

Testing

Data-acquisition system

Larson Davis' digital sensing system (DSS) is a multi-channel, multi-drop, high-speed data-acquisition system



using digital sensor interface transmitter (DSIT) technology to optimize the use of digital technology in structural dynamics and modal analysis measurements. The DSS will measure up to 64 channels per chassis with remote DSITs performing 24-bit analog-to-digital conversion near ICP accelerometers and transmitting signals back digitally via ribbon cable. System features include 110 dB dynamic range, TEDS compatibility, Ethernet communication, and fanless operation.

For more information, circle 180

Thermometers catalog

Palmer Instruments offers a catalog of industrial thermometers that includes the company's new line of Sky Blue economy industrial



thermometers. Sky Blues are inexpensive, mercury-free, and environmentally safe with lead-free glass, according to the company, making them suitable for HVAC and building construction applications. They are available in 3.5 and 6 in (89 and 152 mm) stem lengths and in temperature ranges up to 300°F (149°C) and offer flex angle adjustment, allowing for any required viewing angle. The catalog also features a range of

"red-reading" mercury-filled economy industrial thermometers, classic industrial thermometers, and air-duct thermometers.

For more information, circle 181

Noncontact measurement

CAESAR DataSystems' Microdac B1A one-channel telemetry system provides a simple and accurate method of measuring strain, torque, thermocouple, or voltage signals on engine rotating shafts or other moving machinery. Applications include truck, off-highway equipment, and ATV drive shafts, steering linkages, and

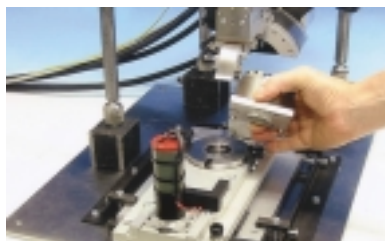


shipboard propeller shafts. The system operates in a completely contactless mode. Power is transferred inductively via a radio frequency signal between the moving and static component. A transmission coil wrapped around the shaft is used as an antenna, which transmits power to the rotor electronics and return signal transmission to the stator. The complete system includes rotor electronics, inductive transmit-rotate head, and signal conditioner, and it comes with all components necessary for several applications.

For more information, circle 182

Stress testing

The rotation and positioning system from **American Stress Technologies, Inc.** aids in measuring residual stress and retained austenite processes. The system



offers a bottom plate with motorized rotation and a removable part holding the device. Parts can be quickly mounted, measured, removed, and remounted.

For more information, circle 183

Heat flowmeter

Kyoto Electronics' HFM-215 heat flowmeter is manufactured by **CSC Scientific Co., Inc.** and can process data from up to 12 different



sensors, showing the results on a 5.5-in colored digital display through data logging setup, trend, or bar graph. To simplify data processing, the unit offers e-mail, Web, and Ethernet capabilities; standard floppy disc drive; and data-capture software. The HFM-215 can evaluate and manage thermal insulation, energy control, and the in/out balance of heat flow. A rechargeable battery and ac adapter are included.

For more information, circle 184

Data recorder

TEAC Corp.'s LX-Series instrumentation data recorders offer noise and vibration engineers and technicians solid-state recording media to acquire, store, and retrieve test data. With a mass less than 10



lb (4.5 kg) and a 12- x 2.5- x 8-in (305- x 64- x 203-mm) footprint, LX-Series recorders are tested to MIL-810E for operation in harsh shock and vibration environments. Using the constant current excitation input amp card, users can connect constant current accelerometers and microphones directly to the recorder, which can read transducer sensitivity and

calibration values. Other features include the ability to read eight channels, each with a bandwidth of 20 kHz, at 48 kHz sampling frequency, and a variety of start/stop trigger modes that allow the use of recording time and media.

For more information, circle 185

Vibration measurement

An annular shear sensor element that presents a high immunity to base strain and transverse acceleration is used in



the 8798A accelerometer series from **Kistler Instrument**. This ceramic shear design enables precise vibration measurements in three mutually perpendicular directions. An advanced hybrid charge amplifier design provides a wide operating frequency range. The series is available in ranges of 5, 10, and 50 g, with sensitivities of 1000, 500, and 100 mV/g respectively. The three built-in IEPE electronic impedance converters provide a low-impedance voltage output signal. The low weight of the unit is desirable in measurement applications on small structures where mass loading must be kept to a minimum.

For more information, circle 186

Data platform

By isolating all front ends from the computer and combining features of both transient and data recorders, the DM3000 data platform from **Western Graphtec** is said to improve efficiency and reaction time. Features include max/min reporting, triggering controls, and data search capabilities. Available in 8- or 16-channel plug-in configurations, the platform



allows users to mix or match voltage (up to 500 V), temperature, sound or vibration, rpm, strain, and logic inputs. A portable monitor and printer are available for off-line interrogation or local documentation, while an internal 40 GB hard drive is available to store all data at sampling rates up to 1 μ s per channel for post-capture analysis.

For more information, circle 187

High-speed dynamometers

A new generation of eddy-current dynamometers from **Magtrol** were designed to better serve the demands of high-speed electrical motors. The dynamometers are available in torque



ratings as low as 150 mN•m (0.11 lb•ft) with speed ranges up to 70,000 rpm. Higher torque ratings up to 20 N•m (15 lb•ft) with the capability to reach speed ranges up to 65,000 rpm are optional. An optical speed sensor and torque measurement providing 0.3% accuracy are integrated into the dynamometer, or Magtrol's TM torque sensor can be mounted in line with the dynamometer for a system accuracy of 0.1% and speeds up to 50,000 rpm.

For more information, circle 188

Emissions analysis

Sensors, Inc.'s Semtech NO/NO₂ 200 emissions analysis unit provides accuracy within $\pm 3\%$ of the reading or 15 ppm, whichever is greater, for both NO and NO₂. For both gas constituents, resolution is 1 ppm and linearity is $\pm 1\%$ of the reading or 5 ppm, whichever is greater. The measurement system uses an electrodeless lamp, which emits discreet spectral lines corresponding to



adsorption wavelengths for NO and NO₂, eliminating the need for a converter. The use of specific wavelengths also eliminates the risk of interference from water vapor in the non-dispersive ultraviolet analyzer. The unit can be used to monitor engine performance of vehicles in use, to research and develop engines and emissions control equipment, and to test in end-of-line production environments.

For more information, circle 189

Process solution

The ICE-flow is an end-to-end process solution from **nCode International** for applications where massive amounts of test data have to be acquired, validated, processed, and distributed to others within an enterprise in a traceable way. The first



release targets the road load data (RLD) process, offering an expected 50% improvement in efficiency. Combining integration, communication, engineering, and workflow tools, ICE-flow is a scalable environment configurable to specific data acquisition, processing, reporting, and process management tools. It provides a system for management of the RLD process and makes full use of satellite communications to get data from the field, into the system, and back out to any authorized reader.

For more information, circle 190

Testing

Test kits

Pomona Electronics and **Wavetek Meterman** have teamed up to offer two deluxe test kits designed for electronic and industrial applications that feature



power, accuracy, and affordability in a single package, according to the companies. The PM 1 includes a full-featured Meterman 37XR Digital Multimeter (DMM) with true-rms and component and logic test capability, plus a 17-piece Pomona 5674B Electronic Test Lead Kit with case for fast and accurate electronic tests and measurements. The PM 2 offers a Meterman 38XR DMM with true-rms and optical PC cable and software interface, plus a 13-piece Pomona 5904 Deluxe Industrial DMM Test Lead Kit built for industrial use.

For more information, circle 191

Display panel

The BB-3 from **Bosch Rexroth Corp.**'s Mobile Hydraulics business unit is designed for real-time parameter



adjustment and diagnosis during the development and optimization of prototype and series mobile machines. Featuring a membrane keyboard with

24 defined keys and four-line liquid crystal display with up to 16 characters per line, the BB-3 handheld display provides automatic recognition of the microcontroller, communication via serial interface, and automatic recognition of baud rate. BB-3 communication capabilities include setting, measurement, and display of microcontroller/machine dependent parameters; measurement and display of status and error messages; fault finding; and storage of parameter sets in the control panel. Voltage to the unit is supplied via connection to machine voltage. Common applications include setting ramp values and PID loops for load control as well as other application-based parameter adjustments.

For more information, circle 192

Blow-by flowmeter

The VH563 all-electronic handheld flowmeter from **J-TEC Associates, Inc.** was developed to measure engine blow-by.



Features include minimal pressure drop with little effect on engine performance during operation; no moving parts; improved accuracy, repeatability, and durability; drift-free performance; easy maintenance and cleaning; a 40:1 turndown ratio; and measurement of low flows down to 0.14 ft³/min (4 L/min).

For more information, circle 193

Calibration software

Synchro-Start Products' all-purpose calibration tool (ACT) is available in CD-ROM format, which includes a

Wizard for accurate calibration of the APECS and EPS series of programmable controllers. The CD contains application programs for APECS 3000, 4000, 4500, and 5000 controllers and the EPS 1000 equipment-protection system as well as demo mode for each program and user's manuals for each product series. ACT software operates on any IBM-compatible PC equipped with a CD-ROM drive.

For more information, circle 194



Bolt measurement

The **StressTel BoltMIKE III** ultrasonically measures the elongation of installed bolts and fasteners. Ultrasonic measurement of bolt elongation determines the true bolt



stress and is often used when traditional methods are limited by unpredictable operational values such as friction and lubricant. Features include an easy-to-read display, rapid calibration and set up, and automatic temperature compensation, all of which ensure repeatable and accurate fastener tension measurements in applications such as injection molding and power generation. Measurement data can be uploaded and downloaded directly to a PC for quick documentation and reporting.

For more information, circle 195

Diode lasers

The DLR series of fiber pigtailed 960-nm (38- μ m) direct diode lasers systems from **IPG Photonics Corp.** feature output powers of over 100 W, air cooled operation, a compact design, and



improved reliability over a range of ambient conditions. Units offer diode lifetime greater than 100,000 h; wall-plug efficiencies greater than 30%; and are suitable for soldering, plastic welding, heat treating, and sintering applications. DLR series lasers are available in a completely integrated, rack mount/table top enclosure that includes a fan-based cooler, current control, power monitor, back reflection protection, a dc power supply, red aiming diode, and controls and interfaces. Units can be operated either in a continuous or pulsed mode and operate on a standard 110/220 V line.

For more information, circle 196

Temperature calibration

Hart Scientific has consolidated its Calibrate-*it* and Generate-*it* software systems into a package called MET/TEMP II. The software offers automated calibration and can be integrated with **Fluke Corp.**'s MET/



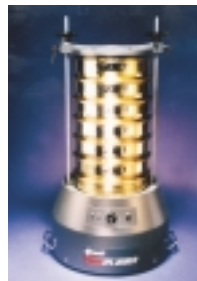
TRACK software to provide equipment tracking and asset management capabilities. MET/TEMP II supports a variety of Hart thermometer readouts and can calibrate most temperature sensors, with a capacity of 100 sensors at once. It tests thermocouples, RTDs, SPRTs, thermistors, and liquid-in-glass thermometers, and can use fixed-point instruments (such as TPW cells) as reference heat sources. In addition, the software can calibrate electronic heat sources, such as drywells, and performs ITS-90 coefficient and residual calculations and generates corresponding tables and reports.

For more information, circle 197

Sieve shaker

Endecott's EFL 2000/2 sieve shaker, manufactured by **CSC Scientific Co., Inc.**, is a rugged shaker suited for on-site and heavy-duty applications. It is equipped with a dynamic power source to ensure the sieves and sample are provided the right vibration for consistent, quick, reproducible tests. A 60-min timer and clamping system allow sieve tests to be set up in seconds, and vertical movement is fixed to ensure samples spend a maximum amount of time seeking apertures instead of being suspended in mid-air. The shaker can be used for 8- or 12-in (203- or 305-mm) sieve tests and features non-corrodible, non-metallic springs and a durable motor for maintenance-free testing.

For more information, circle 198



Instrumentation system

Serving as the software core of **Sakor Technologies'** DynoLAB PT and DynoLAB EM, DynoLAB Test Executive is based on **National**



Instruments' LabVIEW and Sakor's proprietary software architecture. Version 4.0 features a profiling module that allows for more precise simulation of actual test conditions while the unit is on the test stand. The PT system provides reliable testing of engine and drivetrain components in performance, durability, and quality control applications through the integration of external devices such as dynamometers, throttle actuators, spark and fuel controllers, combustion analysis systems, emissions analyzers, and other smart I/O devices. EM is specifically for testing electric motors and electrical device applications, including motors and motorized devices, alternators and starters, generators, HVAC systems, pumps, and transmissions and gearsets.

For more information, circle 199

Noncontact metrology

The Holomapper metrology instrument from **X-Rite** (formerly **Coherix**) measures the surface flatness of precision-machined metal parts, including wheel hubs, brake rotors, wheel clamping surfaces, and transmission components. Using patented holographic imaging techniques, Holomapper generates high-resolution, color-coded, 3-D images that reveal part imperfections. It measures more than one million data points over a surface area up to 12 x 12 in (305 x 305 mm) in less than 5 min.

For more information, circle 200



Testing

Vibration and noise analysis

Dactron's Focus portable dynamic signal analyzer is a multi-channel, real-time analyzer, with 4 to 20 analog inputs



for vibration and noise analysis. Its portable design makes it suitable for in-vehicle testing. The unit can do online analysis while streaming data to the computer's hard disk, so there is no need to wait for post-processing to see critical results. Using the high-speed USB 2.0 interface, it throughputs to the PC's disk, or to a USB connected disk drive, at a rate of over 1.6 mega-samples per second. The system can stream the data from up to 16 input channels to disk with all channels running at a rate of 96,000 samples per second. All inputs and outputs are 24-bit resolution, protected by both analog and digital anti-alias filters, to deliver high-accuracy measurements.

For more information, circle 201

Radiator test bench

A radiator test bench from Imtech Deutschland provides thermal shock testing on the radiator liquid side. Controlled coolant inlet temperatures from -40 to +120°C (-40 to +248°F) with trapezoidal temperature ramps are provided for up to six or more test samples in parallel. The design and auxiliary equipment layout enables up to 10⁵ cycles for thermal stressing. Needed floor space is 15 m² (160 ft²). The flow rates per sample supply line can be adjusted from smaller heater cores to heavy-duty truck radiator sizes.

For more information, circle 202

Test probes

The Model 6580 extended-length insulation-piercing probe from Pomona Electronics, a division of Fluke Corp.,



offers a reach up to 24 in (610 mm) and heat-resistant Teflon tubing capable of withstanding contact with hot surfaces without burning. The probe is suited for test and diagnostics as well as other measurement applications up to 60 V dc in hard-to-reach places. The product makes access to wiring or cables in congested engine compartments and under-dash wiring panels easier.

For more information, circle 203

Motion imaging

The OmniSpeed LR400 motion imaging system from Speed Vision Technologies, Inc. continuously records high-speed



visual phenomena in slow motion for more than one hour. The system records directly to high-capacity disks in a portable, rugged housing. It is easily operated using a high-bright touch-screen LCD to access a Windows-based GUI. Real-time viewing, recording, and playback, as well as complete camera and system control, are provided from a single screen.

For more information, circle 204

Transducer information

LMS International's testing solutions are integrated with PCB Piezotronics' transducers equipped with Transducer Electronic Data Sheets (TEDS). The

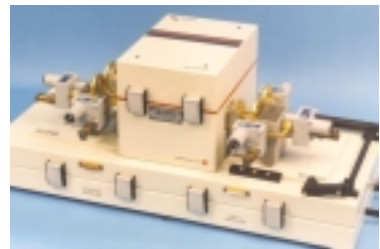


self-identifying transducers include geometry-related information and will save time on instrumenting a test structure, identifying coordinates, documenting test data, and creating geometry. TEDS support adheres to the IEEE P1451.4 standard, which defines the template that organizes typical transducer information such as type, serial number, and sensitivity. TEDS-compliant data-acquisition systems read this information from the transducer and store it in the measurement setup without operator intervention.

For more information, circle 205

Compact environmental chamber

The ThermoFixture compact environmental chamber from Temptronic is a compact environmental test chamber for the fast, convenient testing of sensors,



ECUs, sample parts, and critical electronics at precise temperature from -80 to +225°C (-112 to +437°F) at the benchtop or test station. With precise temperature control directly at the sample or PC board case, the ThermoFixture chamber provides uniform temperature control across the PC board, ECU, or sensor to be tested. Suitable for thermal cycling, thermal

shock, environmental testing, or any thermal test application, the system performs with fast temperature change rates using the ThermoStream high-volume thermal airstream system.

For more information, circle 206

Film-to-digital scanner

Visual Instrumentation Corp.'s high-resolution automatic 16-CVS film-to-digital scanner is designed to transfer 16-mm (0.63-in) high-speed data film captured in full-scale



vehicle barrier, Hi-g sled, airbag deployment tests, and related safety testing applications. The 16-CVS automatic scanner handles both color and monochrome films with digital resolution up to 4.2 million pixels per image frame. Once captured, these digital images are easily transferred to most popular file formats including AVI, TIFF, JPEG, and MPEG2 for analysis, presentation, distribution, archival, and other formats as required. Options include Visual Fusion 2-/3-D motion-analysis software. When included with the 16-CVS, users have a complete and fully integrated turnkey system. Visual Fusion detects and tracks moving objects in a series of images and provides position, velocity, angle, acceleration, and size vs. time. It also handles NTSC & PAL video formats and provides users with advanced motion-analysis software.

For more information, circle 207

Transient recorder

The MC900 transient recorder analyzer from **Micro Control Inc.** is a complete system for fastener performance recording and analysis. Combination of the standard MC900, which can measure signals from various sensors (including torque, angle, load cell, and pressure), with its optional ultrasonic tension measurement system provides a powerful tool for fastener engineers. It is suitable for studying threaded fastener joint designs or dynamic analysis of nut-runner operations on the plant floor or laboratory environment. It can measure torque, tension, elongation, and angle of rotation of a threaded fastener in an actual joint without altering any joint characteristics. Using the "Glue On" Ultrasonic Tension Sensor, the tension or elongation on a fastener can be measured dynamically or statically. Its hardware and Windows software enable the user to set up, capture, view, store, and analyze the transient signals on the same unit with relative ease.

For more information, circle 208



Gas analyzers

California Analytical Instruments, Inc. manufactures gas analyzers commonly used for exhaust emissions



research. These analyzers include flame ionization detectors, chemiluminescent (CLD), and nondispersive infrared. The analyzer

techniques are combined with a unique software package to provide complete emissions analysis systems. The firm's new microprocessor-based gas-analyzer product line includes the heated CLD with a self-contained chiller to provide both wet and dry measurement capabilities.

For more information, circle 209

Combustion analyzer

The DEWE-2010-CA combustion analyzer from **Dewetron Inc.** is a portable system for tuning engines' electronic control units (ECUs). Proper ECU tuning is critical for the prevention of knocking and for fuel-efficient engine operation. The system has integrated



charge amplifiers, allowing direct connection of popular sensors, particularly **Kistler** combustion sensors. The system also accepts crankshaft tach signals with precision, both from the standard crankshaft tach output (60-2), or a special high-resolution 0.1° crank angle sensor. If only the built-in crankshaft sensor is available, the analyzer can interpolate greater resolution from the sensor in real time. In addition to the crankshaft signal, 15 more inputs can be recorded and displayed simultaneously. All inputs are referenced to the crankshaft's timing, which varies continuously as the engine runs, via automatic adjustment of the sampling rate to maintain an absolute correlation of data to the crankshaft position.

For more information, circle 210

Testing

Gas analyzers

A family of analyzers from **GTR Tec** streamlines the sample analysis process. A single system can simultaneously analyze blended gas components; gases including oxygen, nitrogen, and CO₂; and gases, vapors, and liquids. The system optimizes test conditions via the humidification of



either or both sides of the test cell. Highly accurate results are achieved with sensitive detection equipment (FID, TCD, or both). The technology combines a permeation unit with a chromatography system to separate gas components for simultaneous analysis. Proprietary test-cell configurations are easily modified to analyze gases, liquids, vapors, and volatile compounds, and to allow for measurement from 5 to 150°C (41 to 302°F). Operations are controlled by a computerized system. The analyzers have been used for the development and evaluation of gasoline tanks, fuel supply systems, fuel cells, and high-performance membranes and polymers.

For more information, circle 211

Leak detector

The HLD5000 refrigerant leak detector from **INFICON** ensures enhanced quality, yield, and environmental safety during production, quality assurance, and servicing of refrigerant systems. The detector uses an infrared absorption sensor system that will not



trigger a false alarm, detects leaks of less than 1 g (0.03 oz) per year, and responds in less than a second. It detects various refrigerants, including industry standards of R134A, R407C, and R410A, and can be converted for five different refrigerant gases.

For more information, circle 212

Exhaust measurement

Quantum Technologies' Advanced Vehicle Concept Center is using **AVL's** BMD/DVE (bag mini diluter/direct vehicle

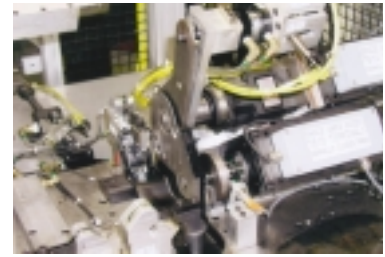


exhaust) system for emissions testing of passenger vehicles and commercial trucks with LPG and CNG engine conversions for global OEMs. The system enhances exhaust flow measurement accuracy compared to previous flow measurement devices. The AVL DVE-150 is a compact, cost-effective, direct vehicle exhaust unit that features two flow measurement devices, an exhaust shut-off ball valve, a control and signal processing enclosure, and flow ductwork—all packaged on a lightweight framework that is easily positioned behind the vehicle. It is designed for seamless integration into the AVL BMD-150 bag mini diluter and GEM-150 control software.

For more information, circle 213

Seat-latch testing

A test system from **Interwest Automation** measures the actuation force required for seat latches and other components through their full range of motion. The system is based on the capabilities of torque and electronic control equipment made by **Promess, Inc.** The seat-latch application includes a motorized torque control (MTC) system, its electro-mechanical assembly controller (EMAC), and signature analysis technology. During the test, a seat latch or similar component



is placed in the test fixture and moved through its entire range of motion by an MTC-powered effector. The system can turn to a torque, turn to an angle, effort test, function test, or perform any combination of these tests. In each test, a real-time torque/angular position "signature" is generated and compared to a nominal curve by the EMAC.

For more information, circle 214

Data acquisition

The DaqBook/2000E and WaveBook/516E Ethernet-based data-acquisition devices from **IOtech** can continuously acquire data and transfer it to a PC via Ethernet, while operating at full speed and



with no loss of data. The units can transfer 100% of the acquired waveform information to a PC in real time, a capability made possible by a Linux/PowerPC-based Ethernet engine. Since Ethernet supports distances up to 100 ft (30 m), it allows the instrumentation to be located at remote sites from the PC. For example, instrumentation can be located within a vehicle inside a wind tunnel, while the acquired data are viewed on an Ethernet-linked PC in the control room.

For more information, circle 215