

### Turbine flowmeter

The EFR series (enhanced floating rotor) is a precision turbine flowmeter (PTF) from **Sponsler, Inc.** It is designed to measure liquid and gas flows to custody-transfer standards, and is available in all industry-standard end-fittings. The axial design of the meter provides a rotor that is



mounted on a shaft between flow cones at 90° to the flow. Requirements for downstream thrust bearings are eliminated because the rotor does not rest against any surface when operating in its linear range. Resulting flows can be measured at accuracy of up to 0.15% with 0.2% repeatability within linear measurement ranges.

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### DSP design validation

**National Instruments'** LabVIEW DSP test integration toolkit 2.0 integrates with **Texas Instruments'** code composer studio (CCStudio) development tools. The toolkit simplifies debugging and validation of code executing on TI TMS320 digital signal processors with an executable that design engineers use to establish communication and control of data internal to digital signal processors in seconds. The



executable runs parallel to CCStudio and uses the real-time, data-exchange communication protocol. The toolkit enables engineers to drop controls and indicators onto the executable front panel and configure the objects with a few mouse clicks.

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### Handheld data acquisition

The Dash 2EZ handheld data acquisition recorder from **Astro-Med, Inc.** offers a 5.7-in, color, real-time display for waveform viewing and intuitive touch-screen control. It includes compact Flash memory and an integral 3-in



thermal printer for printing real-time and captured data. The device can record two channels at a sample rate of 10 kHz per channel while displaying waveforms on the high-resolution customizable display. Applications include shock and vibration testing, and nondestructive testing.

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### Engine and dyno control

**Schenck Test Automation's** taskmaster compact engine and dynamometer control system is suitable for car, motorcycle, kart, or truck engine building and tuning is applicable to new testbed installations or upgrades to existing testbed control systems. It is designed to optimize performance and identify modifications to



maximize power and can be used with almost any existing hydraulic or eddy-current dynamometer. Operators have full, manual, or autorun capabilities with independent throttle and dynamometer control together with oil, water, and maximum rpm alarm settings. Using the computer interface, repeatable custom test routines can be written to simulate race circuits or known problems, together with specific vehicle and driver characteristics. Power curve results are displayed on screen in real time and can be compared with previous tests before printing.

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### Torque display

**Magtrol's** Model 3400 torque transducer display is designed for use with the company's in-line torque transducers. The device powers the transducer and uses high-speed digital signal processing to display torque, speed, and



mechanical power. Features include standard English, metric, and SI torque measurement selections; isolated RS-232 interface; closed-box calibration of torque; built-in test equipment; overload indication; and an optional 19-in (483-mm) rack-mount kit.

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### Gage display

ESLSense I from **Electro Standards Laboratories** is a precision measurement instrument suitable for process monitoring and control, materials testing, and calibration. It features single- or dual-channel strain-gage transducer inputs for load cells, extensometers, or pressure sensors, and two independent displays allow for simultaneous viewing of any two quantities of interest from one or both input channels. An integrated quadrature encoder channel allows for combined force, position, and rate measurements. The unit features automatic setup for 25 load cells, selectable filters, peak/valley hold and reset, and local and remote tare. Display features include eight units of conversion and counts  $\pm 999,999$ .



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### Oil monitoring

The Oil Insyte in-line oil monitoring system from **VSI, Voelker Sensors Inc.** is designed for continuous monitoring of oil additive performance, oxidation, and soot contamination in R&D test lab engines. This technology provides fast results by measuring oil breakdown as it happens, independent of the base type or additive package. It is designed to fit test facility engines, and allows easy setup and operation. No standards or calibration are required. The system performs at temperatures up to 150°C (302°F).



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### Noise and vibration analyzer

**LMS International** has introduced a new four-channel entry-version of the LMS Pimento, its compact PC-based noise and vibration analyzer. The four-channel system is suitable for manufacturers that want to qualify the noise or vibration performance of their products, and analyze the root cause of problems with the dynamic behavior of their designs. With a mass of less than 5 kg (11 lb), LMS Pimento can be used for general-purpose data acquisition, or specific modules for acoustics, structural testing, and rotating machinery analysis. The Pimento Visual Basic module allows users to customize the applications to their specific needs or company procedures.



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### Force sensors


High-capacity ICP and charge output three-component force sensors from the Force/Torque Division of **PCB Piezotronics, Inc.** simultaneously measure dynamic or quasi-static forces in three orthogonal directions. The sensors are structured with three quartz elements that provide long-term stability, repeatability, and linearity, with a dynamic range of 10,000 lb (44,500 N) in the z axis and 4000 lb (17,800 N) in the x and y axes. Hermetically sealed stainless steel construction makes them suitable for applications such as force-limited vibration testing, modal analysis, engine mount analysis, and impact testing.



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This plug

ISO/TS 16949




is tight!

Our plug (specification HN 8-WD) is tight up to 5600 psi

Because of the integrated sealing ring, made of high-quality material NBR (Nitrile Butadiene Rubber), our plug seals not only against hydraulic and transmission oils and against compressed air. Moreover the plug can be used repeatedly.

Assembly is simple and safe, because no sealing ring is either forgotten or lost. The integrated soft sealing ring, made of high-quality NBR material is useful for temperatures between -35°C and +100°C. For higher temperature applications we recommend FKM sealing rings.

Convince yourself of the functionality and quality of our components. Why don't you ask for a complimentary sample. We look forward to your enquiry.



Heinrichs & Co. KG • D-56290 Dommersh.-Dorweiler  
 Phone +49 6762 93050 • Fax +49 6762 930555 • www.heinrichs.de • info@heinrichs.de

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## Torque control

Promess, Inc.'s motorized torque control system features built-in angular sensing and feedback capabilities. It is designed for use by test and assembly equipment builders and end users in applications such as steering and drivetrain component testing and assembly, manual window



crank final testing, seat testing, bearing pre-load, and torque-to-turn testing. The complete turnkey torque system consists of a torque module that contains a servo motor, encoder, torque transducer, and output shaft. Mechanical overload stops to protect the transducer.

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## Wireless transmitter

The BlueLynx Model BLM-TX self-calibrating wireless sensor link from Wilcoxon Research replaces cable and conduit in predictive maintenance, process monitoring, and data acquisition applications. This compact unit collects analog signals from up to four 4-20 mA sensors, then transmits the signals wirelessly to a BlueLynx Model BLM-RX receiver, a Bluetooth access point, or a Bluetooth PC serial port adapter. A programmable logic controller, data collection system, personal computer, or other form of instrumentation can then analyze the received signals.

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## Vibration calibration

The K9100C portable vibration calibration system from The Modal Shop calibrates vibration sensors and produces NIST-traceable reports. The self-contained 9100C calibrator unit is equipped with a rechargeable power source. It includes everything needed to

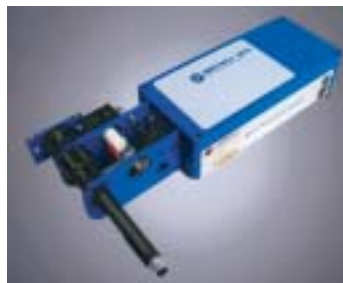


calibrate displacement, velocity, and acceleration sensors when operated with user-supplied sensor signal conditioning. Non-contact displacement sensors can be tested for accuracy, linearity, and frequency response using the optional S4A-1 proximity probe mounting attachment. It also holds sensors having a mass of up to 500 g (18 oz) without the aid of an external support mechanism.

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## Particulate mass measurement

The SEMTECH QCM (quartz crystal microbalance) and MPS (micro-proportional sampler) from Sensors, Inc. provide dynamic mass measurement of particulate matter (PM) in engine exhausts. The QCM uses electrostatic precipitation to collect aerosol particles



from a known volume of air and deposits them on an oscillating piezoelectric crystal. By measuring these shifts in frequency, the unit can calculate the mass of the PM with a resolution approaching 0.1 ng (1.5 grain). The MPS was developed to permit transient, in-use measurements. It delivers response times of 0.1 s and operation speeds greater than 5 Hz.

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## Ultrasonic meter

Hedland HTTF ultrasonic flowmeters can be used with carbon steel and stainless steel pipes, and with copper and plastic tubing, in sizes from 0.5 to 2 in (13 to 51 mm) and with liquid temperatures from 0 to 180°F (-17 to +82°C). They are non-invasive and unaffected by suspended solids or gas



pockets, making them suitable for machine tool coolant lines and industrial processes where contaminants can compromise readings. The enclosure is weatherproof for indoor or outdoor mounting and installs by clamping onto the outside of the pipe. Direct interface is provided for integrated data systems via 4 to 20 mA output and either transistor-transistor logic-pulse or simulated turbine meter outputs that are proportional to the fluid-flow rate. Rate and totalizer displays, remote mount transducers, and UltraLink Microsoft Windows-based software are also available.

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## In-line flowmeter

J-TEC Associates, Inc. offer expansions to its VF563 Series in-line flowmeters used to measure air or low-pressure gas with vortex shedding technology. The flowmeters can be used within a 0.75- and 1-in (19- and 25-mm) line size in addition to the existing line sizes. Other features include a lack of



moving parts, improved accuracy, drift-free performance, repeatability, and improved durability. The line measures flow down to 0.14 ac field measurement and is designed for rugged applications with minimal space requirements.

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## Acquisition boards

The PCIDAQ 04 series of data-acquisition boards from **CyberResearch, Inc.** offer four channels of simultaneously sampled data at speeds up to two MS/s and resolutions up to 16 bit. All signals are brought out to a single 68-pin connector. Features include two digital/analog (D/A) channels, two 16-bit counter/timers,



autocalibration, first-in-first-out buffers, and a variety of trigger modes and sources. The 12-bit D/A channels can be used for waveform generation, and PCIDAQ 04 boards can be synchronized to work together and offer more than four channels. Applications include transient signal measurements, cable testing, and automated test equipment.

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## Wheel-torque sensor

**Sensor Developments Inc.**'s wheel-torque sensor measures torque at the road interface without the use of anti-rotation brackets. The sensor will correlate vehicle particulate emissions to a given engine output and can be used with either standoff adapter plates or a custom-designed wheel rim. The wheel-torque sensor system features wireless signal transmission of torque, speed, and temperature. When combined



with data from exhaust-measuring equipment, the sensor provides an accurate picture of the vehicle's emissions profile, claims the company.

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## Rotating transducer

Rotating torque transducers from the Force/Torque Division of **PCB Piezotronics, Inc.** use noncontact, rotary transformers for sending excitation voltage to, and receiving measurement signals from, the rotating strain gage sensor. Capacities from 0.26 to 8333 lb•ft (0.35 to 11,300 N•m) full-scale, and speeds up to 20,000 rpm make the series



4100 transducers suitable for use in dynamometers and torque studies on fuel pumps, hydraulic motors, drive shafts, transmissions, and electric motors. An optional pickup provides an output proportional to speed. The design eliminates the need for replacing worn brushes compared to the conventional slip ring type rotating torque sensors. Keyed shaft, spline shaft, or flange ends are also available, as are custom-designed units for alternate measure ranges and speeds.

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## Onboard acquisition

An expanded line of EZ-Logger onboard data-acquisition systems from **Corsa Instruments, Inc.** includes the EZ-TK, EZ-ACCEL, and EZ-AFR modules. The EZ-TK accommodates up to eight standard type K thermocouples and features built-in cold-junction compensation, calibration, and linearization. The system automatically detects broken thermocouples, and additional modules can be added for extra channels. The EZ-ACCEL module provides one, two, or three accelerometers capable of measuring  $\pm 5 g$  and allows users to directly measure acceleration, cornering forces, and  $g$ loads. The EZ-AFR module provides one or two



channels of wideband air-fuel ratio measurement and works with all fuel types, including alcohol and gasoline, and nitrous systems. All logger systems collect and record data for tuning vehicle engine, gearbox, or chassis and feature wireless data-download and data-analysis software.

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## Multi-platform acquisition

The DaqBoard/1000 series 26-bit, peripheral component interconnect-(PCI) based data-acquisition board from **IOtech** features synchronous analog, digital, and frequency I/O, software support including **Linux** drivers, and a direct memory access bus mastering. Complete software support includes **Microsoft Windows** drivers, components



for C++ and Visual Basic, **National Instruments** data-acquisition applications LabVIEW and MATLAB. Other features include synchronous scanning of all analog, digital, and counter inputs; PCI-bus plug-and-play configuration; and onboard scan sequencer with timing down to 5  $\mu$ m between channels. Two 16-bit timer outputs are capable of generating square waves with a frequency range from 16 Hz to 1 MHz. Up to four DaqBoards per PC in any combination is available for channel expansion up to 64 analog input and 96 digital I/O signals, and a high-density 68-pin connector. Various trigger modes are supported to accommodate measurement situations.

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### Powertrain test-cell control

Version 4.1 of the DynoLAB PT test-cell control system from **SAKOR Technologies, Inc.** adds increased bandwidth and both Ethernet and wireless-Ethernet support to the system. The latest version increases data-acquisition, reducing the number of connections required, and enabling a high level of remote monitoring capability.



Wireless Ethernet potentially eliminates physical connections between test-cell devices and the control room. DynoLAB PT uses SAKOR's test executive software, which offers a user-friendly graphical interface that creates complex sequences without specialized programming. Entire display panels can be replicated and modified to present desired parameters without the need to manually recreate each display. Version 4.1 is suited for engine and powertrain testing and integrates external devices including dynamometers, throttle actuators, spark and fuel controllers, combustion analysis systems, emissions analyzers, and other I/O devices.

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### Ultrasonic flowmeter

**Fuji Electric's** Portaflow-X ultrasonic flowmeter uses the transit-time-difference principle to measure flow rates through pipes from the outside, enabling multiple flow measurements of different running systems. The Portaflow-X can measure flows through most pipe and lining materials with diameters from 0.50 to 235



in (13 to 5970 mm). Common applications include boilerwater/feedwater supplies, cooling water, cooling oil, deionized water for semiconductor manufacturing, chemicals, fuel, and other homogenous flows with low-solid content and low to moderate aeration. The 3.3-lb (1.5-kg) unit features a backlit display, accuracy of  $\pm 0.5$  to 1.0% of velocity, and a built-in data logger. It can be used as a backup flowmeter or stand-alone system and is offered with an optional top-mount thermal printer.

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### Zero-drift amplifiers

A series of 12-V, zero-drift operational amplifiers are suitable for high-precision, power-sensitive applications that require stability over time and temperature.

**Texas Instruments' OPA734** and



OPA735 families use auto-zeroing techniques to provide low offset voltage and near-zero drift. Additional features include low quiescent current of 750  $\mu$ A, low bias current, 1.6-MHz bandwidth, and rail-to-rail output swing within 50 mV of the rails. Both amplifier models operate on single or bipolar supplies from 2.7 to 12 V, and are specified from  $-40$  to  $+125^{\circ}\text{C}$  ( $-40$  to  $+257^{\circ}\text{F}$ ). The OPA734 family includes a shutdown mode that allows the device to be switched from normal operation to a standby current that is under 9  $\mu$ A.

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### Triaxial accelerometer

The Vibration Division of **PCB Piezotronics, Inc.'s** miniature, lightweight ICP triaxial accelerometer simultaneously measures vibration in three orthogonal directions. The sensor's



built-in filtering allows frequencies of interest in the useable range to pass unchanged, and eliminates high frequencies due to metal-to-metal impact such as gear mesh or drivetrain noise, thereby minimizing the potential for sensor overload and erroneous measurements, according to the company. Signal-conditioning microelectronics produce low-impedance voltage outputs that are transmittable over long cable lengths and protected inside a precision-machined, hermetically sealed titanium housing. Sensitivity rating of 10 mV/g with a 500 g peak measurement range is standard, while a high temperature range of up to  $325^{\circ}\text{F}$  ( $163^{\circ}\text{C}$ ) is available. Applications include engine studies, NVH, dynamometer, and other off-highway testing.

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### Displacement flowmeter

**Max Machinery Inc.**

has added a 7500-psi (517-bar) version of its Model 213 positive displacement flowmeter, previously rated at 1000 and 3000 psi (69 and 207 bar). The Model 213-59X has a displacement of less than 0.9 mL/rev and is used in



hydraulic leak testing, bi-directional valve testing, and other low-flow-rate applications. Combining the flowmeter with a frequency or analog transmitter will provide a high-resolution signal, claims the company. Other features include a reduction in air entrapment or other factors that affect positive-displacement meter performance.

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## Helium leak detector

Pfeiffer Vacuum's QualyTest Component (QTC) helium leak detector is a modular unit designed for integration into automated assembly and test systems. The device is equipped with a turbo-drag pump, which is packaged in a unique housing that does not use a



valve block. This feature permits the direct flow of helium into the analyzer cell, resulting in quick response, good recovery time, and high sensitivity. Applications include testing industrial applications where fast, precise leak checking is needed. The QTC leak detector offers an optional built-in calibrated leak, automated backing pump gas ballast control, and automated sniffer control.

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## Motion controller

The BMC 800 motion and measurement controller from BIA manages actuator control and data-acquisition. It allows different systems and sensors to be used without additional conditioning systems. A single BMC 800 provides one to eight channels, while a network of up to 16 BMC 800 units can be linked for any testing application, including hydraulic actuators or to update existing test benches. Each channel offers a range of conditioning and data-acquisition, and additional transducers can be directly plugged into each channel to control the servo drive and servo valve signals. Drag and drop software links basic processes, including function generation, data-acquisition, and triggers



to build complex tests. Multi-processing parallel construction features improved power for real-time test control and helps eliminate software complexity issues. Each channel can synchronize to the general application process and share information among networked modules. The unit works in harsh industrial environments and can be made portable with locking wheels.

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## Leak-test system

The Falcon leak-test system from Cincinnati Test Systems, Inc. simultaneously determines leak-location and total leak-rate, providing real-time process control. It narrows the gap between traditional pressure decay technology and helium-vacuum mass



spectrometry. An on-screen graphics display provides visual recognition of the leak location, identifies the leak-rate for the operator, and communicates the information to designated networks, ensuring improved resolution of manufacturing deficiencies to avoid downtime and production back-up. The system interfaces with a matrix of strategically integrated sensors and features onboard diagnostics. Microprocessors initiate data processing while software manages the signals from multiple sensors.

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## Oil purification system

The FS series of oil filters from Triple R America Co. Ltd. features the Triple R H-308-1FS oil purification and flushing



system, capable of processing 7 gal/min (26.4 L/min) and maintaining up to 3000 gal (11,350 L) at five to six ISO grades clean oil. The system features elements designed for maximum retention of solids as well as for removal of sludge and moisture build up. Units can be customized to fit individual requirements for power, flow, micron cleanliness level, and environmental conditions.

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## Diagnosis recording

IXXAT's CAN data logger, the CANcorder, diagnoses CAN networks and records process data independent of a PC. Intelligent trigger functions allow a specific recording of CAN messages



before and after a trigger event. The CANcorder is available with one or two channels (11- or 29-bit identifier) and allows data to be recorded in single or dual mode. Up to 200,000 messages can be stored on a buffered data memory of 4 MB. A Microsoft Windows-based software tool is included and allows trace data to be uploaded and stored in different formats.

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