



CRN TECNOPART, S.A.

Sant Roc 30
08340 VILASSAR DE MAR (Barcelona)
Tel 902 404 748 - 937 591 484 Fax 937 591 547
e-mail: crn@crntp.com [http:// www.crntecnopart.com](http://www.crntecnopart.com)

BrainChild

BC-130.10E

AUTO TUNE PID TEMPERATURE CONTROLLER BTC SERIES



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
- SEL function allows to rearrange user menu
- UL/CSA/CE approval
- High performance with low cost

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 ~ 1800 °C (32 ~ 3272 °F)	±2 °C (200°C - 1800°C)	2.2MΩ
R	0 ~ 1767.8 °C (32 ~ 3214 °F)	±2 °C	2.2MΩ
S	0 ~ 1767.8 °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	1.3MΩ
PT100 (JIS)	-200 ~ 600 °C (-328 ~ 1112 °F)	±0.4 °C	1.3MΩ
mV	-8 ~ 70mV	±0.05 °C	2.2MΩ
mA	-3 ~ 27mA	±0.05 °C	70.5MΩ
V	-1.3 ~ 11.5V	±0.05 °C	650MΩ

DESCRIPTION

The Fuzzy Logic plus PID microprocessor-based temperature controller, incorporate two 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.

As a professional and experienced manufacturer, we supply high-performance and quality temperature controllers, which are also called temperature control, electronic temperature control, electronic temperature controller, and PID controller.

SPECIFICATIONS

Power

90 - 250 VAC, 47 - 63 Hz, 12VA, 5W maximum

11 - 26 VAC / VDC, SELV, Limited Energy, 12VA, 5W maximum

Signal Input

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 66.

Linear Output Characteristics:

Type	Zero Tolerance	Span Tolerance	Load Capacity
4-20 mA	3.6-4 mA	20-21 mA	500. max.
0-20 mA	0 mA	20-21 mA	500. max.
0-5 V	0 V	5-5.25 V	10K. min.
1-5 V	0.9-1 V	5-5.25 V	10K. min.
0-10 V	0 V	10-10.5 V	10K. min.

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

Alarm Relay : Form C, 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

Dual 4-digit LED Displays :

BTC-4100 Upper 0.55" (14mm)

Lower 0.4" (10 mm)

BTC-7100, BTC8100, BTC9100

Upper 0.4" (10 mm)

Lower 0.31" (8 mm)

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

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 :

BTC-4100 ---96mm(W) X 96mm(H) X 65mm(D), 53 mm depth behind panel

BTC-7100 ---72mm(W) X 72mm(H) X 78.2mm(D), 65 mm depth behind panel

BTC-8100 ---48mm(W) X 96mm(H) X 80mm(D), 65 mm depth behind panel

BTC-9100 ---48mm(W) X 48mm(H) X 116mm(D), 105 mm depth behind panel

Mounting:

BTC-4100 ---panel mount, cutout 92 X 92 (mm)

BTC-7100 ---panel mount, cutout 68 X 68 (mm)

BTC-8100 ---panel mount, cutout 45 X 92 (mm)

BTC-9100 ---panel mount, cutout 45 X 45 (mm)

Weight :

BTC-4100 --- 250 grams

BTC-7100 --- 200 grams

BTC-8100 --- 210 gram

BTC-9100 --- 150 grams

Approval Standards

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

Protective Class :

IP65 front panel with additional option,

IP50 front panel without additional option,

all indoor use,

IP 20 housing and terminals with protective cover.

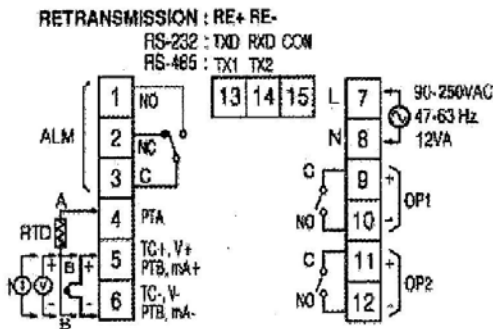
EMC : EN61326

CONNECTION DIAGRAMS

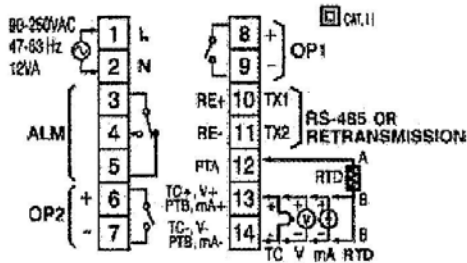
ORDERING CODE

1 2 3 4 5 6 7

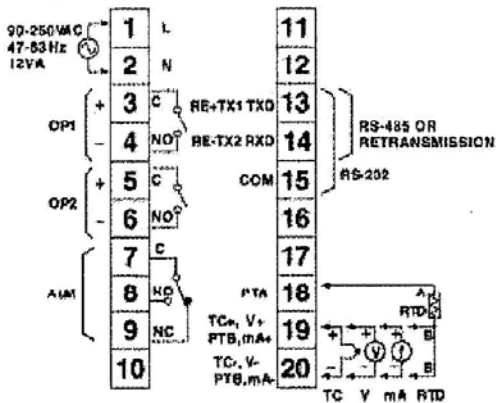
BTC-9100



BTC-7100



BTC-8100, BTC-4100



1 Power Input

- 4: 90 - 250 VAC, 47-63 HZ
- 5: 11 - 26 VAC or VDC, SELV, Limited Energy

2 Signal Input

- 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 / 25 mA DC Output Power Supply
- 8: Isolated 12V / 40 mA DC Output Power Supply
- 9: Isolated 5V / 80 mA DC Output Power Supply
- C: Pulsed voltage to drive SSR, 14V/40mA
- A: Special order

5 Alarm

- 0: None
- 1: Form C relay 2A / 240VAC
- 9: Special order

6 Communications

- 0: None
- 1: RS-485 interface
- 2: RS-232 interface(not available for BTC-7100)
- 3: Retransmit 4 - 20 mA / 0 - 20 mA
- 4: Retransmit 1 - 5V / 0 - 5V
- 5: Retransmit 0 - 10V
- 9: Special order

7 Options

- 0: Panel mount IP50 standard
- 1: Panel mount IP65 water resistant rubber installed
- 2: DIN Rail mount with IP50 (for BTC-9100 only)
- 3: DIN Rail mount with IP65 (for BTC-9100 only)