TACTICAL INERTIAL MEASUREMENT UNIT (IMU)

FEATURES



- Miniature and Compact Design
- High Dynamic Range
- Low Bias Instability
- Low Angle Random Walk
- Continuous Self-Diagnosis and Onboard Monitoring
- Ruggedized for Mechanical Shock (Up to 1500g)
- Digital SPI Communication Interface

APPLICATIONS

- Navigation and Control
- Drone Navigation and Control
- Unmanned Ground Vehicle System
- Robotics and Gimbal Control

DESCRIPTION

The Castor series, Model: CSTR-IMU1640 is a high-end tactical class inertial measurement unit consisting of high-performance triaxial MEMS Accelerometer and triaxial Gyroscope sensors based on latest MEMS technology. The IMU is equipped with a high-speed processor that runs superior digital signal processing algorithms delivering control grade inertial measurement data. The IMU output is available over a Digital SPI interface. Its rugged and modular design makes it suitable for integration with control computers and other application hardware.

The sensing elements of each axis are factory-calibrated for bias, mis-alignment and are compensated for temperature effects to be usable across the entire operating temperature range. The miniature MEMS IMU, CSTR-IMU1640 offers <1°/hr bias instability performance and is suitable for inertial guidance and control applications where size is the constraint.

TECHNICAL SPECIFICATIONS

Parameter Name	Parameter Value			Unit	Remarks
	Min	Typical	Max		
Acceleration					
Bias Instability[1]	0.015	0.019	0.020	mg	At 25°C
VRW	0.015	0.017	0.06	m/s/√hr	262 Hz LPF, at 25°C
Range		±16		g	±40 g (Overrange)
Bias Repeatability[5]		±1.5		mg	-
Bandwidth		400		Hz	-3dB (262 Hz LPF)
Noise Density		0.0005		$m/s^2/\sqrt{Hz}$	With filter
Resolution		32		bits	-
Gyro					
Bias Instability[2]	0.6	1	1.6	°/hr	At 25°C
ARW	0.11	0.14	0.2	°/√hr	262 Hz LPF, at 25°C
Range		±480		°/s	-
Bias Repeatability[5]		±250		°/hr	-
Bandwidth		400		Hz	-3dB (262 Hz LPF)
Resolution		32		bits	-
Scale Factor Accuracy		<500		ppm	1σ, at 25°C
Non-Linearity[4]		<40		ppm	1σ, for full scale ±480°/s
Electrical					
Input Voltage		3 to 3.6		VDC	-
Power Consumption		<1		W	-
Diagnostics		Continuous onboard temperature, voltages, sensor health monitoring		-	-
Update Rate		Up to 4250		Hz	-
Communication Interface					
Hardware		SPI, 4 x Digital I/Os		-	-
Software		Binary		-	-
SPI Clock Speed		15		Mbps	-
Timing					
Time to transmit after power ON		0.9		sec	-
Time to first valid data		0.9		sec	-
Physical					
Dimensions		47 (L) x 44 (W) x 14 (H)		mm	-
Weight		57 ± 3		gm	-
Connector		MW-12-03-G-D-118-118		-	Device Connector
		MLE-112-01-G-DV-A-P		-	Mating Connector
Fixation Bolts		M2		metric	-
Recommended Torque		0.35		Nm	-
Environmental					
Operating Temperature[6]		-40 to +71		°C	-
Storage Temperature		-55 to +85		°C	-
Mechanical Shock[3]		1500/ 0.5 ms half-sine		g	-
Ingress Protection		IP65		-	-

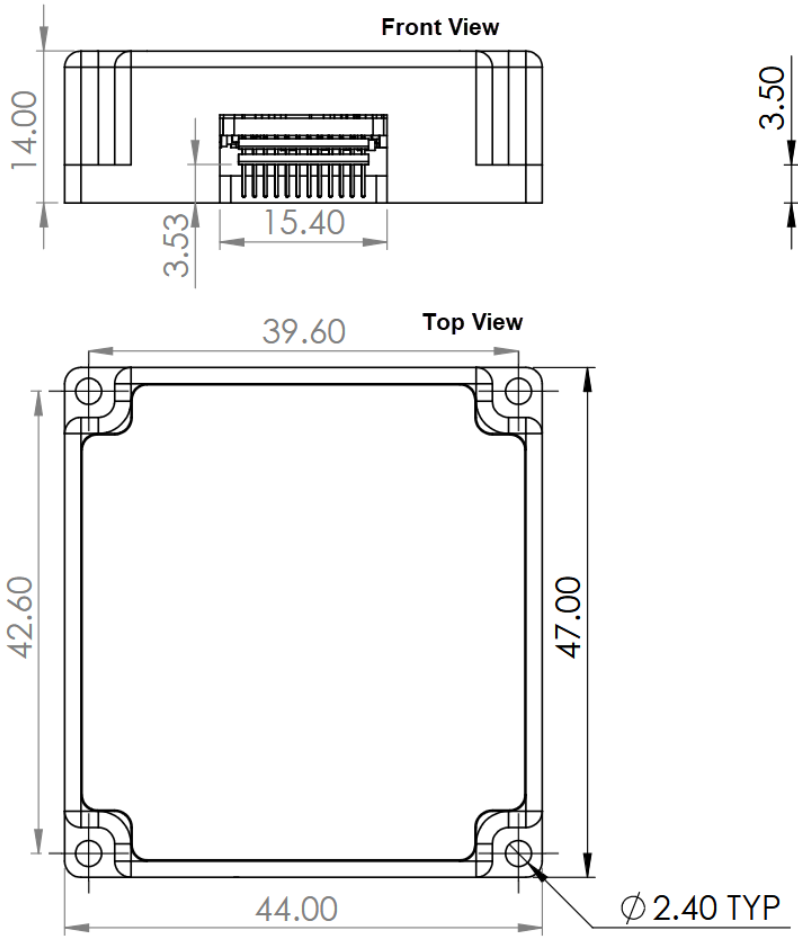
Note:

1. Accelerometer Bias Stability > 0.13 milli g when measured over a period of one year with respect to a fixed calibration value, and Accelerometer Bias Repeatability >1.25 milli g when measured over a period of one year for the entire range.
2. Bias Stability > 1°/Hr when measured in a 1 g environment over a period of one month and with respect to a fixed calibration value.
3. As per MIL-STD-883F Method 2002.4 Test Condition B.
4. Largest deviation from the BSL (Best Straight Line) Over the range specified.
5. The parameter has been tested for short term duration, the value has been derived by calculating the mean of the data samples of 15 mins duration (5 runs).
6. Extended exposure to temperatures that are lower than -40°C or higher than +71°C can adversely affect the accuracy of the factory

MADE IN INDIA

MECHANICAL DIMENSIONS

All the dimensions in mm



ORDERING INFORMATION

1. **Device:**
   - **CSTR - IMU1640** (Product Code: 26002)
2. **Accessories:**
   - **CSTR - IMU1640-EV** (Product Code: 27059)