

FenixN – user's manual



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Revision History

The following table shows full description of changes made in this document.

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January 2022	<ul style="list-style-type: none"><li>• Initial release of document.

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1 Introduction

The FenixN system is a pair of main 80mm and 57mm indicator unit. It is IGC certified flight recorder system (Level 1) with ENL detection (*IGC approval pending*).

User interaction with the system is done via three rotary knobs. Two rotary knobs are on main 80mm unit and one is on 57mm indicator.

Main unit features one main 3.5” sunshine visible display and secondary side display. All air data, navigation data and information are displayed in clear way on both displays. Indicator unit has additional 2.1” round display.

With a built-in multi-language voice module, the system offers the pilot voice warnings, alerts...

Below is the short list of the system functionality:

- IGC certified by latest security requirements (3072-bit unique signature)
- Bluetooth module
- GNSS receiver supporting GPS, Galileo, Glonass and BeiDou
- Extension port (for input switches and other extension peripherals)
- Internal beeper
- Integrated voice module
- Internal solid-state 32GB memory (380.000 h of logging with 1s logging interval)
- Two data ports for 3rd party devices (Flarm, Radios, PNA, ...)
- Front facing micro SD card port for data transfers
- Internal rechargeable battery for backup power supply
- Electronic vario compensation or TE probe connection
- Speed to fly function
- Final glide calculator
- Internal glider database
- Flarm radar screen
- Thermal assistant
- Logbook
- Worldwide terrain maps
- Airspace display with warnings
- Multi-pilot support
- Wind calculation in both circling and straight flight
- User warnings
- Multi language support
- Custom page arrangement

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2 Basic operation

In the following section we will provide more details of the FenixN system. We will show you the easiest way to start up using your new device and its features.

2.1 Powering up

To turn on the device, press and hold left knob on main unit until the FenixN logo appears on the main screen.

Once turned on, the following info screens will appear on main display:

- FenixN intro screen
- Basic initial setup screen, where user will set next options:
 - **Select Pilot** – select pilot from internal database.
 - **Set Elevation** – set take-off elevation.
 - **Set QNH** – set current air pressure.
- Info screen
 - **Pilot** – that is currently set.
 - **Glider** – that is currently set.
 - **Reserve** – set value for reserve value for final glide.
 - **FGmc** – final glide MacCready value set value.
 - **TP** – set file for turn points
 - **APT** – set file for airports
 - **AS** – set file for airspace

After displaying all screens, some warnings may appear, giving user access to information for limited operation capability or device hardware interruption.

2.2 Front view 80 mm unit



Reference front view of device. Also the FenixN intro screen.

- 1 – Main screen
- 2 – Left push-rotary knob
- 3 – Additional screen
- 4 – Micro-SD card slot
- 5 – Right side screen

2.3 Front view 57 mm unit



Reference front view of indicator.

- 1 – Main screen
- 2 – Push-rotary knob

2.4 User interface

Rotary knobs are used by the pilot to interact with the system. To get more understanding of their use, we will describe all functions in next sub-sections. Knobs can be turned clockwise CW or counter clockwise CCW.

2.4.1 Main unit right push-rotary knob

Following functions are possible:

- Rotation will change pages or change values in edit fields.
- Short press for confirmation, entering sub-menus and confirming edit values.
- 2 seconds press will offer pilot to set navboxes on page

2.4.2 Main unit left push-rotary knob

Following functions are possible:

- Changing volume / zoom on primary pages (depends on page type)
- Short press will exit sub menus.
- 4 seconds press will show turn off dialogue
- 8 seconds press will make hard shutdown

2.4.3 Indicator unit push-rotary knob

Following functions are possible:

- Rotation will change pages or change values in edit fields.
- Short press for confirmation, entering sub-menus and confirming edit values.
- 2 seconds press will offer pilot to set navboxes on page

2.5 Software update

For more info you can contact RC Electronics support via the following email address support@rc-electronics.eu , adding contact details, device spec and current software revision of the FenixN system. In a short time, our staff will provide you with software update file.

All required device info can be obtained in Setup / Info page.

After receiving update file, copy it to dedicated micro-SD card and use Setup / Transfer / Update option to update the unit.

NOTE

Before and during software update, keep external main input power present. If shutdown state is occurred during software update, it could lead to data corruption.

2.6 System shutdown

2.6.1 Loss of main input power

System will automatically shut down when external voltage is not detected anymore, system is not in flight and there is no human interaction via rotary knobs for last 2 min.

2.6.2 Manual shutdown

To do so, press and hold left rotary knob for 4 seconds until “Turn off dialogue” pops up. Confirm turn off by clicking the right rotary knob.



Turn-off dialogue.

2.6.3 Hard shutdown

By holding left rotary knob for 8 second, the system will shut down with no graphical indication. This is also known as hard shutdown.

WARNING

By choosing hard shutdown procedure, some data can be lost or corrupted.

PLEASE USE THIS PROCEDURE ONLY IN CASE IF MANUAL SHUTDOWN CANNOT BE EXECUTED!

2.6.4 Shutdown during ongoing flight mode

If the loss of main input power comes during flight mode, the system will keep its normal operation due to internal integrated battery which can provide power to the system.

If the pilot wishes to shut down device, he must use manual shutdown procedure.

3 Page overview

Each page was designed in such a way as to give best user experience, to be clear to read and offer help to user with help icons on additional bottom displays for extra options.

Main pages are selected / changed with rotation of right rotary knob.

Some pages also have sub-menus. This is presented with a special help icon on lower side display (knob with enter arrow). To access sub-menu user must press right knob

3.1 Indicator main page

Main page on indicator displays all needed flight information. It can display up to four digital numeric navbox information on main screen.

Together with digital numeric information there is also current wind direction and its speed.

Additional status displays show BT connectivity, battery level, GPS reception, Flarm connectivity and device current flight mode.



Reference view of main page.

Description:

1. Vario / SC / Netto / Relative needle (depends on setting)
2. Average vario indicator (blue circle)
3. MacCready setting indicator (yellow circle)
4. Speed to fly indicator
5. Thermal vario indicator (green circle)
6. Wind, Flarm, GPS and BT module status.
7. Vario scale.
8. Vario scale units and type of needle (VAR – vario)
9. Battery status indicator with name of the page
10. Current flight mode icon (thermal mode / glide mode).

3.1.1 Indicator digital numeric navigation information

Large view area of the main screen is used to display digital numeric information. The pilot can set up to four digital numeric values at the same time on the main screen. Type of them can be set by user for each flying mode (thermal / glide).



Displaying one information's on the main screen.



Displaying two information's on the main screen.



Displaying three information's on the main screen.

3.1.2 Flight mode

Navigation data is separately set for both flight modes. Device will detect the mode of flight and switch view mode of all informational positions on screens. The status icon at bottom right of the vario screen always indicates the current detected flight mode.



Displaying that device is currently in glide flight mode.



Displaying that device is currently in thermal flight mode.

3.1.3 Needle unit's

Main needle units can be view at the bottom right side of the main screen. Selection can be made between **m/s** or **kts**.



Vario units in m/s.



Vario units in kts.

3.1.4 Wind and connectivity status

A small section of the main screen is used to constantly display wind information and the status icons. For the pilot, wind information includes values of wind direction and speed. These values are represented graphically and numerically in a small half circle on the left side center of the main screen.

Wind indication features:

- **Wind direction** – pointer, to show wind direction relative to current track.
- **Wind speed** – displayed numerically in the selected user unit.
- **Wind absolute direction** – displayed numerically in degrees.

Connectivity status icons represent current mode of GPS reception, Flarm and Bluetooth module. Every module has its own represented icon.

Flarm and Bluetooth connections are fully operating if icons are displayed. For GPS reception, green color will indicate 3D mode, while red will indicate no GPS fix.



Wind and connectivity status view.

3.1.5 Battery status

Battery status indicator displays internal battery voltage level of the system. Indicator will be displayed in following modes:

- **FLASHING MODE** – indicates that the system is currently using internal integrated battery.
- **STATIC MODE** – indicates that the system is currently using external battery power of the glider. Internal battery of the system will be automatically charged during this mode.

Different color of indicator shows different current charge state of battery:

- **RED** – will indicate near empty battery.
- **YELLOW** – will indicate half empty battery.
- **GREEN** – will indicate fully charge battery.

3.1.6 Indicator navbox subpage

The sub-menu **Select navbox** is where pilot can set number of navboxes on indicator main screen for each flight mode, type of needle for each flight mode and type of navbox displayed. To enter **Select navbox** sub-menu, pilot must use long press function while on main page.



Page Select navbox.

Needle can show:

- Vario
- SC
- Netto
- Relative

3.1.6.1 Customizing displayed navigational data

Information displayed on main screen are specified by **Set navbox** sub-page. By confirming selection, display will show main page for customization of displayed navigational data.



Option for change navigational informational.

Main page ready for customization.

Once on main customization page, first position of navbox data will be colored yellow. This gives indication of current selected navbox position, ready to be customized. Pilot can scroll this indicator through displayed navbox data by rotating rotary knob.

With the indicator position set, confirm selected position by pressing knob to continue setting customization.

On **Select navbox** subpage, pilot can scroll through the navigation list of data.



Select navbox page.

Selection can be made between the following data. Short press on bottom rotary knob will confirm selection.

➤ UTC Time	➤ Local time	➤ Flight time	➤ Leg time
➤ Task t. elapsed	➤ Task t. left	➤ Altitude	➤ Alt. QNH ft
➤ Flight level	➤ Thermal gain	➤ Flarm alt.	➤ Distance Tp
➤ Distance Apt	➤ Distance Tsk	➤ Distance Nrst	➤ Flarm dist.
➤ Final glide Tp	➤ Final glide Apt	➤ Final glide Tsk	➤ Final glide Nrst
➤ TAS	➤ IAS	➤ Ground speed	➤ Speed to fly
➤ Vario	➤ Vario avg	➤ Vario netto	➤ Vario relative
➤ Thermal avg	➤ Thermal max	➤ FLARM vario	➤ Track
➤ Bearing Tp	➤ Bearing Tsk	➤ Bearing Apt	➤ Bearing Nrst
➤ OAT	➤ ENL	➤ G-force	➤ F. ID
➤ Efficiency (L/D)	➤ Tp req. L/D	➤ Apt req. L/D	➤ Tsk req. L/D
➤ Nrst req. L/D	➤ AGL		

NOTE

Pilot can simply return or exit currently view page by long pressing the knob.

3.1.7 Indicator main page sub-menu

To access sub-menu for adjusting Volume, MacCready, Ballast, Bugs, QNH and Brightness press on knob.

Volume settings.

Volume will be set for current flight mode (Vario / SC).



MacCready settings.



Ballast setting.



Bugs setting.



QNH setting.



Brightness setting.



3.2 Indicator thermal assistant page

While thermalling, all thermal information can be viewed on **Thermal assistant page**. Designed to provide best user interface displaying all essential thermal information to the pilot. The displayed **Thermal assistant page** will show following information on main screen:

- **GAIN** – will display gained altitude.
- **ALT** – will display current altitude of the glider.
- **Wind indicator** – will display wind speed and direction.

Current vario, average and thermal average vario are always shown as colored dots on vario scale!



Thermal assistant page.

Thermal assistant page contains following layout. On the middle of the screen, graphical and numerical wind indicators can be seen inside thermal assistant.

Main purpose of displaying thermal assistant circuit, is to show the pilot a map of the thermal strength in the last full circuit. This will present approximated location of the currently best-known thermal strength.

Once the system in circling flying mode the **Thermal assistant page** will start indicating strength of thermals with the size of the dots. The larger the displayed dots, the stronger is the thermal.

Colors of the dots, will display following type of the thermal:

- **Red circuit** – will indicated positive thermal.
- **Blue circuit** – will indicated negative thermal.

Graphically displayed max vario in last circle can be seen on **Thermal assistant page** as large white dot.

Displayed green glider represents current positions of the pilot in the thermal. Left hand circling will display glider on the right side and right-hand circling will display glider on the left side.

To enter the Thermal assistant sub-menu, the pilot must short press on rotary knob.

Thermal assistant sub-menu holds the following functions, which can be enabled or disabled:

- **Auto switch** – enabled will automatically switch to thermal assistant page when circling is detected.
- **MacCready colors** – will represent climb stronger than $1.2*MC$ with red dots. Between $1.2*MC$ and $0.8*MC$ the color of the dots will be yellow and less than $0.8*MC$ will display blue dots.
- **Max beep / offset** – will make the device beep when the glider is approaching the point of the max value. With offset set, system will generate a beep by a set number of seconds before max position is reached.

3.3 Indicator Flarm radar page

With the externally connected Flarm device into a data 2 port of the main unit, nearby objects can be viewed on the **Flarm radar page**. Displayed graphical radar on the main screen and additional numeric information on the side, will give the pilot quickly needed information about the surrounding gliders.



Flarm radar page reference figure.

The pilot position is represented as green displayed glider in the middle of the screen. Colored arrows will represent nearby gliders. Blue arrows show objects which are higher, brown the ones which are lower and white the ones which are the same altitude (+/- 20m). Short press on rotary knob will allow pilot to select different object from radar. Selected object is colored in yellow color. Switch will also refresh selected glider information’s on side screens.

Screen will show the following information’s from currently selected glider:

- **F.ID** – will display the ID (3 letter code) of the selected glider.
- **F.ALT** – will display relative altitude of selected object.
- **F.VAR** – will display vario information of the selected object.
- **F.DIST** – will display the relative distance from us.

To change range of displayed radar, long press on rotary knob must be made to enter the Flarm sub-menu. Once in the Flarm sub-menu, the following function will displayed:

- **Zoom** – selecting will enable the pilot to change displayed range of the radar. Pilot must turn rotary knob CW to zoom in or CCW to zoom out. With selected range, the pilot must short press on the rotary knob to confirm this action.
- **Details** – selecting will display all information of the currently selected glider. If a glider with the unknown details is selected, the pilot can manually insert parameters in the indicator unit. Parameters will then be saved.
- **Exit** – will return back to Flarm radar page.



Figure 1: Reference view of Flarm radar page.

Description:

1. Displayed type of the selected glider.
2. Currently selected glider marked by yellow arrow.
3. Objects on near same height are colored white.
4. A higher flying glider displayed with blue arrow.
5. Additional information of the currently selected glider.
6. Currently displayed range of the flarm radar (**can be selected from 1 to 9**).

3.4 Main unit turn-point navigation page

Navigation towards turn-point can be set and viewed on **Turn-point navigation** page. Once *.cup files are saved in to internal memory and selected, turn-points will be displayed on the map as drops like icons.



Turn-point navigation page reference.

All eight nav-boxes indicators on bottom can be set to any type of indicators by using a long press on right knob.

On top of the screen the name of the navigation page is displayed (TP or turn-point), steering correction (in degrees) and the name of turn-point.

Since the steering course is calculated from your track and bearing to the target, the wind component is already calculated into this value. When relative bearing is displayed with zero degrees and blue line is aligned with red line, you are in fact moving in the direction of the desired turn-point.

In addition, the wind direction can be always seen on indicator display.

With short press on the right rotary knob, **Select turn-point** sub-page will be displayed with the full list of all saved turn-points. For the desired turn-point, search can be done manually or with the use of quick search function which can be selected in first line of list. In the quick search the turn-points can be quickly sorted by entering **Code**, **Name** or **Distance**.



Select turn-point.



Using Name filter for selecting the turn-point.

To change type of displayed navbox, make a long press on right rotary-knob and customization mode for navbox positions will be activated. Once entered, current selected navbox position will be displayed with yellow color.

Pilot can scroll this indicator through displayed navbox positions by rotating right rotary knob. With selected position, another short press of bottom rotary knob displays a list of all available navigation data.



Customization mode for navbox indicators at TP page reference figure.



Navbox data list reference figure.

To finish customization, use left knob to exit set navbox mode.

3.5 Main unit airport navigation page

Navigation towards single airport can be set and viewed on **Airport navigation** page. Once *.rca files are saved in to internal memory, selecting the file will display airports on the map.



Airport navigation page reference figure.

Same graphical layout applies for **Airport navigation** page but the only difference is displayed name of navigation page in the upper part of the display (APT). Before continuing with this subparagraph, please check previous section for additional information.

With short press on the right rotary knob, **Select airport** sub-page will be displayed with the full list of all saved airports. For the desired airport, search can be done manually or with the use of quick search function which can be selected in first line of list. In the quick search the airport can be quickly sorted by entering **ICAO**, **Name** or **Distance**.

To change displayed data on navbox indicator same procedure applies as on **Turn-point navigation page**

With the selected land-able point, additional info can be viewed by pressing left rotary-knob:

- **Frequency** – of the airport for radio contact.
- **Runway** – will display numbers of the runways.
- **Type** – of runways.
 - **Grass**
 - **Paved**
- **Elevation** – of the airport.



3.6 Main unit task navigation page

Generated task from airports, turn-points or combination of both can be displayed on **Task Navigation** page. Tasks can be uploaded from external SD card to internal memory of the main unit. For transferring files in to the unit internal memory use **Task Options**.



Task navigation page reference figure.

Same graphical layout applies for **Task navigation** page but with the difference of displayed name and yellow graphical box which is used for displaying current status of the task. Before continuing with this sub-paragraph, please check previous section for additional information.

Once the tasks are set, task indicator can display current status:

- **STANDBY** – displayed yellow when task is in standby mode. If you cross the start line, the task navigation will not start.
- **ARMED** – displayed green when the task is armed. Once start line is crossed, task navigation page will start. To Arm task use **Task Options** menu.
- **FINISHED** – displayed when the task is finished.

Quick access to **Arm** or **Disarm** the task is to short press left rotary-knob. By doing long-press on left rotary-knob, the pilot can **Restart** the current task.

By short pressing right rotary knob, **Task edit** sub-page will be displayed with task information and current settings.



Task edit sub-page reference figure.

Under **Task Options**, user can select following:

- **Load** – will load task from external SD card to internal memory of the Fenix.
- **Delete** – will delete current task from the Fenix.
- **Reverse** – will reverse order of points inside task including start and finish point
- **Arm** – confirmation will arm the task.
- **Restart** – confirmation will restart the task to start and new crossing of start line is needed.
- **Next point** – will change the navigation point to the next one in line.
- **Previous point** – will change the navigation to the previous one.

Back on **Task edit** sub-page, following information and setting can be viewed:

- **Task time** – When flying AAT task, time of task can be set here.
- **Type** – describes which type of task is detected.
- **T:** – or also known as take-off point which does not have to be set, and it’s not taken into account for navigation. Take-off point can be set from the list of **turn-points** or **airports**.
- **S:** – or also known as start point of your task, can be set from **turn-points, airports** or **zones**. Short press with bottom rotary knob will let you enter a sub-page, from where you can select start-point. Selecting option **Goto** will display direction to currently set start point in red line.
- **1, 2, 3, n** – are list of navigation points in your task. Short press on any of these points will display edit menu sub-page. Following options for editing navigation points are available:
 - **Goto** – will display direction and set currently selected point as navigation point.
 - **Select TP** – gives option to change current selected point from turn-point list.
 - **Select APT** - gives option to change current selected point from airports list.
 - **Insert TP** – will add point from selection in turn-points list. Added point will be inserted above currently selected point.
 - **Insert APT** – will add point from selection in airports list. Added point will be inserted above currently selected point.
 - **Zone** – can set or edit specification, shape, and type of currently selected point.
 - **Delete** – will fully erase currently selected point.
- **F:** – or finish line settings. Same optional settings apply as for navigation points with the difference of two additional settings:
 - **Finish < 1000m** – is optional setting that can be selected.
 - **Finish altitude** – determine altitude of finish line.



Task edit sub-page with navigation points.



Edit menu sub-page for navigation point.



View of turn-point zone.

3.7 Main unit nearest airport page

The **NRST** or **Nearest land-able point** page can display the 20 nearest airports / land-able points that are in close proximity. The pilot can select any of the displayed land-able points on the screen to view their properties.



Nearest airport sub-page reference figure.

Displayed navboxes can be change by, making a long press on the bottom rotary-knob. For more information on how to change navbox type and view, please see **Main unit turn-point navigation** page sub paragraph.

To view the list of land-able points that are in close proximity, the pilot must press right rotary knob. Once performed, the list will be displayed. The pilot can then select any point on the list.



Displayed list of 20 nearest airports.

With the selected land-able point, additional properties can be viewed by pressing upper rotary-knob:

- **Frequency** – of the airport for radio contact.
- **Runway** – will display numbers of the runways.
- **Type** – of runways.
 - **Grass**
 - **Paved**
- **Elevation** – of the airport.



Properties of the selected airport.

3.8 GPS info page

Once on **GPS info** page, following information can be seen:

- **Fix Quality / Satellite number** – displaying receiving signal quality and number of satellites that are being received.
- **Latitude** – displays GPS latitude.
- **Longitude** – displays GPS longitude.
- **Time** – UTC time.
- **Date** – current UTC date.



GPS Info page.

3.9 Logbook page

In the ground stationary mode, the Logbook page will only show its name on the screen. During this mode, the pilot can access saved flights with a press of bottom rotary knob.



Logbook page on main screen.



Logbook list of saved flights.

With the displayed list of all saved flights, the pilot can scroll through the list by rotating the bottom rotary knob. On a list, pilot name, date of takeoff, time of takeoff and flight time can be seen.

To transfer selected saved flight, the pilot must insert SD Card into the front slot and short press the right rotary knob for confirmation. If a flight requires to be erased from the logbook, long press on the right rotary-knob will perform delete routine for selected flight.

3.9.1 Flight statistics

The Fenix will auto-jump in to the flight mode, once the flight is detected. The **Logbook page** will then change in to the **Flight Statistics page**.



The page will display properties about an ongoing flight. Information that can be viewed is displayed graphically and numerically.

3.9.2 Airspace page

The **Airspace page** allow quick insight into the current flying airspace. The pilot can see a fully displayed shape of the airspace, currently known location inside the airspace and all additional airspace info.

With rotation of left knob, pilot can view all nearest airspaces.



Airspace page view.

3.10 Setup page

At setup page, configurations for system and user settings can be customized to the current pilot and glider. The user setting contains saved pilot profile. Every profile is saved into internal device memory, so the user settings need to be entered only once. Selection of the profile is confirmed during device power up stage and it will reload all user settings.

System settings do not relate to pilot profile but to settings of the glider, device internals periphery, external connected segments to the device, etc. System settings are common for all pilot-based settings.



Setup page view.

3.10.1 User settings

User settings or pilot profile settings includes following sub-menus:

➤ Pilot	➤ Vario/SC	➤ Units
➤ Logger	➤ Warnings	➤ Voice
➤ Pages		

3.10.1.1 Pilot

In the **Pilot** sub-menu, settings can be made for:

➤ Active pilot	➤ Surname	➤ Name
➤ Weight	➤ Reserve	➤ Final glide MC
➤ Copilot surname	➤ Copilot name	➤ Copilot weight

The **Pilot** sub-menu holds all information for the pilot and copilot in case of double seater. User profile which all user settings is saved to, relate to the current pilot profile.

A new pilot profile can be created anytime for a new user. To create the new pilot profile, first select **Active pilot** field and choose **EMPTY**. Once set, the fields **Surname, Name, Weight and Reserve** can be set. These settings will save in your new created pilot profile.

The created pilot profile can be selected ether during device power up, as noted in **2.1 Powering up** sub-section or by choosing it in this sub-menu. After pilot profile selection, all changes made will be saved to the selected pilot profile.

NOTE

Pilot and Copilot name and surname are written into the declaration of the IGC flight, so be sure to have the correct information if badge, record or competition flights are planned.

NOTE

The pilot and copilot masses are used for calculating wing-loading and the adjustments made to the glider polar, used for calculation of the final glide, so great care should be taken to insert the correct information.

WARNING

Due to the direct impact of Reserve altitude on the final glide calculation, always make sure prior to take-off that the Reserve altitude is set to a value you are comfortable with.

Additional shortcuts at the bottom of the settings list, allows the pilot to **Import, Export** or **Delete** the user of the internal memory.

Delete option will delete the currently selected user from the list. After erasing the user profile, this action can not be undone. To recreate the profile, the pilot must manually insert the setting and then save it to the new named user profile.

To perform the **Export** routine of the currently set user profile, an external SD Card must be inserted into the front SD slot. The pilot can then perform a user profile export routine by pressing the shortcut command **Export**.

Successfully exported profile will display **Info** with the message **Exported!**



Successfully exported user profile.

To **Import** the user profile, the pilot must perform an export routine of the user profile to an external SD Card from a 2nd FenixN unit. The same SD Card is inserted into the new FenixN unit. Once the SD Card is detected, the shortcut command **Import** is selected to display a list of all available user profiles in the external SD Card. To finish-user profile import, the pilot must select and confirm the user profile name.

3.10.1.2 Vario /SC

In the **Vario/SC** sub-menu, functionality of the Vario can be set and the following variables adjusted:

- **Altitude Sensor** – pilot can choose, which of two sensors in the device will be used for determining current altitude. A decision can be made between internal **IGC** sensor (measuring cabin static) or sensor which is connected to **TE/ST** pressure port.
- **Zero frequency** – the frequency tone generated by device on displaying vario at 0 m/s.
- **Positive frequency** – the frequency tone generated by device on displaying vario at max range.
- **Negative frequency** – the frequency tone generated by device on displaying vario at min range.
- **Test audio** – selected option will output the tone from the negative frequency to the positive frequency, allowing the pilot to hear current frequency range and adjust it if needed.
- **Range** – lets the pilot adjust the current scale of selected vario unit (In the case of kts numbers 5, 10 or 20 can be set as scale). The same principle applies to other units.
- **Filter** – increasing or decreasing this number will have an influence on variometer response. A smaller value will make the variometer more responsive to small changes, while a larger value will do the opposite.
- **TE level** – will affect the Total Energy compensation. With the integrated Total Energy compensation, TE probe is not required to be connected on instrument for instrument to be compensated.
- **Integration time** – interval for calculating average vario.
- **Vario silence** – the sound of vario will not be produced below this set value. This helps the pilot to not be distracted from small changes in areas of the zero. This feature can be turned off or set between:
 - -0.1 kts to -4.0 kts (For kts units)
 - -0.1 m/s to -2 m/s (For m/s units)
- **Max SC speed** – SpeedToFly tone will be disabled once this speed is exceeded in glide mode.
- **SC mode** – setting will determine how SC mode is enabled.
 - **Manual** – the pilot must manually switch mode during the change of flight, by using external switch
 - **Circling** – the device will automatically switch, when circling is not detected.
 - **Speed** – the device will automatically switch, when a set speed is exceeded.
- **SC switch** – defines type of switch used (on, off or toggle mode)
- **SC speed** – speed at which unit will switch to glide mode. This only applies if the device “**SC mode**” is set to “**Speed**” switch.
- **SC silence** – between 0 and set value, the SC sound will not be produced, if the device is in SC mode.

3.10.1.3 Logger

In Logger sub-menu, the pilot can parameters of IGC logger. One of the main functions of the IGC logger is Event functions, which for a set period of time, will change the logging interval from the regular interval value, to the Event interval value, which is more frequent.

The following settings can be adjusted in **Logger** sub-menu:

➤ Log interval	➤ Registration number	➤ Competition id
➤ Glider class	➤ Event fixes	

Triggering the event function, can be done with dedicated external switch connected to the extension input interface. When the switch is pressed, event function will be triggered.



Logger view.

3.10.1.4 Warnings

Entering the **Warning** sub-menu, the list of available warnings for the Fenix will be displayed on screen. In sub-menu the pilot can overview and select/deselect warnings for the display during device operation.

- | | | |
|-------------|---------------|---------|
| ➤ Airbrakes | ➤ Low battery | ➤ Stall |
| ➤ Vne | ➤ Airspace | ➤ Gear |

For the warning references please see pictures below.

Airbrake warning will be displayed, when glider airbrakes are engaged.



Airbrake warning view.

Low battery warning will indicate a low external voltage.



Low battery warning view.

Stall warning



Stall warning view.

Vne warning that will indicate when airspeed is higher than Vne setting.



Vne warning view.

Gear warning will pop up 5min after takeoff if gear is still not “in” and 200m above takeoff altitude if gear is not “out” before landing.



Gear warning view.

Airspace warning that will indicate when airspace is nearby. Warning for particular airspace will be disabled for the day with short press on **bottom** knob or put in snooze for 10 minutes with **upper** knob.

NOTE

Airspace confirmation is only valid until the landing. After new takeoff, airspace warning will be displayed again.



Airspace warning view.

3.10.1.5 Voice

In the **Voice** setup sub-menu the pilot can adjust volume and mixer setting for voice warnings. Sub-menu also includes setting for additional voice alerts, which can be left disabled or enabled for use during a flight. The “**Voice**” sub-menu includes following settings:

- | | |
|--|---|
| <ul style="list-style-type: none"> ➤ Volume
Range: 0% to 100% ➤ Flarm traffic
Options: <ul style="list-style-type: none"> <input type="radio"/> Enable <input type="radio"/> Disable ➤ Flarm obstacle
Options: <ul style="list-style-type: none"> <input type="radio"/> Enable <input type="radio"/> Disable ➤ Flarm v. distance
Options: <ul style="list-style-type: none"> <input type="radio"/> Enable <input type="radio"/> Disable | <ul style="list-style-type: none"> ➤ Mix (vario - voice)
Range: 0% to 100% ➤ Flarm warnings
Options: <ul style="list-style-type: none"> <input type="radio"/> Enable <input type="radio"/> Disable ➤ Flarm h. distance
Options: <ul style="list-style-type: none"> <input type="radio"/> Enable <input type="radio"/> Disable |
|--|---|



Voice page reference.

3.10.1.6 Pages

In **Pages** sub-menu, a list of different primary pages can be viewed. The pilot can choose from list which pages will show or be hidden during device operation.

With the bottom rotary knob, the pilot must scroll down to the selected page number for customization. To change the displayed type of page, simply press the bottom rotary-knob and sub-menu of all pages will be displayed on the screen. The pilot can then select a different page by simply confirming it with the bottom rotary-knob.

List of primary pages (**First half of the sub-menu list**):

➤ Nearest	➤ Turn-point	➤ Airport
➤ Task	➤ AHRS	➤ Airspace
➤ GPS info	➤	

3.10.2 System settings

Just like in user setting, there are sub-menus for system settings:

➤ Glider	➤ Zone	➤ Units
➤ Transfer	➤ Inputs	➤ User port

3.10.2.1 Glider

In **Glider** sub-menu all settings connected to properties of glider can be adjusted:

- **Select glider** – entering setting will display a list of preinstalled types of the glider. Simply select the type of glider and confirm the selection. By confirming the type **User polar**, properties of glider type will be defined with variables in sub-menu.
- **Polar A** – variable to set polar A parameter of glider.
- **Polar B** – variable to set polar B parameter of glider.
- **Polar C** – variable to set polar C parameter of glider.
- **Empty mass** – variable to set empty mass of glider.
- **Reference mass** – variable to set reference mass of glider.
- **Max mass** – variable to set maximal mass of the glider.
- **Wing area** – variable to set wing area of glider.
- **Dump rate** – variable to set ballast dump rate. Ballast input will automatically calculate new ballast when ballast dump is detected.

NOTE

Please see the documentation of your glider for all variables in “Glider” sub-menu.



Sub-menu Glider.

3.10.2.2 Zone

Short press with bottom rotary knob will display subpage **Zone**, where setting for default parameters of point zone: start, turn point and finish sector can be set.



Zone sub-page reference figure.

Selecting any of displayed options, the following list of parameters is displayed.

- **Turn-point** – cannot be modified and is set as default.
- **Type** - describes zones specifications or directions.
 - **Symmetrical**
 - **Fixed**
 - **To next**
 - **To previous**
 - **To start**
- **A21** – angle between leg and rotation of observer zone
- **A1** – will determine the zone angle.
- **R1** – will determine the zone radius.
- **A2** – will add secondary angle to zone.
- **R2** – will add secondary radius to zone.
- **Line** – will enable feature only edge border of zone is shown.

With all set parameters, you can now preview zone with selection of **View** feature.

3.10.2.3 Units

The displaying units for every numeric and graphical displayed indicator are adjusted in the **Units** sub-menu. The following settings can be made on indicators:

➤ Altitude Optional units: ○ ft ○ m	➤ Climb rate Optional units: ○ m/s ○ m	➤ Speed Optional units: ○ km/h ○ mph ○ kts
➤ Wind speed Optional units: ○ km/h ○ mph ○ kts ○ m/s	➤ Distance Optional units: ○ km ○ nm ○ mi	➤ Pressure Optional units: ○ hPa ○ inHg
➤ Temperature Optional units: ○ °C ○ °F	➤ Mass Optional units: ○ kg ○ lb	➤ Area Optional units: ○ m ² ○ ft ²

3.10.2.4 Transfer

The Transfer page displays a list from which the pilot can select a desired file to be copied in to the device from external micro-SD card or select it as active from internal memory.

To copy new files, the pilot must have the files saved to the external SD card. Once the SD card is inserted to front slot, please perform the following steps.

Current reference steps are for copying **Airspace** file, but the process is valid for all file types.

Select sub-menu for desired file transfer. In this case we selected **Airspace**.



Airspace file copy.

To copy new file to the device, select **Load**.



Load external SD files.

External SD card **Airspace** files will be displayed. Once file is selected, process of copying file will be performed.



Selecting Airspace file.

After successful copy, new file can be selected in sub-menu **Selected**.



New copied file in sub-menu Selected.

3.10.2.5 Inputs

The Inputs sub-menu sets inputs specific external plane events. Detection is made on 4 external inputs and every input can support the following types:

- | | | |
|------------|-----------------|---------------|
| ➤ SC | ➤ VP | ➤ event |
| ➤ gear | ➤ airbrakes | ➤ ballast |
| ➤ inv SC | ➤ inv VP | ➤ inv event |
| ➤ inv gear | ➤ inv airbrakes | ➤ inv ballast |



Inputs sub-menu reference.

3.10.2.6 Data port

Working configuration of the external data ports is set in subpage **Data port**. The pilot can set and enable or disable following parameters:

- **Data port 1** – parameter to set communication speed between the FenixN system data port 1 and the externally connected device. **This connector is based on indicator unit and settings are for it!** The following speeds can be chosen:
 - **BR9600**
 - **BR19200**
 - **BR38400**
 - **BR57600**
 - **BR115200**
- **Data port 2** – parameter to set communication speed between the FenixN data port 2 and the externally connected device. The following speeds can be chosen:
 - **BR9600**
 - **BR19200**
 - **BR38400**
 - **BR57600**
 - **BR115200**
- **Radio** – selecting radio on the list, will set the same communication baud-rate of the data port 1 as-is for the connected radio.
- **GPGGA** – enabling this parameter, the GPS GPGGA sentence will be sent every second through data port 1.
- **GPRMC** – enabling this parameter, the GPS GPRMC sentence will be sent every second through data port 1.
- **GPRMB** – enabling this parameter, the GPS GPRMB sentence will be sent every second through data port 1.
- **PFLAx** – enabling this parameter, the FLARM sentence will be sent every second through data port 1.



Data port sub-page reference.

3.10.2.7 Localization

Information and local settings can be set in the **Localization** sub-menu, containing preferred language and time zone.

- **Language** – can be chosen between English and German.
- **Time zone** – for local time.



Localization sub-page reference.

3.10.2.8 Info

Unique device identifiers can be seen in sub-menu **Info**. Displayed list shows following identifiers:

- **Serial nr.** – serial number of main FenixN unit.
- **IGC nr.** – three letter IGC serial number.
- **Firmware** – current version of running firmware.
- **Hardware** – version of hardware used inside main FenixN unit.
- **Voltage** – displays measured voltage at the power main input.
- **Backup battery** – displays measured voltage of the internal battery.
- **Club mode** – can be enabled or disabled.



Info sub-menu reference.

Enabling **Club Mode** will offer user to set a custom password. With setting a password, all current settings are used then as admin settings.

Any new user added or imported later will have admin settings. During the on time user can change all settings but next power on it will load admin settings again. If reset happens during the flight, then last settings by users are still active ones.

3.10.2.9 Password

Special function passwords can be used:

- **46486** – will set FenixN to factory default state (all settings are cleared and default are used)
- **99999** – will empty logbook.



Password page reference.

4 Rear of unit

The FenixN system contains the following external peripheral connections.

- **Power (9 – 17 Vdc)** – delivery connector to connect external power supply of glider system.
- **Data 1 and Data 2** – which is used to connect devices with RS232 communication protocol.
Indicator is connected to main 80mm unit on Data 1 port and FenixN port on indicator
- **Input / OAT** – to connect extension board for **OAT** and **Inputs** peripheral.
- **Audio** – output for speaker.
- **GPS** – SMA connector for external active antenna.
- **Pst, Ptot and Pte** – pressure connections.



Rear of the system.

4.1 Data 1, data 2 port pinout

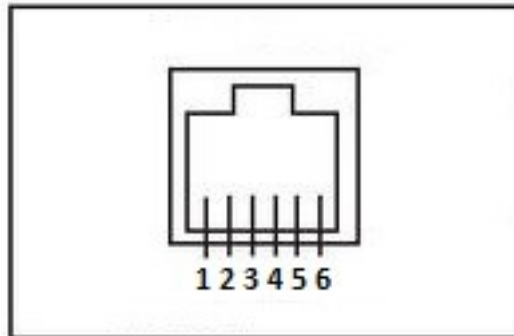


Figure 2: Data connectors pinout.

Pin number	Pin description
1	Power output (same voltage as on power cable 9-32V)
2	Not used
3	Not used
4	RS232 data input (unit receives data)
5	RS232 data output (unit transmits data)
6	GND

5 Bluetooth connectivity

System has internal Bluetooth module which is always enabled. At the back of the unit, there is external Bluetooth antenna, that enables better range. Do not bend or cut this antenna and keep it away from any metal objects / cables.

5.1 Pairing

To pair your device with system please initiate search of BT device on your PNA/PDA/Android phone.

FenixXXXX, where XXXX represents serial nr of the unit, will be visible on detected list, when in range and turned on.

Pair code will be requested to start communication with PDA/PNA and Fenix. Just confirm the pair code being offered and devices will be successfully paired.

After successful pair, you can connect to system with different applications (Oudie, LK8000, XcSoar,...) When application connect to it, bluetooth icon will be visible on main vario page.

5.2 Supported data transfers

Data transfer type	Supported	Note
GPRMC	yes	If enabled in Data port settings
GPRMB	yes	If enabled in Data port settings
GPGGA	yes	If enabled in Data port settings
PFLAx (Flarm data)	yes	If enabled in Data port settings
Declaration transfer from unit	no	
Declaration transfer to unit	yes	
File transfers	no	
Flight transfers	no	

6 Physical properties

This section is used to describe mechanical and electrical properties.

Dimensions	Main: 82 mm x 82 mm x 27 mm Indicator: 65 mm x 62 mm x 30 mm
Weight	225g + 120g

6.1 Electrical properties

POWER USAGES

Input voltage	9V (Vdc) to 17V (Vdc)
Input current	210mA @ 13V (Vdc)

AUDIO (POWER DELIVERY)

Output power	1W (RMS) @ 8Ω
--------------	---------------

DATA PORTS (POWER DELIVERY)

Output voltage	Same as Input voltage of power connector
Output current (MAX)	-500 mA @ 9V (Vdc) to 17 (Vdc) per port

7 Installation of the unit

7.1 Mechanical installation

System unit fits in standard 80mm + 57mm hole in instrumental panel so no extra cutout is required. To install the unit in instrumental panel, unscrew two mounting screws (black) with a screwdriver and knob of rotary switch.

To remove the knob do not use force. Remove the press-in cover first to get to the screw. After unscrewing the screw pull off the knob. Then unscrew mounting nut for rotary switches

Place the unit in the instrumental panel and first screw in the two black screws and then mounting nuts for rotary switches. After that put back the knobs on the rotary switches. Don't forget to screw the knob in place and put the press-in cover back on.

7.2 Pneumatic connections

Three pressure intake ports are fitted on the back of the unit. Their function is described by the label next to each port.

P_{tot} = Pitot or Total pressure

P_{st} = Static pressure

P_{te} = TE probe

When electronics compensation is used to compensate vario (vario/SC setting TE option to 90-110%) connect P_{te} and P_{st} port to static, P_{tot} to pitot pressure.

When compensation probe is used (set TE option to 0%) then connect P_{te} to compensation probe, P_{st} to static and P_{tot} to total / pitot pressure.

7.3 External switch installation

Up to four external switches can be connected to the unit. To connect external switch to FenixN you need to use external switch interface board (included in package). Every slot available has a signal input and ground input. The configuration of inputs can be set under Setup / Inputs.

All inputs except SC will be “active” when switch is closed (signal and ground are in short circuit). If “Inv” (Invert) option is selected on input setting then “active” means when switch is open. SC input has its own setting under Vario/SC menu and can be set to be active on “on”, “off” and “toggle” state.

8 Flight Recorder

The flight recorder doesn’t need any special care as it works nearly automatically without pilot assistance. All the pilot should do is to adapt the logger settings under Setup / Logger menu chapter.

8.1 Start and stop of flight recording

The unit will start recording immediately after start conditions are met. Start conditions are based on ground speed and altitude change, so even if the GPS status is bad during takeoff, the unit will start recording. It is recommended to switch the unit on a few minutes before takeoff. Running time before takeoff will not reduce memory space of the flight recorder, due to circular recording before takeoff. After landing the unit will close the flight after approximately 5 minutes at standstill, so it is recommended to keep the unit under power and GPS OK until the Calculating security message appears on the display. To determine if the flight recorder has closed the flight, check logbook/statistic page. If the Logbook appears, the recording has finished, if the statistic page appears, the recorder is still active.

9 Flying with the system

To get the best out of the unit, it is important that some preparation is done prior to the flight. Pre-flight preparation will ensure that the flight will be both successful and enjoyable.

9.1 Flight preparation on ground

- Check if you have desired TP data base uploaded.
- Prepare a task.
- Enter flight recorder information (pilot name, surname, glider type, recording interval...).

9.2 Before take-off

- Switch the unit ON at least 3 minutes before take-off (this will ensure sufficient GPS reception and will create a base line of the baro trace).
- Select correct pilot (many settings belong to pilot) on initial setup.
- Check task if it is correct after using of Task setup.
- The active task during take-off will be automatically declared in flight recorder.

9.3 During flight

The unit hardware and firmware concept are so far optimized that the pilot doesn’t spend too much time to operate the unit during flight. A very significant indication that shows that the unit has changed to flying mode is Logbook replacement with statistics page.

9.3.1 Set QNH

The pilot should input actual QNH value of the airport where he will take-off. This action should be carried out on ground, after take-off, change of QNH in main page quick setup menu will adjust altitude reading to actual QNH setting.

9.3.2 Wind calculation

Unit is able to measure wind under two different methods. Wind calculation results are shown on wind indicator which is part of many pages. Unit will switch between straight and circling method automatically and history of wind will be counted in new calculations.

Circling: Calculation is based on ground speed change due to wind influence in circling. The method is active exclusively during climbing process. The process start automatically after circling is detected. The method is based on fact that the ground speed is affected by the wind. GS is maximal by tailwind and minimal by head wind. This phenomenon is used by GS difference calculation method.

Straight flight: On straight flight, wind will be calculated with use of iterative method which is based on air speed, ground speed and track measurements.

9.3.3 Influence of wind in final glide

The actual wind data (speed and direction) influences the final glide calculation. In task mode the final glide indication is based on remaining distance over all TP until finish (not over already flown turn points). Wind influence for individual legs is based on current wind data.

9.3.4 Event function

User has option to set one of the user inputs to Event. If event switch is pressed during flight, it will enable faster record interval in flight recorder (recording in shorter intervals as default for a limited time). Event parameters can be set under Setup / Logger. The action is accompanied with a clear message.

9.3.5 Task start

Pilot has to ARM first the unit under task page / options. After start line is armed, next crossing of the line will start navigation to the next point. Task can always be restarted and pilot has also option to always select point to which he would like to navigate.

9.4 After landing

It is recommended to keep the instrument on for a few minutes after landing. After landing is detected pilot can see in statistic page a countdown of 5 min before flight will be ended. Pilot can wait for 5min or press enter to end flight.

Calculating security message will follow and then logbook will be offered to the pilot. At this point unit can be switched OFF or flight download process can start.

9.4.1 Downloading flights

Insert micro-SD card to the unit. Go to logbook page and search for a flight that you wish to download. Press lower knob on that flight and transfer of flight will start. Progress bar will inform pilot when flight is copied to external SD card.