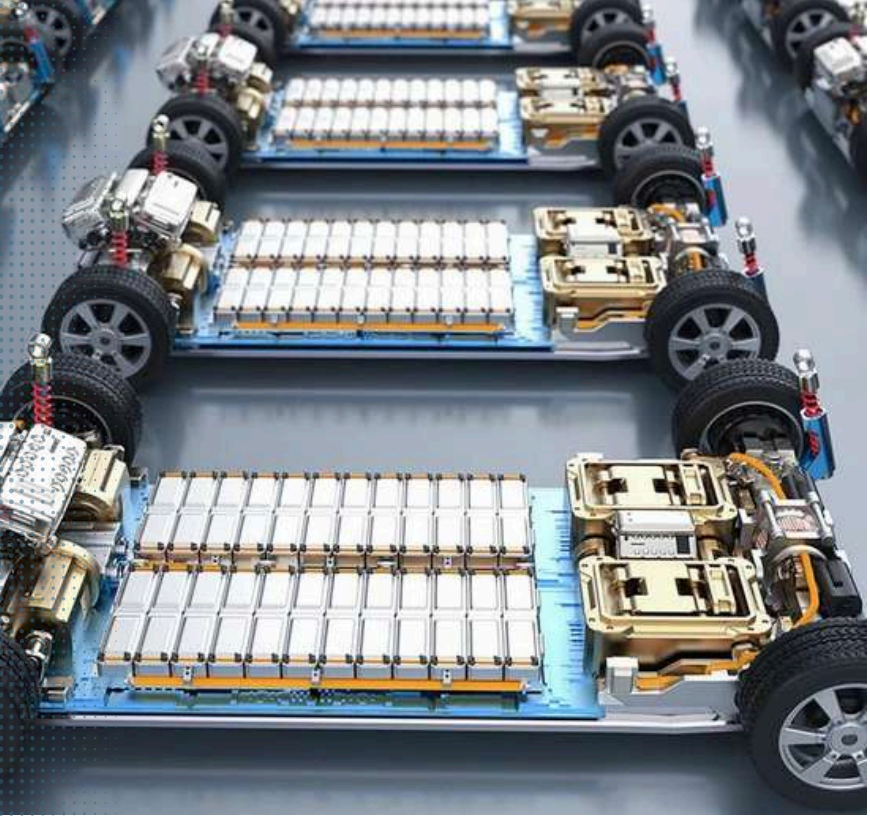
ZENTHERMIK

THE COMPLETE THERMISTOR SOLUTIONS

TEMPERATURE SENSOR SELECTION GUIDE



OUR STORY

We are a dedicated venture founded by a team of seven engineers, based in Kozhikode, Kerala, India. Our core focus lies in the manufacturing and supply of Thermistors and Thermistor-based products. These electro-ceramic components play a critical role across a wide spectrum of industries due to their high sensitivity and reliability in temperature sensing and control applications.

With a strong foundation in engineering expertise and a commitment to innovation and quality, we strive to deliver solutions that meet the evolving demands of modern industry.

OUR VALUES

Our mission is Total Quality Commitment — a principle we uphold by fostering strong partnerships with our employees through teamwork, open communication, and empowerment. We are dedicated to creating an exceptional work environment driven by innovative Statistical Process Control (SPC) concepts and methods. Through our collective success, we aim to inspire individual growth and continuous self-advancement.

OUR VISION

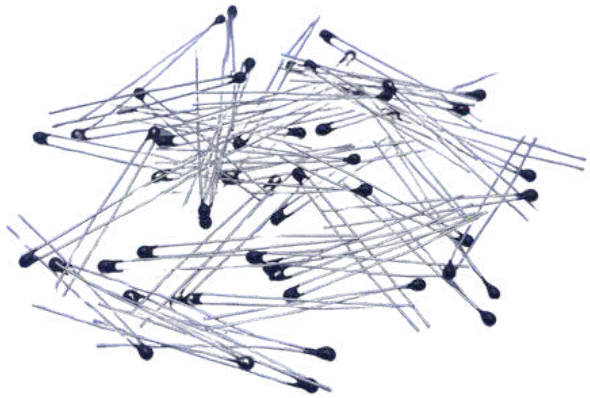
We aspire to become the most innovative, customer-centric, inclusive, and sustainable manufacturer of Thermistors. Our goal is to expand our global presence and establish ourselves as the most trusted name in Thermistor manufacturing worldwide.

WHY THERMISTOR

The term “thermistor” originated from the descriptor **THERM**ally sensitive res**ISTOR.** The two basic types of thermistors are the Negative Temperature Coefficient (NTC) and Positive Temperature Coefficient (PTC). Thermistors exhibit a very high and precise temperature coefficient of resistance, and therefore they are temperature sensors especially suitable for Temperature Measurement, Control and Sensing Applications

Features:

- ·Small Size
- ·Fast response
- ·High sensitivity
- ·High accuracy tolerance to ± 0.1°C
- ·Excellent thermal cycle endurance
- ·High Stability
- ·Operating ranges from - 50°C ~ +150°C



WHAT SETS US APART

At ZENTHERMIK, we offer a wide range of high-performance NTC Thermistors designed for precise temperature measurement and control across diverse industries. Our products are engineered with cutting-edge technology to meet the most demanding applications.

Industries We Serve:

- Automotive – Engine management, battery temperature sensing, HVAC
- Food Handling & Processing – Accurate process monitoring and safety
- Telecommunications – Circuit protection and thermal compensation
- Medical & Scientific – Diagnostic equipment, patient monitoring
- Military/Defense – Rugged solutions for extreme conditions
- Consumer Electronics – Smart devices, home appliances

WHY CHOOSE ZENTHERMIK?

Advanced Manufacturing: Built using sophisticated, state-of-the-art techniques
Superior Accuracy: Reliable sensing in critical environments
Quality Assurance: Stringent testing ensures long-term stability and performance
Customized Solutions: Tailored thermistors to match your exact specifications

NEXT-GEN NTC THERMISTORS FOR ELECTRIC MOBILITY SOLUTIONS

Precision Sensing for High-Performance Electric Vehicles

As electric mobility surges ahead, thermal management becomes a mission-critical function for battery safety, efficiency, and lifespan. ZENTHERMIK's EV battery temperature sensors are engineered to deliver accurate, real-time thermal monitoring in compact, rugged, and high-reliability packages.

Key Features:

- Wide Operating Temperature: −50°C to +150°C
- High Accuracy: ±1% to ±0.1°C tolerance options
- Fast Thermal Response: ≤15 seconds (still air / oil)
- Compact Form Factors: Fits tight battery module designs
- Excellent Stability: <0.02°C/year drift
- Customized Housing: Available in SS, Copper, ABS, Nickel Alloy and Aluminum Alloy
- Automotive Grade: ISO 9001:2015 certified production

Custom Solutions for OEM Integration

- Connector-ready harnesses
- Multiple -sensor assemblies
- BMS-compatible output calibration
- Design support for pack-level integration
- Customizable Lugs for EV Battery Integration (For Screw mounting & Laser welding)

Applications

- EV Battery Packs (LFP, NMC, LTO)
- Battery Management Systems (BMS)
- Thermal Runaway Detection
- Onboard Chargers & Power Electronics
- Energy Storage Systems (ESS)

ZENTHERMIK's thermistors empower EV manufacturers with safe, efficient, and scalable thermal solutions.

HIGH PRECISION BEADS - ZENCB SERIES

Compact size with high precision and fast response They can be PCB mounted or easily assembled into small diameter custom probe assemblies

SCREW MOUNTING SENSORS - ZENST SERIES

Our Screw mount NTC sensors for temperature sensing and compensation embody all the qualities of NTC technology.

POWDER COATED SENSORS- ZENCP SERIES

Powder epoxy encapsulated NTC sensors commonly used in applications where durability and resistance to harsh environments are important with High measuring accuracy.

TEMPERATURE PROBES - ZENAC SERIES

Standard and customized probe assemblies offer very precise and extremely reliable thermal monitoring in the most demanding applications.

GLASS BEAD - ZENGB SERIES

High quality glass encapsulated NTC temperature sensors can be used at up to 300 °C, and the glass encapsulation makes them ideal for use in corrosive atmospheres and harsh environments.

AUTOMOTIVE SENSORS - ZENAS SERIES

Relatively inexpensive, compact, and provide a reliable, accurate reading of temperature changes. Additionally, their resistance change can be easily interpreted by the vehicle's electronic systems.

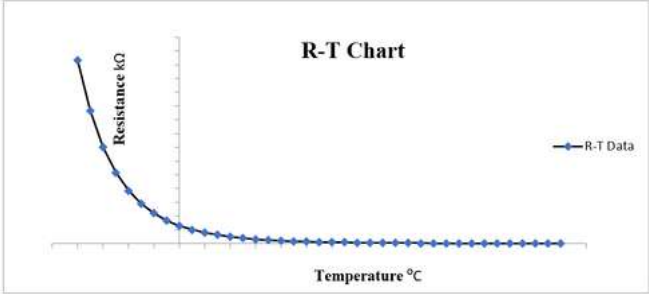
Because a good sensor is the cornerstone of a good system, many engineers select NTC thermistors when designing their temperature measurement and control systems

INTRODUCTION TO TEMPERATURE SENSORS

Thermistors are thermally sensitive resistors whose prime function is to exhibit a large, predictable, and precise change in electrical resistance when subjected to a corresponding change in body temperature.

Resistance Temperature (R/T) characteristics

The relationship between the resistance value and absolute temperature of the NTC thermistor within an NTC's operating temperature range is approximated by an exponential function



$$R1 = R2 \bullet \exp(\beta \bullet (1/T1 - 1/T2))$$

R1 NTC Resistance in Ω at temperature T1 in K
R2 NTC Resistance in Ω at temperature T2 in K
β Beta value in K- Material Constant of NTC thermistor

Beta value (β)

The B value is determined by the NTC material and is expressed as the slope of the R/T curve. The B value is represented below in Formula

$$\beta = (\ln R1 - \ln R2)/(1/T1 - 1/T2)$$

Temperature coefficient (α)

The temperature coefficient of the resistance value is defined by the relative change in the resistance value due to the temperature change.

$$\alpha = -\beta/T^2$$

T Temperature in kelvin

The Steinhart-Hart equation

The Steinhart-Hart equation is an empirically derived polynomial formula which best represents the resistance versus temperature relationship of NTC thermistors and is accurate over a much wider range of temperature than β method. To solve for temperature when resistance is known, yields the following form of the equation:

$$1/T = a + b(\ln R) + c(\ln R)3$$

T = temperature in Kelvin (K = ˚C + 273.15)
a, b and c are equation constants
R = resistance in Ω at temp T

Stability

The stability of a thermistor is the ability of a thermistor to retain specified characteristics after being subjected to designated environmental or electrical test conditions.
Years of experience in thermistor manufacturing, coupled with stringent process controls, ensures that highly stable thermistors are produced. Our thermistors typically exhibit less than 0.02°C thermometric drift per year when stored or operated at temperatures less than 50°C.

COMPREHENSIVE SPECIFICATION CHART

Product Series	Description	Overall Dimensions	Resistance	Resistance Tolerence	R-T Curve	Beta Nominal	Thermal Time Constant, Max-Still Air	Thermal Time Constant, Max- Stirred Oil Well	Temperature Rating
		mm	Ohms(Ω)	± %		K			
		Head Dia	@25°C	@25°C		25-85°C	Seconds	Seconds	°C
ZENCB	High precision NTC bead with bare leads	3 mm max	1kΩ - 200kΩ	±1%, ±2% ±5%	A, J,K,L	3435K-4250K	15 S Approx	10 S Approx	-50°C-150°C
ZENCB	High precision NTC bead with insulated leads	3.5 mm max	1kΩ - 200kΩ	±1%, ±2% ±5%	A, J,K,L	3435K-4250K	15 S Approx	10 S Approx	-50°C-150°C
ZENCP	Epoxy Coated thermistor with PTFE wires	3.5mm Max	1kΩ - 200kΩ	±1%, ±2% ±5%	A, J,K,L	3435K-4250K	15 S Approx	10 S Approx	-50°C-150°C
ZENCP	Epoxy coated thermistor with FEP wires	3.5mm max	1kΩ - 200kΩ	±1%, ±2% ±5%	A, J,K,L	3435K-4250K	15 S Approx	10 S Approx	-50°C-150°C
ZENCP	Epoxy coated thermistor with PVC wires	4.5 mm max	1kΩ - 200kΩ	±1%, ±2% ±5%	A, J,K,L	3435K-4250K	15 S Approx	10 S Approx	-50°C-105°C
ZENAC	Epoxy coated thermistor with PVC wires	4mm max	1kΩ - 200kΩ	±1%, ±2% ±5%	A, J,K,L	3435K-4250K	45 S Approx	30 S Approx	-50°C-105°C
ZENAC	Epoxy coated thermistor with PVC FLRY wires	4.5 mm max	1kΩ - 200kΩ	±1%, ±2% ±5%	A, J,K,L	3435K-4250K	45 S Approx	30 S Approx	-50°C-105°C

- A -3435, J-3560, K-3970, L-4250

Product Series	Description	Overall Dimensions		Resistance Tolerence	R-T Curve	Beta Nominal	Thermal Time Constant, Max-Still Air	Thermal Time Constant, Max- Stirred Oil Well	°C Temperature Rating
		mm Head Dia	Ohms(Ω) @25°C	± % @25°C		K 25-85°C	Seconds	Seconds	
ZENAC	Thermistor in SS housing with PVC wire	4-6mm	1kΩ - 200kΩ	±1%, ±2% ±5%	A, J,K,L	3435K-4250K	45 S Approx	30 S Approx	-50°C-105°C
ZENAC	Thermistor in Copper tube with PVC wire	5-6mm	1kΩ - 200kΩ	±1%, ±2% ±5%	A, J,K,L	3435K-4250K	45 S Approx	30 S Approx	-50°C-105°C
ZENAC	Thermistor in Custom Brass adaptor with PTFE/PVC wire	Custom	1kΩ - 200kΩ	±1%, ±2% ±5%	A, J,K,L	3435K-4250K	45 S Approx	30 S Approx	-50°C-150/105°C
ZENAC	Thermistor in SS tube with PTFE wire	4-6mm	1kΩ - 200kΩ	±1%, ±2% ±5%	A, J,K,L	3435K-4250K	45 S Approx	30 S Approx	-50°C-150°C
ZENAC	Thermistor in Copper tube with PTFE wire	5-6mm	1kΩ - 200kΩ	±1%, ±2% ±5%	A, J,K,L	3435K-4250K	45 S Approx	30 S Approx	-50°C-150°C
ZENAC	Thermistor in ABS TUBE with PTFE/ PVC wire	M6, M8, M10	1kΩ - 200kΩ	±1%, ±2% ±5%	A, J,K,L	3435K-4250K	45 S Approx	30 S Approx	-50°C-150/105°C
ZENAC	Thermistor in Brass tube with PTFE/PVC wire	5mm	1kΩ - 200kΩ	±1%, ±2% ±5%	A, J,K,L	3435K-4250K	45 S Approx	30 S Approx	-50°C-150/105°C

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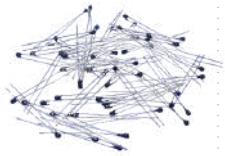
Product Series	Description	Overall Dimensions		Resistance Tolerence	R-T Curve	Beta Nominal	Thermal Time Constant, Max-Still Air	Thermal Time Constant, Max- Stirred Oil Well	Temperature Rating
		mm Head Dia	Ohms(Ω) @25°C	± % @25°C		K 25-85°C	Seconds	Seconds	
ZENST	Thermistor in Ring Lug Housing with PTFE wire	M3, M4,M5, M6, M8,M10	1kΩ - 200kΩ	±1%, ±2% ±5%	A, J,K,L	3435K-4250K	45 S Approx	30 S Approx	-50°C-150°C
ZENST	Thermistor in Ring Lug Housing with PVC wire	M3, M4,M5, M6, M8,M10	1kΩ - 200kΩ	±1%, ±2% ±5%	A, J,K,L	3435K-4250K	45 S Approx	30 S Approx	-50°C-105°C
ZENST	Thermistor in Custom Ring lug Housing with PTFE wires	Custom	1kΩ - 200kΩ	±1%, ±2% ±5%	A, J,K,L	3435K-4250K	45 S Approx	30 S Approx	-50°C-150°C
ZENST	Thermistor in Custom Ring lug Housing with PVC wires	Custom	1kΩ - 200kΩ	±1%, ±2% ±5%	A, J,K,L	3435K-4250K	45 S Approx	30 S Approx	-50°C-105°C
ZENGB	Radial Glass Bead type sensors	3mm Max	10kΩ - 100kΩ	±1%, ±2% ±5%	A, J,K,L	3435K-4250K	10 S Approx	5 S Approx	-50°C-250°C
ZENGB	Axial Glass Bead type sensors	3mm Max	10kΩ - 100kΩ	±1%, ±2% ±5%	A, J,K,L	3435K-4250K	10 S Approx	5 S Approx	-50°C-250°C
ZENFT	Film Type sensors	25mm, 50mm, 75mm	1kΩ - 200kΩ	±1%, ±2% ±5%	A, J,K,L	3435K-4250K	10 S Approx	5 S Approx	-50°C-105°C

- A -3435, J-3560, K-3970, L-4250

PRODUCTS GALLERY

















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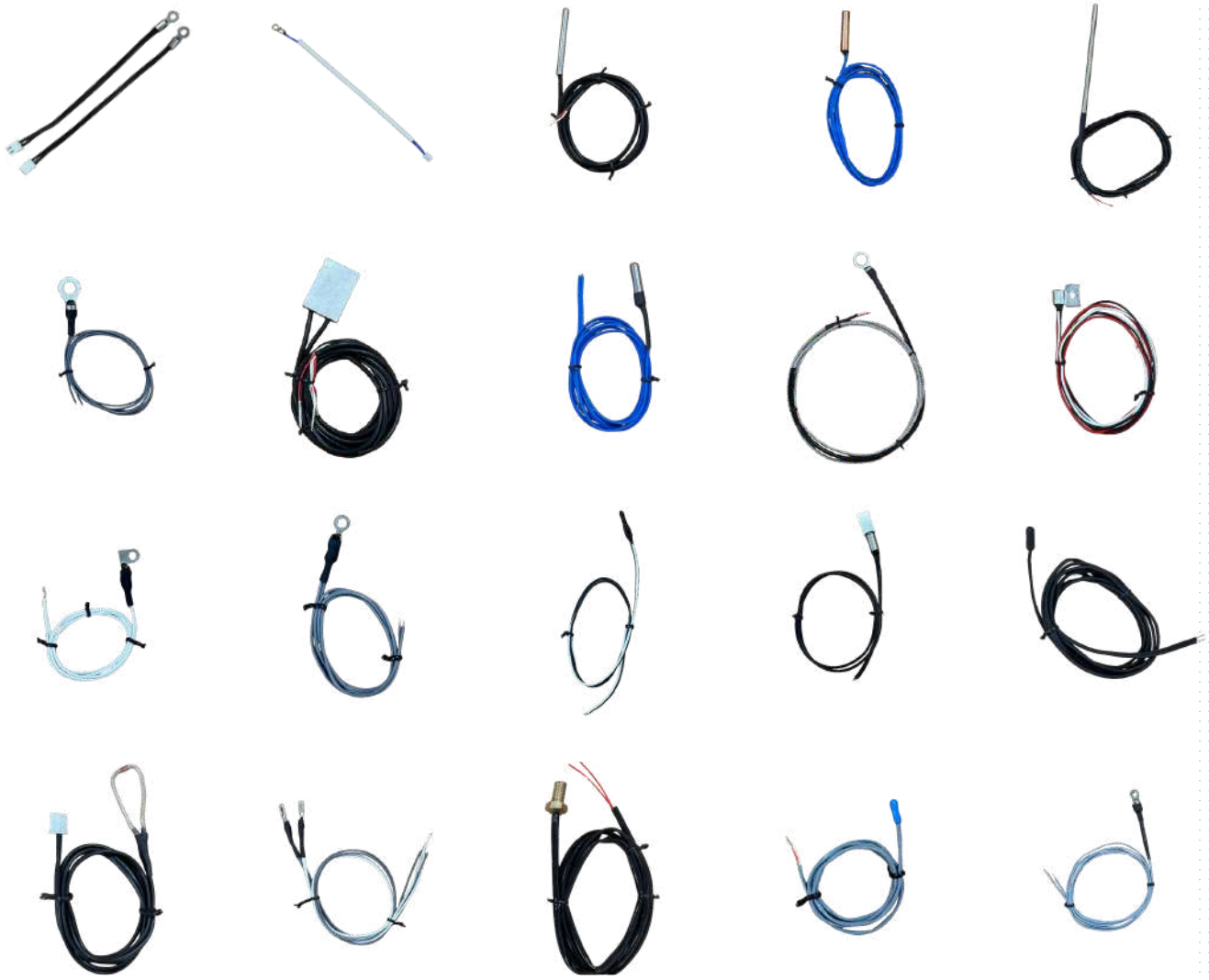

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AN ISO 9001:2015 Certified Company

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