

Motion and temperature sensors

**Position and angle measurement
and temperature management
in automotive engineering**

The characteristic curves of our sensors provide information about the position of moving components. With our diverse manufacturing processes, we embed the sensor elements in modules of all designs. 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, quality, and documentation requirements from automotive processes.

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We use appropriate methods such as FMEA to systematically safeguard against possible errors. With our customers, we clarify the progress made in a transparent development process and, together with service providers, secure this progress through reliability tests and other trials until it is ready for transfer to one of our three production sites. We ensure that all products meet customer requirements, bundle sub-documentation such as feature certificates from suppliers, conduct supplier approval processes, document the production parameters, validate the results, and record corrective measures for possible errors.

We sample at automotive level with production part acceptance procedures (PPAP). They include the determination of product properties and measuring equipment capability tests on the measuring equipment used. We manufacture high technology for automotive applications semi-automatically on customised assembly, production, and test lines.

Behind our diverse manufacturing processes, we use EOL tests depending on project and customer requirements. These can be manual, semi-automatic with data logging for traceability or fully

automatic with 100% parameter monitoring and data logging. For verification and validation, our products undergo internationally standardised as well as customer-specific product tests, if necessary, in cooperation with accredited institutes and laboratories as well as recognised test service providers, such as

- Incoming tests: electrical, mechanical
- Conditioning tests
- Durability or ageing tests such as
 - / Climatic tests: Humid heat cyclic with frost or permanent 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 water with Arizona dust and salt spray tests for outdoor requirements,
 - / Special tests such as chemical resistance,
 - / temperature tests with high and low temperature storage tests,
 - / thermal shock tests,
 - / step temperature tests,
 - / vibration and mechanical shock tests.
- Electrical tests
 - / Electromagnetic compatibility (EMC),
 - / Electrostatic discharge (ESD),
 - / High voltage tests (AC/DC),
 - / insulation resistance measurement.



AIR DISTRIBUTOR OF COMBUSTION ENGINES

Position sensor

Application

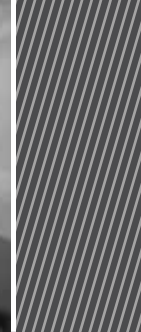
- / Suction tube application in the air distributor of internal combustion engines to detect the position of the damper shaft
- / Displacement or angle measurement
- / Sensor element mounted and sealed in an injection moulding construction
- / Development, prototype construction and planning of the systems 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 discharge ESD, vibration test, high pressure jet, splash water with dust content



Linear Hall sensor integrated in the actuator cover of the vacuum box

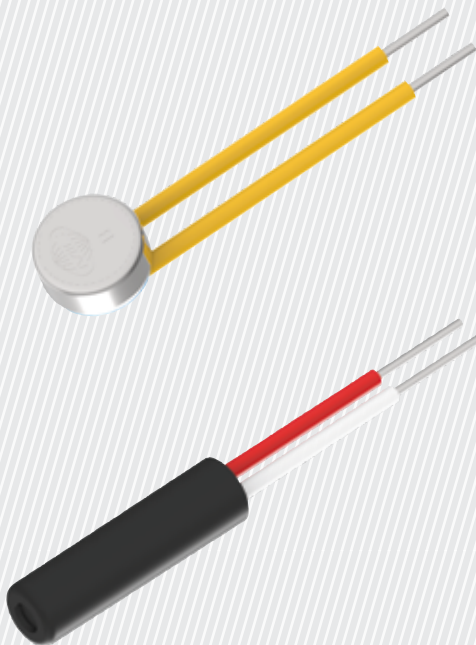


Rotation angle Hall sensor in the end-of-shaft assembly



SENSORS AND SAFETY IN THE CAR

We provide effective temperature protection in automobiles, for example on motors for windscreen wipers, seat position or window regulators. We integrate sensor components based on NTC, PTC or as thin-film platinum sensors or bimetallic switches for temperature management in modules for vehicles of all sizes. We find solutions for every requirement and integrate sensor technology into every available installation space. The development and manufacture of such application-specific temperature protection systems has been a domain of Microtherm for decades.



Above: Bimetal switch; below: Temperature sensor

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