Yudian AI-518 series (AI-518A, AI-518D2, AI-518G)

Yudian AI-518 Series PID Temperature Controller User Manual

Models: AI-518A, AI-518D2, AI-518G

1. INTRODUCTION

This manual provides comprehensive instructions for the installation, operation, and maintenance of the Yudian AI-518 series high-precision PID temperature controllers. These controllers are designed for industrial and laboratory applications requiring accurate temperature regulation. Please read this manual thoroughly before operating the device to ensure correct usage and optimal performance.

2. SAFETY INFORMATION

Observe the following safety precautions to prevent personal injury and damage to the instrument:

- Ensure the power supply voltage matches the specifications of the controller.
- Disconnect power before performing any wiring or maintenance.
- Do not operate the controller in environments with excessive moisture, dust, corrosive gases, or strong vibrations.
- Only qualified personnel should perform installation and wiring.
- Ground the instrument properly to prevent electrical shock.
- Do not disassemble or modify the controller; doing so will void the warranty and may cause malfunction.

3. PRODUCT OVERVIEW

The Yudian AI-518 series temperature controllers are advanced instruments featuring high measurement accuracy and stable control performance. They utilize PID (Proportional-Integral-Derivative) control algorithms to maintain precise temperature levels in various processes. The front panel typically includes dual digital displays for Process Value (PV) and Set Value (SV), along with operational buttons for configuration and control.

3.1 Key Features

- High measurement accuracy and resolution.
- Advanced PID control with auto-tuning function.
- Multiple input types (thermocouple, RTD, linear voltage/current).
- Various output options (relay, SSR, linear current/voltage).
- Alarm functions with configurable modes.

- Digital filtering and sensor error compensation.
- Durable ABS material casing.

3.2 Front Panel Layout (AI-518G Example)

Figure 1: Front panel of the Yudian AI-518G PID Temperature Controller. It features a dual digital display, with the upper red display showing the Process Value (PV) and the lower green display showing the Set Value (SV). Below the displays are indicator lights for various statuses (MAN, PRO, MO, COM, OP1, OP2, AL1, AL2, AUT, AUX) and control buttons including 'Set', 'Up', 'Down', 'Run', 'Stop', and 'A/M' (Auto/Manual).

Figure 2: Side-front view of the Yudian AI-518G Temperature Controller, illustrating its compact form factor and the ventilation slots on the top and sides for heat dissipation. The front panel displays and buttons are visible from this angle.

4. INSTALLATION AND SETUP

4.1 Mounting

The AI-518 series controllers are designed for panel mounting. Ensure adequate space for ventilation and wiring. Cut a panel opening according to the dimensions provided in the product specifications (refer to Section 7). Secure the controller using the provided mounting brackets.

4.2 Wiring

All wiring should be performed with the power disconnected. Refer to the wiring diagram typically found on the side or top of the controller casing, or in a separate wiring guide. Ensure correct connections for:

- **Power Supply:** Connect to the specified AC or DC voltage.
- **Sensor Input:** Connect your temperature sensor (thermocouple, RTD) to the designated input terminals. Observe polarity for thermocouples.
- **Control Output:** Connect the heating/cooling element or SSR to the control output terminals.
- **Alarm Outputs:** If utilized, connect external alarm devices to the alarm output terminals.
- **Grounding:** Ensure proper grounding for safety and noise reduction.

Note: Incorrect wiring can damage the controller or connected equipment. If unsure, consult a qualified electrician.

5. OPERATING INSTRUCTIONS

5.1 Power On and Initial Display

Upon powering on, the controller will typically display the Process Value (PV) on the upper display and the Set Value (SV) on the lower display. The PV indicates the current measured temperature, while the SV is the desired target temperature.

5.2 Setting the Set Value (SV)

1. Press the **SET** button once. The SV display will start flashing.
2. Use the **UP** (▲) and **DOWN** (▼) buttons to adjust the desired temperature.
3. Press the **SET** button again to confirm the new SV. The display will stop flashing.

5.3 Accessing Parameter Menus

To access advanced parameters (e.g., input type, output mode, PID parameters, alarm settings), press and hold the **SET** button for several seconds until the first parameter code appears. Use the **SET** button to cycle through parameters and the **UP**/**DOWN** buttons to change values. Refer to the detailed parameter list in the full technical manual for specific codes and ranges.

5.4 Auto-Tuning (AT) Function

The auto-tuning function automatically calculates optimal PID parameters for your specific process. To initiate auto-tuning:

1. Set the desired SV.
2. Access the parameter menu and locate the auto-tuning parameter (often labeled **AT** or similar).
3. Set the AT parameter to '1' (ON) and confirm. The controller will begin the auto-tuning process, which may involve temperature cycling.
4. Once complete, the AT parameter will automatically revert to '0' (OFF), and the newly calculated PID parameters will be saved.

It is recommended to perform auto-tuning when the controller is first installed or if the process characteristics change significantly.

6. MAINTENANCE

6.1 Cleaning

Wipe the front panel with a soft, damp cloth. Do not use abrasive cleaners, solvents, or harsh chemicals, as these can damage the display or casing. Ensure no liquid enters the controller.

6.2 Inspection

Periodically inspect wiring connections for looseness or corrosion. Check the sensor for damage or degradation. Ensure the operating environment remains within specified conditions.

6.3 Calibration

If the temperature readings appear inaccurate, the sensor or controller may require calibration. Refer to the advanced parameter settings for calibration offsets, or consult a qualified technician for professional calibration services.

7. TROUBLESHOOTING

Problem	Possible Cause	Solution
No display/Power off	No power supply; Incorrect wiring; Blown fuse.	Check power connections; Verify wiring against diagram; Replace fuse if necessary.
PV display shows "HHHH" or "LLLL"	Sensor open circuit (HHHH); Sensor short circuit (LLLL); Incorrect sensor type setting.	Check sensor wiring and integrity; Replace faulty sensor; Verify sensor type parameter in settings.
Temperature not controlled	Incorrect wiring of output; Output parameter set incorrectly; PID parameters not optimized.	Verify output wiring; Check output mode and parameters; Perform auto-tuning.
Temperature oscillates	PID parameters are too aggressive.	Perform auto-tuning or manually adjust PID parameters (decrease P, increase I, decrease D).

For issues not listed here, or if solutions do not resolve the problem, please contact technical support.

8. SPECIFICATIONS (AI-518G EXAMPLE)

- **Model:** AI-518G
- **Control Type:** PID Temperature Controller
- **Material:** ABS
- **Origin:** Mainland China
- **Input Types:** Configurable (e.g., K, J, E, T, S, R, B, N thermocouples; Pt100, Cu50 RTDs; linear voltage/current) - *Specific types depend on model variant.*
- **Output Types:** Configurable (e.g., Relay, SSR drive, 4-20mA, 0-10V) - *Specific types depend on model variant.*
- **Measurement Accuracy:** Typically ±0.2% FS ±1 digit (specifics vary by input type and range).
- **Sampling Period:** Typically 0.25 seconds.
- **Power Supply:** Varies by model (e.g., 100-240VAC, 50/60Hz or 24VDC).
- **Operating Environment:** Temperature 0-50°C, Humidity 10-85% RH (non-condensing).
- **Panel Cutout Dimensions:** Typically 48x48mm, 48x96mm, 96x48mm, or 96x96mm depending on specific AI-518 model.

Note: Detailed specifications for specific AI-518 models (AI-518A, AI-518D2, AI-518G) may vary. Refer to the product's specific datasheet for precise details.

9. Warranty and Support

This product is typically covered by a manufacturer's warranty against defects in materials and workmanship. The duration and terms of the warranty may vary. Please retain your proof of purchase for warranty claims.

For technical support, service, or warranty inquiries, please contact the seller or the manufacturer directly. Provide your product model number (e.g., AI-518G) and a detailed description of the issue when seeking assistance.

You can often find contact information on the product packaging, the seller's website, or through the original point of purchase.