

Bargraph Indicators 48N Series

BARGRAPH INDICATING ALARM
(with isolated DC output)

MODEL **48NAVA**

MODEL & SUFFIX CODE SELECTION

48NAVA-□□□□□□

MODEL _____

ALARM OUTPUT _____

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.'

MOUNTING DIRECTION _____

V : Vertical
H : Horizontal

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 _____

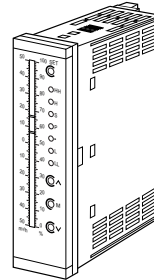
Current	Voltage
A : 4 – 20mA DC	3 : 0 – 1V DC
D : 0 – 20mA DC	4 : 0 – 10V DC
Z : Specify current	5 : 0 – 5V DC
	6 : 1 – 5V DC
	0 : Specify voltage

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
- Provides max. 4 alarm contact outputs
- Isolated DC signal output
- Multi-color indicator
- IP 65 front cover
- Scale plate is easily replaced
- Separable terminal block

ORDERING INFORMATION

Specify code number and variables.

- **Code number** (e.g. 48NAVA-42V33-R/CE/D)
- **Special input and DC output ranges** (For codes Z & 0)
- **Bargraph scale** (e.g. 0 – 100%) (See 'Scale Plate.')

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 (Scale plate is replaceable.)

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

Divisions: Min. 22, max. 100

Engineering unit: Max. 6 characters

Setpoint adjustment

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

L 0 to [H setpoint]

or No alarm trip

48NAVA-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: $\pm 10\%$

DC output zero & span adjustments: $\pm 2\%$

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: 1M Ω 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

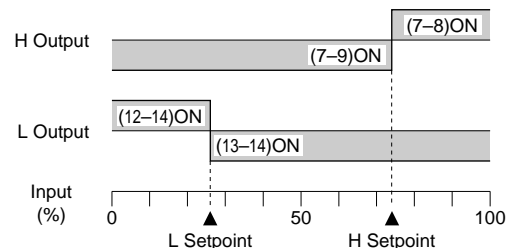
Load resistance: Output drive 1mA maximum; at $\geq \pm 0.5V$

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

ALARM OUTPUT

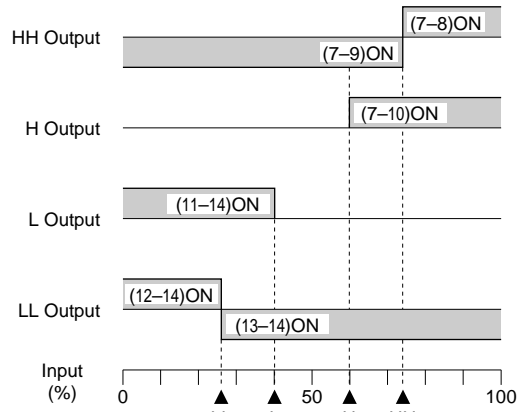
Alarm Trip Operation Terminal No. in parentheses

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 ($\cos\phi=1$)

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
(resistive load)

Minimum load: 5V DC @100mA

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

INSTALLATION

Power input

- 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 \pm 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

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

Horizontal mounting: W144×H36×D103 mm
(5.67"×1.42"×4.06")

Weight: 300 g (0.66 lbs)

PERFORMANCE in percentage of span

Display

Accuracy: \pm 1% \pm 1 digit

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

Response time: \leq 0.5 seconds

DC output

Accuracy: 0.1%

Temp. coefficient: \pm 0.02%/°C (\pm 0.01%/°F)

Response time: \leq 1.0 second (0 – 90%)

Insulation resistance: \geq 100M Ω 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 to ground)

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

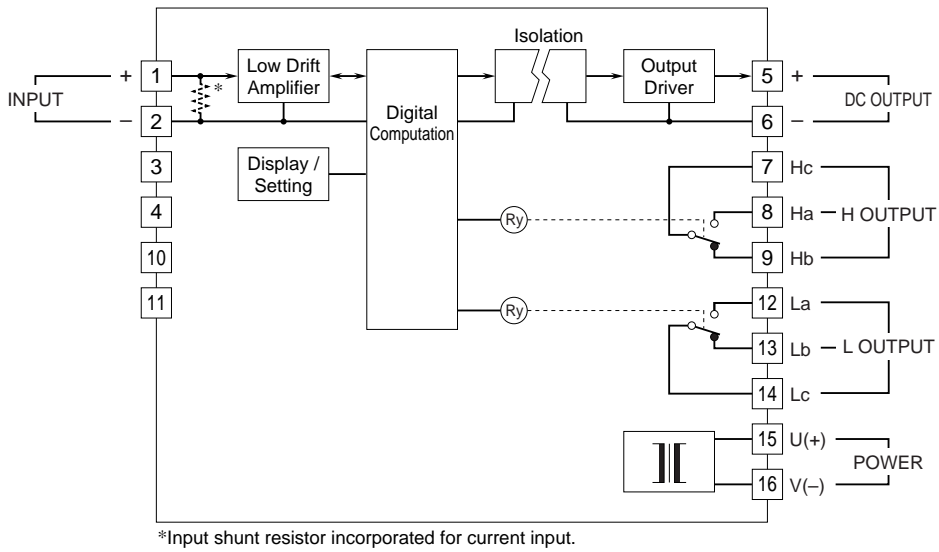
Max. operating voltage 300V

Input to alarm output to power,

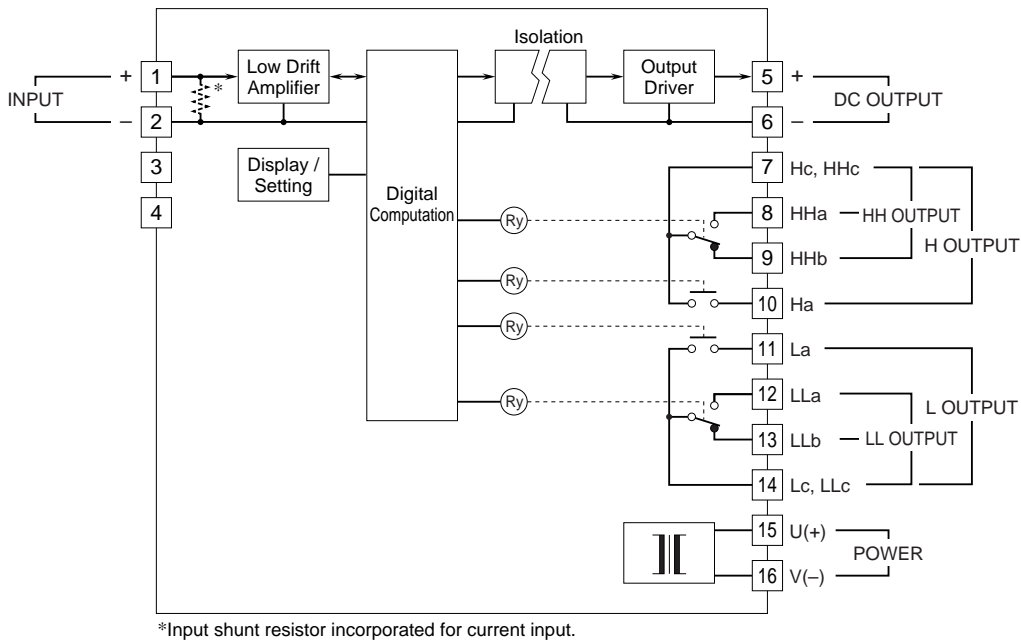
DC output to power – Reinforced insulation

SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM

■ALARM SUFFIX CODE 2: 2 points

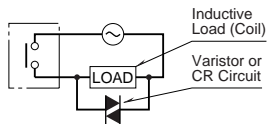


■ALARM SUFFIX CODE 4: 4 points

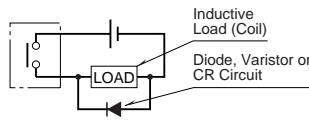


■Relay Protection

•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 —	-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 —
	0.5 —	-100 —
	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 —
	0.3 —	-0.8 —
	0.0 —	

•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 —
	2 —	-100 —
	1.5 —	-150 —
	1 —	-200 —
	0.5 —	-250 —
	0 —	

•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)

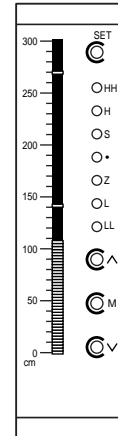
Minimum Divisions	Maximum Divisions	Bipolar Scale
550	10.9	0.5
500	10.0	0.4
	9.0	0.3
400	8.0	0.2
	7.0	0.1
300	6.0	0
	5.0	-0.1
200	4.0	-0.2
	3.0	-0.3
100	2.0	-0.4
	1.0	-0.4
0	0.0	-0.5

[Example] : Bargraph range 0 to 300 cm (Type 4)

- Left scale range: 0 – 300

- Left scale unit (bargraph): cm

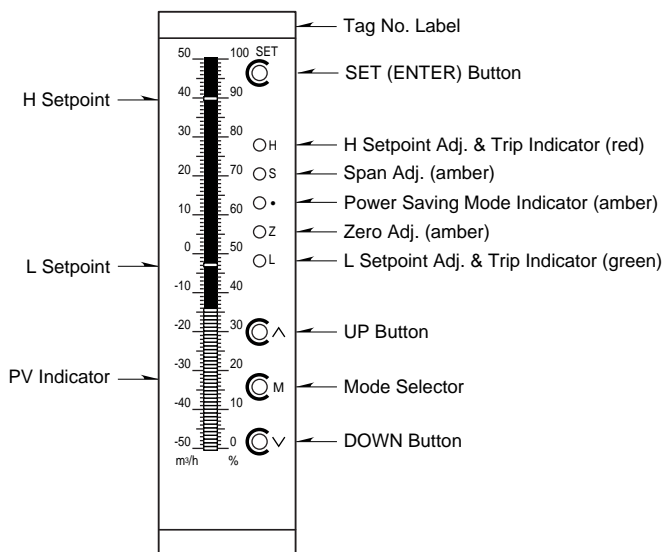
- Right scale: None



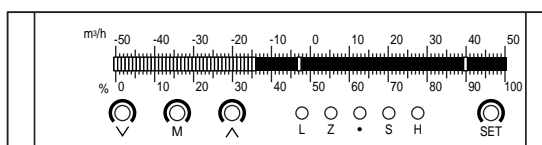
FRONT PANEL CONFIGURATION

ALARM SUFFIX CODE 2: 2 points

Vertical Mounting

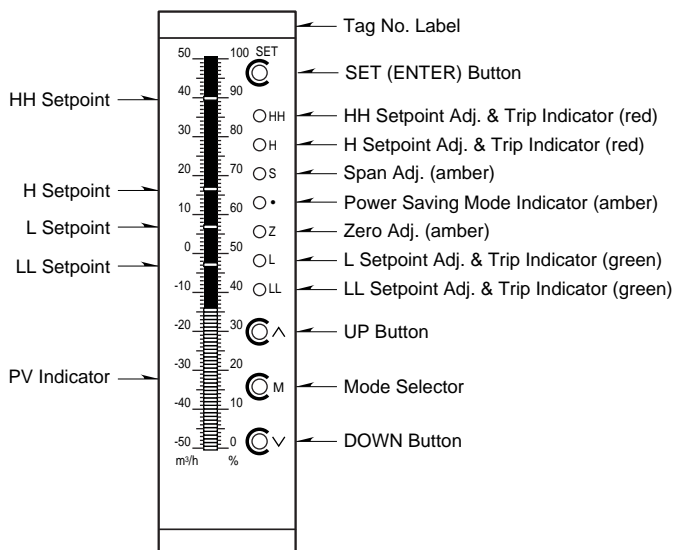


Horizontal Mounting

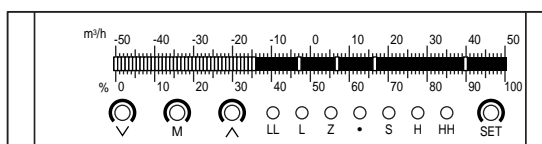


ALARM SUFFIX CODE 4: 4 points

Vertical Mounting

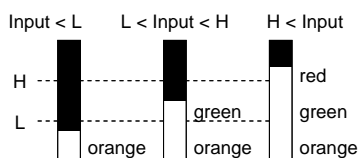


Horizontal Mounting

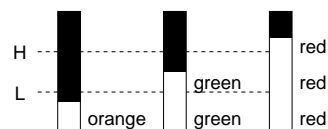


Bar Color Patterns

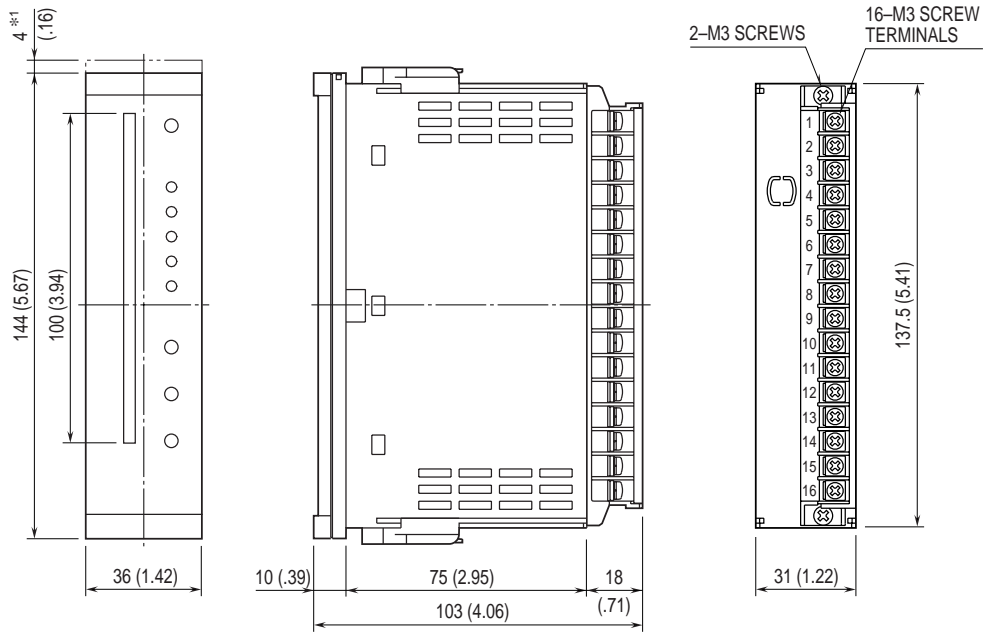
Pattern 1 (model suffix code 1)



Pattern 2 (model suffix code 2)



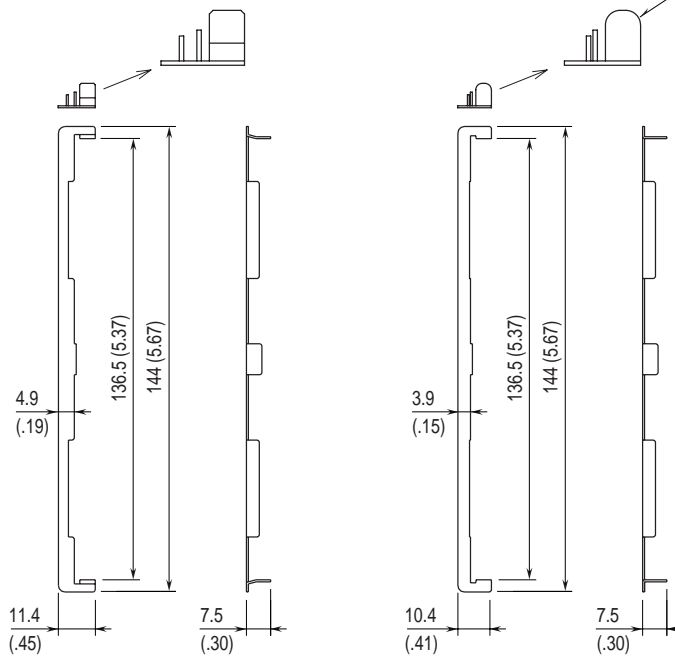
EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENT mm (inch)



■ STANDARD BEZEL *2

■ OPTION /D BEZEL *3

Rounded corners for the option /D

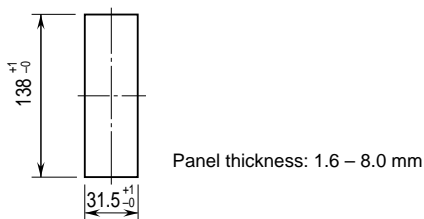


- *1. Space required when replacing the scale plate.
- *2. Used for the existing panel cutout of M-System 48 Series (38 × 139.5 mm).
- *3. Used for the existing DIN panel cutout (33 × 138 mm)

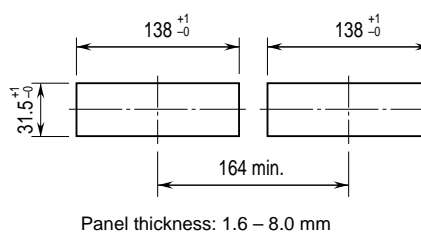
PANEL CUTOUT unit: mm

■ SINGLE MOUNTING (ingress protection)

• Vertical Mounting

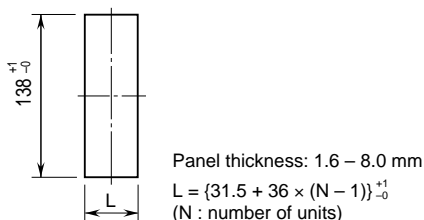


• Horizontal Mounting

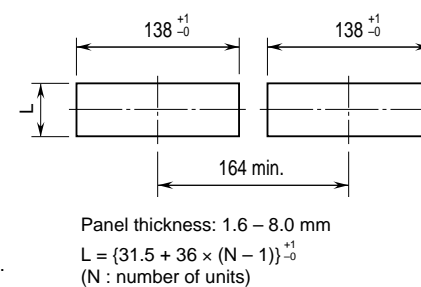


■ CLUSTERED MOUNTING (no ingress protection)

• Vertical Mounting



• Horizontal Mounting



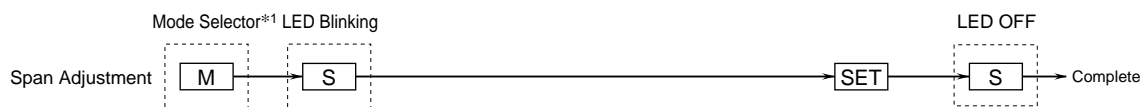
Note 1. Observe at the minimum of 3 cm above and below the units for heat dissipation.
 Note 2. No bezel is needed when the panel is cut according to the above drawings.

ADJUSTMENT PROCEDURE

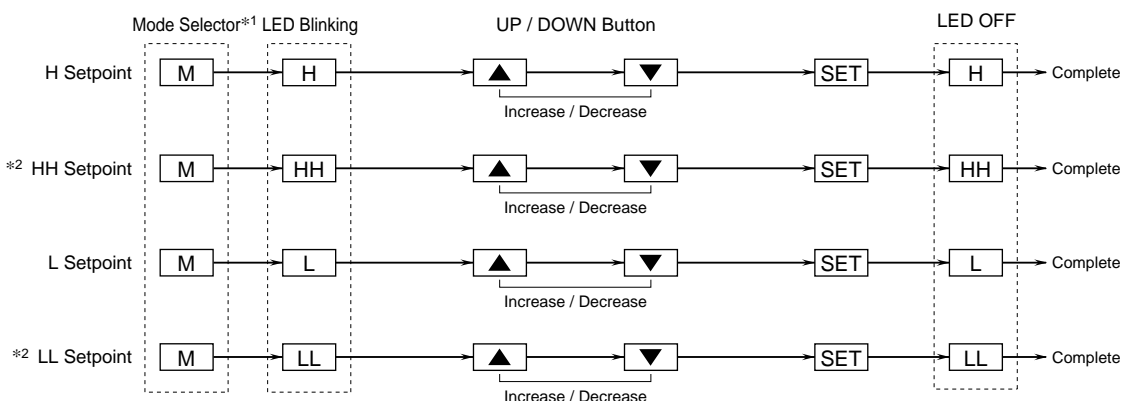
■ ZERO ADJUSTMENT: Apply 0% input signal before adjustment.



■ SPAN ADJUSTMENT: Apply 100% input signal before adjustment.



■ ALARM SETTING: Proceed after the zero / span adjustments.



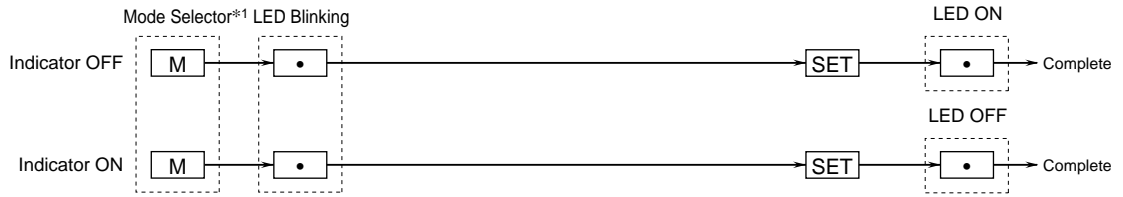
*1. Keep pressing at least for 3 seconds to activate Mode Selector M. Press briefly for second and more times within 1 minute after it has been activated.

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

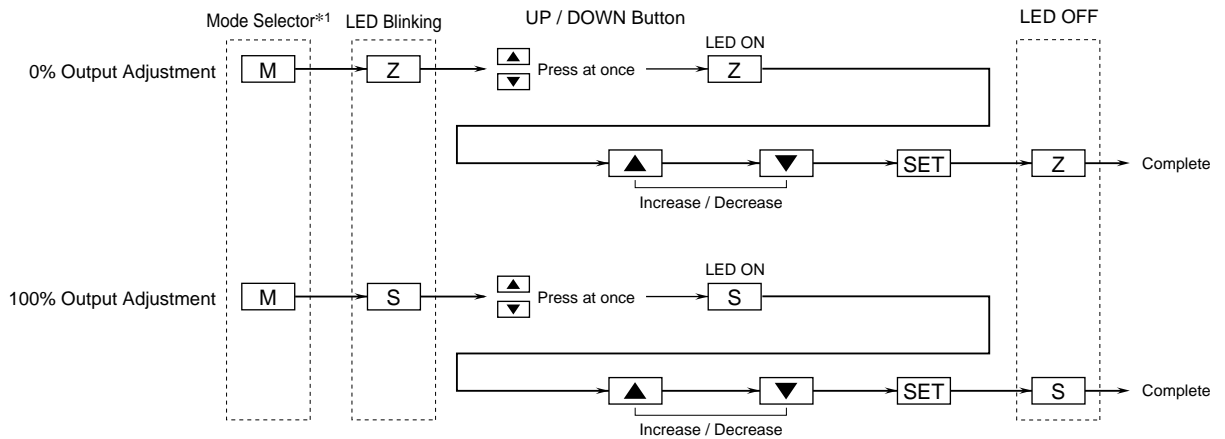
Each setting sequence is complete only when SET button is pressed. Once set, parameters are not lost even after the power is removed.

ADJUSTMENT PROCEDURE

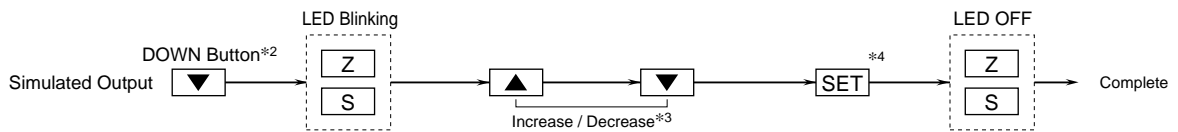
■ POWER SAVING MODE



■ 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. Keep pressing DOWN button at least for 5 seconds to enter the simulated output mode.

*3. Pressing UP or DOWN key simulates the output between 0 and 100%. The bargraph shows the simulated output.

*4. 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, except for the power saving mode. The power saving mode is automatically cancelled when the power is reset.