

■ IMU Product Line-up

- M-G370PDS0 : Low Noise and High Stability IMU
- M-G370PDG0 : Wide Dynamic Range and High Stability IMU
- M-G366PDG0 / M-G330PDG0 : Dynamic Tilt Function IMU
- M-G552 Series : Water and Dust Proof IMU with J1939, CANopen and RS422 Interface (Interface is selectable)

Product Name			M-G370PDS0	M-G370PDG0	M-G366PDG0	M-G330PDG0	M-G552 Series*1
Features			Low Noise High Stability	Wide Range High Stability	Standard Model Dynamic Tilt	Basic Model Dynamic Tilt	Water and Dust proof
Gyroscope	Bias Instability	°/h	0.8	0.8	1.2	3	0.8
	Output Range	°/s	± 200	± 450	± 450	± 400	± 450
	Random Walk	°/√h	0.03	0.06	0.08	0.1	0.06
	Band Width	Hz(Max.)	189	189	472	500	189
Accelerometer	Output Range	G	± 10	± 8 / ± 16 *2	± 8 / ± 16 *2	± 8 / ± 16 *2	± 10
	Initial Bias	mG, σ	2	2	3	4	3
Misalignment (Gyro/Accelerometer)		°	0.01				0.01
Current Consumption		mA(Typ.)	16				32 @12 V
Voltage Supply		V	3.3				9 ~ 32
Operating Temperature		°C	- 40 ~ + 85				-30 ~ +80
Interface			SPI / UART				J1939 (CANopen and RS422 is selectable by product code)
Size		mm ³	24 x 24 x 10				65 x 60 x 30
Weight		g	10				115
Dynamic Tilt Function EKF(Extended Kalman Filter)			---	---	Built in	Built in	---
Functions			External Trigger Input, etc				IP67

Please contact us for information on RoHS and Reach.

*1 The product model number and specification values are determined by the built-in IMU.



The values on this page are the specifications of M-G552PJ7x. Please contact us for detailed information on other products.
Interface is selectable by product code.

* 2 Selectable by register setting.



■ Vibration Sensor / Accelerometer Product Line-up

- M-A342VD10 : Built-in Type Vibration sensor (UART / SPI Interface), ISO 10816 and ISO 20816 compliant
- M-A542VR10 : Water and Dust Proof Vibration sensor (RS422 Interface), ISO 10816 and ISO 20816 compliant
- M-A352AD10 : Built-in Type Accelerometer (UART / SPI Interface), Detectable in the range from DC
- M-A552AC10/AR10 : Water and Dust Proof Accelerometer (CAN / RS422 Interface) , Detectable in the range from DC

Vibration Sensor

Product Name		M-A342VD10	M-A542VR10
Features		Built-in Type	Water and Dust Proof (IP67)
Interface		UART / SPI Selectable	RS422
Transfer Speed	bps	115.2 k~921.6 k(Default 460.8 k)	
Detected Axis		3(X/Y/Z)	
Physical Output Formats		Velocity and Displacement	
Output Formats		raw, rms, p-p (digital output)	
Output Range	Velocity mm/s	± 100	
	Displacement mm	± 200	
Measured Frequency Range	Velocity Hz	10 ~ 1,000	
	Displacement Hz	1 ~ 100	
Operating Temperature	°C	-30 ~ +85	-30 ~ +70
Current Consumption	mA(Typ.)	29 @ 3.3 V	51 @12 V
Voltage Supply	V	3.15 ~ 3.45	9 ~ 32
Size	mm ³	48 x 24 x 16	65 x 60 x 30
Weight	g	25	128
Product Image			

Accelerometer

Product Name		M-A352AD10	M-A552AC10 M-A552AR10
Features		Built-in Type	Water and Dust Proof (IP67)
Interface		UART / SPI Selectable	CANopen:M-A552AC10 RS-422 :M-A552AR10
Noise Density	μG/Hz	0.2	0.5
Output Range	G	± 15	± 15
Detected Axis		3(X/Y/Z)	3(X/Y/Z)
Physical Output Formats		Acceleration, Tilt Angle (Selectable on each axis)	Acceleration, Tilt Angle (Selectable on each axis)
Measured Frequency Range	Hz	DC ~ 460	DC ~ 460
Output Rate	Sps(Max.)	1,000	1,000
Resolution	μG/LSB	0.06	0.06
Shock	G(Max.)	1,000	1,000
Operating Temperature	°C	-30 ~ +85	-30 ~ +70
Current Consumption	mA(Typ.)	13.2	35@12 V:M-A552AC10 49@12 V:M-A552AR10
Voltage Supply	V	3.3	9 ~ 32
Size	mm ³	48 x 24 x 16	65 x 60 x 30
Weight	g	25	128
Product Image			

Please contact us for information on RoHS and Reach.

IMU (Inertial Measurement Unit)

M-G330PDG0



Product Name and Number
M-G330PDG0 : X2G000201000100



- Small size & Light Weight: 24 x 24 x 10 mm³, 10 g
- Low-Noise, High-Stability
Gyro Bias Instability: 3 °/h
Angular Random Walk: 0.1 °/√h
- Calibrated Stability (Bias, Scale Factor, Axial Alignment)
- Interface: SPI / UART
- Calibration Temperature: -40 °C to +85 °C
- Power Supply Voltage: 3.3 V

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 _{CC}		3.15	3.3	3.45	V
Digital Input Voltage		GND	—	V _{CC}	V
Digital Output Voltage		-0.3	—	V _{CC} + 0.3	V
Calibration Temperature	Performance parameters are applicable	-40	—	+85	°C
Operating Temperature		-40	—	+85	°C

SPECIFICATIONS

T_a = 25 °C, V_{CC} = 3.3 V, Angular rate = 0 °/s, ≤ ±1 G, unless otherwise noted.

Parameter	Test Condition / Comment	Min.	Typ.	Max.	Unit	
GYRO SENSORS						
Sensitivity						
Output Range		—	±400	—	°/s	
Scale Factor	16 bit, when 32 bit x 2 ¹⁶	-0.2 %	66	+0.2 %	LSB/(°/s)	
Nonlinearity	1σ	—	0.05	—	% of FS	
Misalignment	1σ, Axis-to-axis, Δ = 90 ° ideal	—	0.01	—	°	
Bias						
Initial Error	1 σ, -10 °C ≤ T _A ≤ +60 °C 1 σ, -40 °C ≤ T _A ≤ +85 °C	—	720 1800	—	°/h °/h	
Repeatability ^{*1}	1σ, Turn-on to Turn-on ^{*1}	—	36	—	°/h	
Bias Instability	Average	—	3	—	°/h	
Angular Random Walk	Average	—	0.1	—	°/√h	
Noise Density	f = 10 Hz to 20 Hz	—	7	—	(°/h)/√Hz, rms	
Frequency Property						
3dB Bandwidth		—	—	500	Hz	
ACCELEROMETERS						
Sensitivity						
Output Range		—	±8 / ±16 ^{*7}	—	G	
Scale Factor	16 bit, when 32 bit x 2 ¹⁶	-0.2%	4(8 G)/2(16 G)	+0.2%	LSB/mG	
Nonlinearity	1 σ, < 1 G	—	0.1	—	% of FS	
Misalignment	1 σ, Axis-to-Axis, Δ = 90 ° ideal	—	0.01	—	°	
Bisa						
Initial Error	1 σ, -40 °C ≤ T _A ≤ +85 °C	—	4	—	mG	
Repeatability ^{*1}	1σ, Turn-on to Turn-on ^{*1}	—	4	—	mG	
Bias Instability	Average	—	34	—	μG	
Velocity Random Walk	Average	—	0.03	—	(m/s)/√h	
Noise Density	f = 10 Hz to 20 Hz	—	70	—	μG/√Hz, rms	
Frequency Property						
3dB Bandwidth		—	—	333	Hz	
ATTITUDE OUTPUT						
Dynamic Range	Inclination Mode	-80	—	+80	°	
	Euler Mode	ANG1:Roll	-45	—	+45	
		ANG2:Pitch	-180	—	+180	
		ANG3:Yaw ^{*4}	-180	—	+180	
Scale Factor	16bit	—	0.00012207 0.00699411	—	rad/LSB °/LSB	
Accuracy ^{*4*6}	1 σ, Static	—	0.3	—	°	
	1 σ, Dynamic ^{*5} (100 °/s, Max.)	—	0.3	—		
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 bit (TEMP_HIGH). *3) Turn-on to turn-on / Day by day, estimated variation during 5 consecutive days.

*4) Yaw axis is not compensated for errors caused by 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: modeA. *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.

Note) The Typ. values in the specifications are average values or 1 σ values.

Note) Unless otherwise noted, the Max. / Min. values in the specifications are design values or Max. / Min. values at the factory tests.

IMU (Inertial Measurement Unit)

M-G366PDG0



Product Name and Number
M-G366PDG0 : X2G000191000100

- Small size & Light Weight: 24 x 24 x 10 mm³, 10 g
- Low-Noise, High-Stability
 Gyro Bias Instability: 1.2 °/h
 Angular Random Walk: 0.08 °/√h
- Calibrated Stability (Bias, Scale Factor, Axial Alignment)
- Interface: SPI / UART
- Calibration Temperature: -40 °C to +85 °C
- Power Supply Voltage: 3.3 V



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 _{CC}		3.15	3.3	3.45	V
Digital Input Voltage		GND	—	V _{CC}	V
Digital Output Voltage		-0.3	—	V _{CC} + 0.3	V
Calibration Temperature	Performance parameters are applicable	-40	—	+85	°C
Operating Temperature		-40	—	+85	°C

SPECIFICATIONS

T_a = 25 °C, V_{CC} = 3.3 V, Angular rate = 0 °/s, ≤ ±1 G, unless otherwise noted.

Parameter	Test Condition / Comment	Min.	Typ.	Max.	Unit	
GYRO SENSORS						
Sensitivity						
Output Range		—	±450	—	°/s	
Scale Factor	16 bit, when 32 bit x 2 ¹⁶	-0.2 %	66	+0.2 %	LSB/(°/s)	
Nonlinearity	1σ	—	0.05	—	% of FS	
Misalignment	1σ, Axis-to-axis, Δ = 90 ° ideal	—	0.01	—	°	
Bias						
Initial Error	1 σ, -40 °C ≤ T _A ≤ +85 °C	—	360	—	°/h	
Repeatability ^{*1}	1σ, Turn-on to Turn-on ^{*1}	—	36	—	°/h	
Bias Instability	Average	—	1.2	—	°/h	
Angular Random Walk	Average	—	0.08	—	°/√h	
Noise Density	f = 10 Hz to 20 Hz	—	6.9	—	(°/h)/√Hz, rms	
Frequency Property						
3dB Bandwidth		—	—	472	Hz	
ACCELEROMETERS						
Sensitivity						
Output Range		—	±8 / ±16 ^{*7}	—	G	
Scale Factor	16 bit, when 32 bit x 2 ¹⁶	-0.1 %	4(8 G)/2(16 G)	+0.1 %	LSB/mG	
Nonlinearity	1 σ, < 1 G	—	0.1	—	% of FS	
Misalignment	1 σ, Axis-to-Axis, Δ = 90 ° ideal	—	0.01	—	°	
Bisa						
Initial Error	1 σ, -40 °C ≤ T _A ≤ +85 °C	—	3	—	mG	
Repeatability ^{*1}	1σ, Turn-on to Turn-on ^{*1}	—	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						
3dB Bandwidth		—	—	333	Hz	
ATTITUDE OUTPUT						
Dynamic Range	Inclination Mode	-80	—	+80	°	
	Euler Mode	ANG1:Roll	-45	—	+45	
		ANG2:Pitch	-180	—	+180	
		ANG3:Yaw ^{*4}	-180	—	+180	
Scale Factor	16bit	—	0.00012207	—	rad/LSB	
		—	0.00699411	—	°/LSB	
Accuracy ^{*4*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 bit (TEMP_HIGH). *3) Turn-on to turn-on / Day by day, estimated variation during 5 consecutive days.

*4) Yaw axis is not compensated for errors caused by 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: modeA. *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.

Note) The Typ. values in the specifications are average values or 1 σ values.

Note) Unless otherwise noted, the Max. / Min. values in the specifications are design values or Max. / Min. values at the factory tests.



3 Axis Vibration Sensor M-A342VD10



Product number
M-A342VD10 : X2F000021000100



- Capable of measuring velocity, velocity RMS, and velocity P-P (ISO10816 / ISO20816 compliant)
- Frequency response characteristics: 10 Hz to 1,000 Hz (-3dB)
- Insensitive to magnetic influences
- High dynamic range: ± 100 mm/s (110 dB)
- 3-axis digital output SPI / UART
- Power consumption : 29 mA Typ.

Recommended Application

- MHM (Machine Health Monitoring) • Condition Based Maintenance (CBM) • Motion analysis and control
- SHM (Structural Health Monitoring) • Vibration analysis, control and stabilization • Lissajous analysis

Recommended Operating Condition

Parameter	Condition	Min	Typ	Max	Unit
VCC to GND		3.15	3.3	3.45	V
Digital Input Voltage to GND		GND		VCC	V
Digital Output Voltage to GND		-0.3		VCC +0.3	V
Operating Temperature Range		-30		85	°C
Start up Time	Power-on to start output.			900	ms.

Specifications

T_A=-30 °C to +85 °C, VCC=3.15 V~3.45 V, $\leq \pm 1$ G, unless otherwise noted.

Parameter	Test Conditions / Comments	Min	Typ	Max	Unit
VELOCITY					
Sensitivity					
Output Range	f = 10 Hz ~ 1000 Hz			± 100	mm/s
Scale Factor	2^{-22} m/s/LSB		2.38×10^{-4}		mm/s/LSB
Sensitivity Error	25 °C, ≤ 1 G	-1550		1550	$\times 10^{-6}$ (ppm)
Nonlinearity	≤ 1 G, Best fit straight line, RT	-0.15		0.15	% of FS
Cross Axis Sensitivity	No alignment correction		± 0.9 *3		%
Noise					
Noise Density	25 °C, Avg, f = 200 Hz ~ 1000 Hz		1.4×10^{-4}		mm/s/ $\sqrt{\text{Hz}}$, rms
Cantilever Resonance Frequency	25 °C, VCC 3.3 V		4,460		Hz
Frequency Property					
Frequency Range	-3 dB at 25 °C		10~1,000		Hz
DISPLACEMENT					
Sensitivity					
Output Range	f = 1 Hz ~ 100 Hz			± 200	mm
Scale Factor	2^{-22} m/LSB		2.38×10^{-4}		mm/LSB
Nonlinearity	≤ 1 G, Best fit straight line, RT	-0.15		0.15	% of FS
Cross Axis Sensitivity			± 0.9 *3		%
Noise					
Noise Density	25 °C, Avg, f = 20 Hz ~ 100 Hz		0.7×10^{-5}		mm/ $\sqrt{\text{Hz}}$, rms
Frequency Property					
Frequency Range	-3 dB at 25 °C		1~100		Hz
TEMPERATURE SENSOR					
Output Range		-40		85	°C
16bit Scale Factor *1	Output=2634(0x0A4A) at 25 °C		-0.0037918		°C/LSB
8bit Scale Factor *1	Output=2634(0x0A4A) at 25 °C		-0.9707008		°C/LSB
RELIABILITY					
MTBF*2	JIS-C5003 TA = 25 °C	87,600			hour

*1) This is a reference value used for the internal temperature correction, and is not guaranteed to accurately output the interior temperature.

*2) The MTBF is an estimated value derived from the result of high temperature operation with a system requirement of TA=25°C and a 60% reliability level.

*3) When the alignment is corrected by the host, the other axis sensitivity is Typ. 0.1 %.

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.

Note) The Max/Min value is the maximum/minimum value of the design or factory shipment examination, unless otherwise specified.

Note) The calibrated standard 1G gravitational acceleration value is 9.80665 m/s²

3 Axis Accelerometer M-A352AD10



Product number
M-A352AD10 : X2F000011000100



- Ultra-low noise : 0.2 μ G/ $\sqrt{\text{Hz}}$ Typ.
- Improved shock resistance: 1,000G
- Selectable output format: Acceleration / Tilt Angle
- 3-axis digital output SPI / UART
- Programmable low-pass digital filters
- Low jitter external trigger function for synchronous sampling
- Solid Metallic Case (Size : 48 x 24 x 16 mm³, Weight: 25g)

Recommended Application

- MHM (Machine Health Monitoring) • Earthquake detection • Environmental vibration measurement
- Industrial equipment monitoring • Unmanned vehicles • Measurement of the vibration and path of industrial equipment and vehicles.

Recommended Operating Condition

Parameter	Condition	Min	Typ	Max	Unit
VCC to GND		3.15	3.3	3.45	V
Digital Input Voltage to GND		GND		VCC	V
Digital Output Voltage to GND		-0.3		VCC +0.3	V
Operating Temperature Range		-30		85	°C
Start up Time	Power-on to start output.			900	ms.

Specifications

T_A=-30 °C to +85 °C, VCC=3.15 V~3.45 V, $\leq \pm 1$ G, unless otherwise noted.

Parameter	Test Conditions / Comments	Min	Typ	Max	Unit
SPECIFICATIONS					
Output Range	f = DC ~ 460 Hz			± 15	G
Scale Factor	2 ⁻²⁴ G/LSB		0.06		μ G/LSB
Sensitivity Error	25°C, ≤ 1 G		± 500		$\times 10^{-6}$ (ppm)
Nonlinearity	≤ 1 G, Best fit straight line, RT			± 0.03	% of FS
Misalignment	25 °C			± 0.1	Deg
Initial Error	25 °C			± 2	mG
Bias Repeatability	T _A =25 °C and VCC=3.3 V for one year after shipment		3		mG
Bias Temperature Error	25 °C			± 2	mG
Noise Density	25 °C, Avg, f = 0.5 Hz ~ 6 Hz		0.2	0.7	μ G/ $\sqrt{\text{Hz}}$, rms
Cantilever Resonance frequency	25 °C, VCC3.3 V		850		Hz
VRC	at 50 Hz, 25 °C, VCC3.3 V			± 50	μ G/G ²
Power Supply Current	Standard noise floor condition, 200 Sps, Average		13.2	18.0	mA
	Reduced noise floor condition, 200 Sps, Average		16.2	20.0	mA
	Sleep mode		1.3	2.0	mA
FUNCTION					
Built-in LPF Cut off	-6 dB at 25 °C, selectable	9		460	Hz
User LPF			4, 64, 128, 512		Tap
Output Data Rate		50		1,000	Sps
Ext.Trigger Input Cycle		1		20	ms
Ext.Trigger Jitter	ADC's completion to Ext.Trigger input	0		5	μ s
RECOMMENDED OPERATING CONDITION					
VCC to GND		3.15	3.3	3.45	V
Operating temperature range	No condensation	-30		85	°C
ABSOLUTE MAXIMUM RATINGS					
Acceleration/Shock	Half-sine 0.2 msec		1,000		G
MTBF	JIS-C5003, 60 % reliability leve		87,600		Hour
Storage Temperature Range	No condensation	-40		85	°C

*1) This is a reference value used for the internal temperature correction, and is not guaranteed to accurately output the interior temperature.

*2) The MTBF is an estimated value derived from the result of high temperature operation with a system requirement of T_A=25 °C and a 60 % reliability level.

*3) When the alignment is corrected by the host, the other axis sensitivity is Typ. 0.1 %.

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.

Note) The Max. /Min. value is the maximum/minimum value of the design or factory shipment examination, unless otherwise specified.

Note) The calibrated standard 1 G gravitational acceleration value is 9.80665 m/s²