



INTRUDER
ST440-A1



**SNOWMOBILE
ASSEMBLY &
PREPARATION
MANUAL**

Notice to Dealers

This manual is provided to ensure that the snowmobile is assembled correctly and given proper presale preparation. Your customer expects and deserves a safe, reliable snowmobile, and performance of the steps listed here is essential to that end.

The selling dealer assumes sole responsibility for any unauthorized modifications prior to sale. Refer to your Snow Products Binder for any Service Bulletins specifying Factory Directed Modifications (Special Claims) which must be performed before the snowmobile is ready for sale.

SAFETY AWARENESS

WARNING

THIS WARNING SYMBOL IDENTIFIES SPECIAL INSTRUCTIONS OR PROCEDURES WHICH, IF NOT CORRECTLY FOLLOWED, COULD RESULT IN PERSONAL INJURY, OR LOSS OF LIFE.

CAUTION

THIS CAUTION SYMBOL IDENTIFIES SPECIAL INSTRUCTIONS OR PROCEDURES WHICH, IF NOT STRICTLY OBSERVED, COULD RESULT IN DAMAGE TO, OR DESTRUCTION OF EQUIPMENT.

Whenever you see the symbols shown above, heed their instructions! Always follow safe operating and maintenance practices.

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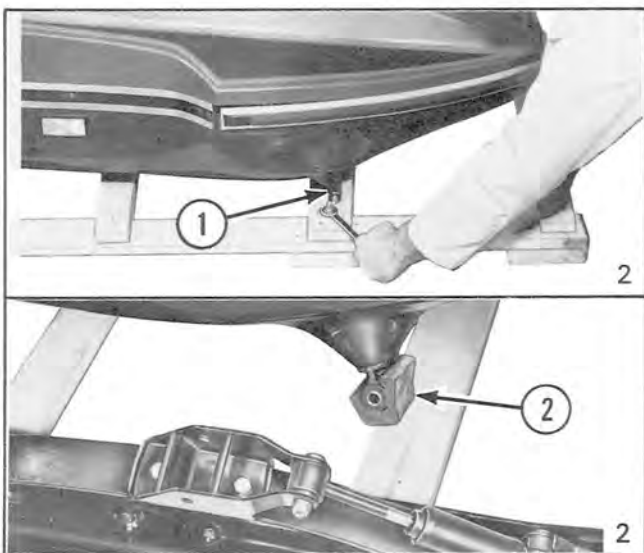
Assembly

Uncrate

Remove the top and side panels from the crate with a pry bar. Remove the plastic covering over the snowmobile by carefully cutting around the base of the crate. Remove windshield from seat. Cut strapping and remove skis and packing. See Figure 1.



Unscrew the nuts securing the ski spindles to the skid. See Figure 2.



- 1. Ski Spindle
- 2. Ski Attitude Bumper

WARNING

To prevent personal injury, use lifting equipment with approved safety hooks when raising the snowmobile.

With assistance, or the use of a hoist, carefully lift the snowmobile from the skid. Thoroughly inspect the snowmobile for shipping damage and missing parts.

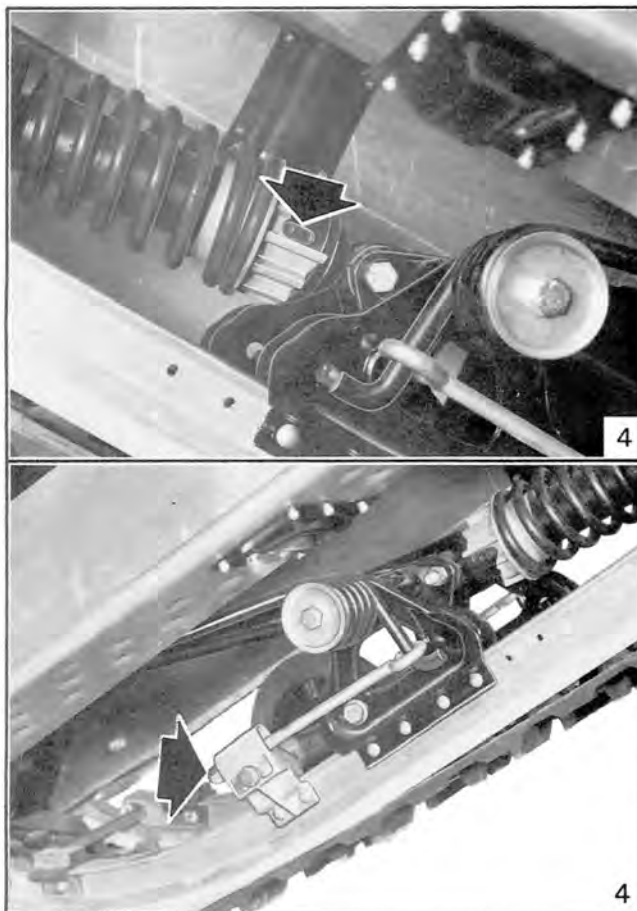
Skis

With one side of snowmobile raised, install ski attitude bumper as shown, then install the skis with the bolts provided. Torque the nuts 28 to 32 foot pounds (3.9 to 4.5 kg-m). Install both skis and return the snowmobile to its upright position. See Figure 3.



Suspension

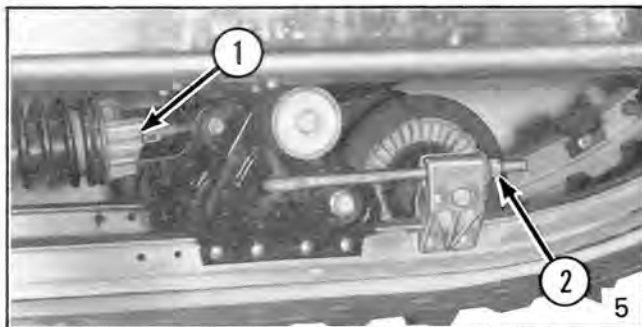
The snowmobile is shipped with the suspension springs at lowest preload. See Figure 4.



1. Position the snowmobile on its side on a protective surface and tighten the front suspension spring adjusting nuts to 1 inch (25.4 mm) when measured from the washer face to the end of the adjusting bolt.

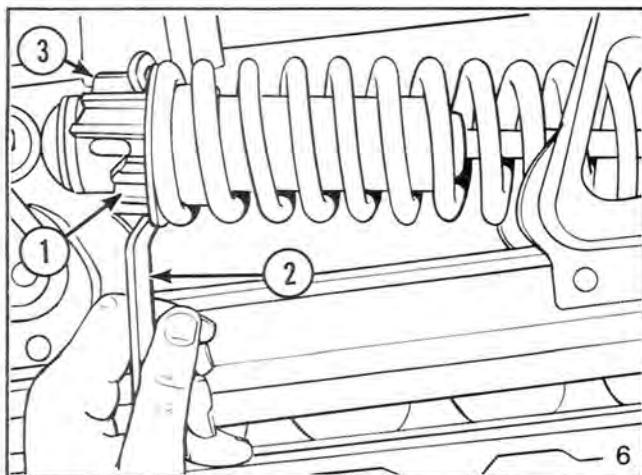
CAUTION

Always adjust the preload (tension) of the springs on each side of the suspension arm equally. Unequal tension can cause spring breakage or excessive wear to one side of the slider wear strips. See Figure 5.



1. Cam in Second Position
2. Suspension Spring Adjusting Nut

2. Adjust the rear shock/spring cam to the second position, using cam wrench which is included in tool kit.



1. Second Position
2. Spanner Wrench
3. Cam

The suspension spring preload settings given are for average driver weight. The operator may change the suspension adjustment, to satisfy rider comfort, by following the procedure outlined in the Owner Manual.

Windshield

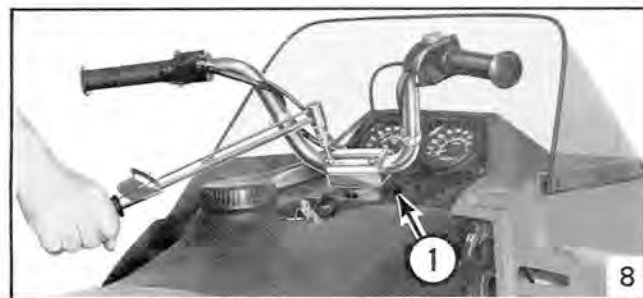
Remove the protective film and install the windshield with the rubber well nuts and screws provided. See Figure 7.



Turn windshield retaining screws in until they are snug and the rubber is flared.

Handlebar

Adjust the handlebar for a comfortable driving position and evenly torque the four Allen screws 7 to 9 foot pounds (1.0 to 1.2 kg-m). See Figure 8.



1. Cutaway Section of Console

CAUTION

Adjust the handlebar so it does not hit the windshield, when turning in either direction.

Check the routing of the cables and wire harnesses for proper positioning. They should pass through the cutaway section in the console to provide adequate free movement of the handlebars. See Figure 8.

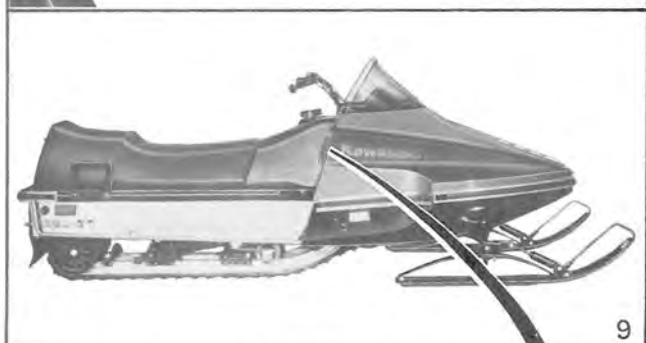
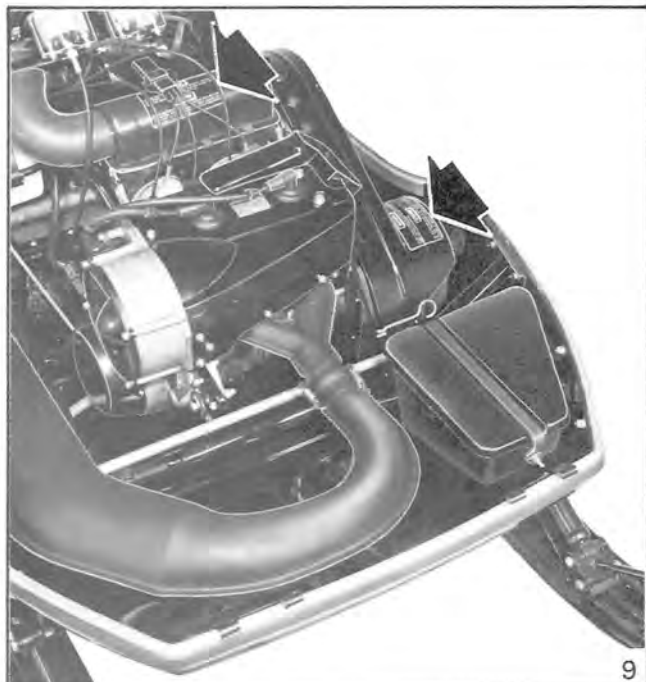
Tool Kit/Owner Manual

Check the storage box to be sure it contains the Tool Kit and Owner Manual.

Safety Labels

WARNING

Insure that all safety decals are properly located and secure. See Figure 9.

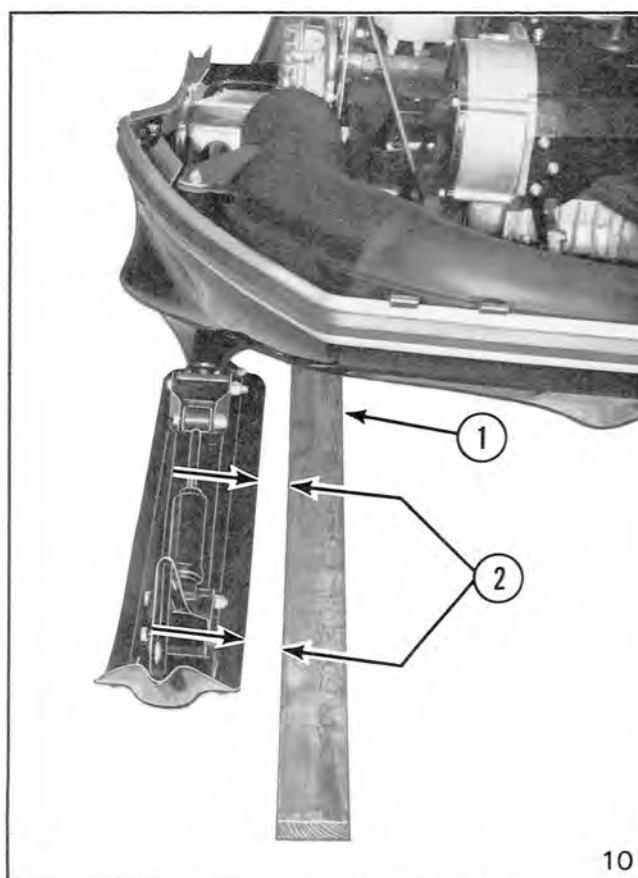


Preparation

Steering Alignment

Check the ski alignment and handlebar centering.

1. Place a long board (or suitable straight edge) against the righthand edge of the track and measure the clearance between the board and ski. Position the righthand ski so that the clearance measured is the same at the front and rear of the ski. See Figure 10.



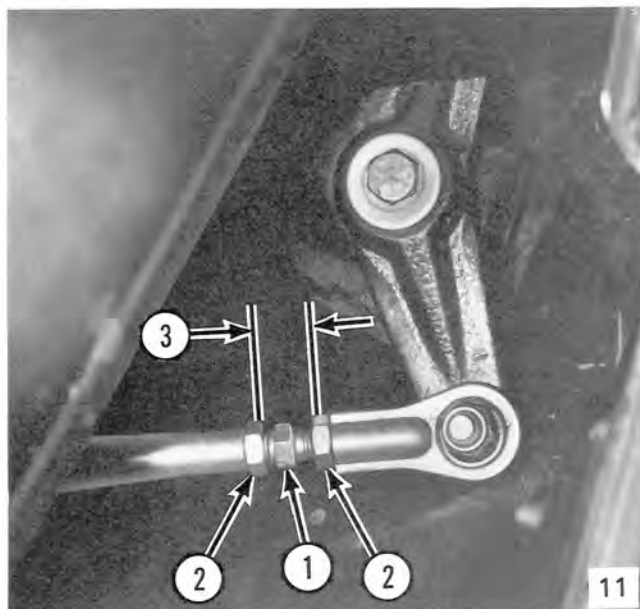
1. Straight Edge Against Track
2. Measure Clearance Here

NOTE: Be sure the ski remains parallel to the straight edge while turning the tie rod length adjusting stud.

2. Check the handlebar for centering. If centering is required, loosen the lock nuts and turn the tie rod length adjusting stud to center the handlebar. See Figure 11.

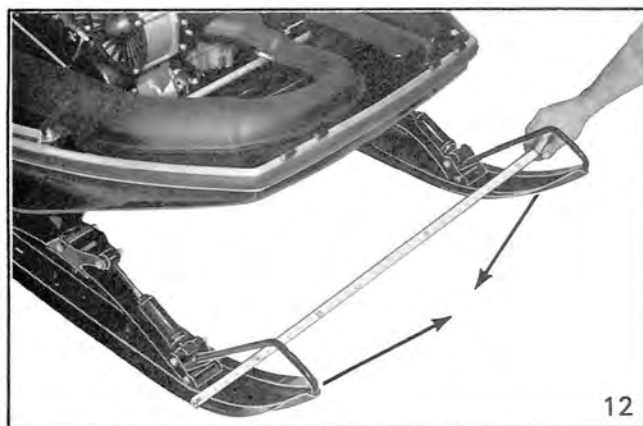
WARNING

The dimension shown must not exceed 1-1/4 inch (32 mm) to prevent possible steering linkage failure. See Figure 11.



1. Tie Rod Length Adjusting Stud
2. Locknuts
3. 1-1/4 Inch (32 mm) Maximum

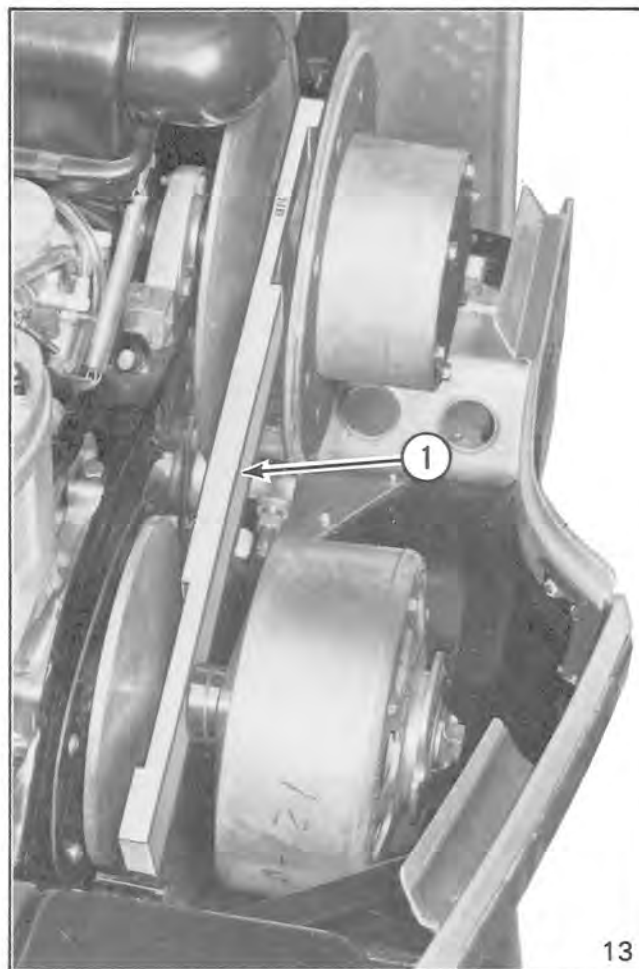
3. To align the other ski, move both ski tips toward the center of the snowmobile to remove the steering linkage play. Loosen the tie rod end locknuts and turn the tie rod to obtain equal distance from ski to ski when measured at the front and rear of the skis. See Figure 12.



4. Torque all the hardware (nuts, bolts, etc.) in the steering system. Refer to the torque chart for the recommended values.

Drive and Driven Converter Alignment

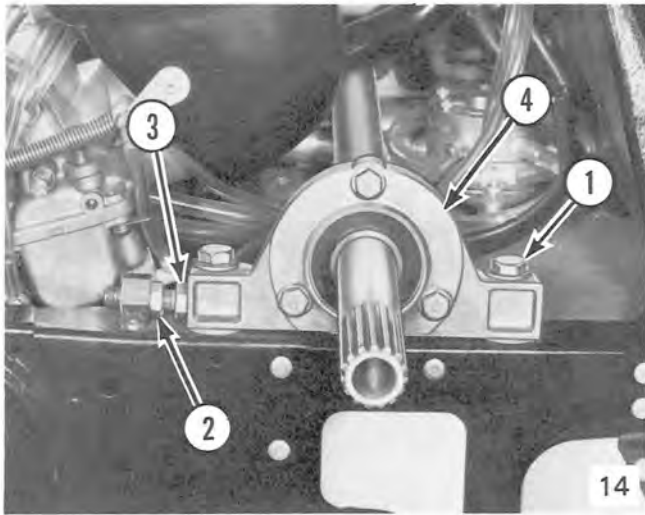
Correct converter center-to-center distance of 12.0 inches (304.8 mm), and converter offset distance 0.588 inches (14.9 mm) is obtained when alignment gauge P/N 57001-3503 is correctly installed between drive and driven converter sheaves. Figure 13.



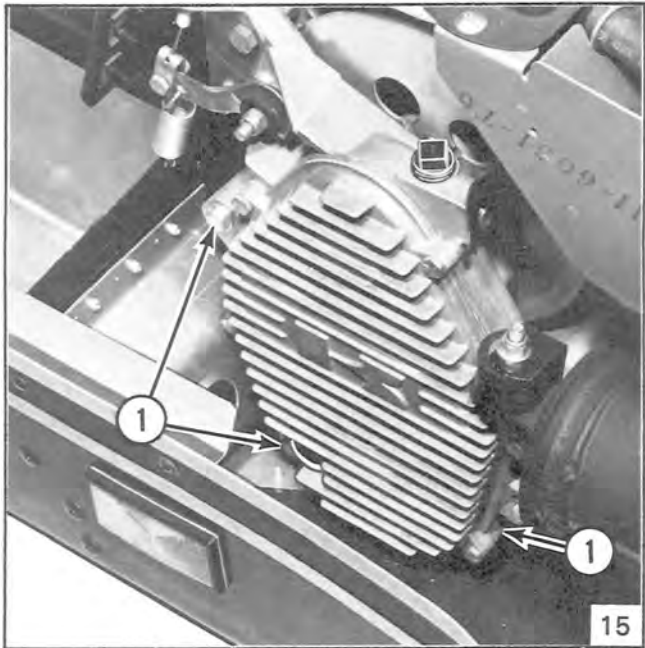
1. Alignment Gauge P/N 57001-3503

Center-To-Center Distance

1. Remove belt guard and remove drive belt.
2. Rotate driven converter moveable sheave assembly clockwise, and insert alignment gauge between sheaves. Carefully release moveable sheave assembly allowing spring tension to retain gauge in position between stationary and moveable sheave assemblies.
3. Position opposite end of alignment gauge over drive converter shaft.



1. Bearing Support Bolts
2. Adjusting Bolt Lock Nut
3. Adjusting Bolt
4. Bearing Support

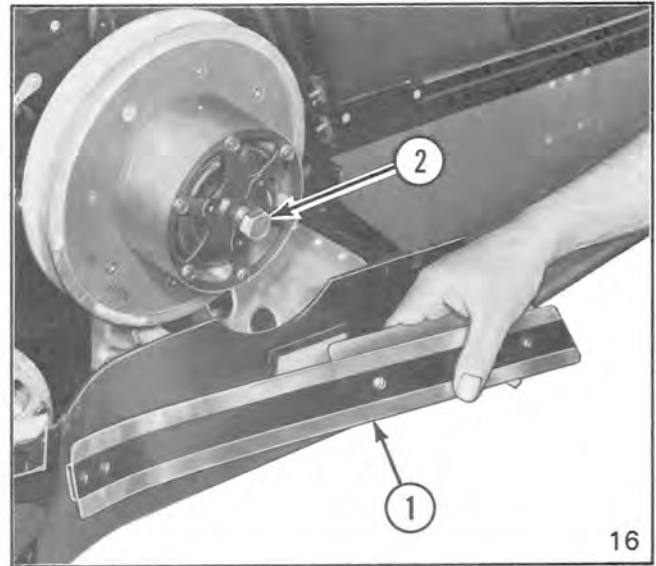


1. Mounting Nuts

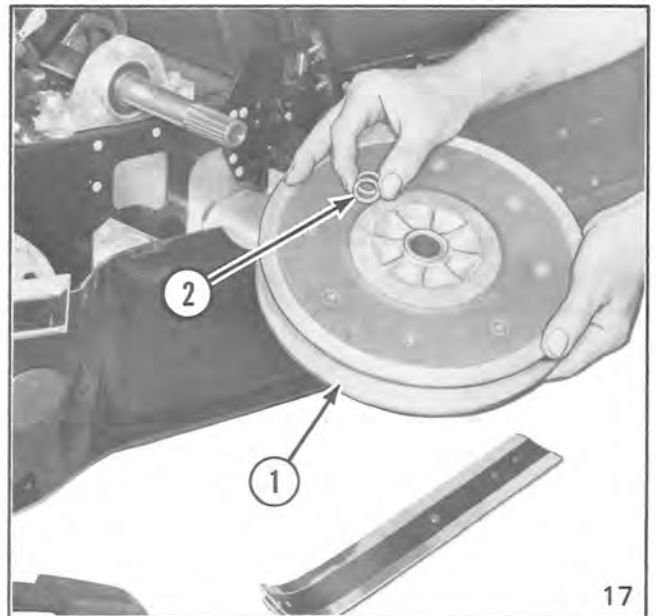
4. If adjustment of the converter center distance is required, loosen the four mounting nuts on the chaincase and the jackshaft bearing support bolts. Push forward or rearward on the jackshaft until alignment gauge can be installed between the drive and driven converters. See Figure 13. Tighten the bearing support bolts and the chaincase mounting nuts. Position head of adjusting bolt against bearing support and secure with lock nut. See Figures 14 and 15.

Offset Distance

1. Correct off set distance 0.588 inches (14.9 mm) is obtained when drive converter stationary sheave fits against recess of alignment gauge when gauge is positioned on shaft.
2. If adjustment is necessary, remove left side aluminum trim from lower pan by removing mounting hardware. See Figure 16. Lower pan is notched to allow driven converter removal.



1. Aluminum Trim
2. Retaining Bolt



1. Driven Torque Converter
2. Shims

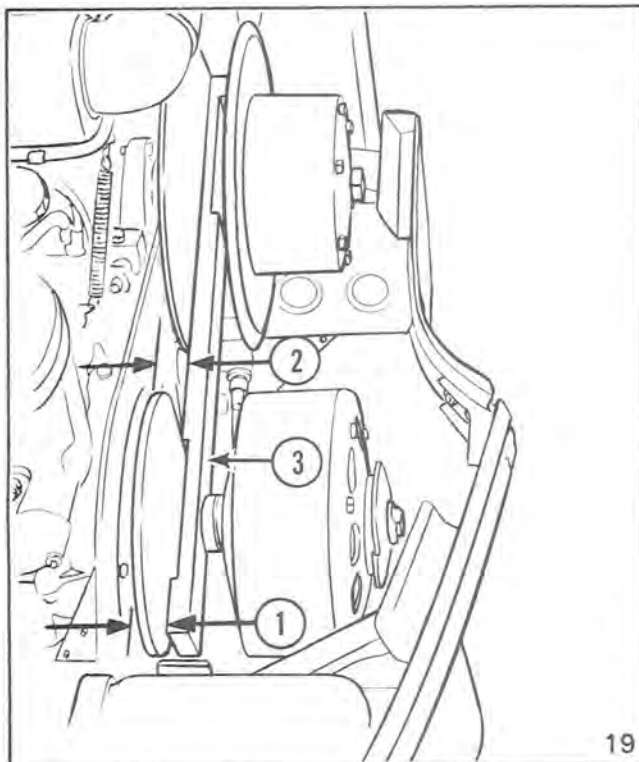
3. Remove the large bolt that retains the driven converter to the jackshaft and remove the driven converter. See Figures 16 and 17.
4. Add or remove shims from the bore of the driven converter to obtain the 0.588 inch (14.9 mm) offset. See Figures 17 and 18.
5. Reinstall the driven converter. Secure with retaining bolt torqued to 55 to 60 Ft. Lbs. (7.61 to 8.30 kg-m).

SHIMS AVAILABLE	
P/N	THICKNESS
92025-3501	.032 INCHES (0.81 mm)
92025-3502	.063 INCHES (1.60 mm)
92025-3503	.100 INCHES (2.54 mm)

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Parallelism

1. When checking the center-to-center and offset distances, parallelism must be checked by measuring dimensions A and B as shown in Figure 19. Compare dimensions A and B against Notes I, II, and III.



1. Distance "A"
2. Distance "B"
3. Alignment Gauge P/N 57001-3503

NOTE I: Dimension A must be more than dimension B.

NOTE II: Dimension A must never exceed dimension B by more than 1/16 inch (1.6 mm).

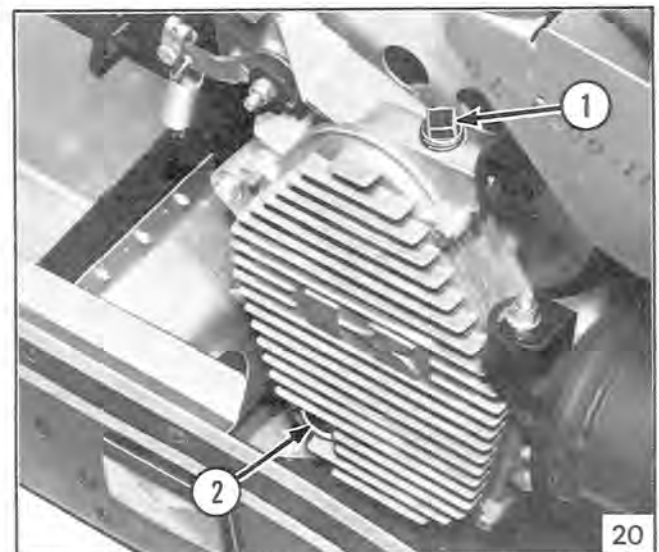
NOTE III: If dimension A is more than dimension B, correct offset as described in Offset Distance.

2. If dimension A is less than dimension B, parallelism between engine crankshaft and driven pulley is not correct. Parallelism must be adjusted as follows:
 - a. Loosen the large bolt in each of the two engine mounts on the right side of the engine.
 - b. Move the right side of the engine either toward the front or rear whichever is necessary.
 - c. Securely tighten the large bolts in the two engine mounts after parallelism is obtained.

Chaincase

NOTE: Use DEXRON II Automatic Transmission Fluid when filling the chaincase.

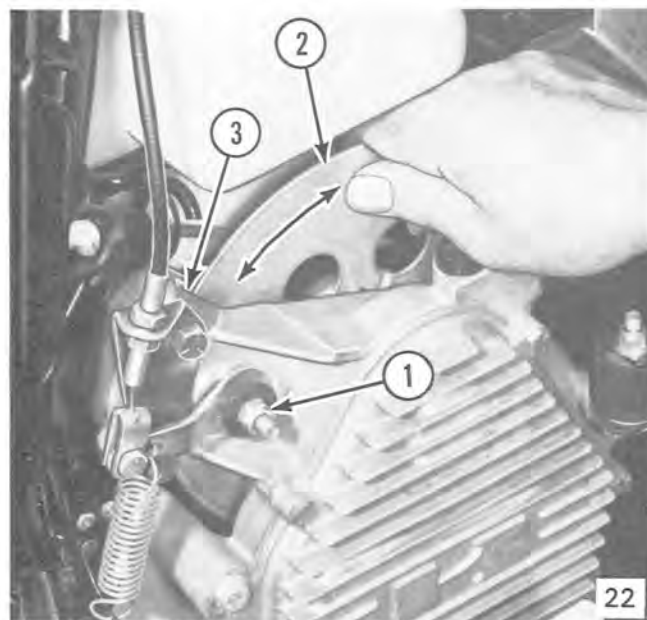
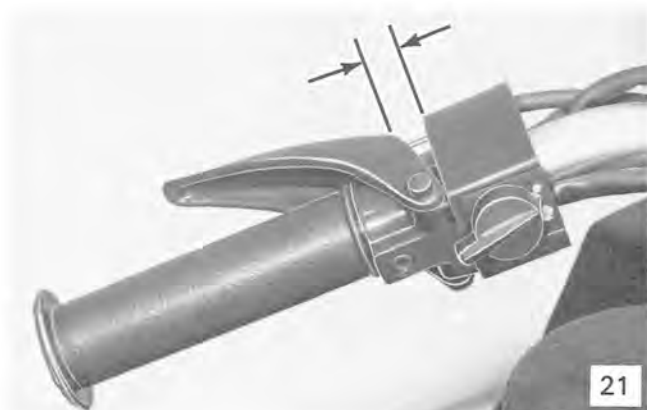
Check the chaincase fluid level. Fluid level must be between the center and the top of the window. If additional fluid is required, remove the upper plug in the chaincase and pour DEXRON II automatic transmission fluid into the chaincase until correct level is attained. This provides the proper lubrication for the chain and bearings. See Figure 20.



1. Upper Fill Plug
2. Fluid Level Gauge

Brake

Check the brake adjustment to be sure the brake disc can be moved back and forth with just a very slight brake drag on the brake disc and that the brake lever movement is less than 3/4 inch (19 mm) when applying the brake. See Figure 21.



1. Brake Adjusting Nut
2. Brake Disc
3. Brake Pads

WARNING

DO NOT OVERTIGHTEN the brake because damage to components, or personal injury could result

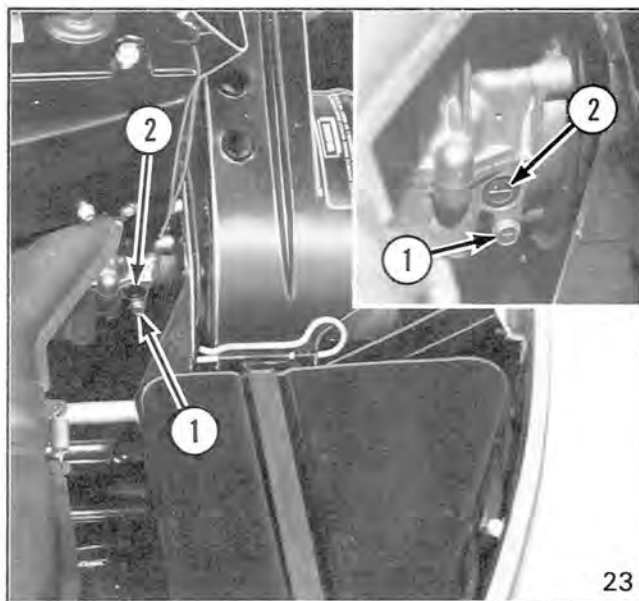
If brake adjustment is required, turn the adjusting nut while simultaneously moving the brake disc back and forth until the brake pads just begin to move with the disc. See Figure 22.

Wiring Harness

Check the connectors on the wiring harness to be sure they are properly located and secure.

Oil Pump Gearcase

Check and fill engine oil pump gearcase. Use Shell XL 100 10W-30 nonfoaming engine oil. Level should be above center of sight glass but not higher than the top. See Figure 23.



1. Gearcase Drain Plug
2. Oil Level Sight Glass

Oil Tank

We recommend using Kawasaki Snowmobile oil. This oil is specially formulated to give minimum piston ring varnish and combustion chamber deposits along with excellent lubrication qualities. Oil tank capacity is 2-1/2 quarts (2.37 liters). THE OIL TANK HAS NO FILTER. DO NOT ALLOW DIRT TO ENTER WHILE FILLING.

The use of fuel additives such as "tune-up tonics" and "super oils" are NOT RECOMMENDED.

In an emergency situation when Kawasaki Snowmobile Oil is not available a B.I.A. certified TC-W oil may be substituted.

After filling the oil tank for the first time, disconnect the oil line at the pump and, allow the air to bleed out.

CAUTION

Failure to bleed the air out of the oil line can cause severe engine damage.

Fuel/Oil Mixture (Ratio)

The fuel-to-oil ratio required is automatically controlled at the engine oil pump.

The oil pump is a variable ratio pump, at idle the fuel/oil ratio is approximately 110 to 1 increasing with throttle position to approximately 25 to 1 at maximum power.

Fuel

Use leaded gasoline with a minimum PUMP POST OCTANE NUMBER of 89.

WARNING

Gasoline fumes are heavier than air and can become explosive if exposed to a pilot light from a furnace, hot water heater, clothes dryer, etc. Fill the fuel tank only in an area that is well ventilated and free from pilot lights and sparks.

Before removing filler cap from the fuel tank, remove any ice, snow, or water from around the fuel tank opening to prevent contamination of fresh fuel mixture.

Fill the fuel tank slowly and pour the fuel into the tank using a funnel with a fine mesh screen.

CAUTION

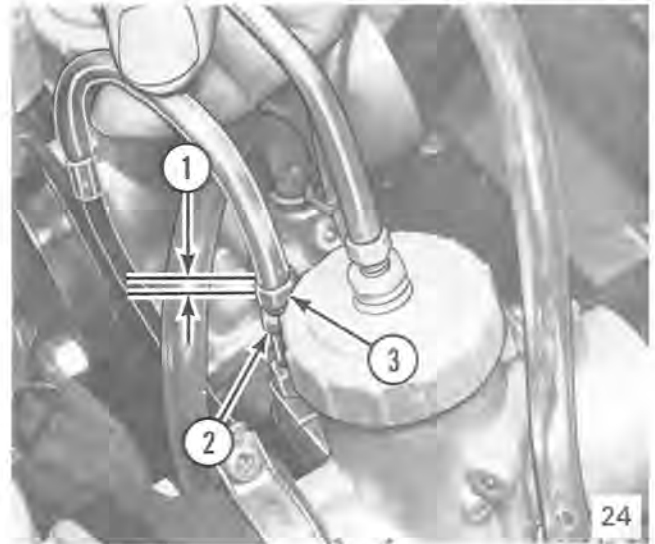
Each time gas tank is filled - check for adequate oil level fill the oil tank with KAWASAKI SNOWMOBILE OIL. A full oil tank assures proper oil/fuel ratio will be maintained to prevent serious engine damage.

Enrichener Control

With the enrichener lever at off, the outer casing of the enrichener cable should have 1/16 inch (1.5 mm) of free movement when raised. Check both carburetors. See Figure 24.

NOTE: Engine flooding may occur if the enrichener cable free movement is less than 1/16 inch (1.5 mm).

If adjustment of the enrichener cable is required, loosen the locknut and turn the adjusting screw to obtain the correct clearance. After check or adjustment reposition the boot over fitting.



1. 1/16 Inch (1.5 mm)
2. Locknut
3. Adjusting Screw

Throttle Cable

CAUTION

If a gap between the throttle lever and handlebar grip is present when the lever is at full throttle, excessive stress may be placed on the throttle cable ends which could cause cable failure.

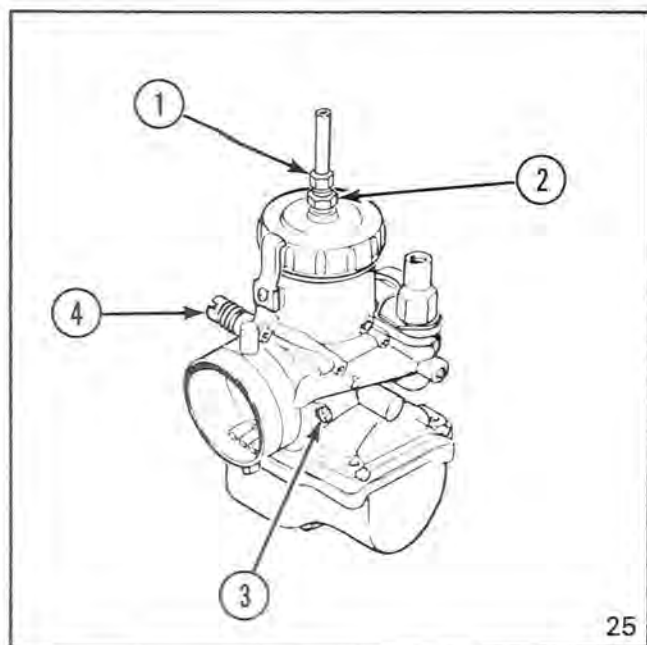
With the air silencer removed from the carburetors, hold the throttle lever at the full throttle position and check that:

1. The throttle slides inside the carburetor bores open fully and are synchronized.
2. The throttle lever is tight against the handlebar grip.

If adjustment of the throttle is required, loosen the locknut, and turn the adjusting screw on the throttle cable as required, and tighten the locknut. See Figure 25. Replace intake silencer.

CAUTION

When reinstalling intake silencer the intake hose must be directed rearward. Failure to do so will cause engine damage.



1. Locknut
2. Adjusting Screw
3. Air Screw
4. Idle Stop Screw

Synchronization of Oil Pump and Carburetors

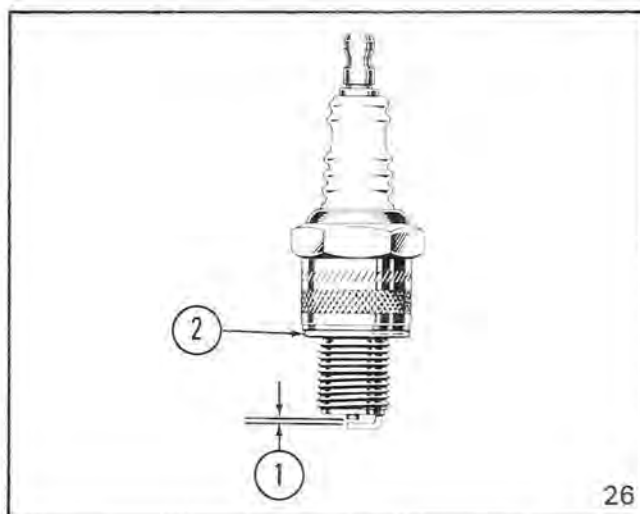
To assure adequate oil to the engine, synchronize the carburetors and oil pump by the following procedure:

1. Remove intake silencer assembly by disconnecting four springs.
2. Loosen throttle idle stop screws so the slides are bottomed out.
3. Adjust carburetor control cables so they are equal and all slack is taken up. Do the same for the oil control lever cable. Tighten locking nuts.
4. Throttle slides and pump lever should start to move in unison, when throttle lever is moved.
5. Replace intake silencer and secure with four springs.

Spark Plugs

Adjust the spark plug gap to 0.024 inch (0.6 mm). See Figure 26.

Before installing the spark plugs, be sure the washer is installed and the seat on the cylinder head is clean. Install the spark plug and torque it 18 to 20 foot pounds (2.5 to 2.8 kg-m).



1. Gap
2. Washer

Carburetor Adjustments

Air Screw

The carburetor air screw is properly adjusted when opened 1.5 to 2 turns off its seat. Refer to the specifications page and see Figure 25.

Idle Screw

The idle speed screw initial adjustment is 3 turns open from coil bound, (screw turned in tight), refer to the specifications page. Refer to the tachometer and adjust the engine idle speed to 2,500 R.P.M. See Figure 25.

Make sure the fuel pump pulse line, all the fuel lines and all oil lines are secure and free of kinks or sharp bends.

Ignition Timing Adjustment

1. Remove recoil starter. Remove the right hand side spark plug and install a dial indicator in the spark plug hole. See Figure 27.
2. Position the recoil side piston at 0.073 inch (1.86 mm) before top dead center.
3. Check that the "F" mark on the flywheel aligns with fixed mark on the magneto housing.
4. Remove the dial indicator and replace the spark plug and lead wire.
5. Connect a strobe type timing light to the right hand side spark plug lead, follow light manufacturer's instructions. See Figure 28. Use the snowmobile tachometer to measure R.P.M.



1. Dial Indicator



1. Timing Light

6. With torque converter belt removed and guard secured in place, start the engine with emergency start rope on drive converter, run at approximately 6,000 R.P.M., and direct the timing light at the fixed mark on the magneto housing. The ignition timing is correct when the "F" mark on the flywheel appears in alignment with the fixed mark on the magneto housing as the light flashes. Shut off engine.

WARNING

Do not touch the spark plug leads while engine is running as they will transmit a powerful electrical shock. Do not touch the hot exhaust system. A severe burn would result.

7. If the timing is incorrect, remove fan belt pulley, loosen the stator plate screws through holes in the flywheel, and reposition the stator plate as necessary. See Figure 29.



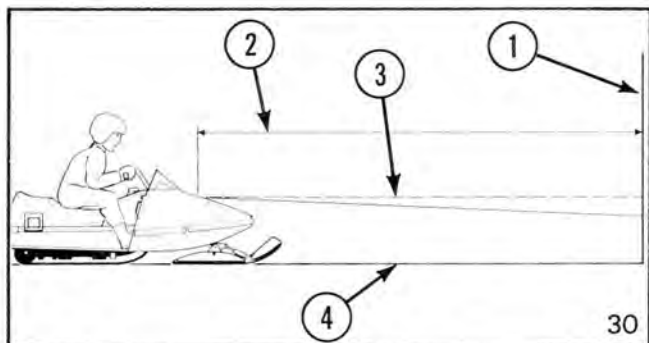
CAUTION

When adjusting the stator plate, take care not to damage the coil windings.

8. Tighten the stator plate screws reinstall fan belt pulley and recheck timing.
9. When the ignition timing is correct, remove the timing light and replace the recoil starter.

Headlight Adjustment

1. Position the snowmobile on a level floor so the headlight points at a wall 25 feet (7,620 mm) away.
2. Measure the distance from the floor to the center of the headlight and mark the wall at the dimension measured (reference mark). See Figure 30.

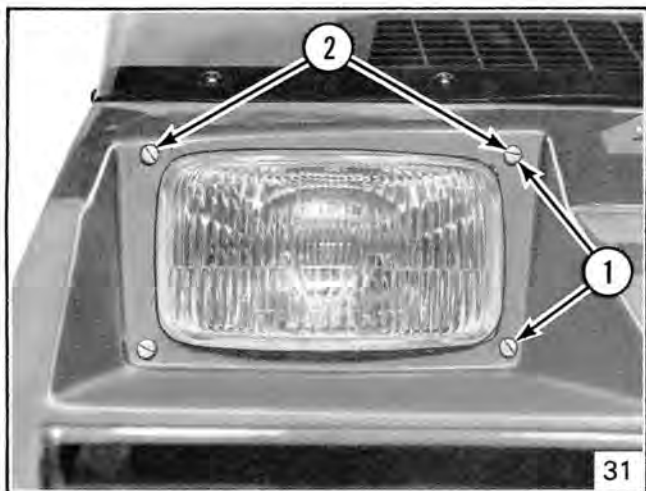


1. Wall
2. 25 Feet (7,620 mm)
3. Reference Mark (center of headlight to floor)
4. 2 Inches (51 mm) Below Reference Mark

WARNING

If adjusting the headlight indoors, provide proper ventilation to prevent possible carbon monoxide poisoning.

NOTE: Be sure an operator is seated on the snowmobile while the engine is running to prevent the vehicle from creeping ahead, and to assure proper aiming.



1. Horizontal Adjusting Screws
2. Vertical Adjusting Screws

3. Turn on the headlight high beam. The headlight is properly aimed when the high beam is centered and aimed 2 inches (51 mm) below the reference mark on the wall. See Figure 30.
4. If headlight adjustment is required, turn the adjusting screws as required. See Figure 31.

Check the operation of the headlight low beam.

Tail/Brake Light

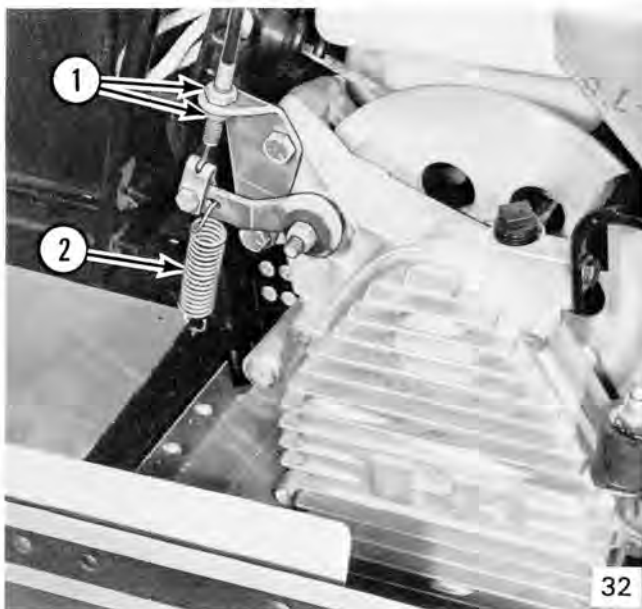
The taillight will operate only when the key switch is in the "Run/Lights" position.

The brake light is activated by a switch mounted in the brake lever housing on the handlebar. Brake light operation is independent of the other lights and the key switch.

WARNING

Whenever the outer casing of the brake cable is repositioned readjustment of the brake is required. Failure to readjust the brake could result in component damage or personal injury.

If the brake lever does not return to the full off position, the brake switch will remain on, causing the brake light to glow constantly. To allow full return of the brake lever, loosen the lock nuts on the brake cable outer casing and move the outer casing further away from the return spring. Re-check the brake lever for full return to off and tighten the lock nuts on the outer casing. See Figure 32.



1. Locknuts
2. Return Spring

Track Adjustments

WARNING

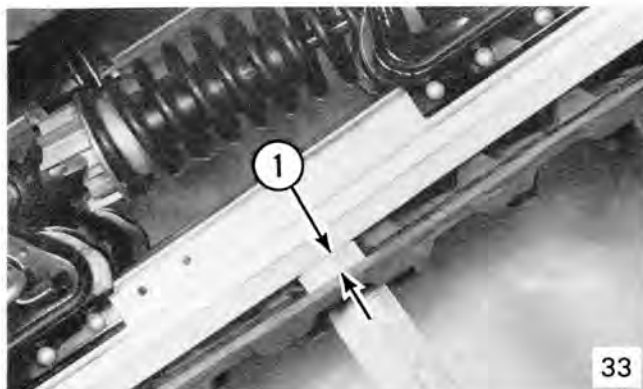
While raising the snowmobile off the ground, place the skis against a stationary object, and be sure the vehicle is properly secured, to prevent personal injury.

Track Tension

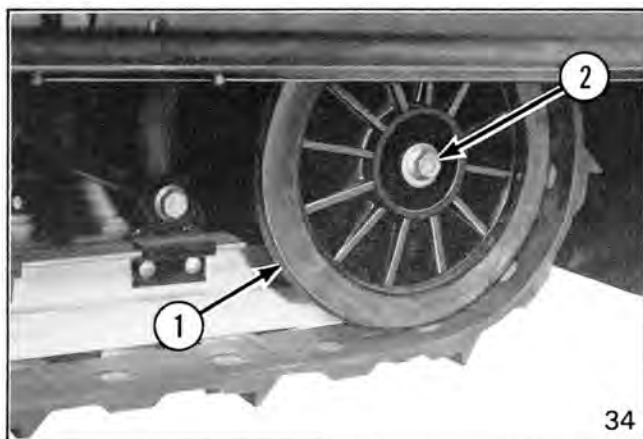
WARNING

To prevent personal injury, never adjust track tension with the engine running.

1. With the track off the ground for its entire length, brace the snowmobile so it cannot fall, then hang a 5 to 8 pound (2.2 to 3.6 kg) weight from the mid point of the track.
2. The clearance from the bottom of the wear strip to the top of the track should be $\frac{3}{4}$ inch (19 mm) when measured directly below the rear suspension pivot arm bolt. See Figure 33.

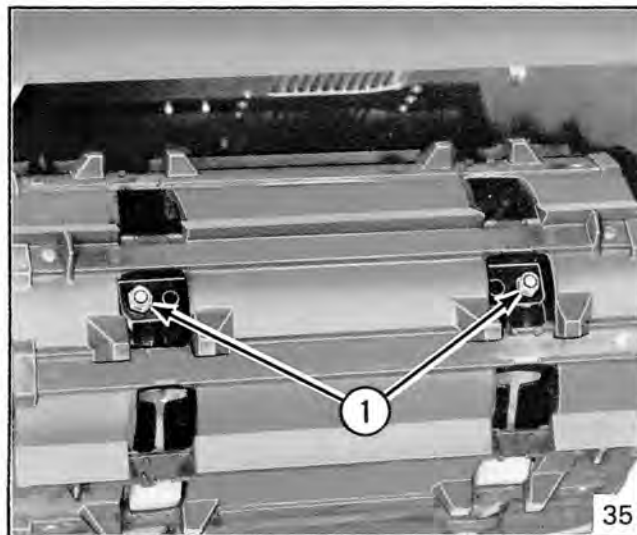


1. $\frac{3}{4}$ Inch (19 mm)



1. Idler Wheel
2. Rear Axle Locking Nuts

3. If necessary, adjust by loosening the rear axle locking bolts turn the rear axle adjusting bolts as required to obtain the specified wear strip-to-track clearance. See Figure 34 and 35.
4. When the proper tension is attained, be sure both adjusting bolts are the same length when measured from the bolt end to the rear axle bracket. See Figure 35. This is a good starting point for track alignment.



1. Rear Axle Adjusting Nuts

Track Alignment

WARNING

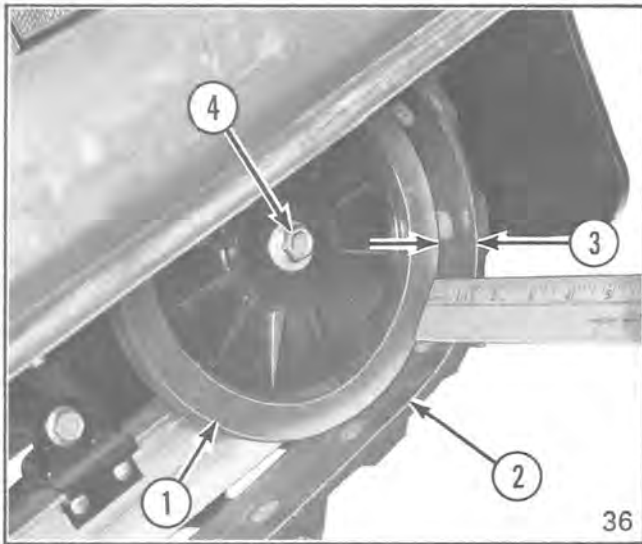
To prevent injury, never adjust or measure track alignment while the engine is running.

Remove the weight from the track, start the engine and push the throttle only enough to turn the track slowly a few revolutions, then stop the engine and allow track to coast to a stop, and check the alignment.

The track is aligned when the distance between the rear idler wheel and edge of the track is equal on both sides. See Figure 36.

If the track runs to one side, tighten the rear axle adjusting bolt on the same side, approximately $\frac{1}{2}$ turn, then restart the engine and recheck the alignment.

When track alignment is correct, tighten the rear axle locking bolts.

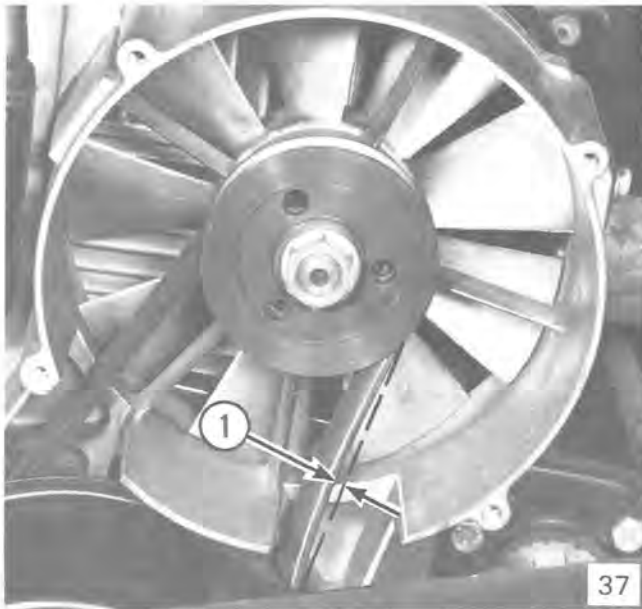


1. Idler Wheel
2. Edge of Track
3. Dimension Equal On Both Sides
4. Rear Axle Locking Bolt

Fan Belt Tension

Remove the fan guard to test fan belt tension. With a 10 pound (5 kg) force applied to the belt, the belt deflection should be 5/32 inch (3.5 to 4.5 mm). See Figure 37.

If adjustment of the fan belt tension is required, remove the outer pulley from the fan shaft and remove a spacer from between the pulley halves to reduce the belt deflection, or add a spacer to increase the belt deflection. Re-install the fan guard.



1. 5/32 Inch (3.5 to 4.5 mm) Deflection

Test Ride (Operational Checks)

Test ride the snowmobile and check for the following:

• CONTROL CABLES

The throttle and brake controls must operate without binding and return freely in any steering position.

• STEERING

Steering should be smooth and free from lock-to-lock with no excessive looseness in the steering linkage.

• ENGINE

Recoil starter works properly and the engine starts promptly. Test for good throttle response and return.

• SUSPENSION

Adjusted for average driver weight and operates smoothly.

• EMERGENCY STOP SWITCH

Check operation in all switch positions.

• CONVERTERS

Test for smooth operation and correct engine R.P.M. (7,200) at full throttle.

• BRAKES

When activated, the brakes should result in adequate smooth stopping of the track; when released, there should be no brake drag.

• INSTRUMENTS

Check for proper indications.

During the test ride, listen for any unusual noises (rattles, squeaks, etc.) that may warrant inspection and correction.

When the test ride is completed, open the hood and thoroughly inspect the engine compartment for fuel or oil leaks.

Check engine gearcase oil level. Level should be above center of sight glass but not above the top. Use Shell XL 100 10W-30 non-foaming oil.

Retorque torque converter bolt 50 to 60 foot pounds (7.61 to 8.30 kg-m). Bend tab of special lockwasher up against a flat on the bolthead to lock in place.

SPECIFICATIONS

ENGINE

Type TA440C
 Displacement 26.6 C.I. (436 cc)
 Bore X Stroke 2.677 x 2.362 inches (68 x 60 mm)
 Number of Cylinders 2
 Ignition System Capacitor Discharge (C.D.)
 Ignition Timing 0.073 inch B.T.D.C. (1.86 mm)
 Spark Plug NGK BR-9 EV
 Spark Plug Gap 0.024 inch (0.6 mm)
 Carburetor Make and Model Mikuni VM32
 Engine R.P.M. at Full Throttle 7,200 R.P.M.

CARBURETOR SETTINGS

Air Screw 1.5 turns off seat
 Idle Screw 3 turns open from coil bound initial (2,500 R.P.M. final)

FUEL

Gasoline Leaded minimum pump posted octane number 89
 Oil Kawasaki Snowmobile Oil or B.I.A. certified TC-W oil
 Gasoline/Oil Ratio Oil Injection

DRIVE SYSTEM

Drive Belt Width 1-1/4 inches (31.7 mm)
 Drive Belt Outside Circumference 46-5/8 inches (1,184 mm)
 Converter Offset 588 inches (14.9 mm)
 Converter Center Distance 12 inches (304.8 mm)

ELECTRICAL SYSTEM

Type 12 Volts - 120 Watts
 Headlight Stanley A5988
 Tail/Brake Light G.E. No. 1157
 Instrument Lights G.E. No. 57

TORQUE CHART

TOOL SIZE	BOLT DIAMETER	RECOMMENDED TORQUE
10 mm	6 mm	5 TO 6 ft lbs (0.7 TO 0.8 kg-m)
7/16 inch	1/4	7 TO 9 ft lbs (1.0 TO 1.2 kg-m)
1/2 inch	5/16	14 TO 18 ft lbs (2.0 TO 2.5 kg-m)
9/16 inch	3/8	28 TO 32 ft lbs (3.9 TO 4.5 kg-m)
5/8 & 11/16 inch	7/16	47 TO 52 ft lbs (6.5 TO 7.2 kg-m)

