

Rugged flow sensor

The Digital Read Out (DRO) flow sensor from **Turck** is a solid-state device that operates on the calorimetric principle, resulting in a sensor with no moving parts that can break or become lodged in the pipeline. It features a highly visible three-digit display that can alternate between flow rate and media tem-



perature. In addition to an adjustable on-and-off delay feature, the DRO allows the user to program set points specific to an application and has an adjustable filter to smooth out erratic flow conditions. DRO sensors are designed to operate with media such as water, glycol, and other fluids.

For more information, circle 1

Leak detection

The Falcon Leak Test System from **Cincinnati Test Systems** bridges the gap between traditional pressure decay technology and helium vacuum mass spectrometry to si-



multaneously determine leak location and total leak rate for real-time process control. A graphical display provides precise visual recognition of the leak location and communicates the information to designated factory communication networks, ensuring the quick resolution of manufacturing deficiencies. In-probe microprocessors initiate data processing while software manages the signals from multiple sensors. The tester also features onboard diagnostics that maintain system vitals.

For more information, circle 2

Coupling system

Ringfeder offers the TOK coupling system for combustion engine test bench shafts from **Reich**. The flex-



ible couplings are used to connect combustion engines to dynamometers for engine testing and evaluation and are suitable for applications requiring different engine types or changes to test parameters. Self-centering and backlash and maintenance free, the TOK coupling system provides low torsional stiffness through the use of two flexible coupling elements. The stiffness can be changed by replacing the flexible elements. The durable, aluminum couplings are available for maximum torque ranges from 420 to 4000 N·m (310 to 2950 lb-ft) and for maximum engine speeds of 7000 to 10,000 rpm.

For more information, circle 3

Intelligent converters

Intelligent frequency converters from **Flo-tech** produce an analog output signal that measures and calculates the flow rate of a turbine flowmeter. The precise, field-programmable converters offer smooth integration with a variety of data-acquisition devices including PCs



and PLCs. Microprocessor-based, the converters are offered with either a 4-20 mA or 0-5 V dc output signal. During operation, the units convert the turbine meter pulse output into a frequency signal for processing.

For more information, circle 4

Data acquisition

Dataforth's isoLynx SLX200 data-acquisition system implements industry-standard Modbus remote telecommunications unit and transfer control protocols, enabling



communication with a variety of existing third-party software drivers and human-machine interface/supervisory, control, alarm, and data-acquisition packages. The SLX200 is a modular, fully isolated system that offers improved reliability, accuracy, and isolation for a range of rugged industrial applications. Able to interface with more than 650 analog I/O modules, the SLX200 offers flexibility for factory automation, process control, test and measurement, machine control, and data-acquisition applications. Other features include support for two analog scan modes and analog input protection of 240-V ac continuous. Temperature range is -40 to +85°C (-40 to +185°F), and the system operates from +5 V dc with no modules installed.

For more information, circle 5

Laser software

Riegl USA uses a 3-D-RiScan Pro software update in its Z-Series line of 3-D laser scanners. The software is used to capture, store, and manipulate scan data in a user-friendly project structure, according to the company. The update includes functions that increase usability and improve scan data handling with features such as the ability to merge scans in 3-D in the field to preview shadow areas that may require additional scanning for full coverage. The 3-D RiScan Pro also handles high-resolution photogrammetric functionality with a high-resolution digital camera mounted on top of the laser scanner to take a series of photos covering the scan data's field of view. The project-based system stores these images as well as scan data and signal points. Benefits include improved accuracy of merged scans in a project, versatility, the ability to embed scan data into a global coordinate system, and the capacity to construct objects based on point cloud data.

For more information, circle 6



Distance sensor

Next-generation rugged, high-performance laser distance sensors for noncontact measurement of solid, semi-solid, and most fluid surfaces are offered by **Metrology Resource**. The Class II, eye-safe MR L-1 distance laser sensors are available for measurements from 0.67 to 660 ft (0.2 to 201 m). Accuracy varies from ± 0.06 to 0.1 in (± 1.5 to 2.5 mm), depending on sensor, and measure-

ment time is 0.3 s. Applications include spotting of items such as cranes and cages in mine shafts, distance measurement to military targets, profiling railway tunnels and caverns, distance of material-handling equipment such as conveyors, and level measurement in tanks or silos. An RS232 or RS422 serial port is included for **Microsoft** Windows-based communication, and operating temperature range is -40 to $+122^{\circ}\text{F}$ (-40 to $+50^{\circ}\text{C}$) with an optional built-in heater available for lower-temperature operations.

For more information, circle 7



Dual-wavelength camera

Sensors Unlimited offers the 640 x 512 pixel resolution, dual-wavelength SU640SDVVis-1.7RT Visible-InGaAs area camera featuring a large format sensor with high sensitivity that captures images from both the visible and the short-wave infrared radiometer (SWIR) wavelengths from 15.7 to 66.9 μm (0.4 to 1.7 μm). The focal plane array simultaneously images in both wavelengths, providing a recognizable combined image with high resolution. The compact camera operates across visible and SWIR spectral range with a 100% pixel fill factor. The video camera has both EIA-170 analog and simultaneous 14-bit digital video CameraLink compatible outputs. Features include factory-set non-uniformity corrections at eight operation settings at room temperature, individual pixel correction, external triggering, and windowing.

For more information, circle 8



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Waterproof borescope

The ValuFlex borescope from **Lenox Instrument** is a portable, flexible instrument that delivers bright, high-resolution images for viewing internal or hard-to-reach areas. The series is suitable for inspection of engine and body panels in the construction equipment, industrial machinery, and marine industries. The ValuFlex features a flexible shaft that holds its shape to view internal or limited-access areas. The lightweight, waterproof probe is coated with PVC interlocking armor for improved strength and may be immersed in water, oil, or gasoline. Features include an 8 mm (0.31 in) diameter; 1 or 2 m (3.3 or 6.6 ft) length, depending on model; configuration with either a 3.5-V battery handle or with a 12-V rechargeable pack; focusable eyepiece for clear images throughout the 50° field of view; and a fiber-optic bundle for bright illumination.

For more information, circle 9



Motion analyzer

Polytec offers a tool for precise 3-D dynamic characterization of microelectromechanical systems and micro-optoelectromechanical microstructures. An integrated probe head microscope, the MSA-400 Micro System Analyzer can measure and display micro-

structure motions, simplifying identification of resonances in all three dimensions. An optional second laser is available to measure differential out-of-plane vibrations between scanned and fixed locations. Benefits include improved engineering productivity, according to the company, as well as enhanced performance over stroboscopic video-only solutions. The analyzer detects out-of-plane and in-plane resonances using laser-Doppler techniques and can measure transient processes using wide-band excitation.

For more information, circle 10



Gas-fueled burner

Southwest Research Institute

developed a system to quickly and precisely age catalytic converters at elevated temperatures for extended periods of time, with or without the introduction of oil to simulate engine oil consumption. The FOCAS system is a gasoline-fueled burner with an integrated, computerized control system designed to realistically simulate the flow of exhaust gas from an engine under a variety of conditions. Five main subsystems, including the burner, optional oil injection subsystem, blower, heat exchanger, and a control system, comprise FOCAS. The computer controls air:fuel ratios by modulating the fuel delivered to the injector under an open- or closed-loop control configuration. System software provides the user an interface to develop catalyst-aging cycles, investigate the effects of oil exposure on catalysts, and to run various accelerated thermal catalyst aging cycles.

For more information, circle 11



Exhaust flowmeter

The 2-in (51-mm) VE502 and 3-in (76-mm) VE503 exhaust flowmeter system was designed by **J-TEC Associates** to measure volumetric exhaust gas flow for emissions testing. Features include minimal pressure drop with decreased effect on engine performance during operation, all electronic with no moving parts, improved accuracy, drift-free performance, high repeatability and durability, and improved maintenance and cleaning. The VE500 series offers a 40:1 turndown ratio and measures flows as low as 0.14 actual ft³/m.

For more information, circle 12



Analysis software

Improved software from **Sensors Unlimited (SUI)** allows control of high-speed windowing functions on the NIR Windowed Snapshot MiniCamera SU320MSW-1.7RT. The software upgrades the company's SUI image analysis software and allows full operational control of the MiniCamera's windowing features. The stand-alone software options include full control of four



preset regions of interest or windows in the center of the frame. Variable windows also can be established through the software interface. The software permits capture of continuous streaming video at speeds up to 10,000 frames/s with the ability to apply one point non-uniformity correction to captured images. The PC-based image acquisition, analysis, storage, and retrieval software includes line profiles, region histograms, and spot meter display features.

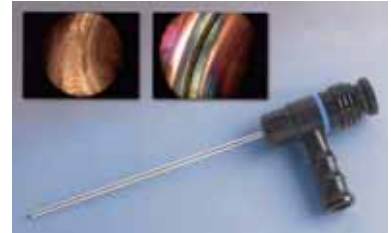
For more information, circle 13

Rigid borescope

Lenox Instrument offers a broad line of high-performance rigid borescopes for remote visual inspection in a variety of commercial applications. The borescopes identify details and flaws as small as 0.001 in (0.025 mm).

Features include stainless steel construction and bright, true-color images. Any type of cavity can be probed because of standard intense fiber-optic illumination as well as a variety of magnifications, fields of view, and probes including direct, forward, oblique, to-the-side, and retrospective. All scopes are video and digital adaptable and are offered in diameters from 4 to 10 mm (0.157 to 0.394 in) and lengths from 177.8 to 1600 mm (7 to 63 in) with optional accessories available.

For more information, circle 14



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Online sensors

Addressing demand for accurate media-compatible pressure sensors that can be delivered quickly, **Senstronics** offers Senstronics Online. Handling all of its pressure and temperature measurement product lines, the tool allows users to configure and purchase pressure sensors for same-day and next-day shipment. The company's products include outputs, fittings, and electrical connectors with variations totaling more than 16,000 possibilities available for assembly and delivery. Other features allow customers to download installation drawings for the configured sensors as well as review purchasing histories, part parameters, or part numbers to facilitate reorders.

For more information, circle 15



Turbine flowmeter

Webster Instruments' CT series turbine flowmeters feature industry-standard analog output for flow and optionally for pressure and temperature. Nine models cover flow ranges from 4 to 350 gal/min (15 to 1325 L/min) at pressures up to 7000 psi (482 bar) and temperatures to 300°F (149°C). Microprocessor design provides linearized flow accuracy of 1% of indicated reading and a response time of 50 ms. An optional built-in bi-directional loading valve features safety discs that relieve overpressure oil internally through the valve, while a shuttle valve integral to the load valve design allows high-pressure sensing from one port, regard-

less of flow direction. Flow, pressure, and temperature signals are industry-standard 0-5 V dc or 4-29 mA for integration with panel meters, programmable logic controller input, or data-acquisition equipment.



For more information, circle 16

Transmission test

Southwest Research Institute's Virtual Vehicle Transmission Test Cell (VVTC) helps engineers evaluate prototype powertrain components singly while simulating other components that still may be in the design

stage. The VVTC uses hardware-in-the-loop technology to determine how a powertrain or a powertrain component would perform if it were integrated into a vehicle of specific characteristics. An electric motor simulates an internal-combustion engine, while a second motor simulates road load, grade resistance, and vehicle inertia. Using computer modeling and electronic control systems, the VVTC can simulate the characteristics of an engine and vehicle without the prototype of the vehicle ready for integration with a new transmission to help engineers evaluate the entire powertrain's performance.

For more information, circle 17



Embedded test circuits

ArraytestMaker from **Genesys Testware** offers automated insertion of embedded test and repair circuits for memory into system integrated circuit (IC) designs. The solution enables IC designers to automatically insert embedded test and repair circuits during the logic synthesis phase of design implementation, eliminating both the before and after insertion steps as well as the validation step typically needed to verify the preservation of original functionality. ArraytestMaker users can specify the hierarchical path name of each memory instance in the design, and the solution also supports the sharing of an embedded test and repair circuit between several memories at different levels of hierarchy to reduce area overhead. Other benefits of the Genesys solution include reduced costs and turn-around time and a reduction in errors.

For more information, circle 18

Conveyor belt scale

ConveyWeigh offers a conveyor belt scale system for weighing applications. The 1i single-idler belt scale is suitable for bulk solids and the mining and aggregate industries. Features include a weighbridge built from heavy steel to offer a rigid platform as well as a heavy-steel speed sensor including a solid-steel wheel, greaseable industrial bearings, and the use of a noncontact speed-sensing element. The BeltPro integrator offers microprocessor-controlled electronics with software that ensures smooth operation and calibration routines housed in a NEMA 4X galvanized steel enclosure. Systems are built application specific and are prewired for installation.

For more information, circle 19

Ratio measurements

Agilent Technologies offers total jitter (TJ) measurement capability on its bit error ratio testers, giving research and design engineers the ability to perform TJ measurements more than 40 times faster than with existing measurement solu-



tions. Users can perform device characterization while increasing the development time of products. The technique uses a statistical algorithm that enables engineers to run TJ measurements more often. Users need to select the desired bit error ratio and the resolution accuracy. The uncertainty of the measurement is also determined and defines the significance of the result. TJ measurement is important to ensure the proper working condition of high-speed devices, according to the company; the measurement works on any jitter distribution.

For more information, circle 20

Product overview

An eight-page, four-color product overview from **Webster Instruments** details the company's product line, including portable hydraulic testers, turbine and positive displacement flowmeters, pressure transducers, panel readouts, inline flow indicators, hydraulic test stand instrumentation, pressure test kits, pump test kits, and portable/industrial data-acquisition equipment. Technical and dimensional data as well as product photos are also included in the catalog. Portable testers from the company allow users to safely simulate operating conditions using a built-in load valve to pinpoint the fault or validate component operation in repair and production environments. Benefits include decreased downtime and the subsequent costs.

For more information, circle 21

Compact controller

The CC-10 wide-range vacuum gauge from **Televac/ETI** is a compact, self-contained gauge that incorporates dual-sensor technology with a controller and allows seamless measurement from atmospheric pressure to ultra-high vacuum on a single vacuum port. The product features a 1-10 V dc analog output, RS485 digital communications, three adjustable set points,

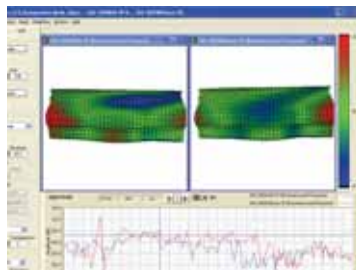
and a digital display that can be read in Torr or Pascal. All operating parameters can be checked from the membrane panel on the front of the electronics module. The blue-green segmented LED provides pressure indication, and LEDs indicate status for the three set point relays.

For more information, circle 22



Sound visualization

SenAH, v.3.0 from **SenSound** provides steady-state integrated sound visualization, enabling users to see sound and its contributing vibration modes in 3-D space and time. Compared to previous versions, it features improved accuracy in reconstruction of the sound field generated by an object and the ability to identify the responsible vibration modes. It also boasts



greater speed and ease of use, and the ability to make A/B comparisons. The software is used to investigate noise transmission through 3-D objects such as instrument panels, door panels, and cabin interiors, as well as objects such as pumps and HVAC units. The company's SenNS 3.0 is a similar software technology used for testing transient and non-stationary objects. It aids in diagnosing noise sources during an engine run-up, slamming doors, and other sources of noise that change over time or with rpm.

For more information, circle 23

High-speed camera

The **MotionXtra HG-TH** from **Redlake** offers a multi-head, high-speed digital-imaging solution. The small, tethered camera heads fit into hard-to-reach locations such as under seats and in foot wells, or onto mounting surfaces. The system can feature one to four camera heads, and 2 to 8 GB of memory for up



to 19.2 s of record time. Each camera head features 752 x 564 maximum resolution at 1000 frames/s, and 1000Base-T Ethernet for fast downloads. The controller and cameras withstand forces up to 100 g.

For more information, circle 24

Data acquisition

A two-channel A/D board from **CyberResearch** acquires 14-bit data at rates up to 65 MS/s on each channel or 130 MS/s on a single channel. It is suitable for applications such as testing systems and capturing transient signals. The



PCIDAQ 02M130 A/D board is more than 20 times faster than any of the company's other A/D boards. The system features a signal-to-noise ratio of 66 dB at ± 5 V, 62 dB at ± 1 V.

For more information, circle 25

Hardness tester

Uson L.P.'s InSite-HT multichannel component hardness tester, part of the Zetec series of eddy current testers, effectively verifies hardness of metal parts and detects flaws such as cracks or defective threads. They are configurable for inline testing of a vari-



ety of metal components such as gears, axles, bearings and castings, engine subassemblies, pistons, fuel systems, wheel hubs, and brake parts. Features include built-in language selection, network adapter, and automatic voltage switching. The system can communicate with material-handling systems and programmable logic controllers. It is offered in two-, three-, and eight-coil versions.

For more information, circle 26