

## CALIBRATION

### TOPICS

- REASONS FOR CALIBRATION
- CALIBRATION INTERVALS
- CALIBRATION AND ADJUSTMENT
- DAKKS ACCREDITED CALIBRATION
- FACTORY CALIBRATION
- TRACEABILITY



## REASONS FOR A CALIBRATION

### PERFORMANCE, QUALITY AND SAFETY

Nowadays it is not enough just to develop high-quality, safe and high-performance products. Evidence that products meet certain quality characteristics must be provided both internally and externally. Comparable statements are only possible with measuring equipment that exhibits traceable accuracy. This is the only way to comply with international standards such as DIN EN ISO 17025 or IATF 16949.

In addition, regular calibration ensures high data integrity and reliability of the measurement systems. Calibration is thus an important part of the maintenance of measurement hardware. Regular calibration not only saves time and money but also ensures that the customer can meet all project requirements.



## CALIBRATION INTERVAL

### WEAR AND ENVIRONMENTAL CONDITIONS

Measuring equipment is subject to continuous loss of accuracy over its lifetime due to environmental conditions and wear. Many application areas are subject to obligations to provide proof of function with defined accuracies. For example, when a measuring instrument ages and no longer meets accuracy specifications without the user's knowledge, it is possible that test results from past measurement campaigns may suddenly no longer be valid. This results in considerable costs, not to mention the failure of the measurement system. In order to achieve a certain degree of traceability and comparability, measuring instruments must be calibrated at regular intervals, depending on the measurement system, sensor technology and area of application. GeneSys recommends a calibration interval of two years for its ADMA inertial systems and for third party devices like from Racelogic, Oxford Technical Solutions, Race-Technology, Kistler and many more.



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## CONCEPTS

### CALIBRATION

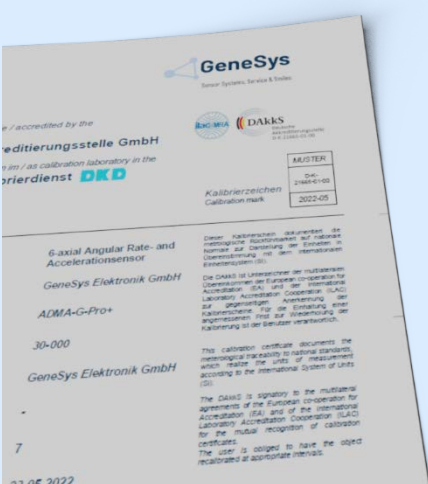
During calibration, the deviation of the measured quantities of a measuring instrument is traced back to a - usually national - standard under defined ambient conditions. The calibration result and the associated measuring uncertainty are documented in a calibration certificate.

### ADJUSTMENT

Adjustment is the setting or calibration of a measuring device to eliminate systematic error of measurement to the extent required for the intended application. Adjusting requires intervention that permanently changes the measuring device. Here, the measured value of a measuring device is set to the known value of a device under test, e.g, through comparison with a reference standard.

### SYSTEMS THAT CAN BE CALIBRATED

All systems of the ADMA family can be calibrated. In addition, GeneSys can also calibrate the measuring systems of other manufacturers like from Racelogic, Oxford Technical Solutions, Race-Technology, Kistler and many more. If interested, please feel free to contact us. We check if your system can be calibrated and provide you with a quotation.



## CONCEPTS

### FACTORY CALIBRATION

Factory calibration is subject to the laboratory's self-obligation to traceability following the DIN EN ISO 17025 standard. At GeneSys, it includes an adjustment with subsequent calibration. For factory calibration, GeneSys guarantees in own obligation the traceability in conformance with standards, documented laboratory processes and expert calculations of the calibration uncertainties. This service is provided outside the scope of accreditation.

### CALIBRATION LABORATORY

GeneSys Elektronik qualifies as a DAkkS accredited calibration laboratory for the measured quantities of velocity, angular velocity and acceleration. With regular audits, the "German Accreditation Body" DAkkS guarantees accurate and reliable measurement results that are based on DIN EN ISO/IEC 17025.

### ACCREDITED CALIBRATION

With this calibration you will receive an accredited calibration certificate. This allows measuring instruments calibrated by GeneSys in the DAkkS-accredited scope to be further listed in a metrological traceability chain. In contrast to factory calibration, they are not subject to direct responsibility, but are proven to comply with the DIN EN ISO/IEC 17025 guideline.

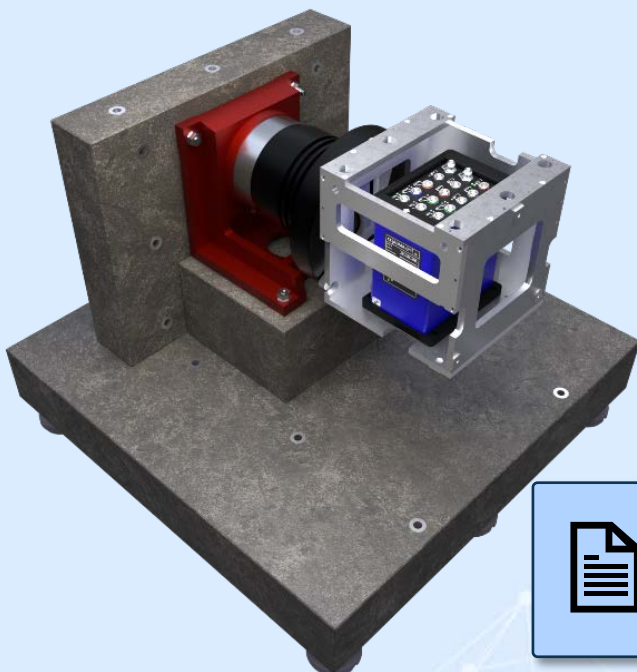
## TURN TABLE CALIBRATION

### ACCELERATION AND ANGULAR VELOCITY

GeneSys offers two calibration procedures. The "turn table calibration" procedure includes the calibration of acceleration and angular velocity. For acceleration calibration, the calibration object is mounted on a turn table and various rotational positions are approached. The procedure is based on inclination in the earth's gravitational field compared to the reference standard. The calibration result is given as the zero point error, scale error and the error of measurement diagram in the measuring range of up to  $\pm 9.8081 \text{ m/s}^2$ .

For angular velocity, measurements are again made against a reference standard mounted on the same axis of rotation as the calibration object. The turntable is moved to the angular velocity end value and back again by means of an angular velocity ramp with constant angular acceleration. This is accomplished in both positive and negative direction. The calibration result is given as the zero point error, scale error and the error of measurement diagram in the measuring range of up to  $\pm 498 \text{ }^\circ/\text{s}$ .

For the "turn table calibration," either a factory calibration or a calibration in the DAkkS-accredited area can be requested from GeneSys. It should be noted that adjustments are only possible for factory calibration and GeneSys products. The accredited calibrations are also available for third-party systems.



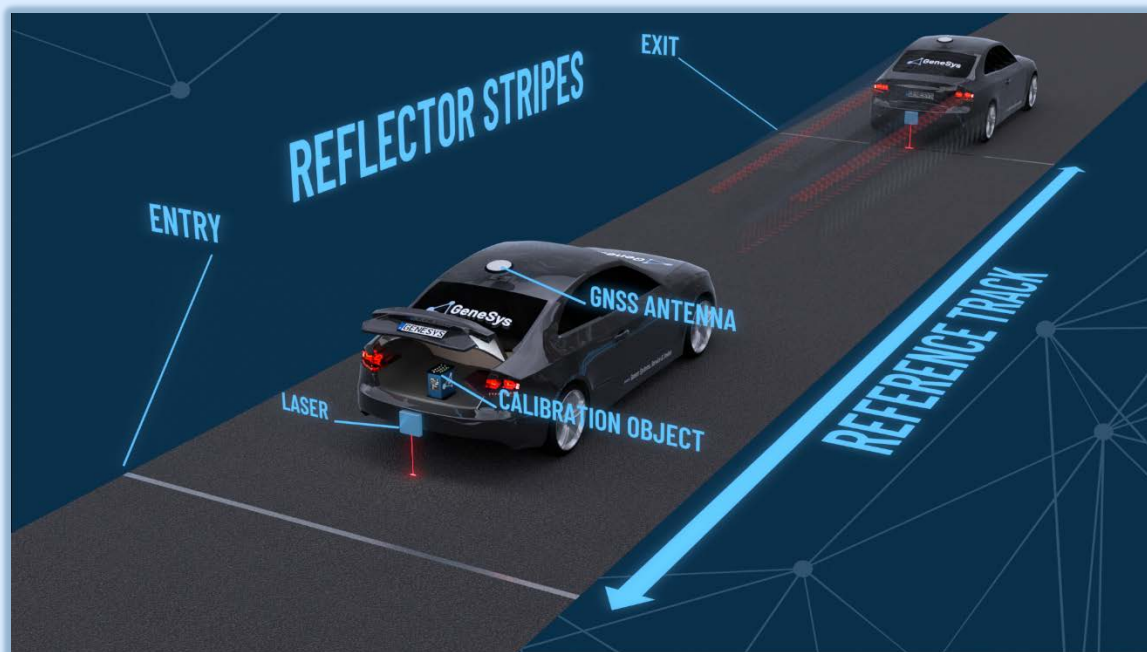
The scope of accreditation is defined according to the [Annex to the accreditation certificate D-K-21665-01-00](#).

## REFERENCE TRACK CALIBRATION

### VELOCITY

With "Reference Track Calibration," the calibration object is permanently mounted in a vehicle. The average velocity that is required to pass two reflector strips placed at a known distance on the road is measured. The velocity is controlled to the prescribed target velocity on a run-up distance.

The reference track calibration is performed at three defined target velocities in the measuring range from 5 m/s to 23 m/s.



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## CONCLUSION

### RECOMMENDATION

Since compliance with DIN EN ISO 17025 and IATF 16949 is mandatory in many areas and will play an increasingly important role in the future, we recommend fixed calibration intervals of two years for ADMA systems and for third party devices like from Racelogic, Oxford Technical Solutions, Race-Technology, Kistler and many more.

The advantage offered here is that fixed blocked calibration periods are defined for each system. This allows advance planning of which system are available at which time for validation and development tests. Fixed calibration intervals also guarantee rapid processing times at GeneSys, which can save a lot of time.



## THE EXPERT

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