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Press release

6-component wheel force transducers for vehicle development – the new RoaDyn Integra series from Kistler

Just three wheel force transducers cover a variety of vehicles ranging from small cars to light commercial vehicles.

Winterthur, September 2024

Vehicle developers use 6-component wheel force transducers in real-life test drives and on road simulators when performing vehicle dynamics, durability and tire tests for Road Load Data Acquisition (RLDA). The wheel force transducers in Kistler's new RoaDyn Integra series capture forces of up to 65 kN and moments of up to 12 kNm. The three sensor types – 4, 5 and 6 – can be mounted on rims with sizes of 15 to 22 inches, and they are designed for measurements on vehicles ranging from small passenger cars to SUVs and commercial vehicles, and also for use in motorsport. Their design ensures that they meet the requirements for tests on vehicles with all drive types. Key features of the new series of wheel force transducers include their wide measuring range, improved user experience and high flexibility; they cover a wide range of applications and are also highly cost-efficient.

The efficiency with which the mechanical energy and power of the engine are distributed to the wheels is a decisive factor in achieving the ambitious targets for reducing CO2 emissions. The new RoaDyn Integra series provides vehicle developers with a measuring system they can use flexibly to determine precise data on durability and vehicle dynamics. But these wheel force transducers can also be used for many purposes that go beyond these applications: examples include roadway characterization, which involves the interactions between vehicles and the road surface. In the NEV segment, knowledge gained about vehicle dynamics is needed to optimize range – a key criterion for electric vehicles. Measurement results are essential for the automotive industry in order to improve safety, performance and efficiency – and also to ensure the durability of vehicles and components.

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RoaDyn Integra: a new concept for enhanced flexibility

The Kistler Group is adding the new RoaDyn Integra series to its tried-and-tested range of RoaDyn wheel force transducers. Unlike the wheel force transducers in the S6(xy) series, these models share a standardized design based on optimized structural parts. They are designed for RLDA measurements to determine the design for vehicle dynamics and durability, and also for tire tests both on the test track and on test stands. At the same time, the new wheel force transducers are designed to meet the higher requirements for the measuring range in NEV development.

'Thanks to their standardized structure, the 6-component wheel force transducers in our RoaDyn Integra series guarantee maximum flexibility and ease of handling, and they deliver precise results in Kistler quality – and that's a proven fact.'
(Tim Schneider, Product Manager, Kistler Group)

Precision wheel force transducers – simple to install and highly versatile

The wheel force transducers in Kistler's new RoaDyn Integra series replace the standard wheel in tests, and they can be installed very easily and quickly. They are positioned on the vehicle's hub to enable measurement of the forces (Fx, Fy, Fz) and moments (Mx, My, Mz) introduced through the tire contact patch in the three directions of the wheel coordinate system, which are exclusively converted into the specific vehicle coordinates. Their innovative design is based on standardized structural components of the sensor assembly, such as the inner and outer parts and the exchangeable 3-component load cells. These are installed between the wheel hub and the rim. This concept yields various benefits. For example: Integra sensors can be adapted to vehicles of different types – in each case, all that is needed is to provide the hub adapter and the rim in the relevant size. So as a user, you gain some critical advantages: you benefit from significantly shorter delivery times – usually about six weeks – and improved cost efficiency.

Three sensor types to cover a wide range of applications

RoaDyn Integra 4: designed for compact to midsize/lower midsize vehicles with the typical wheel loads* of 400 kg to 800 kg for vehicles in these categories. The RoaDyn Integra 4 wheel force transducer is used to measure forces (of up to 25 kN) and moments (of up to 5 kNm) on the rotating wheel in driving mode.

RoaDyn Integra 5: designed for lower to upper midsize vehicles and sports cars, with the typical wheel loads* of 700 kg to 1,100 kg for vehicles in these categories. The RoaDyn Integra 5 wheel force transducer is used to measure forces (of up to 45 kN) and moments (of up to 8 kNm) on the rotating wheel in driving mode.

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RoaDyn Integra 6: designed for upper midsize and full-size vehicles, SUVs and vans, with the typical wheel loads* of 1,000 kg to around 1,500 kg for vehicles in these categories. The RoaDyn Integra 6 wheel force transducer is used to measure forces (of up to 65 kN) and moments (of up to 12 kNm) on the rotating wheel in driving mode.

All three RoaDyn Integra types can be mounted on rims with diameters of between 15 and 22 inches in standard widths, and with the corresponding wheel offsets. They are designed for flexible data transfer – so inboard, outboard and wireless data transmission modes are all possible. The new wheel force transducers offer very high measurement accuracy, and crosstalk is virtually eliminated thanks to best-in-class calibration using hexapods. Very high signal quality is attained because digitalization already takes place in the sensor. Customers also benefit from compatibility with Kistler's complete portfolio of products for vehicle development and testing – ranging from sensors all the way through to data analysis.

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

The 6-component wheel force transducers in the RoaDyn Integra series (4, 5, 6) capture wheel forces (from 25 to 65 kN) and moments (from 4 to 12 kNm). They are used for vehicle development and testing, on test tracks as well as test stands. The wheel force transducers are positioned on the relevant rim and mounted on the vehicle with the help of the matching hub adapter.

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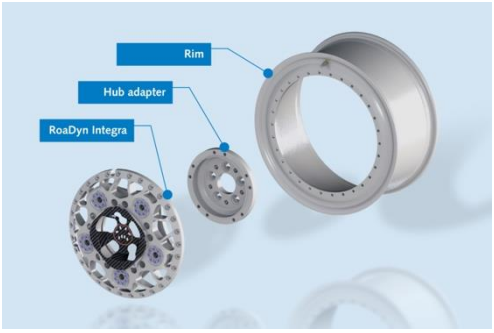
Wheel force transducers in the RoaDyn Integra series feature a standardized design that delivers high flexibility and allows their use on vehicles of different types. The rims are available with diameters from 15 to 22 inches (the example shows the 15” rims), in standard widths and with the corresponding wheel offsets.



The structure of the RoaDyn Integra wheel force transducers comprises the Integra sensor assembly, the data transmission (standard: outboard transmission), rim and hub adapter. The hub adapter and rim are exchangeable, so maximum flexibility is ensured.

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About the Kistler Group

Kistler is the global market leader for dynamic pressure, force, torque and acceleration measurement technology. Cutting-edge technologies provide the basis for Kistler's modular solutions. Customers in industry and scientific research benefit from Kistler's experience as a development partner, enabling them to optimize their products and processes so as to secure sustainable competitive edge. Unique sensor technology from this owner-managed Swiss corporation helps to shape future innovations not only in automotive development and industrial automation but also in many newly emerging sectors. Drawing on our extensive application expertise, and always with an absolute commitment to quality, Kistler plays a key part in the ongoing development of the latest megatrends. The focus is on issues such as electrified drive technology, autonomous driving, emission reduction and Industry 4.0. Some 2,200 employees at more than 60 facilities across the globe are dedicated to the development of new solutions, and they offer application-specific services at the local level. Ever since it was founded in 1959, the Kistler Group has grown hand-in-hand with its customers and posted sales of CHF 465 million in 2023. About 9% of this figure is reinvested in research and technology – with the aim of delivering better results for every customer.