If you have any questions or concerns, our engineers are available just about 24/7 to guide you on all aspects of the Gyro-Gale Stabilizers. We are always more than happy to guide you over the phone, email, and visit your boat wherever it may be.

Factory: 2981 SE Dominica Terrace, Stuart, FL 34995
Mailing: P.O. Box 2650, Stuart, FL 34997
Info@GyroGaleStabilizers.com
www.GyroGaleStabilizers.com
Tel: (772) 283-1711

We are family owned and operated since 1976, our customers are our #1 priority.
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INTRODUCTION

A. The Pneumatic Stabilizer

Gyro-Gale Stabilizers stop the roll before it starts. The idea of using low air pressure to operate the stabilizer is very intriguing, yet quite simple. The response of air is significantly faster than the oil due to the viscosity effect. Air has negligible viscosity, so it flows faster within the system, allowing for pneumatic stabilizers to be effective much faster than hydraulic and gyro-wheel stabilizers. Gyro-Gale Stabilizers are effective within SECONDS of turning on the system, versus other systems that require 30-60 minutes to reach effectiveness. The pneumatic stabilizer is much simpler and more compact due to the non-existence of heavy high pressure lines, need for large equipment, excessive electric and electronic circuits. The compressibility of air, cushions the reaction of the stabilizing motion exerted on the yacht by the fins. Thus, producing a very pleasant and smooth ride. The safety factor of using low air pressure (100 psi) versus high pressure (1200 psi) and flammable hydraulic fluid is undeniable. Best of all, due to the low pressure, it is very rare that you would break a tube, but if you ever do, it's not oil. It's just plain, clean, dry air.

B. Principles of the GG System

The brain of Gyro-Gale Stabilizers is a gyroscope (gyro); one may choose from our air driven mechanical or electronic gyro lines. The stabilizing gyro spins continuously to activate and position two (or more) aero foil shaped stabilizing fins, which project from the sides of the vessel. When the boat rolls, one side of fins develops upward lift while the other side develops downward lift. The combination produces the required stabilizing torque, which counteracts the rolling force induced by the wave action.

Each stabilizing fin is operated by means of double acting pneumatic cylinders, one for pulling and one for pushing. The piston in each cylinder is mechanically coupled to a drive shoe which turns the stabilizing fin. No resetting mechanism is used. The required
fin angle for proper stabilization is obtained by balancing the hydrodynamic force generated by the fin against the pressure in the cylinder. This Gyro-Gale Stabilizers arrangement has the added advantage of allowing the fin to adjust its angle of attack according to the speed of the vessel.

Gyro-Gale Stabilizers are pneumatically operated and controlled, thus providing comfortable, smooth, quiet and reliable air cushioned stabilization. The stabilizer system comprises the latest advanced pneumatic equipment and devices. These components when interconnected, provide the simplest, yet most advanced and efficient stabilizing system.

C. Power

The amount of air required to operate the Gyro-Gale Stabilizers ranges from 16-34 cfm at 120 psi depending on the size of the vessel. The necessary pressure is obtained by the Gyro-Gale Stabilizer's modified compressors. The compressor may be motor driven, belt driven, or directly coupled to the main engine. For Gyro-Gale Stabilizers' Zero-Speed Stabilization, you may upgrade to an electric driven compressor to eliminate the need for running the engines at anchor. Gyro-Gale Stabilizers offers various types of compressors to suit the various installations.
DESCRIPTION OF GYRO-GALE

The Gyro-Gale Stabilizers system comprises of the following items:

- Air Tank
- Filter/regulator/lubricator unit
- Control unit
- Fins and driving mechanism
- Bridge control

A. Air Tank

The air tank acts as an expansion tank to control air supply from the compressor, in spite of fluctuating demand on the system. The tank is fitted with the following items:

- Drain cock
- ON/OFF remote valve
- Pressure gauge
- Air inlet fitting

B. Filter/Lubricator Unit

The unit consists of a micro-filter (0.02 micron) with automatic water ejector and a micro-fog oil lubricator. The lubricator injects oil in the stream of air in the form of a mist of microscopic oil droplets. This ensures that all internal parts and operating mechanism are adequately lubricated.

** Gyro-Gale Stabilizers uses basic mineral oil for lubrication that can be purchased from your local pharmacy/drug store.
C. Control Unit

The control unit senses the rolling motion of the vessel and converts it into a pneumatic power, which positions the fins at the right angles. The control unit comprises the following:

- Gyroscope (Mechanical or Electronic)
- Rotary valve
- Amplifiers
- Distribution block
- Gyro pressure control

1. Gyroscope

Gyro-Gale Stabilizers offers several Mechanical and Electronic Gyros to choose from.

    a. Mechanical Gyro

The Mechanical Gyro wheel rotates about a beam axis. Its supporting gimbal pivots about an upright axis and is centered by a pair of springs. A constant velocity air jet is applied to the serration in the rim of the gyro wheel, which causes it to rotate at a constant speed. Any movement of the vessel about the roll axis will cause a corresponding precession of the gyro.

    b. Electronic Gyro

Installed at the helm, the Electronic Gyro gives the owner or captain more control over the vessel than ever before. This gyro is highly sensitive to the slightest motions, and will automatically correct roll and list, and will trim the vessel.
2. Rotary Valve
The Rotary Valve is mechanically coupled to the gyro and converts the mechanical deflection of the gyro into a pneumatic signal equivalent to the magnitude of the deflection of the gyro. The rotary valve is constantly supplied with 100 psi air pressure. When the gyro is in its central position, the outputs from the rotary valve should be equal. As the gyro moves to either direction, the linkage transmits the movement to the rotary valve and causes its spindle to rotate. Thus, increasing the pressure output on one side and reducing the output on the other side.

3. Amplifiers
The Amplifiers allow a large amount of air, at the prescribed pressure dictated by the rotary valve, to pass through to the driving mechanism, thus, causing the fin to be activated. A pressure gauge is mounted on the amplifier to indicate the pressure going through.

4. Distribution Block
The purpose of the Distribution Block is to distribute the incoming air from the reservoir to the various parts of the control unit. It also distributes the output from the amplifiers to the fin’s driving mechanism.

5. Gyro Pressure Regulator
The Gyro Pressure Regulator controls the pressure of the air supply to the gyro wheel and is used to control the gyro’s rotation speed and consequently determines the sensitivity of the system.
D. Fins & Driving Mechanism

The Stabilizing Fins provide the torque necessary to oppose the sea waves tending to roll the vessel. The fins are deflected by pneumatic cylinders operated by the pressure from the amplifiers in the control unit. Each fin unit comprises the following parts:

- Fin
- Base
- Operating pneumatic cylinders

Gyro-Gale Stabilizers offers three types of fins:

- Cruiser-Fins
- Ultra-High-Speed Fins
- Tab-Fins

Our Fins are a symmetrical hydrofoil based on NASA design to minimize drag and stress on the hull. Gyro-Gale Stabilizers' fins are composed of an epoxy skin over a rigid stainless steel frame. The interior of the fin is filled with light weight closed cell foam which gives the fin a remarkable strength/weight ratio. Making our fins strong, yet light weight for increased buoyancy. The Cruiser-Fin and Ultra-High-Speed Fin are designed to incline up to 22.5 degrees in either direction.

Our Tab-Fin is made of the same quality with the addition of the stainless steel tab at the trailing edge of the fin. The Tab-Fin is designed to incline up to 22.5 degrees in either direction.

When the air pressure is applied to the pistons which deflect the fin, the fin deflects until the water forces acting on it are balanced by the piston forces. This arrangement of balancing the sea forces against the force that deflect the fin insures that the lift produced by the fin remains almost constant over a wide range of operational speeds. This means that it is not necessary with Gyro-Gale Stabilizers to provide a control to reduce fin angles at high speeds (self-adjustable variable incidence fin). Without fin angle/speed compensation the efficiency of the conventional stabilizers would be
considerably reduced at speeds below cruising speed and there would be a danger of overstressing the fin shaft at high speed. This is not the case with Gyro-Gale Stabilizers, our stabilizers designed for fin angle/speed compensation.

E. Bridge Control
This is simply an ON/OFF pneumatic switch together with two gauges to monitor the air pressure on the driving mechanism. When the switch is turned to the ON position, the remote valve mounted on the air tank would open to allow the air to flow through the control unit. The two gauges are connected in parallel to the gauges on the amplifiers of the control unit and therefore allow the user to monitor the pressure in the amplifiers from the helm or bridge.
POWER SUPPLY

Dry and clean air at a minimum rate of 16 cfm and 120 psi is required to operate the system. There are various types of compressors. Generally, an engine mounted compressor offers a more compact installation as compared to the belt driven arrangement. A compressor/motor combination which sometimes has to be used are available. Electric driven compressors may be used for zero-speed stabilization to eliminate the need for running the engines at anchor.

Generally, these compressors are directly mounted on the main engine(s) and are lubricated and water cooled from the engine systems. Some vessels are already equipped with one compressor to operate the windshield wiper or the air horn. In this case, an additional compressor is added to provide the necessary amount of air required to operate the stabilizer. A heat exchanger and an air dryer are used with the compressor to obtain the proper quality of air. The compressors have a free loading valve or pneumatic clutch, if there is no demand for air. Electrical clutches are also available.
INSTALLATION OF GYRO-GALE

A typical Gyro-Gale Stabilizers installation is very simple and normally takes about 4-7 days for the complete installation and sea trial. The following is the installation procedures of the complete system:

- Air tank
- Filter/Lubricator
- Control unit
- Fin unit
- Bridge control
- Compressor
- Heat exchanger
- Air dryer
- Inter connecting tubing end fittings

A. Air Tank Installation

The air tank is best installed over head. In this case, the tank is bolted to a wooden platform and the assembly is then installed over head, preferably in the engine room.

B. Filter/Lubricator Unit Installation

Install the Filter/Lubricator Unit on any vertical partition or bulkhead in the engine room. A clearance below the bottom of the unit must be at least 8in to allow disassembly. The unit should be located in an easily accessible position to check the mineral oil level and top it as required.
C. Control Unit Installation

Install the control unit, preferable as high as possible within the engine room, on a transverse bulkhead or partition so that the unit is facing either forward or aft. The position of the control unit should be selected as close as possible to the vessel center line so that the length of the tubing running to the fins are short and almost of equal length.

D. Electronic Gyro Installation

The Electronic Gyro’s Electronic Box must be mounted 100% horizontally and 100% vertically to ensure proper stabilization. The Electronic Box will come from the Gyro-Gale factory with a Mounting Board. Fasten the Mounting Board to the helm using 4 wood screws. While mounting the Electronic Box, be cautious that none of the wires are squeezed, cut, tugged or damaged what so ever. Once the Mounting Board is secured and wires are cleared inside the helm through panel board, install Bezel. Bezel will require 2 wood screws, one on each side. Pass these 2 wood screws through bezel, panel board and into mounting board. This will properly secure bezel and mounting board while sandwiching panel board.

E. Fins & Driving Mechanism Installation

The installation of the Fins and Driving Mechanisms requires that the vessel be hauled out. The following is a step by step for the complete installation of the Fins:

1. Locate convenient positions for the fins within the middle third of the water line. If you are using two or more fins on each side of the vessel, try to locate them as far as you can from one another so that the cavitation of one fin does not reach the other fin. This will depend on the speed of the vessel, and the length of the middle third of the water line.

2. Using a wooden template of the Inner plate, position the template against the outside of the hull at the desired location. The shaft of the fin should be almost perpendicular to the hull. The tip of the shaft at this position must be at least 2ft
within a vertical line from the widest point of the hull as well as the keel line. This arrangement insures that the fins will be protected when the vessel is being docked or hauled.

3. Using the template, drill holes 1/2in for the holding bolts (three) and the hole for the center shaft 2 1/8in diameter.

4. Assemble the outer plate on the hull. Note that the three holding bolts should be of the same length as these will be used to align the inner plate.

5. Assemble the inner plate and use the length of the holding bolts to insure that the inner and outer plates are parallel. Tighten the nuts or the holding bolts and be sure that the drive shoe is moving freely and without any binding.

6. Mark the excess length of the inner tube, (1 3/4in) above the drive shoe. Disassemble the unit and cut off the excess length.

7. Using a bedding compound (5200) on the inner and outer plates, repeat step #4 & #5. Also use the bedding compound around the holding bolts. Make sure the outer plate is completely sealed against the hull.

** The fins must be free to move easily by hand from one side to the other. Any tightness of the fin movement is due to misalignment and must be corrected before the vessel is back in the water.
F. Tab-Fin Installation

The Outer Plate must be fastened to the hull with 5200 bedding compound as well as three ½” holding bolts. Once the 5200 is cured, then the Tab-Fin is to be installed on the Outer Shaft.

Apply Anti-Seize lubricant (must meet MIL-SPEC-A907E) between all moving parts prior to installing fin on the shaft. Anti-Seize Lubricant must be applied as follows:
- Lubricate the outer rim of Hex Sleeves on all Lower and Upper Drives.
- Lubricate 2” at the top and bottom of Outer Tube.
- Lubricate inside the bushings of the fins and at the area where the fin seal will slide alone and will be embedded at 3” from Outer Plate.
- After installing Fin and installing Spacer and Snap Ring, lubricate inside of Outer Tube and Inner Tube where the O-Ring Seals are located.
- Lubricate the Tab Slot and Pivot Hinges.

G. Bridge Control Installation

The bridge control can be mounted at a point of preference on the bridge control panel. Drill 2 holes 2 1/8in for the gauges & 1in for center switch.

H. Compressor on Engine Installation

1. GM Engines
- Remove drive take-off cover from back of engine (propeller side).
- Insert drive plate and fasten with 4- SAE 3/8in - 1 1/2in long bolts
- Insert drive hub on compressor shaft and secure with locking nut.
- Insert drive coupling between engine and compressor.
- Assemble compressor on engine.
- Install the air cleaners (breather) on both compressors.
- Install the governor on either compressor.
2. 3208 Cat Engine

Use belt drive compressor which may be mounted:
- On top of the engine by relocating the engine’s heat exchanger.
- On side of engine attached to one of the forward engine support bracket (brackets are available by Gyro-Gale).

3. 3609 Cat Engine

- Power take off with compressor male spline inserted into engine’s female spline.

4. 120 & Ford Lehman Engine

- Belt driven from front engine’s pulley. A compressor bracket is generally mounted onto the engine forward support (bracket available by Gyro-Gale).
- At this stage the two compressors are mounted on the engines and ready to be connected to the rest of the system.

I. Heat Exchanger Installation

The heat exchangers are installed in line with the raw water system of the main engines. The heat exchangers should be installed as close as possible to the compressors to minimize the length of the hoses running between the compressors and the heat exchangers, thus, exposed to high temperature.

J. Air Dryer Installation

The air dryer is installed on any vertical partition or bulkhead. The drainage from the dryer (1” line) runs into the engine’s muffler or generator's muffler.
INTERCONNECTING TUBING & FITTING

A. Bridge Valve
- Use 1/4in polyurethane tubing from gauge to the distribution block of control unit (2 lines).
- Use 1/4in tubing valve inlet (in port) to air tank.
- Use 1/4in tubing from valve outlet (out port) to remote valve on tank.

B. Air Tank
- Use 1/2in polyurethane tubing from the remote control valve to the filter/lubricator inlet.
- Use 1/4in polyurethane tubing from the remote control valve to the bridge control (ON/OFF switch outlet).
- Use 1/4in polyurethane tubing from the air receiver to the bridge control (ON/OFF switch inlet).
- Use 1/4in polyurethane tubing from the air receiver to the governor on the compressor (port marked RES).

C. Filter/Lubricator Unit
- Use 1/2in polyurethane line from the unit outlet to the control unit inlet.
- Use 1/2in polyurethane line from the unit inlet to the air tank.
D. Control Unit
- Use 1/4in polyurethane tubing from the control unit to the gauges on the bridge control.
- Use 3/8in polyurethane tubing from the control unit to the fin unit. Use the color code on the driving mechanisms with red on forward slots.

E. Compressor
- Use flexible high temperature hose from compressor air discharge to the heat exchanger.
- Use 1/2in water heater hose from the compressor water cooling inlet to the raw water cooling on heat exchanger.
- Use 1/2in water heater hose from the compressor water cooling outlet (top port) to the raw water cooling system on the heat exchanger.
- Use 1/4in oil line hose from the compressor lubrication inlet to the engine lubrication system. This is mostly taken from the engine’s oil sensor block.
- Use 1/4in polyurethane tubing from the governor to:
  a. The second compressor (from port marked UNL).
  b. The air dryer (from port marked UNL).
  c. The air tank (from port marked RES). Leave port market EXH open.

F. Heat Exchanger
- Use 1/2" polyurethane tubing from the heat exchanger outlet to the air dryer.

G. Air Dryer
- Use 1/2" polyurethane tubing from the dryer to the air receiver.
START UP PROCEDURE

1. Before testing your system, make sure you have adequate air supply. Let the compressors run for 2-3 minutes before you switch the system ON. Adjust the mineral oil supply in the lubricator.

2. Adjust the filter/lubricator oil injection rate so that a drop of oil is hanging in the sight dome (not dripping). The amount of oil infected is controlled through the screw behind the sight dome. Proper adjustment is about 1/2 turn open.

3. Gently move the gyro cage back and forth on 4 seconds interval and notice the following: one gauge goes up to at least 80 psi while the other gauge drops to zero instantly. As you reverse the movement of the gyro cage, the gauges will also reverse their readings. That is the gauge which reads 80 psi will drop instantly to zero and the other gauge will go up to 80 psi.

4. When the front of the gyro is moved to port side, the port fin will go up and the starboard fin will go down. When you reverse the movement of the gyro, the fins will reverse their actions. If the fins do not follow this sequence, it means that the green and red tubing are reversed at the control unit.

5. When you release the gyro, the pressure on both gauges will be approximately the same (within 5 psi) and the fins will be free and may be easily moved by hand.

**Gyro-Gale Stabilizers’ usual start up time is only 15 seconds.**
STARTUP OF ELECTRONIC GYRO

1. Startup STBD engine, allow up to 1 minute for pressure to build up in tank and one purge cycle occurs.

2. Make sure Electronic Gyro is plugged into socket. Turn on Electronic Gyro by pressing the black button on the right side of the electronic gyro box.

3. Once on bridge switch on the stabilizers.

4. Check to make sure the pressure is up and fairly equal.

5. Enjoy your trip!

SHUT DOWN OF ELECTRONIC GYRO

1. Turn off STBD engine.

2. Leave stabilizers running, to allow the pressure in the tank to go to ZERO.

3. Turn off Electronic Gyro via the black button.

4. Switch off stabilizers.

5. Enjoy your Stay!
OPERATING ELECTRONIC GYRO – ROLL

A. Sensitivity
- As the sensitivity of the gyro increases the greater the angle the fin will make. It calm waters the sensitivity should be low and as seas are rougher the sensitivity should be increased. While the vessel is anchored or traveling at very low speeds the sensitivity should be turned up to allow the fins to make a large motion to control the vessel. In summary, the faster the vessel goes the less angle the fins need to make. The slower the vessel traveling the larger the angle should be.

B. Pressure
- The pressure knob should only be used to centralize both port and starboard pressure gauges.

C. List
- The list knob is used to correct any listing of the vessel, what this does is allow the controls the hold the fins to a given position to stop the vessel from listing. The higher the value the large the angle the fins will make and hold to correct list.
TESTING PROCEDURE

1. Reverse the red and green tubing at the control unit.

2. Put the vessel at cruising speed, turn the stabilizers ON and allow 30 seconds for the gyro to pick up its speed. Gently move the gyro to one side then release it quickly. The vessel will roll approximately 20 degrees, the vessel should roll back and forth on its own. If the vessel does not maintain the roll, increase the sensitivity of the system (by increasing the gyro speed) through the pressure inserted on the rotor in an increment of one psi at a time. Repeat the roll test until you maintain a steady roll.

3. When the roll test is completed, reverse the green and red tubing at the control unit to normal position.

4. The switch on the bridge control panel is the only control necessary to operate the stabilizer. Whatever the weather, sea condition, or speed of the vessel.

**It is recommended to have a Gyro-Gale Engineer during sea trial.**
A. Stabilizer Maintenance

Maintenance of the Gyro-Gale Stabilizers consists entirely of insuring that clean dry air reaches the control unit. The air tank has a drain cock to drain the condensate water in the tank. In addition the filter/lubricator unit has an automatic water separator followed by a lubricator which injects a fine mist of oil in the stream of air to insure adequate lubrication of all components of the system. Thus, the system requires minimum maintenance, nevertheless the following are some steps to insure perfect performance:

1. Check the oil level in the lubricator unit and top as required with light weight mineral oil (approximately every 400 hours of stabilizer operation).

2. Adjust springs tension in control unit to equalize the pressure readings on the top two gauges (the pressure going through amplifiers) when the gyro is in the central position. Adjustment should be carried out only if the pressure differential exceeds 10 psi. The control unit is the brain of the system. If the unit appears to be malfunctioning, please remove from bulkhead and send back to the factory for tuning at no cost to you. Do not attempt to repair or adjust the control unit beyond this step.

3. Check for free movement of fins by rotating the hex shaft back and forth.
B. Replacement of Complete Filter Package

Once every 12-24 months the following filters must be replaced, please call Gyro-Gale to re-order the “Complete Filter Package”:

- Dryer cartridge & filter
- Breather on compressor
- Micro-Filter
- Muffler on control unit

C. Replacement of Fin Seal Kit

Once every 5-8 years, the following fin seals must be replaced, please call Gyro-Gale to re-order the “Fin Seal Kit”:

- Upper Seal (2)
- Lower Seal (2)
- Fin Seal (1)

D. Every 30 Days

- Drain the air tank.
- Check mineral oil level lubricator.

** Failure to change your Filter Package will result in contamination of the gyroscope (brain of the system), and ultimately contamination of the system. Gyro-Gale Stabilizers run on nothing but clean air. Keep that air clean. **
A. Complete System
B. Inter-Connecting the System
C. Air Supply Tubing
D. Air Supply Tubing w/ Electric Driven Compressor

** Use Electric Driven Compressor for Zero-Speed Stabilization without the need to run the engines.
E. Double Bridge Connection
F. Electronic Gyro – Roll
G. Fin Assembly
H. Outer Assembly
I. Tab-Fin Outer Assembly
J. Inner Assembly
K. Dryer

**Specifications**

- Length - 18.25 in.
- Max. Width - 7.49 in.
- Weight - 23 lbs.
- Relief Valve - 150 psi
- Primary Material - Aluminum
- Drying Method - Convection-Coalescence-Desiccant
- Max. Operating Pressure - 250 psi
- Burst Rating - 500 psi
- Port Adjustment - 360°
- Mounting - Adjustable Clamps Service
  Requirement – When necessary, once a year minimum
- Capacity - 36 Cu. ft/min
- Inlet Port – 1/2in NPT
- Outlet Port - 1/2in NPT
- Governor Port - 1/2in NPT Purge Port – 1in hose
- Mounting position - horizontally (within 7°) or vertically
L. Micro-Filter with Drain
M. Lubricator
N. Regulator on Control Unit
TUBING COLOR CODES

1/2in Black – Air Supply Circuit
- From Heat Exchanger(s) to Air Dryer.
- From Air Dryer to Air Tank.
- From Air Tank Actuator to Filter/Lubricator.
- From Lubricator to Control Unit.

3/8in Red – Controlled Air Delivery to Fin Actuators
- From forward side of the Control Unit Distribution Block to Inner Plate Assemblies. (Color Coded)

3/8in Green – Controlled Air Delivery to Fin Actuators
- From Aft side of the Control Unit Distribution Block to Inner Plate Assemblies. (Color Coded)

1/4in Red – Air Delivery to Bridge Switch
- From Tank Tee to (IN) on Bridge Switch Only.
- From Tank Tee to (RES) on Compressor Governor.

1/4in Blue – Air Signal Return from Bridge Switch
- From Bridge Switch (OUT) to Actuator on Tank.

1/4in Black – Controlled Air Signal to Bridge Gauge
- Forward side of Distribution Block on Control Unit to Stb. Gauge in Bridge Panel.
- Dual Bridge Switches – Connector between Switches.
1/4in Green – Controlled Air Signal to Bridge Gauge and Signal to Compressor Governor
- Aft side of Distribution Block on Control Panel to Port Gauge in Bridge Panel.

1/4in Yellow – Governor Control Circuit
- Signal Compressor installation – from (UNL) on Governor to Purge Valve Fitting on the bottom of the Air Dryer.
- Dual Compressor Installation – from single fitting on Compressor #2 to (UNL) fitting on Governor on Compressor #1 from (UNL) fitting on Governor to Purge Valve fitting on the bottom of the Air Dryer.
- Dual Bridge Switches – Connector between Switches.

1/4in Brown
- Dual Bridge Switches – Connector between Switches.
## MAINTENANCE LOG

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The World’s Most Intelligent Stabilizers

Factory: 2981 SE Dominica Terrace, Stuart, FL 34995
Mailing: P.O. Box 2650, Stuart, FL 34997
Info@GyroGaleStabilizers.com
www.GyroGaleStabilizers.com
Tel: (772) 283-1711