



IMU (Inertial Measurement Unit)

M-G552PR30

- Small size & Light Weight : 65 x 60 x 30 mm, 115 g
- Low-Noise, High-Stability
 - Gyro Bias Instability : 1.2 °/h
 - Angular Random Walk : 0.08 °/√h
 (It is recommended to use the Gyro sensor with 24-bit resolution.)
- Six-degrees-of-freedom Sensor
 - Triple Axis Gyroscope : ±450 °/s
 - Triple Axis Accelerometer : ±8/±16 G
- Calibrated Stability (Bias, Scale Factor, Axial Alignment)
- Interface : RS-422 Interface
- Operating Temperature : -30 °C to +80 °C
- Power Supply Voltage : 9 V to 32 V
- Waterproof and Dustproof : IP67



Product Name and Number
M-G552PR30: X2G000251000100



Recommended Application

- Autonomous Vehicle
- Navigation Systems
- Vibration Control and Stabilization Pointing and Tracking Systems

RECOMMENDED OPERATING CONDITION

Parameter	Condition	Min.	Typ.	Max.	Unit
Power Supply Voltage	V _{IN} to GND ^{*2}	9 ^{*1}	12	32	V
Port Input Voltage	RD+ / RD- to GND	—	5	—	V
Operating Temperature		-30	—	+80	°C

*1. When power supply voltage is 9 V or less, the host may not be able to communicate with this node normally even if the LED turns on.

*2. The power supply voltage must reach the recommended operating condition within 2 seconds after power is applied to this node.

SPECIFICATIONS

V_{IN} = 12 V, T_a = 25 °C, angular rate = 0 °/s, ±1 G, unless otherwise specified

Parameter	Test Conditions / Comments	Min.	Typ.	Max.	Unit
GYRO SENSOR					
Sensitivity					
Dynamic Range		—	±450	—	°/s
Scale Factor	16 bits	-0.2%	66	+0.2%	LSB/(°/s)
	24 bits	-0.2%	66 x (2 ⁸)	+0.2%	
Nonlinearity (Best fit straight line)	1 σ	—	0.05	—	% of FS
Misalignment	1 σ, Axis-to-axis, Δ = 90° ideal	—	0.1	—	°
Bias					
Initial Error	1 σ, -30 °C ≤ T _a ≤ +70 °C	—	360	—	°/h
Repeatability	1 σ, Turn-on to turn-on ^{*3}	—	36	—	°/h
Bias Instability	Average	—	1.2	—	°/h
Angular Random Walk	Average	—	0.08	—	°/√h
Linear Acceleration Effect	Average	—	18	—	(°/h)/G
Noise Density	f = 10 Hz to 20 Hz	—	6.9	—	(°/h)/√Hz, rms
Frequency Property					
3 dB Bandwidth		—	472	—	Hz
ACCELEROMETERS					
Sensitivity					
Dynamic Range		—	±8/±16 ^{*7}	—	G
Scale Factor	16 bits, Output Range ±8	-0.1%	4	+0.1%	LSB/mG
	16 bits, Output Range ±16	-0.1%	2	+0.1%	
Nonlinearity (Best fit straight line)	1 σ, < 5 G	—	0.1	—	% of FS
Misalignment	1 σ, Axis-to-axis, Δ = 90° ideal	—	0.01	—	°
Bias					
Initial Error	1 σ, -30 °C ≤ T _a ≤ +70 °C	—	4	—	mG
Repeatability	1 σ, Turn-on to turn-on ^{*3}	—	3	—	mG
Bias Instability	Average	—	24	—	μG
Velocity Random Walk	Average	—	0.02	—	(m/s)/√h
Noise Density	f = 10 Hz to 20 Hz	—	50	—	μG/√Hz, rms
Frequency Property					
3 dB Bandwidth		—	333	—	Hz

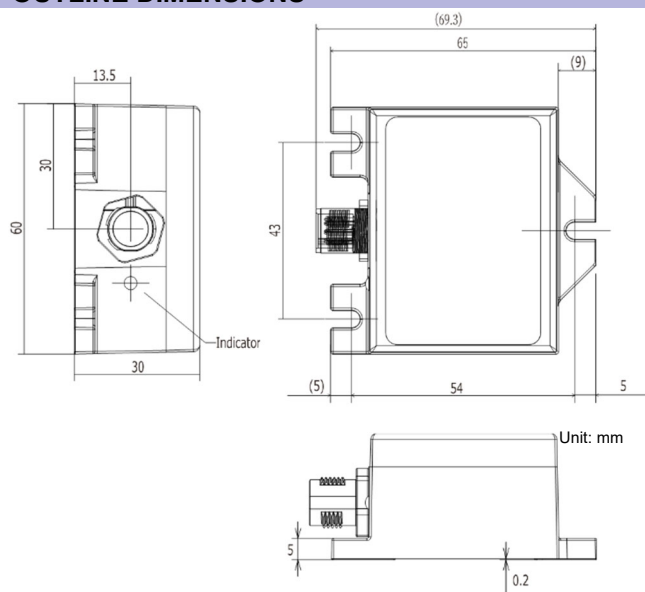
ATTITUDE OUTPUT					
Output Range	Inclination Mode	-80	-	+80	°
	Euler Mode ANG1: Roll	-45	-	+45	
	ANG2: Pitch	-180	-	+180	
	ANG3: Yaw *4	-180	-	+180	
Scale Factor	16 bits	-	0.00012207	-	rad/LSB
		-	0.00699411	-	°/LSB
Accuracy*5*6	1 σ , Static	-	0.2	-	°
	1 σ , Dynamic *5 (100 °/s, Max.)	-	0.2	-	
TEMPERATURE SENSOR					
Scale Factor *1*2	Output = 0 @ +25 °C	-	0.00390625	-	°C/LSB

- *1. This is a reference value used for internal temperature compensation. There is no guarantee that the value gives an absolute value of the internal temperature.
 *2. This is the temperature scale factor for the upper 16 bits (TEMP_HIGH).
 *3. Turn-on to turn-on / Day by day, estimated variation during 5 consecutive days.
 *4. Accuracy does not apply to ANG3 axis because it is not compensated for errors caused by bias drift.
 *5. Dynamic accuracy is based on measurement data that has been measured from a stationary state. The accuracy that can be achieved depends on the input movement.
 *6. Attitude output accuracy is based on measurement data for GLOB_CMD2[0x16(W1)], bit[5:4] = 00: mode A.
 *7. Selectable by register setting.

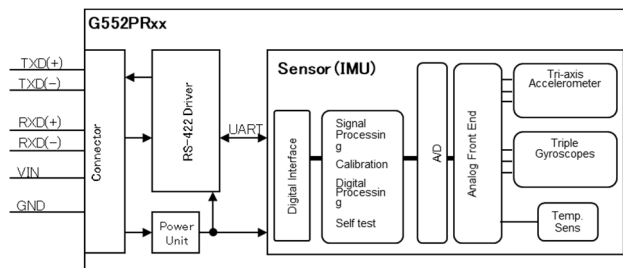
Note:

- The values in the specifications are based on the data calibrated at the factory. The values may change according to the way the product is used.
- The Typ. values in the specifications are average values or 1 σ values.
- Unless otherwise noted, the Max./Min. values in the specifications are design values or Max./Min. values at the factory tests.
- Acceleration characteristics do not depend on the output range.

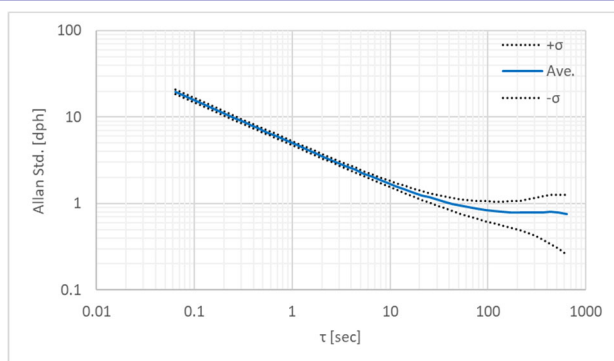
OUTLINE DIMENSIONS



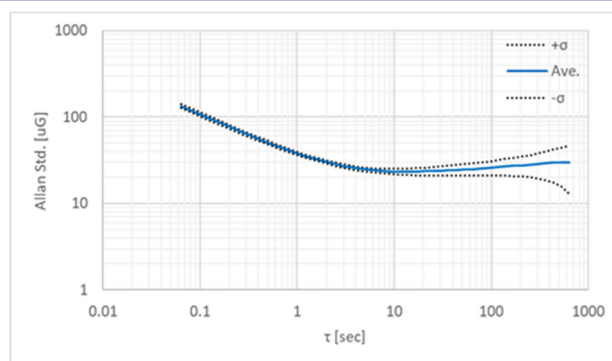
BLOCK DIAGRAM



TYPICAL PERFORMANCE CHARACTERISTICS



Gyro Allan Variance Characteristic



Accelerometer Allan Variance Characteristic

The product characteristics shown above are just examples and are not guaranteed as specifications.

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