TACTICAL INERTIAL MEASUREMENT UNIT

FEATURES

- Miniature and Compact Design
- High Dynamic Range
- Continuous Self-Diagnosis and On-board Monitoring
- Ruggedized for High Mechanical Shock (Up to 1500g)
- RS422 Communication Interface with External Trigger Input



APPLICATIONS

- Navigation and Control
- Robotics and Gimbal Control
- Unmanned Ground Vehicle Systems
- Flight Control Systems

DESCRIPTION

The CASTOR series model, CSTR-IMU1100 is a high-end tactical class inertial measurement unit consisting of high-performance tri-axial Accelerometer, tri-axial Gyroscope and tri-axial Inclinometer sensors based on latest MEMS technology. The IMU is equipped with a high-speed processor that runs the digital signal processing algorithms, delivering control grade inertial measurement data. The IMU output is available over an RS422 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, misalignment and are compensated for temperature effects to be usable across the entire operating temperature range. The miniature MEMS IMU, CSTR-IMU1100 offers 0.7 °/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]	0.016	0.020	0.024	mg	At 25°C
VRW	0.018	0.018	0.028	m/s/√hr	262 Hz LPF, at 25°C
Range		±10		g	-
Bias Repeatability[5]		±1.5		mg	-
Bandwidth		262		Hz	-3dB (262 Hz LPF)
Noise Density		0.0001		$m/s^2/\sqrt{Hz}$	-
Resolution		24		Bits	-
Gyro					
Bias Instability[2]	0.5	0.7	1.2	°/hr	At 25°C
ARW	0.09	0.13	0.2	°/√hr	262 Hz LPF, at 25°C
Range		±480		°/s	-
Bias Repeatability[5]		± 100		°/hr	-
Bandwidth		262		Hz	-3dB (262 Hz LPF)
Noise Density		0.001		°/s/√Hz	-
Resolution		24		bits	-
Scale Factor Accuracy		<500		ppm	1σ, at 25°C
Non-Linearity[4]		<40		ppm	1σ, for full scale ±480 °/s
Inclinometer					
Bias Instability[1]	0.021	0.028	0.035	mg	At 25°C
VRW	0.024	0.026	0.032	m/s/√hr	262 Hz LPF, at 25°C
Range		±1.7		g	-
Bias Repeatability[5]		±1.2		mg	-
Noise Density		0.0001		$m/s^2/\sqrt{Hz}$	-
Electrical					
Input Voltage[6,7]		4.5 to 5.5		VDC	-
Power Consumption		<1.3		W	-
Diagnostics		Continuous onboard temperature, voltages, sensor health monitoring		-	-
Update Rate		Up to 2000		Hz	-
AUX		±2.5		V	Full scale
VSUP to GND		-0.5 to +7		V	Absolute maximum rating
ExtTrig to GND		-0.3 to +7		V	
TOV to GND		-0.3 to +7		V	
NRST to GND		-0.3 to +7		V	
Communication Interface					
Hardware		RS422, External Trigger Input, Time of Validity (TOV), Auxiliary Input		-	-
Software		Binary		-	-
Baud rate		374400 to 1843200		bits/s	-
Timing					
Time to transmit after power ON		0.6		sec	-
Time to transmit after Reset		1.5		sec	-
Time to first valid data		0.6		sec	-

MADE IN INDIA

TECHNICAL SPECIFICATIONS

Parameter Name	Parameter Value	Unit	Remarks
Physical			
Dimensions	38.6 (L) x 44.8 (W) x 21.5 (H)	mm	-
Weight	72 ± 3	gm	-
Connector	Micro-D Connector-Pin: MDA215SFSP4	-	Device Connector
	Micro-D Connector-Socket: MDA215P4L150S	-	Mating Connector
Fixation Bolts	M4	metric	-
Recommended Torque	3	Nm	-
Environmental			
Operating Temperature[8]	-40 to +85	°C	-
Storage Temperature	-55 to +90	°C	-
Mechanical Shock[3]	1500/ 0.5 ms half-sine	g	-
Ingress Protection	IP65	-	-

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. At supply voltages above 6.2 V (maximum value) an internal voltage protection circuit will cut power and the unit will go into reset until the voltage is back within operating conditions.
7. At supply voltages below 4.0 V (minimum value) the unit will go into reset until the voltage is back within operating conditions.
8. Extended exposure to temperatures that are lower than -40°C or higher than +85°C can adversely affect the accuracy of the factory

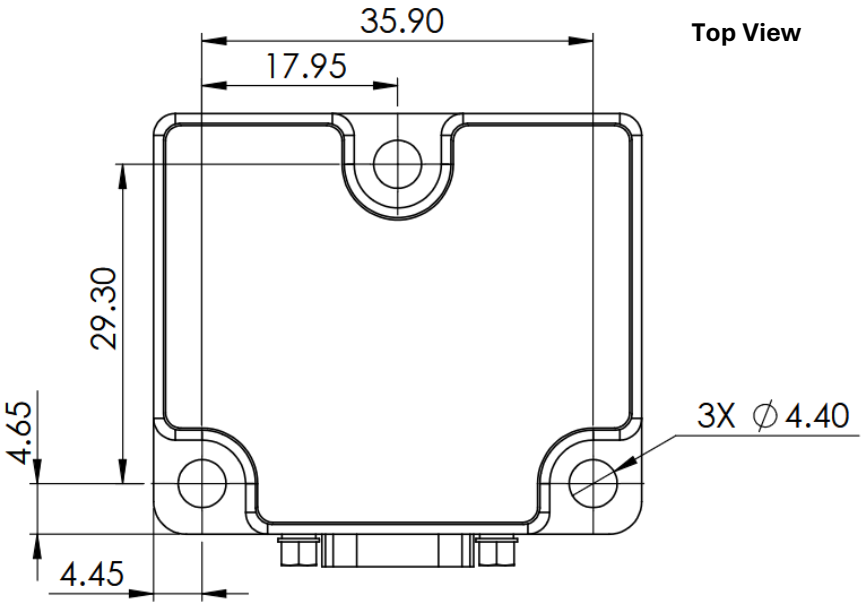
MECHANICAL DIMENSIONS

All the dimensions in mm

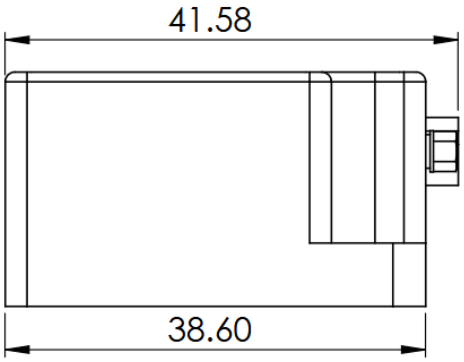
Isometric View for reference



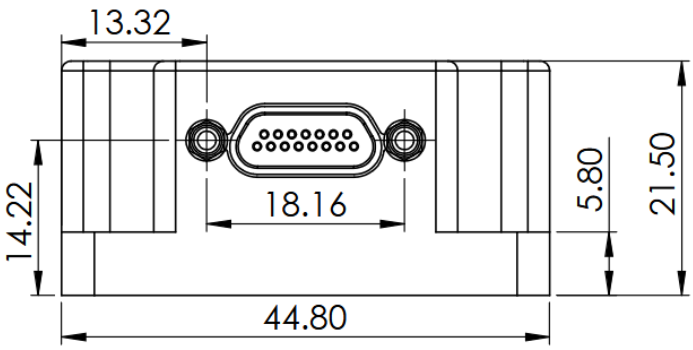
Top View



LHS



Front View



ORDERING INFORMATION

CSTR - IMU1100 (Product Code: 26008)