

2 Channel Super-mini Signal Conditioners with Display M1E-2 Series

SELF-SYNCH TRANSMITTER

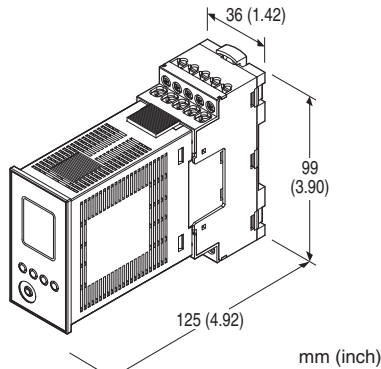
(2 channels, PC programmable)

Functions & Features

- Converts position signals from a self-synchronizing motor into a DC signal proportional to the rotating shaft position
- 2 channels
- Adjustments with the front buttons
- OEL display with good visibility
- Linearization available for each channel (111 points)

Typical Applications

- Position indicator using self-synch
- Tank gauge
- Sounding level meter



Note: The figure shows the combination of the unit and the base.

MODEL: M1EXS-2-K3[1]

ORDERING INFORMATION

- Code number: M1EXS-2-K3[1]
- Specify a code from below for [1].
(e.g. M1EXS-2-K3/Q)
- Specify the specification for option code /Q
(e.g. /C01/SET)

NO. OF CHANNELS

2: 2 channels

INPUT

Self-synch signal

OUTPUT - Field-selectable

- ◆ DC Output
- Current output: 0 - 20 mA DC
- Voltage output: -5 - +5 V DC
- Voltage output: -10 - +10 V DC

POWER INPUT

AC Power

K3: 100 - 120V AC

(Operational voltage range 85 - 132 V, 47 - 66 Hz)

[1] OPTIONS

blank: none

/Q: With options (specify the specification)

SPECIFICATIONS OF OPTION: Q (multiple selections)

COATING (For the detail, refer to our web site.)

/C01: Silicone coating

/C02: Polyurethane coating

/C03: Rubber coating

EX-FACTORY SETTING

/SET: Preset according to the Ordering Information Sheet
(No. ESU-5986)

RELATED PRODUCTS

- Installation base (model: M1E-BS2)
- M1E configurator software (model: M1ECFG)

Downloadable at our web site.

A dedicated cable is required to connect the module to the PC. Please refer to the internet software download site or the users manual (EM-5981) for the M1E configurator for applicable cable types.

GENERAL SPECIFICATIONS

Construction: Plug-in

Connection

- Connected to base with connector
- Base

M2.6 screw terminals (torque: 0.5 N·m)

Applicable solderless terminal size (M3)

Screw terminal: Nickel-plated steel

Housing material: Flame-resistant resin (black)

Isolation: Ch1.input to ch2.input to Ch1.output to ch2.output to power

Overrange output: Approx. -5 to +105 % (Not available for current output not greater than 0 mA)

Output zero fine adj. range: -5 to +5% (front button)

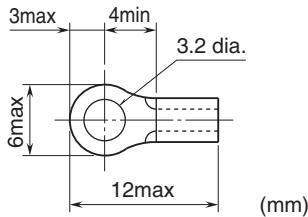
Output span fine adj. range: 95 to 105% (front button)

Configuration: Program with front buttons or Via PC.

Programmable features include: Refer to the parameter list.

Configurator connection: 2.5 dia. miniature jack;
RS-232-C level

■ Recommended solderless terminal size - M3 (unit: mm)



DISPLAY

Display functions: Displays and sets measured range, engineering unit

Display size: Approx. 15.6 × 20.8 mm (0.61" × 0.82")

Number of pixels: 68 × 95 (horizontal × vertical)

Character color: Yellow

Display life: Approx. 50000 hours

(Expected time for the Display brightness to be reduced to 50 % when the Display is used continuously with brightness setting 2 in 25 °C)

Display type: OEL display

Display digit: Negative 5 digits, positive 6 digits (-99999 to 999999)

Decimal point position: Selectable

INPUT SPECIFICATIONS

Measurement range: 0 - 359.99° (deg)

Minimum span: 60° (deg)

Input resistance: 1 MΩ min.

Rated input voltage: 30 - 90 V AC

OUTPUT SPECIFICATIONS

■ DC Current

Output range: 0 - 20 mA DC

Conformance range: 0 - 21mA DC

Minimum span: 1 mA

Load resistance: Output drive 15 V max.

(e.g. 4 - 20 mA: 750 Ω [15 V ÷ 20 mA])

(Not available to output less than 0 mA, output range may not be extended to -5 %)

■ DC Voltage

Output range: -5 - +5 V DC, -10 - +10 V DC

Conformance range: -5.5 - +5.5 V DC, -11 - +11 V DC

Minimum span: 250 mV, 1 V

Load resistance: 200 kΩ min.

INSTALLATION

Power Consumption

• AC: ≤ 7 VA

Operating temperature: -5 to +55°C (23 to 131°F)

Storage temperature: -5 to +55°C (23 to 131°F)

Operating humidity: 10 to 85 %RH (non-condensing)

Mounting: Surface or DIN rail

Weight: 120 g (0.26 lb) except base

PERFORMANCE

Accuracy: Input accuracy + output accuracy

input accuracy + (output accuracy × segment gain) when segment gain > 1

See CALCULATION EXAMPLES OF OVERALL ACCURACY.

Inversely proportional to the setting span.

Input accuracy: ±0.2 % of span or ±0.5°, whichever is greater.

Display accuracy:

Input display: Input accuracy ±1 digit

Output display: Input accuracy + output accuracy ±1 digit

Output accuracy: (% of max. output range)

0 - 20 mA: ±0.06 %

-5 - +5 V: ±0.03 %

-10 - +10 V: ±0.03 %

Temp. coefficient (% of max. I/O range): ±0.015 %/°C

(±0.008 %/°F)

Response time (filter time constant: 0 sec.): ≤ 0.5 sec.

(0 - 90 %)

Line voltage effect: ±0.1 % over voltage range

Insulation resistance: ≥ 100 MΩ with 500 V DC

Dielectric strength: 1500 V AC @ 1 minute

(Ch1 input to Ch2 input to Ch1 output to Ch2 output to power to ground)

CALCULATION EXAMPLES OF OVERALL ACCURACY

[Example] Input Span 60°, Output Range 0 - 20 mA, Output Setting 4 - 20 mA, Segment Gain 1.5

■ Overall accuracy

• Input Accuracy = Input (60°) × Input Accuracy (0.2 %) = 0.12°

0.12° < 0.5° thus

Input Accuracy = 0.5° ÷ 60° × 100 = 0.83 %

• Output Accuracy = Output Range Span (20 mA) ÷ Output Span Setting (16 mA) × 0.06 % × Segment Gain (1.5) = 0.1125 %

Overall Accuracy = 0.83 + 0.1125 = ±0.9425 %

STANDARDS & APPROVALS

EU conformity:

EMC Directive

EMI EN 61000-6-4

EMS EN 61000-6-2

Low Voltage Directive

EN 61010-1

Installation Category II

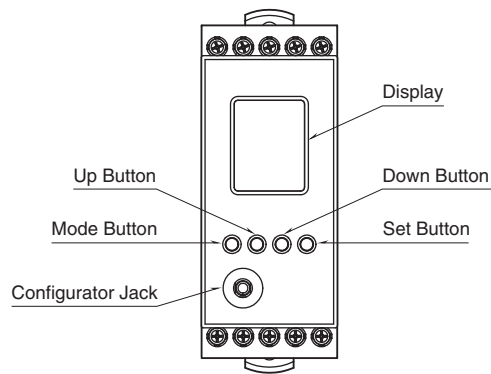
Pollution Degree 2

Input or output to power: Reinforced insulation (300 V)

Input to output: Basic insulation (300 V)

RoHS Directive

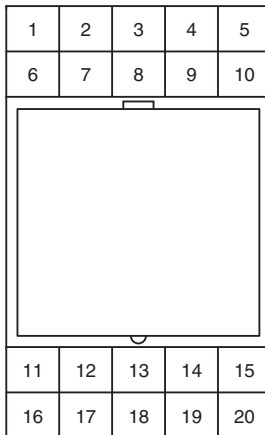
EXTERNAL VIEW



COMPONENT	FUNCTION
Display	Indicates present values, setting values and abnormal information. Two types of present values are displayed respectively at the upper and lower parts according to setting.
Mode button	Shifts from Measuring mode to each setting mode. The destination changes depending on how long the button is held down. Pressing Mode button for ≥ 2 seconds returns to Measuring mode from each setting mode..
Set button	Shifts the setting value of each setting parameter item to a setting changeable state. When at setting changeable state, used to move through the digits of setting value and to enter (save) the setting value.
Up button	Shifts through setting parameter items and to increase or select the setting value.
Down button	Shifts through setting parameter items and to decrease or select the setting value.
Configurator Jack	Used to perform configuration with M1E configurator software (model: M1ECFG). When using the software, set the Lockout setting of the unit to 'Lock'.

Refer to the operating manual (EM-5986-B) for detailed procedures.

TERMINAL ASSIGNMENTS



No.	FUNCTION	No.	FUNCTION
1	Unused	11	Ch1 Output +
2	Unused	12	Ch1 Output -
3	Ch1 Self-synch input S1	13	Unused
4	Ch1 Self-synch input S2	14	Ch2 Output +
5	Ch1 Self-synch input S3	15	Ch2 Output -
6	Unused	16	Unused
7	Unused	17	Unused
8	Ch2 Self-synch input S1	18	Unused
9	Ch2 Self-synch input S2	19	Power U
10	Ch2 Self-synch input S3	20	Power V

* Base does not come with the unit. Please order separately.

PARAMETER LIST

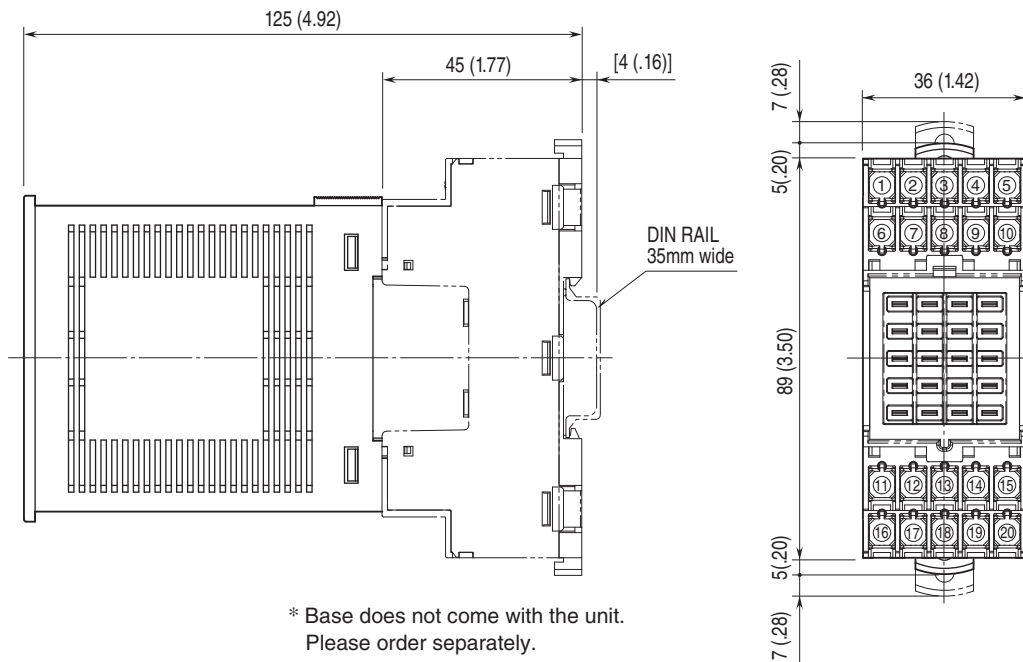
It is available to configure or confirm settings shown below by using front button. Configuring or confirming with PC is available when using M1E configurator software (model: M1ECFG).

MODE	ITEM	SETTING PARAMETER	RANGE	UNIT	INITIAL VALUE	
Ch1 Setting	01	Lockout setting	Lock / Unlock	-	Lock	
	06	Ch1 Angle offset	-	Deg.	0.00	
	07	Ch1 Angle span	60.00 – 359.99	Deg.	270.00	
	08	Ch1 Rotating direction	CW / CCW	-	CW	
	14	Ch1 0 % input scaling	-99999 – 999999	-	0.00	
	15	Ch1 100 % input scaling	-99999 – 999999	-	100.00	
	16	Ch1 Input decimal point	No decimal point The number of decimal places: 1 – 5	-	2 places of decimals	
	17	Ch1 Unit (INP Scaling)	Choose from 68 types*	-	%	
	18	Ch1 Output range	0 – 20 mA -5 – +5 V -10 – +10 V	-	0 – 20 mA	
	19	Ch1 0 % output setting	0.000 – 19.000 -5.000 – 4.750 -10.000 – 9.000	mA V V	4.000	
	20	Ch1 100 % output setting	1.000 – 20.000 -4.750 – 5.000 -9.000 – 10.000	mA V V	20.000	
	28	Ch1 Overrange output < 0 %	-5.00 – 0.00	%	-5.00	
	29	Ch1 Overrange output > 100 %	-100.00 – 105.00	%	105.00	
	79	Ch1 Filter time constant	0 – 30	sec.	0	
	82	Ch1 Output Zero fine adjust	-5.000 – 5.000	%	0.000	
	83	Ch1 Output Span fine adjust	95.000 – 105.000	%	100.000	
	89	Ch1 Loop test	-5.00 – 105.00	%	Cancel	
	Ch2 Setting	106	Ch2 Angle offset	-	Deg.	0.00
		107	Ch2 Angle span	60.00 – 359.99	Deg.	270.00
108		Ch2 Rotating direction	CW / CCW	-	CW	
114		Ch2 0 % input scaling	-99999 – 999999	-	0.00	
115		Ch2 100 % input scaling	-99999 – 999999	-	100.00	
116		Ch2 Input decimal point	No decimal point The number of decimal places: 1 – 5	-	2 places of decimals	
117		Ch2 Unit (INP Scaling)	Choose from 68 types*	-	%	
118		Ch2 Output range	0 – 20 mA -5 – +5 V -10 – +10 V	-	0 – 20 mA	
119		Ch2 0 % output setting	0.000 – 19.000 -5.000 – 4.750 -10.000 – 9.000	mA V V	4.000	
120		Ch2 100 % output setting	1.000 – 20.000 -4.750 – 5.000 -9.000 – 10.000	mA V V	20.000	
128		Ch2 Overrange output < 0 %	-5.00 – 0.00	%	-5.00	
129		Ch2 Overrange output > 100 %	-100.00 – 105.00	%	105.00	
179		Ch2 Filter time constant	0 – 30	sec.	0	
182		Ch2 Output Zero fine adjust	-5.000 – 5.000	%	0.000	
183		Ch2 Output Span fine adjust	95.000 – 105.000	%	100.000	
189		Ch2 Loop test	-5.00 – 105.00	%	Cancel	
01		Lockout setting	Lock / Unlock	-	Lock	

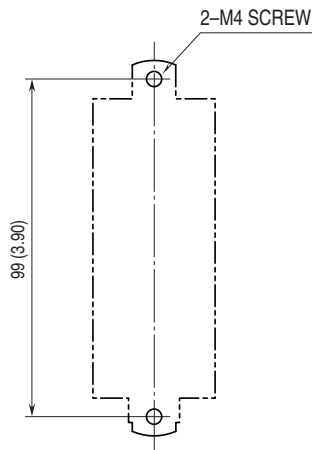
MODE	ITEM	SETTING PARAMETER	RANGE	UNIT	INITIAL VALUE
Advanced	201	Display setting	Upper: choose from 8 types* Lower: choose from 9 types*	–	Upper: Ch1 INPUT Lower: Ch2 INPUT
	202	Channel enable	Choose from 3 types*	–	Ch1 enable Ch2 enable
	203	Brightness	1 (darkest) – 4 (brightest)	–	4
	204	Display timeout	0 (always on), 1 – 60	min.	10
	205	Reset all settings	OFF / RESET	–	OFF
	206	Version indication	–	–	–
Ch1 Linearization	01	Lockout setting	Lock / Unlock	–	Lock
	210	Ch1 User's table linearization	Disable / Enable	–	Disable
	276	Ch1 Number of points	2 – 111	–	2
	277 – 498	Ch1 Table	-5.00 – 105.00	%	X001 -5.00 Y001 -5.00 X002 105.00 Y002 105.00
Ch2 Linearization	01	Lockout setting	Lock / Unlock	–	Lock
	510	Ch2 User's table linearization	Disable / Enable	–	Disable
	576	Ch2 Number of points	2 – 111	–	2
	577 – 798	Ch2 Table	-5.00 – 105.00	%	X001 -5.00 Y001 -5.00 X002 105.00 Y002 105.00
	01	Lockout setting	Lock / Unlock	–	Lock

* For detailed types, refer to the operating manual (EM-5986-B).

EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm [inch]

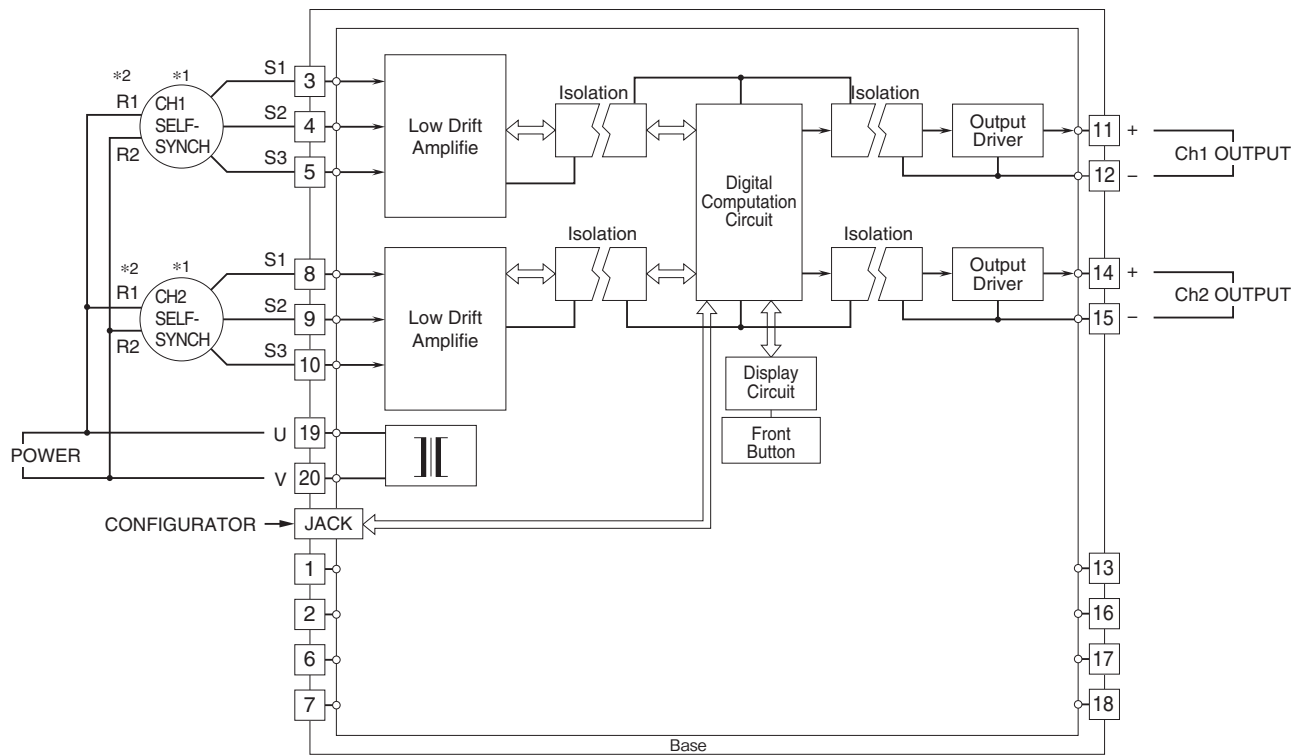


MOUNTING REQUIREMENTS unit: mm [inch]



* Mounting requirements for base.

SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



*1. The input engineering unit value increases when the self-synch rotates clockwise. For changing the operation to counterclockwise and increase, set the ITEM 08, 108 'Rotating direction' to CCW.

*2. The power input of the unit has polarity. Be sure that the connection for R1 and R2 of the self-synch.



Specifications are subject to change without notice.