YGE ProgCard II - Programming Card

With the programming card, we offer an easy to use programming unit, with which all our ProgCard II capable speed controllers can have their individual functions changed. A special feature is the exact Cut-off of the two on the market, Li- Battery types with the respective number of cells. Furthermore, the timing, different braking modes, speed control, and the exact throttle stick positions can be set using buttons. The current settings can be read on all of our BEC regulators, and from version 4, also read on our opto-controllers. For all other Opto-controllers the settings are only available during the programming. Read out is not subsequently possible due to the optical separation. The Power supply is via the included patch cable from Rx port to the gas channel of the receiver.
Each programming step is confirmed by a clear LED matrix and by an acoustic signal, which is generated from the connected motor and controller unit. This is all possible without the usual stick programming.

Disconnect the flight battery from the speed controller.
Disconnect the controller cable from the receiver or optocoupler and connect it with the left ProgCard connector (esc). With opto controllers from V4 use the short cable. The left pin is pulse (white, yellow or orange), the middle one is + 5 V (red), and the right one is negative (brown or black). If you accidentally reverse polarity of the connector nothing happens because the ProgCard II reverse polarity protected.
Now connect the flight battery back to the controller. On the card initially only the top LED of the LED column display lights up, the controller-motor-unit responds with 6 Tones (short melody). Shortly thereafter, the current parameters of the controller are read if this is a BEC model. The readout and ability to programme an opto-controller from V4 is happens by pressing the Enter key, as long as no right LED (Line-LED) lights. All LEDs then quickly light up sequentially. You are now on the
Level 1, starting with the display of timing. Now select the menu item with the lower left button and see the value programmed by the respective line LED. With the top-left button a new value can now be a selected, and with a following press of the bottom right Enter button transmitted to the controller. It acknowledges this with a positive beep.(The line LED on the ProgCard II briefly goes out, and there will be a low and a high tone).
Functions that the controller cannot implement are acknowledged with a negative beep (1 low tone).
This allows adjustment of all functions, where the programming sequence is not important. The exception is setting the Lipo cell type, cut-off voltage and cell number.

However, individual values can be changed later. 2 and 3 cells are detected automatically on all controllers therefore the choice of cell numbers begins only at 4 on the card.

By programming the number of cells this is fixed in the controller. The connection of a different cell numbers leads then causes false shutdowns/breakaway from regulation!!!
By re-selecting the type of cell LiPo / LiFe the controller is switched back into the Lipo / LiFePO auto mode! With activation of LiFe cells (LiFePO4) the per cell cut-off voltage is reduced by 0.7v.
Control shutdown for LiFe (cutoff voltage upper line) is 2.2 to 2.7 V per Cell. Control shutdown for LiPo (cutoff voltage lower line) is 2.9 to 3.4 V per cell. In NiMh mode neither the cutoff voltage nor the number of cells needs to be programmed. The feedback control is done automatically (on the basis of the battery voltage at connection).

BEEP short shortens the starting beep. By repeated pressing you return to the normal beep.

Rev. (Navy) forward and reverse running (only for Navy controllers). If you repeat this exercise only forward is active. If you want a limit for reverse this must be programmed in the transmitter.

Stick position **Brake off** (without brake)
For reading the throttle position, connect the included patch cable between the throttle channel of receiver and the right hand connector on the ProgCard II. Switch the transmitter on and set the throttle stick to stop. Position the ProgCard II LEDs on **Stop** and press the Enter key. Then the same with the throttle stick to full throttle and the ProgCard – Field **Full Speed.**
Stick position **Break on** (with brake)
The brake operates 10% below the stop position, thus here the slightly shorter stick travel must be read in. This involves setting the transmitter stick to 10% gas (about 3 notches from the stop position) and read in the stick position as before.
You can, however, also read in the full movement but first you need to set the corresponding servo at the transmitter to 10-100% and then re-programme to 0-100% after, otherwise you cannot reach the braking position with the stick.
For transmitters with a servo range from -100 to +100 you must correspondingly read in -80 to +100, and afterwards programme back to -100 to +100.
Brake smooth, middle, hard. These three brake stages are only for folding propellers.

Acro special (F3A brake)
This feature provides the capability of adjusting the F3A braking force steplessly. Here again you need the patch cable as described above, position the LED on Acro special, set the throttle stick, eg on half throttle for 50% brake, and press the Enter key. Similarly for 75%, put the stick on ¾ gas, etc.

When programming controllers with integral **Optocoupler** you always need the patch cable in the above manner so that the ProgCard II is supplied with power from the receiver. When programming controllers with an attached optocoupler this must first be removed. After reading in the throttle settings in this way the stop point must be moved down in the transmitter. In other words, the lower power off of the gas channel has increased by 10% because the optocoupler has a propagation delay of 50µs and has thus shifted the stop point.

Level 2 (below the first page is the second.)
All other functions, e.g. like speed control (Governor Mode), you reach on the second level of ProgCard by a short press of the two left hand buttons (the changeover takes place when the buttons are released). As a check the respective menu LED flashes. By again pressing the two buttons you come back to level 1 exactly to where you left it.

Act. Freeweel (active free-wheeling) ensures minimum losses in partial load running, whereby the controller runs much cooler.

Speed control (Gov. / Gov. Store**)**
For Helicopter use with speed control, the full transmitter stick movement, or the throttle curve (100%), must be set as described on level 1. A throttle preset of 70% for example corresponds to a fixed rpm, which is held by the controller as long as the battery voltage permits it. So if the battery voltage decreases below a certain level, you reach a point where even at full power the controller cannot reach the required speed.

Should this be the end of a flight, the rule is to select a correspondingly lower preset.

It applies to both Gov. modes that the parameters P-gain, I gain, and the motor PWM frequency should not be adjusted for the time being! Otherwise it also changes the internal control parameters!

Governor Mode is the normal speed control in Helicopter use. The setting for the throttle curve should lie at approximately 60 to 80% of the full throttle range. The controller learns at each start the allocation of throttle to preset speed. Therefore, after ramp up, there is a short speed jump that can easily excite the tail. With slight pitch the tail is usually calmed down, because the helicopter no longer "sticks" on the ground

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Gov. store is an advanced Heli function where the allocation of throttle to rpm which was learnt at the first start (the learning process) is stored. This provides a fixed, and each time identical, allocation of throttle pre-selection to the relative speed.
If you change any one component in the setup, you must select the Gov. store menu point again to train the controller again.

Procedure:
Set your throttle curve to its highest level (eg 80%). Start up the controller and let it arrived at the set speed. It is normal to observe a short speed drop. Turn off the controller and then disconnect the power supply. Reconnect the power supply and it starts with the same or lower pre-selection.
If the programming was not successful, or wrong, it can be learnt again by selecting the Gov. store function again.
Learning can take place with almost 100% accuracy. Thus, the mapping of the throttle curve to speed can be better or fully exploited. But remember to start with a low throttle because otherwise it will fly at full power without speed control!

Fast (Gov.) can be selected to work with both Gov. Modes. This feature increases the speed of the control and may be used from a field speed (magnets / 2 x Engine speed) of 80,000 rpm. Set only if the normal rules are desired.
Advantages: P and I can usually be reduced, without the control becoming too soft. System resonances are no longer exited within the control frequency.

Important Note for fine tuning:
The Gov. Programs have the appropriate basic parameters stored in the respective schemes and harmonize with most setups. However, you can still adjust the following parameters if needed (P and I ratios).

P-Gain is the proportional gain.
Speed deviations are adjusted harder or softer accordingly. In practice, the strength of readjustment (-Soft / + harder) for smaller models below 1m rotor diameter, should be a max value of 1, with larger diameters up to a maximum where a wrong value is reflected in a pulsating tail.

I-Gain is the integral gain.
Constant speed deviations are accordingly corrected faster or slower. This is important in the Context of the P ratio: a P-controller is fast, but cannot in principle fully restore the target speed as it is precisely because of this deviation that the control action works.
The I -controller **notes** this (small) difference and regulates this in full from its "memory".

Both parameters are usually changed simultaneously. If the P component is increased you should generally also increase the I-component slightly, and vice versa. Settings too high lead to a fluctuation in control, usually in interaction with the tail. You then get an extremely unsteady or oscillating tail, which can lead to uncontrollability! Therefore, all settings should take place in moderation and in small steps!
By re-selecting one of the governor modes the values are reset to the factory supplied parameters again.

Startup speed is the speed build up rate for helicopters and surface models.

PWM frequency is the clock frequency with which the motor is run in part load operation. With low frequencies lower losses develop in the controller, but the engine is running a little rougher. At high frequencies, it is vice versa. Please refer to the operating manual for your motor for the optimal clock frequency

Startup power is the initial power with which the motor starts. The higher the number, the faster and harder the start. For small propellers this is not a problem, but with large it can cause rough start up behaviour.

Before the ProgCard II is separated from the controller you have the option to look at the programmed settings of the respective items. However this is only a history of the settings you have changed and does not reflect all settings of the controller again. To do this you must read in the values again!

Tip:
If you select a line in which no LEDs are on (eg one of the two rows for the number of cells) and then press Enter, the controller will actually read again and the programmed values can again be adjusted without interrupting the power supply to the controller.

After programming, first disconnect the flight battery, and then plug the controller cable back into the receiver slot.

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