

ATNSINC NTC 3950 100K Thermistor

ATNSINC 100K NTC 3950 Thermistor Temperature Sensor Instruction Manual

For 3D Printers including Creality Ender 3, Ender 3 Pro, and CR-10 Series

1. INTRODUCTION

This manual provides essential information for the proper installation, operation, and maintenance of your ATNSINC 100K NTC 3950 Thermistor Temperature Sensors. These thermistors are designed for accurate temperature measurement in 3D printing applications, specifically for heated beds and extruders. Please read this manual thoroughly before use to ensure optimal performance and safety.

2. PRODUCT OVERVIEW

2.1 Key Features

- **Type:** 100K NTC 3950 Thermistor
- **Resistance:** $R_{25^{\circ}\text{C}}=100\text{K}\Omega$
- **B-Value:** $B_{25/50}=3950\text{K} \pm 1\%$
- **Connector:** XH2.54 2-pin white terminal
- **Wire Length:** Approximately 1 meter (39.4 inches)
- High sensitivity and rapid response for accurate temperature readings.
- Compact design for easy installation.
- Wide temperature range and high reliability.

2.2 Compatibility

These thermistors are compatible with a wide range of 3D printers, including but not limited to:

- Creality Ender 3
- Creality Ender 3 Pro
- Creality Ender 3 V2
- Creality CR-10
- Creality CR-10S
- Hictp D3 Hero
- Other Reprap-based 3D printers utilizing 100K NTC 3950 thermistors.



Figure 1: Overview of eight ATNSINC 100K NTC 3950 Thermistors, each coiled with a white XH2.54 connector and exposed sensor tip.

3. SPECIFICATIONS

Attribute	Value
Model	NTC 3950 100K Thermistor
Resistance at 25°C (R25)	100KΩ
B-Value (B25/50)	3950K ±1%
Connector Type	XH2.54 2-pin
Wire Length	1 meter (39.4 inches)
Manufacturer	ATNSINC

Attribute	Value
Package Dimensions	5.16 x 4.45 x 0.55 inches
Item Weight	0.71 ounces (for 8 pieces)

4. SAFETY INFORMATION

Always observe the following safety precautions when handling and installing electronic components:

- **Power Off:** Ensure your 3D printer is completely powered off and unplugged from the mains electricity before attempting any installation or maintenance.
- **Static Discharge:** Take precautions against electrostatic discharge (ESD) when handling electronic components. Use an anti-static wrist strap or work on an ESD-safe mat.
- **Correct Polarity:** While thermistors are generally not polarity-sensitive, always ensure connectors are inserted correctly and without excessive force.
- **Cable Management:** Route cables carefully to prevent pinching, abrasion, or interference with moving parts of the printer.
- **Professional Installation:** If you are unsure about any step, consult a qualified technician or refer to your 3D printer's specific service manual.

5. SETUP AND INSTALLATION

The ATNSINC 100K NTC 3950 thermistor can be used for both the heated bed and the hotend (extruder) of your 3D printer. The installation process typically involves physical mounting and firmware configuration.

5.1 Physical Installation

1. **Power Down:** Turn off and unplug your 3D printer from the power source.
2. **Access Component:** Carefully access the area where the thermistor needs to be replaced or installed (e.g., hotend assembly or heated bed underside).
3. **Remove Old Thermistor (if replacing):** Disconnect the old thermistor's connector from the mainboard and carefully remove it from its mounting location. Note how it was secured.
4. **Mount New Thermistor:**
 - **For Hotend:** Insert the thermistor's glass bead into the designated hole on the heater block. Secure it using a small screw and washer, or a high-temperature sleeve/cartridge, depending on your hotend design. Ensure good thermal contact.
 - **For Heated Bed:** Typically, the thermistor is either taped to the underside of the heated bed with Kapton tape or inserted into a small hole. Ensure it is securely attached and making good contact with the bed surface for accurate readings.
5. **Connect to Mainboard:** Locate the thermistor input pins on your 3D printer's mainboard (often labeled 'TH0' for hotend, 'THB' for heated bed, or similar). Connect the XH2.54 connector of the new thermistor to the corresponding pins.
6. **Cable Management:** Route the thermistor wire carefully, ensuring it does not interfere with moving parts and is secured to prevent strain or damage.



Figure 2: Detailed view of the XH2.54 2-pin white connector, used for connecting the thermistor to the 3D printer's mainboard.



Figure 3: Close-up of the thermistor's glass-encapsulated sensor tip, which measures temperature, and the protective heat shrink tubing.

5.2 Firmware Configuration

After physical installation, you may need to configure your 3D printer's firmware to correctly interpret the thermistor readings. For most 3D printer firmwares (e.g., Marlin), the NTC 3950 100K thermistor is a common type.

- **Identify Thermistor Type:** The NTC 3950 100K thermistor is typically identified by a specific number in the firmware configuration (e.g., `#define TEMP_SENSOR_0 5` for the hotend, and `#define TEMP_SENSOR_BED 5` for the heated bed in Marlin firmware). The number '5' often corresponds to the 100K NTC 3950 thermistor.
- **Edit Firmware:** Connect your printer to your computer, open your firmware (e.g., Marlin in PlatformIO or Arduino IDE), and navigate to the Configuration.h file.
- **Update Settings:** Locate the `TEMP_SENSOR_0` (for extruder) and `TEMP_SENSOR_BED` (for heated bed) definitions and ensure they are set to the correct value for the NTC 3950 thermistor.
- **Compile and Upload:** Compile the modified firmware and upload it to your 3D printer's mainboard.
- **Verify:** After uploading, power on your printer and check the temperature readings on the LCD screen or via a host software (e.g., Pronterface, OctoPrint) to ensure they are accurate and stable.

Note: Always back up your original firmware before making any changes. Refer to your specific 3D printer's documentation or the firmware's official guide for detailed instructions on firmware modification.

6. OPERATING PRINCIPLES

A Negative Temperature Coefficient (NTC) thermistor is a type of resistor whose resistance is strongly dependent on temperature. As the temperature increases, the resistance of an NTC thermistor decreases. The 3D printer's mainboard measures this resistance change and converts it into a temperature reading using a lookup table defined in the firmware (based on the B-value and R25 value).

The ATNSINC 100K NTC 3950 thermistor is specifically calibrated for 3D printing environments, providing accurate and stable temperature feedback crucial for consistent print quality and preventing thermal runaway.

7. MAINTENANCE

Thermistors are generally low-maintenance components. However, periodic checks can help ensure their longevity and accuracy:

- **Visual Inspection:** Periodically inspect the thermistor wire and sensor tip for any signs of damage, fraying, or corrosion.
- **Secure Mounting:** Ensure the thermistor remains securely mounted in its position on the hotend or heated bed. Loose mounting can lead to inaccurate temperature readings.
- **Cleanliness:** Keep the area around the thermistor tip clean from filament debris or other contaminants that could affect thermal contact.
- **Cable Integrity:** Check that the thermistor cable is not pinched, stretched, or rubbing against moving parts.

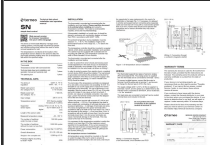
8. TROUBLESHOOTING

If you encounter issues with your thermistor, consider the following troubleshooting steps:



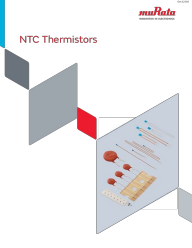

- **Incorrect Temperature Readings:**
 - **Check Firmware:** Verify that the correct thermistor type (e.g., Type 5 for NTC 3950) is selected in your printer's firmware.
 - **Physical Contact:** Ensure the thermistor tip is making good thermal contact with the heated component (hotend or bed).
 - **Cable Connection:** Confirm the XH2.54 connector is fully seated on the mainboard pins.
- **Related Documents - NTC 3950 100K Thermistor**



[Creality Spider High Temperature Hotend User Manual and Installation Guide](#)
Official user manual and installation guide for the Creality Spider High Temperature Hotend. Learn about its components, assembly process, and troubleshooting tips for upgrading your 3D printer.



[terneo SN Simple Heat Control: Installation, Operation, and Technical Data](#)
Comprehensive guide for the terneo SN thermostat, covering technical specifications, installation procedures, wiring diagrams, and troubleshooting for snow melting systems.

 <p>W1209 DIGITAL THERMOSTAT</p> <p>W1209 DIGITAL THERMOSTAT</p>	<p>W1209 Digital Thermostat Module User Guide</p> <p>A comprehensive guide to the W1209 Digital Thermostat module, covering its specifications, features, and operational parameters for temperature control applications.</p>
 <p>ProSense 10K-3 Thermistor Bolt-On Ring Sensors</p>	<p>ProSense 10K-3 Thermistor Bolt-On Ring Sensors - Technical Datasheet</p> <p>Detailed technical specifications, overview, and wiring information for ProSense 10K-3 Thermistor Bolt-On Ring Sensors, including part numbers NTC10K3-B01L06-02 and NTC10K3-B02L06-02, from AutomationDirect.com.</p>
 <p>NTC Thermistors</p> <p>murata</p>	<p>Murata NTC Thermistors: Comprehensive Product Catalog & Datasheet</p> <p>Explore Murata's extensive range of NTC Thermistors for precise temperature sensing and compensation. Discover chip, lead, and string types with detailed specifications and applications.</p>
 <p>Fuji Electric Powering Energy Technology</p> <p>Using the NTC Thermistor</p>	<p>Fuji Electric NTC Thermistor Technical Document for IGBT Modules</p> <p>This technical document from Fuji Electric details the use, characteristics, and temperature detection methods of NTC thermistors integrated into IGBT modules. It covers internal structure, thermal flow, resistance, B value, thermal dissipation, time response, and circuit examples.</p>