

Bargraph Indicators 48N Series

BARGRAPH INDICATING ALARM

(with 4-digit digital meter)

MODEL **48NDV**

MODEL & SUFFIX CODE SELECTION

48NDV-□□□-□□

MODEL

ALARM OUTPUT

0 : None

2 : 2 points

4 : 4 points

BAR LED COLOR

R : Red

Y : Amber

G : Green

B : Blue

C1: Multi-color (red, orange and green), Pattern 1 *1

C2: Multi-color (red, orange and green), Pattern 2 *1

*1 : See 'Front Panel Configuration.'

INPUT

Current

Voltage

A : 4 – 20mA DC

3 : 0 – 1V DC

B : 2 – 10mA DC

4 : 0 – 10V DC

C : 1 – 5mA DC

5 : 0 – 5V DC

D : 0 – 20mA DC

6 : 1 – 5V DC

E : 0 – 16mA DC

4W : -10 – +10V DC

F : 0 – 10mA DC

5W : -5 – +5V DC

G : 0 – 1mA DC

0 : Specify voltage

H : 10 – 50mA DC

Z : Specify current

POWER INPUT

M : 85 – 264V AC *2

M2: 100 – 240V AC

R : 24V DC

*2 : CE marking not available

OPTIONS

/CE: CE marking

/D : Bezels for DIN panel cutout *3

*3 : Bezels for M-System's 48 Series panel cutout will be attached to the product package if Option /D is not specified.

ORDERING INFORMATION

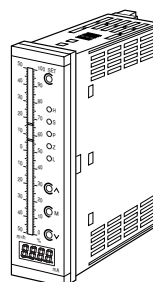
Specify code number and variables.

• **Code number** (e.g. 48NDV-4C23-R/CE/D)

• **Special input range** (For codes Z & 0)

• **Bargraph scale** (e.g. 0 – 100%)
(See 'Scale Plate.')

• **Digital indicator scale** (e.g. 0 – 130.0)



Functions & Features

- Displays a process variable in graphic bargraph of 101 LED segments
- Clear 4-digit digital meter
- Provides max. 4 alarm contact outputs
- Multi-color indicator
- LED brightness adjustment
- IP 65 front cover
- Scale plate is easily replaced
- Separable terminal block

BEZEL OPTION

Bezels are used to adapt the 48N Series to an existing panel cutout. In order to replace M-System's 48 Series products, use the one attached to the 48N Series as standard. When the existing panel is cut according to DIN standard, specify 'D' suffix code.

For a new installation, no bezel is required. Please refer to 'Mounting Requirement' and mount the 48N directly.

Ingress protection is invalid when the 48N is mounted with a bezel, or when multiple modules are stacked side by side.

RELATED PRODUCTS

- Spare scale plate

GENERAL SPECIFICATIONS

Construction: Panel flush mounting

Connection: M3 screw terminals

(nickel plated steel; torque 0.6 N·m)

Material

Housing: Flame resistant resin (black)

Scale plate: Flame resistant resin (white scale & characters on black base)

Bargraph: 101-segment LED, 100 mm (3.96") long, 3.00 mm (.12") wide

Scale

Characters: Max. 4 characters including decimal point and negative sign

Divisions: Min. 22, max. 100

Engineering unit: Max. 6 characters

Digital indicator: 7-segment red LED, 8 mm (.31") high

Number of digits: 4 digits

Scaled range: -1999 to 0 to 9999

(Min. 3 significant digits)

Minimum scale value: 100 (3 digits, the decimal point position disregarded)

Overrange: -15 to +115% of the input range; the indicator blinks.

Read rate: 10/s

LED brightness adjustment: 7 levels

Moving average sample number: 4 (factory setting; field-selectable among 1, 2, 4, 8 or 16)

H & L alarm output delay: 0 sec. (factory setting; field-selectable between 0 and 15 sec. by 1 sec. increments)

Setpoint adjustment

48NDV-2: H [L setpoint] to 100%

L 0 to [H setpoint]

or No alarm trip

48NDV-4: HH [H setpoint] to 100%

H [L setpoint] to [HH setpoint]

L [LL setpoint] to [H setpoint]

LL 0 to [L setpoint]

or No alarm trip

Alarm deadband (hysteresis): 1%

Zero & span adjustments: $\pm 10\%$ (front)

Isolation: Input to output to power

INPUT & OUTPUT

INPUT

• **DC Current:** 0 – 50mA DC; input resistor incorporated (0.5W)

Minimum span: 1mA

Input resistance

Input	Input Resistance
4 – 20mA	: 10 (Ω)
2 – 10mA	: 20
1 – 5mA	: 39
0 – 20mA	: 10
0 – 16mA	: 12
0 – 10mA	: 20
0 – 1mA	: 200
10 – 50mA	: 5.1

Specify resistance values from the above list if needed.

• **DC Voltage:** -10 – +10V DC

Minimum span: 0.1V

Input resistance: 1M Ω minimum

Zero suppression/elevation: Max. 1.5 times span

ALARM OUTPUT

• **Relay Contact:** 250V AC @1A ($\cos\phi=1$)
30V DC @5A (resistive load)
Electrical life $\geq 3 \times 10^4$ cycles (rate 6/min.)

Maximum switching voltage: 250V AC or 220V DC

Maximum switching power: 380VA or 150W

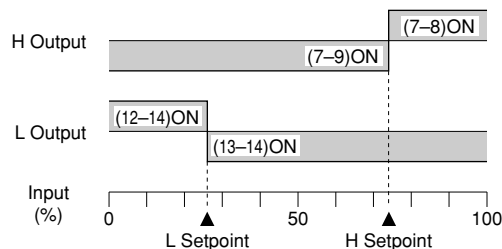
Minimum load: 5V DC @100mA

Mechanical life: $\geq 5 \times 10^8$ cycles (rate 180/min.)

Specifications subject to change without notice.

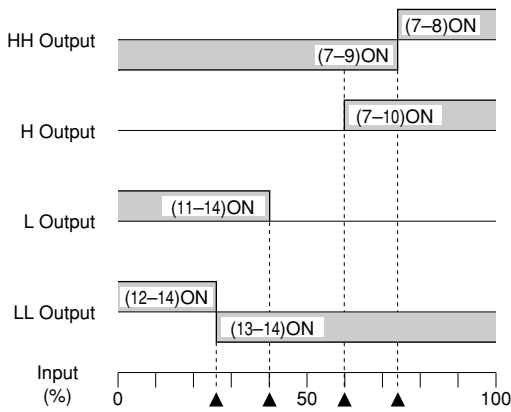
Alarm Trip Operation Terminal No. in parentheses

Alarm Suffix Code 2



Terminals 7 – 9, 13 – 14 turn on at a loss of power.

Alarm Suffix Code 4



Terminals 7 – 9, 13 – 14 turn on at a loss of power.

INSTALLATION

Power input

AC: Operational voltage range 85 – 264V, 47 – 66 Hz, approx. 6VA

DC: 24V $\pm 15\%$, approx. 2.5W
(ripple 10% p-p max.)

Operating temperature: -5 to +55°C (23 to 131°F)

Operating humidity: 30 to 90% RH (non-condensing)

Front panel ingress protection: IP 65*

*Single mounting according to the specified panel cutout

Mounting: Panel flush mounting

Panel cutout: 31.5×138 mm (1.24"×5.43")

Panel thickness: 1.6 – 8.0 mm (0.06" – 0.31")

Dimensions: W36×H144×D103 mm (1.42"×5.67"×4.06")

Weight: 300 g (0.66 lbs)

PERFORMANCE in percentage of span

Accuracy

Bargraph: $\pm 1\% \pm 1$ digit

Digital indicator: $\pm 0.5\% \pm 1$ digit

Temp. coefficient: $\pm 0.015\%$ of FS/°C
($\pm 0.008\%$ of FS/°F)

Response time: ≤ 0.5 seconds

(moving average sample number set to 4)

Insulation resistance: $\geq 100M\Omega$ with 500V DC

(input to output to power)

Dielectric strength: 2000V AC @1 minute (input to power or ground, power to ground, output to input or power or ground)

STANDARDS & APPROVALS

CE conformity: EMC Directive (89/336/EEC)

EMI EN61000-6-4

EMS EN61000-6-2

Low Voltage Directive (73/23/EEC)

EN61010-1

Installation category II

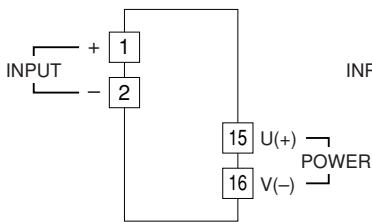
Pollution degree 2

Max. operating voltage 300V

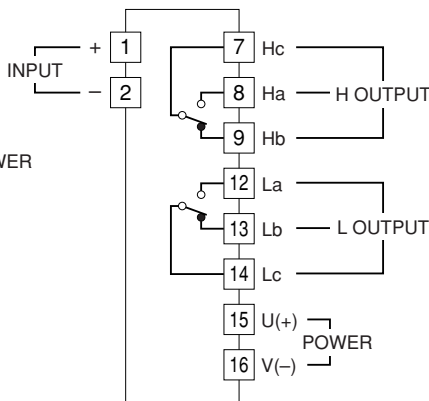
Input to output to power – Reinforced insulation

CONNECTION DIAGRAM

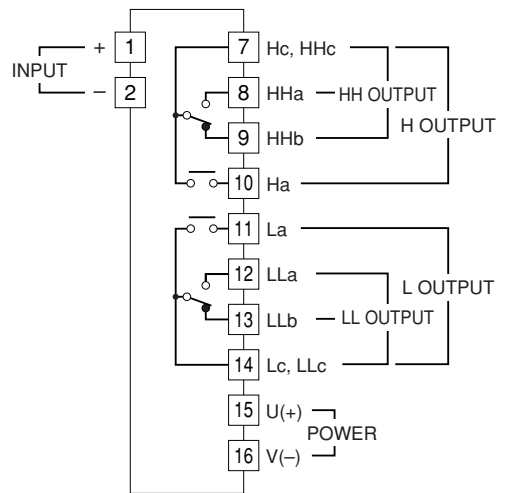
■48NDV-0



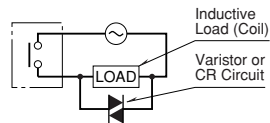
■48NDV-2



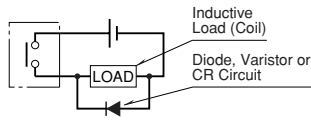
■48NDV-4



■Relay Protection
•AC Powered



•DC Powered



SCALE PLATE

■WHAT MUST BE SPECIFIED WHEN ORDERING

Please specify the bargraph scale range and engineering unit. Number of divisions, division line length, character font are determined by M-System.

[Example] : Bargraph range 0 to 300 cm

Bargraph scale range: 0 – 300

Engineering unit for the bargraph: cm

■TYPES OF DIVISIONS

Five (5) types of divisions are used depending upon the scale span, which determined by the following equation:

$$\text{Scale Span} = (\text{Max. range value} - \text{Min. range value}) \times 10^n$$

where n = integer (used to limit the calculated scale span to the minimum of 1.1, below 11.0.)

•Type 1: $1.1 \leq \text{Scale Span} < 1.3$

Number of divisions: 22 to 25.9

Scale: Starts at 0, increments in 0.02 / 0.2 / 2 / 20 / 200. Min. and max. values are indicated.
4 digits including negative sign and decimal point.

Division lines: Long, Short, Medium, Short, Long
(4 division lines repeating)

Minimum Divisions	Maximum Divisions	Bipolar Scale
11 —	1.29 —	600 —
10 —	1.2 —	400 —
8 —	1.0 —	200 —
6 —	0.8 —	0 —
4 —	0.6 —	-200 —
2 —	0.4 —	-400 —
0 —	0.2 —	-600 —
0 —	0 —	-600 —

•Type 3: $2.0 \leq \text{Scale Span} < 2.6$

Number of divisions: 40 to 51.9

Scale: Starts at 0, increments in 0.05 / 0.5 / 5 / 50 / 500. Min. and max. values are indicated.
4 digits including negative sign and decimal point.

Division lines: Long, Short, Medium, Short, Medium, Short, Medium, Short, Medium, Short, Long
(10 divisions repeating)

Minimum Divisions	Maximum Divisions	Bipolar Scale
20 —	2.59 —	120 —
15 —	2.5 —	100 —
10 —	2.0 —	50 —
5 —	1.5 —	0 —
0 —	1.0 —	-50 —
0 —	0.5 —	-100 —
0 —	0 —	-120 —

•Type 2: $1.3 \leq \text{Scale Span} < 2.0$

Number of divisions: 26 to 39.9

Scale: Starts at 0, increments in 0.03 / 0.3 / 3 / 30 / 300. Min. and max. values are indicated.
4 digits including negative sign and decimal point.

Division lines: Long, Short, Medium, Short, Medium, Short, Long (6 divisions repeating)

Minimum Divisions	Maximum Divisions	Bipolar Scale
130 —	1.99 —	0.8 —
120 —	1.8 —	0.6 —
90 —	1.5 —	0.3 —
60 —	1.2 —	0.0 —
30 —	0.9 —	-0.3 —
0 —	0.6 —	-0.6 —
0 —	0.3 —	-0.8 —
0 —	0.0 —	-0.8 —

•Type 4: $2.6 \leq \text{Scale Span} < 5.5$

Number of divisions: 26 to 39.9

Scale: Starts at 0, increments in 0.05 / 0.5 / 5 / 50 / 500. Min. and max. values are indicated.
4 digits including negative sign and decimal point.

Division lines: Long, Medium, Medium, Medium, Medium, Long (5 divisions repeating)

Minimum Divisions	Maximum Divisions	Bipolar Scale
260 —	5.49 —	250 —
250 —	5 —	200 —
200 —	4.5 —	150 —
150 —	4 —	100 —
100 —	3.5 —	50 —
50 —	3 —	0 —
0 —	2.5 —	-50 —
0 —	2 —	-100 —
0 —	1.5 —	-150 —
0 —	1 —	-200 —
0 —	0.5 —	-250 —
0 —	0 —	-250 —

•Type 5: $5.5 \leq \text{Scale Span} < 11.0$

Number of divisions: 27.5 to 54.9

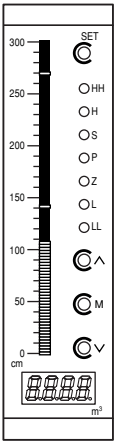
Scale: Starts at 0, increments in 0.01 / 0.1 / 1 / 10 / 100 / 1000. Min. and max. values are indicated. 4 digits including negative sign and decimal point.

Division lines: Long, Medium, Medium, Medium, Medium, Long (5 divisions repeating)

Minimum Divisions	Maximum Divisions	Bipolar Scale
550	10.9	0.5
500	10.0	0.4
	9.0	0.3
400	8.0	0.2
	7.0	0.1
300	6.0	0
	5.0	-0.1
200	4.0	-0.2
	3.0	-0.3
100	2.0	-0.4
	1.0	-0.5
0	0.0	

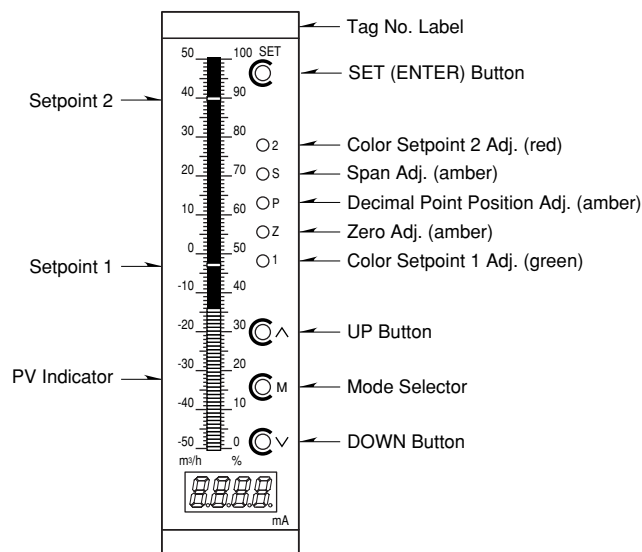
[Example] : Bargraph range 0 to 300 cm
Digital indicator range 0.00 to 6.75 m³
(Type 4)

- Left scale range: 0 – 300
- Left scale unit (bargraph): cm
- Right scale: None
- Digital indicator unit: m³



FRONT PANEL CONFIGURATION

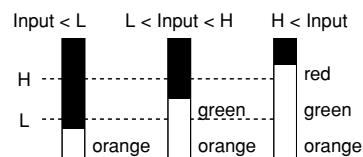
■ALARM SUFFIX CODE 0: None



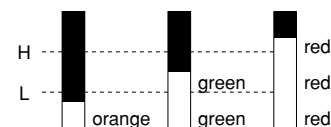
Setpoint 1 or 2 provided only for the multi-color bar type.

• Bar Color Patterns

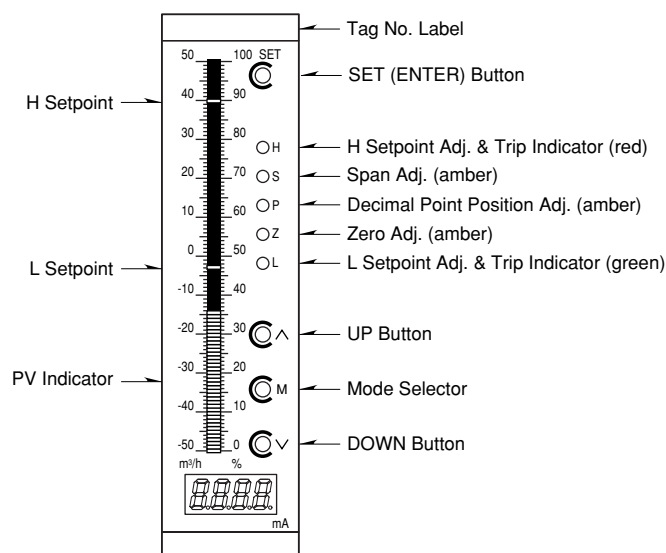
Pattern 1 (model suffix code C1)



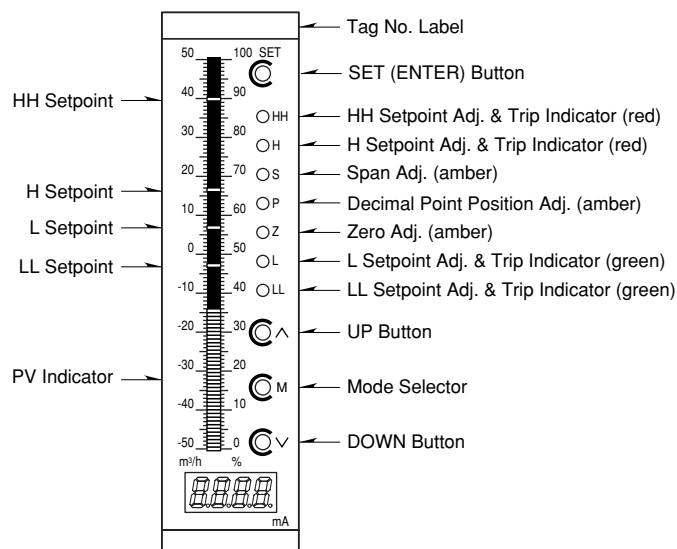
Pattern 2 (model suffix code C2)



■ALARM SUFFIX CODE 2: 2 points

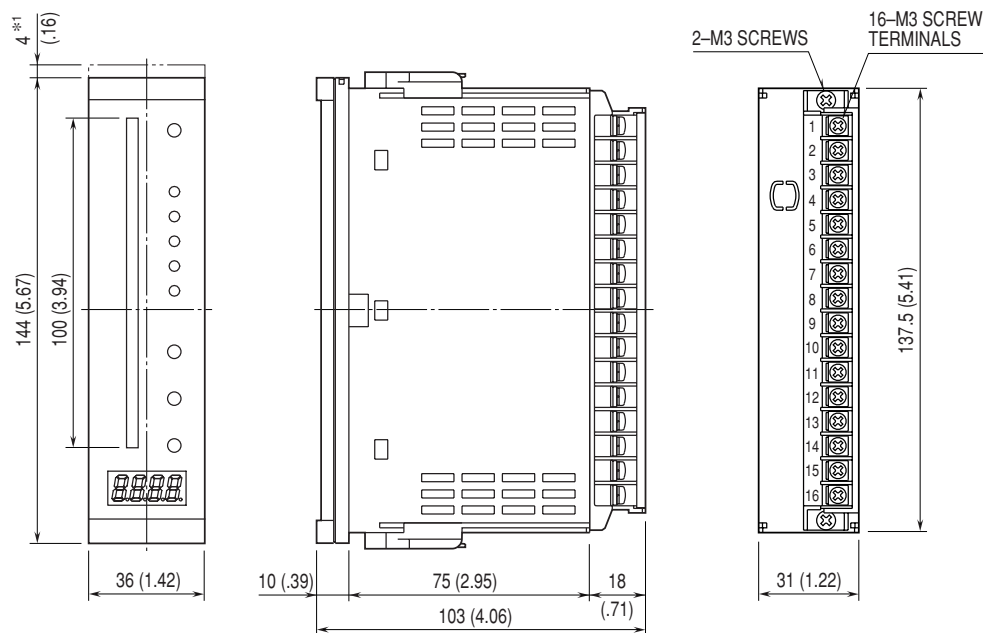


■ALARM SUFFIX CODE 4: 4 points



Specifications subject to change without notice.

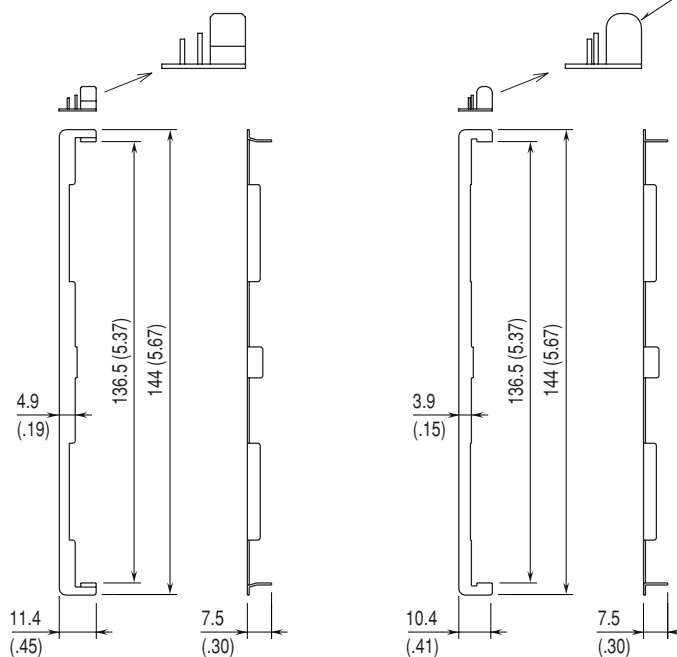
EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENT mm (inch)



■ STANDARD BEZEL *2

■ OPTION /D BEZEL *3

Rounded corners for the option /D



*1. Space required when replacing the scale plate.

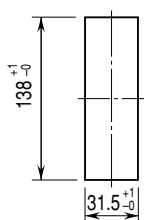
*2. Used for the existing panel cutout of M-System 48 Series (38 × 139.5 mm).

*3. Used for the existing DIN panel cutout (33 × 138 mm)

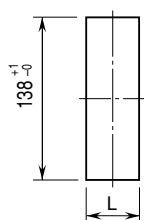
PANEL CUTOUT unit: mm

■ SINGLE MOUNTING (ingress protection)

■ CLUSTERED MOUNTING (no ingress protection)



Panel thickness: 1.6 – 8.0 mm



Panel thickness: 1.6 – 8.0 mm

$$L = \{31.5 + 36 \times (N - 1)\}^{+1}_{-0}$$

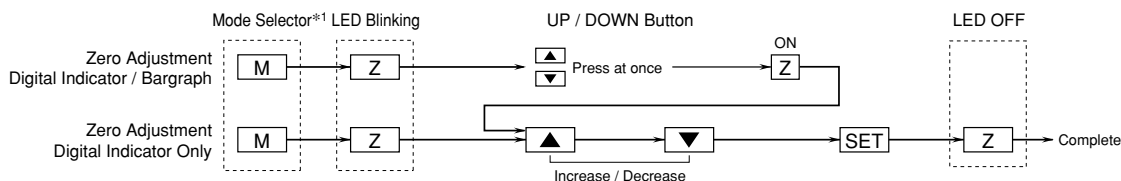
(N : number of units)

Note 1. Observe at the minimum of 3 cm above and below the units for heat dissipation.

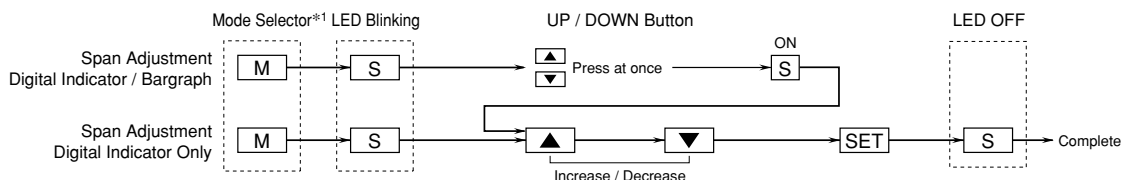
Note 2. No bezel is needed when the panel is cut according to the left drawings.

ADJUSTMENT PROCEDURE

■ **ZERO ADJUSTMENT:** Apply 0% input signal before adjustment. All alarm setpoints will be reset after the adjustment.



■ **SPAN ADJUSTMENT:** Apply 100% input signal before adjustment. All alarm setpoints will be reset after the adjustment.

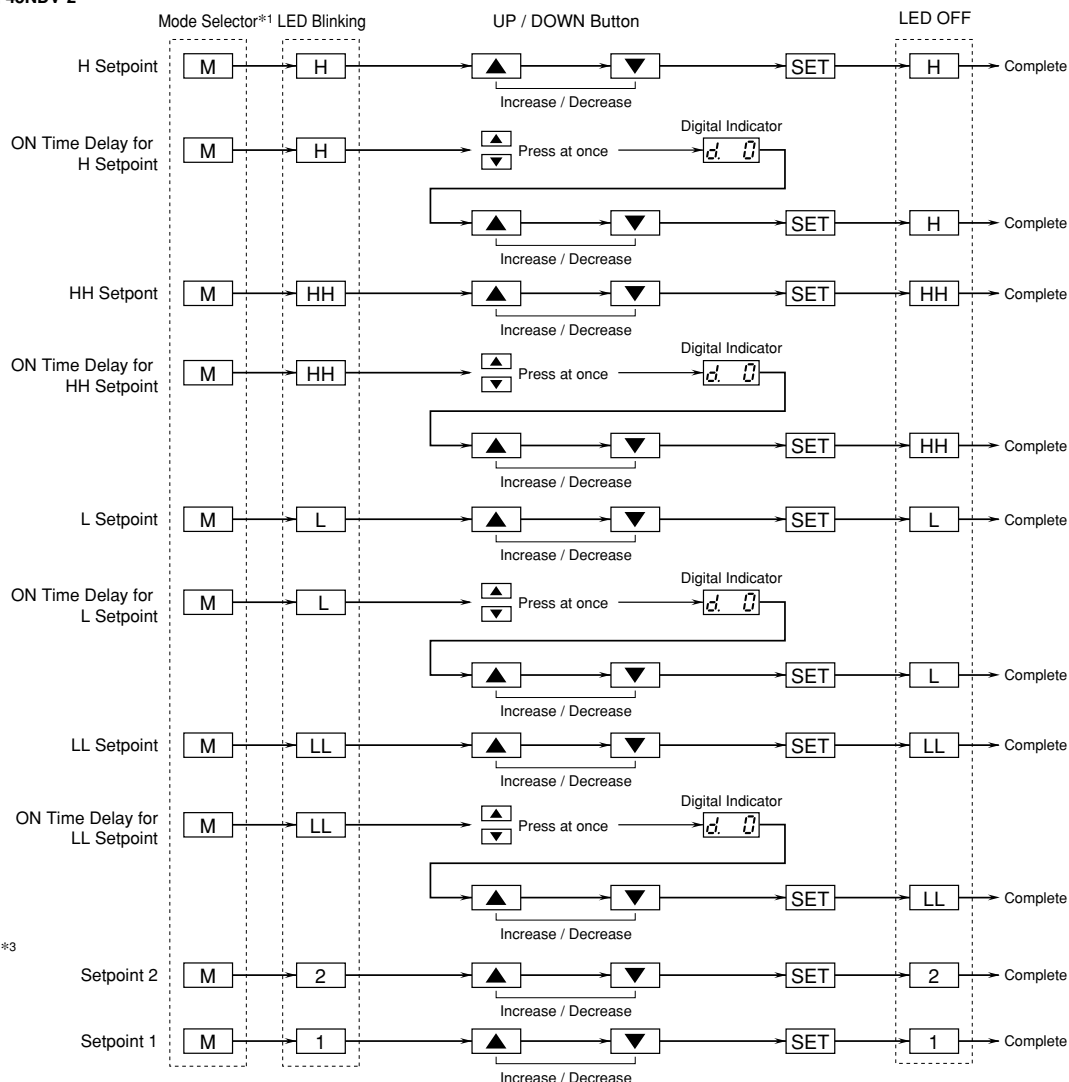


■ **DECIMAL POINT POSITION**



■ **ALARM SETTING:** Proceed after the zero / span adjustments and the decimal point position setting.

• 48NDV-4, 48NDV-2 *2



• 48NDV-0 *3

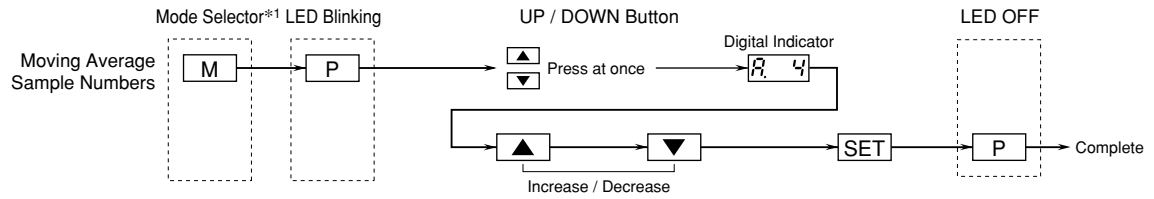
*1. Keep pressing at least for 3 seconds to activate Mode Selector M. Press briefly for second and more times within 1 minute after it has been activated.

*2. HH or LL setpoints are not provided for the 48NDV-2.

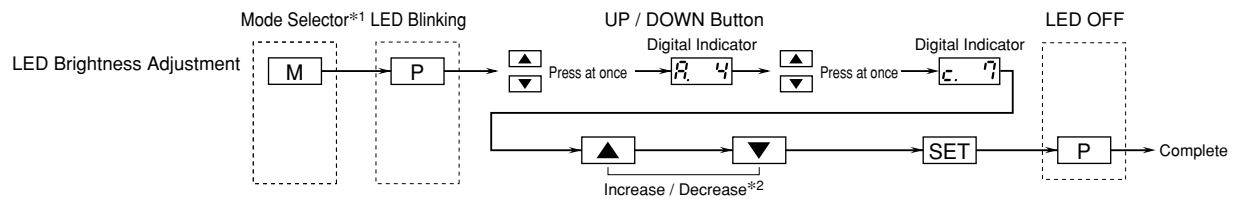
*3. 1 or 2 setpoints are not provided for the 48NDV-0R, -0Y, -0G or -0B.

Each setting sequence is complete only when SET button is pressed. Once set, parameters are not lost even after the power is removed.

■ MOVING AVERAGE SAMPLE NUMBERS



■ LED BRIGHTNESS ADJUSTMENT



*1. Keep pressing at least for 3 seconds to activate Mode Selector M. Press briefly for second and more times within 1 minute after it has been activated.

*2. Pressing UP or DOWN key shifts the LED brightness in 7 levels. Factory default is set to 7, the brightest level.

Each setting sequence is complete only when SET button is pressed. Once set, parameters are not lost even after the power is removed.