

NEW PRODUCTS

The descriptions of the new products listed in this section are based on information supplied to us by the manufacturers. PHYSICS TODAY can assume no responsibility for their accuracy. To facilitate inquiries about a particular product, a Reader Service Card is attached inside the back cover of the magazine.

LAWRENCE G. RUBIN

FOCUS ON SENSORS

Standard Platinum Resistance Thermometer

Hart Scientific's model 5699 high-temperature metal-sheath standard platinum resistance thermometer (SPRT) meets the resistance ratio requirements of the International Temperature Scale of 1990 (ITS-90). It is thus an internationally approved transfer standard for all temperatures within its range of 200 to 660 °C. Ordinarily, SPRTs cannot be used above 450 °C in environments such as metal block furnaces—often the best heat sources for high-temperature calibration applications—because the surrounding metal contaminates the thermometer's sensor. The 5699 eliminates contamination effects by enclosing the sensing element in two sheaths: one Inconel and one platinum; the Inconel sheathing is 5.56 mm in diameter and 48 cm long. After one year of normal usage, including at 660 °C, the 5699 is stable within 0.01 °C, with 0.003 °C being typical. A fifth wire for grounding is added to the four-wire sensor to help limit electrical noise. *Hart Scientific, 799 East Utah Valley Drive, American Fork, Utah 84003*

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Pressure Transducer

The PX624 series pressure transducers from Omega combine a photo-optical sensor with the electronic technology available from surface-mounted devices. The transducers are available in absolute, gage, vacuum, or compound ranges, with spans from 0–2 psi (133 mbar) to 0–10 000 psi (670 bar). The accuracy is 0.05% of span, including linearity, hysteresis, and repeatability parameters. Resolution is 0.01% of the full-scale output of 5 VDC. For absolute pressure ranges of up to 2 bar, it is said that long-term stability is ensured by the inclusion of a getter material in

the evacuated reference chamber. The zero and span adjustments are accessible without removing the cover. Each unit is furnished with a 20-point certificate of calibration traceable to the National Institute of Standards and Technology. *Omega Engineering, One Omega Drive, P.O. Box 4047, Stamford, Connecticut 06907-4047*

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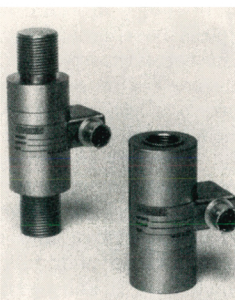
In-Line Load Cell

Sensotec has announced the RM in-line tension-only load cell which features a combined linearity and hysteresis of 0.15% over 18 ranges, from 100 to 200 000 pounds. The RM has a 50% overload capacity rating and full-scale deflection of only 0.01 mm. It accepts excitation up to 15 VDC or AC, with a standard output of 2 mV/V and optional high-level outputs of 0–5 VDC and 4–20 mA. This model can be configured with integral male and/or female threads, and a variety of tongue or yoke shackles and rod end bearings. *Sensotec Inc, 2080 Arlingate Lane, Columbus, Ohio 43228*

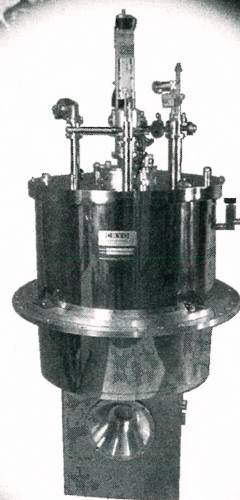
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Thin-Film Resistance Temperature Detectors

Lake Shore Cryotronics has introduced a series of high-temperature Cernox thin-film resistance temperature detectors (RTDs), cryogenic sensors that can withstand vacuum chamber bake-out temperatures to 140 °C. Cernox RTDs combine small size, fast thermal response time, and



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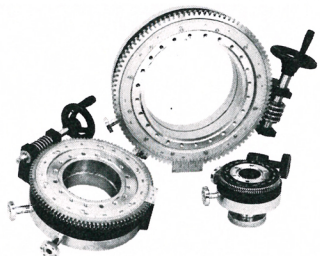
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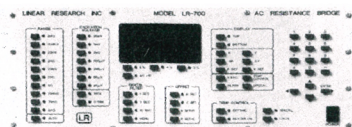
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wide, usable temperature range (0.3 to 420 K) with excellent resistance to repeated thermal cycling, magnetic fields, and ionizing radiation. The devices consist of a ceramic oxynitride thin-film layer over a sapphire substrate, enabling the sensor to be attached directly to an experiment; a metallized backing allows the device to be soldered in place.

High-temperature Cernox devices are identified by an HT extension to the model number. Mounting and packaging options include the unpackaged chips, a hermetically sealed ceramic package with many variations, and a copper canister package. *Lake Shore Cryotronics, 575 McCorkle Boulevard, Westerville, Ohio 43082*

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pH Probes

Sentron's three new series of pH probes incorporate an ion-sensitive field effect transistor (ISFET) as the pH-sensing device. A silicon microchip allows for the design of non-glass, virtually unbreakable probes that deliver stable readings in less than five seconds. The probes can measure both low conductivity and highly concentrated or polluting samples. The Red-Line series of probes is for general purpose applications where sample temperatures do not exceed 60 °C; the Hot-Line series is for operation at temperatures up to 105 °C and in contact with more aggressive chemicals; and the Stream-Line series incorporates a flow-type reference. Within each series, there is a variety of probe designs: the Standard ISFET probe for general pH testing; the ConeFET conical probe for measurements in viscous samples; the SurFET probe for direct measurement on flat surfaces; and the LanceFET probe, whose pointed tip allows easy penetration in dense samples and semi-solids. *Sentron Inc, 7117 Stinson Avenue, Suite C, Gig Harbor, Washington 98335*

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Electrostatic Voltage Sensors

Trek has announced its newest micro-processor-based DC electrostatic voltage sensors, the model 541 series. These sensors are designed for monitoring critical operations associated with semiconductors, liquid crystal devices, and other electronic assembly processes where static charge accumulation poses a threat to production yields and/or product quality.



The 541 series sensors use a miniature probe, which can be remotely located within an assembly process to provide non-contact, accurate, spacing-independent voltage measurements in either ionized or non-ionized environments. The Trek model 541-1 has a measurement range of 0 to 1 kV, the model 541-2 a range of 0 to 100 V. Both instruments feature 1% accuracy and 0.1% resolution. They include independently programmable positive and negative voltage alarm limits with audible, visual, and external relay contact warning signals and a voltage output monitor. *Trek Inc, 3932 Salt Works Road, P.O. Box 728, Medina, New York 14103-0728*

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Piezoresistive Accelerometers

Crossbow has introduced its new TB series of single-axis piezoresistive accelerometers, specifically designed for automotive test applications and industrial vibration monitoring. The sensing element of the TB series consists of a micromachined silicon mass suspended by multiple beams from a silicon frame. Piezoresistors located in the beams change their resistance as the motion of the suspended mass changes the strain in the beams. One model of an accelerometer is the CLX50TB1Z, with a sensitivity of 10 mV/G (where G equals 9.8 m/s², the acceleration due to gravity), a noise level of 20 μV rms, and a range of 50 G. The output level is compatible with most signal processing equipment. Each sealed element is signal conditioned, precisely aligned in a mounting block and potted, and is shipped with a calibration sheet stating the zero acceleration output and sensitivity. *Crossbow Technology Inc, 41 East Daggett Drive, San Jose, California 95134*

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Force Sensors

Single-point force sensors from FlexiForce are only 0.127 mm thick. Their active sensing area, 10 mm in diameter, is comprised of multiple

layers of silver and a semiconductive material whose electrical resistance changes with an applied load. The model B101 is available in maximum force ranges of 4.4, 111, 444, 2224, and 4448 newtons. Its characteristics include a linearity error of less than 5%, a repeatability of better than 2.5% of full scale, and a rise time of less than 20 μ s; their shape, length, width, and other parameters can be customized. The B101 sensors are used with the company's ELF force measurement system, which connects to a serial interface, is compatible with Windows 95 and NT, and enables the force range of the sensors to be calibrated and adjusted. *FlexiForce Inc, 307 West First Street, South Boston, Massachusetts 02127*
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Digital Pressure Transducer

The series 6000 digital pressure transducer from Mensor achieves 0.020% of full scale (fs) accuracy and 0.006% fs precision over a compensated temperature range of 0 to 50 °C. This specification includes linearity, pressure hysteresis, repeatability, creep, and temperature. The transducer also features a 20 ms pressure change response time and an output update of 50 readings per second.



Pressure ranges are available from 70 mbar to 400 bar in both gage and absolute versions. The transducer's RS-232 and RS-485 serial interfaces make possible remote operation at distances as far as 1200 m. *Mensor Corp, 2230 IH-35 South, San Marcos, Texas 78666*

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Tilt Sensors

Applied Geomechanics has announced a series of miniature tilt sensors for measuring the motion of machines and structures. The 755 series sensor offers a resolution of 0.02 arc seconds over an angular range of 1°. The 756 series extends the range to 20°, and the 757 series to

120° with a resolution of 1 arc second. The tilt sensors use precision electrolytic transducers as the sensing element. They operate on the fundamental principle that a bubble suspended in a liquid-filled case is always bisected by the vertical gravity vector. As the sensor tilts, the case moves around the bubble; the electrical resistance measured through the electrolyte changes in a linear fashion. Signal-conditioning circuitry, such as models available from the company, transforms this change into accurate readings of angular position. Both uniaxial and biaxial tilt sensors are available in a variety of shapes and sizes. *Applied Geomechanics Inc, 1336 Brommer Street, Santa Cruz, California 95062*

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Microchannel Plate-Based Detectors

Burle Electro-Optics has introduced microchannel plate (MCP)-based detectors that improve the performance of field-portable mass spectrometers and leak detection systems. MCPs are compact two-dimensional arrays of a large number of miniature (less than 10 μ m in diameter) single-channel electron multipliers. Typical MCP thicknesses are 0.3 mm; when used in two-plate set or three-plate stack configurations, we are told that they occupy only one tenth the volume of most electron multipliers.

These detectors provide high gain (greater than 10^7) and have performed well at operating pressures greater than 1 millitorr. They can be vacuum baked to 380 °C and can be operated in either pulse-counting or analog modes, providing a linear output current exceeding 1 microampere. *Burle Electro-Optics Inc, Sturbridge Business Park, P.O. Box 1159, Sturbridge, Massachusetts 01566-1159*

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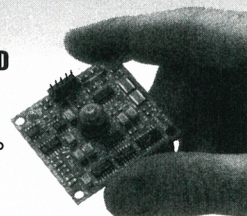
On the Web

A new section of the National Instruments Web site (www.ni.com/sensors) offers sensors fundamentals and a sensor solution database. The database features tutorial information about: different types of sensors, required data acquisition technologies, measurement considerations, and system cost comparisons. *National Instruments Inc, 11500 North Mopac Expressway, Austin, Texas 78759-3504*

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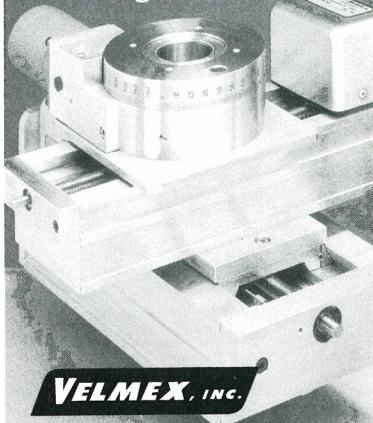
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