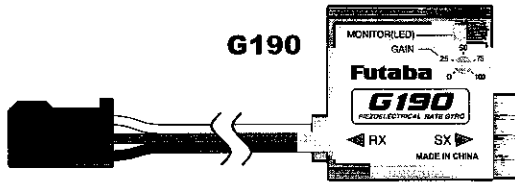


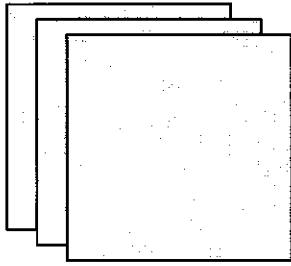
Set Contents

The G190 comes with the following accessories:



G190

**Mini screwdriver
(for adjustments)**



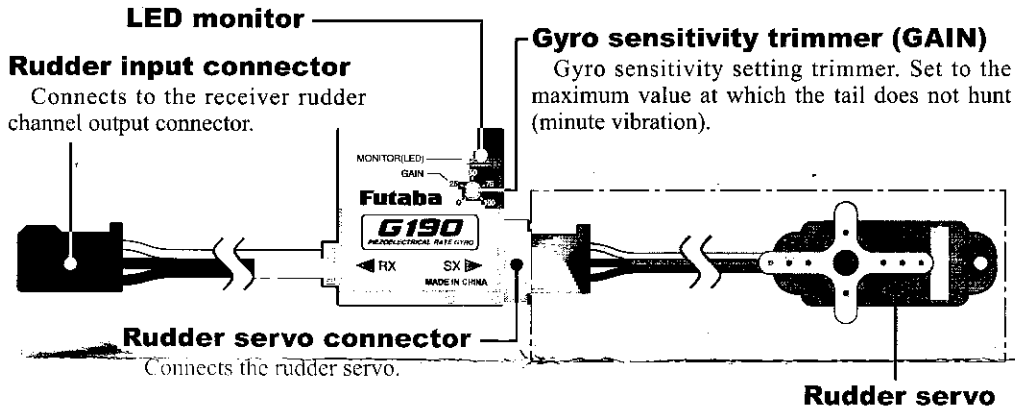
**Double-sided tape
(3 sheets)**

G190 Ratings:

(Integrated sensor type rate gyro)

- Gyro sensor: piezoelectric sensor
- Operating voltage: 4.8 to 6.0VDC
- Current drain: 15mA at 4.8V
- Operating temperature range: -5 to +45°C
- Dimensions: 22.2 x 22.8 x 8.9mm (except protrusion)
- Weight: 6.7g (including connector)
- Functions: Sensitivity trimmer and LED monitor

Functions and Connections



LED monitor:

- **Quick Blinking:** The LED continues blinking quickly as the initialization of the G190 automatically starts immediately after the power is turned on.
- **Always On:** As soon as the initialization is completed, the LED turns on continuously and G190 is ready for operation.
- **Slow Blinking (about 1Hz):** If the G190 receives any abnormal signal from the receiver, the LED starts slow blinking.

Mountings and Adjustments

This section describes how to use the G190. Mount and adjust the G190 as described below.

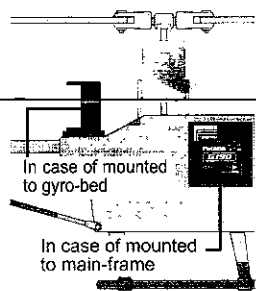
Trimmer Operation

- To make the G190 small and light-weight, a small trimmer is also used. Be careful when operating the trimmer. Always operate the trimmer with the mini screwdriver supplied.

Mounting to Fuselage

1 Using the attached double-sided sponge tape, attach the G190 temporarily to the gyro-bed of a helicopter or a specified place. And be sure that the G190 should be mounted so that the direction of the G190 case is parallel to the main rotor shaft of the helicopter (perpendicular to the tailpipe).

* Only required here is a temporary attachment as the final bonding on the correct direction will be made after confirmation of the direction.

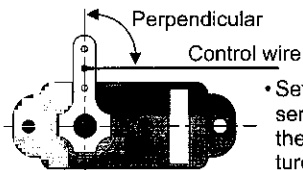


- Always use the attached double-sided sponge tape.
- Cut it a little larger than the attachment surface of the G190.
- Make sure that the surface of the fuselage on which you mount the gyro is wider than the corresponding surface of the gyro.

2 Connect the G190 rudder servo connector to the rudder servo and the G190 rudder input connector to the receiver rudder channel connector.

3 Install the rudder servo and tail control wire linkage and servo horn in accordance with the helicopter instruction manual.

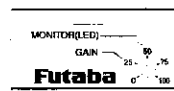
* For the gyro to display top performance, it must be linked at a position at which the servo horn and control wire are perpendicular at the rudder neutral position.



- Set the length of the servo horn based on the model manufacturer's instructions.

Initial adjustment

4 Temporarily set the trimmer of the gyro's sensitivity approximately at 75%.



- First, turn the trimmer fully clockwise. At this time, the position at which the trimmer cuts in is the 100% position. Set the cut-in position to the 75% position.

* Carry out the further tuning later while flying your helicopter.

When turning on the power

5 Pull throttle stick to idle position. Turn on the transmitter power and then the gyro (receiver) power in the proper sequence.

Initialization of G190

- When G190 is turned on, it will automatically start initialization procedure of its gyro sensor by reading the reference point. So, do not move the aircraft until the LED monitor starts to light continuously after quick blinking.

~~• Please note that initialization won't be carried out properly and the LED monitor won't stop blinking if G190 is used under considerable vibration.~~

Rudder servo direction

6 Try moving the rudder stick to the left and right, and check the direction of operation of the rudder servo. If the rudder servo moves in the opposite direction, use the transmitter reverse function to reverse it.

Gyro operation direction

7 If the rudder servo moves to the left when the nose of the helicopter turned to the right, the gyro direction is correct. If the servo moves in the opposite direction, reverse the gyro upside down.

* If you try to fly the helicopter while the gyro operation direction is wrong, the nose will swing to the right or left.

8 Firmly fix the gyro after the gyro operation direction is determined.

Flying Adjustment

9 Lift off and hover, then adjust the rudder neutral position with the transmitter trim lever.

*For large deviation, use the fuselage linkage to adjust the rudder neutral position.

10 Adjust the gyro sensitivity to just before the helicopter tail starts to hunt.

*When hunting occurs, set to a lower value.

*Adjust the sensitivity gradually while checking for hunting.

<**Servo Horn**>: The gyro sensitivity also changes with the length of the servo horn. If the sensitivity is too low, lengthen the servo horn. Conversely, when hunting does not stop, shorten the servo horn.

<**Mixing**>: Where necessary, use the transmitter's revolution mixing (pitch to rudder mixing).

Caution: Please note that the aircraft may become unstable in its behavior and blunt in responding to the gyro signal when the driving battery is low.

Precautions

CAUTION Mounting Precautions

! Always use the attached sensor tape to mount the G190.

*The purposes are not only to fix the gyro firmly to the fuselage but also to prevent unnecessary vibrations of the fuselage from traveling directly to the gyro.

! When mounting the G190, leave a small margin so that the gyro connection cable is not stretched tight.

*If the cable is stretched tight, the gyro will not display top performance. If the gyro is dislodged, the gyro may malfunction and is very dangerous.

! Mount the G190 and receiver as far away as possible from the drive motor and ESC.

*The drive motor and ESC generate strong electromagnetic noise. This noise may interfere with the gyro/receiver and cause erroneous operation.

! Insert the connectors fully and firmly.

*If vibration, etc. causes a connector to work loose during flight, the heli may crash.

! Always check the direction of operation of the servos.

*If you attempt to fly the model when a servo operates in the wrong direction, the fuselage will spin in a fixed direction.

Operating Precautions

⊘ When turning on the power, do not move the fuselage until the LED monitor starts to light continuously after quick blinking.

*It will automatically start initialization procedure of the gyro sensor.

⊘ Avoid sudden temperature changes.

*Sudden temperature changes will cause the G190's reference point to change. For example, in the winter, do not fly immediately after removing the model from inside a heated car and in the summer, do not fly immediately after removing the model from inside an air conditioned car. Allow the model to stand for about 10 minutes and turn on the power after the temperature inside the gyro has stabilized. Also, if the gyro is exposed to direct sunlight, the temperature may change suddenly. Take suitable measures so that the gyro is not exposed to direct sunlight.

Fuselage Maintenance Precautions

! Always perform proper maintenance for ultimate performance.

*Make the fuselage vibration as small as possible. Fuselage vibration has an adverse affect on gyro operation.

⊘ Do not drop or apply any strong shocks to G190.

*G190 contains precision parts in its inside such as a gyro sensor. A strong shock may lead to the failure of the G190.

Repair Service

Before requesting repair, read this instruction manual again and recheck your system. Should the problem continue, request repair service as follows:

Describe the problem in as much detail as possible and send it with a detailed packing list together with the parts that require service.

- Symptom (Including when the problem occurred)
- System (Transmitter, Receiver, Servo's and model numbers)
- Model (Model name)
- Model Numbers and Quantity
- Your Name, Address, and Telephone Number.

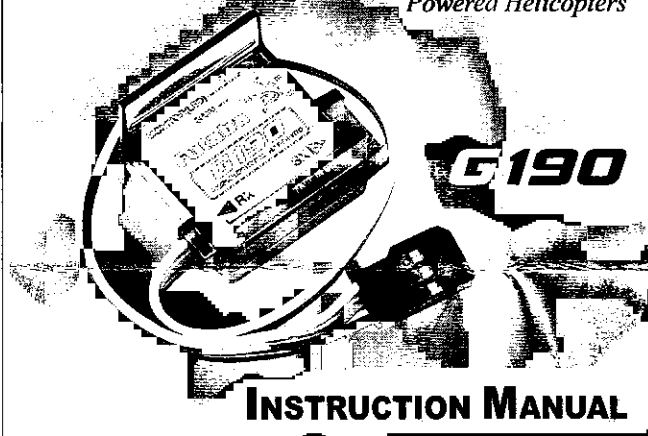
If you have any questions regarding this product, please consult your local hobby dealer or contact the Futaba Service Center.

Futaba

*Rate Gyro for Small Electric
Powered Helicopters*

*Before using your new gyro,
please read this manual thor-
oughly and use the gyro prop-
erly and safely. After reading
this manual, store it in a safe
place.*

- No part of this manual may be reproduced in any form without prior permission.
- The contents of this manual are subject to change without prior notice.
- This manual has been carefully written. Please write to Futaba if you feel that any corrections or clarifications should be made.



Thank you for purchasing a G190 gyro, a rate gyro for small electric powered helicopters. G190 is a small and light-weight gyro with high-performance, employing small size piezoelectric sensor of little temperature drift. In addition, the G190 unit is well deigned as any side of its case can be used for easy and stable mounting.

Features of G190

• Small piezoelectric sensor

G190, utilizing a small piezoelectric sensor of little temperature drift, has achieved a very stable performance.

• Small, light-weight and all-in-one

Our high-density assembly technology has made it possible for G190 to become very small (22.2x22.8x8.9mm, excluding protrusions) and light-weight (6.7g).

• Newly designed case capable of using any side of the case for mounting

The newly designed case, any side of which can be used for mounting, is very small and highly flexible for being correctly positioned and correctly oriented on the limited space of a small-size electric powered helicopter. Consequently G190 can maximize its gyro performance.


• Applicable to the micro servo S3108




Combination of G190 and S3108 micro servo would further reduce the total weight.

Special Markings;

Pay special attention to the safety at the parts of this manual that are indicated by the following marks.

Symbol:  ; Prohibited

 ; Mandatory

Mark	Meaning
 DANGER	Procedures which may lead to a dangerous condition and cause death or serious injury to the user 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.