YGE 120HV (V5) + 160HV (V5) + 200HV electronic speed controller (ESC)
Governor preprogrammed (mode 2)

Technical data:

- The specified current is the maximum continuous full power current.
- 4 to 14s LiPo, with under voltage protection by power reduction.
- 5 to 15s LiFePo, with under voltage protection by power reduction.
- Disconnectable under voltage detection.
- Optocoupler. Receiver Battery can be used up to 9V.
- Speed regulation (Governor mode).
- Soft start.
- Active free-wheel, allowing unlimited part load operation.
- Automatic or 6 step adjustable timing.
- 3 steps adjustable regular back EMF brake.
- Switching rate: 8 to 16 kHz
- Speed limit: 240,000 RPM (2-Pole motors)
- Temperature and overload warning.
- Anti sparkling circuit, decreases the power on spark.
- Programming with mode setup or the ProgCard II / III

	120A	160A	200A
Overall dimensions in mm	72 x 52 x 27	72 x 52 x 28	89 x 52 x 28
Weight in g without / with wires	102 / 146	126 / 178	137 / 189
Cable diameter Battery / Motor	6^2 / 4^2	6^2 / 6^2	6^2 / 6^2

The controller is programmed for **governor** use. You do not have to program anything else. The throttle end points are set to 1.1 ... 1.9ms. This throttle curve will then correspond to 0 to 100% with the transmitter.
If you want to fly different rpms and switch them in flight, you have to start the model with the highest rpm.

In **Gov-Store** you have to switch once to the highest possible rpm (e.g. 90%) in order to learn in the motor parameters. Thereafter you can start with the lowest rpm and switch in flight if you want.

The Gov function starts from 50% of the throttle opening. That is why we do not recommend to operate the heli under 50%.
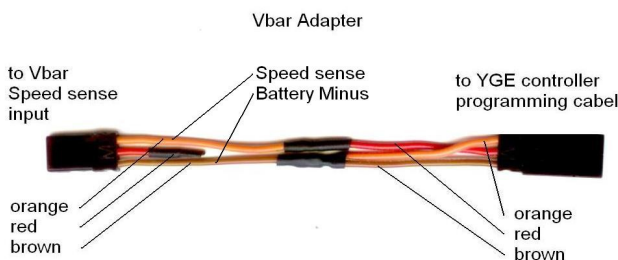
We recommend the following throttle openings:

Hover (Low RPM)	55 ... 60%
Standard	70%
3D	80 ... 85%

In case rotation is too high with the recommended throttle openings, you should choose a lower pinion or a motor with less kv.

In **Vbar Gov. (external governor)**
Disconnect the jumper from the short controller cable and connect the Vbar adapter cable to speed sensor input of the FBL.
Connect the long controller cable to the throttle channel of the FBL.

Vbar Adapter

Initial setup:

After connecting the main battery (red = plus, black = minus) you hear 3 descending tones. When connecting 4s to 6s Lipo follows a number of beeps according to the number of cells. With high cell packs (7 to 14s Lipo) follow 2 high and 2 deeper tones. In case the transmitter stick is in throttle off, you hear now 3 ascending tones.
You need to connect the motor to hear the beeps, as it is the motor itself which acts as a speaker.

--- The ESC is ready to use ---

If the motor turns in the wrong direction, exchange simply 2 of the 3 motor wires.

Use only clean and tight gold connectors for motor and battery. The 5.5mm / 6mm PK connectors have proven to be the best choice. Pay attention for the battery connector to choose a polarity safe system. Exchange low-friction or oxidized plugs and sockets. Because only tight sitting contacts will ensure a high current flow, protect the speed controller against dangerous voltage peaks and avoid disturbances.

The entire wire length, from the controller to the battery, may not exceed 30cm. If longer wires are necessary, a Low ESR switching capacitor of 390µF/63V should be soldered between plus and minus wires every 15cm. You might also consider using our capacitor module YGE Cap´s typ 7. Likewise the motor wires can be extended. Then please twist the 3 lines, in order to minimize interference emission.

Attention:

Inverting the battery polarity leads to heavy damage and to the loss of warranty!!!

Mode Programming:

1. For safety reasons remove ALL rotor blades!

2. Switch on TX and move the throttle stick to maximum.

3. Connect the battery to the ESC → wait for the interval beep: ♪♪♪♪♪♪♪♪♪♪♪♪♪♪♪♪♪♪ after 20 beeps the setup menu is entered: confirmation ♪♪ .

4. Move the throttle stick to minimum and choose the mode:
- ♪ Vbar - gov
- ♪♪ Gov - mode
- ♪♪♪ Gov - store
- ♪♪♪♪ Glider with folding propeller and brake
- ♪♪♪♪♪ Motor plane without brake

5. Once you are In the wanted mode, move the throttle stick to maximum: confirmation ♪♪.

If no mode was selected, the mode programming starts again with mode 1 = Vbar - gov.

6. Once a mode was selected, move the throttle stick to minimum: confirmation ♪♪.

Now the ESC is armed and ready for use.

When activating one of the modes, all relevant heli parameters are set to default. The default will fit almost all setups. You don't need to program anything else.

Here is a list of the default settings. (mode 2)

- Timing = 18°
- Brake off
- cut off type / accutype = slow down / Lipo
- cells = none = automatically cell count
- Act. Freew. on / Gov on
- P-Gain = 0,9
- I-Gain = 0,05
- Startup Speed = Heli middle
- PWM-Frequency = 9 kHz
- Startup Power = Auto 1-32

If it is necessary to change the settings, you need the YGE ProgCard.

In case another mode is selected, all settings are back on default.

Autorotation (AR) and bailout

To use the bailout, the motor should not be switched off during autorotation! Or the ESC uses normal soft start if switched back to flight mode. The motor needs some rpm for the bailout, therefore set the rpm very low: the helicopter should not be able to lift off. We recommend 10 ... 20% throttle opening. If set too low, the motor or ESC might overload.
Always makes the bailout at a safe height!
As soon as the model is on the ground, the motor has to be switched off completely, otherwise there is no soft-start and bailout is active!

Lipo protection / under-voltage protection:

Because of the tension driven load adjustment it is possible to fly further with low power, since the battery recovers with smaller load. However, if the tension continues to break in, the motor is switched off.

Active free-wheel:

The unlimited partial load capability refers to the maximum full power current of the respective ESC types.

Temperature / overload warning:

If the speed controller's temperature exceeds its limit, because of overloading or lack of cooling, after landing and/or motor stop, a warning signal is issued (3 Beeps in the interval). But the motor is **not switched off** in flight unless the temperature becomes extremely critical, then the motor switched off.

The partial load operation between half and nearly full power is the most difficult area for an ESC. In addition the running time becomes longer and longer with the Lipo technology. If it should come to repeated temperature warnings, better cooling should be provided or current should be reduced.
These warnings are to be regarded as overload warnings and **not as normal operating condition**. Because at high temperature the components are strongly stressed, this leads to a decreased life time.

You achieve a better cooling not only through sufficiently dimensioned air intake, but even more efficiently through a larger air outtake, in order to avoid a heat accumulation.
You achieve smaller currents by using a smaller propeller or a one cell smaller battery.

Opto coupler:

In the case of the use of an external BEC the galvanic separation of the opto-coupler is bypassed, which can possibly feed disturbances through to the receiver. Here we recommend the use of our ferrite core for additional filtering.
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Caution:

Fundamentally it is important to make sure that no objects are within the propeller circle when batteries are connected. The use of this speed controller is therefore allowed only in situations where damages and personal injuries are impossible. A damaged governor (e.g. broken, damaged by polarity inversion or humidity) must not be reused under any circumstances. Otherwise it can come to a later malfunctions or failures.
The ESC may only be powered from batteries, a use from power supplies is not allowed.

Trouble shooting:

2 Beeps/flashes: Under-voltage identification
3 Beeps/flashes: Temperature rise warning
5 Beeps/flashes: Receiver signals failed
6 Beeps/flashes: start up failed

The ESC signals any error that happened during flight acoustically (motor) and optically with a blinking LED code.
Errors 2 and 3 are signaled after motor stop, but aren't stored as long as the ESC didn't cut off completely (low voltage / temperature warning). In case the error led to a complete cut off, then it is not cleared by a tension RESET. The deletion can take place only on purpose by connecting the battery with the stick at full power and/or with 100% throttle pre-selection (throttle curve), and disconnecting it again after the interval beep. Please you leave the stick at full power, while disconnecting, otherwise you activate the RC-Setup.
Likewise the errors can be cleared by activating the ProgCard.
With an activated brake, the error is only signaled after a tension reset or in wind milling position.

Warranty:

We give 6 months warranty on this speedcontroller. Any other requirements are excluded. That applies in particular to requirements for damage or injuries compensation due to malfunction or failure. For damages to property or personal injuries and their consequences, which developed from our supply or craftsmanship, we do not take any liability, since we have no control on handling and use.