User Guide

The AcquaLink Nav Box

V1 (7/16)

Content

The AcquaLink Nav Box

The AcquaLink® Nav Box is the heart of the AcquaLink® system. It acts as a CPU and signal interface. The Nav Box provides a wide range of digital and analog input possibilities. These include J1939 CAN, NMEA 2000®, VDO Wind sensor and Sumlog® paddle wheel sensor inputs. It also supports various analogue inputs. Please check the Nav Box Installation Instructions for more details. The Nav Box sends the received data to a NMEA 2000 network and to three separate VDO Bus lines allowing flexible and easy routing to multiple control stands or chart tables.
With wide range of information made available from various sources, the Nav Box processes, calculates and checks received signals for discrepancies, demonstrating its intelligent programming with automated system diagnosis and guided fault finding. The Nav Box system requires a VDO AcquaLink 4.3'' TFT and Nav Control unit to operate.

Note:
Use of information provided by the VDO display does not release you from the responsibility over your ship and demands goog seamanship. Always use your nautical experience in interpreting the displayed values.

Nav Control Menu Operation

Power 	Long press	Power on/off
Illumination 	Short press	Change illumination
	Long press	Change color mode
Home/Back 	Short press	One step back in the menu
	Long press	Shortcut back to last display screen
Setting 	Short press	Enter settings
Pages 	Short press	Scroll through favourite page sets
Change 	Short press	Change the TFT you want to control
 Pages and Change	Together	Lock Nav Control
Press rotary knob	Short press	Enter

Initial Startup

When the Nav Box system is powered up for the first time you can select what kind of boat type you are using and how many engines are installed. This selection affects the preset Favourite data pages.

Note:
This is a pre-preselection. You can change the default data pages and / or add more at any time Four Favourite sets with eleven selectable data pages (up to 44 pages in total).

Note:
For creating and arranging the Favourite data pages please see chapter 4.

By pressing the Settings key you can access the Main menu page.

>> Main menu structure

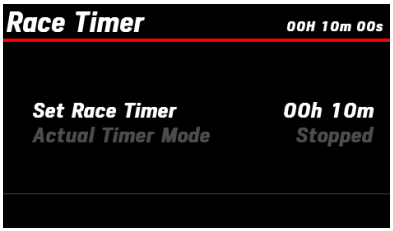
1.User Configuration

The User Configuration menu allows the easy access and use of the race timer, trip log, display illumination and color mode, demo mode, damping setting, clock and unit settings.

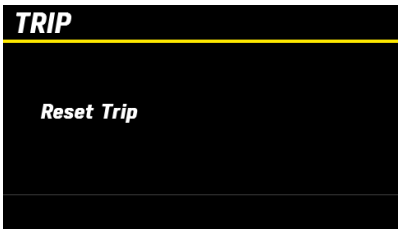
1.1 Race Timer

When using the race timer you need to select *Set Race Timer*. Here you can select the number of hours and/or minutes you want to start the countdown with.

For entering to the Race Timer menu you can select *Actual Timer Mode* to stop, start or rearrange the countdown. Select Race Timer to change the timer value.



1.2 Trip

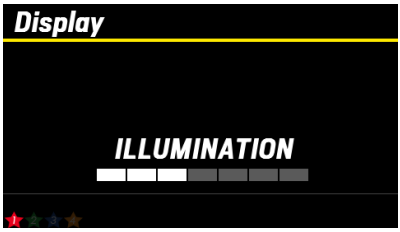


>> To reset your trip select *Reset* (if a speed to water sensor is connected you can reset: trip distance through water and average speed through water)

1.3 Display

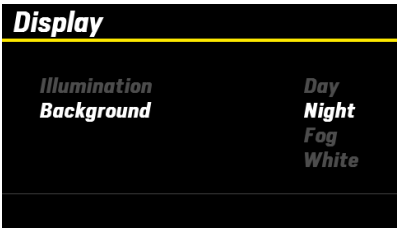
In this menu you can set the the illumination and the color mode of the display. If you have grouped displays together (see chapter 6) this affects all gauges in the same group.

Set the illumination level from 0–7



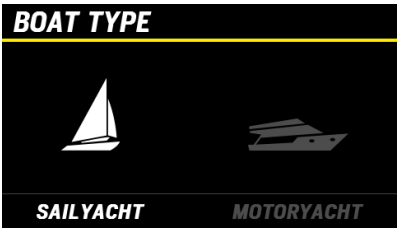
>> Use rotary knob to change the illumination level and confirm by pressing the rotary knob

Background color modes available:
- Day (white on black)
- Night (red on black)
- Fog (yellow on black)
- White (black on white)



1.4 Boat Type

This selection affects the default Favourite pages.



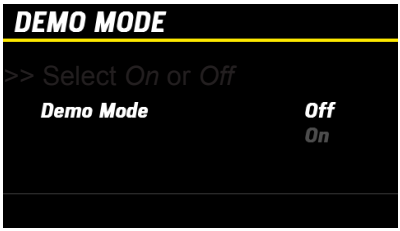
>> Choose SAILYACHT or MOTORYACHT

1.5 EngineAmount

The Engine Amount setting allows you to set your number of engines connected to the Nav Box. Up to four engines are supported (NMEA 2000 or J1939 protocol). Please refer to the installation instruction for more details.

1.6 Demo Mode

The demo mode simulates sensor values. It helps to get familiar with all the features and functions without being on the water or for in-shop demonstration.



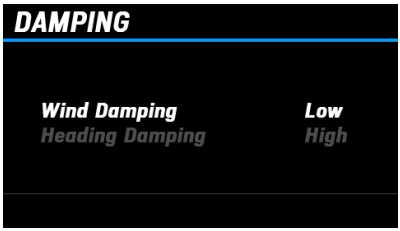
Note:
If *Demo Mode* is selected the average speed will not be calculated. The *Trip/Odometer* is not counted/saved.
You must manually set *DemoMode* to off if you want to exit this mode.
A system reboot doesn‘t automatically change this setting.

2. System Configuration

In this menu all sensors and units connected to the Nav Box can be programmed and/or calibrated

2.1 Damping

The system offers Wind and Heading Damping. You can select *No*/*Low*/*Mid*/*High* depending on the sea conditions or operation mode. The settings are automatically shared with the network.



2.1.1 Wind Damping

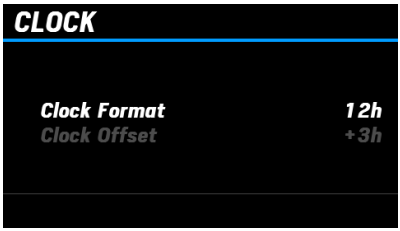
If there is light or no wind it can help to set the wind damping to *High* or *Mid* to avoid the wind indication to rapidly jump and change. In mid or strong wind conditions you can select *No* or *Low* to have a precise wind indication.

2.1.2 Heading Damping

When navigating in rough sea the damping should be set to *High* or *Mid*. In calm conditions the damping can be set to *No* or *Low*.

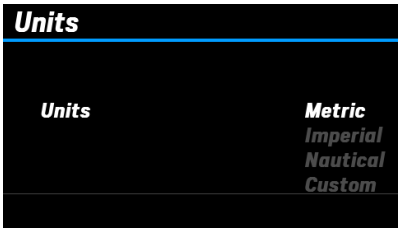
2.2 Clock

The Nav Box System can show time information, if it is provided by an external source.
The clock format can be set to 12h or 24h
The time can be offset in one hour steps.



2.3 Units

You can select default unit formats or customize each value.



Value	Metric	Imperial	Nautical
Distance	km	miles	nm
Boat Speed	km/h	mph	kn
Wind Speed	km/h	kn	kn
Depth	m	ft	ft
Pressure	bar	psi	psi
Barometer	hPa	inHg	inHg
Fuel	l	gal	gal
Temperature	°C	°F	°F

Custom

You can customize the values for your individual use case. For example use knots for boat speed and meters for depth.
Following units are available:

Distance	km	mi	nm	
Boat Speed	km/h	mph	kn	
Wind Speed	m/s	km/h	kn	bft
Depth	m	ft	fath	
Pressure	bar	kPa	psi	
Barometer	hPa	mmHg	inHg	
Fuel	l	gal		
Temperature	°C	°F		

2.4 Reset

If you want to reset the Nav Box system you have following options:

Reset user configurations: Resets all selections made in chapter 1. User Configuration: Resets all user settings.

Reset system configurations: All system related configurations are reset. This affects damping, clock and units.

Reset sensor configurations: All sensors related configurations are reset.

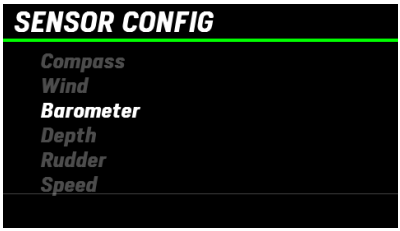
Reset instrument groups: Delete all custom grouping for instruments.

Reset Tacho instance: If you programmed AcquaLink Tachometers with a designated instance number you can reset them in this menu.

Reset Factory: All configurations made in the system are cleared. The system is reset to factory settings.

3. Sensor Configuration

This menu allows you to configure and calibrate all sensors connected to the Nav Box system.



3.1 Compass

The Nav Box supports NMEA 2000 compasses connected through NMEA 2000 and/or the VDO Navsensor connected directly through the Canbus port. NMEA 0183 input is also supported. Following settings are possible:

Heading Offset: If the displayed heading is not matching the true compass heading you can manually align it
Variation: The angle between magnetic and true north can be manually adjusted.

3.2 Wind

The wind sensor should always be properly installed with the use of the Wind sensor manual. The sensor should be aligned with the front of the boat. If this installation is not possible you can adjust the Wind sensor to the centerline of the boat by using the Wind direction Offset.

3.3 Barometer

Adjust the barometer value displayed with a static offset value.

3.4 Depth

The Nav Box system will display the depth below transducer as long as there is no adjustment made in this setting. There are two different depth offset setting in the Nav Box system.

Keel offset: Distance between transducer and keel

Draught: Distance from water line to keel

3.5 Rudder Angle

If the rudder angle is not displayed properly you can adjust it by using the +/− offset.

3.6 Speed

The VDO Sumlog can be calibrated by using a speed correction factor. You need to calculate the deviation of the displayed speed to the actual correct speed in percentage. Select the correction factor.

+1.0 = 0%
+1.1 = 10%
+1.15 = 15%

3.7 Engine

To display analogue engine information in the system, you need to configure the inputs.

3.7.1 Pulse per Revolution

How to calibrate the pulse per revolution:

4 stroke engines (petrol engine, ignition coil, Term 1):
The number of pulses are, in most applications, the number of cylinders divided by two.
Most 4 cylinder applications = 2 pulses/revolution
Most 6 cylinder applications = 3 pulses/revolution
Most 8 cylinder applications = 4 pulses/revolution

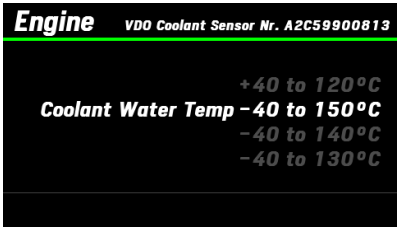
From alternator:
To complete the calculation you need to know the numbers of poles your alternator has.
Divide the diameter of the crankshaft pulley (A) by the diameter of the alternator pulley (B). Multiply the result by ½ the number of poles in the alternator.
Pulses = (A/B) x (1/2 x numbers of poles)

If you know the frequency (Hz) of the alternator signal at a given RPM, you can calculate the number of pulses per revolution:
Pulses = (Hz at a known RPM x 60) / The known RPM

3.7.2 Engine Water Temperature

The Nav Box supports VDO sensors with following temperature ranges. Please select:

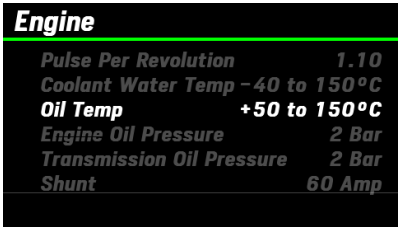
+ 40 to 120°C
− 40 to 150°C
− 40 to 140°C
− 40 to 130°C



3.7.3 Engine Oil Temperature

Follwing VDO temperature sensors are supported:

+ 50 to 150°C
− 40 to 130°C



3.7.4 Engine Oil and Transmission Oil Pressure

Please select the installed VDO sensor:

2 bar / 3 bar / 4 bar / 10 bar / 16 bar / 25 bar / 30 bar

3.7.5 Shunt

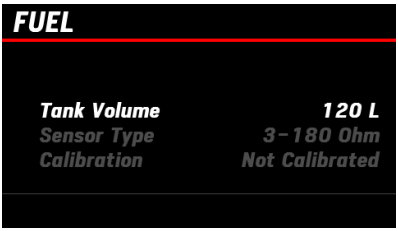
There are two ampere ranges supported:

60 A
150 A

3.8 Fuel

The Nav Box supports one analogue tank input. To set the fuel level, please adjust the volume of your tank.

3.8.1 Tank Volume



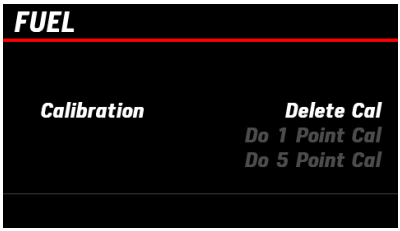
3.8.2 Sensor Type

The system supports three resistive fuel sensor types

2 ... 90 Ohm
3 ... 180 Ohm
240 ... 33.5 Ohm

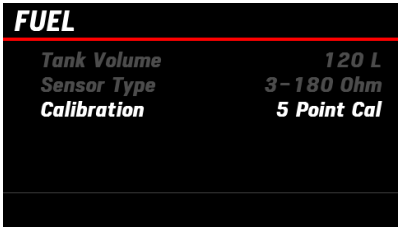
3.8.3 Calibration

To calibrate the fuel sensor select *Calibration.*
You can delete the calibration or precede a one or five point calibration.



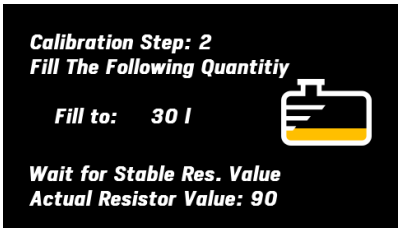
1 point calibration:
Empty the tank and select *Enter*. Fill up the tank to the indicated level and select *Enter* again.

5 point calibration:



>> The 5 point calibration is more precise than the one point calibration

>> Empty the tank and select 0% setting

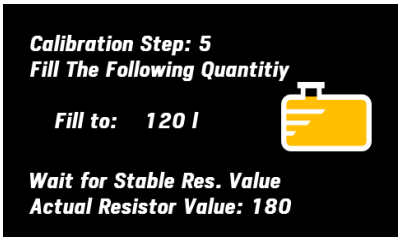


>> Fill up ¼ of the tank and select 25%

>> Fill up to half and select 50%

>> Fill up to ¾ and select 75%

>> Fill up tank and select 100%



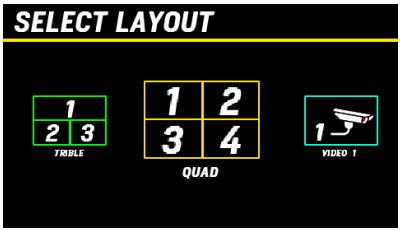
>> Store values

4. Favourite

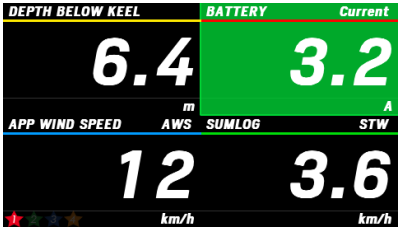
There are four Favourite Screens sets with eleven pages per set. Each page can be set as single, double, treble or quad screen.

The Favourite Screens are default depending on your initial startup selection.
If you want to change any page, select the Favourite set you want to edit, scroll to the designated page and select it. Now you are able to select the layout type.

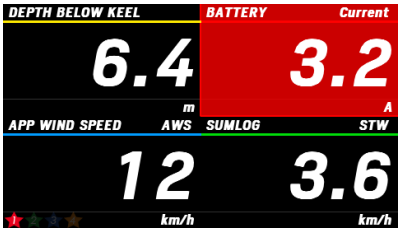
>> Select Favourite set



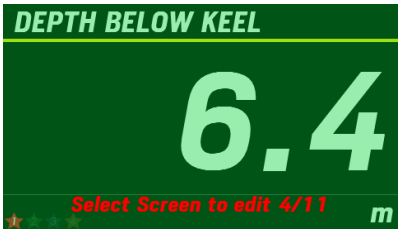
>> Select Layout type



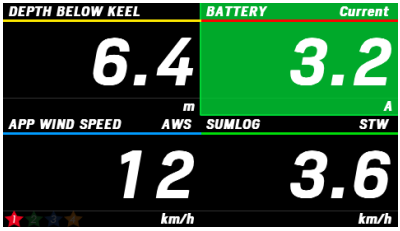
>> Scoll to the data field you want to edit



>> Press *Enter* to highlight the data field



>> Scroll through the available screens and select it



>> Use the Back button to go back to the menu and to save the changes.

As soon as the screen description is highlighted you can scroll through all the information pages that are available. Select *Enter* and scroll to the next description until you have customized your data page.

You can also delete pages by selecting *Remove Data Page.*

5. Alarms

If a alarm occurs in the system a popup message is displaye. You need to acknowledge the message by pressing *Enter.* The alarm is stored in the Alarm List.

5.1 Alarm List

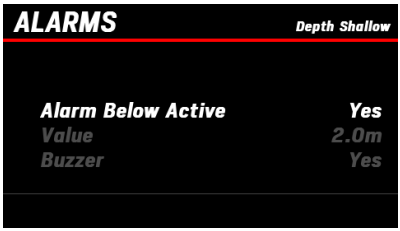
All currently active alarms are listed here.

5.2 Configurate Alarm

It is possible to configure two different alarm settings:
Custom alarms and CAN alarms

5.3 Custom Alarms

You can chose between alarm *On* and *Off*. If you select *On* you can enter the threshold value for the alarm. To active the Buzzer select *Yes.*



Following alarms are available:

- Shallow Depth (below)
- Navigation Depth (above and below)
- Wind Speed (above)
- Battery Voltage (below)
- Engine Water Temperature (above)
- Engine Oil Temperature (above)
- Engine Oil Pressure (below)
- Fuel (below)
- Fresh Water (below)
- Waste Water (above)
- Min RPM (by value defined)

Note: Can only be applied when used with an analogue engine. See CAN Alarms for J1939 and NMEA 2000.

5.4 CAN Alarms

The Nav Box is capable of handling NMEA 2000 and J1939 alarms. See the Nav Box Installation Instruction for more details.
You can active or de-active all alarms in the list:

NMEA 2000:

- Check Engine
- Over Temperature
- Low oil pressure
- Low oil level
- Low fuel pressure
- Low system voltage
- Low coolant level
- Water flow
- Water in fuel
- Charge indicator
- Preheat indicator
- High boost pressure
- Rev limit exceeded
- EGR System
- Throttle position sensor
- Engine emergency stop
- Warning level 1
- Warning level 2
- Power reduction
- Maintenance needed
- Engine Com error
- Sub. or secondary throttle
- Neutral start protection
- Engine shutting down
- Transm. Check Transmission
- Transm. Over temp
- Transm. Low oil pressure
- Transm. Low oil level
- Transm. Sail drive

J1939:

- Engine Speed
- Engine turbocharger boost pressure
- Exhaust gas temperature

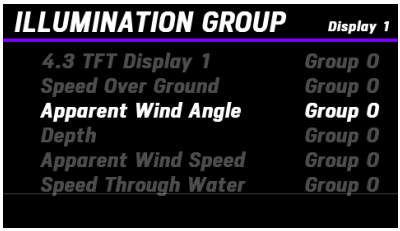
Engine oul pressurel
Engine coolant pressure
Engine coolant temperature
Engine oil temperature
Transmission oil pressure
Transmission oil temperaturel
Fuel level
Water in fuel indication

6. Network

6.1 Group Instruments

You can group displays and gauges together to synchronize the illumination level.

Select *Group Instruments* and pick a gauge from the list displayed. The actual selected instrument or display will blink. The *Group Number* indicates the displays and gauges paired together.

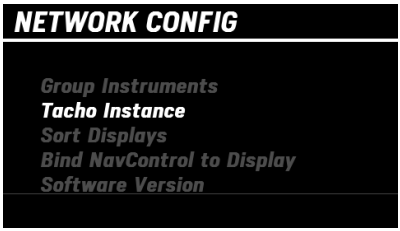


6.2 Tacho Instance

If you are using more than one engine in your system you have to program the Tachomters to read the designated engine information. The instance information is saved on the Tachometer.

Up to four engines are supported.

Select a Tachometer from the list of the Tachometers and select instance 0, 1, 2 or 3 matching with the instance number of the corresponding engine.

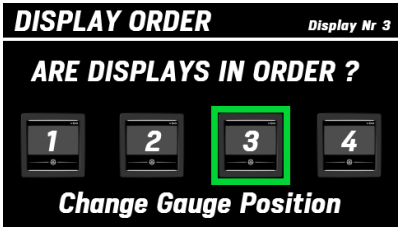


>> Align the engine instances with the Tachometers

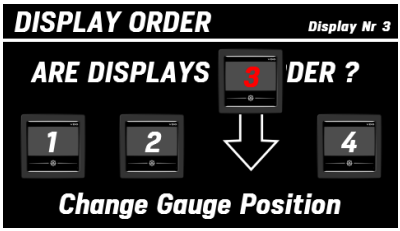
To program the engine instance please contact your engine dealer or engine service agent.

6.3 Sort Displays

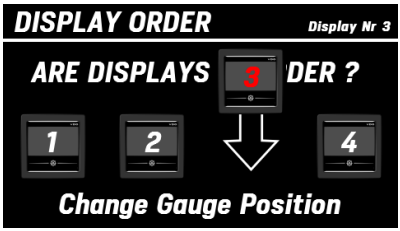
If you are using more than one TFT display in the system, you can arrange the order of the displays. After completing this setup you can switch from one TFT to the next by using the „CHANGE“ key on the Nav Control.



>> To change the order, select the *Display*



>> The display is highlighted



>> Scroll to the right position and select *Enter*

6.4 Bind Nav Control to Display

If you are using more than one Nav Control in the system, you can bind Nav Controls to TFT displays. Up to three Nav Controls can be binded to one TFT or three TFTs to one Nav Control.
The text on the display will guide you through the setup.

6.5 Software Version

This menu displays the software version of all products connected to the VDO Bus.

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Industriestrasse 18
9464 Rüthi
Switzerland

www.marine.vdo.com
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