

M-G370PDS0

IMU (Inertial Measurement Unit)

■ GENERAL DESCRIPTION

The M-G370PDS0 is a small form factor inertial measurement unit (IMU) with 6 degrees of freedom: triaxial angular rates and linear accelerations, and provides high-stability and high-precision measurement capabilities with the use of high-precision compensation technology. A variety of calibration parameters are stored in memory of the IMU, and are automatically reflected in the measurement data being sent to the application after the power of the IMU is turned on. With general-purpose SPI/UART support for host communications, the M-G370PDS0 reduces technical barriers for users to introduce inertial measurement and minimizes design resources to implement inertial movement analysis and control applications. The features of the IMU such as high stability, high precision, small size and super low noise make it easy to create and differentiate applications in various fields of industrial systems, especially for stabilization applications.

■ FEATURES

- Small Size, Lightweight : 24x24x10 mm³, 10 grams
- Low-Noise, High-stability
 - Gyro In-Run Bias Stability : 0.8 °/h
 - Angular Random Walk : 0.03 °/√h
- Initial Bias Error : 360 °/h (1σ) / 2 mG (1σ)
- 6 Degrees Of Freedom
 - Triple Gyroscopes : ±200 °/s
 - Tri-Axis Accelerometer : ±10 G
- 16/32bit data resolution
- Digital Serial Interface : SPI / UART
- Calibrated Stability (Bias, Scale Factor, Axial Alignment)
- Data Output Rate : to 2 k Sps
- External Trigger Input / External Counter Reset Input
- Delta Angle/Delta Velocity Output
- Calibration Temperature Range : -40 °C to +85 °C
- Operating Temperature Range : -40 °C to +85 °C
- Single Voltage Supply : 3.3 V
- Low Power Consumption : 16 mA (Typ.)



■ APPLICATIONS

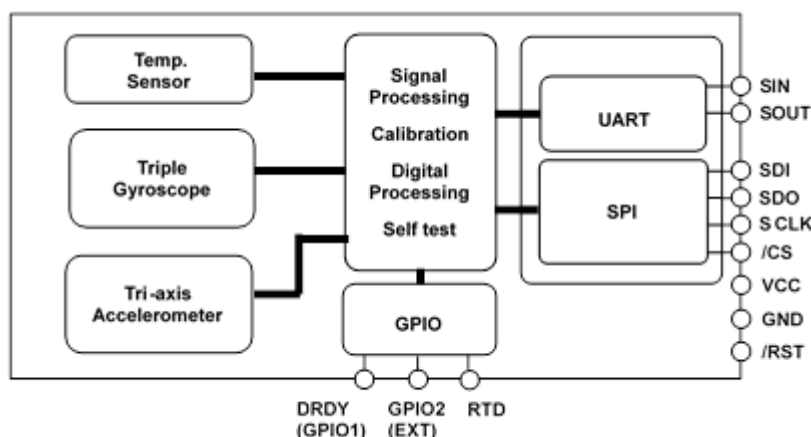
- Unmanned Vehicles
- Antenna Platform Stabilization
- Camera Gimbals
- Vibration Control and Stabilization
- Navigation Systems

Distributed by:



www.texim-europe.com

■ FUNCTIONAL BLOCK DIAGRAM



■ SENSOR SECTION SPECIFICATION

T_A=25 °C, VCC=3.3 V, angular rate=0 °/s, ≤±1 G, unless otherwise noted.

Parameter	Test Conditions / Comments	Min.	Typ.	Max.	Unit
GYRO sensor					
Sensitivity					
Dynamic Range		-	±200	-	°/s
Scale Factor	16 bit	-0.2%	150	+0.2%	LSB / (°/s)
	32 bit	-0.2%	150x(2 ¹⁶)	+0.2%	
Nonlinearity (Best fit straight line)	1 σ, <130 °/s	-	0.05	-	% of FS
	1 σ, >130 °/s	-	0.2	-	% of FS
Misalignment	1 σ, Axis-to-axis, Δ = 90° ideal	-	0.01	-	°
Bias					
Initial Error	1 σ, -40 °C ≤ TA ≤ +85 °C	-	360	-	°/h
Repeatability	1 σ, turn-on to turn-on *3	-	36	-	°/h
In-Run Bias Stability	Average	-	0.8	-	°/h
Angular Random Walk	Average	-	0.03	-	°/√h
Linear Acceleration Effect	Average	-	18	-	(°/h)/G
Noise Density	f = 10 Hz to 20 Hz	-	2.52	-	(°/h)/√Hz, rms
Frequency Property					
3 dB Bandwidth		-	189	-	Hz
ACCELEROMETERS					
Sensitivity					
Dynamic Range		-	±10	-	G
Scale Factor	16 bit	-0.1%	2.5	+0.1%	LSB /mG
	32 bit	-0.1%	2.5 x(2 ¹⁶)	+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, -40 °C ≤ TA ≤ +85 °C	-	2	-	mG
Repeatability	1 σ, turn-on to turn-on *3	-	2	-	mG
In Run Bias Stability	Average	-	12	-	μG
Velocity Random Walk	Average	-	0.025	-	(m/s)/√h
Noise Density	f = 10 Hz to 20 Hz	-	60	-	μG/√Hz, rms
Frequency Property					
3 dB Bandwidth		-	167	-	Hz
TEMPERATURE SENSOR					
Scale Factor *1*2	Output = 2634(0x0A4A) @ +25°C	-	-0.0037918	-	°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 16bit (**TEMP_HIGH**).

*3) Turn-on to turn-on / Day by day, estimated variation during 5 consecutive days.

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.

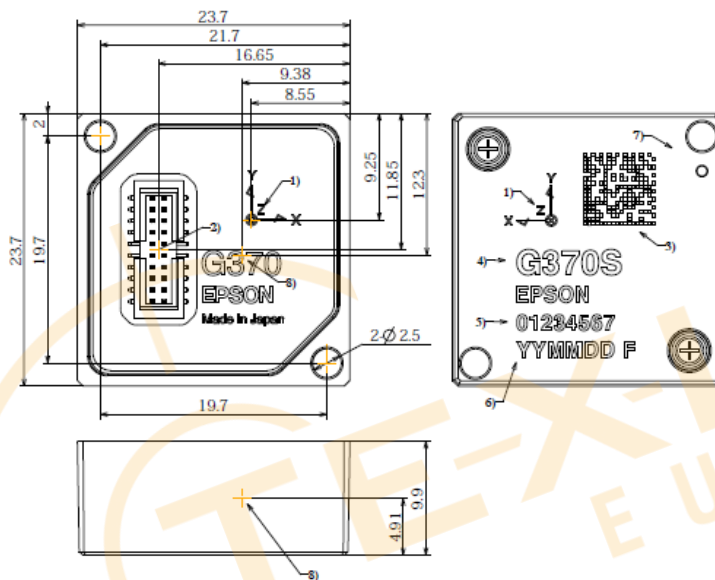
Note) The Typ values in the specifications are average values or 1σ values.

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

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
Calibration Temperature Range	Performance parameters are applicable	-40	—	85	°C
Operating Temperature Range		-40	—	85	°C

OUTLINE DIMENSIONS



NOTICE:

No part of this material may be reproduced or duplicated in any form or by any means without the written permission of Seiko Epson. Seiko Epson reserves the right to make changes to this material without notice. Seiko Epson does not assume any liability of any kind arising out of any inaccuracies contained in this material or due to its application or use in any product or circuit and, further, there is no representation that this material is applicable to products requiring high level reliability, such as, medical products. Moreover, no license to any intellectual property rights is granted by implication or otherwise, and there is no representation or warranty that anything made in accordance with this material will be free from any patent or copyright infringement of a third party. This material or portions thereof may contain technology or the subject relating to strategic products under the control of the Foreign Exchange and Foreign Trade Law of Japan and may require an export license from the Ministry of Economy, Trade and Industry or other approval from another government agency.

All brands or product names mentioned herein are trademarks and/or registered trademarks of their respective companies.

©Seiko Epson Corporation 2021, All rights reserved

SEIKO EPSON CORPORATION

DEVICE SALES & MARKETING DEPT.

29th Floor, JR Shinjuku Miraina Tower, 4-1-6 Shinjuku, Shinjuku-ku,
Tokyo, 160-8801, Japan
Phone: +81-3-6682-4322 FAX: +81-3-6682-5016

Revised date OCT, 2021 in Japan
Rev.20211001



Headquarters & Warehouse

Elektrostraat 17
NL-7483 PG Haaksbergen
The Netherlands

T: +31 (0)53 573 33 33
E: info@texim-europe.com
Homepage: www.texim-europe.com



The Netherlands

Elektrostraat 17
NL-7483 PG Haaksbergen

T: +31 (0)53 573 33 33
E: nl@texim-europe.com



Belgium

Zuiderlaan 14, box 10
B-1731 Zellik

T: +32 (0)2 462 01 00
E: belgium@texim-europe.com



UK & Ireland

St Mary's House, Church Lane
Carlton Le Moorland
Lincoln LN5 9HS

T: +44 (0)1522 789 555
E: uk@texim-europe.com



Germany - North

Bahnhofstrasse 92
D-25451 Quickborn

T: +49 (0)4106 627 07-0
E: germany@texim-europe.com



Germany - South

Martin-Kollar-Strasse 9
D-81829 München

T: +49 (0)89 436 086-0
E: muenchen@texim-europe.com



Austria

Warwitzstrasse 9
A-5020 Salzburg

T: +43 (0)662 216 026
E: austria@texim-europe.com



Nordic

Søndre Jagtvej 12
DK-2970 Hørsholm

T: +45 88 20 26 30
E: nordic@texim-europe.com



Italy

Via Matteotti 43
IT-20864 Agrate Brianza (MB)

T: +39 (0)39 9713293
E: italy@texim-europe.com