

SECTION 7 - MISCELLANEOUS



PART B - EXHAUST SYSTEMS



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EXHAUST SYSTEM - MODEL 220

DISASSEMBLY (Figure 1)

1. Raise seat and exhaust cover.

NOTE: On early production vehicles, exhaust covers are riveted to frame. It will be necessary to drill out rivets to remove covers.

2. Loosen clamps and remove tailpipe.
3. Loosen muffler clamps. Disconnect clamps from retainer (located under muffler) and slide clamps toward center of muffler.
4. Lift rear of muffler until it clears storage compartment and, while pulling back on muffler, work extensions (ahead of muffler) toward engine until muffler disengages at connectors.
5. Remove both muffler connectors and both exhaust pipe extensions. (Figure 1, Items 7 and 8)

NOTE: Storage compartment and front cross support for seat cushion may distort slightly when lifting up on muffler, but can be restored to original position after reinstalling muffler.

6. To remove exhaust pipe assembly (Figure 1, Item 1), it will be necessary to remove engine from vehicle.
7. After removing engine, position engine so that exhaust pipes can be removed.
8. Remove exhaust pipe clamps.
9. Remove front engine mounting bracket.
10. Remove safety wire from allen screws and loosen allen screws. Lift exhaust pipes and gaskets from cylinder.

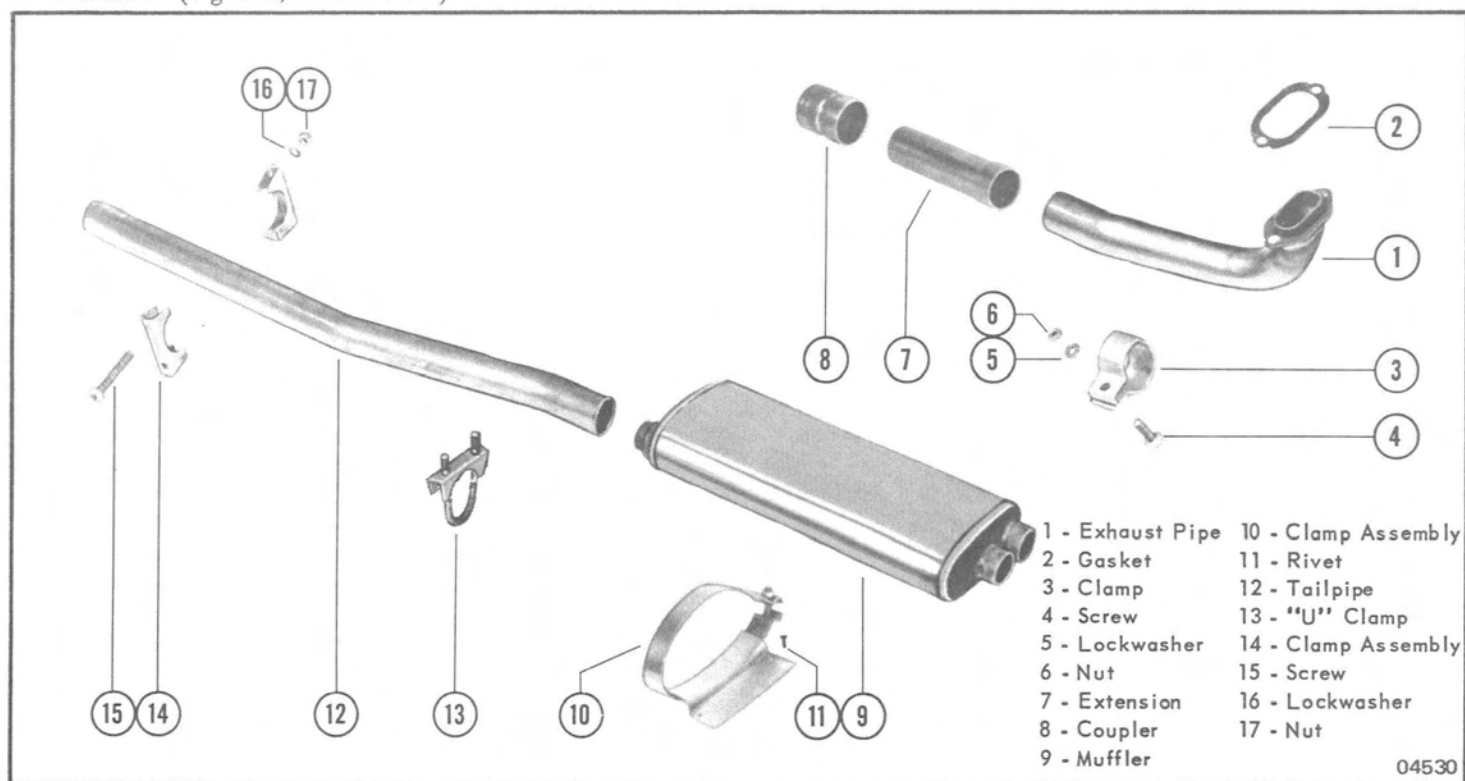


Figure 1. Exhaust Components - 220 Model

INSPECTION

NOTE: If repeated exhaust fuel mixture leaks exist in the exhaust system, install the Flex Pipe Exhaust Kit (D-42-53473A2). Installation instructions are outlined at the end of this section.

1. Clean and inspect all exhaust system components.
2. Replace all damaged parts.
3. Inspect exhaust pipe for any restriction.

REASSEMBLY

1. Place new gasket on cylinder exhaust port and install exhaust pipes, securing pipes to cylinder with allen screws. Torque screws to specifications.
2. Safety wire allen screws.
3. Reinstall exhaust pipe clamps and tighten clamp screws.
4. Reinstall front engine mounting bracket.
5. Reinstall engine on vehicle.
6. Seal all joint surfaces with Exhaust Sealer (C-92-55004A1); instructions supplied in kit.

NOTE: For best results, allow sealer to cure for 24 hours before starting engine.

7. Slide extensions and connectors on exhaust pipes. (Figure 1, Item 1-7-8)

NOTE: On late model 220 vehicles, length of exhaust pipe extensions was shortened from 6-11/64" to 5-11/64" to aid in removing and installing muffler. If extension pipes

(Item 7 in Figure 1) are 6-11/64" long (early type), cut 1" off small (connector) end and deburr edges before reinstalling.

8. Install muffler, working connectors on muffler inlets. Slide extensions, connectors and muffler as far forward as possible (tap lightly with mallet to ensure true seat) and tighten muffler retaining clamps. Be sure that muffler and extensions are held straight in line with engine. Connect muffler clamps to muffler retainers and torque clamp screws to specifications. (Figure 1, Items 3-4-5-6)
9. Install tailpipe to muffler outlet and secure with "U" clamp. (Figure 1, Items 12-13)
10. Secure tailpipe to chassis with clamp. (Figure 1, Items 14-15-16-17)

NOTE: It may be necessary to adjust rear tailpipe clamp by shimming it away from chassis to maintain correct alignment of muffler and tailpipe to engine.

INSTALLATION - FLEX PIPE EXHAUST KIT

1. Remove engine from vehicle.
2. Disconnect tailpipe and remove muffler from vehicle. Remove and discard extension pipes and couplers which connect muffler to exhaust pipes.
3. Remove front engine mounting bracket and exhaust pipes from engine. Cut off 3/2" from outlet end of each pipe.
4. Apply Exhaust Sealer (C-92-55004A1) to ID of flex pipe on exhaust pipe end.
5. Connect flex pipe to each exhaust pipe and secure with standard muffler clamps. (Figure 2) Install exhaust pipe assemblies on engine, using new gaskets from kit. Torque retaining screws to specifications. Do not reinstall 2 rear exhaust pipe hanger support clamps.
6. Reinstall front engine mounting bracket and reinstall engine in vehicle.
7. Apply Exhaust Sealer to OD of flex pipe on muffler end.
8. Connect muffler to flex pipe and secure with special muffler clamps which have a flat area on "U" bolt for

installation between muffler pipes. (Figure 2)

9. Reconnect tailpipe.

NOTE: If an exhaust/fuel mixture leak exists in the exhaust system connections on 220 Model Snowmobiles, all connections in the exhaust system can be sealed with Sealing Compound.

NOTE: For best results, allow Exhaust Sealer to cure for 24 hours before starting engine.

EXHAUST KIT - 220 Model

A Flex Pipe Exhaust Kit now is available for 220 Model Snowmobiles which have repeated exhaust system leaks. The kit consists of a muffler (with welded exhaust extensions), flex pipes, clamps, gaskets and installation instructions. Kit installation requires removal of the engine and exhaust pipe modification.

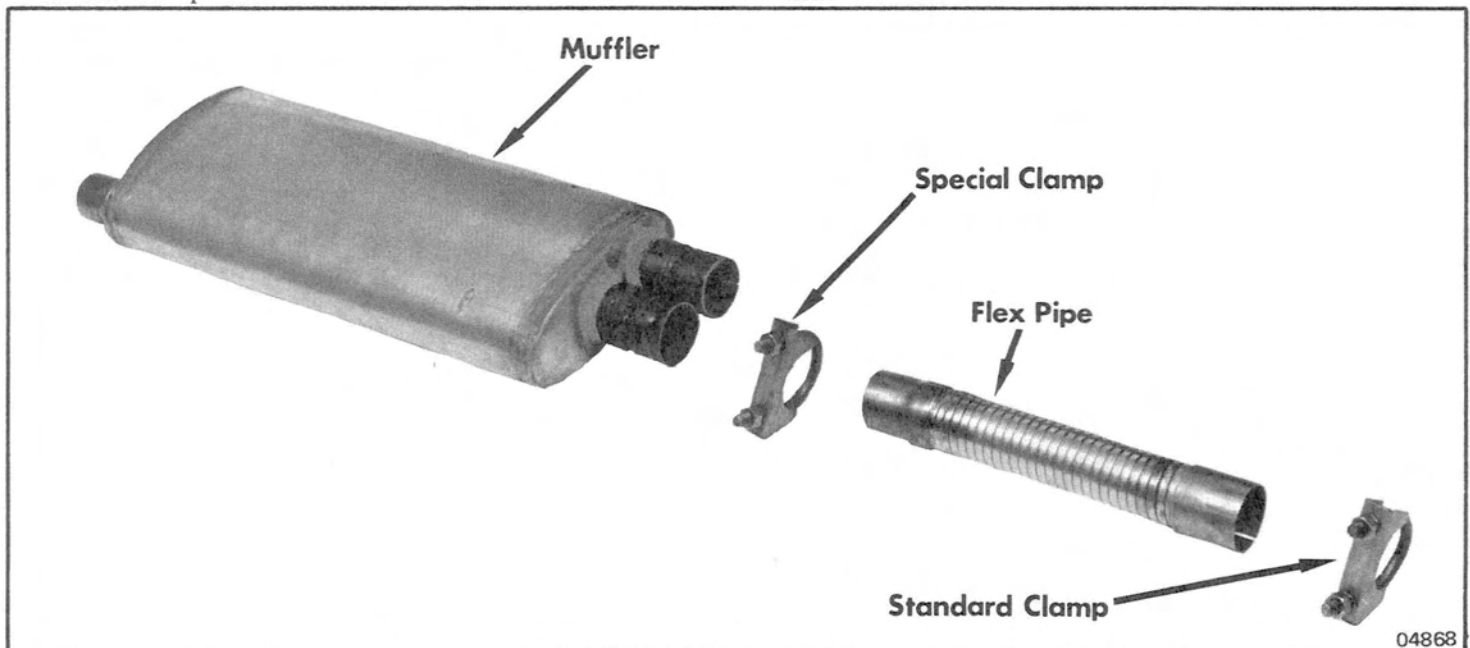
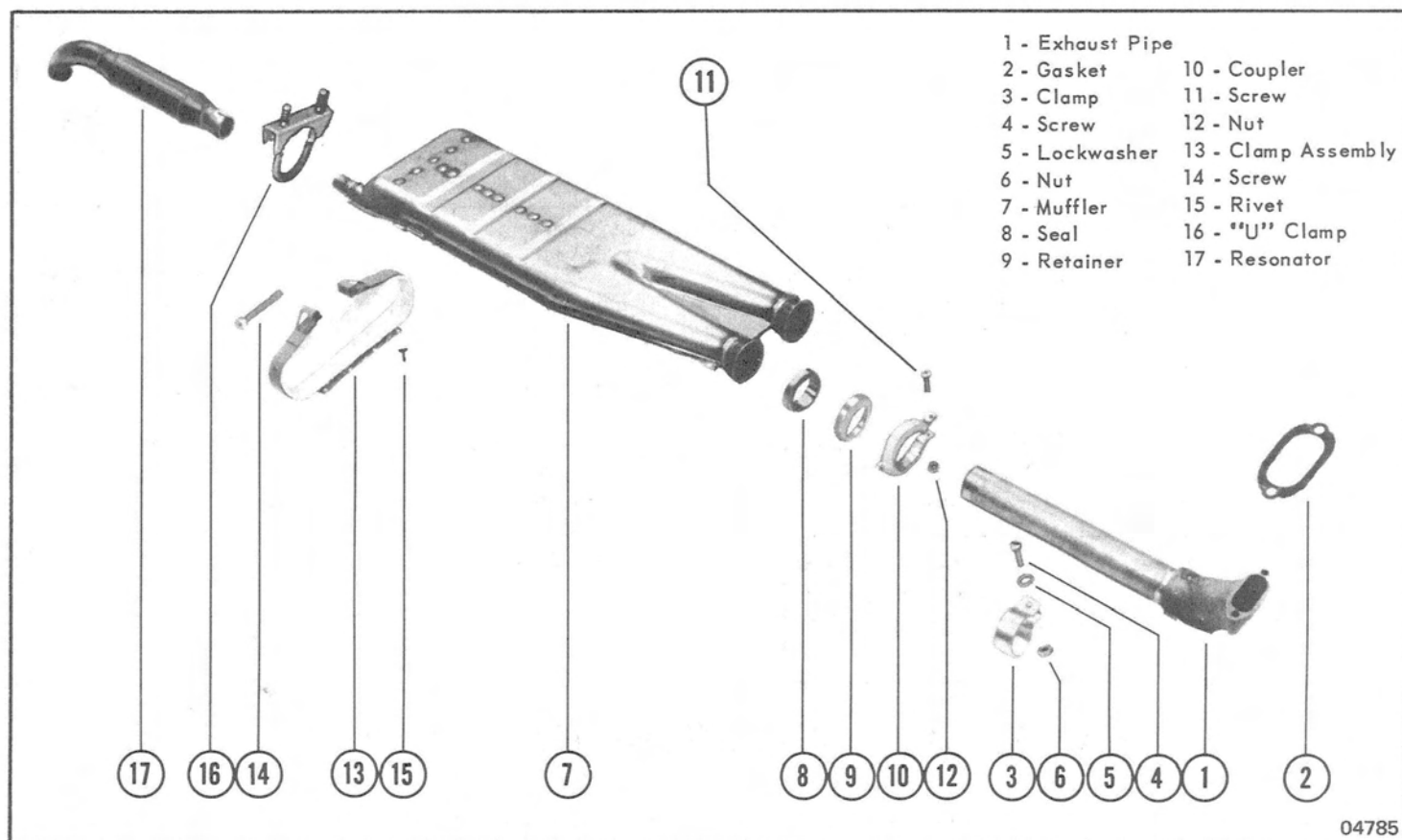


Figure 2. Exhaust Kit Components

EXHAUST SYSTEM - MODEL 250

1. Remove top cowl, dash, seat and backrest.
2. Loosen clamp and remove resonator.
3. Remove screw from muffler clamp. (Figure 1, Items 13-14)
4. Loosen muffler couplings and slide couplings and seal retainers toward engine.
5. Slide muffler off exhaust pipes and lift from chassis.
6. Remove exhaust seals, retainers and couplings from exhaust pipes. (Figure 1, Items 8-9-10)
7. To remove exhaust pipe assembly (Figure 1, Item 1), it will be necessary to remove engine from vehicle.
8. After removing engine, position engine so that exhaust pipes can be removed.
9. Remove exhaust pipe clamps. (Figure 1, Item 3)
10. Remove front engine mounting bracket.
11. Remove nuts and lockwashers from exhaust pipe mounting studs. Lift exhaust pipes and gasket from cylinders.



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Figure 1. Exhaust System Components - 250 Model

INSPECTION

1. Clean and inspect all exhaust system components.
2. Replace all damaged parts.
3. Check exhaust pipe mounting studs to ensure that studs are tight in cylinder. If studs are loose, proceed as follows:
 - a. Remove studs and inspect threads in cylinder. If necessary, threads in cylinder can be restored with Heli-Coil Kit (C-91-59983).
 - b. Reinstall studs in cylinder with Loctite No. 40 and Locquic Primer Grade "T" (C-92-58255A1) per instructions on containers.
4. Inspect exhaust pipe for any restriction.

NOTE: Use Loctite No. 40 where high temperatures are encountered. DO NOT substitute any other grade of Loctite or other adhesive or sealants for this application.

REASSEMBLY

NOTE: Exhaust Kit C-59752A1, designed to eliminate exhaust system leaks and provide flexibility, should be installed during reassembly. (Figure 2)

1. Place new gaskets on exhaust ports and install exhaust pipes. Torque retaining nuts to specifications.

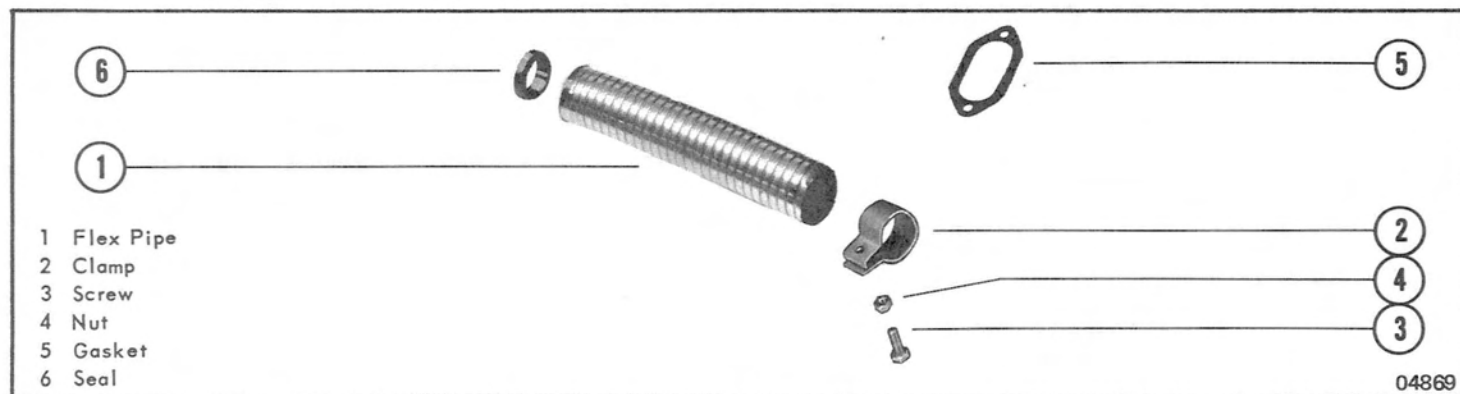


Figure 2. Exhaust Kit Components

NOTE: Exhaust pipes (used with flex pipe kit) must measure 7-7/8" from elbow to end of pipe. If exhaust pipes on engine measure 11-7/8", shorten by cutting 4" off end of each pipe.

2. Install front engine mounting bracket.
3. Apply Exhaust Sealer (C-92-55004A1) to ID of flex pipe on exhaust pipe end. Install flex pipes OVER exhaust pipes (1 1/2") and secure with hanger clamps.

WARNING: To protect hands from cuts and scratches on sharp edge of pipe, use a piece of rubber approximately 4" square to provide a non-slip grip on flex pipe.

4. Remove any burrs created by 1/4" backsaw cut on muffler end of pipe and twist pipe counterclockwise to extend pipe and reduce OD to 2" + 1/16".
5. Reinstall engine in vehicle.
6. Install muffler, guiding flex pipes INTO muffler. Install screw in muffler strap and tighten.
7. Discard muffler seal retainers. (Figure 1, Item 9)
8. Place asbestos muffler seals over flex pipe and against flare on muffler. Reinstall muffler couplings.
9. Install resonator and clamp to muffler outlet.
10. Install dash, top cowl, seat and backrest.

EXHAUST MODIFICATION KIT - 250 Model

If an exhaust pipe loosens from engine or leaks at the muffler connection on a 250 Model Snowmobile, install an exhaust modification kit which consists of flex pipes, exhaust pipe gaskets, muffler seals, hanger clamps and complete installation instructions. Kit installation requires engine removal and modification of the original exhaust pipes.

If exhaust FLEX PIPE breakage is encountered on a 250 Mercury Snowmobile equipped with exhaust modification kit, install a muffler support bracket assembly when new flex pipe(s) is installed.

The muffler support bracket assembly (installation instructions included) mounts under the forward end of the muffler, effectively relieving stress on the flex pipes, which results in longer flex pipe life. The support bracket is designed for use only on 250's equipped with the exhaust modification kit. IT IS NOT intended for use on 250's with original equipment (solid pipe) exhaust systems.

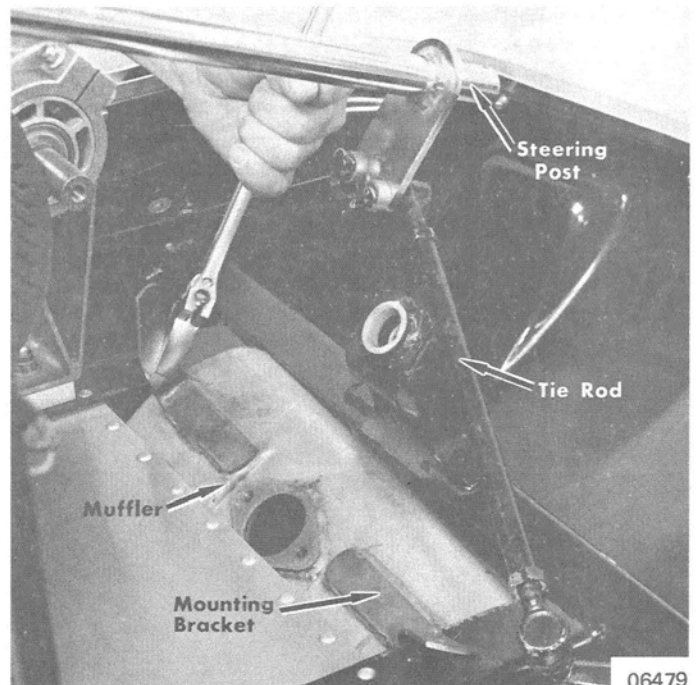
NOTE: When installing an exhaust modification kit or, if replacing damaged flex pipes only, STAINLESS STEEL flex pipes are available as optional equipment and may be used as replacements for galvanized flex pipes, if desired.

EXHAUST SYSTEM - MODEL 200

DISASSEMBLY

1. Remove top cowl.
2. Remove cotter pin and washer from bottom of steering post.
3. Remove screws, washers and nuts which attach steering post to steering support bracket. Remove mounting bracket and bushing from steering post.
4. Lift steering post out of retainer on cross member and move steering post away from muffler. (Figure 1)
5. Remove exhaust pipe and gasket from cylinder and muffler by removing attaching screws, nuts and lockwashers.
6. Remove belt and driven sheave retaining bolt.
7. Remove brake attaching bolts, washers and nuts and let brake hang free on driven sheave.
8. Remove driven sheave from jackshaft and position away from muffler.
9. Remove muffler attaching hardware.
10. Bend mounting brackets on muffler up and remove muffler. (Figure 1)

Figure 1. Bending Muffler Mounting Brackets



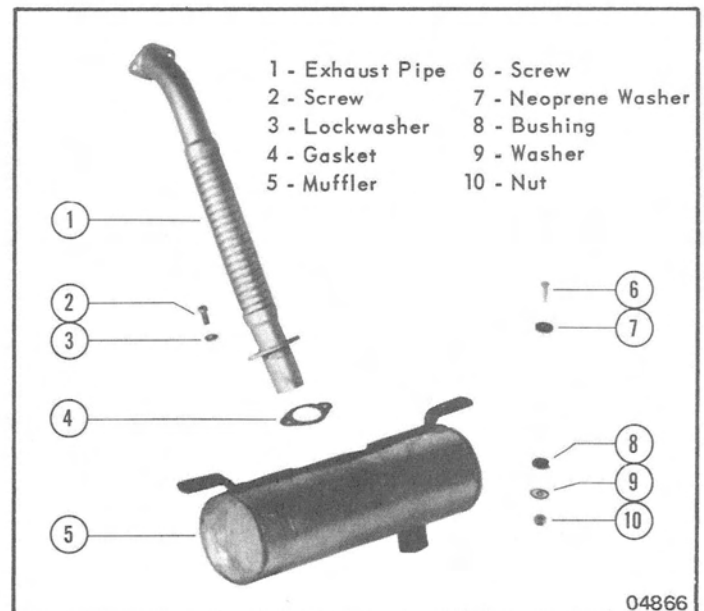
INSPECTION

1. Clean and inspect all exhaust system components.
2. Replace all damaged parts.
3. Inspect exhaust pipe for any restriction.

REASSEMBLY

1. Position muffler in chassis and bend mounting brackets back to original position.
2. Attach muffler to crossmember with attaching hardware. (Figure 2, Items 6-7-8-9-10)
3. Install new gasket and install exhaust pipe in muffler.
4. Install driven sheave and brake assembly.
5. Install new gasket and attach exhaust pipe to cylinder.
6. Place steering post in retainer on crossmember and install washer and cotter pin.
7. Place rubber bushing and mounting bracket on steering post. Attach to steering support.
8. Install top cowl.

Figure 2. Exhaust System Components - 200 Model



EXHAUST SYSTEM - ROCKET (339cc) and LIGHTNING (398cc)

1. Open top cowl.

WARNING: Use caution when handling insulation to avoid cutting fingers and hands on sharp edges.

2. Loosen insulation clamps and fold back insulation.
3. Remove screws, lockwashers and nuts from muffler clamps. (Figure 1, Items 4-5-6-7)
4. Loosen 2 exhaust pipe clamps. Remove muffler and exhaust pipe. (Figure 1, Items 1-2-3)

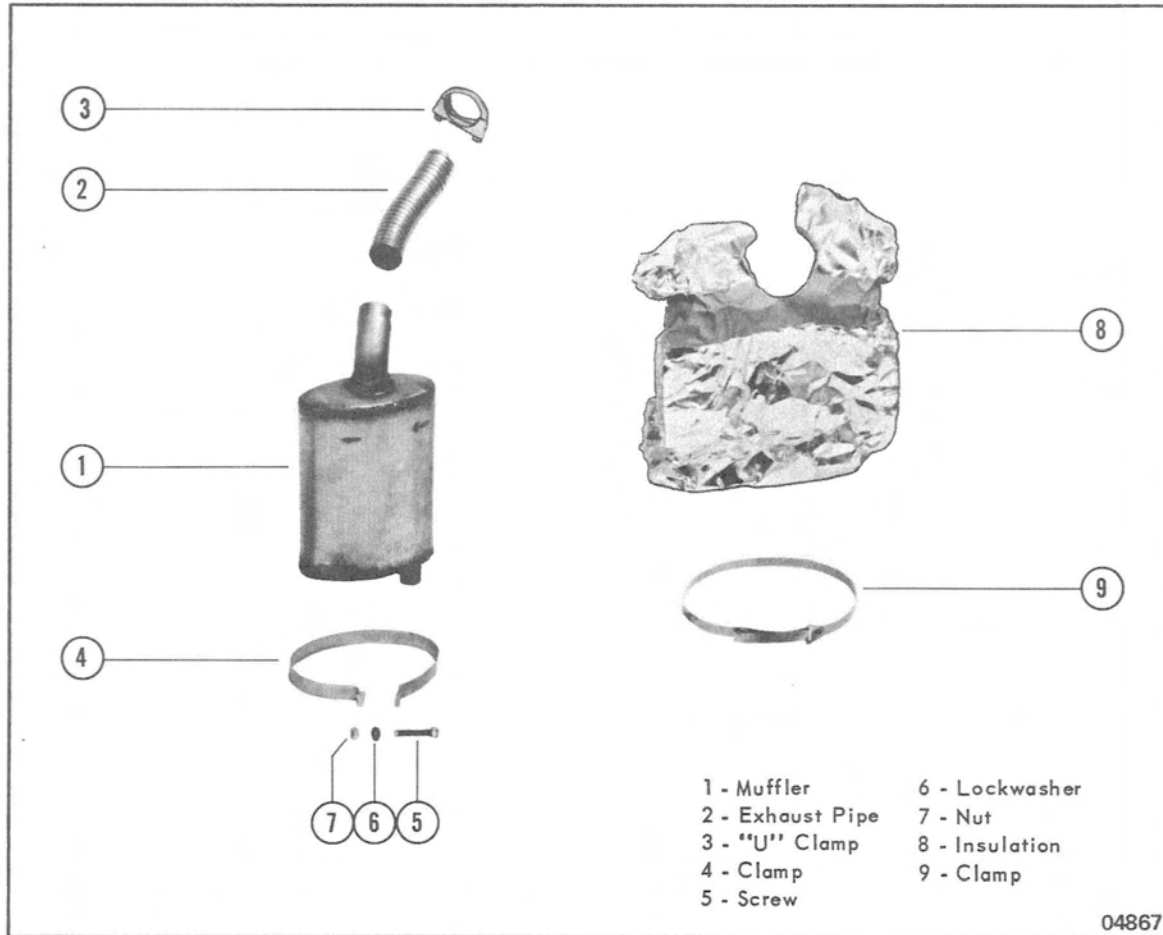


Figure 1. Exhaust System Components - Rocket and Lightning Models

INSPECTION

1. Clean and inspect all exhaust system components.
2. Replace all damaged parts.
3. Inspect exhaust pipe for any restriction.

REASSEMBLY

1. Install exhaust pipe and one clamp on exhaust manifold. DO NOT tighten clamp at this time.
2. Place muffler in vehicle with tab on back of muffler resting on top of mounting bracket.
3. Install exhaust pipe and clamp on muffler but do not tighten clamp.
4. Install screws, lockwashers and nuts in muffler clamps and secure muffler.
5. Tighten "U" clamps which secure exhaust pipe to muffler and exhaust manifold.
6. Wrap insulation around muffler and secure with clamps.
7. Close top cowl.

EXHAUST SYSTEM - HURRICANE (644cc)

DISASSEMBLY (Figure 1)

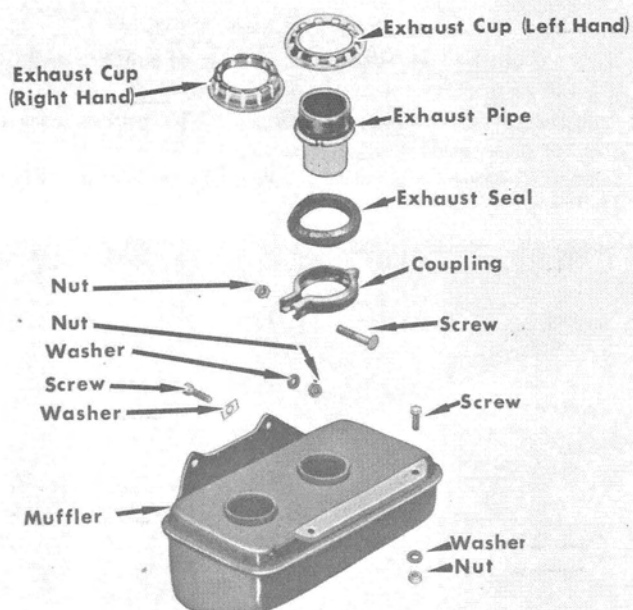


Figure 1. Exhaust System Components

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NOTE: Engine must be removed from chassis in order to remove exhaust system from engine. Refer to Section 5.

1. Remove 4 muffler to engine mounting screws (2 allen head and 2 hex head).
2. Loosen coupling on left and right hand exhaust pipes and remove muffler.

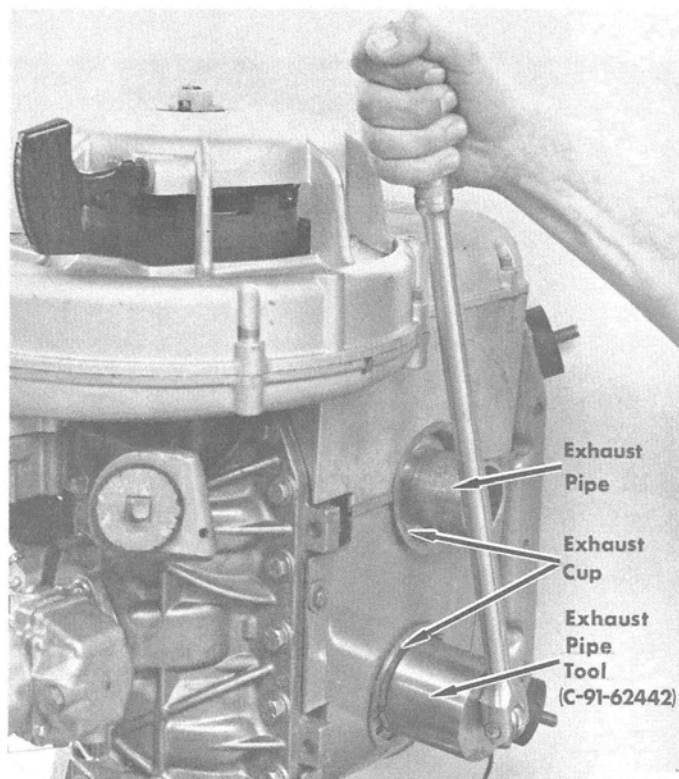


Figure 2. Removing Exhaust Pipes

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3. Remove exhaust pipes from engine with Exhaust Pipe Tool (C-91-62442). (Figure 2) Remove exhaust cups from engine.

INSPECTION

1. Clean and inspect all exhaust system components.
2. Replace all damaged parts.
3. Inspect exhaust pipe for obstructions.

REASSEMBLY

1. Coat exhaust pipe threads with Permatex No. 2 Form-a-Gasket.
2. Install right hand exhaust cup and exhaust pipe to No. 1 cylinder exhaust port (fan end). Tighten exhaust pipe with Exhaust Pipe Tool (C-91-62442) and torque to specifications.
3. Install left hand exhaust cup and exhaust pipe to No. 2 cylinder exhaust port (PTO end). Tighten with exhaust pipe tool and torque to specifications.

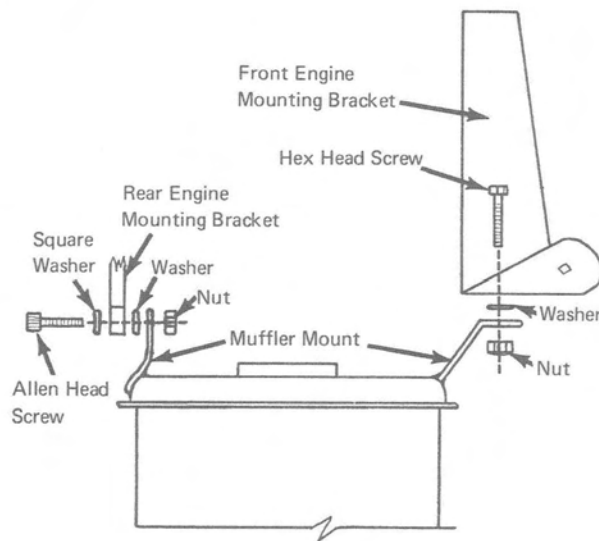
CAUTION: Couplings must be loose enough to prevent damage to seals when reinstalling muffler.

4. Slide muffler onto exhaust pipes.
5. Install muffler to engine with screws, washers and nuts as shown in Figure 3.

NOTE: Make sure that washer is placed between mounting bracket and muffler as shown in Figure 3.

6. Tighten exhaust pipe couplings.

Figure 3. Mounting Hurricane Muffler



EXHAUST SYSTEM

440 MAX (438cc) with CHASSIS

SERIAL NO. 3447382 and BELOW

REMOVAL

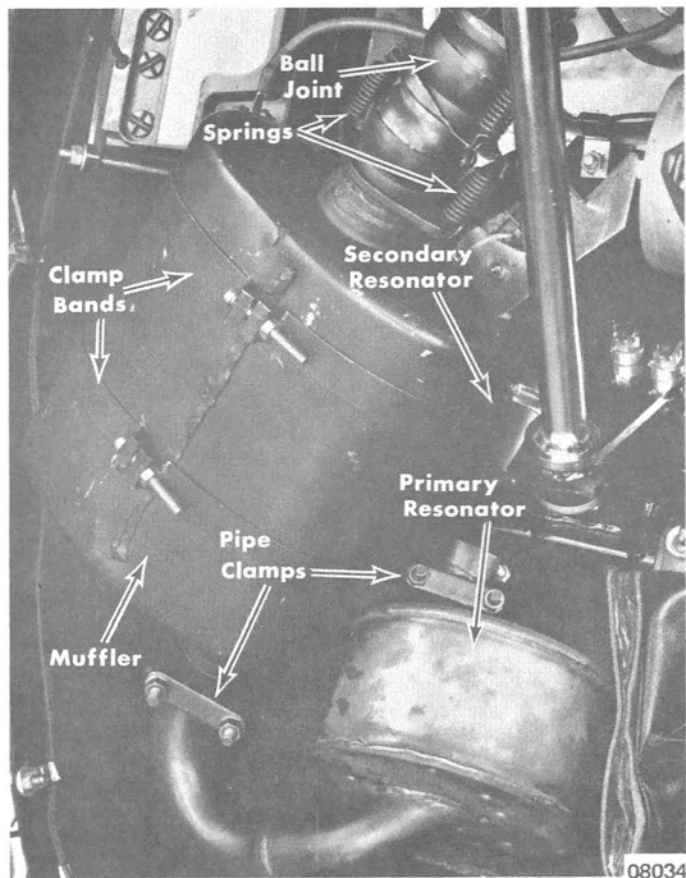


Figure 1. Exhaust System

1. Open top cowl.
2. Unhook 2 ball joint springs. Loosen 2 exhaust pipe clamps (one on each side of primary resonator). (Figure 1)
3. Remove screws, lockwashers and nuts which secure muffler clamp bands. (Figure 1)
4. Position muffler clamp bands over ball joints as shown in Figure 2.

5. Remove muffler by lifting up on rear of muffler and pulling out of primary resonator pipe. (Figure 2)
6. Remove primary resonator (Figure 2) by pulling forward and out of secondary resonator.
7. Loosen 2 clamps and remove secondary resonator. (Figure 1)

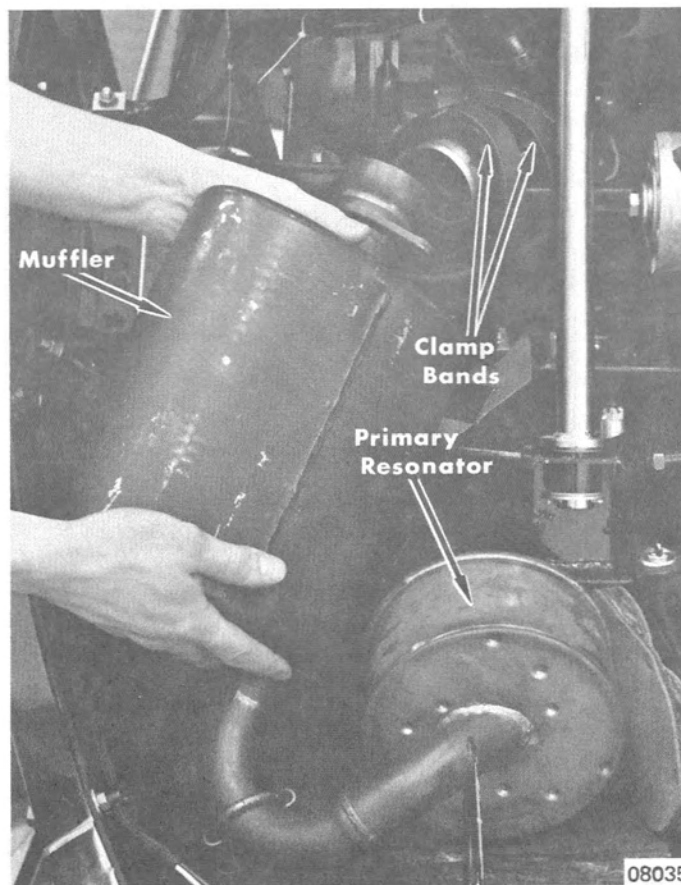


Figure 2. Removing Muffler

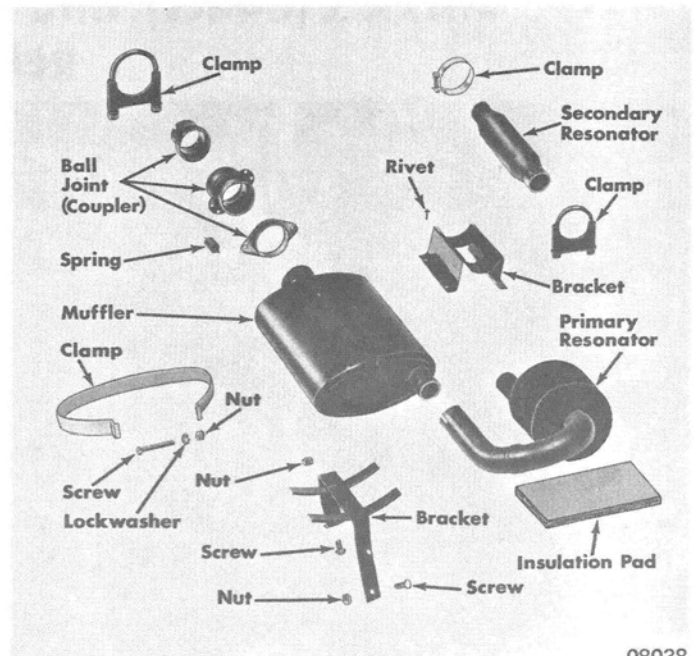
INSPECTION

1. Clean all exhaust system components.
2. Inspect muffler and resonators for cracks, breaks, excessive corrosion and loose baffles.
3. Check exhaust pipes, exhaust manifold and ball joint coupler for obstructions, cracks and breaks.
4. Inspect muffler clamp bands and clamps for cracks and breaks.
5. Replace all components which are damaged or may cause an exhaust leak.

INSTALLATION (Figure 3)

1. Install secondary resonator and secure to bracket with 2 clamps.
2. Place 2 clamps on exhaust pipe of primary resonator (one on each side).
3. Position primary resonator into secondary resonator.
4. Install muffler into primary resonator and align ball joint.
5. Install ball joint coupler springs.
6. Place muffler clamp bands in position around muffler and secure with screws, lockwashers and nuts.
7. Place 2 exhaust pipe clamps in position and tighten.
8. Close top cowl.

Figure 3. Exhaust System Components



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EXHAUST SYSTEM

MARK I (644cc) and MARK II (644cc) MODELS

REMOVAL

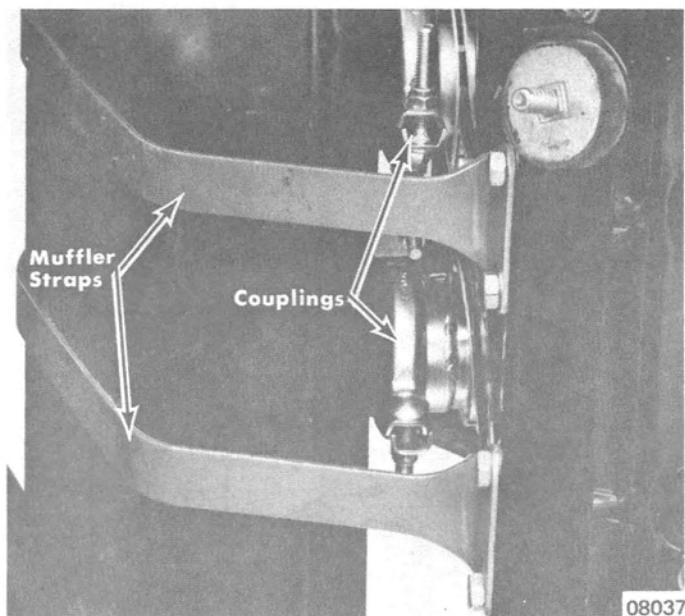


Figure 1. Exhaust System

1. Refer to Section 5, Part D, and remove engine from chassis.
2. Remove muffler straps by removing 6 muffler strap to engine attaching screws (2 allen head and 4 hex head). (Figure 1)

3. Remove exhaust pipe to muffler, couplings and exhaust seals. (Figure 1)
4. Pull muffler assembly and insulator pad (if so equipped) from exhaust pipes.
5. Remove exhaust pipes from engine, using Exhaust Pipe Tool (C-91-65495). (Figure 2) Remove exhaust cups from engine shroud. Exhaust cups (right and left) conform to shape of engine shroud.

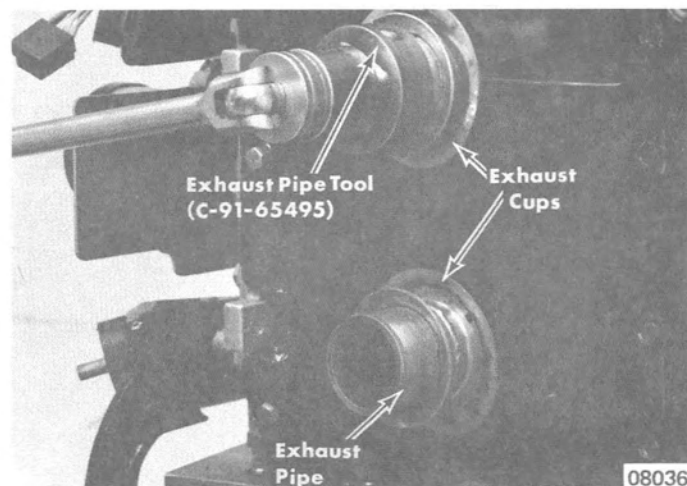


Figure 2. Removing Exhaust Pipes

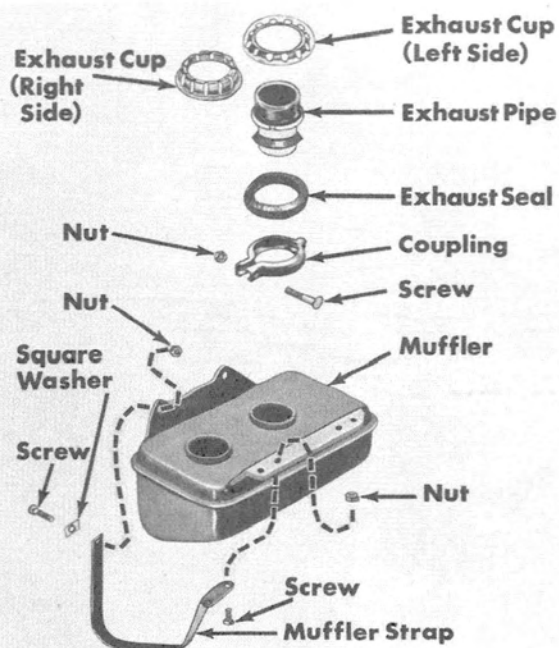
INSPECTION

1. Clean all exhaust system components.
2. Inspect muffler for cracks, breaks, excessive corrosion and loose baffles inside muffler.
3. Check exhaust pipes for obstructions, cracks and breaks.
4. Inspect muffler straps and exhaust seals for cracks and breaks.
5. Replace all components which may cause an exhaust leak or are damaged.

INSTALLATION (Figure 3)

1. Coat exhaust pipe threads with Permatex No. 2 Form-a-Gasket.
2. Install right side (fan end) exhaust cup and left side (PTO end) exhaust cup in engine shroud.
3. Install exhaust pipes with Exhaust Pipe Tool (C-91-65494) and torque to specification. (Refer to "Specifications" Section 8.)
4. Place exhaust seals in position on exhaust pipes and slide muffler and insulator pad (if so equipped) into position on exhaust pipes.
5. Install exhaust pipe to muffler couplings. DO NOT tighten couplings.
6. Install muffler straps and secure with 6 attaching screws. Two allen head screws are used to attach muffler straps to crankcase.
7. Tighten exhaust pipe couplings.

Figure 3. Exhaust System Components

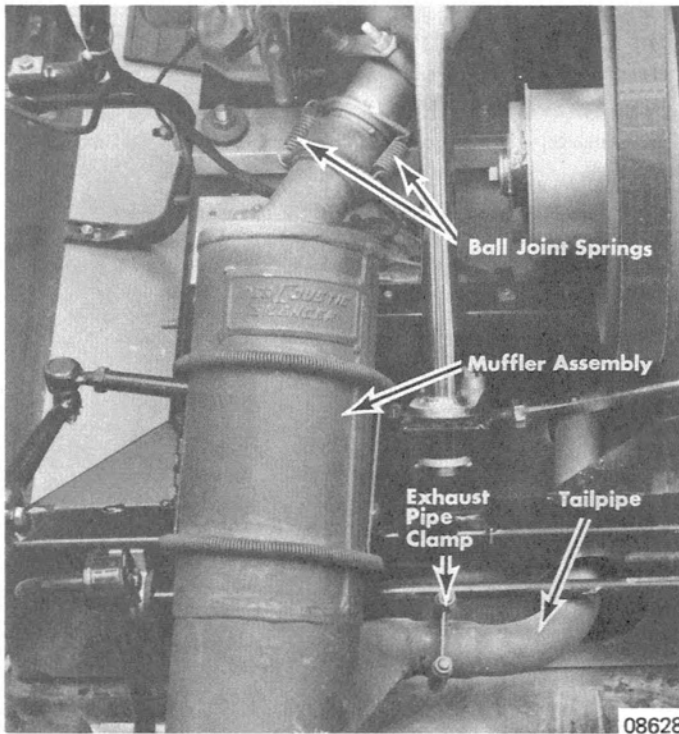


EXHAUST SYSTEM

440 MAX and 440 S/R with CHASSIS

SERIAL NO. 3709838 and BELOW

REMOVAL



1. Open top cowl.
2. Unhook 2 ball joint springs. (Figure 1)
3. Remove 2 springs which secure muffler assembly (Figure 1) to muffler bracket.
4. Remove muffler and tailpipe assembly from chassis.
5. Loosen exhaust pipe clamp (Figure 1) and remove tailpipe from muffler.



Figure 1. Exhaust System

INSPECTION

1. Clean all exhaust system components.
2. Inspect muffler for cracks, breaks, excessive corrosion and loose baffles inside muffler.
3. Check tailpipe and exhaust manifold for obstructions, cracks and breaks. Replace all components which may cause an exhaust leak or are damaged.

INSTALLATION

1. Install exhaust pipe clamp and tailpipe (Figure 1) on muffler. Do not tighten clamp at this time.
2. Insert tailpipe into hole in crossmember and align ball joint with coupler.
3. Install 2 ball joint coupler springs. (Figure 1)
4. Secure muffler assembly to muffler bracket with 2 springs.
5. Be sure that tailpipe is centered in crossmember hole and secure tailpipe to muffler with exhaust pipe clamp. (Figure 1)
6. Close top cowl.

EXHAUST SYSTEM - SNO-TWISTER

REMOVAL

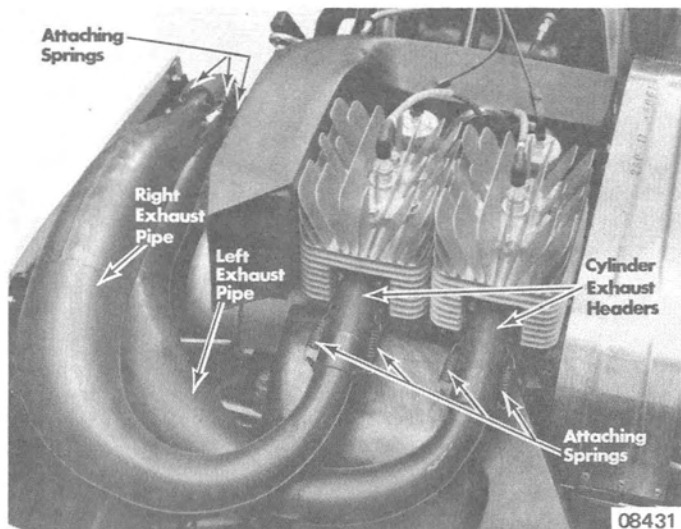


Figure 1. Exhaust Pipes

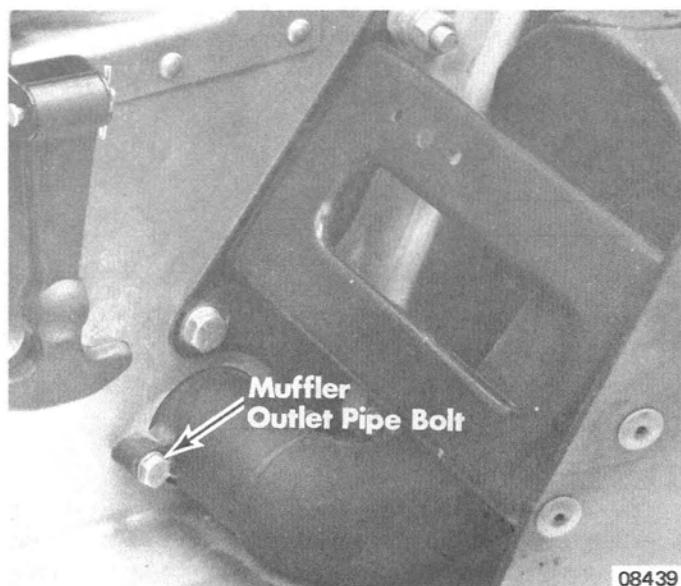


Figure 2. Muffler Removal

1. Remove 4 attaching springs which secure exhaust pipes to cylinder exhaust headers. (Figure 1)
2. Remove 2 attaching springs, which secure right exhaust pipe (No. 2 cylinder - rewind side) to muffler, and pull right exhaust pipe (Figure 1) from muffler seal hose and exhaust header.
3. Remove 2 attaching springs, which secure left exhaust pipe (No. 1 cylinder - PTO side) to muffler, and pull left exhaust pipe (Figure 1) from muffler seal hose and exhaust header.
4. Remove bolt which secures muffler outlet pipe to chassis. (Figure 2)
5. Remove 2 muffler attaching locknuts from upper chaincase thru bolts (Figure 3) and remove muffler.

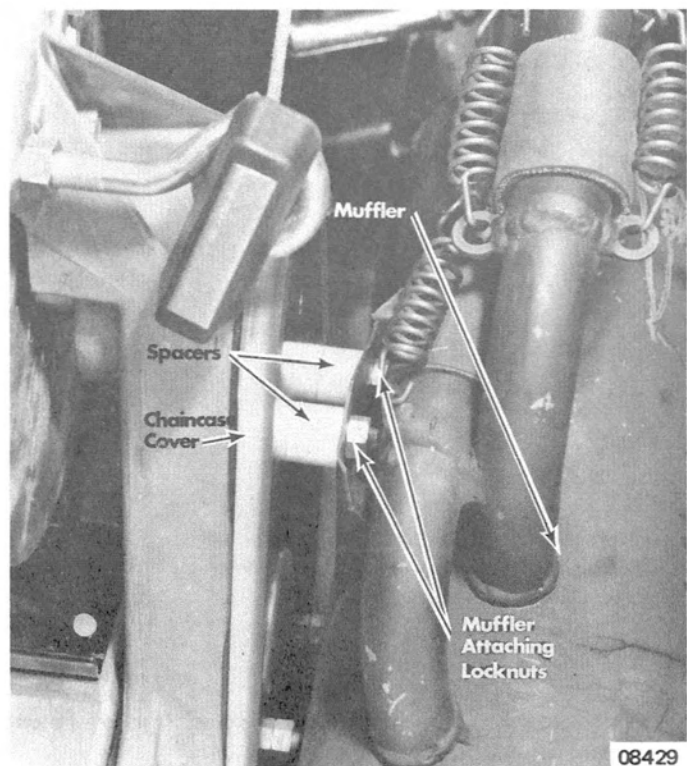


Figure 3. Muffler Removal

INSPECTION

1. Clean exhaust system components.
2. Inspect muffler for cracks, breaks, excessive corrosion and loose baffles inside muffler.
3. Check exhaust pipes for cracks, breaks and obstructions.
4. Replace all components which may cause an exhaust leak or are damaged.

INSTALLATION

1. Install muffler on 2 upper chaincase thru bolts (Figure 3) and secure with locknuts. Tighten locknuts evenly to specification. (Refer to "Specifications" Section 8.)
2. Secure muffler outlet pipe to chassis with bolt and locknut. (Figure 2)
3. Install left exhaust pipe into lower muffler seal hose and on No. 1 cylinder (PTO side) exhaust header. (Figure 1)
4. Install right exhaust pipe into upper muffler seal hose and on No. 2 cylinder (rewind side) exhaust header. (Figure 1) Secure exhaust pipe to muffler and exhaust header with 4 attaching springs.