SERVICE BULLETIN

SB #: F102

BRANDS: FERRIS®

DATE: JUNE 2009

TO: ALL AUTHORIZED FERRIS DEALERS

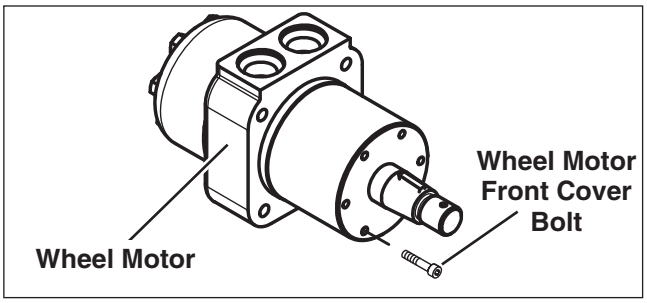
SUBJECT: FRONT COVER BOLT REPLACEMENT ON HYDRO-GEAR HGM-"P" SERIES WHEEL MOTORS USED ON EVOLUTION SERIES ZERO-TURN RIDING MOWERS.

MODELS: SEE LIST BELOW

Brand	Model Number	Serial Number Range	Description
Ferris	5900778, 5900854 & 5900779	2013447320 - 2013704369	Evolution Series Zero-Turn Riding Mowers

DESCRIPTION

This bulletin details a corrective procedure to make sure that all wheel motor front cover bolts are properly seated and correctly torqued. This will ensure that the wheel motor will not be subject to leakage.



INSPECTION

Some units were reworked prior to being shipped. If you have an affected unit (see serial number range above), please perform the inspection procedure detailed below before moving on to the corrective procedure.

1. Park the machine on a flat, level surface. Disengage the PTO, engage the parking brake and turn off the engine.
2. Inspect the wheel motor axle shaft tip. If the wheel motor axle shaft tip has a paint pen mark on it, no further action is required. **If the wheel motor axle shaft tip does not have a paint pen mark on it, continue with CORRECTIVE PROCEDURES.**

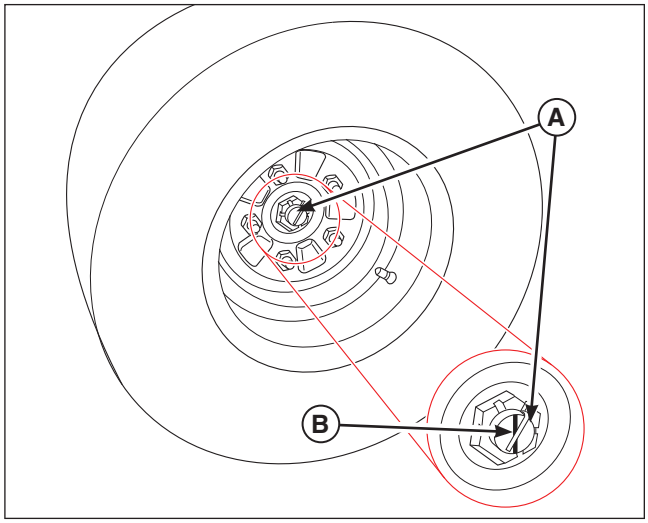


Figure 1. Inspecting the Wheel Motor Shaft Tip
A. Wheel Motor Axle Shaft
B. Paint Pen Mark

CORRECTIVE PROCEDURES

1. Observe the area around the wheel motor (the inside rim of the tire, the tire and the ground beneath the machine) for signs of oil leakage.

   • If there are no signs of oil leakage, order and install kit part number 5600350.

   • If there is obvious signs of oil leakage (oil puddles on the ground, oil coating the rim and tire, etc.) order and install a new wheel motor part number 5101583.

WARRANTY:

File for warranty reimbursement using e-Claim at www.ThePowerPortal.com. Use the values listed below when filling out the claim. The information in the "Brand" block indicates which tab the claim should be filed under. *Note: File only one unit per claim form.*

Brand	Ferris		
Failure Location Category	Hydraulic	**Cause of Failure**	F102
Failure Location Code	H65	**Work Performed**	F102
Defect Code/Failure Mode	PM	**Repair Parts Used**	5600350 (Bolt Kit)
Control/Evaluation Number	F102		5101583 (Wheel Motor)
Pick-Up & Delivery	N/A		
Total Hours (Tenths)	0.2 (Inspection Only) 2.0 (Inspection & Repair per machine) 2.0 (R&R one (1) wheel motor)		

BRIGGS & STRATTON POWER PRODUCTS GROUP, LLC
Distribution Sales & Customer Support

OEM Instruction Sheet

PRODUCTS AFFECTED: HGM-XXP-XXXX Wheel Motors	SUBJECT: Front cover bolt replacement.

DESCRIPTION: HGM-"P" series motors will require all front plate cap screws to be removed and replaced with new longer hex head bolts.

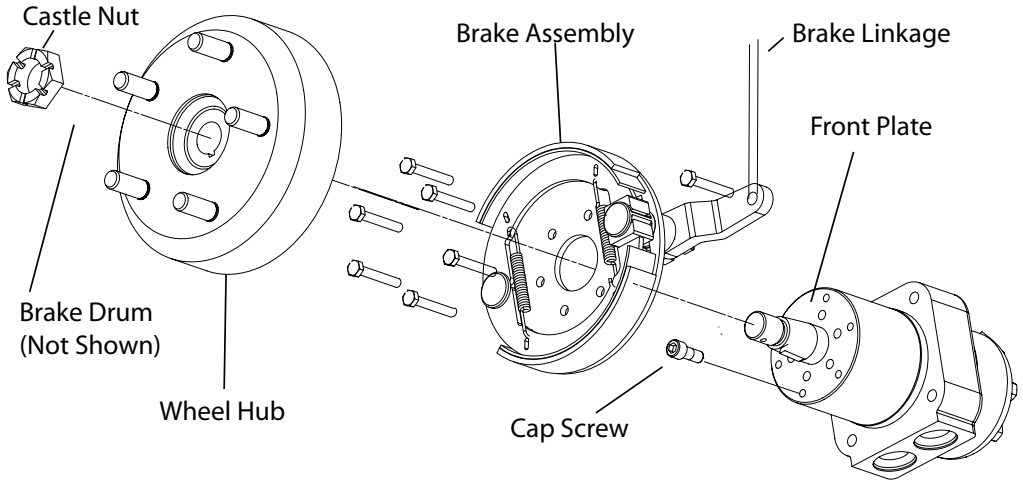
Important: This is a corrective action to make sure all bolts are seated and correctly torqued. This will ensure that the motor will not be subject to leakage.

Suggested Tools:
-Torx T-30
-5mm Hex Head
-Hydraulic Jack
-Hub puller
-1 1/16" socket
-10mm socket
-13/16 socket
-Loctite 272 or Permatex Red

Note: If end of motor shaft has been previously marked with a paint pen, please disregard bulletin actions. This identifies that a unit has already been reworked.

Removal and reinstallation procedures:

1. With the vehicle on the ground, chock the vehicle to prevent vehicle movement. Properly position a hydraulic jack under the vehicle frame and raise the vehicle to a suitable height.
**Caution: Only service one side of the vehicle at a time.*
2. Remove lug nuts and tire.(parking brake needs to be released)
3. Remove the brake drum
4. Remove the cotter pin, and the castellated nut holding the wheel hub onto the motor. Discard cotter pin as a new one will need to be used.
5. Using a hub puller, remove the wheel hub from the axle.
6. Remove nut and bolt that attaches the brake linkage to the brake assembly.
7. Remove the six bolts holding the brake assembly to the motor and remove the brake. (These bolts will be reused)
8. Replace the six cap screws securing the wheel motor front cover one at a time, with the new, longer cap screws provided. Add Loctite 272 or Permatex Red thread locker to tip of screw and torque new cap screws to 100 in-lbs. (Repeat until all six bolts are removed and replaced with new bolts.)
**Note: This must be done one bolt at a time to prevent any oil leakage.*
9. Reinstall brake assembly onto the wheel motor and hand start all six bolts before setting torque to 84 in/lbs on each. (Turn the brake clockwise until its centered and hold in position while setting torque on bolts)
10. Reattach parking brake linkage to the brake assembly. Tighten nut and bolt to vehicle specification.
11. Reinstall the wheel hub and castle nut.
**Note: Ensure that the axle key remains in the axle and lines up with the slot in the hub*
12. Torque castle nut to 110 ft/lbs. Increase torque until pin hole aligns with hole in shaft.
13. Install new cotter pin.
14. Install brake drum onto wheel hub and install tire.
15. Torque lug nuts to 90 ft/lbs
16. Mark the end of the motor shaft with a paint pen to show verification of motor being reworked.



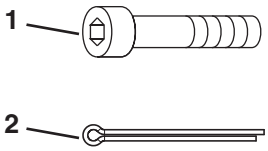
Date: May, 2009

Installation Instructions

Wheel Motor Cover Bolt Replacement Kit

Part No. 5600350

For Ferris Evolution Series Zero-Turn Riding Mowers



Kit Contents:

Ref.	Description	Qty:
1	Socket Head Cap Screws	12
2	Cotter Pin	2

Figure 1. Contents

WARNING

Before beginning any service work turn off the PTO, set the parking brake, turn off the ignition, and disconnect the spark plug wire(s).

INSTALLATION

1. Park the unit on a smooth, level surface such as a concrete floor. Disengage the PTO, engage the parking brake, turn off the engine, and remove the ignition key.
2. Chock the front wheels of the unit to prevent movement.
3. Raise the rear of the machine and support with jack stands.

NOTE: Only service one side of the machine at a time.

4. Remove the rear wheel.
5. Remove the cotter pin (A, Figure 2) and the castellated nut (B). Discard the cotter pin and retain the castellated nut.
6. Disengage the parking brake.
7. Remove the brake drum (A, Figure 3) and the wheel hub (B).

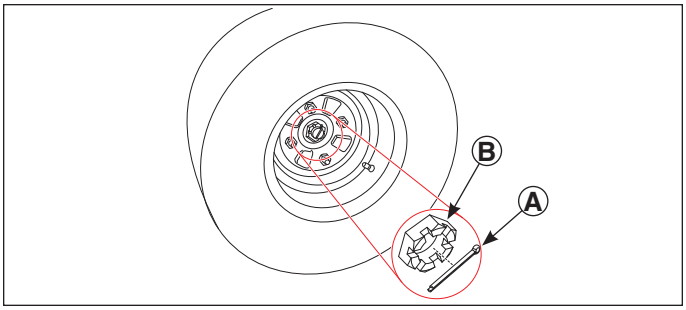


Figure 2. Cotter Pin and Castellated Nut
A. Cotter Pin
B. Castellated Nut

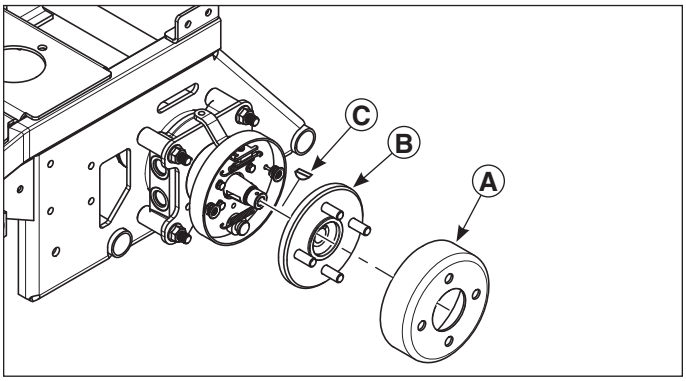


Figure 3. Remove the Brake Drum and Wheel Hub
A. Brake Drum
B. Wheel Hub
C. Woodruff Key

Form No.: 5405589
Revision: -
Rev. Date: 06/2009

8. Remove the bolt (A, Figure 4), washer (B) and nut (C) that secures the brake linkage arm (D) to the range selector plate (E).

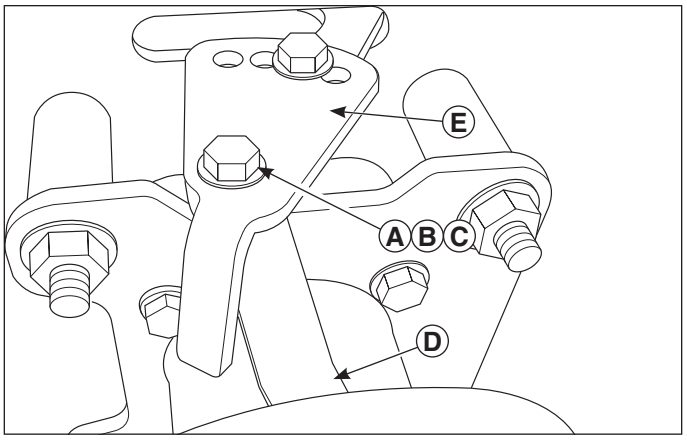


Figure 4. Removing the Brake Hub
A. Bolt
B. Washer
C. Nut
D. Brake Linkage Arm
E. Range Selector Plate

9. Loosen and remove the six (6) M6-1.0 X 14MM capscrews (A, Figure 5) and the 1/4 lock washers (B) that secure the brake assembly (C) to the wheel motor. Remove the brake assembly.

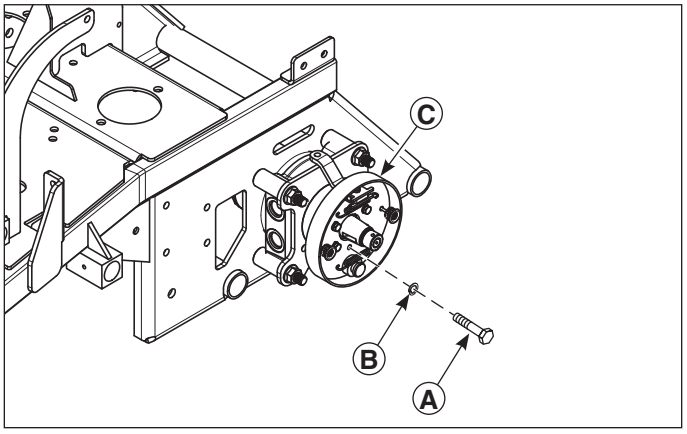


Figure 5. Removing the Brake Assembly
A. M6-1.0 X 14MM Capscrew
B. 1/4 Lock Washers
C. Brake Assembly

10. Refer to Figure 6. Inspect the wheel motor cover plate for any signs of leakage. If there is no evidence of leakage or just a light film of oil around the wheel motor cover plate, skip to step # 12. **If there is evidence of oil leakage (oil is dripping from the wheel motor cover plate) order a new wheel motor (part number # 5101583) from your normal parts source.**
11. Install the new wheel motor onto your machine. Skip to step # 13.

IMPORTANT NOTE: To prevent oil leakage, the wheel motor cover bolts must be replaced one bolt at a time.

12. Replace the six (6) wheel motor cover Torx T-30 bolts (A, Figure 6) securing the wheel motor cover plate (B) one at a time with the new longer socket head cap screws provided. **Add Loctite 272 or Permatex Red thread locker to the tip of the capscrew and torque the new longer socket head capscrews to 100 in/lbs. (11,3 Nm).** (Repeat until all six bolts are removed and replaced with the newer bolts.)

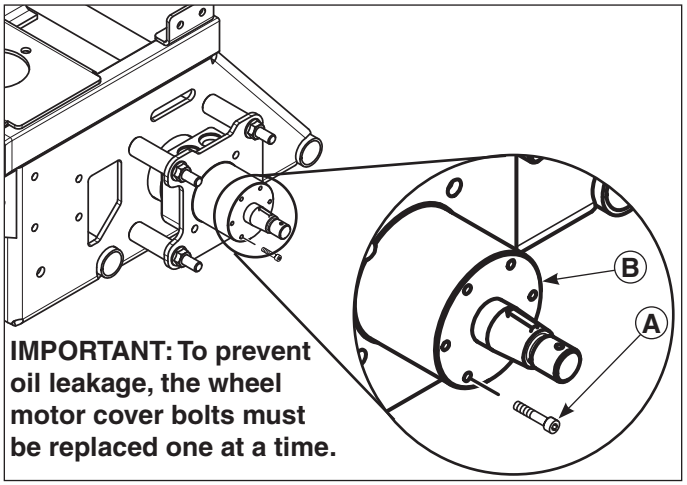


Figure 6. Replacing the Wheel Motor Cover Bolts
A. Wheel Motor Cover Bolt
B. Wheel Motor Cover Plate

13. Refer to Figure 5. Reinstall the brake assembly (C, Figure 5) onto the wheel motor and hand start all six (6) M6-1.0 X 14MM capscrews (A) and 1/4 lock washers (B) that were removed in step # 9. Turn the brake assembly clockwise until it is centered, hold brake assembly in place and torque the M6-1.0 X 14MM capscrews to 84 in/lbs (9,5 Nm).
14. Reinstall the bolt (A, Figure 4), washer (B) and nut (C) that were removed in step # 8 to secure the brake linkage arm (D) to the range selector plate (E).
15. See Figure 7. Clean the wheel motor tapered axle shaft (D, Figure 7) and threads with brake cleaner using care not to contact the wheel motor shaft seal or to contaminate the brake shoes. Wipe the wheel motor tapered axle shaft dry with a clean towel.
16. Clean the inside of the hub with brake cleaner and wipe dry with a clean towel.
17. Do not clean the castellated nut. If threads are dry, use a light oil, such as WD-40 to lubricate the threads before installation.
18. Ensure that the axle shaft key (C, Figure 7) remains in the axle. Reinstall the wheel hub (B) onto the wheel motor tapered axle shaft, making sure the axle key lines up with the slot in the wheel hub.
19. Reinstall the brake drum (A) and engage the parking brake.
20. Install the castellated nut (B, Figure 2) on the wheel motor tapered axle shaft. **Torque the castellated nut to 115 ft/lbs (156 Nm).** If necessary, a bar can be used to prevent the wheel motor axle shaft from turning while you are tightening the castellated nut.
21. Check to see if the slots in the castellated nut line up with the cross hole in the wheel motor axle shaft. If the slot and the cross hole are not aligned continue to tighten the castellated nut until they do.
22. Install the new cotter pin Bend the long cotter pin leg counter-clockwise to mate with the castellated nut flat.
23. Reinstall the rear wheel and torque the lug nuts to 90 ft/lbs (122 Nm).
24. Repeat the process for the other side of the unit.

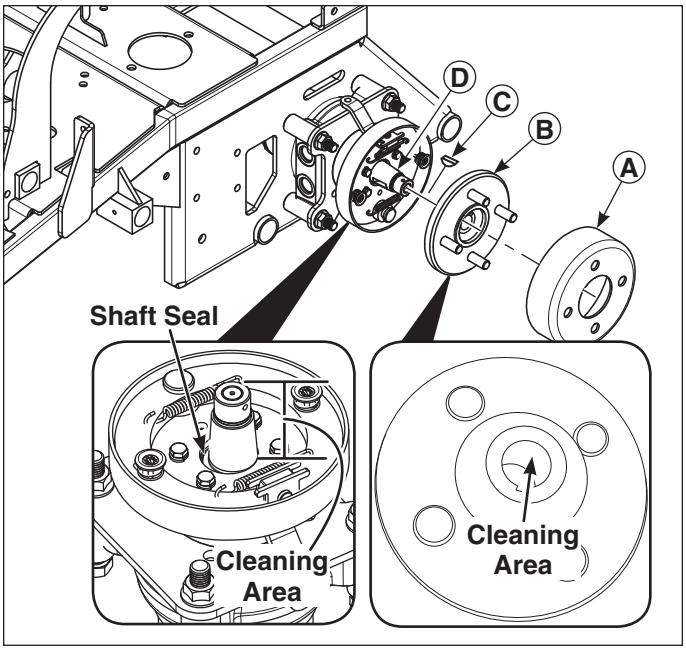


Figure 7. Cleaning the Brake Hub and Tapered Shaft
A. Brake Drum
B. Wheel Hub
C. Half Moon Key
D. Wheel Motor Tapered Axle Shaft