

Rotor Azimuth Processor

Model RAP-001

Designed for use with helicopter tachometer and contactor signals, the Rotor Azimuth Processor (RAP) measures main and tail rotor azimuth and main rotor speed. The RAP, a self-contained system, meets the demands of today's high rate, real-time applications.

The RAP generates both 12-bit parallel digital and 12-bit analog values to measure azimuth and rotor speed. Tachometer frequency period measurements are converted to percent rotor speed based on a user input factor configured by the setup software.



The Rotor Azimuth Processor uses a PC-based Rotor Azimuth Setup Program (RASP) to configure user parameters for each helicopter. The parameters are stored on the PC for future retrieval through the RASP. Setup is accomplished by connecting the RAP through an RS-232 serial port on the PC.

Features:

- *Calculates main rotor speed as a percent of configured main rotor speed*
- *Calculates main and tail rotor azimuth to 1.0 degree at 130% main rotor speed*
- *Accepts input signals from 2V to 100V peak-to-peak*
- *Tachometer rates from 1 KHz to 20 KHz maximum*
- *Tachometer waveform consists of distorted (third harmonic) sinusoidal signal*
- *Provides 12 bit digital and analog outputs*
- *Easy to use: setup, connect and forget*

Benefits:

- *Latest high speed digital technology*
- *High speed data collection for rotary wing performance monitoring*
- *Noise reduction by Individual Blade Control*
- *Cycloidal Rotor Analysis and Control*
- *Aircraft Accident Reconstruction*
- *Available Software Noise Filter*
- *Resolution to 1 degree of Main Rotor Azimuth*
- *PC-Programmable Setup*
- *Completely self-contained processing unit*
- *MIL-DTL-38999 Series III connectors*

Specifications:

Operator Inputs:

Tachometer frequency at 100% rotor speed
Main rotor revolutions per second
Tail to main rotor turns ratio
Software filters on/off

Signal Inputs:

Tachometer:

Voltage 2 – 100 VAC
Frequency 1 KHz – 20 KHz
Impedance 100 K Ohms Minimum

Contactors:

Voltage 2 – 100 VAC
Frequency 10 Hz – 10 KHz
Impedance 100 K Ohms Minimum

Signal Outputs:

Main Rotor Speed:

Digital 12 Bit Parallel
Analog 0 – 4.095 VDC
Range 0 – 130% of entered 100%
Rotor Speed
Update Rate 200 mS
Scale Factor 31.5 (130% = 4.095 VDC)
Accuracy $\pm 0.05\%$ Full Scale Speed

Main Rotor Azimuth:

Digital 12 Bit Parallel
Analog 0 – 4.095 VDC
Range 0 – 360 Degrees
Update Rate 200 μ S
Scale Factor 11.375 (360° = 4.095 VDC)
Resolution 1.0 Degree
Accuracy ± 0.5 Degree

Tail Rotor Azimuth:

Digital 12 Bit Parallel
Analog 0 – 4.095 VDC
Range 0 – 360 Degrees
Update Rate 200 μ S
Scale Factor 11.375 (360° = 4.095 VDC)

Communications:

Type RS-232
Data Format 38.4 KBPS, 8 Data Bits
1 Stop Bit, No Parity

Power Requirements:

Voltage 28 VDC ± 6 VDC Per
MIL-STD-704F
Current 475 mA Operating
625 mA Peak

Circuit breaker 1 ADC
Power Dissipation 13.3 Watts
Protection Reverse Voltage, Over
Voltage, Surge Protected

Environmental:

Temperature -20 to +140°F
(-29 to +60°C)
Humidity 6 to 95%

Mechanical:

Dimensions 3.031" x 6.00" x 9.57"
(without mating connectors)
Weight 1.24kg
Chassis Aluminum alloy 6061-6063,
Corrosion Resistant
Finish Orange Powder Coat
Connectors MIL-C-38999 Series III
Mounting Flanges front and rear with
two 1/4" mounting holes

Quality Systems by Design

In addition to the RAP, Precision Systems offers a full range of engineering design and software engineering services.

Our *Quality Systems by Design*™ project methodology and extensive experience makes PSI the right choice for your control and processing needs.

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Model Number
RAP-001 shown.
Can be customized
to your specifications.

To learn more about the RAP or any of our products and services, contact Walter Johnson.

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Quality Systems by Design

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