Instruction Manual V1.04 for Software V1.04

This manual will be updated continuously and offered for download here, please do always use the newest version.:
http://www.lf-technik.de/shop/product_info.php/info/p3492_GyroBot-700.html

Introduction:

Congratulations for buying a GyroBot 700

You purchased a high-quality triaxial filght control system which was designed and produced in Germany exclusively.
Please do not start running the GyroBot before having read these instructions carefully and having carried them out thoroughly.

Lutz Focke, LF-Technik, does assume no liability for the correct installation and handling/operation of the GyroBot.

What is the GyroBot 700 ?

The GyroBot 700 is a high-quality and precise flight control system incl. stabilisation of the aileron, elevator and rudder axis of a model helicopter without using mechanic stabilisation devices like flybars.
Also the normal tail rotor gyro can be replaced by the GyroBot.
All components necessary during the flight are stored in a very small box.

In which models the GyroBot can be installed?

In all remote-controlled model helicopters (which are powered by IC, Gas, or Electric motors) with rigid rotor head (flybarless, two blade rotor) with controllable pitch function, but not in coaxial helicopters or in those with rotary speed control.
Your helicopter must NOT have a flybar and a Tail Gyro.

for Scale models with turbine motors and multi blade rotors and for extreme high performance for 3D anf FAI flying we recommend our Gyrobot 900.

Especially for easy and safe learning of hovering and flying normal (Beginnermode) and learning flips, rolls and inverted flying (Beginnermode Acro) we also recommend our Gyrobot 900.

Which advantages does the GyroBot 700 have?

You reach, compared to conventional paddle rotor heads, a fully adjustable, very precise flight control. So to say, the model seems to fly “on rails”. Furthermore, you can even during the flight switch the models agility from very calm to extremely agile.

As the model has less weight and less aerodynamic resistance, you can benefit from more direct and more precise flight characteristics as well as from higher power and longer flight time.

Please follow the instructions step by step before your model helicopter is ready for the first take off.

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Scope of delivery:

Depending on which components you ordered, the following parts are included in the delivery:

Order No. 5001

1. GyroBot 700 central unit
2. 5 three-pole cable, (double-sided, servo connector male)with a length of optional 10 or 30 cm
3. 1 three pole cable, (double-sided, servo connector male), length of 10cm, for programming connection
4. CD with software and instruction manual

Order No. 5000/1:

1. USB Interface cable (to programme via PC and for software updates)

Order No. 5001/2:

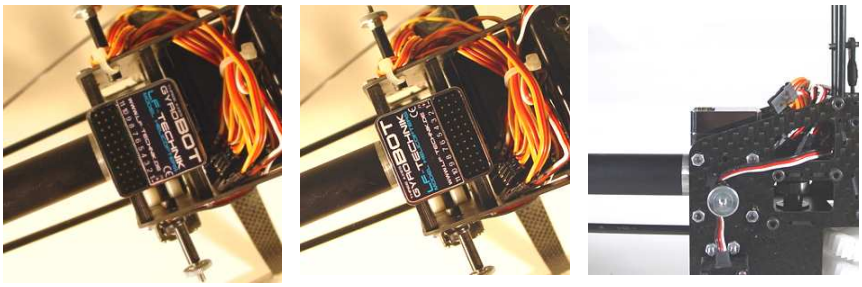
1. “Cockpit Sport” programming box (to programme without further supports/tools)
2. three-pole cable (servo connector male-servo connector female)

		
Order no. 5001	Order no. 5000/1	Order no. 5001/2

Installation:

Make sure that you have a remote controlled model helicopter with rigid rotor head and pitchcontrol. A rigid rotor head has no flybar, no mixing lever and no pitch compensator. Our Roxxter helicopters are available in a special GyroBot version, but we also offer conversion kits for backfitting.
We also provide special rigid rotor heads for other models which you can find on our website or in our main catalogue.
If you want to epuip a helicopter of another producer with the GyroBot, please contact the company concering the leverage, etc.
The distance between the linkage position of the blade grips to the center of the rotor head central unit of helicopters with a rotor diameter of more than 1.15m should be at least 25mm . The bigger the helicopter the bigger the distance should be.
You should avoid a distance that is too small, this may cause a loss in resolution, regulation and control. On the other hand it is uncritical to have a distance that is too high.
Remove your old gyrosystem and install the GyroBot on the very spot with the enclosed double-sided adhesive tape.
Please use only one tape when installing the GyroBot in an electric powered helicopter and two tapes for IC, Turbine and Gas Helicopters.

Please stick absolutely to the correct installation position:
The GyroBot type plate **has to face upwards** necessarily, the connection plug board may face **to the front or the back**, but **not** aside and **not** transverse.
Make sure the the GyroBot is installed exactly parallel to the 3 principal axes of the helicopter and not transversely as is done with normal gyro systems.



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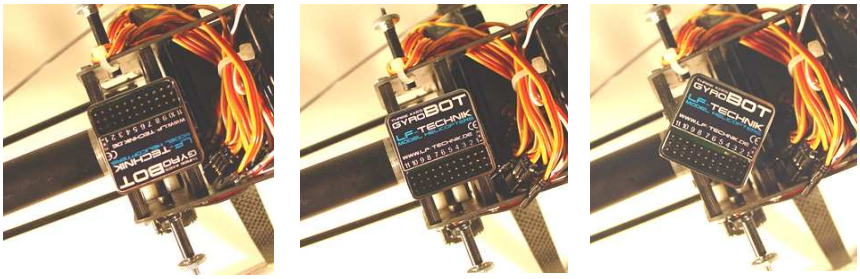

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Plug connection definition:

Attention:
Pls. pay attention to the fact that the negative pole of all plugs (black or brown) are located at the exterior of the GyroBot.

The GyroBots plug connections are configurated as follows:

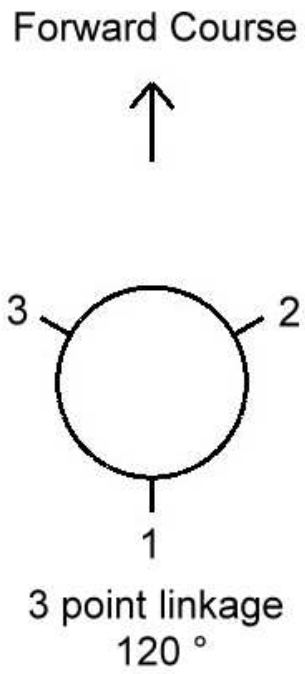
Plug connection no. at the GyroBot 700	Function
1	programming an update plug
2	rudder outlet (to the rudder servo)
3	rudder imput (rudder plug of the receiver)
4	aileron input (aileron plug of the receiver)
5	elevator input (elevator plug of the receiver)
6	pitch input (pitch plug of the receiver)
7	Input flight phase switch (free plug on the transmitter, If desired)
8	swashplate outlet 1 (to swashplate servo 1)
9	swashplate outlet 2 (to swashplate servo 2)
10	swashplate outlet 3 (to swashplate servo 3)
11	blocked

Different types of swashplates:

You should chose a difference between the swashplate servoarms and the linkage position that is 2 mm smaller than the one you would use at a model with flybar.

Of course all arms of 3 point linkages should be of the same length.

3 point linkage 120°
If your model has this linkage, pls. attach the 3 swashplate servos according to the following figure.



Example:
3 point linkage: you plug the left aileron servo (swashplate output 3) into slot 10 of the GyroBot.

Mechanical Mixture (direct linkage)
If your model disposes of a mechanical mixture (aileron, elevator and pitch are being mixed in the model), please attach the 3 swashplate servos as follows:

Pitchservo: slot 8 at the GyroBot
Elevatorservo: slot 9 at the GyroBot
Aileronservo: slot 10 at the GyroBot

Now attach the servos correctly to the GyroBot, depending on the swashplate type.
Then connect the 4 receiver outputs (elevator, aileron, pitch and rudder) with the corresponding slots of the GyroBot. For this use 4 of the attached cables (servo connector (male) on both sides). Please attach the 5th cable to slot 1 of the GyroBot, afterwards the USB cable or the programming box will be connected here.
Only if you want to change the flight phases, you need the 6th cable. In this case you`ll have to install it at port 7 at the GyroBot and at a free slot at the receiver.

Now lay all cables carefully in the model and fix the programming plug (slot1) so that you can reach the end of the cable (even with assembled canopy or body) easily from the outside.

Make sure that no plug can become loose during the flight (maybe you can fix it additionally with rubber or adhesive tape).
Now you should fix the GyroBot additionally with a rubber ring (do not tighten too much). On the RoXXters you can fix the rubber ring at the left and right side of the canopy supports for example.

Preparation of the transmitter

The complete swashplate mixture takes place in the GyroBot. Please use an empty (reset) memory cell in the transmitter and adjust the following:

1. Chose empty memory , adjust helicopter programme.
2. Adjust Swashplate type H1, mechanical mixture (even if your model has a different Swashplate type)
3. Adjust the servo travel (ATV, Endpoint) for pitch to +/- 100%
4. Adjust servo travel (ATV, Endpoint) for aileron and elevator to +/- 100%
5. Reset all Trimms (if not yet done by resetted memory)
6. Put pitch stick exactly to the middle position
7. if desired, determine triple switch for the flight phase switch
8. Adjust the dynamic and static tail mix (revo mix) to 0 or make it inactive

Explanation:
-The swashplate mixture is completely realized in the GyroBot
- With the servo travel (ATV, End point) you can adjust the rotation speed or agility for the aileron, elevator and rudder axis.

For example: With servo travel 20% for the aileron (of course for both sides) the helicopters reactions on the aileron axis are slower than with 40 %.

- Using the Expo-function at the transmitter you can soften the flight characteristics around the center of the stick (also for aileron, elevator and rudder).

(This value must not be shifted before the programming of the menue of the swashplate basis)

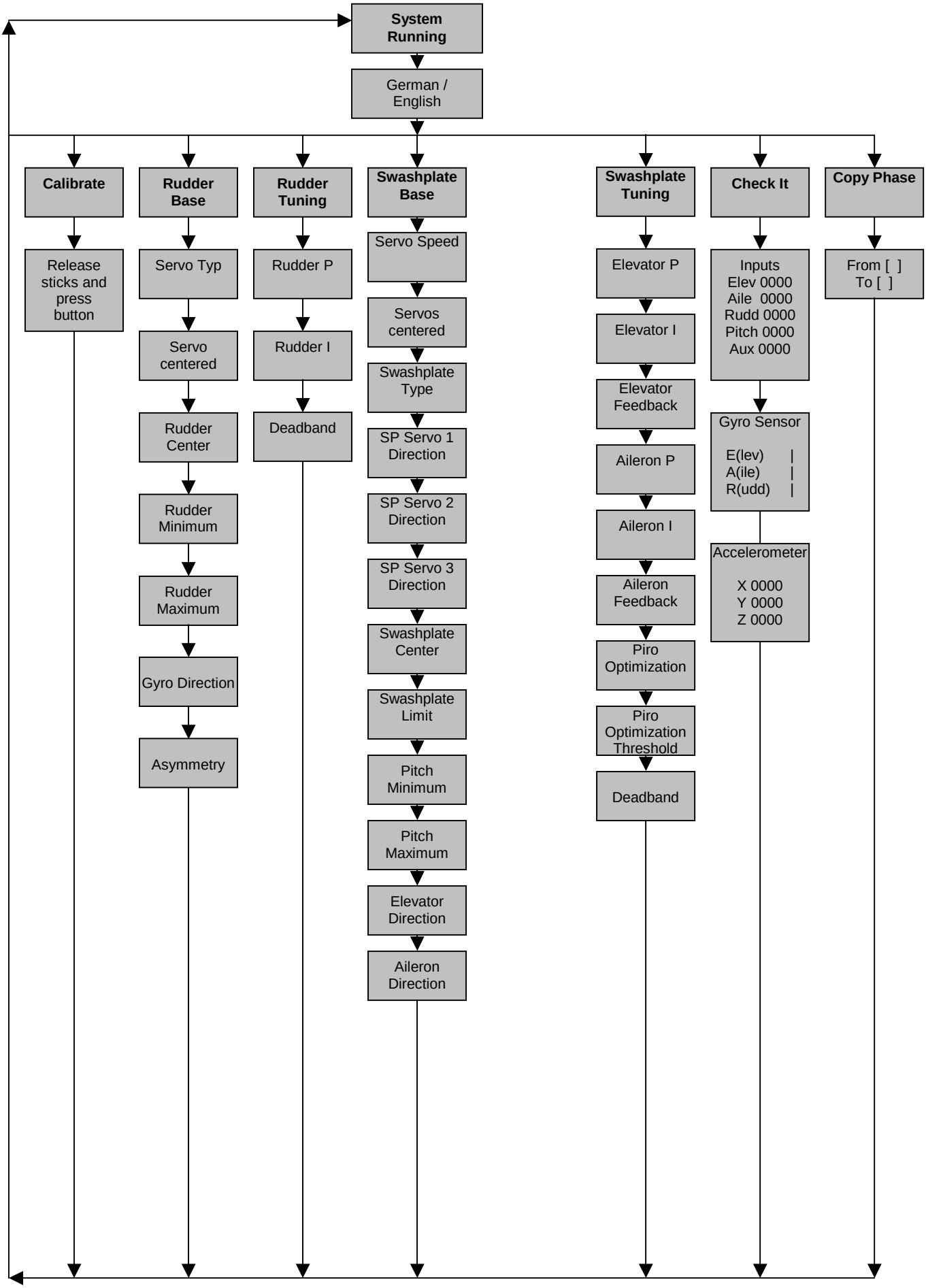
The difference between a setup for beginners and a setup for 3D pilots is only the reaction of the helicopter on aileron, elevator and rudder (adjusted by the servo travel of the transmitter).

As the 3 D pilot as well as the beginner always wants to have an ideally stabilized helicopter , the adjustment of the stabilization (at the GyroBot) is independent from the reactions of the model.

Now unhinge all servo rods (swashplate and rudder)

First of all have a look at the following menu structure:

Menü structure GyroBot 700 Software version V1.04:



Flight phase switch:

Now you have to decide if you need flight phases that can be switched or not.
The Gyrobot 700 offers 2 flight phases.
We recommend you, not to switch flight phases at the moment; if you are more familiar with the system you still can do it later.
If you do not want to switch flight phases for now, please do not assign slot 7 at the GyroBot. From now on flight phase 1 is active what you will recognize because of the 1 in the right corner at the top of the display.
If you want to switch flight phases, connect slot 7 with a free outlet of your receiver. To this outlet, a two or three level switch has to be attributed (servo travel at +/- 100 %). So you can switch between phase 1 and 2.

You always programme the flight phase in which you are when entering the menue by pressing the button longer. Even while programming you can see the actual flight phase at the right hand corner but you cannot switch between the flight phases, you first have to leave the programming menue.
ALL VALUES are completely switched. Later you can copy the phases in the menue **copy flight phase**. Doing this you always copy from the actual flight phase to another; first you chose the flight phase with the rudder stick and then you press the button.

ATTENTION: Please be always aware that you also programme the flight phases when you want to switch into them. If you switch into a not programmed flight phase during the flight, you cannot control your model any more.

Therefore always copy the actual phase into the other to make sure that not a single flight phase is not programmed. If necessary you can later adjust several data there.

You can for example also realize with the flight phase switch the shifting of the „Gyro Sensivity". Furthermore it is possible to save two models in a GyroBot 700. So you can use the GyroBot for two models at the most without having to programme something new (the GyroBot has to be converted between the models).
It is also possible to provide a model with two different adjustments and to switch them during the flight.

As the reaction of the helicopter (agility) for the aileron-,elevator and rudder function is adjusted with the servo travel (ATV, End Point) of the transmitter, it might be useful to combine the flight phase switch at the GyroBot with the flight phase switch at the transmitter (the same switch)
If you only want to switch the reactions (agility) you can also do this with the Dual Rate function of the transmitter. For this you do not have to switch the flight phases of the GyroBot.

Explanations to the programming:

Attach the USB cable (after having attached it to a free USB slot at the PC) or the programming box "Cockpit" to the free cable at slot 1.
The 3 pole servoplug is attached with the negative pole (brown cable) down to the cockpit. Both connections are possible (left or right).

If you work with the USB Interface cable and the PC you now have to copy the programme „Cockpit Simulator“ of the CD onto your PC and start it (double click on the file, no installation is necessary). Systems required for this are Windows XP or Windows Vista.
Then adjust in the cockpit simulator the right COM connection (simply chose all com ports one after the other and press on/off) till the start menue „system running“ appears. If the cockpit simulator will not work, you`ll have to install the following driver unit:

http://www.ftdichip.com/Drivers/CDM/CDM%202.04.06.exe

The driver unit is necessary to be able to use the USB Interface cable. Maybe it already might be available.
In the following it is described how the programming with the push-button at the programming box (or with the space-bar, if you work with the Interface wire lead and the PC) and the rudder control stick of the transmitter is to be realized:

	Cockpit or Cockpit Sport Programming Box	USB Interface Cabel
Navigation through the menu >>>	Button	Space bar on the PC or or button „Menü“ in the Cockpit-Simulator
Adjustment of Data >>>	Rudder Stick	Rudder Stick l

Every value will be saved automatically when leaving the menue.

For rudder and swashplate there is a „**base**“ and a „**tuning**“ menue. In the base menue fundamental adjustments are realized, in the tuning menue values like sensitivity,etc. are being adjusted.
The menue „**calibration**“ memorizes the neutral settings of the transmitter, **PLEASE USE IT ALWAYS AFTER CHANGING ANYTHING ON THE TRANSMITTER OR THE GYROBOT SOFTWARE.** In the menue „check it“ nothing can be adjusted, it only checks the sensors. In this menue you can also see the impulses of your transmitter.

Every value will be saved automatically when leaving the menue.

Programming:

At the end of this instructions you`ll find finished setups for our Roxxter models which can be adopted.
If you have any other model you can orientate yourself to a Roxxter with similar rotor diameter.

A. First switch on the transmitter, then the receiver and then attach your programming cable. If you switch the flight phases place the switch at the transmitter to flight phase 1 (visible at the right corner of the display).

Selection of the language:

Press now the programming button and keep it pressed. Now choose your language (German or English) with the rudder control stick and loose the button.

B. Now you are in the menue „calibration“; press the button shortly. Now it says **Loose the control stick and press the button**. Place all sticks and trimmings exactly in the middle and press the button again. Now the GyroBot has memorized and saved the neutral positions of the transmitter (Attention: the calibration has only been realized for the actual flight phase and does not operate globally). Now you are back in the start menue “**system running”**.

ATTENTION:
You only calibrate the actual flight phase in the GyroBot.

C. Adjustments in the menue Rudder Base

Press the button a little bit longer and loose it then to get back to the menue. Now navigate with the rudder control stick to the menue **Rudder Base**.

Press the button shortly, now you are in the menue **Servo type**. Choose your rudder servo with the rudder control stick. If your servo does not exist in the menue, please choose „standard".

Now once again press the button, and you are in the menue **Servo centered**. The rudder servo is now in the neutral position; please adjust the servo horn in the neutral position and screw it tightly. The difference between the linkage sphere and the pivotal point should be 15mm.

Press now again the button shortly and you are in the menue **Rudder center**. Hinge again the correctly bucked tail rod and place the tailrotor with the rudder control stick in the middle (approx. 5 degrees against the turning moment).

Press now again the button shortly and you are in the menue **Rudder minimum**. (Could be the left or right stop). The rudder automatically moves into the direction where stop is adjusted. Adjust now the stop with the rudder control stick. The tail pitch slider should be located approx. 0.5 mm in front of the mechanical stop.

Press now again the button shortly and you are in the menue **Rudder maximum**. (Could be the left or right stop). The rudder automatically moves into the direction where stop is adjusted. Adjust now the stop with the rudder control stick. The tail pitch slider should be located approx. 0.5 mm in front of the mechanical stop

Now press again the button and you are in the menue **Gyro direction**. Here you can change pole the effective direction of the tail gyro if necessary. Proceed as follows: turn the helicopter fast around the normal axis, the rudder rotor has to stear against now. If it does not stear against, change pole the effective direction with the rudder control stick. (Attention, you must not rely on that, you have to control the effective direction once again before starting to fly!!!)

Now press the button shortly again, and you are in the menue **Asymmetry**. Here you have to adjust whether you fly a main rotor that works clockwise or counter clockwise (top view). As the rudder rotor control characteristic is asymmetric depending on the main rotor rotating direction, the system should know, which rotating direction the main rotor has. If you do not want to adjust asymmetry, chose “off”. (This point only optimizes the rudder performance, it

does not change poles. You can fly in any case even if you fly clockwise rotating helicopter for example and adjusted counter clockwise).

Once again press the button, now you realized all the adjustments of the menue **Rudder base** and are now back in the start or flight menue **System running**.

D. Adjustments in the menue Swashplate Base

Now press the button a little bit longer and loose it then to get back to the menue. Navigate with the rudder control stick to the menu **Swashplate base**.

Now press the button shortly, you are in the menue **Servo speed**.
Here you can adjust the frequency of the swashplate servos. If you do not know anything about the frequency your servos can be used with, please adjust “standard” (even if the servos are of premium quality). Go back to “standard” as soon as the servos do not work well and constant with higher frequency or cause anormal sounds, otherwise the servos could be damaged.
As we do not know the kind of servos you use, we do not assume liability for any subsequent damage.
Increasing the frequency is not very important for normal or 3D flying but its important for flying pirouettes, as this requires an extremely fast regulation.

Now press the button shortly, and you are in the menue **Servos centered**.
The system now has placed all swashplate servos in neutral position. Please check wether the servo horns are really placed in the middle (neutral position); if not, adjust the horns once again and screw them tight again (fine adjustment will be realized later).

Once again press the button shortly, now you are in the menue **Swashplate type**.
Choose the swashplate type with your rudder control stick.
You can choose the following types:

120 degrees 3 point linkage (2 aileron servos, 1elevator servo)
Direct (mechanical mixture, 1 servo each for aileron, elevator and pitch)

Now hinge again the correctly bucked leverages for the swashplate linkages.

The next menue differentiates between the different swashplate types.
Please do only process your own swashplate type:

120 degrees 3 point linkage:

Now press the button only short, you are in the menue **Swashplate servo 1 direction**
Navigate with the pitch stick pitch, servo 1 (rear elevator servo) has to go in the correct direction (only for pitch). If not, change poles with the rudder stick.
Now press the button only short, you are in the menue **Swashplate servo 2 direction**
Navigate with the pitch stick pitch, servo 2 (right aileron servo) has to go in the correct direction (only for pitch). If not, change poles with the rudder stick.
Now press the button only short, you are in the menue **Swashplate servo 3 direction**
Navigate with the pitch stick pitch, servo 3 (left aileron servo) has to go in the correct direction (only for pitch). If not, change poles with the rudder stick.

When you now move the pitch stick, all 3 servos have to go in the correct direction.

For direct linkage (mechanical mixture, 1 servo each for aileron, elevator and pitch):

Here the poles of the servos are not being changed in the GyroBot but later in the transmitter.
Pass on to the next topic.

The following adjustments do not depend on the swashplate type and are valid for all linkage types.

Once again press the button shortly, now you are in the menue **Swashplate center**.
Here you place the swashplate in horizontal position and in the pitch center. At first place the swashplate exactly in the horizontal position with the aileron stick for the aileron axis and with the elevator stick for the elevator axis. If aileron or elevator go in the wrong direction change poles of the function in the transmitter (servo reverse menue) before having finished the menue. It is important to place the swashplate in a horizontal position **AS EXACTLY AS POSSIBLE**.
With the rudder stick you now adjust the mechanical pitch center. The pitch center always has to be the absolute center (0 degrees at the rotor blades, servos in neutral position, pitch stick in the center). So there are 0 degrees at the rotor blades when the stick is in the center position. If you want to hover already at that stage adjust this later in the pitch curve menue of your transmitter.
Once again press the button short, you are now in the menue **Swashplate limit**
Here you adjust the swashplate amplitude (tilt angle) for aileron and elevator together, as it is described in the following: stear complete aileron amplitude for example to the left and hold it in this position. Now reduce or amplify the amplitude with the rudder control stick. Adjust the amplitude in a way that the swashplate does not touch the rotor shaft. The amplitude should in any case be maximal and has nothing to do with the agility of the helicopter.
Now press the button again short, and you are now in the menue **Pitch minimum**.
Here you adjust the pitch maximum or the pitch minimum (the system doesn`t make a difference). The swashplate automatically moves into the direction that now is adjusted.
Now attach the pitch angle meter to the rotor blades and adjust the desired pitch value with the rudder stick. This value shows the maximal pitch angle possible. If you later want to have less pitch angle you can reduce it in your pitch curve at your transmitter.
Now press the button again short, and you are now in the menue **Pitch maximum**.
Here you adjust the pitch maximum or the pitch minimum (the system doesn`t make a difference). The swashplate automatically moves into the direction that now is adjusted.
Now attach the pitch angle meter to the rotor blades and adjust the desired pitch value with the rudder stick. This value shows the maximal pitch angle possible. If you later want to have less pitch angle you can reduce it in your pitch curve at your transmitter.

Now press the button again shortly and you are now in the menue **Elevator direction.**
Here you can adjust the direction of the elevator gyro. Do the following:
Turn the helicopter fast to the front, the swashplate has to navigate backwards now (it has to turn backwards). If it doesn`t do so, change pole of the direction with the rudder control stick.
ATTENTION: THIS ADJUSTMENT HAS TO BE ABSOLUTELY CORRECT, OTHERWISE YOUR MODEL WILL CRASH IN THE FIRST SECOND OF FLIGHT.

Now press the button again shortly and you are now in the menue **Aileron direction.**
Here you can adjust the direction of the aileron gyro. Do the following:
Turn the helicopter fast to the left, the swashplate has to navigate to the right now (it has turn rightwards). If it doesn`t do so, change pole of the direction with the rudder control stick .
ATTENTION: THIS ADJUSTMENT HAS TO BE ABSOLUTELY CORRECT, OTHERWISE YOUR MODEL WILL CRASH IN THE FIRST SECOND OF FLIGHT.

If you turn the model in any direction, the swashplate always must turn into the horizontal position and go back slowly to the center.

Now press the button again shortly and you have left the menue Swashplate base and are again in the start or flight menu System Running.

Now you have to adapt the pitch travel of the transmitter to the pitch values adjusted in the GyroBot.
Do the following: Move the pitch stick to the full positive pitch position (in the flight mode **System Running**) and reduce or amplify the servo travel (ATV, Endpoint) of the pitch servo in the transmitter until you recognize a pitch movement till the end of the pitch stick travel. There should not be a backlash. That means that you have to find the right adjustment when you can see a swashplate movement exaclty till the end of the pitch stick travel, no more, no less.
Repeat all that also for pitch negative.

If you now measure in the flight mode **System Running** pitch values slightly different than those you have adjusted in the GyroBot, a reason might be that the swashplate is not exactly horizontal and you measured a certain part of aileron and elevator. In this case please calibrate again or adjust the swashplate more exact to the horizontal position for aileron and elevator (in the menu **Swashplate Base**, Sub menu **Swashplate Center**).

For your explanation: pitch minimum and pitch maximum adjusted in the GyroBot indicate absolutely the final positions, within this range you can use your pitch curve in the transmitter if you like.

If the swashplate is not in the horizontal position as you adjusted, please calibrate again.

E. Adjustment in the menue Rudder Tuning

Now press the button a little bit longer and loose it then to get back to the menue. Navigate with the rudder control stick to the menue **Rudder Tuning**. (Here the tailrotor sensivity is adjusted with 2 parameters).

Now press the button shortly and you are in the menue **Rudder P**. Adjust now the P-part with the rudder stick to 0300 or as shown in one of the setups at the end of this manual, (The P-part is equal to the “normal mode” of standard gyro systems). If you only fly with P-part (without I part), you fly in the normal mode (which is not recommended).

Now press the button short, you are in the menue **Rudder I**. Adjust the I-part with the rudder stick to 0300 or as shown in one of the setups at the end of this manual.

Now press the button short, you are in the menue **Rudder Deadband**. The Deadband is a range around the stick center where the Gyrobot does not react to the stick moves. It is important if the potentiometers of the tail stick is a bit inexact. If the deadband would not be there, the tail servo would always move without moving the stick. If your tail servo never moves without moving the stick you can leave the setting to 30. If not, you can increase it until it does not move. Please note that increasing it too much the precision of the tailrotor around the center becomes worse.

Now press the button again short and you are back in the flight menu **System Running**.

F. Adjustments in the menue Swashplate Tuning

Press the button again a little bit longer and loose it then to get back to the menue. Now navigate with the rudder control stick to the menue **Swashplate tuning**. (Here the “sensitivity” of the swashplate is adjusted).

One annotation in advance: All values for aileron and elevator have to be adjusted identically; The results are already very good. Later you can still vary.

Press the button shortly, you are now in the menue **Elevator P**. Adjust the P-part with the rudder stick to 0250 or as shown in one of the setups at the end of this manual.

Press the button shortly, you are now in the menue **Elevator I**. Adjust the I-part with the rudder stick to 0400 or as shown in one of the setups at the end of this manual.

Press the button shortly, you are now in the menue **Elevator feedback**. Adjust now with the rudder stick the feedback to 0010 or as shown in one of the setups at the end of this manual.

Press the button shortly, you are now in the menue **Aileron P**. Adjust the P-part with the rudder stick to 0250 or as shown in one of the setups at the end of this manual.

Press the button shortly, you are now in the menue **Aileron I**. Adjust the I-part with the rudder stick to 0400 or as shown in one of the setups at the end of this manual.

Press the button shortly, you are now in the menue **Aileron Feedback**. Adjust with the rudder stick the feedback to 0010 or as shown in one of the setups at the end of this manual.

Press the button shortly, you are now in the menue **Piro Optimization**. Adjust with the rudder stick the pirouettes optimization to 0000. This function is only for the fine tuning and is only necessary for 3D and FAI pilots. Explanation will follow later.

Press the button shortly, you are now in the menue **Piro Optimization Threshold**. Adjust with the rudder stick the pirouette optimization threshold to 0000. This function is only for the fine tuning and is only necessary for very less 3D and FAI pilots. Explanation will follow later.

Press the button shortly, you are now in the menue **Deadband**.
The Deadband is a range around the stick center where the Gyrobot does not react to the stick moves. It is important if the potentiometers of the aileron and elevator stick is a bit inexact. If the deadband would not be there, the swashplate servos would always move without moving the stick. If your swashplate servos never move without moving the sticks you can leave the setting to 30. If not or if the Swashplate moves if you Switch between Dual Rate or Flight Phases on the Transmitter, you can increase it until it does not move. Please note that increasing it too much the precision of the Swashplate around the center becomes worse.

Changes in the adjustment of the transmitter before the first flight:

Now you necessarily have to reduce several values at the transmitter so that the model is not too agile. (**ABSOLUTELY NECESSARY)**:

1. 50% Expo to aileron and elevator (ways are shorter in the middle range)
2. 30% Expo to rudder
3. Adjust the servo travel (ATV, Endpoint) on the transmitter for aileron and elevator channel to +/- 20 % (20% for the one side and 20% for the other side). **Yes, you are right: Only 20% servo travel (=agily) for the beginning, please follow that instruction, you can increase it later if you want).**
4. Adjust the servo travel (ATV, Endpoint) for the rudder channel to +/- 60% (60% for the one side and 60% for the other side).
5. **Calibrate again.**

You can increase the values after the first flight step by step, if the model is too inactive for you.
Please Note: Every time you change anything on the transmitter or the GyroBot settings, please calibrate again before flying.

G. The first flight

Switch on the transmitter first and then the receiver. Do not move the model and the control sticks till the green LED shines permanently.

Before each flight check if all functions work true sided (gyro direction of all 3 axes, aileron, elevator, pitch and rudder function on the transmitter, swashplate in absolutely horizontal position).

Lift the model and turn it all around to see whether the sensors work and whether the gyro directions are correct.

Attention: When you want to fly, the GyroBot has always to be in the flight mode "System Running". If you are in the programming mode continue pressing the button till the display says "System running" again. Do only pull off the connecting plug to the cockpit or USB interface cable when the menue says "System Running".

DO ONLY FLY WHEN THE MENU SAYS "SYSTEM RUNNING", OTHERWISE THE MODEL IS NOT CONTROLLABLE.

An important annotation before the first take off:
Take care that the model is situated horizontally on flat bottom (grass) and that the swashplate is absolutely horizontal (to the helicopter, if the skids are not exactly parallel to the model).

BEFORE EVERY TAKE OFF BASICALLY PAY ATTENTION TO AN ABSOLUTELY HORIZONTAL POSITION OF THE SWASHPLATE (in relation to the helicopter).

It may also occur that the swashplate is not horizontal any more when you adjust or switch values, THEREFORE ALWAYS MAKE A CONTROL BEFORE THE TAKE OFF (calibrate again, if not).

Also control at first the switching between the flight phases at stand; it can also be that the swashplate leaves its horizontal position (if you did not calibrate alle flight phases or if the deadband is too small).

The control characteristics look a little bit strange if you don´t know it. It is absolutely normal that the swashplate gets back very slowly onto neutral position after you moved the sticks.
A helicopter stabilized with the GyroBot reacts a little bit different at take off and landing as normal paddle helicopters.
Adjust an average main rotor rotary speed. It should neither be too low nor too high.
Before the take off adjust the rudder rotor roughly to the middle.
Adjust the pitch stick to slightly negative pitch and let the system rev up completely.

This is very, very important:

AT THE GROUND DO NOT MOVE THE AILERON AND ELEVATOR STICK.

This is a very important point and different to helicopters with flybars. If you steer aileron or elevator on the ground the systems expects that the helicopter turns into this direction.
As the model is on the ground this doesn´t happen, so the system stears more and more to that direction, it can even tilt over. But after several take offs and landings you will certainly get used to it.

The swashplate has to be in horizontal position. Do not lift off before the rotation speed is reached. Now take off continuously so that you reach an altitude of 1-2 m very fast. Then start hovering and get used to the flight characteristics. Probably the model will still fly a little bit smooth or slow-acting, as the sensitivities are choosen relatively low at first.

Fine adjustments during the flight:

Now start adjusting the tailrotor (in the menue rudder tuning):

Raise constantly the P-part in steps of 50 till the tailrotor locks in place abruptly after stopping from pirouettes. The P-part is responsible for fast and snappy stops of the tailrotor when flying pirouettes, but it cannot keep the rudder stable against the wind or with crosswind. This must do the I-part. Now fly forward with average speed. During the flight fly pirouettes. Raise the I-part in steps of 50 till the pirouettes turn with constant speed.
Now raise the P-and I-part constantly till the tailrotor swings up when flying fast forward against the wind. Then reduce both parts till there is no more swinging up.

For fine adjustment you can either raise the I-part if the pirouetting rates do not seem to be constantly enough to you and reduce the P-part a little. If the abrupt stopping after pirouettes does not seem to be hard enough to you do the other way round (raise P, reduce I).
The rotational speed of the tailrotor is adjusted with the servo travel (ATV, Endpoint) of the rudder channel on the transmitter. The lower the value (please adjust for the time being both sides equally) the slower the rotational speed.
Furthermore you can smoothen the reactions around the stick center with the expo function of the transmitter. Please always calibrate after changing any settings.

Explanation:
The P-part is equivalent to the normal mode of a standard Gyro. The higher it is adjusted the more “crisp” and the more abrupt the tailrotor locks after pirouettes. The P-part alone cannot maintain the tailrotor correctly in its position, that`s the I-part´s job. With it you can fly sideways and backwards without turning away the tailrotor. The P-part and the I-part together are extensively equivalent to the so-called “Heading Lock” or “AVCS” mode of common gyrosystems.
If you want to fly in the so-called “normal mode” of common gyrosystems adjust the I-part to approx. 5 and the P-part to the value previously reached.
Attention: It is not possible to fly sideways or backwards with a stable tailrotor then.

The GyroBot provides a tailrotor control on highest level. But please pay attention to the fact that a perfect tailrotor performance can only be reached with a rigid linkage (and free from

backlash), a fast and appropriate servo, stiff and correctly dimensioned Carbon rudder tailrotor blades and sufficient mechanical amplitude to the left and the right.

Adjustment of the swashplate:
The following test flights all refer to the elevator function as these have to be adjusted more exactly. But continue adjusting also the corresponding value for the aileron function as this then is correct as well. When the correct value is found, reduce only the P-and I part for aileron a little bit more than for elevator.
The rotor head absorption should be adjusted relatively hard for good results. At lower rpm´s and for scale models also a smoother absorption is ok. Furthermore it is of advantage to use high-quality rotor blades with a a very neutral CG in direction of the blade (If you hang the blade in the hole, the blade must hang down as vertical as possible, the more the blade hangs vertical, the better it is).
We start with the I part: If the model still continues turning a short while after stopping the elevator stick (for example front flips or only short elevator movements with hard stops on the stick) you have to raise the I part. If it strikes back from short elevator inputs the I partis still too high. The right setting is found if the model stops exactly if you stop moving the stick. You found the right point when the model stopps abruptly and does not strike back.

Now we adjust the P-part: It is responsible for the a “snappy” or “crisp” lockage from elevator and aileron movements. Raise the P-part in steps of 50 till the model stopps “hard enough”. If you do not miss anything the P-part can remain unchanged.

Attention: A I and P-part too high adjusted can cause unpleasant swinging up (first on the ailever axis). So it is necessary to adjust the I and P parts of the aileron axis approx. 50 points lower than the of the elevator axis.

Now we adjust the feedback: a higher value causes that the model raises more while flying fast forward. The more you reduce the feedback the more the model runs absolutely straight while forward flying. during the fast flight. The feedback should only serve for the adjustment of the right characteristics while flying fast forward.
Do the following: Fly fast straight forward. Does the model climb up slowly (on the elevator axis), reduce the feedback till the model runs absolutely straight forward.

Attention: Never reduce the feedback below the value 2. When the value is reduced too much the swashplate is not able to go back into horizontal position by itself, the model can tilt over during the take off.

The rotation speed or agility of the aileron and elevator function is adjusted with the servo travel (ATV, Endpoint) of the aileron and elevator channel at the transmitter; the lower the value the slower the rotary speed of the model.

The next two functions are only interesting for some 3D and possibly F3C pilots; many pilots will not recognize at all the effects of the functions, respectively will not consider them necessary. If this is the case, please adjust both values to 0.

First of all there is one important thing to know: The best pirouettes are possible with fast and high resoluting servos, here you don´t need any piro optimization. If you don´t use very good servos as recommended from us, you can use the piro optimization, but its not easy to adjust.

If you want to use these functions please do the following:

Adjust the piro optimization if you want to do so. You can influence the behaviour of the helicopter when flying pirouettes around the normal axis (rotations with the tailrotor) with the pirouettes optimization.

Explanation: the electronical control loop is only as fast as the weakest element; in this case this is the servo (even if you use high-quality speed servos). When the model now flies fast tailrotor pirouettes, it may occur that the aileron and elevator functions are being regulated delayed (for example: the controller corrects for the position 0 degrees of the model; till the correction reaches the rotor blades, the model already is situated at 2 degrees). The result could be “winding out” when flying several pirouettes or pirouettes with climb flight or pitch-pumping.
The best would be to use very fast swashplate servos that can be used with servo speed on “high speed” in the swashplate base menue. In the menue swashplate base adjust the servo speed to “high speed” and check if your servos run smoothly and without strange sounds. If they make noise that is not normal please take a lower servo speed. (Attention: without guarantee).

If you still did not reach a satisfying result, please use the function **piro optimization**:

As your effective direction depends on the direction of installation, the pole reversal of the functions and the direction of the piro optimization has to be tested during the flight. Do the following: At first raise the value in one direction by steps of 20 and continue flying horizontal pirouettes (it would be best to do with pitch-pumping or during the climb flight). Observe whether the model holds its position better than before. If yes, raise the value by steps of 20 till the behaviour is good. When the behaviour turns worse, change the direction (the prefix) and raise the value again carefully.
Attention: Raise the value always very carefully from 0; a value too high can lead to a massive “wobbeling”.

If you want to, adjust the piro optimization threshold now.

Explanation: the piro optimization can change the flight characteristics of piro-flips or other piro-figures. In order not to influence the control of these figures the piro optimization can be blanked out again through the piro-optimization threshold, when the aileron and the elevator stick are being moved beyond (more than) this threshold.
That means: When the piro optimization threshold is 0, the piro optimization is not active, if you move the aileron or elevator stick only a little bit. The more the value is increased the fading-out is being delayed to outwards (depending on how far the sticks are moved for aileron and elevator).
Try to find a value that allows a low elevator and aileron correction when flying pirouettes, but that does not influence you with larger stick moves for other piro figures.

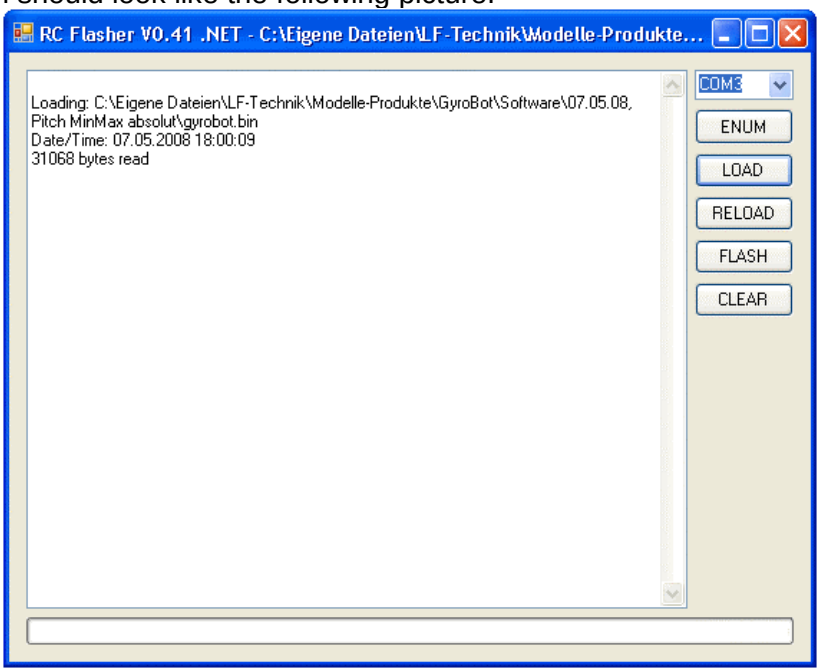
The menue “Check it”

Here you cannot adjust anything, but you can read off, respectively control different values. Push the button a little bit longer in the menue “system running” navigate then with the rudder stick to the menue **Check it**.
Now press again the button shortly, you are in the test menue for the inputs of the transmitter. Here you can control whether the inputs of the transmitter do come in correctly or are in neutral position (after having calibrated). The channels for elevator, aileron, rudder, pitch and the channel for the flight phase switch (AUX) are displayed. If the inputs are not in a neutral position (numerical value +10 till -10), please adjust all trims on the transmitter exactly to 0 and repeat the calibration.
Now push again the button shortly, you are in the test menue for the gyro sensors. If you now turn the model around the corresponding axis, you can see in the bar diagram, how the respective sensor works. A stands for aileron, E for elevator and R for rudder (tailrotor). If the model is not moved, all bars should be in the middle, respectively should not be displayed. (If

this is not the case please switch on the GyroBot again, without moving the model, till the green LED shines constantly and test it again.)
Press the button again shortly, you are now in the test menue for the acceleration sensors. If you now turn the model around the corresponding axis you will see from the numerical value how the corresponding sensor works. X,Y and Z indicate the respective axis.

Installation of software updates:

As it is our intention to keep your GyroBot always up-to-date, you have the possibility to update your GyroBot with the actual software. Do the following: As a precaution write down all values achieved during the flight. Normally the values remain valid but for the future we cannot guarantee that they are still there forever when new menus are added.
If this is the case we offer a new instruction manual together with the new software that substitutes this version. Please read the new manual completely before flying again.
Load down the new software file “gyrobot.bin” from www.lf-technik.de and save it on your harddisk. It makes sense to start a folder with date and further information so that you can reconstruct later which is your actual file.
Connect the USB Interface cable (No. 5000/1) to your PC and at slot 1 of the GyroBot.
Now copy the file “flasher.exe” from the attached CD to your PC and start it with double-click (no installation necessary). System requirements are Windows XP or Windows Vista.
Now chose the correct Com port (can be adopted from the cockpit simulator) and click on the button “LOAD” and choose the new file “gyrobot.bin” from your harddisk.
Now the screen should look like the following picture.



Now click on the push button “FLASH” and connect the GyroBot to the reciever batterie (or (BEC) within 10 seconds. You are not allowed to energize the GyroBot before, as it is prepared for software updates for a short time only during the start up. If you are using BEC, please be sure that you motor of the helicopter cannot start (disconnect two cables from the ESC to the Motor) or use a separate reciever batterie. The transmitter should be switched on because of security reasons although it is not needed for the updating process.
When everything is correct a bar at the bottom of the flasher-window raises till its full and the GyroBot flashes red. Wait till the bar in the window is complete and the GyroBot glows green permanently. Now you can disconnect the electricity supply and the USB cable.

If the update does not work, install the following driver unit:

http://www.ftdichip.com/Drivers/CDM/CDM%202.04.06.exe

and

http://www.microsoft.com/downloads/details.aspx?displaylang=de&FamilyID=0856eacb-4362-4b0d-8edd-aab15c5e04f5

If problems with the update occur or if you are not sure please do the update again.
Do not fly if the GyroBot does not work properly after the update. We do not assume any liability.
After the update always control **ALL VALUES** as they can switch or change when installing new menues.

Technical dates of the GyroBot 700:

-Plastic housing
-Dimensions: 33x33x12 mm
-Weight: 20g
- Gyro elements: MEMS sensors, lowest temperature drift (not relevant during the flight), the highest possible resolution
- acceleration sensors on 3 axes
-measurement range: +/- 1000°/s with 0,2°/s resolut ion
- low-noise signal processing without drift and with special filtering
- RISC processor
-Optimized electromagnetic compatibility
-electric power supply: 3-12,6 V
-power input: Typical 65 mA, 5,5 V; maximum 100 mA

Recommended servos:
Tailrotor: Futaba S9253/54/57, Futaba S9251/56, Futaba BLS 251
Swashplate: Futaba S9452, Futaba BLS 451, Futaba S9650
When using slower servos, handling is possible, but the highest precision will no more be possible. Furthermore it can not be assured that servos different from those recommended will resist the increased control requirements of the GyroBot permanently.

Complete Setups:

If you have a Roxxter or one of the following models you can transfer these values. Please consider that these values are only reference values that could vary optionally and according to the used components. Further setups will follow.

Model:	**RoXXter 22 GyroBot Version**
Flying Style:	**Beginner**
Swashplate-Servos:	Futaba S9650 (Lenght of Servo horn: 19 mm)
Tailservo:	Futaba S9254 (Lenght of Servo horn: 15 mm)
Main rotor blades:	NHP 500
Tail rotor blades:	85 mm Original stock tailblades
Rudder P:	320
Rudder I :	490
Elevator P:	280
Elevator I:	420
Aileron P:	250
Aileron I:	520
Elevator and Aileron Feedback:	5
Piro-Optimization:	0
Piro-Opt. Threshold:	0
Servo Travel (ATV, Endpoint) on the transmitter for Aileron:	+/- 15%
Servo Travel (ATV, Endpoint) on the transmitter for Elevator:	+/- 15%
Servo Travel (ATV, Endpoint) on the transmitter for Rudder:	+/- 40%
Expo on the transmitter for Aileron:	45% (less agility around the center of the stick)
Expo on the transmitter for Elevator:	45% (less agility around the center of the stick)
Expo on the transmitter for Rudder:	30% (less agility around the center of the stick)

Model:	**RoXXter 22 GyroBot Version**
Flying Style:	**3D and FAI**
Swashplate-Servos:	Futaba S9650 (Lenght of Servo horn: 19 mm)
Tailservo:	Futaba S9254 (Lenght of Servo horn: 15 mm)
Main rotor blades:	NHP 500
Tail rotor blades:	85 mm Original stock tailblades
Rudder P:	320
Rudder I :	490
Elevator P:	280
Elevator I:	420
Aileron P:	250
Aileron I:	520
Elevator and Aileron Feedback:	5
Piro-Optimization:	0
Piro-Opt. Threshold:	0
Servo Travel (ATV, Endpoint) on the transmitter for Aileron:	+/- 35%
Servo Travel (ATV, Endpoint) on the transmitter for Elevator:	+/- 35%
Servo Travel (ATV, Endpoint) on the transmitter for Rudder:	+/- 70%
Expo on the transmitter for Aileron:	45% (less agility around the center of the stick)
Expo on the transmitter for Elevator:	45% (less agility around the center of the stick)
Expo on the transmitter for Rudder:	30% (less agility around the center of the stick)

Model:	**RoXXter 11 GyroBot Version**
Flying Style:	**Beginner**
Swashplate-Servos:	Hitec HS 65HB (Lenght of Servo horn: 15,5 mm)
Tailservo:	Graupner DS 3781 (Lenght of Servo horn: 11 mm)
Main rotor blades:	LF Powerblades 360
Tail rotor blades:	Original stock tailblades
Rudder P:	360
Rudder I :	300
Elevator P:	270
Elevator I:	400
Aileron P:	270
Aileron I:	400
Elevator and Aileron Feedback:	20
Piro-Optimization:	0
Piro-Opt. Threshold:	0
Servo Travel (ATV, Endpoint) on the transmitter for Aileron:	+/- 15%
Servo Travel (ATV, Endpoint) on the transmitter for Elevator:	+/- 15%
Servo Travel (ATV, Endpoint) on the transmitter for Rudder:	+/- 40%
Expo on the transmitter for Aileron:	45% (less agility around the center of the stick)
Expo on the transmitter for Elevator:	45% (less agility around the center of the stick)
Expo on the transmitter for Rudder:	30% (less agility around the center of the stick)

Model:	**RoXXter 11 GyroBot Version**
Flying Style:	**Aerobatics and 3D**
Swashplate-Servos:	Hitec HS 65HB (Lenght of Servo horn: 15,5 mm)
Tailservo:	Graupner DS 3781 (Lenght of Servo horn: 11 mm)
Main rotor blades:	LF Powerblades 360
Tail rotor blades:	Original stock tailblades
Rudder P:	360
Rudder I :	300
Elevator P:	270
Elevator I:	400
Aileron P:	270
Aileron I:	400
Elevator and Aileron Feedback:	20
Piro-Optimization:	0
Piro-Opt. Threshold:	0
Servo Travel (ATV, Endpoint) on the transmitter for Aileron:	+/- 30%
Servo Travel (ATV, Endpoint) on the transmitter for Elevator:	+/- 30%
Servo Travel (ATV, Endpoint) on the transmitter for Rudder:	+/- 60%
Expo on the transmitter for Aileron:	45% (less agility around the center of the stick)
Expo on the transmitter for Elevator:	45% (less agility around the center of the stick)
Expo on the transmitter for Rudder:	30% (less agility around the center of the stick)

Model:	**RoXXter 33 SE GyroBot Version**
Flying Style:	**Beginner**
Swashplate-Servos:	Futaba S9452 (Length of servo horn: 18,5mm)
Tailservo:	Futaba S9254 (Length of servo horn: 16,5mm)
Main rotor blades:	LF Powerblades 600
Tail rotor blades:	Original stock tailblades 95 mm
Rudder P:	470
Rudder I :	500
Elevator P:	300
Elevator I:	450
Aileron P:	300
Aileron I:	450
Elevator and Aileron Feedback:	7
Piro-Optimization:	0
Piro-Opt. Threshold:	0
Servo Travel (ATV, Endpoint) on the transmitter for Aileron:	+/- 15%
Servo Travel (ATV, Endpoint) on the transmitter for Elevator:	+/- 15%
Servo Travel (ATV, Endpoint) on the transmitter for Rudder:	+/- 40%
Expo on the transmitter for Aileron:	45% (less agility around the center of the stick)
Expo on the transmitter for Elevator:	45% (less agility around the center of the stick)
Expo on the transmitter for Rudder:	30% (less agility around the center of the stick)

Model:	**RoXXter 33 SE GyroBot Version**
Flying Style:	**3D and FAI**
Swashplate-Servos:	Futaba S9452 (Length of servo horn: 18,5mm)
Tailservo:	Futaba S9254 (Length of servo horn: 16,5mm)
Main rotor blades:	LF Powerblades 600
Tail rotor blades:	Original stock tailblades 95 mm
Rudder P:	470
Rudder I :	500
Elevator P:	300
Elevator I:	450
Aileron P:	300
Aileron I:	450
Elevator and Aileron Feedback:	7
Piro-Optimization:	0
Piro-Opt. Threshold:	0
Servo Travel (ATV, Endpoint) on the transmitter for Aileron:	+/- 40%
Servo Travel (ATV, Endpoint) on the transmitter for Elevator:	+/- 40%
Servo Travel (ATV, Endpoint) on the transmitter for Rudder:	+/- 70%
Expo on the transmitter for Aileron:	45% (less agility around the center of the stick)
Expo on the transmitter for Elevator:	45% (less agility around the center of the stick)
Expo on the transmitter for Rudder:	30% (less agility around the center of the stick)

We are presuming that you are well versed with the handling of model helicopters and computer remote controls. As beginner you neccessarily should contact an expert. If you do not know anybody do not hesitate to contact us.

Now have fun and enjoy your flights with your GyroBot 700.

Your LF-Technik Team