Program Controller, USBCOM and controllers Expert, Expert+ and Z-series

All controllers are possible programming by transmitter. In this manual is describing programming by PC.

A) BEC version Controllers: BEC: Expert+ and Z-series (aircraft), Race Boat Expert+, Race Boat Z-series, Car / Boat Expert+.

These controllers may be connected to the USBCOM(+) module with the connection cable CC_02. The cable is inserted in a special **ICS** connector which is a part of the controller. In this case it is not necessary to disconnect the controller from the receiver each time which significantly simplifies the whole process. Connection makes by picture **A**, see below. We recommend turn on your transmitter during programming (during communication) – servos not jerk (receiver and servos are supply from controller's BEC). You can controller on after push button "Controller" in running program "Controller", see below.
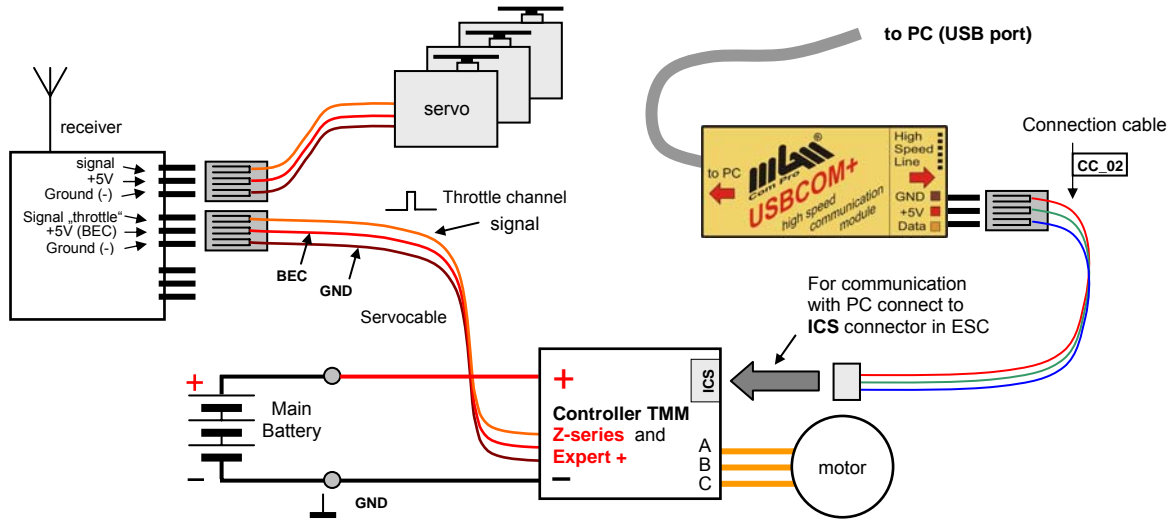

Fig. A   Connection to the controllers Expert+ and Z-series with BEC

B) OPTO version Controllers: Expert+ and Z-series (aircraft), Race Boat Expert+, Race Boat Z-series, Car / Boat Expert+.

These controllers may be connected to the USBCOM(+) module with the connection cable CC_02. The cable is inserted in a special **ICS** connector which is a part of the controller. In this case it is not necessary to disconnect the controller from the receiver each time which significantly simplifies the whole process. Connection makes by picture **B**, see below. We recommend turn off your receiver during programming (during communication) – servos not jerk. You can controller on after push button "Controller" in running program "Controller", see below.
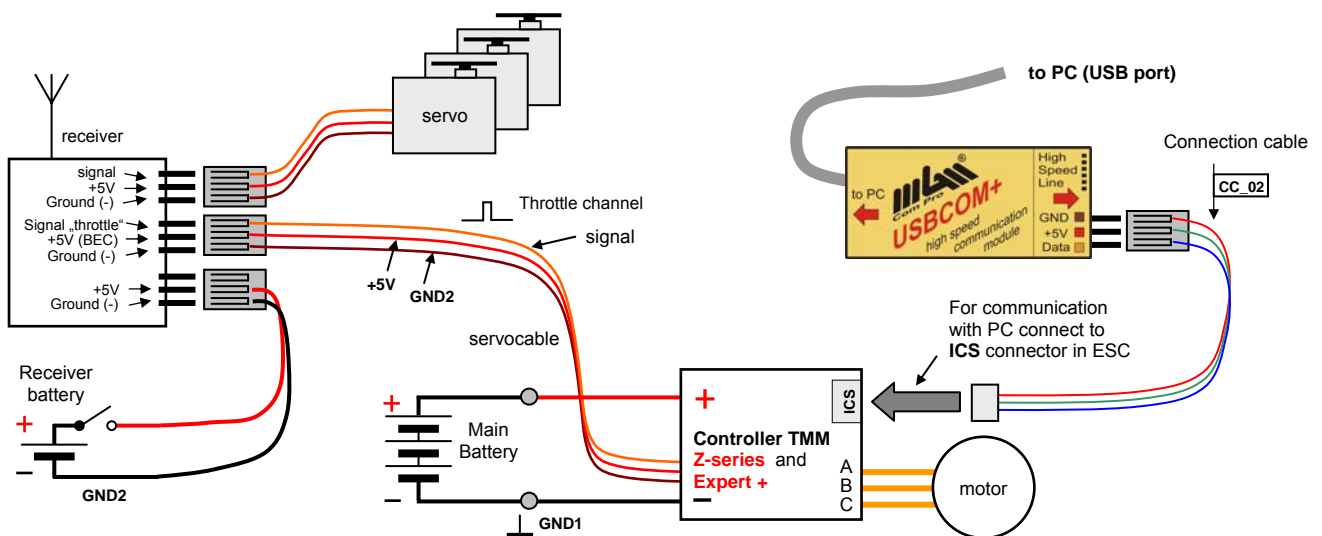

Fig. B   Connection to the controllers Expert+ and Z-series , OPTO versions

Note: controllers **Expert+** and **Z-series** (aircraft), **Race Boat Expert+**, **Race Boat Z-series**, **Car / Boat Expert+** support only this type of connection (via **ICS** connector)

C) BEC version Controllers Expert, Expert+ (controllers Z-series, Race Boat, Car / Boat Expert+ don't support this connection)

All these controller are possible programming (and communicate) by servocable also. Connection makes by picture **C**, see below. You can controller on after push button "Controller" in running program "Controller", see below.
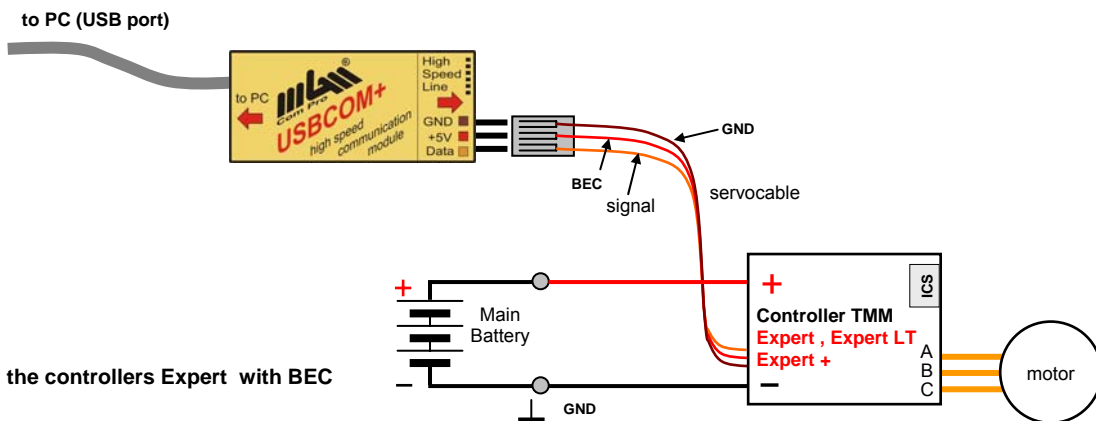

Fig. C   **Connection to the controllers Expert with BEC**

D) OPTO version Controllers Expert, Expert+ (controllers Z-series, Race Boat, Car / Boat Expert+ don't support this connection)

All these controller are possible programming (and communicate) by servocable also. It is necessary use „Y" cable for connecting. Connection makes by picture **C**, see below. It is need connect (switch on) receiver battery first, and main battery as 2nd, after pushing of the button "Controller" in running program "Controller", see below.
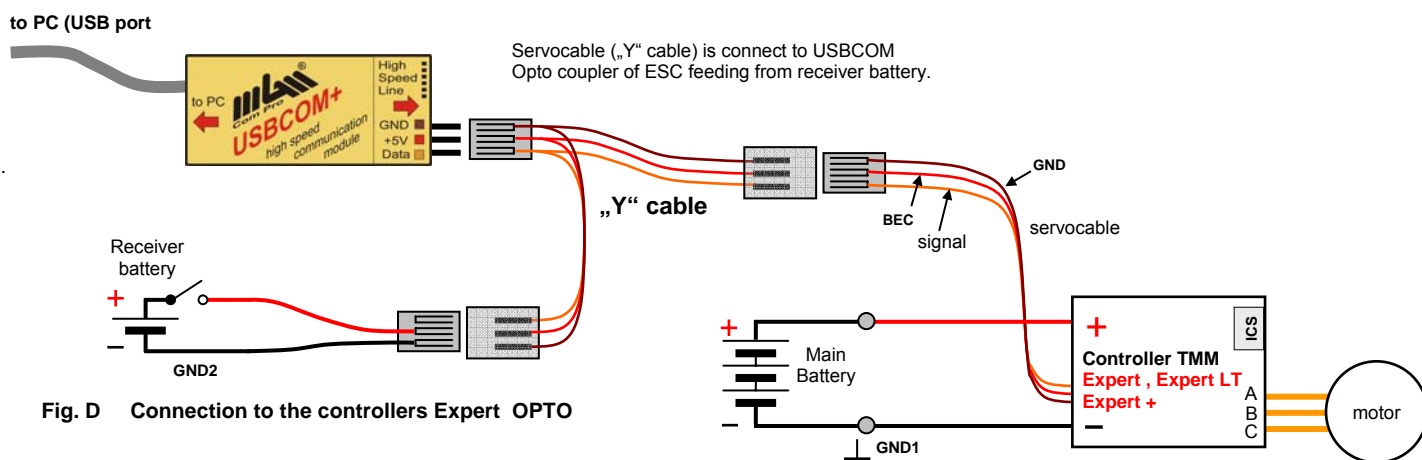

Fig. D   **Connection to the controllers Expert OPTO**

Installation of program Controller

Run automatically after start the „Controller_v1.2.2.xx_setup.exe" (or newest) program from the enclosed CD or download it from www.mgm-compro.com to your computer.
Please, reed instruction on manual „Automatic_Installation_of_Program Controller ".
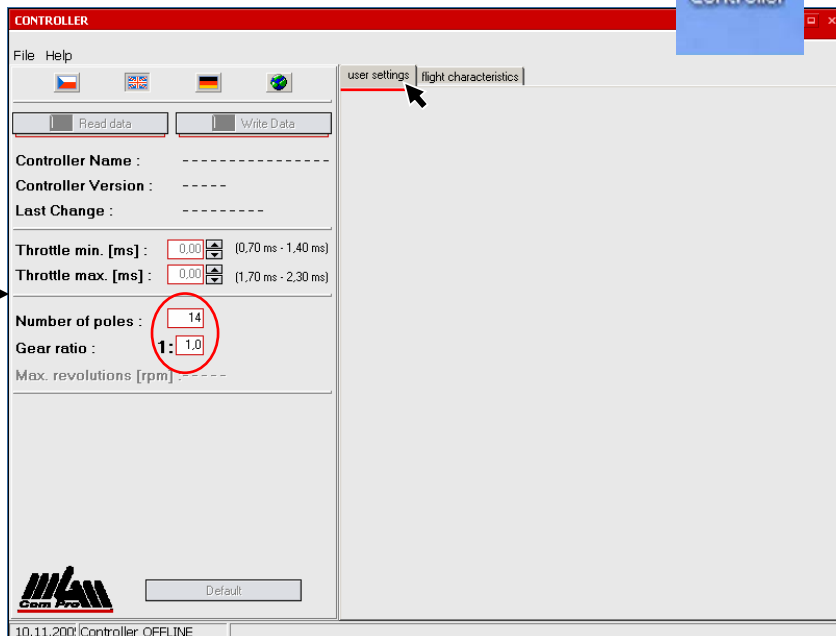
Start of program Controller

Connect USBCOM / USBCOM+ module to USB port of your PC. After click on Controller icon (shortcut), program Controller is started.
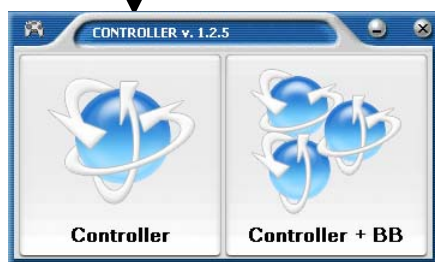
Click to „**Controller**"
and the following window will open

!   Buton „**Controller + BB**" is choice for controllers **Z-series** with **connection Black Box only**.

Choose the „**User settings**" fold (if not already opened). Correct number of poles of the motor must be entered for correct revolutions display (motor instructions) and the gearbox ration (if it is used).

Controller parameters Setting / Reading

Connect controllor by the pictures **A** up to **D**. The type of the controller, its version and currently set parameters will be read-out when the controller is switched on (by switch or by connecting the battery)..

To change any parameter simply click on the desired option is that parameter. If you wish to write the changed settings to the controller – click on „`Write data`". In this case, the data measured by the controller and displayed in the left part of the window are erased .

Type and version of controller are recognized automatically

Min. a max. throttle position – read out/ change of value

Setting of number of motor poles and gear ratio

Measured values area

Shift to other parameters

Fast setting of default parameters

Parameters read out from controller are displayed here + changes of parameters can be done here using mouse

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In this window, the name of the controller together with its SW version and all the programmable parameters and their actual values (same parameters as in the table in controller manual) will be displayed. If some of the parameters are displayed in gray, they are not available for that particular version of controller (or SW version). Possibly, they are not available in the chosen mode of controller (for example in basic mode it is not possible to change acceleration, timing, etc) – after switching to aircraft mode, these parameters will be available. All the settings may be saved in a file under any name, their number is not limited.

If instead of measured values only dashes („------") are shown, the controller has not run for at least 2 seconds in full throttle and the value is not available

Any programmable parameter can be changed using mouse. Then, all the changed settings as well as the read-out data can be saved in a file for later use (`file → save as`). To write data to controller simply press the „`write data`" button. The default settings can be restored by the „`Default`" button and then „write data". Data in BB_03 will not be erased – those are erased by new flight recording.

The possibility to find out the min and max throttle position can sometimes be very advantageous. These values can be set if needed using the appropriate buttons (arrows ▲ ▼).

Important Notice: If the controller was never programmed using transmitter and then read-out in the program, the real values **min. throttle** and **max. throttle** are not known to you. If values that do not correspond with the real min and max throttle positions are set, it is possible that after the controller is switched on, it might not start as it is waiting for the minimal throttle position (in the aircraft mode) which is probably set lower than the real value.

Recommendation:
Aircraft ESC - Program the controller using transmitter for the first time – it is enough to go thru the beginning – only entering the programming mode (full throttle, switch on controller, wait 10 seconds for 3 beeps, throttle down, 1 beep) and now you can turn the controller off – the correct min and max throttle positions are saved and you do not have to program any other parameters. Now when connected to PC, the correct min and max positions of the set will be read-out.

CAR/BOAT ESC - Program the controller using transmitter for the first time – it is enough to go thru the beginning – only entering the programming mode (full throttle forward, switch on controller, wait 10 seconds for 3 beeps, throttle move to full backward, 1 beep, move to neutral, 2 beeps) and now you can turn the controller off – the correct min and max throttle positions are saved and you do not have to program any other parameters. Now when connected to PC, the correct min and max positions of the set will be read-out.

When the programmable parameters are written to controller the data measured during the last flight are deleted. If now the read-out data button is pressed – data from the last flight will be empty („---") and will be filled only after the next flight with the new parameters.


The newest version of the program "Controller xxxxxxx.exe" you can download from www.mgm-compro.com

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Meaning of each measured data:
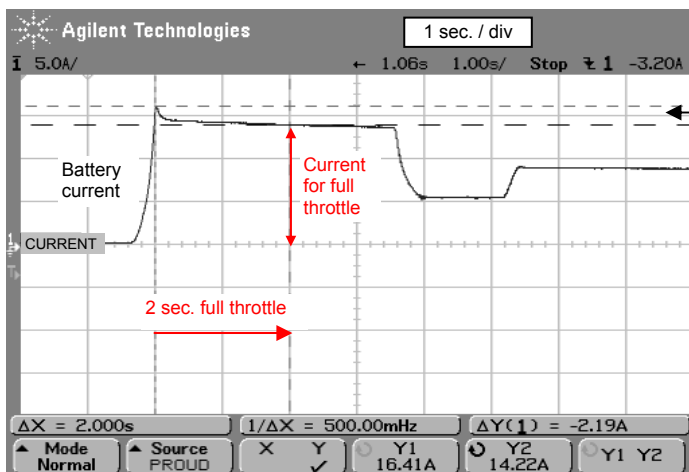
The value „**Current in full throttle**" is the highest average value of current during the flight in stabilized state after 2 seconds in full throttle (therefore not the current overshoot when moving throttle stick quickly to full throttle).

The „**Maximal current peak**" is the value of current peaks in PWM pulses – it should exceed 300% of nominal current in required mode (otherwise the current fuse will cut off). In the figure is show a case of motor start up – average current from battery is only ~ 3,8A, however the current peaks through FETs go as high as 21,9A (almost 6x times more as the average) **!**
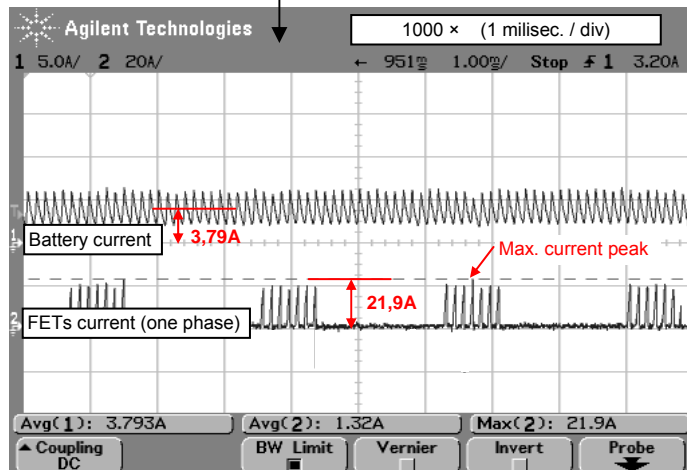
Both current values are considerably dependent on the temperature of the controller – they should therefore be considered only as a benchmark values for comparison measurements (for higher temperatures the current seems to be higher).

DOES NOT substitute for real Ampermeter ! These current values are not suitable for Lipol cells max. current dimension.
The current fuse of the controller however takes care of this fact**.**
Some versions of the Z-series controllers don't displayed these values, joinable Black Box measure currents with significant better accuracy.

„**Max. revolutions**" are maximal revolutions reached during the flight – accurate value.
„**Voltage of battery when switched off**" shows the voltage at the moment when controller was switched off – accurate value.
„**Maximal temperature**" is the max temperature reached during the flight – accurate value.
„**Throttle min.**" is value of minimal throttle position – accurate value.
„**Throttle max.**" is value of maximal throttle position – accurate value.