LXNAVIGATION

Traffic monitor

user's manual

www.lxnavigation.com

LXNAVIGATION

Traffic Monitor 57
Traffic Monitor 80

User's manual
(version 1.8)

Refers to Traffic Monitor FW version 1.8

Made in Slovenia.

Contents

PART ONE – OVERVIEW

1.1 Overview

The Traffic Monitor is a FLARM radar and warning displaying unit with a bright, transflective technology display, which offers the pilot multiple navigation pages. It is a final glide calculator and navigation system with airspace support, audio warnings and voice messages.

The unit is capable of providing APT (airport), TP (turnpoint), and RTE (Route) navigation on three dedicated navigational pages. It also has a page showing detailed information regarding nearest objects with additional options. Navigation pages feature Navboxes, and Airspace, airports and turnpoint information is shown graphically.

The Traffic Monitor is designed to be installed into a standard 57 mm or 80 mm aviation instrument hole, depending on which size you have.

As an integral part, it has a 3.5" sunshine readable transflective LCD display (80 mm version) and a 2.5" screen (57 mm version) to show all user-defined data during flight.

For accessing all system options, two push-rotary knobs and two push buttons are used. A voice module is also built-in for audio warnings.

It also boasts 16 GB of internal memory, used for storing flights, aircraft info, databases etc.

The unit has the capability to be updated to any later FW version free of charge.
(Visit www.lxnavigation.com and look for Software & updates)

1.2 Operation

Switching the unit on

When power is delivered to the device, Traffic monitor will power on.

Switching the unit off

When power is taken from the device, Traffic monitor will shut down.

Input push buttons and push-rotary knobs

The LX Traffic Monitor has two push buttons and two push/rotary knobs for operation.

The left push/rotary knob, labeled with a magnifying glass, is used for the following operations:

- Turning the device on, when being held for three seconds
- Cancel or Exit, when pressed in most menus
- Zoom level change by turning on navigation pages

- Changing numeric values by tenfold when turning
- Additional info, when pressed while using navigation pages

The right push/rotary knob, labeled with 'NAVBOX' icon, is used for the following operations:

- Scrolling between primary pages by turning
- Changing numeric values by one when turning
- Enter or confirm, when pressed in most menus
- Enter submenu, when pressed in primary pages
- Change/edit NavBox, when being held for two seconds in any page that contains a NavBox line

The left button, labeled with 'BOX', is used for the following operations:

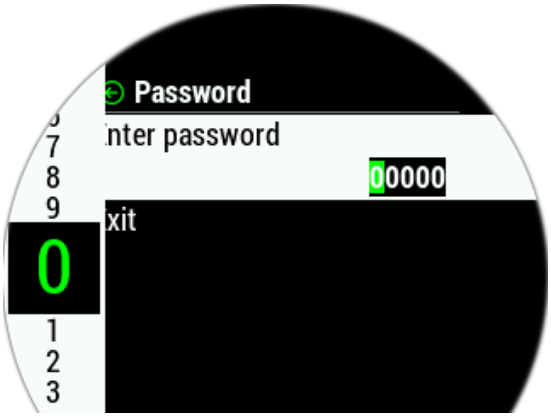
- Show/Hide and slide between different NavBox lines, when pressed in any page containing a NavBox line
- Change/edit NavBox, when being held for two seconds

The right button, labeled with 'VOL' is used for the following operations:

- Open MC submenu, when on any primary page
- Scroll between options in MC submenu, when pressed

Numeric input

In menus, where numeric input is required, such as Pilot mass or QNH value, the Pilot can either change the value by 1 with turning the right push/rotary knob, or by 10, with turning the left push/rotary knob.

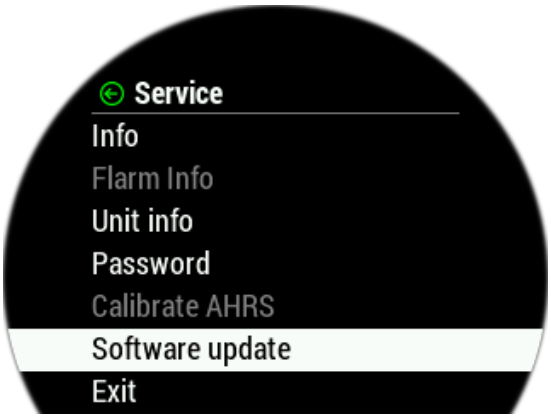


Alphanumeric input

In menus, where alphanumeric input is required, such as Pilot name and glider type an alphanumeric tape appears on the left. The pilot can choose the desired letter/number by turning the right push/rotary knob and confirm or transition to the next character with pressing the push/rotary knob. The left push/rotary knob has no function here.

Updating procedure

To start the updating procedure, gently eject the micro SD card. Turn off the device. Connect the micro SD card via the provided adapter or with the card reader to a computer. Open the micro SD card folder. Copy and paste the file for update (x.xx.lxu) to the root of your micro SD card. Carefully and gently insert the micro SD card in the LX Traffic Monitor and power up the device.
Go to Setup > Service > Software update and select the desired file. A password input dialog will appear. Type in the password '00000'.



PART TWO – INSTALLATION

1. 2.1 Mechanical installation

LX Traffic Monitor fits in a standard 80 or 57 [mm] // 3.15 or 2.25 [˝] instrument hole so no extra cut out is required. To fit the LX Traffic Monitor in the instrument panel, unscrew the two mounting screws (black) with a screwdriver and remove the two rotary knobs.
To remove the rotary knobs do not use force. First, remove the press-in cover to access the screw. Loosen the screw and pull off the knob. Place the LX Traffic Monitor in the hole in the instrument panel and first screw in the two black screws and then install the two rotary knobs.
Don't forget to tighten the screws in the knobs and put the press-in cover back on.

2. 2.2 Electrical installation

FLARM 1 (RJ45)

Pin number	Description
1	Power input
2	Power input
3	Not used
4	GND
5	RS 232 data in
6	RS 232 data out
7	GND
8	GND

FLARM 2 (RJ45)

Pin number	Description
1	Power input
2	Power input
3	Not used
4	GND
5	RS 232 data out
6	RS 232 data in
7	GND
8	GND

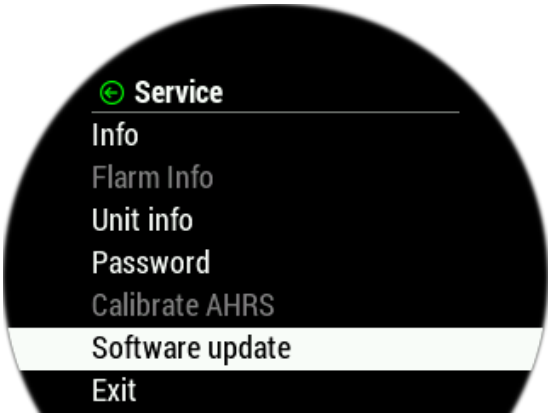
AUDIO (3.5 mm jack)

Standard 3.5 mm jack with audio out

3. 2.6 Update procedure

In order to update the device, please follow the steps below:

- Find and download the update file on www.lxnavigation.com
- Save the downloaded update file to the root of the supplied microSD card
- Insert the microSD card into the Traffic Monitor
- Turn the device on
- Go to Setup > Service > Software updates and select the downloaded update file
- Type in the password '00000'
- Copying of the file, and with it the update process, shall commence
- The device will turn off and require another turn on
- ″LX updating″ screen will appear
- After the updating process has ended, the unit will start itself normally. The user should check if the correct version is displayed on the greeting screen.



4.

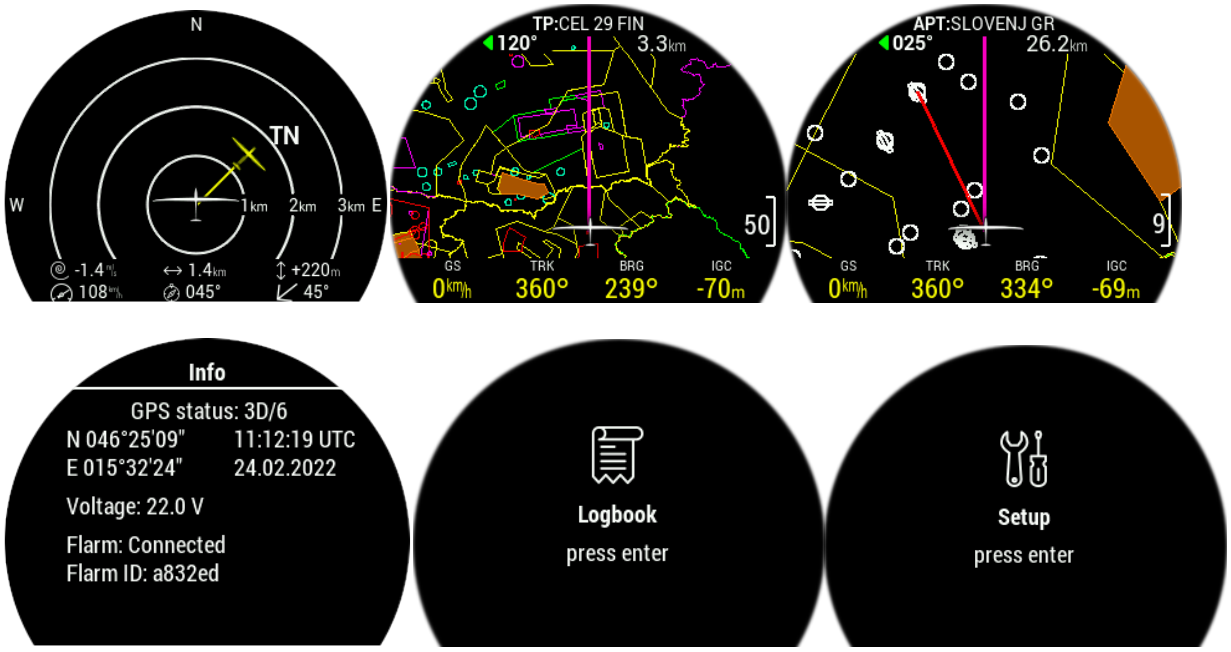
6. 2.7 Technical specifications

		Traffic monitor 57	Traffic monitor 80
Dimensions	[mm]	62.2 x 62.2 x 66.2	82.3 x 82.3 x 68.0
Power supply	[V DC]	9.0 - 29.0	9.0 - 29.0
Nominal Voltage	[V DC]	13.8	
Average power consumption	[W]	1.52	
Mass	[g]	185	255
Mounting panel cut out	[mm]	57.0	80.0
Depth behind panel without connectors	[mm]	45.5	49.0
Depth in front of panel	[mm]	20.7	19.0
Low Ground Survival Temperature	[°C]	-55	
Low Operating Temperature	[°C]	-20	
High Ground Survival Temperature	[°C]	+85	
High Short Time Operating Temperature	[°C]	+70	
High Operating Temperature	[°C]	+55	
Temperature Variation	[5°C/min]	5	
Relative Humidity	[%]	0 – 98	
Max. Operational Altitude	[ft]	90,000	
Operational Shock	[10g]	6 g	
Crash Safety Shock	[20g]	20 g	
Vibration		DO-160D U F/F1	

PART THREE – INTERFACE

3 Primary pages overview

The primary pages represent a row of pages in the graphical user interface, which allow the user to access different information screens and flight parameters.
The user will go through the following pages, in their respective order, if he swipes to the right:



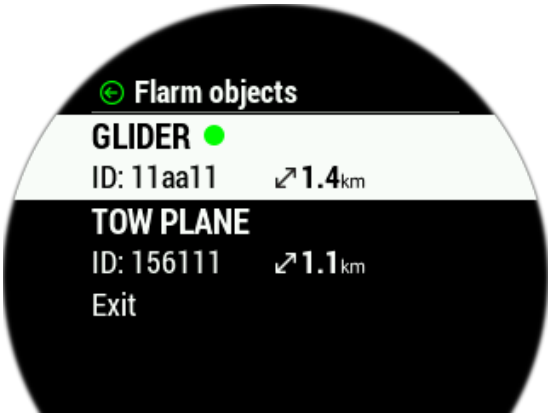
3.1 Radar page

Usable only when a Flarm and/or ADS-B device is connected. If the Flarm device is not connected, a red cross will appear. The device is capable of showing all traffic processed by the Flarm (Flarm objects, ADS-B and Transponder).

NOTE: Press the "BOX" button to hide the parameters bar at the bottom of the display.

Rotating the left push/rotary knob will change the zoom level.

Pressing the left push/rotary knob will open the list of Flarm objects, stating their Flarm ID and aircraft type, as well as horizontal distance.

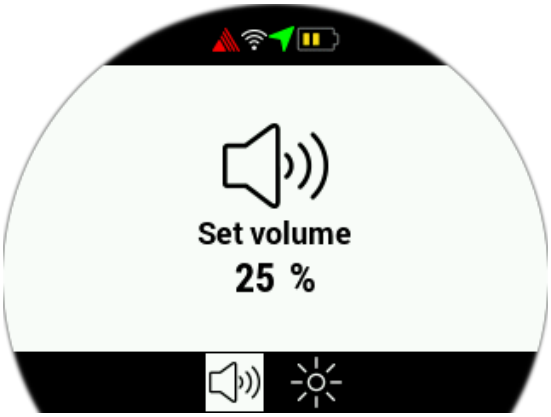


Pressing the right push/rotary knob will open the selection option, where the pilot can select an object, for which additional info will be shown below. The additional info is as follows:

- Vertical speed of the object
- Horizontal distance to object
- Vertical distance to object
- Speed of the object
- Bearing of object
- Current track of object

Pressing the right 'VOL' button will open the VOL submenu, where we can see the Flarm, GPS and battery status indicators, and the following values can be set:

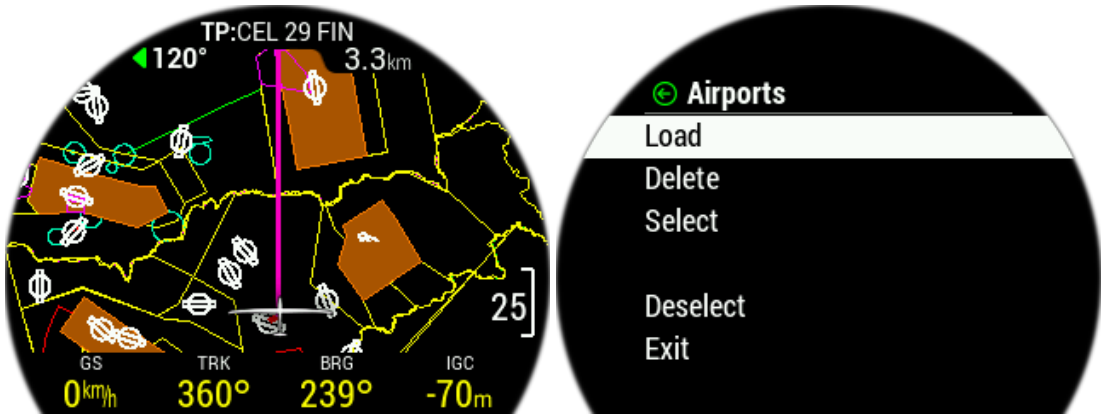
- Volume
- Brightness



NOTE: A red cross across the screen indicates that there is no FLARM connection.

3.2 TP page

In order to use this page to its maximum extent, the user should first import turnpoint, airspace, and airfield files. For more information on this subject, please refer to Setup/Transfer/Load Turnpoints.

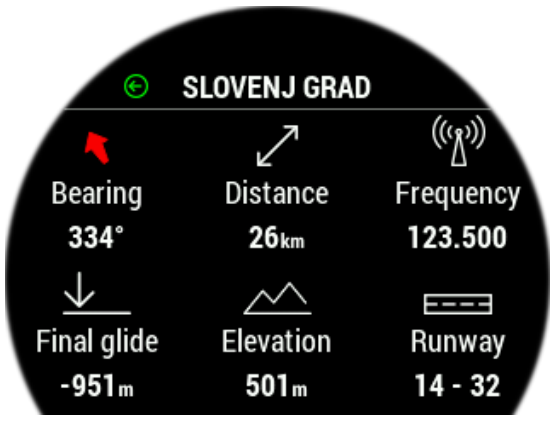


At the top of the screen, the current navigation page is noted with **TP**, **APT** or **RTE/TSK**, followed by the name of the current navigation point.
In the next line, the steering course is shown on the left and distance to turnpoint on the right.
On the right side of the screen, a scale for zoom level is shown.
In the far bottom a NavBox line containing four NavBoxes is shown. This NavBox line can be manipulated with the use of the 'BOX' button. Pressing the 'BOX' button will hide it, for a greater view of the map.

Above the NavBox line, in the middle, a glider (Powered plane for powered aviation) is located with two lines. The first one, showing in line with the aircrafts chord the current course and the second, toward the navigation point.

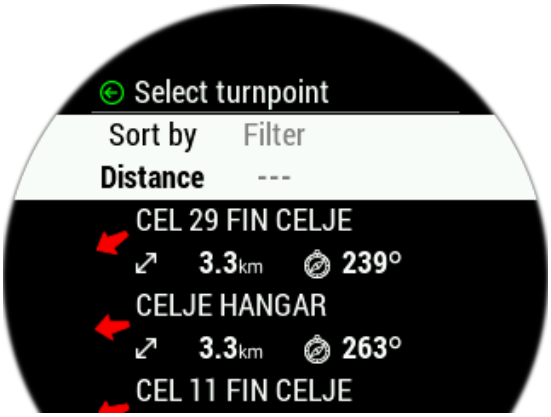
Pressing the left push-rotary knob will open additional info of the point, showing the following info:

- Bearing, indicated with a numeric value and whether or not it is in final glide, with the colour of the arrow (Red for out of final glade and green for in final glide)
- Distance
- Final glide
- Elevation



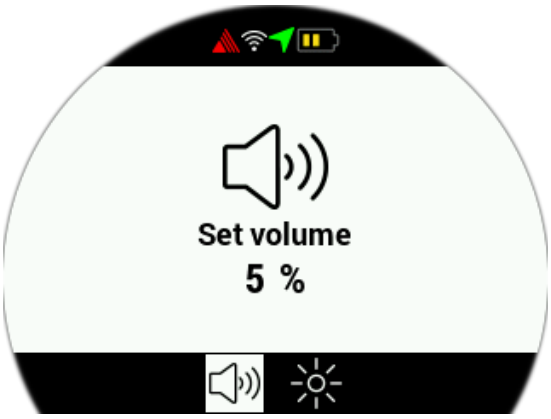
Turning the left push-rotary knob will change the current zoom level on the map.

Pressing the right push/rotary knob will open the Turnpoint selection submenu. Here, the pilot can sort and select turnpoints by distance, name or code. Distance, bearing and whether or not the point is within range (final glide) is shown for every point.



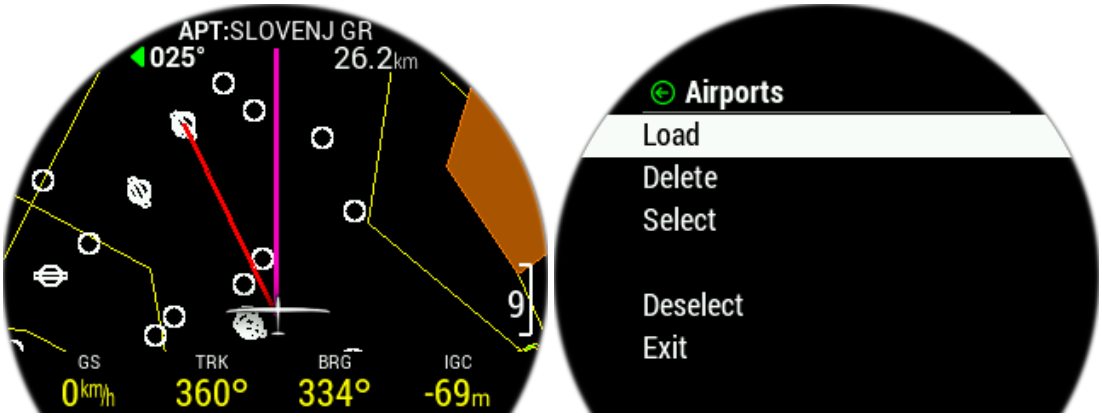
Pressing the right 'VOL' button will open the VOL submenu, where we can see the Flarm, GPS and battery status indicator, and the following values can be set:

- Volume
- Brightness



NOTE: A red cross across the screen indicates that there is no GPS connection.

3.3 APT page



In order to use this page to its maximum extent, the user should first import airports, airspace, and airfield files. For more information on this subject, please refer to Setup/Transfer/Load airports.

At the top of the screen, the current navigation page is noted with **TP**, **APT** or **RTE/TSK**, followed by the name of the current navigation point.
In the next line, the steering course is shown on the left and distance to airports on the right.
On the right side of the screen, a scale for zoom level is shown.

In the far bottom a NavBox line containing four NavBoxes is shown. This NavBox line can be manipulated with the use of the 'BOX' button. Pressing the 'BOX' button will hide it, for a greater view of the map.

Above the NavBox line, in the middle, a glider (Powered plane for powered aviation) is located with two lines. The first one, showing in line with the aircrafts chord the current course and the second, toward the navigation point.

Pressing the left push-rotary knob will open additional info of the point, showing the following info:

- Bearing, indicated with a numeric value and whether or not it is in final glide, with the colour of the arrow (Red for out of final glade and green for in final glide)
- Distance
- Final glide
- Elevation

Turning the left push-rotary knob will change the current zoom level on the map.

Pressing the right push/rotary knob will open the Airport selection submenu. Here, the pilot can sort and select Airport by distance, name or ICAO code. Distance, bearing and whether or not the point is within range (final glide) is shown for every point.

Pressing the right 'VOL' button will open the VOL submenu, where we can see the Flarm, GPS and battery status indicators, and the following values can be set:

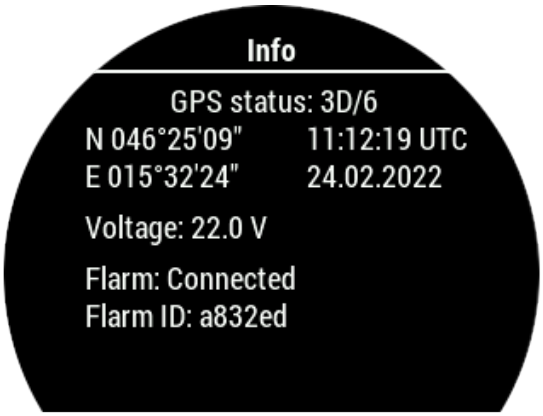
- Volume
- Brightness

NOTE: A red cross across the screen indicates that there is no GPS connection.

3.4 Flarm warning

Appears when the Flarm device sends a warning to its displays. The page itself shows all relevant info to the pilot with symbols, graphics and numbers.

3.5 Info page



Info page shows the following info:

- current GPS status
- date
- latitude
- longitude
- UTC time
- Voltage of external battery
- Flarm status
- Flarm ID

Pressing the right 'VOL' button will open the VOL submenu, where we can see the Flarm, GPS and battery status indicator, and the following values can be set:

- Volume
- Brightness

3.6 Flight statistics page / Logbook

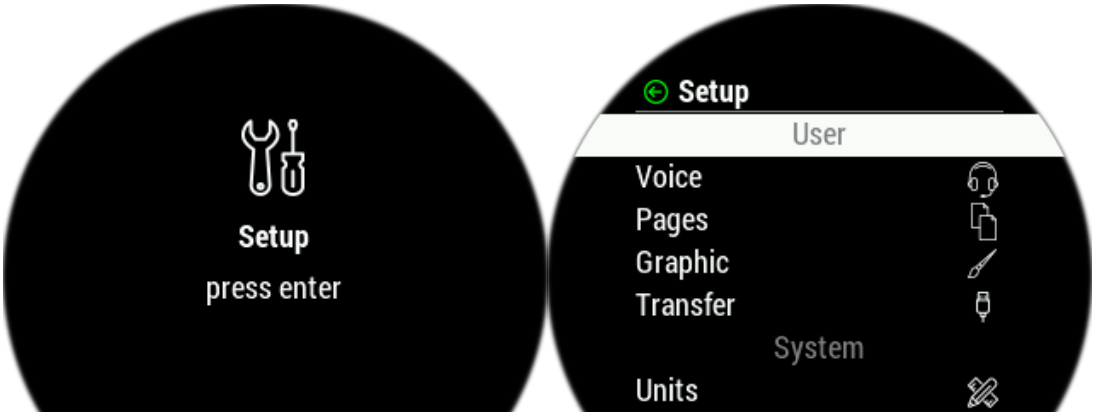
Flight statistics page appears instead of the logbook page only when the unit is in flight mode.
It shows us our barograph, with time on the x-axis and altitude on the y-axis.

The maximal altitude, flight duration and take-off time are shown.
When not in flight mode, Logbook is shown.

Pressing the right 'VOL' button will open the VOL submenu, where we can see the Flarm, GPS and battery status indicator, and the following values can be set:

- Volume
- Brightness

3.7 Setup page

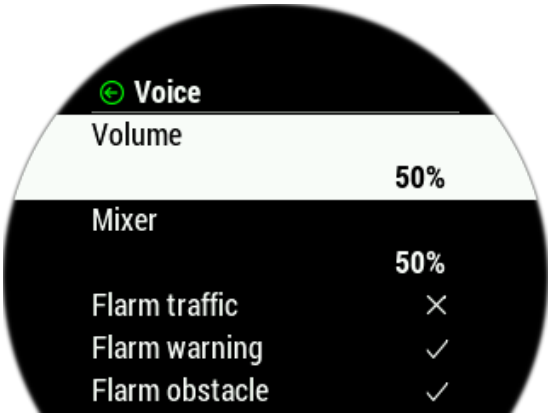


Under setup, the pilot can set all parameters of the unit. The menus are divided into two subsections, User and System. User settings are concerning the pilot's personal preferences, while System settings are concerned to the device setup. The menus are following:

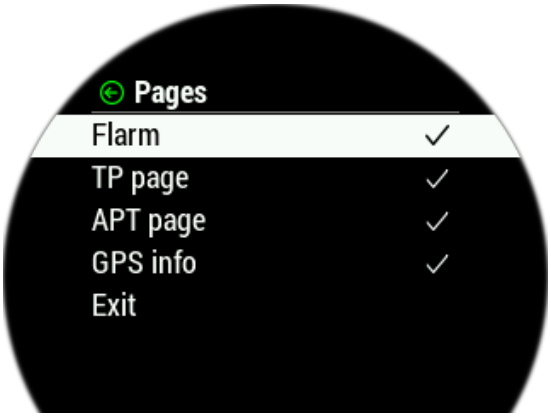
- User:
  - Voice
  - Pages
  - Graphic
  - Transfer
- System
  - Units
  - NMEA
  - Network
  - Localization
  - Service
  - Shutdown
  - Exit

3.7.1 Voice

Gives us the option to set volume for Voice commands and which voice commands we wish to hear. Mixer and Volume for voice warnings can be set, as well as selection of warnings, which should be used by the voice module.



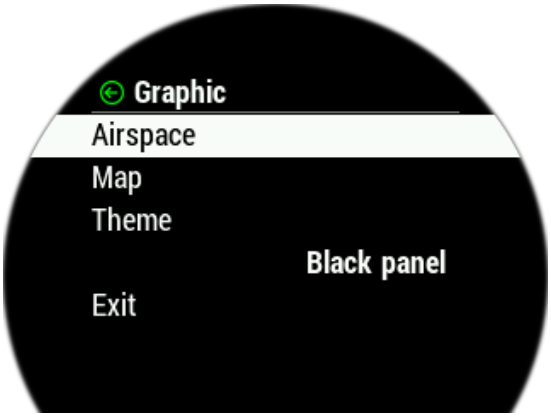
3.7.2 Pages



The pilot can select which main pages are active. Page is active when the box is checked. There are eight main pages available:

- Flarm
- TP page (turnpoint)
- APT page (airport)
- RTE/TSK page (route/task)
- GPS Info

3.7.3 Graphic



The Graphic setup is where you can set custom colours for Airspace, Map and Task, as well as set font sizes for map objects. By selecting Theme you can either select "Black panel" for black background or "White Panel" for white background.

Airspace

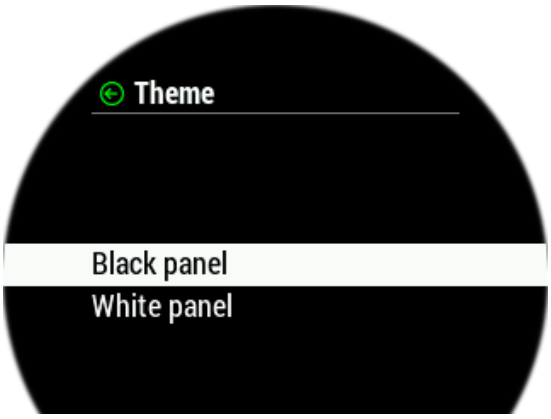
In the Airspace menu you following submenus to edit:

- Controlled Zone
- Prohibited
- Restricted
- Danger
- Terminal area
- Airway
- Glider
- Military
- Other
- Class A, B
- Class C
- Class D
- Class E
- Class F

Under each submenu you can find Outline and Fill row. Some have only Outline. By selecting each row you enter the menu with a scroll bar for selecting the colour. As described in point 1.4 Basic use & gestures.

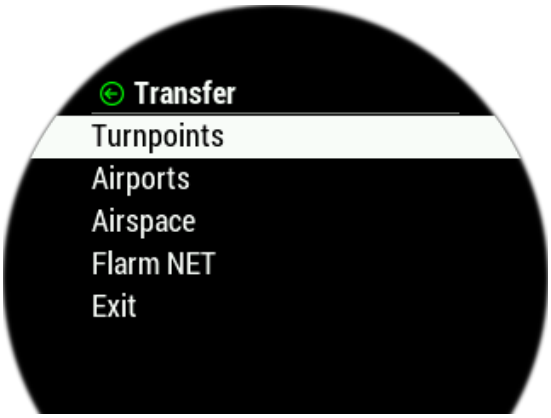
Once you have adjusted the colour you want to use, press back on the top left corner of the display and the settings will be saved and you will return to the submenu.
The same logic applies to set colour for Fill.

Theme



We offer two different colour themes, a 'White panel' and 'Black panel' theme. Pilots can choose to their taste and visibility. Please note that after choosing a theme, the device will turn itself off.

3.7.4 Transfer



The transfer page is used for transferring turnpoint and task files (.cup), airport files (.af), airspace files (.cub) and FlarmNET files.

It is also used for selecting active files and deleting old files.

'Load' is used to upload a file from the microSD card to internal memory.

'Select' is used to select between multiple files from internal storage.

NOTE: Always use only SanDisk Ultra, red and grey, from 2 GB to 32 GB.

Turnpoints

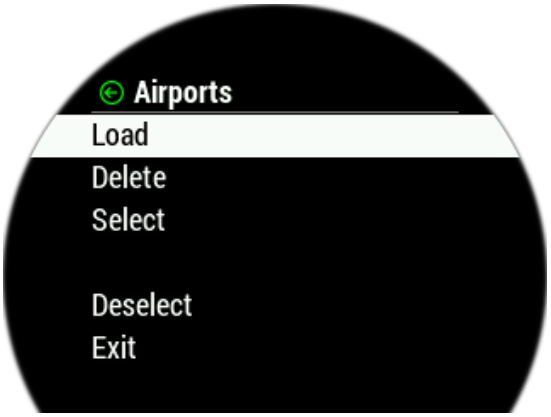
After selecting "Turnpoints" option, multiple options are shown:
- Load is used for uploading files from microSD to device
- Delete is used for erasing files from the device
- Select is used for selecting and activating file
- Deselect is used for deselecting and deactivating the file

A list of .cup files (up to 20) found in the root of the external microSD card will be listed under Load Turnpoint.
Select a file from which you wish to import TPs and tasks to the internal database.

After importing, the process can take from 5 sec. up to 10 min (depends on the number of TPs and alphabetical sort inside CUP file). The number of TPs is not limited but we recommend that you use a CUP file with up to only 6000 points.

Name of every TP will be shortened to max 11 characters after import.

Airports

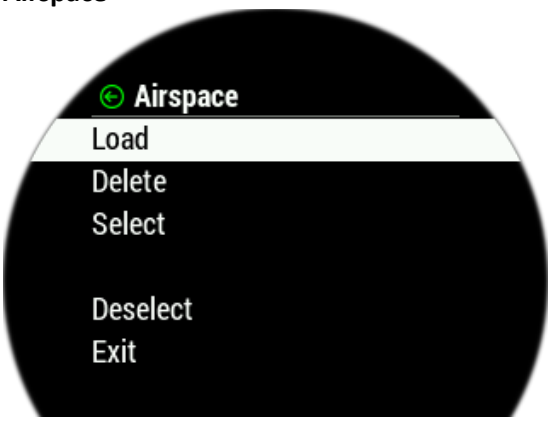


After selecting "Airports" option, multiple options are shown:
- Load is used for uploading files from microSD to device
- Delete is used for erasing files from the device
- Select is used for selecting the active file
- Deselect is used for deselecting the file

A list of all .af files (up to 20) found in the root of the external microSD card will be listed under Load Airports.

Select the file from which you wish to import APTs to the internal database. .af file is a commonly used file for transferring APTs.

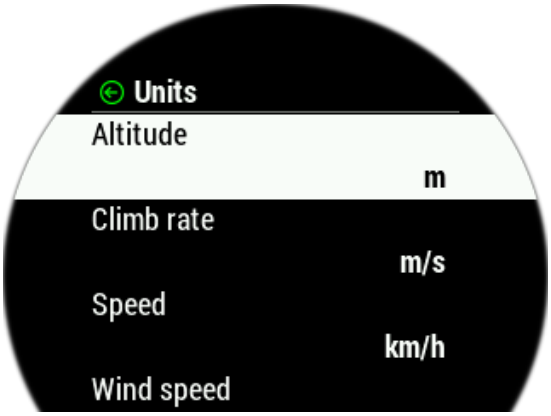
Airspace



A list of all .cub files (up to 20) found in the root of the external microSD card will be listed under Load Airspace.
Select the file from which you wish to import Airspace data to the internal database.

.cub file is a commonly used file for transferring Airspace data.

3.7.5 Units



The units menu holds the units options for all flight parameters, shown as either an indicator, navbox, widget or digital needle. Pilot can set units for:

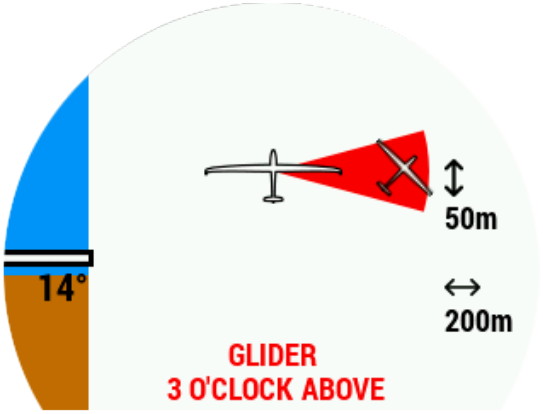
- Altitude (m, ft)
- Climb rate (m/s, kts)
- Speed (km/h, mph, kts)
- Wind (km/h, mph, kts, m/s)
- Distance (km, nm, mi)
- Pressure (mbar, inHg)
- Temperature (°C, °F)
- Weight (kg, lb)
- Area (m2, ft2)

3.7.6 Warnings

Warnings are used to inform the pilot that some flight-related data is outside set margins. When a warning state is detected by LX Traffic Monitor, the pilot will get a red warning message box with a description of what is outside margins.

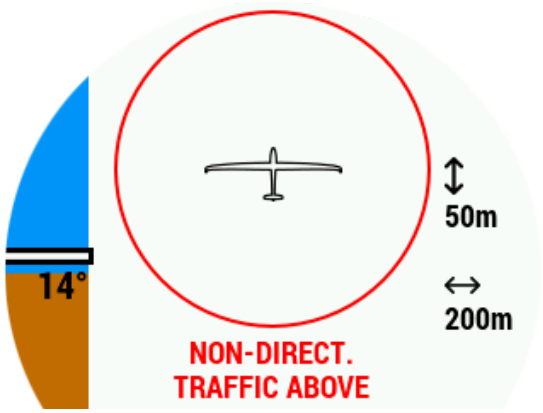
The pilot can enable (box is checked) audio warnings and Flarm warnings.
- Audio: if disabled, voice warning will not be generated – only visual warning message box
- Altitude warning: warning when flying over selected altitude

Flarm warnings



Classic flarm warning will display a direction in which the object is, the vertical and horizontal distance and the angle at which the pilot must be cautious.

Non-directional warnings



Warnings received from transponder traffic will be displayed as non-directional warning which will display peremitter in which the object might be without the direction.

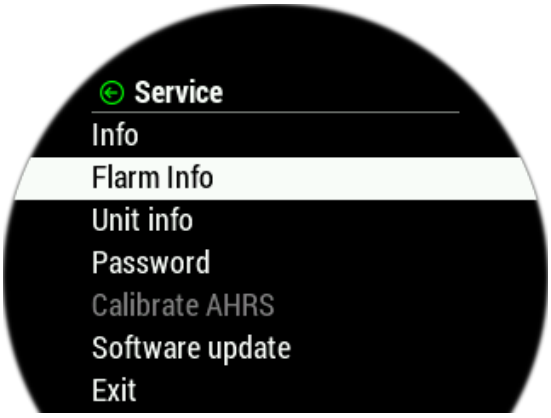
3.7.7 NMEA

- This page is used to set up the baud rate of both 'Data in' and 'Data out' ports. The pilot can set a baud rate for communication over both ports.
- Pilot can select from: BR4800, BR9600, BR19200, BR38400, BR57600 and BR115200 options.
- In case the device has CAN ports, this Setup menu is not used.

3.7.8 Localization

Select your language and time zone for correct time offset.

3.7.9 Service



3.7.10 Shutdown

To shutdown the device, use a manual switch to take power and the device will shut down.

PART FOUR – CONNECTIVITY

1. 4.1 SD card

Always copy data to the root of the SD card. Always use the SD card provided with the new device.
All the data and flights are on the root of the SD card. Always safely remove SD card when connected to a computer.

NOTE: Always use only supplied SanDisk Ultra, red and grey, from 2 GB to 32 GB.

PART FIVE – CONFORMITY

2. 5.1 Declaration of CE Conformity

Identification of product
Traffic Monitor (all variants)

Manufacturer
LX navigation d.o.o.
Tkalska ulica 10
SI-3000 Celje
Slovenia

Related standards
EMC directive 2004/108/EC

This product is designed to comply with standards/regulations and technical specifications stated above. This certificate is granted subject to the LX navigation quality rules on product certification.

Remark
The product is designed to comply with s LX navigation standards and standards harmonized with directive 2004/108/EC: EN 55022:1998+A1:2000+A2:2003, class A; EN 55024:1998+A1:2001+A2:2003; En 61000-3-2:2000+A2:2005; EN 61000-3-3:1995+A1:2001+A2:2005

3. 5.2 Environmental data

Description	***Section***	***Category***	***Conditions***
Temperature / Altitude D1	4.0	D1	
Low Ground Survival Temperature	4.5.1	D1	-55°C
Low Operating Temperature	4.5.1	D1	-40°C
High Ground Survival Temperature	4.5.2	D1	+85°C
High short Time Operating Temperature	4.5.2	D1	+70°C
High Operating Temperature	4.5.3	D1	+55°C
In Flight Loss of Cooling	4.5.4	Z	No auxiliary cooling required
Altitude	4.6.1	D1	90,000 ft
Temperature Variation	5.0	B	
Humidity	6.0	A	
Shock	7.0	B	
Vibration	8.0	U/U2	Vibration curve F/F1 (robust vibration, helicopter)
Explosion Proofness	9.0	X	not tested
Water Proofness	10.0	X	not tested
Fluids Susceptibilities	11.0	X	not tested
Sand and Dust	12.0	X	not tested
Fungus Resistance	13.0	X	not tested
Salt Spray	14.0	X	not tested
Magnetic Eect	15.0	Z	Less than 0.3m
Power Input(DC)	16.0	B	
Voltage Spike Conducted	17.0	B	
Audio Frequency Conducted Susceptibility	18.0	B	
Induced Signal Susceptibility	19.0	X	not tested
Radio Frequency Susceptibility	20.0	T	Radiated Susceptibility T
Conducted Susceptibility Emission of RF	21.0	M	
Lightning Induced Transient Susceptibility	22.0	A2XXX	
Lightning Direct Effects	23.0	X	not tested
Icing	24.0	X	not tested
Electrostatic Discharge (ESD)	25.0	A	
Fire, Flammability	26.0	X	Enclosure made of aluminum (Al) sheet

Environmental tests are performed in accordance with RTCA DO-160

TIPS, TRICKS & TROUBLESHOOTING

Storing the device

Store the LX Traffic Monitor in a dry environment, with a temperature below 25°C.

Battery
There is no internal battery inside this device.

LXNAVIGATION