

## PID Controller-Single Loop – 5 digit (1/16 DIN - Microcontroller Based)

(Product Code 10.10)



**PID-485**

### Model Wise Description:

Sr. No	Model	Description	Size (mm.)
10.10	PID-485-F	PID Temperature Controller for 0.1 and 0.01°C control accuracy	48 x 48 x 110

#### Description:

Libratherm offers new PID controller, Model PID-485 for systems requiring 0.1oC or 0.01oC temperature control accuracy. This is designed and developed using the latest microcontroller chip and 16 bit ADC and programmed with the time tested and field proven PID algorithm. Normally standard PID controllers are available with 4 digit display and, whereas this model is designed using 5 digit display for 0.01/0.1°C of resolution and control accuracy. PID controllers are mainly used for the precise process control. Unlike On/Off type of oscillatory control, PID control action gives smooth and steady state control. This model offers all the useful features which are required to control very precisely the most complex system.

This model accepts factory set single fixed input. The control action is user selectable as PID or On/Off for direct (Cool) or reverse (Heat) action. Control outputs are given in the form of optically isolated DC pulse to drive external SSR or linear signal of 4-20mA or 0 to 5VDC. Analog output can be used to control heating through libratherm make thyristor based heater power regulator. Additional analog output can also be provided as retransmission output proportional to the process input.

### Features:

- ❖ Microcontroller based design.
- ❖ Single loop PID function.
- ❖ Auto/Manual tuning of PID parameters.
- ❖ Field proven Algorithm tested successfully for various process control applications.
- ❖ Auto/Manual bump- less transfer.
- ❖ Programmable alarm and / or event relay outputs.
- ❖ RS 485 serial interface - Optional

### Applications:

- ◆ Furnace / Oven Temperature control
- ◆ Pressure control
- ◆ Constant Temperature Bath
- ◆ Laboratory equipment.
- ◆ Material Testing equipments
- ◆ Auto Clave, BOD incubators etc...
- ◆ Ultra low deep freezers

### Technical Specifications:

<b>Input</b>	J,K, R,S, B type thermocouple, RTD(Pt-100), RTD(Pt-1000), 4-20mA (User to specify at the time of order)
<b>Range</b>	Full range of the specified input. (As given in the range selection table below).
<b>Resolution</b>	0.1 °C for thermocouples and 0.01 °C for Pt-100 /Pt-1000 For mA input the display resolution is subject to the required range.
<b>Indicating Accuracy</b>	+/- 0.1°C for thermocouples +/-0.01°C for Pt-100 / Pt-1000 sensors (software linearized) for (4-20)mA absolute to the linear input signal
<b>Display</b>	5 digit 0.25" Red 7-segment display for process variable. 5 digit 0.25" Green 7-segment display for set value and PID parameters
<b>Output Indication</b>	Front Panel LED indications for SSR output, % Control Output and for Alarm status.
<b>Control Algorithm</b>	Linear or Time proportional PID or ON/OFF selectable
<b>Tuning</b>	Auto/Manual tuning of PID values.
<b>PID Values</b>	Proportional Band (P)= 0.0 to 100.0% of Span, Integral (I)= 0.00 to 5.00 resets/minute, Derivative (D) = 0.00 to 5.00minutes, Cycle Time = 2 to 100 seconds. Hysterisis = 0 to 50 counts, Soft start or Ramp time (rt) = 2 to 99 seconds Power Limit (PL) = 1 to 100%.

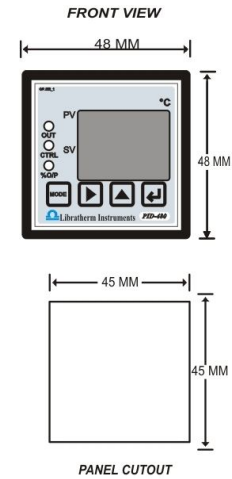
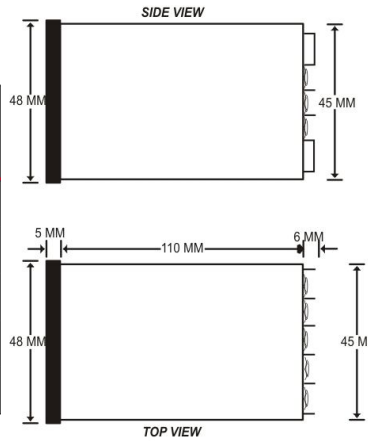
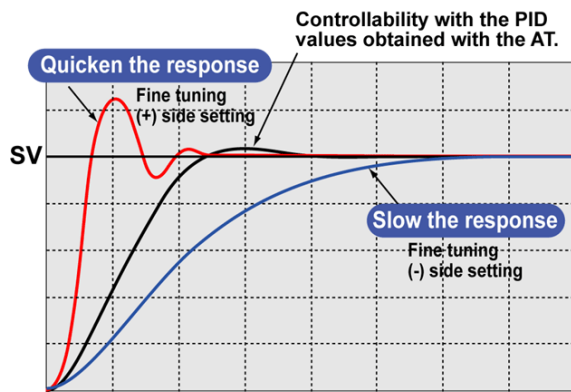
<b>Settings</b>	Using front panel feather touch (tactile) key board to set various parameters.
<b>Memory Backup</b>	Retention of PID and Set values in the built in non-volatile memory - in case of power failure and automatic re-execution of control on power resumption.
<b>Control Outputs (Switching)</b>	For external SSR, 0 to 10VDC pulse (OUT1 )
<b>Control Outputs (Analog)</b>	Analog Outputs (4-20)mA (RL max = 300 Ohms) or 0-5VDC (RL min = 10KOhms) (12 bit resolution)
<b>Retransmission Output (Analog)</b>	4-20mA, linearized and proportional to the selected input type and range. RL max = 250 Ohms. (12 bit resolution) - Optional
<b>Alarm Output</b>	Single Relay Output with programmable hysteresis- can be used as High or Low Alarms.
<b>Serial Communication (Optional)</b>	Optically isolated 2 wire RS485 on Modbus RTU protocol. (in Slave mode with programmable mod bus address) in lieu of OUT2.
<b>Supply</b>	(90VAC-250VAC), 50/60 Hz
<b>Size</b>	48 x 48 x 110 mm.
<b>Panel Cutout / Terminals</b>	45 x 45 mm. +/- 0.5 mm. - 16 back panel terminals
<b>Enclosure</b>	ABS plastic with polycarbonate front graphic.

**Note :** Technical specifications are subject to change due to continuous product upgradation and the discretion of manufactures. For any special requirement contact manufacturers.

## Input and Range Selection Table:

Code	Input	Range
A1	J type : Fe/Con thermocouple	0.0 to 760.0°C
A2	K type : Cr/Al thermocouple	0.0 to 1372.0°C
A3	R type : Pt/PtRh13% thermocouple	0.0 to 1768.0°C
A4	S type : Pt/PtRh10% - thermocouple	0.0 to 1768.0°C
A5	B type : Pt30%Rh/Pt6%Rh thermocouple	200.0 to 1820.0°C
A6	T type : Cu/Con thermocouple	0.0 to 350.0°C
A7	N type : Ni-Cr-Si/Ni-Si-Mg	0.0 to 1300.0°C
A8	Pt-100 (Alpha = 0.00385) DIN 43760(*)	0.0 to 400.0°C
A9	Pt-100 (Alpha = 0.00385) DIN 43760	-199.0 to 200.0°C
A10	Pt-100 (Alpha = 0.00385) DIN 43760(*)	0.00 to 150.00°C
A11	Pt-1000 (Alpha = 0.00385) DIN 43760	-199.0 to 200.0°C
A12	Pt-1000 (Alpha = 0.00385) DIN 43760(*)	0.00 to 150.00°C
A13	4-20mA (*)	-1999 to 9999UOM

### Physical Dimensions:



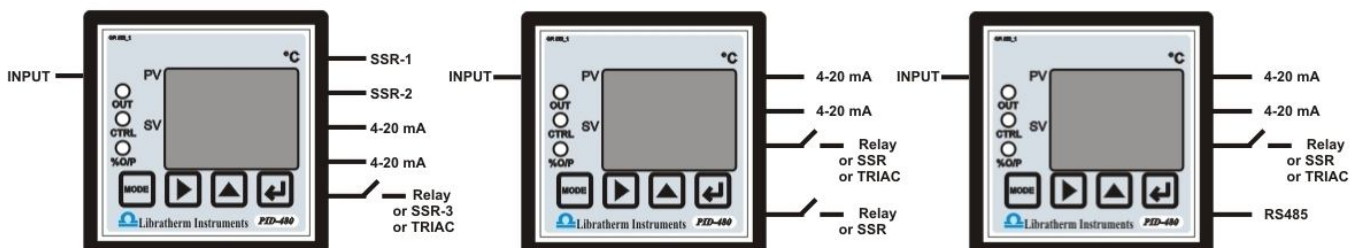
### Ordering Information:

Model	A- Input	B- Output 1 (Heat – OUT1)	C- Retransmission	D- Alarm 1 – OUT1	E- Serial Interface
PID-485-F	A1 to A13- (Single Fixed input)	B1- (DC Pulse) B2- (4-20 mA) B3- (0-5V) B4- (DC Pulse + 4-20 mA) B5- (DC Pulse + 0-5V)	C1- (4-20mA)  00- (None)	D1- (High Alarm Relay)  D2- (Low Alarm Relay) D3- High and Low common  00- (None)	E1- (RS485)  00- (None)

### Example:

Model	A- Input	B- Output 1 (Heat – OUT1)	C- Output 2 (Cool – OUT2)	D- Retransmission	E- Alarm 1 – OUT1	F- Alarm 2 – OUT2	G-Serial Interface
PID-485-F	A10	B2	00	D1	E1	F2	00

Example	Ordering Code	Description
1	PID-485-U-A1-B1-00-D1-E1	Model PID-485-F with Pt-100 input and SSR output, with High Alarm relay and RS485 interface



Any special feature or requirement of optional feature can be mentioned by the user in the Remark column.

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