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BrainChild

BC-140.09E

AUTO-TUNE PID TEMPERATURE CONTROLLER C 91 (48X48mm)



The Fuzzy Logic plus PID microprocessor-based temperature controller, incorporate one bright, easy to read 4-digit LED display, indicating process value and set point value. The Fuzzy Logic technology enables a process to reach a predetermined set point in the shortest time, with the minimum of overshoot during power-up or external load disturbance.

SPECIFICATIONS

Power

90 - 250 VAC, 47 - 63 Hz, 10VA, 5W maximum
11 - 26 VAC / VDC, SELV, Limited Energy, 10VA, 5W

Input 1

Characteristics

Type	Range	Accuracy @ 25 °C	Input Impedance
J	-120 ~ 1000 °C (-184 ~ 1832 °F)	±2 °C	2,2MΩ
K	-200 ~ 1370 °C (-328 ~ 2498 °F)	±2 °C	2,2MΩ
T	-250 ~ 400 °C (-418 ~ 752 °F)	±2 °C	2,2MΩ
E	-100 ~ 900 °C (-148 ~ 1652 °F)	±2 °C	2,2MΩ
B	-0 ~ 1820 °C (-32 ~ 3308 °F)	±2 °C (200 - 1820°C)	2,2MΩ
R	-0 ~ 1768 °C (-32 ~ 3214 °F)	±2 °C	2,2MΩ
S	-0 ~ 1768 °C (-32 ~ 3214 °F)	±2 °C	2,2MΩ
N	-250 ~ 1300 °C (-418 ~ 2372 °F)	±2 °C	2,2MΩ
L	-200 ~ 900 °C (-328 ~ 1652 °F)	±2 °C	2,2MΩ
PT100 (DIN)	-210 ~ 700 °C (-346 ~ 1292 °F)	±0,4°C	1,3 KΩ
PT100 (JIS)	-200 ~ 600 °C (-328 ~ 1112 °F)	±0,4°C	1,3KΩ
mV	-8 ~ 70mV	±0,05%	2,2MΩ
mA	-3 ~ 27mA	±0,05%	70,5Ω
V	-1,3 ~ 11,5V	±0,05%	302KΩ

FEATURES

Easy-to-use
Fuzzy modified PID heat & cool control
Fast A-D sampling rate (5 times/s)
Universal input (PT100, thermocouple)with high accuracy
18-bit A-D
Analog output (linear current or voltage)uses high accuracy
15-bit D-A
RS-485 RS-232 interface
Programming port provided on board
Support manual control & auto-tune function
Wide variety of alarm mode selection
Lockout protection control
Bumpless transfer during failure mode
Soft-start ramp and dwell timer
Bright display stabilized with digital filter
UL/CSA/CE approval
High performance with low cost

Resolution : 18 bits

Sampling Rate : 5 times / second

Maximum Rating : -2 VDC minimum, 12 VDC maximum(1 minute for mA input)

Temperature Effect : ±1.5 uV/ °C for all inputs except mA
input ±3.0 uV/ °C for mA input

Sensor Lead Resistance Effect :

T/C: 0.2uV/ohm

3-wire RTD: 2.6 °C/ohm of resistance difference of two leads

2-wire RTD: 2.6 °C/ohm of resistance sum of two leads

Burn-out Current : 200nA

Common Mode Rejection Ratio (CMRR) : 120dB

Normal Mode Rejection Ratio (NMRR) : 55dB

Sensor Break Detection :

Sensor open for TC, RTD and mV inputs,

Sensor short for RTD input,

below 1 mA for 4-20 mA input,

below 0.25V for 1 - 5 V input, unavailable for other inputs.

Sensor Break Responding Time :

Within 4 seconds for TC, RTD and mV inputs,

0.1 second for 4-20 mA and 1 - 5 V inputs.

Output 1 / Output 2

Relay Rating : 2A/240 VAC, life cycles 200,000 for resistive load

Pulsed Voltage : Source Voltage 5V, current limiting resistance 66Ω .

Linear Output Characteristics:

Type	Zero Tolerance	Span Tolerance	Load Capacity
4-20 mA	3,8-4 mA	20-21 mA	500Ω máx.
0-20 mA	0 mA	20-21 mA	500Ω máx.
0-5 V	0 V	5-5,25 V	10KΩ mín.
1-5 V	0,95-1 V	5-5,25 V	10KΩ mín.
0-10 V	0 V	10-10,5 V	10KΩ mín.

Linear Output

Resolution : 15 bits

Output Regulation : 0.02 % for full load change

Output Settling Time : 0.1 sec. (stable to 99.9 %)

Isolation Breakdown Voltage : 1000 VAC

Temperature Effect : ±0.01 % of SPAN / °C

Triac (SSR) Output

Rating : 1A / 240 VAC

Inrush Current : 20A for 1 cycle

Min. Load Current : 50 mA rms

Max. Off-state Leakage : 3 mA rms

Max. On-state Voltage : 1.5 V rms

Insulation Resistance : 1000 Mohms min. at 500 VDC

Dielectric Strength : 2500 VAC for 1 minute

Alarm(Output 2)

Alarm Relay :Form A,Max. rating 2A/240VAC, life cycles 200,000 for resistive load.

Alarm Functions : Dwell timer,

Deviation High / Low Alarm,

Deviation Band High / Low Alarm

Process High / Low Alarm

Alarm Mode : Normal, Latching, Hold, Latching / Hold.

Dwell Timer : 0.1 - 4553.6 minutes

Data communication

Interface : RS-232 (1 unit), RS-485 (up to 247 units)

Protocol : Modbus Protocol RTU mode

Address : 1 - 247

Baud Rate : 2.4 ~ 38.4 Kbits/sec

Data Bits : 7 or 8 bits

Parity Bit : None, Even or Odd

Stop Bit : 1 or 2 bits

Communication Buffer : 160 bytes

Analog retransmission

Output Signal : 4-20 mA, 0-20 mA, 0-1V, 0-5V, 1-5V, 0-10V

Resolution : 15 bits

Accuracy : ±0.05 % of span ±0.0025 %/ °C

Load Resistance : 0 - 500 ohms (for current output), 10 K ohm minimum (for voltage output)

Output Regulation : 0.01 % for full load change

User interface

Single 4-digit LED Displays :10mm

Keypad : 4 keys

Programming Port : For automatic setup, calibration and testing

Communication Port : Connection to PC for supervisory control

Control mode

Output 1 : Reverse (heating) or direct (cooling) action

Output 2 : PID cooling control, cooling P band 50 ~ 300% of PB, dead band -36.0 ~ 36.0% of PB

ON-OFF : 0.1 - 90.0 (°F) hysteresis control (P band = 0)

P or PD : 0 - 100.0 % offset adjustment

PID : Fuzzy logic modified , Proportional band 0.1 ~ 900.0°F , Integral time 0 - 3600 seconds , Derivative time 0 - 360.0 seconds

Cycle Time : 0.1 - 90.0 seconds

Manual Control : Heat (MV1) and Cool (MV2)

Auto-tuning : Cold start and warm start

Failure Mode : Auto-transfer to manual mode while sensor break or A-D converter damage

Ramping Control : 0 ~ 900.0°F/minute or 0 ~ 900.0 °F/hour ramp rate

Sleep Mode : Enable or Disable

Ramping Control : 0 ~ 500.0 °C/minute or 0 ~ 500.0 °C/hour ramp rate

Digital Filter

Function : First order

Time Constant : 0, 0.2, 0.5, 1, 2, 5, 10, 20, 30, 60 seconds programmable

Environmental & physical

Operating Temperature : -10°C to 50°C

Storage Temperature : -40°C to 60°C

Humidity : 0 to 90 % RH (non-condensing)

Altitude : 2000m maximum

Pollution : Degree 2

Insulation Resistance : 20 Mohms min. (at 500 VDC)

Dielectric Strength : 2000 VAC, 50/60 Hz for 1 minute

Vibration Resistance : 10 - 55 Hz, 10 m/s² for 2 hours

Shock Resistance : 200 m/s² (20 g)

Moldings : Flame retardant polycarbonate

Dimensions :

48mm(W) X 48mm(H) X 94mm(D), 86 mm depth behind panel

Mounting:

panel mount, cutout 45 X 45 (mm)

Weight :

140 grams

Approval standards

Safety : UL 61010C-1 , CSA C22.2 No. 24-93 , EN61010-1 (IEC1010-1)

Protective Class :

NEMA 4X (IP65) front panel for C21,

IP30 front panel for C91, all indoor use,

IP20 housing and terminals

EMC : EN61326

ORDERING CODE C91

1 2 3 4 5 6

1 Power supply

4: 90 - 264 VAC, 47-63 HZ
5: 11 - 26 VAC VDC, SELV, Limited Energy

2 Signal output

1: Standard Input
Thermocouple: J, K, T, E, B, R, S, N, L
RTD: PT100 DIN, PT100 JIS
2: 0 - 60 mV
3: 0 - 1 V
4: 0 - 5 V
5: 1 - 5 V
6: 4 - 20 mA
7: 0 - 20 mA
8: 0 - 10V
9: Special order

3 Output 1

0: None
1: Relay rated 2A / 240VAC
2: Pulsed voltage to drive SSR, 5V / 30mA
3: Isolated 4 - 20mA / 0 - 20mA
4: Isolated 1 - 5V / 0 - 5V
5: Isolated 0 - 10V
6: Triac output 1A / 240VAC, SSR
C: Pulsed voltage to drive SSR, 14V/40mA
9: Special order

4 Output 2

0: None
1: Form A relay 2A / 240VAC
2: Pulsed voltage to drive SSR, 5V / 30mA
3: Isolated 4 - 20mA / 0 - 20mA
4: Isolated 1 - 5V / 0 - 5V
5: Isolated 0 - 10V
6: Triac output, 1A / 240VAC, SSR
7: Isolated 20V / 25mA transducer power supply
8: Isolated 12V / 40mA transducer power supply
9: Isolated 5V / 80mA transducer power supply
A: RS-485 interface (for C91)
C: Pulsed voltage to drive SSR, 14V/40mA
D: Retransmit 4-20mA / 0-20mA (for C91)
E: Retransmit 1-5V / 0-5V (for C91)
F: Retransmit 0-10V (for C91)
B: Special order

5 Communications

0: None
1: RS-485 interface
2: RS-232 interface(for C21)
3: Retransmit 4 - 20 mA / 0 - 20 mA(for C21)
4: Retransmit 1 - 5V / 0 - 5V(for C21)
5: Retransmit 0 - 10V(for C21)
9: Special order

6 Display color

0: Red color
1: Green color