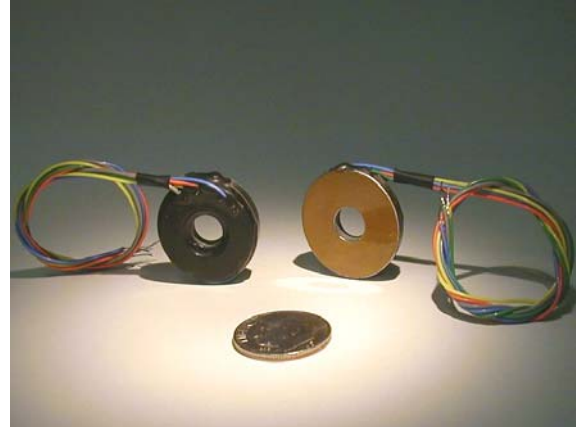


The Fredericks Company

0728-1023-99
“Micro-arc” Wide
Angle, Dual Track
Electrolytic Tilt Sensor



Patent 5,855,878

<i>Angle Range</i>	$\pm 180^\circ$
<i>Resolution</i>	<i>.2 arc minutes</i>
<i>Repeatability</i>	$\pm .05$ degrees

The **0728-1023-99** ”Micro-arc” uses patented construction technology for this wide-angle sensor. The metal housing and ceramic electrode array are manufactured to precise tolerances for extreme sensor-to-sensor sensitivity, repeatability and ruggedness. This sensor features dual concurrent linear outputs, good vibration resistance, and superior cross axis properties. New sealing technologies allow for operation in a wider temperature range.

Applications Include:

- ◆ Off Road and Construction Vehicles
- ◆ Medical Instruments
- ◆ Navigation and GPS Compensation
- ◆ Robotic and Automation Applications
- ◆ Oceanographic Instrumentation

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Operating Specifications:

Operating Range (max.)..... $\pm 180^\circ$
 Linear Range (10 to 90%)..... $\pm 80^\circ$
 Linearity..... $\pm 3\%$
 Null Voltage..... ≤ 0.025 Volts
 Null Current (max.)..... 0.2 mA (continuous)
 Null Impedance (nom)....
 Outer electrodes..... 10.0 K Ohms (25° C)
 Inner electrodes..... 11.5 K Ohms (25° C)
 (measured left to right electrode) see figure 2
 Repeatability..... $\pm .05^\circ$
 Resolution..... < 0.2 arc minutes
 Symmetry (typ.)..... $\leq 5\%$
 Mech. Crosstalk / Deg. (typ.)..... 0.005°
 Operating Temperature..... -20° C to +80° C
 Storage Temperature..... -20° C to +80° C
 Time Constant(1) ≤ 100 msec
 Materials..... non-magnetic

NOTE: Null Impedance of the sensor may be modified to individual requirements upon special order.

Physical Dimensions:

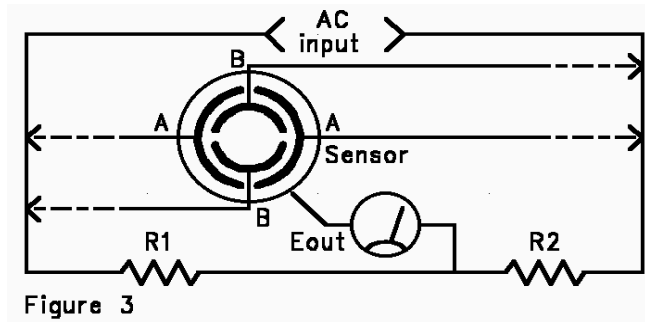
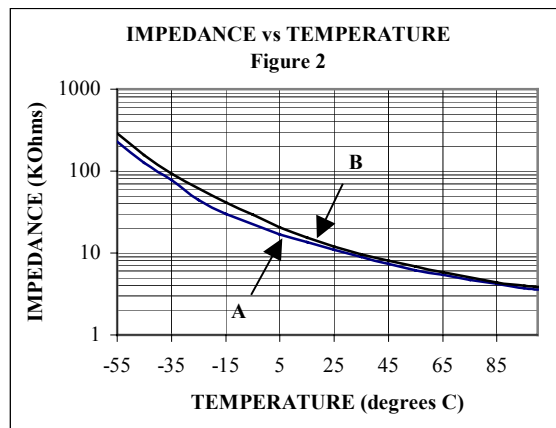
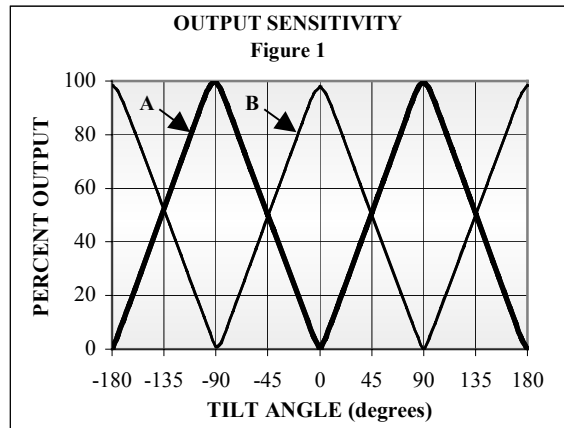
Diameter..... 0.850"(21.65mm)
 Width..... 0.165"(4.20mm)
 Diameter – mounting hole..... 0.260"(6.62mm)
 Wire length (min)..... 6"(152.4mm)

Sensor Test Circuitry

Tests were conducted by exciting the left and right electrodes with an AC signal of 400 Hz and a 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° 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.