

SkyDrop

user guide



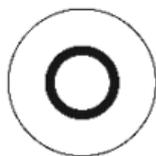
SkyDrop – combined GPS variometer

- **analog/digital variometer** – no delay vario response
- **tracklog recording** – IGC FAI1 Civil approved or KML
- **bluetooth & USB connectivity** – Android, iOS, PC
- **thermal assistant, airspace warning, wind speed & direction**
- **full customizable** – multiple screens, layouts and widgets
- **navigation functions** – compass, waypoints, odometer
- **light weight & compact size** – 68g, 98 x 58 x 20 mm
- **navigation functions** – compass, waypoints, odometer

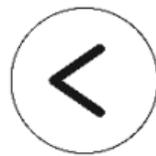
about this user guide

Despite of we made SkyDrop vario as intuitive as possible, we recommend to read this user guide. We know this is not your favorite activity, so just briefly go through to understand basic concept of operation. You can leave detailed reading about every function to winter time or if you want to learn about specific function. You don't have to keep the printed copy, PDF copy is stored inside memory (SD card), or you can find it on our webpage skybean.eu

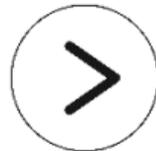
buttons



long press (for 1s) – turn on, pull up menu bar, move to upper level in menu, toggle widget value, start/stop flight stopwatch, **short press** – confirm, list adjustable widgets on home screen, turn off device (if menu bar is pulled up), **press & hold for 5s** to turn device off



short press – scroll between home screens to the left, select widget menu if menu bar is pulled up, scroll up in menu, lower value during setting parameter, **press & hold** to rapid value lowering



short press – scroll between home screens to the right, select settings menu if menu bar is pulled up, scroll down in menu, raise value during setting parameter, **press & hold** to rapid value raising

important note – please read

SkyDrop is in silent mode after start-up, so if you want to hear vario sound, select **FTime** widget and manually start the flight by long press. This feature will help you to be nice to other pilots before take-off. By default, the sound will be enabled automatically after take-off. To disable this function, please uncheck **Suppress audio** checkbox in Settings>Logger>Auto start/land menu entry.

operation of the SkyDrop variometer

During startup animation, firmware version in bottom left and hardware revision in bottom right corner are shown. The device will start on the last used home screen. You can **scroll between home screens by pressing the left or the right arrow buttons**. If adjustable/switchable widgets are on current home screen, you can press middle button to scroll between them. If adjustable widget is highlighted, you can change its value by arrow buttons. If switchable widget is highlighted, you can toggle its state by long press of the middle button. To enter widget or settings menu, you need to **pull up the menu bar** from the bottom while on any home screen by **long press of the middle button**, until menu bar appears. After that, you can enter into **widget menu by pressing the left button**, or enter into **settings menu pressing the right arrow button**, or you can turn off the device by short press of the middle button again.

multi-color light signalization

yellow light – device is being flashed with new firmware

red light – device is charging

green light – device is fully charged

red flash – battery is less than 20%

yellow flash – searching for GPS fix

green flash – GPS 3D fix is acquired

cyan flash – bluetooth is enabled, but not connected

blue flash – bluetooth is enabled & connected

widget menu

SkyDrop can use various widget layouts on home screens. You can adjust all screens, layouts and widgets easily through online drag&drop configurator at vps.skybean.eu/configurator, or you can set it directly on device. Before selecting layout of the screen, we recommend to make a list of widgets to be shown and choose the most adequate layout. To change layout, enter widget menu (long press the middle button and then left button), hit **Change layout** entry and select desired option. After that, hit **Change widgets** entry from the same menu. Selected layout will appear and one of the widget position will blink. Use arrow buttons to scroll between layout fields and press middle button to enter complete widget list. Then scroll to desired widget and confirm by the middle button. Several widgets are adjustable (e.g. altimeter widgets **Alt**) or can enable/disable specific function and can be toggled (e.g. **beep** or **weak**).

In widget menu, there are several more options to set for each home screen. **Silent page** mutes vario tones while this home screen is shown. **Hide labels** checkbox disables little description labels, shown near widgets, and therefore allows widget data to be larger. **Pages count** entry from the same menu defines number of home screens (1 to 8).

Autoset submenu entry allows user to use **smart screen switching** function, which is described in separate chapter in this user guide.

widget list and description

Vario bar shows graphical value of analog vario, each step represents 1 m/s. The vario bar increases from middle to top when bar shows 0 to 3 m/s, then decreases from middle to top when vario shows 3 to 6 m/s. The bar shows sinking the same way, so the total range of analog vario bar is -6 to 6 m/s.

Vario shows value of digital variometer.

AVG vario (Avg on LCD) shows averaged digital variometer during time period set in **Average vario integration int.**

Vario history shows graphically relative vario value during time. Range of time interval is set in **Average vario integration int.**

Altitude 1 to 5 (Alt on LCD) shows altimeter (1 – 5) value. This widget can be adjusted.

Height AGL is altitude above ground (shown if terrain data in current location is stored on SD card).

Ground Level is elevation of terrain (shown if terrain data of current location is stored on SD card).

Ground speed (GSpd on LCD) shows ground speed relative to ground.

Glide ratio (Glide on LCD) shows ratio between actual ground speed and sinking rate.

GPS heading (GHdg on LCD) shows heading obtained from GPS receiver.

GPS HDG arrow shows graphically heading obtained from GPS receiver – the North is up.

GPS HDG points shows your actual GPS heading in one of 8 main directions (N, NE, E, SE, S, SW, W and NW).

GPS position (GPos on LCD) shows GPS coordinates in selected format obtained from GPS receiver.

Thermal time measures time while circling in current thermal.

Thermal gain shown altitude change while circling in current thermal.

Thermal assistant graphically represents your actual vario value during last circle in 8 main heading positions. Lift is represented by circles, sink by crosses. The larger is the symbol, the higher is lift or sink. Use larger widget slot for better readability (e.g. layout #16).

Flight time (FTime on LCD) shows duration of current flight. You can manually start/stop this timer by long press the middle button when highlighted.

Time shows actual clock in current time zone.

Date shows actual date.

Odometer measures your total traveled distance, including circling.

Home Arrow is pointing to position set as Home, if set. Default home is take-off position.

Home Distance shows the shortest distance between Home and your actual position.

Home Time is estimated time to reach the Home position based on Home Distance and actual ground speed.

Home Info shows name of the selected home position.

Waypoint Arrow is pointing to actual waypoint position.

Waypoint Distance shows distance to actual waypoint.

Waypoint Time is estimated time to reach actual waypoint position.

Waypoint Info shows name and position in waypoints row.

Airspace Arrow is pointing to horizontally closest airspace border in your actual altitude. If you are inside airspace, arrow will show you closest way out of this airspace. All Airspace widgets will blink if you are inside the airspace.

Airspace Distance shows distance to horizontally closest airspace border in your actual position, it doesn't matter if you are inside or outside airspace.

Airspace Limits shows actual lower and upper limit of your actual position. If you are inside, this widget shows only INSIDE warning.

Airspace Info shows limits of horizontally closest airspace in your actual position, it doesn't matter if you are inside or outside airspace.

Airspace Name shows name of horizontally closest airspace in your actual position, it doesn't matter if you are inside or outside airspace.

Wind direction shows absolute value in degrees (0-359) of wind direction.

Wind arrow shows direction of wind relative to magnetic compass.

Wind dir points shows direction of wind in 8 main directions.

Wind speed shows calculated wind speed in selected units.

Accelerometer shows actual G force, where 1 represents rest position.

Compass heading shows actual compass heading in degrees.

Compass arrow graphically points to north as standard compass.

Compass points shows orientation of vario in 8 main directions.

Battery shows remaining battery power in %. Low temperature in high altitude can cause battery voltage drop, what seems like battery power lost, but it only look like.

Temperature (Temp on LCD) shows air temperature and humidity.

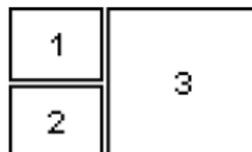
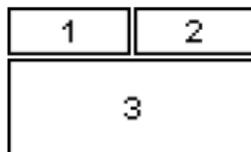
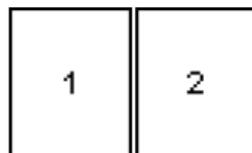
Weeklift ON/OFF (**weak** on LCD) switch on/off attention to light thermal (<1m/s) around.

Audio ON/OFF (**beep** on LCD) can be toggled by long press to mute/unmute vario sound.

Empty leaves current widget slot empty.

screen layout options

Each slot can show one widget, its size is adaptable, so the larger slots shows bigger numbers or letters. Of course, there are physical limits, so don't put large widget into small slot e.g. GPS position or Thermal assistant.



1	3	5
2	4	6

1	3	5
2	4	6
		7

1	3	6
	4	7
2	5	8

1	4
2	
3	

1	4
2	5
3	6

1	4	7
2	5	8
3	6	9

settings menu

Long press the middle button and then press the right button to enter settings menu on SkyDrop vario. There are 9 main entries with their submenus.

1. Vario

- 1.1. **Lift threshold** defines the positive vertical speed level when sound is activated (in 0.1m/s steps).
- 1.2. **Sink threshold** defines the negative vertical speed level when sound is activated (in 0.1m/s steps).
- 1.3. **Units** can be metric or imperial (meters per second or hundreds feet per minute).
- 1.4. **Use accel** checkbox allows motion sensors (9D IMU) fusion with barometer to accelerate vario response to altitude changes.
- 1.5. **Advanced**
 - 1.5.1. **Fluid audio** checkbox allows sound tone change during actual beep.
 - 1.5.2. **Weak lift** checkbox enables weak lift detection, reported by continual sound, before lift threshold is reached to let pilot know "something is in the air" (in 0.1m/s steps).

- 1.5.3.**Weak lift threshold** defines lower value of weak lift working range. Upper value is defined by Lift threshold.
- 1.5.4.**Beep sink** checkbox enables two tone sink instead of the classic continuous tone.
- 1.5.5.**Weak/Beep offset** defines frequency change of sink pretone to tone drop.
- 1.5.6.**Weak/Beep duration** sets pretone duration.
- 1.5.7.**Digital vario int.** defines time, when very fast vario changes are filtered and makes displayed digital vario value more stable in 0.1s steps (won't affect vario bar graph or sound output).
- 1.5.8.**Average vario int.** defines time used to compute average vario value and defines **Vario history** time range.

2. Altimeters

2.1. Altimeter 1-5

- 2.1.1.**Mode** can be absolute, related to QNH1 or QNH2, relative to other altimeter, with offset adjustable through home screen widget, or following GPS altitude.
- 2.1.2.**Relative to** selection defines related altimeter if relative mode is selected.
- 2.1.3.**Zero at takeoff** checkbox, shown only in altimeter relative mode, set altimeter value to zero right after takeoff (automatic or manual).
- 2.1.4.**Units** can be metric or imperial (meters or feet).
- 2.1.5.**Auto from GPS** checkbox, shown if absolute to QNH is selected, is barometric altitude periodically corrected by GPS altitude. Algorithm is based on actual GPS accuracy and accumulated barometric drift during time.

2.2. Alarms

- 2.2.1.**Enabled** checkbox turn this function on.
- 2.2.2.**Alarm 1 (Low)** warns pilot when sinking through preset altitude.

2.2.3. Alarm 2 (Lowest) warns pilot when sinking through preset altitude. This alarm has to be lower than **Alarm 1 (Low)**.

2.2.4. Alarm 3 (High) warns pilot when lifting through preset altitude.

2.2.5. Reset value defines hysteresis of alarms. Actual altitude has to reach at least this difference than alarm altitude to re-activate alarm function (higher at low alarm or lower at high alarm).

2.3. QNH1 value in hPa is pressure adjusted to mean sea level for actual date and location according to local info service.

2.4. QNH2 value in hPa is pressure adjusted to mean sea level for actual date and location according to local info service. SkyDrop can store two different QNH values for flying in wide altitude range, lower altitudes using GPS or adjusted QNH value, or higher altitudes using standard QFE pressure 1013.25 hPa, what is default value of QNH2.

3. Logger

3.1. Enabled checkbox enables or disables GPS tracking.

3.2. Total time summarize air time of all flights. You can adjust it, or even reset (lowering to zero).

3.3. Format of output file can be chosen IGC, KML or RAW.

3.4. Auto start/land submenu offers

3.4.1. State shows status of logger, can be waiting for takeoff, flying or landed.

3.4.2. Start threshold defines altitude change within **Timeout** time period, used for automatic takeoff detection.

3.4.3. Land threshold in meters defines maximum altitude change within **Timeout** period to detect landing.

3.4.4.Timeout is time period in seconds used for landing detection. This time is then subtracted from flight time **FTime**.

3.4.5.Suppress audio checkbox mutes the device when waiting for takeoff.

3.4.6.Record always checkbox disables automatic start/stop of logging. Logger records while device is turned on, until it is turned off.

3.5. Pilot name field is used to be written in recorded tracklogs.

3.6. Glider type field is used to be written in recorded tracklogs.

3.7. Glider ID field is used to be written in recorded tracklogs.

4. Flight logs contains all recorded tracklogs arranged by their date, showing basic flight statistics.

5. Navigation

5.1. Home position submenu defines its parameters.

5.1.1.Set as Takeoff checkbox set takeoff position as Home.

5.1.2.Load from SD set loaded waypoint as Home.

5.2. Waypoints

5.2.1.Load from SD allows user to choose waypoint from loaded list.

6. GPS

6.1. Enable GPS checkbox enables/disables onboard GPS receiver (significant for battery life).

6.2. Status shows available satellites and signal strength.

6.3. GPS time shows actual GMT time obtained from GPS receiver.

6.4. GPS date shows actual date obtained from GPS receiver.

6.5. Speed units, used for ground speed widget **GSpd**, can be chosen from – m/s, km/h, mph or knots.

6.6. Format of coordinates can be chosen from – DD.ddddddd, DD° MM.mmm' or DD° MM' SS".

6.7. Distance units can be set to metric or imperial.

7. Bluetooth

7.1. Bluetooth module shows used module type equipped onboard.

7.2. Enabled checkbox enables/disables bluetooth function.

7.3. Protocol selection changes devices communication between protocols (apps) – LK8EX1 (XCtrack), DigiFly (XCSoar) or BlueFly (FlyMe). **SkyDrop SPP** Bluetooth device must be chosen when pairing with your Android phone or tablet.

7.4. Forward GPS checkbox will enable forwarding GPS coordinates to connected device, so there is possibility to turn off its internal GPS receiver to save power.

8. Settings

8.1. Date&Time

8.1.1. Time item in settings menu allow adjust on-board clock.

8.1.2. Date item in settings menu allow adjust on-board date.

8.1.3. Time zone entry is used when time is obtained from GPS receiver to set correct local time.

8.1.4. DST checkbox means daylight saving time option if applicable.

8.1.5. Sync with GPS checkbox allows to get accurate time from GPS.

8.2. Display

8.2.1. Contrast adjust LCD screen contrast.

8.2.2. Backlight adjustment controls backlight level (in 20% steps).

8.2.3.Backlight timeout defines time interval after button press when backlight remains turned on.

8.2.4.Invert display checkbox invert pixels on LCD.

8.2.5.Flip orientation checkbox turn over LCD screen, so SkyDrop can be operated in upside-down position.

8.2.6.Animation checkbox enables smooth switching between home screens.

8.3. Audio

8.3.1.Vario volume adjust vario sound level (in 10% steps).

8.3.2.Vario mute checkbox turns off vario beeping. This can be also done by **beep** widget.

8.3.3.Alert volume adjust sound level of pop-up info messages.

8.3.4.Menu volume adjust sound level of menu sounds.

8.3.5.Menu Sounds

8.3.5.1. On/Off sound checkbox play sound at startup or power off sequence.

8.3.5.2. Page sound checkbox informs, which home screen is currently selected by two beeps of different tone.

8.3.5.3. Button sound checkbox enables beep, when any button is pressed.

8.3.5.4. GPS ready checkbox enables notification, when GPS 3D fix is achieved.

8.4. Auto power-off entry defines time while device stays turned on, if no operation occurred. Auto power-off will not occur during flight.

8.5. Advanced

8.5.1.Device id shows vario's serial number.

8.5.2.Mass storage checkbox enables automatic switching to USB mode after plugging USB cable. Don't use if you want charge vario during flight.

8.5.3. Uart function can be used for data streaming by UART interface. User can choose from several baud rates – 9600, 19200, 38400, 57600 or 115200. UART is using same protocol as Bluetooth. Debug msg. option runs at 921600 baud rate and is used for development.

8.5.4. Format SD function will erase and format inserted micro SD card – recommended if any mass storage connection problem occurs. Format will erase all data including tracklogs, AGL data or any other files. We recommend to backup all data files from SD card before performing format.

8.5.5. Calibration – this submenu contains motion sensors calibration routines. We recommend to use it, if you feel that one or more motion sensor based functions are inaccurate.

8.5.5.1. Accelerometer calibration procedure needs to define six possible positions in orthogonal system. Each of these positions, called X+, X-, Y+, Y-, Z+ and Z-, is detected automatically if vario lies still in given position. Z+ and Z- are level positions, when vario lies on table (in level) face up or down (LCD surface is horizontal). Y+ and Y- are positions, when vario lies on side, where LCD surface and button row are vertical. X+ and X- are positions, when vario stays vertically in normal and upside down positions. LCD surface is then vertical, but button row is horizontal. Confirmation screen will appear after successful calibration. Press the middle button to confirm and save new calibration data.

8.5.5.2. Gyroscope calibration is the easiest from all sensors. After activation leave SkyDrop in calm static position while status bar is running. Press the middle button to confirm and save new calibration data.

8.5.5.3. Compass calibration needs to turn vario into all possible positions and rotations. The movement can look like making virtual eights in every axis or you can rotate quickly when hanging on security line. Keep rotating while vario beeps, each beep means new maximal compass reading. Again confirm by the middle button to save new calibration data.

9. Debug (used for development purpose only)

- 9.1. **Firmware** info shows installed software version.
- 9.2. **Board rev.** info shows main board version, can be 1504 or 1506.
- 9.3. **Debug log** checkbox activating log records is used for debugging and can be checked if our technical support ask for it.
- 9.4. **Clear log** deletes all previously recorded debug log files. We recommend to use it to clear all previous logs before activation of logging, if new problem appears.
- 9.5. **Debug GPS** checkbox add raw GPS data to UART data stream.
- 9.6. **Record screen** checkbox activates recording all happening shown on LCD.

smart screen switching

SkyDrop has implemented switching between various home screens, dependent on situation during flight. There are several recognizable modes:

- **Prepare** mode is active after you switch vario on, but before takeoff.
- **Circling** mode is detected, if vario GPS heading makes whole circle. If direction of heading change will switch to other side, detection is reset. Circling mode will return back to normal, if there isn't enough heading change during **Circling timeout** time period.

- **Normal** mode is active while flying, but not circling, neither acro.
- **Acro** mode detection is based on G-force measurement and average sink rate.
- **Landed** mode is active after landing, detected automatically or set manually.

Any of home screens can be set for one or more of these modes, but each mode can be set to only one home screen. We recommend to set relevant widgets to home screen associated to flight mode, e.g. **Thermal assistant** to **Circling** screen, or **Glide ratio** to **Normal** screen.

bluetooth pairing

SkyDrop vario is equipped with Bluetooth module, which can work in both SPP and BLE modes. Older Android devices support SPP only. On the other hand, iPhones support only BLE. Modern Android devices can work with both standards, we recommend to use BLE mode.

If you want to use SPP you need to **pair** SkyDrop before the first use in **system bluetooth settings**. Turn vario on, enable bluetooth and choose protocol according Android app. Enable bluetooth also on Android device, go to system bluetooth settings and hit search button. Wait until **SkyDrop SPP** appears in list of found devices and confirm pairing. Then start flight app and connect to the paired SkyDrop. Don't connect SkyDrop without previous pairing through system. It might work, but not always correctly.

If you are using BLE, there is no need to pair the device. Connection is done through the application.

tracklog download

SkyDrop vario generates KML or IGC tracklog files approved by FAI Civil class 1 certification, sufficient for the highest level competitions. All tracklogs are stored on SD card inside vario. To access them, connect powered off vario via micro USB cable to PC, it will connect to computer as flash disk, and copy your actual flight log into PC.

There is also possible to download tracklog to mobile phone using OTG adaptor.

power management

SkyDrop is portable device with rechargeable Li-Poly battery onboard, which needs time to time to be filled up. You can use any USB wall charger or another USB host device, even another portable device with active OTG function. We recommend to fill up vario before each flight, you never know how far you will fly :)

technical specification

weight & dimensions – 68g, 98 x 58 x 20 mm (3.8" x 2.3" x 0.8")

memory – 16 GB flash (more than 116k hours of IGC)

USB interface – micro USB 2.0, device only

battery – 950 mAh or 2000 mAh (depends on vario model)

operation temperature range – -20 to 45 °C (0 to 160 °F)

power consumption – depends on activated functions 7 to 13 or 15 to 28 hours.

package includes

SkyDrop variometer with strap, raiser mount, hook&loop adhesives, USB cable, printed user guide, stickers.

device update

Please use web based online configurator vps.skybean.eu/configurator for update or comfortable configuration of SkyDrop vario:

- 1.Connect SkyDrop (powered off) to the computer** via micro USB cable. Charging screens will appear and vario will connect to computer as flash disk (USB mode shown on LCD).
- 2.If you don't want to keep your custom settings and just apply new software using factory settings, please skip step 3. and go to step 4. directly.**

3. After startup, configurator will show the first bookmark menu - Update wizard. Hit "**Load your existing configuration**" button, then select and open configuration file **CFG.EE** from main folder of connected vario. Configurator will process your custom settings and include it into new firmware update.
4. Press "**Download firmware update**" button, or "**Download configuration with firmware**" button if you skipped step 3, and store **SKYDROP.FW** file into main folder of vario. Make sure that name of file won't change e.g. to SKYDROP(2).FW or so (this can happen if old unapplied update files are still in vario's main folder).
5. **Unplug vario** from computer, turn it on and **follow instructions** shown on **vario's screen**. Press middle button to confirm question "Update file found. Apply?", press middle button again to confirm "Update done. SkyDrop will reboot". Yellow light will show up for several seconds while flashing new software.
6. Turn on vario and choose how to set correct date and time. We recommend to select automatic update from GPS by pressing the middle button.

Hint: If new firmware update will appear while you are on fly adventure, you can apply it also from mobile phone using OTG connection.

important information

By purchasing this device user agrees with terms and conditions of device operation. SkyDrop variometer is not designed for flying under instrument flight rules (IFR) in any case. Manufacturer is not responsible for any accidents or injuries caused by reliance on information provided by SkyDrop variometer. We highly recommend to use both hook&loop mount and safety strap when flying with SkyDrop. Security strap is not unbreakable for your safety, it can hold at least 8kg of tension, what is more than enough for vario body. However we did our best to protect device against destruction during water landing, it is not guaranteed and warranty will be void. If device is broken for any reason, do not hesitate to contact us to solve it.

FAQ / Troubleshooting

If there is something wrong with the device or if you need more detailed explanation of any function, please visit our FAQ section at skybean.eu/page/skydrop-frequently-asked-questions

If you cannot find the answer, do not hesitate to contact us via email.

contact information

email:

info@skybean.eu

website:

skybean.eu



facebook.com/skybeanvario



youtube.com/c/SkyBeanVarios



instagram.com/skybean_vario



