YAMATAKE **Specification**

SystempaK (Analog/Single Case)
MV/V (I) Module
Model J-SMP 50/55

Introduction

The mV/V(I) Module is a signal conversion module housed in a single case and accepts an emf of thermocouple or dc millivolt input corresponding to temperature or others being measured, and converts it into a 1 to 5V DC or 4 to 20mA DC signal.

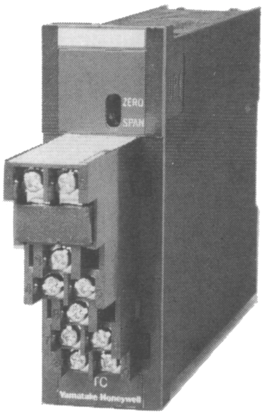
The mV/V(I) Module is available for one-output (J-SMP50) or two-output (J-SMP55) model.

The mV/V(I) Module with a linearizer (for thermocouple input) generates a linear output signal corresponding to the measured temperature by linearizing the input signal with a maximum of four line-segments.

Complete isolation is employed between the power, input, and output circuits.

Specification

Input signal: 2 to 100mV DC (span)
Suppression: −10 to +35mV DC
Input bias current:
+20nA or less (at downward burnout)
+100nA or less (at upward burnout)
Burnout signal: UP or DOWN scale
Speed; 2 minutes/FS or less
Output signal:
No.1 output; 1 to 5V DC or 4 to 20mA DC
No.2 output; 1 to 5V DC
Between No.1 and No.2 outputs is not isolated. (minus common)
Output impedance:
Voltage output; 250Ω or less (No.1 and No.2 outputs)
Current output; 250KΩ or more (No.1 output)
Load: 0 to 600Ω (current output)
Conversion accuracy (No.1 and No.2 outputs):
Obtained by adding output conversion and cold junction compensation accuracy.
Output conversion accuracy;
Without linearizer...
±0.25% FS (4mV span or more),
±10μV (Less than 4mV span, input signal equivalence)



With linearizer (including linearizer accuracy)...
- ±0.5% FS (4mV span or more),
- [±0.25%FS]+[±10μV (input signal equivalence)] (Less than 4mV span)
- ±1%FS (for R input, within 0 to 30% of the following ranges)
  0 to 800°C, 0 to 1000°C,
  0 to 1200°C, 0 to 1400°C,
  0 to 1500°C, 0 to 1600°C

Cold junction compensation accuracy: ±0.5°C
Common mode rejection ratio: 120dB (at 50Hz)
Power supply: 24V DC $^{+15}_{-10}$%
Current consumption:
Without linearizer;
120mA max. (at 24V)
With linearizer;
160mA max. (at 24V)
Ambient temperature: −5 to +55°C
Ambient humidity: 0 to 90%RH
Mounting:
Panel, Wall, DIN rail mounting
Front mask color: Black
Weight: 450g

Operating influence:
Supply voltage effect;
±0.1%FS/24V DC $^{+15}_{-10}$%
Temperature effect;
(Obtained by adding the conversion accuracy due to ambient temperature and the cold junction compensation accuracy due to ambient temperature.)
- Conversion accuracy due to ambient temperature...

$$\pm[0.2+0.1\times\left|\frac{1}{4}-\frac{\text{suppression (mV)}}{\text{span (mV)}}\right|]$$

%FS/±10°C (4mV span or more)

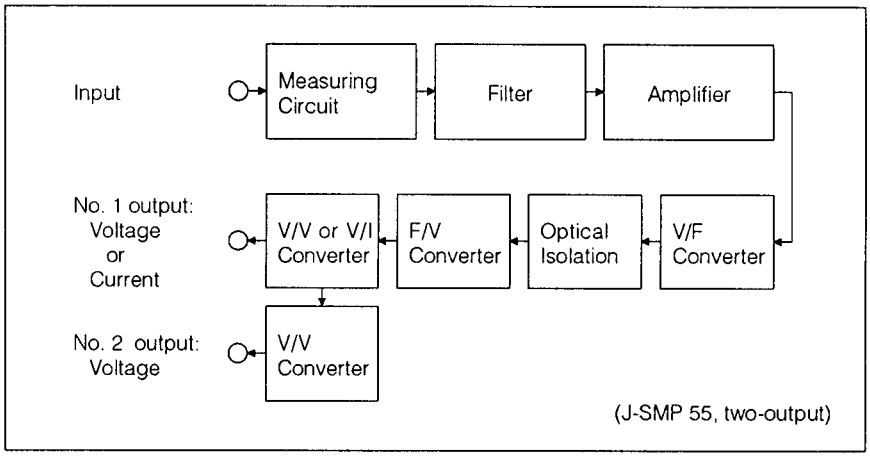
$$\pm[0.3+0.1\times\left|\frac{1}{4}-\frac{\text{suppression (mV)}}{\text{span (mV)}}\right|]$$

%FS/±10°C (Less than 4mV span)

- Cold junction compensation accuracy due to ambient temperature...
  ±0.5°C/±10°C

Theory of Operation

An input is converted into an appropriate mV (for amplification) by the Measuring circuit, and the Filter circuit removes any AC noise. The input voltage (converted into a rippleless DC voltage) is converted again into 1 to 5V DC (passing through the V/F and F/V converters) is isolated by the photocoupler and is V/V- or V/I- converted for voltage or current output.



Measuring Ranges (w/ Linearizer)

Range (°C)	T	J	K	E	R
−100 to +50	○	○	○	○	–
−100 to +100	○	○	○	○	–
−50 to +50	◎	○	A	○	×
−50 to +100	◎	○	○	○	×
−50 to +150	○	○	○	○	×
−40 to +60	A	○	A	○	×
−30 to +20	×	C	–	B	×
−30 to +30	D	B	D	A	×
−25 to +25	×	C	×	B	×
−20 to +30	×	C	×	B	×
−20 to +80	○	○	○	○	×
−20 to +100	○	○	○	○	×
−10 to +10	×	×	×	×	×
−10 to +40	×	C	E	A	×
−10 to +50	D	B	D	A	×
−10 to +90	○	○	○	○	×
0 to 10	×	×	×	×	×
0 to 20	×	×	×	×	×
0 to 30	×	×	×	×	×
0 to 50	E	○	E	B	×
0 to 70	B	○	C	○	×
0 to 100	◎	◎	○	◎	×
0 to 120	○	○	○	○	×
0 to 150	◎	◎	○	◎	×
0 to 200	◎	◎	◎	◎	×
0 to 250	○	◎	○	◎	×
0 to 300	◎	◎	◎	◎	D
0 to 400	○	◎	◎	◎	C
0 to 500	–	◎	◎	◎	B
0 to 600	–	◎	◎	◎	B
0 to 700	–	○	○	○	D
0 to 800	–	○	◎	◎	◎
0 to 1000	–	○	◎	○	◎
0 to 1200	–	○	◎	–	◎
0 to 1400	–	–	–	–	◎
0 to 1500	–	–	–	–	◎
0 to 1600	–	–	–	–	◎
0 to 1700	–	–	–	–	B

Range (°C)	T	J	K	E	R
10 to 30	×	×	×	×	×
20 to 50	×	×	×	×	×
30 to 80	E	C	E	B	×
50 to 100	D	C	Δ	B	×
50 to 150	○	○	○	○	×
100 to 150	D	C	E	A	×
100 to 200	○	◎	○	○	×
100 to 300	◎	◎	○	◎	×
100 to 500	–	○	○	◎	A
150 to 250	○	Δ	○	○	×
200 to 300	○	Δ	○	○	×
200 to 400	○	◎	○	◎	×
200 to 500	–	Δ	◎	○	B
200 to 600	–	○	○	○	○
200 to 700	–	○	◎	○	○
200 to 1000	–	○	○	○	○
250 to 350	○	Δ	○	○	×
300 to 400	○	Δ	○	○	×
300 to 500	–	○	○	○	E
300 to 600	–	◎	◎	◎	B
300 to 800	–	○	○	○	○
400 to 600	–	○	○	○	E
400 to 800	–	○	◎	○	○
400 to 1000	–	○	◎	○	○
400 to 1400	–	–	–	–	◎
400 to 1600	–	–	–	–	○
500 to 800	–	○	○	○	A
500 to 1000	–	○	◎	○	○
500 to 1500	–	–	–	–	◎
600 to 1000	–	○	○	○	○
600 to 1200	–	○	◎	–	○
600 to 1600	–	–	–	–	◎
700 to 1200	–	○	◎	–	○
700 to 1400	–	–	–	–	◎
700 to 1700	–	–	–	–	○
800 to 1200	–	○	○	–	○
800 to 1600	–	–	–	–	◎

mV Input Range (w/o Linearizer)

Range	mV
0 to 5	◎
0 to 10	◎
0 to 50	◎
0 to 100	◎

Symbol	Description	Symbol	Description
Δ	Linearizing not required Non-linearizing type used	A	Accuracy ±0.55%FS
×	Out of specified ranges	B	Accuracy ±0.60%FS
–	Out of JIS ranges	C	Accuracy ±0.65%FS
◎	Standard ranges	D	Accuracy ±0.70%FS
○	Accuracy ±0.5%FS	E	Accuracy ±0.75%FS

Model Number Table

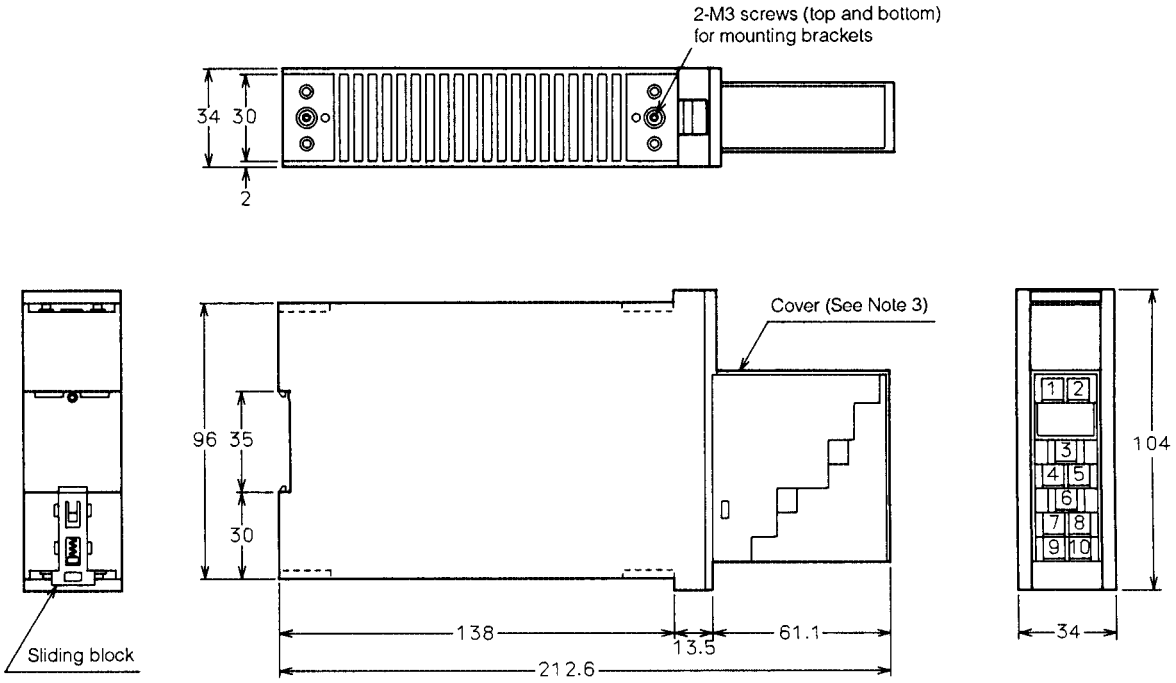
One-output module:

Basic Model Number	Selections I	Selections II	Description
J-SMP50			mV/V(I) Module
	-1		w/o Linearizer
	-2		w/ Linearizer
		1	1 to 5V DC output
		2	4 to 20mA DC output

Two-output module:

Basic Model Number	Selections I	Selections II	Description
J-SMP55			mV/V(I) Module
	-1		w/o Linearizer
	-2		w/ Linearizer
		1	No.1 output : 1 to 5V DC No.2 output : 1 to 5V DC
		2	No.1 output : 4 to 20mA DC No.2 output : 1 to 5V DC

Dimensions and Wirings



mV Input

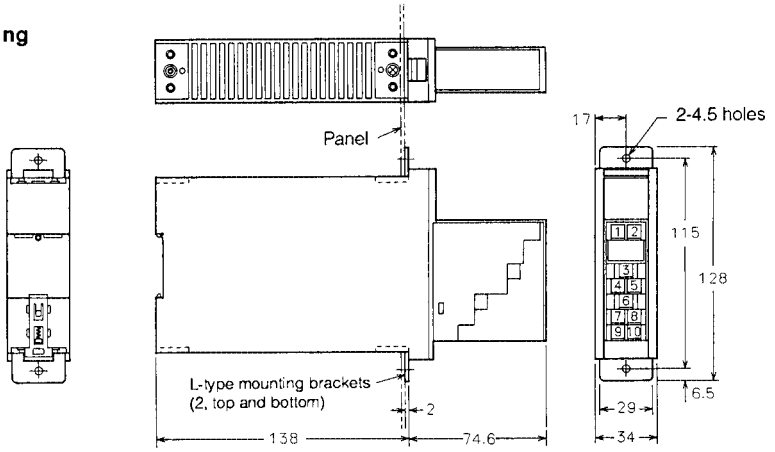
No.	Description
1	———
2	Input (–)
3	Input (+)
4	No. 1 output (+)
5	No. 1 output (–)
6	No. 2 output *1 (+)
7	No. 2 output *1 (–)
8	24V (PS+)
9	GND
10	0V (PS–)

T/C Input

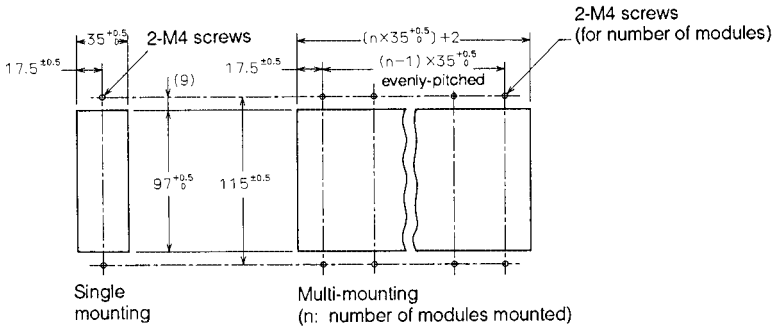
No.	Description
1*2	———
2*2	T/C Input (–)
3	T/C Input (+)
4	No. 1 output (+)
5	No. 1 output (–)
6	No. 2 output *1 (+)
7	No. 2 output *1 (–)
8	24V (PS+)
9	GND
10	0V (PS–)

*1 : For two-output model.
*2 : Used for cold junction resistor.
*3 : Operate the Module with a cover.
*4 : Terminal screws: M3.5
*5 : Use the pressured terminals with insulation sheath.

Panel-mounting

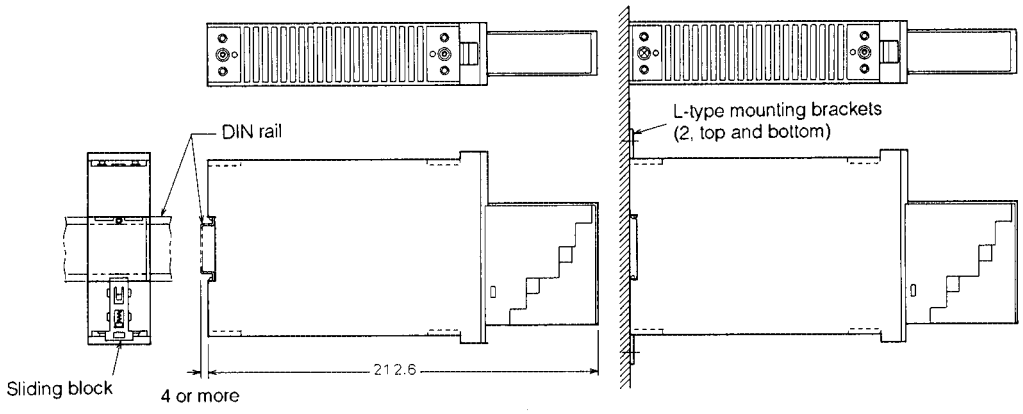


Panel-cutout

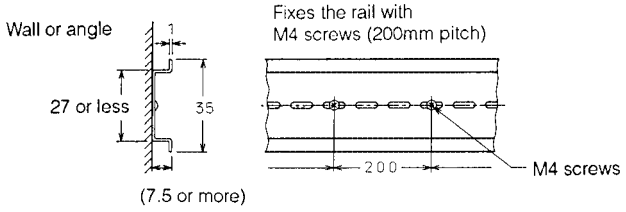


DIN rail mounting

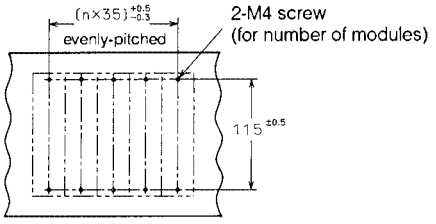
Wall-mounting



DIN rail mounting



Wall-mounting
(n: number of modules mounted)



Recommended DIN rail and end fittings Rail : DAS-4 [Toyo Giken made]
End fittings : ATO-29 [Toyo Giken made]

Specifications are subject to change without notice.

YAMATAKE

Yamatake Corporation

Totate International Building
2-12-19 Shibuya
Shibuya-ku Tokyo 150-8316
Tel : 81-3-3486-2216
Fax: 81-3-3486-2503

Yamatake-SIC Control Systems Co., Ltd.	: China	86-10-6326-9844/55
Shanghai Yamatake Jinshan Control Instruments Co., Ltd.	: China	86-21-5793-5334
Yamatake (Thailand) Co., Ltd.	: Thailand	66-2-210-0900~7
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