M-G552PJ1

■ GENERAL DESCRIPTION

The M-G552PJ1 is a small form factor inertial measurement unit (IMU) with 6 degrees of freedom: tri-axial angular rates and linear accelerations, and provides high-stability and high-precision measurement capabilities with the use of high-precision compensation technology. With Controller Area Network (CAN) interface support for host communication, the M-G552PJ1 reduces technical barriers for users to introduce inertial measurement and minimizes design resources to implement inertial movement analysis and control applications. This unit is packaged in a water-proof and dust-proof metallic case. It is suitable for use in industrial and heavy-duty applications.

The M-G552PJ1 features a built-in attitude angle output function using an extended Kalman filter optimized for high-speed operation and highly accurate attitude angle (Roll/Pitch). This exceptional real time performance is achieved using our unique DSP processing architecture for efficiency, and low power consumption. The application or system level power consumption and complexity can be reduced by offloading the high-speed processing from the host system that would otherwise be necessary to achieve highly dynamic posture angle.

The features of the IMU such as high stability, high precision, and small size make it easy to create and differentiate applications in various fields of industrial systems.

■ FEATURES

Item		Specification
Sensor		
	Integrated sensor	SEIKO EPSON inertial measurement sensor
		Low-noise, High-stability
		Gyro bias instability : 1.2 deg/hr
		Angular random walk : 0.08 deg/√hr
		Initial bias error : 0.1 deg/s (1σ) / 4mG(1σ)
		6 Degree of freedom
		Triple Gyroscope : ±450 deg/s
		Tri-axis Accelerometer : ±10 G
		Tilt function
		Inclination mode : ±80deg
		Euler mode: ±180deg(Pitch), ±45deg(Roll)
		Resolution: 0.01deg , Static :±0.2deg (1σ), Dynamic :±0.2deg (1σ)
		16bit data resolution
		Calibrated stability (Bias, Scale factor, Axial alignment)
	Output data rate	100 sps (Default)
		Up to 200 sps (When attitude angle output is enabled)
		Up to 1000 sps (When attitude angle output is disabled)
	LPF	Built-in moving average filter and FIR Kaiser filter
Interface		
	Protocol	J1939 compatible
	Physical layer	ISO11898-2 (High speed CAN)
	Frame format	CAN2.0B 29 bit-ID
	Bit rate	250k bps or 500k bps
	Node-ID	128 (programmable)
Other function		
	Indicator	Green-LED / Red-LED
General Specification		
	Voltage supply	9 to 32 V
	Power consumption	32 mA (Vin=12V, default setting)
	Operating temperature range	-30 to +80 °C
External dimension		
	Outer packaging	Overall metallic shield case
	Size	65 x 60 x 30mm (Not including projection.)
	Weight	115g
	Interface connector	CAN connector: 5-pos, M12, water-proof

M-G552PJ1

| Item	Specification
Water-proof , Dust-proof:	IP67 equivalent
Regulation (Applicable only for Mass production)	
EU	CE marking (EN61326/RoHS Directive) Class A
USA	FCC part15B Class A

■ APPLICATIONS

- Motion and vibration measurement
- Platform stabilization
- Attitude detection for unmanned systems
- Vibration control and stabilization

Appendix1. CONNECTOR SPECIFICATIONS

Connector specification

Model number	SACC-DSI-MS-5CON-M12-SCO SH
Manufacturer	PHOENIX CONTACT
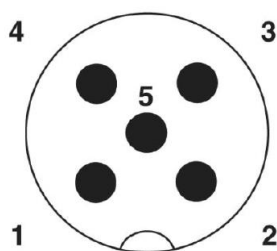
Terminal Layout

Terminal Function

No	Pin Name	I/O	Description
1	CAN_SHLD	-	CAN shield [*1]
2	CAN_V+	I	External power supply (9-32V)
3	CAN_GND	-	Ground
4	CAN_H	I/O	CAN H bus line
5	CAN_L	I/O	CAN L bus line

Notice: This unit should be connected to a connector that satisfies at least the IP67 water and dust proof specification.
(*1) CAN_SHLD is connected to the case.

Appendix2. J1939 MESSAGE OVERVIEW

Communication Settings

Item	Value	Note
CAN bit rate	250k bps / 500k bps	
CAN 29bit ID	-	CAN 11bits ID is ignored.
Address	128 (0x80)	Address is programmable.

Name Field

Field Name (J1939)	No. of bits	Byte No.	Value	Description
Arbitrary address capable	1	8	1	"Arbitrary address capable"
Industry group	3	8	0	"Global"
Vehicle system instance	4	8	0	
Vehicle system	7	7	0	"Non-specific system"
Reserved	1	7	0	
Function	8	6	145 (dec)	"Inertial Sensor"
Function Instance	5	5	0	
ECU Instance	3	5	1	
Manufacturer code	11	4,3	650 (dec)	"Seiko Epson Corp."
Identity number	21	3,2,1	xxxx	Unique number

Predefined Messages

Message Name	Direction	Priority	PGN	Description
Address claimed	in/out	6	60928 (0x00EE00)	Claim an address to use.

Proprietary Messages

Message Name	Direction	Priority	PGN	Description
Command	input	6	61184 (0x00EF00)	Command to the device.
Response	output	6	65504 (0x00FFE0)	Response for a command from the device.
SOUT1	output	6	65505 (0x00FFE1)	Angular rate data output
SOUT2	output	6	65506 (0x00FFE2)	Acceleration data output
SOUT4	output	6	65508 (0x00FFE4)	Temperature data output
SOUT5	output	6	65509 (0x00FFE5)	Time data output
SOUT7	output	6	65511 (0x00FFE7)	Attitude angle data output

■ OUTLINE DIMENSION
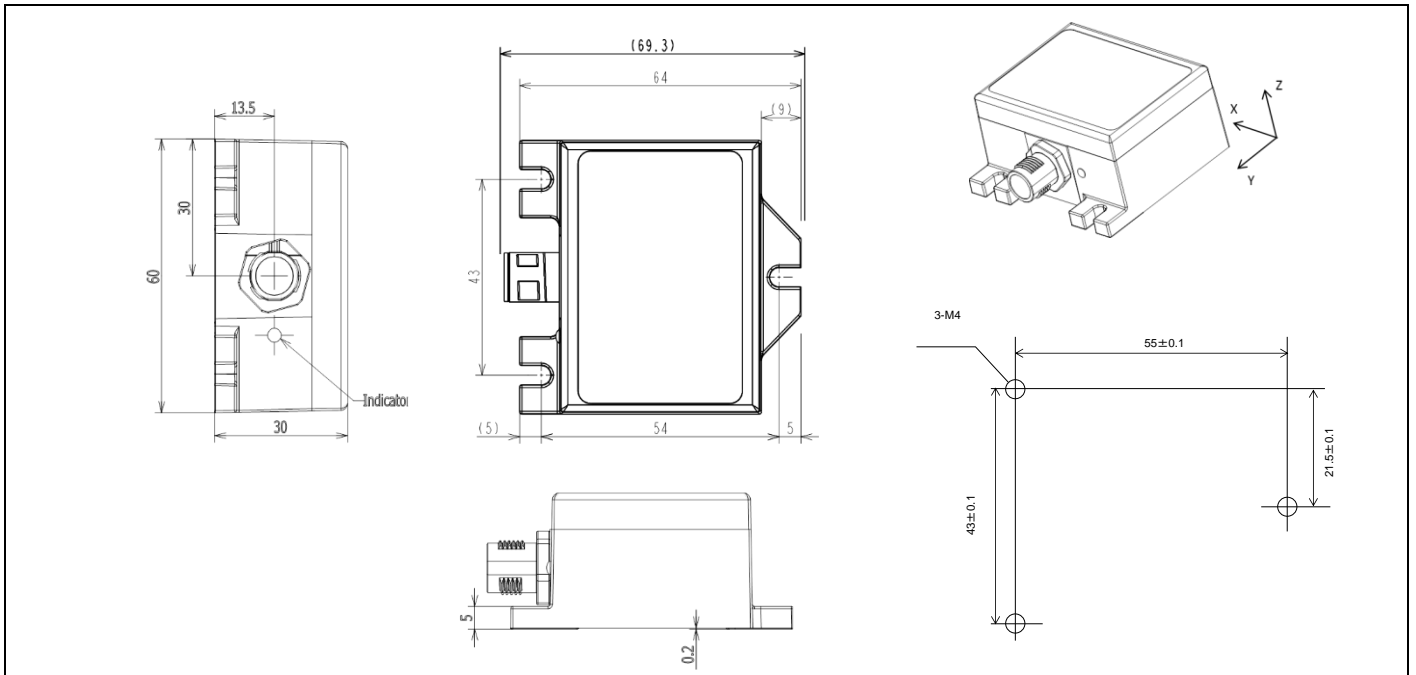
Outline Dimensions (millimeters)

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