

# CAST IRON SELF-PRIMING CENTRIFUGAL PUMPS

## INSTRUCTION MANUAL

2" M222 WET SEAL SERIES  
3" M332 WET SEAL SERIES



# OVERVIEW

Read these instructions and the instructions covering operation of the pump drive unit.

The gas engine (if so equipped) is shipped with no oil. Consult your owners manual for specific oil recommendations, maintenance procedures, schedules, and troubleshooting. The maximum angle of operation for gas engine drive units is 25° in all directions. For engine warranty service contact your local engine dealer.

Make certain that all hose and pipe connections are airtight. An air leak in the suction line may prevent priming and will reduce the performance of the pump.

Do not restrict the pump inlet. High volume pumps such as the Banjo 222 Series pumps should not have the inlet port or line restricted. If the pump is equipped from the factory with a 2" inlet flange, the pump should be plumbed with a 2" inlet line. If the pump is equipped from the factory with a 3" inlet flange, the pump should be plumbed with a 3" inlet line. Failure to follow these instructions can result in pump cavitation and pump failure.

Always place the pump as close to the liquid to be pumped as possible. Keep the suction line short and with few bends. Keep the pump and engine on a level foundation. A poor foundation and a heavy suction hose (made heavier when "primed" full of liquid) could result in a pump "down the hole". It is not necessary to drain the pump body after use, unless there is a danger of freezing.

There are no points on the pump that need lubrication. The pump seal is cooled and lubricated by the fluid being pumped. When pumping dirty water or liquids containing solids, always use a basket strainer on the end of the suction line.

Engine warranty service available at authorized Honda® & Briggs and Stratton® Dealers.

\*Note: Do NOT operate pump without the supplied EPA approved fuel tank and lines.

## WARNINGS



### OPERATION WARNING

Do not operate the gas engine (if so equipped) until you have put oil in the engine. Do not run the pump dry. Serious damage to the mechanical seal or complete failure of the mechanical seal can result from running the pump dry. Always fill the pump with water or the liquid being pumped before starting the drive unit.



### WARNING! DO NOT USE WITH FLAMMABLE LIQUIDS.

Do not use flammable liquids. This pump is not designed or produced to pump flammable liquids of any kind. Failure to follow this warning can result in explosion, serious bodily injury or death.



### STORAGE WARNING

There are important instructions regarding the preparation of the engine for long periods without use (reference the engine owners manual). Before long periods of storage, the pump should be flushed with clean water and drained. Leave all plugs (fill and drain) out of the pump. Always store the pump in a heated and dry building.

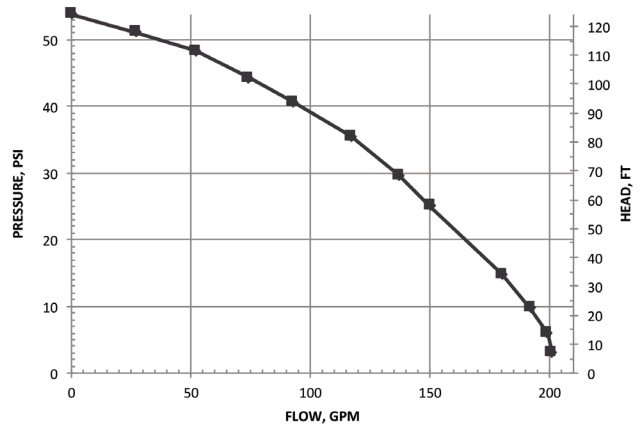
# PERFORMANCE

## 2" CAST IRON PUMPS

### Port Size

Suction..... 2" NPT

Discharge ..... 2" NPT



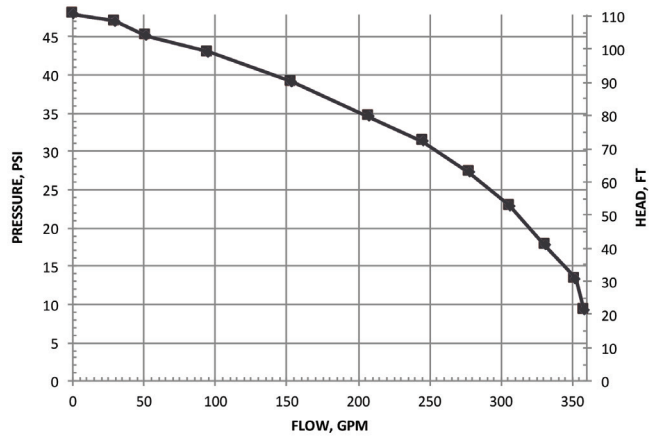
FLOW CHART FOR M222

## 3" CAST IRON PUMPS

### Port Size

Suction..... 3" NPT

Discharge ..... 3" NPT

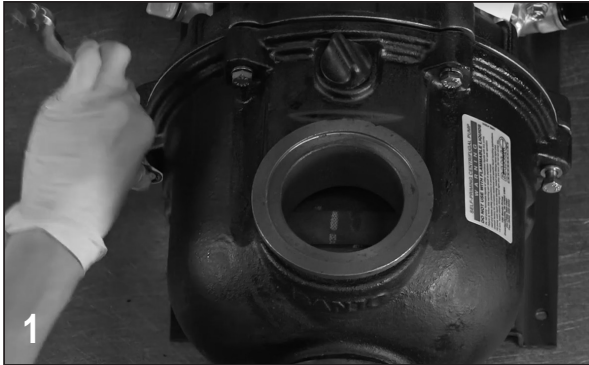


FLOW CHART FOR M332

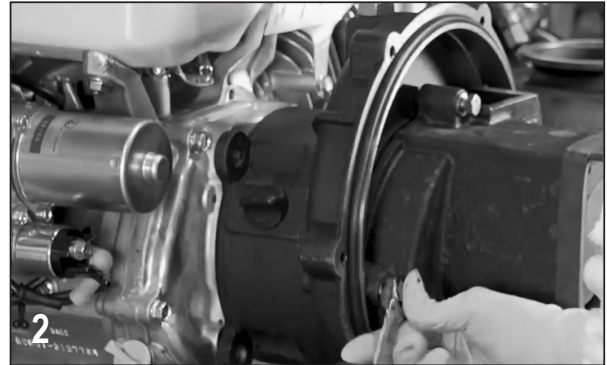
# DISASSEMBLY INSTRUCTIONS:

**NOTE:**

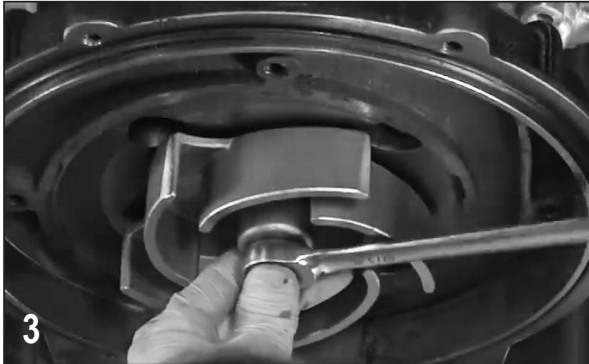
If bracket shims have been installed from the factory, the same number of shims will need to be reinstalled



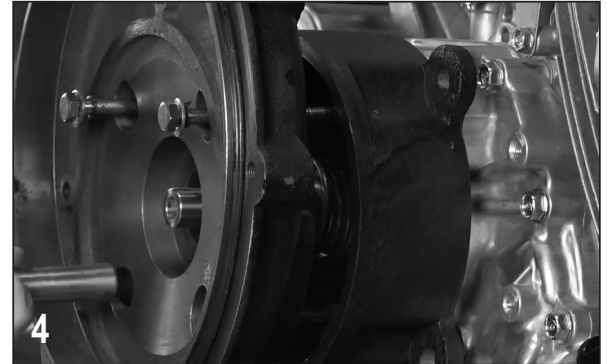
1  
Remove the six (6) body bolts that hold the pump body assembly onto the rear bracket. Remove the body from the remaining pump assembly.



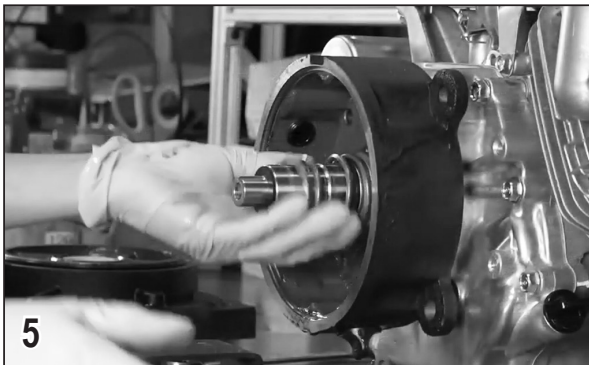
2  
Remove the three (3) bolts holding the volute to the rear bracket. Remove the volute from the remaining pump assembly.



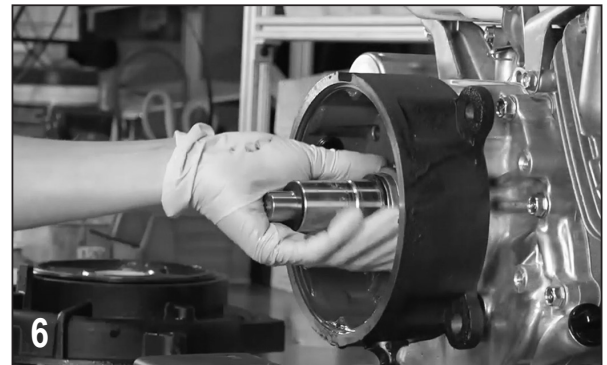
3  
Remove the impeller bolt from the impeller. Remove the impeller and the key from the key way.



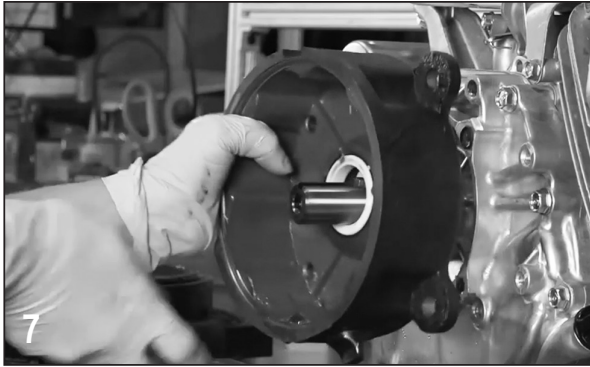
4  
Remove the four (4) rear bracket bolts and lock washers that hold the rear bracket to the drive unit. With the 4 bolts removed, the rear bracket can be removed from the drive unit.



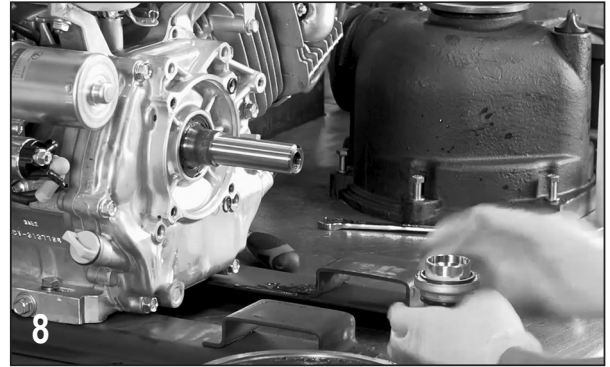
5  
Remove the seals and spring.



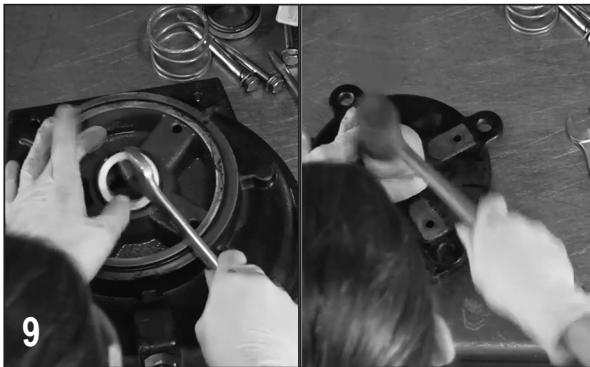
6  
Remove the shaft.



Remove the reservoir.



Remove the seals from the shaft. This may require additional lubrication. Once these seals are removed, replace the shaft.

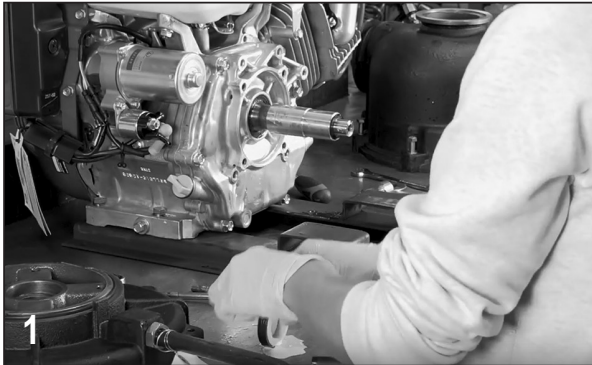


Remove the ceramic seals from the rear bracket and reservoir. A flat uniform object and rubber mallet can be used to remove the ceramic seal. Use caution when applying pressure as the ceramic seals are fragile and may crack.

# ASSEMBLY INSTRUCTIONS:

## TOOLS REQUIRED:

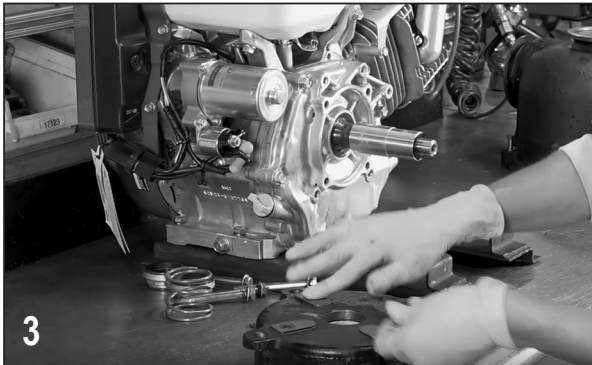
9/16" Box End Wrench, 9/16", 13/16" & 5/8" Socket, Ratchet with 3" Extension, Gasket Scraper or Wire Brush, Locktite 242 and Locktite Gasket Adhesive #2 P80 lubricant



1 Clean the new seals thoroughly and lubricate with P80 lubricant.



2 Install the ceramic seal into the rear bracket and reservoir. . A flat uniform object and rubber mallet can be used to install the ceramic seal. Use caution when applying pressure as the ceramic seals are fragile and may crack.



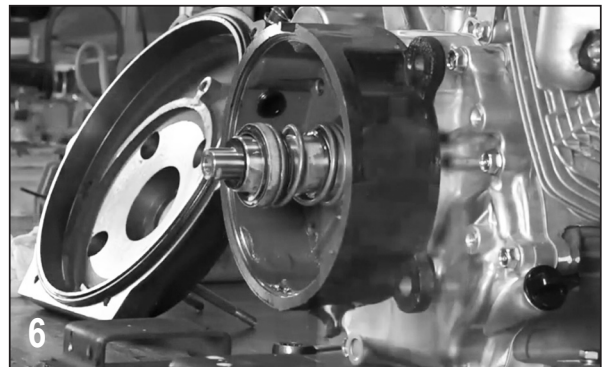
3 Remove and replace the old reservoir seals with new.



4 Replace the reservoir.

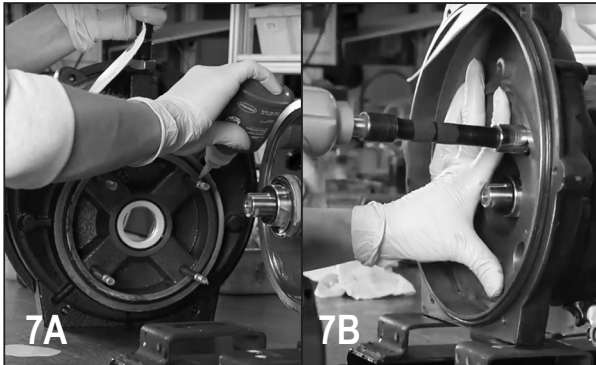


5 Clean the rear bracket bolts, making sure they are free from damage. Replace the rear bracket bolt o-rings with new.



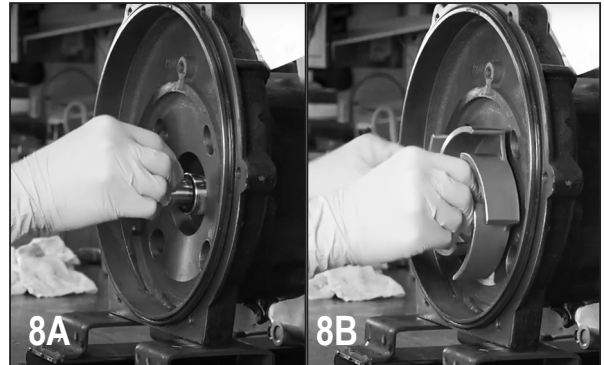
6 Replace the clean and lubricated spring and seals on the shaft.

# ASSEMBLY INSTRUCTIONS:



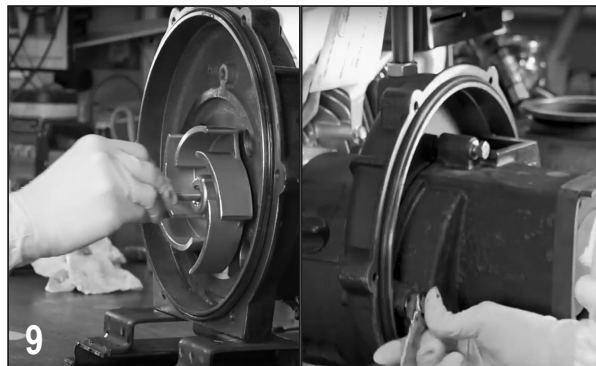
**7A** Apply Locktite to the rear bracket bolts. Replace the rear bracket and rear bracket bolts.

**7B** Tighten rear bracket bolts.

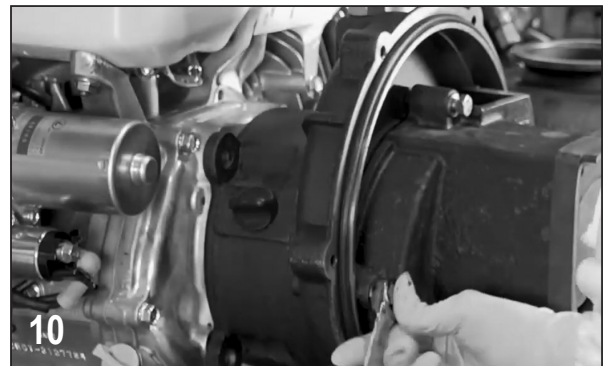


**8A** Place key into key way shaft.

**8B** Replace the impeller.



Apply Locktite to the impeller bolt and install in impeller. Tighten the impeller bolt only until the o-ring is flat.



Replace the volute and tighten the three volute bolts until the lock washers lay flat.



Ensure that the rear bracket o-ring is clean and free from damage.



Replace the pump body and tighten the six pump body bolts evenly. Tighten until the lock washers are flat.

Refill the reservoir with antifreeze. Make sure to fill above the spring.

# TROUBLESHOOTING GUIDE:

## 1. GAS ENGINE WILL NOT START.

- a. Verify that there is no external damage to the engine.
- b. Verify that engine has the manufacturer's recommended amount and grade of oil in the engine.
- c. Verify that the engine gas tank has been filled with a minimum of 87 octane unleaded gasoline. Verify that the gasoline is fresh and clean.
- d. Verify that the spark plug wires are properly connected to the spark plugs.
- e. Verify that the battery cables are tight and properly connected to both the battery and engine.
- f. Verify that the battery is fully charged and in good condition.
- g. Review starting procedures and/or trouble-shooting guide in engine owners manual.
- h. Contact the engine manufacturer for warranty assistance and repair information.

**Honda®:** 800-426-7701 | [www.honda.com](http://www.honda.com)

**Briggs and Stratton®:** 414-259-5262 | [www.briggsandstratton.com](http://www.briggsandstratton.com)

## 2. PUMP WILL NOT PRIME.

- a. Verify that the pump is filled with fluid prior to start up via the fill hole located on the top of the pump.
- b. Verify that the fluid is not being lifted more than 15 vertical feet.
- c. Verify that there are no kinks in the suction line.
- d. Verify that the pump inlet or suction line is not clogged.
- e. Verify that the suction line does not have any vacuum leaks at any of the connections.
- f. Verify that the pump is operating at a minimum of 3450 RPM for lifting and self-priming applications. Banjo pump will not prime while operating below 1750 RPM.
- g. Verify correct pump rotation if an electric motor or hydraulic motor is being used. A counter clockwise rotation (right hand rotation) is required from the motor.
- h. Verify that the impeller spacing is no more than 0.100".

## 3. PUMP LOOSES PRIME DURING OPERATION.

- a. See 2B above.
- b. See 2C above.
- c. Verify that the pump inlet or suction line is not clogged.
- d. Verify that the suction line does not have any vacuum leaks at any of the connections.
- e. Verify that the pump is operating at a minimum of 3450 RPM for lifting and self-priming applications. Banjo pump will not prime while operating below 1750 RPM.

## 4. ENGINE RUNS BUT PUMP DOES NOT TRANSFER LIQUID.

- a. Verify that the pump is operating at a minimum of 1750 RPM. Banjo pumps may not operate below this RPM.
- b. Verify correct pump rotation if an electric motor or hydraulic motor is being used. A counter clockwise rotation (right hand rotation) is required from the motor.
- c. Verify that the impeller spacing is no more than 0.100".
- d. Verify that the impeller is secured to the engine shaft with a shaft key. This verification can be done by turning the impeller (via the impeller bolt) on the pump by using a 5/8" socket attached to a 6" extension. If the impeller turns without spinning drive unit impeller, the shaft key is broken or missing. Replace shaft key.
- e. Verify that the customer does not have any kinks in the suction or discharge lines.
- f. Verify that the pump inlet, outlet, suction line or discharge line is not (partially) blocked.
- g. Verify all plumbing system valves are open.



**5. MOTOR RUNS BUT PUMP DOES NOT PERFORM ADEQUATELY.**

- a. Verify that the pump is operating at a minimum of 1750 RPM. Banjo pumps may not operate below this RPM.
- b. Verify correct pump rotation if an electric motor or hydraulic motor is being used. A counter clockwise rotation (right hand rotation) is required from the motor.
- c. Verify that the impeller spacing is no more than 0.100".
- d. Verify that the impeller is secured to the engine shaft with a shaft key. This verification can be done by turning the impeller (via the impeller bolt) on the pump by using a 5/8" socket attached to a 6" extension. If the impeller turns without spinning drive unit impeller, the shaft key is broken or missing. Replace shaft key.
- e. Verify that the customer does not have any kinks in the suction or discharge lines.
- f. Verify that the pump inlet, outlet, suction line or discharge line is not (partially) blocked.
- g. Verify all plumbing system valves are open.

**6. ENGINE BOGS DOWN DURING PUMP OPERATION / ELECTRIC MOTOR TRIPS CIRCUIT BREAKER DURING START UP OR OPERATION.**

- a. Verify that the customer does not have any kinks in the suction or discharge lines.
- b. Verify that the pump inlet, outlet, suction line or discharge line is not (partially) blocked.
- c. Verify that the impeller spacing is no less than .080". The impeller should not be touching the wear plate/volute.
- d. Verify the weight of fluid being transferred. Make sure that the drive unit is properly sized for the pump and its application.

**7. GRINDING, TICKING OR WHIRRING SOUND DURING PUMP OPERATION THAT IS UNUSUAL.**

- a. Verify that the impeller bolt has not loosened, letting the impeller pull itself into the volute. The impeller spacing should be no less than .080". The impeller should not be touching the wear plate/volute.
- b. Verify that outside diameter is not hitting the pump housing or volute. Slowly rotate the pump several times by hand. If you can feel the pump dragging on the housing or volute or hear a scraping sound, the impeller may be hitting the pump body or volute. The impeller can be removed from the pump and filed down or trimmed down slightly on a lathe.
- c. Remove the pump housing and inspect for internal debris such as rocks, sticks or other foreign material stuck inside of pump. With the pump housing and volute removed, you can then inspect the impeller face and outside diameter for signs of contact between the impeller and other pump components.

**8. PUMP/ENGINE RUNS TEMPORARILY, THEN STOPS. THE PUMP/ENGINE WILL NOT RESTART.**

- a. Verify that there is no external damage to the engine.
- b. Verify that engine has the manufacturer's recommended amount and grade of oil in the engine.
- c. Verify that the engine gas tank has been filled with a minimum of 87 octane unleaded gasoline. Verify that the gasoline is fresh and clean.
- d. Verify that the spark plug wires are properly connected to the spark plugs.
- e. Verify that the impeller bolt has not loosened, letting the impeller pull itself into the volute. The impeller spacing should be no less than .080". The impeller should not be touching the wear plate/volute.

Please see [banjocorp.com](http://banjocorp.com) for more information



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