LXNAVIGATION

PowerFLARM Eagle

installation manual

www.lxnavigation.com

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Flarm Eagle 2022

Installation manual
(version 1.0)

Refers to LX Flarm Eagle 2022 version 1.0

For a new world experience.

Made in Slovenia.

Contents

PART ONE – INTRODUCTION

1.1 Preamble

Why LX Navigation?

LX Navigation is one of the oldest avionics brands. Its founders started experimenting with glider computers way back in the 70's and the company has been working on improving your flight performance ever since.

Throughout the last 45 years or so it has been working on instruments that most pilots will have used at some time. In fact, our equipment can be found in almost any aeroclub!

Our equipment has always been ground-breaking.

Our motto?

Be the first. Be the best. Be different.

1.2 Operation

Switching the unit on

To turn the unit on, provide the unit with the power supply. Unit will turn on automatically when power is applied. Power supply can be provided on any of the two available data/power ports (RJ45). Device is typically operational within 1 minute after applying power if sufficient GNSS reception is provided.

Switching the unit off

To switch off the device, cut off the power supply. There are no special procedures required to switch off the unit.

Operation mode

Operation mode slide switch is located on the bottom side of the unit. The position of the switch can be changed using a pen or similar pointy object. This prevents the switch from accidentally changing position.

There are two modes of operation:
- BLUETOOTH/WIFI
- *FLARM2

In case WIFI mode is selected, the Flarm Eagle itself is the configuration device. Flarm can be configured by the user using built-in WiFI portal. In such a case *FLARM2 port can be used as an output port only. This means we can connect only monitor devices to the *FLARM2 port.

In case *FLARM2 mode is selected, the *FLARM2 port acts as a fully operational configuration interface (output and input). This means that devices with capability to configure the Flarm module can be connected to the *FLARM2 port.
In this case the WiFi portal can not be used for configuring the Flarm module.

PART TWO – INSTALLATION

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 Electrical installation

Flarm Eagle has two DATA ports (Flarm / NMEA) and is intended for use with FLARM and other NMEA devices.

2.6 Update procedure

Flarm Eagle is constructed from two modules: Flarm module, Eagle module. Each module is updatable by procedures described below.

Updating Flarm module

The Flarm module can be updated in two ways. Either using a USB key or via Flarm Eagle built-in WiFI portal.

There three types of updates that can be uploaded to Flarm module:

- Firmware
- Obstacle database
- License file

Each type of update is performed in the same way.

The Flarm firmware update file is published on www.lxnavigation.com under section "Support".

NOTE: *Obstacle database and License files are created by FLARM and depend on module serial number. Therefore they are not published on the LX Navigation website.*

Updating using USB key:

In order to update Flarm module, follow the steps:

1. Save the downloaded update file to the root of the USB key.
2. Insert the USB key into the Flarm Eagle.

3. Turn the device on.
4. Wait. The unit will update on its own. Typical duration is less than 5 minutes.
5. After an update the unit will restart and boot into a new version.

Updating using WiFi portal:

WiFi portal is accessible by connecting to the Flarm Eagle access point using a personal device (tablet, smartphone, PC, etc). After successful connection, the portal shows up automatically.

NOTE: *In case the portal is not shown automatically, open a web browser and enter url: 192.168.4.1.*

In order to update Flarm module, follow the steps:

1. Save the downloaded update file to the device you will use while connecting to the portal.
2. Connect to the portal.
3. Go to “Transfer” > “Update FLARM module” (check note below).
4. Choose the previously downloaded file and click “Upload”.
5. Status message at the bottom of the page will indicate the progress of the upload. At the end message: “Finished uploading. Please, restart the device.” shows up.
6. Restart Flarm Eagle manually.

NOTE: *For uploading an Obstacle database or License file go to* “Transfer” > “Update database” or “Transfer” > “Update license” in step 3.

Updating Eagle module

Eagle module firmware is user updatable via built-in WiFi portal only. WiFi portal is accessible by connecting to the Flarm Eagle access point using a personal device (tablet, smartphone, PC, etc). After successful connection, the portal shows up automatically.

NOTE: *In case the portal is not shown automatically, open a web browser and enter url: 192.168.4.1.*

Eagle module firmware update contains two files: application part and file system part.

Check the current firmware version

In order to check the current firmware version (application and file system parts) follow steps:

1. Connect to the portal.
2. Go to “System info”.
3. Under the section “System” there are attributes “Firmware version” (application part) and “File system version” (file system part).

Update application and file system part

The latest Flarm Eagle firmware is published on www.lxnavigation.com under section “Support”.

Download and extract the archive. There are separate binary files for application and file system part. Save those files to the device you will use while connecting to the portal (smartphone, tablet, PC, etc).

NOTE: *It is recommended to first update the application and then file system part.*

To update application follow the steps:

1. Connect to the portal.
2. Go to “Transfer” > “Update Eagle”.
3. Under the “Application” section choose the application file.
   (named FlarmEagle_ESP32_1.0.160.bin or similar).
4. Click “Upload” (button in “Application” section).
5. Status at the bottom of the page should now show the message: “Uploading… This might take a while”. Wait until the message “Finished uploading” pops up. Flarm eagle will then automatically restart.

To update file system follow the steps:

1. Save the downloaded update file to the device you will use while connecting to the portal.
2. Connect to the portal.
3. Go to “Transfer” > “Update Eagle”.
4. Under the “File system” section choose the file system file.
   (named FlarmEagle_esp32_spiffs_1.0.161.bin or similar).
5. Click “Upload” (button in “File system” section).
6. Status at the bottom of the page should now show the message: “Uploading… This might take a while”. Wait until the message “Finished uploading” pops up. Flarm eagle will then automatically restart.

2.7 Technical specifications

Dimensions	[mm]	23.1 x 69.6 x 79.5
Power supply	[V DC]	9.0 - 32.0
Nominal Voltage	[V DC]	13.8
Average power consumption	[W]	2.35
Mass	[g]	102
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	[g]	10 g
Crash Safety Shock	[g]	20 g
Vibration		DO-160D U F/F1

NOTE: *This specifications applies to all variants of Flarm Eagle*

PART THREE – INTERFACE

3.1 Serial Data Interface

Flarm Eagle is capable of interfacing with other aviation instruments by sending and/or receiving serial data on its two serial data ports. All two serial data ports can be configured individually.

The serial inputs/outputs conform to RS-232C (EIA Standard) with a positive and a negative output voltage of at least 5V when driving a standard RS-232 load.

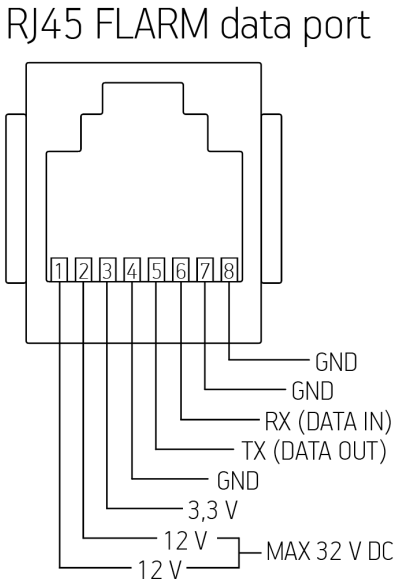
It is not sucient that power supply ground on both devices is connected to aircraft ground. An additional direct ground connection is mandatory.

The use of a 4 twisted pair shielded cable, is highly recommended.
With this cable both data wires, GND reference and power supply can be connected using a single cable.

The table below contains maximum recommended cable lengths when using shielded data cables for an RS-232 data interface. Exceeding these cable lengths may reduce signal integrity and compromise the reliability of the data interface.

DATA TYPE:
Each of the ports can be configured individually:
Data protocols available:

- NMEA (default @ 19200 baud rate)
- GARMIN TIS (requires additional license @ 9600 baud rate)



3.2 WiFi Interface

Flarm Eagle features an integrated WiFi interface through which personal devices like tablets, smartphones, or computers can connect and control the device. More details on usage of WiFi portal is available in the users manual.

3.3 Audio Output

Flarm Eagle audio output is available on the 3.5mm standard audio jack. THis provides an audio signal to an audio panel, an intercom or an external speaker (max power 5W)

The audio output volume level is adjustable via WiFi portal (permanently configured to a certain level)

In some installations, for example if connecting the AT-1 to an avionics audio panel (input impedance typically 500 Ohm), it may be required to install an impedance matching transformer 1:4, 1:1 or similar.

LX navigation provides an optional 1:1 transformer (sold separately).

PART FOUR – INSTALLATION

4.1 Handling

To avoid damage to the system, take precautions to prevent Electrostatic Discharge (ESD) when handling with the unit, connectors, and associated wiring. ESD damage can be prevented by touching an object that is of the same electrical potential as the unit before handling the unit itself. Make sure you are working in an ESD safe environment. Devices contain sensitive RF components that can be permanently damaged when exposed to an ESD.

Installation and handling of the supplied goods should be performed only by skilled personnel.

Many military or civil standards for avionics installations are acceptable.

4.2 Wiring and connections

Wiring should be installed in accordance with applicable regulations.

Flarm Eagle is using a standard RJ45 connector on both interfaces. Route the wiring bundle as appropriate. Avoid sharp bends. Secure all wires in order to minimize vibration damage. Preferably shielded wire is to be used. Do not route cable near high voltage sources and alongside Radio and Transponder antennas.

For power supply, manually resettable circuit breakers are strongly recommended. These circuit breakers allow for individual devices to be switched without compromising other systems on the same power bus. 3A fuse is recommended.

4.3 Antenna

Flarm Eagle relly on the performance of the antenna. Propper Antenna installation is essential for a proper system operation. For more details on antenna installation and antenna selection please advise document FTD-041-Application-Note-FLARM-Antenna-Installation.

Connecting the antennas
Use a provided, marked antenna and screw the connector on the antenna to the same marked connector on the device.

1. GPS (Caution: “GPS” text on antenna must face upward.)
2. ADS-B (ADS-B receiver antenna)
3. FLARM 2 (Optional additional FLARM antenna for Diversity)
4. FLARM 1 (Main FLARM ante)

Picture: SMA connector on the antenna

4.3 Mounting

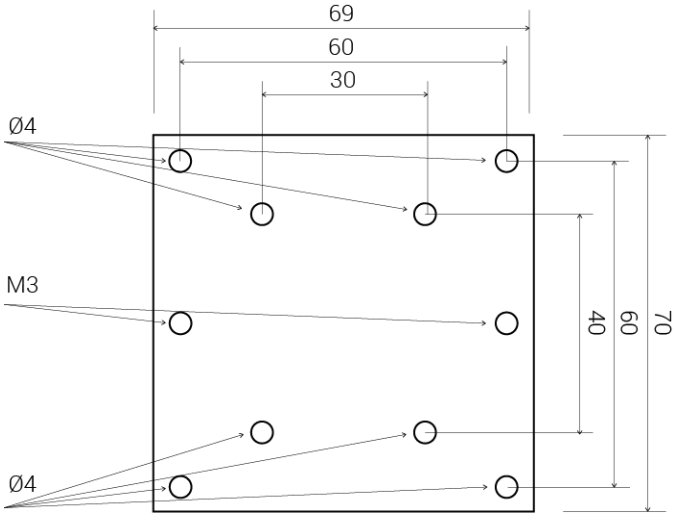
Flarm Eagle is designed with two brackets with holes that serve as mounting points for the installation. Flarm Eagle can be mounted securely via these two M3 holes onto a flat surface with any screw. Flarm Eagle is designed to be mounted in the avionics compartment or behind the instrument panel of an aircraft. Depending on the aircraft's individual requirements other locations may be suitable as well.
Flarm Eagle does not require additional external cooling. Make sure that installation is performed behind the engine firewall.

Two mounting options in remote location are possible:

- Directly to flat surface via two eyelets with M3 screw (DIN 7985).
- With usage of mounting frame (sold separately).

Compass sidconeration
Make sure that device is mounted more than 25 cm from the compass. When installation is completed a fresh compass calibration is recommended (in some installation cases required).

Mounting Frame (PN LX02167)
Mounting frame has two M3 tap holes for Flarm Eagle mounting.
The mounting frame must be fixed on a flat surface with at least four screws. There are two possible mounting options. Inner holes are 4 mm countersunk holes allowing use of M3/M4 DIN 965 screws while outer holes allow mounting with M3/M4 DIN 7985 screws.



All dimensions are in millimeters (mm).

PART FIVE – CONFORMITY

5.1 Declaration of CE Conformity

Identification of product
Flarm Eagle 2022 (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

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	Except intended operating frequencies (868/915 MHz and 2.4/5 GHz)
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 Flarm Eagle in a dry environment, with a temperature below 25°C.

Battery
There is no internal battery inside this device.

RELEASE NOTE

Eagle module firmware versions:

Version: 1.0.160
Date: 2021-12-23
Compatible file system: 1.0.161

- Added portal stop timeout.
- Fix for RX and TX status wrong indications.
- Fix for default units.

Version: 1.0.40
Date: 2021-10-12
Compatible file system: 1.0.32

- Added Upload Barograph feature.
- Fix for Logbook showing blank items if logbook empty.

Version: 1.0.0
Date: 2021-09-21
Compatible file system: 1.0d

- Initial version.

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