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KiBox® user meeting 2017

Exciting presentations and experts’ tips on mobile engine indication

Following the first KiBox® user meeting in 2016, Kistler staged the second event in the series at its Sindelfingen facility on January 12, 2017. At this gathering, over 40 participants learned about the latest innovations in engine indication. They also shared their experiences and picked up tips on even easier ways to operate the KiBox®.

Marco Wagner, Product Manager for Engine Research and Development at Kistler, explains: ‘We’ve noticed that users of engine indication equipment have few opportunities to exchange information. So we want to offer our customers a welcoming forum where they can share experiences with colleagues, listen to stimulating presentations and – first and foremost – get to know the new functions of the KiBox® Cockpit V3.0 software update.’

Second meeting: a total success

Kistler staged the first meeting on the KiBox® and its applications at Sindelfingen in January 2016. ‘The first working
week in January has become established as a very convenient time for our KiBox® meeting, especially since many end users still haven’t started testing by then,’ Marco Wagner adds.

As in 2016, this year’s meeting attracted representatives from renowned OEMs and automotive suppliers, as well as members of university engine development and research departments. The meeting’s aim: to deepen and broaden participants’ knowledge about KiBox®. With that purpose in mind, the primary focus was on the KiBox® workshop, flanked by additional presentations such as ‘Fast torque parameterization via KiBox® connection on a stationary test bench’. Hands-on examples helped participants to discover useful hints and tips on KiBox® applications.

16-channel option optimizes test bench applications

As a source of detailed information on the combustion process, Kistler’s compact KiBox® broadens our product range for onboard and test-bench engine indication. With the KiBox®, users can reliably record and process information about injection valve activation, ignition, combustion and gas exchange. This data can then be displayed in the familiar INCA environment, among others.

For optimal test bench use, the new KiBox® Cockpit V3.0 can be expanded to 16 channels by cascading two boxes. The eight channels available in the past were sometimes inadequate for large-scale measurements. Another plus: users can program calculators themselves, so their know-how is safeguarded. Now that the latest INCA driver update (V7.2) is available, the two systems are compatible and they share the same level of technological development.

A firm date for KiBox® users

Participants had a chance to see the cascaded KiBox® and other Kistler exhibits at first hand in our in-house showroom. After a tour of Kistler Germany’s new headquarters, they went on to enjoy racing in a mini-tournament at the nearby go-kart track. The awards ceremony for the Kistler KiBox® Cup was followed by a gala dinner to honor the winners.

A final reminder from Marco Wagner: ‘Users can already save the date for our third KiBox® meeting – it will take place on January 11, 2018.’

At a glance

Key facts

- Cascading from two boxes to 16 channels
- Autonomous calculator programming
- The INCA V7.2 driver update makes both systems compatible

The new KiBox® Cockpit V3.0 can be extended to 16 channels by cascading two boxes, making it ideal for test bench use.
New: Type 611xC measuring spark plug

Longer service lifetimes and enhanced reliability

The latest generation of engines sets challenging requirements for the ignition reliability and wear resistance of spark plugs. But Kistler has met the challenges by developing a unique modular concept with a new, improved design and enhanced performance. Thanks to the new Type 611xC measuring spark plug, users can now measure cylinder pressure with minimal integration effort.

Virtually flush-mounted, the cylinder pressure sensor of the 611xC measuring spark plug offers impressively high measurement accuracy and rugged design: features that enable it to withstand high engine speeds and potential knocking. Another innovative addition: a new ceramic insulator. An integrally molded plastic sleeve allows adaptation to the required diameters. Benefits of the new geometry for the spark plug body include reduced surface discharge and improved stability for high ignition voltages, as well as protection against damage to the ceramic material. The ground electrode also features a solid platinum insert to maximize wear resistance. The results: improved sparking stability and longer service lifetimes.

Design enhancements now make the measuring spark plug more reliable and durable – and it also requires less maintenance. PiezoSmart® technology from Kistler enables automated sensor identification, so the process is more reliable and test setup is more efficient. The Type 611xC measuring spark plug can be used for engine calibration and diagnostics in onboard and test bench applications. Measuring spark plugs offer an excellent alternative in situations where cylinder pressure sensors cannot or should not be installed. Kistler offers reliable, versatile and affordable solutions – backed by 50 years’ experience of sensor technology. Thanks to the modular design of this measuring spark plug, users can implement a wide range of geometries and heat values to match each specific application.

At a glance

- High measuring accuracy
- Rugged design
- Ceramic insulator
- Reduced surface discharge
- Increased stability for higher ignition voltages
- Cost-efficient service concept
New SCP charge amplifier 5064D

Peak pressure monitoring with pMax detection up to 50 kHz

Kistler unveils a product that sets new standards for continuous monitoring and recording of peak cylinder pressure (pMax): the 5064D SCP (Signal Conditioning Platform) charge amplifier. With the analog bandwidth now increased from 5 to 50 kHz, users can also record all peak pressure values and knock events above 300 bar. pMax values are outputted digitally via a standardized CAN bus interface, or in analog form via the SCP interfaces.

The PiezoSmart® sensors incorporated in this charge amplifier deliver dual benefits: automated sensor identification as well as monitoring of sensor runtime. The amplifier continuously captures key parameters such as effective sensor operating hours and number of cycles completed for storage on the TEDS chip (Transducer Electronic Data Sheet) in the sensor connector. The associated SCP software assigns individual pressure measurement values for each cycle to the appropriate pressure value class, and then graphs them. Automatic sensor runtime recording lays the foundations for cost-effective operation – setting new standards for quality assurance.

Classification of different peak combustion pressures is designed as an aid to determining load profiles. The new pMax detection technology can also capture extreme pressures (above 300 bar), so users benefit from a more accurate indication of the actual loads on the engine and the sensor. As well as helping to avoid costly engine damage, this feature can prevent misinterpretations due to incomplete datasets.

Kistler’s new SCP charge amplifier (Type 5064D) improves continuous monitoring and recording of peak cylinder pressure (pMax).
DTI technology

Faster and more efficient testing

Kistler makes vehicle dynamics and durability testing faster and simpler. Kistler is the first provider on the market to offer integrated measuring solutions that feature groundbreaking Digital Transducer Interface (DTI) technology.

Reliable tests are the essential basis for optimum vehicle development and engineering. The objective is to capture exact measurements of a vast number of physical variables. That’s why many hours are often needed for each test setup. So, is there a way to reduce the enormous time and expense needed to obtain precise measurements from vehicle dynamics, tire and durability tests? Many customers ask this question – and Kistler, the expert in dynamic measurement technology, has come up with the answer.

When you opt for Kistler’s DTI technology, you can be sure that your test setup will be fast and efficient. Only one single cable is needed to configure the sensors, transmit and synchronize the measurement data, and supply power. TEDS-assisted automatic sensor detection makes configuration even simpler. Installed position, calibration values and relevant physical parameters are detected automatically by the KiCenter (Kistler’s measurement software), where they can be configured. The results: guaranteed maximum process reliability – and efficient use of your time.

DTI technology makes use of an end-to-end bus system for the entire application. Signals are digitized as required, and converted into a DTI signal. This takes place either directly in the Kistler DTI sensors, or via suitable Kistler DTI converters if sensors are already present. The sensor data is fed into the central Kistler DTI logger – with no risk of interference – and is then transmitted via Ethernet to the computer for recording.

For brake path measurement with straightforward ABS braking to DIN 70028, Kistler offers you a perfected, holistic measurement solution based on our DTI technology. Its components include Kistler sensors and triggers, the DTI logger and the KiCenter. Test setup couldn’t be simpler thanks to the ‘One Cable for Everything’ concept. KiCenter enables end-to-end configuration of all connected sensors, guiding you through the entire test with three sequential measurement data displays – before, during and after the measurement task. The benefits: users can focus fully on their work, and valuable time is gained on the test track.

Several years have already passed since Kistler successfully launched its DTI technology for vehicle safety testing. Over 40,000 DTI channels are currently in use for crash tests. Based on the knowledge gained from this experience, Kistler has consistently developed its proprietary DTI technology at its Competence Center in Wetzlar, matching it to the demanding requirements for vehicle dynamics and durability tests. Kistler is the first and only provider to deploy this advanced technology in this segment – to boost efficiency and enhance process reliability.
Outstanding performance and absolutely straightforward installation: these are the key benefits of Kistler’s new system for reliable and robust wheel torque measurements. The new RoaDyn® P109 car wheel torque transducer delivers precise measurement results even under high load demands. Onboard test setup is now even easier and more user-friendly thanks to KiRoad Wireless P1 WLAN data transmission combined with DTI technology.

Reliable wheel force measurement technology is a key factor in vehicle testing nowadays. From the electronics to the sensor, cutting-edge technology is essential across the entire measuring chain – a crucial factor for all players in the automotive industry. That’s why Kistler set three priorities throughout the development work for this new measuring system: user-friendliness, operability and maximum accuracy.

Car wheel force transducer for high load demands

The centerpiece of every Kistler measuring system is the high-precision sensor. The new RoaDyn® P109 wheel torque transducer was designed specifically for measurements involving very high loads. Development work focused on load requirements set by a wide range of vehicles, including modern crossovers, roomy SUVs and high-performance cars. The RoaDyn® P109 relies on unique piezo technology to deliver extremely precise measurements of very small torques in vehicle dynamics and handling tests or powertrain analyses, even under high dynamic loads. The piezoelectric sensors used in this transducer show no signs of wear; their sensitivity remains virtually constant across a wide temperature range, and their rigidity values are very high. Thanks to the piezo sensors, users can choose from two independent measuring ranges – with full resolution in each.

Reliable wireless data transmission

The innovative KiRoad Wireless P1 data transmission system features synchronous data transmission via WLAN. Each KiRoad Wireless system builds its own encrypted WLAN network so that parallel tests can be conducted with multiple systems at the same time. ‘With this development, we’ve raised transmission technology to a new level of reliability and user-friendliness. The benefit is that users can minimize their setup times before tests,’ says Dr. Jakub Vidner, Product Manager at Kistler.
New RoaDyn® S530 measuring hub

Innovative tire test portfolio for high-quality measurement results

Tire testing is gaining importance all the time – and this is an area where reliable measurement data is essential. To meet this need, Kistler is launching its new RoaDyn® S530 in 2017. This multi-component strain gage measuring hub allows users to analyze tire wear and life expectancy on laboratory tire test benches and mobile test vehicles. Rugged, sustainable design is a hallmark of this impressive high-precision measuring hub, which allows control of the test bench based on the forces measured.

For many years now, tire testing has been a key focus of Kistler’s activities in the automotive sector, alongside vehicle dynamics and durability. Frank Furter, Business Driver at Kistler, explains: ‘Tires are the most sensitive parts of a vehicle, but they also have to cope with the most intense stress. Constant testing is the only way to guarantee lasting safety and quality.’ Vehicle tires have to meet increasingly strict requirements and conform to international standards. As well as the tire label required by law, automobile manufacturers also specify their own strict guidelines for their suppliers. This results in higher requirements for test procedures and measuring systems used on test benches or test tracks.

Vehicle testers want to focus their efforts on the actual test, not the preparatory installation work. Thanks to the extensive transmission range for its strong WLAN signal, the new KiRoad Wireless P1 operates with no need for additional reception antennas. ‘In the past, you had to install external reflecting antennas or use many meters of cable to mount external reception antennas along a truck chassis, fairly close to the transducer. With the KiRoad Wireless P1, there’s no need to spend valuable time on those steps,’ Dr. Vidner explains. ‘Now, it’s: install onboard electronics in the cab, mount the wheel module on the drive axle – and the transmission link is ready to go!’

Equipped for the future with DTI technology

Another plus: when the system is combined with the new DTI Logger, only one single cable is needed to connect the onboard electronics to the data acquisition unit. What’s more, Kistler DTI technology ensures fast and efficient test setup. Now only one single cable is needed to configure sensors, transmit and synchronize measurement data, and supply power. Automatic sensor recognition with TEDS makes configuration even easier. The KiCenter (Kistler’s measurement software) automatically recognizes calibration values and relevant physical variables, which can be configured on the software. Guaranteed benefits: maximum process reliability and efficient use of time. As Jakub Vidner points out: ‘The combination of the KiRoad Wireless P1 measuring system and the DTI Logger saves time for users. We see that as a very valuable advantage because it frees our customers up to focus on the job they really need to do: taking high-precision measurements.’

For more information, visit: www.kistler.com/kiroad-performance
Tire testing improves driving comfort and boosts efficiency

‘For years, Kistler has been the market leader in the ride comfort segment with its P530 measuring hub. But now we’re seeing an increase in demand for equipment to measure rolling resistance forces. Since November 2012, manufacturers who supply the European market with tires for cars and light or heavy commercial vehicles must use a label to inform end users about tire quality (as per ISO 28580:2009 and UN ECE R117). Various tire tests must be carried out to measure the parameters required for the label. First and foremost is safety testing: how well does the tire grip the road when braking in wet conditions? Testing must also determine the tire’s environmental impact (as regards noise pollution, for instance). Another requirement is to determine the fuel efficiency class by measuring the tire’s rolling resistance, so the vehicle’s fuel consumption can be deduced. Kistler’s RoaDyn® S220 and S260 measuring hubs come into play here. Based on the force method principle, they deliver measurements of the required quality for longitudinal and contact forces. The test specimen can be mounted directly on the measuring hub thanks to its compact design and integrated mount. Parasitic losses are minimized, so the measuring results are stable.

Durability means efficiency

‘When people talk about the efficiency of a tire, they often forget about wear and tear, or the tire’s lifetime. This is where our new S530 measuring hub comes into its own,’ Frank Furter explains. The new RoaDyn® S530 is a 5/6-component hub for static measurements, with 3 force directions and 2/3 torque directions for use on tire and wheel test benches at up to 30kN. It is used for long-duration measurements, which are usual for tire wear and life expectancy tests. In contrast to the conventional method where the test bench is controlled or regulated by the angle, the measured forces can be used to control the test bench (closed loop control). The key advantage of this unique feature is that force spectra logged on the test track (Road Load Data Acquisition, or RLDA) can be simulated as realistically as possible on the test bench. This completely eliminates the need for additional force sensors and a separate wheel mount. Other impressive features of this measuring hub include its long service lifetime, compact design and rigid mount to keep the wheel in the desired position.

The right measurement technology for every application

Depending on the tire test assignment to be undertaken, either strain gage or piezoelectric sensor technology is used with RoaDyn® measuring hubs. Piezoelectric sensors are used for measurement tasks that involve exceptional demands on dynamics. Thanks to their rigidity, they are ideal for measuring high-frequency force and torque peaks, and they remain consistently sensitive even after years of operation. ‘Measuring hubs based on strain gage technology are used for longer tests that can last days or weeks, where the force measurement signal is used as the control variable,’ Frank Furter notes. Tire quality is verified at many points in the value chain, no matter whether the tests are performed by premium-class automobile manufacturers, OEMs or the tire producers themselves.

Kistler offers professional consulting backed by decades of experience – but that’s not all. The group’s other services include calibration of RoaDyn® wheel force sensors and customized advisory support in the project phase.

For more information, visit: www.kistler.com/tire-testing
Crash tests are a crucial factor in passive safety throughout the automotive industry. They give manufacturers and OEMs in-depth knowledge about the structural and energy absorption behavior of vehicles and their components, and they also show how a crash impacts the vehicle occupants. Results from these tests are key inputs for the development process. As vehicles become more complex and digitization becomes more widespread, there is a growing need for larger numbers of onboard and in-dummy measuring channels. Continental Safety Engineering needs its crash tests to be efficient and effective. And that’s precisely why Continental relies on data acquisition technology from Kistler, the innovation leader. Tried-and-tested DTI (Digital Transducer Interface) technology is installed in their crash test dummies. DTI technology converts the analog measurement data into digital signals directly in the sensor, and transmits them to a central data recorder via a digital data bus circuit. This is all accomplished inside the dummy. Kistler’s measurement technology gives Continental a whole series of benefits, such as reliability, high data quality and reduced space requirements. The data acquisition system (DAS) required in the trunk is less bulky, and thick analog sensor cabling is replaced by one single digital cable from the dummy to the vehicle. The advantages: installation is easier, and less time is needed to prepare tests.

Continental’s crash test dummies have a track record of success – thanks to Kistler’s groundbreaking DTI technology.

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The revolution in data acquisition

At Continental’s development site, approximately 550 sled tests and 450 crash tests are currently performed per year. Thomas Wild, Team Manager for Measurement and Video Technology at Continental Safety Engineering, explains: ‘With so many tests, we wanted to update our test equipment with the latest technology to ensure efficient processes and guarantee accurate, reliable measurement data. Requirements for the scope of testing are generally on the increase, and the same applies to the numbers of measuring points on vehicles.’ The number of sensors needed in a crash test is constantly growing: back in 1993, just 246 analog measurement channels were controlled and processed but nowadays, the number can exceed 600. At the same time, the installation space available in the vehicle is decreasing. Another motivation for Continental was the need to improve the system’s reliability and minimize the error rate. Setup times had to be shortened and the number of analog input channels reduced.

DTI technology: the new standard

DTI technology plays a key part in the expansion of the DAS for in-dummy data measurement. This technology uses an integrated data bus system. Data from a wide range of sensors is converted into digital output signals by digitization modules (or DiMods for short). The DiMods are installed directly in the Kistler sensors; where sensors are already in place, suitable Kistler DTI integration solutions are used. The digitized sensor signals are then recorded during the crash event by a central Kistler DTI data recorder mounted in the dummy. One single cable for data, synchronization, triggering and power supply runs from the dummy to the vehicle communication box. Post test, the data is downloaded via the vehicle communication box for evaluation by the facility computer on Ethernet.

Integrating DTI technology into existing processes

In early 2014, Kistler began the DTI integration for ten existing H3 dummies; the WorldSID dummy upgrade followed at the end of the year. The challenge posed by the H3 dummies was to integrate this technology into the existing processes and infrastructure. With analog measurement technology, each sensor channel had to be plugged into the data acquisition system by hand. This meant long setup times – and potential for errors. For the onboard system, Continental opted for the latest generation of Kistler technology: the KiDAU data acquisition unit. Compatibility between existing and newly-integrated hardware was guaranteed, and Kistler also adapted and expanded its CrashDesigner software to meet Continental’s needs.

Qualitative crash tests of the future

DTI technology can be installed in all dummy models – including THOR-M: so now Continental can reliably combine a number of different devices that include both new and tried-and-tested hardware. This avoided the need to convert all technical devices to the new technology, thereby saving the company a great deal of time and money. Thomas Wild sums up Continental’s collaboration with Kistler: ‘In this project, Kistler drew on its technical expertise and lengthy experience of vehicle safety. The end result: convincing proof that DTI technology is the most suitable measurement system on the market for in-dummy installations. Kistler knows what matters in highly complex crash tests – especially as regards converting to DTI technology. So now we can guarantee that our crash tests will continue to meet the highest standards in the future, just as they do at present. As well as delivering accurate measurement data, Kistler’s sensors are extremely reliable and durable. As far as we’re concerned, that’s the perfect combination. That’s why we’re already involved in intensive discussions about future projects,’ Mr. Wild concludes.