

(F1) MICROCONTROLLER BASED SINGLE / TWO LOOP PID CONTROLLER



MODEL WISE DESCRIPTIONS :

7.1.1	PID-723/U	Micro controller based Single input PID Controller (Universal Input)
7.1.2	PID-966/U	Micro controller based Single input PID Controller (Universal Input)
7.2.1	PID-723/F	Micro controller based Single input PID Controller (Fixed Input)
7.2.1	PID-966/F	Micro controller based Single input PID Controller (Fixed Input)
7.3.1	PID-723/T	Micro controller based Two input / Two loop PID Controller
7.3.2	PID-966/T	Micro controller based Two input / Two loop PID Controller

DESCRIPTION :

Libratherm offers two new models of PID controllers Model PID-723/PID-966. These are indigenously designed and developed using the latest microcontroller chip and programmed with the time tested and field proven PID algorithm. PID controllers are mainly used for the precise process control. Unlike On/Off type of oscillatory control, the PID control gives smooth and steady state control. These model offers, all those useful features which are required to control the complex system.

These model accepts factory set fixed input or the user selectable universal input. The control action is PID or On/Off for both direct and reverse action. Control outputs are given in the form of optically isolated DC pulse, Triac, electro mechanical Relay and/or (4-20)mA. The analog output levels can also be configured for (0-20)mA or (4-20)mA or (0-5) / (0-10) volt using the front panel key board, In brief, PID-723 provides 4 switching outputs and 2 analog outputs whereas PID-966 provides 6 switching and two analog outputs. Both Auto and

manual tuning of PID values makes the controller versatile and user friendly. The model PID-723 being small in size, can easily be accommodated in small size equipments.

These are the only models designed to accepts two independent input sensor, which avoids the need for two controllers, where the space and cost is the constraint. This feature is useful for system where two sensors are used for controlling two independent loads, as in case of strip packaging machines where two heaters are to be controlled and each heater has individual sensor and may be same or different set stability chamber where, temperature and humidity both needs to be controlled. The temperature is controlled using the air heaters and humidity is controlled using boiler heater. For such two parameter control, the two dc pulse output in time proportional PID action can be used and at the same time, two independent (4-20)mA lienarized analogue output proportional to each input can also be provided.

FEATURES :

- Microcontroller based design.
- Single loop or two loop pid function.
- One Ramp/Soak feature (user programmable).
- Available Control - Two logic (dc pulse) and Two analog (12 bit resolution).
- Auto/Manual tuning of PID parameters.
- Field proven Algorithm tested successfully for various process control applications.
- Auto/Manual bump less transfer.
- Two programmable alarms and / or event relay outputs.

APPLICATIONS :

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|-----------------------------------|-------------------------------------|
| ▶ Furnace / Oven Temperature | ▶ Constant Temperature Bath |
| ▶ Environmental Chamber | ▶ Cold storage and Chilling plants |
| ▶ Laboratory equipment etc. | ▶ Plastic Injection, Extruders |
| ▶ Material Testing Lab equipments | ▶ Auto Clave, BOD incubators etc... |

TECHNICAL SPECIFICATIONS:

Input	RTD(Pt-100) or Thermocouple (type J,K,R,S,B,C,D), mV and mA (Maximum & user selectable inputs using DIP switch on the back panel)
Range	Full +ve range of the selected input (please refer to range selection table)
Resolution	1°C for thermocouples and 0.1°C for Pt-100 for mV and mA inputs subject to range required
Sampling rate / Display rate	40mS / 1 second
Indicating Accuracy	+/- 1°C for Thermocouple throughout the range and +/- 0.1°C for Pt-100 and for other input - absolute to the input signal
Display (PID-723)	4 digit 0.3" Red 7-segment display for process variable. 4 digit 0.3" Red 7-segment display for set value and PID parameters
Display (PID-966)	4 digit 0.5" Red 7-segment display for process variable. 4 digit 0.5" Green 7-segment display for set value and PID parameters
Output Indication	Front Panel LED indications for Control Output, Alarms, Control and A/M status
Control Algorithm	PID or ON/OFF selectable (when specified for switching output). Direct action or Reverse action (to be specified in ordering information)
Tuning	Auto/Manual tuning of PID values
Settings	Using front panel membrane key board to set the various parameters.
Memory Backup	Retention of PID and Set values in the built in non-volatile memory in case of power failure and automatic re-execution of control on power resumption
Control Outputs (Switching)	Switching Outputs- DC pulse, Relay or Triac (rated for 5A @230VAC/24VDC) (Dual output for 7.3.1 and 7.3.2).
Control Outputs (Analogue)	Analog Outputs 4-20mA or 0-5VDC or 0-10VDC (Dual Output for 7.3.1 and 7.3.2)
Retransmission Output	4-20mA non-isolated linearized and proportional to the selected input range. (Dual outputs can be provided when not used for control output).
Alarm Outputs	2 extra Relay Outputs can be used as High or Low Alarms (relay changeover contacts rated for 5A @ 230VAC) 2 extra dc pulse outputs can be used for Alarms /logics as desired by the user (PID-723). 4 extra dc pulse outputs can be used for Alarms /logics as desired by the user (PID-966).
Serial Communication	Optically isolated 2 wire RS485 in Modbus RTU protocol.
Loop Supply	Isolated 24VDC @ 50 mA (PID-966) (Optional)
Supply	230VAC +/- 20%, 50/60Hz. Or 110VAC +/- 20 %, 50/60 Hz.
Size	72 x 72 x 120 mm.(PID-723) • 96 x 96 x 120 mm (PID-966)
Panel Cutout	68 x 68 mm. +/- 0.5 mm. (PID-723) • 92 x 92 mm +/- 0.5 mm. (PID-966)
Enclosure	Metallic powder coated with ABS bazzel and polycarbonate front. (PID-723). ABS plastic with polycarbonate front (PID-966).

ORDERING INFORMATION :

MODEL	INPUT (Any of the 8 for universal input)		RANGE IN °C		OUTPUT 1 (HEAT / PID) DIRECT		OUTPUT 2 (COOL / PID) REVERSE/RETRANS	
	A	B	C	D	C		D	
PID-723/U	J	- (A1)	0 TO 760 °C	(B1)	Triac -	(C1)	Triac -	(D1)
PID-723/F	K	- (A2)	0 TO 1378 °C	(B2)	DC pulse -	(C2)	DC pulse -	(D2)
PID-723/T	E	- (A3)	0 TO 1000 °C	(B3)	(0-5)V -	(C3)	(0-5)V -	(D3)
	T	- (A4)	0 TO 400 °C	(B4)	(4-20)mA -	(C4)	(4-20)mA Control -	(D4)
PID-966/U	S	- (A5)	0 TO 1768 °C	(B5)	NIL -	(C5)	(4-20)mA Retrans-	(D5)
PID-966/F	R	- (A6)	0 TO 1768 °C	(B6)			NIL -	(D6)
PID-966/T	B	- (A7)	200 TO 1820 °C-	(B7)				
	C	- (A8)	0 TO 2000 °C -	(B8)				
	D	- (A9)	0 TO 2000 °C -	(B9)				
	(Pt-100)	-(A10)	0 TO 400 °C	(B10)				
	(4-20)mA	- (A11)	-50.0-199.9 °C	(B11)				
	(0-1)VDC	- (A12)	0.0 TO 100.0 %	(B12)				
	Any Other	- (A13)	Any Other	- (A13)				

HIGH ALARM E	LOW ALARM F	*EXTRA OUTPUTS G	SERIAL PORT H	SUPPLY I
Relay (E1)	Relay (F1)	DC pulse 1 (G1)	RS 485 (H1)	230VAC (I1)
DC pulse (E2)	DC pulse (F2)	DC pulse 2 (G2)	None (H2)	110VAC (I2)
Both Relay and DC pulse (E3)	Both Relay and DC pulse (F3)	Both DC pulses (G3)		
Nil (E4)	Nil (F4)	Nil (G4)		
Not available as Relay if C1 is used	Not available as Relay if D1 is used	Available only in PID-966		

* USER MUST SPECIFY THE MODE OF EXTRA OUTPUTS SUCH AS HIGH, LOW OR DEVIATION.

EXAMPLE-1 FOR MODEL PID-723/U or PID-966/U:

MODEL	A	B	C	D	E	F	G	H	I
PID-723/U	A 1	B 1	C 2	D 6	E 1	F 1	G 4	H 1	I 1
PID-966/U	A 2	B 2							
	A 5	B 5							
	A 6	B 6							
	A 7	B 7							
	A 10	B 4							
	A 11	B 7							
	A 12	B 8							

This is Model PID-723/U or PID-966/U with Universal input of types J, K, S, R, B, PT-10, 4-20mA and (0-10)V having Range subject to the specified input respectively and having 1st output in Direct mode as DC-Pulse with High and Low Alarm Relay output, RS485 serial port and Operating on 230VAC supply.

EXAMPLE-2 FOR MODEL PID-723/F or PID-966/F:

MODEL	A	B	C	D	E	F	G	H	I
PID-723/F	A 2	B 2	C 2	D 5	E 1	F 4	G 4	H 2	I 1
PID-966/F									

This is Model PID-723/F or PID-966/F with K type thermocouple input having Range (0-1372)^oC and having 1st Output as DC-Pulse, second output as 4-20mA proportional to input with High Alarm Relay output and Operating on 230VAC supply.

Technical Support: In case the above ordering information is not meeting the requirement - user may specify the desired specifications. Our technical team will be pleased to customize the product to suit your application.

EXAMPLE-3 FOR MODEL PID-723/T and PID-966/T:

MODEL	A	B	C	D	E	F	G	H	I
PID-723/T	A 10	B 10	C 2	D 2	E 1	F 1	G 4	H2	I 1
PID-966/T	A 11	B 12							

This is 2 Channel Model PID-723/T with One Pt-100 input and Other 4-20mA input having Range (0-400)^oC and 0.0 to 100.0% respectively with output as DC Pulses, High and Low Alarm Relay and Operating on 230VAC supply.

For more information please contact :



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