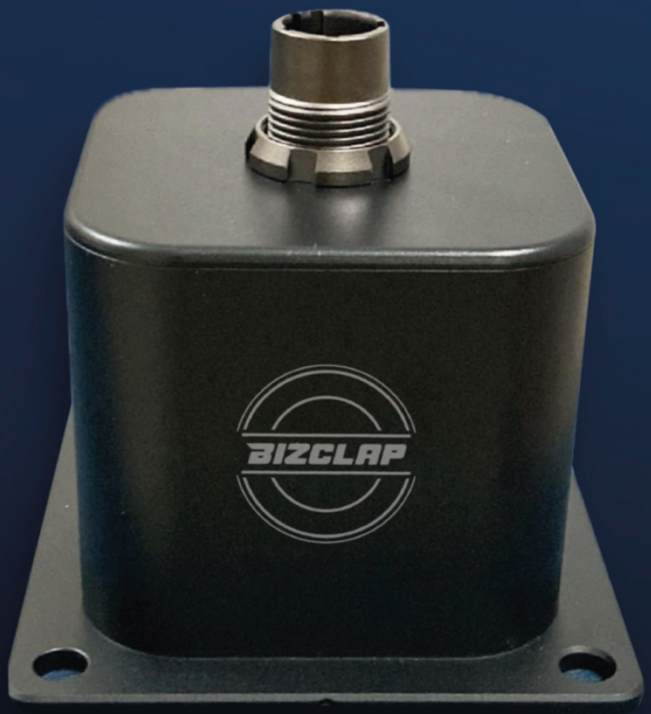
# Bizclap Gyrocompass

Input & Output Protocols - **03/2025 update**

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# Input & Output Protocols

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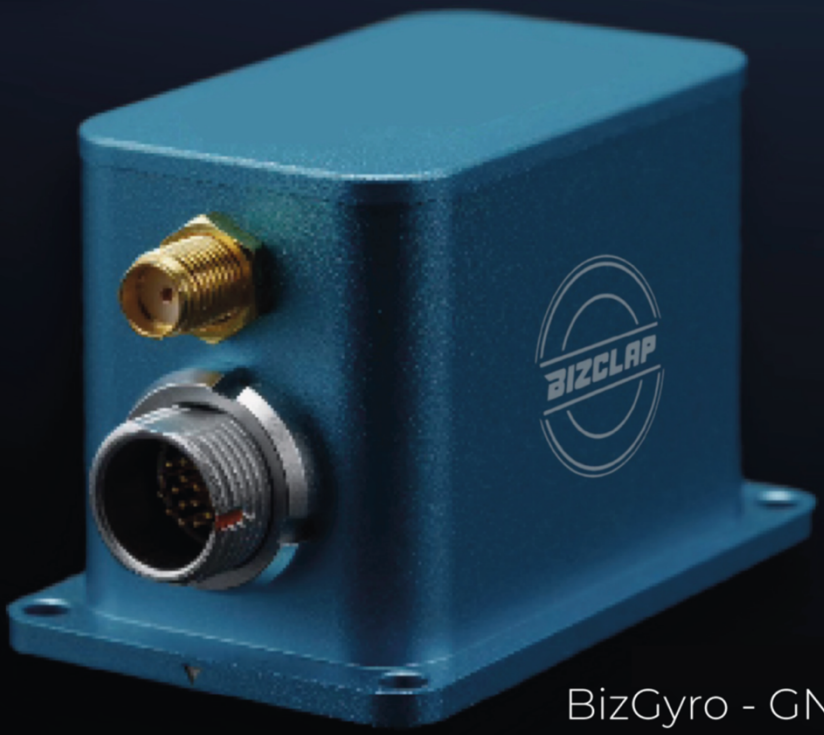


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# Supported Input NMEA Messages

This first part of the document outlines the supported NMEA input sentences parsed by the Bizgyro GPS integration function, which reads incoming GPS data for further processing.
It provides a brief description of each message type and includes information about the NMEA Talker ID.

## 🗣️Talker ID

Every NMEA sentence begins with a Talker ID, which consists of two characters immediately after the $ symbol. This ID identifies the source of the data. For example:

$GPRMC,...

**Here, GP is the Talker ID, which stands for a GPS receiver.**
However, the parser is implemented generically to support any standard Talker ID.
The code does not enforce restrictions on the Talker ID, so any valid two-letter prefix preceding the three-letter sentence type is accepted.

## ✅ Common Talker IDs Supported

| ID | Description |
|---|---|
| **$AI** | Alarm Indicator (AIS?) |
| **$AP** | Auto Pilot (e.g., pypilot) |
| **$BD** | BeiDou (China) |
| **$CD** | Digital Selective Calling (DSC) |
| **$EC** | Electronic Chart Display & Information System (ECDIS) |
| **$GA** | Galileo Positioning System |
| **$GB** | BeiDou (China) |
| **$GI** | NavIC, IRNSS (India) |
| **$GL** | GLONASS (per IEC 61162-1) |
| **$GN** | Combination of multiple satellite systems (NMEA 1083) |

| | |
|---|---|
| **$GP** | Global Positioning System receiver |
| **$GQ** | QZSS (Japan regional GPS augmentation system) |
| **$HC** | Heading/Compass |
| **$HE** | Gyro, north seeking |
| **$II** | Integrated Instrumentation |
| **$IN** | Integrated Navigation |
| **$LC** | Loran-C receiver (obsolete) |
| **$Pxxx** | Proprietary (Vendor specific) |
| **$PQ** | QZSS (Quectel Quirk) |
| **$QZ** | QZSS (Japan regional GPS augmentation system) |
| **$SD** | Depth Sounder |
| **$ST** | Skytraq |
| **$TI** | Turn Indicator |
| **$YX** | Transducer |
| **$WI** | Weather Instrument |

## Supported NMEA Message Types

| Message | Name | Description |
|---|---|---|
| **RMC** | Recommended Minimum Navigation Data | Provides essential data like speed over ground, heading, date, and status. |
| **RMA** | Recommended Minimum Navigation Data (Alternate) | Recognized but not parsed (placeholder only). |
| **VBV** | Velocity and Bearing Vector | Recognized but not parsed (placeholder only). |
| **HDT** | Heading, True | True heading in degrees. |
| **HDG** | Heading, Deviation, and Variation | Magnetic heading, deviation, and variation |

| | | |
|---|---|---|
| | | combined. Calculates true heading. |
| **HDM** | Heading, Magnetic | Magnetic heading only. |
| **HSC** | Heading Steering Command | Provides both true and magnetic heading steering commands. |
| **VHW** | Water Speed and Heading | Includes true/magnetic heading and speed in knots/km/h. |
| **VTG** | Track Made Good and Ground Speed | Heading and speed over ground (both knots and km/h). |
| **ZDA** | Time & Date | UTC time, date, and local timezone offset. |

## 🧠 Example: Sentence Parsing

**RMC (Recommended Minimum Navigation Information)**
$GPRMC,123519,A,4807.038,N,01131.000,E,022.4,084.4,230394,003.1,W*6A
- Speed: 022.4 knots → Converted to m/s
- Heading: 084.4 degrees (true)
- Status, location, and time fields parsed but not all stored.

**HDG (Heading, Deviation & Variation)**
$HCHDG,98.3,0.0,E,12.6,W*57
- Heading: 98.3 + deviation + variation → true heading

**VTG (Track & Speed)**
$GPVTG,054.7,T,034.4,M,005.5,N,010.2,K*48
- Track Degrees: 054.7 → Heading
- Speed: 005.5 knots → or 010.2 km/h → Velocity in m/s

**Notes**
- Speed in knots is converted to meters per second (m/s) using: 1 knot = 0.51444 m/s
- Speed in km/h is converted using: 1 km/h = 0.27778 m/s
- The parser prioritizes recent data and sets validity flags and watchdogs accordingly.

# Output Formats Protocols

## General description

The document describes the output formatting based on the user-selected output protocol defined by User Settings Protocol.

## List of Supported Protocols

| Protocol ID | Output Type | Description |
|---|---|---|
| PRT_RAW | ASCII | Raw gyroscope, accelerometer, temp |
| PRT_RAW_TEST | ASCII | Raw + extra temperature |
| PRT_STD | ASCII (Standard) | Orientation + movement + checksum (NMEA style) |
| PRT_CALIB_OUT | ASCII | Calibrated sensor output |
| PRT_TSS1 | ASCII | Heave, roll, pitch, acceleration (TSS1) |
| PRT_TSS3 | ASCII | Adds remote heave (TSS3) |
| PRT_TiMEMS | ASCII | Custom TOGS format |
| PRT_ISH | ASCII | Impact Subsea Heading format |
| PRT_EULER_L / PRT_EULER_B | Binary | Euler angles in little/big endian |
| PRT_EM3000 / PRT_EM1000 | Binary | Simrad-like binary packet |
| ther (Custom Header) | ASCII | Format defined dynamically using bit flags |

# Detailed Protocol Documentation

### PRT_RAW
wx,wy,wz,ax,ay,az,temp,counter\r\n

### PRT_RAW_TEST
wx,wy,wz,temp1,temp2,ax,ay,az,tempdxl,counter\r\n

### PRT_STD
roll,pitch,yaw,wx,wy,wz,surge,sway,heave,surgefrq,swayfrq,heavefrq,ax,ay,az,counter*CS\r\n

### PRT_TSS1
:HHVV heave f roll pitch\r\n

### PRT_TSS3
:RRHH f roll pitch\r\n

### PRT_TiMEMS (TOGS)
AHaaa.aa APbccc.cc ARdeee.ee Mf Egggggggg\r\n

### PRT_ISH
$ISHPR,yaw,pitch,roll*CS\r\n

### PRT_EULER_L / PRT_EULER_B
Binary: FA FF 32 0C + floats (LE or BE) + checksum

### PRT_EM3000 / PRT_EM1000
Binary: 6-byte values per axis (scaled)

### Other (Custom Header)
Header + bit-flag selected fields, NMEA-style checksum if enabled

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