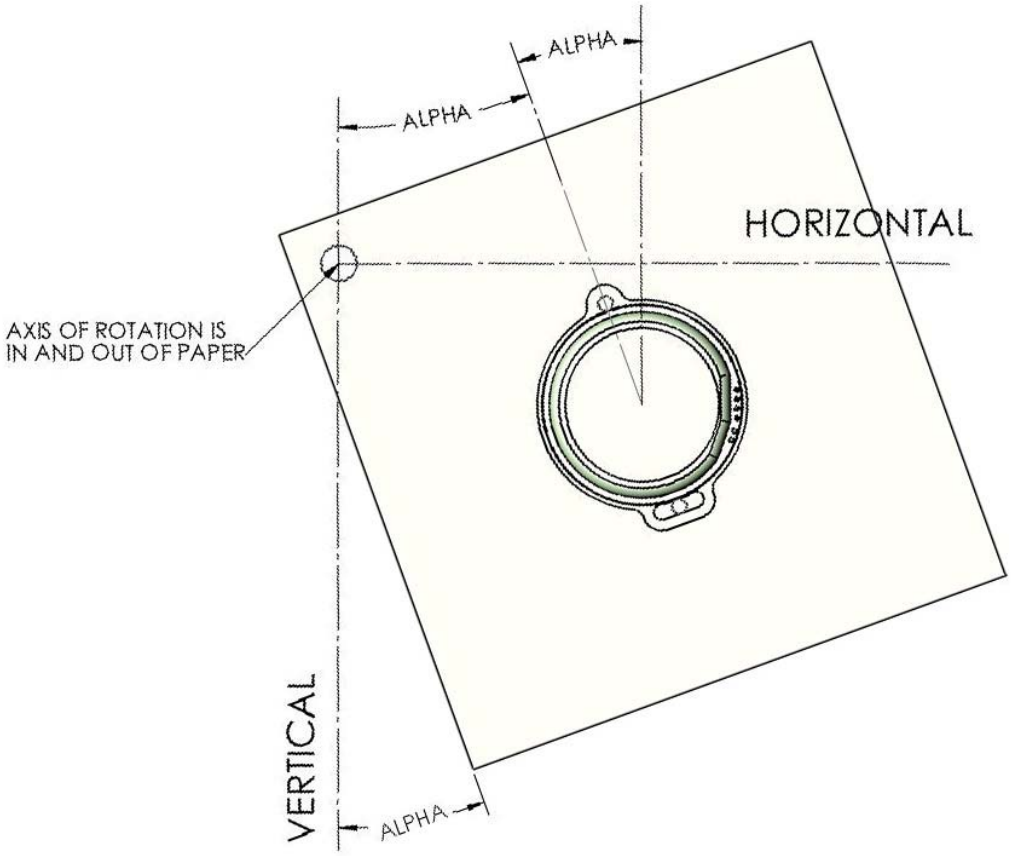
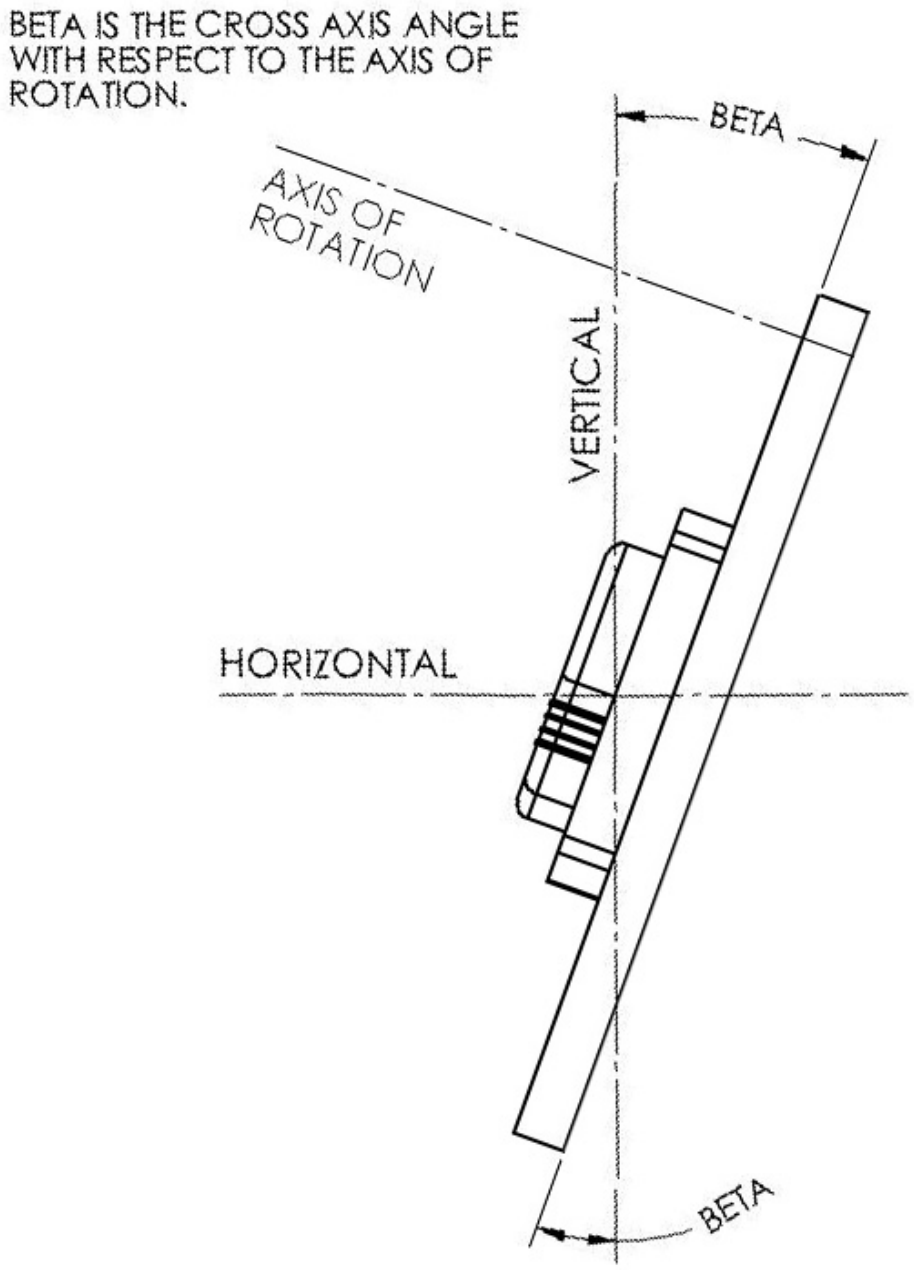
Description of Operation

An integral angle measurement device employs a printed circuit board having electronic components mounted on the front surface thereof and having a pair of sensor plates etched into the back surface thereof. Containment of the sensor fluid adjacent the sensor plates is accomplished by soldering a sensor cover to an etched sealing ring on the back of the circuit board. The sensor plates etched into the back of the printed circuit board, in combination with the sensor fluid, act as variable impedances whose impedance changes as a function of their angle of rotation from a reference position. An output signal across these variable impedances is in or out of phase with an applied reference signal. The output signal is demodulated with the same reference signal and then filtered to a DC level that corresponds to the angle of rotation.



The sensor measures the angle ALPHA about the axis of rotation as shown above. It is not a requirement that the sensor be mounted on the axis of rotation.



The cross axis is the angle (BETA) in the plane that is perpendicular to the plane of rotation as shown above. The axis of rotation is perpendicular to the plane of rotation. The senor performs very well with cross axis angles. The sensor will continue to measure the angle about the axis of rotation (ALPHA from previous drawing) with maximum error of 1% of the cross axis angle. For example if the actual angle of rotation about the axis of rotation (ALPHA) is 10 degrees and the cross axis is 20 degrees then the added error due to the cross axis position is less than (.01 * 20 = .2 degrees). The maximum error of the output with these conditions would be 10 ± 0.3. The 0.3 consists of a linearity error at 10 which is 0.1 plus the cross axis error of 0.2. The sensor does not measure cross axis angle!