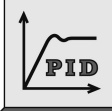


EC1200A**PROGRAM CONTROLLER****OUTLINE**

The EC1200 can, totally and with high precision, control and monitor such factors as temperature, temperature balance (ΔT), ambient gas, soaking time and processing time essential in seeking stability and enhanced productivity in work quality.

The EC1200 employs a large TFT color liquid crystal display as a human interface (HMI) for enabling graphical touch operation, providing far better operating environment compared with conventional models.

The EC1200 is an advanced programmable controller with high precision control and excellent operating environment realized by multiple functions intended for high performance heat treatment.

MODELS AND DESCRIPTIONS

EC1201A: Multi-loop control

EC1202A: Work temperature ΔT control (Control temperature balance for surface and core of the work)

EC1203A: Wide range control, 2 selective inputs/1 control output (Selection between thermocouple and radiation thermometer)

EC1206A: Multi-sensor interlocking wide range control (Selection between thermocouple and others)

EC121□A: Profiling control (Cascade control with input signal for the work)

FEATURES**■ Total control of high performance heat treatment system**

Temperature: Work temperature balance (ΔT) control and profiling control enabling substantial work temperature control

Ambient gas: Program analog retransmission output in parallel with temperature control enabling detection of ambient gas and control of density by mass flow controller etc.

Reliable uniform heating: Continuously monitors electric furnace heater resistance by the Heater Monitoring Unit; model ZE720I, and its expedient alarm function works for preventive detection of electric heater wear-out then uniform heating for the work is guaranteed

Keep Time: Keep time triggered and initiated by temperature balance for surface and core of the work for ensuring even sintering treatment.

■ Variety of input/output functions

Input: control input (1 ~ 3ch), precise analog input (for profiling, ΔT control: 3 inputs max.)

Output: control output (1 ~ 3ch), analog retransmission (output for configuring mass flow controller, etc.: 3 outputs max.)

DI/DO: 16 points max. each

Communication interface: RS-232C, RS-422A, GP-IB

Extended function: ARCNET®

**■ Multiple control of up to 3 channels per single unit**

Control channel: Programmable control of up to 3 zones per single unit
: Up to 18 channels controllable by ARCNET® (Control by 6 units max.)

■ Variety of program loop

4 program linked control (Ex.: Temperature, gas and pressure)

Program biased control (Ex.: 3 zones temperature control)

3 program independent control (Ex.: Independent furnace control)

■ High performance

High accuracy: $\pm 0.05\% + 1$ digit

High resolution: 0.01°C (Pt 100, JPt 100)

■ TFT large full-color liquid crystal display (103 × 75mm)

Enable operators to see quickly control results on real-time trend screen

Easy programming of data input with graphic pattern on the same display

■ IC Memory Card

Program pattern, PID constants, Parameters, SET UP data can be stored

■ Safety standards UL, CSA

INPUT SPECIFICATIONS

Input range: I-type B, R, K, S, E, T, J, WRe₅₋₂₆, PR₄₀₋₂₀,
N, PLII, U, L, AuFe,
0 to ± 10mV, 0 to 20mV, 0 to 50mV,
1 to 5V, 0 to 5V, 4 to 20mA
II-type 0 to ± 10mV, 0 to 20mV, 0 to 50mV,
1 to 5V, 0 to 5V, 4 to 20mA,
Pt100Ω, JPt100Ω

Resolution: 0.1°C (0.01°C for Pt100, JPt100)

Accuracy: ± (0.05 % + 1 digit)
Refer to Measurement Range and Accuracy Table

Sampling cycle: 0.1 s / 3 channels

Burnout: Thermocouple, mV input — Up-scale

Sensor correction: Applied to thermocouple and RTD input

CONTROL SPECIFICATIONS

Control cycle: 0.1 s / 3 channels

Control mode: PID, PD, ON-OFF and 3-position control action
Dual output (Heat & Cool)

Control constants: PID, manual reset (At PD control)
(Programmed PID/multi - PID selection)
Programmed PID: Correction method with 3
reference points
Multi -PID : Select out of 8 kinds for
each step
2nd output P (At dual output type)
Dead band (At dual output type)
Hysteresis width (At ON-OFF control type)

Output limit: Upper and lower output limits (1st output only)
(Programmed output limit/ multi -output limit
selection)
Programmed output limit : Correction method with 3
reference points
Multi-output limit : Select out of 8 kinds for each step

Auto tuning: Enabled

Anti -overshoot: Enable/disable selectable (At PID control)

Preset output: Enabled

Control output: Current: 4 ~ 20 mA DC (600Ω at maximum),
0 ~ 5 mA DC (2kΩ at maximum);
SSR drive: ON – 15 V DC (20 mA at maximum),
OFF – 0 V DC;
Relay contact : a-contact, 150V,
3AAC maximum (Resistive load)

PROGRAM SPECIFICATIONS

Program :
Control loop : 3 programs at maximum
Analog retransmission : 3 programs at maximum
Control loop and analog retransmission : 4 programs at
maximum

Pattern/step 200 patterns at maximum;
100 steps/pattern (Step number 00 ~ 99);
2,000 steps in total/4 programs (At maximum);
At 4 programs: 50 patterns/program
At 3 programs: 66 patterns/program
At 2 programs: 100 patterns/program
At 1 program: 200 patterns/program

Action mode: Select individual action or collective action

Setting method: θ -Y; Ramping rate and target SP
X-Y; Time and target SP
Select with a switch

SP correction: Programmed bias
Correction method with 8 reference points
3 bias groups/channel
Specify the bias group for each pattern

Sequence output/Timing DO:
16 points at maximum
(Specify per step)

Condition: 16 points at maximum (Specify per step)

Control output at program end:
Output OFF/continuous control selectable

SP at Reset:
SP hold/SP return to Step 00 selectable

ALARM SPECIFICATIONS

Number of points: Standard alarm by channel;
2 points/channel
Additional alarm by channel;
Up to 2 channels/channel
available out of 16 DO points
Auxiliary alarm;
Optionally available out of
16 DO points

Types: Standard alarm by channel:
Deviation high and low alarms,
Process variable high and low
alarms, SP high and low alarms,
deviation absolute value
Additional alarm by channel;
Same as standard alarm by channel
Auxiliary alarm;
AI, AO, heater monitoring (Option)

Contact output: 1a-contact

Contact capacity: 250V, 0.5AAC maximum
(Resistive load)

DO SPECIFICATIONS

Number of Points: 16 points (12 points for the relay adaptor or built-in open collector, 4 points for built-in relay contact)

Contacts: Built-in relay contact; 250 V, 0.5 AAC maximum
(Resistive load)
Adaptor contact; 250 V, 1 AAC (Option)
Built-in open collector; 30 V, 20 mA DC at maximum
(Connector No.2)

Types : Sequence contact, timing DO (ON time settable), RUN-DO, END-DO, MAN-DO, Additional alarm, Condition pause alarm (ON pause time settable), Guarantee soak pause alarm (ON pause time settable), PV error alarm, power down limit

DI SPECIFICATIONS

Number of points: 16 points

Contacts: No-voltage contact input,
(5 V, 1 mA DC Supply from EC1200)

Types : Condition input, Program RUN/STOP, Program RESET, Program ADVANCE, Program pattern switching, AUTO/MAN switching, SP remote/local switching, Control stop

OPTIONAL SPECIFICATIONS

Analog retransmission (AO): 3 points at maximum,
Range; Select 1 ~ 5 VDC,
or 0 ~ 5 VDC
Source; Select PV, SP, OUT, heater
resistance, or AO program.
Accuracy rating; $\pm 0.1\%$,
resolution 0.05 % or less
Load resistance; Voltage (V) 1k Ω
or less

AI: 3 points at maximum
Each channel insulated

Same accuracy and range as PV input

Communication : Select either RS-232C, RS-422A, or GP-IB

ARCNET[®] : LAN for the extend function

Token bus N : N - communication

Comm. speed; 2.5 Mbps

20 nodes/ network

255 nodes at maximum (HUB used)

Application; Up to 9 heater monitoring units
(ZE7201),

Multiloop control ;Up to 6 units (EC1200)

GENERAL SPECIFICATIONS

Display(LCD): Full -dot TFT color LCD,
display size:102.7(W) \times 74.9(H) mm

LED: RUN lamps (6 pieces),
MAN lamps (3 pieces),
ALM lamps (3 pieces),
COMM lamp (1 piece),
POWER lamp (1 piece)

LCD backlight: Automatic ON/OFF by the human sensor,
Manual illumination control

Fail-safe: Watchdog timer, various self- diagnostics, with FAIL
contact

Memory backup: Non-volatile memory

Power down limit: Settable in 10 steps, ranging from 8
seconds to 1 hour 8 minutes

Memory card: Available, data write/read

CMRR: 150 dB or more

NMRR: 60 dB or more

Mass: Approx. 3 kg

Signal source: Thermocouple, mV input; Effect of about
0.15 $\mu\text{V}/\Omega$, resistance
Allowable wiring resistance of the input;
1 Ω or less

Input resistance: V input; Approx. 1 M Ω ,
mA input; Approx. 250 Ω

Operating temperature range: -10 ~ 50 $^{\circ}\text{C}$, -10 ~ 45 $^{\circ}\text{C}$
(with option)

(avoid freezing or condensation)

Operating humidity range: 10 ~ 90% RH

(avoid condensation)

Power supply : Voltage rating at 100 to 240VAC, 50/60Hz

MEASUREMENT RANGE AND ACCURACY TABLE (I - TYPE)

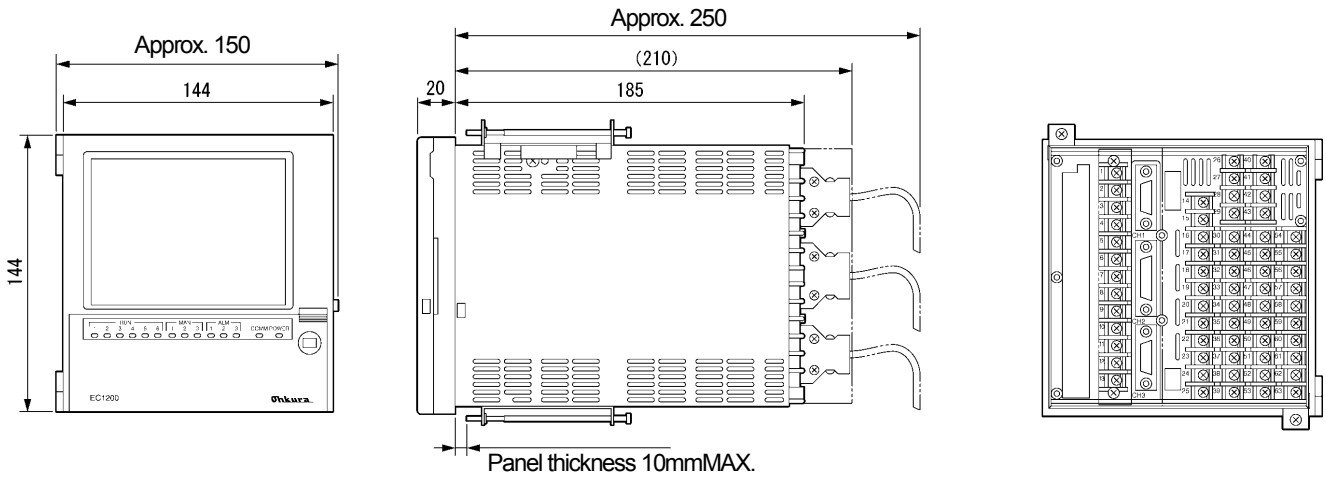
INPUT	INPUT SYMBOL	INPUT RANGE	ACCURACY	REMARKS
B	B	*1 0.0 ~ 1820.0	$\pm (0.05\% + 1 \text{ digit})$ However, -200 ~ 0°C $\pm (0.15\% + 1 \text{ digit})$	*1 0 ~ 400°C $\pm 4\%$
R	R1	*2 0.0 ~ 1760.0		*2 400 ~ 800°C $\pm 0.15\%$
	R2	*2 0.0 ~ 1200.0		*2 0 ~ 200°C $\pm 0.15\%$
S	S	*2 0.0 ~ 1760.0		
K	K1	-200.0 ~ 1370.0		
	K2	0.0 ~ 600.0		
	K3	-200.0 ~ 300.0		
E	E1	-200.0 ~ 700.0		
	E2	*3 -270.0 ~ 300.0		*3 -270 ~ -200°C $\pm 2\%$
	E3	*3 -270.0 ~ 150.0		
J	J1	-200.0 ~ 900.0		
	J2	-200.0 ~ 400.0		
	J3	-100.0 ~ 200.0		
T	T1	*4 -270.0 ~ 400.0		*4 -270 ~ -200°C $\pm 1\%$
	T2	-200.0 ~ 200.0		
WRe ₅₋₂₆	C	0.0 ~ 2320.0		
N	N	0.0 ~ 1300.0		
PLII	PL1	0.0 ~ 1390.0		
	PL2	0.0 ~ 600.0		
U	U	-200.0 ~ 400.0		
L	L	-200.0 ~ 900.0		
Au - Fe	AUFE	*5 0.0 ~ 300.0(K)	$\pm (0.2\% + 1 \text{ digit})$	*5 0 ~ 25K $\pm 0.5\%$
PR ₄₀₋₂₀	PR	*6 0.0 ~ 1880.0		*6 20 ~ 50K $\pm 0.3\%$
				*6 0 ~ 300°C $\pm 1.5\%$
				300 ~ 800°C $\pm 0.8\%$
0 ~ $\pm 10\text{mV}$	10mV	0.0 ~ $\pm 10.0\text{mV}$	$\pm (0.05\% + 1 \text{ digit})$	
0 ~ 20mV	20mV	0.0 ~ 20.0mV		
0 ~ 50mV	50mV	0.0 ~ 50.0mV		
1 ~ 5V	1 ~ 5V	1.0 ~ 5.0V		
0 ~ 5V	0 ~ 5V	0.0 ~ 5.0V		
4 ~ 20mA	mA	4.0 ~ 20.0mA		

MEASUREMENT RANGE AND ACCURACY TABLE (II - TYPE)

INPUT	INPUT SYMBOL	INPUT RANGE	ACCURACY	REMARKS
Pt100	Pt0, JPt0	-200.00 ~ 650.00	$\pm (0.05\% + 1 \text{ digit})$	
	Pt1, JPt1	-200.00 ~ 400.00		
	Pt2, JPt2	-200.00 ~ 300.00		
	Pt3, JPt3	-200.00 ~ 200.00		
JPt100	Pt4, JPt4	-100.00 ~ 100.00	$\pm (0.1\% + 1 \text{ digit})$	
0 ~ $\pm 10\text{mV}$	10mV	0.0 ~ $\pm 10.0\text{mV}$	$\pm (0.05\% + 1 \text{ digit})$	
0 ~ 20mV	20mV	0.0 ~ 20.0mV		
0 ~ 50mV	50mV	0.0 ~ 50.0mV		
1 ~ 5V	1 ~ 5V	1.0 ~ 5.0V		
0 ~ 5V	0 ~ 5V	0.0 ~ 5.0V		
4 ~ 20mA	mA	4.0 ~ 20.0mA		

DIMENSIONS

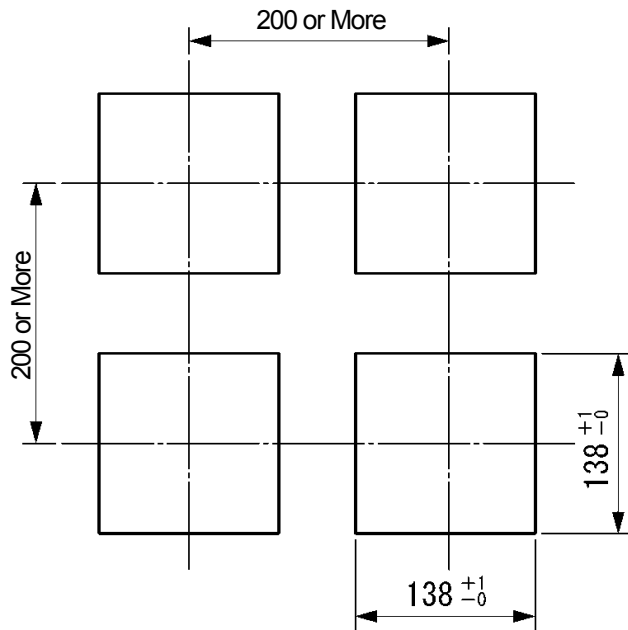
(Unit = mm)



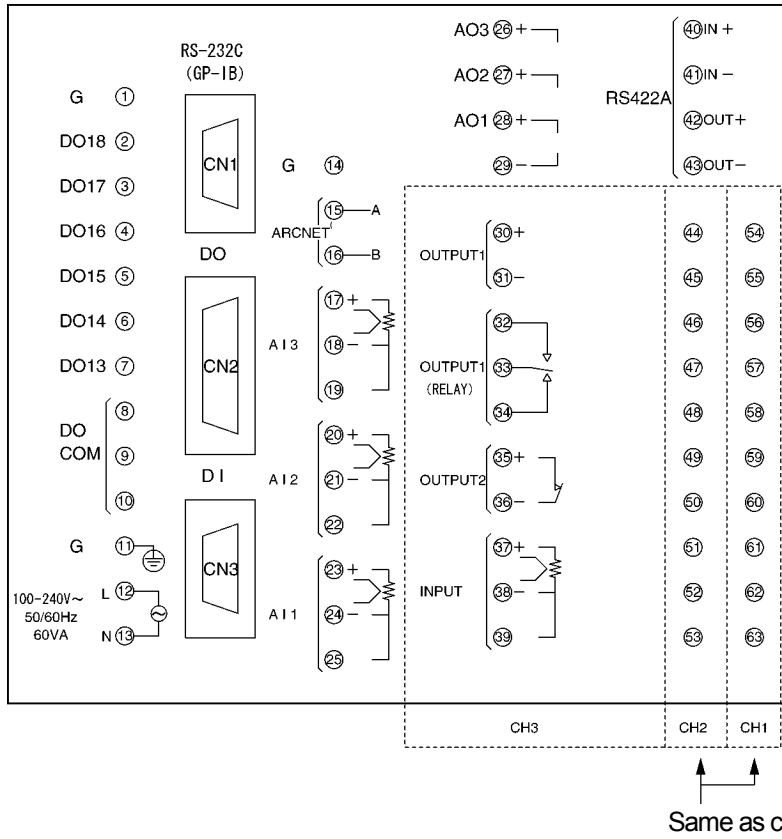
Dimensions required when the door is fully opened (150°)
(when on the left side)

PANEL CUTOUT

(Unit = mm)



TERMINAL ASSIGNMENT



MODEL		
EC12		
CODE	Type *1	
01 ~17	Refer to Type table below	
CODE	INPUT RANGE TYPE *2	
1	I- Type (TC, mV, V, mA)	
2	II- Type (RTD, mV, V, mA)	
CODE	CHANNEL -1 OUTPUT	
<input type="checkbox"/>	(1 ~ 9, A ~ H, J ~ L) *3	
CODE	CHANNEL -2 OUTPUT	
<input type="checkbox"/>	(0 ~ 9, A ~ H, J ~ L) *3	
CODE	CHANNEL -3 OUTPUT	
<input type="checkbox"/>	(0 ~ 9, A ~ H, J ~ L) *3	
CODE	COMMUNICATION	
0	None	
1	RS-232C	
2	RS-422A	
3	GP- IB	
4	ARCNET®	
5	RS-232C + ARCNET®	
6	RS-232C + ARCNET®	
7	GP- IB + ARCNET®	
CODE	AI	
0	None	
1	1 point	
2	2 point	
3	3 point	
CODE	AO	
0	None	
4	V, 1 point	
5	V, 2 point	
6	V, 3 point	
CODE	SPECIAL	
0	Not attached	
Z	Attached	

MODEL CODE MUNBER

*1 TYPE TABLE

CODE	TYPE
01	Multi-Loop control
02	Work temperature ΔT control
03	Wide range control
06	Multi-sensor interlocking wide range control
11	Profiling control 1-program, 1-master, 1-slave control
12	Profiling control 1-program, 1-master, 2-slave control
13	Profiling control 1-program, 2-master, 2-slave control
14	Profiling control 2-program, 2-master, 2-slave control
15	Profiling control 1-program, 1-master, 3-slave control
16	Profiling control 1-program, 3-master, 3-slave control
17	Profiling control 3-program, 3-master, 3-slave control

*2: Input Range type; Common to all the channels and AIs. Refer to Measurement Range and Accuracy table.
(It is not allowed to mix I - type with II - type.)

*3: Output designation

Output Code	1st Output	2nd Output	
0	No channel		
1	4 ~ 20mA	None	} When the 2 nd output option is attached.
2	4 ~ 20mA	4 ~ 20mA	
3	4 ~ 20mA	SSR Drive	
4	4 ~ 20mA	Relay	
5	4 ~ 20mA	0 ~ 5mA	
6	SSR Drive	None	} When the 2 nd output option is attached.
7	SSR Drive	4 ~ 20mA	
8	SSR Drive	SSR Drive	
9	SSR Drive	Relay	
A	SSR Drive	0 ~ 5mA	
B	Relay	None	} When the 2 nd output option is attached.
C	Relay	4 ~ 20mA	
D	Relay	SSR Drive	
E	Relay	Relay	
F	Relay	0 ~ 5mA	
G	0 ~ 5mA	None	} When the 2 nd output option is attached.
H	0 ~ 5mA	4 ~ 20mA	
J	0 ~ 5mA	SSR Drive	
K	0 ~ 5mA	Relay	
L	0 ~ 5mA	0 ~ 5mA	

ARCNET[®] is a registered trademark of U.S. DATAPOINT.

⚠ CAUTION

Do not install this device before consulting instruction manual

Specifications are subject to change without notice.

For further information, a quotation or a demonstration please contact to:

Ohkura

OHKURA ELECTRIC CO., LTD.

Head Office / Factory

Saitama, JAPAN

Sales Offices

Tokyo, Osaka, Nagoya, Kyushu, Tohoku

URL

<http://www.ohkura.co.jp/>

e-mail (in English)

intsales@ohkura.co.jp