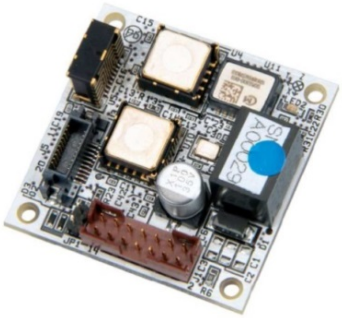
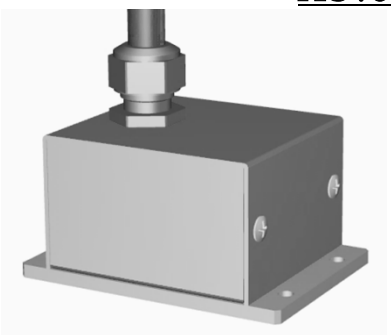
3-axis Inertial Measurement Unit

AU7684N1x00/TAG300N1x00/TAG289N1x00

Support Manual for Leveling Mode



AU7684 (PCB Type)



TAG289 (Compact Case Type)

TAG300 (Waterproof Case Type)

TAMAGAWA SEIKI CO., LTD.

TAMAGAWA TRADING CO., LTD

Revision History

Rev	Date	Page	Reason of Correction
1	2019.09.03	—	The document is released.
2	2019.09.12	P10-12	Section 3 is revised for the new content.
3	2019.11.15	P4 P5 P6-P19 P16 P17 P20-P27	Introduction contents added. IMU Simulator vs InsMon added. Section 1-4 Section# reviewed. Section 3.3 Note added Section 4 Dimension of GPS Module added Section 5 Command List added
4	2020.1.10	—	The document is revised for its exclusive usage of leveling operation mode.
5	2020.03.12	—	The new product “TAG289” is added.
6	2021.08.21	P18	Change contact information .

Table of Content

Introduction

This manual provides the operating procedures and cautions for the small 3-axis Inertial Measurement Unit (IMU) AU7684, TAG300 and TAG289 Leveling operation mode. Please read this document along with the product specification before using the device. Regarding GNSS/INS/VS Mode, please refer to the document "Support Manual (GNSS/INS/VS Mode)".

Contents

- **AU7684N1x00/TAG300N1x00/TAG289N1x00**, which are an Inertial Measurement Units (IMU) incorporating 3-axis MEMS gyroscopes and 3-axis integrated MEMS accelerometer. The device measures acceleration and angular rate along the X, Y, & Z axes of the sensor, attitude and heading angle.
- **EU8937 and EU8940 Interface Cable (sold separately)**
  There are 2 types of interface cable for each model. The one is loose wire type and the other is connector type for external GPS module.
  TAG289 Interface cable is attached to the product. You do not need to buy a cable separately.
- **External GPS Module (KGM-810GRB1_PS_917/Position) (available in market)**
  Regarding the inquiries and purchases, please refer to section 4 in this manual.
  The AU7684 series and TAG300 series can output GPS information (latitude, longitude, altitude, direction, speed, UTC time, etc.) by connecting a GPS module. The information is also utilized for the calculation to reduce attitude and heading errors.

Note: if you need to use USB, please use RS232C-USB conversion cable available in the market. Also, power source of 8-28 VDC should be prepared by customer.

Reference Documents

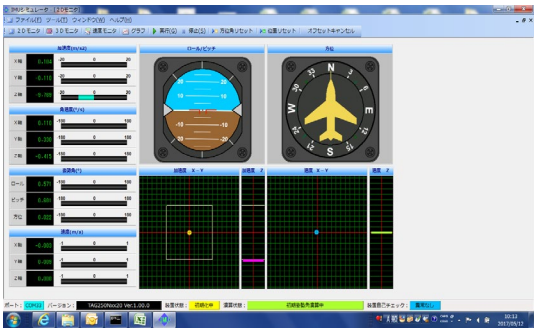
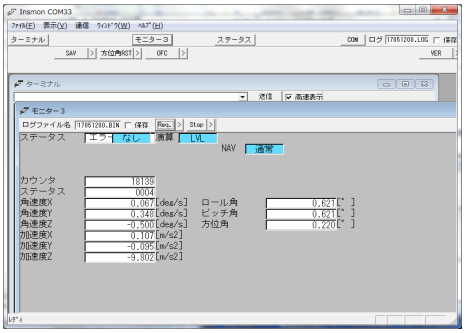
- SPC015354W00_R0001 Specification AU7684 Series
- SPC015456W00 Specification TAG300 Series
- SPC016342W00 Specification TAG289 Series
- Support Manual (GNSS/INS/VS Mode)

Downloads (URL: http://mems.tamagawa-seiki.com/en/download/)

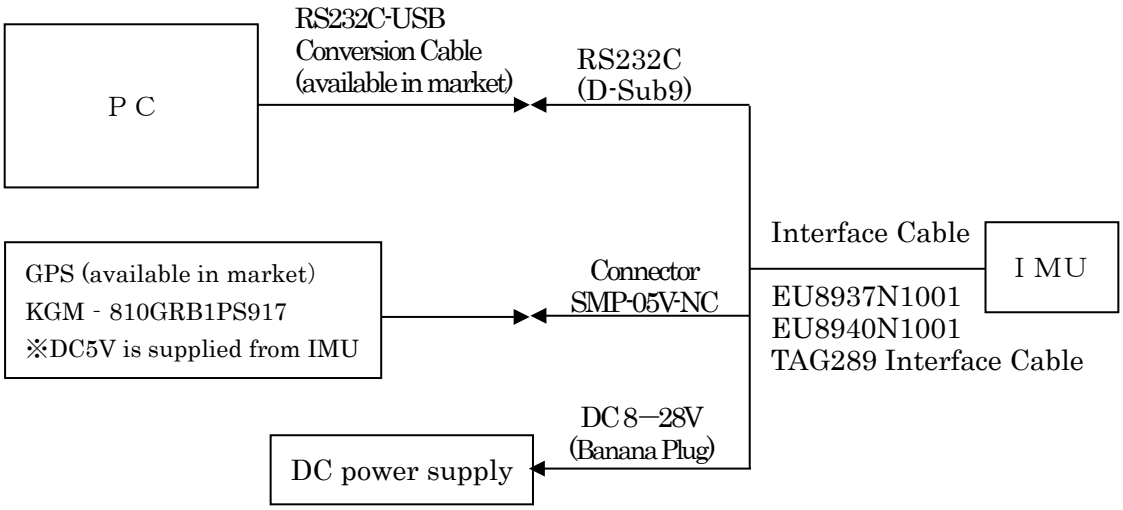
- IMU Simulator Software
- InsMon Software

IMU Simulator vs InsMon

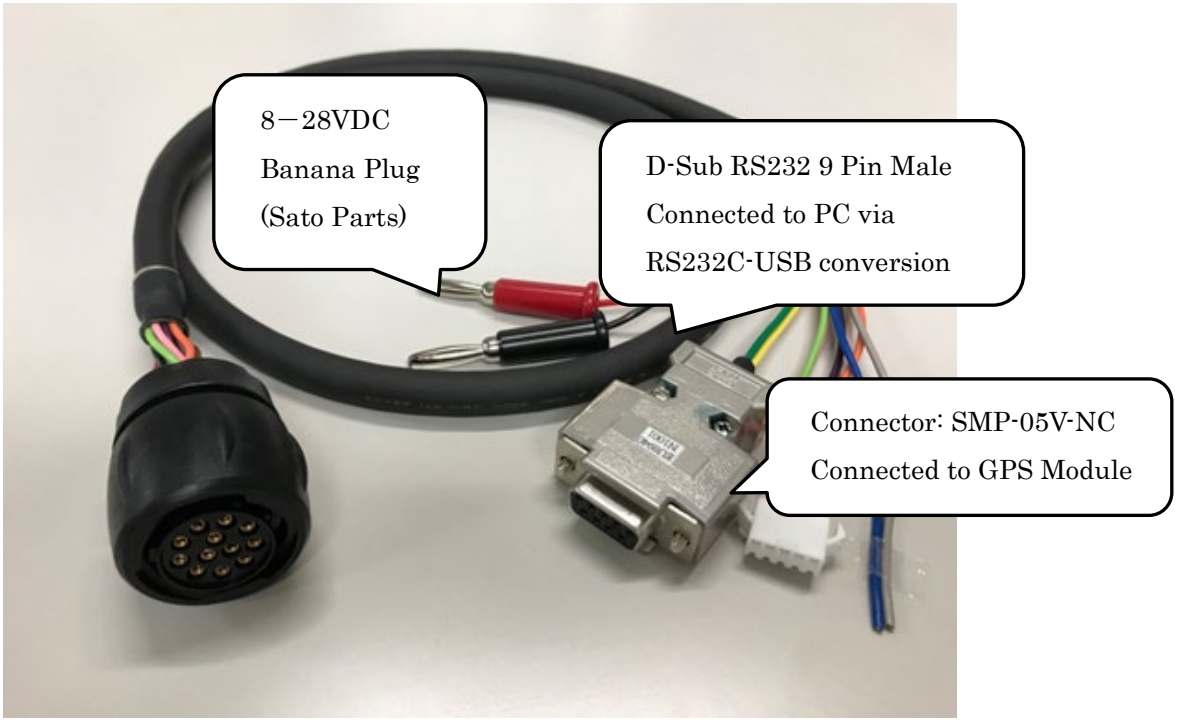
Two types of software (IMU simulator & InsMon) are provided for free. The features and functions are listed in the table below. Please make use of them according to the usage. The operation procedure is written in the following pages.

IMU Simulator	InsMon
	
Compatibility with PC: **Good** The graphics function is heavy and puts a burden on the PC. Some PCs do not work due to compatibility.	Compatibility with PC: **Very Good** Software is light and does not put a burden on the PC. Most of PCs are compatible.
Multiple Setup: **Not available** Only one IMU can be measured.	Multiple Setup: **Good** Multiple IMUs can be measured simultaneously.
Numerical Values Display: **Good**	Numerical Values Display: **Good**
2D Display: **Good**	2D Display: **Good**
Graph Display: **Good**	Graph Display: **Not available**
Communication Cycle Setting: **Good** Only 3 settings: 200Hz, 100Hz, 50Hz	Communication cycle setting: **Very Good** User can specify the values as desired.
Data Acquisition: **Good** Data acquisition is conducted for at most 6 hours. Acquired data will be lost if the PC freezes during data acquisition.	Data Acquisition: **Very Good** There is no limitation on logging time. Acquired data is saved in BIN file, so it is not heavy. If the PC freezes during data acquisition, the acquired data is not lost.
Offset Cancel: **Good** The period of offset cancel cannot be changed.	Offset Cancel: **Very Good** The period of offset cancel can be changed.
Send Command: **Not Available**	Send Command: **Good** Command can be sent from terminal.

Connection to PC



Block Diagram of PC connection



Interface Cable (P/N: EU8940N1001)

1 IMU Simulator Installation / Setup

- **Installation Overview**

  Download the software “IMU Simulator” from our website.

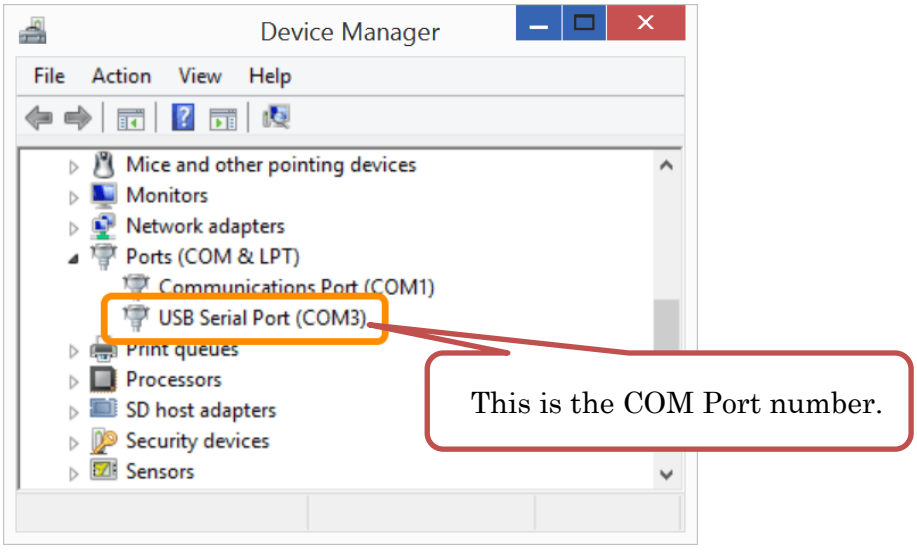
  http://mems.tamagawa-seiki.com/en/download/

- **COM Port setting**

  Supply the required voltage to the IMU, and connect the IMU to PC with a specified cable. If you need to convert RS232C to USB, please use RS232C-USEB conversion cable available in the market.

  Ex) BUFFALO　BSUSRC06 series.

  Confirm the COM port# which you are currently connected. Open the Device Manager and check the port COM and LPT. If you are using a USB cable, "USB Serial Port #" is added. (In case you use the IMU for the first time, it sometimes takes several minutes to display the COM port number.)



  If COM port number is not displayed, you may need to install RS232C-USB driver. (If COM port number is displayed, RS232C-USB driver is already installed in your PC. You do not need to re-install the driver.

- **Application Setting**

  Click [Tools]→[Option] in Menu Bar. Please conduct each setting according to the following procedure.

  - Serial Communication

    Select COM Port# where IMU is connected.

  - Communication type

    Select communication format to IMU device.

    In this application, only BIN 50 format (50Hz) is applicable.

  - Application Language selection

    Select the language to be used for this application.

  - Direction

    Select the roll direction to be used for 2D monitor and 3D monitor.

    CW: rotational direction of IMU is reversed on the monitor.

    CCW: rotational direction of IMU is corresponded with the monitor.

  - Time

    Set the Coordinated Universal Time (UTC) of the GPS time displayed on the 2D monitor.

    Initial setting: UTC+9 (JST)

  - Unit of data

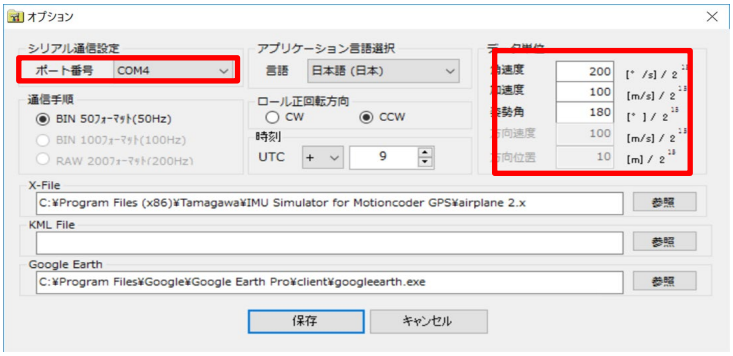
    Set Angular Velocity, Acceleration, and Attitude Angle as follows.

    Angular Velocity: 200 [°/s]/ 2^{15}

    Acceleration: 100 [m/s2]/ 2^{15}

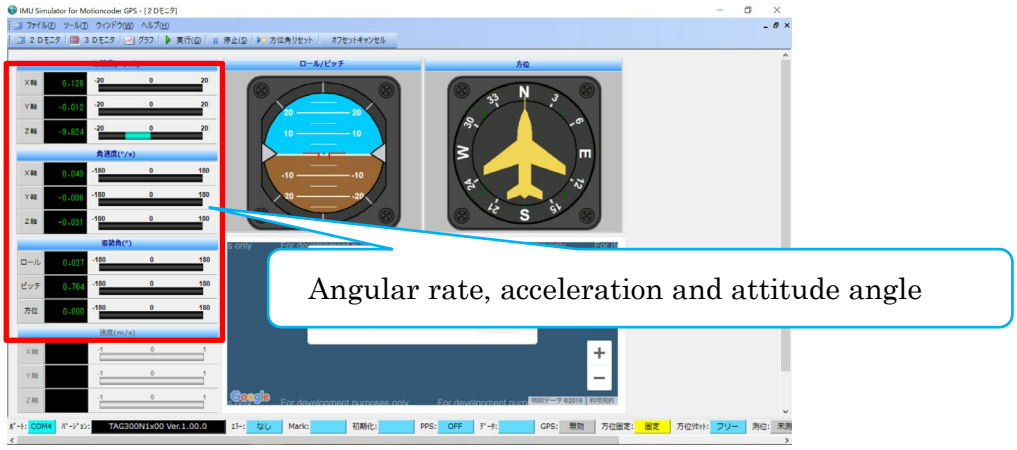
    Attitude Angle: 180 [°]/ 2^{15}

    If you change the setting of Unit, the values are written in red. Please push [Enter] to complete the setting and the values are changing color to black.



- **Operation in 2D Monitor**

  Click [2D monitor] and the following monitor is displayed. If you connect the IMU properly, angular velocity, acceleration and attitude angle are displayed.



The operation in 2D Monitor is described as follows.

- Start

  Click 2D monitor in Menu Bar. Monitoring will start automatically.

- Run

  Click [GO] button. The monitor is displayed.

- Stop

  Click [Stop] button. The monitor is stopped.

- Azimuthal Reset

  Click [Azimuthal Reset]. The attitude angle is reset.

- Offset Cancel

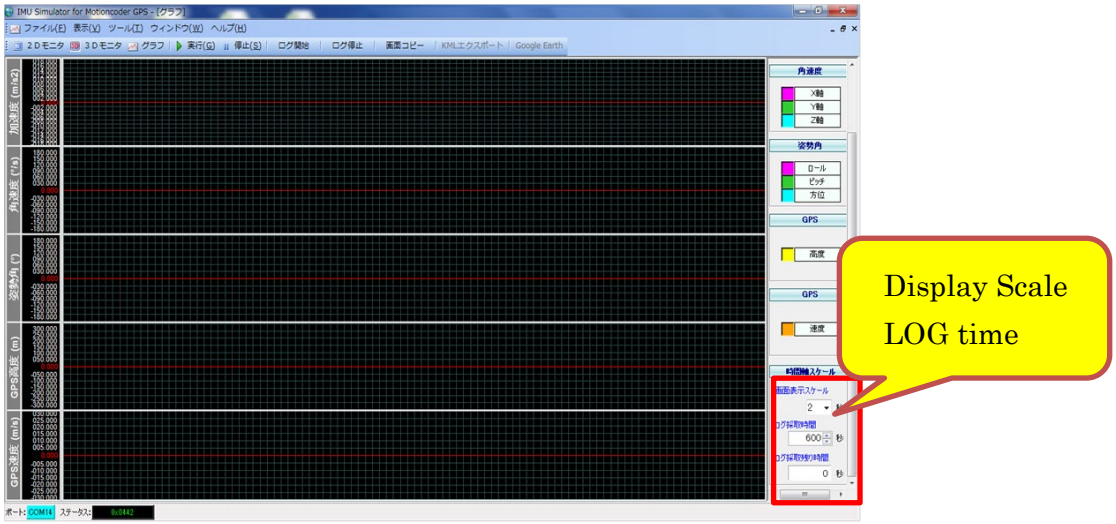
  Click [Offset Cancel]. The offset cancel is processed.

- Close 2D monitor

  Click [×] button in caption bar and close 2D monitor.

- **Operation in Graph Monitor**

  The real time data of angular velocity, acceleration and attitude angle from IMU device are displayed on chart.



➢ The operation in Graph Monitor is described as follows.

1) [Time Axis Scale] → [Display Scale]: Set the time to be displayed on the screen. From 1 sec to 10sec are applicable.
2) [Time Axis Scale] → [LOG Time]: Set the time to log. From 1 sec to 21600 sec are applicable.
3) Click [Chart] button in Menu Bar and start logging on chart.
4) Logging is finished according to LOG time. Dialogue box is displayed on the screen. If you want to finish logging before LOG time, click [LOG Stop] in Menu Bar.

Display Scale is the time to be displayed on the screen. The graph will flow faster if it is shorter period of time. The graph flows slowly if it is longer period of time.

The acquired data is accumulated on the PC memory, so an error may occur depending on the PC memory capacity when logging for a long time. The acquired data will be lost if an error occurs, so it is recommended to use another software InsMon for data acquisition.

➢ EXCEL data export

After data logging, click [File] → [EXCEL Export] button in Menu Bar. EXCEL starts automatically and chart data is exported.

2 InsMon Setup

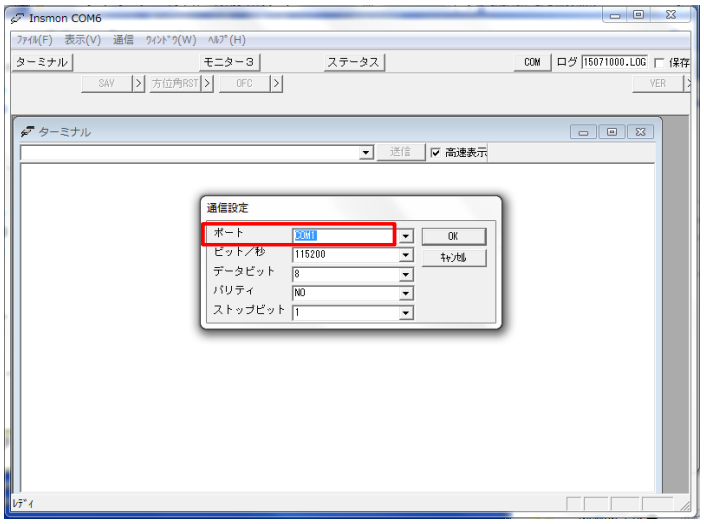
- **How to setup the application**

  Download InsMon corresponding to the applicable model from the following URL, and unzip it to desktop or My Documents, etc.
  http://mems.tamagawa-seiki.com/en/download/

  If you use GPS Module,
  Please use InsMon_AU7684N1x00_TAG300N1x00_BIN Folder.
  If you do not use GPS Module,
  Please use InsMon_AU7684N1x00_TAG300N1x00_RAW Folder.

- **COM Port setting**

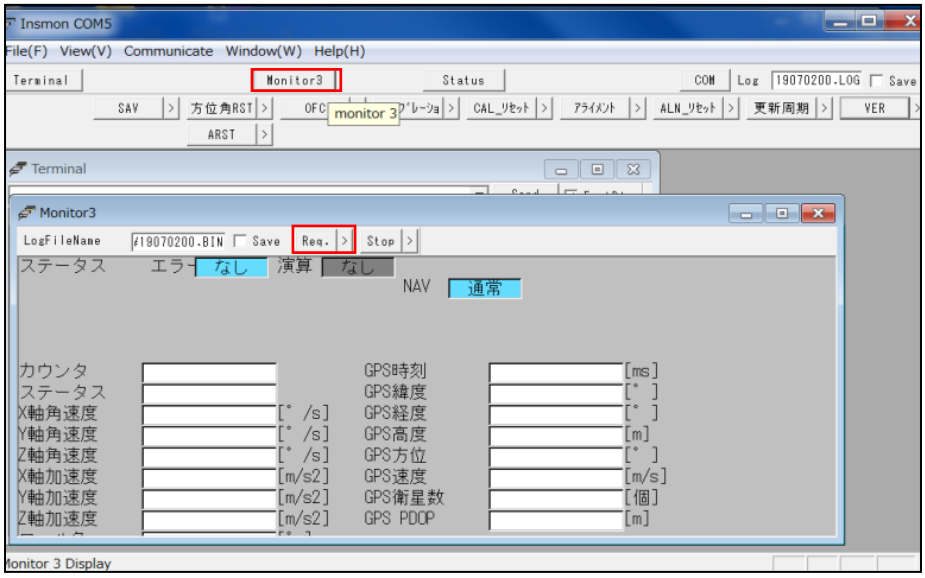
  1) Click [Communication] → [Disconnect] and disconnect the communication.
  2) Click [Communication] → [Setting] and select the COM port# which you are using. (The instruction is referred to section 1.2 in this manual)
  Please do not change any other settings except for COM port#.



  3) Click [Communication]→[Connect]

- **Measurement**

  1) Click [Monitor 3] and following screen is displayed. (Screen is different depending on the model.) Press “Req.” button to start operation. If you connect the IMU properly, angular velocity, acceleration and attitude angle are displayed.



  2) Click [OFC] and offset cancel is performed.
  The accuracy of attitude angle can be improved by performing offset cancel in static condition before measuring.
  You can also change the Frequency from [>] button next to [Req.] button. In BIN format, the maximum output is 100Hz. In RAW format, the maximum output is 200Hz. The frequency that can be received is the values obtained by dividing 200 by an integer. For example, 200, 100, 66, 50..., etc. If you input such as 150Hz, the value is automatically changed to 100Hz. 75Hz is automatically changed to 66Hz. In case of less than 1Hz, 0.5Hz, 0.2Hz, and 0.1Hz are available.

- **Data Saving**

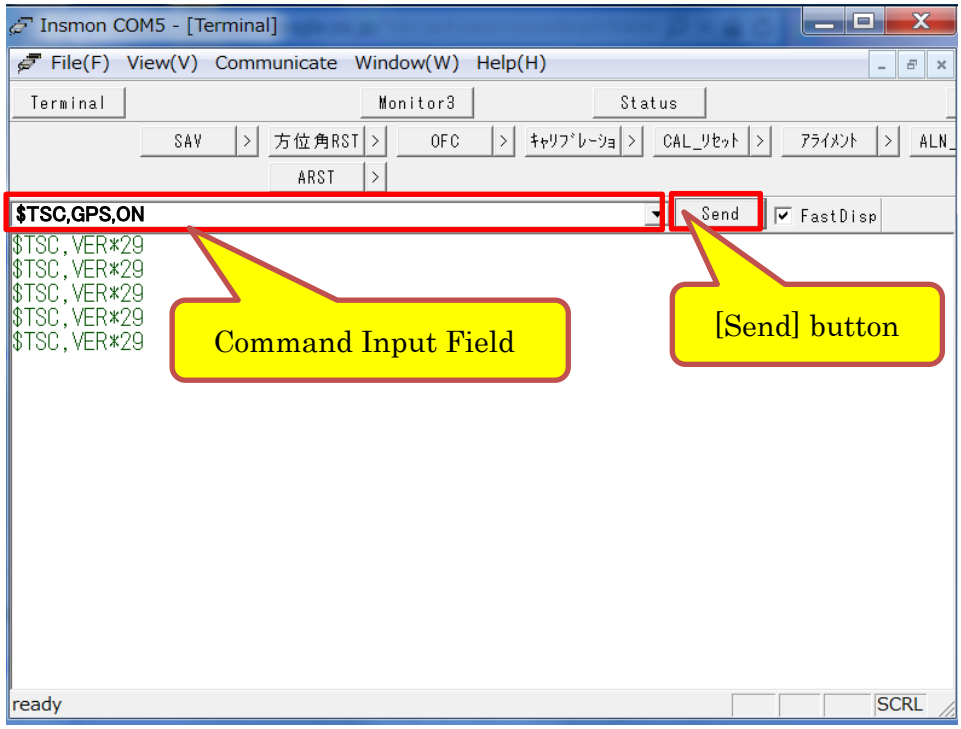
  1) Input the title of file and click the save checkbox. Only BIN file can be used.
  2) Press the “Req.” button and start data reception. Press “Stop” button or uncheck the checkbox when you finish data saving. The data is created in the same folder as the exe file.
  3) After measuring, you can convert a BIN file into csv file by converting Binary to Text. You can also decimate the acquired data the by changing conversion rate, initial setting of which is 1.

- **Command Input**

  (1) With IMU being connected, press [Stop] button in monitor 3.

  (2) Press [Terminal] button and enter the command in the command field. Press [Send] button to send commands. Checksum can be omitted

  Ex) GPS Turn-on Command: $TSC,GPS,ON



Command List Example

- Setting Initializing Command: $TSC,ARST
- GPS Switch-on Command: $TSC,GPS,ON
- Offset cancel command (time: 3 seconds): $TSC,OFC,3
- Alignment Compensation Command: $TSC,ALGN
- Power-on Offset Time Change Command: $TSC,AVET,0 (0 second)
- Leveling Constants Change Command: $TSC,LVLW,0.02 (0.02Hz)

Please refer to the specification for IMU for the other commands.

3 Interface Cable

If customer prepares a harness to be connected to the IMU, please refer to the following pin assignment and connector part. Please also check section 3.3 in case that customer use our interface cable sold separately.

3.1 AU7684 Harness connection

AU7684 J1 Connector Pin Assignment

Pin#	Signal	Remark
1A	Power Source	8V～28V DC
1B	Power Source 0V	Connected to Signal GND
2A	+5V	
2B	RS232 TXD	
3A	RS232 RXD	
3B	CAN H	
4A	CAN L	
4B	GND	
5A	GPS TX ※	
5B	GPS RX ※	
6A	PPS IN ※	
6B	GND	
7A	BACK	
7B	PULSE	

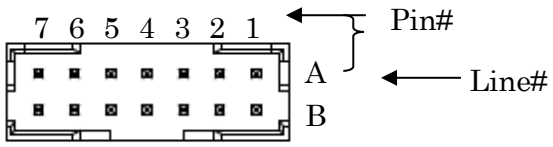
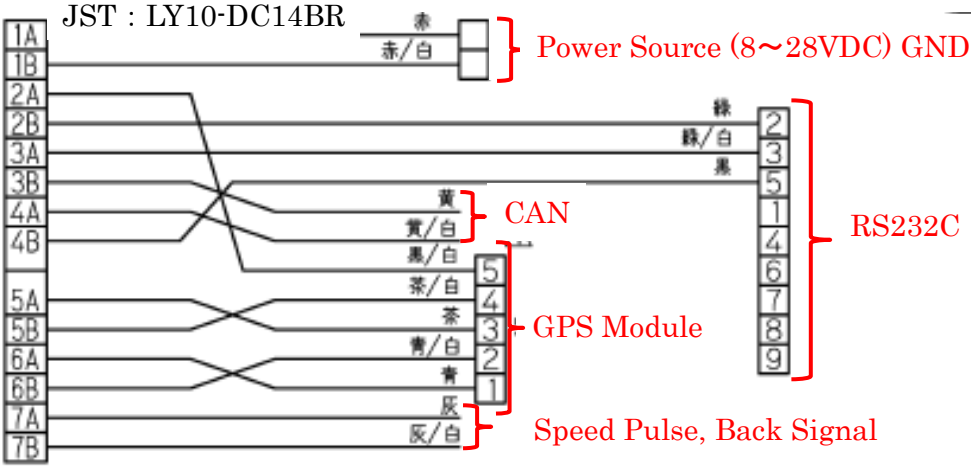


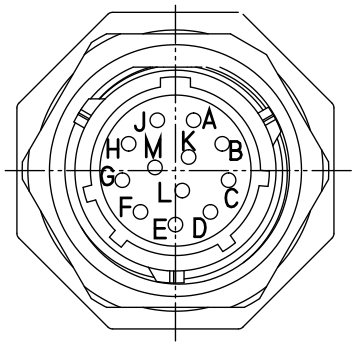
Diagram of AU7684 Harness J1(JST : LY20-14P-DT1-P1E-BR)



3.2 TAG300 Harness connection

TAG300 J1 Connector Pin Assignment

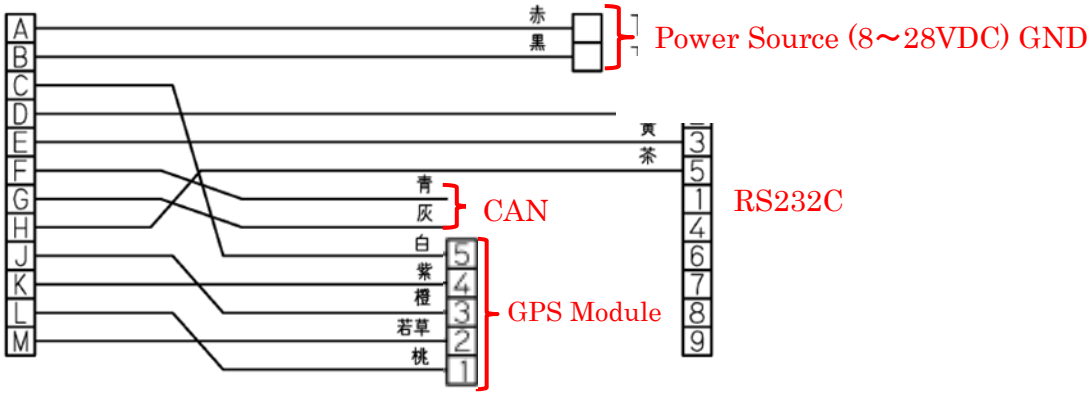
Pin#	Signal	Remark
A	Power Source	8V～28V DC
B	Power Source 0V	Connected to Signal GND
C	+5V	for GPS Power-supply
D	RS232 TXD	
E	RS232 RXD	
F	CAN H	
G	CAN L	
H	GND	
J	GPS TX ※	RS232 Level
K	GPS RX ※	RS232 Level
L	PPS IN ※	
M	GND	



J1(SOURIAU：UTS71412P)

Diagram of TAG300 Harness

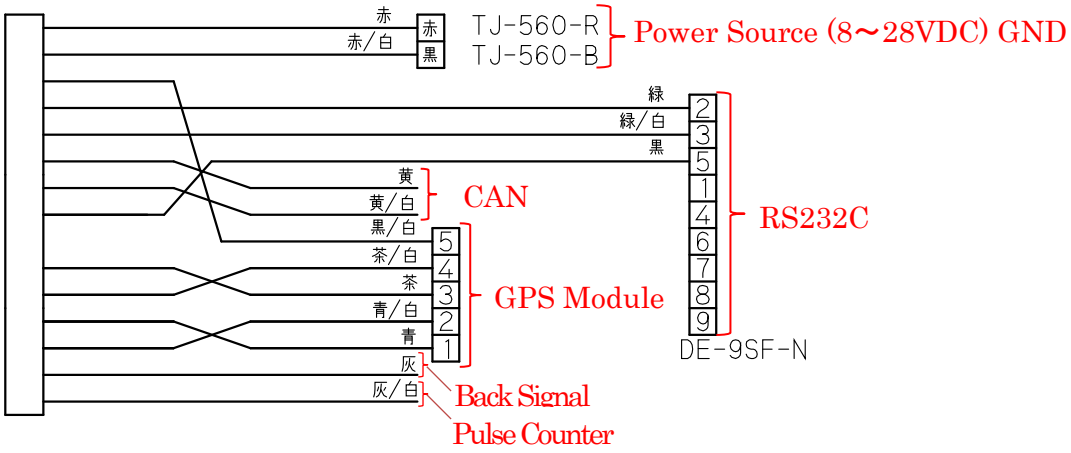
SOURIAU：UTS6GN1412S or UTS6JC1412S



3.3 TAG289 Pin Assignment

TAG289 Pin Assignment

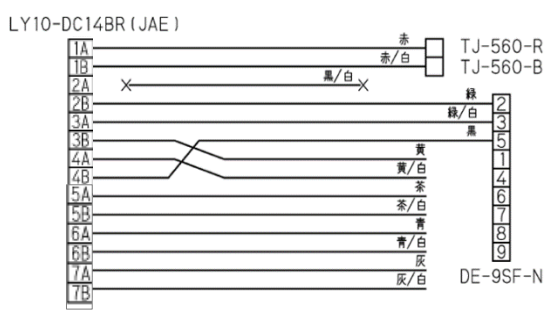
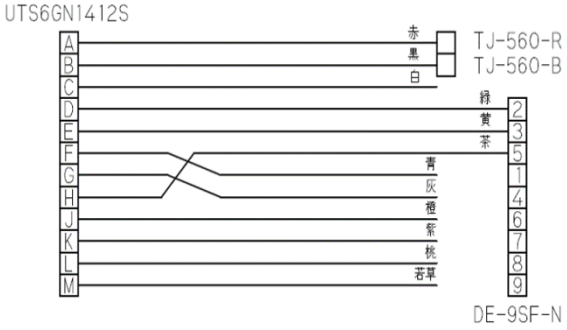
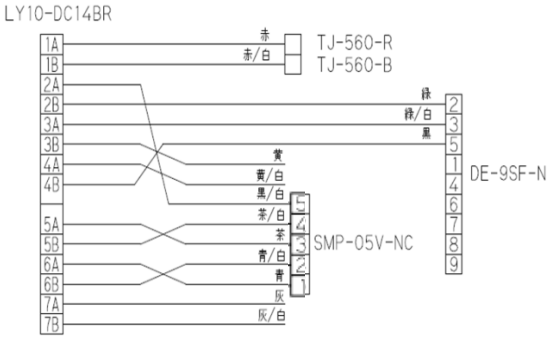
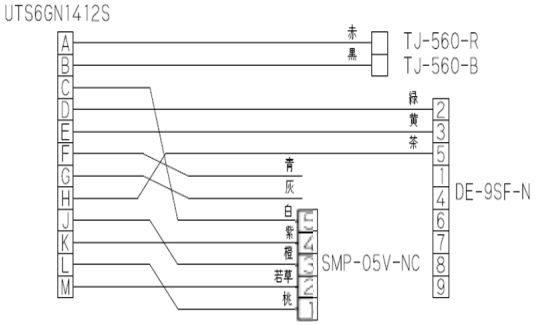
Connector	Pin#	Signal	Remark
TJ-560-※	Red	Power Source	8V～28V　DC
	Black	Power Source 0V	Connected to Signal GND
DE-9SF-N	2	RS232 TXD	
	3	RS232 RXD	
	5	GND	
SMP-05-NC	1	PPS IN	
	2	GND	
	3	GPS TX	RS232 Level
	4	GPS RX	RS232 Level
	5	+5V	GPS Power Source
Loosen Wire	Yellow	CAN H	
	Yellow/White	CAN L	
	Gray	Discrete Signal	Back Signal
	Gray/White	Discrete Signal	Pulse Count



3.4 Optional Interface Cable

We are preparing for an optional interface cable for AU7684 and TAG300. There are 2 types of interface cable for each model. “N1000” is loose wire type and “N1001” is connector type for external GPS module.

TAG289 Interface Cable is attached to the product.

<table>
<tr><th>AU7684 Interface Cable</th><th>TAG 300 Interface Cable</th></tr>
<tr><td>P/N: EU8937N1000
 
</td><td>P/N: EU8940N1000
 
</td></tr>
<tr><td>P/N: EU8937N1001
With GPS Module Connector
GPS: KGM-810GRB1_PS_917/
Position
 
</td><td>P/N: EU8940N1001
With GPS Module Connector
GPS: KGM-810GRB1_PS_917/
Position
 
</td></tr>
</table>

Note:
If there are unconnected pins, please protect the terminal part with a shrink tube so that the cable terminal part is not short-circuited.

4 External GPS Module

The AU7684 series, TAG300 series and TAG289 series can output GPS signal (latitude, longitude, altitude, direction, speed, UTC time, etc.) by connecting a GPS module. In addition, the GPS speed and GPS direction are utilized for the calculation to reduce Attitude and Heading angle errors.

4.1 Applicable GPS Module

P/N: KGM-810GRB1_PS_917 manufactured by Position

Seller:

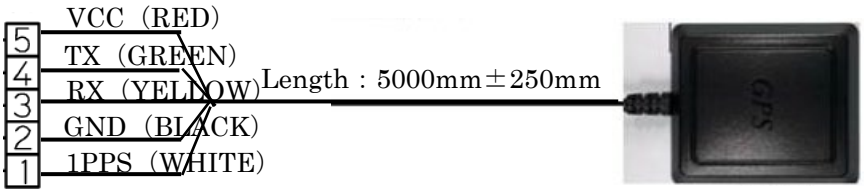
Yukihide Tanaka (Mr.)

CHIYODA ELECTRONIC CO., LTD.

Kanto Sales Office 4-1-20 9F, Higashishukugo, Utsunomiya Shi, Tochigi Ken, 321-0953, Japan

E-Mail : yu-tanaka@cec-chiyoda.co.jp

TEL : +81-28-637-3900 FAX : +81-28-637-3903



Connector SMR-05V-N（JST） Dimension：44.0×49.8×t 14.3mm

The connection with other GPS module such as C099-F9P/ u-blox can be customized. For inquiries about availability, please submit the inquiry from our website.
https://mems.tamagawa-seiki.com/en/contact/form/

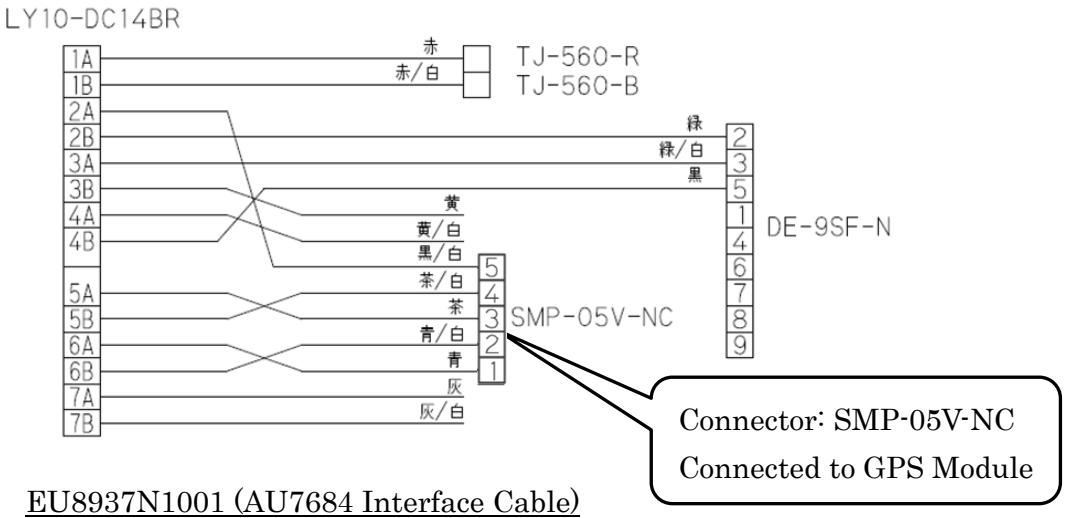
4.2 Connection of AU7684 & External GPS Module (KGM-810GRB1_PS_917)

Please connect the GPS according to the following table.

AU7684 J1 Connector Pin Assignment

Pin#	Signal	Connection to GPS Module
1A	Power Source	
1B	Power Source 0V	
2A	+5V	→Vcc of GPS
2B	RS232 TXD	
3A	RS232 RXD	
3B	CAN H	
4A	CAN L	
4B	GND	
5A	GPS TX ※	→Rx of GPS
5B	GPS RX ※	→Tx of GPS
6A	PPS IN ※	→1PPS of GPS
6B	GND	→GND of GPS
7A	BACK	
7B	PULSE	

When you use EU8937N1001, please follow the instruction below.



EU8937N1001 (AU7684 Interface Cable)

You need to make the setting of IMU to validate GPS. Restart the IMU after sending a command to enable the GPS to the IMU using one of the following methods.

- Via RS232C Refer to specification P22

  Ex) Send Command "$ TSC, GPS, ON" via InsMon
- Via CAN Refer to specification P40 (GPS Valid/ Invalid)

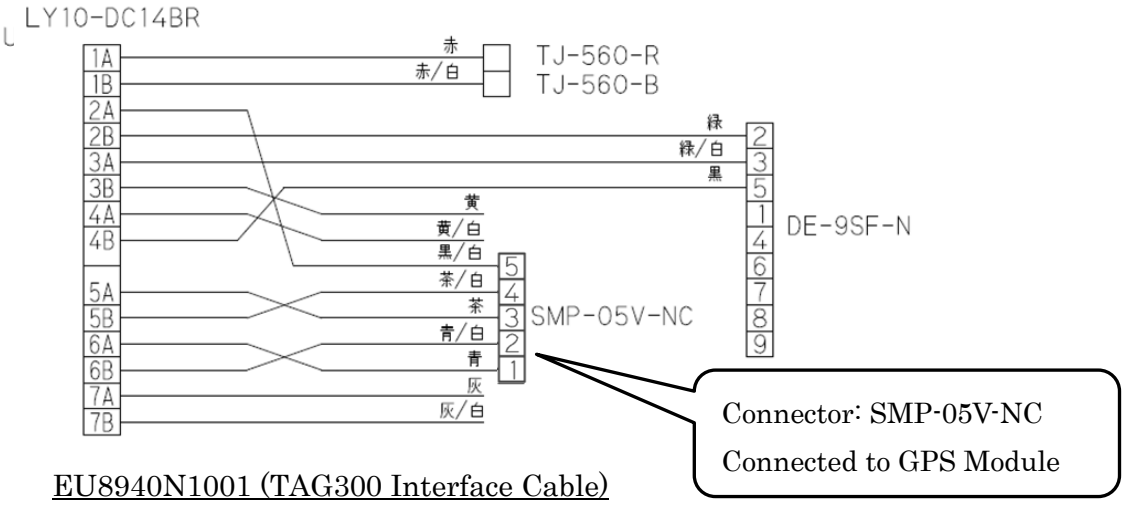
4.3 Connection of ATG300 & External GPS Module

Please connect the GPS according to the following table

TAG300 J1 Connector Pin Assignment (SOURIAU:UTS71412P)

Pin#	Signal	Remark
A	Power Source	
B	Power Source 0V	
C	+5V	→Vcc of GPS
D	RS232 TXD	
E	RS232 RXD	
F	CAN H	
G	CAN L	
H	GND	
J	GPS TX ※	→Rx of GPS
K	GPS RX ※	→Tx of GPS
L	PPS IN ※	→1PPS of GPS
M	GND	→GND of GPS

When you use EU8940N1001, please follow the instruction below.



EU8940N1001 (TAG300 Interface Cable)

You need to make the setting of IMU to validate GPS. Restart the IMU after sending a command to enable the GPS to the IMU using one of the following methods.

- Via RS232C Refer to specification P22

  Ex) Send Command "$ TSC, GPS, ON" via InsMon
- Via CAN Refer to specification P39 (GPS Valid/ Invalid)

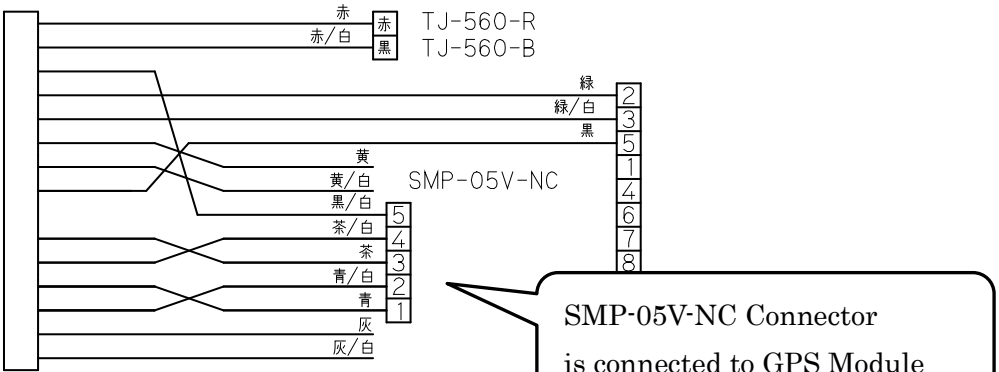
4.4 Connection of TAG289 & External GPS Module

Please connect the GPS according to the following table

TAG289 Pin Assignment

Connector	Pin#	Signal	Remark
TJ-560-※	Red	Power Source	8V～28V　DC
	Black	Power Source 0V	Connected to Signal GND
DE-9SF-N	2	RS232 TXD	
	3	RS232 RXD	
	5	GND	
SMP-05-NC	1	PPS IN	→1PPS of GPS
	2	GND	→GND of GPS
	3	GPS TX	→Rx of GPS
	4	GPS RX	→Tx of GPS
	5	+5V	→Vcc of GPS
Loosen Wire	Yellow	CAN H	
	Yellow/White	CAN L	
	Gray	Discrete Signal	Back Signal
	Gray/White	Discrete Signal	Pulse Count

When you use EU8940N1001, please follow the instruction below.



TAG289 Interface Cable

You need to make the setting of IMU to validate GPS. Restart the IMU after sending a command to enable the GPS to the IMU using one of the following methods.

- Via RS232C Refer to specification P22
  Ex) Send Command “$ TSC, GPS, ON” via InsMon
- Via CAN Refer to specification P40 (GPS Valid/ Invalid)

5 Command List

No.	Command	Function	Initial Setting	Ref	
1	RAW	Raw data output	—	—	
2	BIN	BIN data output	—	—	
3	SAV	Save current setting	—	P21	*
4	OFC	Offset cancel	—	P22	
5	HRST	Azimuth angle reset	—	—	
6	SPD	Vehicle Speed input	—	—	
7	VER	Software version display	—	—	
8	CAN	CAN communication setting	500kbps 200Hz	—	
9	FREQ	Update cycle setting	200Hz	—	*
10	RFRQ	Update cycle display	—	—	
11	BIAS	Display the value with offset cancel	OFF	P22	
12	AVET	Startup offset time setting	5 sec	P23	*
13	YAWF	Yaw dead zone setting	0.3deg/sec	P24	
14	LVLW	Leveling calculation setting	0.1Hz	P24	
15	LVLR	Leveling calculation display	—	P25	
16	CAL	Calibration	—	P23	*
17	RCAL	Calibration Reset	—	P23	*
18	ALGN	Alignment compensation	—	P25	*
19	RALN	Alignment compensation reset	—	P25	*
20	AXIS	Axis setting	1:Z Axis downward	P26	*
21	IDN	CANID（standard ID）setting	—	—	*
22	JIDN	CANID（extension ID）setting	—	—	*
23	CNID	CAN format setting	0:Standard, 1: Extended	—	*
24	CNED	CAN Endianness setting	1:Big endianness	—	*
25	CNSW	CAN output valid / invalid	-	—	*
26	GPS	GPS valid / invalid	0:GPS invalid	—	*
27	SVEL	Vehicle speed input setting	0:GPS or CAN/RS232	—	*
28	PLSE	Vehicle speed pulse setting	4 pulse / 1 round	—	*
29	RPM	Vehicle speed RPM setting	637 rpm	—	*
30	BACK	Back signal setting	OFF: Back signal off	—	*
31	ARST	Initialization	—	P27	*

For items with ＊ on the right side of the table, please turn off the device for about 1 second and restart the power to reflect the setting change.

SAV Command (Save current setting)

You can save the output status of IMU by this command. If SAV command is conducted while data is being output, IMU outputs the data without RAW data request from the next startup, and the output cycle will be the same as when the SAV command is executed.

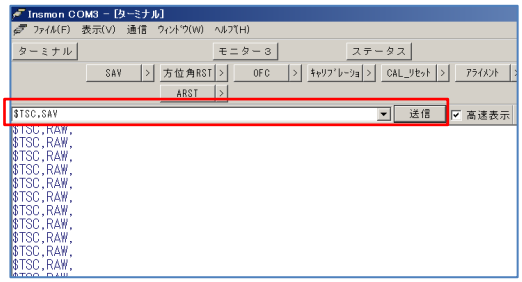
■Usage

You can maintain the output of IMU after restart.

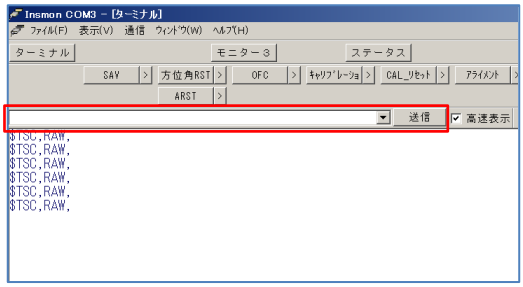
■Setting

Command：$TSC,SAV*2C<CR><LF>

Response：ACK／NAK



Request for RAW data output at your desirable output cycle. Enter the SAV command, and confirm the ACK response.



From the next startup, IMU outputs the data at the same cycle as when the SAV command is executed.

The SAV command is not initialized by ARST command (initialization). It is possible to return to the initial setting by resending SAV command with IMU stopped.

OFC Command（Offset cancel）

With this command, it is possible to calculate the average value of angular velocity error (bias) in specified period of time and offset the bias error from the next calculation. By setting BIAS command (display the value with offset cancel), offset data is displayed.

OFC Command

Command: $TSC,OFC,t*CC<CR><LF> (t: Offset time [sec])

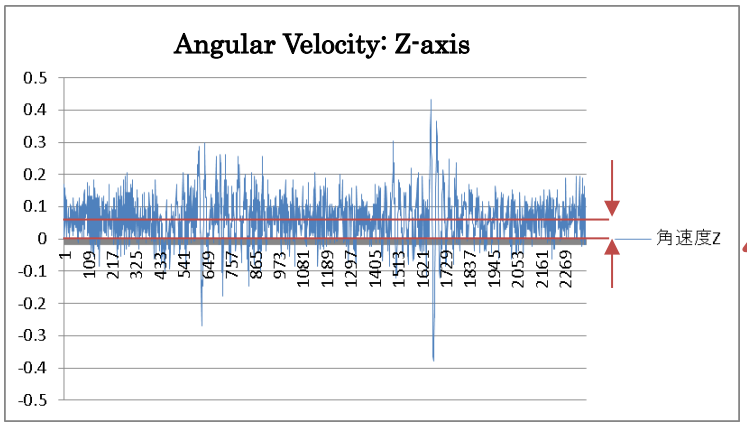
Response: None（RAW/BIN Status change）/NAK

BIAS Command

Command: $TSC,BIAS,a*CC<CR><LF> (a：ON to reflect offset / OFF)

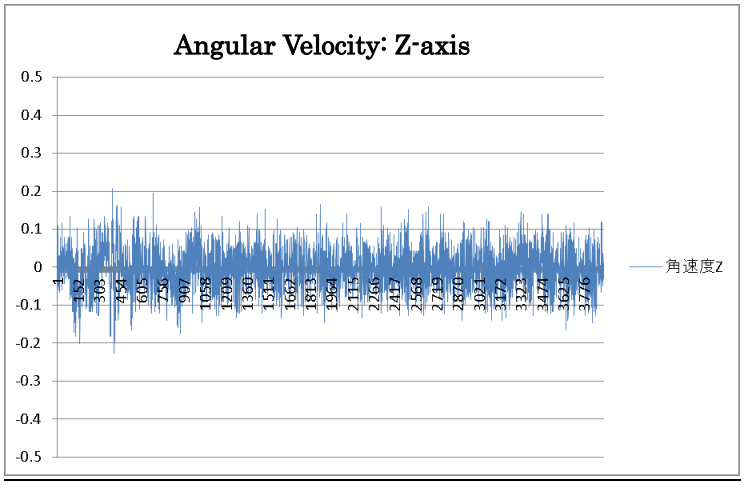
Response: ACK / NAK

In case that offset cancel is not conducted:



The deviation from the ideal center (bias) is averaged by OFC command.

In case that offset cancel is conducted:



By turning BIAS command on, the value with offset cancel is displayed.

AVET Command (Startup offset time setting)

The averaging time of offset cancel can be changed by AVET command. In the initial setting, offset cancel is conducted for 5 seconds at startup. During offset cancel, IMU should not be moved. If you cannot secure a static condition, for example in a ship, offset cancel may not be executed correctly. In that case, it is recommended to set the averaging time to zero. In addition, the value of offset can be saved by CAL command. Therefore, you can use CAL command in static condition, and use it in combination with AVET command.

AVET Command

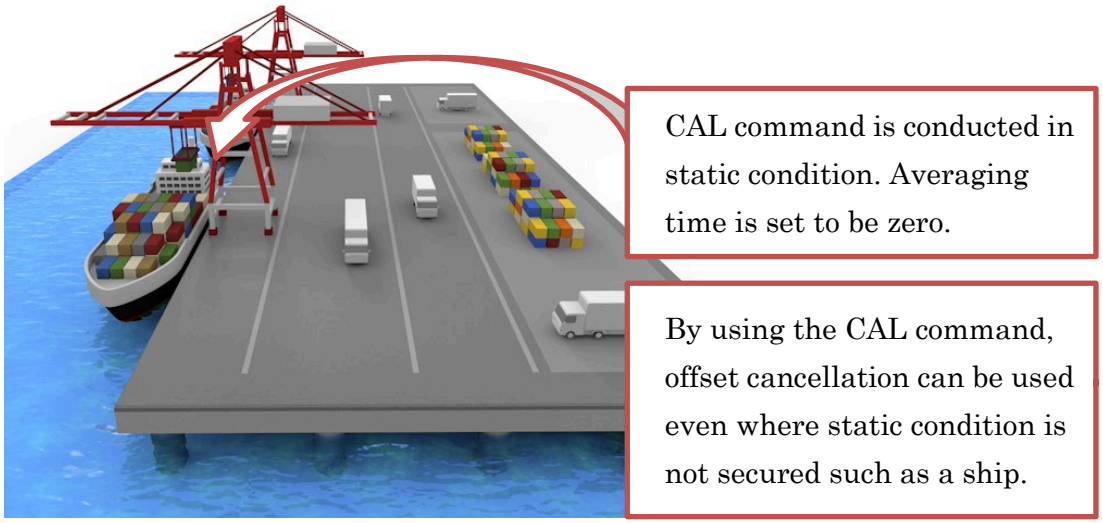
Command: $TSC,AVET,a*CC<CR><LF> (a: Average time[sec]) Range (0～60sec)

Response: ACK / NAK

CAL Command

Command: $TSC,CAL*26<CR><LF>

Response: ACK / NAK



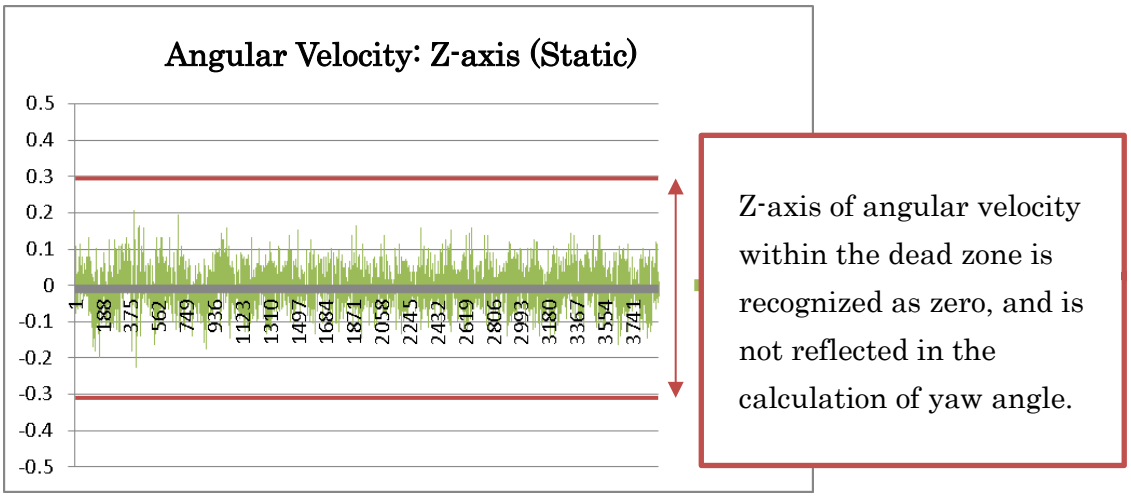
* CAN command can be reset by sending RCAL command (Calibration Reset).

YAWF command (Yaw dead zone setting)

In order to suppress the azimuth drift in static condition, Yaw dead zone can be set. Within the dead zone, the Z-axis angular velocity input is judged to be zero and is not reflected in the calculation of the azimuth. It is recommended to lower the setting value when you want to measure the low speed range.

Command: $TSC,YAWF, a*CC<CR><LF> (a: Dead Zone:[deg/sec])
Response: ACK / NAK

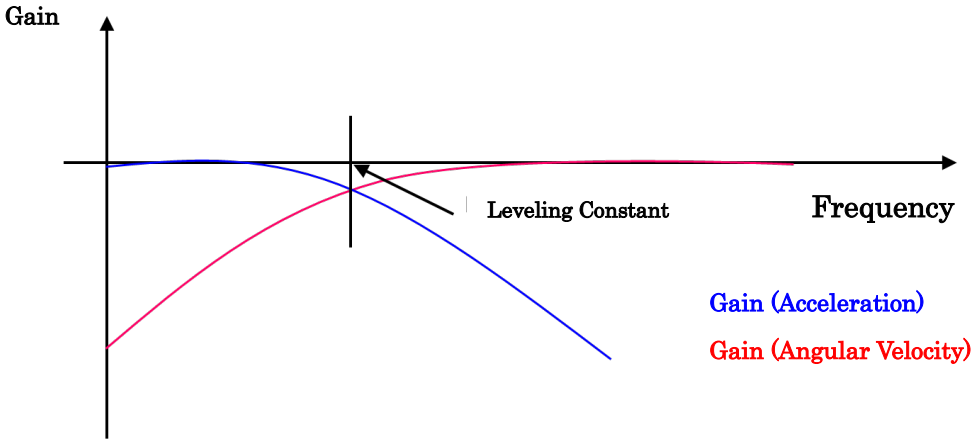
Initial Setting (Dead zone 0.3° /sec)



LVLW Command (Leveling calculation setting)

IMU calculates the attitude angle in 2 ways; the one is to use acceleration for the movement in lower frequency, the other is to use angular velocity for the movement in higher frequency. You can change the calculation setting to be suitable for your device by this command. The leveling time constant is set to 0.1 in the initial setting. It is recommended to increase the constant when acceleration / deceleration and disturbance are small, and to decrease the constant when acceleration / deceleration and disturbance are large. Please contact our sales representative for more details.

Command: $TSC,LVLW,a*CC<CR><LF> (a: Leveling constant[Hz])
Response: ACK / NAK



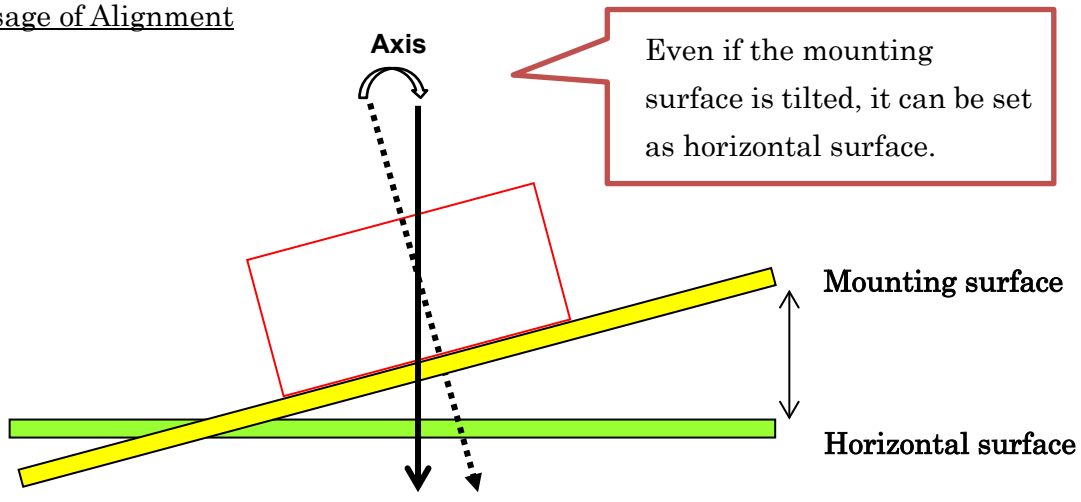
* Applied leveling constant is confirmed by sending LVLR command(Leveling calculation display).

ALGN Command (Alignment compensation)

If there is a mounting error or tilt on the IMU, that position can be set as horizontal attitude. Realignment may not be performed correctly if the previous alignment value is stored. Therefore, please conduct RALN (reset alignment) command and restart IMU before realignment.

Command: $TSC,ALGN*6C<CR><LF>
Response: ACK / NAK

Usage of Alignment



By sending RALN command (Alignment compensation reset), it is possible to return to the initial setting.

AXIS Command (Axis setting)

The axis definition can be changed by this command. In case you need to install IMU in a vertical direction, please send this command. The definition of axis is specified as follows.

Command: $TSC,AXIS,a*CC<CR><LF>

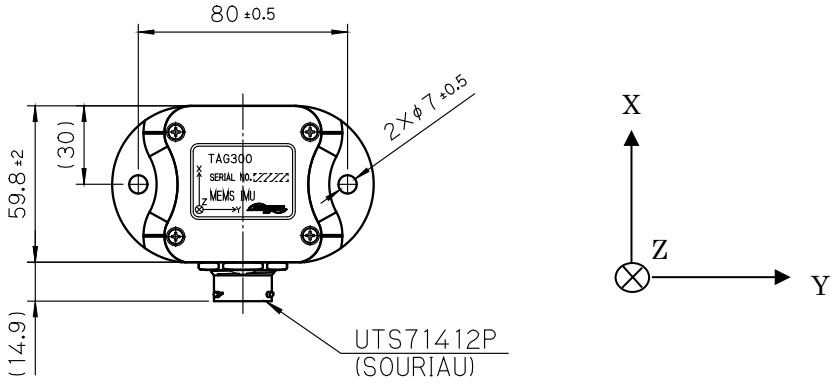
a: Axis setting

1: Positive Z-axis points down into the ground (Initial setting)

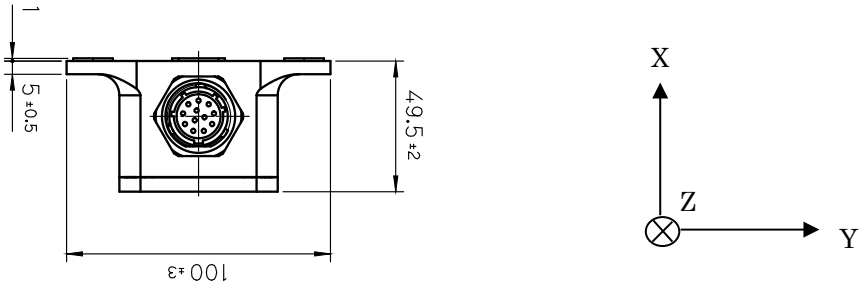
2: Positive X-axis is reverted to Positive Z-axis.

3: Positive Y-axis is reverted to Positive Z-axis.

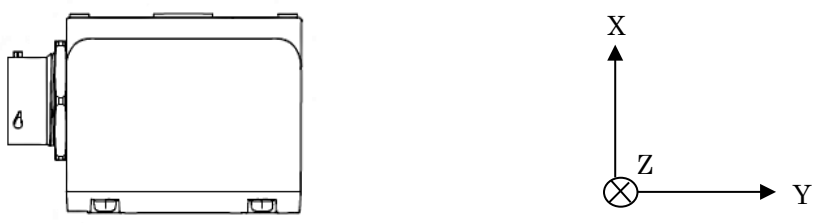
1: Positive Z-axis points down into the ground.



2: Positive X-axis is reverted to Positive Z-axis.



3: Positive Y-axis is reverted to Positive Z-axis.



ARST Command (Initialization)

This command resets all settings except for SAV command. It will be validated from the next startup.