



Temperature measurement and overheating protection

Safety for motors,

temperature protection for batteries

and connectors

E-mobility is gaining in importance not only through battery-electric and hybrid cars, but also from e-scooters, e-bikes, public utility vehicles, and electrically powered forklifts. Microtherm Sentronic has accompanied industry early birds in their early electrification projects from the very beginning and has gained extensive experience in the development and manufacture of application-specific temperature management systems.

Our products are based on sensor elements such as thermistors (NTC), thermistors (PTC), or platinum measuring resistors (PT1000 or others). On this basis, we manufacture a standard range of temperature sensors. We combine temperature sensor technology with our diverse manufacturing processes to create new applications in e-mobility.

With certifications according to IATF 16949 and ISO 9001:2015, we are a direct and indirect series supplier to well-known international manufacturers of assembly groups and drive systems. We integrate pure sensor components in modules of all designs and performance classes. With their many years of expertise, our in-house developers find solutions for every requirement and integrate sensor technology into every available installation space. They ensure that all products meet customer requirements as well as general development, manufacturing, and quality and documentation requirements as needed from automotive processes.

We use methods such as FMEA to systematically safeguard against potential errors. In a transparent development process with our customers, we clarify the progress made and, if necessary, work with service providers to safeguard this progress through reliability tests and other trials until the product is ready for transfer to one of our three production sites, validate the results and record corrective measures for possible errors. We collect sub-documentation such as feature certificates from suppliers, carry out supplier approval processes, document the production parameters, validate the results, and record corrective measures for possible errors.

We develop individual solutions for temperature protection and temperature-dependent functionality in the drive and energy technology of modern mobility. These are primarily sensors for powertrains in e-mobility, energy systems and battery packs. Important applications are temperature management in the stator and winding head and protection of electric motors by initiating protective functions temperature monitoring in battery management against overheating of batteries and temperature monitoring on high-current plug connections.

Depending on project and customer requirements, we use EOL inspections after production processes. These can be manual, semi-automatic with Datalog for traceability or fully automatic with 100% parameter monitoring and Datalog. For verification and validation, our products undergo internationally standardized and customer-specific product tests in cooperation with accredited institutes and laboratories as well as recognized test service providers, such as

- Initial tests: electrical, mechanical
- Conditioning tests
- Service life or aging tests such as
 - / Climatic tests: Damp heat cyclic with frost or continuous storage at temperature and humidity,
 - / Leakage and corrosion tests: IP protection class tests such as high pressure water/steam tests, storage at heat followed by surge with Arizona dust and salt spray tests for outdoor requirements,
 - / Special tests such as chemical resistance,
 - / temperature tests for high and low temperature storage tests,
 - / thermal shock tests,
 - / step temperature tests,
 - / vibration and mechanical shock tests.
 - / Electromagnetic compatibility (EMC),
 - / Electrostatic discharge (ESD),
 - / High voltage tests (AC/DC),
 - / insulation resistance measurement.



ELECTRIC MOTORS AND CHARGING CONNECTORS

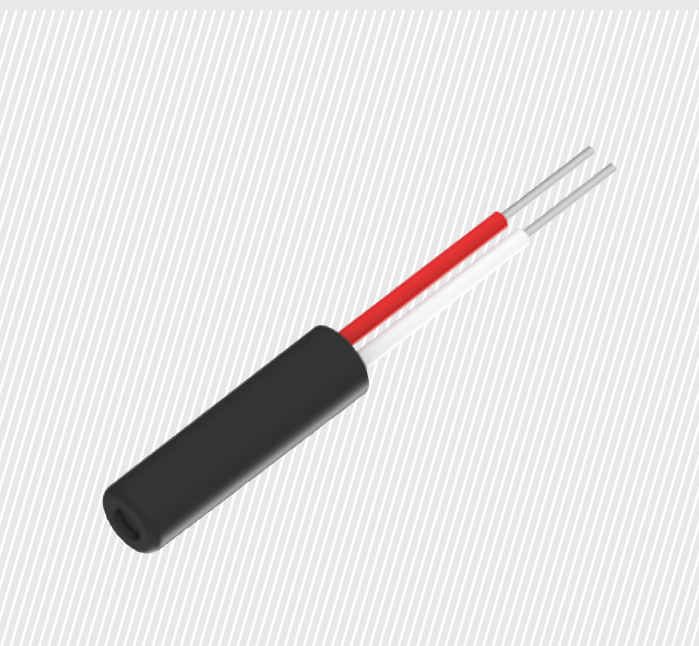
Temperature sensor

Application

- / Overtemperature protection and temperature-dependent function management for electric motors and charging connectors
- / Sensor element mounted and sealed in a protective sleeve
- / Possible as a module with various customer interfaces
- / Development, prototype construction and planning of the systems by Microtherm Germany
- / Series production at Microtherm China according to IATF 16949
- / Test data: Thermal shock, humidity test, high and low temperature storage, vibration test, electromagnetic compatibility EMC, electrostatic discharge ESD, high pressure jet, high voltage test, characteristic curve measurement



NTC temperature sensor assembly integrated in the stator of the electric drive motor



PT1000 temperature sensor integrated in the charging connection or in the electric drive motor



NTC temperature sensor (sectional view)

PT1000 temperature sensor (sectional drawing)

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