

# EH3000 SERIES 180mm chart DOT PRINTING TYPE ANALOG RECORDER



EH 3000 series is a dot printing type analog recorder sized 288x288mm with 180mm width chart. Recording points are 5 kinds, 1 point to 12 points and records clearly temperature, pressure, flow, level, etc. at regular interval.



## ■ FEATURES

### ● High accuracy $\pm 0.25\%$

By large scale plate and sharp pointer location, it is easy to see the indication and high accuracy of  $\pm 0.25\%$  (DC voltage input).

### ● Universal power supply

Universal power supply with voltage range of 100 to 240 V AC (50/60Hz) is applied.

### ● Linearized temperature scale prepared

Temperature scale of thermocouple and resistance thermometer input is a linear scale that is excellent in reading value.

### ● 6 chart speeds

6 chart speeds (12.5, 25, 50, 75, 100, 150mm/h) are switchable as standard. 5 chart speed and hour/minute change are prepared as option.

### ● Alarm setting as standard

High and low limit alarm can easily programmed by pointer location. Also you can check the alarm by front LED.

### ● Easy operation and robust structure

Operation switch and setting switch are separate arranged for easy operation and robust structure that adopted steel casing and die-cast door.

### ● Chart paper illumination

White LED illumination is adopted for to read the indication in the dark places. You can also adjust the brightness.

### ● Flat front chart chassis

Front chart feeding part is flat so easy to read the recorded result and also to take note.

### ● Unit structure and light-weight

Light-weight (60% of the previous unit weight) is realized by easy maintenance structure.

### ● CE approval

## ■ MODELS

EH3    -

### Input point

- D1 : 1 point
- D2 : 2 points
- D3 : 3 points
- D6 : 6 points
- 12 : 12 points

### Input signals

- 5 : Thermocouple/DC voltage
- 7 : Resistance thermometer  
Thermocouple with burnout/  
DC voltage  
Built-in voltage divider input  
(option)\*1

### Input and scale plate

- 0 : Standard input  
+ standard scale plate
- 1 : Non-standard input\*2  
+ Non-standard scale plate

### Alarm output

- 0 : None
- 2 : 2 alarm outputs\*3

### Chart speed and burnout

- 0 : Standard 6-speed+ burnout  
disabled
- 1 : Standard 6-speed + up-scale  
burnout\*4
- 2 : Standard 6-speed  
+ down-scale burnout\*4
- A : Standard 5-speed hour/  
minute change  
+ burnout disabled\*3
- B : Standard 5-speed hour/  
minute change  
+ up-scale burnout\*4
- C : Standard 5-speed hour/  
minute change  
+ down-scale burnout\*4

\*1: Optional built-in voltage divider and thermocouple/resistance thermometer burnout input is only type "7".

\*2: Built-in voltage divider input included. Triple scale is available. (Input and scale selection are needed for non-standard input and non-standard scale plate.)

\*3: Option

\*4: Burnout on all channels is programmed together for thermocouple/resistance thermometer input.

## INPUT SPECIFICATIONS

Input types:	DC voltage ---±13.8mV, ±27.6mV, ±69mV ±200mV, ±500mV, ±2V, ±5V Built-in voltage divider (option): ±10V, ±20V, ±50V DC current: External shunt resistor (250Ω) required (option) Thermocouple ---K, E, J, T, R (option B, S, N, U, L) Resistance Thermometer --- Pt100, JPt100 (option) *Linear scale for thermocouple and resistance thermometer
Input designation:	Single scale (standard), double / triple scale (option)
Accuracy ratings:	DC voltage input --- ±0.25% of input span Thermocouple and resistance thermometer --- ±0.5% of input span (except for some inputs)
Indicating dead band:	±0.2% of input span
Reference junction compensation accuracy:	K, E, J, T --- ±1.0°C or below (23°C±10°C) ±2.0°C or below (0°C to 50°C) (For internal reference junction compensation, the errors above are added to the accuracy rating)
Temperature drift:	±0.02%FS / °C (Converted into reference ranges)
Indicating resolution:	Approximately 1/3,600
Allowable signal source resistance:	DC voltage inputs, thermocouple inputs --- 1kΩ or less (no burnout). Resistance thermometer inputs --- per wire 10Ω or less (same resistance for 3 wires)
Input resistance:	DC voltage inputs (±5V or less), thermocouple inputs --- approximately 8MΩ DC voltage inputs (voltage divider built-in) --- approximately 1MΩ
Maximum input voltage:	DC voltage inputs, thermocouple inputs, --- ±10V DC or less DC voltage inputs (voltage divider built-in) --- ±60V DC or less Resistance thermometer --- ±6V DC or less
Maximum common mode voltage:	30V AC
Common mode rejection ratio:	120dB or more
Normal mode rejection ratio:	50dB or more

## RECORDING SPECIFICATIONS

Chart paper:	Fan-fold type --- effective chart width 180mm (total width 200mm), total length of 20m
Recording points:	1, 2, 3, 6, 12 points
Dotting interval:	6 seconds/point
Recording system:	Inkpad dotting 1: red 2: blue 3: sky blue, 4: green, 5 brown, 6 purple, 7 orange, 8 gray, 9 blue, 10 greenish brown, 11 scarlet, 12 violet
Chart speed:	12.5, 25, 50, 75, 100, 150mm/h
Chart speed accuracy:	±0.1% (based on chart paper scale)

## GENERAL SPECIFICATIONS

Rated power voltage:	100 to 240V AC, 50/60Hz
Power voltage fluctuation:	Indication fluctuation 0.2% or less (converted into reference ranges at 90 to 264V AC)
Power consumption:	Maximum 20VA (100V AC), 25VA (240V AC)
Environmental conditions:	Reference operation condition--- Ambient temperature range: 21 to 25°C Ambient humidity range: 45 to 65%RH Power voltage: 100V AC ±1% Power frequency: 50/60Hz ±0.5% Attitude: left/right 0°C, forward tilting 0°C, backward tilting 0°C Warm-up time: longer than 30 minutes Normal operation condition--- Ambient temperature range: 0 to 50°C (20 to 65%) Ambient humidity range: 20 to 80%RH (5 to 40°C) Power voltage: 90 to 264V AC Power frequency: 50/60Hz ±2% Attitude: left/right 0 to 10°, forward tilting 0°, backward tilting 0 to 30°

Transportation condition:	(At the packed condition on shipment from our factory)--- Ambient temperature range: -20 to 60°C Ambient humidity range: 5 to 90%RH (No dew condensation) Vibration: 10 to 60Hz, 4.9m / s <sup>2</sup> (0.5G) or less Impact: 392m / s <sup>2</sup> (40G) or less
Storage condition:	Ambient temperature and humidity range -20 to 40°C : 5 to 90%RH, 40 to 60°C : 5 to 65%RH
Insulation resistance:	Primary terminals and protective conductor terminals --- 20MΩ or more at 500V DC Secondary terminals and protective conductor terminals --- 20MΩ or more at 500V DC Primary and secondary terminals --- 20MΩ or more at 500V DC
Dielectric strength:	Primary terminals and protective conductor terminals --- 1 minute at 1500V AC Secondary terminals and protective conductor terminals --- 1 minute at 500V AC Primary and secondary terminals --- 1 minute at 1500V AC
Illumination:	White LED lamp, 3 levels of brightness, and lights can be OFF.
Case:	Door frame --- aluminum die-cast, Door window --- glass, Back case --- steel Color: door frame --- Gray (equivalent to Mussel N3) Back case --- Gray (equivalent to Mussel N7) Door window --- transparent
Mounting:	Panel mounting
Weight:	Approximately 8.0kg
Terminal screws:	Power terminals / protective conductor terminals / alarm terminals --- M4.0, measuring terminal --- M4.0

## INDICATING SPECIFICATIONS

Analog indication:	Scale plate and pointer
Scale plate:	Max. triple scale (option) (minimum scale division:150)

## ALARM SPECIFICATIONS

Alarm display:	Pointer and alarm-point seal pasted on scale. Alarm LED lamp lightens for alarming. (All channels common display).
Alarm types:	Higher and lower limit alarm
Alarm dead band:	0.4% of input span

## OPERATION / PROGRAMMING SPECIFICATIONS

Switches:	POWER --- ON/OFF the recorder power supply AUTO CH --- Switching automatic channels change (recording mode) and fixed channel (Chart feed stops when 1 point indication mode selected) RECORD --- Indication / Recording start/ stop FEED --- Feed chart paper MODE --- Select setting mode --- Select setting / adjusted parameter, move pointer ENTRY --- Parameter / Adjusted value confirmed CAL --- User indication adjustment, shift adjustment KEY LOCK --- Setting key locked
Indication:	LED (green) --- Power ON monitor LED (red) --- Alarm monitor (All channels common OR output monitor) LED (white) --- Chart speed

## STANDARD

CE approval:	EMC directive, low voltage directive conformity, EN61326-1, EN61010-1 *Under EMC directive test condition, indication equivalent to maximum 500μV might fluctuate.
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## OPTION SPECIFICATIONS

- Alarm output:** Alarm contact output is available  
 Alarm relay --- Mechanical relay 1 N.O. (form A) and relay 2 N.C. (form B) contact, 2 outputs (high and low), all channels common  
 Maximum contact rating --- 250V AC 2A, 30V DC 2A (resistive load)  
 250V AC 1A, 30V DC 1A (inductive load)
- Non-standard input:**  
 Minimum width of scale---  
 DC voltage ---10mV DC width or more  
 DC current --- 10mA DC width or more  
 Thermocouple --- K; 200°C width or more,  
 E, J, T; 150°C width or more  
 R; 600°C width or more  
 Resistance thermometer ---100°C width or more
- Non-standard scale plate:**  
 Scale plate for non-standard input
- Double / Triple scale:**  
 Measures input with 2 or 3 types of scales (each scale is serial channel only), minimum division; divided into 150 equal parts
- Chart speed:** 5-speed change, 12.5,25,50,100,200mm/minute, hour change
- Dotting interval:** 3 seconds/point
- DC current input:** 250Ω of shunt resistor is applied to measure voltage input (max 20mA)
- Built-in-voltage divider:**  
 Built-in voltage divider (1/1000) measures DC voltage input of ±10V, ±25V, ±50V, input type "7" only
- Burnout:**  
 Function for detecting disconnection for sensor with thermocouple or resistance thermometer input.  
 Upper and lower scale burnout on all channels can be programmed, parallel operation is unavailable, Input type "7" only

## Standard input and chart paper Nos.

Input type	Scales	Minimum scales	Chart paper Nos.	Input code	
DC voltage*	0 to 10mV	1	EH01001	M1	
	0 to 20mV			M8	
	0 to 50mV			M9	
	-5 to 5mV			M6	
	0 to 5V			V5	
	1 to 5V			V6	
T/C	K	0 to 200°C	2°C	EH05043	KG
		0 to 250°C	2°C	EH05042	K2
		0 to 300°C	2°C	EH05041	K3
		0 to 400°C	5°C	EH05040	K4
		0 to 600°C	5°C	EH05038	K6
		0 to 800°C	10°C	EH05037	K8
		0 to 1000°C	10°C	EH05036	KA
		0 to 1200°C	10°C	EH05035	KC
	E	0 to 200°C	2°C	EH05043	E2
		0 to 300°C	2°C	EH05041	J3
	J	0 to 400°C	5°C	EH05040	J4
		0 to 150°C	1°C	EH05044	TF
	T	0 to 200°C	2°C	EH05043	T2
		0 to 300°C	2°C	EH05041	T3
		0 to 300°C	2°C	EH05041	T3
		-50 to 150°C	2°C	EH05052	T5
	R	0 to 1200°C	10°C	EH05035	R2
		0 to 1400°C	10°C	EH05031	R4
0 to 1600°C		20°C	EH05034	R6	
0 to 100°C		1°C	EH05001	31	
RTD	0 to 150°C	1°C	EH05044	3A	
	0 to 200°C	2°C	EH05043	32	
	0 to 250°C	2°C	EH05042	37	
	0 to 300°C	2°C	EH05041	33	
	-20 to 80°C	1°C	EH05056	38	
	-50 to 50°C	1°C	EH05054	3E	

K, E, J, T, R : IEC584. JIS C1602-1995

Pt100 : IEC751. JIS C1604-1997

\*Scale plate will be standard plate of 0 to 100 equally divided (no unit). Please specify for other range.

## Standard range and minimum width of scale

Input type	Standard range	Minimum width of scale	
DC voltage	-13.8 to 13.8mV	10mV	
	-27.6 to 27.6mV	17mV	
	-69 to 69mV	35mV	
	-200 to 200mV	100mV	
	-500 to 500mV	250mV	
	-2 to 2V	1V	
	-5 to 5V	2.5V	
	-10 to 10V	5V	
	-25 to 25V	13V	
	-50 to 50V	25V	
DC current	0 to 20mA	10mA	
T/C	K	-200 to 330°C	200°C
		-200 to 660°C	400°C
		-200 to 1370°C	700°C
	E	-200 to 200°C	150°C
		-200 to 380°C	250°C
		-200 to 720°C	380°C
		-200 to 900°C	720°C
	J	-200 to 250°C	150°C
		-200 to 500°C	300°C
	T	-200 to 1200°C	500°C
		-200 to 280°C	150°C
	R	-200 to 400°C	300°C
		0 to 1240°C	600°C
	B	0 to 1760°C	1300°C
		0 to 1820°C	900°C
		0 to 1350°C	700°C
		0 to 1760°C	1400°C
		0 to 1760°C	1400°C
N	-200 to 420°C	240°C	
	-200 to 770°C	430°C	
	-200 to 1300°C	870°C	
	-200 to 280°C	160°C	
	-200 to 500°C	280°C	
	-200 to 600°C	530°C	
L	-200 to 250°C	150°C	
	-200 to 490°C	280°C	
	-200 to 900°C	500°C	
	-200 to 900°C	500°C	
RTD	Pt100	-140 to 150°C	100°C
		-200 to 300°C	200°C
	JPt100	-200 to 650°C	400°C
		-140 to 150°C	100°C
		-200 to 300°C	200°C
		-200 to 500°C	400°C

## Exceptions of accuracy ratings

Input types	Measuring range	Accuracy ratings
K	-200 to -50°C	±1.0%
E, J, T, L	-200 to -50°C	±1.0%
R, S	0 to 100°C	±1.5%
B	0 to 400°C	None
U, L	-200 to -50°C	±1.5%

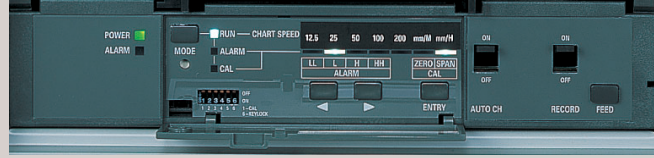
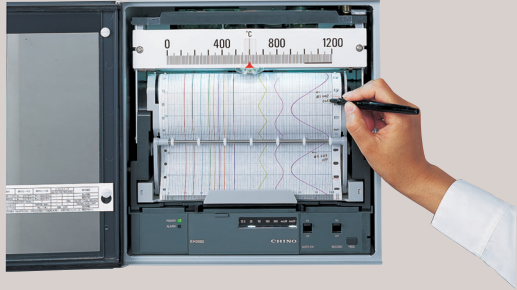
Note) The accuracy ratings are converted into the measuring range

**Easy operation**

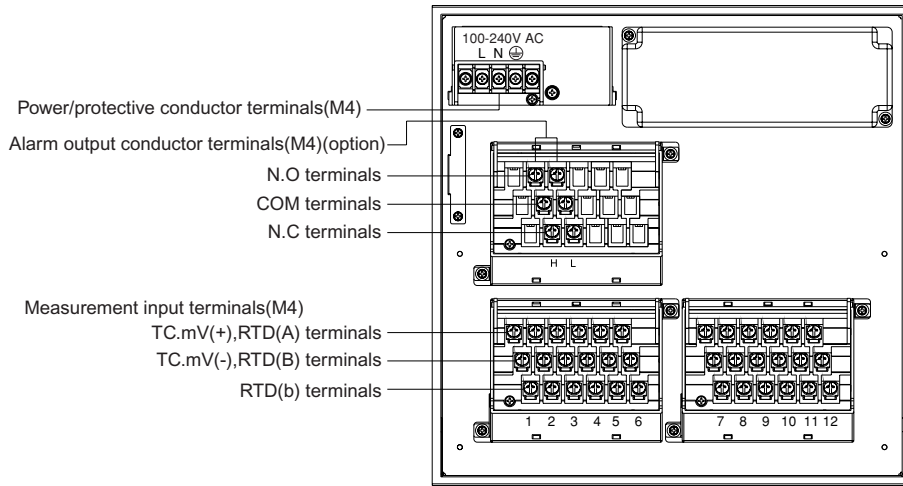
**EH3000Series**

Flat front chart chassis enables easy memo writing.

All operations and settings adjustable.

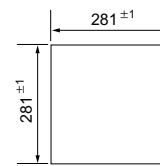
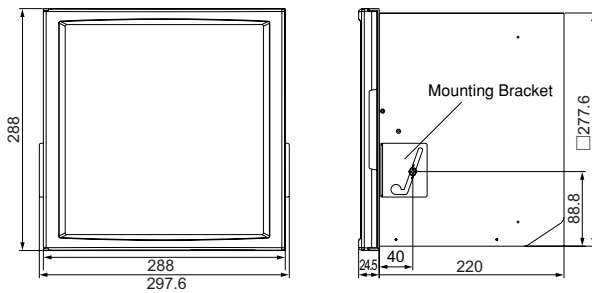


**TERMINAL BOARD**

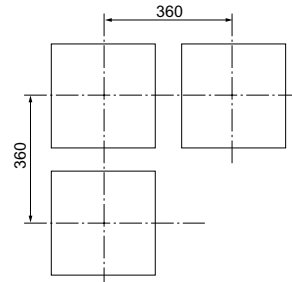


**DIMENSIONS**

**Panel cutout**



**Minimum clearance for plural installation**



Unit : mm

Specifications subject to change without notice. Printed in Japan (I) 2013. 5

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