M·SYSTEM CO., LTD.

Bargraph Indicators *48 Series*

BARGRAPH INDICATING ALARM
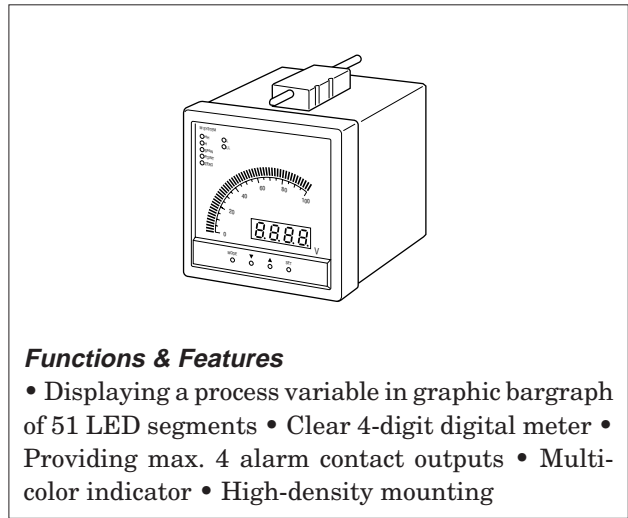### (with 4-digit digital meter)

MODEL **49AV2**

MODEL & SUFFIX CODE SELECTION

49AV2–☐W1☐–☐

MODEL
ALARM OUTPUT
0 : None
2 : 2 points
4 : 4 points
LED COLOR
W : Multi-color (red, orange and green)
DIGITAL METER
1 : With
INPUT

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

*0% input must be 0mA or 0V.

POWER INPUT
M : 85 – 264V AC
R : 24V DC

ORDERING INFORMATION

Specify code number and variables. Use Ordering Information Sheet (No. ESU-9333). Factory default setting will be used unless otherwise specified.
• **Code number** (e.g. 49AV2-4W1A-R)
• **Special input range** (For codes Z & 0)
• **Digital meter scale** (e.g. 0 – 150.0)

GENERAL SPECIFICATIONS

Construction: panel flush mounting
Connection: M4 screw terminals
Material
   Housing: ABS resin
   Scale plate: aluminium (white scale & characters on black base)
Bargraph
   LED: 51 segments
   Scale: 0 – 100%
   Scale length: 89 mm (3.50") long, angle 120°

Functions & Features
• Displaying a process variable in graphic bargraph of 51 LED segments • Clear 4-digit digital meter • Providing max. 4 alarm contact outputs • Multi-color indicator • High-density mounting

Digital display
   LED: 10 mm (.39"), red
   Number of digits: 4 digits
   Range: -1999 to 0 to 9999 (3 significant digits)
   Minimum span: 120 (3 digits; disregard the decimal point)
   Decimal point position: field-selectable
   Factory default setting: 0 to 100.0
   Read rate: 12.5/s
   Number of samples for moving average: 4 (1, 2, 8 or 16 optional)
Engineering unit: standard unit label sheet* is included in the the product package.
H & L alarm output delay: 0 seconds (1 to 15 seconds by 1 sec. increments optional)
Zero & span adjustments: ±10%
Setpoint adjustment

49AV2-2:	H	[L setpoint] to 100%
	L	0 to [H setpoint]
49AV2-4:	HH	[H setpoint] to 100%
	H	[L setpoint] to [HH setpoint]
	L	[LL setpoint] to [H setpoint]
	LL	0 to [L setpoint]

Isolation: input to alarm output to power

*Standard Engineering Unit: %, m, N/m², m³/h, mm, °C, Pa, A, pH, m³, Nm³/h, t/h, l/h, kg/h, kPa, abs, ppm, psi, kg/cm²G, N/cm², lb/h, J, kJ, Nl, lbs, Ω, μΩ, 1°, km³/h, Sm³

INPUT & OUTPUT

■**INPUT**

•**DC Current**: 0 – 50mA DC; input resistor incorporated (2W)

Minimum span: 1mA

Input resistance

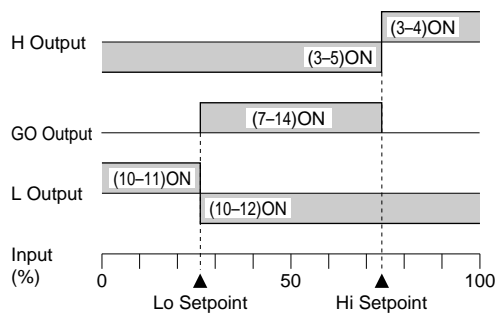| Input	Input Resistance
4 – 20mA	: 10 (Ω)
0 – 20mA	: 10
0 – 1mA	: 200

•**DC Voltage**: 0 – 10V DC

Minimum span: 1V
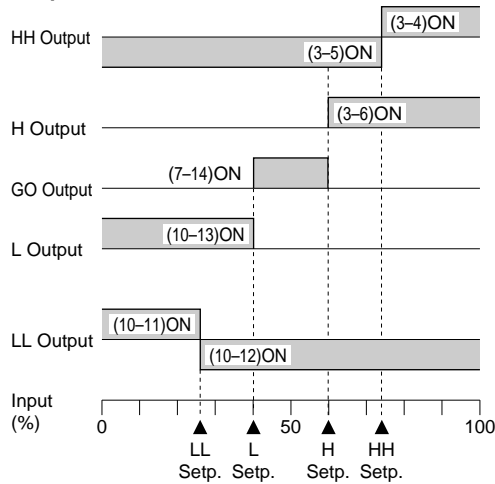
Input resistance: 1MΩ

■**ALARM OUTPUT**

Alarm Trip Operation Terminal No. in parentheses

•**Output Code : 2**

•**Output Code : 4**

Trip Operation in Power Failure
: terminals 3 – 5, 10 – 12 turn ON

Memory compensation in power failure: setpoint data are stored in non-volatile memory.

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

Maximum switching voltage: 300V AC or 50V DC

Maximum switching power: 750VA or 90W

Minimum load: 5V DC @100mA

Mechanical life: ≥2×10^7 cycles (rate 300/min.)

INSTALLATION

Power input

AC: operational voltage range 85 – 264V, 50/60 Hz, approx. 7VA

DC: operational voltage range 24V ±15%, approx. 6W
(ripple 10% p-p max.)

Operating temperature: 0 to 45°C (32 to 113°F)

Operating humidity: 40 to 80% RH (non-condensing)

Mounting: panel flush mounting

Dimensions: W96×H96×D116 mm (3.78"×3.78"×4.61")

Weight: 500 g (1.10 lbs)

PERFORMANCE in percentage of span

Accuracy
Bargraph: ±2%
Digital meter: ±0.5%

Setpoint accuracy
Bargraph: ±2%
Digital meter: ±0.5%

Response time: 0.5 second

Insulation resistance: ≥10MΩ with 500V DC (input to alarm output to power to ground)

Dielectric strength: 2000V AC @1 minute
(input to power, input or alarm output or power to ground)
1500V AC @1 minute (input to alarm output, power to alarm output)

CONNECTION DIAGRAM

■49AV2-0

```
        ┌─ + │1│    │8│ U(+) ─┐
INPUT ──┤                      ├── POWER
        └─ − │2│    │9│ V(−) ─┘
```
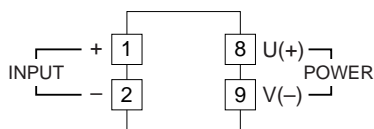
■Relay Protection
•AC Powered

Inductive Load (Coil)
LOAD
Varistor or CR Circuit

•DC Powered

Inductive Load (Coil)
LOAD
Diode, Varistor or CR Circuit

■49AV2-2

```
        ┌─ + │1│    │8│  U(+) ─┐
INPUT ──┤                       ├── POWER
        └─ − │2│    │9│  V(−) ─┘

        Hc │3│      │10│ Lc
        Ha │4│      │11│ La
        Hb │5│      │12│ Lb

        Gc │7│
        Ga │14│
```

■49AV2-4
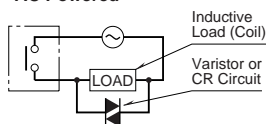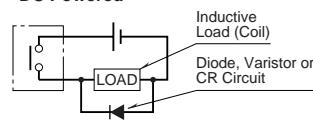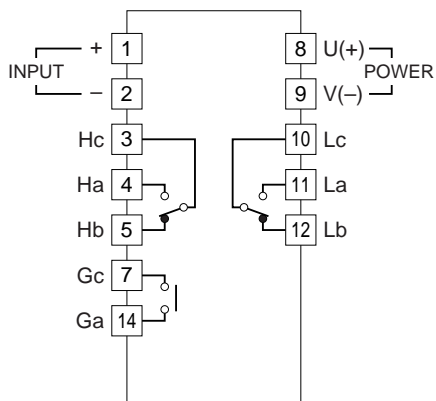
```
        ┌─ + │1│    │8│  U(+) ─┐
INPUT ──┤                       ├── POWER
        └─ − │2│    │9│  V(−) ─┘

   Hc, HHc │3│      │10│ Lc, LLc
      HHa  │4│      │11│ LLa
      HHb  │5│      │12│ LLb
       Ha  │6│      │13│ La

        Gc │7│
        Ga │14│
```
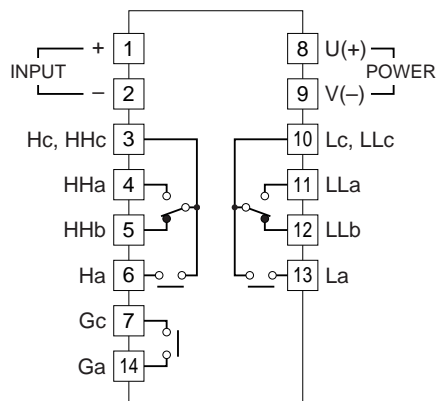
EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENT mm (inch)

14–M4 SCREW

96 (3.78)

96 (3.78)

10 (.39)

90.5 (3.56)

approx. 16 (.63)

91 (3.58)

91 (3.58)

115 (4.53)

M·SYSTEM
○HH ○L
○H   ○LL
○SPAN
○POINT
○ZERO

0 20 40 60 80 100 V

MODE ▼ ▲ SET
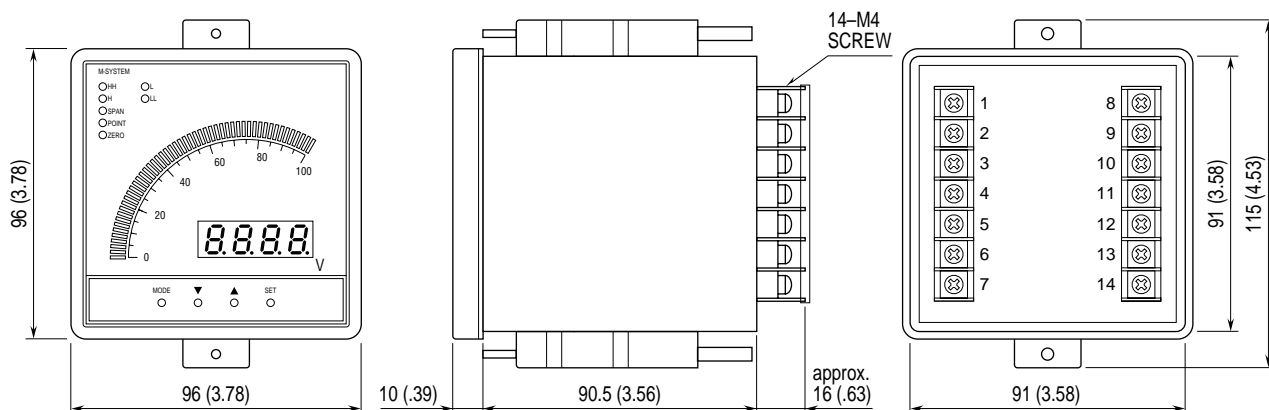
MOUNTING REQUIREMENTS mm (inch)

■PANEL CUTOUT

$L \, ^{+1}_{0}$

$92 \, ^{+1}_{0} \, (3.62)$ (3.66)
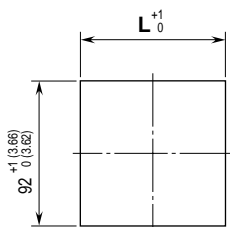
Panel thickness 1.6 – 5.5 mm
$L = 96 \times (N − 1) + 92$ (mm)
where N : number of units

FRONT PANEL CONFIGURATION

L* : Lo Setting & Indicator
LL : Lo / Lo Setting & Indicator

HH : Hi / Hi Setting & Indicator
H * : Hi Setting & Indicator
SPAN : Span Adjust. Indicator
POINT : Decimal Point Position Set. Ind.
ZERO : Zero Adjust. Indicator

Bargraph

Digital Meter

SET : Setting ENTER Button
UP : UP Button
DOWN: DOWN Button
MODE : MODE Selector
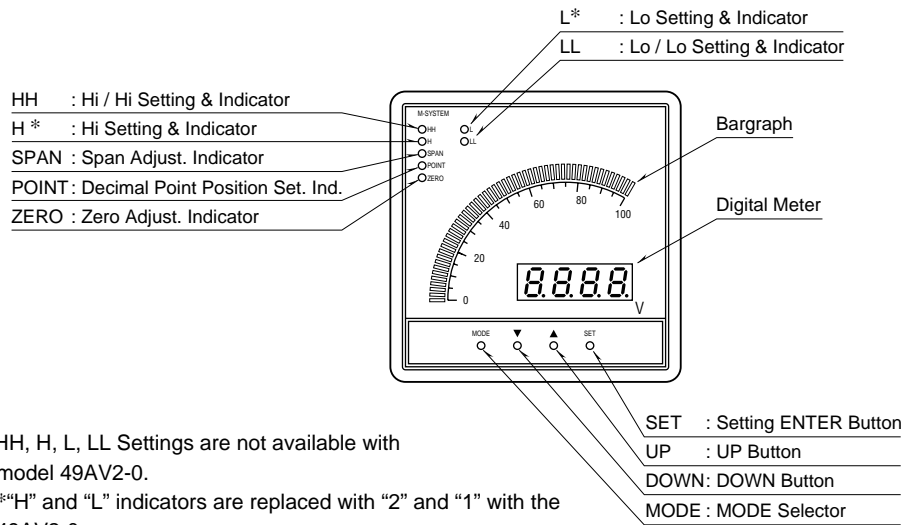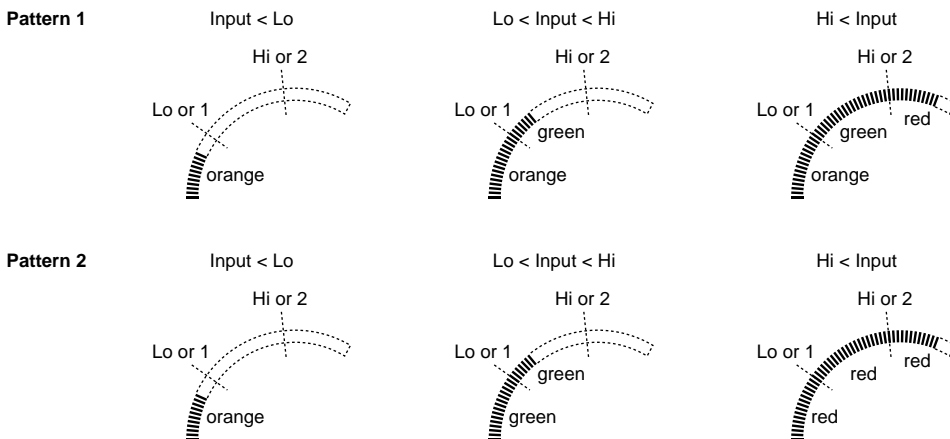
Remark 1: HH, H, L, LL Settings are not available with
model 49AV2-0.
*"H" and "L" indicators are replaced with "2" and "1" with the
49AV2-0.
"2" and "1" determine where the bargraph color changes.
Remark 2: HH, LL Settings are not available with model 49AV2-2.

Mulit-Color Indication

| Pattern 1 | Input < Lo | Lo < Input < Hi | Hi < Input |

| Pattern 2 | Input < Lo | Lo < Input < Hi | Hi < Input |

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ADJUSTMENT PROCEDURE

■ TURNING OFF DISPLAYS

Pressing DOWN key for longer than 2 seconds when the unit is not in the adjustment mode will turn the digital display off. Pressing UP key for longer than 2 seconds likewise will turn the bargraph off.

In order to return these displays on, proceed the same, or turn power supply off and on.

■ MULTI-COLOR PATTERN

Pressing UP and DOWN keys at once for longer than 2 seconds when the unit is not in the adjustment mode will switch between the Multi-Color Bargraph Pattern 1 and Pattern 2.

• Digital Zero Adjustment

1) Press MODE key once or several times until ZERO LED starts blinking.
2) Press UP or DOWN keys until the 4-digit meter shows a desired 0% value.
3) Press SET key. The setting is complete and the ZERO LED turns off.

• Decimal Point Position Adjustment

1) Press MODE key once or several times until POINT LED starts blinking.
2) Press UP or DOWN keys to move the decimal point on the digital meter.
3) Press SET key. The setting is complete and the POINT LED turns off.

• Digital Span Adjustment

1) Press MODE key once or several times until SPAN LED starts blinking.
2) Press UP or DOWN keys until the 4-digit meter shows a desired 100% value.
3) Press SET key. The setting is complete and the SPAN LED turns off.

• Low Setpoint Adjustment

*Replaced with '1' LED or '1' setpoint for the display-only type. With no alarm, this adjustment determines the position where the LED color changes.)
1) Press MODE key once or several times until L* LED starts blinking.
2) Press UP or DOWN keys until the 4-digit meter shows a desired L* setpoint.
3) Press SET key. The setting is complete and the L* LED turns off except in Low alarm state.

• LL Setpoint Adjustment (for 4-point alarm output type only)

1) Press MODE key once or several times until LL LED starts blinking.
2) Press UP or DOWN keys until the 4-digit meter shows a desired LL setpoint.
3) Press SET key. The setting is complete and the LL LED turns off except in LL alarm state.

• High Setpoint Adjustment

*Replaced with '2' LED or '2' setpoint for the display-only type. With no alarm, this adjustment determines the position where the LED color changes.)
1) Press MODE key once or several times until H* LED starts blinking.
2) Press UP or DOWN keys until the 4-digit meter shows a desired H* setpoint.
3) Press SET key. The setting is complete and the H* LED turns off except in High alarm state.

• HH Setpoint Adjustment (for 4-point alarm output type only)

1) Press MODE key once or several times until HH LED starts blinking.
2) Press UP or DOWN keys until the 4-digit meter shows a desired HH setpoint.
3) Press SET key. The setting is complete and the HH LED turns off except in HH alarm state.

• Analog/Digital Zero Adjustment (input sensitivity adjustment)

1) Apply a desired 0% input to the input terminals.
2) Press MODE key once or several times until ZERO LED starts blinking.
3) Press UP and DOWN keys at once. The ZERO LED now remains ON.
4) Press UP or DOWN keys until the 4-digit meter shows a desired 0% value.
5) Press SET key. The setting is complete and the ZERO LED turns off.

• Analog/Digital Span Adjustment (input sensitivity adjustment)

1) Apply a desired 100% input to the input terminals.
2) Press MODE key once or several times until SPAN LED starts blinking.
3) Press UP and DOWN keys at once. The SPAN LED now remains ON.
4) Press UP or DOWN keys until the 4-digit meter shows a desired 100% value.
5) Press SET key. The setting is complete and the SPAN LED turns off.

• Moving Average

The number of samples to be used for the moving average calculation can be selected among 1, 2, 4, 8 and 16.
1) Press MODE key once or several times until POINT LED starts blinking.
2) Press UP and DOWN keys at once. Now an 'A.' is shown at the left end of the 4-digit meter.
3) Press UP or DOWN keys until the 4-digit meter shows a desired number among 1, 2, 4, 8 and 16.
4) Press SET key. The setting is complete and the POINT LED turns off.

• Digital Display Read Rate

The digital display's read rate can be thinned out by one (80 msec.) to one-fifteenth (1200 msec.) against the unit's sampling rate. The bargraph read rate and the comparison rate of input signal against alarm setpoints is always 80 msec.
1) Press MODE key once or several times until POINT LED starts blinking.
2) Press UP and DOWN keys at once for twice. Now an 'r.' is shown at the left end of the 4-digit meter.
3) Press UP or DOWN keys until the 4-digit meter shows a desired number between 1 and 15. For example, setting '5' means that the digital display reading is changed once every 5 samplings; 80 msec. multiplied by 5 equals 400 msec.
4) Press SET key. The setting is complete and the POINT LED turns off.

• Digital Display for Negative Input

With this setting, you can specify either the digital display reading goes to negative or be fixed to zero for input signals below 0%.
1) Press MODE key once or several times until POINT LED starts blinking.
2) Press UP and DOWN keys at once for three times. Now an '$\overline{n}$.' is shown at the left end of the 4-digit meter.
3) Press UP or DOWN keys and choose ON or OFF shown on the 4-digit meter. The display shows negative value with ON setting, is fixed to zero with OFF setting.
4) Press SET key. The setting is complete and the POINT LED turns off.

• Bargraph Offset

The zero point on the bargraph can be shifted from the leftmost segment (0) up to the middle segment (50%) position.
1) Press MODE key once or several times until POINT LED starts blinking.
2) Press UP and DOWN keys at once for four times. Now a 'b.' is shown at the left end of the 4-digit meter.
3) Press UP or DOWN keys until the 4-digit meter shows a desired number between 0 (leftmost) and 25 (middle). One lighted segment on the bargraph indicates the selected point.
4) Press SET key. The setting is complete and the POINT LED turns off.

• Alarm Output Delay

Relay output can be turned ON with a delay after the alarm is tripped. Delay time can be specified between 0 and 15 seconds in 1-second increments, independently for each setpoint.
1) Press MODE key once or several times until the LED for the setpoint (HH, H, L, or LL) starts blinking.
2) Press UP and DOWN keys at once for twice. Now a 'c.' is shown at the left end of the 4-digit meter.
3) Press UP or DOWN keys until the 4-digit meter shows a desired number between 0 and 15 (seconds).
4) Press SET key. The setting is complete and the LED turns off except for normal alarm indicators.

• High or Low Trip

High or Low trip type can be specified for each alarm setpoint. For example, HH setpoint (High trip) can be changed to Low trip.
1) Press MODE key once or several times until the LED for the setpoint (HH, H, L, or LL) starts blinking.
2) Press UP and DOWN keys at once. Now a 'd.' is shown at the left end of the 4-digit meter.
3) Press UP or DOWN keys and choose H (High) or L (Low) shown on the 4-digit meter.
4) Press SET key. The setting is complete and the LED turns off except for normal alarm indicators.

[Remarks]
ANALOG ZERO/SPAN ARE FACTORY CALIBRATED TO APPROPRIATE STATE. THERE USUALLY IS NO NEED OF ADJUSTMENT BUT IF YOU NEED TO DO SO, BE SURE TO USE PROPER CALIBRATION EQUIPMENT.
1) Go through zero/span adjustment and digital scaling before adjusting alarm setpoints.
2) For adjusting analog zero, input 0%. For span, input 100%.
3) Alarm setpoint data are stored in memory even when the power is removed.

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