5.3

VBar Express

Quick Start Guide

Mikado
Model Helicopters

Welcome to VBar Express 5.3

The **VBar with V 5.3 Express software** is an innovative product setting new standards for model helicopters in terms of flight performance and programming capacity.

Features:

- Easy Start setup via PC or Control Panel

- Programming Assistant (Setup Wizard):
  gets you ready for flight in 11 steps

- Fine adjustments can be done at the field in your transmitter (no PC necessary)

- Ready for online updates as they become available

Safety Instructions

An R/C controlled helicopter is not a toy! While moving, the rotor blades pose a serious danger to persons and things. You must obey all safety instructions of the manufacturer for operation of your helicopter.

VBar is not an autopilot! VBar may be installed in helicopters which are suitable for flying without flybar. During installation and operation you must follow all instructions given in the software and in this manual. VBar may not be operated in wet conditions (high humidity or rain). If the helicopter shows vibrating behavior during flight, operation of the helicopter is to be stopped immediately. Do not continue flying until the cause for vibration has been eliminated.

- **When setting up with a single line receiver or Spektrum satellites: disconnect the motor wires or remove the pinion gear to avoid accidental spooling up of the helicopter while setting up the speed controller (ESC) functions.**

- **The same applies when loading unknown setup or preset-files, as they may transport other receiver and speed controller settings as you have on your heli!**

- **Never connect the Gyro-Sensor to a port other that it's own or it will be destroyed immediately and beyond repair.**

- **Note: A heli equipped with VBar draws higher currents than a conventional flybarred heli. Make sure you use a sufficient power supply.**

1. Items needed for first installation

- VBar, with sensor connected, CD and Mini USB cable

- Transmitter and receiver

- Power supply (BEC or receiver battery)

- Helicopter with servos installed, **but not yet connected! Only digital servos allowed!**

- Pitch Gauge (swash plate levelling tool)

- PC with Windows or Mac OS and CD drive *(to install on a Netbook PC, please copy the contents of the CD onto a USB stick)*

Contents

2. Preparing the Helicopter

First you need to assemble the helicopter in accordance with manufacturer's instructions. The heli must have a flybarless rotor head and a swash plate driver. There are suitable head conversion kits on the market for many common model helicopters. It is very important that you assemble the helicopter mechanically correct with exact symmetry and geometry. This is to ensure that you do not run into problems resulting from mechanical inconsistencies later.

3. Preparing the Transmitter

In your transmitter, choose a new model and select a heli program with swash plate configuration H-1 or with mechanical mixing (1 Servo). When using VBar, swash plate mixing in the transmitter is not necessary. However, you do need to use other functions which are adjustable in heli programs only, such as flight modes, autorotation and so on.

Set all transmitter trims to zero or switch off all trimming functions. This is important because a change in trimming, e. g. in flight modes in the transmitter, is interpreted by VBar as control inputs, which will lead to drift.

The transmitter needs to be calibrated in setup mode. That is, all center and end positions of all channels need to be aligned with VBar. (See Adjusting the Transmitter.)

You may use the dual rate function for adjusting agility, and the expo function for adjusting control behavior at stick center. You can set this differently for different flight modes.

4. Installation of PC Software

Windows
For Windows, please install the PC software by placing the CD in the CD drive. The V 5.3 icon will appear on your desktop. Connect your VBar to the computer via the t USB cable. Wait until the message *"new hardware found"* appears and the *hardware assistant* has started up. When prompted to enter the location on which the drivers are stored, please click on the CD drive or click on *"install automatically."*

If you have downloaded the PC software from the internet, you will find the drivers under *"Applications"* in the VBar folder on our PC.

If you are using Windows 7, connect the VBar to your PC and install the driver manually using the hardware manager. Additional help is available on www.vstabi.info (see PC Software section).

Apple Macintosh
For Mac OS X there is a separate PC software version as well as a universal driver available on the CD, and also via download from www.vstabi.info. Driver installation starts when you double-click on it. Then follow the on-screen instructions. The software folder should be copied into the folder /Applications.

5.   Format of the PC Software

The VBar software has two modes: The **flight menu** and the **Programming Assistant (Setup Wizard)**. You will use the **flight menu** to select your preferred flying style and adjust the gain of your model. Tail gain is set via the gyro channel of your transmitter.

The Programming Assistant (Setup Wizard) leads you to a finished setup in 11 consecutive steps. You must read and follow the short explanations supplied at each step. In several places you have the option of clicking on

buttons showing a little book with a question mark. These buttons lead you to the www.vstabi.info website where you will find additional relevant information. Also, by hovering the cursor over a button, you can find additional online information.

You can move around in the setup menu by clicking *"Continue"* and *"Back."* You cannot click on the individual tabs.

Careful: Should you want to create a new setup, disconnect the motor / speed controller first in order to avoid unwanted powering up! This is necessary because after clicking on *"Create New Setup"*, all values will be reset, and you have to begin from scratch. The reset also applies to the receiver configuration and possibly for the governor.
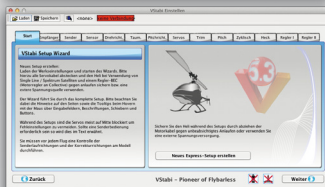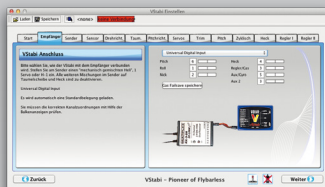
6. Initial Programming

After you have clicked on the V 5.3 icon, your screen will show the main page with the parameter settings. Now connect the VBar **(servos still disconnected!)** via the USB cable with the PC. The USB connectivity status display will switch to green. The tab *"no connection"* will stay on red.

Now connect VBar with your power supply (3.5 V to 8.4 V). Now the screen will switch to initialization mode. Do not move the model until VBar has completed initialization. *(Mac: first connect the device to your Mac, then start VBar software).*

On successful initialization, the main page will reappear on the screen. The connection status will switch to the green bar, indicating *"connected"*.

Now click on the **Setup** button to switch to the **Setup Wizard**, which is your programming assistant. You will be led through the setup menu step by step. After completion of the 11 steps, your helicopter will be ready for flight. At each step you will find information on the left-hand side of the screen. Be sure to read the text and follow the instructions! It is also necessary that you perform the steps in the order provided. Do not skip around between steps.

Attention: once you have set up your heli for the first time, you can navigate the Wizard using the „Continue" and „Back" buttons. **Don't click „Create new setup" unless you really need-to**, **and mind the safety instructions concerning speed controllers and accidental spooling up!**

7. Using the Wizard

Start
In the Start menu select *"Create new setup."* After you receive confirmation you are automatically led to the next step; *"Receiver."*

Receiver
Select the receiver to be used with your VBar. The default setting is "standard RX hookup".

Tail Rotor Gain
Note that with 5.3 Express the tail rotor adjustments are carried out exclusively in the transmitter. For this, use a suitable channel with dial, slider or switch in your transmitter. For use with a standard receiver, a separate patch wire is included with your VBar. If you are using receiver satellites you need to assign a channel for setting the tail rotor gain. Check functionality. Should the display stay at 64 % (default), assignment is probably wrong. To make use of the full range of this channel, set your transmitter to normal/rate mode if available.

ESC
If you are using a standard receiver, the speed controller is connected to it as usual. If you are using Spektrum satellites or single-line receivers (S-Bus, Rasst, Jeti), the ESC is always connected to the port "Collective/ESC".

Adjusting the Transmitter
It is necessary to set the TX signals to the correct directions, center, and end positions. This is done by using the transmitter's sub trim menu to zero all centers for all channels on the VBar setup software. The ATV menu is used to adjust all channels to 100% at full stick deflection and the servo re-

versing is used to change direction to correspond to the correct direction in the VBar software.

Once this is done, you need to save the center positions to VBar by clicking the button *"set center."* VBar will perform a cold start and reinitialize.

Sensor Mounting
Choose the mounting orientation of the sensor in your model.

Direction of Main Rotor
Select whether the main rotor turns clockwise or anti-clockwise.

Swash plate Type
Click on the type of swash plate used.

Collective Direction
VBar needs to know the direction of the swash movement for positive collective. Please check this on your heli and set it accordingly.

Servo Directions
Now install the VBar into your helicopter and connect the swash plate servos. It is very important that the servos are connected to the correct slots of your VBar *(CH 1/2/3)*. **VBar will not work if you have misconnected the servos.**

Swash plate adjustment
In this menu, the swash plate is set to center position of its collective travel (zero pitch), and also leveled at 90° to the main shaft in both aileron and elevator axis using the controls per servo or per function. For this, it is necessary that the helicopter has been built with correct geometry (servos, swash plate, and linkages). A Pitch Gauge (swash plate leveling tool) is best to accomplish this task.

Adjust collective travel

Please set the desired collective travel here. The range for this is optimal between 80 and 100. You may reduce (but not increase) the pitch values later in your transmitter using the pitch curve function, e. g. if you measure different angles for maximum positive and maximum negativ collective. Check that your transmitter output **doesn't exceed 115 %** of travel in any case.

Adjust cyclic throw

Adjust cyclic throw here to the indicated value. The range between 80 and 110 is optimal.

Tail

The last step in the programming assistant is for the tail settings. Please **first** choose the tail servo used in your model, **then** connect the tail servo to the VBar by plugging the servo into the slot in the VBar labeled *"Tail Servo"*, to avoid servo damage.

Finally you should check if stick travel and tail rotor travel correspond properly. If they do not, it is necessary to reverse the function **in the software**. The servo travels are set separately for each direction. For top performance, the values should be approximately equal for both directions. If that's not possible, move the servo arm by one notch around the center postion and try again.

Programming is now finished. Go back to the main page by clicking **Finished.**
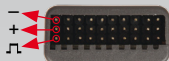
8. Wiring your VBar

Connection of servos, devices:

Pay attention when connecting the Gyro-Sensor: Never connect the Sensor to any other port or it will be destroyed immediately and beyond repair.

Status-LED

Mini USB
Computer

Governor
Servo
Sensor
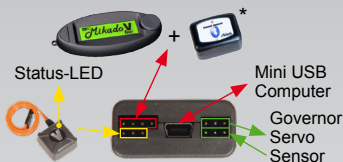
Do not connect BT/CP and USB at the same time.
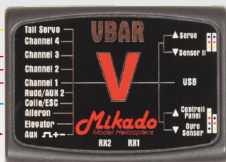* Bluetooth-PIN: 1111

Additional power supply can be connected to any free servo slot.

Tail rotor servo

Swash plate servos

Receiver Tail
Receiver collective
Receiver Aileron
Receiver Elevator
Receiver Gyro-Sens.
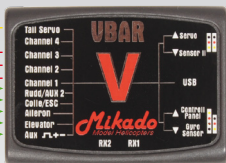
Diagram for use with standard receivers.

Tail rotor servo

Swash plate servos

Speed Controller

Rasst/Jeti/S-Bus/
Single-line receiver

Diagram for use with Rasst, Jeti, S-Bus and other single-line receivers.
If you do not use the built-in governor, an additional channel is available through slot *Rudder/AUX 2*.

Tail rotor servo

Swash plate servos

Speed-Controller
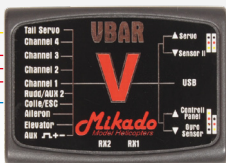
Diagram for use with Spektrum satellites.

Spektrum satellites

9. Initialization (Pitch Twitch, V is lit)

During Initialization, the VBar goes through a self-test. The helicopter must be at rest during this test. While the self-test occurs, the V is illuminated solid red. When the test is finished, you will see a brief twitching (jump) of the swash plate. Also the V starts flashing blue-green-red in a sequence.

10. Pre-flight check

Before each flight you must double-check the active direction of the swash plate and the tail rotor. To do so, lift the helicopter up and move it along the three axes as shown in the three pictures below. Helis different from the Mikado Logo shown below may show different movements and have to be checked at your own discretion.

Checking elevator function

Checking aileron function

Checking tail function
(trailing edges of the tail blades move against the direction of rotation)

Each sensor shows it's activity with a different color.

11. Operation

Upon successful initialization of the VBar and pre-flight check you may proceed to the maiden flight with your VBar. At the field you may further adjust the following values in your transmitter:

- Gyro gain

- Yaw rate (via dual rate tail channel)

- Cyclic rates aileron and elevator
  (via dual rate, cyclic channels, < 110 %)

- Expo function for aileron, elevator and tail.
  You can adjust the control behavior at
  stick center.

- Collective pitch travel via pitch curve

Trim flight:
During a trim flight, VBar performs all necessary trims of the helicopter automatically (elevator, aileron, tail). A trim flight is not necessary if the servo linkages are installed mechanically correct, the swash plate is leveled, and the center of gravity is set properly.

To perform a trim flight, turn on the helicopter while the stick for collective is at full positive. The VBar confirms this with a **short double-twitch (jump)** of the swash plate. It is best to perform the trim flight in very calm weather conditions. For further information on how to perform a trim flight, click on **"Trim flight info"** in the flight menu.

12. Miscellaneous

Exemption from Liability
Mikado does not assume liability for completeness or correctness of the content of this manual and of the PC software.

Technical Data
Supply Voltage	3.5-8.4 V (2S LiPo)
Current Consumption	ca. 120 mA
Operating Temp.	-5 to 60 °C
	23 to 140 °F

Accessories
You will find accessories to be used with VBar on Mikado's website www.mikado-heli.de

Support
Forum and extensive online manual at www.vstabi.info
Email: service@mikado-heli.de
         vstabi@mikado-heli.de