

## IMU (Inertial Measurement Unit) RS422 INTERFACE

### ■ GENERAL DESCRIPTION

The M-G552PR1 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.

The M-G552PR1 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.

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 RS422 interface support for host communication, the M-G552PR1 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 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

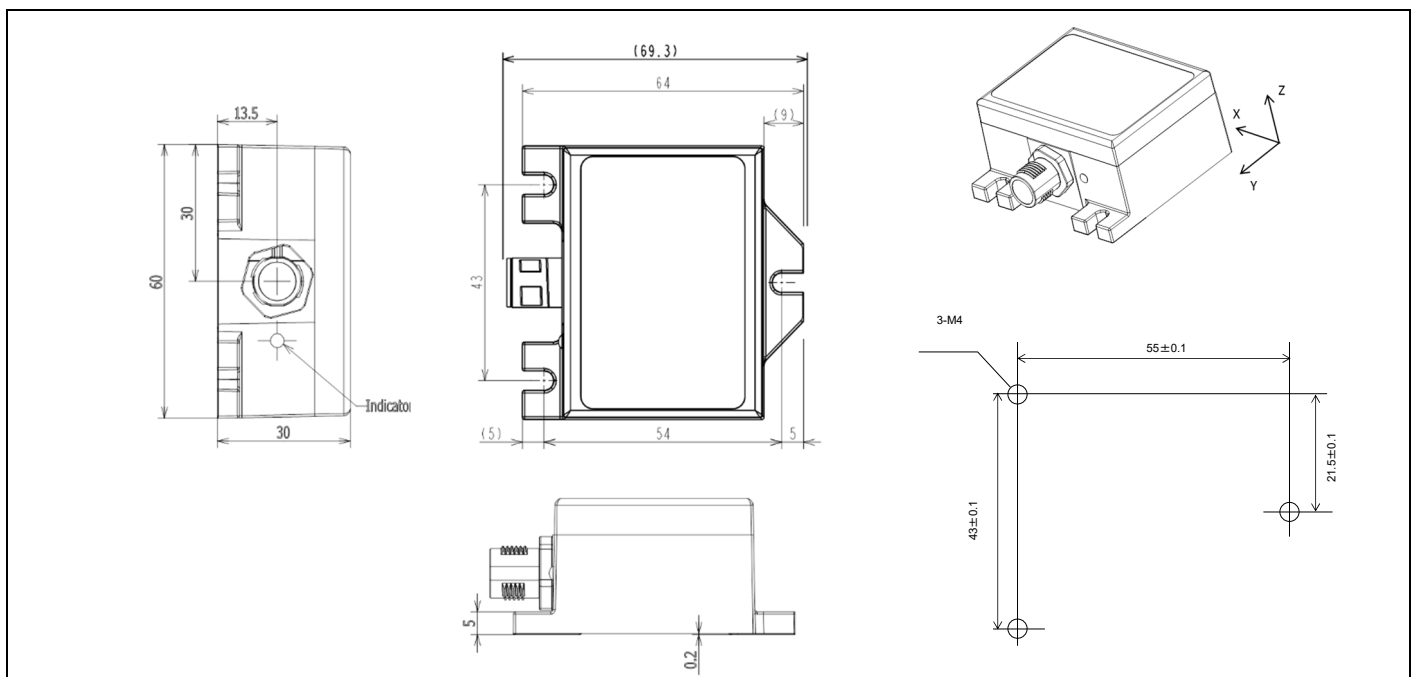
| Item                        | Specification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Sensor</b>               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Integrated sensor           | SEIKO EPSON inertial measurement sensor<br><br>Low-noise, High-stability<br>Gyro bias instability : 1.2 °/h<br>Angular random walk : 0.08 °/√h<br>Initial bias error : 360 °/h (1σ) / 4 mG(1σ)<br><br>6 Degree of freedom<br>Triple Gyroscope : ±450 °/s<br>Tri-axis Accelerometer : ±10 G<br><br>Tilt function<br>Inclination mode : ±80 °<br>Euler mode: ±180 °(Pitch), ±45 °(Roll)<br>Resolution: 0.01 °, Static :±0.2 °(1σ), Dynamic :±0.2 °(1σ)<br><br>16bit / 32bit data resolution<br>Calibrated stability (Bias, Scale factor, Axial alignment) |
| <b>Interface</b>            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Protocol (DL layer)         | RS-422 (TX/RX Pair, Full-duplex transmission)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Bit rate                    | 460.8k bps (default) / 230.4k bps / 921.6k bps                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Cable length                | 250m (max)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Terminator                  | Included (120Ωtyp)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Environment</b>          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Voltage supply              | 9 V to 32 V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Power consumption           | 42 mA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Operating temperature range | -30 °C to +80 °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>External dimension</b>   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Outer packaging             | Overall metallic shield case                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Size                        | 65 x 60 x 30 mm <sup>3</sup> (Not including projection.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Weight                      | 115 g                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Interface connector         | M12, 8pin-male, waterproof                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Waterproof, Dustproof:      | IP67 equivalent                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

| Item       |                      | Specification                                                      |
|------------|----------------------|--------------------------------------------------------------------|
|            | Random vibration     | 1 hour at 20Grms<br>MIL-STD-810, METHOD 514.x ANNEX E, Category 24 |
|            | Sine sweep vibration | 4 hours / axis at 10G<br>MIL-STD-202G, METHOD 204                  |
|            | Mechanical shock     | 1,000G, Half-sine 0.5ms, once per $\pm$ each axis(6times)          |
| Regulation |                      |                                                                    |
|            | 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

## OUTLINE DIMENSION



Outline Dimensions (millimeters)

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