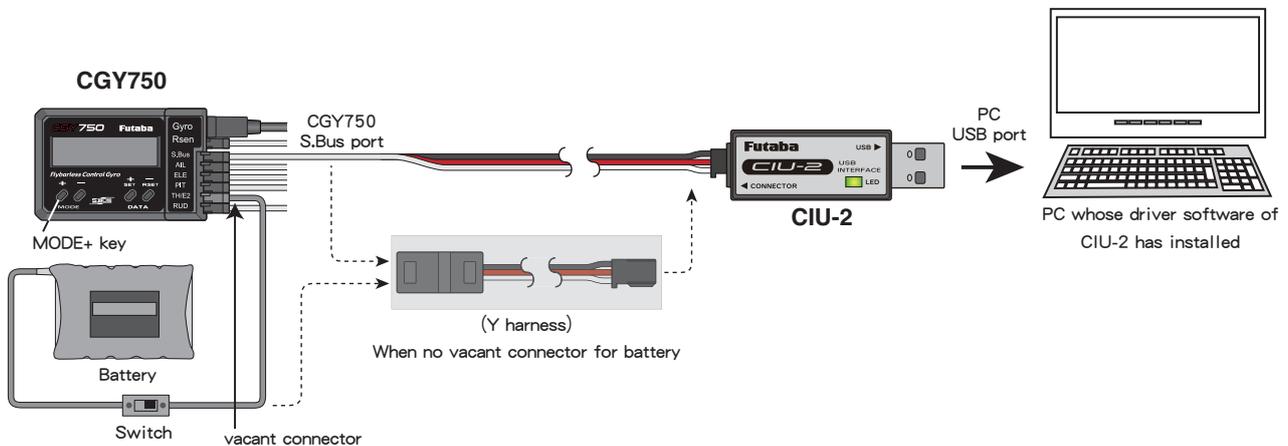


CGY750 Software Updating Procedure

Please update CGY750 software as follows. Before updating, install the CIU-2 device driver and place into the state in which the CIU-2 is operated properly from the PC.

[Connection]



1. Connect the CIU-2 to USB terminal of the PC.
2. Disconnect the S.BUS cable and connect the CIU-2 other side cable to S.BUS input of the CGY750.
3. Connect the battery to vacant a servo slot. If there is no vacant servo slot, use a Y-harness to connect the battery and CIU-2 cable. Other possible ways include disconnecting the servo and inserting the battery connector into that open slot. The battery power can be supplied by S.BUS cable as well. Connect the S.BUS cable to servo slot. Please DO NOT connect the battery to the revolution sensor slot, or the CGY750 will be severely damaged. Connect the power switch between the battery and power supply connector.

[Updating procedure]

1. Download the update software from web. Site. It is a zip. formatted file. Extract the zip. file by the Windows application. There are 2 files, GY750.bin and Update.exe, after extraction is complete.
 2. Push the MODE[+] key of the CGY750 and supply the power to the CGY750. The screen will read UPDATE READY .
 3. Double click the Update.exe and run the update program. The PC screen will ask to proceed with the update. Select YES button and the update will commence.
 4. During the updating, the PC screen shows a moving status bar as the update proceeds while the CGY750 screen shows NOW WRITING.
 5. It will take about 3 minutes to complete the firmware update. The PC shows the update finished message, and CGY750 screen shows SUCCESS to confirm successful updating.
 6. Turn off the power to the CGY750, and turn on again. The display will BRIEFLY show "InitData"; watch the screen closely. The CGY750 is initializing the new parameter data until the "InitData" disappears. NEVER turn off the CGY750 before "InitData" disappears, or initialization may not correctly execute.
- ***IMPORTANT***:** Due to the sometimes erratic initial power ON/plug in that can occur in an electric model when a BEC is used to power the radio system, it is **STRONGLY** suggested that the first power ON of the newly updated CGY750 be done with an external power source connected to the CGY750 in the manner described in the [CONNECTION] section.
7. The gyro compensation directions are preserved after updating. Parameters need not be set prior to the first flight after the update, but please confirm correct gyro compensation directions as a preflight precaution. Reversed gyro compensation direction will result in model roll over even before lift off.
 8. After initialization is complete, the display will show the firmware version of "Ver: 1.30" on the second line. All the updating processes have been successfully completed.

CGY750 Software Update Functions (VERSION 1.10-1.30)

This software update adds or changes the following functions. In addition to the manual originally supplied with your system, please now refer to the following new instructions:

* Please replace the instruction manual of aileron and elevator gyro expert setting as below.

■ Aileron and Elevator gyro EXPERT setting (Ver: 1.30)

① Start display

AIL.Gyro
Expert

(at Aileron)

ELE.Gyro
Expert

(at Elevator)

Use the MODE[+] or MODE[-] keys to navigate through the menus.

② I gain <integral gain>

I.Gain
30 %

Default: Aileron 100%,
Elevator 100%
Ranges: 0 ~ 200%

I gain tunes the ability of the model to maintain a given heading. Inadequate I gain results in a change in model heading especially with aggressive collective pitch input. Excessive I gain can result in oscillations in forward flight or with cyclic input. On the ELE axis especially, excessive I gain can create bounce.

③ D Gain<differential gain>

D.Gain
200 %

Default : Aileron 150%,
Elevator 80%
Ranges : 0 ~ 250%

D gain is best used to tune the stops following cyclic commands. Inadequate D gain results in soft, indeterminate stops possibly with a slow bounce. Excessive D gain causes harsh stops with a quick bounce or oscillation in forward flight or with cyclic input.

④ Head Response

HeadResp
-2-

Default : Aileron 3,
Elevator 1
Ranges : 1 ~ 10

Head response tunes the rate of data flow between the flybarless controller and the servos. In general the default values for head response should be maintained because they yield the best response to control input. However, if certain brands of non-Futaba servos are observed to be running excessively warm and current consumption per flight is high, then higher head response values will ease the issue. Excessively high head response values will cause unacceptable lags in model response to control input.

⑤ AVCS.Dmp<AVCS damping>

AVCS.Dmp
98 %

Default: 98% (Flight mode 1 ~ 3) ,
99% (Flight mode 4 ~ 5)
Ranges: 0 ~ 100%

AVCS.DMP tunes the overall heading hold/AVCS effect of the system. Values of 98-100% are compatible with moderate to aggressive flying styles. Note that with high(er) AVCS.DMP values, try to ensure that the swashplate is reasonably level prior to spool up.

⑥ Cnt .feel<control feel>

Cnt .feel
5 n

Default: Aileron 4n,
Elevator 4n
Ranges: 1 ~ 10n

Control feel adjusts the "feel" of the model when a cyclic command is input. For example, if the model seems to change heading too abruptly when exiting or entering a maneuver, a higher control feel value will reduce that effect. If control feel is set too high, the model will feel "heavy" on the stick and react in a nonlinear fashion to a cyclic command.

⑦ Rate CST<rate constant>

Rate.Cst
50 %

Default: Aileron
70%(HeliSize=600-700,750-More),
60% (HeliSize=450-550)
Elevator 100%(HeliSize=600-
700,750-More),
60% (HeliSize=450-550)
Ranges: 0 ~ 150%

Rate constant is used to tune stationary versus traveling pitch and roll rates. Increase the rate constant when traveling pitch or roll rates noticeably exceed stationary rates. Excessive rate constant values can cause oscillations during rolls or flips.

⑧ Angular rate

ANG.Rate
0 of 300d

Default : set by each heli size
and flight mode
Ranges : Varied from 50% to
150% of default value

Angular rate sets the maximum cyclic pitch and roll rate (d/s) as limited by the model's ability to reach that set rate. The higher the flight mode, the higher the default angular rate.

⑨ Expo (Normal and AVCS)

EXP.AVCS
-40 %

EXP.NOR
-10 %

Default:set by flight
mode
Ranges: -100% ~
+100%

Tune the exponential as desired to soften or sharpen the feel of the cyclic controls around center stick. NEGATIVE values soften control feel; POSITIVE values sharpen control feel. Note that any exponential present in the TRANSMITTER adds to the value set in the CGY750. Exponential may be individually set for both AVCS (AVC) and NORMAL (NOR) cyclic gyro modes.

⑩ Control IN delay

AIL.DIn
2 n

ELE.DIn
2 n

(at Aileron)

(at Elevator)

Default:set by each
flight mode
Ranges:0 ~ 20

⑪ Control OUT delay

AIL.Dout
2 n

ELE.Dout
2 n

(at Aileron)

(at Elevator)

Default:set by each
flight mode
Ranges:0 ~ 20

These delays soften the feel of the control response when a cyclic command is input (Delay IN) or when a cyclic command is released and the stick is returned to center (Delay OUT).

NOTE: There are LEFTa/RIGHTb and UPa/DOWNb components to these delays. Make sure you adjust both sides.

12 Stop gain

Stp.Gain
100 %

Default:Aileron100%,
Elevator130%
Ranges:100% ~ 300%

Stop gain is used to fine tune any bounce present after D gain has been previously tuned. Increase stop gain when a small bounce is observed as a cyclic command is input and the stick is quickly returned to center.

13 CNT.Gain <control gain>

CNT.Gain
35 %

Default:set by flight mode
Ranges: 0 ~ 150%

Maximum roll or pitch rate are determined by angular rate, head speed, model type, and blade choice. After the maximum desired pitch or roll rate is determined, control gain can be used to tune how aggressive the model feels when cyclic command is input. Ideally, the model's response to an initial input should feel proportional and linear to the maximum pitch or roll rate.

NOTE: There are LEFTa/RIGHTb and UPa/DOWNb components to the control gain parameter. Make sure you adjust both sides.

14 Dead band

DeadBand
15.0 uS

Default:Aileron 7.5 uS,
Elevator 7.5uS
Ranges: 0 ~ 25.0 uS

Dead band sets the null/non-responsive range of the stick. When the center stick feeling is too unsettled, increasing the deadband will calm that feel. Note that excessive deadband will result in a disconnected feel of the model to small stick inputs.

15 Data reset

RESET AIL.Gyro → *RESET* Exec.?? → *RESET* -Exec.--
RESET ELE.Gyro → *RESET* Exec.?? → *RESET* -Exec.--

This menu resets all of the aileron (elevator) gyro parameters back to the default values. Press the data [+] key once and [Exec ??] will be shown as a confirmation. Press the data [+] key again to confirm the operation and that all of the gyro parameters have been reset.

* This section explains the additional or modified functions of the Swashset BASIC menu from the instruction manual.

Swash BASIC setting

1 Servo type (adding the selection)

ServoTyp AN: 70Hz ← ServoTyp DG: 95Hz ←
ServoTyp AN: 140Hz ← ServoTyp DG: 285Hz

Default : AN:70Hz

This function selects the driving frequency for the swashplate servos. There are four choices of servo driving frequency in this selection, AN(analog): 70Hz, DG(digital): 96Hz, DG: 140Hz, DG: 285Hz. All Futaba

digital servos can work with DG: 285Hz mode. Some servos of other manufacturers do not support DG: 285Hz mode. In this case, select the proper servo driving frequency as directed by the manufacturer.

2 Swash servo direction setting (new function)

ServoDir Comb# 1

This menu item simplifies model set up by simultaneously adjusting servo direction to yield correct swashplate movement with stick input. On the H3-xx swash mode, the direction of the three swashplate servos can be changed by pushing the DATA [+] or [-] key. There are eight choices in H3-xx swash mode; select the correct one. In H4-xx swash mode, there are sixteen combinations. With the addition of this new menu, AIL.Rev, ELE.rev, PIT.Rev and ELE2.Rev are deleted.

NOTE: It is possible that the aileron or elevator direction may be reversed even when the collective pitch direction is correct. In this case, change the transmitter servo reverse (servo reverse menu) on the aileron or elevator as needed.

3 Aileron direction setting (new function)

STK.Dir AIL.Rt ← STK.Dir !AIL.Rt ←

This function teaches the aileron direction to the CGY750. Move the aileron stick to RIGHT full and push the DATA [+] or [-] key. The RIGHT direction of the aileron data will be saved to CGY750. To confirm the setting, move the aileron stick to full RIGHT, and the "!" mark will appear on the display. This procedure must be done for the F/F mixing to function correctly.

4 Elevator direction setting (new function)

STK.Dir ELE.Up ← STK.Dir !ELE.Up ←

This function teaches the elevator direction to the CGY750. Move the elevator stick to full UP and push the DATA [+] or [-] key. The UP direction of the elevator data will be saved to CGY750. To confirm the setting, move the elevator stick to full UP, and the "!" mark will appear on the display. This procedure must be done for the F/F mixing to function correctly.

5 Pitch low setting (moved from expert menu)

Pit.Low !1939 uS Default:1940 uS

This parameter saves the minimum collective pitch point into the CGY750. Move the collective pitch stick to minimum pitch and push DATA [+] or [-] key. The minimum pitch signal will be saved to the CGY750. The display shows "!" when the stick is at the saved point. The low pitch setting/saving must be done when using F/F mixing and/or linkage compensation because the CGY750 calculates its mixing based on the saved setting.

6 Pitch zero setting (moved from expert menu)

Pit.Zero !1520 uS Default:1520 uS

This parameter saves the zero collective pitch point into the CGY750. Move the collective pitch stick to zero degrees pitch and push DATA [+] or [-] key. The zero degrees pitch signal will be saved to the CGY750. The display shows "!" when the stick is at the saved point. The zero degrees pitch setting must be saved into the CGY750 for F/F mixing and/or linkage compensation to function correctly.

7 Pitch high setting (moved from expert menu)

Pit.High
11226 uS

Default: 1100 uS

This parameter saves the maximum collective pitch point into the CGY750. Move the collective pitch stick to maximum pitch and push DATA [+] or [-] key. The maximum pitch signal will be saved to the CGY750. The display shows "!" when the stick is at the saved point. The maximum collective pitch setting must be saved into the CGY750 for F/F mixing and/or linkage compensation to function correctly.

8 F/F mixing rate setting (new function)

F/F.Mix
- 0 -

Default: 0
Ranges: 0~10

This parameter sets the F/F (feed forward) mixing amount. There are 10 choices with increasing volume of mixing. The value selected automatically sets the F/F mixing volume for PIT → AIL, PIT → ELE, ELE → AIL, AIL → ELE at the same time. Correct mixing directions are previously determined by the AIL and ELE STK. Dir menus. When the F/F mixing value is 0, no mixing occurs. PLEASE NOTE: In most cases no F/F mixing is required by the CGY750. Use as needed only if the model is observed to corkscrew in rolls, roll out of flips, or deviate on the AIL and/or ELE axes during ascents or descents. If desired, the mixers tuned as a group by the F/F mixing can be individually set in the Swashset EXPERT menu.

The table shows the mixing percentages present with each value (1-10) for F/F mixing.

< FF Mixing rate table >

Rate#	0	1	2	3	4	5
1 PIT → AIL(H/L)	0	0	2%	4%	6%	8%
2 PIT → ELE(H/L)	0	0	4%	8%	12%	16%
3 ELE → AIL(UP/DN)	0	0	2%	4%	6%	8%
4 AIL → ELE(R/L)	0	0	3%	6%	9%	12%

Rate#	6	7	8	9	10
1 PIT → AIL(H/L)	12%	19%	26%	33%	40%
2 PIT → ELE(H/L)	0	24%	48%	72%	96%
3 ELE → AIL(UP/DN)	12%	6%	14%	8%	20%
4 AIL → ELE(R/L)	22%	10%	26%	14%	38%

Note.

PIT → AIL H: left aileron correction L: right aileron correction
PIT → ELE H: down elevator correction L: up elevator correction
ELE → AIL UP: right aileron correction DN: left aileron correction
AIL → ELE R: up elevator correction L: down elevator correction
(H: at high collective pitch, L: at low collective pitch)

* Rotor turning direction is CW, mixing polarity are reversed at CCW (A setup of rotor turning direction is performed by "Yaw. Comp" of governor basic setting.)

9 Phase equalizer (new function)

PhaseEqu
ON

Default: off

This function optimizes swashplate phasing during pirouettes. Press the DATA [+] or [-] key to turn the function on or off.

NOTE: This function needs rotor head RPM and direction of rotation to work correctly, so please set the rotor head RPM and direction in the governor menu. Note that rotor head speed information must still be set into the CGY750 governor menu even if using an electronic speed control (ESC) with an electric model.

10 Rotational equalizer (new function)

ROT.Equa
ON

Default: off

This function works to optimize pirouette stability during stationary and forward flight. Press the DATA [+] or [-] key to turn the function on or off.

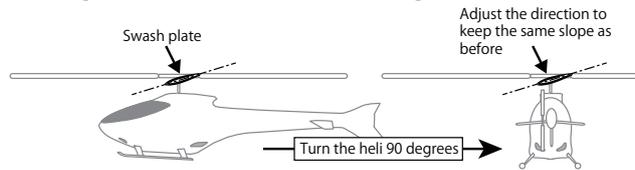
11 Equalizer direction (new function)

Equa.Dir
Normal

Default: Normal

This function sets the rotational equalizer direction. Setting method: When the CGY750 is in this mode, the swashplate will tilt on direction and stay that way. Observe the direction of the tilt relative to the surface on which the model sits. Rotate the model 90 degrees about its mainshaft clockwise or counterclockwise. The swashplate should remain tilted in the **same direction** relative to the surface on which the model sits. Adjust Equa.Dir from NORMAL to REVERSE if needed to keep the swashplate tilt in the same direction as the model is rotated. Correctly setting of the rotational equalizer is critical for proper flight performance during pirouettes. All linkages from servos to swashplate should be installed prior to setting direction.

[confirmation of the direction]



12 Rotational tracking (new function)

ROT.Trak
+0.0 %

Default: 0 %
Ranges: -5.0 ~ +5.0 %

This function tunes the rotational equalizer to the pirouette characteristics of the model. When pirouetting the model at the desired rate, observe the model's rotor DISK (NOT the mechanics) and tune the ROT.Trak until the disk stays flat during the pirouette. Find the best average setting for both left and right pirouettes.

* This section explains the added functions from instruction manual.

Swashset EXPERT setting

1 Pitch → Aileron F/F mixing

FPIT → AIL
+: +0 %

Default: 0 %
Ranges: -100 ~ +100 %

This function sets the mixing rate of the pitch to aileron mixing. The roll axis may be affected by positive/negative collective pitch movement. This mixing compensates this effect. The mixing amount can be adjusted for both positive and negative pitch individually. This function more precisely adjusts the F/F mixing.

2 Pitch → elevator F/F mixing

FPIT → ELE
+: +0 %

Default: 0 %
Ranges: -100 ~ +100 %

This sets the mixing rate of the pitch to elevator mixing. The elevator axis may be affected by the positive/negative collective pitch movement. This mixing compensates this effect. The mixing amount can be adjusted for both positive and negative pitch individually. This function more precisely adjusts the F/F mixing.

3 Elevator → Aileron F/F mixing

FELE → AIL
U: +0 %

Default: 0 %
Ranges: -100 ~ +100 %

This sets the mixing rate of the elevator to aileron mixing. The roll axis may be affected by the elevator input. This mixing compensates this effect. The mixing amount can

be adjusted for both elevator UP and DOWN individually. This function more precisely adjusts the F/F mixing.

④ Aileron → Elevator F/F mixing

FAIL→ELE
R: +0 %

Default: 0 %
Ranges: -100 ~ +100 %

This sets the mixing rate of the aileron to elevator mixing. The elevator axis may be affected by the aileron input. This mixing compensates this effect. The mixing amount can be adjusted for both aileron LEFT and RIGHT individually. This function more precisely adjusts the F/F mixing.

* This part explains the added function from instruction manual.

■ Governor BASIC setting

① Pole number

Pole.Nmb
2 p

Default: 2 p
Ranges: 2 p ~ 24 p

This function sets the motor pole count. This function is used when employing a direct phase sensor attachment to a brushless motor lead. Input the motor pole count as specified by the brushless motor manufacturer. When using any revolution sensor other than a direct phase sensor type, set the pole number to 2p.

NOTE: The input signal range of the CGY750 is 0.0v-3.0v. Exceeding this voltage range may cause damage to the CGY750.

② Gear ratio setting ranges

The setting range of the gear ratio has been expanded. The new range is 1.00 to 50.00:1.

* This section explains the added functions from instruction manual.

■ Governor EXPERT menu

① Operation response (adding the selection)

Response
Moderate

Response
Middle

Response
Quick

Response
Silent

Silent mode has been added. Please select silent mode with electric models when RPM detection is accomplished either with a magnet on the motor's rotor or with a brushless phase sensor.

① Governor ON revolution

On.Revo
60 %

Default: 60 %
Ranges: 50 ~ 90 %

This setting determines at what percentage of the set engine rpm the governor becomes active. The default value is 60%, so when the engine rpm reaches 60% of the set value, the governor becomes active.

② Low revolution setting

Low.Revo
1000rpm

Low.Revo
700rpm

Default: 1000 rpm
Ranges: 1000rpm or 700rpm

This sets the minimum head speed setting ranges. The

lower 700 rpm mode meets the needs of larger gasoline engines running at lower rpm.

□ Tuning Guidelines for V1.3 CGY 750 Firmware

V1.3 firmware for the CGY750 has been exhaustively tested to NOT require tuning of numerous parameters to achieve good flying performance. Nonetheless, the wide variations in model, blade, and radio equipment types may dictate the need for a small amount of fine tuning to yield the best model performance.

Static cyclic pitch should be measured in the AIL and ELE RATE sections of the SWASHSET BASIC menu ONLY. Suggested cyclic pitch range should be at least 9-10 degrees on each side of neutral with an acceptable working range for the AIL and ELE rate of 50-70%. Please keep the CGY750's AIL and ELE rates at the same percentage for best system performance. Use your transmitter's AIL and ELE AFR's or dual rates to fine tune cyclic rates to your needs. Previous recommendations of 8-9 degrees of cyclic pitch are not applicable to this firmware and will yield inadequate cyclic rate and poor performance. Observed cyclic travel when the CGY750 is NOT in the AIL/ELE rate menu will be several degrees more than the measured static pitch.

Total gyro (transmitter) gain for AIL and ELE should initially be set to 60%. The degree to which the total gain can be increased from there is highly dependent on model, servo type, and blades. It is also suggested that the gyro gains for AIL and ELE be set to matching percentages.

As with previous firmware, the higher the chosen Flight Mode (1-5), the more responsive the model is to pilot input. PLEASE NOTE: V1.3 firmware has been carefully refined to deliver effectively large amounts of cyclic rate when commanded by the pilot. Due to this fact, it is suggested that you start with Flight Mode 3 and fly it there to assess your needs for cyclic rate and aggressiveness. After initial observations, final selection of Flight Mode may be made.

Proper response of the elevator axis to control input with avoidance of bounce is achieved with adjustment of D gain and Stop Gain. D gain should be adjusted first if bounce is observed. If the bounce is slow at the end of an elevator cyclic input, increase the D gain until the bounce disappears. The limit of D gain adjustment comes when a fast and/or harsh bounce is observed instead of a crisp stop. In some cases, you may observe a small bounce that is created when an elevator command is input and then the stick quickly returned to center. In this case, increasing the Stop Gain will remove this bounce. Excessive Stop Gain will worsen the bounce. Please note that any flybarless or even a single axis tail rotor gyro will exhibit bounce if total gyro gain is too high. If you have tuned D gain and Stop Gain as well as possible and still have a little bounce, a simple reduction in total gyro gain will almost assuredly remove the remaining bounce.

V1.3 firmware incorporates Feed Forward (F/F) mixing for PIT → AIL, PIT → ELE, AIL → ELE, and ELE → AIL. These mixes may not be needed in most cases because the holding ability of V1.3 firmware has been dramatically improved. If any tendency is observed for the model to corkscrew in rolls, deviate off axis during flips, or for the nose to pitch up/down and/or roll off during ascents or descents, increase the F/F mixing value in the SWASHSET BASIC menu. Remember to teach the CGY750 the directions for UP ELE and RIGHT AIL commands in the STK.Dir menu (Swashset BASIC) and memorize them into the system by pressing either the [+]or[-]DATA button.

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