

LOW-NOISE MICROSIZE ANGULAR RATE SENSOR

GENERAL DESCRIPTION

The latest development of molecular electronic technologies is the ultra small and lightweight yaw rate sensor, comparable with the microelectromechanical gyros in size, weight and power consumption. Unlike the MEMS gyros the new MET sensor is characterized by significantly higher sensitivity and very low intrinsic noise level. However the bandwidth of this sensor is limited at low frequencies by the value of ~ 0.02 Hz because of the physical operating principle. In MTRS-614A the signal from the MET sensor is complemented by the low-frequency component of the ADXRS614 (Analog Devices MEMS gyro) signal. This solution allows to widely extend the range of application, maintaining extremely high accuracy inherent to molecular electronic sensors.

FEATURES

- Bandwidth [0-100] Hz
- Measurement range $\pm 50^\circ/\text{sec}$
- Low intrinsic noise
- High bias stability
- High sensitivity
- Small dimensions and low weight
- Low power consumption

APPLICATIONS

- Inertial navigation
- Stabilization systems
- Intelligent safety systems
- Personal navigation
- Robotics

SPECIFICATIONS

	MTRS-614A	ADXRS614	Unit
Measurement range	±50	±50	°/sec
Sensitivity	250	25	$\frac{mV}{\text{°/sec}}$
Null	0	2.5	V
Root Allan deviation	See fig. 1	See fig.1	-
Bandwidth	100 300 - optional	1000	Hz
Sensor resonant frequency	-	14.5	KHz
Rate noise spectral density at 1 Hz	0.002	0.04	$\frac{\text{°/sec}}{\sqrt{\text{Hz}}}$
Integral noise (0-100 Hz bandwidth)	0.02	0.4	°/sec
Harmonic distortions and scale factor nonlinearity	<3	0.1	%
Temperature range	-15— +55 -40 — +55 Optional	-40 — +105	°C
Scale factor drift over temperature range	±5	±3	%
Linear acceleration effect	0.1	0.1	$\frac{\text{°/sec}}{g}$
Operating voltage	5-18	5	V
Supply current	5	3.5	mA
Turn-on time	30	0.05	sec

ATTACHMENT

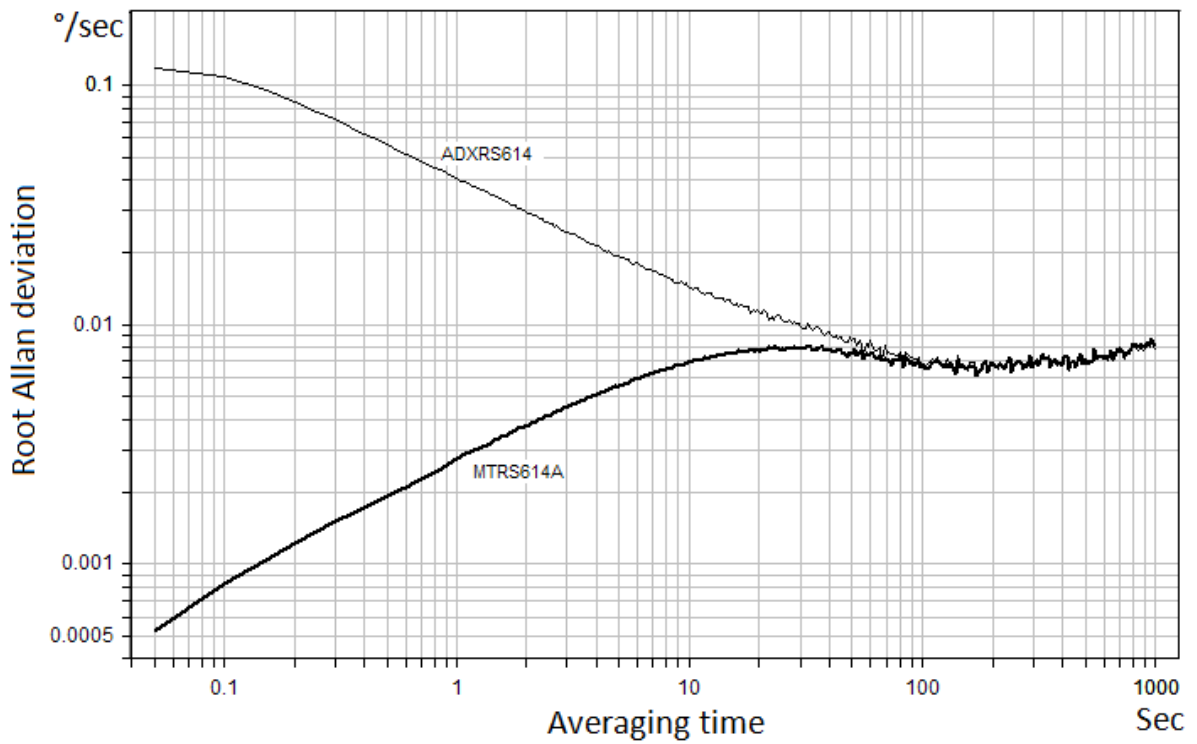


Figure 1. Root Allan deviation at 25°C vs. Averaging Time for MTRS-614A and ADXRS614.

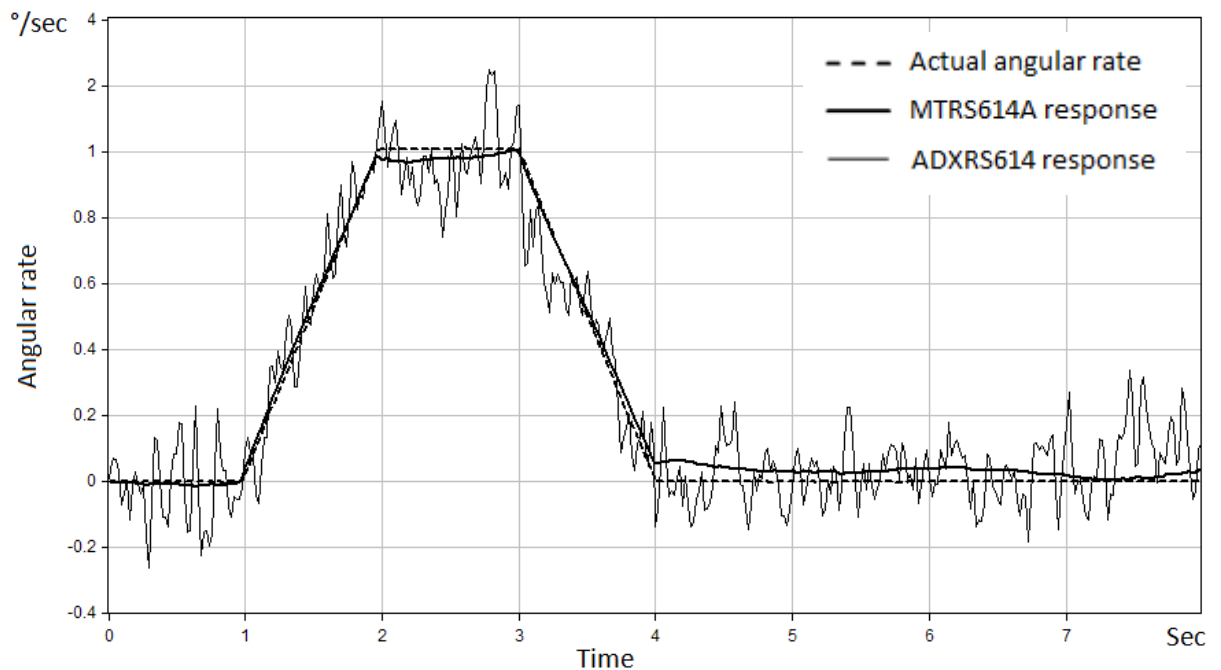


Figure 3. Comparison of the MTRS-614A and ADXRS614 responses for the signal consisting of the acceleration, constant rate and deceleration regions. Each region lasts for 1 sec.