

High-Accuracy Fluid & Surface Temperature Sensor for Motorsport Telemetry

1. PRODUCT OVERVIEW & APPLICATIONS

The GE-NTC-M8-10K is a rugged, miniature NTC thermistor temperature sensor encapsulated in an M8 × 1.0 mm metric threaded body with an integrated 12 mm hexagonal wrench collar. Engineered specifically for precision liquid and surface temperature monitoring in motorsport racing, dynamometer benches, and high-performance automotive testing, it provides exceptional thermal sensitivity and fast response. Featuring a premium 10 kΩ NTC element with a calibrated B3950 constant (±1% tolerance), an IP67 waterproof seal, and high resistance to engine vibrations, it is ideal for measuring engine coolant/water, engine oil, cylinder head, and gearbox temperatures, connecting directly to the analog inputs of Gubellini Electronics GUBELOG and MICROLOG dataloggers.

2. KEY FEATURES

- M8 × 1.0 mm Metric Threaded Body:** Precision brass/stainless steel threaded probe with 12 mm hex boss for easy leak-free installation into radiators, oil blocks, or manifolds.
- High-Precision NTC 10K Element:** Calibrated nominal resistance of 10.0 kΩ at 25°C with ±1% tolerance for laboratory-grade thermal accuracy.
- Standard B3950 Constant:** Beta value $B_{25/85} = 3950\text{ K} \pm 1\%$ ensures seamless plug-and-play conversion in automotive telemetry software.
- Wide Measuring Range (-40°C to +125°C):** Built to handle severe motorsport thermal extremes from sub-zero starts to elevated engine operating temperatures.
- Fast Dynamic Response ($\tau \leq 5\text{ s}$):** Optimized metallic thermal conduction path ensures rapid detection of sudden coolant surges or oil overheating.
- IP67 Hermetic Environmental Sealing:** Resistant to high-pressure washdown, engine vibration, hot motor oil, fuel, and aggressive ethylene glycol coolants.
- Direct DAQ Compatibility:** Connects seamlessly to 0–5 V analog temperature channels on Gubellini Electronics GUBELOG and MICROLOG.

3. DIMENSIONAL & MECHANICAL SCHEMATIC

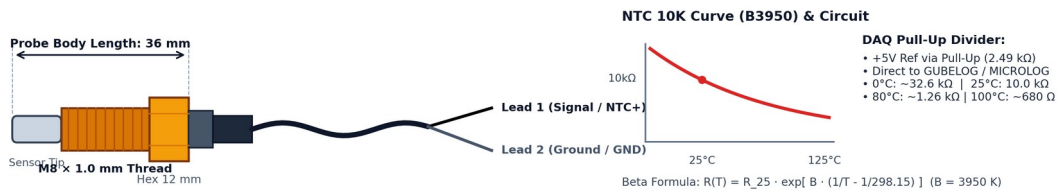


Figure 1: GE-NTC-M8-10K Mechanical dimensions (M8×1 thread, hex 12 mm), NTC R-T calibration curve, and DAQ voltage divider.

4. ORDERING INFORMATION & ACCESSORIES

Part Number	Description	Cable Length	Compatible System
GE-NTC-M8-10K-1M	M8×1 NTC 10K Sensor, B3950, Brass/SS Body, IP67	1.0 m Flying Lead Cable	GUBELOG / MICROLOG Analog Inputs
GE-NTC-M8-10K-2M	M8×1 NTC 10K Sensor, B3950, Brass/SS Body, IP67	2.0 m Flying Lead Cable	GUBELOG / MICROLOG Analog Inputs
GE-WASH-M8-CU	M8 Copper Crush Washer Kit (Pack of 5)	M8 Sealing Washer	Radiator / engine oil gallery sealing

5. TECHNICAL SPECIFICATIONS

Parameter	Specification
Sensing Element Type	Precision NTC Thermistor (Negative Temperature Coefficient)
Nominal Resistance at 25°C (R25)	10.0 kΩ (10,000 Ω)
Resistance Tolerance at 25°C	± 1.0% (High precision grade)
Beta Constant (B25/85)	3950 K ± 1.0% (Standard B3950 curve)
Continuous Temperature Range	-40°C to +125°C (-40°F to +257°F) continuous; peak +135°C
Thermal Time Constant (τ)	≤ 5.0 seconds (measured in agitated liquid flow)
Thermal Dissipation Constant	≥ 5.0 mW/°C in still air
Mounting Thread	Metric M8 × 1.0 mm (straight thread with sealing face)
Thread Length	18.0 mm nominal
Wrench Boss Size	12.0 mm Hexagonal across flats (AF)
Probe Body Total Length	36.0 mm (excluding rear strain relief)
Housing Material	High-thermal-conductivity nickel-plated brass / AISI 304 stainless tip
Insulation Resistance	≥ 100 MΩ at 500 V DC (at room temperature)
Maximum Permissible Power	≤ 10 mW (to prevent measurement error from self-heating)
Enclosure Ingress Rating	IP67 (Hermetically sealed epoxy / resin potting)
Extension Cable Type	2-core high-flexibility heat-resistant cable (AWG 24 / 0.22 mm²)
Cable Outer Insulation	Black fuel- and oil-resistant PVC / Silicone outer jacket
Reference Resistance at 0°C	~ 32.65 kΩ (R0)
Reference Resistance at 100°C	~ 680 Ω (R100)

6. SYSTEM INTEGRATION & WIRING (GUBELLINI DAQ)

The GE-NTC-M8-10K connects directly to any analog temperature channel on the Gubellini Electronics GUBELOG and MICROLOG dataloggers. The logger provides a 5.0 V reference through an internal precision pull-up resistor (R_pullup = 2.49 kΩ), creating a voltage divider. The software calculates exact temperature using the Steinhart-Hart equation or the Beta calibration model.

Conductor Lead	Signal Function	Electrical Connection	GUBELOG / MICROLOG Terminal
Lead 1 (Black)	NTC Thermistor Input (NTC+)	Voltage Divider Midpoint	Terminal AN_IN (Analog Temp Channel)
Lead 2 (Black/White)	Ground Return (GND)	Analog Sensor Ground	Terminal AGND (Analog Sensor Ground)
Internal Pull-Up	Reference Supply (+5V)	Internal 2.49 kΩ to +5V Ref	Integrated inside GUBELOG hardware

7. INSTALLATION & MOTORSPORT SETUP GUIDELINES

- Tightening Torque Limit:** Do not exceed 10.0 Nm tightening torque when installing the M8×1 sensor into aluminum radiators or engine blocks. Always use a 12 mm open-ended wrench on the hex boss.
- Sealing Washer:** Always fit an annealed copper or bonded Dowty sealing washer under the M8 hexagonal face to ensure positive hydraulic sealing against pressurized coolant (up to 2.5 bar).
- Vibration & Cable Routing:** Route the 2-core cable away from ignition coils, spark plug leads, and exhaust headers. Secure with P-clips allowing slight strain relief loop at the sensor exit.