# ION Electricals Pvt. Ltd.

# OPERATING MANUAL

## OF


# PID PRO

- Make sure you read this operating manual before using the PID PRO.
- Store this operating manual safely so that you can use it in future.

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# 1.GETTING STARTED

THIS SECTION MAKES YOU FAMILIAR WITH OUR PID PRO.

## 1.1 FRONT PANEL

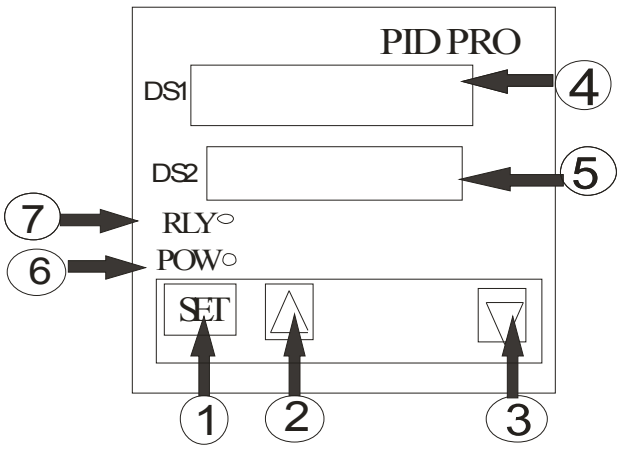



Figure 1:Front panel of PID PRO

1. SET KEY
2. INCREMENT KEY
3. DECREMENT KEY
4. DISPLAY 1 FOR PROCESS VALUE INDICATION
5. DISPLAY 2 FOR SET VALUE INDICATION
6. LED FOR POWER ON INDICATION
7. LED FOR RELAY ON INDICATION

## 1.2 SIDE VIEW

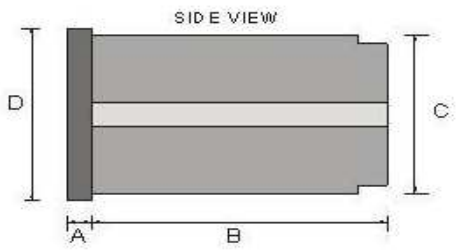



Figure 2:Side view of PID PRO

| Model | A | B | C | D |
|---|---|---|---|---|
| Pid Pro 48 | 5 | 125 | 45 | 48 |
| Pid Pro 72 | 10 | 120 | 68 | 72 |
| Pid Pro 96 | 12 | 118 | 88 | 96 |

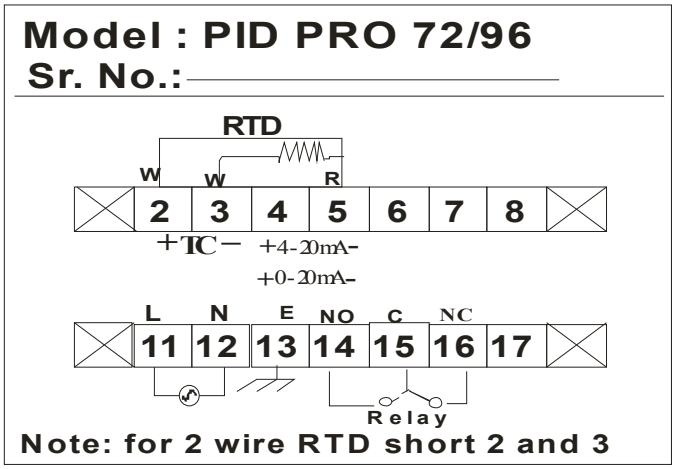
## 1.3 FEATURES

1. Heating/Cooling control & proportional action with tune function for set point 1 & Heating/cooling for set point 2.
2. Proportional band adjustment by front keys.
3. Cycle time adjustment for proportional action by front keys.
4. Offset adjustment for proportional action by front keys.
5. Independent logic selection PID, heating/ cooling (user selectable).
6. Input sensor selection by front keys.
7. Independent differential adjustment for both set points & that is user selectable.
8. PID action can be set in auto tune.
9. PID lock is provided.
10. 5 amp relay contacts for resistive load.
11. Flush panel mounting in 72 x72 /96 x 96.

## 1.4 SPECIFICATIONS

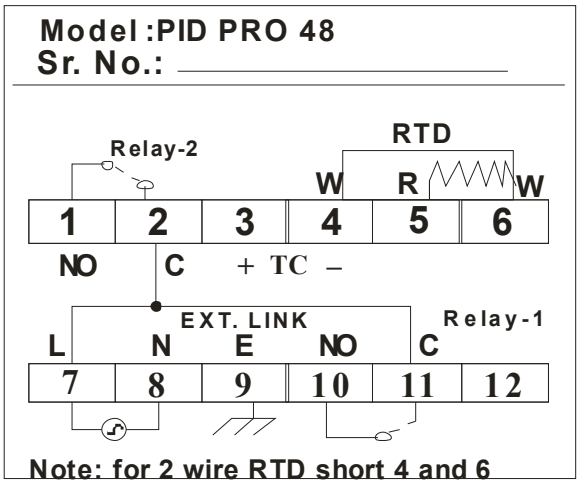
1. Input sensor: - PT 100 (RTD), J-type, K-type, R-type, S-type Thermocouple, mV, mA input provided.
2. Hysteresis independent of the set points.
3. Proportional band: - 0 to 100%.
4. Cycle time: - 1 to 50 sec.
5. Sensor error adjustment/input correction: - 0 to 50.
6. Current under limit function provided
7. Cut-out: - 70 x 70 mm / 92 x 92 mm.
8. Power consumption: - 10 VA max.
9. Display:- 4 digit, 7-segment, red led display or 4 digit, 7-segment, green led display.

## 1.5 TERMINAL CONNECTIONS (Pid Pro 72/96)




2 - Positive of TC / White or Black of 3 wire RTD (Short Wire)
3 - Negative of TC / White or Black of 3 wire RTD (Short Wire)
4 - Positive of mA
5 - Negative of mA/RED of 3 wire RTD
11 - Live (supply)
12 - Neutral (supply)
13 - Earth
14 - Normally open contact of relay
15 - Common contact of relay
16 - Normally closed contact of relay

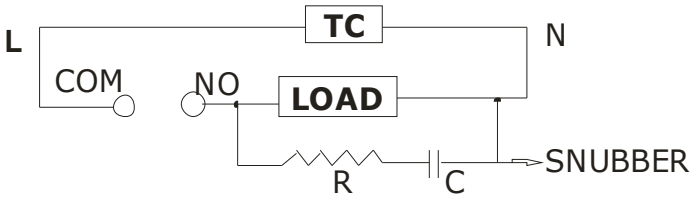
## 1.6 TERMINAL CONNECTIONS (Pid Pro 48)




1 - Normally open contact of relay2
2 - Common contact of relay2
3 - Positive of TC
4 - Negative of TC / White or Black of 3 wire RTD (Short Wire)
5 - RED of 3 wire RTD
6 - White or Black of 3 wire RTD (Short Wire)
7 - Live (supply)
8 - Neutral (supply)
9 - Earth
10 - Normally open contact of relay1
11 - Common contact of relay1

## 1.7 NOTE 1:-

**If load is inductive,**
**connect snubber across load**




R=56 OHMS / 2 WATT.
C=0.1 MFD / 250 V AC
TC=TEMPERATURE CONTROLLER

# 2. LEARNING TO OPERATE

## 2.1 TO BEGIN WITH

- Check all the connections and switch ON the mains supply.
- Display DS1 will show the Process Temperature.
- Press the "SET" key.
- Now display-2 will start flashing with the previous set no. Set it using the increment or decrement key to the desired value.
- After setting the new value, press “SET” key again to store it. This is set value for relay.
- **Note:** If no key is pressed in the set mode then the display will go to normal mode after 4 seconds (in which it shows the process temperature). So to store new value press SET key otherwise it will go to the normal mode by saving current value.
- Press "SET2" key.()
- Now display-2 will start flashing with previous set no. Set it using the increment or decrement key to desired value.
- After setting the new value, press “SET2” key again to store it. This is set value for relay-2.
- **Note:** If no key is pressed in the set mode then display will go to normal mode after 4 seconds (in which it shows the process temperature). So to store new value press SET2 key otherwise it will go to normal mode by saving current value.

## 2.2 HOW TO SET THE LOGIC?

- Press the decrement key, hold it & then press the increment key. Hold both the keys for 5 seconds.
- **"SEn"** ( on display1) along with the type of sensor selected ( on display2) will flash simultaneously. Here one can select the required type of sensor by pressing the increment or decrement key from the given options.
  (RTD: PT100 (RTD), RTD 0.1, J: J-type thermocouple, K: K-type thermocouple R: R-type thermocouple, S: S-type thermocouple, current input, voltage input).
- Press the SET key.
- Now, **“IPC”** is displayed on display1 (DS1). **IPC** stands for Input Correction i.e. sensor error adjustment.
  **Eg**:- If room temp is 30°C & it is displaying 29 then **IPC** can be adjusted to 1°C. Generally set it to “0000”.
  If current mode is selected than “Dp” will appear with “0000”. Here one can set decimal point for current input. Set it by △ or ▽ key from “0000”, “000.0”, “00.00” or “0.000”.
- Press SET key.
- Now, **“LOK”** is displayed on display1 (DS1). **LOK** stands for Lock.
  If **“yes”** is selected then, AUTO PID TUNING is locked i.e. no tuning can be done from outside. If tune function is required then select **“no”**. Select YES or NO using increment & decrement key.
- Press SET key.
- Now, **“rnGL”** is displayed on display1 (DS1). **rnGL** indicates the lower value of the selected sensor range. If required , it can be set using the increment / decrement key.
- Press SET key.

- Now, **“rnGH”** is displayed on display1 (DS1). **rnGH** indicates the higher value of the selected sensor range. If required , it can be set using the increment / decrement key.

| INPUT SENSOR | LOWER RANGE | HIGHER RANGE |
|---|---|---|
| **RTD** | **-99°C** | **400°C** |
| **J** | **0°C** | **750°C** |
| **K** | **0°C** | **1200°C** |
| **R** | **0°C** | **1750°C** |
| **S** | **0°C** | **1750°C** |
| **mA** | **0 counts** | **1000 counts** |
| **mV** | **0 counts** | **1000 counts** |

- Press SET key.
- Now, **“Con1”** is displayed indicating controller 1. Select **Het** (Heating),**Col** (cooling), **Pid** as per the requirements. These options are displayed on display 2(DS2). Press SET key.
  If it is set to PID mode then,
  - **“CY-t”** will flash with some number. This is cycle time in seconds. Set it by increment or decrement key from 1 to 60 sec. Press SET key.
- **"P-b"** with flash with some number. This is proportional band. Set it by increment or decrement keys.( settable from 1 to 100 % & applicable for set-1only).
- Press SET key.
- **"P-G"** with flash with some number. This is proportional gain. Set it by increment or decrement keys.( settable from 0.1 to 10.0 & applicable for set-1 only).
- Push SET key.
- **"I-G"** with flash with some number. This is integration gain. Set it by increment or decrement keys.( settable from 0.1 to 10.0 & applicable for set-1 only).
- Push SET key.
- **"d-G"** with flash with some number. This is derivative gain. Set it by increment or decrement keys.( settable from 0.1 to 10.0 & applicable for set-1only).
- However if it is set to Heating or cooling then HYS(HYSTERESIS) and DLY(DELAY) will appear.
- Now, “**Hy1**” is displayed indicating Hysteresis.
  If in HEATING logic & Hy1 is set to 1 and set temperature is 35, then relay will cut OFF when the temperature reaches 35, but will turn ON again when the temperature becomes 34 and heater is turned on for heating.
  If in COOLING logic & Hy1 is set to 1 and set temperature is 35, then relay will be on at 36 and compressor is turned on for cooling.
  By default **“0002”** is displayed on display2 (DS2). If required it can be changed using the increment/decrement key.
- Press SET key.
- Now, **“Dly”** is displayed on display1 (DS1) indicating Delay time.
  Now let the set temperature be 35 & delay be 10.Once the temperature reaches 35, the compressor will be ON again only after 10 sec.
  By default **“120”** is displayed on display2 (DS2). If required it can be changed using the increment/decrement key.
- Press SET key.

- Now, **"Con2"** is displayed indicating controller 2. Select **Het** (Heating),**Col** (cooling), **OFF** as per the requirements. These options are displayed on display 2(DS2).
- Press SET key.
- Now controller is out of logic mode and the process temperature & set temperature can be seen on the respective displays.
- If PID action is selected for CON1 & TUNE action is to be set then after setting Con1 to PID come out of logic mode & press decrement key (3).Now tuning process begins.

# 3.TROUBLESHOOTING

1. Sensor open indication : Display shows "Err"

2. Sensor reverse :If thermocouple is not connected according to the polarity temperature goes on decreasing while heating

3. Not showing proper temperature : Loose connection on terminal or calibration problem.

4. No Display: Main connection problem.