

Futaba®

GYRO & GOVERNOR

GY701

Advanced and adaptive operation



INSTRUCTION MANUAL

TABLE OF CONTENTS

• Precautions -----	3
• Warranty and Repair Service (in U.S.A.)--	8
• Introduction -----	9
• Features -----	9
• Contents -----	11
• Specifications -----	14
• Recommended Servos -----	15
• Replacement and Optional Items-----	15
• Connecting the GY701 to your Receiver	16
• LED Indicator Description -----	19
• Mechanics Preparation-----	20
• Opening Screen-----	22
• Home Screen-----	23
• Warning Display-----	30
• Edit Screen -----	32
• Gyro Basic Setting -----	34
• Gyro Sensor Installation-----	36
• Tail Rotor Servo Installation and Setup--	37
• Before Flight Checklist -----	40
• Adjustments During the Test Flight----	41
• Using Normal Mode -----	43
• Setting the Gain-----	44
• Governor Basic Setting -----	46
• Mounting the Magnet and Sensor -----	54
• Fuselage Setting Precautions -----	58
• Governor Operation -----	60
• Governor Speed Setting -----	62
• S.BUS Basic Setting -----	64
• Gyro Expert Setting -----	68
• Governor Expert Setting-----	76

TABLE OF CONTENTS

Gyro : Instructions for gyro function

Governor : Instructions for governor function

Technical updates and additional programming examples can be found at:

www.futaba-rc.com/faq

PRECAUTIONS

Meaning of Special Markings

Pay special attention to safety where indicated by the following marks:

⚠ DANGER - Procedures which may lead to dangerous conditions and cause death/serious injury if not carried out properly.

⚠ WARNING - Procedures which may lead to a dangerous condition or cause death or serious injury to the user if not carried out properly, or procedures where the probability of superficial injury or physical damage is high.

⚠ CAUTION - Procedures where the possibility of serious injury to the user is small, but there is a danger of injury, or physical damage, if not carried out properly.

⊘ : Prohibited ⓘ : Mandatory

PRECAUTIONS

⚠ WARNING

Failure to follow these safety precautions may result in severe injury to yourself and others.

- Read through the entire manual before operating this product.

BEFORE EACH FLIGHT:

- ❗ Always check the transmitter and receiver battery voltage to ensure they have enough remaining capacity to complete the flight.
- ❗ Always exit programming mode before attempting to fly the model.
- ❗ Only use the GY701 with a 2.4GHz system such as the Futaba FASST system, or a PCM system. Use with a FM system is strongly discouraged since interference can cause serious operational problems.

Gyro operating precautions: Gyro

⊗ ***The GY701 requires 5-10 seconds to initialize when the power is turned on. Do not move the helicopter and do not move the tail rotor stick during this initialization or the gyro may not initialize properly. Once the initialization process is complete, the tail rotor servo will move to the left extent and then to the right extent. This will occur twice. The indicator light will change to solid red for AVCS Mode or solid blue for Normal Mode.***

- ❗ Verify that the gyro is operating correctly.
- ❗ Verify that the gyro compensates in the correct direction before flight. If the compensation direction is incorrect the model will pirouette uncontrollably, at a very high rate.

PRECAUTIONS

- ❗ Verify that the gyro is operating in the desired mode.
- ❗ Verify that the gyro mounting pads are in good condition.
- ❗ Verify that the gyro wires are not contacting the frame of the helicopter.
- ❗ The servo type parameter within the GY701 must match the type of servo you are using. Incorrect setting may damage the GY701 or the servo, possibly resulting in a loss of control during flight.
- ❗ Always ensure that there is some slack in the gyro cables to help maximize performance. Always use the supplied gyro mounting pads to attach the gyro to the helicopter mechanics. Do not use a strap that encompasses the GY701 sensor. This may affect the overall performance of the gyro.
- ❗ Always allow the gyro to adjust to the surrounding environmental temperature before flight. A large temperature change during use will cause drift and other operational issues.
- ⊗ The GY701 sensor uses a high strength aluminum die cast case. Do not allow anything to touch the gyro case as it may cause a short circuit.
- ❗ If you are switching between Normal Mode and AVCS Mode in flight, please keep in mind that you must have the gyro re-learn the center position after making a trim change within the transmitter. To memorize the new center position simply flip the gain switch on the transmitter three times between Normal Mode and AVCS Mode (Normal→AVCS→Normal→AVCS) within one second. The tail rotor servo will center indicating that the new center position has been memorized.

PRECAUTIONS

❗ When operating the gyro in AVCS Mode, all tail rotor compensation and revolution mixing must be disabled and any tail rotor offsets for flight modes must be disabled.

❗ When the GY701 is operated in AVCS mode the tail rotor servo will not center when the stick is released. This is normal operation for AVCS mode. The servo may also move to the extent while the model is being carried out to the flight line. Before take off, you must center the tail rotor servo by moving the tail rotor stick full left, then full right, back to full left and then allow the stick to center within one second. You can also visually center the tail rotor pitch slider by using the tail rotor stick.

⚠ Do not drop the GY701 sensor onto a hard surface or subject the GY701 sensor to a strong shock as this may damage the sensor. Always use the supplied mounting pads or the Futaba replacement mounting pads available from your local hobby dealer.

Governor operating precautions: **Governor**

❗ Always set battery fail safe function at the GY701. Since the GY701, when used, controls the throttle, the battery fail safe function that is in a receiver will not be used.

❗ Throttle fail safe function (transmitter setting): Use the fail safe function for the channel that turns the governor on and off to set the fail safe position to the point at which the governor is turned off. With this setting, when the system enters the fail safe state, the governor will be turned off and the receiver throttle signal (fail safe position preset) will be output directly.

PRECAUTIONS

❗ When using the condition hold function, transmitter's function), always set the throttle servo maximum operating point to less than the point at which the governor is turned on. Depending on the conditions, this setting will turn on the governor and prevent the engine from exceeding the set speed even when condition hold is set.

❗ At the beginning of flight, keep the governor in the off state by setting the throttle stick to maximum slow side.

❗ When the model is on the ground, lower the pitch to the position at which the model does not try to lift off. Do not take your eyes off the model. When the governor operates and the rotor speed increases the lift also increases causing the model to try lift off, depending on the pitch position.

❗ Check the sensor output not only when installing the sensor but periodically. Since the magnet rotates at high speed, it is subjected to a large centrifugal force. Check the magnet output and mounting state after about every 10 flights.

❗ If the model begins to shake during operation, immediately turn off the governor. The carburetor design, etc. may cause the engine to operate unstable. If this occurs, lower the maximum speed setting to the range over which there is no problem.

WARRANTY & REPAIR SERVICE (IN U.S.A.)

If any difficulties are encountered while setting up or operating your GY701, please consult the instruction manual first. For further assistance you may also refer to your hobby dealer, or contact the Futaba Service Center at the web site, fax or telephone number listed below:

www.futaba-rc.com or www.hobbyservices.com
Fax (217)-398-7721, Tel (217) 398-0007

If you are unable to resolve the issue, pack the system in its original container with a note enclosed and a thorough, accurate description of the difficulty. Include the following in your note:

- Symptoms (including when the problem occurred)
- System (Transmitter, Receiver, Servos and model numbers)
- Model (Model name)
- Model numbers and quantity
- Your Name, Address and Telephone number

Send the respective items to the authorized Futaba Service Center Address below:

Futaba Service Center
3002 N Apollo Drive Suite 1
Champaign, IL 61822

INTRODUCTION

The Futaba® GY701 is combined heading hold AVCS gyro and head speed governor in one box. Its cutting-edge MEMS (Micro Electro Mechanical System) sensor design, ultra high-speed processing speed and advanced PID control algorithm put it a quantum leap ahead of all other heading hold gyros in size, weight and performance. The GY701 has been optimized to work for model helicopter competition.

FEATURES

- Combined Gyro and Governor in one box. Individual either Gyro or Governor working mode are supported.
- The fastest operation scheme is utilized both the Gyro and Governor section.
- Low profile, small size and lighter weight.
- Small size of the combined one box gyro and governor controller, 44 x 29 x 12mm, 13 g
- Using the 128 x 36 dots graphical white color OLED (Organic Light Emitting Display), high brightness and contrast.
- Easy setting divided by Basic and Expert editing menu. The basic setting is for initial setting and Expert setting is for precise setting.
- Firmware can be updated from PC through CIU-2.
- Supporting the S.Bus connection. Only one wire connection to the receiver can operate the GY701.

FEATURES

- Gyro section
 - Advanced and adaptive PID operation is utilized
 - Small and low profile gyro sensor. 2 colors LED are installed on the top surface. Using the Aluminum Alloy metal case. 21 x 21 x 8mm, 14.5 g
 - Wide operation dynamic ranges up to +/- 1,200 deg/sec.
 - 3 kinds of servo type are supported
 - 3D and F3C operation mode is selectable
 - The Feed forward operation is utilizing. Pitch signal can be added to the gyro operation.
 - New operation algorithm achieves the more consistent pirouette and smooth Yaw control .
- Governor section
 - Advanced and adaptive PID operation is utilized
 - Fastest operation.
 - Wide revolution control ranges, 1000 rpm-3000 rpm
 - Both digital and analog servo can be selected
 - Revolution compensation by Yaw rate is installed
 - Governor or Rev. Limit mode selectable
 - New operation algorithm achieves more faster and smooth revolution control .
 - Back plate sensor can be selected by the option (for OS-91, OS-55, OS-50)
- Other function
 - Maximum revolution memorize
 - Engine runtime integration
 - OLED power saving
 - LED on/off selectable

CONTENTS

Your GY701 includes the following components:

Type of set

- Gyro & Governor set w/BLS251
- Gyro & Governor set
- Governor set
- Gyro set

SET CONTENTS				
GY701 Control Amp				
*Mini Screwdriver	X	X	X	X
*Dust Covers (x3)				
Gyro Sensor				
*Mounting Pads (x3)	X	---	X	X
Governor Sensor				
*Sensor Mounting Hardware	---	X	X	X
*Magnet (x2)				
BLS251 Servo				
*Servo horn and mounting parts	---	---	---	X
Extensions (Black/Red)				
	1	1	2	2

X: supplied ---: not supplied

CONTENTS

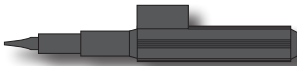
GY701 Control Amp



Dust Cover



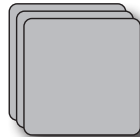
Adjustment Screwdriver



Gyro Sensor



Mounting Pads 2mm Thick (three)



Governor Sensor



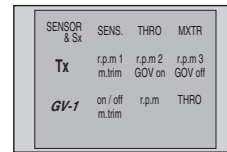
Magnet



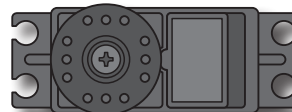
12

CONTENTS

Sensor Mounting Stay



BLS251 Servo



Extensions:

Extension (Black)



Extension (Red)



13

SPECIFICATIONS

- Width (Controller):** 1.14in [29mm]
(Gyro sensor): 0.83in [21mm]
(Speed sensor): 0.30in [7.5mm]
Length (Controller): 1.73in [44mm]
(Gyro sensor): 0.83in [21mm]
(Speed sensor): 0.63in [16mm]
Height (Controller): 0.55in [14mm]
(Gyro sensor): 0.31in [8mm]
(Speed sensor): 0.39in [10mm]
Weight (Controller): 0.459oz [13g]
(Gyro sensor): 0.353oz [10g]
(Speed sensor): 0.141oz [4g]
- Maximum* Operating Voltage:** 3.8V to 8.4V DC
Current Drain: 80mA
Selectable Servo Frame: 70Hz, 280Hz and 570Hz (Gyro only) Rate 1520µS (70Hz & 280Hz Frame Rate)
Center Pulse Width: 1520µS (70Hz & 280Hz Frame Rate)
Flight Mode: User selectable F3C or 3D (Gyro)
Control Resolution: 0.1Hz (6rpm) (Engine speed)
Speed stability accuracy: 1%
Speed Control Range: 1,000-3,000rpm (Rotor speed)
Operating Temperature: 14°F to 113°F (-10°C to +45°C)
Control System: Digital advanced control
Sensor: Vibrating structure gyro/ Magnetic sensor (Gyro/Governor)
Angular Velocity Range: ±1,200 Degrees Per Second (Gyro)

* The maximum operating voltage listed only applies to the GY701. Always verify that your receiver, servos, tail rotor servo, switch and any other electronic components used in your installation are capable of operating at the voltage you plan to use.

RECOMMENDED SERVOS

.91 Size Helicopters

- Futaba S9254 Digital Servo Heli: **FUTM0224**
(280Hz/1520µS)
Futaba S9256 Digital Hi Speed: **FUTM0226**
(560Hz/760µS)
Futaba BLS251 Brushless Heli Servo: **FUTM0521**
(560Hz/760µS)

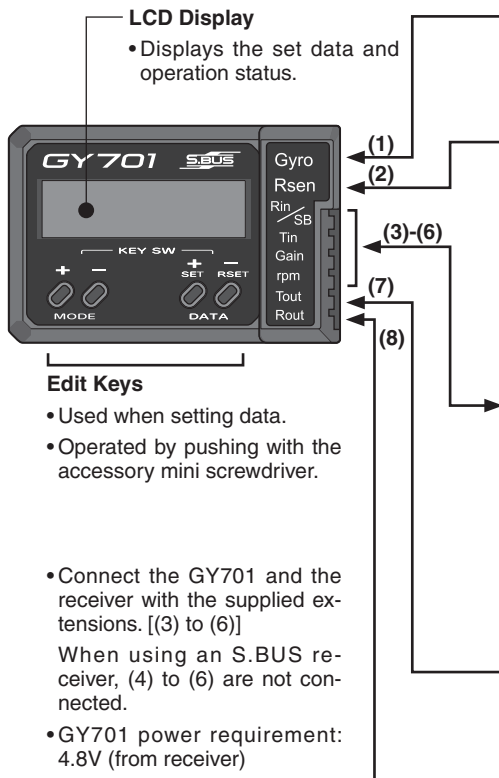
REPLACEMENT & OPTIONAL ITEMS

- Futaba PC Interface CIU-2 for GY701: **FUTM0951**

- FSH64 GY520 Extension 200 mm (2): **FUTM4664**
FSH65 GY520 Extension 350 mm (2): **FUTM4665**
FSH66 GY520 Extension 55 mm (2): **FUTM4666**
FSH67 GY520 Extension 80 mm (2): **FUTM4667**
FSH68 GY520 Extension 130 mm (2): **FUTM4668**

- FSH69 GY520 Mounting Pad: **FUTM4669**
2x22x22 mm (10)
FSH70 GY520 Mounting Pad: **FUTM4670**
3x22x22 mm (10)
FSH71 GY520 Shield Plate: **FUTM4671**
1x22x22 mm (3)

CONNECTING THE GY701 TO YOUR RECEIVER



CONNECTING THE GY701 TO YOUR RECEIVER



(1) Gyro: Gyro

- Connect the gyro sensor.

*Insert the sensor connector until it is firmly locked.



(2) Rsen: Governor

- Connect the speed sensor.

(3) Rin/SB:

- S.BUS receiver: Connect to the S.BUS output of the receiver.
- Other than S.BUS receiver: Connect to the rudder channel output. Gyro

(4) Tin: Governor

- Connect to the throttle channel output.

(5) Gain: Gyro

- Connect to the gyro gain channel output.

(6) rpm: Governor

- Connect to the governor speed channel output.



(7) Tout: Governor

- Connect the throttle servo.



(8) Rout: Gyro

- Connect the rudder servo.

CONNECTING THE GY701 TO YOUR RECEIVER

Connect the supplied extensions to the GY701 connector. Route the wires through the helicopter mechanics and connect them to the appropriate receiver channels. To determine the appropriate receiver channels please check your transmitter's instruction manual. Using wire mounts, wiring fixtures molded into the helicopter, or hook and loop material, route the extensions to the receiver. Ensure that the extensions leading to the receiver cannot become entangled in rotating components and make sure the extensions are not rubbing against metal or carbon fiber which may damage the wires.

Once the power system is installed into your helicopter please move onto the later section to learn how to program the gyro.

LED INDICATOR DESCRIPTION

Slow Flash: 1/2 Second or longer

Fast Flash: 1/4 Second or shorter



LED Indicator

CONDITION	LED INDICATOR	DESCRIPTION
Initialization	Red Double Flash	No Receiver Pulse or Sensor Error
	Slow Blue Flash	Warm-Up
	Fast Blue Flash	Sensor Initialization
	Slow Red Flash	Governor Warning
Program- ming	Blue Single Flash	Parameter Programming Mode
	Slow Blue Flash	Rudder Limit Setting Mode
Operating	Solid Blue	Normal Mode, Ready for Flight
	Solid Red	AVCS Mode, Ready for Flight
	Slow Violet Flash	Offset from the Neutral Position (AVCS)
	Fast Blue or Red Flash	Gyro is Rotating

MECHANICS PREPARATIONS

⚠ WARNING

❗ ***Newer high end servos and other radio equipment are capable of placing large demands on the power systems in use today. When using a regulator you must ensure that the regulator is capable of delivering the current demands of the equipment you have selected. In addition to this make sure the wiring and switch you have selected are capable of handling high current draws.***

❗ Even though the GY701 is a high performance gyro and governor it will be necessary to ensure that the helicopter mechanics are also in optimum operating condition. Please use the guidelines below and address all issues before installing and test flying the GY701.

- The GY701 must be used with a rigid tail rotor drive system. Any modern torque tube or belt drive system should be adequate. Do not attempt to fly the GY701 using a wire driven tail rotor system.
- Always ensure the drive gears, torque tube, pulleys, belt, bearings and shafts are in proper working condition. If any of these items are damaged or worn they must be replaced.
- The linkage rod, tail rotor bell crank, pitch slider and tail rotor grips must operate without friction to obtain the best performance from the GY701. If any binding is present it must be fixed before the helicopter can be flown. Binding in the tail rotor control linkage will decrease the performance of the GY701 gyro and this may also shorten the servo lifespan. Please take the time now to ensure the tail rotor system on your helicopter is working correctly, without friction or binding.

Gyro

MECHANICS PREPARATIONS

- Vibration will affect the GY701's overall performance. All rotating components on the helicopter should be balanced to minimize vibrations in flight. Ensure that your motor is running smooth and all vibrations have been addressed before installing and test flying the GY701.

OPENING SCREEN

The GY701 starts the initializing process at turned on the power. After finished the initializing, the GY701 starts the operation and moves to the home screen.

Boot up display

The OLED shows below the screen. The upper line indicates the identification code of the GY701 and below of the line indicates the firmware version.

ID:65535
Ver:1.01

Initializing display

The pirouetted helicopter images are displayed during initializing. After completed the initialize, the rudder servo moves CW-> CCW as the initialize finished sign and move to home screen. The helicopter must not be moved during the initializing process.

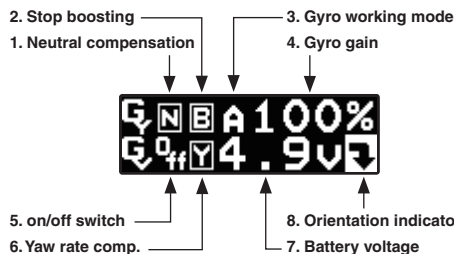


HOME SCREEN

After finished the initialize sequence, OLED changes the display to Home screen. There are 3 kinds of the Home screen related by the operation mode. The home screen shows the information as follows.

Initial Home screen

•Gyro+Governor mode



•Gyro only mode

GYRO NEUTRAL BOOST 90%
4.9V

•Governor only mode

1498srpm
4.9V

1. Neutral compensation Gyro

It indicates the function of the neutral compensation at the pirouette stop is active. No display shows at the function inhibited.

2. Stop boosting Gyro

It indicated the function of the gain boosting at the pirouette stop is active. "G" character is displayed at the function inhibited.

HOME SCREEN

3. Gyro working mode Gyro

It indicates the gyro working mode either AVCS or Normal mode. The inverse "A" character is displayed at the rudder neutral is offset.



At the AVCS mode, move the rudder stick more than 2 times left and right full within the period 1 second and return the stick to neutral position, the rudder servo retrieves the neutral position. The OLED shows the "-----" display at this condition.



Hold the rudder stick to neutral and move the gyro gain channel, Normal→AVCS→Normal→AVCS within the 1 second period. After done the process, the rudder stick neutral is memorized to the GY701 to match the rudder stick neutral. This operation is useful for rudder neutral re_trimming from normal mode to AVCS mode. After finished the operation, OLED shows "*****". The GY701 always renews the rudder neutral position at the turned on the power with AVCS mode. The rudder stick must be stayed neutral position during the starting up.



4. Gyro gain Gyro

It indicates the gyro working gain.

HOME SCREEN

5. on/off switch Governor

It shows the switch condition of the governor. The governor is active at "On" displayed.



6. Yaw rate comp. Governor

It indicates the revolution compensation at the pirouette is active. No display shows at the function inhibited.

7. Battery voltage

It indicates the battery voltage. The Low battery is displayed at below 3.8 volts.

8. Orientation indicator

It supports as the operation guide. Push the key switch below this indicator, changes the editing mode.

9. Setting revolution display Governor

It displays the setting revolution of the governor. It shows only at the governor only operation mode.

HOME SCREEN

Revolution display Governor



QNB A100%
Q 1494rpm

The battery voltage display is changed to engine revolution display at starting the engine running, and return to battery voltage display at the engine stop automatically. The revolution mode can be selected either main rotor revolution or engine revolution. The rpm character starts slow blinking at the governor starts the operation and fast blinking at the revolution reached to +/- 2% of the setting revolution. The rpm character changes to inverse character at the revolution within +/- 1% of the setting revolution as the revolution is locked.

At the governor only mode, the revolution is displayed on the top of the display line after running the engine.



Q 1511rpm
Qn 4.9Q

Sub_Home screen

At the home screen display, the display of below the line is scrolled to Battery voltage→Max. revolution→Engine runtime→OLED display mode→LED display mode→Operation mode by pushing the mode + or - key.

HOME SCREEN

1. Max. revolution Governor



QNB A100%
2124Mrpm

It memorizes the maximum engine revolution at the operation. The display is changed to Max. revolution by pushing the mode + key. The revolution data is stored to the memory. The data is reset by pushing the data + or - key for more than one second.

2. Engine runtime Governor



QNB A100%
0H52M19

It displays the engine runtime integration. The display is changed to runtime mode by pushing mode + key 2 times from home screen. The display unit is second until 100 hours as xxHxxMxx, over 100 hours, minutes as xxxxHxxM. The display is reset by pushing data + or - key for more than 1 second.

3. OLED display mode [default: Saver]



OLED.MD
Saver



OLED.MD
Light

It selects the OLED display mode. The Saver mode reduces the brightness and saves the power consumption after no editing for 60 seconds. The brightness is returned by pushing any key. The Light mode always lights the maximum brightness.

4. LED display mode [default: ON]

LED.Slct
ONLED.Slct
Off

It selects the display mode of the LED on the gyro sensor. The LED is light at ON setting, turned off by Off setting for power saving. The mode can be changed by pushing the data + or – key.

5. Operation mode [default: Gyro+Gov]

Opr.Mode
Gyro+GovOpr.Mode
GovernorOpr.Mode
Gyro

It sets the operation mode of the GY701. Set to “Governor” when the gyro sensor is not installed and set “Gyro” when the governor sensor is not installed. Set “Gyro+Gov” when the both gyro and governor sensor are installed. Mode is changed by pushing the data + or – key. The home screen is changed after changed the operation mode. The “SensorER” is displayed when the gyro sensor is not installed and the operation mode is set “Gyro” or “Gyro+Gov” mode. Push any key to escape this display and set the operation mode is to be “Governor”.

When the operation mode is changed, it must be needed the reboot the GY701. During the operation, it is not allowed to change the operation mode.

WARNING DISPLAY

Governor warning display Governor



The warning symbol is displayed when the governor is on condition at turned on the power. The governor is never activated at this condition. The governor can be working condition after off condition is recognized. The governor must be off condition at starting the engine.

Input error Gyro



It indicates the no rudder or throttle signal input. The GY701 does not work at this condition.

Sensor error Gyro



The gyro sensor does not work collect. The gyro does not work at this condition.

Low battery



It displays at the battery voltage becomes less than 3.8 v. The low battery is recognized for more

WARNING DISPLAY

than 1 second, the governor is low battery condition and the governor operation is stop. If the B/FS function is activated, the throttle servo is moved to setting position by B/FS function. The B/FS condition is reset for 30 seconds by moving the throttle stick to low full. Throttle servo can be controlled by stick. After 30 seconds passed, getting into B/FS condition again. This sequence lasts forever. The helicopter should be landing immediately if the B/FS condition.

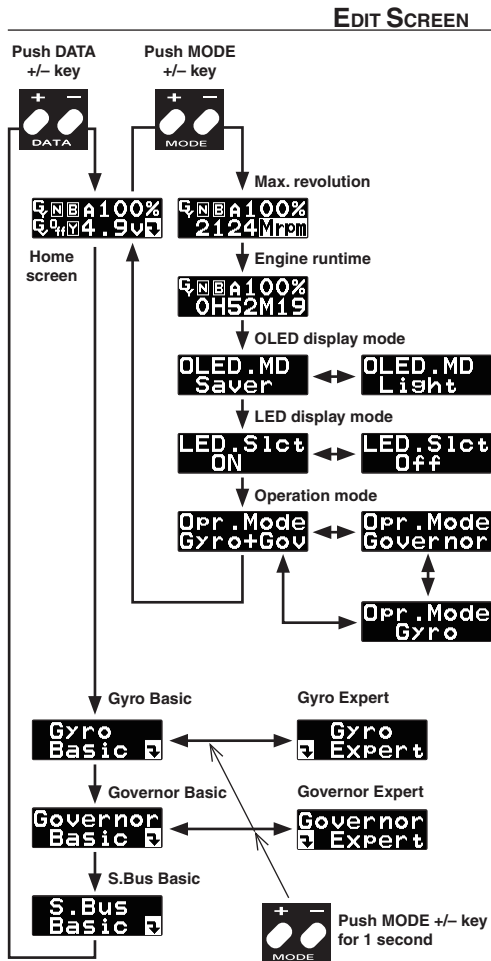
EDIT SCREEN

The edit mode is changed to Gyro basic, Governor basic, S.Bus basic mode by pushing the data+ or - key. These modes set the basic operation setting for initial flight. Pushing the mode + or - key for more than 1 second at the gyro or governor screen, the editing mode is changed to the expert mode, the precise setting can be done by this mode. Pushing the mode+ or - key for 1 second again, the editing menu is returned to basic menu. The setting of the governor functions are skipped at the gyro only mode or the gyro function are skipped at the governor only mode as well.

Pushing the mode+ or – key at basic or expert mode, the edit menu is scrolled and the parameter can be set on the each menu.

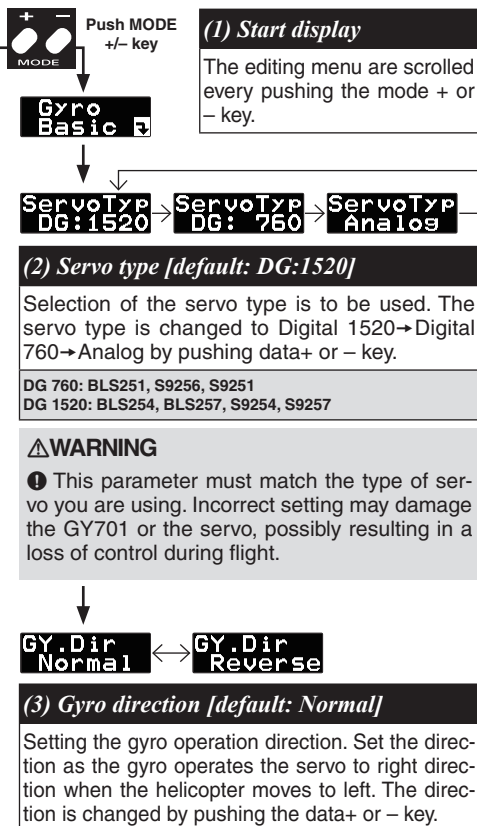
During the home screen, the display is changed to Max. revolution→Engine runtime→OLED display mode→LED display mode→Operation mode by pushing the data+ or - key.

The below the diagram shows the edit sequence. The instruction describes the Gyro+Governor mode after.



GYRO BASIC SETTING

It sets the gyro's fundamental functions. The menu (4) *Servo limit point setting* should be set first with other menu.



GYRO BASIC SETTING

⚠ WARNING

❶ Verify that the gyro compensates in the correct direction before flight. If the compensation direction is incorrect the model will pirouette uncontrollably, at a very high rate.

Sv.Limit
B: 100 %

(4) Limit setting [default: 100%, setting range: 50 ~ 150%]

Adjusting the maximum servo through. Set the amount to be not interacted the rudder linkage.

Move the rudder stick right (left) maximum. At this condition, the servo increased the movement by pushing the data+ key, decreased by pushing the data- key.

⚠ WARNING

❶ When using the GY701 for the first time, or when making changes in the throw of a servo, always perform the limit setting operation.

FLT.Mode F3C ↔ **FLT.Mode 3D**

(5) Flight mode [default: F3C]

Selection of the flight style. F3C mode is more precise rudder control, the 3D mode is more active rudder control, pirouette speed is faster than F3C mode. The mode is changed every pushing the data+ or - key.

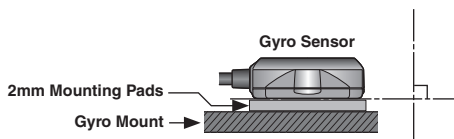
Pirouette rate at AFR100% to full stick:
F3C = 450 deg/sec
3D = 720 deg/sec

GYRO SENSOR INSTALLATION

The gyro sensor should be mounted on a rigid platform, at least 6in [152mm] away from a Nitro Engine. It is not necessary to mount the gyro near the main shaft of the helicopter but it is very important that the mounting area chosen is rigid. Please refer to your helicopter manufacturer's instructions for recommended mounting locations.

Installing the gyro sensor

The GY701 is supplied with three 2mm Mounting Pads. When mounting the gyro in a larger electric or .50 through .91 size nitro helicopter we recommend using a supplied 2mm Mounting Pad.



TROUBLESHOOTING

If you experience erratic gyro operation (drifting, not holding well or inconsistent pirouette rate), please follow the troubleshooting tips listed below.

1. Always verify that your model's tail rotor control and drive system are working correctly.
2. Electromagnetic interference could affect the gyro or tail rotor servo. Mount the gyro in a different location, away from the electronic speed control, servos and drive motor.
3. The trouble may be caused by vibration. Verify that your helicopter's components are balanced. If problems persist, try mounting the gyro in a different location.

TAIL ROTOR SERVO INSTALLATION AND SETUP

Following your transmitter instructions, program your transmitter as follows:

- ☐ Enable the gyro function within the transmitter.
- ☐ Set the gyro mode to AVCS (GY) within the transmitter.
- ☐ Set the remote gyro gain to 70% AVCS in the transmitter for the Normal and Hold flight conditions and use 40% AVCS for all idle up conditions. See "Setting The Gain" section later in this manual for more details.
- ☐ Set the Tail Rotor ATV/EPA to 100% for both left and right.
- ☐ Set D/R to 75% for both left and right. This will reduce the maximum pirouette rate. Make adjustments to these values once the initial test flight has been completed.
- ☐ It is recommended that you run 30% softening expo on the tail rotor channel.

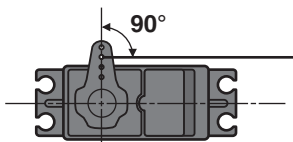
⚠WARNING

⊗ Do not connect the tail rotor servo to the gyro until the servo type has been selected. Operating the servo using the incorrect setting may damage the GY701 or the servo.

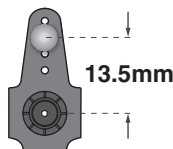
Once these steps are completed, turn the receiver power on and allow the gyro to initialize. Follow the instructions within the "*Gyro Basic Setting*" section of the manual and select the Servo Type that matches the servo you have chosen to use. Power down the receiver for now.

TAIL ROTOR SERVO INSTALLATION AND SETUP

- ❑ Install the tail rotor servo into the mechanics and connect the servo to the gyro. Remove the servo arm screw from the servo. Turn the receiver power on and allow the gyro to initialize. Enter the “**Gyro Basic Setting**” mode and go to parameter (4) “Servo Limit Point Setting”. While in the servo limits parameter the servo will remain centered.



- ❑ Place an appropriate servo arm onto the servo and ensure that it is perpendicular to the tail rotor pushrod as shown. Remove the unused sides of the servo arm.
- ❑ Install the control ball supplied with your helicopter onto the servo arm. For larger electric models or nitro powered models we recommend placing the ball 13.5mm from center. Once the control ball has been installed place the arm back onto the servo ensuring that it is perpendicular to the tail rotor pushrod. Install the servo arm screw.



TAIL ROTOR SERVO INSTALLATION AND SETUP

- ❑ Follow the instructions within the “Servo Limit Point Setting” section and set the servo limits for the tail rotor servo. Hold the tail rotor linkage over the linkage ball to avoid damaging the servo. Once the limits are set you can place the linkage onto the linkage ball. When using AVCS mode the optimum setup is to have 0° of pitch with the tail rotor servo centered and use all of the available pitch range in the tail without binding.
- ❑ Turn the receiver power off to exit programming mode and then turn the receiver power back on. Once the gyro has completed initialization move the tail rotor stick to the right on the transmitter and verify that right (clockwise rotation) tail rotor pitch is inputted to the tail rotor blades. If left tail rotor pitch is inputted to the tail rotor blades, then it will be necessary to reverse the tail rotor channel in the transmitter.
- ❑ Pick the helicopter up by the main shaft and rotate the mechanics counter-clockwise (from the top). The gyro should compensate by adding clockwise rotation pitch to the tail rotor blades. If the gyro compensates by adding counter-clockwise rotation pitch to the tail rotor blades then it will be necessary to reverse the “Gyro Direction” setting within the gyro (refer to the “**Gyro Basic Setting**” section earlier in this manual).

If you are going to fly AVCS Heading Hold mode exclusively, then the gyro setup is now complete.

BEFORE FLIGHT CHECKLIST

- ☐ Transmitter and Receiver batteries are fully charged.
- ☐ The gyro mounting pads are in good condition.
- ☐ The gyro wiring has some slack in it and all wires are clear of the main frame.
- ☐ Power on the transmitter and receiver. Allow the gyro to initialize.
- ☐ The GY701 servo type parameter matches the servo you are using.
- ☐ The Tail rotor servo arm is perpendicular to the pushrod and the pitch slider is centered.
- ☐ The servo does not bind when full left or full right tail rotor is applied.
- ☐ The gyro is operating in the correct mode (AVCS or Normal).
- ☐ The tail rotor stick operates the tail rotor the correct direction.
- ☐ The gyro compensates the correct direction when the helicopter is rotated.
- ☐ The gain is set correctly and the gyro operates in the correct mode (AVCS or Normal) in every flight condition.

ADJUSTMENTS DURING THE TEST FLIGHT

⚠ WARNING

❗ Always make small (1%) adjustments to the tail rotor D/R or EPA once the value exceeds 100%. Over 100%, it is possible to exceed the sensor's Angular Velocity Sensing Range (+/- 1,200° per second). The gyro will then no longer control the pirouette rate or consistency. The pirouette rate will be extremely fast.

If you experiment with the ultra-fast pirouette rate, make sure that your flight battery and fuel tank are secure. Also be certain that your model's tail rotor drive train is up to the task.

The Tail Rotor AFR or D/R function within the transmitter is used to adjust the pirouette rate of the helicopter. For example at 100% D/R, with the gyro set to F3C mode, the helicopter will achieve a 450 deg/sec pirouette rate. If you would like the model to pirouette faster, then increase the AFR or D/R. If you would like the model to pirouette slower, then decrease the AFR or D/R.

The gain should be raised until the tail begins to oscillate quickly (also called Tail Wag). Once this point has been achieved, reduce the gain by a couple of percent and test fly the model again. Check and set the gain for each flight mode. Typically the gain will be lower for the Idle up 1 and Idle up 2 flight modes due to the higher head speed being used. The gain for the Hold condition can also be much higher than other flight modes since the head speed is lower and the engine vibration is minimized.

ADJUSTMENTS DURING THE TEST FLIGHT

The tail rotor ratio, tail rotor pitch range and tail blade length play a large part in achieving optimum tail rotor performance. The gain value can vary drastically from model to model and the exact value should not play a part in the evaluation of the gyro's performance. How the gyro operates during flight is the only concern of ours.

USING NORMAL MODE

Most pilots today are using AVCS Mode. If you are just starting out, it is recommended that you use AVCS Mode exclusively from the start. Normal Mode is rarely used today due to the performance benefits of AVCS mode. When using AVCS mode all trimming of the tail is automatically handled by the gyro. If you should decide to use Normal Mode then all trimming and mixing must be setup by you.

If you will be using the Normal Mode (also referred to as Rate Mode) then a few changes to the setup will be necessary. The tail rotor should be set to 10 degrees of tail rotor pitch (to counteract torque) when the tail rotor servo is centered. With clockwise rotating main rotor blades this means 10 degrees of right tail rotor pitch will be necessary to counteract torque. In addition to this it will be necessary to use the tail rotor compensation or revolution mixing functions of your transmitter to help counteract torque. Please see your transmitter instruction manual for more information on how to set this up.

If you decide to switch between Normal Mode and AVCS Mode in flight, you must have the gyro re-learn the center position after making a trim change within the transmitter. To memorize the new center position simply flip the gain switch on the transmitter three times between Normal Mode and AVCS Mode (Normal→AVCS→Normal→AVCS) within one second. The tail rotor servo will center, indicating that the new center position has been memorized.

SETTING THE GAIN

Most modern computer transmitters will have a gyro function built into them. If this is the case, please refer to your transmitter's instruction manual. Most modern gyro functions will allow you to set the mode of operation and the gains for several flight conditions. The use of these functions is strongly encouraged. Shown below is a recommendation of settings:

Recommended Gyro Function Settings:

Switch: Condition

Type: GY or AVCS

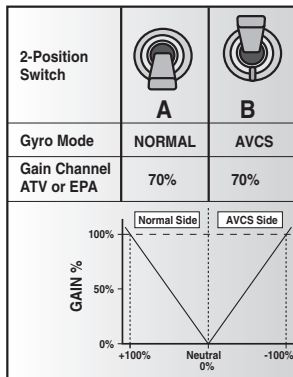
Gain Values

Normal: 70% A (AVCS)

Idleup 1: 40% A (AVCS)

Idleup 2: 40% A (AVCS)

Hold: 70% A (AVCS)

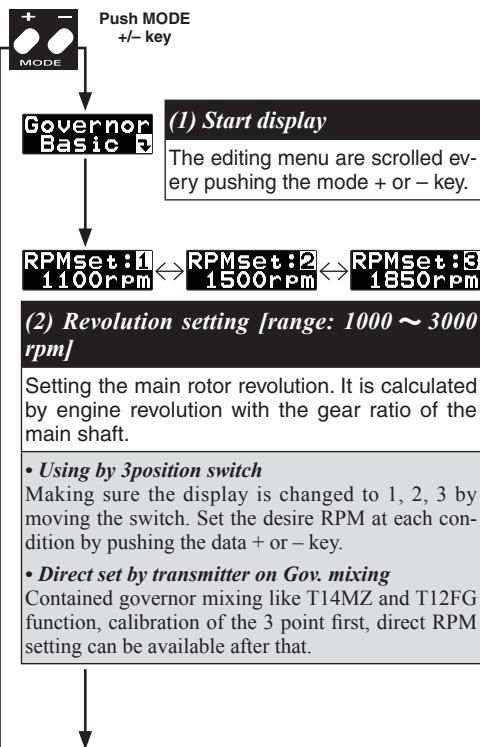


SETTING THE GAIN

If your transmitter does not have a Gyro function built in then it will be necessary to use the ATV or EPA function to control the gain. The Gyro Gain channel will generally be assigned to a switch which provides two gain values. Simply set the ATV or EPA for the gyro channel to the desired gain value and set the Gain Switch to the desired mode of operation. Unfortunately since you will only have one gain value available it will be necessary to use the lowest value needed (for example Idleup 2). When using this method of controlling the gain, one direction of the switch will be AVCS mode and the other direction of the switch will be Normal mode. Always ensure the gyro switch is set to the desired mode before flying. Do not accidentally change the gyro switch in flight.

GOVERNOR BASIC SETTING

It sets the governor's fundamental functions. The menu (9) *Servo limit point setting* must be set first with other menu.



46

GOVERNOR BASIC SETTING

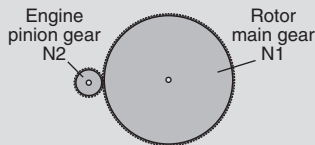
Gear.Rt
7.92 t

(3) Gear ratio [default: 8.00, range: 3 ~ 30]

Input the main rotor gear ratio by pushing the data + or-key.

Notes:

- If the gear ratio is not properly set, the set speed and actual engine speed will be different.
- The gear ratio should be given in the helicopter instruction manual. If the helicopter instruction manual does not give the gear ratio, calculate the gear ratio as follows:



$$\text{Gear ratio} = N1/N2$$

- Carry values less than 1/1000 to the next whole number.

47

GOVERNOR BASIC SETTING

ServoTyp ↔ ServoTyp
Analog DG:1520

(4) Servo selection [default: Analog]

Select the throttle servo type. Digital servo is the best for the response. The type is changed by pushing data + or – key.

⚠ WARNING

❗ This parameter must match the type of servo you are using. Incorrect setting may damage the GY701 or the servo, possibly resulting in a loss of control during flight.

Stick.SW ↔ Stick.SW
ON 30% Inhibit

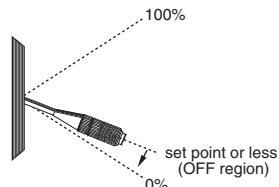
(5) Stick switch [default: 30%]

The governor can be activated by throttle stick position. Move the throttle stick to be on position and push SET key, the on point is memorized. When push the RSET key, the function is inhibited. When the governor on/off switch is inhibited, the stick switch is automatically turned on.

When governor turned on and off by transmitter throttle stick

The data is set so that the governor can be turned on and off with the transmitter throttle stick. The following describes this operation.

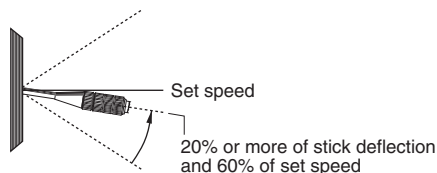
GOVERNOR BASIC SETTING



(OFF at slow side)

- Throttle stick set at least the set point from slow side and engine running at 60% or more of set speed → → → ON
- Throttle stick held at the set point or more from slow side → → → Remains ON
- Throttle stick lowered the set point or less from slow side → → → OFF

(Governor operating point)



GOVERNOR BASIC SETTING

On/OffSW Inhibit ↔ On/OffSW ON ↔ On/OffSW Off

On/OffSW
Invalid

Invalid display
(at PWM)

(6) Governor on/off switch [default: Inhibit]

It selects the governor activate switch if additional switch is used. Pushing the SET (Data+) key to be activated the function. The on/off direction is changed by pushing the SET key again. The function is inhibited by pushing the RSET (Data-) key. This function is only available at S.Bus connection. "Invalid" is displayed at PWM connection.

When governor turned on and off by switch (S.BUS connection only)

Setting the switch to the ON position turns on the governor. The following describes this operation.



Governor can be turned on and off by a switch.

- Switch set to on position and engine running at 60% or more of set speed → → → ON
- Throttle stick set to maximum slow position → → → Remains ON
- Switch set to off position → → → OFF



GOVERNOR BASIC SETTING

B/FS.Set Inhibit ↔ B/FS.Set 28%

(7) Battery failsafe setting [default: Inhibit]

The governor gets into the failsafe mode at the battery voltage is below 3.8 v when function is activated, the governor is deactivated and the throttle servo is moved to B/FS position at B/FS condition. Move the throttle stick to idle position, the B/FS condition is dis activated for 30 seconds, and returned to B/FS after 30 seconds passed.

Move the throttle stick to B/FS position as desired, push set key to be finished the setting. Pushing RSET is to be inhibited the function.



Yaw.Comp Off → Yaw.Comp CW/TOP → Yaw.Comp CW/BOTM
Yaw.Comp CCW/BOTM ← Yaw.Comp CCW/TOP

(8) Yaw rate compensation [default: CW/TOP]

It works the revolution compensation at the pirouette. Set the mode to match the gyro installing direction, either CW/TOP, CW/BOTM, CCW/TOP, CCW/BOTM by pushing the Set key. Pushing the RSET key is to be inhibited the function.

At the governor only mode, this function is ignored.

CW: clockwise
CCW: counter clockwise
TOP: normal side
BOTM: reverse side



GOVERNOR BASIC SETTING

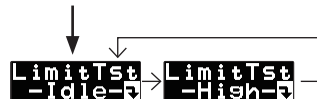


(9) Servo limit point setting

It sets the throttle servo maximum through. It is fundamental for governor operation. It must be set prior to other function setting. It must be set when the throttle linkage is changed or trim is changed as well.

For the setting, idling position is set first, then high position guided by the display. Pushing the data + or – key to be memorized. “*Finish*” is displayed when the setting is completed, “*Error*” is displayed when the setting position is out of range (too narrow from high to idle below 50 % through).

❗ When using the GY701 for the first time, or when making changes in the throw of a servo, always perform the limit setting operation.



(10) Limit point testing

It tests the limit point if they are correct. Push data + or – key, throttle servo moves to setting point followed to the display.

GOVERNOR BASIC SETTING

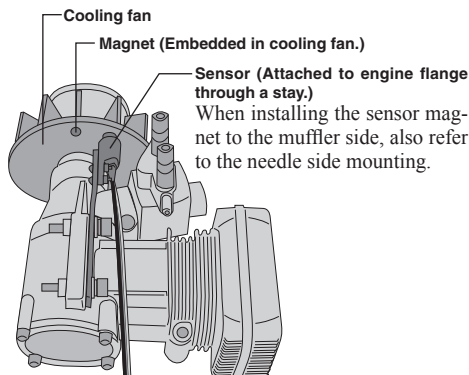
Rev. Sens
1% 62%M

(11) Revolution sensor testing

It tests the output level of the revolution sensor. Turning the engine by hand, and check the output level. The display indicates the current level on left numbers, maximum level on right numbers. The output level is required more than 60 % for correct operation.

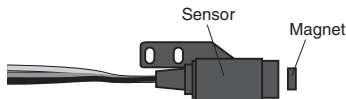
MOUNTING THE MAGNET AND SENSOR

Modify the cooling fan and install the accessory magnet and attach the magnetic sensor to the engine at the position shown below.



Magnet operating side check

- ❑ Bring the magnet near the end of the sensor and check the operating side.

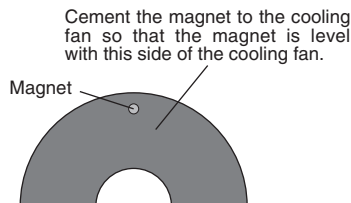


This is the side at which the displayed value increases in the “Revolution sensor testing” menu within the “**Governor Basic Setting**” section earlier in this manual. Install the magnet with this side facing the sensor. Mark this side of the magnet with a felt tip pen.

MOUNTING THE MAGNET AND SENSOR

Cooling fan modification

- ❑ Drill a hole in the fan at the magnet mounting position. Make the hole about 4.1mm in diameter and 1.5 to 1.7mm deep.
- ❑ Embed the magnet in this hole in the direction in which an output is obtained. Use epoxy adhesive that cures in 30 minutes or longer. Do not use epoxies that contain metal such as JB Weld.



- ❑ If the cooling fan is unbalanced and vibrates, etc., balance it by mounting the spare magnet to the opposite side of the cooling fan in the opposite polarity (so that it does not output a signal).

Sensor mounting

The sensor mounting method depends on the helicopter and engine.

- ❑ Mount the sensor to the sensor stay. (Temporary assembly)
- ❑ Drill a hole in the fan cover at the part corresponding to the sensor so that the distance

MOUNTING THE MAGNET AND SENSOR

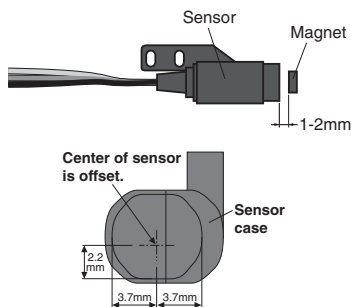
between the sensor and magnet can be made 1 to 2mm.

- ❑ Tighten the sensor stay together with the engine mounting flange. (Temporary assembly)
- ❑ Select the mounting method so that the sensor does not touch the frame, or other parts of the helicopter. Temporarily mount the sensor and select the magnet mounting position.
- ❑ Install the sensor to the sensor stay using the accessory screws and washers.
- ❑ Tighten the sensor stay together with the engine using the engine mount screw.



Sensor adjustment

- ❑ Adjust the sensor position to obtain a sensor output of at least 60% in the “Revolution sensor testing” menu within the “**Governor Basic Setting**” section earlier in this manual.



MOUNTING THE MAGNET AND SENSOR

- ❑ The center of the sensor is different from the center of the sensor case so be careful when mounting the sensor.

If the display is less than 60% when the magnet is directly below the sensor, bring the sensor closer to the magnet so that the 60% or more is displayed. The magnet and sensor gap criteria is approximately 1 to 2mm. If a sensor output is not obtained even when the sensor is brought close to the magnet, the magnet and sensor center positions may have changed.

- ❑ Complete assembly of the sensor by securely tightening the screws that were temporarily tightened.
- ❑ Recheck the sensor output.

FUSELAGE SETTING PRECAUTIONS

Throttle servo linkage precautions

To effectively use the governor, observe the following precautions when connecting the servo linkage.

- ❑ Make the servo operating range as wide as possible. Make the throw of the transmitter EPA (ATV) function and AFR function as close as possible to 100%. The governor will not operate at throws lower than 50%.
- ❑ Fly with the governor turned OFF and adjust the needle so that the engine smoothly reacts to movement of the transmitter stick.
- ❑ If there is a point at which the reaction of the engine is considerably different due to a too rich or too lean mixture, the governor may not operate to its maximum potential.

Fuselage vibration countermeasures

If the helicopter frame is weak, or the engine mount is deformed or not installed properly, the vibrations applied to the engine will increase. Engine vibrations will lead to unstable speed and prevent the governor from maximum performance. Therefore, make sure that the engine is vibration free and that the carburetor is of good liner design because the governor cannot correct engine problems.

Use of a tuned silencer

The use of a tuned pipe type silencer may cause the engine throttle response to be substantially

FUSELAGE SETTING PRECAUTIONS

different from that with a normal muffler. Adjust the needle (and pipe length) so that engine speed changes are proportional to the throttle opening. If the engine speed does not change linearly, the governor will not perform satisfactorily with a muffler or a pipe that does not allow the carburetion to be linear.

GOVERNOR OPERATION

Governor operation

The GY701 operates from 1000 to 3000rpm main rotor speed. However, the engine must be running at the set speed. The GY701 turns off the governor when the engine is starting or idling.

* Governor operation: Operation that stabilizes the engine speed at the set speed.

Condition of the governor to be on

For the safety purpose, the governor is turned on at the below the condition are satisfied.

- ☐ The on/off switch conditions are to be off condition at the power on.
- ☐ The stick switch is on position when it is used.
- ☐ The on/off switch is on position when it is used.
- ☐ Setting speed is not Off.
- ☐ The engine speed exceeds to 60 % of the setting speed.
- ☐ The speed sensor is working properly.

The following operations do not indicate trouble:

When engine speed rises above the set speed:

A near-vertical dive may cause the engine speed to rise above the set speed.

Throttle operation speed and ON/OFF point:

If throttle operation exceeds 60% of the set speed and the rotor speed rises to the set value, the ON/OFF point may seem to differ with the operating speed. Delay operation to smoothen the switching operation causes this and does not mean that the ON/OFF point

GOVERNOR OPERATION

has changed.

Deviation from set speed:

The GY701 stabilizes the engine speed to within +1% of the set speed. For example, if the rotor R.P.M. is set to 1500rpm, the Rotor R.P.M. speed will deviate about ± 15 rpm. However, this poses no problem from the standpoint of practical use.

GOVERNOR SPEED SETTING

The GY701 is used by connecting the “rpm” input to the governor speed setting channel of your system. When using an independent governor on/off switch, activate the “(6) Governor on/off switch” function within the “**Governor Basic Setting**” section earlier in this manual. (S.BUS connection only)

Direct set by transmitter on Gov. mixing

- ❑ A contained governor mixing like T14MZ and T12FG function is used to switch the RPM of the rotor head speed. The head speed can be switched with each condition or the switch.

*For a description of the governor mixing, refer to your transmitter’s manual.

Using by 3position switch

- ❑ Set the RPM at each switch position in the “(2) Revolution setting” menu within the “**Governor Basic Setting**” section earlier in this manual.

Speed setting precautions

- When the speed setting channel travel (EPA, ATV, AFR) is made 20% or less, points 1 and 3 cannot be set.
- The engine maximum speed range limits the maximum speed setting.
- Test fly the helicopter with the governor turned off and tach the main rotor R.P.M. while in horizontal flight. This is the maximum R.P.M. that can be achieved with the engine and pitch setup that you are using. Please set the governor maximum speed to approximately 50 R.P.M.’s less. (Example:

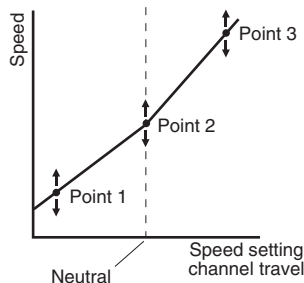
GOVERNOR SPEED SETTING

If 1800 R.P.M.’s is max then set governor to 1750)

- The maximum speed can be verified at the MAX. speed display, however this could show some unlocked main rotor condition which is not accurate.

Reference

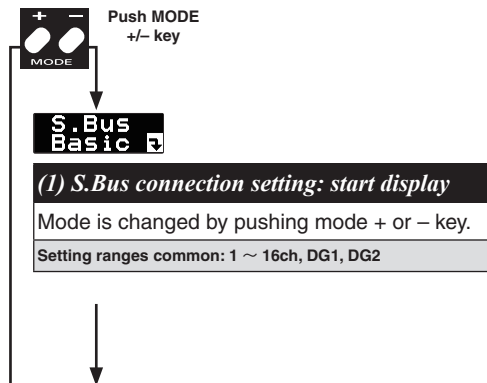
The transmitter EPA function can also be used to change the point 1 and point 3 speed settings to a certain extent. The amount of this change is proportional to the difference between the point 1 and point 3 set speed and the point 2 set speed. For example, if point 1 is set to 1300rpm and point 2 is set to 1500rpm, and the transmitter EPA is changed from 20 to 100%, the point 1 speed will change from 1460 to 1300rpm. The transmitter EPA function has very little effect on the point 2 speed setting.



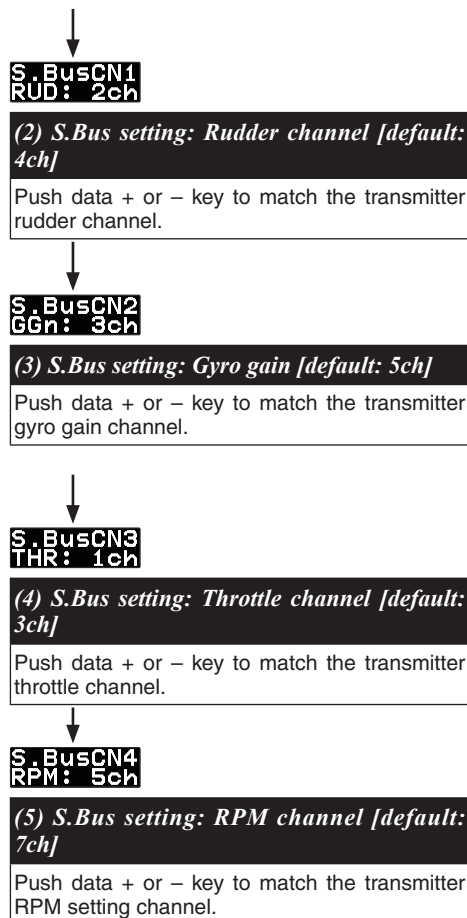
The speed changes linearly on a line connecting points 1, 2, and 3.

S.BUS BASIC SETTING

It sets the function to channel at S.Bus connection. It is required the S.Bus compatible receiver. The wiring from receiver to servos is to be simple by using the S.Bus connection, only one main S.Bus wire is connected to receiver and GY701 can complete the operation. In addition, governor on/off switch function, F/F mixing can be available at the S.Bus connection. At the PWM connection, this function is invalid. When do not use S.Bus channel, set "INH" for the channel setting. The S.Bus channels have linear 16ch, digital 2ch, 18ch total, but the controllable channels are limited by the transmitter channels.



S.BUS BASIC SETTING



S.BUS BASIC SETTING

S.BusCNS
GovS: 9ch

(6) S.Bus setting: GOV. on/off channel [default: 8ch]

Push data + or – key to match the transmitter governor on/off channel.

S.BusCNS
PIT: 12ch

(7) S.Bus setting: Pitch channel [default: INH]

Push data + or – key to match the transmitter pitch channel.

RESET S.Bus → *RESET* Exec.?? → *RESET* -Exec.--

(8) S.Bus data reset

It resets the S.Bus connection channel to be default. The “Exec.??” is displayed by pushing data + or – key for confirmation. Push data+ or – key again, the reset process is done and displayed “-Exec.--” and return to the start display. Pushing mode+ or – key during confirmation display, the reset process is aborted.

S.Bus
Invalid

Invalid display
(at PWM)

GYRO EXPERT SETTING

It sets the detail of the gyro function for expert modeler. Push the mode + or – key for more than one second on the Gyro Basic menu, the editing is got into the Gyro expert menu. Push mode + or – key for more than one second again on the Gyro expert menu to be returned to the Gyro basic menu.

(1) Start display

Gyro
Expert

Push mode + or – key, the editing menu is scrolled every time. Pushing mode + or – key for more than one second, back to gyro basic menu.

(2) Rudder servo neutral setting

RUD.Ntr
+0 uS

default: 0 uS
ranges: -140 ~ +140 uS

It sets the neutral position of the rudder servo. Pushing data+ or – key, the neutral position of the rudder servo is moved.

(3) Gyro basic gain

GY.Gain
A: 100 %

default: 100 %
ranges: 50 ~ 120 %

It sets the gyro fundamental gain. Pushing the data+ or – key, the value is changed.

(4) Rudder exponential

EXP.AVC **EXP.NOR**
-40 % -10 %

default: -60% (F3C-AVCS), -40% (F3C-Normal), -20% (3D-AVCS), -20% (3D-Normal)
ranges: -100% ~ +100%

It sets the control feeling of the rudder control. Decreasing the rate to minus, the rudder control is to be soften, and is to be quick when the value is increased to plus side. Pushing the data+ or – key, the value is changed.

(5) Rudder delay mode

Dly.Mode **Dly.Mode**
Function **Constant**

default: Function

It selects the rudder delay mode either Function or Constant. The Function mode has the rudder control is to be soften. The Constant mode has the linear and quick motion of the rudder control. Select by pilot preference.

(6) Control delay In

CNT.DlIn
A: 20 n

default: F3C=12, 3D=15
ranges: 0 ~ 20

It sets the rudder control delay at moving to right or left from neutral side. It can adjusts left and right individually. Adding the value, the control feeling is to be mild. Pushing data+ or – key, the value is changed.

(7) Control delay Out

CNT.Dout
A: 20

default: F3C=10, 3D=12
ranges: 0 ~ 20

It sets the rudder control delay at moving to neutral from right or left side. It can adjusts left and right individually. Adding the value, the control feeling is to be mild. Pushing data+ or – key, the value is changed.

(8) Stop delay

Stop.Dly
120 %

default: 120%
ranges: 100% ~ 400%

It sets the rudder delay at the tail stop motion. It improves the tail stop bounce to adjust the value. Pushing the data+ or – key, the value is changed.

(9) Gyro working mode

Wrk.Mode **Wrk.Mode** **Wrk.Mode**
CMT **Normal** **AVCS**

default: CMT

It selects the gyro working mode either CMT, Normal or AVCS. The CMT mode can select the AVCS or Normal mode by gyro gain channel. The Normal mode is always worked as Normal mode, AVCS is always AVCS mode. Pushing the data+ or – key, the mode is changed.

GYRO EXPERT SETTING

(10) Pirouette speed

ANG: 450d
AM +0d

default: 450 deg/sec (F3C), 720 deg/sec (3D)
ranges: 100 ~ 999 deg/sec

It adjusts the pirouette speed by the rudder control. The default value are set 450 deg/sec on F3C mode, 720 deg/sec on 3D mode at rudder through is 100 %. The below the line shows the actual pirouette speed by rudder control. When this value exceeds 1200 deg/sec, the gyro is out of control, the pirouette speed is to be very quick and may be dangerous situation. Pushing the data+ or – key, the value is changed.

(11) Gain change up delay

CG.DlInc
12 Fr

default: 12
ranges: 1 ~ 50

It sets the delay of the gyro gain changed from low to high, the condition represents from idle up to hovering. Increasing this value may cure if the tail hunting is taken place at idle up to hovering. Pushing data+ or – key, the value is changed.

(12) Gain change down delay

G.DlDec
3 Fr

default: 3
ranges: 1 ~ 50

It sets the delay of the gyro gain changed from high to low, the condition represents from hover-

GYRO EXPERT SETTING

ing to idle up. Decreasing this value may cure if the tail hunting is taken place at hovering to idle up. Pushing data+ or – key, the value is changed.

(13) Rudder histeresis

RUD.His
6.0 uS

default: 6 uS
ranges: 0 ~ 50 uS

It adjusts the rudder stick null ranges. Pushing data+ or – key, the value is changed.

(14) Gain tracking

G.Track
+0 %

default: 0 %
ranges: -20% ~ +20%

It adjusts the gyro holding feeling at left and right pirouette. Pushing data+ or – key, the value is changed.

(15) F/F mixing (S.Bus connection only)

F/F.Mix
Off

F/F.Mix
Active

F/F.Mix
Invalid

default: off

It selects the F/F (Feed Forward) mixing active. It helps the gyro operation to add the pitch to rudder mixing prior to the gyro operation and improves the gyro performance.

GY701 installs the pitch-> rudder mixing internally. The swash signal are mixed at the swash mode helicopter. The correct F/F mixing is achieved by individual pitch signal is to be input to the

GYRO EXPERT SETTING

GY701. Separate the pitch signal at the transmitter side, and input this signal to the GY701. To do that, making the programmable mixing as pitch→AUX, and input AUX signal to the GY701.

This function is only available at S.Bus connection. Invalid is displayed at PWM connection. Pushing data+ or – key, the mode is changed.

(16) F/F mixing rate

F/F.Rate
! +0 %

default: 0 %
range: -100% ~ +100%

It adjusts the F/F mixing rate. It can adjust low or high pitch rate individually from pitch zero point. Pushing data+ or – key, the value is changed.

(17) F/F mixing acceleration gain

ACC.Gain
0

default: 0 %
range: 0 ~ 200 %

It sets the F/F mixing acceleration gain. Pushing data+ or – key, the value is changed.

(18) Pitch zero setting

Pit.Zero
!1520 uS

default: 1520 uS

It sets the pitch zero point of GY701. Move the pitch stick to the zero pitch, push data+ or – key. The zero pitch signal is memorized to GY701. The display shows ! marked at the setting point.

GYRO EXPERT SETTING

This setting must be done when F/F mixing is used.

(19) Pitch low setting

Pit.Low
!1939 uS

default: 1940 uS

It sets the minimum pitch point of GY701. Move the pitch stick to minimum pitch, push data+ or – key. The minimum pitch signal is memorized to GY701. The display shows ! marked at the setting point. This setting must be done when F/F mixing is used.

(20) Pitch high setting

Pit.High
!1226 uS

default: 1100 uS

It sets the maximum pitch point of GY701. Move the pitch stick to maximum pitch, push data+ or – key. The maximum pitch signal is memorized to GY701. The display shows ! marked at the setting point. This setting must be done when F/F mixing is used.

(21) Sensor mode

Sen.Mode
Moderate

Sen.Mode
Quick

Sen.Mode
Middle

default: Middle

It selects the response of the gyro sensor signal. The response is ordered by Moderate→Middle→Quick, but the stability is vice versa. Select the good matching for the heli.

GYRO EXPERT SETTING

Pushing data+ or – key, the mode is changed.

(22) Neutral compensation

Ntr.Obsr
Off

Ntr.Obsr
ON

default: ON

This function works as recalling the neutral point of the rudder servo for improving the tail stop motion. To be this function effective, hover the helicopter for about one second, and memorize the neutral point. As the 3D helicopter, the tail movement is often and very quick, this function may not work as correctly. Check the function if it is works correctly. Pushing data+ or – key, the mode is changed

(23) Stop boosting

StpBoost
Off

StpBoost
150 %

default: Off

range: Off ~ 200%

This function works as boosting the gyro gain at tail stop motion to be improved. Pushing the data+ or – key, the value is changed.

(24) Gyro data reset

RESET
Gyro

RESET
Exec.??

RESET
-Exec.--

It resets the gyro parameter to be default setting. The “Exec.??” is displayed by pushing data + or – key for confirmation. Push data+ or – key again, the reset process is done and displayed “-Exec.—” and return to the start display. Pushing mode+ or –

GYRO EXPERT SETTING

key during confirmation display, the reset process is aborted.

GOVERNOR EXPERT SETTING

It sets the detail of the governor function for expert modeler. Push the mode + or – key for more than one second on the Governor Basic menu display, the editing is got into the Governor expert menu. Push mode + or – key for more than one second again on the Governor expert menu to be returned to the Governor basic menu.

(1) Start display

**Governor
Expert**

Push mode + or – key, the editing menu is scrolled every time. Pushing mode + or – key for more than one second, back to governor basic menu.

(2) Governor working mode

Wrk.Mode Governor **Wrk.Mode Rev.Lmt**

default: Governor

It selects the governor working mode either governor or revolution limit mode. The Governor mode works as the engine revolution is constant as setting revolution. The revolution limit (Rev. Lmt) mode only works at the engine revolution exceeds the setting revolution and engine revolution is to be lower at that condition. Pushing data+ or – key the mode is changed. When the Rev.Lmt mode is selected, the menu (6) *Throttle data mode* should be set to Tx.Curve mode.

GOVERNOR EXPERT SETTING

(3) Revolution display mode

Rv.Disp Rotor **Rv.Disp Engine**

default: Rotor

It selects the revolution display mode either main rotor or engine revolution. Pushing data+ or – key, the mode is changed.

(4) Operation response

Response Moderate **Response Middle** **Response Quick**

default: Middle

It selects the governor operation response. Select the best match of the engine type. Pushing data+ or – key, the mode is changed. Recommended selection are, Middle-> glow engine, Moderate-> gasoline engine, Quick ->Blushless motor-.

(5) Governor gain

Gv.Gain 40 %

default: Moderate=30%,Middle=40%,Quick=60%
ranges: 10~100%

It sets the governor working gain. When the operation response is changed, the governor gain is automatically changed as default. The best gain is the before the revolution wagging taken place. Pushing data+ or – key, the value is changed.

(6) Throttle data mode

THR.Mode Optimize **THR.Mode Fixed** **THR.Mode Tx.Curve**

default: Optimize

GOVERNOR EXPERT SETTING

It selects the throttle input operation. Pushing data+ or – key, the mode is changed

Optimize:

GY701 operates the throttle input signal as optimize. No need to consider the throttle curve setting on the transmitter.

Fixed:

The fixed throttle input is utilizing related by the revolution. It is recommended for the electric motor.

Tx.Curve:

GY701 uses the exact throttle input from the transmitter. The throttle curve setting on the transmitter is required. When the Rev.Lmt mode is selected, this mode should be selected.

(7) Revolution change up delay

Rv UpDly
10 Frm

default: 8
range: 2 ~ 20

It sets the delay at the revolution changed from low to high. Pushing data+ or – key, the value is changed.

(8) Revolution down delay

Rv DnDly
10 Frm

default: 10
range: 2 ~ 20

It sets the delay at the revolution changed from high to low. Pushing data+ or – key, the value is changed.

GOVERNOR EXPERT SETTING

(9) Start delay

StartDly
1 St

default: 5
range: 2 ~ 20

It sets the delay at the starting up the governor. Pushing data+ or – key, the value is changed.

(10) Low limit at hovering

LLmt_Hov
20 %

default: 25 %
range: 0 ~ 80 %

It sets the throttle low limit at hovering revolution to avoid too much lean the carburetor. Pushing data+ or – key, the value is changed.

(11) Low limit at idle up

LLmt Idup
40 %

default: 45 %
ranges: 10 ~ 80 %

It sets the throttle low limit at idle up revolution to avoid too much lean the carburetor. Pushing data+ or – key, the value is changed.

(12) Governor data reset

RESET
Gov. [F]

RESET
Exec.??[F]

RESET
-Exec.--

It resets the governor parameter to default setting. The “Exec.??” is displayed by pushing data+ or – key for confirmation. Push data+ or – key again, the reset process is done and displayed “-Exec.--”

GOVERNOR EXPERT SETTING

and return to the start display. Pushing mode+ or – key during confirmation display, the reset process is aborted.

FUTABA CORPORATION Phone: +81 475 32 6982,
Facsimile: +81 475 32 6983

1080 Yabutsuka, Chosei-mura, Chosei-gun, Chiba 299-4395,
Japan

©FUTABA CORPORATION 2010, 06 (1)
1M23N23902

GYRO & GOVERNOR

GY701

Advanced and adaptive operation