Thermomart PID-RS-96

Thermomart PID-RS-96 Programmable PID Temperature Controller

Model: PID-RS-96

Introduction

This manual provides instructions for the installation, operation, and maintenance of the Thermomart PID-RS-96 1/8 DIN Programmable PID Temperature Controller. This device is designed for precise temperature control in various industrial and laboratory applications, particularly those requiring timed temperature cycles such as kilns, annealing furnaces, and ceramic processing.

The controller features a Ramp & Soak function, allowing for up to 60 programmable segments (30 ramp and 30 soak) to execute complex temperature profiles. It includes an SSR output and supports a wide range of universal input types.

Key Features

- Up to 60 programmable segments (30 ramp, 30 soak, and other logic actions) for precise temperature profiling.
- Wide temperature range: -200 to 1800 °C (input type dependent), with soft-start function.
- Output: Voltage pulse to drive Solid State Relays (SSR).
- Universal input types:
  - Thermocouple: K, S, E, J, T, B, N
  - RTD: Cu50, PT100
  - Linear Voltage: 0-5V, 1-5V, 0-1V, 0-100mV, 0-20mV, 0-60mV, 0.2-1V (100-500mV), -20 -+20mV (0-10V), -5V- +5V (0-50V), -100 - +100mV (2-10V)
  - Linear Resistor: 0-80 Ohm, 0-400 Ohm
- Power Supply: 90~260VAC.
- Dimensions: 96mm x 48mm x 90mm (DIN 1/8 panel mount) with a large, readable display.
- Display in Fahrenheit or Celsius, configurable decimal points for all inputs.
- Control Method: ON/OFF, AI MPT with auto-tuning, adopting fuzzy logic PID algorithm.

- Alarm Modes: Absolute value high limit, Absolute value low limit, Deviation high limit, Deviation low limit.
- Configurable time between minute and second, decimal point for all inputs.
- Auto/Manual control switchable from the front panel.
- Configurable time-dominate or value-dominate controls.

Setup

1. Physical Installation

The PID-RS-96 controller is designed for 1/8 DIN panel mounting. Ensure adequate space for ventilation and wiring connections at the rear of the unit.

- **Dimensions:** 96mm (width) x 48mm (height) x 90mm (depth).
- Cut a panel opening of approximately 92mm x 45mm.
- Insert the controller into the opening and secure it using the provided mounting brackets.

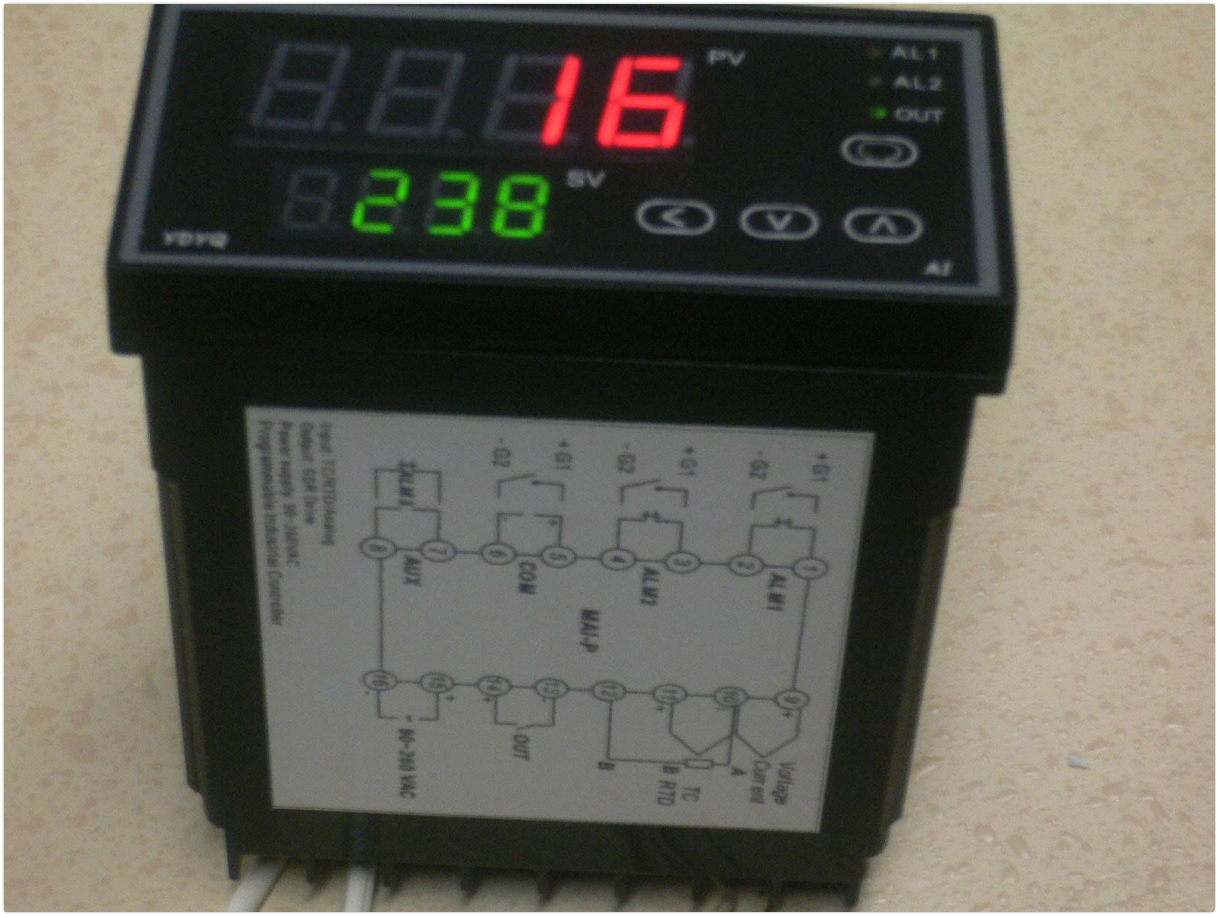

Figure 1: Front view of the Thermomart PID-RS-96 Temperature Controller, showing the display and control buttons.

2. Electrical Wiring

Before wiring, ensure the power supply is disconnected. Refer to the wiring diagram provided with your unit for specific terminal connections. Incorrect wiring can damage the controller or connected equipment.

- **Power Supply:** Connect 90~260VAC to the designated power terminals.
- **Input Wiring:** Connect your chosen temperature sensor (Thermocouple, RTD, or linear input) to the corresponding input terminals. Ensure correct polarity for thermocouples and linear inputs.
- **Output Wiring:** Connect the voltage pulse output to the control input of your Solid State Relay (SSR). The controller provides a voltage pulse suitable for driving standard SSRs.

- **Alarm Output (Optional):** If using, connect alarm outputs to external alarm devices as per the wiring diagram.

Operating Instructions

1. Initial Power-Up and Display

Upon initial power-up, the controller will perform a self-test and then display the current process value (PV) and set point value (SV). The large display ensures readability from a distance.

- **Temperature Unit:** The display can be configured for either Fahrenheit (°F) or Celsius (°C). Refer to the parameter settings section for changing this unit.
- **Decimal Points:** Decimal point positions are configurable for all input types to suit measurement precision requirements.

2. Control Method and Auto-Tuning

The controller utilizes an advanced fuzzy logic PID algorithm for stable and accurate temperature control. It supports ON/OFF control and AI MPT (Artificial Intelligence Multi-Point Tuning) with auto-tuning functionality.

- **Auto-Tuning:** To initiate auto-tuning, access the parameter menu and select the auto-tune function. The controller will cycle the output to determine optimal PID parameters for your specific system, minimizing overshoot and undershoot.
- **Manual/Auto Control:** The controller allows switching between manual and automatic control modes directly from the front panel. In manual mode, the output power can be set directly.

3. Programming Ramp and Soak Cycles

The PID-RS-96 excels in applications requiring timed temperature profiles. It supports up to 60 segments, allowing for complex ramp (temperature increase/decrease) and soak (temperature hold) cycles.

1. **Access Program Mode:** Enter the program setting menu (refer to the detailed parameter manual for specific key presses).
2. **Define Segments:** For each segment, set the target temperature (set point) and the duration.
    - **Ramp Segment:** The controller will change the temperature from the previous segment's end temperature to the current segment's set point over the specified duration.
    - **Soak Segment:** The controller will maintain the set point temperature for the specified duration.
3. **Time Configuration:** The time for each segment can be configured in minutes or seconds.
4. **Start Program:** Once all segments are defined, initiate the program from the operating menu.

4. Alarm Configuration

The controller offers various alarm modes to alert users to deviations from desired operating conditions.

- **Absolute Value High/Low Limit:** Alarms activate when the process value exceeds or falls below a fixed temperature threshold.
- **Deviation High/Low Limit:** Alarms activate when the process value deviates from the set point by a specified amount (e.g., ±5°C).

Configure alarm parameters and assign them to specific alarm outputs in the parameter settings menu.

Maintenance

The Thermomart PID-RS-96 controller is designed for reliable operation with minimal maintenance. Regular checks can help ensure longevity and accurate performance.

- **Cleaning:** Periodically wipe the front panel with a soft, dry cloth. Avoid abrasive cleaners or solvents.
- **Connections:** Ensure all electrical connections remain secure. Loose connections can lead to intermittent operation or inaccurate readings.
- **Environment:** Operate the controller within its specified environmental conditions (temperature, humidity) to prevent damage.
- **Calibration:** If significant discrepancies in temperature readings are observed, consider recalibrating the input sensor or the controller itself, following advanced calibration procedures outlined in the full technical manual.

Troubleshooting

This section addresses common issues you might encounter. For more complex problems, consult the full technical manual or contact customer support.

Problem	Possible Cause	Solution
No display/Power off	No power supply; Incorrect wiring; Blown fuse.	Check power connections (90-260VAC). Verify wiring. Check internal fuse (if accessible and user-serviceable).
Inaccurate temperature reading	Sensor not connected; Incorrect sensor type selected; Sensor damaged; Calibration error.	Ensure sensor is correctly wired. Verify the input type setting matches your sensor. Replace damaged sensor. Perform auto-tuning or calibration.
Controller not heating/cooling	Output wiring incorrect; SSR faulty; Control mode incorrect (e.g., in manual mode with 0% output).	Check SSR wiring and functionality. Ensure controller is in auto mode or manual output is set correctly.
Temperature overshoot/undershoot	PID parameters not optimized.	Perform auto-tuning to optimize PID parameters for your system.

Specifications

Parameter	Detail
Model Number	PID-RS-96
Brand	Thermomart
Dimensions	96mm x 48mm x 90mm (1/8 DIN Panel Mount)
Power Supply	90~260VAC
Input Types	Thermocouple (K,S,E,J,T,B,N), RTD (Cu50, PT100), Linear Voltage/Current, Linear Resistor
Output	Voltage pulse to drive SSR
Control Method	ON/OFF, AI MPT with auto tuning, Fuzzy Logic PID
Programmable Segments	Up to 60 (30 Ramp, 30 Soak)
Temperature Range	-200 to 1800 °C (sensor dependent)
Display Type	LCD
Material	Ceramic, Metal, Glass, Other
UPC	769675373351

Warranty and Support

Thermomart products are manufactured to high-quality standards. For specific warranty details, please refer to the warranty card included with your product or visit the official Thermomart website.

For technical support, troubleshooting assistance beyond this manual, or inquiries regarding parts and service, please contact Thermomart customer service through their official channels. When contacting support, please have your model number (PID-RS-96) and purchase information readily available.