The NMEA data parser plugin
PRINTED MANUAL

NMEA data parser plugin

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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. 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

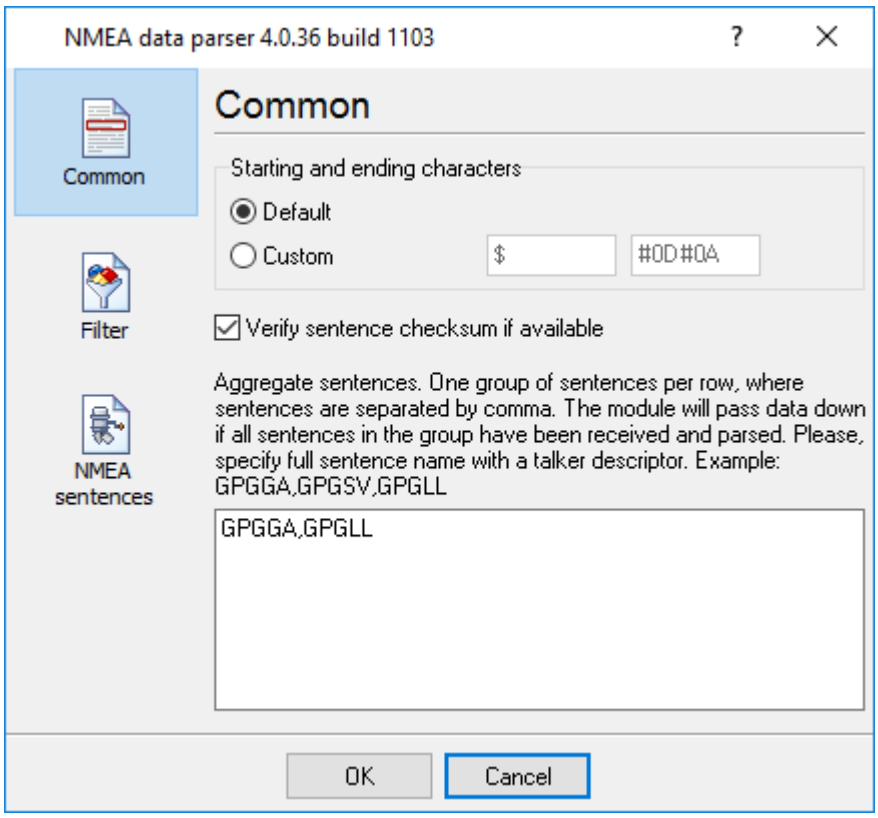

Fig. 1 Common parameters

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.

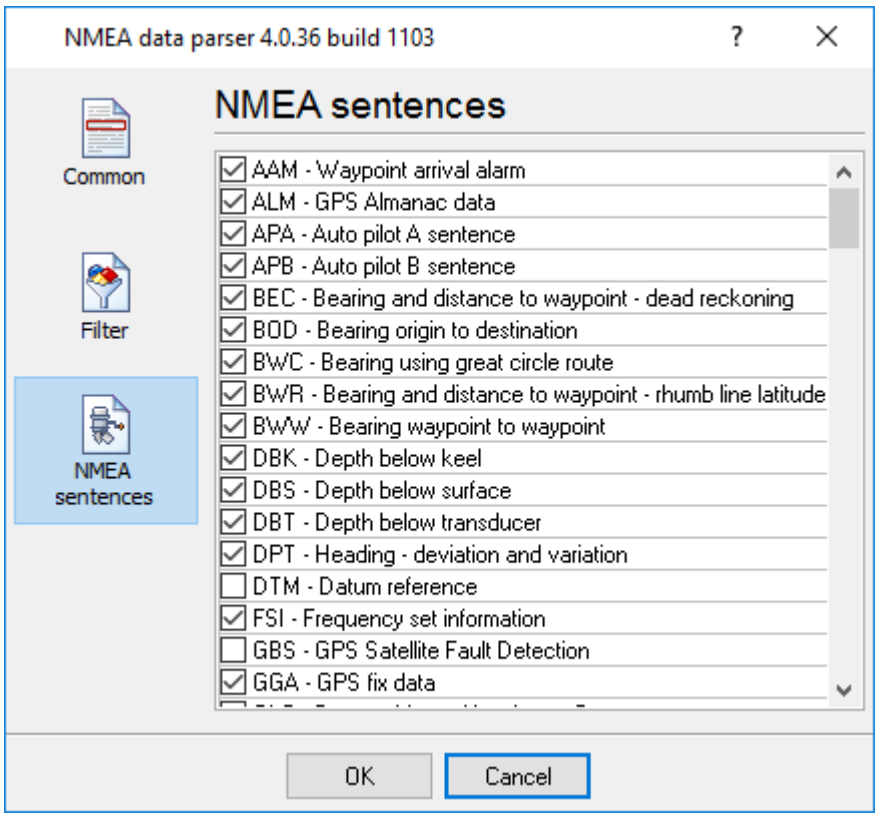

Fig. 5.3.2 NMEA sentences

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 x 10^-39 .. 1.7 x 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_BEAR - Velocity towards destination, knots
RMB_ARIV_ALRM - 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