

Temperature Sensors - Market Share Analysis, Industry Trends & Statistics, Growth Forecasts (2025 - 2030)

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Report description:

Temperature Sensors Market Analysis

The temperature sensor market size has reached USD 9.35 billion in 2025 and is forecast to climb to USD 12.68 billion by 2030, registering a 6.28% CAGR. Demand is rising as industrial facilities digitize, electric vehicles proliferate, and life-science supply chains enforce real-time thermal traceability. Regulatory cold-chain mandates for biologics, hyperscale data-center buildouts that favor fiber-optic distributed sensing, and widespread IIoT adoption across European process plants jointly elevate sensor volumes. Growth is further strengthened by GaN/SiC power-electronics adoption, which raises precision-cooling requirements, and by 5G base-station deployments that need on-board thermal monitoring to protect uptime. On the supply side, vertically integrated incumbents counter price pressure from low-cost Asian suppliers by focusing on high-accuracy products and wireless retrofit solutions that reduce total installed cost.

Global Temperature Sensors Market Trends and Insights

Expansion of Smart IIoT Temperature Networks in European Process Industries

European manufacturers are integrating wireless temperature nodes into existing control architectures to meet Industry 5.0 goals for energy efficiency and worker safety. Maintenance-free sensor designs lower lifecycle cost and simplify retrofit deployment, which is attractive in chemical-fiber plants and HVAC upgrades. AI-enabled control loops use the richer data stream to stabilize air-pressure and thermal conditions, improving product yield and reducing downtime. Return-on-investment studies in small US

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factories show operating savings that outweigh initial IIoT hardware spend, validating capital budgets for similar. As a result, wireless nodes gain momentum even in reliability-critical applications, accelerating the temperature sensor market toward connected architectures.

GaN/SiC Power Electronics Adoption Elevating Precision-Cooling Sensor Demand

Gallium-nitride and silicon-carbide devices operate at higher power densities, creating localized heat zones that require sub-degree monitoring accuracy. Semiconductor suppliers forecast GaN reaching commercial tipping points in fast chargers, AI servers, and electric-vehicle converters. Automotive OEMs specify sensors that maintain calibration under strong electromagnetic fields, while data-center operators adopt multi-point thermal maps to contain hotspot risk. Research into aluminum-nitride thin-film sensors shows reliable operation up to 900 C, extending sensor use into extreme power-electronics environments. Suppliers that deliver precision and EMI immunity at competitive cost are well-positioned to gain share in the temperature sensor market.

Downward ASP Pressure from Chinese Low-Cost Suppliers

State-supported economies of scale allow Chinese vendors to undercut global peers on commodity thermocouples and basic RTDs, eroding margins across the temperature sensor market. European firms are countering by releasing cost-efficient yet accurate models such as Sensirion's STS4L, which draws micro-watts of power while holding ± 0.4 C accuracy, thereby defending share without direct price wars

Other drivers and restraints analyzed in the detailed report include:

Mandatory Cold-Chain Traceability for Biologics & mRNA Vaccines / 5G Base-Station Roll-outs Requiring On-Board Thermal Monitoring / Supply Risk of High-Purity Platinum Wire for RTDs /

For complete list of drivers and restraints, kindly check the Table Of Contents.

Segment Analysis

Wired sensors continued to dominate with 84.7 % revenue in 2024, anchoring production-critical loops that must resist electromagnetic interference and latency risks. Wireless nodes are closing the gap, expanding at 11.8 % CAGR to 2030 as factories retrofit legacy lines and building-management firms deploy battery-powered transmitters that install without conduit work. The temperature sensor market benefits because every wireless retrofit typically adds extra redundancy channels, lifting unit volumes and service revenues. Use cases span chemical reactors, HVAC balancing and remote well-head monitoring, each demanding secure protocol stacks and multi-year battery life.

Rapid protocol maturation is reducing the reliability delta versus copper cabling and bringing average project payback below two years for multi-node deployments. Honeywell's ISA100-compliant SmartLine transmitter illustrates how encrypted mesh architectures keep packet loss below 0.01 % while reporting sub-second updates [honeywell.com]. Operators also value firmware-over-the-air upgrades that let them roll out cyber-security patches without line shutdowns, a feature now common across the temperature sensor market. The overall temperature sensor industry therefore sees wireless not as a niche but as the long-term default for brown-field sites.

Analog devices retained 71.2 % revenue in 2024 because 4-20 mA loops still anchor distributed-control-system (DCS) inputs in refineries and steel mills. Digital sensors, however, are expanding 9.4 % CAGR to 2030 as industrial Ethernet, I²C and 1-Wire buses proliferate in edge-to-cloud architectures. When digital nodes embed EEPROM-based calibration, installers no longer need

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plant-floor trim, cutting commissioning cost and shortening downtime. The temperature sensor market size for digital devices is projected to reach USD 5.1 billion by 2030, reflecting this accelerating conversion.

Texas Instruments' \pm 0.08 C TMP117 exemplifies how embedded CRC-protected registers improve traceability in pharmaceutical plants that must archive calibration data for FDA audits [ti.com]. Data-rich packets also enable asset-performance-management algorithms that predict failure before excursions occur, extending pump and motor life and lowering indemnity exposure. Vendors consequently bundle analytics dashboards as value-added subscriptions that smooth revenue cyclicity across the temperature sensor market.

The Temperature Sensors Market Report is Segmented Into Type (Wired, Wireless), Output (Analog, Digital), Technology (Contact Thermocouple, and More), End-User Industry (Chemical and Petrochemical, Oil and Gas and More), and Geography. The Market Forecasts are Provided in Terms of Value (USD).

Geography Analysis

Asia-Pacific generated 44.9 % of 2024 revenue and is advancing at a 7.2 % CAGR, supported by China's 5G macro-cell rollout and India's build-out of GMP-compliant vaccine plants. Government subsidies for EV battery lines amplify sensor density per vehicle, while domestic semiconductor fabs adopt clean-room loops that demand \pm 0.2 C RTDs. Japan and South Korea add precision-manufacturing pull, especially for SiC wafer furnaces requiring 1,400 C sensors.

North America follows with pharmaceutical cold-chain compliance and hyperscale cloud campuses that often deploy >150 km of fiber DTS per site. The FDA's 2025 waiver on certain clinical thermometers accelerates device qualification cycles, while DOE-funded efficiency targets push data-center operators to sub-1 C inlet-air control. Automotive Tier-1 design cycles are longer, yet every new EV platform still expands thermal nodes, tying the temperature sensor market to Detroit's electrification timetable.

Europe prioritizes Industry 5.0 retrofits, leveraging EU-level grants for smart-factory upgrades that merge wireless sensor networks with digital twins. EV adoption likewise lifts battery thermal-management units per vehicle. The region's energy transition stimulates demand for corrosion-resistant probes in hydrogen electrolyzers and offshore wind converters. Overall the temperature sensor industry in Europe is characterised by premium ASPs and stringent metrology standards that shield margins against global price competition.

List of Companies Covered in this Report:

Honeywell International Inc. / Siemens AG / Texas Instruments Inc. / STMicroelectronics N.V. / TE Connectivity Ltd. / Panasonic Corporation / ABB Ltd / Emerson Electric Co. / Analog Devices Inc. / Denso Corporation / Microchip Technology Inc. / Amphenol Advanced Sensors / Sensirion AG / Endress+Hauser AG / Robert Bosch GmbH / Fluke Process Instruments / FLIR Systems (Teledyne) / Gnther GmbH Temperaturmesstechnik / Kongsberg Gruppen / Maxim Integrated Products / Thermometris /

Additional Benefits:

- The market estimate (ME) sheet in Excel format /
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