MAXX GPS/GLONASS with Compass and Altitude Sensor System manual

Maxx GPS/GLONASS (SKU: MXK-1003) with Compass and Attitude Sensor system includes GPS/GLONASS module and 4 axis sensor (compass and altitude sensor). It is used to upgrade Maxx Pro and Maxx ASG flybarless to 10-axis Flight Controller, allows Maxx Flybarless flight with GPS mode like a Drone.

MAXX ELECTRONICS

Specifications:

- Update rate: up to 10 Hz with 2 concurrent GNSS (GPS and GLONASS).
- New altitude sensor technology, high resolution, fly in high wind conditions more accurately, low error dift by temperature and long flight time.
- Integrated on-board MCU to communicate with FBL units using full-duplex communication, push-pull I/O (not I2C) for low noise and more reliability.

A. Functions:

1. Automatically hold position according to GPS/GLONASS, holding altitude by center of collective joystick.

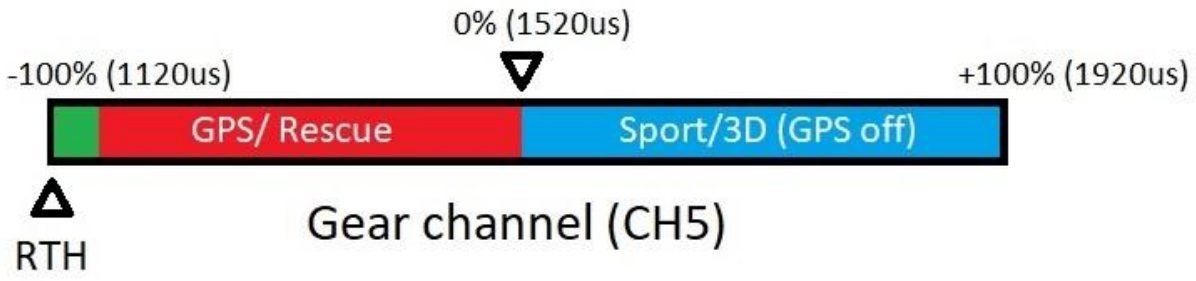
2. GPS rescue: If your helicopter is reversed or tilted more than 15 degrees, it will automatically activate rescue, the helicopter will fly straight up, then automatically break and enter GPS fly mode when you switched to GPS fly mode by transmitter.
3. Return to Home: the helicopter automatically returns home when you swich channel 5 (gear) on transmitter to -100% (about 1120us channel value), or radio signal is lost over 2seconds. The home point is the point where you take off for the first time after turning on the power of helicopter.
4. Shows poor GPS signal in the area you fly. The red LED on the Maxx flybarless unit (FC) will flash 3 times, indicating that the GPS signal has been lost, or the signal is below the allowable threshold during flight.

B. Installation steps :

1. Need to upgrade MAXX flybaress (FC) to firmware version 2.69 or later (see Maxx FBL maunal to upgrade).

   Make sure the Maxx Flybarless has set the standard to fly without GPS (sport, 3D flight). All parameters for cyclic, tail, gyro gain and collective pitch were matched. Should try flying with not GPS first to make sure you have setting cyclic, collective pitch, tail gain... is properly.

2. The Maxx unit uses RC channel 5 on your transmitter to adjust tail gain, switching flight mode 3D/GPS/RTH, active Rescue function and calibration for compass.



Transmitter setting for GPS flight mode: Set channel 5 of transmitter to negative value (less than center 1520us) for GPS flight mod. Value range from -90% to 0.

for example -40, tail gain will be like 40 but Maxx unit will activate rescue mode and GPS flight mode.

MAXX unit allows tail gain to be adjusted by % of channel 5 of Tx, It is not only used channel to switching a few positon like some other Flight Controllers.

If you switching to GPS mode, your heli will automatically flip back (rescue) if it was inverting, then it will switch to GPS flight mode.

Return to Home (RTH) mode: set Gear channel (CH5) value on your transmitter to -100% (about 1120us). The tail gain won't change from previous flight mode, Maxx the unit remembers the previous tail gain and the tail response will not change even though you have set -100%.

Example of a setting on transmitter:

Normal flight mode: Return to Home.

Stunt 1: GPS flight mode (position/altitude holding) with tail gain is 40%.

Stunt 2: 3D flight mode with tail gain is 38%.

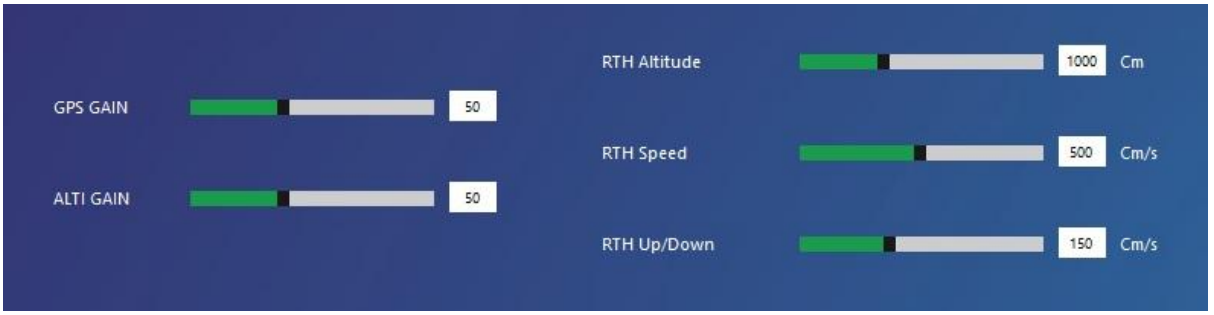
Hold mode: cut off the motor (by Throttle setting on your transmitter). The tail gain is 40% in this flight mode.

Gear channel monitor of GPS flight mode, channel value lower than 1520us.

Note: The Futaba transmitter , negative value is not displayed in the tail gain menu, but please select “Normal”, not AVCS tail gain mode, it is the same as the negative value on Tx Spektrum and other Tx brands. Exampe: 40 NORMAL tail gain on Futabta transmitter same the -40% on the Spektrum transmitter.

Setting channel 40% AVCS on Futabta is same 40% on Spektrum transmitter.

3. Put the Maxx GPS unit on the tail boom by foam tape, at least 10cm away from the tail servo/motor with micro helicopter size, and at least 20cm with 600/700 size. Need to set the right heading according to the label on the GPS unit.
4. Connect the Maxx GPS system to the Maxx flybarless unit via the MaxxBus port on the Maxx Flybarless (Programs Card port), the red color wire connects to '+' label on main unit and GPS unit.
5. Power on your helicopter, connection with PC via USB cable and setting it by GPS table on the Maxx software.



(default setting, recommend for first time flight)

6. Compass Calibration (in the field, do not operate indoors, or near a location with a lot of metal):

See the Red LED (on MAXX Flybarless unit, not the LED on GPS unit) status table:

ON	OFF	Slow Blinking (5Hz)	Fast Blinking (20Hz)
Not GPS signal yet, or Takeoff done (flying)	GPS signal ok, ready to flight	Waiting for enough GPS satellites	Compass calibrating

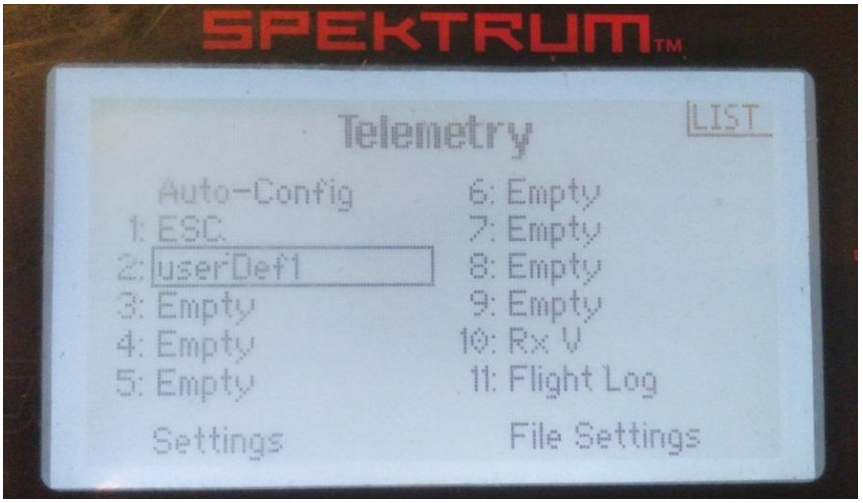
- Unplug USB cable to disconnect MAXX unit with your computer -> Power on your heli and transmitter again → Put the heli to be static and wait for a few seconds for the sensor to initialize done.
- Fast switching up/down the flight mode switch on transmitter to change fly mode (Gear channel switching value) more than 3 times per second. The red LED on the maxx FBL will flash quickly (20 Hz), indicating that the instrument is in compass calibration mode.

  The engine will not run if the GPS signal is not strong enough to ready to flight, even when you switch to unhold of throtlle channel. So it should be do as soon as the gyroscope initialize done.

- Rotation the tail of your heli more than 2 turns with the main blades parallel to the ground and main shaft pointing to the sky (head and tail go through the directions East, West, South, North looks like piro hover). When the calibration is complete, the red LED may turn off, flash slowly, or turn on depending by the GPS status (see Red LED status table above).
- Turn off your heli and turn it back on to waiting GPS signal and flight.

7. Telemetry for used Spektrum transmitter and SRXL2 receiver (only for MAXX ASG).

- Go to Telemetry on Spektrum transmitter and enable “userDef1”.



Your Tx will shows the following parameters from Maxx units on the Telemetry display table:

- sField1: Aileron tilt angle
- sField2: Elevator tilt angle
- sField3: Heading to Home point
- uField1: Distance to Home point (m)
- uField2: Horizontal velocity (cm/s)
- uField3: Altitude (above Home point).
- uField4: Compass heading (relative to the North)

C. Take off and flight with GPS fly mode.

Before you unlock the throttle, you need the following conditions: Wait for the GPS signal to be enough (red LED on the MAXX controller unit is turned off), see the LED status table above.

Put collective pitch level is low, heli tilt angle not more than 8 degrees.

Otherwise the MAXX controller will not let the engine run even though you have increased the throttle. The MAXX flight controller is programmed like that for safety.

The steps to take off are as follows:

1. Switch transmitter to GPS mode(not RTH) and put the collective pitch joystick to the low level (-50% or lower --> Hold lock throttle by your transmitter switch --> Turn on the helicopter power and wait for the red LED on the MAXX flight controller unit to flash to indicating has GPS/GLONOSS signal.

2. Continue to wait until the red LED turned off, that the GPS/GLONOSS signal is enough to fly. The MAXX FBL unit only allows flight when the satellite signal it sees form GPS modules is strong enough to ensure safety. So it is normal that the blue LED on the GPS unit has blinked but has not yet allowed to fly. You need to wating to red LED on MAXX FBL unit turned off.

3. Unlock the throttle and move the collective pitch joystick up to center → move the collective pitch joystick to center position → increase the pitch joystick level to take off when the RPM is stable.

Put the collective pitch joystick back to center after the heli has taken off to altitude holding . The Maxx FC read the pitch channel value to control the height increase and decrease as you like.

Moving position of heli by cyclic joystick on your transmitter.

4. Return to Home: Your heli will automatically fly back, landing and cut off the throttle if you switch to RTH mode or lose radio signal.

Heli will not do RTH as soon as you activate it or moving by cylcic joystick. It needs to brake and hovering for a few seconds before flying back to home.

During landing, if it is drifted away by high winds, it will stop go down and try to return to the correct home point first.

D. Waypoints flight mode

Waypoints flight mode use channel 8 of your transmitter to creating point and active after creating points.

Firmware update required for MAXX FBL units (2.71 or later for Maxx PRO and 1.02 or later for MAXX ASG).

1. Setting on the transmitter:

   Assign the on swicher of your transmitter to change *RC* channel 8 value, two value level is High and Low. High value is full channel value (100% about 1920us *RC* channel value). Low value is center value (1520us) or lower.

   Check channel value again by channel monitor on your transmitter.

2. Additon points and acitved when flying in GPS mode.
   - Fly the heli in GPS mode to your desired point then switch channel 8 to high value and push the switch to low within 3 seconds to creating the first point.
   - Repeat the above step as many times as possible to create the next points you want. Total points not less than 2 and not more than 64 points (included first point). When the heli in the last point, you do not switch channel 8 to low the value, still holding the high level of channel 8 over 3s. Your heli will enter Waypoints mode.

   Note: Waypoint mode will paused when you moving heli by cyclics joystick (like moving in GPS mode), then it will fly to next point on its own if you stoped moving cyclics joystick. It will also exit this mode if RTH mode is activated by RC channel 5(-100%).

Note:

- *Do not fly GPS mode in obscure locations or in bad weather*
- *Do not fly GPS at too high RPM, there will be many vibrations that reduce the accuracy of the sensor, or should not switch to GPS/rescue mode when flying at high RPm.*
- *It is best to use GPS with electric heli, we do not recommend it for Nitro/Gasser heli for now.*
- *Soft foam tape for Maxx main unit is better than hard tape.*
- *Should not be started heli to initialize with tilte angle of more than 8 degrees.*

- *You can take off from 3D flight mode, but for your safety the MAXX needs to wait for the GPS signal to be good for you to take off. It won't unlock the throttle until the GPS signal is good for take off.*