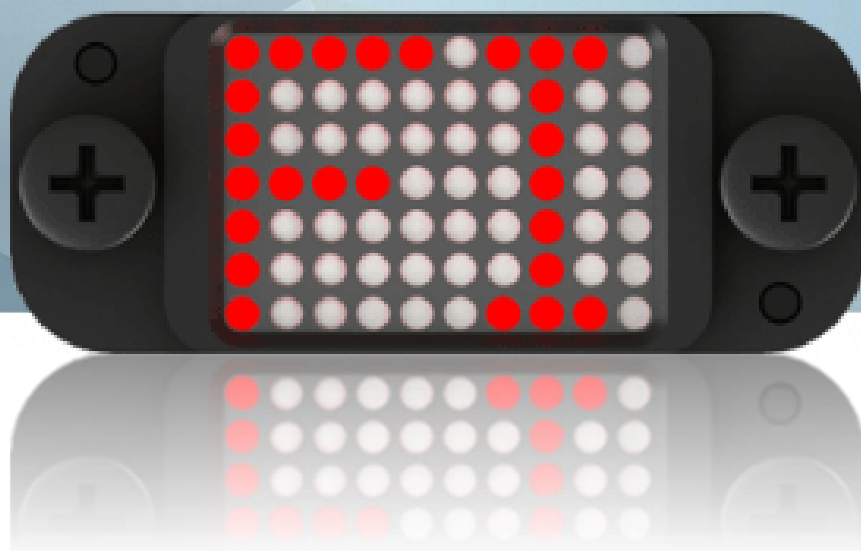


INSTALLATION MANUAL

FLAP indicator

Version 1.10



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1 Important Notices

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A Yellow triangle is shown for parts of the manual which should be read very carefully and are important for operating the system.



Notes with a red triangle describe procedures which are critical and may result in loss of data or any other critical situation.



A bulb icon is shown when a useful hint is provided to the reader.

1.1 Limited Warranty

This LXNAV product is warranted to be free from defects in materials or workmanship for two years from the date of purchase. Within this period, LXNAV will, at its sole discretion, repair or replace any components that fail in normal use. Such repairs or replacement will be made at no charge to the customer for parts and labor, provided that the customer shall be responsible for any transportation cost. This warranty does not cover failures due to abuse, misuse, accident, or unauthorized alterations or repairs.

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To obtain warranty service, contact your local LXNAV dealer or contact LXNAV directly.

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2 Installations

2.1 Packing Lists

- Flap Indicator unit

2.2 Basics

The LXNAV FLAP indicator is a small display unit with a red 10x7 LED matrix display (sup for) indicating preconfigured flap positions. It can be used as a part of main instrument or as stand-alone unit connected only to a LXNAV FLAP sensor. The indicator has no buttons or any other user interactives. All settings and firmware upgrades on the device are made over the main instrument, or a PC via mini a USB cable.

At startup indicator will roll its name over the display as FLIND, (sup when follows) followed by the "app" or "rec" and at the end, version of firmware for example "v1.00".

"app" (application) means that Flap indicator is in the operation mode, and waiting either for settings from the main unit, PC or data from the FLAP sensor to show its position. If the indicator is in the "rec" mode (recovery), then it will not show any data. The reason could be in errors while upgrading the firmware such as a cable disconnection, low voltage, etc.

In case the FLAP indicator is going to be used in a standalone operation, it has to be purchased with:

- FLAP sensor
- RS485 splitter
- Power cable with termination

2.3 Electrical specifications

2.3.1 Absolute maximum ratings with respect to GND

Parameter	Symbol	Rating	Units
Power Supply	V _{max}	40.0	V
Power Consumption at 12V	I _{max}	200	mA

2.3.2 Recommended electrical and mechanical characteristics

Parameter	Symbol	Min	Typ	Max	Units
Power Supply	V _{in}	8.0	12.0	28.0	V
Operation temperature range	T _{wr}	-20	-	+60	°C
Storage temperature	T _{st}	-40	-	+80	°C

2.4 Installation

The flap indicator has a specific, non-standard enclosure that fixes to airplane panel with two M4 screws on 41 mm distance between them. Mount it horizontally with a mini USB connector on top.

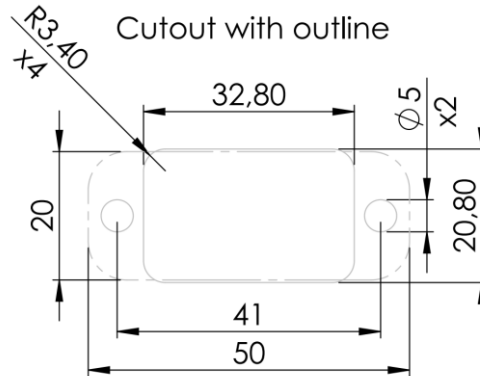


Figure 1: Recommended panel cutout (hatched area)

2.5 Wirings

The LXNAV Flap indicator is connected to the RS485 bus through an RS485 splitter and a SUB D9 connector. The splitter is not part of the package. If you don't have a spare port on it, you must order another 485 splitter. Along the flap indicator (supp should be mounted also) one should also mount a FLAP sensor from which the indicator receives data.

2.5.1 Slave mode wiring

In the slave mode, connecting the FLAP indicator to an RS485 bus is the same as for any other LXNAV instrument. Connect it to any free port on the RS485 splitter.

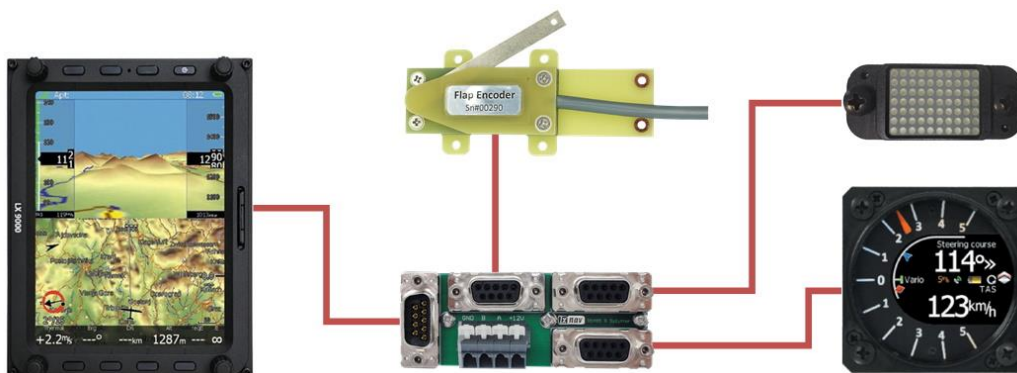


Figure 2: Example of slave wiring

2.5.2 Standalone mode wiring

When the FLAP indicator is used in the standalone mode, connect it to an RS485 splitter along FLAP sensor. Two devices are powered from third connector on which is power cable and a built-in termination resistor.

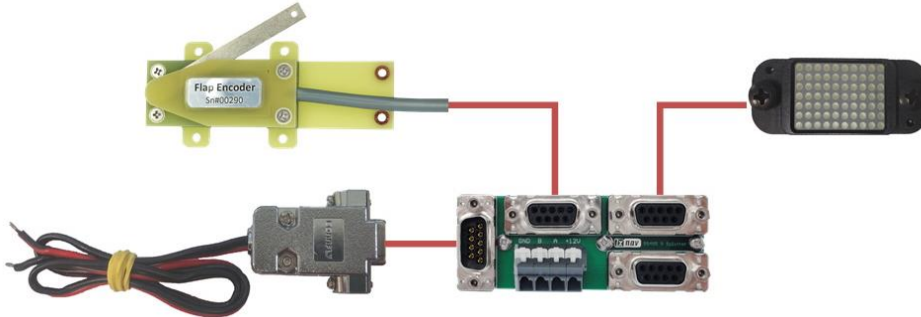


Figure 3: Wiring of FLAP indicator in standalone mode

2.6 Setting flap positions

Putting the FLAP indicator in the working mode is selected automatically. When it receives a flap setting from the main unit, such as an LX9000, it goes into slave mode. This means, the indicator is just listening on the RS485 bus. The second option is, when there is no main unit. In that case, it goes in standalone mode and is constantly asking the FLAP sensor for the current position. The standalone mode is selected right after the user sends settings to the FLAP indicator over the USB. Setting the flap positions is described in following chapters.

2.6.1 LX80xx, LX90xx

On the main unit, under the "Setup" menu, go to "Hardware" and "Flaps". Put the flaps (sup to) in the upper position, move the cursor on the instrument to the first box, and click the "SET" button. This will save current angle set from the FLAPS sensor to the first box. Write the name for this state, and repeat the same action for the remaining positions. When this is finished, click the "CLOSE" button, and all data will be sent to the FLAP indicator.

Flaps		
Sensor Position: 5.5°		
Toggle SC/Vario at: ---		
Reference Weight: 375 _{kg}		
Flap	Speed Range	Sensor
• +1	60 ^{km/h} - 76 ^{km/h}	246.9°
• 0	76 ^{km/h} - 94 ^{km/h}	320.6°
• -1	94 ^{km/h} - 112 ^{km/h}	5.5°
•	112 ^{km/h} - 130 ^{km/h}	---
•	130 ^{km/h} - 148 ^{km/h}	---
•	148 ^{km/h} - 166 ^{km/h}	---
•	166 ^{km/h} - 184 ^{km/h}	---
•	184 ^{km/h} - 202 ^{km/h}	---
•	202 ^{km/h} - 220 ^{km/h}	---

Figure 4: Example of saved flap positions on LX9000 main unit

If the positions are already saved, after a first startup with the FLAP indicator, wait for a minute, and the instrument is going to update the indicator automatically. When it receives data, it will save them to its internal memory, and show them next time right after the system startup.

2.6.2 PC via mini USB

This option is available only for the standalone mode of the FLAP indicator. Settings made over the Flap configurator tool will not be sent to the main unit, instead they will be rewritten by LX80/90xx.

Connect the mini USB connector to the FLAP indicator **after** powering up. On your computer you should see a new serial communication port. Under "Settings", in Flap configurator, select it, and then press the "Connect" button just next to "Settings".

Now you are able to see the current flap angle. Put the flaps in the upper position, write its name in the "Pos1 name" text box, and press the "Set" button to determine the angle. Repeat the same process for the remaining flap positions. When it is done, click the "Save" (sup button) and "Disconnect" buttons. Now you are ready to use the FLAP indicator with the FLAP sensor.

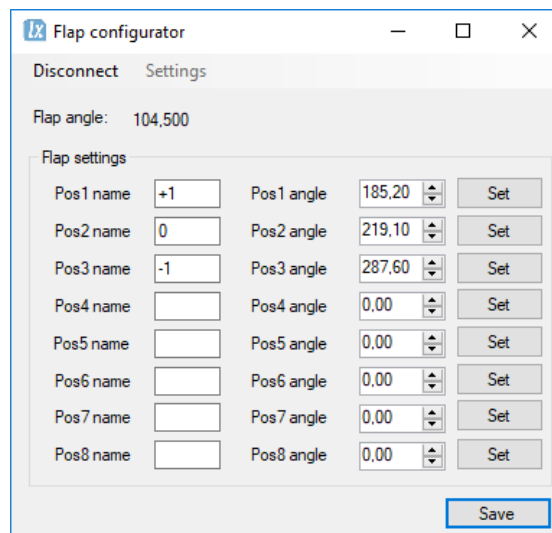


Figure 5: Flap configurator with FLAP indicator settings

2.7 Updating firmware of Flap Indicator

Latest firmware for LXNAV instruments can be found on:

<http://www.lxnav.com/download/firmware>

Update is possible with one of the following two examples:

2.7.1 LX80xx, LX90xx

Firmware updates can be done via a main unit such as the LX 80/90xx.

- 1.) Start the main unit with the connected FLAP indicator.
- 2.) Go to: Setup->Password and type in "89891"
- 3.) If there is only one update file, it will automatically update the indicator. Otherwise it should be selected manually. The update filename name is "App_FIND_x.yy.lxfw", where x.yy is the firmware version.
- 4.) When the update is done, the FLAP indicator will restart with the new firmware and the previously saved settings.

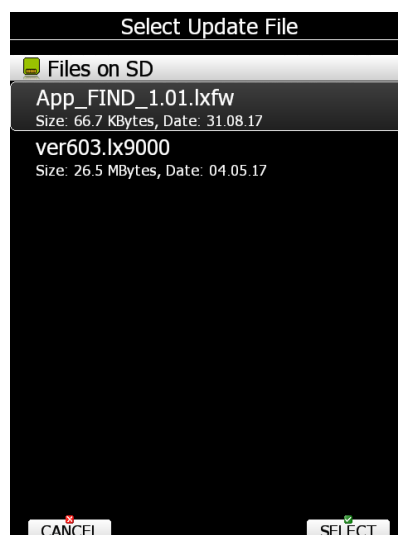


Figure 6: Select update file for FLAP indicator

2.7.2 PC via mini USB

The second option for firmware updating is via a PC, and is the only way when the FLAP indicator is used without the main unit.

- 1.) Download FlashLoader485App (PC update tool) from the LXNAV website under the section for S7 instruments: www.lxnav.com/download/firmware
- 2.) Connect the mini USB connector to the FLAP indicator, and on the other side, to your PC.
- 3.) Power up the indicator over the SUB D9 connector.
In this case, when the USB is connected before powering up the instrument, it goes in recovery mode, which can be seen from the welcome text "FLIND rec vx.yy" on the screen. From this moment on, the firmware can be updated.

- 4.) Choose the correct serial port. Baudrate has no function – leave it as it is.
- 5.) Chose the firmware file App_FIND_x.yy.lxfw, where x.yy is the version.
- 6.) Press the Flash button, and the update will start.

After a successful update, the indicator will restart and go back in recovery mode; thus the USB has to be disconnected and the indicator repowered. If the update procedure is interrupted (supp of any case) for any cause, the FLAP indicator will cycle in recovery mode and it has to be updated again following the process described above.

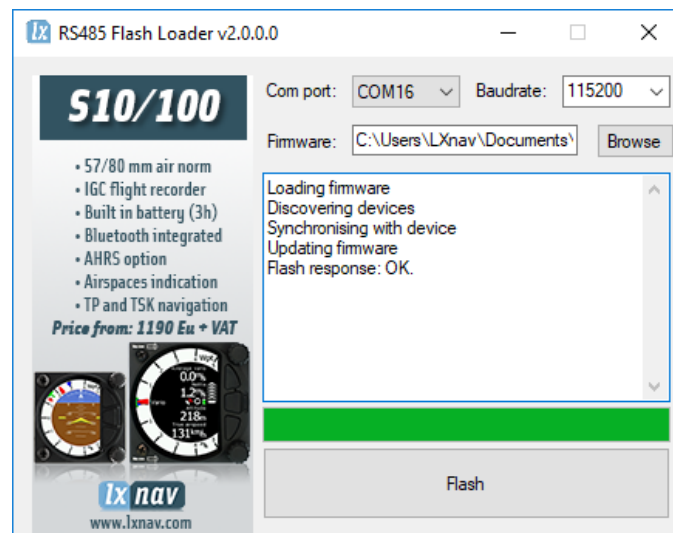
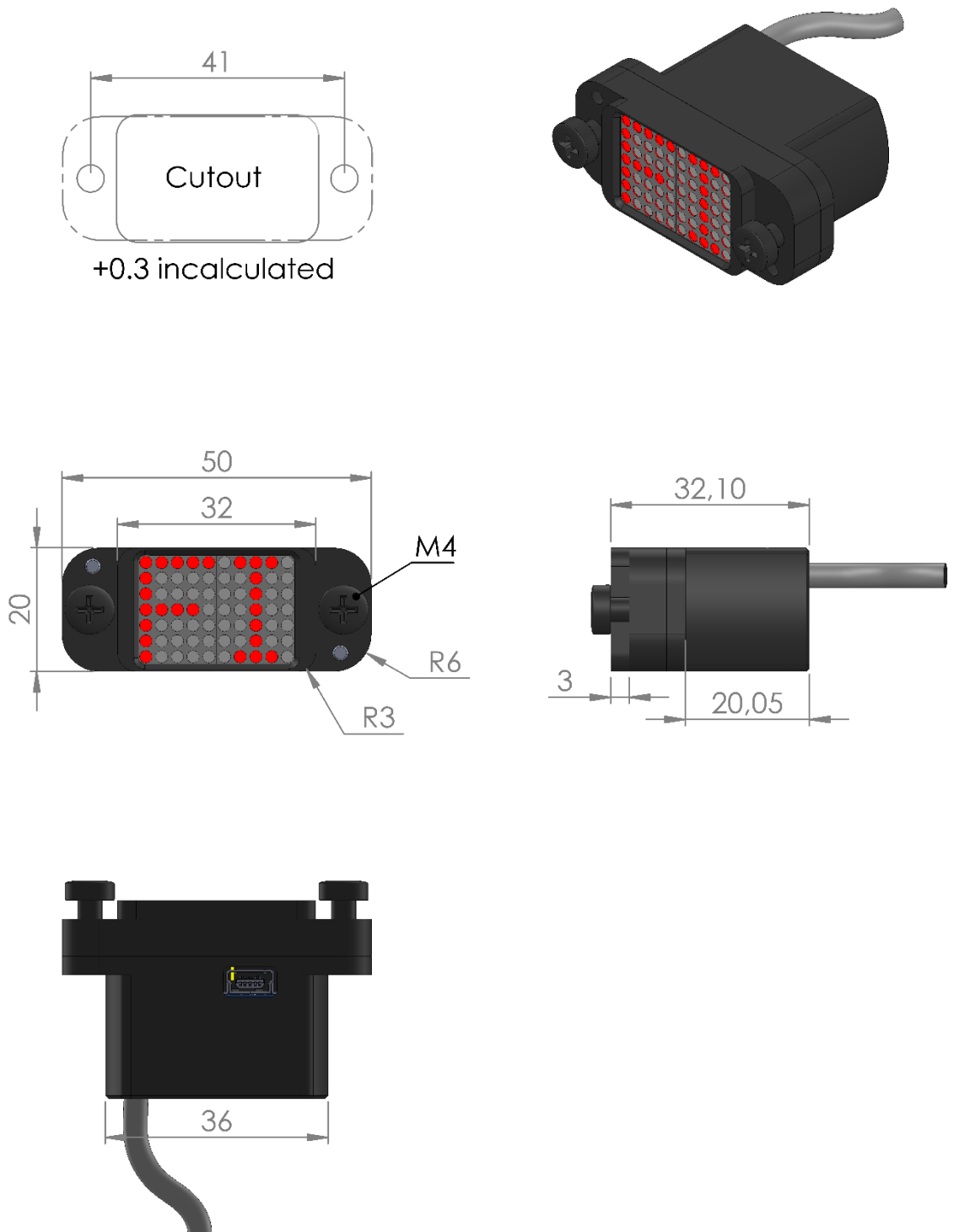


Figure 7: Flash Loader update tool after a successful firmware update

2.8 Dimmensions



Drawing is not to scale

Figure 8: FLAP indicator outer dimmensions

3 Revision History

Rev	Date	Comments
1	September 2017	Initial release
2	August 2018	English correction by JR.
3	January 2021	Style update
4	December 2023	Updated chapter 2.4

The pilot's choice



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