

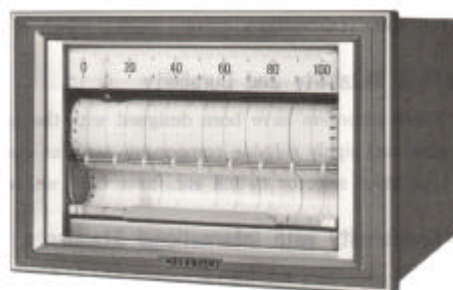
EX SERIES ELECTRONIC RECORDER



MODEL EA□OO-□□
 EA2P00 (2-pen recorder)
 EA3P000 (3-pen recorder)
 EA4P0000 (4-pen recorder)

The EA series electronic self-balancing instruments using a 250mm fan-fold recording chart comprise recorders, alarms, and controllers. Their recording types are 1-pen, 2-pen, 3-pen, and 4-pen recording, 2, 3, 6, and 12-dot recording, and 24-dot recording with a select-off function.

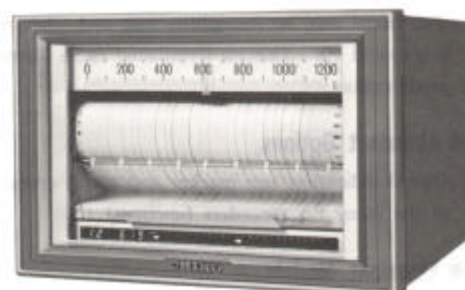
These instruments can precisely record DC voltage, DC current, thermocouple temperature, resistance thermometer temperature, thermistor temperature, and other various industrial variables as measured inputs.



MODEL EA200-12

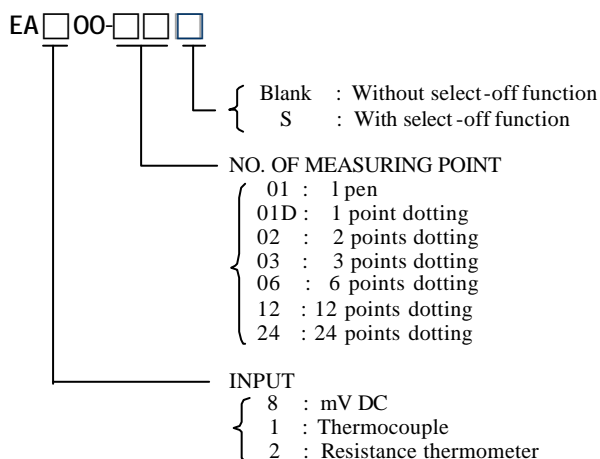


MODEL EA3P000



MODEL EA100-24S

MODEL



EA2P00 (2-pen recorder)

EA3P000 (3-pen recorder)

EA4P0000 (4-pen recorder)

■ FEATURES

- **High Accuracy $\pm 0.25\%$**

The latest electronics techniques and high-reliability design have successfully realized the indicating accuracy of $\pm 0.25\%$ of full scale (DC voltage, current input), which is the highest in industrial recorders.

- **High Reliability and Durability**

These recorders have been designed with the aim of achieving freedom from routine maintenance so far as possible. Durable and highly reliable components such as conductive plastic balancing potentiometers, brushless DC servomotor, reed type input selector switch etc., have been utilised.

- **Conformity with International Standards**

These recorders are high-accuracy and high-reliability international products, conforming with the applicable IEC and ANSI standards.

- **Linearized Temperature Scale**

All temperature inputs from thermocouples, resistance thermometers and other sensors are linearized by the built-in high-accuracy linearizer circuit.

- **Durable Structure and Easy Operation**

These recorders feature a durable structure having a diecast door, diecast chassis and a steel case, capable of coping with harsh industrial environments, and all switches and controls are arranged on the front panel to ensure easy operation.

- **Speedy Pen Response and Clear Recording**

Continuous record instruments have a pen response speed of about 1000mm/sec (max.). A cartridge pen which provides a very clear trace features easy replacement and freedom from interruption of ink flow, even when recording rapidly fluctuating phenomena.

- **Modular Unit Design Aids Servicing**

The range unit, servoamplifier unit and other modules are grouped according to function around mother boards and signals are routed via connector-terminated cable looms. This arrangement ensures high reliability and enables rapid checking or modification.

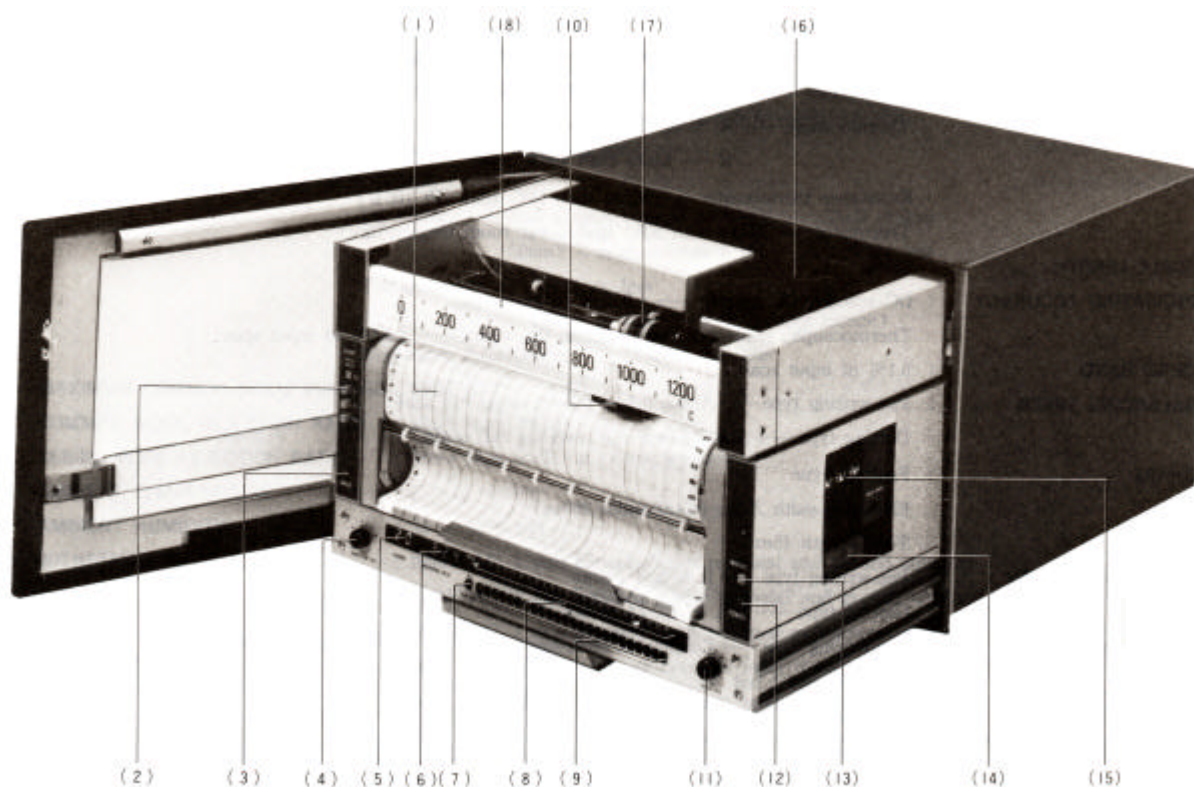
- **Abundant Options**

Digital indication, pen marker and alarm contacts are just three of a large number of options which allow full deployment of the many EA recorders functions.

- **Abundant Models**

In addition to recorders, EA series products comprise two kinds of high-limit or low-limit type and high-limit/low-limit type recording alarms and multi-pen recording controllers.

■ CONSTRUCTION (Model EA100-24S)



- | | |
|---------------------------------------|---------------------------------------|
| (1) CHART | (10) POINTER |
| (2) CHART SPEED SETTING SWITCH | (11) DOTTING INTERVAL SELECTOR SWITCH |
| (3) CHART DRIVE SWITCH | (12) POWER SWITCH |
| (4) PRINTING INTERVAL SELECTOR SWITCH | (13) INDICATION SWITCH |
| (5) MEASURING POINT INDICATION | (14) FUSE |
| (6) DIGITAL INDICATOR (option) | (15) CHECK TERMINAL |
| (7) HOLD SWITCH | (16) MULTIPOINT INPUT SELECTOR |
| (8) MEASURING POINT INDICATOR LAMP | (17) INK PAD |
| (9) SELECT-OFF SWITCH | (18) SCALE PLATE |

■ GENERAL SPECIFICATIONS

| | |
|---|---|
| OPERATION SYSTEM | : Self-balancing system |
| INPUT | : DC voltage — More than 4mV DC span, less than 100V DC span DC current — More than 10 μ A DC span, less than 50mA DC span Thermocouple — K, J, E, T..... More than 100°C span R..... More than 400°C span Resistance thermometer — More than 50°C span (Pt 100 Ω) Thermistor — More than 50°C span (near room temperature) |
| SCALE LENGTH | : 250mm |
| INDICATING ACCURACY | : DC voltage, DC current — $\pm 0.25\%$ of input span Thermocouple, resistance thermometer, thermistors — $\pm 0.5\%$ of input span |
| DEAD BAND | : 0.1% of input span |
| BALANCING SPEED | : Pen-writing type — About 0.3sec for traveling full scale Dotting type — About 0.5sec for traveling full scale |
| CHART | : Fanfold type Effective width 250mm (total width 280mm) Total length 15m |
| RECORDING POINTS | : Pen-writing type — 1, 2, 3, 4 points Dotting type — 2, 3, 6, 12, 24 points |
| RECORDING SYSTEM | : Pen-writing type — Continuous recording at 1, 2, 3, 4 points using cartridge pens 1st pen : red 2nd pen : green 3rd pen : blue 4th pen : brown Dotting type — Dotting recording at 2, 3, 6, 12, 24 points using colored ink pad at each point dotting colors 2 points — 1: red, 2: black 3 points — 1: red, 2: black, 3: sky blue 6 points — 1: red, 2: black, 3: sky blue, 4: green, 5: brown, 6: purple 12 points — 1: red, 2: black, 3: sky blue, 4: green, 5: brown, 6: purple 7: orange, 8: gray, 9: blue, 10: brownish green, 11: scarlette, 12: violet 24 points — Repetition of 12 points and 1~24 numerical printing |
| CHART SPEED | : 15, 30, 60mm/h and Fast (600mm/min) |
| DOTTING INTERVAL | : 2 to 12 dotting type — 6sec (50Hz) or 5sec (60Hz) 24 dotting type — 1, 2, 5, 10, 30, 60 sec, 6-step selection |
| RECORDING PEN INTERVAL (MULTI PEN TYPE) | : About 5mm |
| PEN LIFT (PEN-WRITING TYPE) | : All pens are lifted manually at the same time. |
| POWER SUPPLY | : 100, 110, 120, 200, 220, 240VAC, 50/60Hz |
| ALLOWABLE VOLTAGE FLUCTUATION | : (+)10 to (-)10% of rated value |

| | |
|------------------------------------|---|
| INPUT RESISTANCE | : DC voltage $4\text{mV} \leq \text{span voltage} \leq 500\text{mV}$ — about $8\text{M}\Omega$ $500\text{mV} < \text{span voltage} \leq 100\text{V}$ — about 10Ω , constant DC current $10\mu\text{A} \leq \text{span current} \leq 200\mu\text{A}$ — about 500Ω $200\mu\text{A} \leq \text{span current} \leq 50\text{mA}$ — about 10Ω Thermocouple — about $8\text{M}\Omega$ |
| ALLOWABLE SIGNAL SOURCE RESISTANCE | : DC voltage — $4\text{mV} \leq \text{span voltage} \leq 500\text{mV}$ — $10\text{k}\Omega$ or less $500\text{mV} < \text{span voltage} \leq 100\text{V}$ — $1\text{k}\Omega$ or less Thermocouple — $10\text{k}\Omega$ or less (150 Ω or less — with burnout circuit) Resistance thermometer — 10Ω or less/line |
| MAXIMUM COMMON MODE VOLTAGE | : 250V AC |
| COMMON MODE REJECTION RATIO | : More than 160dB |
| SERIES MODE REJECTION RATIO | : More than 50dB (at power frequency) |
| AMBIENT TEMPERATURE | : (-) 10 to 50°C |
| AMBIENT HUMIDITY | : 30 to 90% RH |
| WITHSTAND VOLTAGE | : 1000V AC, 1 mm between input terminal and ground terminal 1500V AC, 1 mm between power terminal and ground terminal 1000V AC, 1 mm between input terminal and power terminal |
| INSULATION RESISTANCE | : 500V DC, 100M Ω or more between input terminal and ground terminal 500V DC, 100M Ω or more between power terminal and ground terminal 500V DC, 100M Ω or more between input terminal and power terminal |
| ILLUMINATION | : Cold cathode discharge tube |
| POWER CONSUMPTION | : 1-pen type — about 11VA, max. about 20VA 2-pen type — about 15VA, max. about 34VA 3-pen type — about 19VA, max. about 48VA 4-pen type — about 23VA, max. about 62VA Dotting type (2 to 12P) — about 20VA 24-point — about 27VA |
| CASING | : Front door — Diecast aluminum Case — Steel plate |
| COATING | : Door — Gray Case — Gray |
| MOUNTING | : Flush panelmount |
| WEIGHT | : 1-pen type — about 16.5kg 2-pen type — about 18kg 3-pen type — about 19.5kg 4-pen type — about 21kg Dotting type (2 to 12P) — about 17.5kg 24-point — about 21kg |

● Specifications for 24-Point Recorder with Select-off Function

NO. OF MEASURING POINTS : 24 points

MEASURING POINT DISPLAY : 1 to 24 LED red lamp display and LED numeral display

RECORDING SYSTEM : 24-point 12 - color ink pad dotting and
24- point numeral printing at each point

DOTTING INTERVAL : 1, 2, 5, 10, 30, 60 sec, 6- step selection

PRINTING INTERVAL : Every dot, spaced at 25, 49, 97, 193 dotting intervals, and no-numeral; 6-step selection

■ STANDARD SCALE

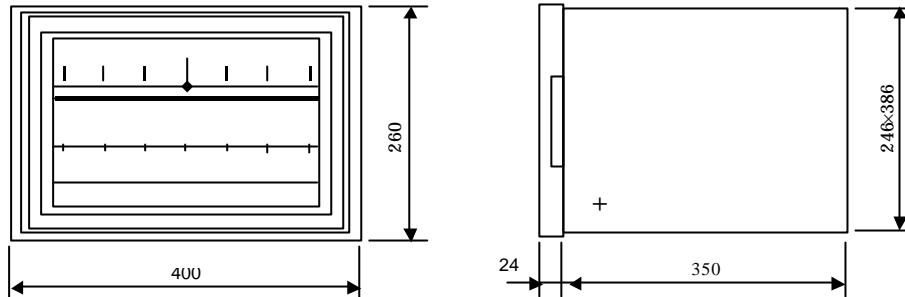
| Input | | Standard scale (°C) |
|-----------------------------------|---|---|
| Thermocouple | R | 0 to 1600(10), 0 to 1400(10), 0 to 1200(10), 800 to 1600(5), 400 to 1600(10) |
| | K | 0 to 1200(10), 0 to 1000(10), 0 to 800(5), 0 to 600(5), 0 to 500(5), 0 to 400(2), 0 to 300(2), 0 to 250(2), 0 to 200(2), 500 to 1200(5), 100 to 250(1) |
| | T | 0 to 300(2), 0 to 250(2), 0 to 200(2), 0 to 150(1) (-)50 to 150(2), (-)50 to 100(1) |
| | J | 0 to 600(5), 0 to 500(5), 0 to 400(2), 0 to 350(2), 0 to 300(2), 0 to 200(2) |
| | E | 0 to 300(2), 0 to 200(2), 0 to 150(1), (-)50 to 100(1) |
| Resistance thermometer Pt 100Ω | | 0 to 500(5), 0 to 400(2), 0 to 300(2), 0 to 250(2), 0 to 200(2), 0 to 150(1), 0 to 100(1), 0 to 50(0.5) 50 to 150(2), 50 to 100(0.5) (-)30 to 70(1), (-)50 to 150(2), (-)40 to 80(1), (-)20 to 80(1), (-)20 to 30(0.5), (-)50 to 50(1), (-)50 to 100(1), (-)100 to 50(1) |
| MV | | 0 to 5mV(0.05), 0 to 10mV(0.1), 0 to 20mV(0.2), 0 to 50mV(0.5), 0 to 100mV(1), 0 to 1V(0.01V) 1 to 5V(0.05V) (-)1 to 1V(0.02V), (-)50 to 50mV(1), (-)10 to 10mV(0.2), (-)5 to 5mV(0.1) |
| mA | | 0 to 10μA(0.1μA), 0 to 20μA(0.2μA), 0 to 50μA(0.5μA), 0 to 100μA(1μA), 0 to 200μA(2μA), 0 to 500 μA(5μA) 0 to 1mA(0.01), 0 to 2mA(0.02), 0 to 5mA(0.05), 0 to 10mA(0.1), 0 to 20mA(0.2) 0 to 50mA(0.5), 4 to 20mA(0.2) |

() shows 1 graduation.

■ OPTIONS

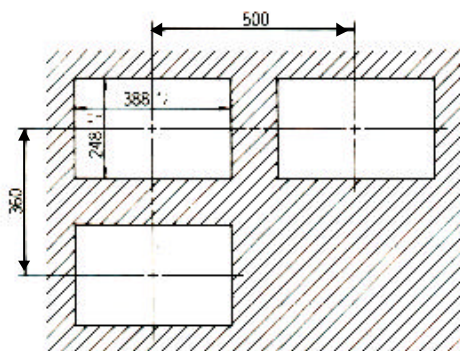
| Option | Description |
|----------------------------------|--|
| Manual switching multiple scales | This instrument has 2 or 3 kinds of measuring ranges which are manually selectable. <ul style="list-style-type: none">• 2-range same input Combinations of the same type of thermocouples, resistance thermometers or DC voltage• 2-range different input Combinations of different types of thermocouples, thermocouple and DC voltage, or others.• 3-range same input Combinations of the same type of thermocouples, resistance thermometers or DC voltage• 3-range different input Combination of different types of thermocouples, thermocouple and DC voltage, or others. |
| Digital indication | A digital indicator can be combined with the main body to show the present measured value. No. of display digits : 3½ digits Accuracy : ±0.3% ±1 digit (Temperature— ±0.5% ± 1 digit) |
| Pen marker | Marking is made at the upper end or lower end of the chart according to external signals. External signals : TTL, open collector, contact (5.5V, 1mA DC) Marker ON at L (short-circuit) level Marker OFF at H (open) level Marker pen position : about 5mm inside 1st pen |
| External pen-up | All pens are lifted up and down by external signals. External signals : TTL, open collector, contact (5.5V, 1mA DC) Pen up at L (short -circuit) level Pen down at H (open) level |
| External chart operation | Chart feed controlled externally. An internal/external setting selector switch is provided. (1) Chart feed start/stop by external signals External signals : Open collector, contact (5.5V, 1mA DC) Chart stops during short -circuit and starts during open circuit. (2) Chart feed by an external oscillator Waveforms : Sine wave, triangular wave, square wave pulses Level : 2V < V _H < 24V, (-)24V < V _L < 0.5V , Input resistance : 10kΩ, High limit of frequency : 2kHz (600mm/min) |
| Chart end detection | Detects a shortage of chart and sends a status output. Status output : ON contact Contact rating : 110V AC, 2A, 60VA |
| Time axis synchronizing circuit | Time axis difference of each pen is automatically corrected to record data on the same time axis in 2-pen 3-pen and 4-pen recorders. |
| High-sensitivity instrument | Instruments are graduated with an input sensitivity of more than 1mV DC span/full scale to less than 4mV span/full scale. |
| Burn-out circuit | Circuit to deflect the pointer toward the high limit or low limit, if the input becomes open circuit due to the breakage of a thermocouple, etc. Signal source resistance : Less than 150Ω |
| Chart speed | In addition to the standard 3-speed drive, 18 alternatives 3-speed drive and one 12-speed drive are also available. 3-speed 2.5, 5, 10mm/h 50, 100, 200mm/h 450, 900, 1800mm/h 50, 100, 200mm/min 5, 10, 20mm/h 75, 150, 300mm/h 500, 1000, 2000mm/h 75, 150, 300mm/min 7.5, 15, 30mm/h 150, 300, 600mm/h 750, 1500, 3000mm/h 150, 300, 600mm/min 25, 50, 100mm/h 250, 500, 1000mm/h 15, 30, 60mm/min 30, 60, 120mm/h 300, 600, 1200mm/h 25, 50, 100mm/min 12-speed 15, 30, 60mm/h, mm/ min, cm/h, cm/min |
| Thermal pen | Using heat-sensitive chart, this instrument performs recording in a chromogenic state (black) by a thermal pen. Recording system: Heat-sensitive recording. With line width control knob } The knob, etc. will become visible at an upper part when has been With recording ON-OFF switch } drawn out. Without pen lift. * In the case of 2-pen instrument, distinguish the 1st and 2nd pens according to line width. |

EXTERNAL DIMENSIONS



Unit: mm

PANEL CUTOUT AND MOUNTING INTERVALS



Unit : mm

Specifications subject to change without notice. Original

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