NMEA 2000 ®

STANDARD FOR SERIAL-DATA NETWORKING OF MARINE ELECTRONIC DEVICES

059392   ISO Acknowledgment

This message is provided by ISO 11783 for a handshake mechanism between transmitting and receiving devices. This message is the possible response to acknowledge the reception of a "normal broadcast" message or the response to a specific command to indicate compliance or failure.

Field #	Field Description
1	Control Byte
2	Group Function Value
3	Reserved Bits
4	PGN of Requested Information

059904   ISO Request

As defined by ISO, this message has a data length of 3 bytes with no padding added to complete the single frame. The appropriate response to this message is based on the PGN being requested, and whether the receiver supports the requested PGN.

Field #	Field Description
1	PGN being requested

060160   ISO Transport Protocol, Data Transfer

ISO 11783 defines this PGN as part of the transport protocol method used for transmitting messages that have 9 or more data bytes. This PGN represents a single packet of a multipacket message.

Field #	Field Description
1	Sequence number of multi-packet frame
2	Multi-packet packetized data

060416   ISO Transport Protocol, Connection Management - RTS group function

ISO 11783 defines this group function PGN as part of the transport protocol method used for transmitting messages that have 9 or more data bytes. This PGN's role in the transport process is determined by the group function value found in the first data byte of the PGN.

Field #	Field Description
1	RTS Group Function Code
2	Total message size, bytes
3	Total number of frames to be transmitted
4	Reserved Bits
5	PGN of multi-packet message

060416   ISO Transport Protocol, Connection Management - CTS group function

ISO 11783 defines this group function PGN as part of the transport protocol method used for transmitting messages that have 9 or more data bytes. This PGN's role in the transport process is determined by the group function value found in the first data byte of the PGN.

Field #	Field Description
1	CTS Group Function Code
2	Number of frames that can be sent
3	Number of next frame to be transmitted
4	Reserved Bits
5	PGN of multi-packet message

060416   ISO Transport Protocol, Connection Management - EOM group function

ISO 11783 defines this group function PGN as part of the transport protocol method used for transmitting messages that have 9 or more data bytes. This PGN's role in the transport process is determined by the group function value found in the first data byte of the PGN.

Field #	Field Description
1	EOM Group Function Code
2	Total message size, bytes
3	Total number of frames received
4	Reserved Bits
5	PGN of multi-packet message

060416   ISO Transport Protocol, Connection Management - BAM group function

ISO 11783 defines this group function PGN as part of the transport protocol method used for transmitting messages that have 9 or more data bytes. This PGN's role in the transport process is determined by the group function value found in the first data byte of the PGN.

Field #	Field Description
1	BAM Group Function Code
2	Total message size, bytes
3	Total number of frames to be transmitted
4	Reserved Bits
5	PGN of multi-packet message

060416   ISO Transport Protocol, Connection Management - Abort group function

ISO 11783 defines this group function PGN as part of the transport protocol method used for transmitting messages that have 9 or more data bytes. This PGN's role in the transport process is determined by the group function value found in the first data byte of the PGN.

Field #	Field Description
1	Abort Group Function Code
2	Reserved Bits
3	PGN of multi-packet message

060928   ISO Address Claim

This network management message is used to claim network address, reply to devices requesting the claimed address, and to respond with device information (NAME) requested by the ISO Request or Complex Request Group Function. This PGN contains several fields that are requestable, either independently or in any combination.

Field #	Field Description
1	Unique Number (ISO Identity Number)
2	Manufacturer Code
3	Device Instance Lower (ISO ECU Instance)
4	Device Instance Upper (ISO Function Instance)
5	Device Function (ISO Function)
6	Reserved
7	Device Class
8	System Instance (ISO Device Class Instance)
9	Industry Group
10	Reserved (ISO Self Configurable)

065240   ISO Commanded Address

ISO 11783 defined this message to provide a mechanism for assigning a network address to a node. The NAME information in the data portion of the message must match the name information of the node whose network address is to be set.

Field #	Field Description
1	Unique Number (ISO Identity Number)
2	Manufacturer Code
3	Device Instance Lower (ISO ECU Instance)
4	Device Instance Upper (ISO Function Instance)
5	Device Function (ISO Function)
6	Reserved Bits
7	Device Class
8	System Instance (ISO Device Class Instance)
9	Industry Group
10	Reserved (ISO Self Configurable)
11	New Source Address

126208   NMEA - Request group function

The Request / Command / Acknowledge Group type of function is defined by first field. The message will be a Request, Command, or Acknowledge Group Function.

Field #	Field Description
1	Complex Request Group Function Code
2	Requested PGN
3	Transmission interval
4	Transmission interval offset
5	Number of Pairs of Request Parameters to follow
6	Field number of first requested parameter
7	Value of first requested parameter
8	Variable Number of fields, Field number 6 repeated
9	Variable Number of fields, Field number 7 repeated

126208   NMEA - Command group function

The Request / Command / Acknowledge Group type of function is defined by first field. The message will be a Request, Command, or Acknowledge Group Function.

Field #	Field Description
1	Command Group Function Code
2	Commanded PGN
3	Priority Setting
4	Reserved Bits
5	Number of Pairs of Commanded Parameters to follow
6	Field number of first commanded parameter
7	Value of first command parameter
8	Variable Number of fields, Field number 6 repeated
9	Variable Number of fields, Field number 7 repeated

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126208 NMEA - Acknowledge group function

The Request / Command / Acknowledge Group type of function is defined by first field. The message will be a Request, Command, or Acknowledge Group Function.

Field #	Field Description
1	Acknowledgment Group Function Code
2	Requested or Commanded PGN # being acknowledged
3	PGN error code
4	Transmission Interval / Priority error code
5	Number of Requested or Commanded Parameters
6	First parameter error code
7	Variable Number of fields, Field number 6 repeated

126208 NMEA - Read Fields - group function

The Request / Command / Acknowledge Group type of function is defined by first field. The message will be a Request, Command, or Acknowledge Group Function.

Field #	Field Description
1	Complex Request Group Function Code
2	PGN Number
3	Manufacturer's Code
4	Reserve Bits
5	Industry Group
6	Unique ID
7	Number of pairs of Commanded Parameters Fields
8	Number of pairs of Fields to Read
9	Field Number of first Commanded Parameter
10	Value of first Commanded Parameter
11	Variable Number of fields, field 9 repeated
12	Variable Number of Fields, field 10 repeated
13	Field Number of first Field to Read
14	Variable Number of Fields, field 13 repeated

126208   NMEA - Read Fields Reply - group function

The Request / Command / Acknowledge Group type of function is defined by first field. The message will be a Request, Command, or Acknowledge Group Function.

Field #	Field Description
1	Complex Request Group Function Code
2	PGN Number
3	Manufacturer's Code
4	Reserve Bits
5	Industry Group
6	Unique ID
7	Number of pairs of Commanded Parameters Fields
8	Number of pairs of Fields to Read
9	Field Number of first Commanded Parameter
10	Value of first Commanded Parameter
11	Variable Number of fields, field 9 repeated
12	Variable Number of Fields, field 10 repeated
13	Field Number of first Field to Read
14	Value of first Field to Read
15	Variable Number of Fields, field 13 repeated
16	Variable Number of Fields, field 14 repeated

126208   NMEA - Write Fields - group function

The Request / Command / Acknowledge Group type of function is defined by first field. The message will be a Request, Command, or Acknowledge Group Function.

Field #	Field Description
1	Complex Request Group Function Code
2	PGN Number
3	Manufacturer's Code
4	Reserve Bits
5	Industry Group
6	Unique ID
7	Number of pairs of Commanded Parameters Fields
8	Number of pairs of Fields to Written
9	Field Number of first Commanded Parameter
10	Value of first Commanded Parameter
11	Variable Number of fields, field 9 repeated
12	Variable Number of Fields, field 10 repeated
13	Field Number of first Field to be Written
14	Value of first Field to be written
15	Variable Number of Fields, field 13 repeated
16	Variable Number of Fields, field 14 repeated

126208   NMEA - Write Fields Reply - group function

The Request / Command / Acknowledge Group type of function is defined by first field. The message will be a Request, Command, or Acknowledge Group Function.

Field #	Field Description
1	Complex Request Group Function Code
2	PGN Number
3	Manufacturer's Code
4	Reserve Bits
5	Industry Group
6	Unique ID
7	Number of pairs of Commanded Parameters Fields
8	Number of pairs of Fields to Written
9	Field Number of first Commanded Parameter
10	Value of first Commanded Parameter
11	Variable Number of fields, field 9 repeated
12	Variable Number of Fields, field 10 repeated
13	Field Number of first Field to be Written
14	Status of first Field Written
15	Variable Number of Fields, field 13 repeated
16	Variable Number of Fields, field 14 repeated

126464   PGN List - Transmit PGN's group function

The Transmit / Receive PGN List Group type of function is defined by first field. The message will be a Transmit or Receive PGN List group function.

Field #	Field Description
1	Transmitted PGN Group Function Code
2	First PGN supported
3	Variable Number of fields, Field number 2 repeated

126464   PGN List - Received PGN's group function

The Transmit / Receive PGN List Group type of function is defined by first field. The message will be a Transmit or Receive PGN List group function.

Field #	Field Description
1	Received PGN Group Function Code
2	First PGN supported
3	Variable Number of fields, Field number 2 repeated

126992   System Time

The purpose of this PGN is twofold: To provide a regular transmission of UTC time and date. To provide synchronism for measurement data.

Field #	Field Description
1	SID
2	Source
3	Reserved Bits
4	Date
5	Time

126996   Product Information

Provides product information onto the network that could be important for determining quality of data coming from this product.

Field #	Field Description
1	NMEA 2000 Database Version
2	NMEA Manufacturer's Product Code
3	Manufacturer's Model ID
4	Manufacturer's Software Version Code
5	Manufacturer's Model Version
6	Manufacturer's Model Serial Code
7	NMEA 2000 Certification Level
8	Load Equivalency

126998   Configuration Information

Free-form alphanumeric fields describing the installation (e.g., starboard engine room location) of the device and installation notes (e.g., calibration data).

Field #	Field Description
1	Installation Description, Field 1
2	Installation Description, Field 2
3	Manufacturer Information, Field 3

127237   Heading/Track Control

Sends commands to, and receives data from, heading control systems. Allows for navigational (remote) control of a heading control system and direct rudder control.

Field #	Field Description
1	Rudder Limit Exceeded
2	Off-Heading Limit Exceeded
3	Off-Track Limit Exceeded
4	Override
5	Steering Mode
6	Turn Mode
7	Heading Reference
8	Reserved Bits
9	Commanded Rudder Direction
10	Commanded Rudder Angle
11	Heading-To-Steer (Course)
12	Track
13	Rudder Limit
14	Off-Heading Limit
15	Radius of Turn Order
16	Rate of Turn Order
17	Off-Track Limit
18	Vessel Heading

127245   Rudder

Rudder order command in direction or angle with current rudder angle reading.

Field #	Field Description
1	Rudder Instance
2	Direction Order
3	Reserved Bits
4	Angle Order
5	Position
6	Reserved Bits

127250   Vessel Heading

Heading sensor value with a flag for True or Magnetic. If the sensor value is Magnetic, the deviation field can be used to produce a Magnetic heading, and the variation field can be used to correct the Magnetic heading to produce a True heading.

Field #	Field Description
1	SID
2	Heading Sensor Reading
3	Deviation
4	Variation
5	Heading Sensor Reference
6	Reserved Bits

127251 Rate of Turn

Rate of Turn is the rate of change of the Heading.

Field #	Field Description
1	Sequence ID
2	Rate of Turn
3	Reserved Bits

127257 Attitude

This parameter group provides a single transmission that describes the position of a vessel relative to both horizontal and vertical planes. This would typically be used for vessel stabilization, vessel control and onboard platform stabilization.

Field #	Field Description
1	SID
2	Yaw
3	Pitch
4	Roll
5	Reserved Bits

127258 Magnetic Variation

Message for transmitting variation. The message contains a sequence number to allow synchronization of other messages such as Heading or Course over Ground. The quality of service and age of service are provided to enable recipients to determine an appropriate level of service if multiple transmissions exist.

Field #	Field Description
1	Sequence ID
2	Variation Source
3	Reserved Bits
4	Age of Service (Date)
5	Variation
6	Reserved Bits

127488 Engine Parameters, Rapid Update

Provides data with a high update rate for a specific engine in a single frame message. The first field provides information as to which engine.

Field #	Field Description
1	Engine Instance
2	Engine Speed
3	Engine Boost Pressure
4	Engine tilt/trim
5	Reserved Bits

127489   Engine Parameters, Dynamic

Used to provide real-time operational data and status relevant to a specific engine, indicated by the engine instance field. This message would normally be broadcasted periodically to provide information for instrumentation or control functions.

Field #	Field Description
1	Engine instance
2	Engine oil pressure
3	Engine oil temp.
4	Engine temp.
5	Alternator potential
6	Fuel rate
7	Total engine hours
8	Engine coolant pressure
9	Fuel Pressure
10	Not Available
11	Engine Discrete Status 1
12	Engine Discrete Status 2
13	Percent Engine Load
14	Percent Engine Torque

127493   Transmission Parameters, Dynamic

Used to provide the operational state and internal operating parameters of a specific transmission, indicated by the transmission instance field. This message would normally be broadcasted periodically to provide information for instrumentation or control functions.

Field #	Field Description
1	Transmission instance
2	Transmission Gear
3	Reserved Bits
4	Transmission oil pressure
5	Transmission oil temperature
6	Transmission Discrete Status
7	Reserved Bits

127496   Trip Parameters, Vessel

Trip parameters relative to Vessel

Field #	Field Description
1	Time to Empty
2	Distance to Empty
3	Estimated Fuel Remaining
4	Trip Run Time

127497   Trip Parameters, Engine

Engine related trip information.

Field #	Field Description
1	Engine instance
2	Trip fuel used
3	Fuel Rate, Average
4	Fuel Rate, Economy
5	Instantaneous Fuel Economy

127498   Engine Parameters, Static

Provides identification information and rated engine speed for the engine indicated by the engine instance field. Used primarily by display devices.

Field #	Field Description
1	Engine instance
2	Rated engine speed
3	VIN
4	Software ID

127501   Binary Switch Bank Status

Universal status report for multiple banks of two-state indicators.

Field #	Field Description
1	Indicator Bank instance
2	Indic. 1
3	Indic. 2
4	Indic. 3
5	Indic. 4
6	Indic. 5
7	Indic. 6
8	Indic. 7
9	Indic. 8
10	Indic. 9
11	Indic. 10
12	Indic. 11
13	Indic. 12
14	Indic. 13
15	Indic. 14
16	Indic. 15
17	Indic. 16
18	Indic. 17
19	Indic. 18
20	Indic. 19
21	Indic. 20
22	Indic. 21
23	Indic. 22
24	Indic. 23
25	Indic. 24
26	Indic. 25
27	Indic. 26
28	Indic. 27
29	Indic. 28

127502   Switch Bank Control

Universal commands to multiple banks of two-state devices.

Field #	Field Description
1	Switch bank instance
2	Switch 1
3	Switch 2
4	Switch 3
5	Switch 4
6	Switch 5
7	Switch 6
8	Switch 7
9	Switch 8
10	Switch 9
11	Switch 10
12	Switch 11
13	Switch 12
14	Switch 13
15	Switch 14
16	Switch 15
17	Switch 16
18	Switch 17
19	Switch 18
20	Switch 19
21	Switch 20
22	Switch 21
23	Switch 22
24	Switch 23
25	Switch 24
26	Switch 25
27	Switch 26
28	Switch 27
29	Switch 28

127503   AC Input Status

Any device with an AC Input may transmit this message

Field #	Field Description
1	AC Instance
2	Number of Lines
3	Line
4	Acceptability
5	Reserve Bits
6	Voltage
7	Current
8	Frequency
9	Breaker Size
10	Real Power
11	Reactive Power
12	Power Factor

127504   AC Output Status

Any device with an AC Output may transmit this message.

Field #	Field Description
1	AC Instance
2	Number of lines
3	Line
4	Waveform
5	Reserve Bits
6	Voltage
7	Current
8	Frequency
9	Breaker Size
10	Real Power
11	Reactive Power
12	Power Factor

127505   Fluid Level

Fluid Level contains an instance number, type of fluid, level of fluid, and tank capacity. For example the fluid instance may be the level of fuel in a tank or the level of water in the bilge. Used primarily by display or instrumentation devices.

Field #	Field Description
1	Fluid Instance
2	Fluid Type
3	Fluid Level
4	Tank Capacity
5	Reserved Bits

127506   DC Detailed Status

Provides parametric data for a specific battery, indicated by the battery instance field. Used primarily by display or instrumentation devices, but may also be used by battery management controls.

Field #	Field Description
1	SID
2	DC Instance
3	DC Type
4	State of Charge
5	State of Health
6	Time Remaining
7	Ripple Voltage

127507   Charger Status

Any device capable of charging a battery may transmit this message.

Field #	Field Description
1	Charger Instance
2	Battery Instance
3	Operating State
4	Charge Mode
5	Charger Enable/Disable
6	Equalization Pending
7	Reserved
8	Equalization Time Remaining

127508   Battery Status

Provides parametric data for a specific DC Source, indicated by the instance field. The type of DC Source can be identified from the DC Detailed Status PGN. Used primarily by display or instrumentation devices, but may also be used by power management.

Field #	Field Description
1	Battery Instance
2	Battery Voltage
3	Battery Current
4	Battery Case Temperature
5	SID

127509   Inverter Status

Any device capable of inverting a DC source to an SC output may transmit this message.

Field #	Field Description
1	Inverter Instance
2	AC Instance
3	DC Instance
4	Operating State
5	Inverter Enable/Disable
6	Reserved

127510   Charger Configuration Status

Any device capable of charging a battery may transmit this message.

Field #	Field Description
1	Charger Instance
2	Battery Instance
3	Charger Enable/Disable
4	Reserved Bits
5	Charge Current Limit
6	Charging Algorithm
7	Charger Mode
8	Estimated Battery Temp - When No Sensor Present
9	Equalize One Time Enable/Disable
10	Over Charge Enable/Disable
11	Equailize Time

127511   Inverter Configuration Status

Any device capable of inverting DC to AC may transmit this message.

Field #	Field Description
1	Inverter Instance
2	AC Instance
3	DC Instance
4	Inverter Enable/Disable
5	Inverter Mode
6	Load Sense Enable/Disable
7	Load Sense Power Threshold
8	Load Sense Interval

127512   AGS Configuration Status

Any device that is capable of starting/stopping a generator may transmit this message.

Field #	Field Description
1	AGS Instance
2	Generator Instance
3	AGS Mode

127513   Battery Configuration Status

Any device connected to a battery may transmit this message.

Field #	Field Description
1	Battery Instance
2	Battery Type
3	Supports Equalization
4	Reserved Bits
5	Nominal Voltage
6	Battery Chemistry
7	Battery Capacity
8	Battery Temperature Coefficient
9	Peukert Exponent
10	Charge Efficiency Factor

127514   AGS Status

Any device capable of starting/stopping a generator may transmit this message.

Field #	Field Description
1	AGS Instance
2	Generator Instance
3	AGS Operating State
4	Generator State
5	Generator On Reason
6	Generator Off Reason

128259   Speed, Water referenced

This parameter group provides a single transmission that describes the motion of a vessel.

Field #	Field Description
1	Sequence ID
2	Speed Water Referenced
3	Speed Ground Referenced
4	Speed Water Referenced Type
5	Reserved Bits

128267 Water Depth

Water depth relative to the transducer and offset of the measuring transducer. Positive offset numbers provide the distance from the transducer to the waterline.

Field #	Field Description
1	SID
2	Water Depth, Transducer
3	Offset
4	Reserved Bits

128275 Distance Log

This PGN provides the cumulative voyage distance traveled since the last reset. The distance is tagged with the time and date of the distance measurement.

Field #	Field Description
1	Measurement Date
2	Measurement Time
3	Total Cumulative Distance
4	Distance Since Last Reset

128520 Tracked Target Data

Message for reporting status and target data from tracking radar external devices.

Field #	Field Description
1	Sequence ID
2	Target ID #
3	Track Status
4	Bearing Reference
5	Reserved Bits
6	Bearing
7	Distance
8	Course
9	Speed
10	CPA
11	TCPA
12	UTC of Fix
13	Name
14	Reference Target

129025   Position, Rapid Update

This PGN provides latitude and longitude referenced to WGS84. Being defined as single frame message, as opposed to other PGNs that include latitude and longitude and are defined as fast or multi-packet, this PGN lends itself to being transmitted more frequently without using up excessive bandwidth on the bus for the benefit of receiving equipment that may require rapid position updates.

Field #	Field Description
1	Latitude
2	Longitude

129026   COG & SOG, Rapid Update

This parameter group is a single frame parameter group that provides Course Over Ground (COG) and Speed Over Ground (SOG).

Field #	Field Description
1	SID
2	COG Reference
3	Reserved Bits
4	Course Over Ground
5	Speed Over Ground
6	Reserved Bits

129027   Position Delta, High Precision Rapid Update

The "Position Delta, High Precision Rapid Update" Parameter Group is intended for applications where very high precision and very fast update rates are needed for position data. This PGN can provide delta position changes down to 1 millimeter with a delta time period accurate to 5 milliseconds.

Field #	Field Description
1	Sequence ID
2	Time Delta
3	Latitude Delta
4	Longitude Delta

129028   Altitude Delta, High Precision Rapid Update

The "Altitude Delta, High Precision Rapid Update" Parameter Group is intended for applications where very high precision and very fast update rates are needed for altitude and course over ground data. This PG can provide delta altitude changes down to 1 millimeter, a change in direction as small as 0.0057 degrees, and with a delta time period accurate to 5 milliseconds.

Field #	Field Description
1	Sequence ID
2	Time Delta
3	GNSS Quality
4	Direction
5	Reserved Bits
6	Course Over Ground
7	Altitude Delta

129029   GNSS Position Data

This parameter group conveys a comprehensive set of Global Navigation Satellite System (GNSS) parameters, including position information.

Field #	Field Description
1	SID
2	Position date
3	Position time
4	Latitude
5	Longitude
6	Altitude
7	Type of System
8	Method, GNSS
9	Integrity
10	Reserved Bits
11	Number of SVs
12	HDOP
13	PDOP
14	Geoidal Separation
15	Number of Reference Stations
16	Reference Station Type"1"
17	Reference Station ID"1"
18	Age of DGNSS Corrections "1"
19	Reference Station Type "n"
20	Reference Station ID "n"
21	Age of DGNSS Reference Station "n"

129033   Time & Date

This parameter group has a single transmission that provides: UTC time, UTC Date and Local Offset Datum Local geodetic datum and datum offsets from a reference datum.

Field #	Field Description
1	Date
2	Time
3	Local Offset, Minutes

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129038   AIS Class A Position Report

This parameter group provides data associated with the ITU-R M.1371 Messages 1, 2, and 3 Position Reports, autonomous, assigned, and response to interrogation, respectively. An AIS device may generate this parameter group either upon receiving a VHF data link message 1,2 or 3, or upon receipt of an ISO or NMEA request PGN (see ITU-R M.1371-1 for additional information).

Field #	Field Description
1	Message ID
2	Repeat Indicator
3	User ID
4	Longitude
5	Latitude
6	Position Accuracy
7	RAIM-flag
8	Time Stamp
9	COG
10	SOG
11	Communication State
12	AIS Transceiver Information
13	True Heading
14	Rate of Turn
15	Navigational Status
16	Reserved for Regional Applications
17	Spare

129039   AIS Class B Position Report

This parameter group provides data associated with the ITU-R M.1371 Message 18 Standard Class B Equipment Position Report. An AIS device may generate this parameter group either upon receiving a VHF data link message 18, or upon receipt of an ISO or NMEA request PGN (see ITU-R M.1371-1 for additional information).

Field #	Field Description
1	Message ID
2	Repeat Indicator
3	User ID
4	Longitude
5	Latitude
6	Position Accuracy
7	RAIM-flag
8	Time Stamp
9	COG
10	SOG
11	Communication State
12	AIS Transceiver Information
13	True Heading
14	Reserved for Regional Applications
15	Reserved for Regional Applications
16	Class B unit flag
17	Class B Display Flag
18	Class B DSC Flag
19	Class B Band Flag
20	Class B Msg 22 Flag
21	Mode Flag
22	Communication State Selector Flag

129040   AIS Class B Extended Position Report

This parameter group provides data associated with the ITU-R M.1371 Message 19 Extended Class B Equipment Position Report containing position and static information. An AIS device may generate this parameter group either upon receiving a VHF data link message 19, or upon receipt of an ISO or NMEA request PGN.

Field #	Field Description
1	Message ID
2	Repeat Indicator
3	User ID
4	Longitude
5	Latitude
6	Position Accuracy
7	RAIM-flag
8	Time Stamp
9	COG
10	SOG
11	Reserved for Regional Applications
12	Reserved for Regional Applications
13	NMEA 2000 Reserved
14	Ship/Cargo Type
15	True Heading
16	NMEA 2000 Reserved
17	Type of Electronic Positioning Device
18	Ship Length
19	Ship Beam
20	Position Reference Point from Starboard
21	Position Reference Point aft of Ship's Bow
22	Name
23	Data Terminal Equipment (DTE)
24	Mode Flag
25	Spare
26	AIS Transceiver Information

129044   Datum

This parameter group is used to define the datum to which a position location output by the same device in other PGNs is referenced.

Field #	Field Description
1	Local Datum
2	Delta Latitude
3	Delta Longitude
4	Delta Altitude
5	Reference Datum

129045   User Datum Settings

Transformation parameters for converting from WGS-84 to other Datums.

Field #	Field Description
1	Delta X
2	Delta Y
3	Delta Z
4	Rotation in X
5	Rotation in Y
6	Rotation in Z
7	Scale
8	Ellipsoid Semi-major Axis
9	Ellipsoid Flattening Inverse
10	Datum Name

129283   Cross Track Error

This parameter group provides the magnitude of position error perpendicular to the desired course.

Field #	Field Description
1	SID
2	XTE Mode
3	Reserve
4	Navigation Terminated
5	XTE
6	Reserve

129284   Navigation Data

This parameter group provides essential navigation data for following a route. Transmissions will originate from products that can create and manage routes using waypoints. This information is intended for navigational repeaters.

Field #	Field Description
1	SID
2	Distance to Destination Waypoint
3	Course/Bearing Ref.
4	Perpendicular Crossed
5	Arrival Circle Entered
6	Calculation Type
7	ETA Time
8	ETA Date
9	Bearing, Origin To Destination Waypoint
10	Bearing, Position To Destination Waypoint
11	Origin Waypoint Number
12	Destination Waypoint Number
13	Destination Wpt Latitude
14	Destination Wpt Longitude
15	Waypoint Closing Velocity

129285   Navigation - Route/WP information

This parameter group returns Route and WP data ahead in the Active Route. It can be requested or may be transmitted without a request, typically at each Waypoint advance.

Field #	Field Description
1	Start RPS#
2	nItems
3	Database ID
4	Route ID
5	Navigation direction in route
6	Supplementary Route/WP data available
7	Reserved bits
8	Route Name
9	Reserved
10	WPID
11	WP Name
12	WP Latitude
13	WP Longitude
14	Fields 10 thru 13 repeat as needed

129291   Set & Drift, Rapid Update

The Set and Drift effect on the Vessel is the direction and the speed of a current.

Field #	Field Description
1	SID
2	Set Reference
3	Reserved Bits
4	Set
5	Drift
6	Reserved Bits

129301   Time to/from Mark

Time to go to or elapsed from a generic mark, that may be non-fixed. The mark is not generally a specific geographic point but may vary continuously and is most often determined by calculation (the recommended turning or tacking point for sailing vessels, the wheel-over point for vessels making turns, a predicted collision point, etc.)

Field #	Field Description
1	SID
2	Time elapsed (from) or to-go to mark
3	Mark Type
4	Reserved Bits
5	Mark ID

129302   Bearing and Distance between two Marks

Bearing and distance from the origin mark to the destination mark, calculated at the origin mark, for any two arbitrary generic marks. The calculation type (Rhumb Line, Great Circle) is specified, as well as the bearing reference (Mag, True).

Field #	Field Description
1	SID
2	Bearing Ref.
3	Calculation Type
4	Reserved Bits
5	Bearing, Origin To Destination
6	Distance
7	Origin Mark Type
8	Destination Mark Type
9	Origin Mark Id
10	Destination Mark ID

129538   GNSS Control Status

GNSS common satellite receiver parameter status

Field #	Field Description
1	SV Elevation Mask
2	PDOP Mask
3	PDOP Switch
4	SNR Mask
5	GNSS Mode
6	DGNSS Mode
7	Position / Velocity Filter
8	Max Correction Age
9	Antenna Altitude for 2D Mode
10	Use Antenna Altitude for 2D Mode

129539   GNSS DOPs

This PGN provides a single transmission containing GNSS status and dilution of precision components (DOP) that indicate the contribution of satellite geometry to the overall positioning error. There are three DOP parameters reported, horizontal (HDOP), Vertical (VDOP) and time (TDOP).

Field #	Field Description
1	SID
2	Set Mode
3	Op Mode
4	Reserve
5	HDOP
6	VDOP
7	TDOP

129540   GNSS Sats in View

GNSS information on current satellites in view tagged by sequence ID. Information includes PRN, elevation, azimuth, SNR, defines the number of satellites; defines the satellite number and the information.

Field #	Field Description
1	SID
2	Mode
3	Reserve Bits
4	Number of SVs
5	PRN "1"
6	Elevation "1"
7	Azimuth "1"
8	SNR "1"
9	Range Residuals 1
10	PRN Status "1"
11	Reserved Bits
12	PRN "n"
13	Elevation "n"
14	Azimuth "n"
15	SNR "n"
16	Range Residuals "n"
17	PRN Status "n"
18	Reserved Bits

129541   GPS Almanac Data

This parameter group provides a single transmission that contains relevant almanac data for GPS products. The almanac contains satellite vehicle course orbital parameters. This information is not considered precise and is only valid for several months at a time. GPS products receive almanac data directly from the satellites. This information would either be transmitted to and from GPS products for update, or system interrogation.

Field #	Field Description
1	PRN
2	GPS Week number
3	SV Health Bits
4	Eccentricity
5	Almanac Reference Time
6	Inclination Angle
7	Rate of Right Ascension
8	Root of Semi-major Axis
9	Argument of Perigee
10	Longitude of Ascension Node
11	Mean Anomaly
12	Clock Parameter 1
13	Clock Parameter 2
14	Reserved Bits

129542 GNSS Pseudorange Noise Statistics

GNSS pseudorange measurement noise statistics can be translated in the position domain in order to give statistical measures of the quality of the position solution. Intended for use with a Receiver Autonomous Integrity Monitoring (RAIM) application.

Field #	Field Description
1	SID
2	RMS of Position Uncertainty
3	STD of Major axis
4	STD of Minor axis
5	Orientation of Major axis
6	STD of Lat Error
7	STD of Lon Error
8	STD of Alt Error

129545 GNSS RAIM Output

This parameter group is used to provide the output from a GNSS Receiver's Receiver Autonomous Integrity Monitoring (RAIM) process. The Integrity field value is based upon the parameters set in PGN 130059 GNS RAIM Settings.

Field #	Field Description
1	Sequence ID
2	Integrity Flag
3	Reserve Bits
4	Latitude expected error
5	Longitude expected error
6	Altitude expected error
7	SV ID of most likely failed sat
8	Probability of missed detection
9	Estimate of pseudorange bias
10	Std Deviation of bias

129546 GNSS RAIM Settings

This PGN is used to report the control parameters for a GNSS Receiver Autonomous Integrity Monitoring (RAIM) process.

Field #	Field Description
1	Radial Position Error Maximum threshold
2	Probability of False Alarm
3	Probability of Missed Detection
4	Pseudorange Residual Filtering Time Constant
5	Reserved Bits

129547   GNSS Pseudorange Error Statistics

This parameter group is used to support Receiver Autonomous Integrity Monitoring (RAIM). Pseudorange measurement error statistics can be translated in the position domain in order to give statistical measures of the quality of the position solution.

Field #	Field Description
1	Sequence ID
2	RMS Std Dev of Range Inputs
3	Std Dev major error ellipse
4	Std Dev minor error ellipse
5	Orientation of error ellipse
6	Std Dev Latitude error
7	Std Dev Longitude error
8	Std Dev Altitude error

129549   DGNSS Corrections

This PGN provides a means to pass differential GNSS corrections between NMEA 2000 devices. Passing DGNSS data this way allows for more flexibility than traditional methods. One differential correction receiver could supply multiple GNSS receivers. Multiple differential correction receivers or data streams could be connected to a GNSS receiver allowing for network DGNSS approaches. This PGN can accommodate DGPS and DGLONASS corrections.

Field #	Field Description
1	Sequence ID
2	Reference Station ID
3	Reference Station Type
4	Time of corrections
5	Station Health
6	Reserved Bits
7	Satellite ID
8	PRC
9	RRC
10	UDRE
11	IOD

129550   GNSS Differential Correction Receiver Interface

GNSS common differential correction receiver parameter status.

Field #	Field Description
1	Channel
2	Frequency
3	Serial Interface Bit Rate
4	Serial Interface Detection Mode
5	Differential Source
7	Differential Operation Mode
8	Reserved Bits

129551   GNSS Differential Correction Receiver Signal

GNSS differential correction receiver status tagged by sequence ID. Status information includes frequency, SNR, and use as a correction source.

Field #	Field Description
1	SID
2	Channel
3	Signal Strength
4	Signal SNR
5	Frequency
6	Station Type
7	Station ID
8	Differential Signal Bit Rate
9	Differential Signal Detection Mode
10	Used as Correction Source
11	Reserved Bits
12	Differential Source
13	Time Since Last Sat Differential Sync
14	Satellite Service ID No.

129556   GLONASS Almanac Data

This PGN provides a single transmission that contains relevant almanac data for Glonass products. The almanac contains satellite vehicle course orbital parameters. This information is not considered precise and is only valid for several months at a time. Glonass products receive almanac data directly from the satellites. This information would either be transmitted to and from Glonass products for update, or system interrogation.

Field #	Field Description
1	PRN
2	NA
3	Reserved Bits
4	CnA
5	HnA
6	(epsilon)nA
7	(deltaTnA)DOT
8	(omega)nA
9	(delta)TnA
10	tnA
11	(lambda)nA
12	(delta)inA
13	tcA
14	tnA

129792 AIS DGNSS Broadcast Binary Message

This parameter group provides data associated with the ITU-R M.1371 Message 17 GNSS Broadcast Binary Message containing DGNSS corrections from a base station. An AIS device may generate this parameter group either upon receiving a VHF data link message 17, or upon receipt of an ISO or NMEA request PGN (see ITU-R M.1371-1 for additional information).

Field #	Field Description
1	Message ID
2	Repeat Indicator
3	Source ID
4	NMEA 2000 Reserved
5	AIS Transceiver Information
6	Spare
7	Longitude
8	Latitude
9	NMEA 2000 Reserved
10	Spare
11	Number of Bits in Binary Data Field
12	Binary Data

129793 AIS UTC and Date Report

This parameter group provides data from ITU-R M.1371 message 4 Base Station Report providing position, time, date, and current slot number of a base station, and 11 UTC and date response message providing current UTC and date if available. An AIS device may generate this parameter group either upon receiving a VHF data link message 4 or 11, or upon receipt of an ISO or NMEA request PGN.

Field #	Field Description
1	Message ID
2	Repeat Indicator
3	User ID
4	Longitude
5	Latitude
6	Position accuracy
7	RAIM-flag
8	NMEA 2000 Reserved
9	Position time
10	Communication State
11	AIS Transceiver Information
12	Position Date
13	NMEA 2000 Reserved
14	Type of Electronic Positioning Device
15	Spare

129794   AIS Class A Static and Voyage Related Data

This parameter group provides data associated with the ITU-R M.1371 Message 5 Ship Static and Voyage Related Data Message. An AIS device may generate this parameter group either upon receiving a VHF data link message 5, or upon receipt of an ISO or NMEA request PGN.

Field #	Field Description
1	Message ID
2	Repeat Indicator
3	User ID
4	IMO
5	Call Sign
6	Name
7	Ship/Cargo Type
8	Ship Length
9	Ship Beam
10	Position Reference Point from Starboard
11	Position Reference Point aft of Ship's Bow
12	Estimated Date of Arrival
13	Estimated Time of Arrival
14	Draft
15	Destination
16	AIS Version
17	Type of Electronic Positioning Device
18	Data Terminal Equipment (DTE)
19	Spare
20	AIS Transceiver Information

129795   AIS Addressed Binary Message

This parameter group provides data associated with the ITU-R M.1371 Message 6 Addressed Binary Message supporting address communication of binary data. An AIS device may generate this parameter group either upon receiving a VHF data link message 6, or upon receipt of an ISO or NMEA request PGN.

Field #	Field Description
1	Message ID
2	Repeat Indicator
3	Source ID
4	NMEA 2000 Reserved
5	AIS Transceiver Information
6	Sequence Number
7	Destination ID
8	NMEA 2000 Reserved
9	Retransmit Flag
10	Spare
11	Number of Bits in Binary Data Field
12	Binary Data

129796   AIS Acknowledge

This parameter group provides data associated with the ITU-R M.1371 Messages 7 Binary Acknowledge Message and 13 Safety Related Acknowledge Message. Message 7 acknowledges receipt of message 6 while message 13 acknowledges receipt of message 14. An AIS device may generate this parameter group either upon receiving a VHF data link message 7 or 13, or upon receipt of an ISO or NMEA request PGN.

Field #	Field Description
1	Message ID
2	Repeat Indicator
3	Source ID
4	NMEA 2000 Reserved
5	AIS Transceiver Information
6	Spare
7	Destination ID"1"
8	NMEA 2000 Reserved
9	Sequence Number for ID"1"
10	Destination ID"n"
11	NMEA 2000 Reserved
12	Sequence Number for ID"n"

129797   AIS Binary Broadcast Message

This parameter group provides data associated with the ITU-R M.1371 Message 8 Binary Broadcast Message supporting broadcast communication of binary data. An AIS device may generate this parameter group either upon receiving a VHF data link message 8, or upon receipt of an ISO or NMEA request PGN.

Field #	Field Description
1	Message ID
2	Repeat Indicator
3	Source ID
4	NMEA 2000 Reserved
5	AIS Transceiver Information
6	Spare
7	Number of Bits in Binary Data Field
8	Binary Data

129798   AIS SAR Aircraft Position Report

This parameter group provides data associated with the ITU-R M.1371 Message 9 SAR Aircraft Position Report Message for Airborne AIS units conducting Search and Rescue operations. An AIS device may generate this parameter group either upon receiving a VHF data link message 9, or upon receipt of an ISO or NMEA request.

Field #	Field Description
1	Message ID
2	Repeat Indicator
3	User ID
4	Longitude
5	Latitude
6	Position Accuracy
7	RAIM-Flag
8	Time Stamp
9	COG
10	SOG
11	Communication State
12	AIS Transceiver Information
13	Altitude
14	Reserved for Regional Applications
15	Data Terminal Equipment (DTE)
16	Spare

129799   Radio Frequency/Mode/Power

This PGN provides status and control for a Radiotelephone, connected to a NMEA 2000 network. The Radiotelephone will transmit and receive status along with remote control and repeater products.

Field #	Field Description
1	Rx Frequency
2	Tx Frequency
3	Radio Channel
4	Tx Power
5	Mode
6	Channel Bandwidth

129800   AIS UTC/Date Inquiry

This parameter group provides data associated with the ITU-R M.1371 Message 10 UTC and Date Inquiry Message used to request current UTC and date. An AIS device may generate this parameter group either upon receiving a VHF data link message 10, or AIS Addressed Safety Related Message.

Field #	Field Description
1	Message ID
2	Repeat Indicator
3	Source ID
4	NMEA 2000 Reserved
5	AIS Transceiver Information
6	Spare
7	Destination ID
8	Spare

129801 AIS Addressed Safety Related Message

This parameter group provides data associated with the ITU-R M.1371 Message 12 Addressed Safety Related Message supporting addressed communication of safety related data. An AIS device may generate this parameter group either upon receiving a VHF data link message 12, or upon receipt of an ISO or NMEA request PGN.

Field #	Field Description
1	Message ID
2	Repeat Indicator
3	Source ID
4	NMEA 2000 Reserved
5	AIS Transceiver Information
6	Sequence Number
7	Destination ID
8	NMEA 2000 Reserved
9	Retransmit Flag
10	Spare
11	Safety Related Text

129802 AIS Safety Related Broadcast Message

This parameter group provides data associated with the ITU-R M.1371 Message 14 Safety Related Broadcast Message supporting broadcast communication of safety related data. An AIS device may generate this parameter group either upon receiving a VHF data link message 14, or upon receipt of an ISO or NMEA request PGN.

Field #	Field Description
1	Message ID
2	Repeat Indicator
3	Source ID
4	NMEA 2000 Reserved
5	AIS Transceiver Information
6	Spare
7	Safety Related Text

129803   AIS Interrogation

This parameter group provides data associated with the ITU-R M.1371 Message 15 Interrogation Message used to request a specific ITU-R M.1371 message resulting in responses from one or more AIS mobile units. An AIS device may generate this parameter group either upon receiving a VHF data link message 15, or upon receipt of an ISO or NMEA request PGN.

Field #	Field Description
1	Message ID
2	Repeat Indicator
3	Source ID
4	NMEA 2000 Reserved
5	AIS Transceiver Information
6	Spare
7	Destination ID 1
8	NMEA 2000 Reserved
9	Message ID 1.1
10	Slot Offset 1.1
11	Spare
12	Message ID 1.2
13	Slot Offset 1.2
14	NMEA 2000 Reserved
15	Spare
16	Destination ID 2
17	NMEA 2000 Reserved
18	Message ID 2.1
19	Slot Offset 2.1
20	Spare

129804   AIS Assignment Mode Command

This parameter group provides data associated with the ITU-R M.1371 Message 16 Assigned Mode Command Message for assigning specific behavior by a competent authority. An AIS device may generate this parameter group either upon receiving a VHF data link message 16, or upon receipt of an ISO or NMEA request PGN.

Field #	Field Description
1	Message ID
2	Repeat Indicator
3	Source ID
4	NMEA 2000 Reserved
5	AIS Transceiver Information
6	Spare
7	Destination ID A
8	Offset A
9	Increment A
10	Destination ID B
11	Offset B
12	Increment B
13	Spare

129805   AIS Data Link Management Message

This parameter group provides data associated with the ITU-R M.1371 Message 20 Data Link Management Message for reserving slots for base stations. An AIS device may generate this parameter group either upon receiving a VHF data link message 20, or upon receipt of an ISO or NMEA request PGN.

Field #	Field Description
1	Message ID
2	Repeat Indicator
3	Source Station ID
4	NMEA 2000 Reserved
5	AIS Transceiver Information
6	Spare
7	Offset Number 1
8	Number of Slots 1
9	Time Out 1
10	Increment 1
11	Offset Number 2
12	Number of Slots 2
13	Time Out 2
14	Increment 2
15	Offset Number 3
16	Number of Slots 3
17	Time Out 3
18	Increment 3
19	Offset Number 4
20	Number of Slots 4
21	Time Out 4
22	Increment 4
23	Spare

129806   AIS Channel Management

This parameter group provides data associated with the ITU-R M.1371 Message 22 Channel Management Message supporting management of transceiver modes and channels by a base station.

Field #	Field Description
1	Message ID
2	Repeat Indicator
3	Station ID
4	NMEA 2000 Reserved
5	AIS Transceiver Information
6	Spare
7	Channel A
8	Channel B
9	NMEA 2000 Reserved
10	Power
11	Tx/Rx Mode
12	North East Longitude Corner 1
13	North East Latitude Corner 1
14	South West Longitude Corner 2
15	South West Latitude Corner 2
16	NMEA 2000 Reserved
17	Addressed or Broadcast Message Indicator
18	Channel A Bandwidth
19	Channel B Bandwidth
20	NMEA 2000 Reserved
21	Transitional Zone Size
22	Spare

129807   AIS Class B Group Assignment

The Group Assignment Command is transmitted by a base station when operating as a controlling entity for AIS Stations.

Field #	Field Description
1	Message ID
2	Repeat Indicator
3	Source ID
4	Spare
5	Tx/Rx Mode
6	NMEA 2000 Reserved
7	North East Longitude Corner 1
8	North East Latitude Corner 1
9	South West Longitude Corner 2
10	South West Latitude Corner 2
11	Station Type
12	NMEA 2000 Reserved
13	Ship and Cargo Filter
14	Spare
15	NMEA 2000 Reserved
16	Reporting Interval
17	Quiet Time
18	Spare

129808   DSC Call Information

This parameter group provides Digital Selective Calling (DSC) data according to ITU M.493-9 with optional expansion according to ITU M.821-1. DSC is a paging system that is used to automate distress alerts sent over terrestrial communication systems such as VHF, MF and HF marine radio systems. DSC provides a mechanism to report significantly more information regarding a distress call rather than just the distress itself. Products equipped with DSC will transmit and receive this information.

Field #	Field Description
1	DSC Format Symbol
2	DSC Category Symbol
3	DSC Message Address
4	Nature Of Distress or 1st Telecommand
5	Subsequent Communication Mode or 2nd Telecommand
6	Proposed Rx Frequency/Channel
7	Proposed Tx Frequency/Channel
8	Telephone Number
9	Latitude of Vessel Reported
10	Longitude of Vessel Reported
11	Time of Position
12	MMSI Of Ship In Distress
13	DSC EOS Symbol
14	Expansion Enabled
15	Reserved Bits
16	Calling Rx Frequency/Channel
17	Calling Tx Frequency/Channel
18	Time of Receipt/Transmission
19	Date of Receipt/Transmission
20	DSC Equipment Assigned Message ID
21	DSC Expansion Field Symbol
22	DSC Expansion Field Data
23	Variable Number Of Fields, Field 21 Repeated, Expansion Field Type
24	Variable Number Of Fields, Field 22 Repeated, Expansion Field Data

129809   AIS Class B "CS" Static Data Report, Part A

This parameter group is used by Class B "CS" shipborne mobile equipment each time Part A of ITU-R M.1372 Message 24 is received.

Field #	Field Description
1	Message ID
2	Repeat Indicator
3	User ID
4	Name

129810 AIS Class B "CS" Static Data Report, Part B

This parameter group is used by Class B "CS" shipborne mobile equipment each time Part B of ITU-R M.1372 Message 24 is received.

Field #	Field Description
1	Message ID
2	Repeat Indicator
3	User ID
4	Type of Ship and Cargo
5	Vendor ID
6	Call Sign
7	Ship Length
8	Ship Beam
9	Reference Point Position from Starboard
10	Reference Point Position Aft of Bow
11	Mother Ship MMSI
12	NMEA 2000 Reserved
13	Spare

130052 Loran-C TD Data

This provides Time Difference (TD) lines of position of Loran-C signals relative to a single Group Repetition Interval.

Field #	Field Description
1	Group Repetition Interval (GRI)
2	Master Range
3	V Secondary TD
4	W Secondary TD
5	X Secondary TD
6	Y Secondary TD
7	Z Secondary TD
8	Station status: Master
9	Station status: V
10	Station status: W
11	Station status: X
12	Station status: Y
13	Station status: Z
14	Mode
15	Reserved Bits

130053   Loran-C Range Data

This provides Propagation times (Ranges) of Loran-C signals relative to a single Group Repetition Interval.

Field #	Field Description
1	Group Repetition Interval (GRI)
2	Master Range
3	V Secondary Range
4	W Secondary Range
5	X Secondary Range
6	Y Secondary Range
7	Z Secondary Range
8	Station status: Master
9	Station status: V
10	Station status: W
11	Station status: X
12	Station status: Y
13	Station status: Z
14	Mode
15	Reserved Bits

130054   Loran-C Signal Data

SNR, ECD, and ASF values of Loran-C signals

Field #	Field Description
1	Group Repetition Interval (GRI)
2	Station identifier
3	Station SNR
4	Station ECD
5	Station ASF

130064   Route and WP Service - Database List

Complex request for this PGN should return a list of Databases in which a navigation Device organizes its Routes and WPs. A Database may contain one WP-List and multiple Routes.

Field #	Field Description
1	Start Database ID
2	nItems
3	Number of Databases available
4	Database ID
5	Database Name
6	Database Timestamp
7	Database Datestamp
8	WP Position Resolution
9	Reserved Bits
10	Number of Routes in Database
11	Number of WPs in Database
12	Number of Bytes in Database
13	Fields 4 thru 12 repeat as needed

130065   Route and WP Service - Route List

Complex request for this PGN should return a list of Routes in a Database.

Field #	Field Description
1	Start Route ID
2	nItems
3	Number of Routes available in Database
4	Database ID
5	Route ID
6	Route Name
7	reserved
8	WP Identification Method
9	Route Status
10	Fields 5 thru 9 repeat as needed

130066   Route and WP Service - Route/WP-List Attributes

Complex request for this PGN should return the attributes of a Route or the WP-List.

Field #	Field Description
1	Database ID
2	Route ID
3	Route/WP-List Name
4	Route/WP-List Timestamp
5	Route/WP-List Datestamp
6	Change at Last Timestamp
7	Number of WPs in the Route/WP-List
8	Critical supplementary parameters
9	Navigation Method
10	WP Identification Method
11	Route Status
12	XTE Limit for the Route
13	Reserved

130067   Route and WP Service - Route - WP Name & Position

Complex request of this PGN should return the Waypoints belonging to a Route.

Field #	Field Description
1	Start RPS#
2	nItems
3	Number of WPs in the Route
4	Database ID
5	Route ID
6	WPID
7	WP Name
8	WP Latitude
9	WP Longitude
10	Fields 6 thru 9 repeat as needed

130068   Route and WP Service - Route - WP Name

Complex request of this PGN should return the Waypoints belonging to a Route.

Field #	Field Description
1	Start RPS#
2	nItems
3	Number of WPs in the Route
4	Database ID
5	Route ID
6	WPID
7	WP Name
8	field 6 thru 7 repeat as needed

130069   Route and WP Service - XTE Limit & Navigation Method

Complex request of this PGN will return XTE Limit and/or Navigation Method specific to individual legs of a Route.

Field #	Field Description
1	Start RPS#
2	nItems
3	Number of Waypoints with a specific XTE Limit or Nav. Method
4	Database ID
5	Route ID
6	RPS#
7	XTE limit in the leg after WP
8	Nav. Method in the leg after WP
9	Reserved Bits
10	Fields 6 thru 9 repeat as needed

130070   Route and WP Service - WP Comment

Complex request of this PGN should return supplementary Comments attached to Waypoints in a Route or a WP-List

Field #	Field Description
1	Start ID
2	nItems
3	Number of WPs with Comments
4	Database ID
5	Route ID
6	WPID / RPS#
7	Comment
8	Fields 6 thru 7 repeat as needed

130071   Route and WP Service - Route Comment

Complex request of this PGN should return supplementary Comments attached to Routes.

Field #	Field Description
1	Start Route ID
2	nItems
3	Number of Routes with Comments
4	Database ID
5	Route ID
6	Comment
7	Fields 5 thru 6 repeat as needed

130072   Route and WP Service - Database Comment

Complex request of this PGN should return supplementary Comments attached to Databases in the navigation Device.

Field #	Field Description
1	Start Database ID
2	nItems
3	Number of Databases with comments
4	Database ID
5	Comment text
6	Fields 4 thru 5 repeat as needed

130073   Route and WP Service - Radius of Turn

Complex request of this PGN should return the Radius of Turn at specific Waypoints of a Route.

Field #	Field Description
1	Start RPS#
2	nItems
3	Number of Waypoints with a specific Radius of Turn
4	Database ID
5	Route ID
6	RPS#
7	Radius of Turn
8	Fields 6 and 7 repeated as needed

130074   Route and WP Service - WP List - WP Name & Position

Complex request of this PGN should return the Waypoints of a WP-List.

Field #	Field Description
1	Start WPID
2	nItems
3	Number of valid WPs in the WP-List
4	Database ID
5	reserved
6	WPID
7	WP Name
8	WP Latitude
9	WP Longitude
10	Fields 6 thru 9 repeat as needed

130306   Wind Data

Direction and speed of Wind. True wind can be referenced to the vessel or to the ground. The Apparent Wind is what is felt standing on the (moving) ship, I.e., the wind measured by the typical mast head instruments. The boat referenced true wind is given by the vector sum of Apparent wind and vessel's heading and speed though the water. The ground referenced true wind is given by the vector sum of Apparent wind and vessel's heading and speed over ground.

Field #	Field Description
1	Sequence ID
2	Wind Speed
3	Wind Direction
4	Wind Reference
5	Reserve

130310   Environmental Parameters

Local atmospheric environmental conditions

Field #	Field Description
1	Sequence ID
2	Water Temp
3	Outside Ambient Air Temp.
4	Atmospheric Pressure
5	Reserved Bits

130311   Environmental Parameters

Environmental Conditions contains Temperature, Humidity, and Atmospheric Pressure. This is a rework of PGN # 130310 and should be used for new designs.

Field #	Field Description
1	Sequence ID
2	Temperature Instance
3	Humidity Instance
4	Temperature
5	Humidity
6	Atmospheric Pressure

130312   Temperature

Temperature as measured by a specific temperature source.

Field #	Field Description
1	SID
2	Temperature Instance
3	Temperature Source
4	Actual Temperature
5	Set Temperature
6	Reserve Bits

130313   Humidity

Humidity as measured by a specific humidity source.

Field #	Field Description
1	SID
2	Humidity Instance
3	Humidity Source
4	Actual Humidity
5	Set Humidity
6	Reserve Bits

130314   Actual Pressure

Pressure as measured by a specific pressure source

Field #	Field Description
1	SID
2	Pressure Instance
3	Pressure Source
4	Pressure
5	Reserve Bits

130315   Set Pressure

This parameter group can be sent to a device that controls pressure to change its targeted pressure, or it can be sent out by the control device to indicate its current targeted pressure.

Field #	Field Description
1	SID
2	Pressue Instance
3	Pressure Source
4	Pressure
5	Reserve Bits

130320   Tide Station Data

Tide station measurement data including station location, numeric identifier, and name

Field #	Field Description
1	Mode
2	Tide Tendency
3	Reserved Bits
4	Measurement date
5	Measurement time
6	Station location, latitude
7	Station location, longitude
8	Tide level
9	Tide level standard deviation
10	Station ID String
11	Station Name String

130321   Salinity Station Data

Salinity station measurement data including station location, numeric identifier, and name.

Field #	Field Description
1	Mode
2	Reserved Bits
3	Measurement Date
4	Measurement time
5	Station location, latitude
6	Station location, longitude
7	Salinity
8	Water Temperature
9	Station ID String
10	Station Name String

130322   Current Station Data

Current station measurement data including station location, numeric identifier, and name.

Field #	Field Description
1	Mode
2	State
3	Reserved Bits
4	Measurement date
5	Measurement time
6	Station location, latitude
7	Station location, longitude
8	Measurement depth
9	Current speed
10	Current flow direction
11	Water Temperature
12	Station ID String
13	Station Name String

130323   Meteorological Station Data

Meteorological station measurement data including station location, numeric identifier, and name.

Field #	Field Description
1	Mode
2	Reserved Bits
3	Measurement date
4	Measurement time
5	Station location, latitude
6	Station location, longitude
7	Wind Speed
8	Wind Direction
9	Wind Reference
10	Reserve Bits
11	Wind Gusts
12	Atmospheric Pressure
13	Air Temperature
14	Station ID String
15	Station Name String

130324   Moored Buoy Station Data

Moored buoy measurement data including station location and numeric identifier.

Field #	Field Description
1	Mode
2	Reserved Bits
3	Measurement date
4	Measurement time
5	Station location, latitude
6	Station location, longitude
7	Wind Speed
8	Wind Direction
9	Wind Reference
10	Reserved Bits
11	Wind Gusts
12	Wave Height
13	Dominate Wave Period
14	Atmospheric Pressure
15	Pressure Tendency Rate
16	Air temperature
17	Water temperature
18	Station ID String

130576   Small Craft Status

Provides data on various small craft control surfaces and speed through the water. Used primarily by display or instrumentation.

Field #	Field Description
1	Port trim tab
2	Starboard trim tab
3	Reserved Bits

130577   Direction Data

The purpose of this PGN is to group three fundamental vectors related to vessel motion, speed and heading referenced to the water, speed and course referenced to ground and current speed and flow direction.

Field #	Field Description
1	Data Mode
2	Set/COG/Heading Ref.
3	Reserved Bits
4	SID
5	Course Over Ground
6	Speed Over Ground
7	Heading
8	Speed through Water
9	Set
10	Drift

130578   Vessel Speed Components

This PGN provides a single transmission that accurately describes the speed of a vessel by component vectors.

Field #	Field Description
1	Longitudinal Speed, Water-referenced
2	Transverse Speed, Water-referenced
3	Longitudinal Speed, Ground-referenced
4	Transverse Speed, Ground-referenced
5	Stern Speed, Water-referenced
6	Stern Speed, Ground-referenced