

## (A3) DIGITAL TIME PROPORTIONAL / ANALOG PROPORTIONAL TEMPERATURE INDICATOR / CONTROLLER IN METAL ENCLOSURE



### MODEL WISE DESCRIPTIONS :

|      |           |  |
|------|-----------|--|
| 2.15 | DTC-303/T | Single set point - time proportional pot. Settings (3 digit)                                     |
| 2.16 | DTC-304/T | Single set point - time proportional T/W Settings (3 digit)                                      |
| 2.17 | DSP-16    | Two set point on/off + TP (pot setting) for Heat/Cool (3 digit)                                  |
| 2.18 | DTC-302/T | Single set point - time proportional pot. Settings (3 digit)                                     |
| 2.19 | TPC-10    | Single set point - time proportional pot. Settings   |
| 2.20 | TPC-11    | Single set point - time proportional T/W Settings  |
| 2.21 | TPC-12    | Two set point on/off + TP (pot setting) for Heat/Cool  |
| 2.22 | DPC-10    | Single set point Proportional control with analogue output (4-20) mA/(0-5) VDC                   |
| 2.23 | APID-10   | Digital PID Time Proportional Controller (For precise control) 0.0 to 199.9 °C / 0.0 to 399.9 °C |

### DESCRIPTION :

Libratherm Time proportional / analog proportional series of Digital Temperature Indicator / Controllers in various sizes are low cost, accurate, rugged and reliable Digital Temperature Indicator / controllers for general-purpose and steady state temperature control applications. These controllers being designed using discrete electronics, are less susceptible to industrial RFI/EMI interference as compared to high

frequency operated microcontroller based instruments.

The range covers single and dual set point time proportional / proportional / indicator-Controllers. The time proportional control gives stable control at the set point as compared to simple ON/OFF type control. The analog proportional control gives the smooth and variable voltage control output using SCR/Triac as the controlling device.

**FEATURES :**

- Accurate, stable and sturdy in operation.
- Accuracy better than  $\pm 0.5\%$  of the full scale.
- Elegant looks and very easy to operate.
- Accepts standard type of thermocouple or RTD - Pt-100 2 or 3-wire input.
- Control output of Relay or TRAIC or DC pulse.
- Switching and continuously variable voltage output.
- Uses high quality potentiometer and membrane switch for adjusting the set points.

**APPLICATION :**

- ▶ Heat treatment
- ▶ Food processing
- ▶ Environmental chambers
- ▶ Cold storage and Chilling plants
- ▶ Furnace / Oven control
- ▶ Constant temp. Bath
- ▶ Plastic / Packaging industry
- ▶ Laboratory equipment etc.

**TECHNICAL SPECIFICATIONS:**

|  |  |
|--|--|
| <b>Input</b>                                 | Thermocouple type J, K, RTD (Pt-100)/2 or 3 wire (any one to be specified)   |
| <b>Range</b>                                 | 0 to 400 °C for J type or K type or RTD (Pt-100)<br>0 to 1000 °C for K type<br>0.0 to 199.9 °C for RTD (Pt-100)<br>User may specify the required display range   |
| <b>Accuracy</b>                              | Indicating accuracy of better than $\pm 0.5\%$ of the range  |
| <b>Display</b>                               | 3 or 3.5 digit 0.3" or 0.5" Red/Green 7-segment LED display  |
| <b>Cold Junction Compensation</b>            | Automatic for thermocouple input   |
| <b>Set Points</b>                            | Adjustable using front panel multi-turn potentiometers with push to read membrane switches or push type coded wheels (Thumb wheels)  |
| <b>Type of Control</b>                       | <b>a)</b> Relay changeover contacts (rated for 7A @ 230VAC) preferred for ON/OFF control   |
| <b>Outputs</b>                               | <b>b)</b> Solid state relay driver (0 to 10) VDC pulse or built in Triac (rated for 7A @ 230VAC) preferred for Time Proportional control   |
|  | <b>c)</b> Analog or triggering pulses for external Triac for phase angle control (single phase) preferred for proportional control   |
| <b>Hysteresis</b>                            | 2°C for ON/OFF action (for 1°C resolution controller)<br>0.3 °C for ON/OFF action (for 0.1°C resolution controller)  |
| <b>Proportional Band</b>                     | $\pm 3\text{ }^{\circ}\text{C}$ to $\pm 15\text{ }^{\circ}\text{C}$ for time proportional & proportional action adjustable using front panel multi turn potentiometer  |
| <b>Reset Control</b>                         | 0 to 100% (adjustable using front panel multiturn potentiometer)   |
| <b>Auto Reset Control or Integral action</b> | Adjustable using potentiometer (APID-10)   |
| <b>Rate control or Derivative action</b>     | Factory set in minutes (APID-10)   |
| <b>Cycle Time</b>                            | <b>a)</b> 2 to 5 seconds for SSR DC pulse output (to drive external solid-state relays, Single SSR for single-phase load and 3 SSR for 3-phase load).<br><b>b)</b> 20 second for Relay or Triac Output (to drive external load contactor)<br><b>c)</b> 2 to 5 second for TRIAC Output (to drive direct heater load of max.1.5KW@ 230VAC) |
| <b>Output Indication</b>                     | The front panel LEDs marked OUT or OUT1 and OUT2.  |
| <b>Supply</b>                                | 230VAC / 110 VAC $\pm 10\%$ (5VA), 50/60Hz or 24VDC @ 250mA  |
| <b>Size</b>                                  | 96 x 96 x 120 mm, 96 x 48 x 130 mm, 48 x 96 x 130 mm   |
| <b>Enclosure</b>                             | Metal - Powder coated, weather proof / flame proof enclosures are also available   |

**ORDERING INFORMATION :**

| MODEL     | INPUT  |        | RANGE IN °C |        | OUTPUT 1 MODE      | OUTPUT 1 TYPE     |
|-----------|--------|--------|-------------|--------|--------------------|-------------------|
|           | A      |        | B           |        | C                  | D                 |
| DTC-303/T | 'J'    | - (A1) | 0.0 199.9   | - (B1) | HEAT/LOW ALM (C1)  | RELAY - (D1)      |
| DTC-304/T | 'K'    | - (A2) | -50.0-199.9 | - (B2) | COOL/HI ALM (C2)   | DC PULSE - (D2)   |
| DSP-16    | Pt-100 | - (A3) | 0-400       | (B3)   | Analog signal (C3) | TRIAC/SSR - (D3)  |
| DTC-302/T | OTHER  | (A4)   | 0-600       | (B4)   | NONE (C4)          | 4 - 20mA - (D4)   |
| TPC-10    |        |        | 0-800       | (B5)   |                    | 0 - 10 VDC - (D5) |
| TPC-11    |        |        | 0-1000      | (B6)   |                    | 0 5VDC - (D6)     |
| TPC-12    |        |        | OTHER       | (B7)   |                    | NONE - (D7)       |
| DPC-10    |        |        |             |        |                    |                   |
| APID-10   |        |        |             |        |                    |                   |

| OUTPUT 2 MODE |      | OUTPUT2 TYPE |        | SUPPLY VOLTAGE |
|---------------|------|--------------|--------|----------------|
| E             |      | F            |        | G              |
| HEAT/LOW ALM  | (E1) | RELAY        | - (F1) | 230 VAC (G1)   |
| COOL/HI ALM   | (E2) | DC PULSE     | - (F2) | 110 VAC (G2)   |
| NONE          | (E3) | TRIAC/SSR    | - (F3) | 24VDC (G3)     |
|               |      | NONE         | - (F4) |                |

**EXAMPLE :**

| MODEL  | A  | B  | C  | D  | E  | F  | G  |
|--------|----|----|----|----|----|----|----|
| TPC-10 | A2 | B6 | C1 | D3 | XX | XX | G1 |

This is Single Set Point time proportional controller K type thermocouple input (0-1000)°C with Triac output operating on 230VAC supply.