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Dual Vibration & Temperature Sensors

Wilcoxon Research designs a number of sensors which provide more than one output.

Wilcoxon has some sensors that provide both a vibration signal and a temperature signal. These dual output sensors are useful for those situations where users wish to know the temperature of the machine where the vibration is measured. One example is in paper machines where users want to know the temperature at the mounting locations in the dryer section.

The vibration portion of the sensor is powered in the same fashion as all other industrial vibration sensors. Voltage is supplied to the sensor through a constant-current diode and the sensor maintains a characteristic Bias Output Voltage (BOV). The sensor superimposes the vibration upon the BOV where it is available for the user.

The temperature sensor operates in a similar manner in that it must be powered through a constant-current diode and the DC bias voltage relates to the temperature. The temperature measurement is done using a special integrated circuit "chip" that produces a DC output voltage signal. The signal changes by 10 millivolts per degree Kelvin. Since a one degree Kelvin change is the same as a one degree Celsius change, the only difference between them is in the reference temperature, where 0°Celsius is 273° Kelvin. As an example, at a temperature of 300°K (27°C) the DC temperature signal would be 3.00 Volts DC.

Wilcoxon Temperature Output Accelerometers:

Model	Style	Sensitivity	Low Freq	High Freq	Accel Range
793T-3	compression	100 mV/g	0.5 Hz	15,000 Hz	80 g peak
797T-1	shear	100 mV/g	1.0 Hz	12,000 Hz	80 g peak
797LT	shear	500 mV/g	0.2 Hz	3,700 Hz	10 g peak

Note: Frequency @ ±3dB.

Model 793T-3

General Purpose Accelerometer with Internal Temperature Sensor



DYNAMIC

Sensitivity, ±5%, 25°C	100 mV/g
Acceleration Range	80 g peak
Amplitude Nonlinearity	1%
Frequency Response:	
±5%	1.5 - 5,000 Hz
±10%	1.0 - 7,000 Hz
±3 dB	0.5 - 15,000 Hz
Resonance Frequency	24 kHz
Transverse Sensitivity, max.	5% of axial
Temperature Response	-50°C -10%
	+120°C +5%
Temperature Output Sensitivity, ±5%	10 mV/K
Temperature Measurement Range	223 to 390°K (-50 to 120°C)

ELECTRICAL

Temperature Sensor

Power Requirement:	voltage source	18 - 30 VDC
	current regulating diode	2 - 4 mA
Grounding		case isolated, internally shielded

Accelerometer

Power Requirement:	voltage source	18 - 30 VDC
	current regulating diode	2 - 10 mA
Electrical Noise, equiv. g:		
Broadband	2.5 Hz to 25 kHz	600 µg
Spectral	10 Hz	8 µg/√Hz
	100 Hz	5 µg/√Hz
	1000 Hz	5 µg/√Hz
Output Impedance, max		100 Ω
Bias Output Voltage		12 VDC
Grounding		case isolated, internally shielded

ENVIRONMENTAL

Temperature Range	-50 to 120°C
Vibration Limit	500 g peak
Shock Limit	5,000 g peak
Electromagnetic Sensitivity, equiv. g.	10 µg/gauss
Sealing	Hermetic
Base Strain Sensitivity	0.0005 g/µstrain

PHYSICAL

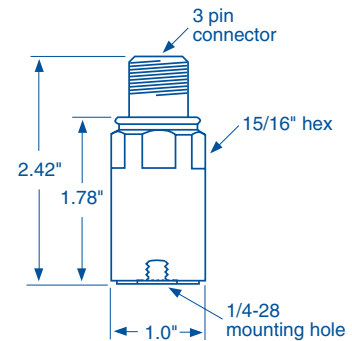
Sensing Element Design	PZT ceramic / compression
Weight	115 grams
Case Material	316L stainless steel
Mounting	1/4-28 tapped hole
Output Connector	3 pin, MIL-C-5015 style
Mating Connector	R6G type

CONNECTOR PIN

SHELL	FUNCTION
A	accelerometer- power & signal
B	accelerometer- temperature / sensor common
C	temperature sensor- power & signal

FEATURES:

- Senses both acceleration and temperature
- Rugged design
- Hermetic seal
- Ground isolated
- ESD protection
- Miswiring protection



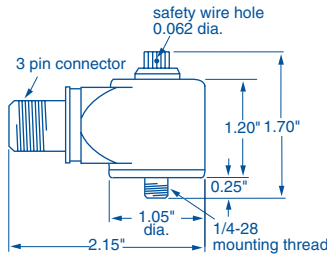
ACCESSORIES SUPPLIED: SF6 mounting stud (International customers specify mounting requirements); Calibration data (level 3).





FEATURES:

- Senses both acceleration and temperature
- Rugged design
- Hermetic seal
- Ground isolated
- ESD protection
- Miswiring protection
- Mounts in any orientation



Model 797T-1

Dual Output, Side Exit, Accelerometer with Temperature Sensor

DYNAMIC

Sensitivity, $\pm 5\%$, 25°C	100 mV/g
Acceleration Range	80 g peak
Amplitude Nonlinearity	1%
Frequency Response:	
$\pm 5\%$	3 - 5,000 Hz
$\pm 10\%$	2 - 7,000 Hz
± 3 dB	1 - 12,000 Hz
Resonance Frequency	26 kHz
Transverse Sensitivity, max	5% of axial
Temperature Response	-50°C -5%
	+120°C +5%
Temperature Output Sensitivity, $\pm 5\%$	10 mV/K
Temperature Measurement Range	223 to 390 K (-50 to 120°C)

ELECTRICAL

Temperature Sensor

Power Requirement:	voltage source	18 - 30 VDC
	current regulating diode	2 - 4 mA
Grounding		case isolated, internally shielded

Accelerometer

Power Requirement:	voltage source	18 - 30 VDC
	current regulating diode	2 - 10 mA
Electrical Noise, equiv. g:		
Broadband	2.5 Hz to 25 kHz	600 μ g
Spectral	10 Hz	8 μ g/ \sqrt Hz
	100 Hz	5 μ g/ \sqrt Hz
	1000 Hz	5 μ g/ \sqrt Hz
Output Impedance, max.		100 Ω
Bias Output Voltage		12 VDC
Grounding		case isolated, internally shielded

ENVIRONMENTAL

Temperature Range	-50 to 120°C
Vibration Limit	500 g peak
Shock Limit	5,000 g peak
Electromagnetic Sensitivity, equiv. g	30 μ g/gauss
Seal	Hermetic
Base Strain Sensitivity	0.002 g/ μ strain

PHYSICAL

Sensing Element Design	PZT ceramic / shear
Weight	135 grams
Case Material	316L stainless steel
Mounting	1/4-28 captive socket head screw
Output Connector	3 pin, MIL-C-5015 style
Mating Connector	R6G type
Recommended Cabling	J9T3A

CONNECTOR PIN

FUNCTION

SHELL	ground
A	accelerometer, power / signal
B	accelerometer / temperature common
C	temperature sensor, power / signal

ACCESSORIES SUPPLIED: 1/4-28 captive screw (International customers specify mounting requirements); Calibration data (level 3).



Model 797LT

Low Frequency Accelerometer with Temperature Sensor



DYNAMIC

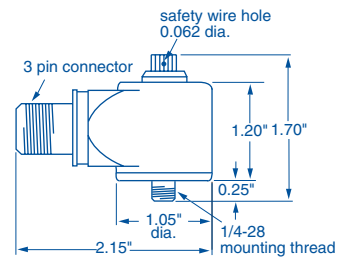
Sensitivity, ±5%, 25°C	500 mV/g
Acceleration Range	10 g peak
Amplitude Nonlinearity	1%
Frequency Response:	
±5%	0.6 - 850 Hz
±10%	0.4 - 1,500 Hz
±3 dB	0.2 - 3,700 Hz
Resonance Frequency	18 kHz
Transverse Sensitivity, max	7% of axial
Temperature Response	-50°C -5%
	+120°C +5%
Temperature Output Sensitivity, ±5%	10 mV/K
Temperature Measurement Range	223 to 390K (-50 to 120°C)

FEATURES:

- Senses both acceleration and temperature
- Corrosion resistant
- Hermetic seal
- Ground isolated
- ESD protection
- Miswiring protection

ELECTRICAL

Temperature Sensor		
Power Requirement:	voltage source	18 - 30 VDC
	current regulating diode	2 - 4 mA
Grounding		case isolated, internally shielded
Accelerometer		
Power Requirement:	voltage source	18 - 30 VDC
	current regulating diode	2 - 10 mA
Electrical Noise, equiv. g:		
Broadband	2.5 Hz to 25 kHz	12 µg
Spectral	2 Hz	2 µg/√Hz
	10 Hz	0.6 µg/√Hz
	100 Hz	0.2 µg/√Hz
Output Impedance, max.		100 Ω
Bias Output Voltage		10 VDC
Grounding		case isolated, internally shielded



ENVIRONMENTAL

Temperature Range	-50 to 120°C
Vibration Limit	250 g peak
Shock Limit	2,500 g peak
Electromagnetic Sensitivity, equiv. g	5 µg/gauss
Seal	Hermetic
Base Strain Sensitivity	0.001 g/µstrain

PHYSICAL

Sensing Element Design	PZT ceramic / shear
Weight	160 grams
Case Material	316L stainless steel
Mounting	1/4-28 captive socket head screw
Output Connector	3 pin, MIL-C-5015 style
Mating Connector	R6G type
Recommended Cabling	J9T3A

CONNECTOR PIN	FUNCTION
SHELL	ground
A	accelerometer, power / signal
B	accelerometer / temperature common
C	temperature sensor, power / signal

ACCESSORIES SUPPLIED: 1/4-28 captive screw (International customers specify mounting requirements); Calibration data (level 3).



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