



EC5600S/EC5900A

Digital Programmer/Controller

- EC5600S 4-digit display Accuracy Rating $\pm 0.2\%$
- EC5900A 5-digit display Accuracy Rating $\pm 0.1\%$

OUTLINE

Models EC5600S / EC5900A are digital programmer/controller offering flexible control by storing programs of 183/376 steps (maximum 63/94 steps per pattern) and maximum 16/19 patterns.

Sufficient comments displayed in the display of 16-character x 4-line at the center of unit allows easy-to-operate and highly functions. The graphic indication of a program pattern makes you keep directly tracking the progress of a process.

FEATURES

- Human friendly display and operability
 - LCD (wide temperature range product) display of 16-character and 4-line
 - Graphic display of program pattern
 - Superb operability by comments display
 - Simultaneous display of process variable, setpoint, residual time and other related data
- Easy setting of fixed patterns by a selective system
- Enables to switch time unit (minute/second) of programs
- Settings by a dial
- Anti-overshoot control
- Multi-input, multi-output, multi-PID, multi-output limit, programmed output limit, programmed PID

SPECIFICATIONS

● Programs

Number of patterns: Max. 16...EC5600S
Max. 19...EC5900A

Number of steps:

Max. 189...EC5600S (Max. 63 steps/pattern)
Max. 376...EC5900A (Max. 94 steps/pattern)

Setting method:

X-Y type by settings of time and target setpoint

Setting range:

Setpoint; Whole input range width
Time setting; 0h00min to 399h59min or
0h00min00s to 5h59min59s (switching type)

Repeat action: Maximum 999 repeats

PV start: Enabled

Link between patterns: Enabled

Guaranteed soak: Enabled

Pattern selection: Keys, DI or external communication

Operation: RUN/STOP, ADVANCE and RESET

7-segment LED display: PV, pattern No. and step No.

LED lamps: ALM, OUT, COMM, MAN, RUN

LCD display: SP, TIME, OUT, graphic pattern display

Comment display, data display



EC5600S

EC5900A

● Input

Range: Multi-range system (limited in a range group) Refer to the range table.

Resolution: 1°C...EC5600S

(Part of the range group II; 0.1°C)

0.1°C...EC5900A

(Part of the range group II; 0.01°C)

Accuracy rating: $\pm(0.2\% + 1 \text{ digit})$...EC5600S

$\pm(0.1\% + 1 \text{ digit})$...EC5900A

Input polygonal line approximation (EC5900A only):

mV/V/mA input (10 polygonal lines)

Burnout: TC/mV input...Upscale

Sensor correction: Applicable to TC/RTD input
0 ~ $\pm 30.0^\circ\text{C}$

Input filter: First-order lag filter 0 ~ 20 seconds
or moving average 1 ~ 8 times

Scaling: a) With setting range limiter for ranges of TC/RTD

b) Ranges of mV/mA; Scaling enabled

-1999 ~ 9999.....EC5600S

-19999 ~ 19999...EC5900A

Signal source resistance:

TC/mV input; Effect of about 0.13 $\mu\text{V}/\Omega$

RTD; Leadwire resistance 5 Ω or less

Input resistance: V inputApprox. 500k Ω

Current input...Approx. 250 Ω

CMRR: 150dB or more

NMRR: 60dB or more

● Control

Control computation cycle: 0.1 second

Control mode: PID control, PD control, ON-OFF control,
3-position control (Dual output only)

PID: Switching system of multi-PID/programmed PID

Multi-PID... Selection of 1 set from 8 sets of PID
parameters on a step basis

Programmed PID... Proportional computation system
by 3 reference points

Control constants:

Proportional band (P); 0.1 ~ 999.9%

Integral (reset) time (I); 0.01 ~ 99.99 minutes

Derivative (rate) time; 0.00 ~ 20.00 minutes

Manual reset (b);

(Available when the control mode is set to PD control)
0.0 ~ 100.0%

D.BAND (Dead band coefficient);

$\pm(0 \sim 0.500)$ (available only with dual output)

HYSTERESIS (Hysteresis band in 2-position or 3-position control); 0.00 ~ 20.00%

Output limit (1st output only):

Switching system of multi-output limit/programmed output limit

Note: 2nd output...No limiter

Multi-output limit...

Selection of 1 set from 8 sets for each Hi and Lo on a step basis

Programmed output limit...

Proportional computation system by 3 reference points

Auto/Manual: Switching of bump-less and balance-less

Direct/reverse action:

Setting up by front keys (dual output type: reverse action fixed)

Cycle time: 1 ~ 120 seconds

(when the output is set to the relay output or the SSR drive output)

CONT·STOP (C·STOP):

When the control action is stopped, a preset value is output.

Preset output:

0.0 ~ 100.0% (Within an output limit, ON or OFF is selectable.)

Self-diagnosis abnormal, PV abnormal, C·STOP, When the power interruption for about 50ms, is recovered, the action shown in the list below is taken.

Preset output ON/OFF	C·STOP	PV abnormal Self-diagnosis abnormal	When the power interruption for about 50ms or more is recovered
ON	Preset output value	Preset output value	Preset output value AUTO→MAN
OFF	Preset output value	Output low-limiter value	Output low-limiter value

Auto-tuning: Available

Anti-overshoot: ON/OFF

● **Types of control output**

a) **1st output (multi-output):** Current, SSR drive, Relay

● Current output; 4 ~ 20mADC (Max. 600Ω)

● SSR drive output: ON...15VDC (Max. 20mA)
OFF...0VDC

● Relay contact output:

Form-A contact 250VAC 3A (resistive load)

b) **1st output:** 0 ~ 5mADC (Max. 2kΩ)...option

c) **2nd output:** Optional combinations from the current output, the SSR drive and the relay contact Ratings are same as Items a) and b).

d) **Servo drive output (option):**

Power source for control equipments;

24 ~ 100VAC, 50/60Hz

Output: SSR 1AACmax

For single-phase capacitor motor

Feedback resistance; 100 ~ 2.5kΩ

Free auto-calibration type

Deadband; 0.5 ~ 10.0% adjustable

● **Alarms**

Types: PV alarm

(High-high limit, high limit, low limit, low-low limit)

SP alarm

(High-high limit, high limit, low limit, low-low limit)

Deviation alarm

(High-high limit, high limit, low limit, low-low limit)

Deviation absolute value alarm (2 types)

Heater monitoring alarm (option)

Setting range: PV alarm...Whole input range

SP alarm...Whole input range

Deviation alarm...

High limit; 0 ~ input range width

Low limit; Input range width ~ 0

Deviation absolute value alarm...

0 ~ input range width

Alarm output hysteresis width:

Enables to set 0 to input range width

Pause function:

The pause function enabled or disabled is selectable.

Not available in SP alarm

● **Contact output (DO)**

Number of outputs: 4 points (common to COM terminal)

Alarm output: Refer to the alarm shown above.

Status outputs:

AUTO/MAN status (ON when the status is MAN)

RUN/STOP status (ON when the status is RUN)

FAIL alarm (ON when the CPU is abnormal)

CONT·STOP (ON when the control action is STOP)

END (ON when the program is END)

DO

Timing DO (1 ~ 999 seconds)

Form-1A contact x 4 (common to COM terminal)

(4 outputs from the alarm types and the status output shown above are selectable.)

Contact rating: 250VAC 1A (resistive load)

● **Contact input (DI)**

Signal assignment:

ON signal...when the input circuit is closed

OFF signal...when the input circuit is open

Number of inputs: 4 points

Input condition: 15VDC 1mA to drive a photo-coupler

Types: RUN/STOP [Program RUN (STOP) when the signal is ON (OFF)]

ADV (The running step NO. is advanced each time when the signal is turned ON)

RST (The running step NO. is set to 00 each time when the signal is turned ON)

AUTO/MAN [MAN (AUTO) when the signal is ON (OFF)]

CONT·STOP [CONT·STOP (CONT·RUN) when the signal is ON (OFF)]

PTN SELECT (ON: enabled)

CONDITION (ON: step progressing condition)

● **Display**

DI/DO (Configurable by key entry)

Terminals	DO	DI	Remarks
A	Note 1		Standard
B			
C			
D			
1	Note 2	Note 3	Option (when using DI/DO expansion adapter)
2			
3			
4			
5			
6			
7			
8			

Note 1: Selection from ALM, RUN, END, MAN, DO, timing DO, FAIL and CONT·STOP

Note 2: Selection from RUN, END, MAN, DO, timing DO and CONT·STOP

Note 3: Selection from RUN, ADV, RST, COND, MAN, CONT·STOP and PTN·SELECT

When DI and DO are used in a program, up to 4 contacts for each of DI and DO can be used in one step.

Types: 7-segment LED
PV (green) 4-digit...EC5600S
5-digit...EC5900A
Pattern No. (orange) 2-digit
Step No. (orange) 2-digit
LED lamp [RUN (green), MAN (green), OUT (green),
ALM (red), COMM (green)]
LCD... 16-character x 4-line (Backlight: green)
Operation screen 1... Current setpoint (SP)
Target setpoint (SP)
Step residual time
Graphic pattern display (left
side)
Operation screen 2... 1st output value
2nd output value (available with
dual output)
Status display
Graphic pattern display (left
side)

Display update: 0.2 second

Auto restoration:

If no key is pressed within 2 minutes, the display will automatically return to the operation screen.

● **Common specifications**

All reset: Enabled

Key lock: Enabled

Memory backup: Non-volatile memory

Front panel: Polyester sheet

Key switch with click

Failsafe: When the instrument becomes abnormal, the output will change to 0% or a preset value by a watch-dog timer and various self-diagnosis functions. FAIL output enabled (when the CPU is abnormal or when a self-diagnosis function is abnormal)

Operating temperature range: -10 ~ 55°C

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

Mass: Approx. 500g

Power consumption: Approx. 9 ~ 18VA/100 ~ 200VAC

Attachments: Mounting brackets, instruction manual, terminal cover (for PV) ... EC5900A only

OPTION

Analog retransmission:

0 ~ 20mADC or 4 ~ 20mADC for a setting scale is selectable.

Process variable (PV), setpoint (SP) or output value (OUT) is selectable.

Accuracy rating... $\pm 0.2\%$... EC5600S
 $\pm 0.1\%$... EC5900A

Resolution: 0.05% or less

Load resistance: Max. 400Ω (current output)

Communication function: RS-232C, RS-422A

(Communication modules and communication cables are sold separately.)

Extension I/F (ARCNET®):

LAN for extended functions

Token-bus N: N communication

Transmission speed 2.5Mbps

20 nodes/ network

255 nodes max (using HUB)

Application... ● Heater monitoring function

● Connection to EC5800R or EC5500R

* ARCNET® is a registered trademark of Datapoint Corporation, USA.

Sensor power: DC24V 24mA max

DI/DO expansion adapter (CA2005A02; sold separately):

DI 7 points Contact input

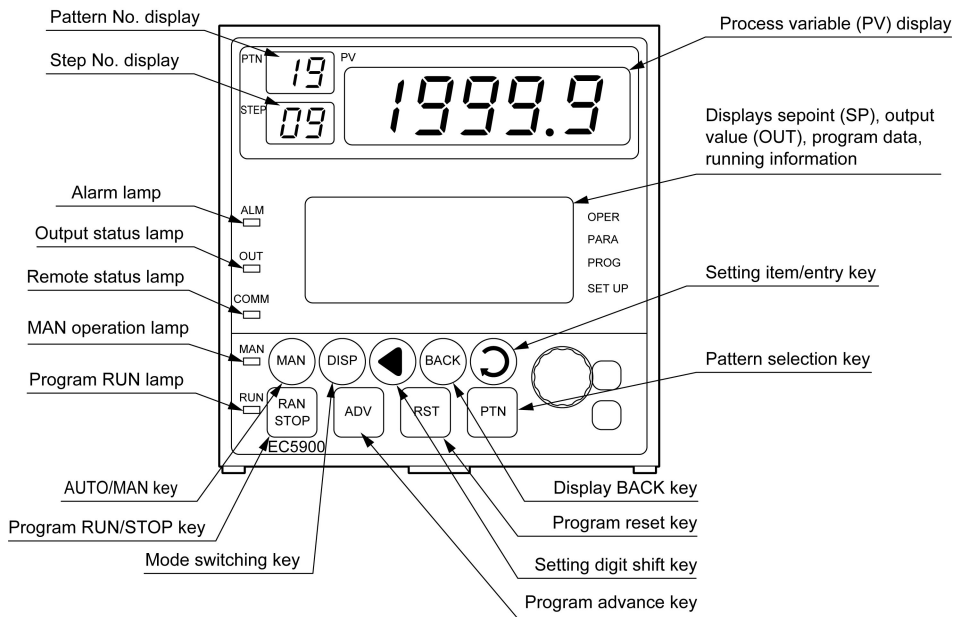
DO 8 points Form-1A 250VAC 1A (resistive load)

Power supply: 100V/110VAC or 200V/230VAC

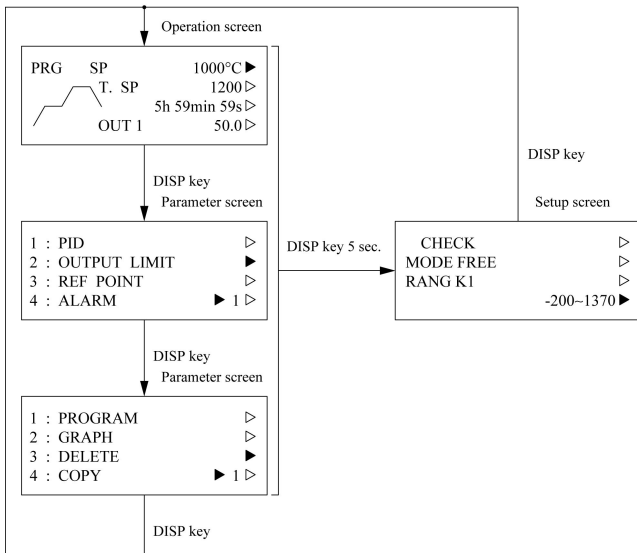
Power consumption: About 3VA/100VAC

Weight: Approx. 1.9kg

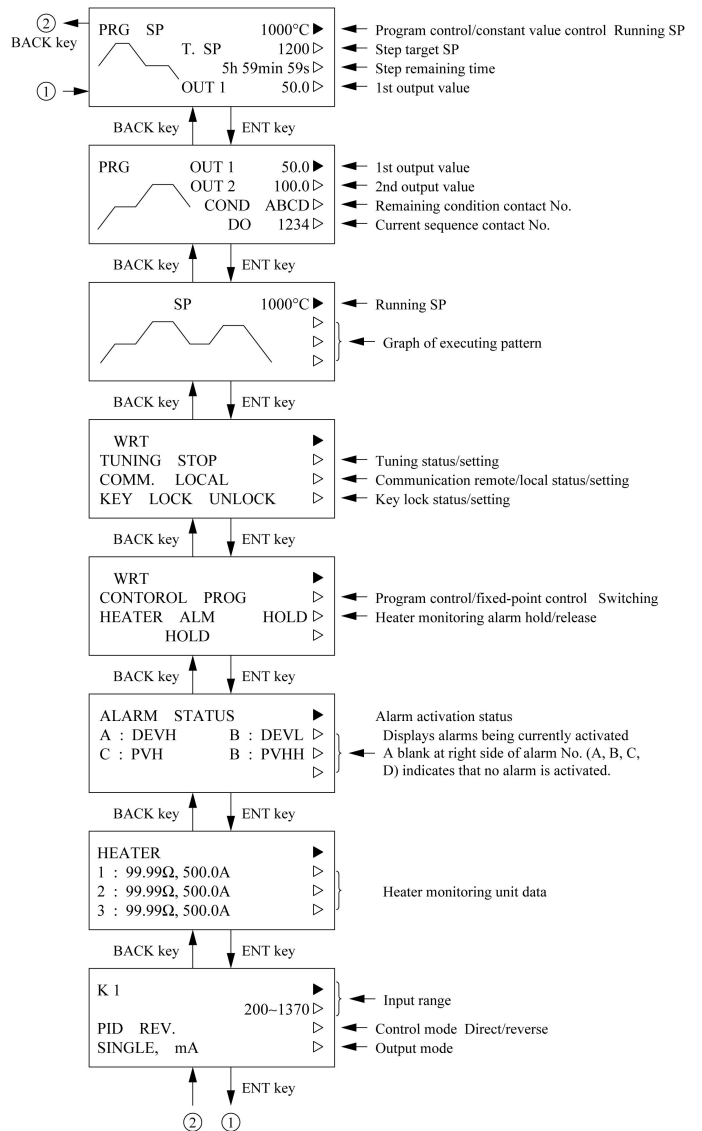
NAMES OF FRONT PANEL PARTS



Types of operation screens



Display examples of operation screens



MODEL CODE NUMBER

(1) (2) (3) (4) (5) (6)
 EC56 [] [] S1 [] [] [] 0
 59 [] [] A [] [] []

(1) Range group

1	I type	TC, mV, V, mA
2	II type	Pt100, JPt100
3	III type	TC, mA, V, mA

(2) 1st output

1	Relay
2	SSR drive
3	-
4	-
5	4 to 20mA
6	0 to 5mA
7	-
8	Multi
9	-

(6) 2nd output

0	None
1	Relay
2	SSR drive
3	-
4	-
5	4 to 20mA
6	0 to 5mA

Note 1 For 1st output, specify 8 or 6.
 For 2nd output, specify 1, 2, 5 or 6.
 Multi-output: Relay, SSR drive, 4 to 20mA

(3) Color

Black

(4) Built-in option

0	None
1	-
2	-
3	AO
4	-
5	-
6	-
7	-
8	Sensor power + AO

Note 2

(5) Extension option

0	None
1	Extension I/F
2	Servo drive
3	Extension I/F + servo drive

Note 3

Note 4

Note 3

Note 2 For the voltage output, use an external resistance HMSU3081A02 (250Ω±0.1%).

Note 3 The extension I/F is used for the connection to ARCNET®.

Note 4 For using the servo drive, select 8 (multiple output) in 1st output.

RANGE LIST

Range group	Range ID	Input	Input range	
			EC5600S	EC5900A
I type (26 kinds)	B	B	0 ~ 1820°C	0.0 ~ 1820.0°C
	R1	R	0 ~ 1760°C	0.0 ~ 1760.0°C
	R2	R	0 ~ 1200°C	0.0 ~ 1200.0°C
	S	S	0 ~ 1760°C	0.0 ~ 1760.0°C
	K1	K	-200 ~ 1370°C	-200.0 ~ 1370.0°C
	K2	K	0 ~ 600°C	0.0 ~ 600.0°C
	K3	K	-200 ~ 300°C	-200.0 ~ 300.0°C
	E1	E	-200 ~ 700°C	-200.0 ~ 700.0°C
	E2	E	-270 ~ 300°C	-270.0 ~ 300.0°C
	E3	E	-270 ~ 150°C	-270.0 ~ 150.0°C
	J1	J	-200 ~ 900°C	-200.0 ~ 900.0°C
	J2	J	-200 ~ 400°C	-200.0 ~ 400.0°C
	J3	J	-100 ~ 200°C	-100.0 ~ 200.0°C
	T1	T	-270 ~ 400°C	-270.0 ~ 400.0°C
	T2	T	-200 ~ 200°C	-200.0 ~ 200.0°C
	C	WRe5-26	0 ~ 2320°C	0.0 ~ 2320.0°C
	N	N	0 ~ 1300°C	0.0 ~ 1300.0°C
	PR42	PR40-20	0 ~ 1880°C	0 ~ 1880.0°C
	PL1	PLII	0 ~ 1390°C	0.0 ~ 1390.0°C
	PL2	PLII	0 ~ 600°C	0.0 ~ 600.0°C
	10mV	mV	0.0 ~ ±10.0mV	0.0 ~ ±10.0mV
	20mV	mV	0.0 ~ 20.0mV	0.0 ~ 20.0mV
	50mV	mV	0.0 ~ 50.0mV	0.0 ~ 50.0mV
	1-5V	V	1.0 ~ 5.0V	1.0 ~ 5.0V
	0-5V	V	0.0 ~ 5.0V	0.0 ~ 5.0V
	20mA	mA	4.0 ~ 20.0mA	4.0 ~ 20.0mA
II type (10 kinds)	Pt0	Pt100	-200 ~ 650°C	-200.0 ~ 650.0°C
	Pt1	Pt100	-200 ~ 400°C	-200.0 ~ 400.0°C
	Pt2	Pt100	-200.0 ~ 300.0°C	-200.0 ~ 300.0°C
	Pt3	Pt100	-200.0 ~ 200.0°C	-200.00 ~ 200.00°C
	Pt4	Pt100	-100.0 ~ 100.0°C	-100.00 ~ 100.00°C
	JPt0	JPt100	-200 ~ 630°C	-200.0 ~ 630.0°C
	JPt1	JPt100	-200 ~ 400°C	-200.0 ~ 400.0°C
	JPt2	JPt100	-200.0 ~ 300.0°C	-200.0 ~ 300.0°C
	JPt3	JPt100	-200.0 ~ 200.0°C	-200.00 ~ 200.00°C
	JPt4	JPt100	-100.0 ~ 100.0°C	-100.00 ~ 100.00°C
III type (21 kinds)	K1	K	-200 ~ 1370°C	-200.0 ~ 1370.0°C
	K2	K	0 ~ 600°C	0.0 ~ 600.0°C
	K3	K	-200 ~ 300°C	-200.0 ~ 300.0°C
	E1	E	-200 ~ 700°C	-200.0 ~ 700.0°C
	E2	E	-270 ~ 300°C	-270.0 ~ 300.0°C
	E3	E	-270 ~ 150°C	-270.0 ~ 150.0°C
	J1	J	-200 ~ 900°C	-200.0 ~ 900.0°C
	J2	J	-200 ~ 400°C	-200.0 ~ 400.0°C
	J3	J	-100 ~ 200°C	-100.0 ~ 200.0°C
	T1	T	-270 ~ 400°C	-270.0 ~ 400.0°C
	T2	T	-200 ~ 200°C	-200.0 ~ 200.0°C
	AuFe	Au-Fe	0 ~ 300K	0.0 ~ 300.0K
	N	N	0 ~ 1300°C	0.0 ~ 1300.0°C
	U	U	-200 ~ 400°C	-200.0 ~ 400.0°C
	L	L	-200 ~ 900°C	-200.0 ~ 900.0°C
	10mV	mV	0.0 ~ ±10.0mV	0.0 ~ ±10.0mV
	20mV	mV	0.0 ~ 20.0mV	0.0 ~ 20.0mV
	50mV	mV	0.0 ~ 50.0mV	0.0 ~ 50.0mV
	1-5V	V	1.0 ~ 5.0V	1.0 ~ 5.0V
	0-5V	V	0.0 ~ 5.0V	0.0 ~ 5.0V
	20mA	MA	4.0 ~ 20.0mA	4.0 ~ 20.0mA

Note) For mv, V and mA input, linear scaling or square root extraction scaling is selectable.

10 input polygonal line approximation is enabled in EC5900A.

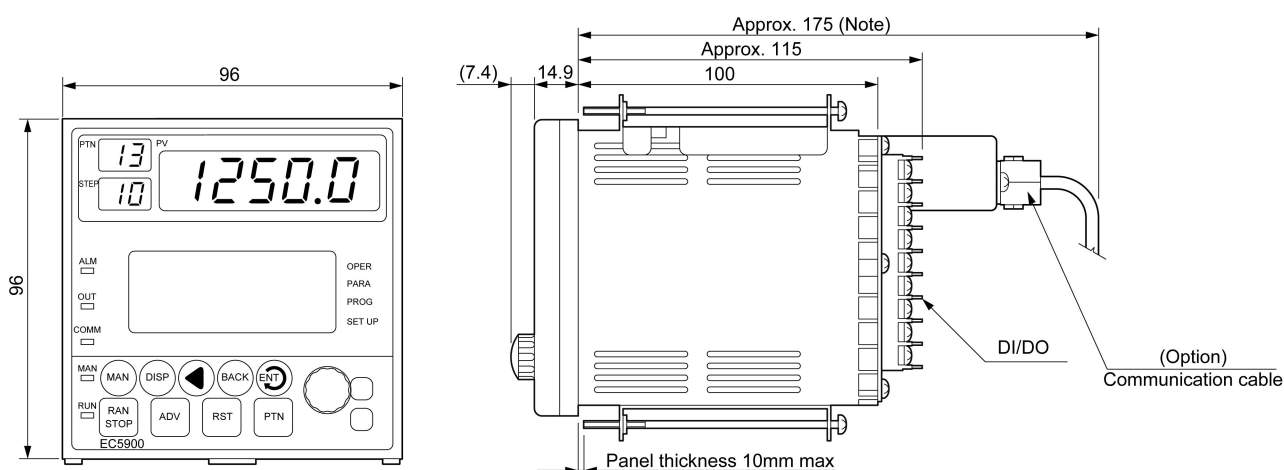
DEFAULT SETTINGS

Default settings at the shipment from the factory.

	Function		Default settings	
			EC5600S	EC5900A
Display/input	I type III type	Range	K1, -200 ~ 1370°C	K1, -200.0 ~ 1370.0°C
		PV abnormal High	1401°C	1401.4°C
		PV abnormal Low	-231°C	-231.4°C
	II type	Range	PI0, -200 ~ 650°C	PI0, -200.0 ~ 650.0°C
		PV abnormal High	667°C	667.0°C
		PV abnormal Low	-217°C	-217.0°C
	Key lock		UNLOCK	
Control	Program control/constant value control		Program control	
	Function mode		Free	
	Sensor correction		OFF	
	Number of moving average times		8 times	
	Control mode		PID (P: 2.0%, I: 3.00min, D: 0.00min)	
	Direct/reverse action		Reverse action	
	Preset output		OFF	
	CJC (I and III types)		ON	
Program	PID output limiter		Single mode	
	Fixed pattern/free pattern		Free pattern	
	Number of patterns		16	
	Time unit		h, m	
	Pattern link		OFF	
	Guaranteed soak		OFF	
	PV start		OFF	
	At end of program		CONT (continuance of control)	
Digital input	DI assignment		A to D: Condition	
Digital output	DO assignment	I type III type	A: Deviation high alarm 1570°C Alarm pause OFF Hysteresis width 2°C B: Deviation low alarm -1570°C Alarm pause OFF Hysteresis width 2°C C, D: Sequence contacts	A: Deviation high alarm 1570.0°C Alarm pause OFF Hysteresis width 1.6°C B: Deviation low alarm -1570.0°C Alarm pause OFF Hysteresis width 1.6°C C, D: Sequence contacts
			II type	A: Deviation high alarm 850°C Alarm pause OFF Hysteresis width 1°C B: Deviation low alarm -850°C Alarm pause OFF Hysteresis width 1°C C, D: Sequence contacts
Communication	Communication speed		9600bps	9600bps
	Address		0	0

DIMENSIONS

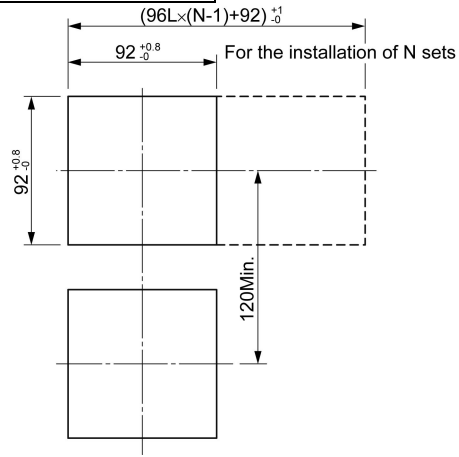
Unit: mm



Note) Approx. 133mm when RS-422A module is attached

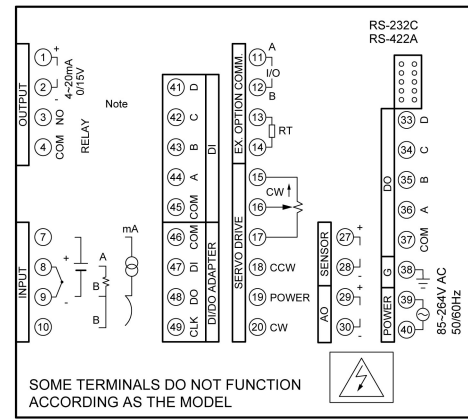
PANEL CUTOUT

Unit: mm

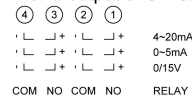


TERMINAL CONFIGURATION

In case of multiple output



Note: The following configuration is for 2-output or 0 ~ 5mA output.

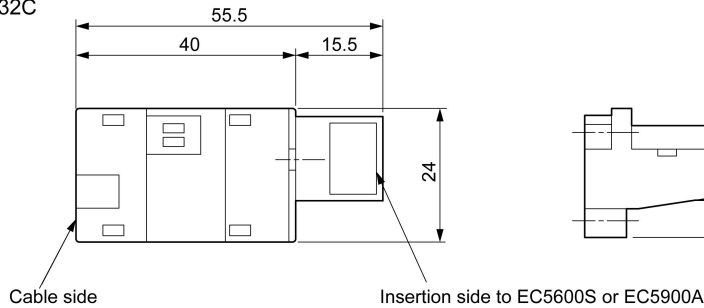


PERIPHERAL UNIT

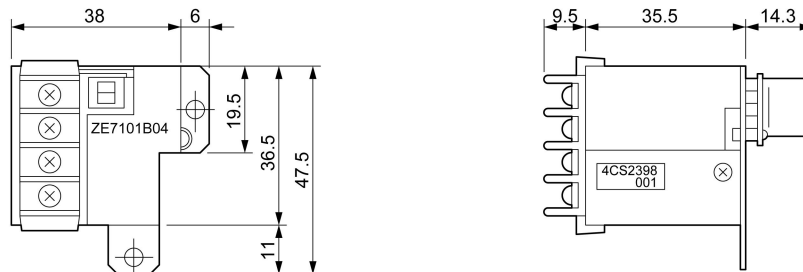
● Communication module

	Type	Model	Remarks
1	RS-232C	ZE7101A0104	EC5600S
2	RS-232C	ZE7101A0105	EC5900A
3	RS-422A	ZE7101B0404	EC5600S Terminal block type Up to 32 sets can be connected to a HOST.
4	RS-422A	ZE7101B0405	EC5900A Terminal block type Up to 32 sets can be connected to a HOST.

For RS-232C



For RS-422A



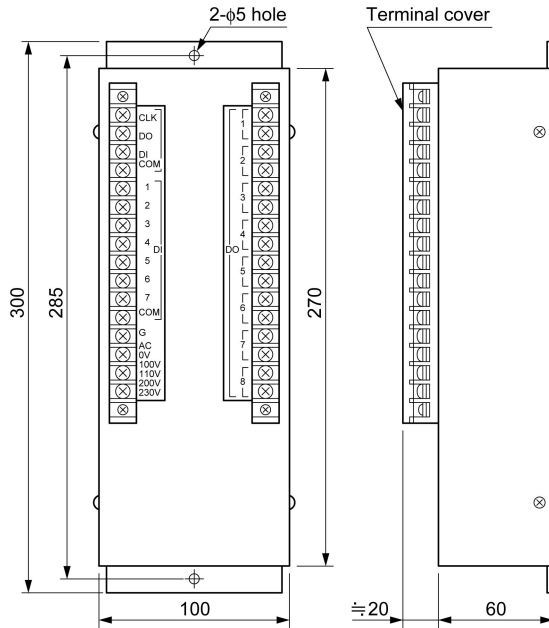
● **Communication cable**

For RS-232C:

Model; HMSU2255B02 With an exclusive connector for the instrument side, cable length 2m, D-sub connector (male) for other side

● **DI/DO expansion adapter (CA2005A02)**

Dimensions (Unit: mm)



● **Extension option**

Heater monitoring unit Model: ZE7201

Note: The extension I/F is required for EC5600S/EC5900A.

Use the following cable.

HMSU2032A7601 (2m), CO-SPEV-SB(A) 1P×0.3SQ or equivalent cables

● **External resistor**

Model: HMSU3081A02

Resistance: 250Ω ± 0.1%

⚠ CAUTION

Do not install this device before consulting instruction manual

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Specifications are subject to change without notice.

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

