Specifications Sheet	No.SPEC-1244E (1st Edition)
EC5900R	**Digital Programmer/Controller**

OUTLINE

Model EC5900R are digital programmer/controller offering flexible control by storing programs of 400 steps (maximum 100 steps per pattern) and maximum 19 patterns.
Sufficient comments displayed in the display of 16 character × 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

■ **It is lineup about one channel type and two channel types**
1 channel-type basic model : EC5900R
2 channel-type basic model : EC5950R

■ **The program function of fullness**
- ● The mass program of a maximum of 400 steps and 19 patterns
- ● DO : A maximum of 15 points, DI : A maximum of 12 points
- ● Time Units : Enables to switch time unit (minute/second) of programs
- ● It is easy edit about a program pattern by deletion/insertion function of a step, and deletion/copy function of a pattern

■ **High accuracy : ± (0.1% + 1 digit)**
Multi-Input (Thermocouple, RTD, Voltage or Current), Multi-Output (Current, SSR drive, Relay)

■ **Anti-overshoot control**

■ **Multi-PID, Programmed PID, Multi-output limit, Programmed output limit**

■ **Easy replace from EC5600S/EC5900A (They are following and terminal-arrangements community about a function and operability)**

SPECIFICATIONS

● Programs
Number of programs: 1 (1program-2controls) or
(EC5950R) 2 (2programs-2controls : 2ch independent control)
Number of patterns :
Max 19 ····· EC5900R
Max 38 (19×2programs) ···· EC5950R
Number of steps: Max 400 (Max 100/ 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 range: 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

● Input
Points: 1 ····· EC5900R
2 ····· EC5950R
Range: Multi-range system (limited in a range groupe)
Refer to the range table.
Resolution: Five columns: 0.1°C
(Part of the range;0.01°C)
Four columns: 1°C
Accuracy rating: ± (0.1% + 1 digit)
However, TC input does not include reference-junction compensation error.
(Refer to Range and Accuracy Table)
Input polygonal line approximation:
mV, V, mA input (10 polygonal lines)
Burn out: TC/ mV input ····· Upscale
Sensor correction: Applicable to TC/RTD input
0.0 ~ ± 100.0°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) Rages of mV/mA; Scaling enabled

Four columns: -1999 ~ 1999

Five columns: -19999 ~ 19999

Signal source resistance:

TC/mV Input; Effect of about 0.13μV/Ω

RTD; Lead wire resistance 5Ω or less

Input resistance: V Input ····· Approx.500kΩ

Current Input ····· Approx.250Ω

CMRR: 140 dB or more

NMRR: 60 dB or more

Range and Accuracy Table

INPUT	CODE	ACCURACY	REMARKS
B	B *1	±(0.1%+1digit)	*1 0~400℃:±4%
R	R1 *2		400~800℃:±(0.15%+1digit)
R	R2 *2		
S	S *2		*2 0~200℃:±(0.15%+1digit)
K	K1		
K	K2		
K	K3		
E	E	±(0.15%+1digit) within -200 to 0℃	
J	J1		
J	J2		
T	T *3		*3 -270~-200℃:±(1%+1digit)
Wre_{5-26}	C		
N	N		
PL Ⅱ	PL2		
U	U		
L	L		*4 0~20K:±(0.5%+1digit)
Au-Fe	AUFE *4	±(0.2%+1digit)	20~50K:±(0.3%+1digit)
PR_{40-20}	PR42 *5		*5 0~300℃:±(1.5%+1digit)
Pt100 JPt100	Pt0 JPt0 Pt1 JPt1	±(0.1%+1digit)	300~800℃:±(0.8%+1digit)
	Pt2 JPt2	±(0.15%+1digit)	

reference-junction compensation error :±1℃(15~35℃)
±1.5℃(0~15℃, 35~55℃)
±2℃(-10~0℃)

● Control

Control computation cycle: 0.1 second

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

PID: Switching system of single PID/multi-PID/programmed PID

Single PID ····· It always uses same PID

Multi-PID ····· Selection of 1set 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(D); 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);

± (0 ~ 0.500) (available only with dual output)

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

Output limit:

Switching system of single output limit/multi-output limit/programmed output limit

Note; 2nd output always uses same output limit.

Single output limit····· It always uses same output limit

Multi-output limit····· Selection of 1set 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.)

C·STOP, when the power interruption for about 50ms or more is recovered, the action shown in the list below is taken.

Preset output ON/OFF	C·STOP	When the power interruption for about 50ms or more is recovered
ON	Preset output value	Preset output value AUTO → MAN
OFF	Preset output 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)

0 ~ 5mADC (Max. 2kΩ) ···· option

● SSR drive output; ON····· 15VDC (Max. 20mA)

OFF···· 0VDC

● Relay contact output;

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

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

c) Servo drive output(option):

Power source for control equipments;

24 ~ 100VAC, 50/60Hz

Output; SSR 1AAC Max.

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 limit, Low limit)

SP alarm; (High limit, Low limit)

Deviation alarm; (High limit, Low limit)

Deviation absolute value

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: Max. 5 points (2 points; standard, 2 points; option, 1 point; When the relay is not used for the control output, it is possible to specify it.)
It is one side commonness excluding the control output.
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 × 4
(common to COM terminal (The control output relay is excluded.))
(Max. 5 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	Note1	Note3	Standard
B			
C			
D			
E		—	
1	Note2	Note3	Option (when using DI/DO expansion adapter or DI/DO connector)
2			
3			
4			
5			
6			
7			
8			
9			Option (when using DI/DO connector)
a			

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) 5 digit
Pattern No. (orange) 2-digit
Step No. (orange) 2-digit
LED lamp [RUN (green), MAN (orange), OUT (orange) , ALM (red), COMM (green), 1CH (green), 2CH (green)]
LCD····· 16-character × 4-line (Backlight: green)
Operation screen 1·····Current setpoint (SP)
Target setpoint (SP)
Step residual time
1st output value
Graphic pattern display (left side)
Operation screen 2·····2nd output value (available with dual output)
Status display
Display update: 0.2 seconds
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 (Fe-RAM)
Front panel: Dust-proof and Drip-proof front panel conforming to IP65.
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)

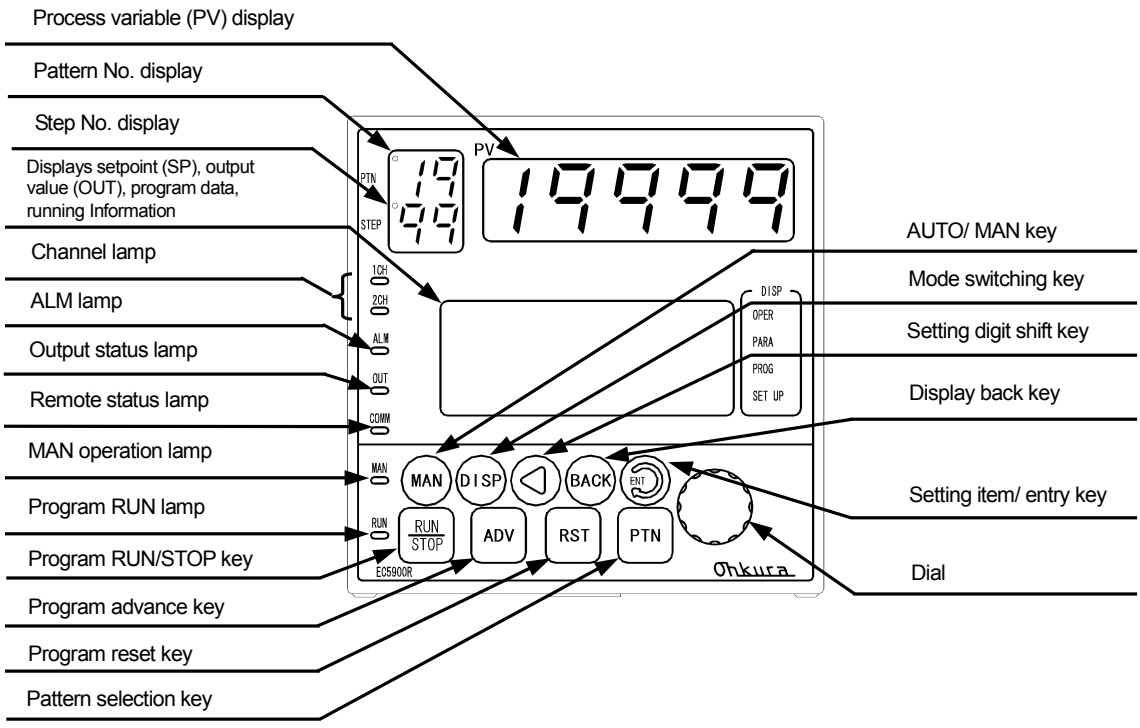
Operating temperature range: -10 ~ 55°C
Power supply: Voltage rating at 100 to 240VAC, 50/60Hz
Mass: Approx. 500g
Power consumption: 30VA Max.
Attachments: Mounting brackets, instruction manual

● Safety and EMC standards
(The agreement evaluation is done.)
Electrical safety: IEC61010-1
Emissions: EN61326-1
Immunity: EN61326-1

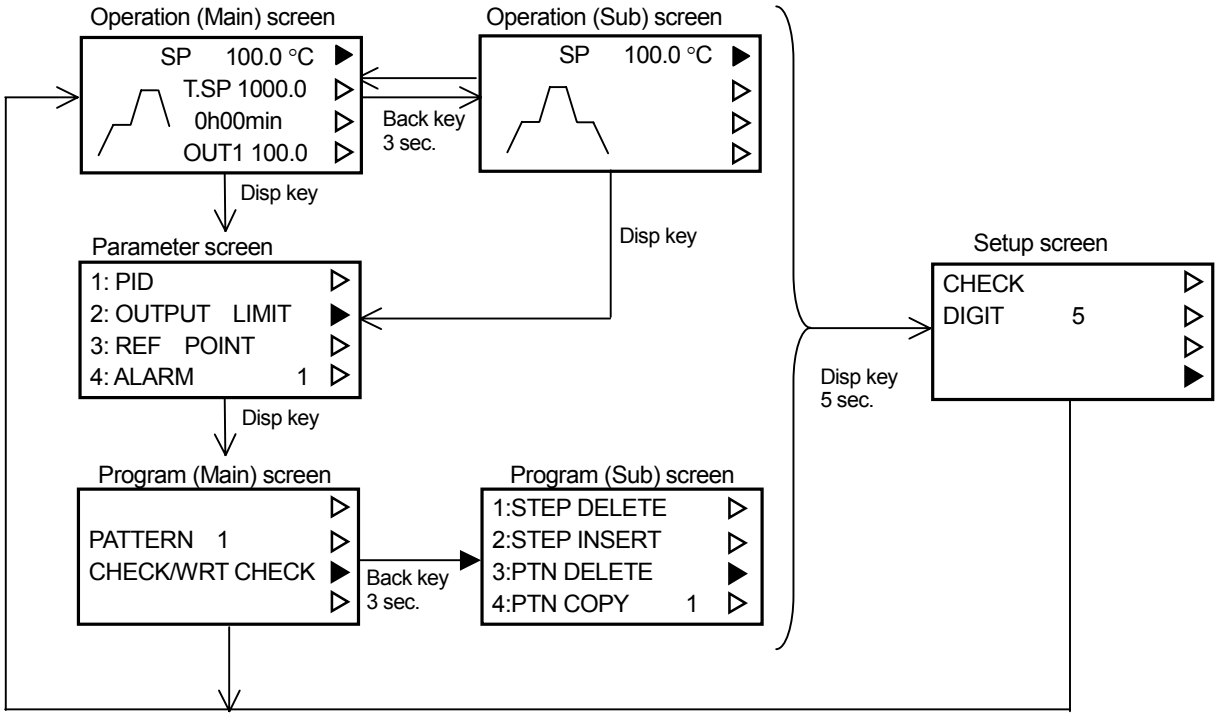
● Option
Analog retransmission:
0 ~ 20mADC or 4 ~ 20mADC for a setting scale is selectable.
Process variable (PV), setpoint (SP), or output value (OUT), is selectable.
Accuracy rating; ± 0.1%
Resolution; 0.05% or less
Load resistance; Max. 600Ω (current output)
Communication function: RS-232C, RS-422A, RS-485
(Communication modules and communication cables are sold separately. RS-485 has the type with built-in the main body.)

Extension I/F (ARCNET®):
LAN for extended functions
Token-bus N: N communication
Transmission speed 2.5 Mbps
20 nodes/ network
255 nodes max (using HUB)
Application ····· ● Heater monitoring function
● Connection to EC5500R or EC5800R
* ARCNET® is a registered trademark of Datapoint Corporation, USA.
Sensor power: 24VDC 24mA Max.
DI/DO connector:
DI; 8 points Contact input
DO; 10 points Open collector output
(30 VDC, 20mA)
DI/DO connector cable;
WMSU0243A* 01:1m, 02: 5m, sold separately
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
ower consumption; Approx. 3VA/ 100VAC
Mass; Approx. 1.9kg

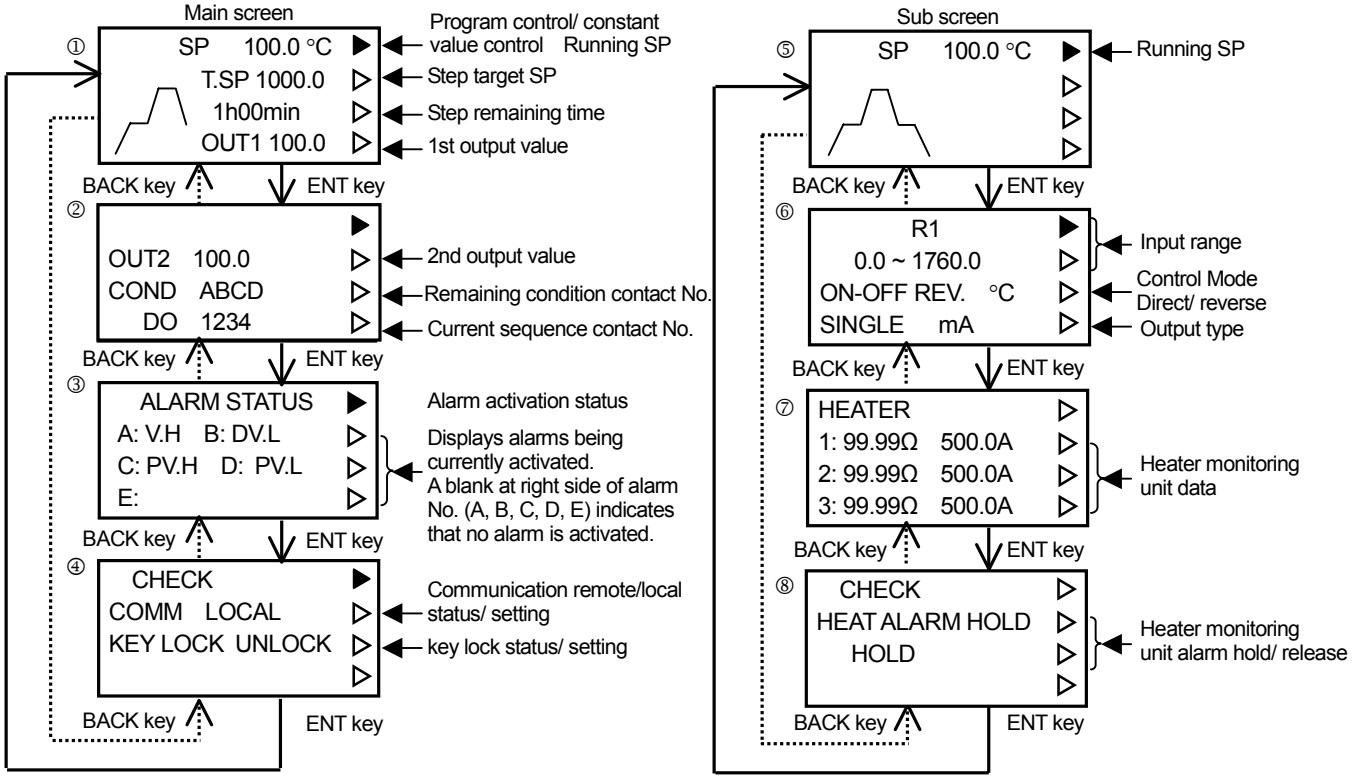
PART NAMES AND FUNCTION



Types of operation screens



Display examples of operation screens



MODEL CODE NUMBER

EC59 ① ② R ③ ④ ⑤ ⑥ ⑦ ⑧

①Control method Note4

0	1 channel
5	2 channel

②1st output Note 1

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

③Event relay output Note 2

0	2 points
1	4 points

④Built-in option Note 3

0	None
5	AO
8	Sensor power + AO

⑤Extension option Note 1, 4

0	None
1	Extension I/F
2	Servo drive
3	Extension I/F + Servo drive
4	RS-485
5	2 channel, multi-output
6	2 channel, multi-output, RS-485
7	2 channel, 0 to 5mA output
8	2 channel, 0 to 5mA output, RS-485

⑥2nd output Note 1

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

⑦DI/DO option

0	None
1	DI/DO adapter terminal
2	DI/DO connector

⑧Special

0	None
Z	Special

Note1: Designating 1st output, 2nd output and servo drive

Output type	1st output	2nd output
Single output multi	8	0
Single output 0- 5 mA	6	0
Dual output	One of 1, 2, 5 and 6	One of 1, 2, 5 and 6
Servo drive	8	0

Note 2: When select 8 by the 1st output and do not use the relay output, point of contact output appointment becomes 5 points with 3 points, "1" with "0".

Note 3: For the voltage output, use an external resistance HMSU3081A02 (250Ω ± 0.1%)

Note 4. Designating extension option

Control method	Extension option
EC590∗R	0, 1, 2, 3, 4
EC595∗R	0, 5, 6, 7, 8

RANGE TABLE

Input	Range code	Input range	
		5 columns	4 columns
TC (Thermocouple) input			
B	B	0.0～1820.0℃	0～1820℃
R	R1	0.0～1760.0℃	0～1760℃
R	R2	0.0～1200.0℃	0～1200℃
S	S	0.0～1760.0℃	0～1760℃
K	K1	-200.0～1370.0℃	-200～1370℃
K	K2	0.0～600.0℃	0～600℃
K	K3	-200.0～300.0℃	-200～300℃
E	E	-200.0～700.0℃	-200～700℃
J	J1	-200.0～900.0℃	-200～900℃
J	J2	-200.0～400.0℃	-200～400℃
T	T	-270.0～400.0℃	-270～400℃
WRe5-26	C	0.0～2320℃	0～2320℃
N	N	0.0～1300.0℃	0～1300℃
PR40-20	PR42	0.0～1880.0℃	0～1880℃
PLⅡ	PL2	0.0～1390.0℃	0～1390℃
U	U	-200.0～400.0℃	-200～400℃
L	L	-200.0～900.0℃	-200～900℃
Au-Fe	AUFE	0.0～300.0K	0～300K
DC (Voltage and current) input			
mV	10mV	0.0～±10mV	
mV	20mV	0.0～20.0mV	
mV	50mV	0.0～50.0mV	
V	0-1V	0.0～1.0V	
V	1-5V	1.0～5.0V	
V	0-5V	0.0～5.0V	
V	0-10V	0.0～10.0V	
mA	20mA	4.0～20.0mA	
RTD (Resistance temperature detector) input			
Pt100	Pt0	-200.0～850.0℃	-200～850℃
	Pt1	-200.0～300.0℃	-200～300℃
	Pt2	-150.00～150.00℃	-150.0～150.0℃
JPt100	JPt0	-200.0～650.0℃	-200～650℃
	JPt1	-200.0～300.0℃	-200～300℃
	JPt2	-150.00～150.00℃	-150.0～150.0℃

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

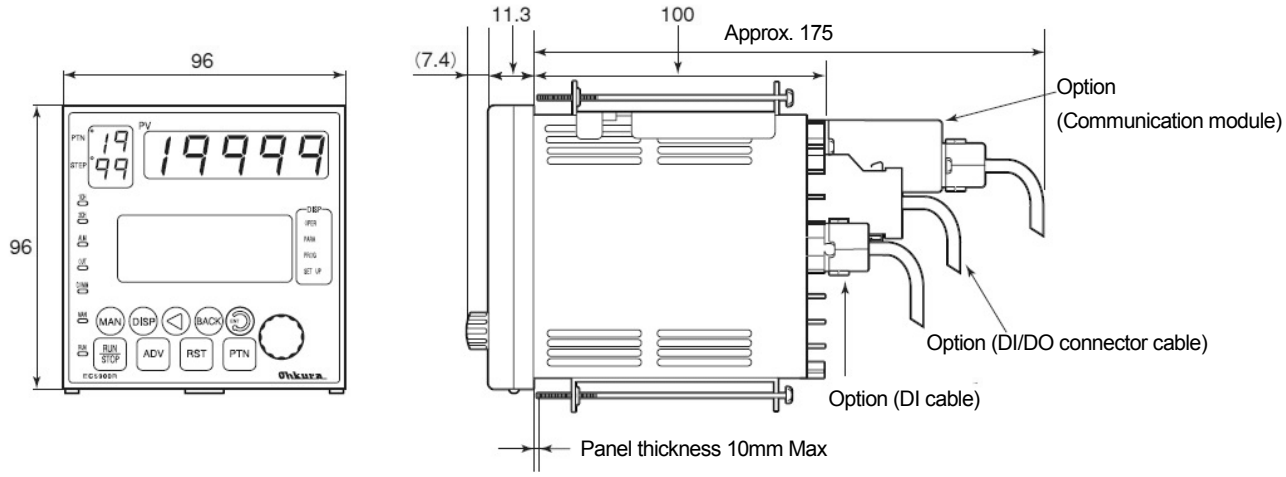
DEFAULT SETTINGS

Default settin g at the shipment from the factory.

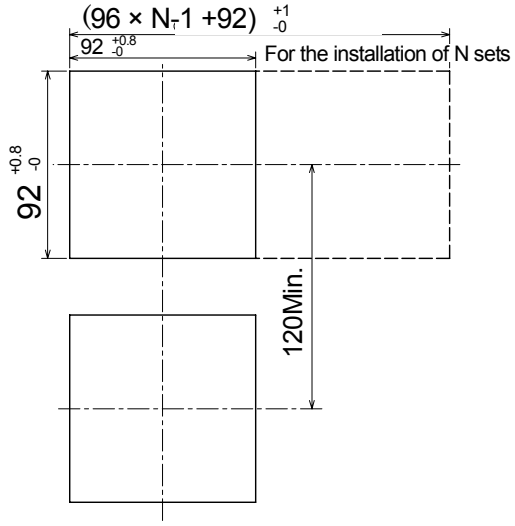
	Function	Initial value
Display/ input	Indication columns	5
	Input range, scale	K1, -200.0～1370.0℃
	PV abnormal high limit value	1401.4℃
	PV abnormal low limit value	-231.4℃
	Sensor correction	0.0℃
	1st order lag filter	0 second
	Number of moving average	8
	RJC	ON
	Key lock	Unlock
Control	Output type	mA
	Direct/reverse action	Reverse action
	Preset output	OFF
	PV start	OFF
Program	PID output limit	Single mode
	Number of patterns	16
	Time setting	H: M
	Link between patterns	OFF
	Guaranteed soak	OFF
	Program end	CONT
Digital input	DI assignment	A～D: condition input
Digital output	DO assignment	A: Deviation high alarm
		B: Deviation low alarm
		C: Sequence contact
		D: Sequence contact
		E: Sequence contact
Communication	Communication type	Original
	Communication speed	9600 bps
	Address	0

DIMENSIONS

Unit: mm

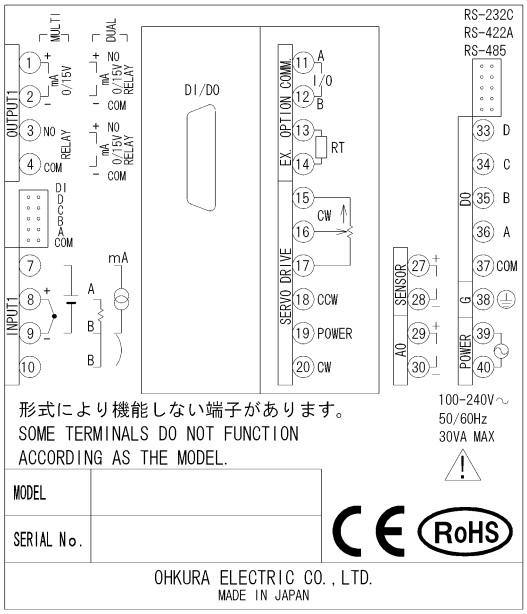


PANEL CUTOUT

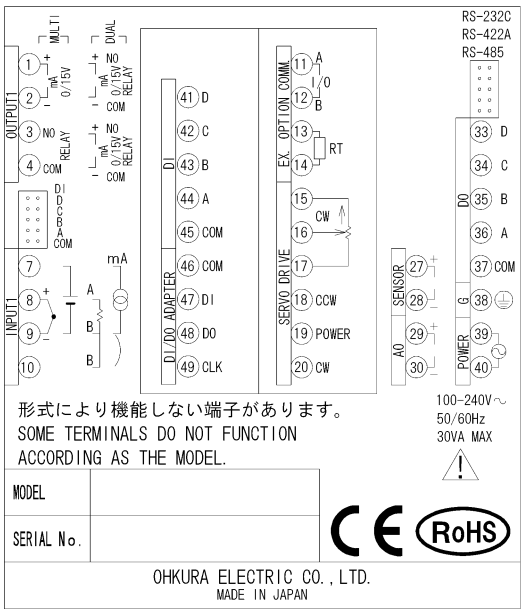


TERMINAL CONFIGURATION

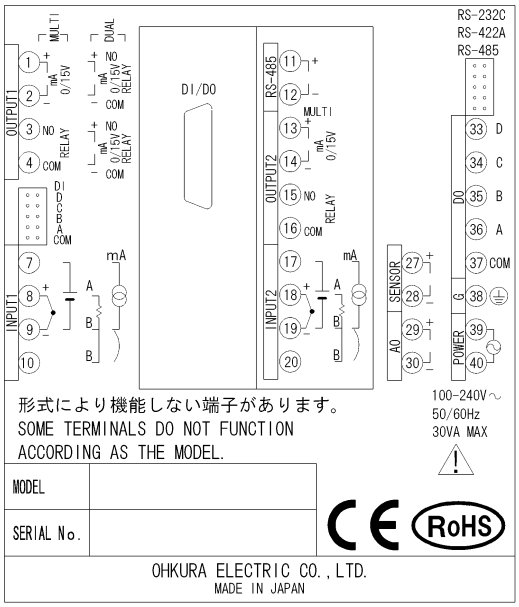
1) EC5900R: DI/DO connector, ARCNET, Servo drive, Sensor POW, AO



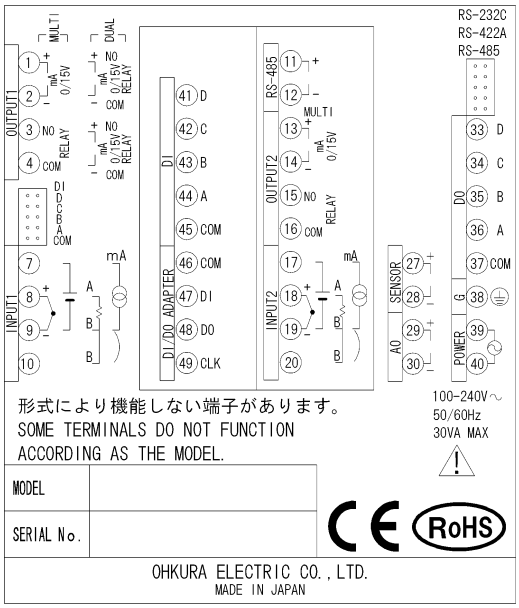
2) EC5900R: DI/DO terminal adapter, ARCNET, Servo drive, Sensor POW, AO



3) EC5900R: DI/DO connector, RS-485, Sensor POW, AO
EC5950R: DI/DO connector, RS-485, Sensor POW, AO



4) EC5900R: DI/DO terminal adapter, RS-485, Sensor POW, AO
EC5950R: DI/DO, terminal adapter, RS-485, Sensor POW, AO

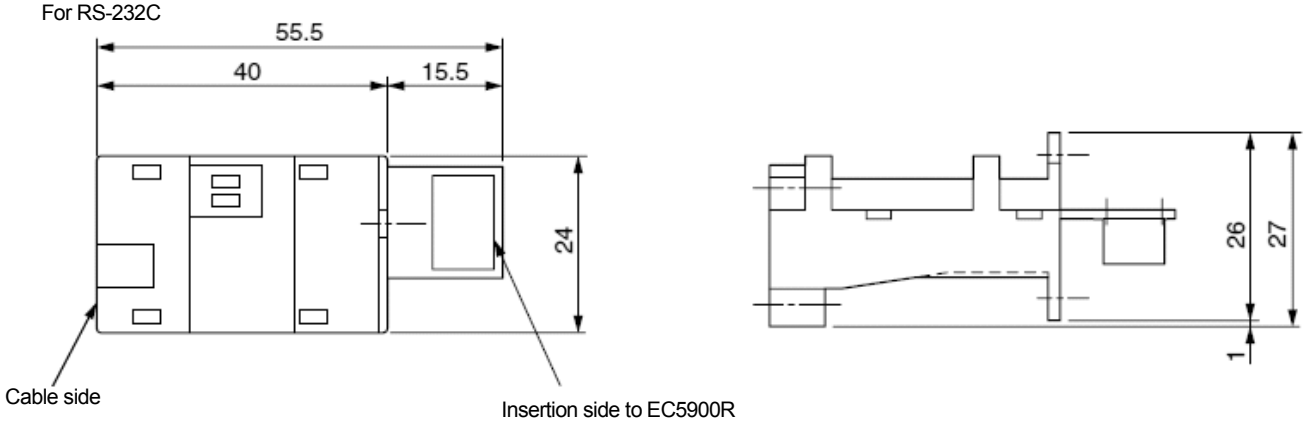


PERIPHERAL UNIT

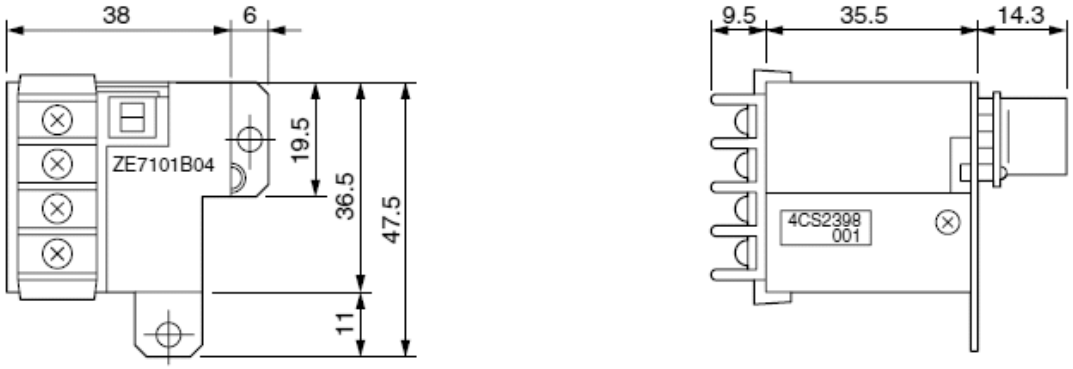
● Communication module

	Type	Module	Remarks
1	RS-232C	ZE7101A0113	EC5900R
2	RS-232C	ZE7101A0114	EC5950R
3	RS-422A/ RS-485	ZE7101B0411	EC5900R Terminal block type Up to 32 sets can be connected to a HOST.
4	RS-422A/ RS-485	ZE7101B0412	EC5950R Terminal block type Up to 32 sets can be connected to a HOST.

For RS-232C



For RS-422A/ 485



● 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

For RS-422A:Model : WMSU0075A01 (Appoint a cable length)

For RS-485: Model : WMSU0075A02 (Appoint a cable length)

● DI cable

HMSU2695A01 Cable length 1m

HMSU2695A02 Cable length 5m

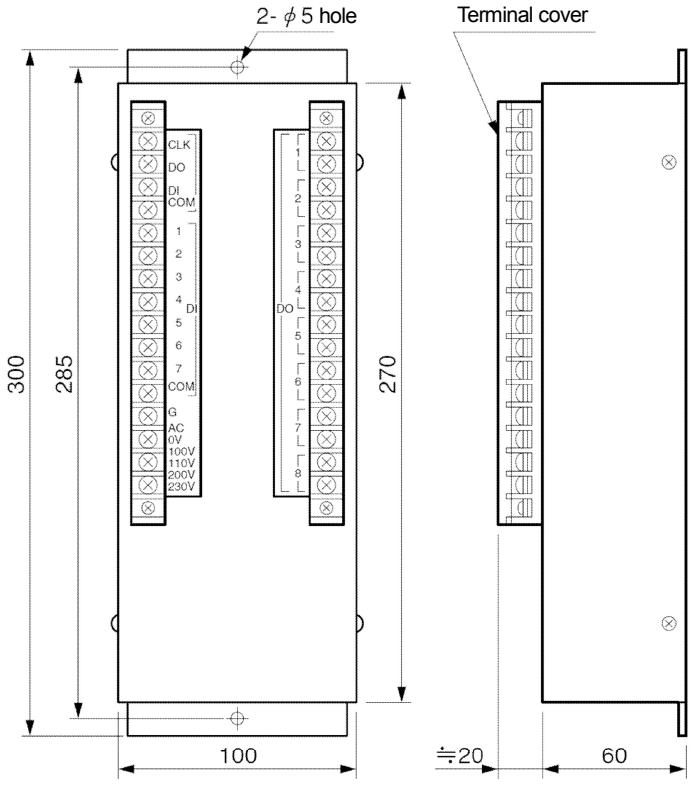
● DI/DO connector cable

WMSU0243A01 Cable length 1m

WMSU0243A02 Cable length 5m

● DI/DO expansion adapter (CA2005A02)

Dimensions (Unit: mm)



● Extension option

Heater monitoring unit Model: ZE7201

Note: The extension I/F is required for EC5900R.
Use the following cable.
HMSU2032A7601 (2 m), CO-SPEV--SB (A)
1P × 0.3SQ or equivalent cables

● External resistor

Model: HMSU3081A02

Resistance: 250Ω ± 0.1%

● For RS-485 (Extension option) terminator

Model: WMSU0303A01

Resistance: 200Ω

⚠CAUTION

Do not install this device before consulting instruction manual

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

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