

**The NMEA data parser plugin
PRINTED MANUAL**

NMEA data parser plugin

© 1999-2016 AGG Software

All rights reserved. No parts of this work may be reproduced in any form or by any means - graphic, electronic, or mechanical, including photocopying, recording, taping, or information storage and retrieval systems - without the written permission of the publisher.

Products that are referred to in this document may be either trademarks and/or registered trademarks of the respective owners. The publisher and the author make no claim to these trademarks.

While every precaution has been taken in the preparation of this document, the publisher and the author assume no responsibility for errors or omissions, or for damages resulting from the use of information contained in this document or from the use of programs and source code that may accompany it. In no event shall the publisher and the author be liable for any loss of profit or any other commercial damage caused or alleged to have been caused directly or indirectly by this document.

Printed: 28.11.2016

Publisher

AGG Software

Production

© 1999-2016 AGG Software

<http://www.aggsoft.com>

Table of Contents

Part 1 Introduction	1
Part 2 Common parameters	1
Part 3 NMEA sentences parser	2
Part 4 Supported talkers	3
Part 5 Supported sentences	4

1 Introduction

The National Marine Electronics Association (NMEA) has developed a specification that defines the interface between various pieces of marine electronic equipment. An NMEA standard defines an electrical interface and data protocol for communications between marine instrumentation. (They may also have standards for other things.)

NMEA 0183 devices are designated as either **talkers** or **listeners** (with some devices being both), employing an asynchronous serial interface with the following parameters: **Baud rate**: 4800, **Number of data bits**: 8 (bit 7 is 0), **Stop bits**: 1 (or more), **Parity**: none, **Handshake**: none. NMEA 0183 allows a single talker and several listeners on one circuit.

GPS receiver communication is defined within this specification. Most computer programs that provide real time position information understand and expect data to be in NMEA format. This data includes the complete PVT (position, velocity, time) solution computed by the GPS receiver. The idea of NMEA is to send a line of data called a **sentence** that is totally self contained and independent from other sentences. There are standard sentences for each device category and there is also the ability to define proprietary sentences for use by the individual company. All of the standard sentences have a two letter prefix that defines the device that uses that sentence type. (For GPS receivers the prefix is GP.) which is followed by a three letter sequence that defines the sentence contents. In addition NMEA permits hardware manufactures to define their own proprietary sentences for whatever purpose they see fit. All proprietary sentences begin with the letter P and are followed with 3 letters that identifies the manufacturer controlling that sentence. For example a Garmin sentence would start with PGRM and Magellan would begin with PMGN.

Our module parse each sentence begins with a '\$' and ends with CRLF (a carriage return/line feed sequence). The data is contained within this single line with data items separated by commas. The data itself is just ASCII text and may extend over multiple sentences in certain specialized instances but is normally fully contained in one variable length sentence. The data may vary in the amount of precision contained in the message. For example time might be indicated to decimal parts of a second or location may be show with 3 or even 4 digits after the decimal point. There is a provision for a checksum at the end of each sentence which may or may not be checked by the unit that reads the data. The checksum field consists of a '*' and two hex digits.

Our parser module splits all data to variables and this variables can be used in data export modules.

2 Common parameters

These parameters are used for data parsing (fig. 5.3.1).

1. **Add date/time stamp to each sentence parsed** - the parser will add an additional stamp value to other values, that the parser will extract from a data block;
2. **Add serial port number to each sentence parsed** - the parser will add an additional value with serial port number, that received this data block. You can use it in a multi port configuration, for identifying sentences from different serial ports.
3. **Verify sentence checksum if available** - the parser will calculate a checksum and verify it for each sentence that will contain '*' characters at the end of sentence:

Sentence example: GPGGA,123519,4807.038,N,01131.000,E,1,08,0.9,545.4,M,46.9,M,,*47

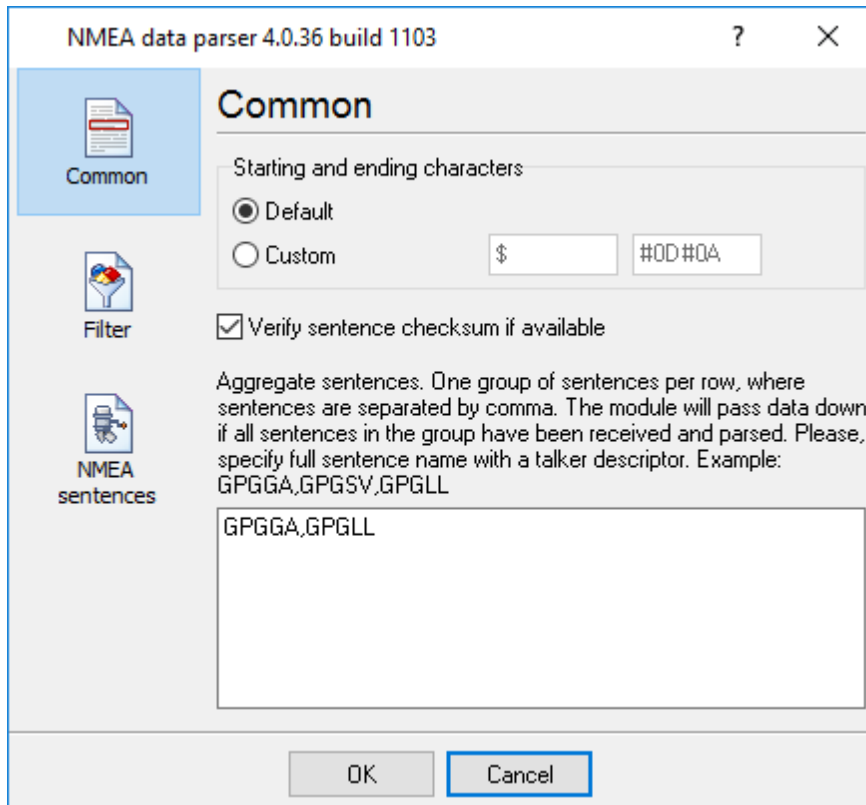


Fig. 5.3.1 Common parameters

Aggregate sentences

This option is very useful if your talker sends more than one sentence and you want to save data to a file at single row. You can aggregate two or more sentences and data of these sentences will be send to data export modules at same moment with one date time stamp. If you'll specify sentence names then the module will store all data in a temporary buffer, while all sentences isn't received. When all data is received the module sends data to a data export module, clears the buffer and starts waiting for new data.

You can specify one or more different aggregate groups. Simply add sentence name to different rows. Sentences in the row should be separated by comma and a sentence should contain a talker name.

3 NMEA sentences parser

If you want to export to any target, then you should configure a parser module. The ASCII data parser allows you to extract data from data flow, that contains a ASCII characters. The parser module splits data flow to data block and extracts data values from each data block. On the "sentence" tab (fig. 5.3.2) you should specify sentences, that the parser will parse. Other sentences

will be ignored.

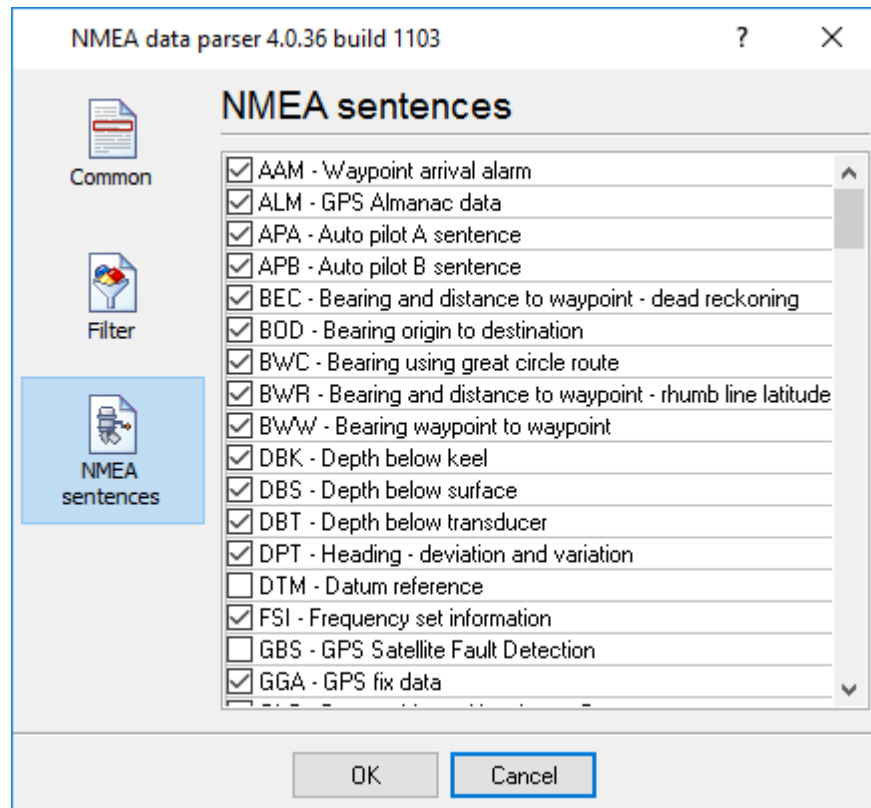


Fig. 5.3.2 NMEA sentences

The full list of supported sentences and variables that parsed from each sentence is listed [here](#).

Our software create variables with following types:

- **String** - Characters array with length from 1 to 65535 characters;
- **Boolean** - Logical value (True/False) - 0 or 1;
- **Float** - Real number - value range: $-2.9 \times 10^{39} .. 1.7 \times 10^{38}$
- **Integer** - Integer value: $-2147483648..2147483647$;
- **DateTime** - Date and time.

Note: Our modules doesn't support Time and Date data types. Therefore time variables, that exists in a sentence contains current date, but with time from the sentence.

4 Supported talkers

- AG** - Autopilot - General
- AP** - Autopilot - Magnetic
- CD** - Communications – Digital Selective Calling (DSC)
- CR** - Communications – Receiver / Beacon Receiver
- CS** - Communications – Satellite
- CT** - Communications – Radio-Telephone (MF/HF)

CV - Communications – Radio-Telephone (VHF)
CX - Communications – Scanning Receiver
DF - Direction Finder
EC - Electronic Chart Display & Information System (ECDIS)
EP - Emergency Position Indicating Beacon (EPIRB)
ER - Engine Room Monitoring Systems
GP - Global Positioning System (GPS)
HC - Heading – Magnetic Compass
HE - Heading – North Seeking Gyro
HN - Heading – Non North Seeking Gyro
II - Integrated Instrumentation
IN - Integrated Navigation
LC - Loran C
P - Proprietary Code
RA - RADAR and/or ARPA
SD - Sounder, Depth
SN - Electronic Positioning System, other/general
SS - Sounder, Scanning
TI - Turn Rate Indicator
VD - Velocity Sensor, Doppler, other/general
DM - Velocity Sensor, Speed Log, Water, Magnetic
VW - Velocity Sensor, Speed Log, Water, Mechanical
WI - Weather Instruments
YX - Transducer
ZA - Timekeeper – Atomic Clock
ZC - Timekeeper – Chronometer
ZQ - Timekeeper – Quartz
ZV - Timekeeper – Radio Update, WWV or WWVH

5 Supported sentences

AAM - Waypoint arrival alarm

AAM_ARIV_ENT - Arrival circle entered
AAM_PERP_PASS - Perpendicular passed
AAM_CIRCLE_RAD - Circle radius
AAM_CIRCLE_RAD_UNIT - Circle radius units
AAM_WPTNAME - Waypoint name

ALM - GPS Almanac data

ALM_SENT_NUM - Number of sentences
ALM_SENT_CNT - Sentence count
ALM_PRN_ID - Satellite PRN number
ALM_WEEK_NO - GPS week number
ALM_SV_HEALTH - SV health
ALM_ECCENTRICITY - Eccentricity
ALM_REF_TIME - Almanac reference time
ALM_INC_ANGLE - Inclination angle
ALM_RA_RATE - Rate of right ascension
ALM_AXIS_ROOT - Root of semi-major axis
ALM_PEREGREE_ARG - Argument of perigee
ALM_NODE_LONG - Longitude of ascension node

- ALM_MEAN_ANN** - Mean anomaly
- ALM_F0_CLOCK** - F0 clock parameter
- ALM_F1_CLOCK** - F1 clock parameter
- APA** - Auto pilot A sentence
 - APA_STATUS1** - Loran-C blink/SNR warning, general warning
 - APA_STATUS2** - Loran-C cycle warning
 - APA_CROSS_TRACK_RAD** - Cross-track error distance
 - APA_STEER** - Steer to correct
 - APA_CROSS_TRACK_RAD_UNIT** - Cross-track error units
 - APA_ARIV_ALRM_C** - Arrival alarm - circle
 - APA_ARIV_ALRM_P** - Arrival alarm - perpendicular
 - APA_MAG_BEAR_OD** - Magnetic bearing, origin to destination
 - APA_MAG_BEAR_OD_UNIT** - Magnetic bearing unit
 - APA_DEST_WPTID** - Destination waypoint ID
- APB** - Auto pilot B sentence
 - APB_STATUS1** - Loran-C blink/SNR warning, general warning
 - APB_STATUS2** - Loran-C cycle warning
 - APB_CROSS_TRACK_RAD** - Cross-track error distance
 - APB_STEER** - Steer to correct
 - APB_CROSS_TRACK_RAD_UNIT** - Cross-track error units
 - APB_ARIV_ALRM_C** - Arrival alarm - circle
 - APB_ARIV_ALRM_P** - Arrival alarm - perpendicular
 - APB_MAG_BEAR_OD** - Magnetic bearing, origin to destination
 - APB_MAG_BEAR_OD_UNIT** - Magnetic bearing unit
 - APB_DEST_WPTID** - Destination waypoint ID
 - APB_MAG_BEAR_PD** - Magnetic bearing, present position to destination
 - APB_MAG_BEAR_PD_UNIT** - Magnetic bearing unit
 - APB_MAG_BEAR_HS** - Magnetic heading to steer
 - APB_MAG_BEAR_HS_UNIT** - Magnetic heading unit
- BEC** - Bearing and distance to waypoint – dead reckoning
 - BEC.UTC** - UTC time of fix
 - BEC.WPT_LAT** - Latitude of waypoint
 - BEC.WPT_LAT_H** - Latitude hemisphere
 - BEC.WPT_LONG** - Longitude of waypoint
 - BEC.WPT_LONG_H** - Longitude hemisphere
 - BEC.BEARING** - Bearing to waypoint
 - BEC.BEAR_TYPE** - Bearing to waypoint type
 - BEC.DIST** - Distance to waypoint
 - BEC.DIST_UNIT** - Distance to waypoint units
 - BEC.WPTID** - Waypoint ID
- BOD** - Bearing origin to destination
 - BOD.BEARING** - Bearing from START to DEST, degrees
 - BOD.BEAR_TYPE** - Bearing from START to DEST type
 - BOD_DEST_WPTID** - Destination waypoint ID
 - BOD_ORIG_WPTID** - Origin waypoint ID
- BWC** - Bearing using great circle route
 - BWC_DEPTH** - Depth
 - BWC_DEPTH_UNIT** - Depth unit
- DBS** - Depth below surface
 - DBS_DEPTH** - Depth, meters
 - DBS_OFFSET** - Offset from transducer
- FSI** - Frequency set information

- FSI_TX_FREQ** - Transmitting frequency
FSI_RX_FREQ - Receiving frequency
FSI_COMM_MODE - Communications mode
FSI_POWER_LEVEL - Power Level
- GGA** - GPS fix data
GGA_TAKEN_AT - Fix taken at
GGA_LATITUDE_DEG - Latitude
GGA_LATITUDE_DEG_H - Latitude hemisphere
GGA_LONGITUDE_DEG - Longitude
GGA_LONGITUDE_DEG_H - Longitude hemisphere
GGA_QUALITY - Fix quality
GGA_SAT_NUM - Number of satellites being tracked
GGA_HOR_DIL - Horizontal dilution of position
GGA_ALTITUDE - Altitude above mean sea level
GGA_ALTITUDE_UNIT - Altitude units
GGA_HEIGHT_OF_GEOID - Height of geoid (mean sea level) above WGS84 ellipsoid
GGA_HEIGHT_OF_GEOID_UNIT - Height of geoid units
GGA_TIME_SNC_DGPS - Time in seconds since last DGPS update
GGA_DGPS_ID - DGPS station ID number
- GLC** - Geographic position, Loran-C
GLC_GRI_MS - GRI Microseconds
GLC_TOA_MS - Master TOA microseconds
GLC_TOA_STATUS - Master TOA signal status
GLC_TIME_DIFF_MS - Time difference in microseconds
GLC_TIME_DIFF_STATUS - Time difference signal status
- GLL** - Geographic position, lat/lon data
GLL_LATITUDE_DEG - Latitude
GLL_LATITUDE_DEG_H - Latitude hemisphere
GLL_LONGITUDE_DEG - Longitude
GLL_LONGITUDE_DEG_H - Longitude hemisphere
GLL_TAKEN_AT - Fix taken at
GLL_STATUS - Status
- GSA** - Overall satellite data
GSA_AUTO_SEL - Auto selection of 2D or 3D fix
GSA_3D_FIX - 3D fix
GSA_SAT_PRN - Sat used for fix
GSA_PDOP - Dilution of precision
GSA_HDOP - Horizontal dilution of precision
GSA_VDOP - Vertical dilution of precision
- GSV** - Detailed satellite data
GSV_SENT_NUM - Number of sentences
GSV_SENT_CNT - Sentence count
GSV_SAT_IN_VIEW - Number of satellites in view
GSV_SAT_PRN - Satellite PRN number
GSV_ELEVATION - Elevation, degrees
GSV_AZIMUTH - Azimuth, degrees
GSV_SNR - SNR - higher is better
- GTD** - Geographic location in time differences
GTD_TIME_DIFF - Time difference
- HDG** - Heading, deviation and variation
HDG_MAG_HEAD - Magnetic sensor heading in degrees
HDG_MAG_DEV - Magnetic deviation in degrees

HDG_MAG_DEV_DIR - Magnetic deviation direction
HDG_MAG_VAR - Magnetic variation in degrees
HDG_MAG_VAR_DIR - Magnetic variation direction

HDM - Heading, magnetic
HDM_HEADING - Heading in degrees
HDM_HEADING_UNIT - Heading unit

HDT - Heading, true
HDT_HEADING - Heading in degrees
HDT_HEADING_UNIT - Heading unit

LCD - Loran-C signal data
LCD_GRI_MS - GRI Microseconds
LCD_MR_SNR - Master relative SNR
LCD_MR_ECD - Master relative ECD
LCD_TIME_DIFF_MS - Time difference in microseconds
LCD_TIME_DIFF_STATUS - Time difference signal status

MSK - Send control for a beacon receiver
MSK_FREQ - Frequency
MSK_FREQ_MODE - Frequency mode
MSK_BITRATE - Bitrate
MSK_BITRATE_MODE - Bitrate mode
MSK_FREQ_STATUS - Frequency for MSS message status

MSS - Beacon receiver status information
MSS_SIGNAL_S - Signal strength in dB
MSS_SIGNAL_N - Signal to noise ratio in dB
MSS_BEACON_FREQ - Beacon frequency in KHz
MSS_BEACON_BITRATE - Beacon bitrate in bps

MTW - Water temperature
MTW_DEGREES - Degrees
MTW_DEGREES_UNIT - Unit of measurement

MWV - Wind speed and angle
MWV_ANGLE - Wind angle
MWV_REF - Reference
MWV_SPEED - Wind speed
MWV_SPEED_UNIT - Wind speed unit
MWV_STATUS - Status

OSD - Own ship data
OSD_HEADING - Heading true, degrees
OSD_STATUS - Status
OSD_VESSEL - Vessel course true, degrees
OSD_VESSEL_REF - Course reference
OSD_VESSEL_SPEED - Vessel speed
OSD_SPEED_REF - Speed reference
OSD_VESSEL_SET - Vessel set true, degrees
OSD_VESSEL_DRIFT - Vessel drift true, degrees
OSD_VESSEL_DRIFT_UNIT - Vessel drift unit

ROO - Waypoints in active route
ROO_WPT_ID - Waypoint identifier

RMA - Recommended minimum navigation information
RMA_STATUS - Status
RMA_LATITUDE_DEG - Latitude
RMA_LATITUDE_DEG_H - Latitude hemisphere
RMA_LONGITUDE_DEG - Longitude

- RMA_LONGITUDE_DEG_H** - Longitude hemisphere
RMA_TIME_DIFF_A - Time difference A
RMA_TIME_DIFF_B - Time difference B
RMA_SPEED - Speed over the ground in knots
RMA_TRACK_ANGLE - Track angle in degrees
RMA_MAGN_VAR - Magnetic variation
RMA_MAGN_VAR_H - Magnetic variation hemisphere
- RMB** - Recommended minimum navigation information
RMB_STATUS - Status
RMB_CROSS_TRACK_ERR - Cross-track error
RMB_CROSS_TRACK_ERR_DIR - Cross-track error steer
RMB_ORIG_WPTID - Origin waypoint ID
RMB_DEST_WPTID - Destination waypoint ID
RMB_WPT_LAT - Latitude of destination waypoint
RMB_WPT_LAT_H - Latitude hemisphere
RMB_WPT_LONG - Longitude of destination waypoint
RMB_WPT_LONG_H - Longitude hemisphere
RMB_RANGE - Range to destination, nautical miles
RMB_BEAR - True bearing to destination
RMB_VELOCITY - Velocity towards destination, knots
RMB_ARIV_ALARM - Arrival alarm
- RMC** - Recommended minimum navigation information
RMC_TAKEN_AT - Fix taken at
RMC_STATUS - Status
RMC_LATITUDE_DEG - Latitude
RMC_LATITUDE_DEG_H - Latitude hemisphere
RMC_LONGITUDE_DEG - Longitude
RMC_LONGITUDE_DEG_H - Longitude hemisphere
RMC_SPEED - Speed over the ground in knots
RMC_TRACK_ANGLE - Track angle in degrees
RMC_DATE - Date
RMC_MAGN_VAR - Magnetic variation
RMC_MAGN_VAR_H - Magnetic variation hemisphere
- ROT** - Rate of turn
ROT_RATE_OF_TURN - Rate of turn, degrees per minute
ROT_STATUS - Status
- RPM** - Revolutions
RPM_SOURCE - Source
RPM_NUM - Engine or shaft number
RPM_SPEED - Speed, revolutions per minute
RPM_PITCH - Propeller pitch, % of maximum
RPM_STATUS - Status
- RSA** - Rudder sensor angle
RSA_SR_SENSOR - Starboard (or single) rudder sensor
RSA_STATUS - Starboard rudder sensor status
RSA_PR_SENSOR - Port rudder sensor
RSA_STATUS - Port rudder sensor status
- RSD** - Radar system data
RSD_CURSOR_RANGE - Cursor range from own ship
RSD_CURSOR_BEARING - Cursor bearing CW from zero, degrees
RSD_RANGE_SCALE - Range scale
RSD_RANGE_UNIT - Range units

- RTE** - Route message
 - RTE_SENT_NUM** - Number of sentences
 - RTE_SENT_CNT** - Sentence count
 - RTE_TYPE** - Type
 - RTE_TYPE_NAME** - Type name
 - RTE_ID** - Route identifier
 - RTE_WPT_ID** - Waypoint identifier
- SFI** - Scanning frequency information
 - SFI_SENT_NUM** - Number of sentences
 - SFI_SENT_CNT** - Sentence count
 - SFI_FREQ** - Frequency
 - SFI_MODE** - Mode
- STN** - Multiple data ID
 - STN_ID** - Talker ID number
- TTM** - Tracked target message
 - TTM_TARGET_NUM** - Target number
 - TTM_TARGET_DIST** - Target distance
 - TTM_BEARING** - Bearing from own ship
 - TTM_BEAR_TYPE** - Bearing units
 - TTM_TARGET_SPEED** - Target speed
 - TTM_TARGET_COURSE** - Target course
 - TTM_COURSE_UNIT** - Course units
 - TTM_DIST_CPA** - Distance of closest-point-of-approach
 - TTM_TIME_CPA** - Time until closest-point-of-approach '-' means increasing
 - TTM_SIGN** - '-' means increasing
 - TTM_TARGET_NAME** - Target name
 - TTM_TARGET_STATUS** - Target status
 - TTM_REF_TARGET** - Reference target
- VBW** - Dual ground/water speed
 - VBW_WATER_LONG_SPEED** - Longitudinal water speed
 - VBW_WATER_TRAV_SPEED** - Transverse water speed
 - VBW_WATER_STATUS** - Water speed status
 - VBW_GROUND_LONG_SPEED** - Longitudinal ground speed
 - VBW_GROUND_TRAV_SPEED** - Transverse ground speed
 - VBW_GROUND_STATUS** - Ground speed status
- VDR** - Set and drift
 - VDR_DEGRESS** - Degress
 - VDR_DEGRESS_TYPE** - Degress type
 - VDR_SPEED** - Speed
 - VDR_SPEED_UNIT** - Speed units
- VHW** - Water speed and heading
 - VHW_DEGRESS** - Degress
 - VHW_DEGRESS_TYPE** - Degress type
 - VHW_SPEED** - Speed
 - VHW_SPEED_UNIT** - Speed units
- VLW** - Distance traveled through water
 - VLW_TOTAL** - Total cumulative distance
 - VLW_TOTAL_UNIT** - Total cumulative distance unit
 - VLW_RESET** - Distance since Reset
 - VLW_RESET_UNIT** - Distance since Reset unit
- VPW** - Speed, measured parallel to wind
 - VPW_SPEED** - Speed

VPW_SPEED_UNIT - Speed units

VTG - Vector track an speed over the ground

VTG_MAG_TRACK - Track made

VTG_MAG_TRACK_TYPE - Track made type

VTG_SPEED - Ground speed

VTG_SPEED_UNIT - Ground speed units

VWR - Relative wind speed and angle

VWR_WIND_DIR - Wind direction magnitude in degrees

VWR_WIND_DIR_TYPE - Wind direction type

VWR_SPEED - Speed

VWR_SPEED_UNIT - Speed units

WCV - Waypoint closure velocity

WCV_VELOCITY - Velocity

WCV_VELOCITY_UNIT - Velocity units

WCV_WPT_ID - Waypoint identifier

WNC - Distance, waypoint to waypoint

WNC_DISTANCE - Distance

WNC_DISTANCE_UNIT - Distance units

WNC_DEST_WPTID - Destination waypoint ID

WNC_ORIG_WPTID - Origin waypoint ID

WPL - Waypoint information

WPL_LATITUDE_DEG - Latitude

WPL_LATITUDE_DEG_H - Latitude hemisphere

WPL_LONGITUDE_DEG - Longitude

WPL_LONGITUDE_DEG_H - Longitude hemisphere

WPL_WPTNAME - Waypoint name

XDR - Multiple cross track error, dead reckoning

XDR_TRANS_TYPE - Transducer type

XDR_MEASURE_DATA - Measurement data

XDR_MEASURE_UNIT - Measurement data units

XDR_TRANS_NAME - Name of transducer

XTE - Measured cross track error

XTE_GEN_WARN - General warning flag

XTE_LORAN_LOCK - Loran-C cycle lock flag

XTE_CROSS_TRACK_DIST - Cross track error distance

XTE_STEER - Steer

XTE_DIST_UNIT - Distance units

XTR - Cross track error, dead reckoning

XTR_TRANS_TYPE - Transducer type

XTR_MEASURE_DATA - Measurement data

XTR_MEASURE_UNIT - Measurement data units

XTR_TRANS_NAME - Name of transducer

ZDA - Date and Time

ZDA_TIME - Time

ZDA_DAY - Day

ZDA_MONTH - Month

ZDA_YEAR - Year

ZDA_ZONE_HOUR - Local zone hours

ZDA_ZONE_MIN - Local zone minutes

ZFO - UTC and time to destination waypoint

ZFO_TIME - Time

ZFO_TIME_REMAIN - Time remaining

- ZFO_WPT_ID** - Waypoint identifier
- GRMC** - Sensor configuration information
 - GRMC_MODE** - Fix mode
 - GRMC_ALT** - Altitude above/below mean sea level
 - GRMC_DATUM_INDEX** - Earth datum index
 - GRMC_DATUM_AXIS** - User earth datum semi-major axis
 - GRMC_DATUM_FACTOR** - User earth datum inverse flattening factor
 - GRMC_DATUM_DELTA_X** - User earth datum delta x earth centered coordinate
 - GRMC_DATUM_DELTA_Y** - User earth datum delta y earth centered coordinate
 - GRMC_DATUM_DELTA_Z** - User earth datum delta z earth centered coordinate
 - GRMC_DIFF_MODE** - Differential mode
 - GRMC_BAUD_RATE** - NMEA Baud rate
 - GRMC_FILTER_MODE** - Filter mode
 - GRMC_PPS_MODE** - PPS mode
- GRME** - Estimated position error
 - GRME_HPE** - Estimated horizontal position error (HPE)
 - GRME_HPE_UNIT** - HPE units
 - GRME_VPE** - Estimated vertical error (VPE)
 - GRME_VPE_UNIT** - VPE units
 - GRME_OSEPE** - Overall spherical equivalent position error (OSEPE)
 - GRME_OSEPE_UNIT** - SEPE units
- GRMF** - Position fix sentence
 - GRMF_WEEK_NO** - GPS week number
 - GRMF_SEC_NUM** - GPS seconds
 - GRMF_UTC_DATE** - UTC date of position fix
 - GRMF_UTC_TIME** - UTC time of position fix
 - GRMF_LEAP_SEC_NUM** - GPS leap second count
 - GRMF_LATITUDE_DEG** - Latitude
 - GRMF_LATITUDE_DEG_H** - Latitude hemisphere
 - GRMF_LONGITUDE_DEG** - Longitude
 - GRMF_LONGITUDE_DEG_H** - Longitude hemisphere
 - GRMF_MODE** - Mode
 - GRMF_FIX_TYPE** - Fix type
 - GRMF_SPEED** - Speed over ground, km/h
 - GRMF_COURSE** - Course over ground, degrees
 - GRMF_DIL_POS** - Position dilution of precision
 - GRMF_TIME_DIL_POS** - Time dilution of precision
- GRMI** - Sensor initialization information
 - GRMI_LATITUDE_DEG** - Latitude
 - GRMI_LATITUDE_DEG_H** - Latitude hemisphere
 - GRMI_LONGITUDE_DEG** - Longitude
 - GRMI_LONGITUDE_DEG_H** - Longitude hemisphere
 - GRMI_UTC_DATE** - Current UTC date
 - GRMI_UTC_TIME** - Current UTC time
- GRMM** - Map datum
 - GRMM_DATUM** - Currently active horizontal datum
- GRMO** - Output sentence enable/disable
 - GRMO_NAME** - Target sentence description
 - GRMO_MODE** - Target sentence mode
- GRMV** - 3D velocity
 - GRMV_EAST_VEL** - True east velocity
 - GRMV_NORTH_VEL** - True north velocity

GRMV_UP_VEL - Up velocity
GRMZ - Altitude information
 GRMZ_ALT - Altitude
 GRMZ_ALT_UNIT - Altitude units
 GRMZ_POS_FIX_DIM - Position fix dimensions
SLIB - Differential GPS beacon receiver control
 SLIB_FREQ - Frequency
 SLIB_BITRATE - Bit rate
 SLIB_REQ_TYPE - Request type
SRF150 - OK to send
 SRF150_STATUS - Status
SRF161 - OK to send
 SRF161_ANT_STATUS - Antenna status
 SRF161_AGC - AGC