

Press release

New optical sensor for measuring vehicle dynamics in motorsport – Correvit KiMotion Racing from Kistler

Robust and highly precise: The new contact-free optical sensor has been tailored to the unique requirements of motorsport

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Highly precise measurements are extremely important when determining vehicle dynamics and speed in motorsport – not only for development and vehicle testing, but also during a race. Correvit KiMotion Racing is the latest chapter in the success story of the renowned Correvit line of optical sensors from Kistler. The completely redesigned Electronic Control Unit (ECU) and the advanced sensor head are raising the bar in terms of precision, reliability, compact dimensions, resilience and weight. When it comes to slip-free measurement of longitudinal speed, transverse speed and sideslip angle, the determined values serve as a reference – the “ground truth.” Correvit KiMotion Racing was developed for all kinds of motorsport: Formula 1, NASCAR, MotoGP, Formula E and autonomous racing.

During development of the Correvit KiMotion Racing, particular attention was paid to the specific requirements of motorsport to ensure that the new optical sensor delivers consistent, exact measurement results to determine vehicle dynamics even under extremely challenging, changing course conditions. Racing vehicle chassis are not designed for comfort. In combination with their powertrains and the high speeds on racetracks – including when cornering – this leads to extreme vibrations. Track unevenness is not absorbed and can be felt in the vehicle as shocks. Correvit KiMotion Racing’s vibration resistance guarantees extremely precise, fail-safe measurements, even under these conditions, so that they can be integrated into racing strategy in real time.

Designed for motorsport – compact, robust and precise

The Correvit KiMotion Racing optical sensor meets the aforementioned challenges with aplomb. It is made up of two components – the sensor head with its optical measurement system and a completely redesigned control unit. Both are more compact and lightweight than previous models – a fact that is extremely important in the world of motorsport, where every gram and millimeter counts. To address the specific demands of motorsport testing, the Correvit KiMotion Racing contact-free optical sensor can be combined with two optical sensor heads that correspond to two installation heights: 270 mm and 180 mm. The compact dimensions make it possible to install the optical sensor head behind the

cladding on the chassis so that it has no impact on vehicle aerodynamics. In addition to the robust design, which prevents disruptions, a newly developed ECU is responsible for reliable data acquisition under extreme conditions.

Measuring vehicle dynamics with groundbreaking technology

The new Correvit KiMotion Racing optical sensor delivers continuous, reliable measurement results even at temperatures of up to 80°C, which is a significant improvement on the previous temperature limit of 50°C. This improvement is particularly important when installed behind fairings, where heat build-up occurs due to the limited air circulation and the extreme conditions in motorsport.

The newly integrated Inertial Measurement Unit (IMU) of the Correvit KiMotion Racing Sensor collects more comprehensive data compared to the previous model while at the same time offering several advantages: The detailed information about the vehicle's acceleration, angular speed and alignment of the vehicle is transmitted with minimal latency and enables improved and immediate analysis of vehicle dynamics. In addition, the Correvit technology's already low signal noise is further reduced by the use of the IMU.

Furthermore, the Correvit KiMotion Racing optical sensor features a completely overhauled algorithm – the Correvit movement algorithm, which offers decisive positive characteristics that increase the stability of the measurements and guarantee reliable data acquisition.

1. The Correvit KiMotion Racing optical sensor delivers reliable measurement results in environments with temperatures of up to 80°C.
2. It allows for practically noise-free detection of the slightest movements in terms of vehicle dynamics.
3. Very low latency: almost delay-free transmission of measurement data.
4. The optical sensor adapts almost instantly to changing conditions on the track such as lighting, wet or dry road surfaces, and road markings.
5. It also avoids dropouts due to so-called road ghosts – incidental light reflections caused, for example, by abrupt changes in road lighting.

Versatile and flexible in use

The Correvit KiMotion Racing optical sensor can be used in vehicles with all drive types. It guarantees extreme precision – even under excessive strain. Typical areas of application include

- Measurement of vehicle dynamics in motorsport: Formula 1, NASCAR, MotoGP, Formula E, etc.
- High-precision, slip-free measurement of
 - longitudinal and transverse speed
 - sideslip angle
- High-precision measurement of
 - acceleration along the X, Y and Z axes
 - rotation around the X, Y and Z axes
- Vehicle telemetry: The vehicle dynamics process variables tracked during a race are transmitted in real time, making it possible to adjust racing strategy, determine the status of the tires and plan optimizations of the racing line.

Correvit KiMotion Racing is the perfect ground-truth sensor for research and development as well as for tests in the fields of racing and motorsport. There's a reason why Correvit technology is used during many world record attempts for contact-free, high-precision measurement of vehicle speed, acceleration and distance traveled – aka vehicle dynamics. Motorsport teams can adapt their racing strategies at extremely short notice on the basis of the new technology, which transmits the data almost delay-free - giving them a crucial competitive advantage.

You can find more detailed information about Correvit KiMotion Racing here:

Image material (please name the Kistler Group as picture source)



The optical sensor Correvit KiMotion Racing 2059B is made up of an optical sensor head and the newly developed control unit. Both components are extremely compact and lightweight (sensor head: 156 g, control unit: 315 g). Moreover, its robustness and vibration resistance make the sensor ideal for use in motorsport applications.



Vehicle dynamics and speed measurements in motorsport are carried out both on the test bench and on the track. A practical case is therefore available for the sensor head and control unit of the Correvit KiMotion Racing optical sensor to transport both components safely protected to any location.



Correvit KiMotion Racing's optical sensor head can be installed not only on racecars for vehicle dynamics measurements, but also on standard road vehicles. Installation types: External installation on the vehicle (as shown), direct installation on the wheel, on the vehicle chassis or behind cladding – as standard in motorsport. Kistler also offers the corresponding accessories to ensure optimal installation on the vehicle.

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About the Kistler Group

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