



# eCAL Temperature & Process Controller



Single loop temperature / process controller  
1/16 DIN (48 x 48mm) & 1/8 DIN (96 x 48mm)  
Profiler function – 2 programs x 16 segment  
70mm depth behind panel  
Universal Input & 2 or 3 Outputs

The markets for industrial and scientific equipment demand that controllers not only provide a cost-effective and compact solution but also add-value to the overall competitive characteristics of the machine by offering improved aesthetic design or enhanced functions & diagnostics. The E6C economy controller has been designed to encompass these requirements by a global market leader in temperature and process control products.

## Specification

### Features

Control Types	Full PID with Pre-tune, manual tuning, or On-Off control, Heat Only or Heat & Cool
Output Configuration	Output 1 & 2; Relay or SSR drive. Output 3; Relay, SSR drive, Linear DC (mA/V), RS485 Comms
HMI	4 button operation, dual 4 digit 10mm & 8mm high LED displays, optional choice of colours (Red/Red, Red/Green), plus 3 LED output indicators. Function button: Profiler Control (Run, Hold, Stop, Reset) or Auto / Manual control (user defined)

### Input

Thermocouple	J, K, B, C, D, L, N, R, S, T, PtRh 20%:40%
RTD	3 Wire PT100, 50Ω per lead maximum (balanced)
DC Linear	0 to 20mA, 4 to 20mA, 0 to 50mV, 10 to 50mV, 0 to 5V, 1 to 5V, 0 to 10V, 2 to 10V. Scaleable -1999 to 9999, with adjustable decimal point to 3 places with 4 display digits
Impedance	>10M resistive, except DC mA (5 ) and V (47k )
Accuracy	0.1% of full range, 1LSD (thermocouple 1°C for internal CJC)
Sampling	4 per second, 250mS
Sensor Break Detection	Thermocouple & RTD - <i>Control goes to off. High alarms activate.</i> Linear (4 to 20mA, 2 to 10V and 1 to 5V only) - <i>Control goes to off. Low alarms activate.</i>

### Control

Tuning Types:	Automatic Pre-Tune and Manual Tuning.
Proportional Bands	0.5% to 999.9% of input span in range units, or On/Off control.
Automatic Reset:	Integral Time Constant, 1s to 99min 59s and OFF
Rate:	Derivative Time Constant, 1s to 99 min 59s and OFF
Manual Reset:	Proportional Output Power Bias 0 to 100%. (-100 to 100
Differential:	ON/OFF switching differential 0.1% to 10.0% of input span
Cycle Time:	Selectable from 0.1 to 512 seconds (SSR output) Selectable from 0.5 to 512 seconds (Relay output)

### Profiler

Number of programs	2, Each with 16 free-form segments (Ramp /dwell / Step / End) Maximum segment length 99Hrs 59 Mins
Delayed start	Max 99 hours 59mins delay from initiation to program start
Guaranteed soak	Holds program if PV out of specified hold band during dwell segments
Program cycles	1 to 9999 or infinite (continuously restarts program at end)
Ramp rate definition	Either ramp rate or time to target setpoint
Power loss recovery	Continue profile from point of power fail or end profile and return to controller mode

### Alarms

Alarm types

Process High, Process Low, Band and Deviation. Band and Deviation (high or low) alarm values are relative to the current setpoint value. Hysteresis; A dead-band from 1 LSD to full span (in display units) before deactivation of the alarm.

### Outputs

Control & Alarm Relays

Contacts SPST 2 Amp resistive at 120/240V AC, >300,000 operations (Out 3 >500,000 operations)

Out 1 & 2 Basic safety from universal input and SSR drive.

Out 3 Reinforced safety from universal input and SSR drive.

SSR Driver Outputs

Drive capability >10V DC in 500Ω minimum, non-isolated

DC Linear Outputs

0 to 20mA, 4 to 20mA into 500 Ω max, 0 to 10V, 2 to 10V, 0 to 5V into 500 Ω min.

Accuracy 0.25% at 250 Ω (Degrades linearly to 0.5% for increasing burden to specified units)

Basic safety from universal input and SSR drive.

Reinforced safety isolation from mains and relay circuits

### Serial Communications

Physical

RS485 at 1200, 2400, 4800, 9600, 19200 or 38400bps

Protocol

Modbus RTU

Isolation

Basic safety from universal input and SSR drive.

Reinforced safety isolation from mains and relay circuits

### Operating and Environmental

Temperature & RH

0 to 55°C (-20 to 80°C storage), 20% to 95% RH non-condensing

Power Supply

100 to 240V 50/60Hz ±10%, 7.5VA

or optional 20 to 48VAC 50/60Hz or 22 to 65VDC 5W (low voltage version)

Front Panel Protection

IP66 (IP20 behind panel)

### Conformance

Standards

CE.

EMI:

Complies with EN61326.

Safety Considerations:

Complies with EN61010-1. Pollution Degree 2, Installation Category II.

### Weights & Dimensions

Weight:

0.21kg maximum.

Dimensions

1/ 16 DIN , 48 x 48mm ; 1/8 DIN 96 x 48mm ; 70mm (Depth Behind Panel).

### Wiring Connections

1/16 DIN

	RS485	RLY	SSR/ LIN						
Output 3 (option)	B	NO	+	6	7	8	L	Power	
	COM	COM		5			N		
	A	NC	-	4	9	10	NO	-	OUT1
Universal input				3	10	11	COM	+	OUT2
				2	11	12	NO	-	
				1	12		COM	+	
	RTD	mA	TC/mV/V				RLY	SSR	

1/8 DIN

Power	L	12	13
	N	11	14
OUT1	RLY	10	15
	SSR		
	COM		
	NO	9	16
OUT2	COM	8	17
	NO	7	18
Output 3 (option)	RS485	6	19
	RLY		
	SSR/ LIN		
	B	5	20
	COM	4	21
	A	3	22
Universal input		2	23
		1	24
	RTD	mA	TC/mV/V



## Ordering Code

Model Code	E	X	C	0	X	X	X	X	X	X
<b>Model Type</b>										
1/32 - DIN		3								
1/16 - DIN		6								
1/8 - DIN		8								
<b>Options 1 and 2</b>										
Relay / Relay					R	R				
DC Drive Output for SSR / Relay					S	R				
DC Drive Output for SSR / DC Drive Output for SSR					S	S				
<b>Option 3</b>										
Not fitted							0			
Relay Output							R			
DC Drive Output for SSR							S			
Linear mA/VDC Output							L			
RS485							C			
<b>Supply Voltage</b>										
100-240V AC								0		
20 to 48VAC 50/60Hz or 22 to 65VDC low volts								2		
<b>Display Colour</b>										
Red/Red									0	
Red/Green										2

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