

GENERAL

Micron's Models 140820-17-4 CRES and 140821-6AL4V miniature dual measurement sensor has been optimized for measuring rocket motor propellant bond stress and temperature at the inside surface of the motor case wall. Keeping the sensor very small minimizes perturbations in the normal stress field. It's high frequency and over-range capability provides the option of leaving it in place to record pressure during firings to 3000 psi. (140820-17-4 CRES) and 2000 psi. (140821-6AL4V). Advise the factory when this option is required. Calibration data to 3000 psi. will be provided.

For ease of installation into motors, the electrical cable is a miniature flex 0.137 wide by 0.010 thick. The free end of the flex terminates in a miniature edge circuit board that plugs into a miniature electrical connector in the bridge completion housing (BCH). The flex cable is pressure sealed at the sensor end. For wound cases, cable routings can be through the case wall or under the insulation or out the front or rear of the motor.

For motor work, normally the sensor is bonded to a shim that fits the inside contour of the motor case. The top of the shim provides a flat surface to mount the DBST. All of this keeps the adhesive compliance to a minimum and optimizes the measurement accuracy.

Thermal hysteresis is used for motor analysis and performance testing. Long-term stability is necessary when studying chemical aging. The above performance options are described on the DBST price list.



Bond Stress and Temperature Sensor

Applications

- Solid Grain Rocket Motors Health Monitoring
- Bond Stress Measurements General
- Production Equipment and Controls
- Robotics

MECHANICAL

Standard Pressure Ranges	± 100 psi (G-Gage or R-Sealed Reference) (7.03 kg/cm ²)
Over Pressure (No change in performance)	4.0x Range
Maximum Over Range Without Failure	30x Range (140820) & 20x Range (140821)

PERFORMANCE (STRESS)

Balance (Zero) Output @ STP Conditions	0.0 ± 2.0 mV
Full Scale Sensitivity	20 ± 1.0 mV
Static Error Band (Max)	$\pm 0.25\%$ FS *BFSL (*Best Fit Straight Line)
Operational Temperature Range	-100 to 325 °F
Compensated Temperature Range	-50 to 150 °F
Balance TC (Max)	$< \pm 0.06\%$ FS / °F (0.04 % FS / °C)
Sensitivity TC (Max)	$< \pm 0.02\%$ FS / °F (0.009 % FS / °C)

PERFORMANCE (TEMPERATURE)

Output (Max)	0 ± 4 mV at 0° F 150 ± 4 mV at 150° F Centigrade Calibration Consult Factory
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ENVIRONMENTAL	
Storage and Operating Temperature	-100° F to 325° F (-73° C to +162° C)
Compensated Temperature Range	-50° F to +150° F (-46° C to +66° C)
Acceleration	100g's Any Axis
Other Temperature Compensated Ranges	Consult Factory
ELECTRICAL	
Input (Constant Current)	4.0 mA
Input Impedance (Nominal) (75°F/24°C)	500 ± 100Ω
Output Resistance (Nominal) (75°F/24°C)	Stress Sensor 450 ± 50Ω
Output Resistance (Nominal) (75°F/24°C)	Temperature Sensor 3000 ± 500 Ω
Insulation Resistance Minimum	50 MΩ @ 50 VDC

Ordering Guidelines	Example
A. Model Number 140820 – 17-4 Cress 140821 - 6AL4V	Model 140820 with a 100 PSI R Sealed Reference Sensor with 2 feet of flex cable, 2 feet of shielded cable and Options A, C, D. A = Thermal Hysteresis Data C = <0.5% FS/yr Long Term Stability D = Long Term Stability Data
B. Pressure Range 100 PSI	
C. PSI Options G - PSIG G = Gage R - PSIR R = Sealed Reference	
D. Flex Cable Flex Cable Length (feet) (02, 05, 10) (Sensor to Bridge Housing)	
E. Shielded Cable length (1 foot Standard)	
F. Options A = Thermal Hysteresis Data B = <1% FS/yr Long Term Stability C = <0.5% FS/yr Long Term Stability D = Long Term Stability Data E = Custom applications - Call for Details	

