Bargraph Indicators *48N Series*

BARGRAPH INDICATING ALARM
(with 4-digit digital meter; with isolated DC output)

MODEL **48NDVA**

MODEL & SUFFIX CODE SELECTION

48NDVA–❑❑❑❑–❑❑

MODEL

ALARM OUTPUT
0 : None
2 : 2 points
4 : 4 points

BAR LED COLOR
R : Red
Y : Amber
G : Green
B : Blue
1 : Multi-color (red, orange and green), Pattern 1 *1
2 : Multi-color (red, orange and green), Pattern 2 *1
*1 : See 'Front Panel Configuration.'

INPUT

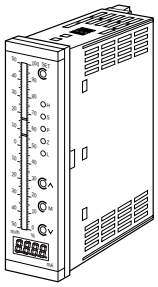
Current	Voltage
A : 4 – 20mA DC	**3** : 0 – 1V DC
B : 2 – 10mA DC	**4** : 0 – 10V DC
C : 1 – 5mA DC	**5** : 0 – 5V DC
D : 0 – 20mA DC	**6** : 1 – 5V DC
E : 0 – 16mA DC	**0** : Specify voltage
F : 0 – 10mA DC	
G : 0 – 1mA DC	
H : 10 – 50mA DC	
Z : Specify current	

DC OUTPUT

Current	Voltage
A : 4 – 20mA DC	**3** : 0 – 1V DC
D : 0 – 20mA DC	**4** : 0 – 10V DC
Z : Specify current	**5** : 0 – 5V DC
	6 : 1 – 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.



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

ORDERING INFORMATION

Specify code number and variables.
- **Code number** (e.g. 48NDVA-4233-R/CE/D)
- **Special input and DC output ranges** (For codes Z & 0)
- **Bargraph scale** (e.g. 0 – 100%)
  (See 'Scale Plate.')
- **Digital indicator scale** (e.g. 0 – 130.0)

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
48NDVA-2: H [L setpoint] to 100%
L 0 to [H setpoint]
or No alarm trip
48NDVA-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%
Display zero & span adjustments: ±10%
DC output zero & span adjustments: ±2%
Isolation: Input to DC output to alarm output to power
Simulated output: Programmable within 0 – 100%

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: 1V
Input resistance: 1MΩ minimum
Zero suppression/elevation: Max. 1.5 times span

■DC OUTPUT
•**DC Current**: 0 – 20mA DC
Minimum span: 1mA
Zero suppression/elevation: Max. 1.5 times span
Load resistance: Output drive 11V maximum

Output	Load Resistance
4 – 20mA	: 550 (Ω maximum)
0 – 20mA	: 550

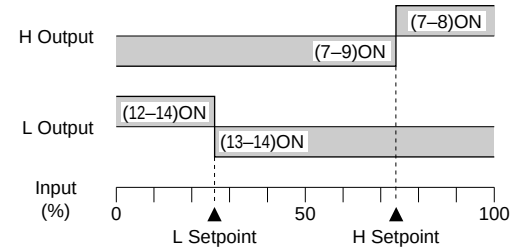
•**DC Voltage**: -10 – +10V DC
Minimum span: 1V
Zero suppression/elevation: Max. 1.5 times span
Load resistance: Output drive 1mA maximum; at ≥±0.5V

Output	Load Resistance
0 – 1V	: 1000 (Ω minimum)
0 – 10V	: 10k
0 – 5V	: 5000
1 – 5V	: 5000

■ALARM OUTPUT

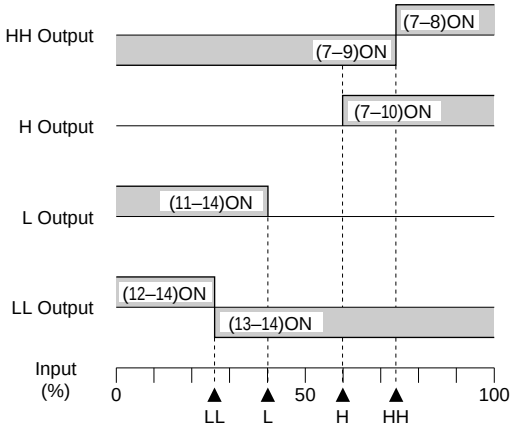
Alarm Trip Operation Terminal No. in parentheses

• 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.

- **Relay Contact**: 250V AC @1A (cosø=1)
  30V DC @5A (resistive load)
  Electrical life ≥3 × 10^4 cycles (rate 6/min.)

Maximum switching voltage: 250V AC or 220V DC
Maximum switching power: 380VA or 150W (resistive load)
Minimum load: 5V DC @100mA
Mechanical life: ≥5 × 10^8 cycles (rate 180/min.)

INSTALLATION

AC: Operational voltage range 85 – 264V, 47 – 66 Hz,
approx. 5.5VA at 100V with max. load
approx. 7VA at 200V with max. load
approx. 8VA at 264V with max. load
DC: 24V ±15% (ripple 10% p-p max.)
approx. 3.5W at 20.4V with max. load
approx. 3.5W at 24V with max. load
approx. 3.5W at 27.6V with max. load
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

Display
Accuracy: ±1% ±1 digit (bargraph)
±0.5% ±1 digit (digital indicator)
Temp. coefficient: ±0.015% of FS/°C
(±0.008% of FS/°F)
Response time: ≤0.5 seconds
(moving average sample number set to 4)

DC output
Accuracy: 0.1%
Temp. coefficient: ±0.02%/°C (±0.01%/°F)
Response time: ≤1.0 second (0 – 90%)

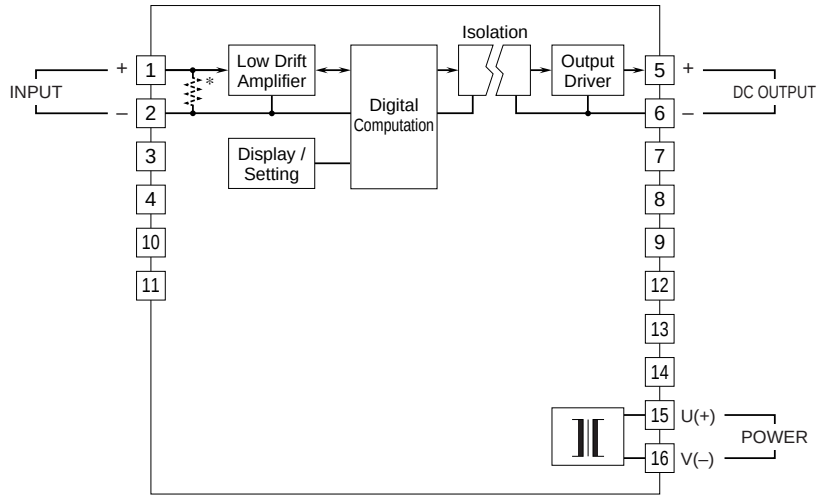
Insulation resistance: ≥100MΩ with 500V DC (input to DC output to alarm output to power)
Dielectric strength: 2000V AC @1 minute (input to DC output to alarm output to power)

STANDARDS & APPROVALS

CE conformity: EMC Directive (89/336/EEC)
EMI EN61000-6-4
EMS EN61000-6-2
Low Voltage Directive (2006/95/EC)
EN61010-1
Installation category II
Pollution degree 2
Max. operating voltage 300V
Input to alarm output to power,
DC output to power – Reinforced insulation

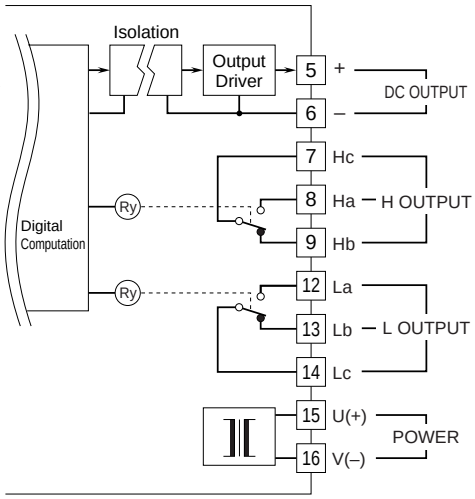
SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM

■ALARM SUFFIX CODE 0: None

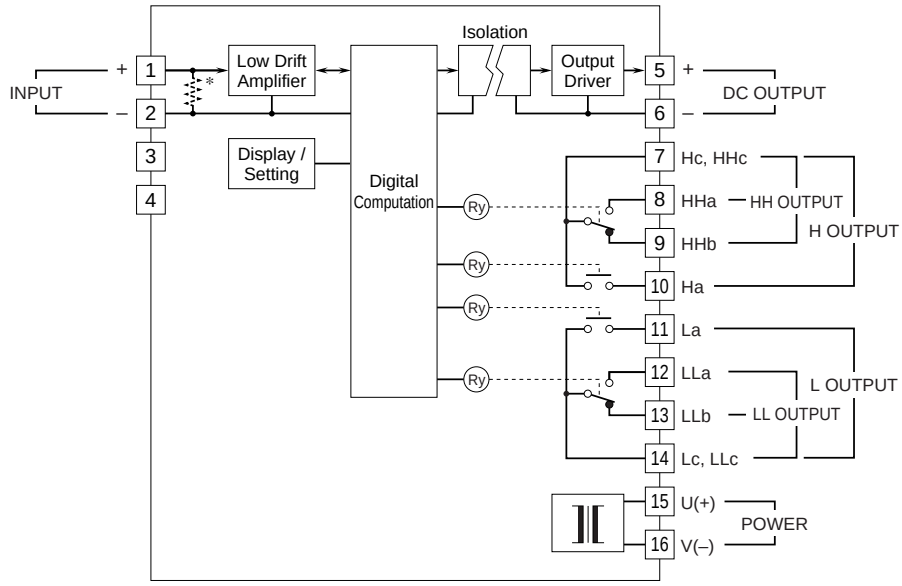


*Input shunt resistor incorporated for current input.

■ALARM SUFFIX CODE 2: 2 points



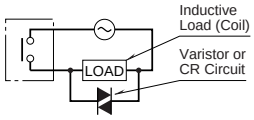
■ALARM SUFFIX CODE 4: 4 points



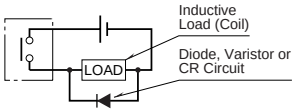
*Input shunt resistor incorporated for current input.

■Relay Protection

•AC Powered



•DC Powered



Specifications subject to change without notice.

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:

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

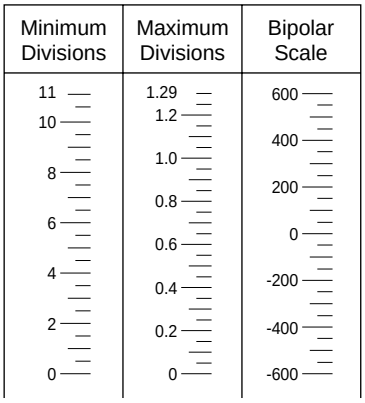
where n = integer (used to limit the calculated scale span to the minimum of 1.1, below 11.0.)

•Type 1: 1.1 ≤ 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)

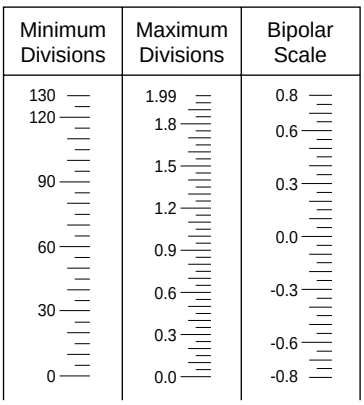


•Type 2: 1.3 ≤ Scale Span < 2.0

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)

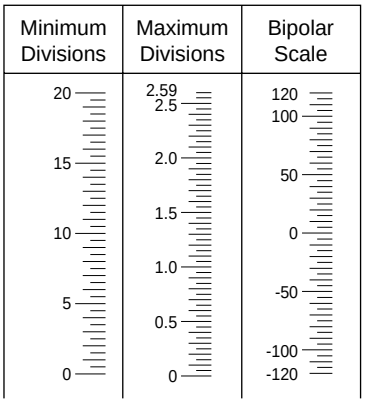


•Type 3: 2.0 ≤ Scale Span < 2.6

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)

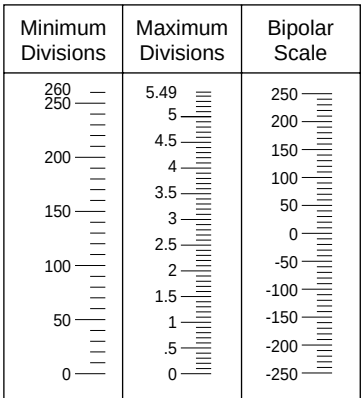


•Type 4: 2.6 ≤ Scale Span < 5.5

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)

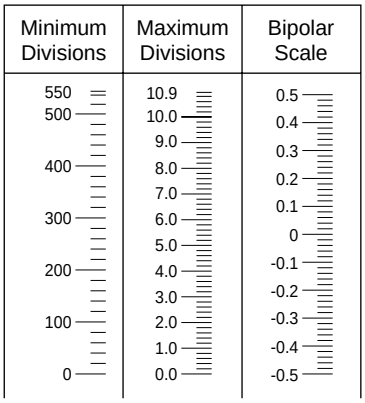


•Type 5: 5.5 ≤ Scale Span < 11.0

Number of divisions: 27.5 to 54.9

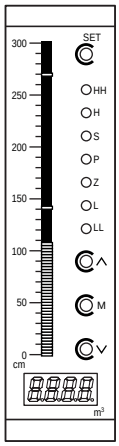
Scale: Starts at 0, increments in 0.01 / 0.1 / 1 / 10 / 100 / 1000. Min. and max. values are indicated. 4 digits including negative sign and decimal point.

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



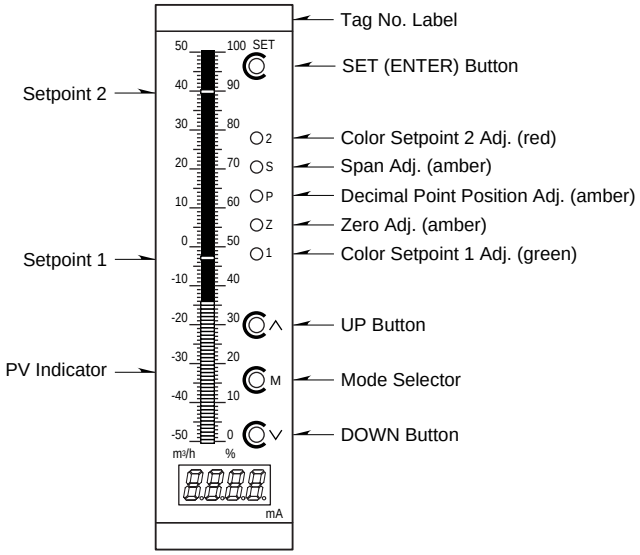
[Example] : Bargraph range 0 to 300 cm
Digital indicator range 0.00 to 6.75 m^3
(Type 4)

- Left scale range: 0 – 300
- Left scale unit (bargraph): cm
- Right scale: None
- Digital indicator unit: m^3



FRONT PANEL CONFIGURATION

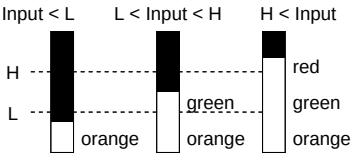
■ALARM SUFFIX CODE 0: None



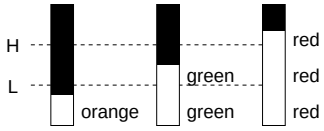
Setpoint 1 or 2 provided only for the multi-color bar type.

• Bar Color Patterns

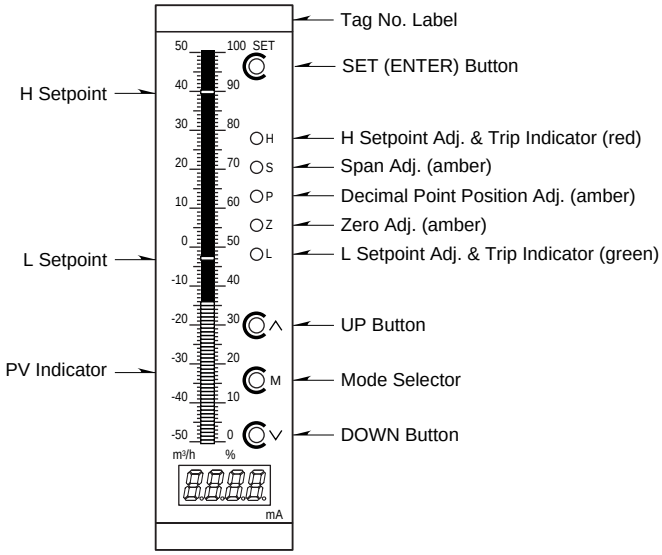
Pattern 1 (model suffix code 1)



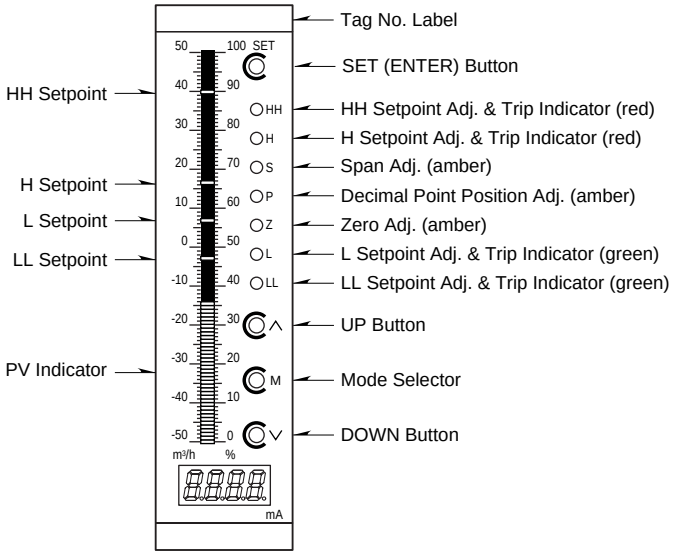
Pattern 2 (model suffix code 2)



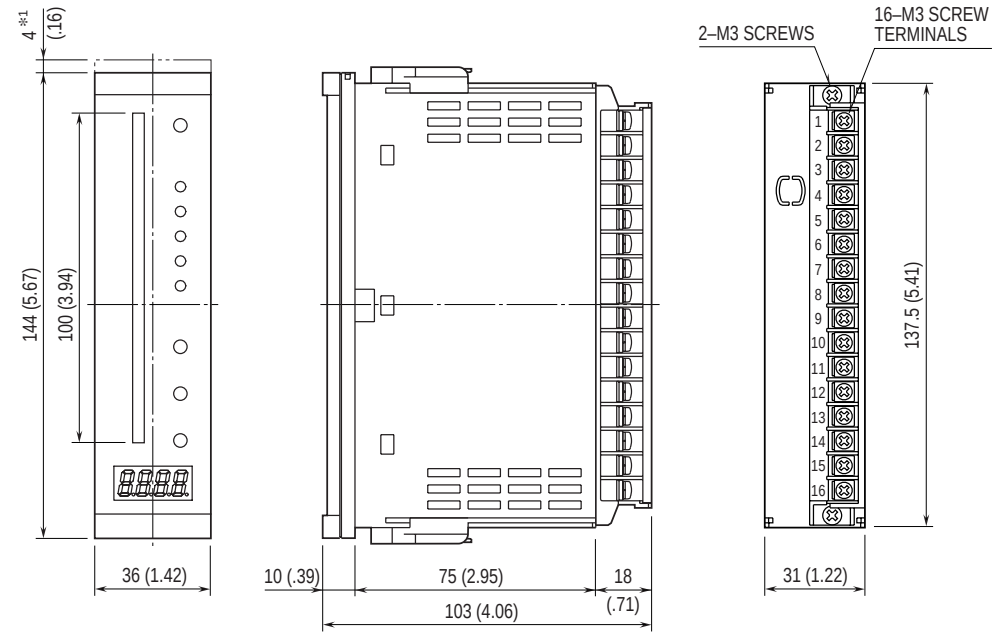
■ALARM SUFFIX CODE 2: 2 points



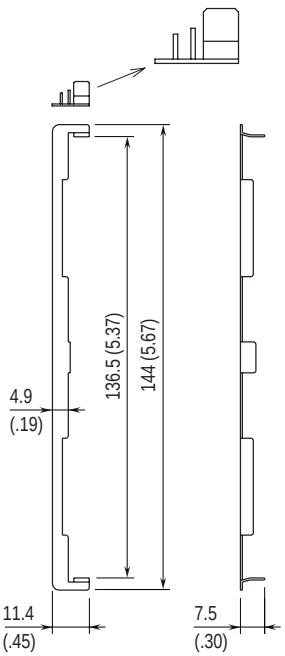
■ALARM SUFFIX CODE 4: 4 points



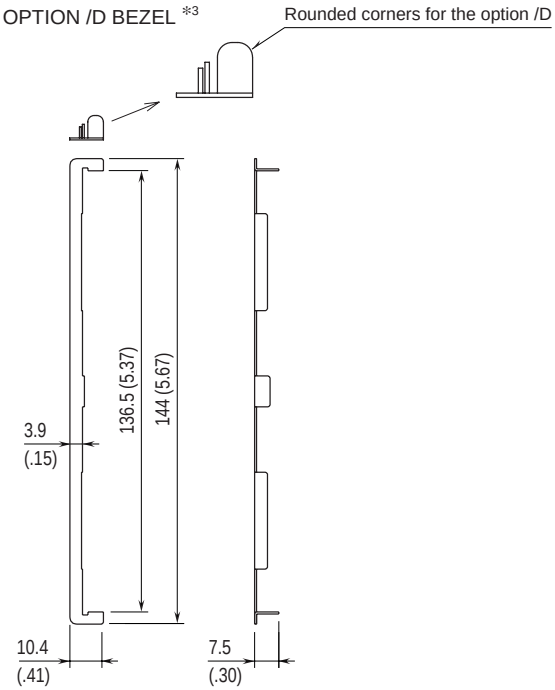
EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENT mm (inch)



■ STANDARD BEZEL *2



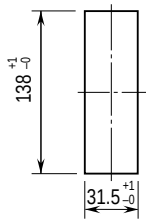
■ OPTION /D BEZEL *3



*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)

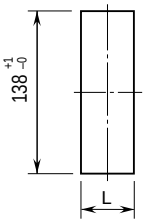
PANEL CUTOUT unit: mm

■ **SINGLE MOUNTING (ingress protection)**



Panel thickness: 1.6 – 8.0 mm

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



Panel thickness: 1.6 – 8.0 mm

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

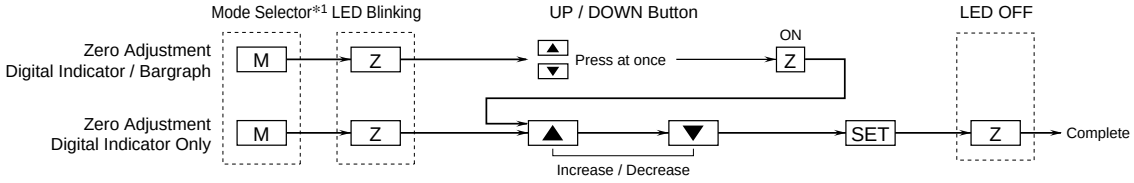
(N : number of units)

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.

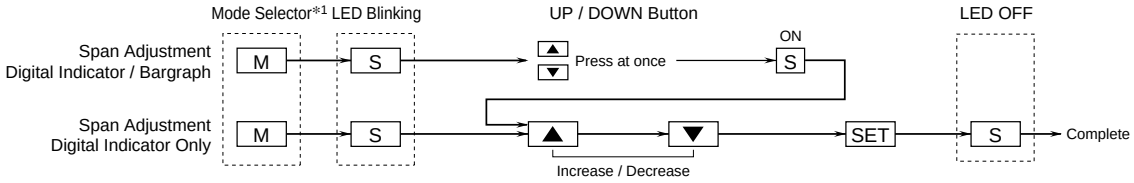
Specifications subject to change without notice.

ADJUSTMENT PROCEDURE

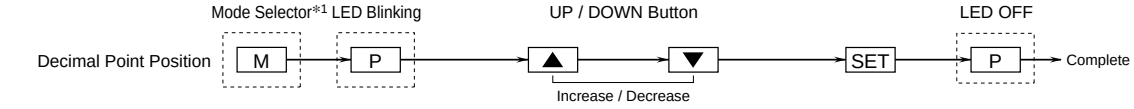
■ **ZERO ADJUSTMENT**: Apply 0% input signal before adjustment. All alarm setpoints will be reset after the adjustment.



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

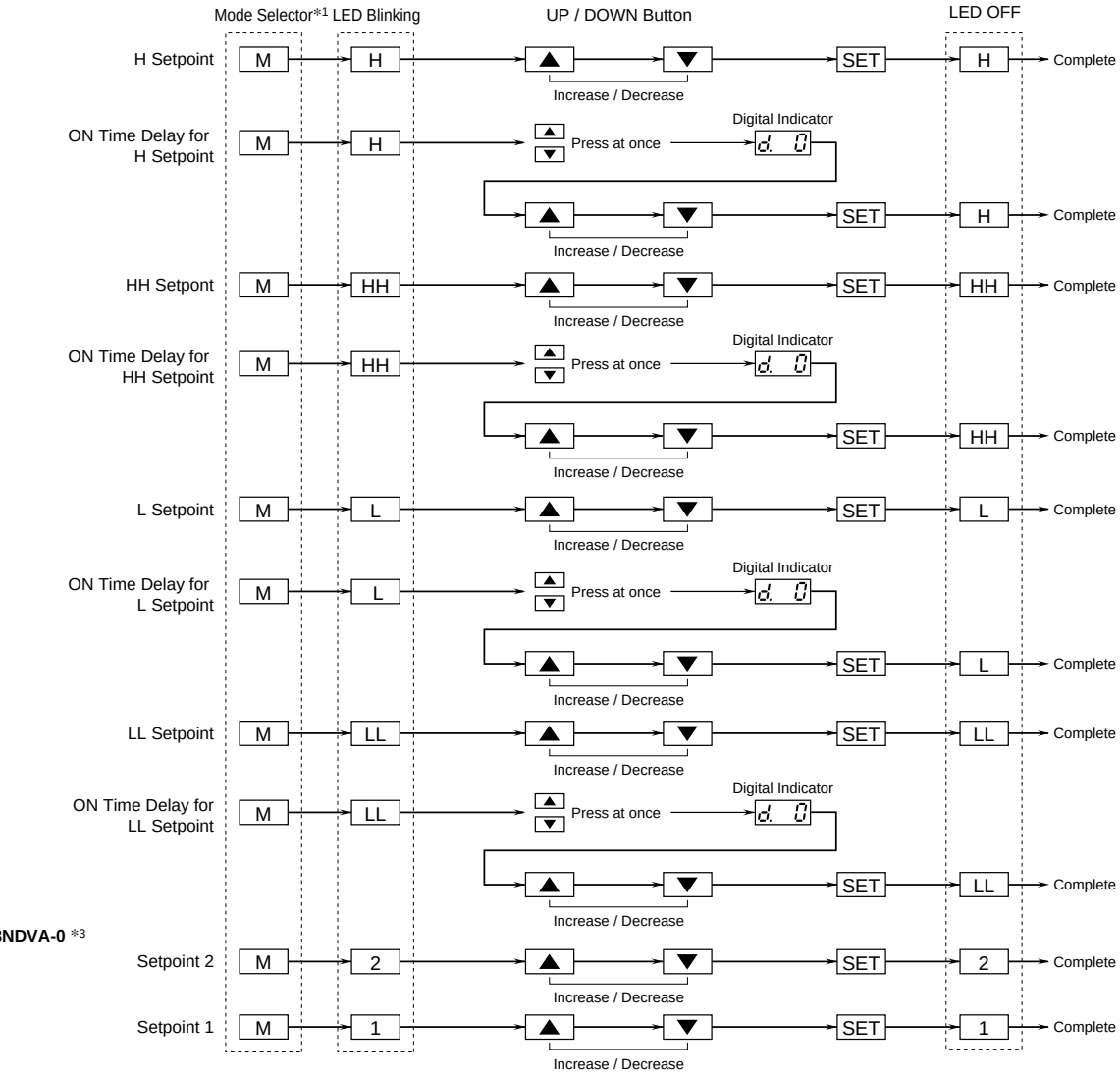


■ **DECIMAL POINT POSITION**



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

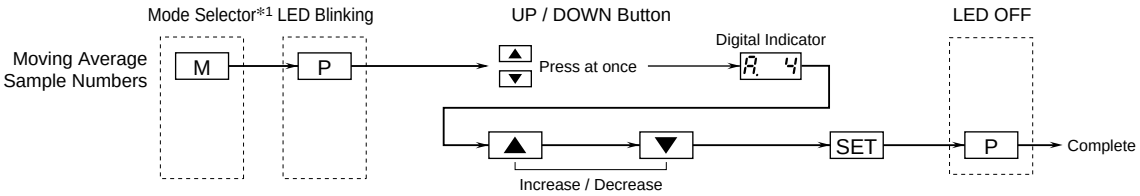
• **48NDVA-4, 48NDVA-2** *2



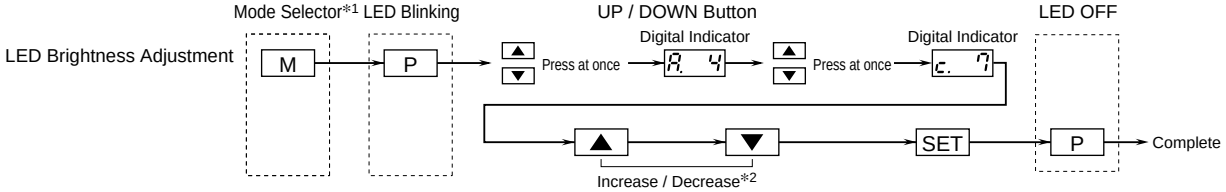
• **48NDVA-0** *3

*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 48NDVA-2.
*3. 1 or 2 setpoints are not provided for the 48NDVA-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.

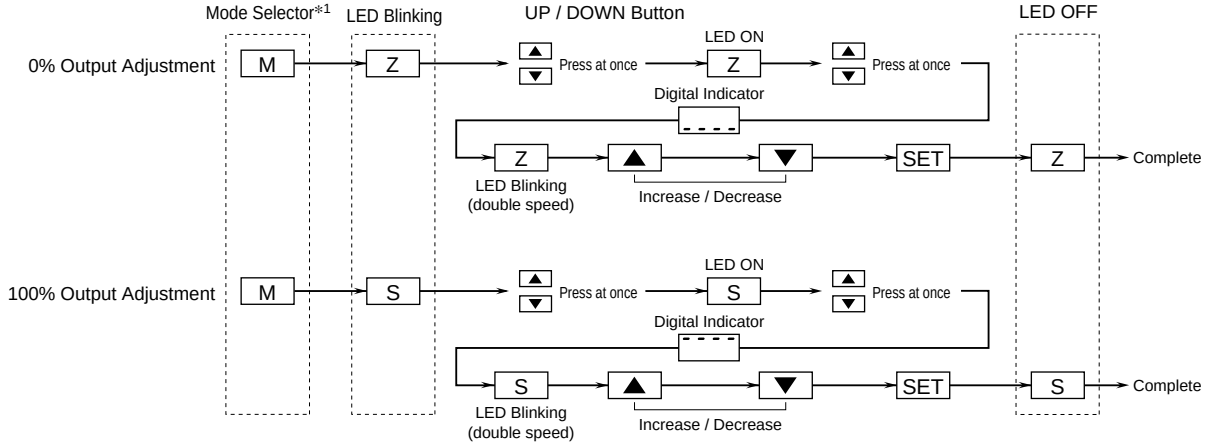
■ **MOVING AVERAGE SAMPLE NUMBERS**



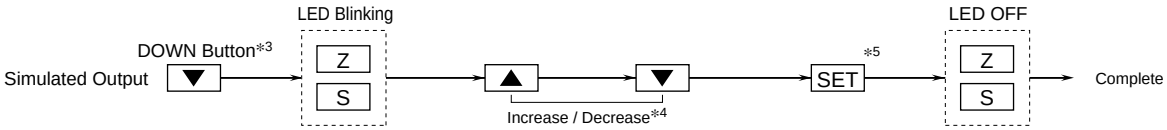
■ **LED BRIGHTNESS ADJUSTMENT**



■ **DC OUTPUT FINE ZERO/SPAN ADJUSTMENTS**



■ **SIMULATED OUTPUT**



*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.
*3. Keep pressing DOWN button at least for 5 seconds to enter the simulated output mode.
*4. Pressing UP or DOWN key simulates the output between 000.0 and 100.0%. The bargraph and the digital indicator show the simulated output.
*5. Keep pressing SET button at least for 5 seconds to exit the simulated output mode.
Each setting sequence is complete only when SET button is pressed. Once set, parameters are not lost even after the power is removed.