



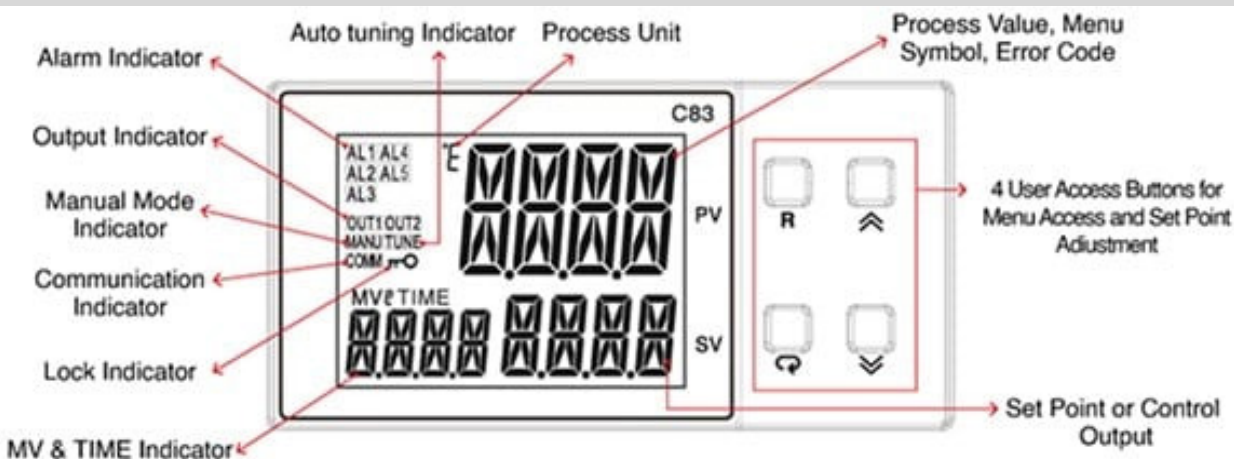
## INFORMATION

The new generation low cost PID microprocessor-based with Fuzzy logic controller series incorporate two bright easy to read LCD Displays which indicates Process value (PV) and Set point value (SP). The Fuzzy Logic technology incorporated on this series controllers enables a process to reach the predetermined set point in the shortest time with minimum of overshoot during Start up (Power ON) or external load disturbances.

## FEATURES

- High quality LCD Display
- High Accuracy 18 Bit A-D Input and 15 Bit D-A Output
- The Fast Sampling Rate in 200msec
- True Universal Inputs of Thermocouple, RTD, mA, V
- Fuzzy+ PID Control
- Auto-Tuning
- Possibility of both RS-485 and Analog Retransmission
- 2 Programs each with 8 Segments of Ramp & Soak
- CT Inputs for Heater-Break Detection
- Upto 6 Event Inputs
- Remote Setpoint
- Bumpless Transfer
- Lockout Protection
- Bidirectional Menu Navigation

## SPECIFICATIONS



## POWER

Power Supply	90 to 250 VAC, 47–63 Hz ; 11 to 40 VDC / 20 to 28 VAC, 47–63 Hz
Power Consumption	12VA, 6W maximum

## 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	18 Bits			
Sampling Rate	5 Times / Second (200msec)			
Maximum Rating	-2VDC minimum, 12VDC maximum			
Input Characteristics	Type	Range	Accuracy @ 25°C	Input Impedance
	J	-120°C to 1000°C ( -184°F to 1,832°F )	±2°C	2.2 MΩ
	K	-200°C to 1370°C ( -328°F to 2498°F )	±2°C	2.2 MΩ
	T	-250°C to 400°C ( -418°F to 752°F )	±2°C	2.2 MΩ
	E	-100°C to 900°C ( -148°F to 1652°F )	±2°C	2.2 MΩ
	B	0°C to 1820°C ( 32°F to 3308°F )	±2°C ( 200°C to 1800°C )	2.2 MΩ
	R	0°C to 1767.8°C ( 32°F to 3214°F )	±2°C	2.2 MΩ
	S	0°C to 1767.8°C ( 32°F to 3214°F )	±2°C	2.2 MΩ
	N	-250°C to 1300°C ( -418°F to 2372°F )	±2°C	2.2 MΩ
	L	-200°C to 900°C ( -328°F to 1652°F )	±2°C	2.2 MΩ
	U	-200°C to 600°C ( -328°F to 1112°F )	±2°C	2.2 MΩ
	P	0°C to 1395°C ( 32°F to 2543°F )	±2°C	2.2 MΩ
	C	0°C to 2300°C ( 32°F to 4172°F )	±2°C	2.2 MΩ
	D	0°C to 2300°C ( 32°F to 4172°F )	±2°C	2.2 MΩ
	PT100(DIN)	-200°C to 850°C ( -328°F to 1562°F )	±0.4°C	1.3KΩ
	PT100(JIS)	-200°C to 600°C ( -328°F to 1112°F )	±0.4°C	1.3KΩ
	mA	-3mA to 27mA	±0.05%	2.5Ω
	V	-1.3V to 11.5V	±0.05%	1.5MΩ
Temperature Effect	1.5μV /°C for all inputs except mA input, 3.0μV /°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	200nA			
Common Mode Rejection Ratio(CMRR)	120 dB			

Normal Mode Rejection Ratio (NMRR)	55dB
Sensor Break Detection	Sensor open for Thermocouple and RTD inputs, sensor short for RTD input, below 1mA 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

### REMOTE SET POINT INPUT

Type	Linear Current, Linear Voltage
Range	-3mA to 27mA, -1.3V to 11.5V
Accuracy	±0.05 %
Remote Set Point Option	Available
Input Impedance	Current: 2.5Ω, Voltage: 1.5MΩ
Resolution	18 Bits
Sampling Rate	1.66 Times/Second
Maximum Rating	280mA maximum for Current Input, 12VDC maximum for Voltage Input
Temperature Effect	±1.5μV/°C for Voltage Input, ±3.0μV/°C for Current Input
Sensor Break Detection	Below 1mA for 4-20mA input, below 0.25V for 1 – 5V input, not available for other inputs
Sensor Break Responding Time	0.1 Seconds

### EVENT INPUT

No. of Event Inputs	6
Logic Low	-10V minimum, 0.8V maximum.
Logic High	2V minimum, 10V maximum
Functions	See availability table in user manual

### CT INPUT

CT Type	CT98-1
Accuracy	±2% of Full Scale Reading, ± 1 digit maximum
Input Impedance	294Ω
Measurement Range	0 to 50A AC
Output of CT	0 to 5V DC
CT Mounting	Screw Mounting
Sampling Rate	1 Time/Second

**OUTPUT 1 / OUTPUT 2**

<b>Type</b>	Relay,Pulsed Voltage,Linear Voltage and Linear Current
<b>Relay Rating</b>	2A,240V AC,200000 Life Cycles for Resistive Load
<b>Pulsed Voltage</b>	Source Voltage 5V,Current Limiting Resistance 66Ω
<b>Linear Output Resolution</b>	15 Bits
<b>Linear Output Regulation</b>	0.02% for full load change
<b>Linear Output Settling Time</b>	0.1 Second ( Stable to 99.9%)
<b>Isolation Breakdown Voltage</b>	1000 V AC
<b>Temperature Effect</b>	±0.01% of Span/ °C
<b>Load Capacity of Linear Output</b>	Linear Current: 500Ω maximum, Linear Voltage: 10KΩ minimum

**ALARM**

<b>Relay Type</b>	Form A
<b>Maximum Rating</b>	2A,240V AC,200000 Life Cycles for Resistive Load
<b>Alarm Functions</b>	Dwell Timer, Deviation Low, Deviation High, Deviation Band Low, Deviation Band High, Process High, Process Low
<b>Alarm Mode</b>	Latching, Hold, Normal, Latching/Hold
<b>Dwell Timer</b>	0.1 to 4553.6 Minutes

**DATA COMMUNICATION**

<b>Interface</b>	RS-485
<b>Protocol</b>	Modbus RTU (Slave Mode)
<b>Address</b>	1 to 247
<b>Baudrate</b>	2.8KBPS to 115.2 KBPS
<b>Parity Bit</b>	None, Even or Odd
<b>Stop Bit</b>	1 or 2 Bits
<b>Data Length</b>	7 or 8 Bits
<b>Communication Buffer</b>	160 Bytes

**ANALOG RETRANSMISSION**

<b>Output Signal</b>	4-20 mA, 0-20 mA,0 – 10V
<b>Resolution</b>	15 Bits
<b>Accuracy</b>	±0.05% of Span ± 0.0025% / °C

Load Resistance	0 to 500Ω for Current Output , 10KΩ minimum for Voltage Output
Output Regulation	0.01% for full load change
Output Setting Time	0.1 Second (Stable to 99.9%)
Isolation Breakdown	1000VAC minimum
Integral Linearity Error	±0.005% of Span
Temperature Effect	±0.0025% of Span /°C
Saturation Low	0mA or 0V
Saturation High	22.2mA or 5.55V,11.1V min
Linear Output Ranges	0 – 22.2mA (0 – 20mA/4 – 20mA), 0 – 5.55V (0 – 5V, 1 – 5V),0 – 11.1V (0 – 10V)

## USER INTERFACE

Keypad	4 Keys
Display Type	4 Digit LCD Display
No. of Display	3
Upper Display Size	0.98”(25mm)
Lower Display Size	0.55”(14mm)

## 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 – 3600 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**

<b>Function</b>	First Order
<b>Time Constant</b>	0,0.2, 0.5, 1, 2, 5, 10, 20, 30, 60 Seconds Programmable

**PROFILER**

<b>Availability</b>	Option
<b>No of Segments/ Program</b>	4 / 8 / 16

**ENVIRONMENTAL AND PHYSICAL SPECIFICATIONS**

<b>Operating Temperature</b>	-10°C to 50°C
<b>Storage Temperature</b>	-40°C to 60°C
<b>Humidity</b>	0 to 90 % RH (Non-Condensing)
<b>Altitude</b>	2000 Meters maximum
<b>Pollution</b>	Degree II
<b>Insulation Resistance</b>	20MΩ minimum(@500V DC)
<b>Dielectric Strength</b>	2000V AC,50/60 Hz for 1 Minute
<b>Vibration Resistance</b>	10 to 55 Hz , 10m/s <sup>2</sup> for 2 Hours
<b>Shock Resistance</b>	200 m/s <sup>2</sup> (20g)
<b>Moldings</b>	Flame Retardant Polycarbonate
<b>Mounting</b>	Panel
<b>Dimensions (W*H*D) (mm)</b>	96*96*59
<b>Depth Behind Panel (mm)</b>	50
<b>Cut Out Dimensions (mm)</b>	92*92
<b>Weight (grams)</b>	290

**APPROVAL STANDARDS**

<b>Safety</b>	UL61010-1, EN61010-1 (IEC1010-1), RoHS, REACH
<b>Protective Class</b>	IP50 for Panel,IP20 for terminals and housing, all indoor use
<b>EMC</b>	EN61326