CHAPTER 3
FIRST FLIGHT & BASIC TUNING

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Spartan

YOUR FIRST FLIGHT

Safety Precautions

BEFORE EACH FLIGHT:
- Verify that the Vortex operates correctly.
- Verify that the Vortex compensates in the correct direction in all axes.
- Verify that the Vortex is operating in the desired flight mode.
- Verify that the sensor mounting pads are in good condition.
- Verify that interconnection wires are not in contact with the sharp edges of the helicopter frames.
- Verify that all linkages, ball links and blade grip bearings can move freely without excessive friction.

Immediately after powering on, the Vortex performs automatic calibration of the sticks and sensor resting positions. During this time the helicopter must remain undisturbed and the cyclic and rudder sticks must be left at the centre position. Calibration lasts approximately 4 seconds and upon completion the Vortex will zip the swashplate and tail rotor. [FAQ158]

Most flybarless systems benefit from firm head dampening. Soft or worn out dampeners allow the rotor disk to flex thus introducing a control delay which can ultimately result in cyclic lag and elevator bounce. Your Vortex is designed to offer sharp cyclic stops and for this firm dampening becomes more important. Check their condition now. [FAQ160]

There are a few parameters outside the scope of the Setup menu that you will need to adjust during your first flight. If you are new to helis please see [FAQ141]. Guidance for F3C pilots is provided in [FAQ149]. If you want to see what settings other 3D pilots use visit [FAQ155].

System :: Failsafe – Failsafe defaults to 0% throttle. However the default value is only meaningful when the Vortex's internal governor or "MixOnly" function is used. When the Setup :: Governor Type is set to "Inhibit" you must update the failsafe value before your first flight.

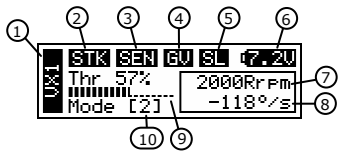
Gov :: Rotor RPM – Before you first flight set the governor rotor RPM even if you are not using the internal governor. The RPM value does not need to be precise and a best guess within ±100RPM would be acceptable. Knowledge of the rotor RPM allows the Vortex to optimise its rotor phase compensation and vibration filtering algorithms. The latter reduces servo wear and receiver battery consumption.

Gov :: Enable – As the engine governor is not essential for the helicopter to fly we advice that the governor is set to Off during the first flight and until the tail, rotor and engine mixture are fine tuned.

Tail :: Gain – The tail gyro gain will need to be adjusted during the first flight. The factory default value should provide enough stability to at least hover; however you should always proceed with care. If insufficient stabilisation or tail wag is seen the gain should be raised or lowered respectively. It is not uncommon to find that the optimal gain value for a helicopter could be as small as 30-45%. A small value does not mean that the gyro will be limited in performance. Any gain value performs well as long as it is the optimal gain value. However, a gain below 30% indicates that the mechanical gain of the tail is too high and therefore it is recommended to move the servo arm ball link further in. Similarly if 100% is reached and no tail wagging is seen the ball link needs to be moved further out. [FAQ84]

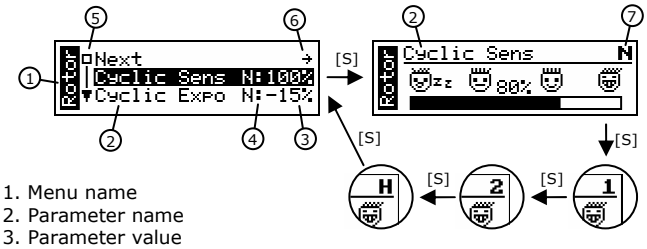
Gov :: Gain – Due to the large variations in engine and fuel performance it is expected that the governor gain may need to be adjusted. If the engine is hunting (rapidly revving up and down) reduce the gain until the hunting stops. Similarly, if the engine to responds too slowly to rapid changes of the collective pitch the governor gain will need to be increased.

HOME SCREEN



1. The Product name is an indication that we are in the home screen.
2. Displayed when the throttle stick is raised above the value set in Gov::Stick On/Off
3. Displayed when the governor sensor is detecting the magnet.
4. Indicates that the governor is armed. It appears when all of these conditions are met: i) The governor function is enabled in the Setup menu. ii) The governor is enabled in the current flight mode. iii) The STK label (2) is displayed.
5. Indicates that self-levelling is active (currently not available).
6. Displays the voltage at the Vortex servo power bus.
7. "2000rpm" – The currently selected governor RPM. "Gov.Inh" - The governor is inhibited via the Setup menu. "Gov.Off" - The governor is set to Off in the currently active flight mode. "RPM Error" - The combination of rotor RPM and gear ratio has pushed the engine RPM outside the range that the governor can regulate.
8. The commanded yaw rate. Changes when the rudder stick is operated.
9. The throttle stick position.
10. The currently selected flight mode.

MENU NAVIGATION



1. Menu name
2. Parameter name
3. Parameter value
4. The colon symbol indicates that different values can be set for each flight mode. The active flight mode is shown on the left of the colon.
5. The square indicates that the top/end of the menu has been reached.
6. The first option in each menu is "Next". This takes us to the next menu.
7. Displayed only for parameters that offer different value in each flight mode. It indicates which flight mode is currently being edited.

ROTOR MENU

Cyclic Rate: Operates in a similar way as dual rates on the radio. By adjusting the rates on the Vortex we preserve the radio system resolution and make it possible to have different cyclic sensitivity for each of the four flight modes.

Cyclic Exponential: Operates in a similar way as exponential on the radio and allows using a different value for each flight mode. Negative values make the control slower and more precise near the stick centre.

Agility: This parameter controls the flip and roll speeds of the helicopter. Higher values will provide faster rotations. [FAQ143]

Style: When this value is set close to 0% the control is predominately based on flybar simulation. Higher values introduce more of the digital stabilisation algorithms. As a result the flight characteristics start to feel more locked in but also more artificial (also referred to as "robotic").

Gain: Controls the amount stabilisation that is applied to the main rotor. If you experience main rotor oscillations on hard stop manoeuvres (for example at the end of rainbows) or porpoising during fast forward flight reduce this value.

TAIL MENU

Rudder Sensitivity: Sets the maximum pirouetting speed in °/s when the rudder stick is at full deflection.

Rudder Exponential: Operates in a similar way as exponential on the radio and allows using a different value for each flight mode. Negative values make the control slower and more precise near the stick centre.

Gyro Type: Select the desired tail gyro mode. The options are *Rate* and *AVCS* (Heading Hold).

Gyro Gain: Sets the gain for that tail gyro. The optimal gain value is the highest value you can reach that does not cause tail wag at any time during flight. [FAQ3]

GOVERNOR MENU

Governor: Selects if the governor is operational or not for each of the flight modes.

Rotor RPM: Selects the desired RPM for the main rotor. The selected value is used by the governor, rotor phase optimiser and vibration filtering algorithms. Set this parameter even if you are not using the built in governor. In this case the RPM value does not need to be precise and a best guess within ±100RPM would be acceptable.

Governor Gain: If the engine is hunting (rapidly revving up and down) reduce the gain until the hunting stops. Similarly, if the engine to responds too slowly to rapid changes of the collective pitch the governor gain will need to be increased.