OMRON

Ramp/Soak Process Controller
E5AK-T/E5EK-T

Advanced Ramp/Soak Process Controllers Ideal for Worldwide Use

- E5AK-T offers up to eight patterns of simple programming control (4 patterns for E5EK-T), with 16 steps per pattern.
- Temperature and analog inputs in a modular structure, one-stock type.
- High-accuracy: 100 ms sampling (for analog input).
- Conforms to international EMC and safety standards.
- IP66/NEMA 4 (indoor use) front face.
- Serial communications (RS-232C, RS-422 and RS-485) and transfer output (4 to 20 mA).
- Position-proportional control models available for valve control applications.
- Heat/Cool control.
- 3-year warranty.

Ordering Information

When ordering, order control output boards and option boards separately. Example: for a relay control output, order the E53-R output board in addition to the standard Process Controller (E5AK-T/E5EK-T). Also specify the current transformer.

■ Process Controllers

Description	DIN size	Supply voltage	Model
Standard model with terminal cover	1/4 DIN (96 x 96 mm)	100-240 VAC	**E5AK-TAA2-500 AC100-240**
			E5AK-TAA2 AC100-240
Position-proportional model with terminal cover (See Note 3)	1/4 DIN (96 x 96 mm)	100-240 VAC	**E5AK-TPRR2-500 AC100-240**
			E5AK-TPRR2 AC100-240
Standard model with terminal cover	1/8 DIN (48 x 96 mm)	100-240 VAC	**E5EK-TAA2-500 AC100-240**
			E5EK-TAA2 AC100-240
Position-proportional model with terminal cover (See Note 3)	1/8 DIN (48 x 96 mm)	100-240 VAC	**E5EK-TPRR2-500 AC100-240**
			E5EK-TPRR2 AC100-240

Note: 1. When using the heater burnout alarm function with a standard model, the linear output board cannot be used for the control outputs (heat).

2. The Process Controller provides transfer outputs at 4 to 20 mA for the PV and SP values and control outputs at 4 to 20 mA for the current outputs.

3. Position-proportional models are intended for motorized valves (not 4 to 20 mA modulating valves). These use two relays (“open” and “close”) which will turn a motor clockwise or counter-clockwise, thus opening or closing a valve.

4. Part numbers ending in –500 available at Omron USA, non -500 numbers available in Omron Canada only. Models with -500 have a terminal cover for finger protection.

■ Optional Output Boards

Description	Specifications	Compatible controller	Max. quantity	Model
Relay	SPST, 5 A, 250 VAC	E5AK/E5EK	2	**E53-R**
SSR (solid state relay)	1 A, 75 to 250 VAC	E5AK/E5EK	2	**E53-S**
Voltage pulse	NPN, 12 VDC	E5AK/E5EK	2	**E53-Q**
	NPN, 24 VDC	E5AK/E5EK	2	**E53-Q3**
	PNP, 24 VDC	E5AK/E5EK	2	**E53-Q4**
Linear current	4 to 20 mA	E5AK/E5EK	2	**E53-C3**
	0 to 20 mA	E5AK/E5EK	2	**E53-C3D**
Linear voltage	0 to 10 VDC	E5AK/E5EK	2	**E53-V34**
	0 to 5 VDC	E5AK/E5EK	2	**E53-V35**
Computer communications	RS-232C	E5AK/E5EK	3/1	**E53-AK01**
	RS-422	E5AK/E5EK	3/1	**E53-AK02**
	RS-485	E5AK/E5EK	3/1	**E53-AK03**
Event input	For remote set point	E5AK/E5EK	3/1	**E53-AKB**
Transfer output	4 to 20 mA	E5AK/E5EK	3/1	**E53-AKF**

Note: If the control period is less than 5 seconds, use an SSR (solid state relay) or pulse voltage output board.

■ Accessories (Order Separately)

Description	Specifications	Compatible controller	Max. quantity	Model
Current transformer; order only if using heater burnout alarm function	50 A load, 5.8 mm hole dia.	E5AK/E5EK	1	**E54-CT1**
	120 A load, 12 mm hole dia.	E5AK/E5EK	1	**E54-CT3**
Terminal cover (supplied with -500 models)	Provides finger protection from terminals (VDE0106 part 100)	E5AK	1	**E53-COV0809**
		E5EK	1	**E53-COV08**
Software	For setup and monitoring; requires optional computer communications board	All	1	**Thermo tools** (See Note)

Note: Contact Omron for current version information.

Specifications

■ Ratings

Model		E5EK/AK-T (Standard)
Supply voltage		100 to 240 VAC, 50/60 Hz
Power consumption	**E5AK-T**	16 VA
	E5EK-T	15 VA
Operating voltage range		85% to 110% of rated supply voltage
Input	**Thermocouple**	K, J, T, E, L, U, N, R, S, B, W, PLII
	Platinum resistance thermometer	JPt100, Pt100
	Current input	4 to 20 mA, 0 to 20 mA (Input impedance: 150 Ω)
	Voltage input	1 to 5 V, 0 to 5 V, 0 to 10 V (Input impedance: 1 MΩ)
Control output	**Standard model**	According to Output Unit (see *Output Board Ratings and Characteristics*)
	Position-proportional model (See Note)	2 Relay outputs: SPST-NO, 1 A at 250 VAC (including inrush current)
Auxiliary output		SPST-NO, 3 A at 250 VAC (resistive load)
Control method		ON/OFF or advanced PID control (with auto-tuning)
Setting method		Digital setting using front panel keys or communications features
Indication method		7-segment digital display and LEDs
Potentiometer		100 Ω to 2.5 kΩ
Event input	**Contact input**	ON: 1 kΩ max., OFF: 100 kΩ min.
	No-contact input	ON: residual voltage: 1.5 V max., OFF: leakage current: 0.1 mA max.
Transmission output		4 to 20 mA, permissible load impedance: 600 Ω max., resolution: approx. 2,600 steps
Current transformer input		Connect only Omron Current Transformers (E54-CT1 or E54-CT3)
Additional functions	**Standard**	Manual output, heating/cooling control, SP limiter, loop burnout alarm, MV limiter, MV change rate limiter, input digital filter, input shift, run/reset, protect functions, scaling function
Approved standards		UL 1092, CSA22.2 No. 14, CSA22.2 No. 1010-1 Conforms to EN50081-2, EN50082-2, EN61010-1 (IEC1010-1) Conforms to VDE0106/part 100 (Finger Protection), when the separately-ordered terminal cover is mounted.

Note: All control outputs are insulated from the input circuit.

■ Characteristics

Indication accuracy (See Note 1)	**Thermocouple**	±0.3% of indication value or ±1°C, whichever greater, ±1 digit max.
	Platinum resistance thermometer	±0.2% of indication value or ±0.8°C, whichever greater, ±1 digit max.
	Analog input	±0.2% (of indication value) ±1 digit max.
Hysteresis		0.01% to 99.99% FS (in units of 0.01% FS)
Proportional band (P)		0.1% to 999.9% FS (in units of 0.1% FS)
Integral (reset) time (I)		0 to 3,999 s (in units of 1 s)
Derivative (rate) time (D)		0 to 3,999 s (in units of 1 s)
Control period		1 to 99 s (in units of 1 s)
Manual reset value		0.0% to 100.0% (in units of 0.1%)
Alarm setting range		-1,999 to 9,999 or -199.9 or 999.9 (decimal point position dependent on input type or result of scaling)
Set time		0 to 99 hrs 59 min or 0 to 99 min 59 s
Program capacity		8 patterns (E5AK-T) or 4 patterns (E5EK-T), 16 steps
Programming method		Time or ramp setting method
Time accuracy		±0.2% (±500 ms) of the set value
Sampling period (See Note 2)	**Temperature input**	250 ms
	Analog input	100 ms
Insulation resistance		20 MΩ min. at 500 VDC
Dielectric strength		2,000 VAC, 50/60 Hz for 1 min between terminals of different polarities
Vibration resistance		Malfunction: 10 to 55 Hz, 10 m/s^2 (approx. 1G) for 10 min each in X, Y, and Z directions
		Destruction: 10 to 55 Hz, 20 m/s^2 (approx. 2G) for 2 hrs each in X, Y, and Z directions
Shock resistance		Malfunction: 200 m/s^2 min. (approx. 20G), 3 times each in 6 directions (100 m/s^2 (approx. 10G) applied to the relay)
		Destruction: 300 m/s^2 min. (approx. 30G), 3 times each in 6 directions
Ambient temperature	**Operating**	-10°C to 55°C (14°F to 131°F) with no icing and 3-year warranty period: -10°C to 50°C (14°F 122°F)
	Storage	-25°C to 65°C (-13°F to 149°F) with no icing
Ambient humidity	**Operating**	35% to 85%
Enclosure ratings	**Front panel**	NEMA 4 for indoor use (equivalent to IP66)
	Rear case	IEC standard IP20
	Terminals	IEC standard IP00
Memory protection		Non-volatile memory (number of writings: 100,000 operations)
Weight	**E5AK-T**	Approx. 450 g
	E5EK-T	Approx. 320 g
	Mounting bracket	Approx. 65 g

(This table continues on the next page.)

Note: 1. The indication accuracy of the K1, T, and N thermocouples at a temperature of -100°C max. is ±2°C ±1 digit maximum. The indication accuracy of the U and L thermocouples at any temperature is ±2°C ±1 digit maximum.
The indication accuracy of the B thermocouple at a temperature of 400°C max. is unrestricted.
The indication accuracy of the R and S thermocouples at a temperature of 200°C max. is ±3°C ±1 digit maximum.
The indication accuracy of the W thermocouple at any temperature is (±0.3% of the indicated value or ±3°C, whichever is greater) ±1 digit maximum.
The indication accuracy of the PLII thermocouple at any temperature is (±0.3% of the indicated value or ±2°C, whichever is greater) ±1 digit maximum.

2. The sampling period of the standard model with CT and remote SP inputs is 250 ms.

Characteristics Table - continued from previous page

EMC	Emission Enclosure: Emission AC Mains: Immunity ESD: Immunity RF-interference: Immunity Conducted Disturbance: Immunity Burst:	EN55011 Group 1 class A EN55011 Group 1 class A EN61000-4-2: 4 kV contact discharge (level 2) 8 kV air discharge (level 3) ENV50140: 10 V/m (amplitude modulated, 80 MHz to 1 GHz) (level 3) 10 V/m (pulse modulated, 900 MHz) ENV50141: 10 V (0.15 to 80 MHz) (level 3) EN61000-4-4: 2 kV power-line (level 3) 2 kV I/O signal-line (level 4)
Approved standards	UL1092, CSA22.2 No. 14, CSA22.2 No. 1010-1 Conforms to EN50081-2, EN50082-2, EN61010-1 (IEC1010-1) Conforms to VDE0106/part 100 (Finger Protection), when the separately-ordered terminal cover is mounted.	

■ Option Board Ratings and Characteristics

Model	Description		Specifications
E53-AKB	Event input		Contact input: ON: 1 kΩ max., OFF: 100 kΩ min. No-contact input: ON: residual voltage 1.5 V max., OFF: leakage current 0.1 mA max.
E53-AK01	Communications	RS-232C	Transmission method: Half-duplex Synchronization method: Start-stop synchronization (asynchronous method) Baud rate: 1.2/2.4/4.8/9.6/19.2 kbps
E53-AK02		RS-422	
E53-AK03		RS-485	
E53-AKF	Transfer output		4 to 20 mA: Permissible load impedance: 600 Ω max.; Resolution: approx. 2,600 steps

Note: Event input is used for switching the target value, run or stop command, or automatic and manual mode with an external signal input.

■ Current Transformer Ratings

Model	E54-CT1	E54-CT3
Max. continuous heater current	50 amps	120 amps (See Note 1)
Dielectric strength	1,000 VAC for 1 min	
Vibration resistance	50 Hz, 98 m/s^2 (10G)	
Weight	Approx. 11.5 g	Approx. 50 g
Accessories	--	Armature: 2; Plug: 2

Note: 1. Use within the max. heater current rating of controller table shown below.

■ Heater Burnout Alarm

Max. heater current	Single-phase 50 A AC
Heater current value display accuracy	±5% FS±1 digit max.
Heater burnout alarm setting range	0.1 to 49.9 A (in units of 0.1 A) (See Note 1)
Min. detection ON time	190 ms (See Note 2)

Note: 1. The heater burnout alarm is always OFF if the alarm is set to 0.0 A and always ON if the alarm is set to 50.0 A.
2. No heater burnout detection or heater current value measurement is possible if the control output (heat) is ON for less than 190 ms.

■ Temperature Ranges

Platinum Resistance Thermometer

Input (switch selectable)		JPt100	Pt100
Range	°C	-199.9° to 650.0°	-199.9° to 650.0°
	°F	-199.9° to 999.9°	-199.9° to 999.9°
Setting °C/°F for main setting and alarm		0.1	0.1

Thermocouple

Input (switch selectable)		K1	K2	J1	J2	T	E	L1	L2	U	N	R	S	B	W	PLII
Range	°C	-200 to 1,300	0.0 to 500.0	-100 to 850	0.0 to 400.0	-199.9 to 400.0	0 to 600	-100 to 850	0.0 to 400.0	-199.9 to 400.0	-200 to 1,300	0 to 1,700	0 to 1,700	100 to 1,800	0 to 2,300	0 to 1,300
	°F	-300 to 2,300	0.0 to 900.0	-100 to 1,500	0.0 to 750.0	-199.9 to 700.0	0 to 1,100	-100 to 1,500	0.0 to 750.0	-199.9 to 700.0	-300 to 2,300	0 to 3,000	0 to 3,000	300 to 3,200	0 to 4,100	0 to 2,300
Resolution °C/°F (main setting and alarm)		1	0.1	1	0.1	0.1	1	1	0.1	0.1	1	1	1	1	1	1

Note: 1. The switch is factory-set to 2 (K1).

2. Thermocouple W is W/Re5-26 (tungsten rhenium 5, tungsten rhenium 26).

Current/Voltage

Input (switch selectable)	Current input		Voltage input		
	4 to 20 mA	0 to 20 mA	1 to 5 V	0 to 5 V	0 to 10 V
Range	One of following ranges depending on results of scaling -1999 to 9999 -199.9 to 999.9 -19.99 to 99.99 -1.999 to 9.999				
Resolution (main setting and alarm)	Depends on the scale range selected				

Nomenclature

■ E5AK-T

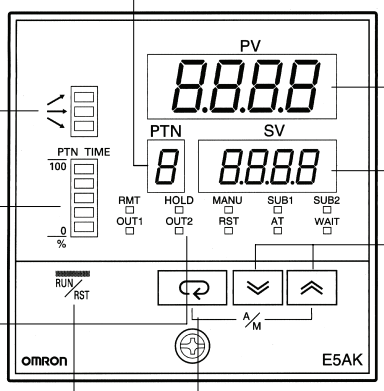
Pattern Number
Indicates the pattern number.

Program Status Indicators
The top indicator indicates the rising step, the middle indicator indicates the constant step, and the bottom indicator indicates the falling step.

Bar Graph
Indicates the rate of pattern elapsing time at the rate of 20% (5 levels) per one segment.

Operation Indicators

- OUT1
  Lit when the pulse output function assigned to control output 1 turns ON.
- OUT2
  Lit when the pulse output function assigned to control output 2 turns ON.
- SUB1
  Lit when the output function assigned to auxiliary output 1 turns ON.
- SUB2
  Lit when the output function assigned to auxiliary output 2 turns ON.
- MANU
  Lit when the manual operation mode.
- RST
  Lit when the operation is reset.
- RMT
  Lit during remote operation.
- AT
  Flashes during auto-tuning.
- HOLD
  Lit when the program is on hold.
- WAIT
  Lit when the program is waiting.



Display 1
Displays the process value or parameter code.

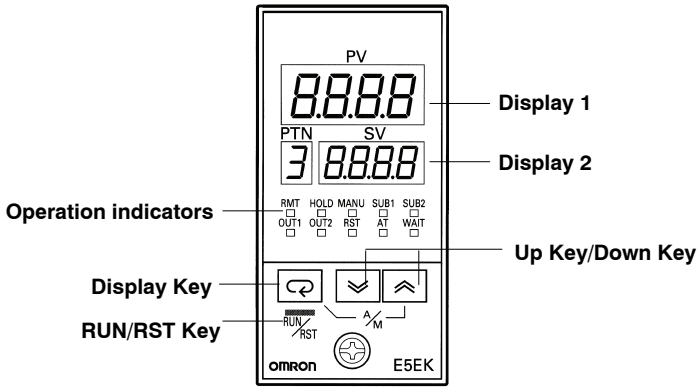
Display 2
Displays the present SP, manipulated variable, or parameter settings.

Up Key/Down Key
Press to increase or decrease the value on the No.2 display.

Display Key
Press to shift the display to the next parameter.

RUN/RST Key
Switches between RUN and RESET mode.

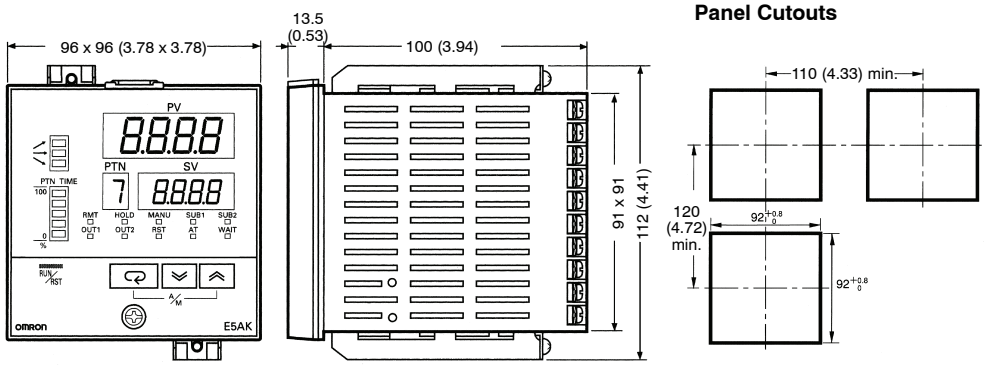
■ E5EK-T



Dimensions

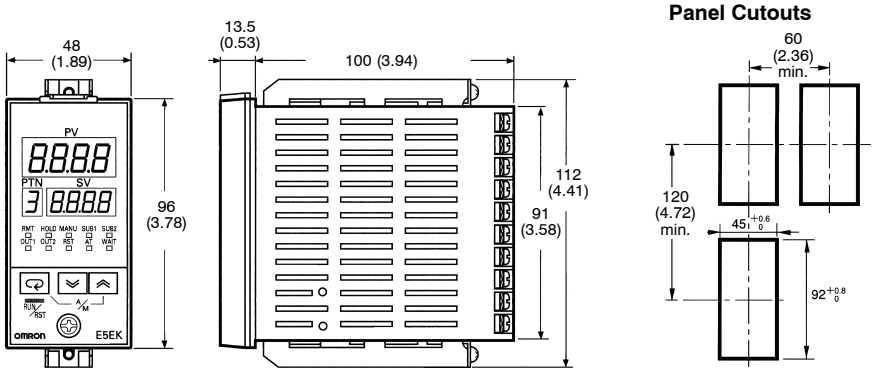
Unit: mm (inch)

■ E5AK-T



Note: 1. Recommended panel thickness is 1 to 8 mm.
2. Maintain the specified vertical and horizontal mounting space between each Unit. Units must not be closely mounted (vertically or horizontally).

■ E5EK-T

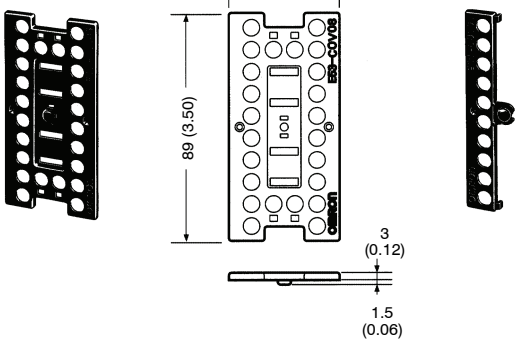


Note: 1. Recommended panel thickness is 1 to 8 mm.
2. Maintain the specified vertical and horizontal mounting space between each Unit. Units must not be closely mounted vertically or horizontally.

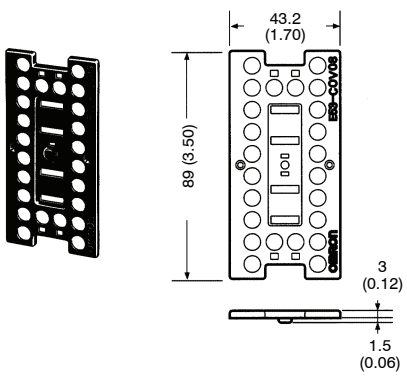
■ Accessories (Order Separately)

Terminal Cover

E53-COV0809

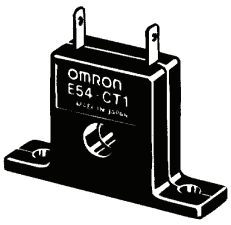


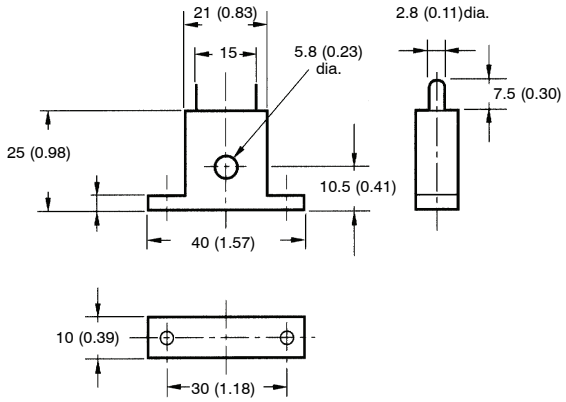
E53-COV08



Current Transformers

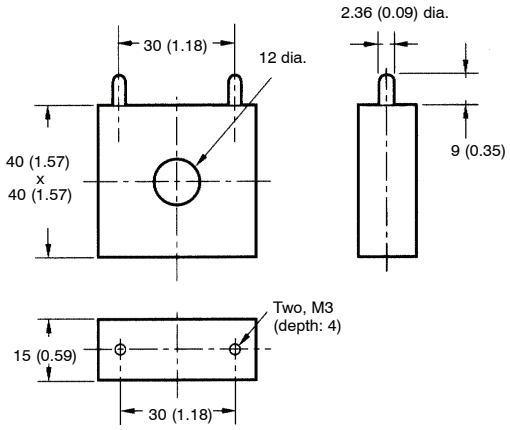
E54-CT1





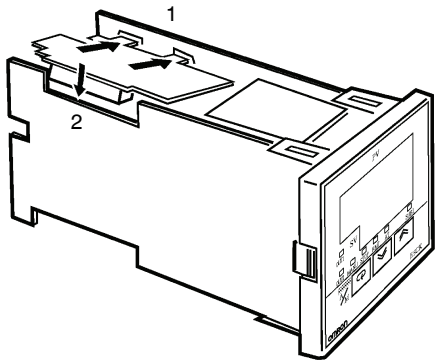
Unit: mm (inch)

E54-CT3



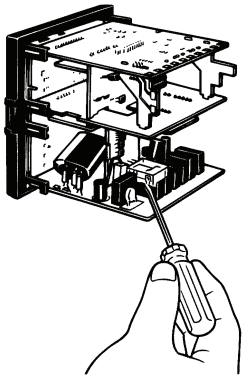
■ Setting Up the Output Board

1. Two rectangular holes are provided on the power board (right side of Controller). Fit the two protrusions of the output board into these two holes.
1. With the output board fitted into the power board, fit the output board into the connector on the control board (left side of Controller).

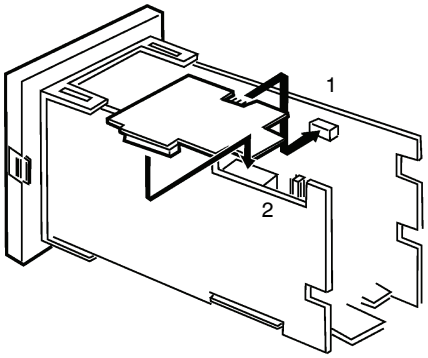


Removing the Output Board

To replace the output board, use a flat-blade screwdriver to push up the output board.

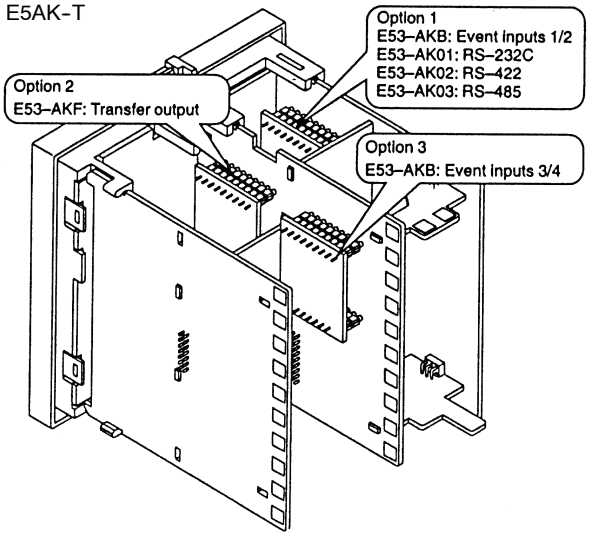


■ Setting Up the Option Board

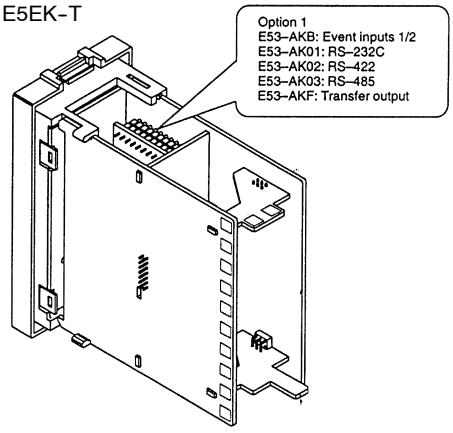


1. Insert the option boards into the sockets for options 1 to 3. The following diagram shows the relationship between the option boards and mounting positions.

E5AK-T



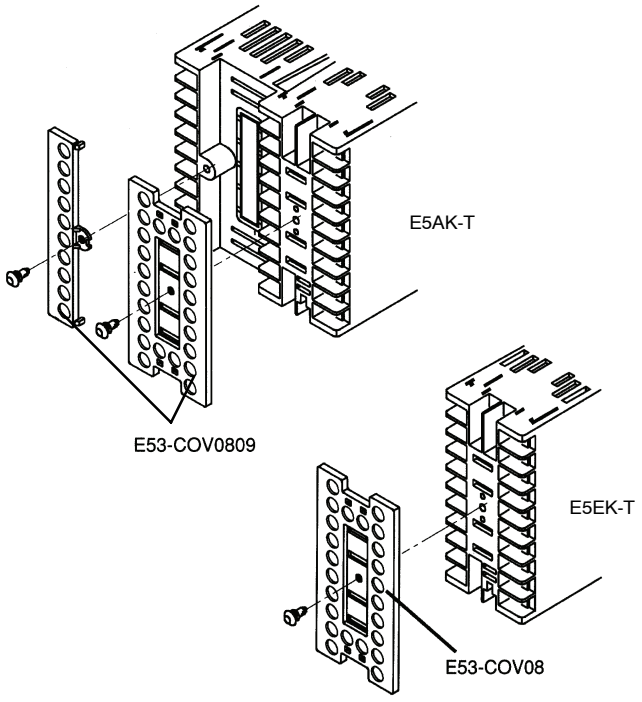
E5EK-T



E53-COV0809, E53-COV08 Terminal Cover

Terminal covers are supplied for controllers with -500 in the part number; for non -500 models, order covers separately. Fasten the terminals covers as follows by using the snap pins.

Note: Snap pins are provided with the terminal covers.

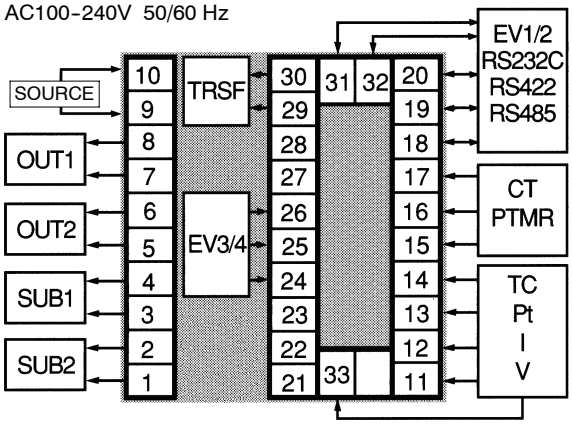


■ Wiring Terminals

Terminal Arrangement

E5AK-T

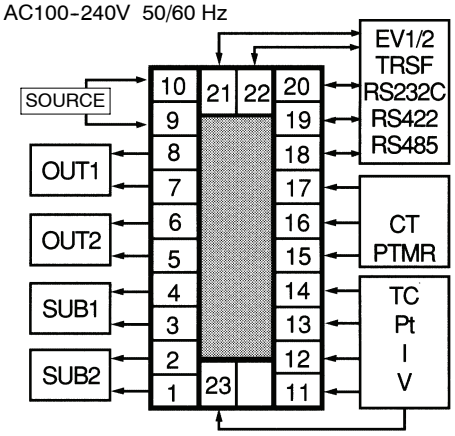
AC100-240V 50/60 Hz



TRSF: Transfer output
EV1 to 4: Event input
PTMR: Potentiometer

E5EK-T

AC100-240V 50/60 Hz



TRSF: Transfer output
EV1/2: Event input
PTMR: Potentiometer

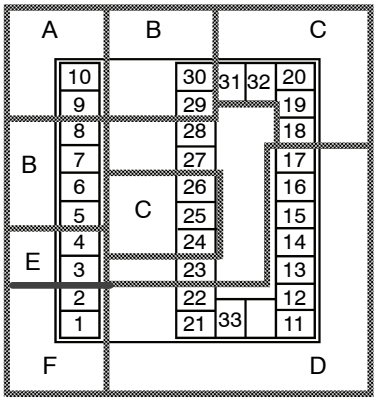
■ Wiring Precautions

- Use ducts to separate input leads and power lines in order to protect the Controller and its lines from external noise.
- Solderless terminals are recommended when wiring the Controller.
- Tighten the terminal screws using a torque no greater than 0.78 N • m, or 8 kgf • cm max. Be careful not to tighten the terminal screws too tightly.

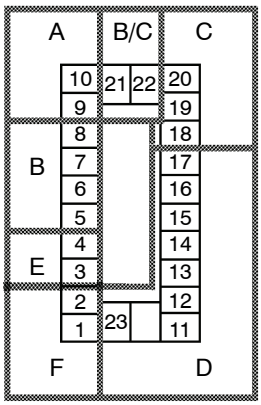
Power Blocks for E5AK-T/EK-T

The E5AK/E5EK has independent power supplies for each of the terminal blocks shown below.

E5AK-T



E5EK-T

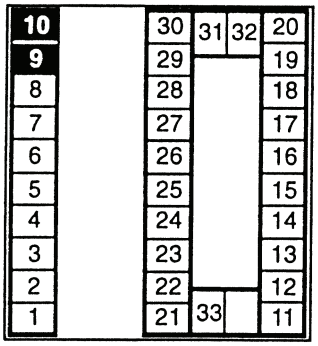


■ E5AK-T Wiring

In the following wiring diagrams, the left side of the terminal numbers indicate the inside of the Controller.

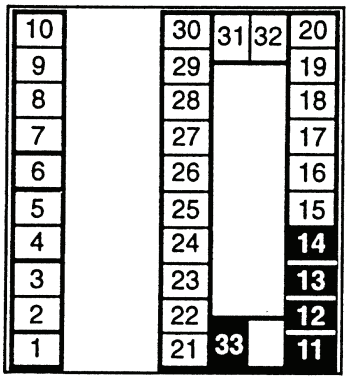
Power Supply

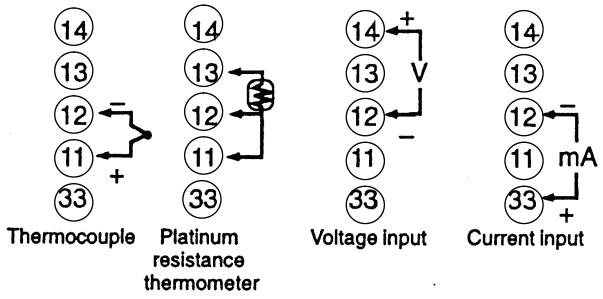
Input 100 to 240 VAC to terminal numbers 9 and 10 according to the specifications.



Sensor Input

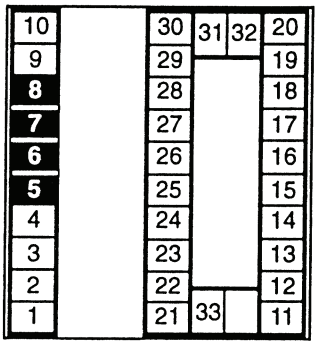
Connect the sensor input to terminal numbers 11 to 14 and 33 as follows according to the input type.

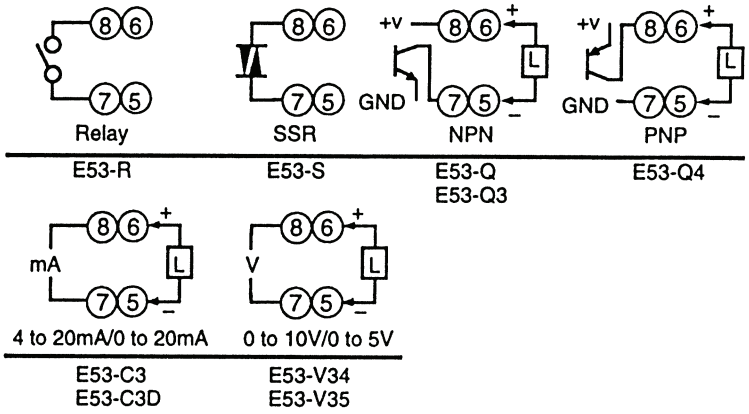




Control Output

Terminal numbers 7 and 8 are for control output 1 (OUT1), and terminal numbers 5 and 6 are for control output 2 (OUT2). The following diagrams show the available output boards and their internal equalizing circuits.





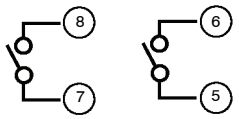
With E53-V□□ output boards, approx. 2 V is output for one second after the power is interrupted.

Specifications for Each Output Board

Model	Output type	Specifications
E53-R	Relay	5 A at 250 VAC
E53-S	SSR	1 A at 75 to 250 VAC
E53-Q E53-Q3 E53-Q4	Voltage (NPN) Voltage (NPN) Voltage (PNP)	NPN: 40 mA at 12 VDC (with short-circuit protection) NPN: 20 mA at 24 VDC (with short-circuit protection) PNP: 20 mA at 24 VDC (with short-circuit protection)
E53-C3 E53-C3D	4 to 20 mA 0 to 20 mA	4 to 20 mA; permissible load impedance: 600 Ω max.; resolution: approx. 2600 0 to 20 mA; permissible load impedance: 600 Ω max.; resolution: approx. 2600
E53-V34 E53-V35	0 to 10 V 0 to 5 V	0 to 10 VDC; permissible load impedance: 1 kΩ min.; resolution: approx. 2600 0 to 5 VDC; permissible load impedance: 1 kΩ min.; resolution: approx. 2600

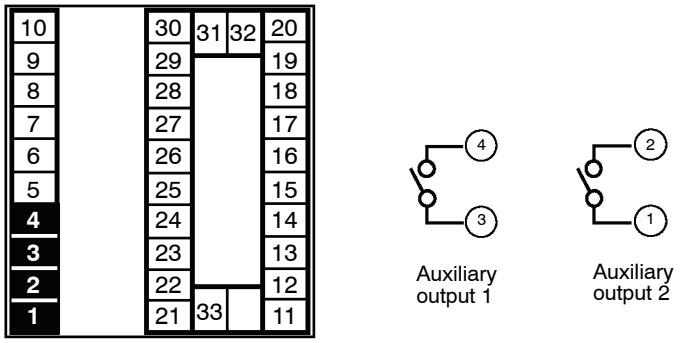
With E5AK-PRR2 Controllers, the relay output (1 A at 250 VAC) is fixed.

When replacing the output board, use the E53-R. The following diagrams show the relationship between terminals and open/close relay settings.



Auxiliary Output

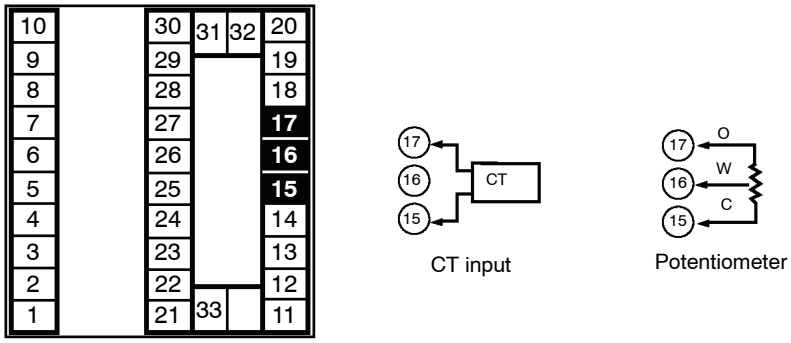
Terminal numbers 3 and 4 are for auxiliary output 1 (SUB1) and terminal numbers 1 and 2 are for auxiliary output 2 (SUB2). The following diagrams show the internal equalizing circuits for the auxiliary outputs:



Output specifications are as follows: SPST-NO, 3 A at 250 VAC

CT Input/Potentiometer

When using the HBA function on the E5AK-TAA2 Controller, connect CT input (CT) to terminal numbers 15 to 17. When monitoring the valve opening on the E5AK-TPRR2 Controller, connect the potentiometer (PTMR) to terminal numbers 15 to 17. Connect each of these inputs as follows:

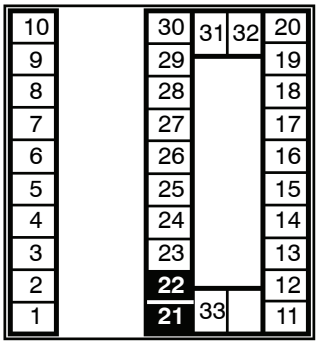


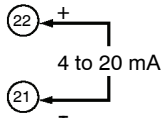
For details on CT inputs, refer to *Appendix, About Current Transformer* in the *E5AK-T/E5EK-T User's Manual (H83/H85)*.

For details on the potentiometer, refer to the *Instruction Manual* for the valve connected to the Controller. The variable resistance range is 100 Ω to 2.5 kΩ.

Remote SP Input

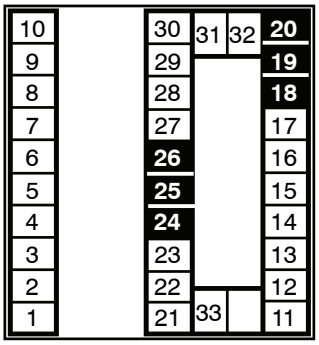
Connect the input (RSP) to be used as the remote SP to terminal numbers 21 and 22. Only 4 to 20 mA inputs can be connected. Connect the input as follows:

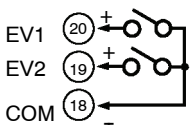




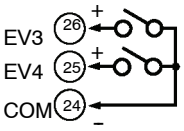
Event Input

Connect event inputs 1 and 2 (EV1/2) to terminal numbers 18 to 20, and events 3 and 4 (EV3/4) to terminal numbers 24 to 26. However, note that terminal numbers 18 to 20 cannot be used on Controllers with a communications function. Connect the event inputs as follows:





Event input 1 and 2



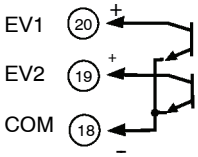
Event input 3 and 4

Terminals 18 and 24 (COM) are connected internally.

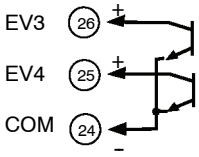
Use event inputs under the following conditions:

Contact input	ON: 1 kΩ max. OFF: 100 kΩ min.
No-contact input	ON: Residual voltage 1.5 V max., OFF: Leakage current 0.1 mA max.

Polarities during no-contact input are as follows:



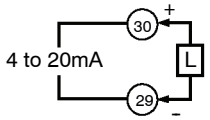
Event input 1 and 2



Event input 3 and 4

Transfer Output

Connect transfer output (TRSF) to terminal numbers 29 and 30. The internal equalizing circuit for transfer output is as follows:



Transfer output specifications are as follows: 4 to 20 mA
Permissible load impedance: 600 Ω max.
Resolution: approx. 2600

Communications

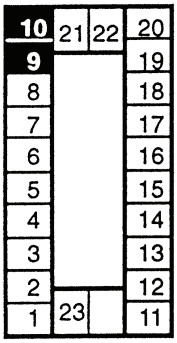
Terminal numbers 18 to 20, 31 and 32 can be used only on Controllers with communications boards (E53-AK01/02/03). For details on wiring, refer to *Chapter 6, Using the Communications Function* in the *E5AK-T/E5EK-T User Manuals (H83 and H85)*.

■ E5EK-T WIRING

In the following wiring diagrams, the left side of the terminal numbers indicate the inside of the Controller.

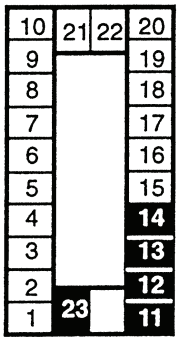
Power Supply

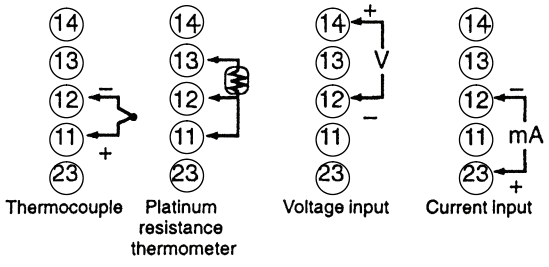
Input 100 to 240 VAC to terminal numbers 9 and 10 according to the specifications.



Sensor Input

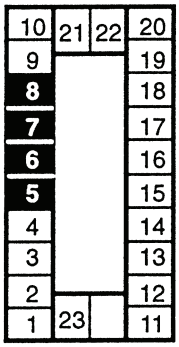
Connect the sensor input to terminal numbers 11 to 14 and 33 as follows according to the input type.

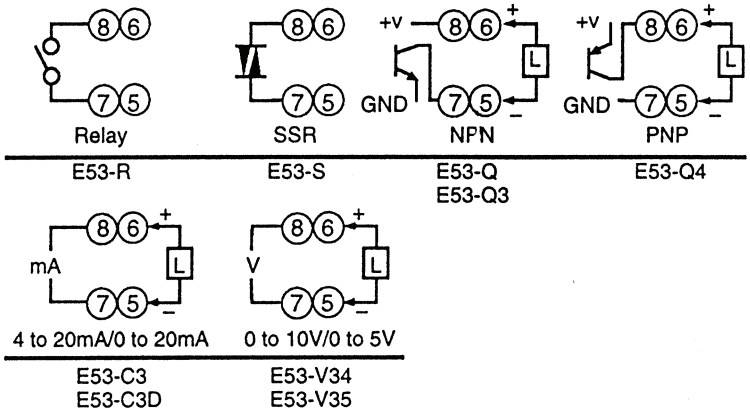




Control Output

Terminal numbers 7 and 8 are for control output 1 (OUT1), and terminal numbers 5 and 6 are for control output 2 (OUT2). The following diagrams show the available output boards and their internal equalizing circuits.





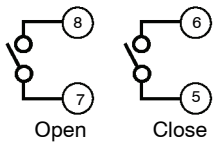
With E53-V□□ output boards, approx. 2 V is output for one second after the power is interrupted.

Specifications for Each Output Board

Model	Output type	Specifications
E53-R	Relay	5 A at 250 VAC
E53-S	SSR	1 A at 75 to 250 VAC
E53-Q E53-Q3 E53-Q4	Voltage (NPN) Voltage (NPN) Voltage (PNP)	NPN: 40 mA at 12 VDC (with short-circuit protection) NPN: 20 mA at 24 VDC (with short-circuit protection) PNP: 20 mA at 24 VDC (with short-circuit protection)
E53-C3 E53-C3D	4 to 20 mA 0 to 20 mA	4 to 20 mA, permissible load impedance: 600 Ω max., resolution: approx. 2600 0 to 20 mA, permissible load impedance: 600 Ω max., resolution: approx. 2600
E53-V34 E53-V35	0 to 10 V 0 to 5 V	0 to 10 VDC, permissible load impedance:1 kΩ min., resolution: approx. 2600 0 to 5 VDC, permissible load impedance: 1 kΩ min., resolution: approx. 2600

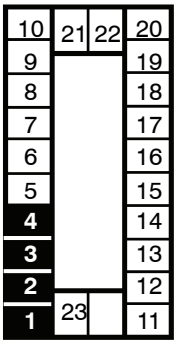
With E5EK-TPRR2 Controllers, the relay output (1 A at 250 VAC) is fixed.

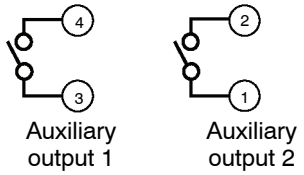
When replacing the output board, use the E53-R. The following diagrams show the relationship between terminals and open/close relay settings.



Auxiliary Output

Terminal numbers 3 and 4 are for auxiliary output 1 (SUB1) and terminal numbers 1 and 2 are for auxiliary output 2 (SUB2). The following diagrams show the internal equalizing circuits for the auxiliary outputs:

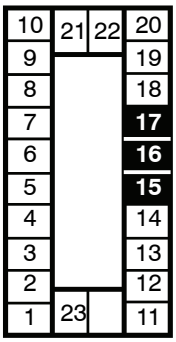


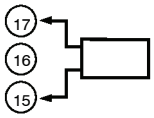


Output specifications are as follows: SPST-NO, 3 A at 250 VAC

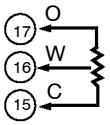
CT Input/Potentiometer

When using the HBA function on the E5EK-TAA2 Controller, connect CT input (CT) to terminal numbers 15 to 17. When monitoring the valve opening on the E5EK-TPRR2 Controller, connect the potentiometer (PTMR) to terminal numbers 15 to 17. Connect each of these inputs as follows:





CT input



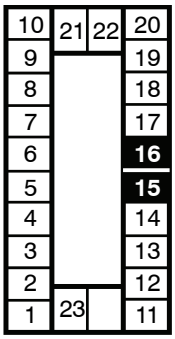
Potentiometer

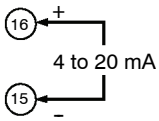
For details on CT inputs, refer to *Appendix, About Current Transformer* in the *E5AK-T/E5EK-T User's Manual (H83/H85)*.

For details on the potentiometer, refer to the *Instruction Manual* for the valve connected to the Controller. The variable resistance range is 100 Ω to 2.5 kΩ.

Remote SP Input

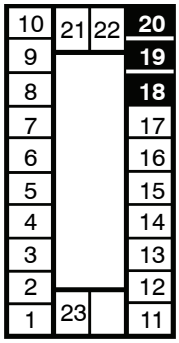
Connect the input (RSP) to be used as the remote SP to terminal numbers 15 and 16. However, note that the remote SP cannot be used on the E5EK-TPRR2 Controller. Only 4 to 20 mA inputs can be connected. Connect the input as follows:

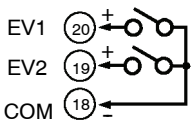




Event Input

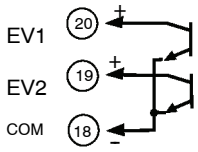
Connect event inputs 1 and 2 (EV1/2) to terminal numbers 18 to 20. However, note that terminal numbers 18 to 20 cannot be used on Controllers with a communications function. Connect the event inputs as follows:





Event input 1 and 2

Polarities during no-contact input



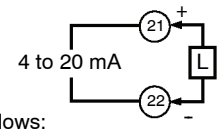
Event input 1 and 2

Use event inputs under the following conditions:

Contact input	ON: 1 kΩ max., OFF: 100 kΩ min.
No-contact input	ON: Residual voltage 1.5 V max., OFF: Leakage current 0.1 mA max.

Transfer Output

Connect transfer output (TRSF) to terminal numbers 21 and 22. The internal equalizing circuit for transfer output is at right.



Transfer output specifications are as follows:
4 to 20 mA,
Permissible load impedance: 600 Ω max.,
Resolution: Approx. 2600

Communications

Terminal numbers 18 to 22 can be used only on controllers with communications boards (E53-AK01/02/03). For details on wiring, refer to *Chapter 6, Using the Communications Function* in the *E5AK-T/E5EK-T User Manuals (H088-E3-1 and H089-E3-1)*.

Precautions

■ Operating Environment

- Operate the Controller within the rated ambient operating temperature, ambient operating humidity, and storage temperature ranges.
- Use the Controller according to the vibration resistance, shock resistance, and enclosure ratings.
- Do not install the Controller in places with corrosive gas or excessive dust.
- Do not install the Controller near machines generating high-frequency noise.

■ Mounting

- The dimensions of the Controller conform to DIN 43700.
- Recommended panel thickness is 1 to 8 mm.
- Mount the Unit horizontally.

■ Connection

- To reduce inductive noise influence, the lead wires connecting the input type to the Controller must be separated from the power lines and load lines.
- Use the specified compensating conductors for thermocouples. Use lead wires having a small resistance for platinum resistance thermometers.

■ Connection Example

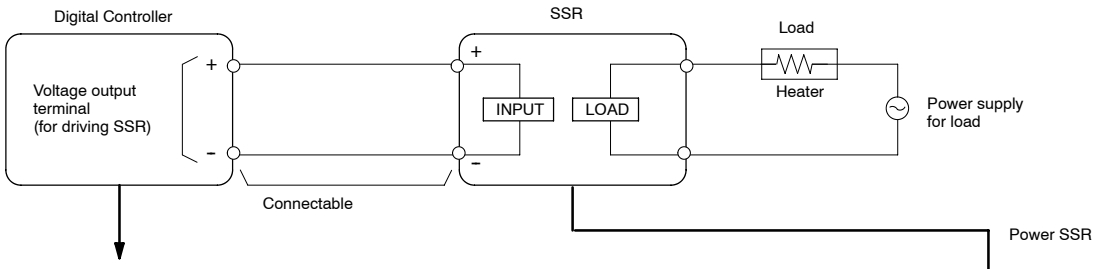
- Wire the terminals of the Unit using solderless terminals.
- The tightening torque applied to the terminal screws of the Unit must be approximately 0.78 N • m or 8 kgf • cm.
- Use the following type of solderless terminals for M3.5 screws.

■ Operation

- The alarm outputs of a model with an alarm function may not turn ON correctly when the model malfunctions. The use of alarm equipment with the Controller is recommended.
- The parameters and internal switch are set before shipping so that the Unit will function normally. Change the settings of the parameters and internal switch according to the application if necessary.
- After power has been supplied to the Controller, several seconds are required until the relay is turned ON. Consider this time delay when designing sequenced circuits which incorporate a Controller.
- Do not use excessive force when removing the internal mechanism from the housing. Protect the internal connector or electronic parts of the Unit from shock.
- Protect against static discharge when changing the settings of the internal switch. Changing the settings on a grounded conductive mat is recommended.
- When connecting the control output board to the Temperature Controller or Process Controller, make sure that the control output board is the appropriate type, or the system may malfunction.
- The heater burnout alarm will not be available if the linear output board is used.

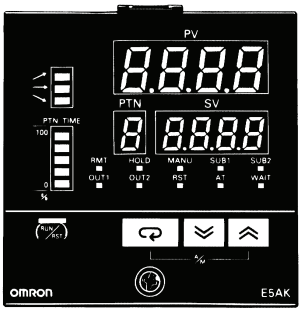
■ SSR

Connection Example of Process Controller and SSR



E5□K-T

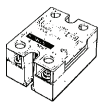
Process Controller with Voltage Output (12 VDC, 40 mA max.)



E5CK-T

Process Controller with Voltage Output (12 VDC, 20 mA max.)

See the following table.

Model	G3PA/G3PB	G3NA	G3NE
Appearance			
SSRs connected in parallel	E5AK-/E5EK-T: 8 pcs. E5CK-T: 4 pcs.	E5AK-/E5EK-T: 5 pcs. E5CK-T: 2 pcs.	E5AK-/E5EK-T: 2 pcs. E5CK-T: 1 piece
Rated input voltage	5 to 24 VDC	5 to 24 VDC	12 VDC
Features	Thin, SSR with built-in heat sink; 1-phase and 3-phase models	Standard model with screw terminals	Compact, low-cost model with tab terminals

Terms and Conditions of Sale

1. Offer; Acceptance. These terms and conditions (these "Terms") are deemed part of all quotes, agreements, purchase orders, acknowledgments, price lists, catalogs, manuals, brochures and other documents, whether electronic or in writing, relating to the sale of products or services (collectively, the "Products") by Omron Electronics LLC and its subsidiary companies ("Omron"). Omron objects to any terms or conditions proposed in Buyer's purchase order or other documents which are inconsistent with, or in addition to, these Terms.
2. Prices; Payment Terms. All prices stated are current, subject to change without notice by Omron. Omron reserves the right to increase or decrease prices on any unshipped portions of outstanding orders. Payments for Products are due net 30 days unless otherwise stated in the invoice.
3. Discounts. Cash discounts, if any, will apply only on the net amount of invoices sent to Buyer after deducting transportation charges, taxes and duties, and will be allowed only if (i) the invoice is paid according to Omron's payment terms and (ii) Buyer has no past due amounts.
4. Interest. Omron, at its option, may charge Buyer 1-1/2% interest per month or the maximum legal rate, whichever is less, on any balance not paid within the stated terms.
5. Orders. Omron will accept no order less than $200 net billing.
6. Governmental Approvals. Buyer shall be responsible for, and shall bear all costs involved in, obtaining any government approvals required for the importation or sale of the Products.
7. Taxes. All taxes, duties and other governmental charges (other than general real property and income taxes), including any interest or penalties thereon, imposed directly or indirectly on Omron or required to be collected directly or indirectly by Omron for the manufacture, production, sale, delivery, importation, consumption or use of the Products sold hereunder (including customs duties and sales, excise, use, turnover and license taxes) shall be charged to and remitted by Buyer to Omron.
8. Financial. If the financial position of Buyer at any time becomes unsatisfactory to Omron, Omron reserves the right to stop shipments or require satisfactory security or payment in advance. If Buyer fails to make payment or otherwise comply with these Terms or any related agreement, Omron may (without liability and in addition to other remedies) cancel any unshipped portion of Products sold hereunder and stop any Products in transit until Buyer pays all amounts, including amounts payable hereunder, whether or not then due, which are owing to it by Buyer. Buyer shall in any event remain liable for all unpaid accounts.
9. Cancellation; Etc. Orders are not subject to rescheduling or cancellation unless Buyer indemnifies Omron against all related costs or expenses.
10. Force Majeure. Omron shall not be liable for any delay or failure in delivery resulting from causes beyond its control, including earthquakes, fires, floods, strikes or other labor disputes, shortage of labor or materials, accidents to machinery, acts of sabotage, riots, delay in or lack of transportation or the requirements of any government authority.
11. Shipping; Delivery. Unless otherwise expressly agreed in writing by Omron:
    a. Shipments shall be by a carrier selected by Omron; Omron will not drop ship except in "break down" situations.
    b. Such carrier shall act as the agent of Buyer and delivery to such carrier shall constitute delivery to Buyer;
    c. All sales and shipments of Products shall be FOB shipping point (unless otherwise stated in writing by Omron), at which point title and risk of loss shall pass from Omron to Buyer; provided that Omron shall retain a security interest in the Products until the full purchase price is paid;
    d. Delivery and shipping dates are estimates only; and
    e. Omron will package Products as it deems proper for protection against normal handling and extra charges apply to special conditions.
12. Claims. Any claim by Buyer against Omron for shortage or damage to the Products occurring before delivery to the carrier must be presented in writing to Omron within 30 days of receipt of shipment and include the original transportation bill signed by the carrier noting that the carrier received the Products from Omron in the condition claimed.
13. Warranties. (a) Exclusive Warranty. Omron's exclusive warranty is that the Products will be free from defects in materials and workmanship for a period of twelve months from the date of sale by Omron (or such other period expressed in writing by Omron). Omron disclaims all other warranties, express or implied. (b) Limitations. OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, ABOUT NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OF THE PRODUCTS. BUYER ACKNOWLEDGES THAT IT ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE. Omron further disclaims all warranties and responsibility of any type for claims or expenses based on infringement by the Products or otherwise of any intellectual property right. (c) Buyer Remedy. Omron's sole obligation hereunder shall be, at Omron's election, to (i) replace (in the form originally shipped with Buyer responsible for labor charges for removal or replacement thereof) the non-complying Product, (ii) repair the non-complying Product, or (iii) repay or credit Buyer an amount equal to the purchase price of the non-complying Product; provided that in no event shall Omron be responsible for warranty, repair, indemnity or any other claims or expenses regarding the Products unless Omron's analysis confirms that the Products were properly handled, stored, installed and maintained and not subject to contamination, abuse, misuse or inappropriate modification. Return of any Products by Buyer must be approved in writing by Omron before shipment. Omron Companies shall not be liable for the suitability or unsuitability or the results from the use of Products in combination with any electrical or electronic components, circuits, system assemblies or any other materials or substances or environments. Any advice, recommendations or information given orally or in writing, are not to be construed as an amendment or addition to the above warranty. See http://www.omron247.com or contact your Omron representative for published information.
14. Limitation on Liability; Etc. OMRON COMPANIES SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR PRODUCTION OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, NEGLIGENCE OR STRICT LIABILITY. Further, in no event shall liability of Omron Companies exceed the individual price of the Product on which liability is asserted.
15. Indemnities. Buyer shall indemnify and hold harmless Omron Companies and their employees from and against all liabilities, losses, claims, costs and expenses (including attorney's fees and expenses) related to any claim, investigation, litigation or proceeding (whether or not Omron is a party) which arises or is alleged to arise from Buyer's acts or omissions under these Terms or in any way with respect to the Products. Without limiting the foregoing, Buyer (at its own expense) shall indemnify and hold harmless Omron and defend or settle any action brought against such Companies to the extent based on a claim that any Product made to Buyer specifications infringed intellectual property rights of another party.
16. Property; Confidentiality. Any intellectual property in the Products is the exclusive property of Omron Companies and Buyer shall not attempt to duplicate it in any way without the written permission of Omron. Notwithstanding any charges to Buyer for engineering or tooling, all engineering and tooling shall remain the exclusive property of Omron. All information and materials supplied by Omron to Buyer relating to the Products are confidential and proprietary, and Buyer shall limit distribution thereof to its trusted employees and strictly prevent disclosure to any third party.
17. Export Controls. Buyer shall comply with all applicable laws, regulations and licenses regarding (i) export of products or information; (iii) sale of products to "forbidden" or other proscribed persons; and (ii) disclosure to non-citizens of regulated technology or information.
18. Miscellaneous. (a) Waiver. No failure or delay by Omron in exercising any right and no course of dealing between Buyer and Omron shall operate as a waiver of rights by Omron. (b) Assignment. Buyer may not assign its rights hereunder without Omron's written consent. (c) Law. These Terms are governed by the law of the jurisdiction of the home office of the Omron company from which Buyer is purchasing the Products (without regard to conflict of law principles). (d) Amendment. These Terms constitute the entire agreement between Buyer and Omron relating to the Products, and no provision may be changed or waived unless in writing signed by the parties. (e) Severability. If any provision hereof is rendered ineffective or invalid, such provision shall not invalidate any other provision. (f) Setoff. Buyer shall have no right to set off any amounts against the amount owing in respect of this invoice. (g) Definitions. As used herein, "including" means "including without limitation"; and "Omron Companies" (or similar words) mean Omron Corporation and any direct or indirect subsidiary or affiliate thereof.

Certain Precautions on Specifications and Use

1. Suitability of Use. Omron Companies shall not be responsible for conformity with any standards, codes or regulations which apply to the combination of the Product in the Buyer's application or use of the Product. At Buyer's request, Omron will provide applicable third party certification documents identifying ratings and limitations of use which apply to the Product. This information by itself is not sufficient for a complete determination of the suitability of the Product in combination with the end product, machine, system, or other application or use. Buyer shall be solely responsible for determining appropriateness of the particular Product with respect to Buyer's application, product or system. Buyer shall take application responsibility in all cases but the following is a non-exhaustive list of applications for which particular attention must be given:
   (i) Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this document.
   (ii) Use in consumer products or any use in significant quantities.
   (iii) Energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
   (iv) Systems, machines and equipment that could present a risk to life or property. Please know and observe all prohibitions of use applicable to this Product.
   NEVER USE THE PRODUCT FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY OR IN LARGE QUANTITIES WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON'S PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.
2. Programmable Products. Omron Companies shall not be responsible for the user's programming of a programmable Product, or any consequence thereof.
3. Performance Data. Data presented in Omron Company websites, catalogs and other materials is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of Omron's test conditions, and the user must correlate it to actual application requirements. Actual performance is subject to the Omron's Warranty and Limitations of Liability.
4. Change in Specifications. Product specifications and accessories may be changed at any time based on improvements and other reasons. It is our practice to change part numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the Product may be changed without any notice. When in doubt, special part numbers may be assigned to fix or establish key specifications for your application. Please consult with your Omron's representative at any time to confirm actual specifications of purchased Product.
5. Errors and Omissions. Information presented by Omron Companies has been checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical or proofreading errors or omissions.

OMRON

Automation...simple...powerful.

OMRON ELECTRONICS LLC • THE AMERICAS HEADQUARTERS
Schaumburg, IL USA • 847.843.7900 • 800.556.6766 • www.omron247.com

OMRON CANADA, INC. • HEAD OFFICE
Toronto, ON, Canada • 416.286.6465 • 866.986.6766 • www.omron.ca

OMRON ELETRÔNICA DO BRASIL LTDA • HEAD OFFICE
São Paulo, SP, Brasil • 55.11.2101.6300 • www.omron.com.br

OMRON ELECTRONICS MEXICO SA DE CV • HEAD OFFICE
Apodaca, N.L. • 52.811.156.99.10 • mela@omron.com

OMRON ARGENTINA • SALES OFFICE
Cono Sur • 54.11.4787.1129

OMRON CHILE • SALES OFFICE
Santiago 56.2206.4592

OTHER OMRON LATIN AMERICA SALES
56.2206.4592

H301-E3-02

Note: Specifications are subject to change.

Printed in U.S.A.

LifeElectronics
Живое партнерство

ООО «ЛайфЭлектроникс» **“LifeElectronics” LLC**

ИНН 7805602321 КПП 780501001 Р/С 40702810122510004610 ФАКБ "АБСОЛЮТ БАНК" (ЗАО) в г.Санкт-Петербурге К/С 30101810900000000703 БИК 044030703

Компания «Life Electronics» занимается поставками электронных компонентов импортного и отечественного производства от производителей и со складов крупных дистрибьюторов Европы, Америки и Азии.

С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров

Мы предлагаем:

- *Конкурентоспособные цены и скидки постоянным клиентам.*
- *Специальные условия для постоянных клиентов.*
- *Подбор аналогов.*
- *Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.*

- *Приемлемые сроки поставки, возможна ускоренная поставка.*
- *Доставку товара в любую точку России и стран СНГ.*
- *Комплексную поставку.*
- *Работу по проектам и поставку образцов.*
- *Формирование склада под заказчика.*

- *Сертификаты соответствия на поставляемую продукцию (по желанию клиента).*
- *Тестирование поставляемой продукции.*
- *Поставку компонентов, требующих военную и космическую приемку.*
- *Входной контроль качества.*
- *Наличие сертификата ISO.*

В составе нашей компании организован Конструкторский отдел, призванный помогать разработчикам, и инженерам.

Конструкторский отдел помогает осуществить:

- *Регистрацию проекта у производителя компонентов.*
- *Техническую поддержку проекта.*
- *Защиту от снятия компонента с производства.*
- *Оценку стоимости проекта по компонентам.*
- *Изготовление тестовой платы монтаж и пусконаладочные работы.*

Тел: +7 (812) 336 43 04 (многоканальный)
Email: org@lifeelectronics.ru

www.lifeelectronics.ru