

Third-generation MEMS IMU

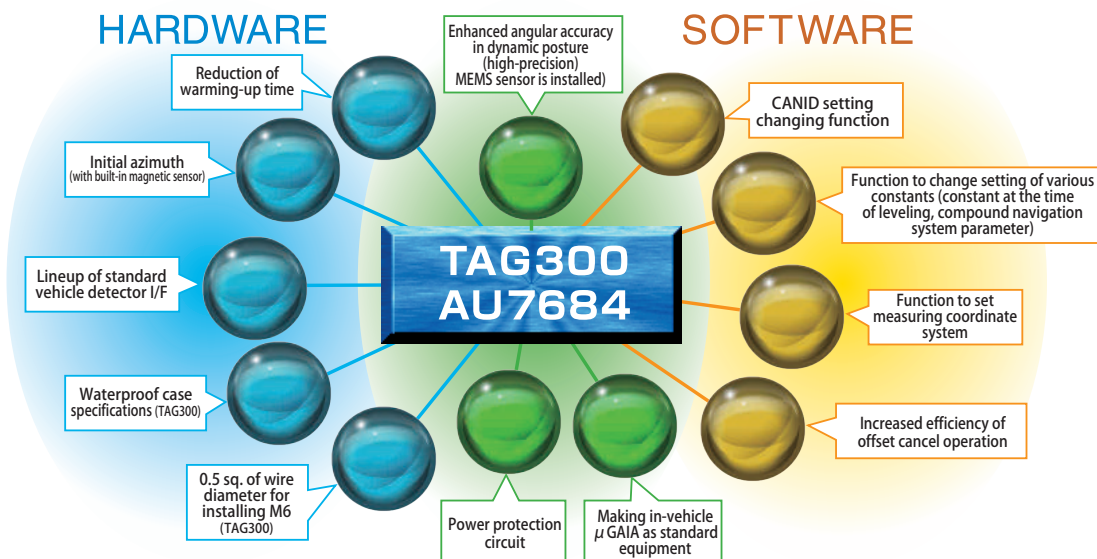


Types

- **AU7684 Series : Substrate type**
- **TAG300 Series : Waterproof case type**

Features

- Precision of built-in MEMS gyro doubled compared to the existing products. [Bias instability: 10°/h]
- Excellent functions
 - Waterproof case (IP65/TAG300 Series)
 - Built-in power protection circuit
 - Built-in magnetic direction sensor
 - CANID setting change function, etc.



Principle of MEMS gyro : Coriolis force

At the time of driving

At the time of driving At the time of detecting

Angular velocity is detected from Coriolis force (*1) that is added to the element by vibrating the element.

*1 Force generated, when the object in motion is rotated, in a direction perpendicular to the direction of movement of an object and that of axis of rotation. (Deflecting force)

MEMS gyro 2

Gyro produced by using the technologies of MEMS (*3). The product with uniform performance and quality can be manufactured with low cost.

MEMS gyro

*2 MEMS gyro is not a principle or method but a name and classification of the product manufactured by a certain production method.
 *3 MEMS stands for Micro Electro Mechanical Systems, and is a system that has a three-dimensional microstructure formulated with semiconductors processing technologies.

Precision of gyro sensor was enhanced and functions improved. IMU in the new stage was released.

Specifications

Item	Specification value	Remarks
External dimension (AU7684: substrate)	35×35×16.1 mm	
External dimension (TAG300: case)	100×67×52.5 mm waterproof	(IP65)
Power-supply voltage	8 ~ 28V DC	
Output signal	RS232 : 115.2 kbps CAN : 500kbps	User can change the CAN baud rate
Output cycle of data	RS232C : 200Hz, CAN : 1000Hz	
Range of angular velocity detection	±200 deg/sec	
Angular velocity bias	0.2 deg/s	Room temperature after warming up
	0.2 deg/s rms	Temperature fluctuation range of standard room temperature
Angular velocity SF error	0.2 %FS rms	SF : Scale factor FS : Full scale
Angle random walk	0.5 deg/√hr	By Allan variance
Bias instability	10 deg/hr	By Allan variance
Angular velocity noise	0.3 deg/s	Peak to peak
Range of acceleration detection	±3 G or ±6 G	Factory default
Acceleration bias	0.0196 m/s ² rms (2mG)	Room temperature after warming up
	0.049 m/s ² rms (5mG)	Temperature fluctuation range of standard room temperature
Acceleration SF error	0.2 %FS rms	
Acceleration noise	0.098 m/s ² (10mG)	Peak to peak
Angular accuracy in static posture	0.1 deg rms (Range 3G)	Room temperature after warming up
	0.2 deg rms (Range 3G)	Temperature fluctuation range of standard room temperature
Azimuth drift	0.01 deg/s rms	In case of offset-cancelling after warming up
Operating temperature range	-40 ~ +85°C	
Vibration resistance	29.4 m/s ² rms 5 ~ 2 kHz	Random vibration
Impact resistance	20 G 10 ms	

List of functions

Item	Specification value	Remarks
Waterproof case	✓	Normal response
Magnetic direction sensor	✓	Standard feature
Input of vehicle speed	RS232/CAN/ (Pulse)	Pulse input: Optional
Power protection circuit	✓	Standard feature
External GPS I/F	✓ (Responded individually)	NMEA format
GPS unit	✓ (Optional)	To be released in 2019
CAN termination resistance	None	
Warming-up time	5 minutes or below (typical time: 3 minutes)	Recommended value

Example of major use

● Automobile



Measurement of vehicle motion and attitude

● Service robot



Measurement of security robot attitude

● Unmanned aircraft



Measurement of drone attitude

● Construction machine



Measurement of inclination angle of unmanned construction machine

● Agriculture machine



Measurement of remote-controlled tractor attitude