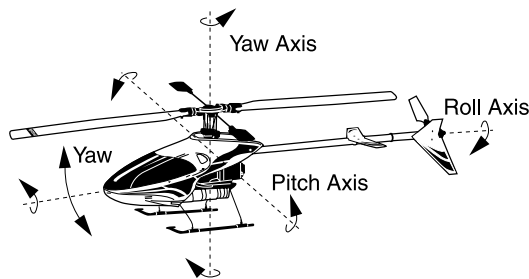


# Heli-Max™

PERFORMANCE PARTS

## MICRO PIEZO GYRO INSTRUCTIONS

Congratulations and thank you for purchasing the Heli-Max™ Micro Piezo Gyro for R/C helicopters. A gyro stabilizes the tail rotor control on your model helicopter. Of all the controls on a model helicopter, the tail rotor is the most difficult to master. In fact, flying an R/C helicopter without a gyro is nearly impossible, or extremely difficult at best. Even an expert wouldn't be caught without a gyro and a beginner would probably never get off the ground without one. Someday you may wish to find out just how difficult it is to fly a model helicopter without a gyro—just turn off your gyro and try to establish a hover—you'll see! Don't try this until you have mastered hovering!



You may have heard the term *single axis* when speaking of gyros. Your Micro Piezo Gyro is a single axis gyro (as are all gyros intended for R/C use). This means that it can be used to control only one axis. The three axes of flight are roll (the axis about which a model banks as it turns), pitch (simply stated, the axis about which a model tilts downward or upward), and yaw (the axis about which a model changes its heading). The Micro Piezo Gyro can be used to stabilize any of the three axes, but for your helicopter, you'll want to use it for the yaw axis.

Traditionally, model helicopter gyro devices have been operated by an actual gyroscope—a spinning flywheel driven by a small electric motor. This is old technology. You've probably seen a mechanical gyro on one of those educational television programs showing the development of rockets for early space flight! Your Micro Piezo Gyro uses the latest technology with a piezo-electric crystal. A piezo-electric gyro has no moving parts, is much more compact, lighter, more durable, and uses much less battery power than a mechanical gyro. Further, a piezo-electric gyro offers faster response time and more accurate control than a mechanical gyro.

The way a gyro works is by sensing motion about the axis which it controls (the yaw axis for your helicopter), and sending a signal to your servo instructing it to *steer* the tail in the opposite direction, thus preventing unwanted rotation of the tail. The end result is a much more stable tail and a helicopter that is easier to control! This gyro does not, however, return the model to its starting position. Don't worry, the gyro *knows* the difference between this unwanted rotation and your control inputs—you're still the one in control!

*Follow these instructions so your gyro will operate correctly.*

### PRECAUTIONS

Before you mount your gyro, keep these things in mind.



❑ 1. You can mount the gyro anywhere on your helicopter as long as its **rotation axis** (noted on the label on your gyro) is lined up with whatever

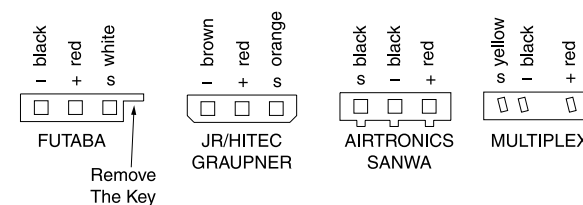
axis you wish to control. In the case of your helicopter, this is the yaw axis.

❑ 2. Although your piezo gyro is mounted in a protective case, as with any electronic device, you must protect it from vibration or shock. Mount your gyro in a **strategic location** where it is not likely to hit the ground or be hit by parts of your helicopter that may break away in a crash (such as the battery pack). Most helicopters have a location intended for mounting the gyro. Use at least one layer of 1/8" (3mm) double-sided foam tape to mount your gyro and make certain none of the surfaces of the gyro contacts any part of the helicopter. Clean the mounting surfaces with alcohol so your gyro will remain secure. Some modelers prefer to cover the gyro with foam or other protective material to provide extra crash protection. We recommend this also.

❑ 3. You may use a servo extension cord if the cord on your gyro is not long enough to reach your receiver.

❑ 4. Piezo crystals are sensitive to temperature changes. It is important that you mount your gyro in a ventilated area to avoid excess heat buildup during operation. Avoid mounting your gyro close to the engine or muffler, or locations on your helicopter that do not provide any air flow.

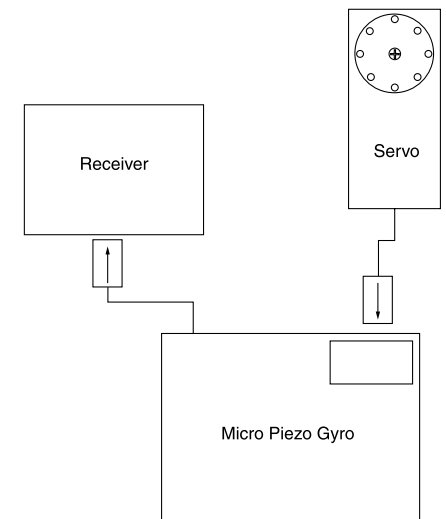
### CONNECT YOUR GYRO



❑ 1. Your Micro Piezo Gyro comes with a Futaba® brand "J" style connector that plugs into your receiver. If you own a Futaba radio control system proceed to step 3. If you own another brand of radio with a different type of connector, you may

have to modify the connector on the gyro to match your radio, and the connector on your servo that plugs into the gyro. Usually, all that is required is to carefully shave the *key* from the gyro connector so it will fit into your receiver and rearrange the wires so the polarities match your radio system. In some cases, you may have to cut your servo cord and the cord on the gyro, then solder on Futaba J-connectors.

❑ 2. If you've modified your connectors, **make certain** the wiring order on your servo connector and the gyro connector is the same as the wiring order on the Futaba connector. Study the diagram. The positive (+) wire is in the center, the negative (-) wire is on the side **opposite** of the *key* on the connector, and signal (s) is on the side of the connector nearest the *key*. **WARNING!** Failure to match polarities on any connector may damage your gyro and will void your warranty.



❑ 3. Plug the connector coming from the gyro into the channel in your receiver you intend the gyro to assist (in the case of your helicopter, the rudder/tail rotor channel).

❑ 4. Make sure the wiring order on your tail rotor servo is correct. Connect your tail rotor servo to the slot on the gyro marked *servo*.

## DETERMINE THE CONTROL DIRECTION

❑ 1. Turn on your transmitter and receiver. Give your tail rotor **left** input from the control stick on your transmitter. Note which way the arm on your tail rotor servo responds.

❑ 2. Holding the gyro in your hand, quickly turn it to the **right** about its rotation axis (clockwise). The tail rotor should respond in the same direction it did when you gave it **left** input from your transmitter (now you can understand that the tail rotor servo will give left input when the gyro moves to the right, and vice versa). If your servo responded with a right control input when you rotated the gyro to the right, your gyro is working in **reverse** so you must flip it upside down. Try again. Now your servo should give a left response when you move the gyro to the right. All you have to do is mount your gyro upside down in your helicopter!

## MOUNT YOUR GYRO

❑ 1. Mount your gyro using the double-sided foam tape included. Make sure it is secure by gently tugging on it. If your gyro comes loose while you are flying, you will notice erratic tail operation. Land immediately and turn off the engine.

❑ 2. Confirm that you have mounted your gyro in the correct orientation. Turn on your transmitter and receiver. Quickly rotate the nose of your helicopter to the right and observe the direction that the tail rotor servo responds. The tail rotor servo arm should rotate in a direction that will provide **left** tail rotor input when you rotate the nose of your helicopter to the **right**. If it does not, you have mounted your gyro upside down. Remove your gyro, flip it upside down, and remount it.

## CENTER YOUR SERVO

❑ 1. Temporarily disconnect the gyro from your helicopter and connect the tail rotor servo to your receiver. If your helicopter has not already been

flown and you have not already done so, center the tail rotor trim on your transmitter. Mount your tail rotor servo arm on your tail rotor servo so it is centered. Adjust the tail rotor control rod so the tail rotor blades have the correct amount of pitch as described in your helicopter instruction manual. Set the ATV's on your transmitter or mount the tail rotor control rod to your tail rotor servo arm so you will get full control throw when you move your transmitter control stick all the way to the right and all the way to the left. **Hint:** For the best servo resolution (smoothness), connect your tail rotor control rod to the servo arm where you can get as close as possible to 100% ATV. Reconnect your gyro to the receiver.

❑ 2. Reconnect your gyro to your receiver and your tail rotor servo to the gyro. Use a small phillips screwdriver to temporarily set the **+gain-dial** inside the gyro to approximately 50% (we'll explain this function in the next section). The gain control dial has a total range of a little less than 270°, so turn the dial all the way to the right (clockwise-no gain), then turn your screwdriver about 140° to the left (toward +gain). Do not force the dial past its stops.

❑ 3. Note the position of your tail rotor servo arm now that you have centered it. Turn on your transmitter and your receiver. Observe the tail rotor servo arm. If it rotates, use a small phillips screwdriver to adjust the **center dial** inside the gyro until your tail rotor servo arm returns to center. Now your tail rotor servo is once again centered. Later, if you choose to adjust the gain control on the gyro, you may have to readjust the center dial to keep your tail rotor servo centered.

## SET YOUR GYRO SENSITIVITY (GAIN)

The sensitivity, or *gain* control, determines how much effect your gyro will have on your tail rotor. The more sensitive you have set your gyro, the more stable your tail will be, but this may reduce aerobatic capability where tail rotor quickness is desired.

❑ 1. If you are a beginner and are not yet able to establish a hover, for now you'll just have to estimate the sensitivity required. 50% is a good starting point. You've already been instructed to set the +Gain- control dial to 50% so you're ready to go. Read the following instructions to know how to fine tune your gyro when you become more proficient at hovering.

❑ 2. Before you begin hovering, make sure your receiver and transmitter are turned off and let your helicopter sit outside for a few minutes. This will allow the gyro to become acclimated to the temperature and is necessary due to the temporary effect the temperature change can have on your gyro.

*If you are able to hover, perform the following exercises to fine tune your gyro sensitivity.*

❑ 3. Turn on your transmitter and receiver. Confirm the operation of your gyro. Start your engine and lift your helicopter into a hover. Give some tail input to test the tail response. If the tail responds faster than you prefer or is not stable, land your helicopter and **increase** the gain dial on the gyro. If the tail *hunts* or *wags* back and forth, or does not respond as quickly as you would like, land your helicopter and **reduce** the gain dial. Make adjustments in small increments. Lift your helicopter into a hover. Continue hovering and adjusting the gain control until your helicopter handles the way you prefer.

❑ 4. Now adjust your gyro for forward flight. The setting you achieved in a hover should work for general sport flying, but if you intend to perform fast forward flight and aerobatics, you may require a less sensitive gain setting. To test this, take the heli up and fly around. The same as in a hover, if the tail *wags* or bounces back and forth, the sensitivity is too high. You may have to compromise between your hovering requirements and forward flight requirements to achieve a gyro setting that is acceptable for both flight modes. Test and adjust your gyro for both hovering and forward flight until your helicopter handles the way you like.

❑ 5. As the temperature changes, the centering of your servo may shift (due to the gyro's temperature sensitivity). Use the Center control dial on your gyro to maintain servo centering as required.

## TECHNICAL SPECIFICATIONS

Power Supply: 3.3-7.0 volts DC  
Current Drain: approximately 35mA  
Weight: 0.49oz (14g)  
Dimensions: 1.1x1.1x0.6in (28x28x16mm)  
Temperature Range: 50° - 95° F (10° - 35° C)

## ONE YEAR WARRANTY STATEMENT \*USA and Canada Only

Heli-Max warrants this product from defects in materials and workmanship for a period of one year from the date of purchase. During that period, Heli-Max will, at its option, repair or replace without service charge any product deemed defective due to those causes. You will be required to provide proof of purchase (invoice or receipt). This warranty does not cover damage caused by abuse, misuse, alteration or accident. If there is damage stemming from these causes within the stated warranty period, Heli-Max will, at its option, repair or replace it for a service charge not greater than 50% of its then current retail list price. Be sure to include your daytime telephone number in case we need to contact you about your repair. This warranty gives you specific rights. You may have other rights, which vary from state to state.

For service on your Heli-Max product, warranty or non-warranty, send it post paid and insured to:

HOBBY SERVICES  
1610 Interstate Drive  
Champaign, IL 61822  
Attn: Service Department  
Phone: (217) 398-0007 9:00 A.M. - 5:00 P.M. Central Time M-F  
E-Mail: [hobbyservices@hobbico.com](mailto:hobbyservices@hobbico.com)

We can also be reached on the internet at:

[www.hobbies.net/helimax](http://www.hobbies.net/helimax)

\*For warranty and service information if purchased outside the USA or Canada, see the additional warranty information (if applicable) or ask your retailer for more information.

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