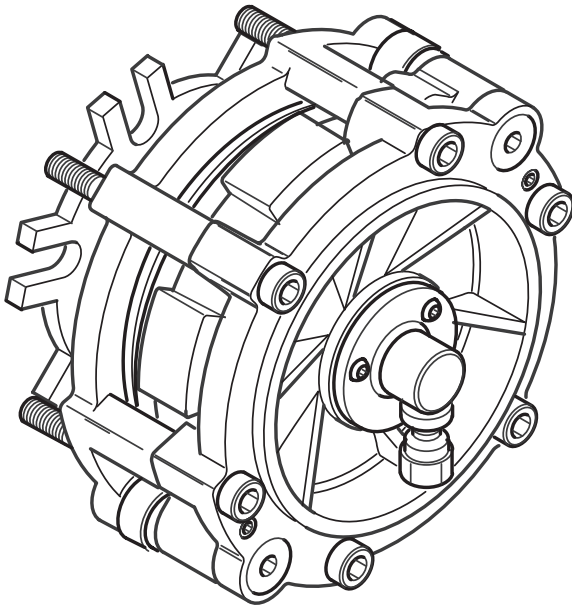


HT650™ FAN DRIVE SERVICE INSTRUCTIONS



When unpacking your product, remove all components and inspect them to ensure that no damage occurred during shipping. If any components are missing or damaged, contact Horton, Inc. at 1-800-621-1320 immediately. Do not return the product to the retailer or point of purchase.



Engine **Cooling Solutions** Worldwide®



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INTRODUCTION

This manual describes the correct Inspection, Service, and Repair procedures for Horton HT650™ Fan Drives. Following the instructions carefully will provide the safest and most trouble-free operation.

Horton uses the following special notices to give warning of possible safety related problems which could cause serious injury and provide information to help prevent damage to equipment.



DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

CAUTION

CAUTION used without the safety alert symbol indicates a potentially hazardous situation, which, if not avoided, may result in property damage.

NOTE

NOTE is used to notify people of installation, operation, or maintenance information which is important but not hazard related.

PRE-INSTALLATION

You must follow your company safety practices, which should adhere to or be better than Federal or State approved shop safety practices and procedures. Be sure that you understand all the procedures and instructions before you begin work on this unit.

NOTE

Parts replacement and/or repair of your Horton DIESLTEMP® Fan Drive should be performed only by the Horton Factory or an authorized Horton Distributor or Dealer to keep your warranty coverage intact during the warranty period.

PREVENTIVE MAINTENANCE

Vehicle Preparation

Before performing tests on the Fan Drive, be sure to follow good shop safety practices and:

- Apply the vehicle's parking brake.
- Block the vehicle's wheels.

Before doing work in the area of the fan:

- Start the vehicle's engine and build air pressure in excess of 90 psi [6.2 bar].
- Observe the fan and Fan Drive from a distance, look for vibration, fan blade contact, Fan Drive slippage, and Fan Drive operation.
- Turn engine off.



WARNING

Be sure engine is turned off and fan has stopped turning before approaching fan area, to prevent serious personal injury.

Every 25,000 Miles

Fan and Fan Belt

1. Check the fan for looseness and damage, such as bent, cracked or missing blades, loose rivets or missing weights. Retighten if loose. Replace if damaged.
2. Check for adequate clearance between the fan and the fan shroud or other engine compartment components. Repair if the clearance is inadequate.
3. Check the fan belt condition, belt tension, and belt alignment. Correct if necessary.

Friction Facing

1. Check for wear condition. Replace when worn to 1/16" [0.159 cm] thick, oil spotted, or if burn marks are visible.

FAN DRIVE REMOVAL

1. Verify the Fan Drive model and that correct replacement parts fit this model.



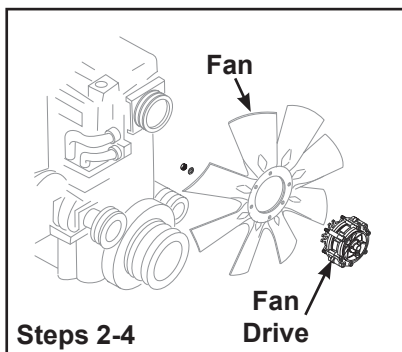
Avoid damaging the Rotary Air Union during fan installation, removal, or when servicing the Fan Drive.

2. Disconnect the air line from the Rotary Air Union.

NOTE

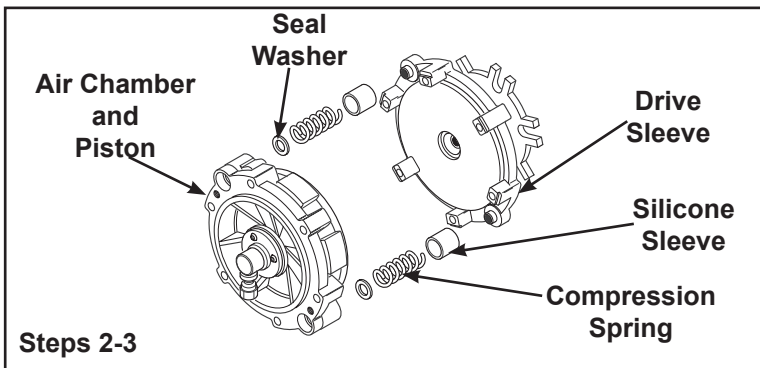
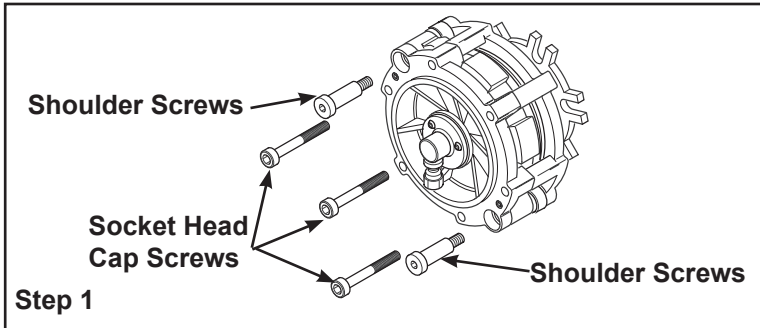
Protect the radiator from possible damage from the fan during fan and Fan Drive removal.

3. Remove the fan and Fan Drive from the engine.
4. Remove the fan from the Fan Drive.



REPAIR KIT INSTALLATION

1. Remove the six Socket Head Cap Screws; then, remove and discard the two Shoulder Screws.
2. Separate the Air Chamber and Piston from the Drive Sleeve.
3. Remove and discard the two old Silicone Sleeves, Compression Springs, and Seal Washers.

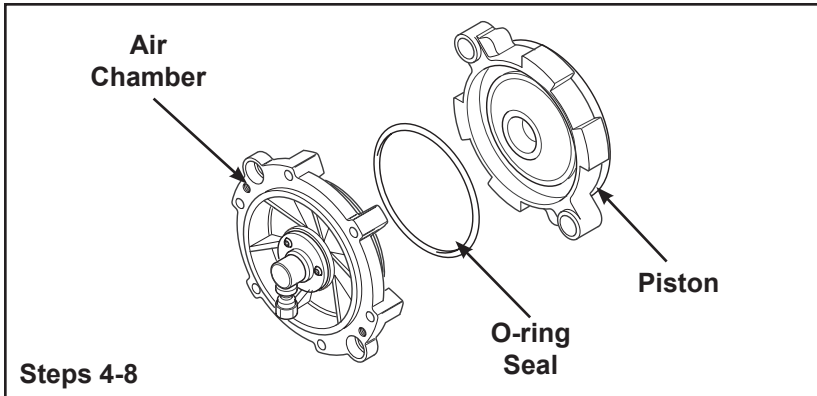


4. Separate the Air Chamber from the old Piston and discard the old Piston and O-ring Seal.
5. Examine the inside of the Air Chamber for signs of dirt and foreign material. The Air Chamber should be relatively clean and dry. If not, a problem may exist in the vehicle air system and must be corrected before the Fan Drive is reinstalled.
6. Using parts cleaning solvent, clean the o-ring contact surfaces of the Air Chamber and new Piston.

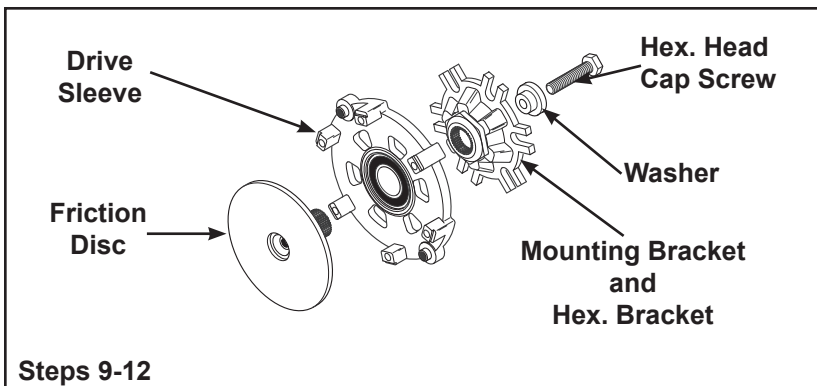
7. Lubricate the new O-ring Seal and O-ring seal contact surfaces of the Air Chamber with the o-ring lubricant supplied in the Repair Kit; then, install the new O-ring Seal into the Air Chamber.
8. Press the new Piston into the Air Chamber.

NOTE

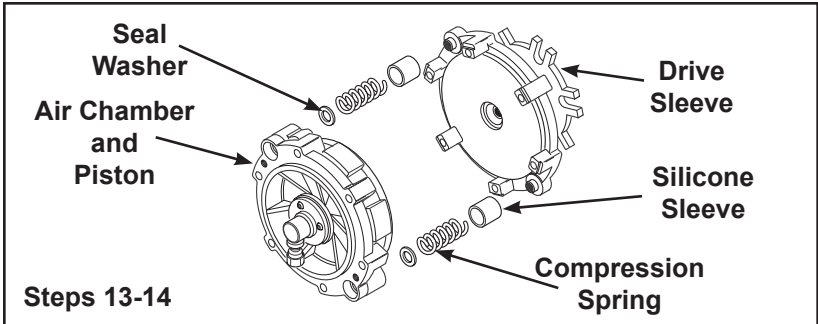
If you are installing a new Drive Sleeve, continue with Step 9. If you are not installing a new Drive Sleeve go to Step 15.



9. Remove the Hex. Head Cap Screw and Washer; then, slide the Mounting Bracket and Hex. Bracket off the splined hub of the Friction Disc.
10. Slide the Friction Disc out of the Drive Sleeve.
11. Slide the Friction Disc into the new Drive Sleeve.
12. Slide the Mounting Bracket and Hex. Bracket onto the splined hub of the Friction Disc. Install the new Washer.



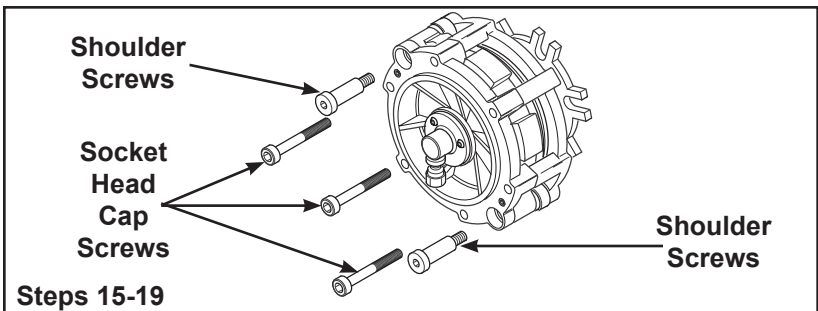
13. Install the two new Silicone Sleeves over the new Compression Springs and onto the Drive Sleeve.
14. Place the two new Seal Washers on top of the new Compression Springs.



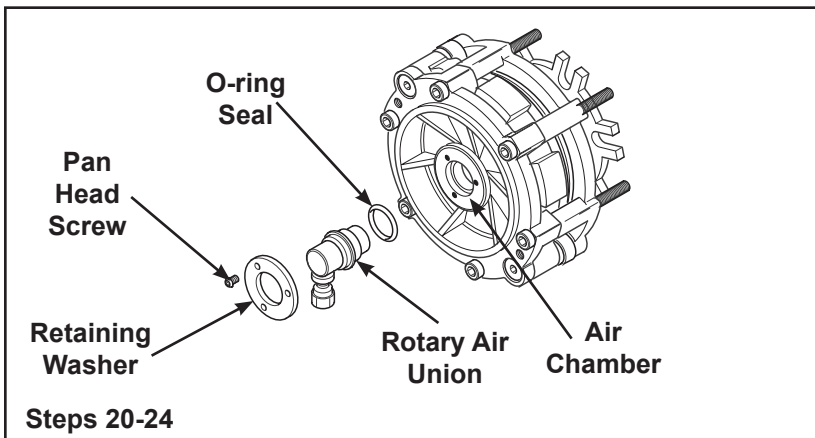
15. Align the Air Chamber and new Piston with the tabs of the Drive Sleeve.
16. Apply a drop of Loctite® 242 to the threads of the two new Shoulder Screws and secure the Air Chamber and new Piston to the Drive Sleeve.
17. Alternately and evenly tighten the two new Shoulder Screws to 20-25 Ft. Lbs. [27.1-33.9 N•m] torque.
18. Apply a drop of Loctite® 242 half way down the threads of the six Socket Head Cap Screws and install the six Socket Head Cap Screws.
19. Alternately and evenly tighten the six Socket Head Cap screws to 20-25 Ft. Lbs. [27.1-33.9 N•m] torque.

NOTE

If you are replacing the Rotary Air Union, continue with Step 20.



20. Remove the three Pan Head Screws and the old Retaining Washer; then, remove the old Rotary Air Union and old O-ring Seal.
21. Lubricate the new O-ring Seal with the o-ring lubricant supplied in the Repair Kit; then, install the new O-ring Seal into the Air Chamber.
22. Press the new Rotary Air Union into the Air Chamber and new O-ring Seal.
23. Slide the new Retaining Washer over the new Rotary Air Union.
24. Install and tighten the three Pan Head Screws to 13-17 In. Lbs. [1.5-1.9 N•m] torque.



INSTALLATION

CAUTION

Avoid damaging the Rotary Air Union during fan installation, removal, or when servicing the Fan Drive.

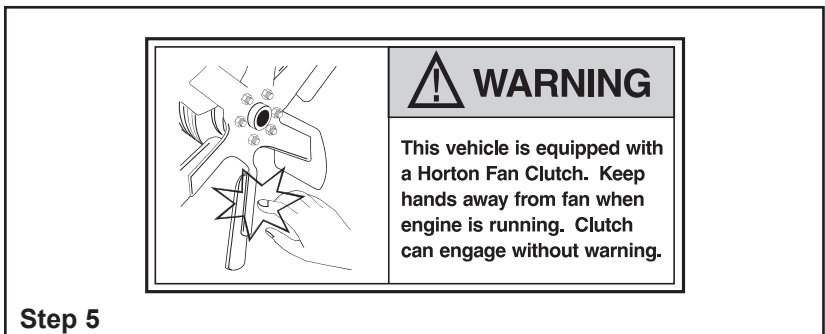
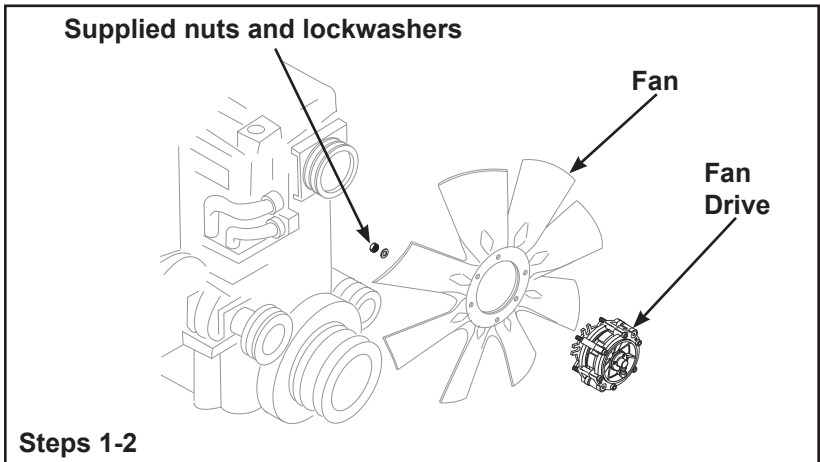
1. Using supplied nuts and lockwashers, mount the fan onto the Fan Drive; then, tighten the nuts to 10 Ft. Lbs. [13.6 N•m] torque.
2. Using SAE grade 8 bolts, install the fan and Fan Drive assembly onto the fan drive pulley. Tighten the mounting bolts to 25 Ft. Lbs. [33.9 N•m] torque.

3. Make the air line connections between the Solenoid Valve and the Fan Drive.
4. Check for proper air pressure to the Fan Drive. This measurement should always be taken at the Fan Drive air inlet port.

NOTE

To assure maximum horsepower carrying capacity of the Fan Drive and to prevent damage to the Fan Drive, there must be a minimum pressure of 90 to 120 psi [6.2 to 8.3 bar] to the Fan Drive upon engagement.

5. Affix the WARNING sticker to a highly visible area of the engine compartment.

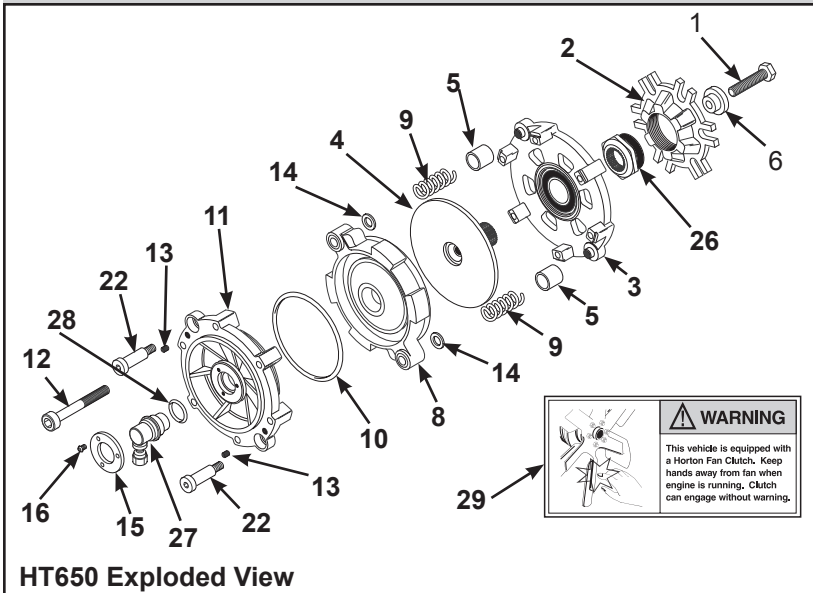


TROUBLESHOOTING

PROBLEM	PROBABLE CAUSE	SOLUTION
Fan Drive fails to engage	Electrical Problem <ol style="list-style-type: none"> 1. Broken circuit (Normally Open System). 2. Improperly wired. 3. Thermal Switch incorrect for application. 4. Bad Solenoid Valve. 	<ol style="list-style-type: none"> 1. Check electrical connections. 2. Check wiring according to diagram. 3. Check Thermal Switch (N.O. or N.C.). 4. Replace the Solenoid Valve.
	Air Problem <ol style="list-style-type: none"> 1. Air leaks in Fan Drive. 2. Restricted air supply to the Fan Drive. 3. Bad Solenoid Valve. 	<ol style="list-style-type: none"> 1. Install new O-ring Seals. 2. Check the Rotary Air Union and air lines for leaks or restrictions. 3. Replace the Solenoid Valve.
Fan Drive fails to disengage	Electrical Problem <ol style="list-style-type: none"> 1. Broken circuit (Normally Closed System). 2. Improperly wired. 3. Bad Thermal Switch. 	<ol style="list-style-type: none"> 1. Check electrical connections. 2. Check wiring according to diagram. 3. Replace Thermal Switch.
	Air Problem <ol style="list-style-type: none"> 1. Air line restricted, not allowing air to exhaust from Fan Drive. 2. Bad Solenoid Valve. 	<ol style="list-style-type: none"> 1. Check the air line between the Fan Drive and Solenoid Valve for restrictions or obstructions. 2. Replace the Solenoid Valve.
Fan Drive engaged, engine running hot	<ol style="list-style-type: none"> 1. Restriction in front of radiator. 2. Cooling system mal-function. 	<ol style="list-style-type: none"> 1. Check for shutter operation, winter fronts, or obstructions in front of radiator. 2. Refer to vehicle engine manual.

PROBLEM	PROBABLE CAUSE	SOLUTION
<p>Fan Drive cycles frequently</p>	<p>Electrical Problem</p> <ol style="list-style-type: none"> 1. Poor ground wire connection. 2. Improper temperature control settings. 3. A/C Pressure Switch setting too low. 4. Restriction in front of radiator, blocking air flow. 5. Faulty Thermal Switch. 6. Faulty Air-Temp Switch. 	<ol style="list-style-type: none"> 1. Check electrical connections. 2. Check temperature setting of all controls. Thermal Switch setting should engage the Fan Drive 10° F higher than the full open temperature of the thermostat. 3. Check the A/C Pressure Switch. Use higher switch. 4. Check for shutter operation, winter fronts, or obstructions in front of the radiator. 5. Replace the Thermal Switch. 6. Replace the Air-Temp Switch.
	<p>Air Problem</p> <ol style="list-style-type: none"> 1. Air line restricted, not allowing air to be released from the Fan Drive. 2. Solenoid Valve not exhausting. 	<ol style="list-style-type: none"> 1. Check for pinching or plugging of the air line between the Fan Drive and the Solenoid Valve. 2. Check for a plugged exhaust port on the Solenoid Valve. Clean or replace the Solenoid valve.

PARTS LIST



HT650 Exploded View

ITEM	DESCRIPTION	QTY
1	Hex. Head Cap Screw	1
2	Mounting Bracket	1
3	Drive Sleeve (Includes Bearing)	1
4	Friction Disc	1
5 ¹	Silicone Sleeve	2
6	Washer	1
8 ¹	Piston (Includes Friction Facing and Sleeve Bearings)	1
9 ¹	Compression Springs	2
10 ¹	O-ring Seal	1

ITEM	DESCRIPTION	QTY
11	Air Chamber	1
12	Socket Head Cap Screw	6
13	Set Screw	2
14 ¹	Seal Washer	2
15	Retaining Washer	1
16	Pan Head Screw	3
22 ¹	Shoulder Screw (Locking)	2
26	Hex. Bracket	1
27	Rotary Air Union Assembly	1
28	O-ring Seal	1
29 ¹	Warning Sticker	1

¹ Denotes Repair Kit item. Repair Kit Part No. 994317.

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QS-9000 Certified
Form # 22610-C-1009



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