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
A : 4 – 20mA DC
B : 2 – 10mA DC
C : 1 – 5mA DC
D : 0 – 20mA DC
E : 0 – 16mA DC
F : 0 – 10mA DC
G : 0 – 1mA DC
H : 10 – 50mA DC
Z : Specify current

Voltage
3 : 0 – 1V DC
4 : 0 – 10V DC
5 : 0 – 5V DC
6 : 1 – 5V DC
4W : -10 – +10V DC
5W : -5 – +5V DC
0 : Specify voltage

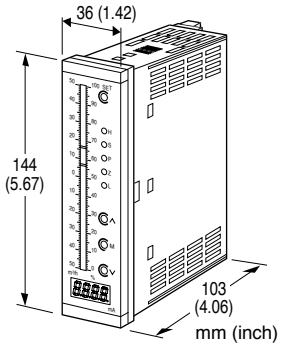
POWER INPUT
M : 85 – 264V AC *2
M2: 100 – 240V AC
R : 24V DC
*2. CE marking not available

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)

CE



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
- IP65 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
Degree of protection: IP65; applicable to the front panel for single 48N module mounted according to the specified panel cutout
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: The indicator blinks when the input is out of the range from -15 to +115%.
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: ±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

(Range)		
	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

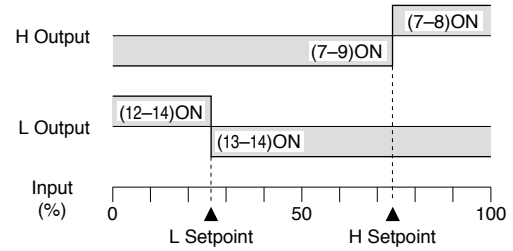
Choose a resistance value from the above list when specifying a current range.

• DC Voltage: -10 – +10V DC
Minimum span: 0.1V
Input resistance: 1MΩ minimum
Offset: Max. 1.5 times span

■ **ALARM OUTPUT**: Relay contact
Rated load: 250V AC @1A (cosø=1)
30V DC @5A (resistive load)
Electrical life ≥3×10^4 cycles (rate 6 cycles/min.)
Maximum switching voltage: 250V AC, 220V DC
Maximum switching power: 380VA, 150W
Minimum load: 5V DC @100mA
Mechanical life: ≥5×10^8 cycles (rate 180 cycles/min.)

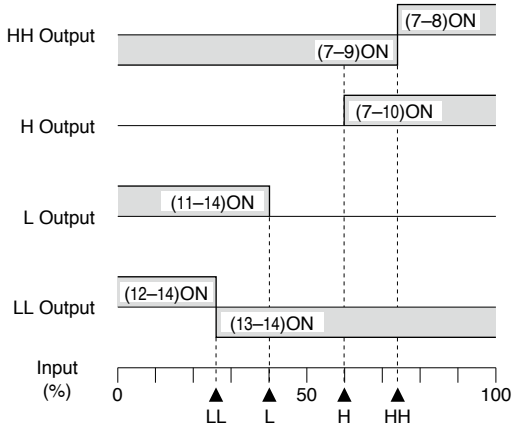
Alarm Trip Operation Terminal No. in parentheses

• 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: Operational voltage range 24V ±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)
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

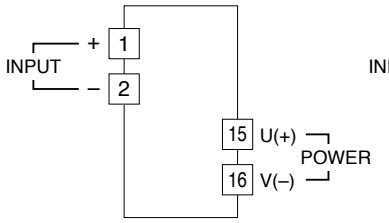
Accuracy
Bargraph: ±1% ±1 digit
Digital indicator: ±0.5% ±1 digit
Temp. coefficient: ±0.015% of FS/°C (±0.008% of FS/°F)
Response time: ≤0.5 second (moving average sample number set to 4)
Insulation resistance: ≥100MΩ with 500V DC (input to output to power)
Dielectric strength: 2000V AC @1 minute (input to power or ground, power to ground, output to input or power or ground)

STANDARDS & APPROVALS

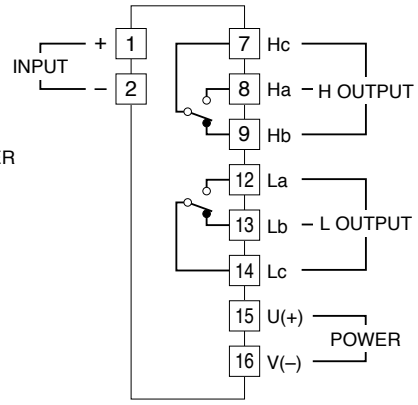
CE conformity: EMC Directive (2004/108/EC)
EN 61000-6-4 (EMI)
EN 61000-6-2 (EMS)
Low Voltage Directive (2006/95/EC)
EN 61010-1
Installation category II
Pollution degree 2
Max. operating voltage 300V
Input to output to power: Reinforced insulation

CONNECTION DIAGRAM

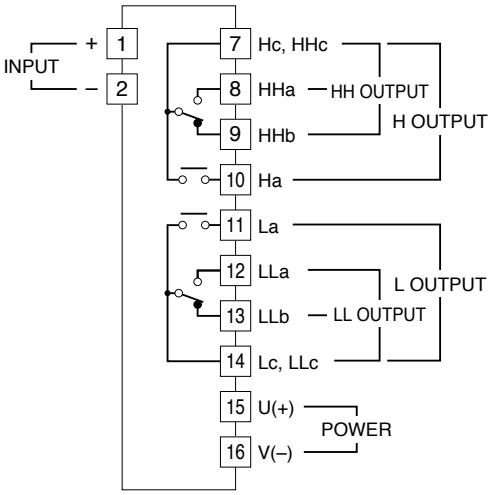
■ **48NDV-0**



■ **48NDV-2**

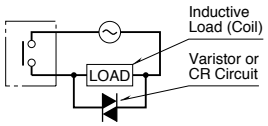


■ **48NDV-4**

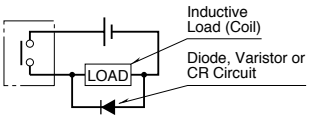


■ **Relay Protection**

• **AC Powered**



• **DC Powered**



SCALE PLATE

■ WHAT MUST BE SPECIFIED WHEN ORDERING

Please specify the bargraph scale range and engineering unit. The overvall scale plate design including the number of divisions, division line length, character font is 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:

Scale Span = (Max. range value – Min. range value) × 10^n

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

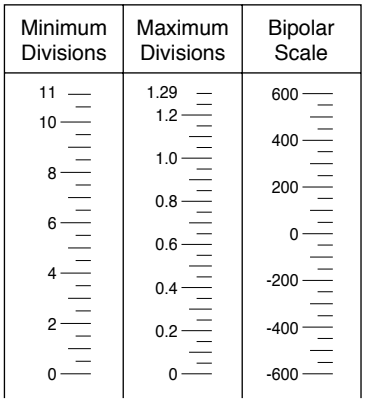
The number of divisions is automatically determined by the scale span.

• Type 1: 1.1 ≤ Scale Span < 1.3

Number of divisions: 22 to 25.9

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

Division lines: Long, Short, Medium, Short, Long (4 divisions repeated)

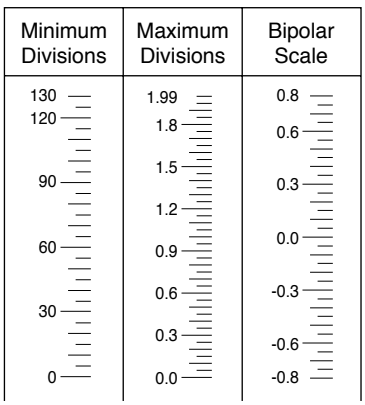


• Type 2: 1.3 ≤ Scale Span < 2.0

Number of divisions: 26 to 39.9

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

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

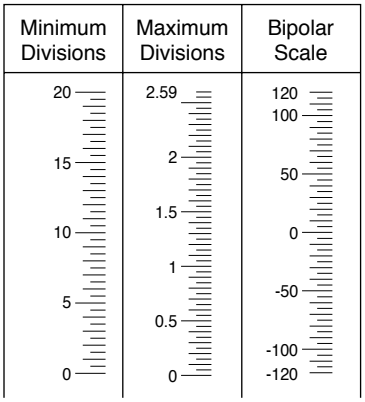


• Type 3: 2.0 ≤ Scale Span < 2.6

Number of divisions: 40 to 51.9

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

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

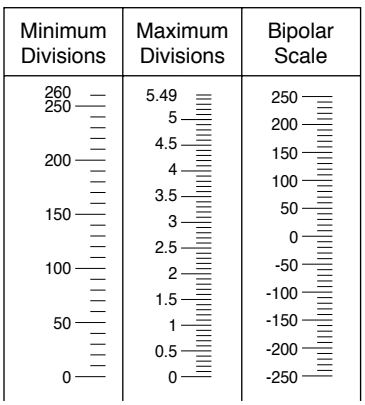


• Type 4: 2.6 ≤ Scale Span < 5.5

Number of divisions: 26 to 54.9

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

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

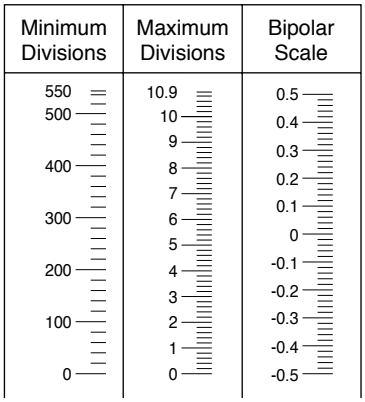


• Type 5: 5.5 ≤ Scale Span < 11.0

Number of divisions: 27.5 to 54.9

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

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



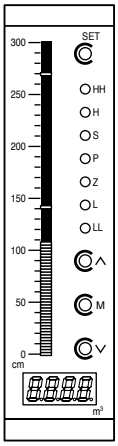
[Example] : Bargraph range 0 to 300 cm (Type 4)
Digital indicator range 0.00 to 6.75 m^3 (Type 4)

Left scale range: 0 – 300

Left scale unit (bargraph): cm

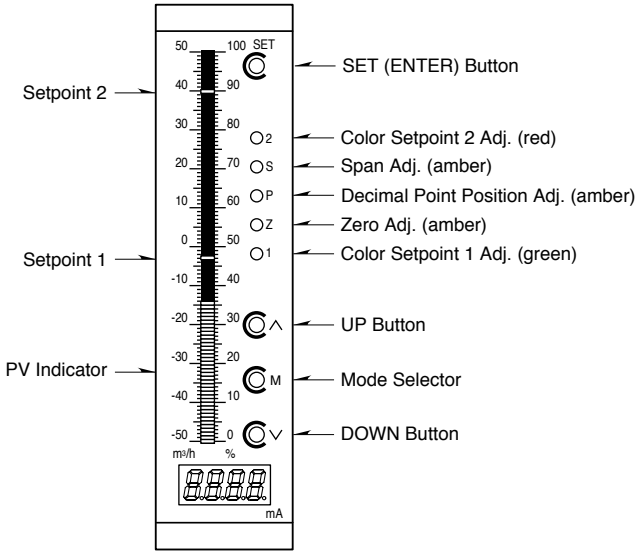
Right scale: None

Digital indicator unit: m^3



FRONT PANEL CONFIGURATION

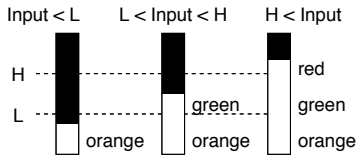
■ ALARM SUFFIX CODE 0: None



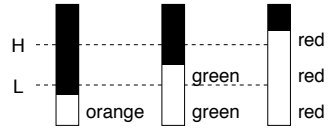
Setpoint 1 or 2 provided only for the multi-color bar type.

• Bar Color Patterns

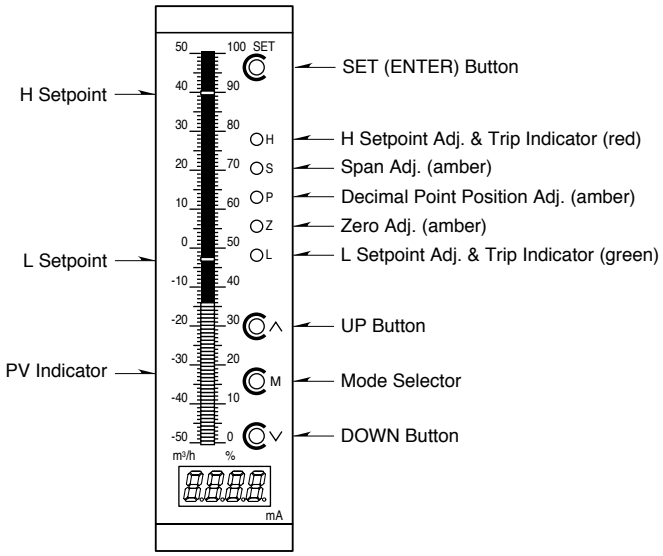
Pattern 1 (model suffix code C1)



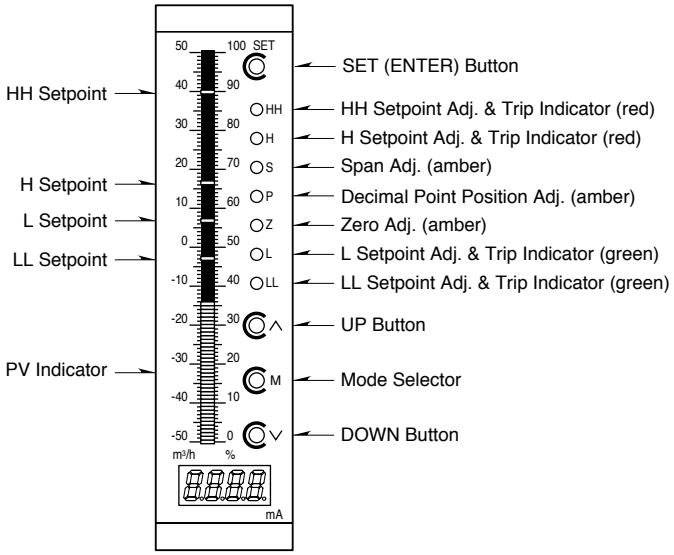
Pattern 2 (model suffix code C2)



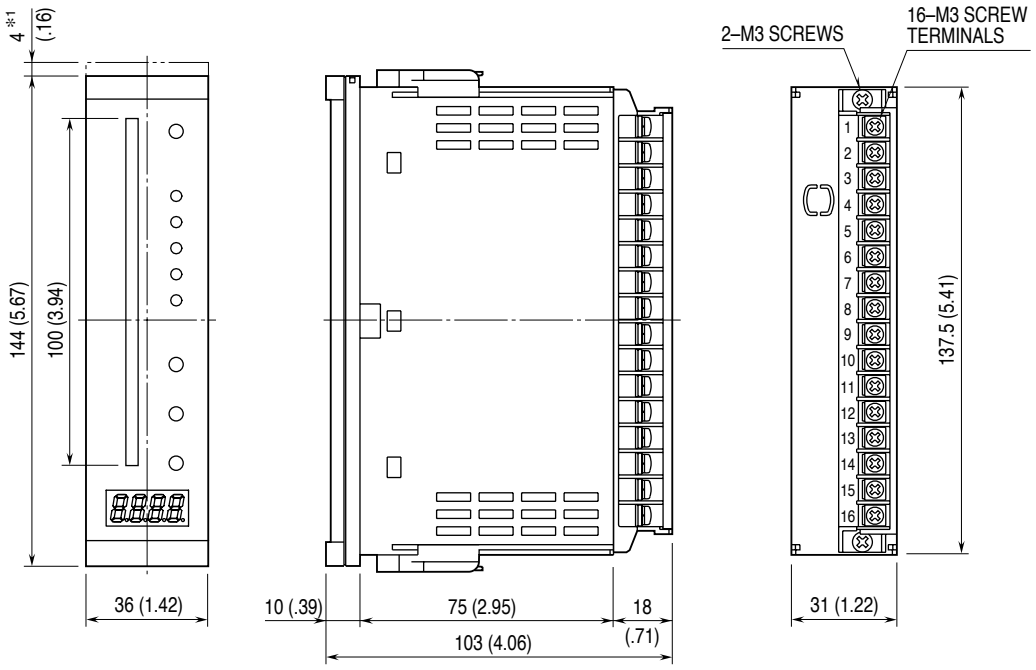
■ ALARM SUFFIX CODE 2: 2 points



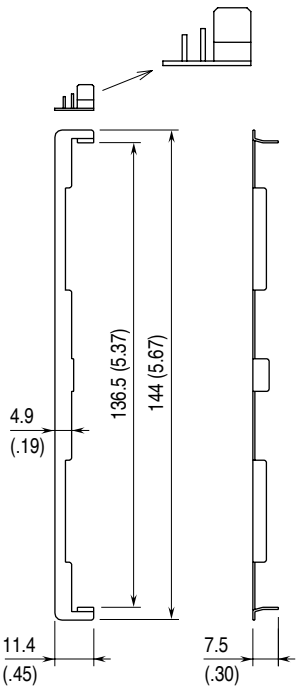
■ ALARM SUFFIX CODE 4: 4 points



EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm (inch)

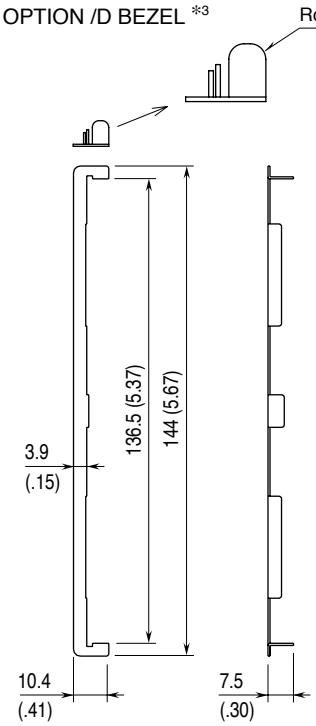


■ STANDARD BEZEL *2



■ OPTION /D BEZEL *3

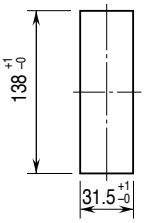
Rounded corners for the option /D



*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)

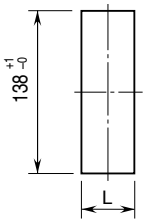
PANEL CUTOUT unit: mm (inch)

■ **SINGLE MOUNTING (ingress protection)**



Panel thickness: 1.6 – 8.0 mm

■ **CLUSTERED MOUNTING (no ingress protection)**



Panel thickness: 1.6 – 8.0 mm

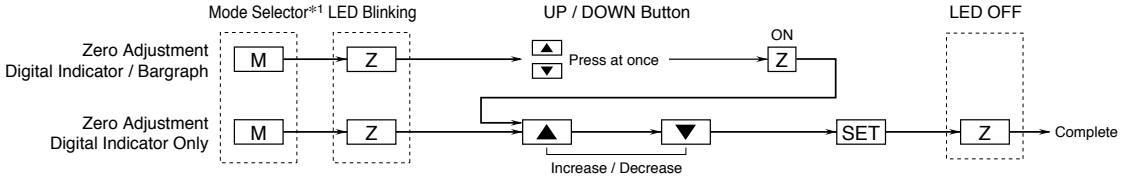
$L = \{31.5 + 36 \times (N - 1)\}^{+1}_{-0}$

(N : number of units)

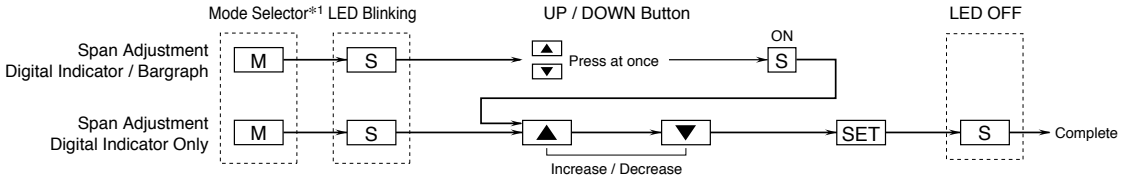
Note 1. Observe at the minimum of 3 cm above and below the units for heat dissipation.
Note 2. No bezel is needed when the panel is cut according to the left drawings.

ADJUSTMENT PROCEDURE

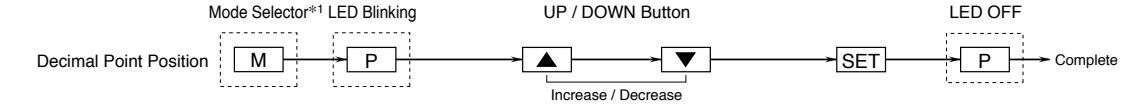
■ **ZERO ADJUSTMENT**: Apply 0% input signal before adjustment. All alarm setpoints will be reset after the adjustment.



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

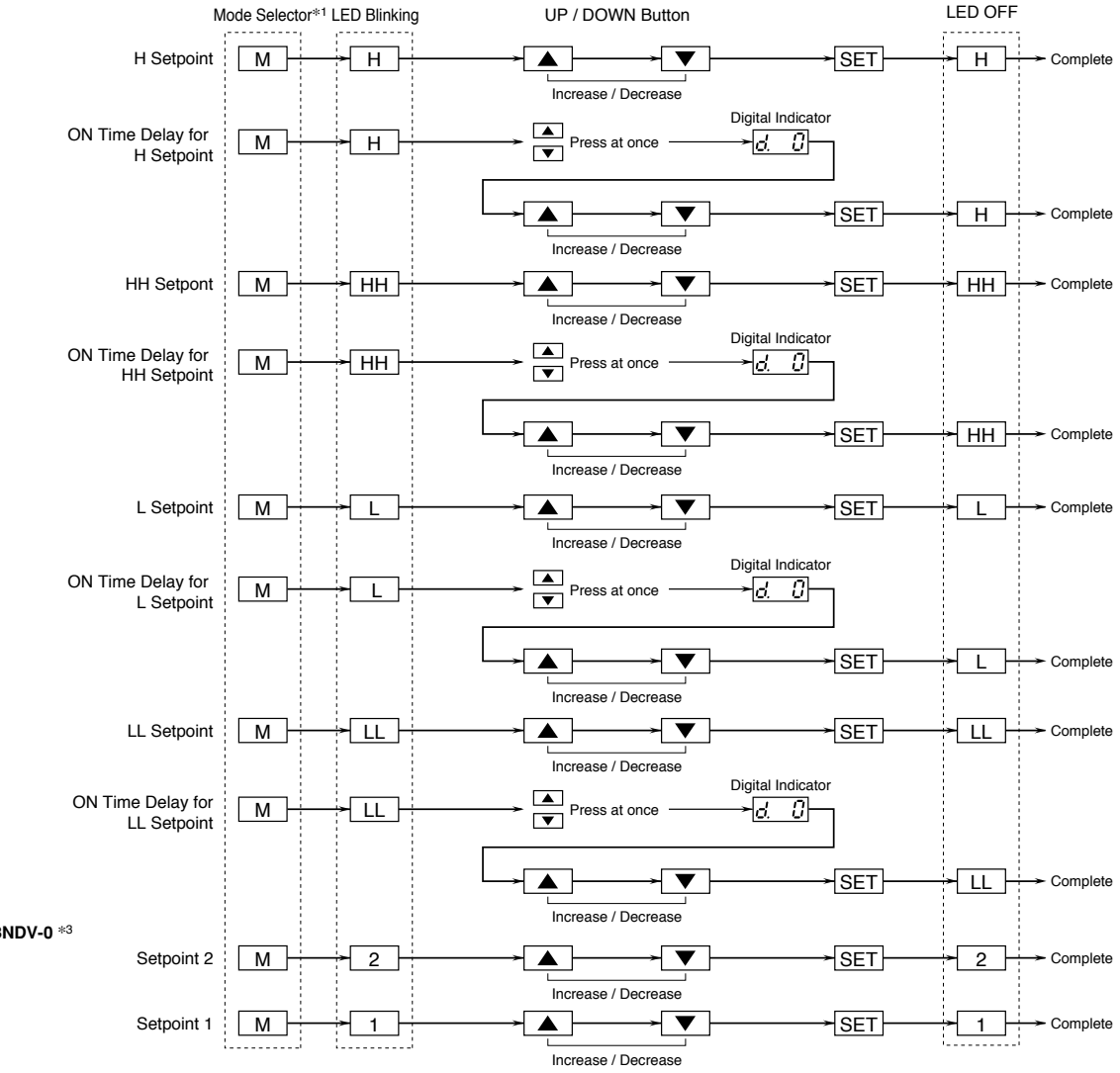


■ **DECIMAL POINT POSITION**



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

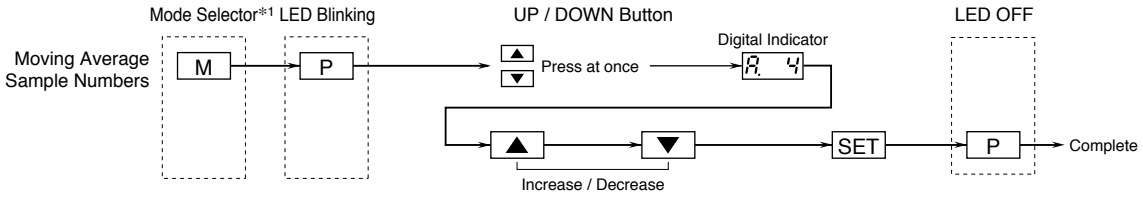
• **48NDV-4, 48NDV-2** *2



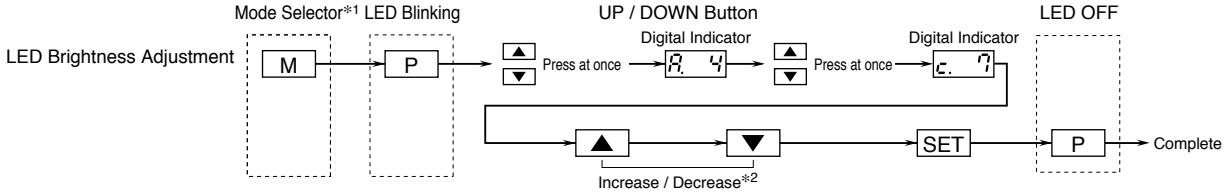
• **48NDV-0** *3

*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.