# FENIX – user's manual



Revision 1.5.B50

February 2022

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## *Revision History*

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

| DATE | DESCRIPTION |
|---|---|
| March 2021 | • Initial release of document. |
| October 2021 | • Added description for **Nearest airport (NRST)** page.<br>• Added navbox data **(E, E Tp, E Apt, E Tsk, E Nrst, F.ID, Bearing Apt, Final glide Apt, Distance Apt, Task t. elapsed)**<br><br>• Parameter **Radio** is added to **Data port** sub-menu.<br>• Added description for shortcut commands **Import, Export** and **Delete** user profile in **Pilot** sub-menu.<br><br>• Added **MC Final glide** setting into **Pilot** sub-menu.<br>• Added description for **Info Screen**<br>• Added **Dump rate** variable to **Glider** sub-menu.<br>• Added description for short-cut **Arm/Disarm** task at **Tsk** page.<br>• Added description for custom page slide flow in sub-menu **Pages**.<br>• Added description for **Airspace (AS)** page.<br>• Added description for deleting single flight in the **Logbook** page. |
| January 2022 | • Corrected BT pairing paragraph<br>• Added data port pin-out |
| February 2022 | • Added AHRS page<br>• Added pairing 2nd unit to 1st unit description |

# Contents

# 1   Introduction

The Fenix unit an ultra slim digital vario navigation unit. It is IGC certified flight recorder (Level 1) with ENL detection.

User interaction with the Fenix unit requires only two rotary knobs.

The Fenix is 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.

With a built-in multi-language voice module, the Fenix offers the pilot voice warnings, alerts, …

Below is the short list of the Fenix 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 peripheries)
- Internal beeper
- Integrated voice module
- Double rotary-push knobs for user interface
- Internal solid-state 16GB memory (190.000 h of logging with 1s logging interval)
- Two data ports for 3$^{rd}$ 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
- Airspace display with warnings
- Multi-pilot support
- Wind calculation in both circling and straight flight
- User warnings
- Multi language support
- Custom page arrangement

## 1.1  Reserves all rights

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# 2   Basic operation

In the following section we will provide more details of the Fenix unit. 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 lower knob until the Fenix logo appears on the main screen.

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

➢ Fenix 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



*Reference front view of device. Also the Fenix intro screen.*

- ➢  **1 –** Main screen
- ➢  **2 –** Top push-rotary knob
- ➢  **3 –** Top side screen
- ➢  **4 –** micro-SD card slot
- ➢  **5 –** Bottom side screen
- ➢  **6 –** Bottom push-rotary knob

## 2.3    User interface

Two rotary knobs are used by the pilot to interact with the Fenix unit. 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.

### 2.3.1    Bottom push-rotary knob

Following functions are possible with use of bottom press-rotary knob:

➢ 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
➢ 4 seconds press will show turn off dialogue
➢ 8 seconds press will make hard shutdown

### 2.3.2    Top push-rotary knob

Following functions are possible with use of top press-rotary knob:

➢ Changing volume / zoom on primary pages (depends on page type)
➢ Short press will exit sub menus.

## 2.4    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 Fenix. 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.

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**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.**

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## 2.5   Device shutdown

### 2.5.1   Loss of main input power

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

### 2.5.2   Manual shutdown

To do so, press and hold bottom rotary knob for 4 seconds until "Turn off dialogue" pops up. Confirm turn off by clicking the lower rotary knob again.



*Turn-off dialogue.*

### 2.5.3   Hard shutdown

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

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**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!**

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### 2.5.4   Shutdown during ongoing flight mode

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

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 side displays for extra options.

Main pages are selected / changed with rotation of bottom 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 lower knob

## 3.1    Main page

Main page displays all needed flight information. It can display up to three digital numeric navbox information on main screen with additional four on right side smaller screens.

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.*
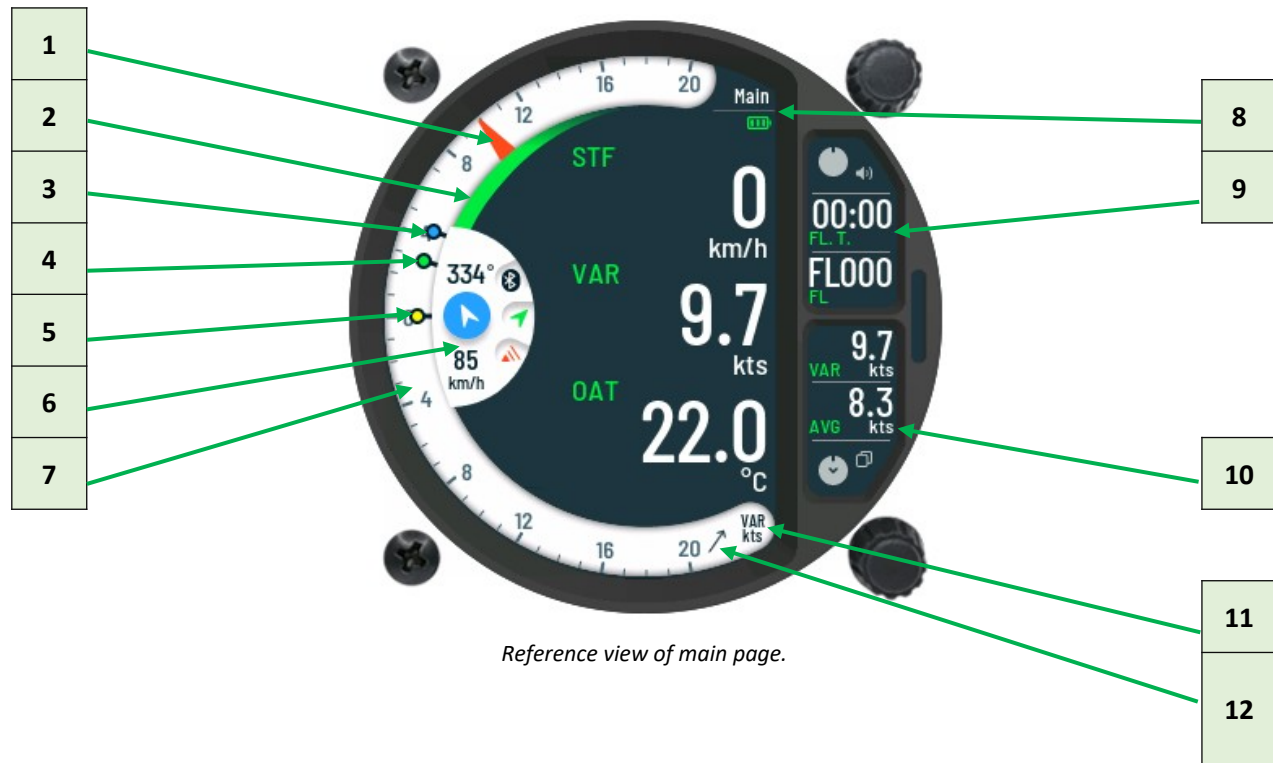
Description:

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

### 3.1.1 Digital numeric navigation information

Large view area of the main screen is used to display digital numeric information. The pilot can set up to three digital numeric values at the same time on the main screen. On the side screens there are fixed four navboxes 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**. Changing the Vario climb units is described in **Sub-paragraph 3.2.2.3.**



*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.

*Wind and connectivity status view.*

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.

### 3.1.5   Battery status

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

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


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

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

### 3.1.6   Navbox subpage

The sub-menu **Select navbox** is where pilot can set number of navboxes on 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 and side 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 bottom rotary knob.

If indicator on main screen is set at first navbox postion, rotating bottom rotary knob CCW will move position indicator to side screens. The same principle applies, if indicator on main screen is set at last navbox position, rotating CW will also move position indicator to side screens.

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 | | | |

| **NOTE** |
|---|
| **Pilot can simply return or exit currently view page by short pressing upper knob.** |

## 3.1.7   Main page sub-menu

To access submenu for adjusting MacCready, Ballast, Bugs, QNH and Brightness press on **lower** knob.

**MacCready** settings.



*MacCready set view.*

**Ballast** setting.



*Ballast set view*

**Bugs** setting.



*Bugs set view*

**QNH** setting.



*QNH set view*

**Brightness** setting.



*Brightness set view*

Changing volume is accessed with rotation of upper knob. Volume will be set for current flight mode (thermal / glide).



*Page Volume SC in glide mode.*



*Page Volume Vario in thermal mode.*

## 3.2    Thermal assistant page

While thermalling, all thermal information can be vied 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:

  ➢ **IAS –** will display indicated airspeed of the glider.
  ➢ **ALT –** will display current altitude of the glider.
  ➢ **Wind indicator –** will display wind speed and direction.

Once we are at **Thermal assistant page**, side screens are also auto preset by the device itself to display more additional thermal information:

  ➢ **AVG –** shows the integrated vertical speed for the time duration set in the Vario/SC setup menu.
  ➢ **T.AVG –** will display average vertical speed for the whole thermal.  Thermall average will begin calculating once circling is detected.
  ➢ **T.MAX –** is the maximal variometer value in the last full 360° circle. Same value is represented as large white circuits on **Thermal assistant page.**
  ➢ **GAIN –** will display accumulated altitude from the very start of circling. Values can also appear as negative.



*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 Fenix is 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 T.MAX value of the thermal can be seen on **Thermal assistant page** as large white dot.



*Positive thermal with T.MAX circle.*                    *Negative thermal reference figure.*

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.

Below the battery indicator, the integrated airspeed can be seen as well as altitude, which is positioned above vario displayed units.

To enter the Thermal assistant submenu, the pilot must short press bottom rotary knob. Thermal assistant submenu 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 T.MAX value. With offset set, Fenix will generate a beep by a set number of seconds before T.MAX position is reached.

## 3.3 Flarm radar page

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



*Flarm radar page reference figure.*          *Nearby selected glider for the information's view.*

Main screen displays graphical radar, with all nearby detected glider. 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). Selected object is colored in yellow color.

With the rotation of the upper rotary knob, the range of displayed radar can be changed from 1 km up to 9 km.

Short press on bottom rotary knob will allow pilot to select different object from radar. Switch will also refresh selected glider information's on side screens.

Side screens will show the following information's:

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

## 3.4    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. To transfer files in to the Fenix internal memory and select it, please refer to **Transfer Sub-paragraph 3.2.2.4**.



*Turn-point navigation page reference.*

With four navboxes indicators on side screens, the **Turn-point navigation** page offers additional four navboxes on bottom side of map, which can be set to any type of indicators.

Above battery indicator, the name of the navigation page is displayed (Tp or turn-point). Steering correction (in degrees) and the name of turn-point can be seen at top center of the map.

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 in left side of **Wind and connectivity status** graphics box. For more info, you can go to **Sub-paragraph 3.1.4** of this document.

With short press on the bottom 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 Code filter for selecting the turn-point.*

To change type of displayed navbox, make a long press on bottom 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 bottom 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 Apt page reference figure.*



*Navbox data list reference figure.*

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

## 3.5    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. For how to transfer files in to the Fenix internal memory, please refer to **Transfer Sub-paragraph 3.2.2.4**.



*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 right corner. Before continuing with this sub-paragraph, please check previous section for additional information.

With short press on the bottom 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 in **Sub-paragraph 3.3.**

## 3.6   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 Fenix. For transferring files in to the Fenix 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 in the upper right corner 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 upper rotary-knob. By doing long-press on upper rotary-knob, the pilot can **Restart** the current task.

By short pressing bottom 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:

   o **Goto –** will display direction and set currently selected point as navigation point.

   o **Select TP –** gives option to change current selected point from turn-point list.

   o **Select APT -** gives option to change current selected point from airports list.

   o **Insert TP –** will add point from selection in turn-points list. Added point will be inserted above currently selected point.

   o **Insert APT –** will add point from selection in airports list. Added point will be inserted above currently selected point.

   o **Zone –** can set or edit specification, shape, and type of currently selected point.

   o **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:

   o **Finish < 1000m –** is optional setting that can be selected.

   o **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   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 **Turn-point navigation page** sub paragraph**.**

To view the list of land-able points that are in close proximity, the pilot must press lower 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.
   o **Grass**
   o **Paved**
➢ **Elevation –** of the airport.



*Properties of the selected airport.*

## 3.8   AHRS page

AHRS page will work only when external AHRS module is connected to it and AHRS is enabled under Setup/Data port setting. If AHRS module is not connected of communication with it is not working, then red cross is seen on this page.



*AHRS page.*

## 3.9    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.*

## 3.10 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 bottom rotary knob for confirmation. If a flight requires to be erased from the logbook, long press on the bottom rotary-knob will perform delete routine for selected flight.

### 3.10.1  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.

### 3.10.2  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 upper knob, pilot can view all nearest airspaces.
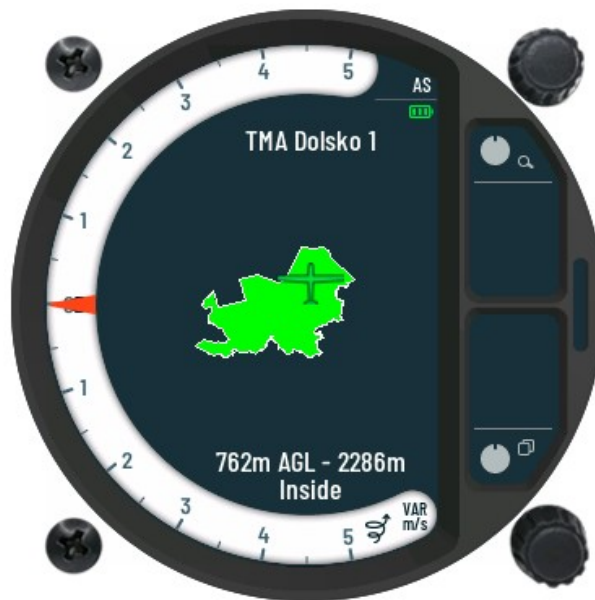


*Airspace page view.*

## 3.11 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.*

### 3.11.1 User settings

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

|  |  |  |
|---|---|---|
| ➢ Pilot | ➢ Vario/SC | ➢ Units |
| ➢ Logger | ➢ Warnings | ➢ Voice |
| ➢ Pages |  |  |

#### 3.11.1.1 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.

<div style="border:1px solid green; padding:10px;">

**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.**

</div>

<div style="border:1px solid green; padding:10px;">

**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.**

</div>

<div style="border:1px solid orange; padding:10px;">

**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.**

</div>

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 Fenix unit or from Fenix simulator PC software. The same SD Card is inserted into the new Fenix 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.

### 3.11.1.2  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.

### 3.11.1.3  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.*

### 3.11.1.4  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.



*Airspace warning view.*

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

### 3.11.1.5 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:

➢ **Volume**
Range: 0% to 100%

➢ **Mix (vario - voice)**
Range: 0% to 100%

➢ **Flarm traffic**
Options:
  o Enable
  o Disable

➢ **Flarm warnings**
Options:
  o Enable
  o Disable

➢ **Flarm obstacle**
Options:
  o Enable
  o Disable

➢ **Flarm h. distance**
Options:
  o Enable
  o Disable

➢ **Flarm v. distance**
Options:
  o Enable
  o Disable



*Voice page reference.*

### 3.11.1.6 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.

The additional feature, that the Fenix unit allows is to customize page arrangement. This gives the pilot option to arrange page slide flow. The customization can be done on same sub-menu **Pages** at the bottom of the list.

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)**:

| | | |
|---|---|---|
| ➢ Thermal assistant | ➢ Flarm radar | ➢ Nearest |
| ➢ Turn-point | ➢ Airport | ➢ Task |
| ➢ Airspace | ➢ GPS info | |

List for page slide flow with currently selected page **(Second half of the sub-menu list)**:

| | | |
|---|---|---|
| ➢ Page 0 | ➢ Page 1 | ➢ Page 2 |
| ➢ Page 3 | ➢ Page 4 | ➢ Page 5 |
| ➢ Page 6 | ➢ Page 7 | ➢ Page 8 |
| ➢ Page 9 | ➢ Page 10 | |



*Pages sub-page reference figure.*                    *Page slide flow customization.*

### 3.11.2  System settings

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

| | | |
|---|---|---|
| ➢ Glider | ➢ Zone | ➢ Units |
| ➢ Transfer | ➢ Inputs | ➢ User port |

*3.11.2.1  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.*

### 3.11.2.2  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.
  o **Symmetrical**
  o **Fixed**
  o **To next**
  o **To previous**
  o **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.

*With only one angle and radius parameter setting to set zone shape.*

*Using two angles and two radiuses to set zone shape.*

### 3.11.2.3 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** | ➢ **Climb rate** | ➢ **Speed** |
| --- | --- | --- |
| Optional units: | Optional units: | Optional units: |
| ○ ft | ○ m/s | ○ km/h |
| ○ m | ○ m | ○ mph |
| | | ○ kts |
| ➢ **Wind speed** | ➢ **Distance** | ➢ **Pressure** |
| Optional units: | Optional units: | Optional units: |
| ○ km/h | ○ km | ○ hPa |
| ○ mph | ○ nm | ○ inHg |
| ○ kts | ○ mi | |
| ○ m/s | | |
| ➢ **Temperature** | ➢ **Mass** | ➢ **Area** |
| Optional units: | Optional units: | Optional units: |
| ○ °C | ○ kg | ○ m2 |
| ○ °F | ○ lb | ○ ft2 |

### 3.11.2.4  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.*

*Selecting Airspace file.*

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



*New copied file in sub-menu Selected.*

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



*Selecting new file.*

Select new copied file which will now be used.

### 3.11.2.5 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.*

### 3.11.2.6   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 Fenix data port 1 and the externally connected device. The following speeds can be chosen:
  - o **BR4800**
  - o **BR9600**
  - o **BR19200**
  - o **BR38400**
  - o **BR57600**
  - o **BR115200**
- ➢ **Data port 2 –** parameter to set communication speed between the Fenix data port 2 and the externally connected device. The following speeds can be chosen:
  - o **BR4800**
  - o **BR9600**
  - o **BR19200**
  - o **BR38400**
  - o **BR57600**
  - o **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.*

*3.11.2.7  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.*

*3.11.2.8  Info*

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

  ➢ **Serial nr. –** serial number of Fenix unit.
  ➢ **IGC nr. –** three letter IGC serial number.
  ➢ **Firmware –** current version of running firmware.
  ➢ **Hardware –** version of hardware used inside Fenix 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.

### 3.11.2.9  Password

Special function passwords can be used:

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



*Password page reference.*

# 4   Rear of unit

The Fenix contains the following external peripheral connections.

- ➢ **Power (9 – 36 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.
- ➢ **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 unit.*
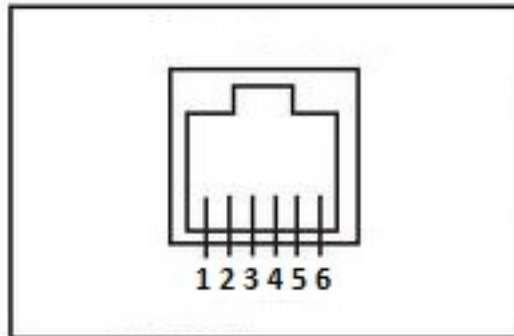
## 4.1    Data 1, data 2 port pinout



*Figure 1: 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 (Fenix receives data) |
| 5 | RS232 data output (Fenix transmits data) |
| 6 | GND |

# 5   Bluetooth connectivity

Fenix 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 Fenix 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 Fenix 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 Fenix | no | |
| Declaration transfer to Fenix | yes | |
| File transfers | no | |
| Flight transfers | no | |

## 5.3   Pairing 2nd seat unit with 1st seat unit

To pair your 2$^{nd}$ seat unit and 1$^{st}$ seat unit, both of units must have v 1.5.B50 or later installed!
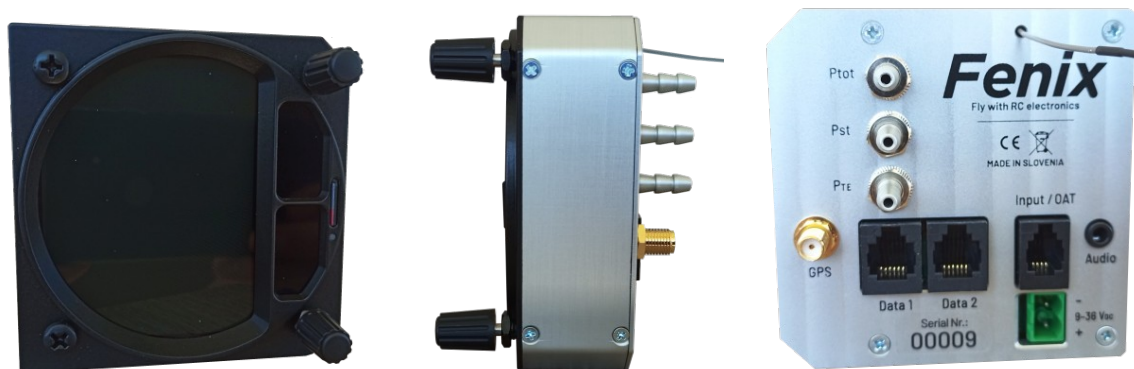
Then on 2$^{nd}$ unit go under Setup/Password and enter: 76676.

New dialog will be shown where user set serial nr of 1$^{st}$ seat main unit. After this 2$^{nd}$ unit needs power reset and communication will be enabled.

Procedure must be done only once!

# 6  Physical properties

This section is used to describe mechanical and electrical properties.



| Dimensions | 82 mm x 82 mm x 27 mm |
|---|---|
| Weight | 225g |

## 6.1  Electrical properties

**POWER USAGES**

| Input voltage | 9V (Vdc) to 32V (Vdc) |
|---|---|
| Input current | 130mA @ 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 32 (Vdc) per port |

# 7    Installation of the unit

## 7.1    Mechanical installation

Fenix unit fits in standard 80mm 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.

Ptot = Pitot or Total pressure
Pst = Static pressure
Pte = TE probe

When electronics compensation is used to compensate vario (vario/SC setting TE option to 90-110%) connect Pte and Pst port to static, Ptot to pitot pressure.

When compensation probe is used (set TE option to 0%) then connect Pte to compensation probe, Pst to static and Ptot 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 Fenix 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 rec order, 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 statis tic page appears, the rec order is still active.

# 9 Flying with Fenix

To get the best out of the unit, it is import ant 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 of 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 know on that flight and transfer of flight will start. Progress bar will inform pilot when flight is copied to external SD card.