CHAPTER 5 REWIND STARTERS

GENERAL INFORMATION

Rewind starters used on vertical shaft Tecumseh engines are top mount horizontal pull style or side mount vertical pull style. Horizontal shaft engines use side mounted starters which can be mounted to pull either vertically or horizontally. All rewind starters except the vertical pull style turn the engine over by engaging a dog(s) into the starter cup attached to the engine flywheel. The vertical pull starter engages the starter gear into the ring gear of the flywheel to turn the engine over. All starters are spring loaded to retract the dog(s) or starter gear when the engine speed exceeds the turning speed of the starter.

OPERATION

As the starter rope is pulled, the starter pulley rotates on the center pin. The starter dog(s) is pinned or pocketed in the pulley hub and extends outward when the pulley's rotation forces the starter dog(s) to contact the ears on the retainer. The retainer ears act as a ramp to fully extend the starter dog(s). The fully extended starter dog(s) locks in contact with notches in the starter cup. When the engine fires and the rotational speed of the starter cup exceeds the starter pulley, the starter dog(s) disengages from the starter cup. The starter dog spring(s) returns the starter dog(s) to the disengaged position. The recoil spring turns the starter pulley in the opposite direction, retracting the starter rope until the handle contacts the stop.

COMPONENTS

![Diagram of Rewind Starter Components]

SERVICE

Starter related problems will require the starter to be removed from the engine to diagnose the cause. Visually inspect the starter dog(s), starter cup, retainer, springs, rope, washers, and the starter pulley for wear or breakage. Use one of the following procedures that applies to your application, to disassemble, repair, and assemble the starter. Always consult the Tecumseh Master Parts Manual for the correct replacement parts.

ROPE SERVICE

Rope replacement should be done using the correct part number replacement rope or braided rope of the correct diameter and length. Consult the Tecumseh Master Parts Manual to obtain the correct part number, length, and size required. Use the following rope chart to convert a numbered rope to a fractional diameter for bulk rope use.

<table>
<thead>
<tr>
<th>Rope Size</th>
<th>Diameter</th>
<th>Part Number</th>
<th>Spool Length</th>
</tr>
</thead>
<tbody>
<tr>
<td># 4 1/2</td>
<td>9/64&quot; (3.572 mm)</td>
<td>Part No. 730526</td>
<td>100' (30.48 meters) spool</td>
</tr>
<tr>
<td># 5</td>
<td>5/32&quot; (3.964 mm)</td>
<td>Part No. 730514</td>
<td>100' (30.48 meters) spool</td>
</tr>
<tr>
<td># 6</td>
<td>3/16&quot; (4.762 mm)</td>
<td>Part No. 730516</td>
<td>100' (30.48 meters) spool</td>
</tr>
</tbody>
</table>
Standard rope lengths

54" (16.5 meters) standard stamped steel starter
61" (18.6 meters) vertical pull - horizontal engagement type
65" (20 meters) vertical pull - vertical engagement type
85" (26 meters) extended handlebar rope start (compliance)

Check the old rope for the right length for the application. Some applications require longer lengths. The rope ends should be cauterized by burning with a match and wiping the rope end with a cloth while hot.

Rope replacement can be done without the starter being disassembled on vertical pull starters that have "V" notches in the bracket. Use the following procedure for rope replacement.

1. Remove the starter assembly from the engine.
2. Turn the pulley until the staple in the pulley lines up with the "V" notch. Pry out the staple with a small screwdriver and remove the original rope (diag. 3).
3. Turn the pulley counterclockwise to fully wind the starter return spring until tight. Allow the pulley to unwind until the hole in the pulley lines up with the "V" notch.
4. Hold the pulley in this position and feed the new rope through the hole and tie a left-handed knot on the rope end. Make sure the rope and knot do not protrude from the knot cavity and bind the pulley rotation.

RETAINER REPLACEMENT (DIAGRAM 4)

1. Remove the starter handle if the retainer is a complete circle design. Remove the staple and old retainer.
2. Slide the rope retainer into the proper position and insert the staple using a pliers.
3. Install the starter handle and tie a left hand knot to secure the handle.

STYLIZED REWIND STARTER (TVS, HM, TVM, TVXL), AND STAMPED STEEL STARTER (HM, VM, TVM, TVXL)

Disassembly Procedure

1. After removing the rewind assembly from the engine blower housing, release the tension on the rewind spring. This can be done by removing the starter handle and carefully allowing the rope to unwind in the starter housing assembly.
2. Place a 1" (25 mm) deep well socket under the retainer. Set the rewind on a bench, supported on the socket.
3. Use a 5/16" (7.938 mm) or 1/4" (6.35 mm) (for stamped steel) roll pin punch to drive out the center pin. The stamped steel center pin is driven out from the top, inside the center hole. Move the punch around while driving the pin to help keep the pin straight.
CAUTION: THIS REWIND SPRING IS NOT SECURED IN A CANISTER. PULLEY BOSSES HOLD THE REWIND SPRING AND COVER, AND CAN BE EASILY DISLODGED DURING HANDLING.

4. Remove the brake spring, spring retainer, washers, and pulley assembly (diag. 7, 8, 9 & 10)

NOTE: THE STARTER DOGS FACE OUT ON THE STAMPED STEEL STARTER AND THE DOGS FACE IN ON THE STYLIZED REWIND STARTER.

5. All components in need of service should be replaced.

Assembly Procedure

NOTE: It is critical to support the starter on a deep well socket to prevent damage.

1. Reverse the disassembly procedure. The starter dogs with the dog springs must snap back to the center of the pulley (disengaged position). When the rope is pulled, the tabs on the retainer must be positioned so that they will force the starter dogs to engage the starter cup. (diag. 7 & 8)

2. Always replace the center spring pin with a new one upon reassembly. Place the two new plastic washers between the center leg of the starter and the retainer. New plastic washers are provided with a new center spring pin. Discard the old plastic washer.

3. Place the rewind on a flat surface and drive the new center pin in until it is within 1/8" (3.175 mm) of the top of the starter.

NOTE: DO NOT DRIVE THE CENTER PIN IN TOO FAR.

The retainer will bend and the starter dogs will not engage the starter cup. On the stamped steel starter the center pin should be driven in until it contacts the shoulder in the starter body.

4. Wind the starter pulley counterclockwise four or five turns to pre-load the recoil spring, thread the rope through the starter housing eyelet and tie a temporary knot in the rope. Reattach the starter handle to the rope using a left-hand knot. Untie the temporary knot and allow the rope to recoil.

STYLIZED REWIND STARTER WITH PLASTIC RETAINER

Disassembly Procedure

1. After removing the rewind assembly from the engine blower housing, remove the starter handle by first pulling a length of rope out using the handle, tying a temporary knot in the exposed rope, and either untying the knot in the handle or prying out the staple.

2. Untie the temporary knot and slowly allow the rope to fully retract into the starter housing and the recoil spring to fully unwind.

3. Remove the decal from the center of the starter housing.

4. Use a small Phillips screwdriver or similar tool to pry the retainer legs apart and lift out the retaining wedge (or steel clip on newer style starters).

5. Pinch the legs of the retainer together and pull on the head of the retainer to remove it from the housing.

6. Remove the pulley assembly from the recoil housing.

7. Repair or replace as necessary.
Assembly

1. If replacing the starter rope, see Step 8.

**Extreme caution should be used when working with springs. Always wear appropriate safety equipment.**

2. Install a new recoil spring if necessary by pushing the new spring out of the holder into the pulley cavity while aligning the outside spring hook into the deep notch in the pulley. Push the spring cover in until seated.

3. Apply a small amount of lithium grease to the inner bore of the center shaft.

4. Replace or check that both starter dogs are in the pulley pockets and that the dog springs are hooked on the outer surface of the dog.

5. Pinch the two legs of the plastic retainer together and start into the center shaft hole.

6. Rotate the retainer so the two tabs on the bottom of the part fit between the dog and pulley hub (left side of the dog). Push the retainer in until the leg prongs pop out of the center shaft.

7. Turn the starter over and snap the locking tab between the retainer legs, replace the top decal.

**NOTE:** Refer to Service Bulletin 122 for steel locking clip.

8. Wind the starter pulley counterclockwise four or five turns to pre-load the recoil spring and thread the rope through the starter housing eyelet. Pull enough rope through to tie a temporary knot in the rope. Reattach the starter handle to the rope using a left-hand knot. Untie the temporary knot and allow the rope to recoil.

**STANDARD STAMPED STEEL AND CAST ALUMINUM STARTER (HM, VM)**

Disassembly Procedure

1. Untie the knot in the rope and slowly release the spring tension.

2. Remove the retainer screw, retainer cup (cam dog on snow proof type), starter dog(s) and dog spring(s), and brake spring (diag. 10).

3. Turn the spring and keeper assembly to remove the pulley. Lift the pulley out of the starter housing. Replace all worn or damaged parts.

Assembly Procedure

1. Place the rewind spring and keeper assembly into the pulley. Turn the pulley to lock into position. A light coating of non-freeze grease should be applied on the spring.
2. Place the pulley assembly into the starter housing.

3. Install the brake spring, starter dog(s), and starter dog return spring(s). The starter dog spring(s) must hold the dog(s) in against the pulley. On Snow King engines the starter dog posts should be lubricated with S.A.E. 30 engine oil.

4. Replace the retainer cup (cam dog on snow proof starter) and retainer screw. Tighten to 65 - 75 in. lbs. Older models that use a 10 - 32 retainer screw can be replaced with a larger 12 - 28 screw (part # 590409A). Re-drill the screw hole using a 13/64" (4.35 mm) drill bit. The center screw torque on cast aluminum starters is 115 to 135 in. lbs (13 - 15 Nm) (diag. 11 & 12).

5. Add-on alternator starters must have the center tubular rivet replaced each time the tubular rivet is removed. The tubular rivet should be pressed to a depth of 1/4" (3.175 mm) from the top of the starter housing. Skip this step if not applicable.

6. Apply tension to the recoil spring by winding the pulley counterclockwise until it becomes tight, then allow the pulley to unwind until the hole in the pulley lines up with the rope eyelet in the starter housing. Install a knotted rope through the pulley and the eyelet and install the handle. A left-hand knot should be tied on the end of the rope to secure the handle.

7. If a centering pin is used, be sure to align with the crankshaft (bottom pin in center screw hole). Install nylon sleeve 1/8" (3.175 mm) onto pin. Position nylon sleeve in aligning recess in the crankshaft. START two mounting screws in blower housing 90° apart. With sleeve centered in crankshaft, gently push the starter in place, tighten the two mounting screws, insert and tighten the other two screws.

**VERTICAL PULL STARTER HORIZONTAL ENGAGEMENT TYPE**

**Disassembly Procedure**

1. Remove the handle and relieve the starter spring tension by allowing the rope to slip past the rope clip.

2. Remove the spring cover by carefully removing the two small screws. Carefully take out the spring.

3. Remove the center hub screw and the spring hub.

4. Lift off the gear and pulley assembly. Disassemble the pulley assembly by removing the snap ring and washer (diag. 13).

5. Remove the starter rope if necessary. Replace all