Airdata indicator

User Manual

Version 1.0

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1 Important notices

The Airdata indicator (ADI) is designed for informational use only. All information are presented for reference only. It is ultimately the pilot's responsibility to ensure that the aircraft is being flown in accordance with the manufacturer's aircraft flight manual. The indicator must be installed in accordance with applicable airworthiness standards according to the country of registration of the aircraft.

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

Notes with a red triangle describe procedures that 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 ADI 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 option, 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 labour, the customer shall be responsible for any transportation cost. This warranty does not cover failures due to abuse, misuse, accident, or unauthorised 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 Packing lists

- Airdata indicator (ADI)
- Power supply cable

3 ADI basics

3.1 The ADI at a glance

The Airdata indicator or ADI is standalone unit designed to measure and indicate airspeed, altitude and outside air temperature. The unit has standard dimensions that will fit into the instrument panel with an opening of 57 mm diameter.
The unit has integrated high precision digital pressure sensors. The sensors are sampled 50 times per second. Real time data is displayed on a QVGA 320x240 pixel 2.5-inch high brightness color display. Three push buttons are used to adjust values and settings.

3.1.1 ADI features

- An extremely bright 2.5" QVGA color display readable in all sunlight conditions with the ability to adjust the backlight
- Three push buttons are used for input
- Logbook
- 100 Hz sampling rate for very fast response.

3.1.2 Interfaces

- Serial RS232 input/output
- Micro SD card

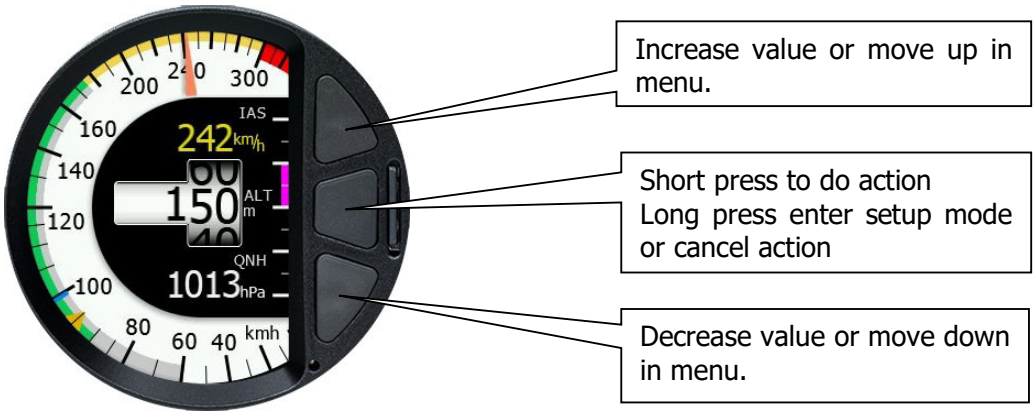
3.1.3 Technical data

- Power input 8-32V DC
- Consumption 90-140mA@12V
- Weight 200g
- Dimensions: 57 mm cut-out 61x61x48mm

4 System description

4.1 Push buttons

Airdata indicator has three push buttons. It detects short or long presses of the push button. A short press means just a click; a long press means pushing the button for more than one second.
The three buttons between have fixed functions. The top button usually increases a value or move focus up. Middle button is used to confirm or dismiss selection. The lower button is used to decrease a value or move focus down.



4.2 SD card

SD card is used for updates and transfer of settings to other device. To update device simply copy update file to SD card and restart the device. You will be prompt for an update. For normal operation, it is not necessary to have SD card inserted.

4.3 Switching on the unit

There is no special action required to switch on the unit. When power is applied to the device, it will switch on and will be ready for immediate use.

4.4 User input

The user interface consists of dialogues which have various input controls. They are designed to make the input of names, parameters, etc., as easy as possible. Input controls can be summarized as:

- Checkbox,
- Selection control,
- Spin control,
- Slider control

Inside the dialog press top button to move the focus to control above currently selected or press bottom button to move next control below currently selected. Press middle button to change value of focused control.

4.4.1 Navigating menus

When you press middle button for longer time, you will get into setup menu. Press upper and lower button to move focus. Quickly press middle button to enter submenu. Long press middle button to exit submenu or select Exit option in menu.

4.4.2 Checkbox

A checkbox enables or disables an option. Press middle button to toggle selected option. If an option is enabled a check mark will be displayed, otherwise an empty rectangle will be drawn.

4.4.3 Selection control

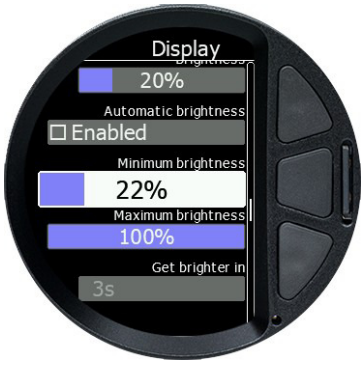
Selection control is used to select a value from a list of predefined values. Press middle button to enter edit mode. Currently selected value will be highlighted in blue. Use upper and lower button to select other value. Confirm selection with short press on middle button. Long press middle button to cancel selection and exit without changes.

4.4.4 Spin control

Spin control is used to select a numerical value. Press middle button to enter edit mode. Currently selected value will be highlighted in blue. Use upper and lower button to increase or decrease value. Long press will make a bigger increase or decrease. Confirm selection with short press on middle button. Long press middle button to cancel selection and exit without changes.

4.4.5 Slider control

Some values, such as volume and brightness, are displayed as a slider.



Press middle button to enter edit mode. Slider background colour will change to white. Use upper and lower button to increase or decrease value. Long press will make a bigger increase or decrease. Confirm selection with short press on middle button. Long press middle button to cancel selection and exit without changes.

5 Operating modes

The Airdata indicator has only one main screen, quick menu for QNH and setup mode. When powered on, main screen will be shown. Short press any button to access QNH menu. Long press middle button to enter setup mode

5.1 Main screen

Primary function of ADI is to display indicated airspeed. Indicated airspeed is displayed with needle on user customizable dial. A great care has been taken when designing a dial, which is nonlinear to have better resolution in thermaling range. See chapter 5.3.2.1 how to customize speeds markings on the dial.

In the middle of screen altitude is displayed as rolling counter. On the right side vertical speed is drawn as a magenta bar. Additionally, two numerical values can be show. See chapter 5.3.1 how to customize main screen.

5.2 QNH mode

QNH mode is used to enter QNH. Press and key to enter this mode. It will display current QNH and elevation, if you are still on the ground. Press upper or lower button to change QNH. On th ground display will look like one the picture below.

While flying QNH display will looks like next picture.

QNH display will be automatically closed few seconds after last button was pressed.

5.3 Setup mode

Long press middle button to enter setup mode. Setup is used to configure your Airdata indicator.

A setup menu with following options will be displayed:

- **Display** – use this menu to set brightness, customize numerical parameters, set theme color and needle size
- **Airspeed** – Define speed markings, airspeed calibration table and method for true airspeed calculation.
- **Vertical speed** – change vertical speed filter and total energy compensation, if needed.
- **Temperature** – define temperature offset.
- **Battery** – select chemistry of battery, which is being used for ADI in order to have proper battery indication
- **Warnings** – ADI can display user defined warnings for speed and altitude.
- **Units** – define system of measure.
- **System time** – enter current time and data for recording purposes.
- **Password** – used to reach system setup and various calibrations.

When SD card is inserted all settings will be copied to it once you exit setup mode. Settings are stored in file named settings.bin. Insert such SD card to other ADI and you will be prompt to copy settings from SD card to device. With this method you can easily duplicate settings.

5.3.1 Display

Use this menu to set brightness, customize numerical parameters, set theme color and needle size.

Display row 1 and Display row 2 are used to select values which are shown in top row or bottom row. User can select among following options: QNH, Battery voltage, Outside temperature, Vertical speed, Density altitude, Flight level, Height above take-off elevation, Altitude, True airspeed, Indicated airspeed and none.

Colour style – Gauge defines background color of airspeed dial, which can be black or default white.

Cursor style, user can choose between three different cursor styles.

Brightness sets current screen brightness. If automatic brightness is enabled then this control will show current brightness.

If the **Automatic Brightness** box is checked the brightness will be automatically adjusted between the minimum and maximum values.

Get Brighter In specifies in which time period the brightness can reach the required brightness.

Get Darker In specifies in which time period the brightness can reach the required lower brightness.

Night Mode Darkness is used in night mode, which is not implemented yet.

5.3.2 Airspeed

In this menu user can define speed markings, airspeed calibration table and method for true airspeed calculation.

5.3.2.1 Speeds

ADI allows user to define all the speed markings for the dial. Please refer to aircraft manual to enter appropriate speeds.

You can also enter Vne at different altitudes. If Vne are entered for different altitude, then speed marking for Vne will change with altitude and gives a pilot proper warning for maximum speed.

5.3.2.2 Calibration table

User can make corrections to the indicated airspeed for instrument and position error. Use this table to enter corrections. By default, two points are entered, one for Vso and one for Vne.

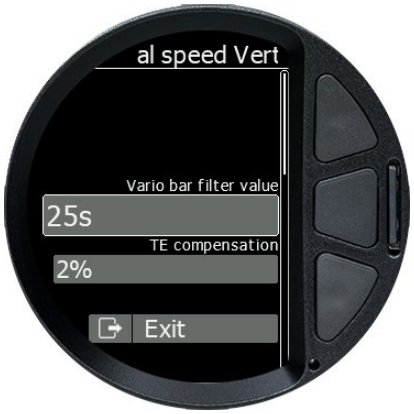
To add new point, select Add Point line and enter IAS and CAS. Press Save button to add or exit to cancel. Press delete line to delete a point.

5.3.2.3 TAS method

You can select three methods how true airspeed is calculated. **Altitude only** method is using standard temperature profile with altitude and shall be used only in case OAT probe is not mounted or not working properly, **Altitude and OAT** is method which takes into account density change due to altitude change and temperature change. **Altitude, OAT and Compressibility** is method which takes into account also compressibility of the air and shall be used for faster aircrafts.

5.3.3 Vertical speed

Vario bar filter value defines response of the vertical speed indication. Higher value of filter will cause more slow and more filtered response of vertical speed indication.



TE compensation is used mainly for gliders in order to show total energy change rather than vertical speed. Set to 100%, if you want to have compensated vertical speed indication or leave on 0 to have non-compensated vertical speed.

5.3.4 Temperature

A temperature offset can be defined here. Temperature offset is same for the whole temperature range. Temperature offset should be set on the ground. If temperature indication is the air is not ok, you should consider relocating OAT probe.

5.3.5 Battery

Airdata indicator can also shows battery information in case it is running on batteries. Select battery type from the list or enter values manually.

5.3.6 Warnings

The indicator can display warnings for user defined altitudes and speeds. Warning will be displayed in center of the screen with red blinking background and critical parameter written in the middle of the screen.

5.3.6.1 Altitude warning

Two altitude warnings can be defined. First altitude warning is set for altitude ceiling and will be triggered "warn me before" seconds you are going to reach this ceiling. Second warning is defined for altitude floor and will be triggered when you are about to descend to this altitude.

5.3.6.2 Speed warning

User can select airspeed alarm for stall speed and for maximum speed.

5.3.7 Units

In this menu you can define system of measure for all the data. Select from predefined sets or change each unit separately.

5.3.8 System Time

In this menu the user can set the local time and date. Available is also an offset from UTC. UTC is used within the recorder.

5.3.9 Password

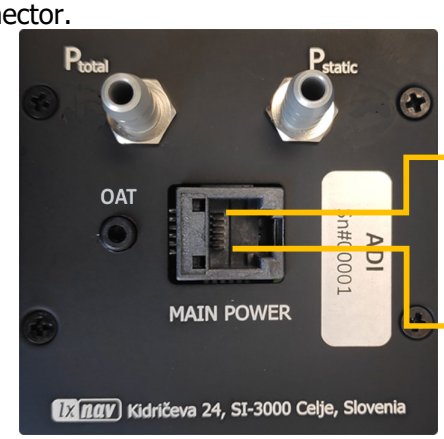
Password menu is used to access special function. Mostly calibration parameters and resetting sensors, etc. Please consult manufacturer before using it.

01043 - Auto zero of the pressure sensor
00666 - Reset all settings to factory default
16250 - Show debug info
40000 – Set airspeed threshold

6 Wiring and static ports

6.1 Pinout

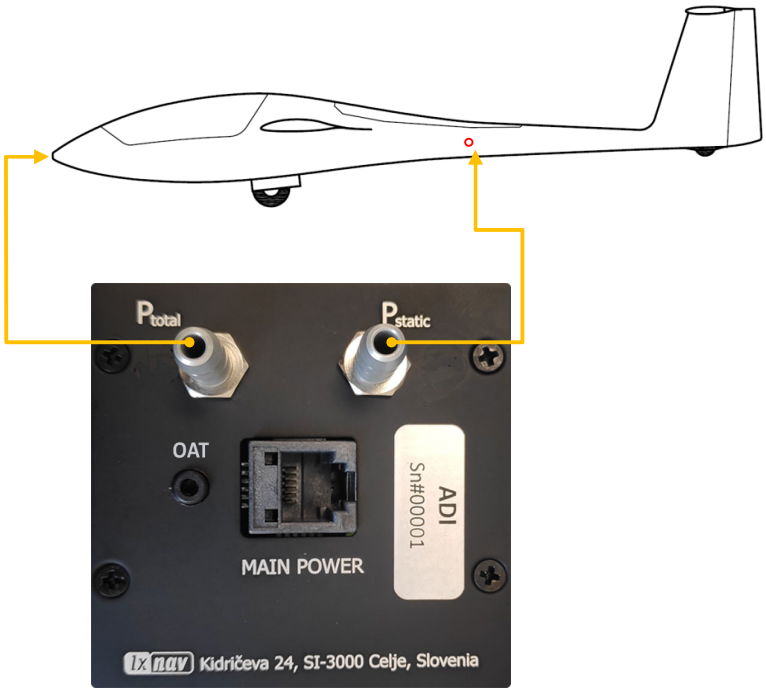
Power connector is pin compatible with S3 power or any other FLARM cable with RJ12 connector.



Pin Number	Description
1	Power supply input
2	No connection
3	Ground
4	RS232 RX (data in)
5	RS232 TX (data out)
6	Ground

6.2 Pressure ports connections

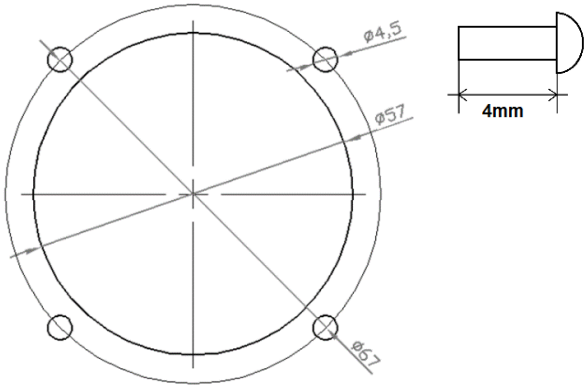
Two ports are on the back of Airdata indicator **P_{static}** static pressure port and **P_{total}** pitot or total pressure port.



7 Installation

The Airdata indicator requires a standard 57mm cut-out. Power supply scheme is compatible to any FLARM device with RJ12 connector. On the back it is fitted with two pressure ports for total pressure and static pressure.
More about pinout and pressure ports connections is available in chapter 7: *Wiring and static ports.*

7.1 Cut-out



The length of the screw is limited to maximum 4mm!

8 Revision history

Rev	Date	Comments
01	September 2020	Initial release