

IMU (Inertial Measurement Unit) CAN INTERFACE

■ 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 |

| 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 |

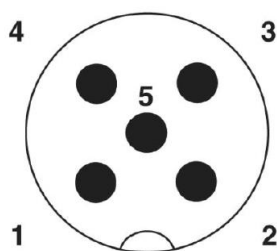
■ APPLICATIONS

- 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 |

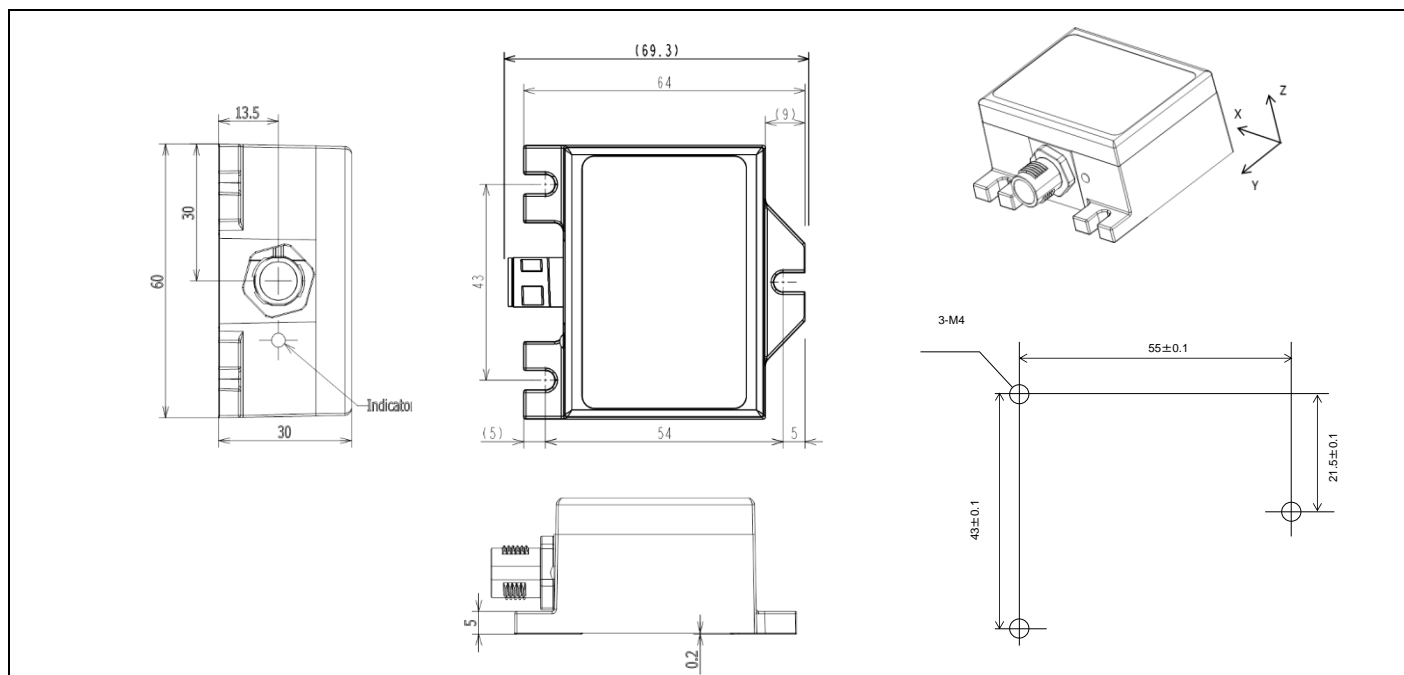
Predefined Messages

| 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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