



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-140.25E

BTC 2500 PROCESS TEMPERATURE CONTROLLER (Size 24x48mm)

The Fuzzy Logic plus PID microprocessor-based temperature controller, incorporate two bright, easy to read 4-digit LED displays, 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 supply

90 - 264 VAC, 47 - 63 Hz, 15VA, 7W maximum
11 - 26 VAC / VDC, SELV, Limited energy, 15VA, 7W maximum

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

- High accuracy 18-bit input A-D
- High accuracy 15-bit output D-A
- Fast input sample rate (5 times / second)
- Basic & full function
- User menu configurable
- Pump control
- Fuzzy+PID microprocessor-based control
- Automatic programming
- Differential control
- Auto-tune function
- Self-tune function
- Sleep mode function
- "Soft-start " ramp and dwell timer
- Programmable inputs (thermocouple,RTD, mA,VDC)
- Analog input for remote set point and CT
- Event input for changing function & set point
- Programmable digital filter
- Hardware lockout + remote lockout protection
- Loop break alarm
- Heater break alarm
- Sensor break alarm+Bumpless transfer
- RS-485,RS-232 communication
- Analog retransmission
- Signal conditioner DC power supply
- A wide variety of output modules available
- Safety UL / CSA / IEC1010-1
- EMC / CE 1326

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 200nA

Common Mode Rejection Ratio (CMRR) : 120dB

Normal Mode Rejection Ratio (NMRR) : 55dB

Sensor Break Detection :

Sensor open for TC, RTD and mV inputs,

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.

Input 2

Resolution : 18 bits
Sampling Rate : 1.66 times / second
Maximum Rating : -2 VDC minimum, 12 VDC maximum
Temperature Effect : $\pm 1.5\mu\text{V}/^\circ\text{C}$ for all inputs except mA
input $\pm 3.0\mu\text{V}/^\circ\text{C}$ for mA input
Common Mode Rejection Ratio (CMRR) : 120dB
Normal Mode Rejection Ratio (NMRR) : 55dB
Sensor Break Detection : Below 1 mA for 4-20 mA input,
below 0.25V for 1 - 5V input,
unavailable for other inputs.
Sensor Break Responding Time : 0.5 second

Characteristics :

Type	Range	Accuracy @ 25 °C	Input Impedance
CT94-1	0-50,0 A	$\pm 2\%$ of Reading $\pm 0,2\text{A}$	302K
mA	-3mA- 27mA	$\pm 0,05\%$	70,5 +0,8V / input current
V	-1,3V- 11,5V	$\pm 0,05\%$	302K

Input 3 (event input)

Logic Low : -10V minimum, 0.8V maximum.
Logic High : 2V minimum, 10V maximum
External pull-down Resistance : 400 K maximum
External pull-up Resistance : 1.5 M minimum
Functions :
Select second set point and/or PID , reset alarm 1 and/or
alarm 2 , disable output 1 and/or output 2 , remote lockout..

Output 1 / Output 2 (Alarm 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	3,8-4 mA	20-21 mA	500 Ω máx.
0-20 mA	0 mA	20-21 mA	500 Ω máx.
0-5 V	0 V	5-5,25 V	10K Ω mín.
1-5 V	0,95-1 V	5-5,25 V	10K Ω mín.
0-10 V	0 V	10-10,5 V	10K Ω mín.

Linear Output

Resolution : 15 bits
Output Regulation : 0.01 % for full load change
Output Settling Time : 0.1 sec. (stable to 99.9 %)
Isolation Breakdown Voltage : 1000 VAC
Temperature Effect : $\pm 0.0025\%$ of SPAN / $^\circ\text{C}$

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

DC Voltage Supply Characteristics
(Installed at Output 2)

Type	Tolerance	Max. Output Current	Ripple Voltage	Isolation Barrier
20 V	$\pm 1,0\text{V}$	25 mA	0,2 Vp-p	500 VAC
12 V	$\pm 0,6\text{V}$	40 mA	0,1 Vp-p	500 VAC
5 V	$\pm 0,25\text{V}$	80 mA	0,05 Vp-p	500 VAC

Alarm 1/ Alarm 2 (Output 2)

Alarm 1 Relay :
Form A or Form B for BTC-9300, Form C for BTC4300,
BTC-8300, 5V Logic output for BTC-2500 Max. Rating
2A/240VAC, life cycles 200,000 for resistive load.
Alarm 2 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,
PV1 High / Low Alarm,
PV2 High / Low Alarm,
PV1 or PV2 High /Low Alarm,
PV1-PV2 High /Low Alarm,
Loop Break Alarm,
Sensor Break Alarm.
Alarm Mode : Normal, Latching, Hold, Latching / Hold.
Dwell Timer : 0 - 6553.5 minutes

Data communication

Interface : RS-232 (1 unit), RS-485 (up to 247 units)
Protocol : Modbus Protocol RTU mode
Address : 1 - 247
Baud Rate : 0.3 ~ 38.4 Kbits/sec
Data Bits : 7 or 8 bits
Parity Bit : None, Even or Odd
Stop Bit : 1 or 2 bits
Communication Buffer : 50 bytes

Analog retransmission

Functions : PV1, PV2, PV1-PV2, PV2-PV1, Set Point,
MV1, MV2, PV-SV deviation value
Output Signal : 4-20 mA, 0-20 mA, 0-1V, 0-5V, 1-5V, 0-10V
Resolution : 15 bits
Accuracy : $\pm 0.05\%$ of span $\pm 0.0025\%$ / $^\circ\text{C}$
Load Resistance : 0 - 500 ohms (for current output), 10 K
ohm minimum (for voltage output)
Output Regulation : 0.01 % for full load change
Output Settling Time : 0.1 sec. (stable to 99.9 %)
Isolation Breakdown Voltage : 1000 VAC min.
Integral Linearity Error : $\pm 0.005\%$ of span
Temperature Effect : $\pm 0.0025\%$ of span/ $^\circ\text{C}$
Saturation Low : 0 mA (or 0V)
Saturation High : 22.2 mA (or 5.55V, 11.1V min.)
Linear Output Range : 0 - 22.2mA(0-20mA or 4-20mA),
0 - 5.55V (0 - 5V, 1 - 5V),
0 - 11.1 V (0 - 10V)

User interface

4-digit LED Display
Keypad : 3 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 1 ~ 255% of PB

ON-OFF : 0.1 - 55.6 (°C) hysteresis control (P band = 0)

P or PD : 0 - 100.0 % offset adjustment

PID : Fuzzy logic modified , Proportional band 0 ~ 500.0 °C

Integral time 0 - 1000 seconds , Derivative time 0 - 360.0 seconds

Cycle Time : 0.1 - 100.0 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 ~ 500.0 °C/minute or 0 ~ 500.0

°C/hour ramp rate

Sleep Mode : Enable or Disable

Ramping Control : 0 ~ 500.0 °C/minute or 0 ~ 500.0

°C/hour ramp rate

Power Limit : 0 - 100 % output 1 and output 2

Pump / Pressure Control : Sophisticated functions provided

Remote Set Point : Programmable range for voltage or current input

Differential Control : Control PV1 - PV2 at set point

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)

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-2500 ---50mm(W) X 26.5mm(H) X 110.5 mm(D), 98.0 mm depth behind panel

Mounting::

BTC-2500 ---45 X 22 (mm)

Weight :

BTC-2500 --- 120 gram

Approval Standards

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

NEMA 4X(IP65) front panel ,

IP 20 housing and terminals

EMC : EN61326

ORDERING CODE BTC 2500 (24x48mm)

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	2	3	4	5	6

1 Power supply

4: 90 - 264 VAC, 47-63 HZ

5: 11 - 26 VAC or VDC, SELV, Limited Energy

2 Signal input

1: Standard Input

Input 1-Universal Input

Thermocouple: J, K, T, E, B, R, S, N, L

RTD: PT100 DIN, PT100 JIS

Current: 4 - 20mA, 0 - 20mA

Voltage: 0 - 1V, 0 - 5V, 1 - 5V, 0-10V

Input 2-CT: 0 - 50 Amp.AC

Current Transformer

Analog Input: 4-20mA, 0-20mA,

0 - 1V, 0 - 5V, 1 - 5V, 0 - 10V

Input 3-Event Input (EI)

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 / Alarm 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 1

1 5V Logic Output

9: Special order

6 Communications

0: None

1: RS-485 interface

2: RS-232 interface

3: Retransmit 4 - 20 mA / 0 - 20 mA

4: Retransmit 1 - 5V / 0 - 5V

5: Retransmit 0 - 10V

9: Special order