the devices from dielectric breakdown.
- Grounding is also effective to eliminate noise that could cause errors in the unit's operation.

■ MINIMIZING NOISE INTERFERENCE TO ANALOG SIGNAL CABLES

- Noise entering through the analog signal cables may cause irregular measurement values, degradation of overall accuracy, and malfunction of the product. We recommend that you would conduct wiring to the unit with the following points of caution.
- Do not install cables close to noise sources (high frequency line, etc.).
- Do not bind the analog I/O cables together with those in which noises are present. Do not install them in the same duct.

■ DO NOT APPLY OVERRANGE INPUT

- Do not apply voltages exceeding ±15V across the voltage input terminals to prevent damage.
- Do not apply currents exceeding ±100mA to the current input terminals to prevent damage.

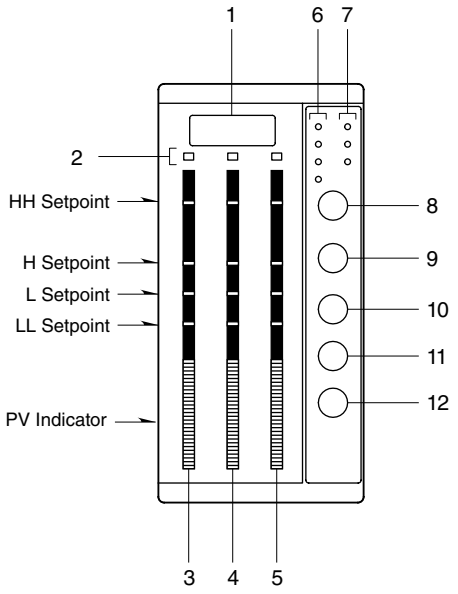
■ INITIALIZATION

Activating "initialization" ex-factory settings (ESU-6341) or user's specified parameters will be deleted and overwritten with the factory default values. Notice that after this, customized settings will be irrecoverable.

■ AND ....

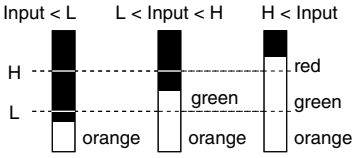
- We recommend use of an UPS to supply power backups.
- The unit is designed to function as soon as power is supplied, however, a warm up for 10 minutes is required for satisfying complete performance described in the data sheet.
- With voltage output, do not leave the output terminals shortcircuited for a long time. The unit is designed to endure it without breakdown, however, it may shorten appropriate life duration.
- Caution!: Activating "initialization" ex-factory settings (ESU-6341) or user's specified parameters will be deleted and overwritten with the factory default values. Notice that after this, customized settings will be irrecoverable.

COMPONENT IDENTIFICATION

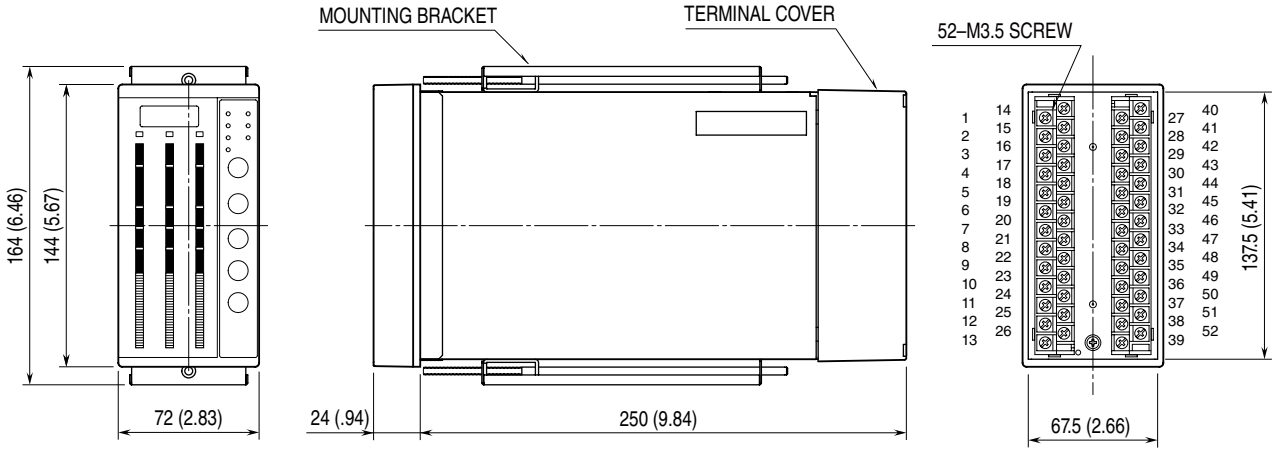


1. Digital meter
2. Digital meter Selector LED
   (Displays which of the 3 inputs value is indicating)
3. Input 1 bargraph meter
4. Input 2 bargraph meter
5. Input 3 bargraph meter
6. Alarm indicator
7. Mode setting status LED
8. Input indication selector (IND)
9. Mode selector (M)
10. Manual operation button (UP)
11. Acceleration button (FAST)
    (Acclerates the operation by pressing simultaneously with UP or DOWN button)
12. Manual operation button (DOWN)

• Bar Color Pattern



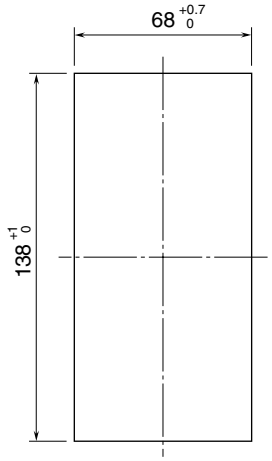
EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm (inch)



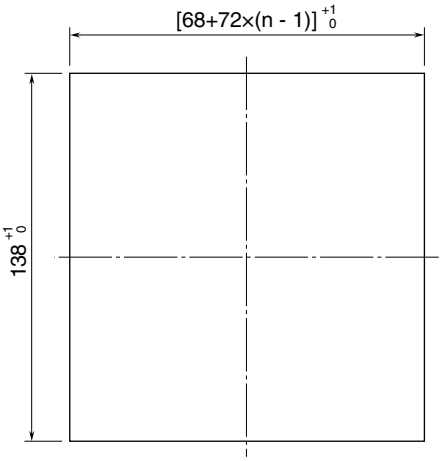
INSTALLATION

■ **PANEL CUTOUT unit: mm**

• **Single mounting**



• **Clustered mounting**



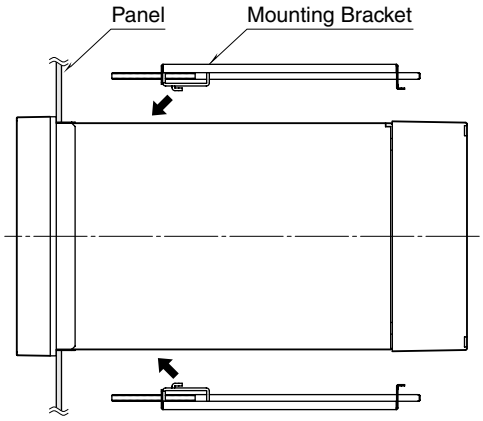
n = number of units Panel thickness 2.3 – 20

■ **CAUTION**

- IP 55 is ensured for the front panel of the unit mounted independently to a panel. Test the sealing at the mounting surface once the device is installed.
- Set the unit on a vertical surface with its digital meter at the top side. Mounting in other directions may cause heat built up inside the unit and shorten its life or degrade its performance.
- Ensure that there is sufficient space for ventilation inside a panel. Do not install above the devices that generate high heat such as heaters, transformers or resistors. Observe at the minimum of 30 mm (1.2") in all directions for maintenance purpose (e.g. wiring, removing or installing).

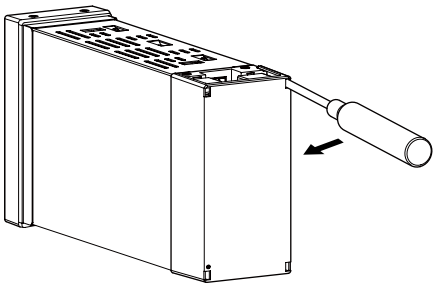
■ **HOW TO MOUNT THE UNIT ON A PANEL**

1) Remove both mounting brackets.
2) Detach the terminal cover and insert it first and then the module itself into the cutout hole. (The cover is slightly wider than the module.)
3) Put and slide the brackets back into the holes at the top and the bottom and tighten them until the module is firmly fixed.

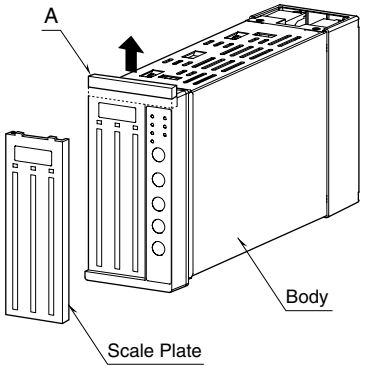


■ **HOW TO REMOVE THE TERMINAL COVER**

Insert the minus tip of a screwdriver into each hole at the four corners of the cover and pull it to the direction as indicated below to separate the terminal cover.

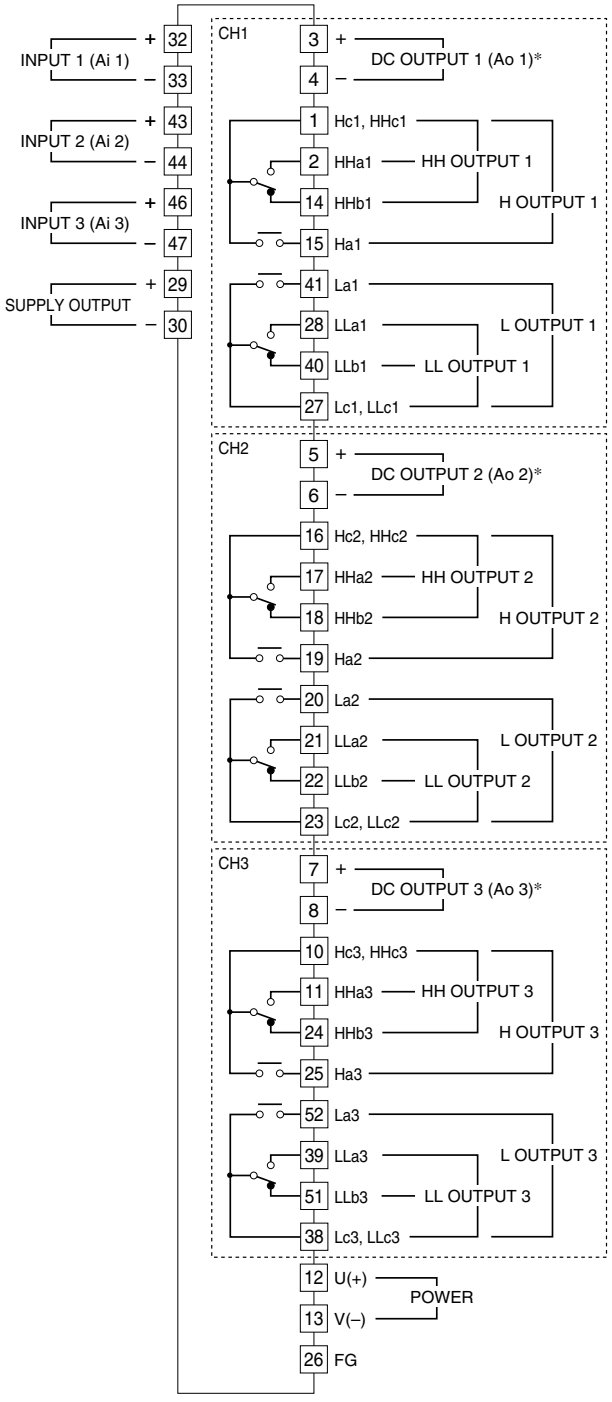


■ **HOW TO REPLACE THE SCALE PLATE**



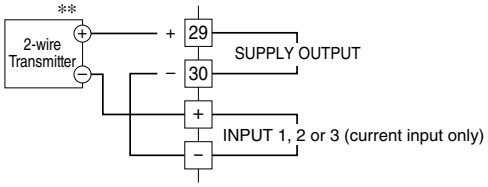
Pull up the part 'A' when replacing the scale plate.

CONNECTION DIAGRAM



* Not available for output code /Y

■ **CONNECTION EXAMPLE (2-wire Transmitter)**



** Not applicable to smart transmitters

PREPARATION & WIRING TO THE UNIT

■ POWER SUPPLY

Confirm the power input rating marked on the product.

1) Remove the terminal cover.
2) Loosen three screws at the power supply terminals.
3) Connect power input and protective earth cables to them.
4) Replace the terminal cover.

■ I/O SIGNALS

Refer to the following example of connecting Input 1 signal:

1) Turn off the power supply and remove the terminal cover.
2) Connect positive signal wire to the terminal +[32] and negative wire to –[33].
3) Replace the terminal cover.

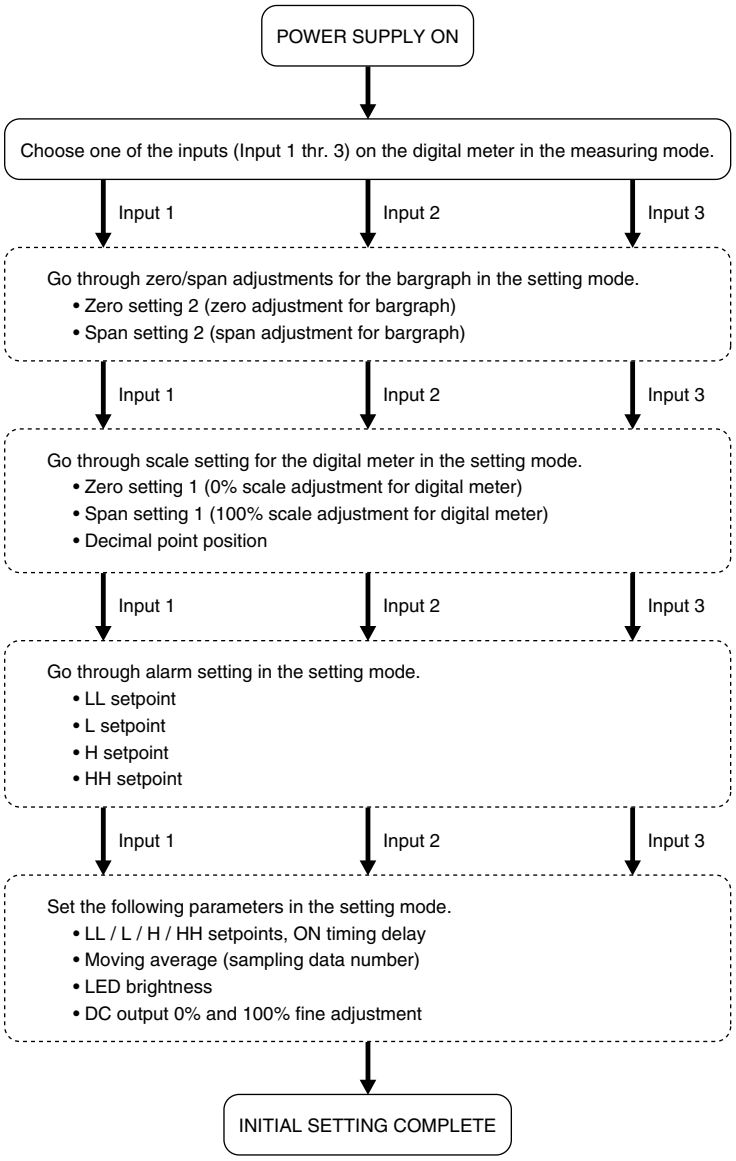
Choose appropriate solderless terminals and wires:
Connection: M3.5 screw terminal (torque 1.0 N·m)
Screw terminal: Nickel-plated steel
Recommended solderless terminal: R1.25-3.5

LIGHTNING SURGE PROTECTION

We offer a series of lightning surge protector for protection against induced lightning surges. Please contact us to choose appropriate models.

SETTING FLOWCHART

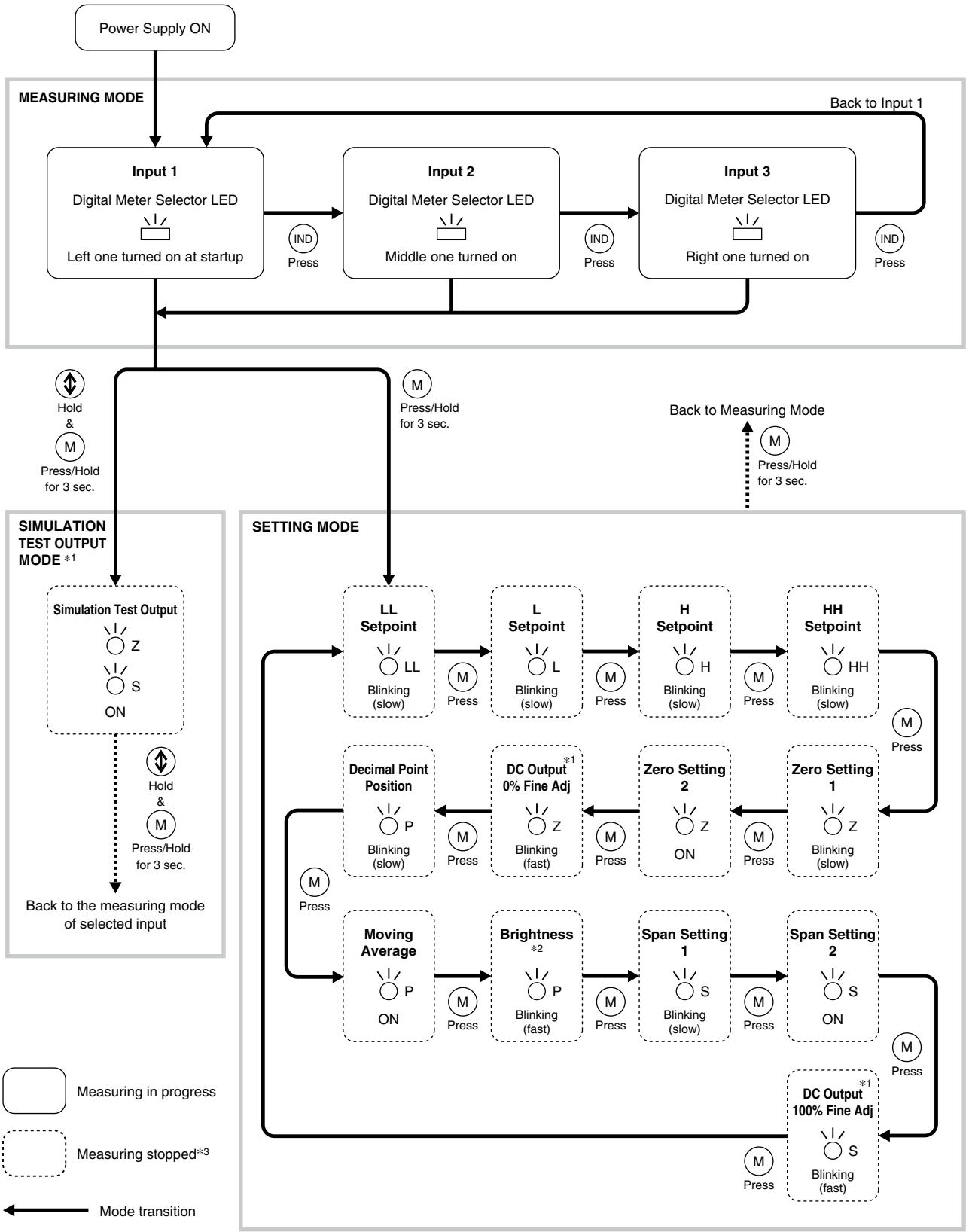
■ **INITIAL SETTING FLOW CHART**



Setting steps shown in broken line may be skipped when not neccesary.
Input 1 through 3 must be set independently.

■ **SETTING MENU**

When the power supply is turned on, the SD10 starts at the measuring mode.
Press and hold the mode selector button (M button) for longer than 3 seconds to turn the module into the setting mode.



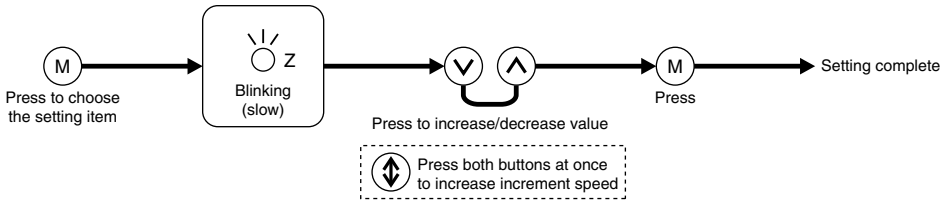
Note 1. Setting Mode and Simulation Test Output Mode must be applied independently to each of Input 1 through Input 3.
Note 2. Digital meter selector LED of the selected input blinks while in the setting mode.
*1. Setting operation is invalid for the output specified 'Y: Without' in the model suffix code.
*2. LED brightness adjustment is available only during Input 1 setting.
*3. Both DC and alarm output values before interruption are held when the measuring is stopped (except during DC output 0%/100% fine adjustments or simulation output test mode. Alarm output LEDs turn off.

SETTING MODE

Press and hold IND button for longer than 3 seconds to enter Setting Mode. Various parameters can be adjusted in this mode.

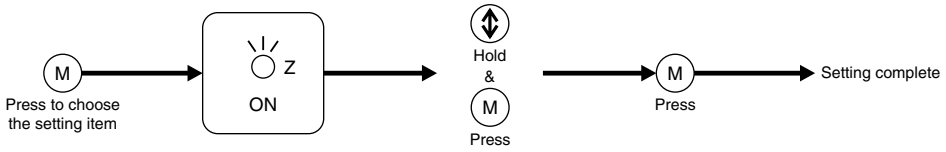
■ ZERO SETTING

• Zero Setting 1: 0% scale adjustment for digital meter
(Default setting: 0.0, Range: -1999 to 9999 with separate decimal point position setting)



1) Confirm that the unit is in the setting mode.
2) Press M button one or more times to choose the LED Z in slow blinking state.
3) Use UP/DOWN button to set a desired value on the digital meter.
4) Press M button to move on to the next item.

• Zero Setting 2: 0% scale adjustment for bargraph
(Default setting: 0.00, Range: -19.99 to 19.99)

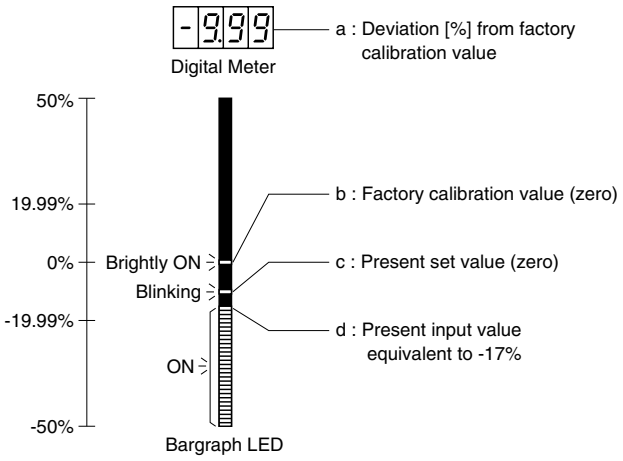


1) Apply 0% input signal.
2) Confirm that the unit is in the setting mode.
3) Press M button one or more times to choose the LED Z turned on.
4) Press M button while holding down the acceleration button to set the present input value as 0%.
5) Press M button to move on to the next item.

• Bargraph Indication during Zero Adjustment

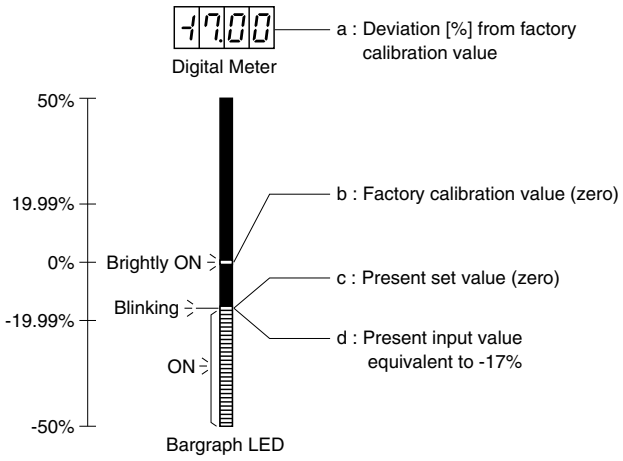
Zero point deviation from the factory calibration can be visually confirmed by referring to the digital meter and the bargraph indicator.

• When Z LED is on by selecting with M button



a : Shows deviation in % of the present set value from the factory calibration value.
Range -19.99% to 19.99%.
-19.99 or 19.99 blinks when the set value is out of the range.
b : Shows the factory calibration value.
Fixed always at the center point, the LED brightly illuminates to give a reference point for the set value.
c : Shows the present set value, blinking.
Positioned over 'b' at the factory setting.
d : Shows the present input value, changing according to input signal.

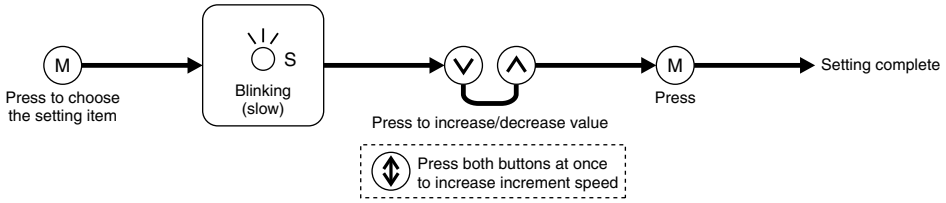
• After adjusting zero by holding the acceleration button and pressing M button



a : Shows deviation in % of the zero adjustment value from the factory cabliration value.
b : Fixed always at the center point, the LED brightly illuminates to show the factory calibration value.
c : The blinking LED segment shifts to the position of the input value.
d : In this example, input value has not been changed, thus the LED segment remains at the same position.

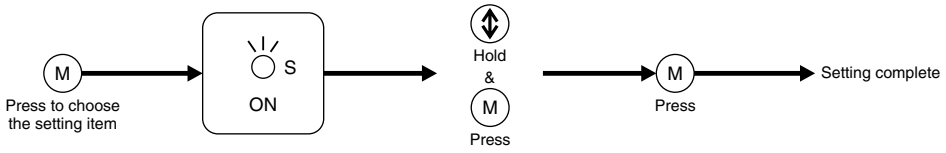
■ SPAN SETTING

• Span Setting 1: 100% scale adjustment for digital meter
(Default setting: 100.0, Range: -1999 to 9999 with separate decimal point position setting)



1) Confirm that the unit is in the setting mode.
2) Press M button one or more times to choose the LED S in slow blinking state.
3) Use UP/DOWN button to set a desired value on the digital meter.
4) Press M button to move on to the next item.

• Span Setting 2: 100% scale adjustment for bargraph
(Default setting: 0.00, Range: -19.99 to 19.99)

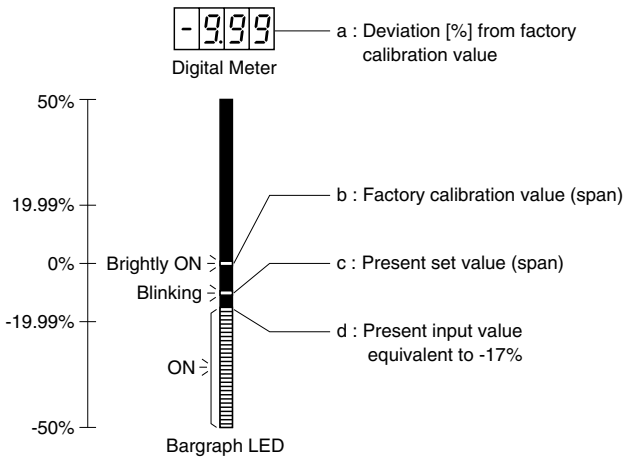


1) Apply 100% input signal.
2) Confirm that the unit is in the setting mode.
3) Press M button one or more times to choose the LED S turned on.
4) Press M button while holding down the acceleration button to set the present input value as 100%.
5) Press M button to move on to the next item.

• Bargraph Indication during Span Adjustment

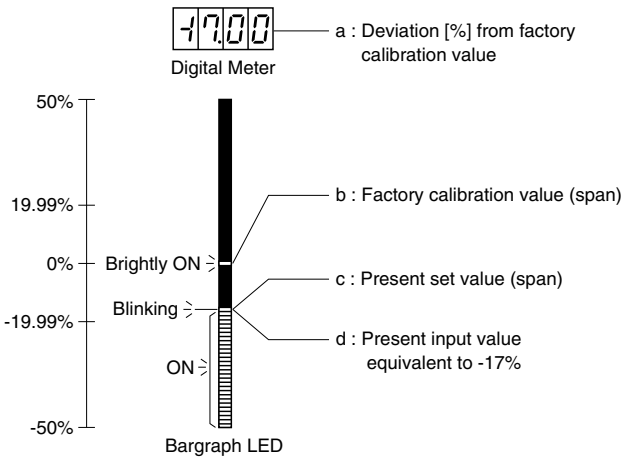
Span point deviation from the factory calibration can be visually confirmed by referring to the digital meter and the bargraph indicator.

• When S LED is on by selecting with M button



a : Shows deviation in % of the present set value from the factory calibration value.
Range -19.99% to 19.99%.
-19.99 or 19.99 blinks when the set value is out of the range.
b : Shows the factory calibration value.
Fixed always at the center point, the LED brightly illuminates to give a reference point for the set value.
c : Shows the present set value, blinking.
Positioned over 'b' at the factory setting.
d : Shows the present input value, changing according to input signal.

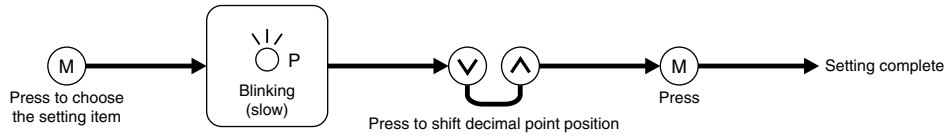
• After adjusting span by holding the acceleration button and pressing M button



a : Shows deviation in % of the span adjustment value from the factory cabliration value.
b : Fixed always at the center point, the LED brightly illuminates to show the factory calibration value.
c : The blinking LED segment shifts to the position of the input value.
d : In this example, input value has not been changed, thus the LED segment remains at the same position.

■ DECIMAL POINT POSITION

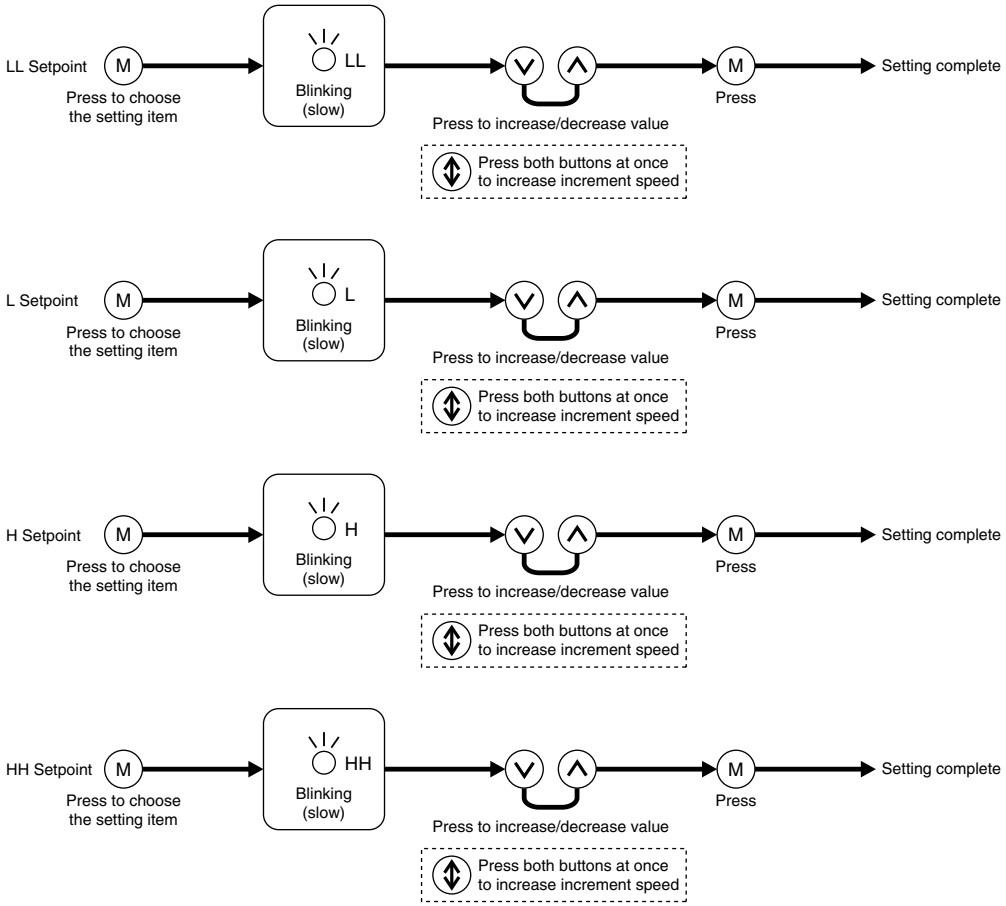
(Default setting: 10^{-1}, Range: 10^{-1} to 10^{-3} or no decimal point)



1) Confirm that the unit is in the setting mode.
2) Press M button one or more times to choose the LED P in slow blinking state.
3) Use UP/DOWN button to set a desired value on the digital meter.
4) Press M button to move on to the next item.

■ ALARM SETPOINTS

(Default setting LL: 10.0, L: 30.0, H: 70.0, HH: 90.0
Range LL: 0% to L, L: LL to H, H: L to HH, HH: H to 100%)



1) Confirm that the unit is in the setting mode.
2) Press M button one or more times to choose the LED LL (for LL setpoint as example) in slow blinking state.
3) Use UP/DOWN button to set a desired value on the digital meter.
4) Press M button to move on to the next item.

L, H and HH setpoints are adjusted by repeating the above procedure.

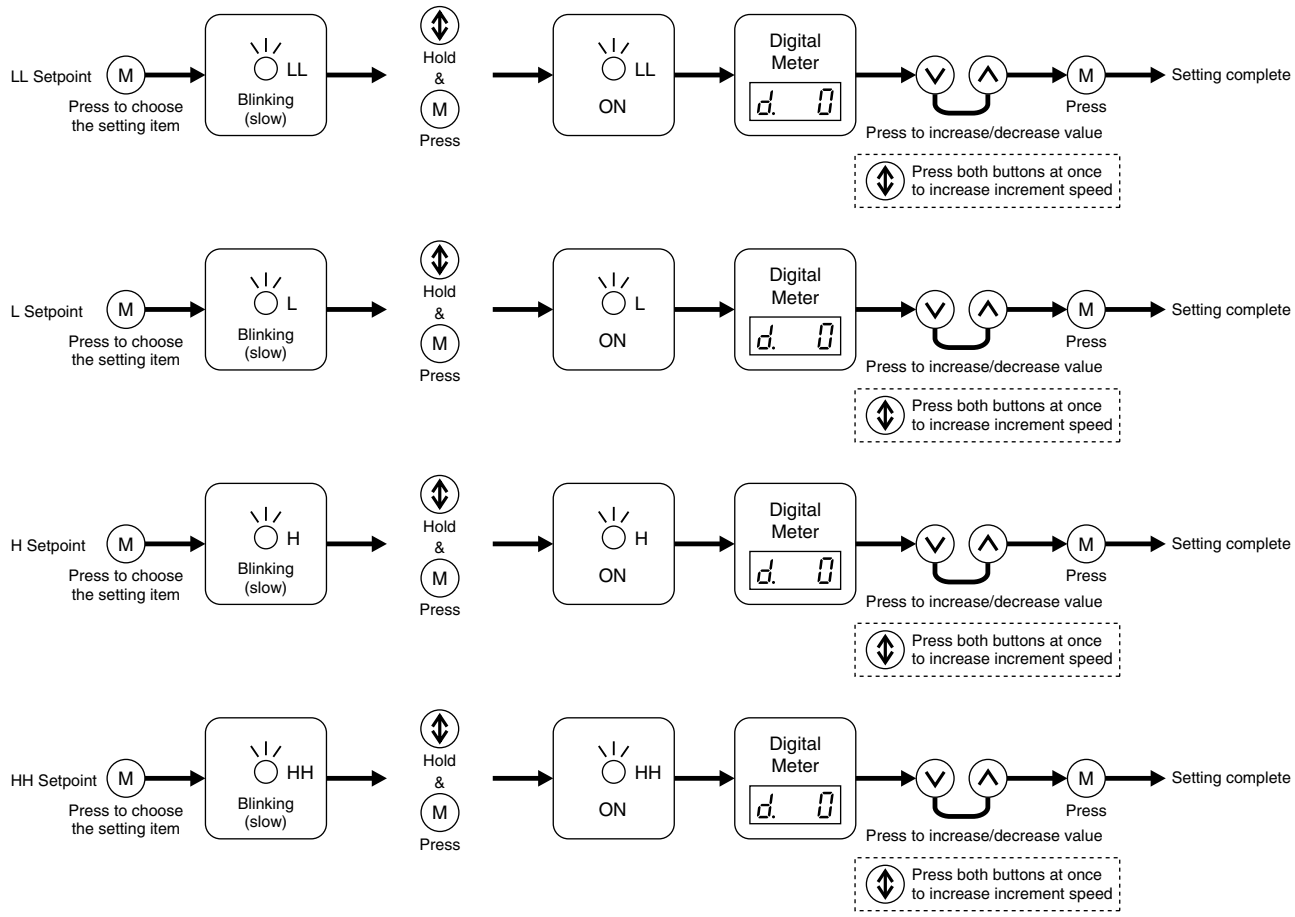
Note: Alarm outputs operate according to the digital meter values.

• How to cancel alarm setting

H and HH setpoints: Use UP/DOWN button to increase the digital meter value to the maximum to cancel alarm. Set HH first as H setpoint cannot exceed HH setpoint.

L and LL setpoints: Use UP/DOWN button to decrease the digital meter value to the minimum to cancel alarm. Set LL first as L setpoint cannot go below L setpoint.

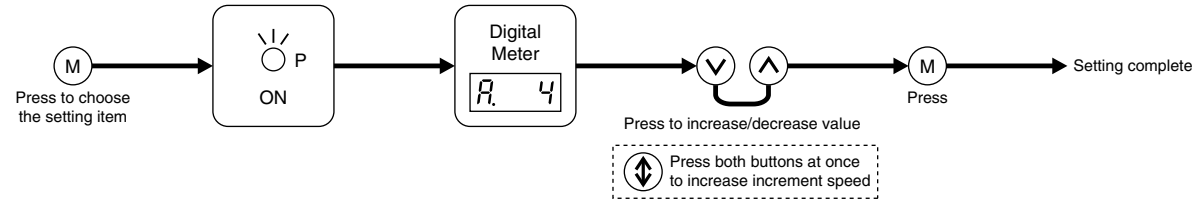
■ **ALARM OUTPUT ON TIMING DELAY**
(Default setting: 0, Range: 0 to 15 seconds)



1) Confirm that the unit is in the setting mode.
2) Press M button one or more times to choose the LED LL (for LL setpoint as example) in slow blinking state.
3) Press M button while holding down the acceleration button. The LED stops blinking.
   Refer to the present setting shown in the digital meter. 'd.' is indicated at the most significant digit.
4) Use UP/DOWN button to set a desired value on the digital meter.
5) Press M button to move on to the next item.

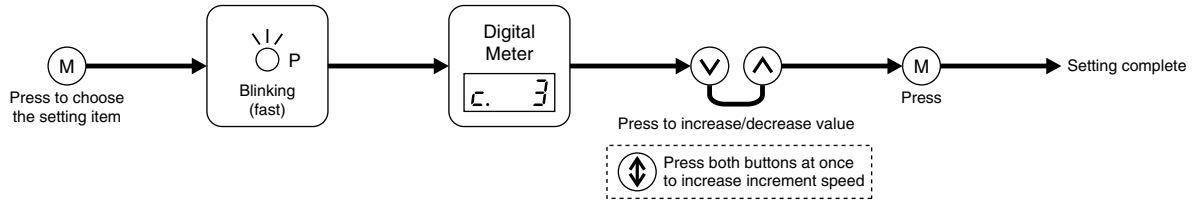
L, H and HH setpoints are adjusted in the same procedure.

■ **MOVING AVERAGE (number of samples to be calculated)**
(Default setting: 4, Range: 1, 2, 4, 8, 16)



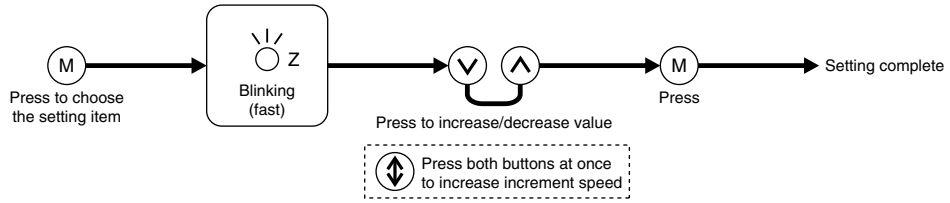
1) Confirm that the unit is in the setting mode.
2) Press M button one or more times to choose the LED P turned on.
   Refer to the present setting shown in the digital meter. 'A.' is indicated at the most significant digit.
3) Use UP/DOWN button to set a desired value on the digital meter.
4) Press M button to move on to the next item.

■ LED BRIGHTNESS (selectable only when Input 1 is selected)
(Default setting: 3, Range: 1, 2, 3)



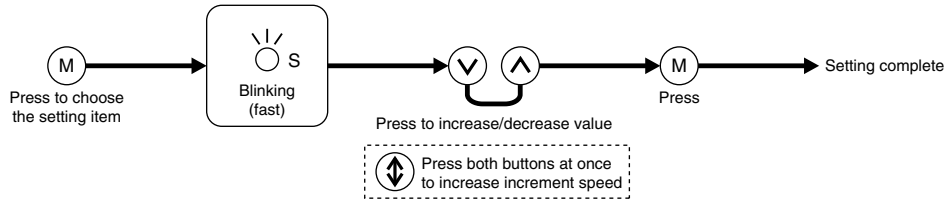
1) Confirm that the unit is in the setting mode.
2) Press M button one or more times to choose the LED P in fast blinking state.
   Refer to the present setting shown in the digital meter. 'c.' is indicated at the most significant digit.
3) Use UP/DOWN button to set a desired value on the digital meter. (3 levels available; except for alarm indicator LED or mode setting status LED)
4) Press M button to move on to the next item.

■ DC OUTPUT FINE ADJUSTMENT (invalid for the output specified 'Y: Without' in the model suffix code)
• 0% Output
(Default setting: 0.00%, Range: -19.99 to 19.99% (deviation from the factory setting))



1) Confirm that the unit is in the setting mode.
2) Press M button one or more times to choose the LED Z in fast blinking state.
3) Use UP/DOWN button to set a desired value on the digital meter.
4) Press M button to move on to the next item.

• 100% Output
(Default setting: 0.00%, Range: -19.99 to 19.99% (deviation from the factory setting))



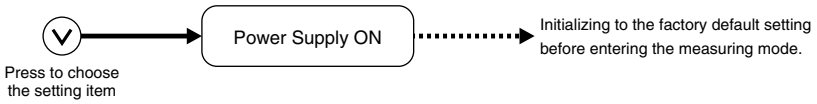
1) Confirm that the unit is in the setting mode.
2) Press M button one or more times to choose the LED S in fast blinking state.
3) Use UP/DOWN button to set a desired value on the digital meter.
4) Press M button to move on to the next item.

■ SIMULATION TEST OUTPUT (invalid for the output specified 'Y: Without' in the model suffix code)
(Default setting: 0.0%, Range: 0.0 to 100.0%)

1) In the measuring mode, confirm that the signal channel you want to test is selected with the digital meter selector LED.
2) Press and hold M button for 3 seconds while holding down the acceleration button. The LED Z and S turn on.
3) LED segments on all the bargraphs turns off and the digital meter shows 0.0. (simulation test mode)
4) Use UP/DOWN button to set a desired value. The digital meter and the bargraph of the tested channel show the simulated value.
5) Press and hold M button for 3 seconds while holding down the acceleration button to go back to the measuring mode.

■ INITIALIZATION

All setting values are initialized to the factory default when the power supply is turned on while pressing DOWN button.



Caution!: Activating "initialization" ex-factory settings (ESU-6341) or user's specified parameters will be deleted and over-written with the factory default values. Notice that after this, customized settings will be irrecoverable.