3610 DGNSS RECEIVER



User Manual



Issue 4.0, January 2025

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This publication could contain technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the manual.

Should you require further assistance please contact the Fugro Norway AS office.

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REVISION HISTORY		
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Manual Reference: 3610 DGNSS receiver User Manual

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ACRONYMS USED IN THIS MANUAL

CE	Communauté Européenne
CEMF	Counter Electro-magnetic Force
C/N	Carrier to Noise ratio
C/N₀	Carrier to normalised Noise ratio
DGPS	Differential GPS
DGNSS	Differential Global Navigation Satellite System
DHCP	Dynamic Host Configuration Protocol
DPS	Differential Positioning Sensor
EN	European Norm
G2	High Precision GPS&GLONASS
GPS	Global Positioning System (USA)
GLONASS	GLObal NAvigation Satellite System (Russian)
HP	High Precision
IEC	International Electrotechnical Committee
IP	Internet Protocol
LAN	Local Area Network
LED	Light Emitting Diode
LNA	Low Noise Amplifier
NCC	Network Control Centre
NMEA	National Marine Electronics Association
	(Standard for interfacing marine electronic device)
NTRIP	Networked Transport of RTCM via Internet Protocol
RF	Radio Frequency
RoHS	Restriction of Hazardous Substances Directive
RTCM	Radio Technical Commissioning Maritime
SCF	Super Compressed Format
ТСР	Transmission Control Protocol
UDP	User Datagram Protocol
WEEE	Waste Electrical and Electronic Equipment
WGS84	World Geodetic Datum of 1984
DOP	Dilution of precision
GGA	Global positioning system (GPS) fix data
VBS	Virtual Base Station
FTP	File Transfer Protocol



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INTRODUCTION

This manual has been produced to assist the typical user with the installation and operation of the 3610 DGNSS receiver.

About this manual

This manual is organised into the following chapters:

- Chapter 1 **Introduction -** A brief presentation of the manual and system features.
- Chapter 2 **Getting started** Describes how to get started with the 3610 DGNSS receiver as quickly as possible.
- Chapter 3 **Modes of operation setup** Description of the different operation modes.
- Chapter 4 **Receiver interfaces** Describes power, antenna and serial line interfaces.
- Chapter 5 **Menus and displays** Describes how to set up and configure the receiver.
- Chapter 6 **3610 DGNSS receiver and DPS setup example** Describes DGNSS receiver setup with various DPS systems.
- Chapter 7 **Installation** A brief presentation of installation considerations and description on how to install antennas and cables.
- Chapter 8 **Technical specifications** Describes the physical dimensions, required power, environmental restrictions and cable specifications.
- Appendix A Receiver service procedure
- Appendix B Fugro receiver problem report form
- Appendix C Factory default settings
- Appendix D Menu interface layout
- Appendix E Diagnostic menu interface layout

System features

The 3610 DGNSS Receiver is a component of the Fugro worldwide DGNSS Service. The Fugro service is a full-time differential GNSS (DGNSS) broadcast system delivering corrections from an array of GPS and GLONASS reference stations located around the globe. Reference stations provide industry standard formatted corrections to Network Control Centres (NCCs) at strategic geographic locations, where the corrections are decoded, checked, and repackaged in a highly efficient broadcast format. The data is modulated onto an RF carrier which is then up-converted for transmission to an L-band communications satellite.



The signals are received via the antenna/DGNSS receiver. After selection of the desired individual reference site's data set, the signals are made available as corrections for use in a GPS and GLONASS differential capable receiver.

The 3610 DGNSS receiver supports the following Fugro services:

- 1. Seastar HP
- 2. Seastar G2
- 3. Seastar XP
- 4. Seastar DGNSS
- 5. Seastar VBS

Seastar HP is a decimetre level phase-based service. It is derived from the GPS L1 and L2 frequencies for centimetres. The service uses GPS phase measurements to obtain an accuracy of 10 cm horizontally (95%) and 15 cm vertically (95%). Available in Europe, America, the Middle East and Asia.

Seastar G2 uses the GPS L1 and L2 frequencies in both GPS and GLONASS to compensate for ionospheric delay. The orbit/clock concept utilizes reference stations with a worldwide spread to calculate the orbit and the clock value of each GPS and GLONASS satellite more accurately than the broadcast ephemeris. Orbit and clock corrections to the broadcast ephemeris are then transmitted to the user. These corrections are valid worldwide and the distance from the nearest reference stations to the user does not affect performance.

Seastar XP is a decimetre level phase-based service. It uses worldwide valid orbit/clock data that is based on GPS L1 and L2 frequencies.

This concept uses reference stations with a worldwide spread to calculate the orbit and the clock value of each GPS satellite more accurately than the broadcast GPS ephemeris. Orbit and clock corrections used to broadcast ephemeris, are then transmitted to the user. These corrections are valid worldwide and the distance from the nearest reference stations to the user does not affect performance.

Seastar DGNSS is a metre level code-based service. It is based on GPS L1 and GLONASS L1 frequencies. This is similar to DGPS. Since GLONASS is not fully operational, DGLONASS has to be used together with DGPS to increase the number of available satellites in the navigation solution. Available in South America, West Africa, Europe, the Middle East and upon request in other areas.

Seastar VBS (Virtual Base Station) is a metre level code-based service based on the GPS L1 frequency. VBS provides users with accurate positioning with a correction message further enhanced from their location. This multiple reference station solution can provide accuracy to within one metre. VBS provides consistent accuracy over wide areas. VBS is highly reliable since it is not dependent on any single reference station. There are no position jumps due to switching from one reference station to another. Available worldwide.



System components

A standard delivery of the 3610 DGNSS receiver with a *spotbeam antenna* consists of the following parts:

- 1. 3610 DGNSS receiver unit
- 2. Coax cable RG-58 N-male to N-female, 1 m
- 3. Coax cable RG-58 TNC-male to N-female, 1 m
- 4. 2 x RS-232 serial cables LIYCY 3 x 2 x 0.14 mm², 9-pin DSub male to 9-pin DSub female, 2 m length
- 5. RS-422 serial cable, 9-pin DSub male to 5-pin Weidmuller female, 2 m length
- 6. LAN cable, shielded, 3 m length.
- 7. Power supply 85 VAC...265 VAC / 24 VDC / 0.75 A
- 8. AC power lead set, 2P, SKX/H03VVH-F, 2 × 0.75 mm², 2 m length
- 9. DC power lead, SKUB 2 x 0.75 mm² red (+)/black (-) with connector of type Hirose LF07WBP-6S female, 1.5 m length
- 10. Mounting brackets with screws. [These are mounted on the unit on delivery.]
- 11. CD or USB stick with this manual
- 12. DGNSS spotbeam antenna with brackets

A standard delivery of the 3610 DGNSS receiver for *Inmarsat* consists of the following parts:

- 1. 3610 DGNSS receiver unit
- 2. 2 x Coax cable RG-223 N-male to TNC-male, 1 m
- 3. Coax cable RG-223 N-male to TNC-female, 1 m
- 4. 2 x RS-232 serial cables LIYCY 3 x 2x 0.14 mm², 9-pin DSub male to 9-pin DSub female, 2 m length
- 5. RS-422 serial cable, 9-pin DSub male to 5-pin Weidmuller female, 2 m length
- 6. LAN cable, shielded, 3 m length.
- 7. Power supply 85 VAC...265 VAC / 24 VDC / 0.75 A
- 8. AC power lead set, 2P, SKX/H03VVH-F, 2 × 0.75 mm², 2 m length
- 9. DC power lead, SKUB 2 x 0.75 mm² red(+)/black (-) with connector of type Hirose LF07WBP-6S female, 1.5 m length
- 10. Mounting brackets with screws. [These are mounted on the unit on delivery.]
- 11. CD or USB stick with this manual



GETTING STARTED

The purpose of this section is to get you started with the 3610 DGNSS receiver as quickly as possible.

When the receiver is supplied to you, it will be configured with default factory settings. This means that you need to configure the receiver and get a subscription before it can deliver useful corrections. In addition, you also need to connect the appropriate cables and apply power to the receiver (and antenna).

There are six buttons on the keypad; **ESC** \leftarrow , \uparrow , \downarrow , \rightarrow and \leftarrow (Enter) (see figure 5). The \leftarrow button is used to confirm user input and settings. It is also used to select a page. The **ESC** button is used to exit pages without changing settings, while the arrow buttons are used to turn pages and to set parameters.

Initial setup



Figure 1. Rear View of 3610 DGNSS receiver

- 1. Install the DGNSS antenna in such a way that it has a clear view of the sky in the direction of the satellite (see also page 24). Refer to the NCC in your region for an azimuth/elevation chart for the satellite service you have subscribed to.
- 2. Connect the DGNSS antenna cable between the DGNSS antenna and the 3610 DGNSS receiver (ANT connector at rear panel).
- 3. Connect the power cable to a suitable 9-24 VDC power supply. Check correct polarity. This will power on the unit. We recommend using the supplied power supply.
- 4. Configure the 3610 DGNSS receiver to acquire the DGNSS signal. This can be done in the following ways:
 - a). By selecting the service directly in the Set Pos/Ch menu (see page 17) or
 - b). By entering the frequency and symbol rate directly into the **Set Pos/Ch** menu (see page 17).



The receiver will indicate frequency searching by displaying "Init" on the signal status page. When it has locked to the signal, "Sync" and finally "Lock" will be displayed. Signal strength will also be indicated by a bar graph display and C/N ratio. Should the "Lock" indicator fail to be displayed after 30 - 90 seconds, check through steps 1 to 4 above. Acquiring lock for the first time can take longer time if the broadcast station and satellite list are updated between production date and initial setup.

5. Make sure you have a valid subscription. If you need any support on the subscription, the contact info is:

Fugro Customer Support and 24-Hour Help Line Fugro Norway AS Tel: +47 21 50 14 20 E-Mail: seastarservice@fugro.com



MODES OF OPERATION SETUP

Set the receiver to the required mode; DGNSS, HP/XP/G2 or VBS.

- **Note!** During certain situations it may take up to 40 min before normal operation is achieved with regard to output of correctional data. Reasons for this include:
 - First time power-up.
 - The unit has been moved for a longer distance without having GPS track.
 - Without power for a longer period of time.

DGNSS mode setup

- In DGNSS mode, the RTCM data will be available from the output ports A and/or B or LAN.
- In DGNSS mode, the GPS L1 output must be enabled. In addition, the GLO L1 output and lono output could be enabled if GLONASS corrections and/or ionospheric corrections shall be used.

HP/XP/G2 mode setup

- In HP/XP/G2 mode, the HP/XP/G2 data will be available from output ports A and/or B or LAN. Default port settings are initially configured, and will by default change based upon the type of subscription. If different port settings are needed, the ports will need to be set up to match the requirements of your GPS receiver HP/XP/G2 ports. The **Port Cfg** menu item must then be used to set these parameters (see page 18).
- In HP/XP/G2 mode the HP/XP/G2 output must be enabled.



Figure 2. Operating in DGNSS or HP/XP mode



VBS mode setup

In VBS mode a composite set of RTCM corrections is computed from the GPS network data sent over the link. The following information is required to compute these corrections; time (supplied via the link), GPS almanac data (supplied via the link), and receiver location entered via the display configuration menu or through the GGA message via a GPS receiver.

- In VBS mode, the RTCM data will appear on the output ports A and/or B or LAN. Default port settings are initially configured, and will by default change based upon the type of subscription. If different port settings are needed, the ports will need to be set up to match the requirements of your GPS receiver RTCM ports. The **Port Cfg** menu item must then be used to set these parameters (see page 18).
- For the VBS operation, the 3610 DGNSS receiver needs to be supplied with a position for the area of operation. Insert the position via the **Set Pos/Ch** menu (see page 17), or from a GGA message input at port A and/or port B.
- In VBS mode, the VBS output must be enabled.



Figure 3. Operating in VBS mode



RECEIVER INTERFACES

Power

The 3610 DGNSS receiver will operate on any DC voltage between 9 VDC and 24 VDC. When operational, the unit dissipates typical 9 W (max 12 W) of power.

Power is connected to the unit via a 1.5 metre long red/black lead. The cable is terminated with a 6-pin Hirose LF07WBP-6S female connector. Red is +Vin and black is -Vin.

The connector pin layout is illustrated in Figure 4. Left is as viewed from the female mating side, and right is solder side.



Figure 4. Pin layout of Hirose LF07WBP-6S female connector

The connector has the pin layout as described below:

Pin no.	Signal
1	GND (Service only)
2	PPS_IN (Service only)
3	-Vin
4	-Vin
5	+Vin
6	+Vin

 Table 1
 Power connector pin layout

Antenna

Antenna connection is made via a low loss 50-Ohm coaxial cable (RG-223), which is terminated with a standard 50-Ohm male N-type connector.

The DGNSS spotbeam antenna has an internal LNA (low noise amplifier), which is powered by +12 VDC. The antenna can be supplied either by external power or powered from the 3610 DGNSS receiver power (see page 17). If you use external power, make sure to attach DC-block between the external power and the 3610 DGNSS receiver ANT connector.



Serial lines

The panel connectors for serial port A and B are DB9 female. Pin layout is described below:

Pin no.	Signal
1	RS-422 TX+
2	RS-232 TXD
3	RS-232 RXD
4	Not in use
5	GND
6	RS-422 TX-
7	Not in use
8	RS-422 RX+
9	RS-422 RX-

Table 2Serial line pin layout

Special serial cables are supplied with the DGNSS receiver. The cables are terminated as described below.

DB9 male Pin number	2 metre cable	DB9 female Pin number
2		2
3		3
5		5

 Table 3
 RS-232 data cable layout

DB9 male Pin number	2 metre cable	Weidmuller female Pin number
1		2
6		1
8		5
9		4
5		3

 Table 4
 RS-422 data cable layout

Note! Do not use standard RS-232/ RS-422 cables

Note! Serial port settings depending on subscription type

By default the automatic port settings based on subscription type is set to on. Any manual changes in the port settings, will disable the automatic port configuration based on subscription type.



The table below describes the automatic serial port configuration, depending on the type of subscription:

Subscription type	Serial port A	Serial port B
H : HP		Х
L : L1	Х	
I : IONO	Х	
G : GLONASS	Х	
V : VBS	Х	
R : RAW (SCF)		Х

UDP ports

The Ethernet connector is a standard RJ45 Ethernet connector with two LEDs. Shielded Ethernet cables can be used to connect to this port.

The Ethernet interface provides the possibility to send corrections on four different UDP ports.

Default port numbers are:

А	: 31100	
В	: 31110	
С	: 31120	
D	: 31130	
Default UDP Ne	et Mask is:	
	: 192.168.000.25	5

The UDP port mask must be configured to match the Ethernet to which it is connected to. Activation of the ports to be used must also be configured, by default all UDP ports are set to off. Type of correction output on the UDP ports is configured in the **Port Cfg** menu, under each UDP port.



MENUS AND DISPLAYS

General

The 3610 DGNSS receiver has an internal display with two lines x 16 characters. There are six buttons on the keypad; **ESC**, \leftarrow , \uparrow , \downarrow , \rightarrow and \leftarrow (Enter).

The \leftarrow button is used to confirm user input and settings. It is also used to select a page. The **ESC** button is used to exit pages without changing settings, while the Arrow buttons are used to turn pages and to set parameters.

Pressing the **ESC** and ← buttons simultaneously for at least three seconds will reboot the receiver.

There are two LED indicators on the 3610 DGNSS receiver, one green and one red. The green LED indicator is lit when the unit is powered on. The red LED indicator is lit or flashes when the 3610 DGNSS receiver unit has an alarm situation.



Figure 5. The 3610 DGNSS receiver front panel

There are seven main pages in the 3610 DGNSS receiver menu structure: **Status** menu, **Set Pos/Ch** menu, **Port Cfg** menu, **Set GPS Sites** menu, **Set GLO Sites** menu, **Display Cfg** menu and **About** menu. In addition to the main pages, a **Signal status** page (top level page) is displayed.

When the 3610 DGNSS receiver unit starts, the **Signal status** page is displayed showing indication of signal strength, satellite name and lock status.

On the display pages there are arrow indicators at the bottom right side of the display. The arrows indicate the possibility to turn pages up or down.

	-fugro
Step into sub-menu	•
Possible to turn page up	•
Possible to turn page down	•
Possible to turn page up or down	\$

Alarm situations

The 3610 DGNSS receiver has two LED indicators, one green for power indication and one red for alarm indication. The red LED will be lit continuously or flash if one of the situations below arises. The LED will be turned off if the situation which activated the alarm becomes OK, for example if lock on signal, upgrade of software is finished. The alarm situation will, however, be stored in the **Status** menu.

Criteria	LED characteristics	Text displayed
No lock on signal	Continuous red	No lock
During software upgrade	Flashing at ⅓ Hz	
Antenna voltage failure, output voltage to the antenna drops	Flashing at ½ Hz	Voltage failure
Not subscribed	Flashing at 1/2 Hz	Not subscribed

The user must acknowledge the alarm on the display by pressing **ESC** before the alarm text disappears and the LED is turned off. The display will return to the page it displayed before the alarm text was displayed.

If an alarm arises, but the situation becomes OK before the alarm is acknowledged on the display, there is a timeout on the display so the alarm text disappears after three minutes and returns to the page it displayed before the alarm was activated. The LED will, however, continue to flash until pressing **ESC**.





Main pages

Signal status

The **Signal status** page is the top page in the 3610 DGNSS receiver. This page is displayed after start up, and is at the top level of the menu structure.

About

From the **About** menu it is possible to read receiver type, serial number, software version and subscription expiry date. It is also possible to reset receiver and select factory default. No configurations from these pages are possible.

Status

From the **Status** menu it is possible to read channel and position status, alarm status, port status and the antenna output voltage. No configurations from these pages are possible. From the Alarm sub menu it is possible to see the list of previous alarms.

Set position/channel

From the **Set Pos/Ch** menu it is possible to configure frequency, symbol rate, which service to use and to set position. In addition, it is possible to set the antenna output power on or off (12 VDC).

Port configuration

From the **Port Cfg** menu it is possible to configure the communication ports in the 3610 DGNSS receiver. The receiver has two serial ports, Port A and Port B and LAN.

Set GPS L1 Sites

From the **Set GPS Sites** menu it is possible to select which GPS L1 reference sites to use.

Set GLONASS L1 Sites

From the **Set GLO Sites** menu it is possible to select which GLONASS L1 reference sites to use.

Display configuration

From the **Display Cfg** menu it is possible to configure the contrast and backlight on the receiver display.

Backup configuration

From the **Backup cfg** menu it is possible to save and restore user configurations.



Signal status

The **Signal status** page for the 3610 DGNSS receiver indicates signal strength, which satellite the receiver is set to, the lock criteria and available subscriptions.

After power on, the receiver will begin to search for a DGNSS satellite. "Init" will be displayed at the bottom right of the screen when the receiver is in search mode. When the receiver locks to a signal, "Lock" will be displayed instead. If a signal is lost after being locked, "Sync" will be displayed.

"Init"	: No lock has been aquired since startup or
	change of channel settings.
"Sync"	: No lock has been aquired since last loss of lock.
"Lock"	: Lock is aquired and correct corrections are being output on the port A and/or port B or the LAN port, depending on the port configuration.

A signal strength number, C/N, will be shown in the top left of the screen together with filled bars when the receiver locks.

The changing between "L" and "I" at the top right indicates that the demodulator is locked to the L-band signal. The changing between "N" and "n" at the top right indicates that the demodulator is locked via NTRIP. Changing between "p" and "P" at the top right indicates that a GGA message is applied.



Note! If "Lock" does not appear, check frequency and symbol rate in the **Set Pos/Ch** menu and make sure the antenna is connected and powered, with a clear view of the sky.

Bars filled	C/N
No bars	<1.0
1 bar	1.0 – 1.5
2 bars	1.5 – 2.0
3 bars	2.0 - 3.0
4 bars	3.0 - 4.0
5 bars	4.0 - 5.0
6 bars	5.0 - 6.0
7 bars	6.0 - 7.0
8 bars	> 7.0

At the bottom left, the text alternates between showing configured satellite and available subscriptions. The subscription indications are as follows:





¢

Status

Ntrip

H:HP L : L1 I : IONO G : GLONASS V:VBS R: RAW (SCF)

About

When pressing arrow down in the **Signal status** page, the **Main** menu with its main pages appears.

The **About** menu shows information about the 3610 DGNSS receiver. Main Menu The DGNSS receiver type, serial number and software version are About displayed.

In addition, the subscription expiry date of the DGNSS service is displayed.

The serial number (Sno) of the unit is important when contacting SeaSTAR 3610 Sno. 1160579 Fugro Norway AS for subscription requests.

Status

When pressing the **Enter** or the \rightarrow button from the the **Status** menu, Main Menu the channel status, NTRIP, VBS, Alarms, Position status, GPS time, Status corrections output and Antenna power on/off are displayed.

The **Channel status** page displays DGNSS satellite status. When selecting a channel status page and using the \uparrow and \downarrow buttons to toggle up and down, the satellite ID, service ID, actual frequency, symbol rate, Uplink status, good and bad counts, last lock time, C/N and C/N₀ are displayed. The good and bad counts percentages are displayed from the last 5 minutes of samples.

The NTRIP page displays if the NTRIP is active or not, the NTRIP IP address, the NTRIP port and the NTRIP mountpoint (satellite).





The **VBS** page displays if an input from an external GPS receiver is available, and the status of the input data. Information available is the quality of the service: Q1 (GPS) or Q2 (DGPS), number of satellites, DOP, data age of the corrections and the latitude/longitude values that are input.

From the **Alarms** page current and/or previous alarm situations can be accessed.

Selecting the **Position** status page displays the position input by the user. If no position is input, --- is displayed.

The **Status GPS Time** menu gives the current date and time received from the satellite.

The **Corrections** menu shows on which ports the different correction formats are set up. The following status could be shown:

- sAB meaning serial port A and B
- uABCD meaning UDP port A, B, C and D.

Combinations of these such as sA uBD, could also be shown according to the port configuration settings.

The Ant.power displays if the antenna voltage is turned on or off.

Set position/channel

When pressing the **Enter** or the \rightarrow button from the **Set Pos/Ch** menu, the channel option, used channel, channel settings, NTRIP, position settings and antenna power on/off settings are displayed.

The **Ch. Option** menu makes it possible to select channel A, B, both channel A and B or Primary A as Lband sources. If both channel A and B are selected, this will include automatic switching between the two channels based on the C/N, and the quality of the signals. Lost lock on one channel will force a switching to the other channel, if good data are received on this channel. Correction data will only be transmitted for the current channel. It is also possible to use channel A as the preferred channel, as long as the signal is good. This is shown as Primary A option. This option will only switch to channel B if the C/N on channel A is to weak. The frequency difference between channel A and channel B is limited by 10 MHz. If channel A and channel B are separated by more than 10 MHz, lock might not be obtained.

The **Use Channel** menu makes it possible to select which channel to use, if both channel A and channel B are selected in the **Ch. Option** menu.

From the **Channel** page it is possible to set the satellite service, frequency and symbol rate. Note that the satellite service choice will Channel A

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Set Pos/Ch

Ch. Option AB





Status Ant.power 12.40V







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not be available before a satellite list is downloaded.

From the **NTRIP** page it is possible to set NTRIP enable/disable, IP-address to server, user name and password.

From the **Position** page it is possible to manually set the latitude and longitude. Press \leftarrow to enter selection mode. Press \leftarrow and \rightarrow to move to correct digit and press \downarrow and \uparrow to change the numbers. Press \leftarrow to save the change. Position N 11°11.1111' E 22°22.2222'

is converted to LAT 1111.1111N LON 2222.2222E

From the last sub-menu you can set the antenna power on/off.

Port configuration menu

When pressing the **Enter** or the \rightarrow button from the **Port Cfg** menu, the serial, UDP, TCP and FTP port settings are displayed.

From the **Serial Port A** and **Serial Port B** pages you can access the port baud rate, GPS enable/disable, VBS enable/disable, HP/XP/G2 enable/disable, GLO enable/disable, IONO enable/disable, RAW (SCF) enable/disable and Debug enable/disable. If there is no subscription to these services, "No Subsc" will be displayed.

From the **UDP port A**, **UDP port B**, **UDP port C** and **UDP port D** menus the port mask, port number and the activation of the port is selected. It is also possible to select GPS enable/disable, VBS enable/disable, HP/XP/G2 enable/disable, GLO enable/disable, IONO enable/disable, RAW (SCF) enable/disable and Debug enable/disable. If there is no subscription to these services, "No Subsc" will be displayed.

From the **TCP/IP** menu DHCP can be set to on/off. Under menu item **set static** the IP address, IP netmask and IP gateway can be set. The IP address and IP MAC address can also be displayed under this menu.

From the **FTP** menu it is possible to configure FTP user name and FTP password.

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Set Pos/Ch Ntrip

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Set GPS L1 sites menu

From this menu the GPS L1 reference stations which shall be output, are set. These settings are only in use when a GPS L1 subscription is enabled.

Note! The site list containing the reference stations must be available from the satellite before the stations are shown. If they are not available. "No station list" will be shown. The list will not be available if there is no, or never have been, GPS L1 subscription available.

The following options may be selected:

On/off/nearest •

It is possible to set all GPS L1 sites on or off, to use the n nearest set GPS L1 sites Site Nearest stations or manually to set individual sites on or off. How many of the nearest stations to use, is configurable. Factory default value is 32. When using the nearest sites option, it is important to insert the position into the receiver. The position is set in the Set Pos/Ch menu, or throught port A or B from a GGA message.

When setting all GPS L1 sites on or off, it is possible to manually set Set GPS L1 Sites which sites to use or not use. The reference station sites are all Site 132 On received on the air and stored in the receiver.

Use the \uparrow and \downarrow buttons to view the available reference stations. Press the \leftarrow button to be able to change the setting. Use the \uparrow and \downarrow buttons to select the setting and press ← to save the setting.

Set GLO L1 sites menu

From this menu the GLO L1 reference stations which shall be Main Menu output, are set. These settings are only in use when a GPS L1 and GLO L1 subscription is enabled.

The site list containing the reference stations must be Note! available from the satellite before the stations are shown. If they are not available, "No station list" will be shown. The list will not be available if there is, or never have been, any GLO L1 subscription available.

The following options may be selected:

On/off/nearest





Set GLO L1 Site





It is possible to set all GLO L1 sites on or off, or only to use the nearest stations. How many of the nearest stations to use, is configurable. Factory default value is 32. When using the nearest sites option, it is important to insert the position into the receiver. The position is set in the **Set Pos/Ch** menu, or through port A or B as a GGA message.

When setting all GLO L1 sites on or off, it is possible to manually set which sites to use or not use. The reference station sites are all received on the air and stored in the receiver.

Use the ↑ and ↓ buttons to view the available reference stations. Press the ← button to be able to change the setting. Use the ↑ and ↓ buttons to select the setting and press ← to save the setting.

Display configuration menu

From the **Display Cfg** menu it is possible to change contrast and enable or disable backlight on the display.

The **Backlight On** menu simply switches the display backlight on or off.

The **Contrast** menu has three choices for the display contrast:

- High
- Medium
- Low

Backup configuration

The **Backup Cfg** menu makes it possible to store the current configuration for port settings and corrections settings, with the **Save** submenu. If lost, the stored configuration can then be easily restored by selecting the **Restore** submenu.

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Note! Restore is only possible if user configurations have been previously saved. It will also reset the receiver.









3610 DGNSS RECEIVER AND DPS SETUP EXAMPLE

The 3610 DGNSS receiver may be used together with a variety of DPS systems: DPS 116, DPS 122, DPS 132, DPS 200, DPS 232 and DPS 700. The different DPS systems use different Seastar services:

DPS	Seastar	Seastar	Seastar	Seastar	Seastar
system	DGNSS	Plus	HP	XP	G2
DPS 116	Х				
DPS 122	Х				
DPS 132	Х	Х	Х	Х	
DPS 200	Х				
DPS 232	Х	Х	Х	Х	Х
DPS 700	Х	Х	Х	Х	Х

To set up a DPS system to use Fugro services do the following:

1. Connect the receiver and DPS as described in Figure 6. below:



Figure 6. DGNSS receiver and DPS connection

- 2. Power on the units. The DPS will start automatically.
- 3. In the DPS, select **System|Change system mode**. Select **Configuration**. A dialog which requires a password will open. The password is "stx".



Figure 1 Entering the DPS setup file

4. Select System|NavEngine standard.

5. The figure below displays a default view for the Input/Output communication before any interface details are added.

WEngine Configuration		1				
	Preview		<u>R</u> e	evert	<u>H</u> istory	
Vessel Geometry Description	-Input/Output list					
- Sensors	Interface	Туре	Direction	1/0 Properties	Description	
E- GNSS	DP	Serial	In/Out	COM9 9600 n 8 1 rs-232	DP interface out	
- Geometry Processing	🗹 🕥 GnssRec1	Serial	In	GNSSA1 57600 n 8 1	Receiver #0	
DGNSS	🗹 🕥 Gyro1	Serial	In	COM7 9600 n 8 1 rs-232	Gyro #0	
SBAS	Gyro2	Serial	In	NONE	Gyro #1	
HP/XP/G2	Gyro3	Serial	In	NONE	Gyro #2	
Aonitorina Points	🔽 🕒 DanssLink0	Serial	In	IALA 4800 n 8 1	IALA	
Geometry	🔽 🔍 DanssLink1	Serial	In	COM5 38400 n 8 1 rs-232	SPOTBEAM	
Communication Interface	DgnssLink2	Serial	In	COM6 38400 n 8 1 rs-232	INMARSAT	
Input/Output	🗹 🕒 DanssLink3	Serial	In	COM8 38400 n 8 1 rs-232	G2	
Data Pool	DanssLink4	Serial	In	NONE	LINK4	
	DqnssLink5	Serial	In	NONE	LINK5	
	DgnssLink6	Serial	In	NONE	LINK6	
	DgnssLink7	Serial	In	NONE	LINK7	
	🗹 🕥 TelegramOut1	Serial	Out	COM10 9600 n 8 1 rs-232	Telegram Out #1	
	🗹 🔍 TelegramOut2	Ethernet	Out	UDP any 13001 UNICAST	Telegram Out #2	
	TelegramOut3	Serial	Out	COM10 9600 n 8 1 rs-232	Telegram Out #3	
	TelegramOut4	Serial	Out	NONE	Telegram Out #4	
	TelegramOut5	Serial	Out	NONE	Telegram Out #5	
	TelegramOut6	Serial	Out	NONE	Telegram Out #6	
	TelegramOut7	Serial	Out	NONE	Telegram Out #7	
	TelegramOut8	Serial	Out	NONE	Telegram Out #8	
	TelegramOut9	Serial	Out	NONE	Telegram Out #9	
	TelegramOut10	Serial	Out	NONE	Telegram Out #10	
	TelegramOut11	Serial	Out	NONE	Telegram Out #11	
	TelegramOut12	Serial	Out	NONE	Telegram Out #12	
	TelegramOut13	Serial	Out	NONE	Telegram Out #13	
	TelegramOut14	Serial	Out	NONE	Telegram Out #14	
	TelegramOut15	Serial	Out	NONE	Telegram Out #15	
	TelegramOut16	Serial	Out	NONE	Telegram Out #16	

Figure 2 Input/Output view before interface details are added

6. Select a DGNSS link and configure the I/O type to match with the output of the 3610 Demodulator. It is possible to define several correction links in the DPS and the 3610 Demodulator system. The links can be set up to decode RTCM or HP/XP/G2.



7. When selecting an interface, the Input/Output view will be divided into two sections. The upper part consists of the list with all interfaces. The lower part consists of **Configuration details** for the interface selected in the list. The configuration details vary between the different interfaces.

Apply	Preview		<u>R</u> e	vert	<u>H</u> istory	
essel	Input/Output list					
Geometry	Interface	Туре	Direction	1/0 Properties	Description	
Description	🗹 🎱 DgnssLink0	Serial	In	IALA 9600 n 8 1	IALA	
- GNSS	🗹 🔍 DgnssLink1	Serial	In	COM7 38400 n 8 1 rs-232	SPOTBEAM	
Geometry	DgnssLink2		In	NONE	DGPS 464	
Processing	DgnssLink3		In	NONE	DGPS 464	
- DGNSS	Dansel ink4		In	NONE	LINKA	•
- SBAS - HP/XP/G2 onitoring Points - Geometry mmunication Interface - Innut/Dutnut	✓ Configuration details Interface DgnssLink1		Descrip	otion SPOTBEAM		
- SBAS onitoring Points - Geometry ommunication Interface - Input/Dutput - Data Pool	▼ Configuration details Interface DgnssLink1 Type Serial	,	Descrip	DTION SPOTBEAM		
→ SBAS → HP/AP/G2 onitoring Points → Geometry ommunication Interface → Input/Dutput → Data Pool	 ✓ Configuration details Interface DgnssLink1 Type Serial Direction In 		Descrip	SPOTBEAM		
SBAS HP/AP/G2 Onitoring Points — Geometry ommunication Interface — Input/Dutput — Data Pool	✓ Configuration details Interface DgnssLink1 Type Serial Direction In V/O Properties		Descrip	SPOTBEAM		
→ SBAS → HPXP/G2 onitoring Points → Geometry ommunication Interface → Input/Dutput → Data Pool	 ✓ Configuration details Interface DgnssLink1 Type Serial Direction In ✓ I/O Properties Port COM7 	• Bau	Descrip	stion SPOTBEAM	s-422	
⊢ SBAS ⊢ HP/AP/G2 Ionitoring Points – Geometry ommunication Interface – Input/Dutput – Data Pool	 ✓ Configuration details Interface DgnssLink1 Type Serial Direction In ✓ I/O Properties Port COM7 > Advanced 	, Bauc	Descrip	otion SPOTBEAM	s-422	
⊢ SBAS HPXP/G2 onitoring Points — Geometry mmunication Interface — Input/Dutput — Data Pool	 ✓ Configuration details	↓ Bauc	Descrip	D T Ors-232 Or	s-422	

Figure 3 Input/Output list view with configuration details

8. The Configuration details view is the lower part of the Input/Output list view. The Configuration details view is divided into two sections: an interface selection section and an I/O Properties section.

▼ Configuration details
Interface DgnssLink1 Description SPOTBEAM
Type Serial -
Direction In
 ▼ I/O Properties Port COM7 ■ Baud rate 38400 ■ Ors-232 Ors-422 ▼ Advanced Parity None ■ Data bits 8 ■ Stop bits 1 ■
DGNSS link properties Earmet DTOM/0 Timeout fet 80
Supplier FUGRO Short range

Figure 4 Configuration details view

- 9. To change the settings, press the Apply button in the upper left corner. Changes are automatically saved and applied.
- 10. Exit the configuration menu.
- 11. When the DPS is configured, make sure the configuration of the 3610 DGNSS receiver agrees with the DPS configuration with regards to baud rate and RS-232/RS-422 interface and cables.

Note! When planning to use HP/XP/G2 corrections, the DPS must be set up and connected to the 3610 DGNSS receiver when the subscription is transmitted and enabled.



INSTALLATION

Installation considerations

Before starting installation of the 3610 DGNSS receiver on a vessel, the following should be considered:

- Determine the preferred location for each unit. The 3610 DGNSS receiver is designed for indoor installation. Consider cable length, connector attachment space (cable bend radius), stowing of excess cable, moisture, chemical corrosion, vibration and heat exposure.
- Before drilling holes, consider using existing hardware and locations where equipment has been previously installed. Avoid drilling holes that may damage other equipment (e.g. structural frame members, electrical cables or fluid lines).
- High vibration and high temperature locations should be avoided whenever possible.
- In applications where vibration exceeds 4Gs acceleration, shock mounts are required. Refer to Customer support for mounting recommendations.
- All connections to the unit are at the rear side and available space for cable connections and service must be provided.
- When using dual/multiple 3610 DGNSS receivers, it is recommended to set the different demodulators to ch.option A. The different 3610 DGNSS receivers should then be set up to track different satellites, to obtain the redundancy by using dual/multiple 3610 DGNSS receivers. This is only a general recommendation, and specific set up considerations must be obtained on each installation by skilled personnel.

DGNSS antenna location

Antenna positioning is critical to system performance. The following conditions must be met for optimum system performance:

- The antenna must be mounted at least 1.5 metres away from transmitting antenna of any frequency. Closer positioning may cause overloading of the receiver RF circuits.
- The antenna should be mounted at the highest point that will give a good view of the horizon and be as level as possible.

Cable installation

Cables must be correctly installed for optimum system operation. Therefore, the following should be noted:

- Recommended cable type is: 1/2" CELLFLEX[®] Superflexible Foam-Dielectric Coaxial Cable (SCF12-50JFN) or equivalent.
- If possible, do not run L-Band receiver antenna cables parallel to other radio system cabling closer than 30 centimetres.



- If cables must cross, ensure that they cross at an angle of 90°. This minimizes the possibility of interference.
- As far as is practicable, ensure that cables and I/O connectors are unique and fit only in their allocated location.
- Try to make the coaxial cables as short as possible.
- Avoid routing cables along-side power generator cabling and other high electrical noise sources. This can cause interference.
- Do not kink or force cables into sharp bends that may damage the cables and cause system failure.
- After installation, ensure that excess cable is looped and clamped or tied safely away from any control cables, fuel lines, hydraulic lines or moving parts. When stowing over-length cables, form loops of no less than 150 mm minimum cable bend radius.
- Cable routing must avoid high temperature exposure (e.g. exhaust manifold).



TECHNICAL SPECIFICATIONS

Radio frequencies

Receiver frequency band:	
Channel bandwidth:	5 kHz

Physical dimensions

Width:	
Height:	
Depth:	
Weight:	1.1 kg (1.2 kg incl. brackets)
Colour housing:	Powder coated blue

Power

Voltage:	
Power consumption:	< 16 W

Environmental specifications

Enclosure material:	Aluminium
Enclosure protection:	IP-22
Operating temperature range:	5 to +55 °C
Recommended operating temperature range:	+20 to +25 °C
Operating humidity:	Max.95% non-condensing
Storage temperature range:	20 to +65 °Č
Storage humidity:	Less than 55%

Connectors

RF input to receiver:	TNC female
Power connector:	Hirose LF07WBR-6P male
Ethernet connector:	RJ45
Serial connectors:	9-pin DSub female

Cables

Coax cables:	1/2" CELLFLEX [®] Superflexible (SCF12-50JFN)
Serial cables:	RS-232 LIYCY 3 x 2 x 0.14 mm ² , RS-422
Power cable:	SKUB 2 x 0.75 mm ²

Compass safe distance

Steering magnetic compass:	0.2 m
Standard compass:	0.4 m

Data input and output

Two serial ports:	A and B
Four UDP ports:	A, B, C and D
Electrical interfaces:	RS-232 and RS-422
Baud rates:	
Serial data format:	N, 8, 1

IP interface

Protocol support:	.NTRIP.	FTP.	UDP.	TCP
		,	00.,	


APPENDIX A – RECEIVER SERVICE PROCEDURE

Receiver service procedure

If a Fugro receiver unit fails to perform, contact Fugro Norway AS, after following the procedural checks. We wish to hear about frequently experienced problems and your assistance will be appreciated. Copy the form on the next page, fill in the details requested and faxing or mailing the form to Fugro Norway AS for forwarding to Product Marketing.

The most common problems are interfacing, and usually occur at installation time. If you have an interfacing connection not covered in this manual we would like to assist you and produce another technical bulletin that may assist other users in the future.

If a problem appears that you think may be caused by a system performance problem, contact the Fugro Support (seastarservice@fugro.com) and inform of any system aberrations that may have been experienced.

We are sensitive to our customers' needs and we want to assure specified system performance at all times. There could, however, be situations where conditions are below par, such as fringe area operations, radio communication disturbance etc., and, as a Fugro receiver monitors the system performance continuously, these conditions would be noted.



APPENDIX B – PROBLEM REPORT FORM

Fugro receiver problem report form

Please copy this form and report the problem with as much detail as possible.

Problem with: Signal Y/N Seastar Y/N	Manual Y/N Receiver Y/N	Date:	
Description of problem:			
Person Reporting:	Contact Ph	none #:	
Model #:	Serial #:		
Customer Name:	Customer	Customer Address:	
Customer Phone #:			
Date purchased: /	/ Dealer:		
GPS Receiver used:	Serial #:		
Area of operations:			
Symptoms from display (if a	iny):		



APPENDIX C – FACTORY DEFAULT SETTINGS

Factory Default settings

Position	
Lat	: 5955.000000
Lon	: 1038.000000
Satellite	
Channel A	FOAT
Name	
Frequency	: 1539.9125 MHZ
Symbolikale	1200
Fragueney	
SymbolPoto	. 1545.5200 MHZ
Symbolicate	. 000
Sitos	
GPS	· 32 Nearest
GLONASS	: 32 Nearest
02010/000	. 02 11001001
Antenna	
Antenna p	ower : Off
Serial Ports	
A	: 38400 baud
В	: 38400 baud
	. 400 400 004 400
Address	: 192.168.004.100
NetiMask	255.255.255.000
	. 192.000.000.001
	. INO . 21140
Port A	. 31140
Port A	. 31141
POILA Dort P	. 31142
FUILD	. 31143
UDP Ports	
A	: 31100
В	: 31110
С	: 31120
D	: 31130
NetMask	: 192.168.000.255
NTRIP	
Option	: Off
ServerAddre	ess : 209.64.123.37
Port	: 2101
Mountpoint	: ESAT
Username	: <get from="" fugro=""></get>
Password	: <get from="" fugro=""></get>
ETD	
IIF sername	· sty
Paseword	· stx
1 0330010	. 314
Displav	
Backlight	: On
Contrast	: Hiah



APPENDIX D - MENU STRUCTURE

This section describes the menu structure in the 3610 DGNSS Receiver.

About menu





Status menu - Channel A, Channel B





Status menu - NTRIP





Status menu - VBS





Status menu - Alarms





Status menu - Position





Status menu - GPS Time





Status menu - Corrections





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Status menu - Ant. Power





Set Pos/Ch - Ch. Option





Set Pos/Ch - Ch. Option





Set Pos/Ch - Channel





Set Pos/Ch - NTRIP





Set Pos/Ch - Position





Set Pos/Ch - Ant.Power





Port Cfg - Serial Port





Port Cfg - UDP Port





Port Cfg - TCP/IP





Port Cfg - FTP





Main menu - Set GPS L1 site





Main menu - Set GLO L1 site





Main menu - Display Cfg





Main menu - Backup Cfg





APPENDIX E – DIAGNOSTIC MENU

This section describes the diagnostic menu structure in the 3610 DGNSS Receiver. It is accessed by pressing \leftarrow and \rightarrow simultaneously, anywhere in the 3610 DGNSS Receiver menu.

Diagnostic menu – About





Diagnostic menu – Status





Diagnostic menu – Config





Diagnostic menu – Corrections



Err 0





Diagnostic menu – IO- Statistics





Diagnostic menu – Reset statistics





Diagnostic menu – Erase flash





Diagnostic menu – DAC calibration





USER NOTES





Fugro Norway AS Customer Support and 24-Hour Help Line

Fugro Norway AS Tel: +47 21 50 14 20 E-Mail: seastarservice@fugro.com

