

*The Fredericks Company*

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**0703-0703-99**

**TrueTilt™, Single Axis  
Narrow Angle, Null Indicating,  
Electrolytic Tilt Sensor**



*Angle Range*                       $\pm 2^\circ$   
*Resolution*                        *1 arc second*  
*Null Repeat*                         $\leq 5$ -arc seconds

Patent 6,688,013

The **0703-0703-99** TrueTilt™ Sensor uses patented technology and construction to provide an accurate and robust narrow angle sensor at an attractive price. The precision-machined parts provide excellent sensor-to-sensor repeatability and reliability. Features include highly sensitive output, exceptional time and temperature stability, and superior roll axis properties. Unparalleled performance and features compared to any other commercially available product!

**Applications Include:**

- ◆ Construction Laser Instruments and Transits
- ◆ Aircraft Avionics
- ◆ Geophysical and Structural Monitoring
- ◆ Machine Tool/ Platform Leveling
- ◆ Medical Positioning and Monitoring

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*To place an order, please contact us at...*

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P/N 07030703999

**0703-0703-99 TrueTilt™, Single Axis, Narrow Angle, Null Indicating, Electrolytic Tilt Sensor**

**Operating Specifications:**

Operating Range (max.).....  $\pm 2^\circ$   
 Null Voltage.....  $\leq 0.025$  Volts  
 Null Current (max.)..... 0.2 mA (continuous)  
 Null Impedance (nom) ..... 50k Ohms (25° C)  
 (measured left to right electrode) see figure 2  
 Null Repeatability.....  $\leq 5$  arc seconds  
 Resolution.....  $< 1$  arc second  
 Symmetry (typ.).....  $\leq 20\%$   
 Roll Sensitivity (null)....  $< 20$  arc sec @  $\pm 3^\circ$  roll  
 Operating Temperature.....  $-20^\circ$  C to  $+50^\circ$  C  
 Storage Temperature.....  $-50^\circ$  C to  $+100^\circ$  C  
 Time Constant (@66%)<sup>1</sup> .....  $\leq 1$  second  
 Materials..... magnetic  
 Temperature coefficient..  $\pm 0.75$  arc seconds / ° C  
 at null (when properly mounted)

<sup>1</sup> Viscosity of the electrolyte may be modified to meet individual requirements to minimize vibration effects. Consult the factory.

**Physical Dimensions:**

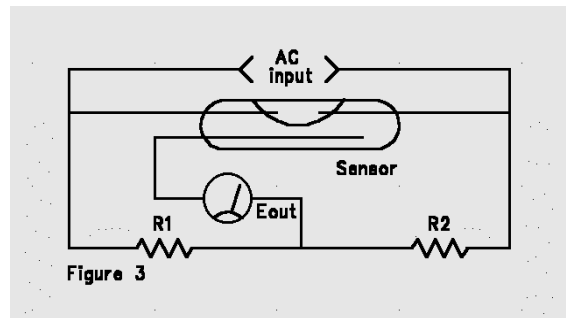
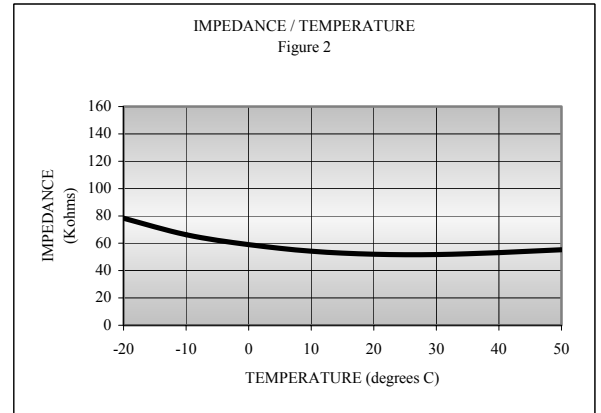
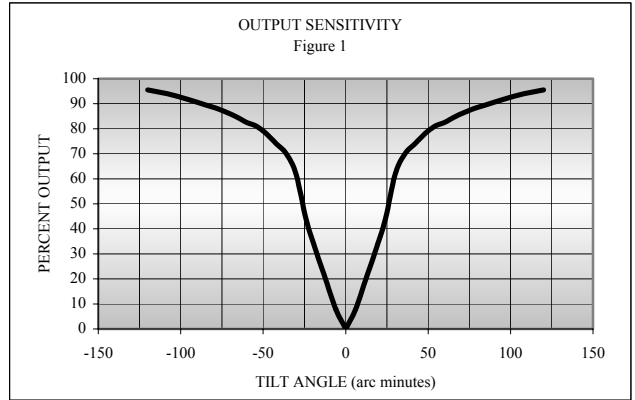
|                                  |                               |
|----------------------------------|-------------------------------|
| Overall length...1.600" (40.6mm) | Height.....0.335" (8.5 mm)    |
| Width.....0.300" (7.6mm)         | Hole Ctr.....1.340" (34 mm)   |
| Hole Dia..... 0.145" (3.7mm)     | Lead Spac.....0.400 (10.1 mm) |

**Sensor Test Circuitry**

Tests were conducted by exciting the left and right electrodes with an AC signal of 400 Hz and an rms voltage to produce the maximum current at null as per operating specifications. Output readings are taken between the center electrode and the center of the balanced resistors R1 and R2. Tests were conducted at a temperature of  $+25^\circ$  C. See sensor test circuitry in figure 3. Output curve is shown in figure 1.

**Description of Test Values**

*AC input voltage = Null Current (max) times  
 Null Impedance (nom)*  
*Eout = Angle of tilt from null (Direction of tilt  
 determined by phase of Eout)*  
*R1 = R2 = 1/2 Null Impedance (nom)*



**Caution!** – Ensure that all test and operating circuits are entirely free of direct current. Direct current will cause level damage and/or instability.  
**Note!** – The housing (center pin) is the active output signal. The unit must be electrically isolated.

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