OMRON

Selection Guide To Temperature Controllers
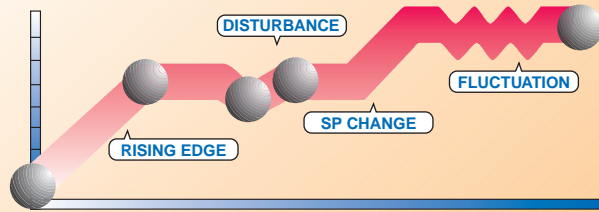

SMART FACTORY

E5□J Temperature Controllers

Fuzzy Self-tuning with Advanced PID for Optimum Temperature Control
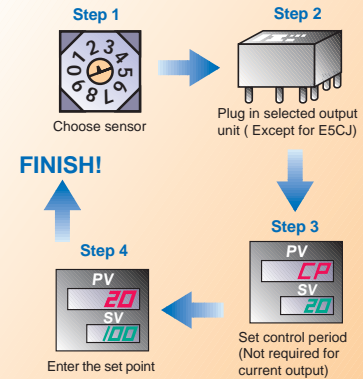
No Tuning Required

E5□J requires NO tuning after initial setting. Just set the desired temperature. Optimum PID constants are automatically calculated. The result is time saving.

PID is checked at:

DISTURBANCE

FLUCTUATION

SP CHANGE

RISING EDGE

Easy Setting

Step 1

Choose sensor

Step 2

Plug in selected output unit (Except for E5CJ)

Step 3

PV CP
SV 20

Set control period (Not required for current output)

Step 4

PV 20
SV 100

Enter the set point

FINISH!

Input

Selectable temperature input from a wide range of temperature sensors.

Output

Selectable plug-in modules of relay, voltage or linear output units, according to the application.

Watertight

The E5□J front panel meets the requirement of IP54 on E5AJ/E5BJ/E5EJ. Additional IP66/NEMA4 can be met with optional cover.

Communication Function

The E5AJ/E5EJ provide the optional RS232/RS422/RS485 communication functions and RUN/STOP operation by external input.

RUN
STOP

E5□K Digital Controllers

Centralized Control of Various Data to Satisfy Application Needs such as Temperature, Humidity, Pressure, etc.
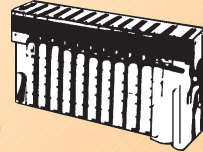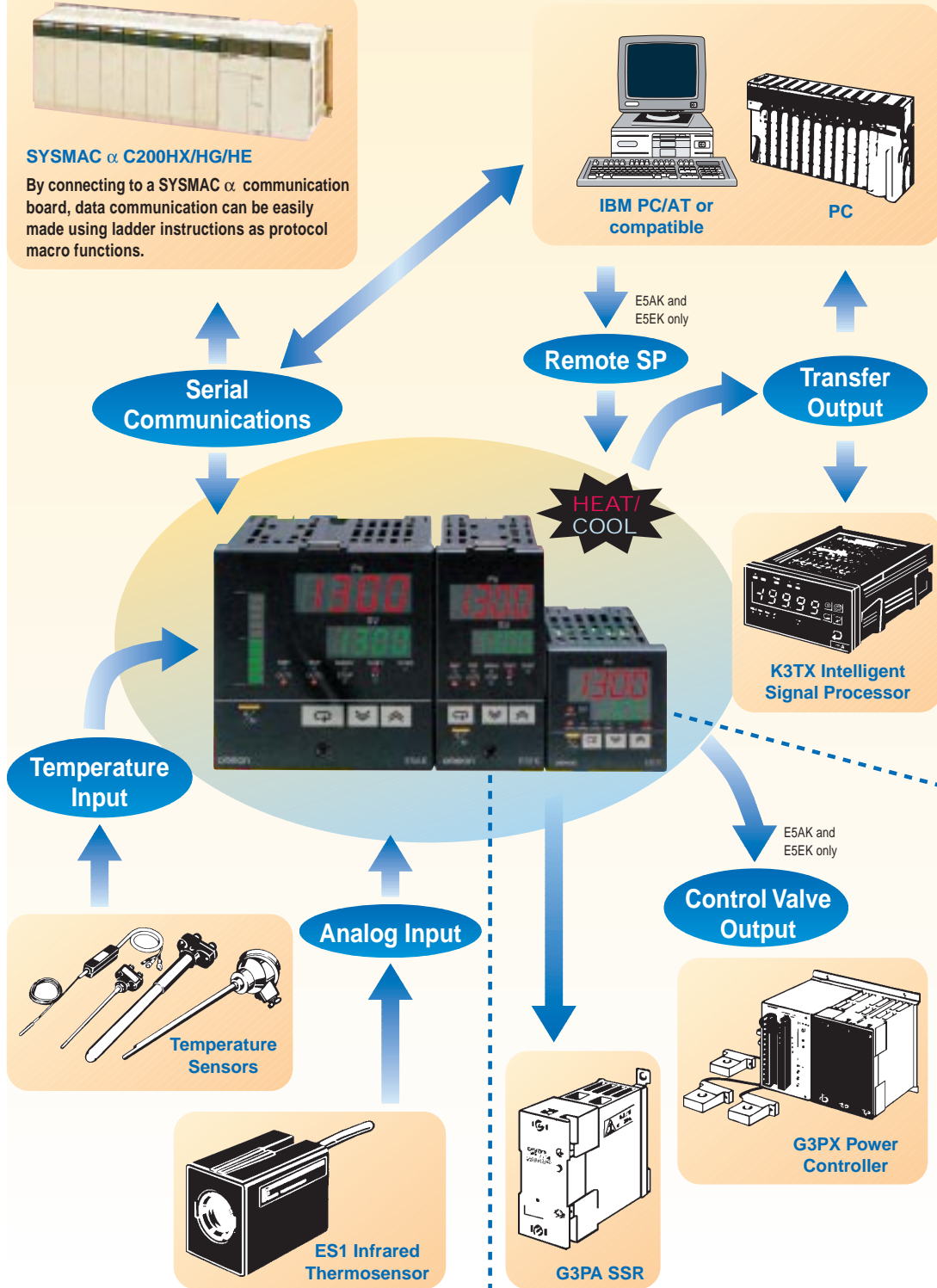
SYSMAC α C200HX/HG/HE

By connecting to a SYSMAC α communication board, data communication can be easily made using ladder instructions as protocol macro functions.

IBM PC/AT or compatible

PC

E5AK and E5EK only

Remote SP

Serial Communications

Transfer Output

HEAT/ COOL

K3TX Intelligent Signal Processor

Temperature Input

Temperature Sensors

Analog Input

Control Valve Output

E5AK and E5EK only

G3PX Power Controller

ES1 Infrared Thermosensor

G3PA SSR

SELECTION GUIDE

Classification	Economical Temperature Controllers		
Product Model	**E5EM**	**E5C2**	**E5CS**
Appearance			
Dimensions (H x W x L) mm	96 x 48 x 100	48 x 48 x 96	48 x 48 x 100
Features	• P control • Thumbwheel switch setting • Maximum heater current: AC 5A/20A/30A single phase (SW selectable) • Deviation indication (meter) / LED PV display	• ON/OFF or PD control • Economical plug-in unit • Panel adapter supplied	• PID or ON/OFF control • Compact, panel mount or socket mount unit • Large, easy to read LED display • Selectable temperature ranges • Input shift • Self diagnostics • 8 alarm modes • °C/°F selectable • Key protect function
Model Variations	• Heater burnout alarm • Digital indication • Deviation indication (meter)	—	—
Indication Accuracy	±1.5% max. of full scale	±2% max. of full scale (setting)	±0.5% of full scale, ±1 digit max.
Control Modes	P	ON/OFF or PD	ON/OFF or PID
Temperature Sensors and Input Ranges	Type K Thermocouple: 0 to 399°C	• Type K Thermocouple: 0 to 1,200°C (7 scales) • Type J Thermocouple: 0 to 400°C (3 scales) • JPt100: -50 to 400°C (7 scales) • Thermistor: -50 to 300°C (5 scales)	• Type K Thermocouple: 0 to 999°C (6 ranges) • Type J Thermocouple: 0 to 500°C (5 ranges) • JPt100, Pt100: -50 to 400°C (9 ranges) • Thermistor: -50 to 300°C (10 ranges)
Supply Voltage	100/110 or 200/220VAC, 50/60Hz	100/110 or 200/220VAC, 50/60Hz	100 to 240VAC, 50/60Hz or 24VDC/AC
Control Outputs	• Relay: SPDT, 3A, 250VAC (Resistive load)	• Relay: SPDT, 3A, 250VAC (Resistive load)	• Relay: SPDT, 3A, 250VAC (Resistive load) • Voltage: 12VDC, 20mA • Alarm: SPST-NO, 1A, 250VAC (Resistive load)
Weight (Approx.)	340g	200g	170g
Front Panel Approval	—	—	IEC IP50
Approved Standards & Markings	—	UL, CSA, CE	UL, CSA, CE

* For further details, consult OMRON representatives.

General Purpose Temperature Controllers	Advance Temperature Controllers	
E5□W	**E5□J**	**E5□X**
E5AW: 96 x 96 x 100 E5BW: 72 x 72 x 100 E5CW: 48 x 48 x 100 E5EW: 96 x 48 x 100	E5AJ: 96 x 96 x 98 E5BJ: 72 x 72 x 98 E5CJ: 48 x 48 x 100 E5EJ: 96 x 48 x 98	E5AX: 96 x 96 x 89 E5BX: 72 x 72 x 89 E5CX: 48 x 48 x 87.5 E5EX: 96 x 48 x 89
• Automatic tuning PID or ON/OFF control • Selectable temperature ranges • Displays Present Value and Set Value simultaneously • Input shift • Self diagnostics • 8 alarm modes • °C/°F selectable • Key protect function	• Fuzzy advanced self-tuning, PID control with two degrees of freedom or ON/OFF control • Selectable temperature inputs • Plug-in output modules (except E5CJ) • Self diagnostics • 4 event inputs (E5AJ, E5EJ) • Heater burnout alarm • 9 alarm modes • °C/°F selectable • Key protect function	• Advanced PID control with two degrees of freedom improves stability and response speed • Select from 7 temperature sensors for a total of 14 temperature ranges • 8 alarm modes • °C/°F selectable • Key protect function
• Heater burnout alarm	• Communication options (E5AJ, E5EJ only) RUN/STOP operation (E5AJ, E5EJ only)	• Position - proportional control • Heat & cool control • Communication options (E5AX, E5EX only)
±0.5% of full scale, ±1 digit max.	±0.5% of set value or ±1°C, ±1 digit max.	±0.3% of set value, 1 digit max.
ON/OFF or PID	ON/OFF or PID	ON/OFF or PID
• Type K Thermocouple: 0 to 999°C (6 ranges) • Type J Thermocouple: 0 to 500°C (4 ranges) • JPt100, Pt100: -50 to 400°C (9 ranges)	• Type K Thermocouple: -200 to 1,300°C • Type J Thermocouple: -100 to 850°C • Type T Thermocouple: -199.9 to 400.0°C • Type N Thermocouple: -200 to 1,300°C • JPt100, Pt100: -199.9 to 650.0°C	• Type K Thermocouple: -200 to 1,300°C • Type J/L Thermocouple: -100 to 850°C • Type T/U Thermocouple: -200 to 400°C • Type E Thermocouple: 0 to 600°C • Type R/S Thermocouple: 0 to 1,700°C • JPt100, Pt100: -99.9 to 450.0°C
100 to 240VAC, 50/60Hz or 24VAC/DC	100 to 240VAC, 50/60Hz	100 to 240VAC, 50/60Hz

• Relay: SPDT, 3A, 250VAC (Resistive load)
• Voltage: 12VDC, 20mA
• Alarm: SPST-NO, 1A, 250VAC (Resistive load)
	Plug-in Control Output Modules:
	• Relay: SPDT, 5A, 250VAC (Resistive load)
	• SSR: SPST-NO, 1A, 75-250VAC
	• Voltage: 12VDC, NPN, 40mA
	      24VDC, NPN / PNP, 20mA
	• Linear: 4 to 20mA / 0 to 20mA
	• 0 to 10VDC / 0 to 5VDC
		Plug-in Control Output Modules:
		• Relay: SPDT, 5A, 250VAC (Resistive load)
		• SSR: SPST-NO, 1A, 75 to 250VAC
		• Voltage: 12VDC, NPN, 40mA
		      24VDC, NPN / PNP, 20mA
		• Current: 4 to 20mA DC

150 to 300g	170 to 360g	160 to 400g
—	IEC IP50	IEC IP50
UL, CSA	UL, CSA, EN/IEC, CE	UL, CSA, SEV

	Digital Controllers	Special Purpose Temperature Controllers	
	E5□K	**E5□F**	
	E5AK: 96 x 96 x 100 E5CK: 53 x 53 x 100 E5EK: 96 x 48 x 100	E5AF: 96 x 96 x 100 E5EF: 96 x 48 x 100	
	• Modular structure • Fuzzy self-tuning, advanced PID or manual control • Auto/manual operation • Heat & cool control • Selectable temperature & analog input • Multi-set point, SP ramp function • Event input • Plug-in control output & optional units • Transfer output • 11 alarm modes • Key protect function	• Improve response to disturbance through Fuzzy logic • Hybrid Fuzzy-PID control with auto-tuning • Selectable temperature inputs • Plug-in control output modules • Displays Present Value and Set Value simultaneously • Input shift • Self diagnostics • Two alarm outputs with 9 modes each • Easily adjustable Fuzzy parameters • °C/°F selectable • Key protect function	
	• Position-proportional control (E5AK, E5EK only) • Heater burnout alarm (E5AK, E5EK only) • Communication options • Remote set point (E5AK, E5EK only) • Loop break alarm (E5AK, E5EK only)	• Communication options • 8 memory banks (E5EF-B only) • Heater burnout alarm	
	±0.3% of indication value, ±1 digit max.	±0.3% of set value, ±1 digit max.	
	ON/OFF or PID	ON/OFF or PID	
	• Thermocouples types: K, J, T, E, L, U, N, R, S, B, W, PL II (-199.9 to 2,300°C) • Platinum RTD: Pt100, JPt100 (-199.9 to 650.0°C) • Current: 4 to 20mA, 0 to 20mA • Voltage: 1 to 5VDC, 0 to 5VDC, 0 to 10VDC	• Type K Thermocouple: -200 to 1,300°C • Type J Thermocouple: -100 to 850°C • Type T Thermocouple: -200 to 400°C • Type N Thermocouple: 0 to 1,300°C • JPt100, Pt100: -99.9 to 450.0°C • Types E, R, S and B also applicable	
	100 to 240VAC, 50/60Hz, 24VAC/VDC	100 to 240VAC, 50/60Hz	
	Plug-in Control Output Modules: • Relay: SPST, 3A(5A*), 250VAC (Resistive load) • SSR: 1A, 75 to 250VAC* • Voltage: 12VDC, NPN, 40mA* 　　　　24VDC, NPN / PNP, 20mA* 　　　　12VDC, NPN / PNP, 20mA (E5CK only) • Linear: 0 to 10VDC, 4 to 20mA 　　　　0 to 5VDC*, 0 to 20mA * E5AK/E5EK only	**Plug-in Control Output Modules:** • Relay: SPDT, 5A, 250VAC (Resistive load) • SSR: SPST-NO, 1A, 75 to 250VAC • Voltage: 12VDC, NPN, 40mA 　　　　24VDC, NPN / PNP, 20mA • Current: 4 to 20mA DC	
	170 to 450g	310 to 430g	
	IEC IP66	IEC IP50	
	UL, CSA, EN/IEC, CE	UL, CSA	

TEMPERATURE CONTROLLERS

Process Controllers	Humidity Controllers
ES100□	**E5RA**

96 x 96 x 160	96 x 96 x 100
• User-configurable advanced process controller • Support software for programming and monitoring via PC • Front panel keys can be assigned with any available function • Incorporates Fuzzy Logic and advanced PID for high precision control • Cascade control & proportional control can be performed • Programmable up to 99 patterns and 99 steps (max. 400 steps) • Programmable event function • 4 key protection levels	• Advanced PID control of relative humidity with two degrees of freedom • Easy maintenance with ceramic humidity component • Displays Present Value and Set Value simultaneously • Aging monitor for sensor • 2 alarm outputs with 8 modes each • Key protection • Plug-in output modules • Self diagnostics
• Ramp/Soak programmable • Built-in timers and tune signals • Expansion I/O; communications	—
±0.1% of indication value, ±1 digit max.	±1% of set value, ±1 digit max.
ON/OFF or PID	ON/OFF or PID

• Thermocouples types:
  K, J, T, E, L, U, N, R, S, B, W, PL II (-199.9 to 2,300°C)
• Platinum RTD: Pt100, JPt100 (-199.9 to 600°C)
• Current: 4 to 20mA, 0 to 20mA
• Voltage: 0 to10mV, 0 to 100mV, -10 to 10mV,
             0 to 1V, 1 to 5V, 0 to 5V, 0 to 10V
	• Omron humidity sensor
	  Part No: E54-RA
	• Replacable humidity sensor module
	  Part No: E54-RB

100 to 240VAC, 50/60Hz	100 to 240VAC, 50/60Hz
Plug-in Control Output Modules: • Relay: SPDT, 5A, 250VAC (Resistive load) • SSR: SPST-NO, 1A, 75 to 250VAC • Voltage: 12VDC, NPN, 40mA 24VDC, NPN / PNP, 20mA • Current: 4 to 20mA DC	**Plug-in Control Output Modules:** • Relay: SPDT, 5A, 250VAC (Resistive load) • SSR: SPST-NO, 1A, 75 to 250VAC • Voltage: 12VDC, NPN, 40mA • Current: 4 to 20mA DC
800g	400g
IEC IP50 (IP66 with optional cover)	IEC IP50
UL, CSA, EN/IEC, CE	UL, CSA

Precision Temperature Control

G32A
CYCLE CONTROL UNIT

- Employs a cycle control method that allows power control with minimal noise generation.
- Used in combination with G3PA to connect to single-and three-phase loads.
- Control signals can be input with the built-in adjuster, the external adjuster, or a DC signal current of 4 to 20 mA.
- Closely mounted to G3PA with the linking terminal.
- 100 to 240 VAC supply voltage.

G3PA
SOLID STATE RELAY

- Downsizing achieved through optimum design of heat sink.
- Dense mounting possible with linking terminals.
- Applicable with 3-phase loads.
- Replaceable power element cartridges.
- Conforms to VDE 0106 (finger protection), with a dielectric strength of 4,000 V between input and load. (see note)
- Conforms to VDE 0805, IEC 950. (see note)

Note: Except for G3PA-420B/-430B

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* Note: Specifications subject to changes without notice.