



Excellent low-cost Process & Temperature Controllers

Outstanding Features

01. High Quality LCD Display	02. High Accuracy 18 Bit A-D Input and 15 Bit D-A Output
03. The Fast Sampling Rate in 200msec	04. True Universal Inputs of Thermocouple, RTD, mA, V
05. Fuzzy + PID Control	06. Auto-Tuning
07. Possibility of both RS-485 and Analog Retransmission	08. 2 Programs each with 8 Segments of Ramp & Soak
09. CT Inputs for Heater-Break Detection	10. Upto 6 Event Inputs
11. Remote Setpoint	12. Bumpless Transfer
13. Lockout Protection	14. Bidirectional Menu Navigation

Specifications

Model



C22



C62



C82



C83



C72



C42



R22

Power Supply	90 to 250VAC, 47–63 Hz ; 11 to 40VDC / 20 to 28 VAC, 47–63 Hz
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Signal Input				
Type	Thermocouple (J, K, T, E, B, R, S, N, L, U, P, C, D), RTD (PT100 (DIN), PT100 (JIS)), Current (mA), Voltage (Volts)			
Resolution	18Bits			
Sampling Rate	5Times/Second (200msec)			
Maximum Rating	-2VDC minimum, 12VDC maximum			
Input Characteristics	Type	Range	Accuracy @ 25°C	Input Impedance
	J	-120 °C to 1,000.0 °C (-184 °F to 1,832 °F)	±2 °C	2.2 MΩ
	K	-200 °C to 1,370.0 °C (-328 °F to 2,498 °F)	±2 °C	2.2 MΩ
	T	-250 °C to 400.0 °C (-418 °F to 752 °F)	±2 °C	2.2 MΩ
	E	-100 °C to 900.0 °C (-148 °F to 1,652 °F)	±2 °C	2.2 MΩ
	B	0 °C to 1,820.0 °C (32 °F to 3,308 °F)	±2 °C (200 °C to 1,800 °C)	2.2 MΩ
	R	0 °C to 1,767.8 °C (32 °F to 3,214 °F)	±2 °C	2.2 MΩ
	S	0 °C to 1,767.8 °C (32 °F to 3,214 °F)	±2 °C	2.2 MΩ
	N	-250 °C to 1,300.0 °C (-418 °F to 2,372 °F)	±2 °C	2.2 MΩ
	L	-200 °C to 900.0 °C (-328 °F to 1,652 °F)	±2 °C	2.2 MΩ
	U	-200 °C to 600.0 °C (-328 °F to 1,112 °F)	±2 °C	2.2 MΩ
	P	0 °C to 1,395.0 °C (32 °F to 2,543 °F)	±2 °C	2.2 MΩ
	C	0 °C to 2,300.0 °C (32 °F to 4,172 °F)	±2 °C	2.2 MΩ
	D	0 °C to 2,300.0 °C (32 °F to 4,172 °F)	±2 °C	2.2 MΩ
	PT100 (DIN)	-200 °C to 850.0 °C (-328 °F to 1,562 °F)	±0.4 °C	1.3 KΩ
PT100 (JIS)	-200 °C to 600.0 °C (-328 °F to 1,112 °F)	±0.4 °C	1.3 KΩ	
mA	-3mA to 27mA	±0.05%	2.5 Ω	
V	-1.3V to 11.5V	±0.05%	1.5 MΩ	
Temperature Effect	1.5 μV/°C for all inputs except mA input, 3.0 μV/°C for mA			
Sensor Lead Resistance Effect	Thermocouple : 0.2 μV/Ω ; 3-wire RTD : 2.6 °C/Ω of Difference of Resistance of two leads ; 2-wire RTD : 2.6 °C/Ω of Sum of Resistance of two leads			
Burn-out Current	200 nA			
Common Mode Rejection Ratio (CMRR)	120 dB			
Normal Mode Rejection Ratio (NMRR)	55 dB			
Sensor Break Detection	Sensor open for Thermocouple and RTD inputs, sensor short for RTD input, below 1 mA for 4–20mA input, below 0.25V for 1–5V input, not available for other inputs			
Sensor Break Responding Time	Within 4 seconds for Thermocouple and RTD inputs, 0.1 second for 4–20mA and 1–5V inputs			

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Remote Set Point Input							
Type	Linear Current, Linear Voltage						
Range	-3 mA to 27 mA, -1.3 V to 11.5 V						
Accuracy	± 0.05 %						
Remote Set Point Option	Not Available	Not Available	Available	Available	Available	Available	Not Available
Input Impedance	Current : 2.5 Ω, Voltage : 1.5 MΩ						
Resolution	18 Bits						
Sampling Rate	1.66 Times/Second						
Maximum Rating	280 mA maximum for Current Input, 12 VDC maximum for Voltage Input						
Temperature Effect	± 1.5 μV/°C for Voltage Input, ± 3.0 μV/°C for Current Input						
Sensor Break Detection	Below 1 mA for 4–20 mA input, below 0.25 V for 1–5 V input, not available for other inputs						
Sensor Break Responding Time	0.1 Seconds						
Event Input							
Number of Event Input	1	2	6	6	2	6	2
Logic Low	-10 V minimum, 0.8 V maximum						
Logic High	2 V minimum, 10 V maximum						
Function	Refer to user manual						
CT Input							
CT Type	CT98-1						
Accuracy	± 2 % of Full Scale Reading, ± 0.2 A						
Input Impedance	294 Ω						
Measurement Range	0 to 50 A AC						
Output of CT	0 to 5 V DC						
CT Mounting	Wall (Screw) Mount						
Sampling Rate	1 Time/Second						
Output 1/Output 2							
Type	Relay, Pulsed Voltage, Linear Voltage and Linear Current						
Relay Rating	2 A, 240 V AC, 200,000 Life Cycles for Resistive Load						
Pulsed Voltage	Source Voltage 5 V, Current Limiting Resistance 66 Ω						
Linear Output Resolution	15 Bits						
Linear Output Regulation	0.02 % for full load change						
Linear Output Settling Time	0.1 Second (Stable to 99.9 %)						
Isolation Breakdown Voltage	1,000 V AC						
Temperature Effect	± 0.01 % of Span/°C						
Load Capacity of Linear Output	Linear Current : 500 Ω maximum, Linear Voltage : 10 KΩ minimum						
Alarm							
Relay Type	Form A						
Maximum Rating	2 A, 240 V AC, 200,000 Life Cycles for Resistive Load						
Alarm Function	Dwell Timer, Deviation Low, Deviation High, Deviation Band Low, Deviation Band High, Process High, Process Low						
Alarm Mode	Latching, Hold, Normal, Latching/Hold						
Dwell Timer	0.1 to 4,553.6 Minutes						
Data Communication							
Interface	RS-485						
Protocol	Modbus RTU (Slave Mode)						
Address	1 to 247						
Baudrate	2.8 KBPS to 115.2 KBPS						
Parity Bit	None, Even or Odd						
Stop Bit	1 or 2 Bits						
Data Length	7 or 8 Bits						
Communication Buffer	160 Bytes						
Analog Retransmission							
Output Signal	4–20 mA, 0–20 mA, 0–10 V						
Resolution	15 Bits						
Accuracy	± 0.05 % of Span ± 0.0025 %/°C						
Load Resistance	0 to 500 Ω for Current Output, 10 KΩ minimum for Voltage Output						
Output Regulation	0.01 % for full load change						
Output Setting Time	0.1 Second (Stable to 99.9 %)						
Isolation Breakdown	1,000 VAC minimum						
Integral Linearity Error	± 0.005 % of Span						

Model









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R22

Analog Retransmission

Temperature Effect	$\pm 0.0025\%$ of Span/ $^{\circ}\text{C}$
Saturation Low	0 mA or 0 V
Saturation High	22.2 mA or 5.55 V, 11.1 V minimum
Linear Output Range	0–22.2 mA (0–20 mA/4–20 mA), 0–5.55 V (0–5 V, 1–5 V), 0–11.1 V (0–10 V)

User Interface

Keypad	4 Keys						
Display Type	4 Digit LCD Display						
Number of Display	2	2	3	3	3	3	2
Upper Display Size	0.4" (10 mm)	0.58" (15 mm)	0.7" (17.7 mm)	0.7" (17.7 mm)	0.58" (15 mm)	0.98" (25 mm)	0.31" (8 mm)
Lower Display Size	0.19" (4.8 mm)	0.3" (7.8 mm)	0.4" (11.2 mm)	0.4" (11.2 mm)	0.32" (8.3 mm)	0.55" (14 mm)	0.25" (6.5 mm)

Programming Port

Interface	Micro USB
PC Communication Function	Automatic Setup, Calibration and Firmware Upgrade

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 0–3,600 Seconds, Derivative time 0–360.0 Seconds
Cycle Time	0.1 to 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 to 900.0 °F /Minute or 0 to 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

Profiler

Availability	No	No	Option	Option	Option	Option	No
Number of Segment	N/A	N/A	4 / 8 / 16	4 / 8 / 16	4 / 8 / 16	4 / 8 / 16	N/A

Environmental and Physical Specifications

Operating Temperature	-10 °C to 50 °C						
Storage Temperature	-40 °C to 60 °C						
Humidity	0 to 90 % RH (Non-Condensing)						
Altitude	2,000 Meters maximum						
Pollution	Degree II						
Insulation Resistance	20 M Ω minimum (@ 500 V DC)						
Dielectric Strength	2,000 V AC, 50/60 Hz for 1 Minute						
Vibration Resistance	10 to 55 Hz, 10 m/s ² for 2 Hours						
Shock Resistance	200 m/s ² (20 g)						
Molding	Flame Retardant Polycarbonate						
Mounting	Panel	Panel	Panel	Panel	Panel	Panel	DIN Rail
Dimensions (W*H*D) (mm)	48*24*92	48*48*59	48*96*59	96*48*59	72*72*59	96*96*59	22.5*96*83
Depth Behind Panel (mm)	84	50	50	50	50	50	-
Cut Out Dimensions (mm)	45*22.2	45*45	45*92	92*45	68*68	92*92	-
Weight (grams)	120	160	220	220	190	290	160

Approval Standards

Safety	UL61010C-1, CSA C22.2 No.24-93, EN61010-1 (IEC1010-1)
Protective Class	IP66 for Panel, IP20 for terminals and housing, all indoor use
EMC	EN61326

Ordering Code

C22 –

R22 –

Power Input

- 4 : 90 to 250 VAC, 47–63Hz
- 5 : 11 to 40 VDC / 20 to 28 VAC, 47–63Hz

Output 1

- 1 : Form A Relay
- 2 : SSRD, 5V/30mA
- 3 : Isolated 4–20mA/0–20mA(OM98-3)
- 5 : Isolated 0–10V(OM98-5)
- C : SSRD, 14V/40mA(OM94-7)

Output 2/Alarm 1

- 0 : None
- 1 : Form A Relay
- 2 : SSRD, 5V/30mA
- 3 : Isolated 4–20mA/0–20mA(OM98-3)
- 5 : Isolated 0–10V(OM98-5)
- C : SSRD, 14V/40mA(OM94-7)

Option 1

- 0 : None
- 1 : RS-485
- 2 : 1 Event Input (EI1)
- 3 : 1 CT Input (CT1)

Option 2

- 0 : None
- 1 : Retransmit 4–20mA/0–20mA(OM98-3)
- 2 : Retransmit 0–10V(OM98-5)
- 3 : Alarm 2 (Form A relay)
- 4 : 1 Event Input (**EI2 only for R22**)
- 5 : 1 CT Input (**CT2 only for R22**)

Accessories of All Models

- OM94-7=14V/40mA SSR Drive Module
- OM98-3=Isolated 4–20mA/0–20mA Analog Output Module
- OM98-5=Isolated 0–10V Analog Output Module
- CM98-3=Isolated 4–20mA/0–20mA Retransmission Module for all models except C22 & R22
- CM98-5=Isolated 0–10V Retransmission Module for all models except C22 & R22
- CT98-1=Current Transformer 0-50A
- PA98-1=USB Programming Adaptor
- CC98-1=Programming Port Cable(1.5M)
- BC-SET=Configuration Software

Related Products

SNA10A = Smart Network Adaptor for third party software, which converts 255 channels of RS-485 or RS-422 to RS-232 Network

C62 –



Power Input

- 4 : 90 to 250 VAC, 47–63Hz
- 5 : 11 to 40 VDC / 20 to 28 VAC, 47–63Hz

Output 1

- 1 : Form A Relay
- 2 : SSRD, 5V/30mA
- 3 : Isolated 4–20mA/0–20mA(OM98-3)
- 5 : Isolated 0–10V(OM98-5)
- C : SSRD, 14V/40mA(OM94-7)

Output 2/Alarm 1

- 0 : None
- 1 : Form A Relay
- 2 : SSRD, 5V/30mA
- 3 : Isolated 4–20mA/0–20mA(OM98-3)
- 5 : Isolated 0–10V(OM98-5)
- C : SSRD, 14V/40mA(OM94-7)

Alarm 2

- 0 : None
- 1 : Form A Relay

Option 1

- 0 : None
- 1 : RS-485

Option 2

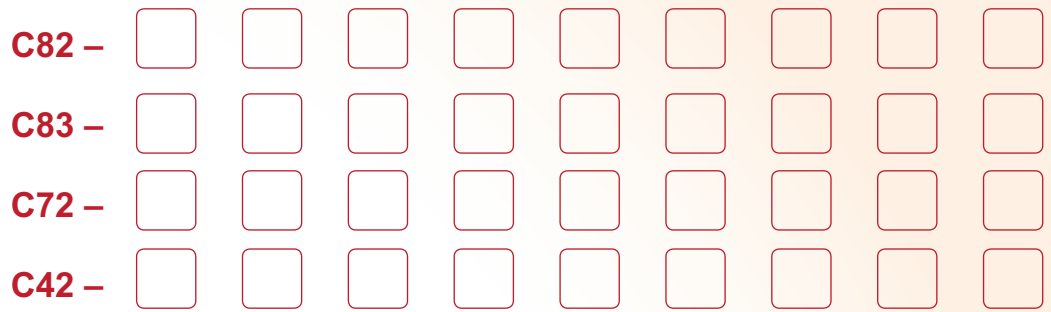
- 0 : None
- 1 : 2 Event Inputs
- 2 : 1 Event Input and 1 CT Input
- 3 : 2 CT Inputs

Option 3

- 0 : None
- 1 : Retransmit 4–20mA/0–20mA(CM98-3)
- 2 : Retransmit 0–10V(CM98-5)
- 3 : Alarm 3

Option 4

- 0 : None
- 1 : Terminal Cover



Power Input

- 4 : 90 to 250 VAC, 47–63Hz
- 5 : 11 to 40 VDC / 20 to 28 VAC, 47–63Hz

Output 1

- 1 : Form A Relay
- 2 : SSRD, 5V/30mA
- 3 : Isolated 4–20mA/0–20mA(OM98-3)
- 5 : Isolated 0–10V(OM98-5)
- C : SSRD, 14V/40mA(OM94-7)

Output 2/Alarm 1

- 0 : None
- 1 : Form A Relay
- 2 : SSRD, 5V/30mA
- 3 : Isolated 4–20mA/0–20mA(OM98-3)
- 5 : Isolated 0–10V(OM98-5)
- C : SSRD, 14V/40mA(OM94-7)

Alarm 2 to 3

- 0 : None
- 1 : Form A Relay on Alarm 2
- 2 : Form A Relay on Alarm 2 to 3

Event Inputs

- 0 : None
- 1 : 6 Event Inputs (2 Event Inputs for C72)

Option 1

- 0 : None
- 1 : RS-485 and Remote Setpoint

Option 2

- 0 : None
- 1 : 1 CT Input and Remote Setpoint
- 2 : 2 CT Inputs and Remote Setpoint

Option 3

- 0 : None
- 1 : Retransmit 4–20mA/0–20mA(CM98-3) and Remote Setpoint
- 2 : Retransmit 0–10V(CM98-5) and Remote Setpoint
- 3 : Alarm 4, Retransmit 4-20 mA/ 0-20mA(CM98-3) and Remote Setpoint (**Retransmit is unavailable for C72**)
- 4 : Alarm 4, Retransmit 0-10V (CM98-5) and Remote Setpoint (**Unavailable for C72**)

Option 4

- 0 : None
- 1 : Terminal Cover
- 2 : Ramp & Soak Profiler
- 3 : Terminal cover and Ramp & Soak Profiler

BrainChild

Head Office & Factory

Brainchild Electronic Co., Ltd.

209 Chung Yang Road Nangang Dist.
Taipei 11573, Taiwan

- Tel : +886-2-2786-1299
- Fax : +886-2-2786-1395
- Website : www.brainchild.com.tw
- Email : sales@brainchild.com.tw ;
service@brainchild.com.tw

China Sales Office

Brainchild Electronic (Kunshan) Co., Ltd.

Room 405, Building #6, Huamin Gentlefolk Garden,
No. 13, Qianjin Central Road, Kunshan City,
Jiangsu 215300, China

- Tel : +86-512-5511-6133
- Fax : +86-512-5511-6113
- Website : www.brainchild.com.cn
- Email : sales@brainchild.com.cn ;
service@brainchild.com.cn

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