

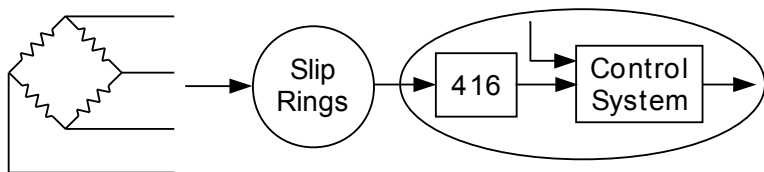
MAST MOMENT DETECTION AND COUNTERMEASURES SYSTEM

The **Rugged Ectron Model 416** amplifier has been used extensively in testing and flight monitoring in helicopters. Helicopter instrumentation is subjected to a more severe environment than that of fixed wing aircraft because of the relatively high vibration levels associated with hovercraft flight. Also the environment includes EMI and magnetic emissions that must be ignored by any instrumentation, especially low level amplifiers.

An Asian helicopter manufacturer was having problems associated with the mast (main drive shaft) of the rotor. Strain gages are attached to the mast to determine stress (termed *mast moment*) during operation. Signals as well as excitation are coupled through slip rings to conditioner-amplifiers to continuously determine mast moment. This manufacturer chose the Ectron Model 416 for this application for several reasons:

- Ruggedness to resist the rigors of long term use aboard hovercraft.
- EMI and magnetic field protection.
- Precision despite the extremes of temperature, vibration, and shock.

The Model 416 provides excitation and amplification of the strain gage signals. These signals along with others are used to determine if the maximum limit of the mast moment is reached and if so, to signal a reduction of engine power.



Other important operating characteristics for this application:

- Operation from -25°C to $+85^{\circ}\text{C}$ (-13°F to $+185^{\circ}\text{F}$).
- Zero stability of $\pm 1 \mu\text{V}/^{\circ}\text{C}$ RTI $\pm 50 \mu\text{V}/^{\circ}\text{C}$ RTO over total temperature range.
- Gain stability of $0.005\%/^{\circ}\text{C}$.
- Frequency response is dc to 5 kHz although this is usually reduced to the highest frequency of interest to reduce unwanted noise.
- The Model 416 is protected from transient voltages of $\pm 500 \text{ V}$ that may appear on the dc power.
- Miniature size.

To see the full specifications or to download a data sheet, visit the Model 416 page on Ectron's website at <http://www.ectron.com/prods/416.php>



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