YGE Brushless – Electronic Speed Controllers (ESC)
Operating instructions for the RC-Setup

Features:

–6 step adjustable timing or automatic timing adjustment
–Lipo(Auto) / NiMh adjustable.
–Adjustable brake. Hardness and speed are proportional to the soft start.
–Full utilization of stick range by programming in the RC-Setup
–PWM switching rate of 8KHz-16KHz adjustable in 1KHz-steps!!

–With the PWM switching rate applies as little as possible and as much as necessary. Higher frequency for low inductive motors, lower frequency for less switching losses.

–Speed regulation with PI-controller.

–Active free-wheel. Can be disabled with ProgCard II.

–Active free-wheel reduces clearly the losses in the partial load range, but can however lead in rare cases to problems. In relation with speed regulation it can come to rougher transitions form part load to full load, avoid therefore full power switching in speed controller mode.

RC-Setup:
General beep sequences outside of the RC-Setup:
Constant monotonous beep signals the programming mode.
A descending beep sequence signals recognition of receiver signals.
A ascending beep sequence signals that the ESC is armed! Caution!

Afterwards (after active signaling) other beeps are following to indicate the recognized or adjusted battery type.

The correct setting are particularly important with Lipos and BEC operation, therefore an acoustic control takes place after every power on of the ESC.

In case of Lipo-setting (Lipo auto-mode 2-6 (14) cells):

- 2 identical beeps => 2S Lipos recognized ♪ ♪
- 3 identical beeps => 3S Lipos recognized ♪ ♪ ♪
  etc...

To have a successful recognition even with more than 3 cells, the battery pack should always be fully charged! Otherwise, with high cell numbers, it can happen that a cell is missed and thus the under voltage protection would trigger too late.

With the optionally available YGE ProgCard II the number of cells can also be set permanently.

With more than 6 cells the beep sequence becomes ♪ ♪ ♪, as following the count of so many beep seems unrealistic. Such high numbers of cells should not be operated in the auto mode anyway. We recommend then to set the number of cells permanently with the ProgCard II.

The under voltage protection is triggered at 3.1V per cell. This is a conservative value however it leads to a longer Lipo life! It is important to verify the recognized cell count to avoid false under voltage triggering.
A fixed under voltage limit can only be programmed with the ProgCard II. You can also set the specific limits for LiFePO with the ProgCard II.

With Ni-based batteries (NiCd/NiMh)

- 2 Beeps high/low => NiMh-Mode: ♪ ♪

under voltage limit is about approx. 0.65 x open circuit voltage of a cell.
Thus with 1,3V open circuit voltage before flight, the limit will be 0,91V/cell.

Generally only sufficiently charged batteries should be connected before a flight for a reliable under voltage detection.

Freely programmable voltage activated:

- 2x2 different beeps low/high/low/high => Programmed under voltage limit is active (default 12V for future PC-Setup) ♪ ♪ ♪ ♪

Basic-Setup:

The basis setup goes relatively quick. One should read this thoroughly before running it. Otherwise one may not be able to keep up with the pace!

1. Verify that the ESC is off, switch on the transmitter with the throttle stick at full power.
2. Hold the Model, Connect the ESC => a monotonous continuous beep should be heard.
   ♪♪♪♪♪♪... : Multiprogramming is activated!
   Full throttle position is learned!
3. During the first 20 beeps move the stick to the desired **Neutral position**. If no brake is required, this is the position „fully back ". If a brake is required , put the stick approx. into the lower quarter (thus not fully back). Now the stick positions are saved. **Acknowledgement**: ♪♪
4. Now comes the setup of the **Soft start.** For extremely fast response simply push the stick back to full power and wait for acknowledgement. Then come back to neutral position and the ESC is ready to run. If this is too hard, or if the motor cannot accelerate that fast, then move the stick back accordingly and wait for the acknowledgement signal. **Acknowledgement**: ♪♪

   => **Softstart is saved.**
   => Softbrake, if activated, will also use this value!

   Please notice that, with brushless motors, very fast response times can lead to several times higher current draws than in steady operation! Therefore this setting should be adjusted carefully. Allow only as much speed as necessary. A good average is to place the stick simply into the center. For geared motors the stick should remain below the center. This applies in particular to the soft start for helicopters!

   Caution Heli-Pilots:
   For helicopters the best is to move the stick fully back (neutral position)!

   It is important that for autorotations trainings the motor is not taken fully back to 0! Otherwise an extremely slow normal softstart takes place in the case of an autorotation abort which eventually may lead to a real inadvertent autorotation…. Thus, the motor needs a certain remaining rpm, so that the ESC isn't considering it as a fresh start. One should select this remaining rpm low enough so that the helicopter cannot hover with it. If it is too small the acceleration could lead to an overload of the motor. Nevertheless the motor will engage only softly after an autorotation abort and not with full power. Therefore an appropriate security flight level must be always kept.

Advanced-Setup:

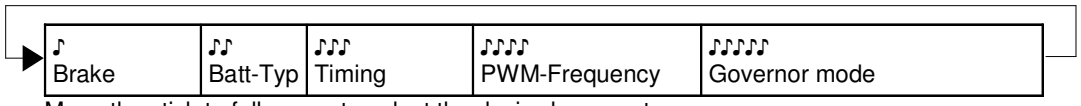
For the Advanced Setup the Basic Setup must have been performed at least once!

1. Verify that the ESC is off, switch on the transmitter with the throttle stick at full power.
2. Hold the Model, Connect the ESC => a monotonous continuous beep should be heard.
3. ♪♪♪♪♪♪... : after approximately 20 tones, the advanced setup is activated as long as the basic setup has been performed!
   Acknowledgement ♪♪ => Advanced Setup
   If the continuous beep is not heard, please disconnect immediately the battery from the ESC and control everything again. Place the transmitter in a good range of the receiver if the antenna is not extended.

Important!!!
In the advanced setup only **ONE** Menu option can be selected, therefore menu choice must take place first:

place the stick again into neutral position to select the parameter to modify:

Menu Options overview:



Move the stick to full power to select the desired parameter.
Acknowledgement: ♪ ♪

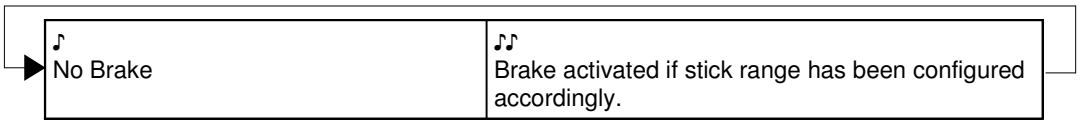
Note:
If no selection is taken, the menu begins again with “Brake” and so on.

Depending upon selection now the ESC switches to the setting of <u>one</u> Parameter.

Possible (sub) menus:

Brake(♪)

move stick again into neutral position:

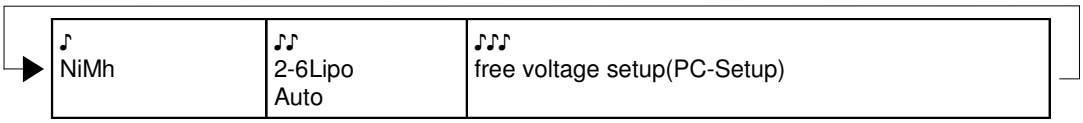


Move the stick to full power to select the desired setting.
Acknowledgement: ♪ ♪
After the acknowledgement the menu option is programmed!
If the stick is taken back to neutral position the ESC is armed and ready for use when the ready signal sounds. This applies to each programming step.

If no selection is made, the above selection menus start over again at the beginning until a selection is made.

Battery-Typ(♪♪)

Battery selection (Batt-Typ):
move stick again into neutral position:



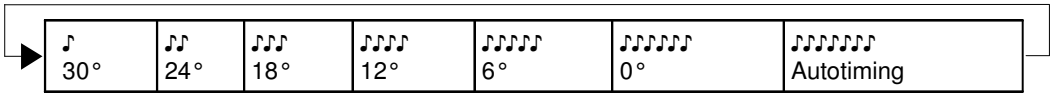
Move the stick to full power to select the desired setting.
Acknowledgement: ♪ ♪
Setting done.

Timing(♪♪♪)

Timing setting:
move stick again into neutral position:

The ESC starts with a single beep (30°) and proceed up to 7 beeps (Autotiming).

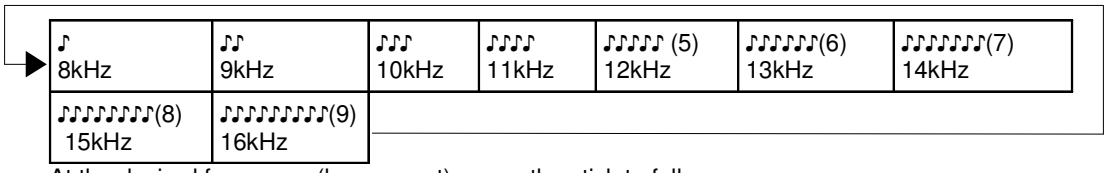
Example: To set 18° : Move the stick to full power to at the third beep signal.



At the desired beep count, move the stick to full power.
Acknowledgement: ♪ ♪

PWM-Frequency(♪♪♪♪)

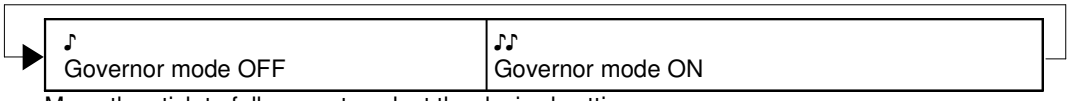
PWM switching rate setting:
move stick again into neutral position:



At the desired frequency (beep count), move the stick to full power.
Acknowledgement: ♪♪
Setup done.

Governor Mode(♪♪♪♪♪)

move stick again into neutral position:



Move the stick to full power to select the desired setting.
Acknowledgement : ♪♪
Setup done.

After setting of the speed regulation the ESC will learn-in the operating speed at the next start. It is therefore important to wait until you can notice a small speed jump indicating that the regulation is active.

If no selection has been made, the above menu options will start over again until a selection is made.

Hint:
The beep starts always with the current setting. This gives a way to readback the ESC settings.

After the setting of any of these parameters, moving the stick back to neutral position will arm the ESC. Alternatively the ESC can be disconnected and reconnected to allow the setting of other parameters.