



***MY2004
Set-up, Service
and Shop Manual***

SNOW HAWK 600HO



FOREWORD

Congratulations, and thank you for buying an *A.D. Boivin design inc.* Snow Hawk™ vehicle. We appreciate the confidence in our product that you have demonstrated by making this purchase.

Several years of design, tests and improvements were necessary to produce this vehicle which combines performance, driving pleasure and safety.

Proper maintenance on a regularly-scheduled basis is essential in order to obtain the performance you have the right to expect from your machine. In this manual, you will find all the information needed for adjustments to and the maintenance of this vehicle.

We sincerely hope that you will have many years of enjoyment with your Snow Hawk™.

AD Boivin design Inc.

All the information, illustrations, photographs and specifications found in this manual are based on the latest available data at the time of publication. Due to improvements or other changes, it is possible that you will note a few differences. *AD Boivin design Inc.* reserves the right to make changes at any time.

WARNING /CAUTION / NOTICE

Please read this manual and follow the instructions carefully. Pay particular attention to the boxes entitled WARNING and CAUTION as well as to the paragraphs preceded by the word *NOTICE*.

◆ WARNING

This symbol is designed to call attention to particular instructions and procedures, which, if not followed to the letter, could cause injury and even fatal accidents.

▼ CAUTION

This symbol is designed to call attention to particular instructions and procedures, which, if not followed to the letter, could cause damage to or even destruction of the vehicle.

● NOTICE:

The information in the NOTICES is designed to explain maintenance procedures and to ensure the best possible use of the vehicle.

IMPORTANT REMARKS

Using this vehicle can be a very pleasurable experience and we wish you all the enjoyment that it can bring you. However, if certain rules are not respected, this sport can become a source of environmental problems and of interpersonal conflicts.

Adopting a responsible attitude and behaving in a responsible manner at all times will help avoid such problems and conflicts.

PROTECT THE FUTURE OF YOUR SPORT. BE RESPONSIBLE AND RESPECT LOCAL LAWS AT ALL TIMES. DEMONSTRATE AN AWARENESS OF THE IMPORTANCE OF THE ENVIRONMENT AND RESPECT THE RIGHTS OF OTHERS.

WARRANTY

1. All the parts of this vehicle are covered by the warranty for a period of one winter season against any problem related to its assembly or construction.
2. The labour costs of repairs covered by the warranty are the responsibility of the vehicle owner.
3. The company reserves the right to require that the dealer carrying out the repairs send back any parts declared or suspected to be defective.

LOCATION OF THE V.I.N.



IMPORTANT MAINTENANCE WARNINGS:

◆ WARNING

Never have the motor running inside a building. The exhaust fumes contain carbon monoxide, a colourless, odourless gas which can cause death or severe injuries.

Allow the motor to run only in a well-ventilated area.

◆ WARNING

When hot, a motor, an exhaust system or a drive system can cause burns.

Wait until they have cooled before carrying out maintenance.

◆ WARNING

The gas tank can catch fire if it is not handled correctly. Gas vapours can burst into flames easily.

Do not smoke while carrying out vehicle maintenance.

Do not carry out maintenance anywhere near exposed flames or sparks.

◆ WARNING

Brake fluid can be dangerous for people and animals. These fluids are harmful or fatal if swallowed and must not come into contact with the skin or eyes.

◆ WARNING

Carrying out maintenance of this vehicle while the motor is running can be dangerous. Injuries could result from contact with moving parts.

Make sure you turn off the motor before working on the vehicle.

◆ WARNING

Working on this vehicle without wearing the appropriate clothing can be dangerous. Injuries could result if you are not adequately protected.

Always wear the necessary equipment when working on the vehicle: shoes, goggles, gloves and/or mask if necessary.

Important information concerning maintenance

- Replace any joints, brake shoes, pins and clips by new ones.
- Use special tools when so indicated.
- Use original parts as well as recommended products.
- After reassembling the vehicle, inspect the parts and verify the torque on the nuts and bolts.

Replacement parts

Use only *A D Boivin* parts or their equivalent. *A D Boivin's* original high-quality parts are designed and manufactured especially for your vehicle.

● NOTICE:

Using replacement parts that are not equivalent or are of inferior quality could mean your vehicle will not be able to perform as it should and could damage your machine.

MANDATORY SERVICE PRODUCTS



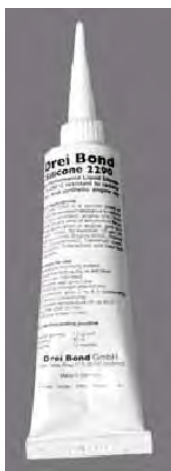
Loctite RC/609, 10 ml
Retaining compound
P/N 413 703 100



Loctite 271, 10 ml
High strength
threadlocker
P/N 293 800 005



Loctite 243, 10 ml
Medium-strength
threadlocker
P/N 293 800 015



Sealing compound, 30 ml
P/N 420 297 905



Loctite Primer, 128g
P/N 413 708 100



Loctite 515, 50 ml
Paste gasket
P/N 413 702 700

MANDATORY SERVICE PRODUCTS (continued)



Loctite chisel, 510g
Gasket/paint remover
P/N 420 899 763



Molykote PG 54, 10g
P/N 420 899 763



Petamo Grease
P/N 420 899 271



Molykote G-n plus. 50g
P/N 711 297 433



Isoflex Grease, 50g
P/N 293 550 021



Loctite 518, 50 ml
Gasket Paste
P/N 293 800 038

RECOMMENDED SERVICE PRODUCTS



Bombardier injection oil
3 x 4 litres P/N 413 803 000



Pre-mix oil
12 x 500ml P/N 413 803 100



Premixed coolant 50/50
16 x 1 litre P/N 293 600 038



Synthetic injection oil
Bombardier Formula XP-S II
3 x 4 litres P/N 293 600 046



Synthetic injection oil
Bombardier Formula XP-S II
12 x 1 litre P/N 293 600 045



Fuel stabilizer
12 x 8 oz P/N 413 408 600

RECOMMENDED SERVICE PRODUCTS (continued)



Storage oil 12 x 350 g
Canada P/N 413 711 600
USA P/N 413 711 900



Synthetic Grease 400 g
P/N 413 711 500



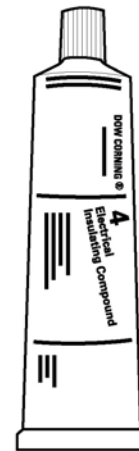
LMZ Grease No 1, 400 g
P/N 413 707 500



Molykote 111, 50 g
P/N 413 707 000



Bombardier lube
12 x 14 oz P/N 293 600 016



Silicone dielectric grease, 3 oz
P/N 293 550 004

RECOMMENDED SERVICE PRODUCTS (continued)



Anti-seize compound, 236 ml
P/N 293 800 070



Brake fluid SRF (DOT 4)
P/N 293 600 063



Brake fluid GTLMA (DOT 4)
P/N 293 600 062



Pulley flange cleaner, 320 g
P/N 413 711 809



Heavy Duty Cleaner
400 g P/N 293 110 001
4 litres P/N 293 110 002

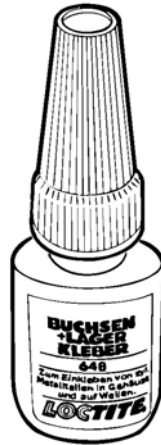


Shock oil 32 oz
P/N 293 600 035

RECOMMENDED SERVICE PRODUCTS (continued)



Loctite 592, 50 ml
Pipe sealant
P/N 293 800 018



Loctite 648, 5 ml
High temperature and strength
retaining compound
P/N 413 711 400



Plastic and vinyl cleaner
P/N 413 711 200



Loctite Ultra Copper, 80 ml
High temperature RTV sealant
P/N 293 800 090



Loctite 5150, 300ml
P/N 293 800 066

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FIRST CONTACT

The SNOW HAWK™ is a completely new type of vehicle. Technically speaking, it is a cross between a snowmobile and a motorcycle. However, its behaviour depends on the conditions in which it is used. Sometimes, it will react more like a bike while at other times, it will react more like a snowmobile or a jetski.

Describing exactly how the SNOW HAWK™ behaves is difficult. This is why we recommend that you take the time to become acquainted with your machine in an area free of any obstacle. This first contact should take place at low speed, with a series of basic manoeuvres that will allow you to learn about the reactions of the vehicle.

A good exercise is to follow a "figure 8" trajectory because this will allow you to experiment with right- and left-hand turns followed by accelerating and braking.

Turning can be done by steering right or left, keeping in mind the speed of the vehicle, the snow conditions and how quickly you want to change direction.

◆ WARNING

Some people enter a turn by stretching out a leg on the inside of the turn and letting the foot slide over the ground (a technique used in motocross). We advise against this practice which could cause severe injuries if your foot should sink into the snow. We rather suggest keeping both feet on the footpegs as much as possible.

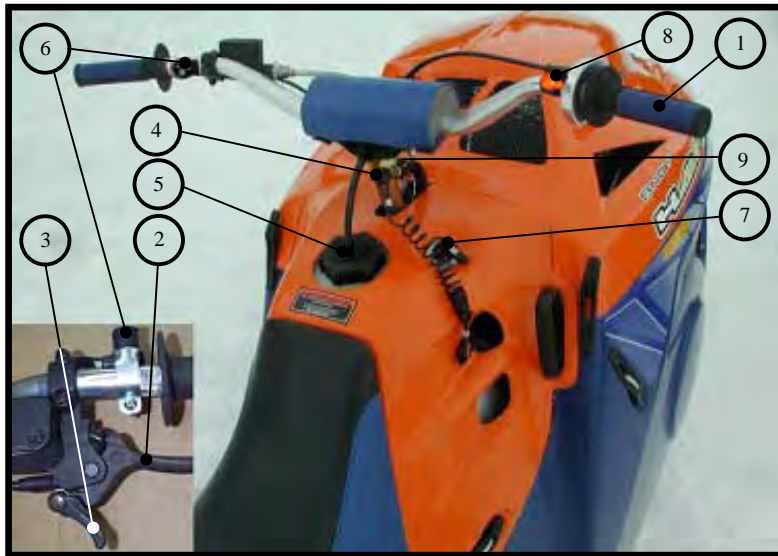
An upright position, with the knees clutching the gas tank and the elbows pointing away from the vehicle, will give a sense of security and provide greater freedom of movement while accelerating or slowing down.

◆ WARNING

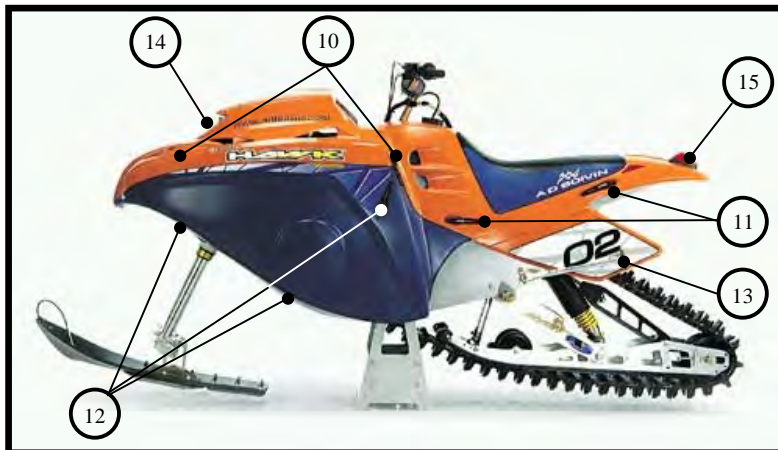
The greatest danger in using this vehicle is the perception you may have of how competent you are. Overestimating how competent you are can result in hazardous situations both for yourself and for other trail users.

Do not forget to take all the time that is necessary for you to practice and feel comfortable at low speeds before attempting high-speed manoeuvres. You will then be able to fully appreciate the joy of driving.

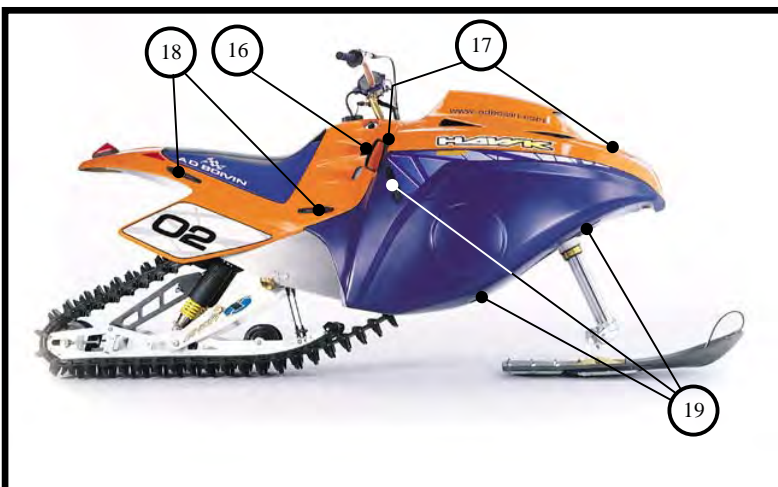
LOCATION OF MECHANISMS AND CONTROLS (503 SHOWN, 600HO IDENTICAL)



1. Throttle control
2. Brake lever
3. Parking brake lever
4. Engine-cutoff (tether)
5. Gas tank cap
6. Dimmer switch
7. Choke control
8. Emergency-stop button
9. Temperature Light



10. Hood latches (4)
11. Rear module latches (4)
12. Bellypan latches (6)
13. Kick stand
14. Headlight
15. Stop and tail light



16. Recoil starter handle
17. Hood latches (4)
18. Rear module latches (4)
19. Bellypan latches (6)

FUEL

This vehicle is powered by a two-stroke engine that uses a pre-mixed gasoline and oil mixture.

Gasoline: Regular unleaded gas with a minimum octane rating of **89** (R+M)/2

Motor oil: Bombardier / ROTAX Formula XPS Synthetic Pre-mix oil (P/N 293600045)

Mixture ratio: 40 : 1 (32 : 1 for break in and CAN safely be used thereafter if desired)

Fuel tank capacity: 30 L (9.5 gallons)



Gasoline (L)	Oil (ml)
5	125
10	250
15	375
20	500
25	625
30	750

▼ CAUTION

A mixture in which the proportion of oil is too low will cause piston failure. On the other hand, a mixture in which the proportion of oil is too high will cause excessive carbon deposits that will result in fouled spark plugs and will affect performance.

Always mix in a proportion of 40 parts of gasoline for each part of oil.

● NOTICE:

- The use of isop[ropyl] alcohol (commonly known as "gas-line antifreeze") is recommended in a ratio of 150 mL per fuel tank in very cold temperatures.
- Avoid mixing oils of different brands.

OPERATING INSTRUCTIONS

Pre-driving inspection

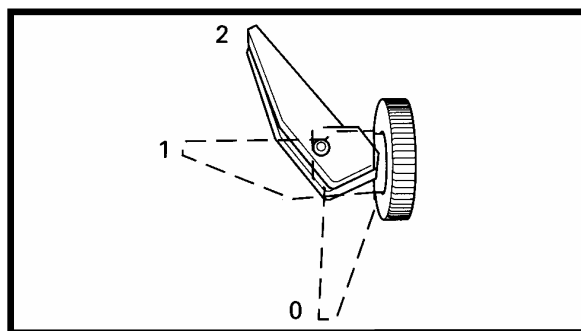
◆ WARNING

A pre-driving inspection is of the utmost importance before using the vehicle. Do not start the machine until you are sure all mechanisms and controls are functioning properly. Failing to proceed in the prescribed manner may result in severe injuries or even death.

- Make sure the track and the idler wheels are not frozen and that they move freely.
- Depress the brake lever and make sure the brake is fully engaged before the end of the lever touches the handlebar. The lever must return to its original position as soon as it is released.
- Turn the twist throttle control a few times to make sure it functions properly. The control must return automatically to the idle position as soon as it is released.
- Make sure the engine cutoff switch, the stop light, the headlight (high and low beams) and the tail light are in good working order.

Starting the engine

- Put the cap of the engine cutoff (tether) switch in place. The other end of the cord must be securely attached to the driver.
- If the engine is cold, use the choke control.
 0. Normal position (not activated)
 1. Intermediate choke position
 2. Full choke position



- Start the engine by firmly pulling the handle of the rewind starter.

◆ WARNING

Do not touch the throttle control while starting the engine.

Stopping the engine

- While the engine is idling, remove the engine cutoff cap (tether) or press the emergency-stop button.



BREAK-IN PERIOD

Engine

▼ CAUTION

A cautious break-in period of 10 to 15 hours is essential before using the vehicle at full power. Failure to provide a sufficient break-in period could result in severe engine damage.

▼ CAUTION

The timing of all Snow Hawk 600HO's is retarded by 3° for a period of 1-hour during the first stages of the break-in period. You may notice a slight increase in performance and a reduction in fuel consumption after this time.

During the break-in period, the throttle control should not be turned more than $\frac{3}{4}$ of its range. However, occasional periods of brief, brisk acceleration and frequent speed variations contribute to a good break-in. On the other hand, periods of long, high acceleration, sustained high speed and engine overheating are harmful during the break-in period.

◆ WARNING

This vehicle is equipped with a liquid cooling system. ALWAYS ride with the rear deflector pad installed and in conditions where there is enough snow to properly cool the engine. If the red temperature light on the steering column should ever illuminate, stop immediately and let the vehicle cool down, and then find some snow. NEVER continue to operate the vehicle with the temperature light illuminated as severe engine damage will occur.

▼ CAUTION

A fuel : oil mixture of 32 : 1 MUST be used during the engine break-in period.

◆ WARNING

During the first hour of the break-in period the fluid levels in the coolant reservoir and the small water pump oil reservoir will go down slightly. This is perfectly normal. Be sure to top-up these fluids with proper coolant (P/N 293600038) and proper oil (P/N 293600045).

GENERAL INSTRUCTIONS 1 - 6

Drive Belt

A new drive belt must be submitted to a 5-hour break-in period. Avoid high-speed driving and brisk accelerations during this period.

Inspection – 10 hours

A general inspection is recommended after the first 10 hours of use. This inspection must be carried out by an authorized SNOW HAWK™ dealer.

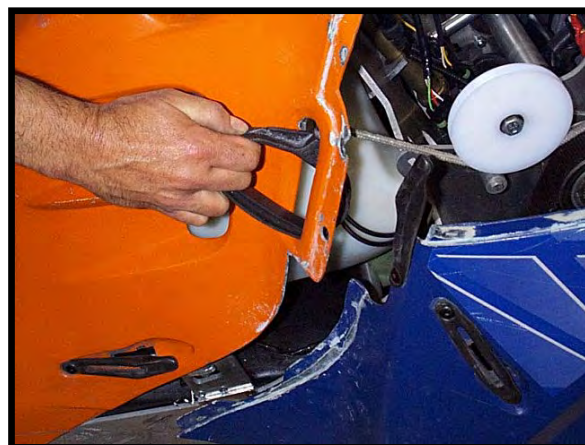
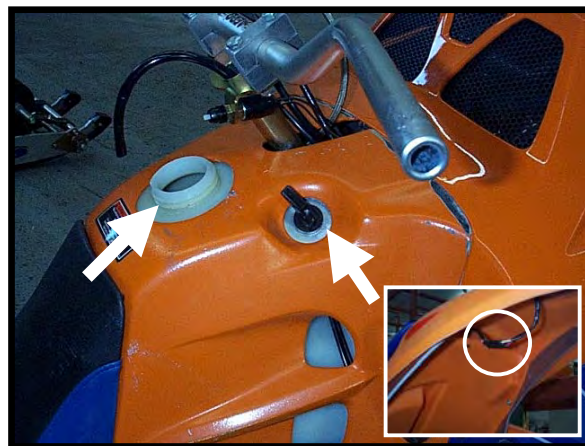
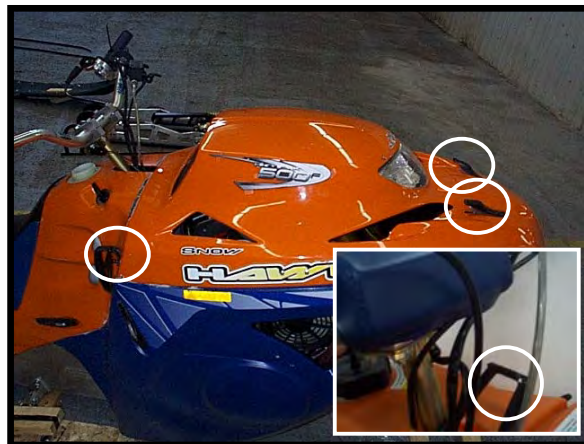
● NOTICE:

- *Most of the wear in this vehicle occurs during the break-in period.*
- *Bolts and nuts can easily become loose in a new machine. Make sure you check them regularly during this period.*

REMOVAL OF THE BODY PANELS (HOOD, REAR MODULE AND BELLYPAN)

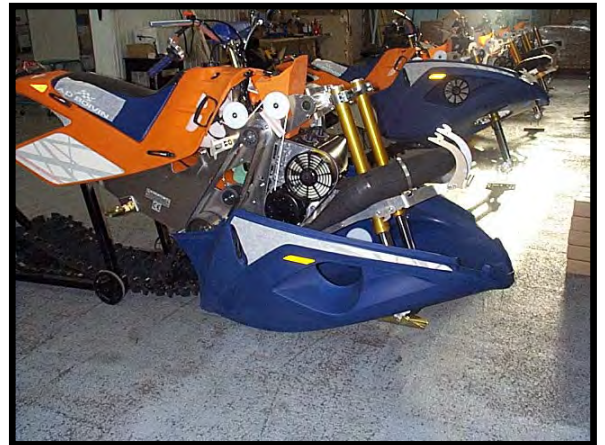
In order to work on the vehicle more easily and to access the anchor ties, we suggest that you remove the rear module from the vehicle. To do so, you must first remove the hood. Proceed as follows:

- Disconnect the front headlight.
- Unhook the 4 rubber latches (2 / side).
- Remove the hood.
- Remove the fuel tank cap.
- Set the choke to the full position.
- Unplug the tail light connector located under the light itself, underneath the rear fender.
- Release the rear module from its four rubber latches, slip the rewind starter handle through the space provided and remove the rear module.



Roll the two O-rings down and pull the two white plastic collars down over the fork legs. To ensure that they will not interfere, let them hang loose at the base of the fork leg.

- o Remove the circular fork disc
- o De-latch the two rubber latches on the sides of the belly pan (towards the rear of the vehicle)
- o De-latch the four rubber latches on the bottom of the belly pan.
- o Descend the belly pan to floor level; most maintenance can be performed with the belly pan in this position. However, if it is required to completely remove the belly pan, remove the single bolt attaching the ski to the fork. At this point, a second person can lift the front of the vehicle slightly and the belly pan can be slid out from underneath.



● **NOTICE:**

Regular inspection and maintenance of the Snow Hawk is of utmost importance. Follow the guidelines in the table below for optimum vehicle performance. Suggested intervals must be reduced if the vehicle is subjected to severe usage conditions.

Interval (Hrs)		Break-in (~ 10 Hrs.)	5 Hrs	15 Hrs	65 Hrs (yearly)
Item					
2.1 Carburetion	Fuel lines and connections	V	-	-	V
	Carburetor adjustment	V	-	-	V
	Throttle cable	V - A	-	-	V - A
	Air Intake Filter	V	-	-	V - C
	Carburetor support bracket	-	-	-	V
2.2 Motor	Starter cord	V	-	-	V
	Cylinder head bolts	V	-	-	V
	Engine support bolts	V	-	-	V
	Exhaust system	V	-	V	V
	Coolant level	V - A	-	V	V - F
	Oil level (water pump oil reservoir)	V - A	-	V	V
	Cooling System (hose connections)	V	-	-	V
2.3 Primary transmission system	Primary drive belt	V	V	-	V - R
	Primary and secondary clutch	V	-	V	V - C
	Primary clutch bolt	V	-	-	V
	Secondary clutch pre-tension	V - A	-	-	V - A
2.4 Secondary transmission system	Secondary drive belt (cog belt)	V	-	-	V
	Cog sprockets	V	-	-	V
	Torque Limiter	V	-	-	V - A
	Taper Locks	V	-	-	V
2.5 Brake system	Brake fluid	V	-	-	F
	Brake pads	V	-	V - R	V - R
	Brake microswitch	V	-	-	V
2.6 Front suspension and ski	Front Fork	F	-	F	F
	Fork rubber cushion and bolt	V	-	V	V
	Fork air bleeder screw	V - A	V - A	V - A	V - A
	Twin axis ski bushings / nuts	V - A	-	V - A	V - A
	Ski and runners	V	V - R as needed		V - R
2.7 Rear suspension and track	Suspension	V	-	V	-
	Shocks	V	-	V	F
	Track	V - A	-	V - A	V - A
2.8 Chassis	Handlebar bolts	V	-	-	V
	Steering components	V	-	V	V
	Assembly bolts / nuts	V	-	-	V - C
2.9 Electrical system	Spark plugs	V - A - R	-	V - A - R	V - A - R
	Spark plug gap	V - A	-	-	V - A
	Fuse	V	-	-	V
	Headlight projection/aim	-	-	-	V - A
	Lighting system, stop lamp and emergency stop switch	V	V	-	V

● **NOTICE:**

V = Verify, A = Adjust, C = Clean, R = Replace one or several part(s), F = Replace fluid

2.1. CARBURETION

Fuel lines and connections

Check all hoses and connections in order to find and fix leaks and/or to help prevent them.

Carburetor adjustment

For carburetor adjustment, refer to **Chapter 3 - Fuel system** section.

Throttle cable

The throttle cable can be adjusted by setting the adjustment mechanism on the throttle end of the throttle cable.

Air intake filter

The air intake filter must be cleaned at least once a year, or more often under severe usage conditions. Clean the filter in a solution containing a non-flammable cleaning solvent (such as hot soapy water). Once dry, apply some light engine to the filters to prevent the infiltration of water and dust.



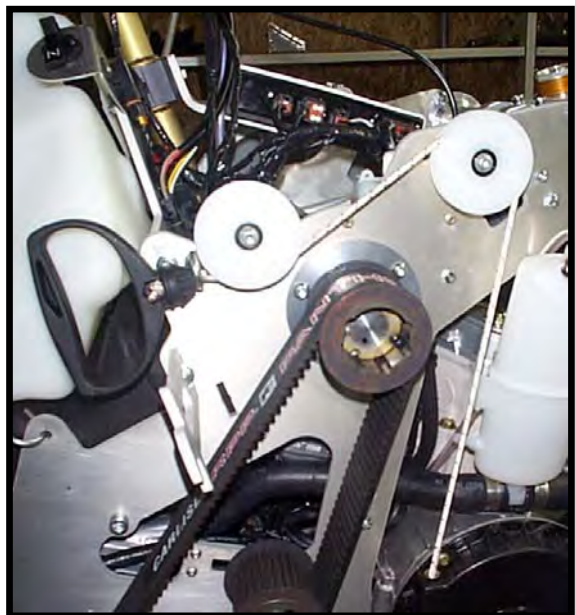
2.2. ENGINE

Recoil starter cord

Pull gently on the handle to unwind the full length of the cable. Inspect the cable visually to detect any wear or other damage that could eventually cause the cord to break.

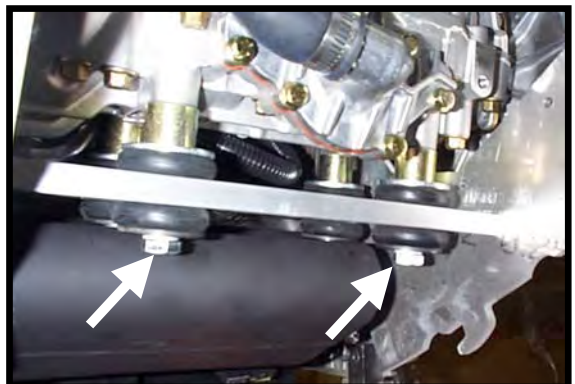
Cylinder head bolts

Refer to the appropriate procedure in **Chapter 7 – Engine (Cylinders/Head/Base)**.



Engine support bolts

To carry out this operation, refer to the appropriate procedure in **Chapter 7 – Engine (Cylinders/Head/Base)**.

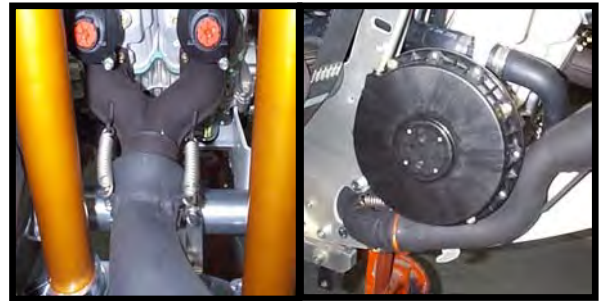


Exhaust system

Using a torque wrench, check the torque of the retaining bolts of the exhaust manifold. Apply a torque of **10 N-m (1 kg-m, 7.4 lbf-ft)**.



Then, proceed to a visual inspection of the system to detect any leak or abnormality in the gasket material.



Cooling system

Inspect the coolant level in the coolant reservoir located on the MAG side of the vehicle. If the coolant level is below the “Cold” coolant mark when the vehicle is not warm or has not been ridden within 30mins or more, add coolant until this line. Check all of the hoses / hose connections and ensure that there are no fluid leaks in the system.



2.3. PRIMARY TRANSMISSION

Primary and secondary clutches

Remove the belt and verify that the sliding half-pulleys of the two clutches is in good working condition.

To take the belt off, first use the special tool provided to open the secondary clutch (P/N 529 008 700). Then, slip the belt over the pulley from rear to front as illustrated. To reinstall the belt, proceed in the reverse order.



Primary clutch bolt

Check the torque on the primary clutch retaining bolt. **Recommended torque: 90 - 100 N-m (9-10 kg-m, 70 lbf-ft).**

For more information, refer to **Chapter 8 - Primary Transmission System.**

Pre-tension of the secondary clutch spring

For more information, refer to **Chapter 8 - Primary Transmission System.**



Primary transmission belt

Examine the belt. Make sure it is not cracked, frayed or worn in an abnormal way (uneven wear, wear on one side only, missing cogs, or cracked material). Abnormal wear of the belt is often due to mis-alignment of the pulleys, excessive throttle when the track is frozen, quick acceleration without a preliminary warm-up, a scratched or rusted pulley, oil on the belt, or a twisted replacement belt. If need be, ask an authorized SNOW HAWK™ dealer for advice.

Measure the width of the belt. Replace if it is less than **31.6 mm (1.245 in) wide.**

For more information, refer to **Chapter 8 - Primary Transmission System.**



2.4. SECONDARY TRANSMISSION

Secondary transmission cog belt

Examine the cog belt. Make sure it is not cracked, frayed or worn in an abnormal way. If in doubt as to the condition of the belt, replace it with a new one.

Verify the tension of the secondary transmission belt according to the instructions found in **Chapter 9 - Secondary Transmission System**.



Cog Sprockets

Check the appearance of the cog sprockets. Make sure all the sprockets are there and are free of any accumulated dirt. Clean if necessary.

Taper-locks

Refer to **Chapter 9 - Secondary Transmission System**.

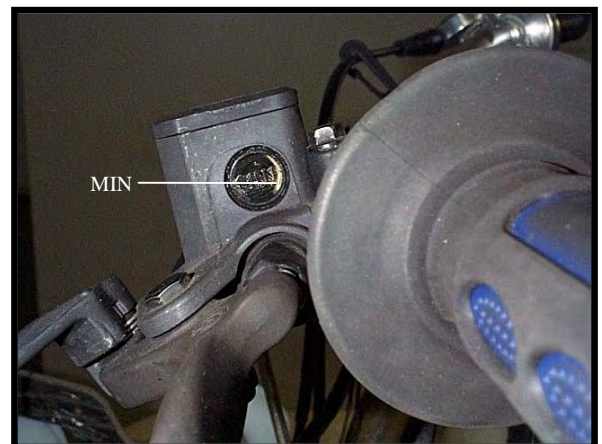


2.5. BRAKE SYSTEM

Brake fluid

Check to see if the brake fluid level is above the "mimimum" mark (see illustration). If not, add fluid.

▼ CAUTION
Use only DOT 4 brake fluid from a sealed container. Do not use any other type of brake fluid.

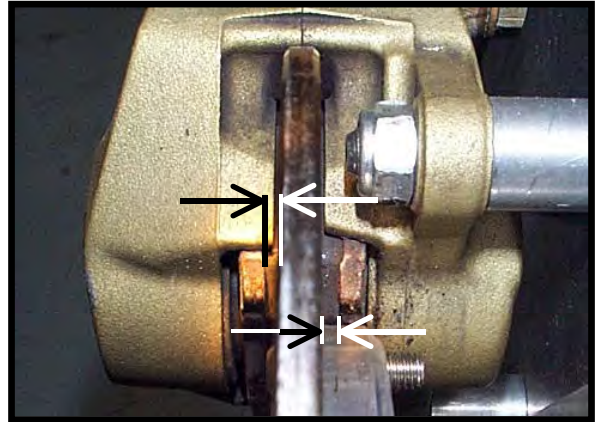


Brake pads

Verify the thickness of the brake pad linings as illustrated. Brake pads must both be replaced if either one of them shows a clearance of less than 1 mm (1/32 in.).

● NOTICE:

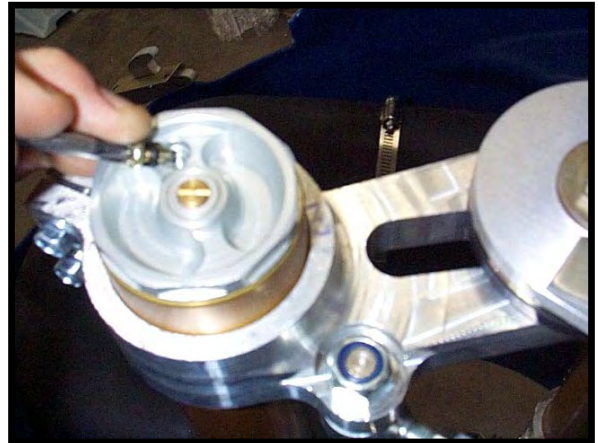
For the replacement of brake fluid, refer to **Chapter 10 – Hydraulic Brake System**.



2.6. FRONT SUSPENSION AND SKI

Front fork

The air pressure inside the fork legs must be as close as possible to atmospheric pressure. Therefore, it is advisable to remove the bleeder screws **after every ride** to re-establish the pressure. It should be done more frequently when temperature variations are greater and more frequent (such as when the vehicle is stored in a heated garage).



A visual inspection of the fork legs can reveal oil leaks that might indicate broken main seals. If excessive oil is present on the lower fork leg, a seal replacement may be required.

It is recommended to replace the fork oil after the break-in period and, from then on, after every 15 hours of use. For details, refer to **Chapter 11 – Front Fork and Twin-Axis Ski**.

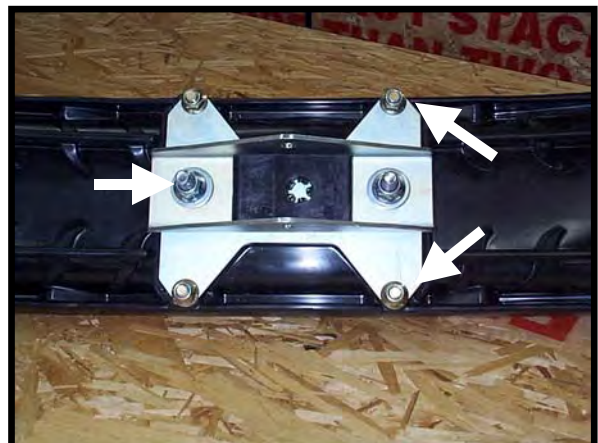


▼ CAUTION

It is advisable to change the fork fluid when preparing the vehicle for storage. The presence of condensation in the suspension fluid could cause corrosion during the storage period.

Twin-Axis Ski and Runners

Verify the torque of all the bolts holding the ski, as well as all the studs and nuts retaining the runners. Also inspect the appearance of the runners to detect any wear, distortion, or broken studs.



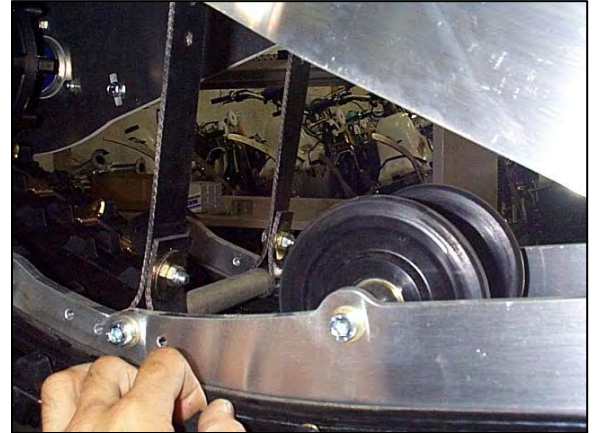
2.7. REAR SUSPENSION AND TRACK

Suspension

Verify that all suspension bolts and nuts are well tightened, especially the four that retain the suspension to the chassis (use Loctite 243 here) Verify that none of the parts are damaged or missing.

Verify that the suspension wheel bearings are in good working order. Check the condition of the suspension limiter straps. Check the condition of the hyfax.

For more information, refer to **Chapter 12 - Rear suspension and Track.**



Shock absorbers

Check around the shock guards for the presence of oil leaks.

Shock oil must be replaced once a year. Refer to **Chapter 12 - Rear suspension and Track.**

▼ CAUTION

It is advisable to change the shock fluid when preparing the vehicle for storage. The presence of condensation in the suspension fluid could cause corrosion during the storage period.



Track

Check the condition, alignment and tension of the track.

With the engine turned off and the rear end of the machine raised from the ground, rotate the track manually and inspect it to make sure it is in good working condition. It must not be cracked and all the lugs must be intact.

● NOTICE:

For track alignment and tension, refer to **Chapter 12 - Rear Suspension, Shocks and Track.**



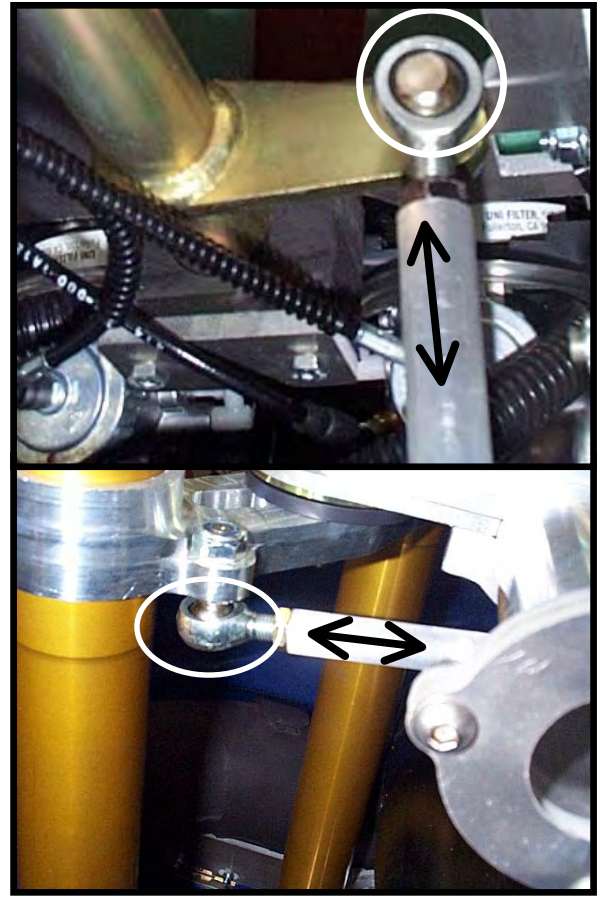
2.8. CHASSIS AND STEERING

Handlebar mounting bolts

Verify and adjust the torque to **36.5 N-m (3.7 kg-m, 27 lbf-ft)**, following a criss-cross order.

Steering mechanism

Verify the condition of the tie rod ends and check for excessive play in the pivots of the steering system. For alignment, refer to **Chapter 13 – Chassis and Steering**.



Assembly

The chassis of the SNOW HAWK is different in that most of the assembly is done by bolting components rather than welding them. Therefore, bolts must be checked and tightened as need be. When doing this, refer to the **Torque Table** at the end of this section.

2.9. ELECTRICAL SYSTEM

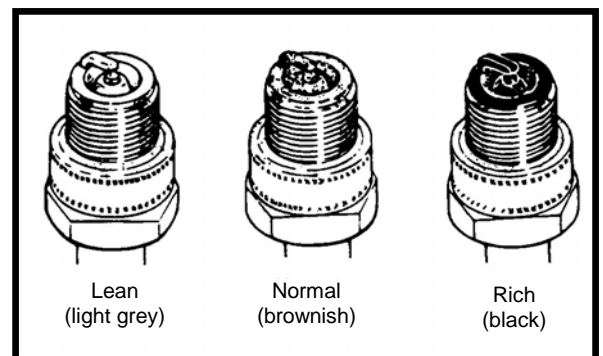
Spark plug

Check the general condition of the plug, the colour of its electrodes, carbon deposits, plug gap and possible damage to the gasket

A **NGK BR9ECS** spark plug is recommended.

Check the spark plug gap. **The suggested gap is 0.45 mm (0.018").**

When tightening the spark plug, the torque must be between **25 and 30 N-m (18 and 21.5 lbf-ft; 2.5 and 3.0 kg-m)**.



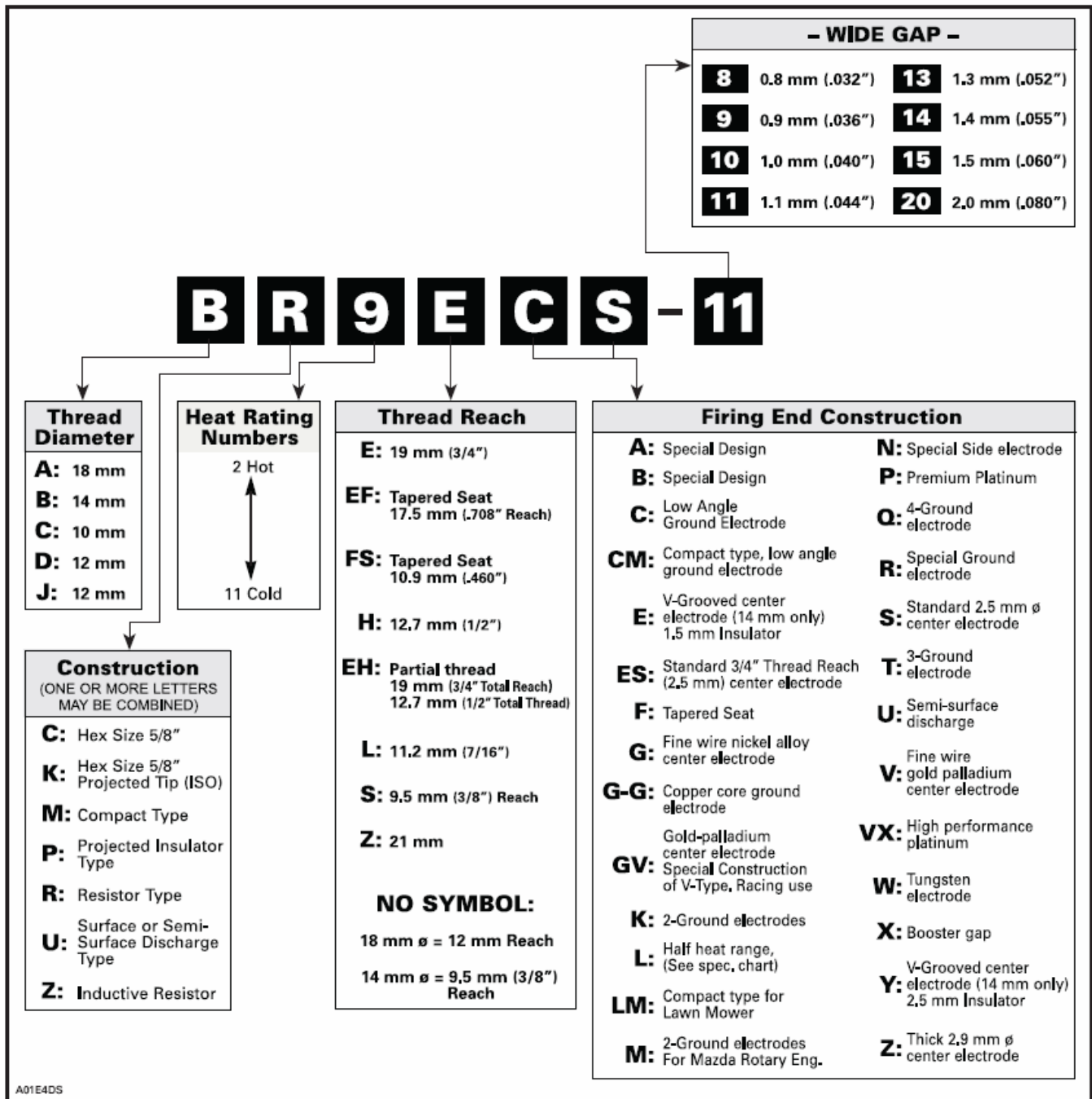
Porcelain Colour	Probable Cause
Light Grey (Overheated)	<ul style="list-style-type: none"> - Plug Temperature rating is too high - Plug gap too wide - Air/Fuel mixture too lean - Stale gasoline
Blackish (Fouled)	<ul style="list-style-type: none"> - Plug temperature rating too low - Plug gap is too small - Air/Fuel mixture too rich - Oil/Fuel mixture too rich

▼ CAUTION

The engine may be seriously damaged if the temperature rating of the spark plug is inadequate.

Refer to the NGK codification on the next page.

Symbols used on the NGK spark plugs



Spark plug gap

The suggested gap is **0.45 mm (0.018")**. For more information, refer to **Chapter 14 – Electrical System**.

Wiring Harness

Electrical wires and connections should be inspected visually to quickly locate broken wires or faulty connections. For more information, refer to **Chapter 14 – Electrical System**.

Headlamp, stop lamp and engine cut-off switch

Before each ride or excursion, it is recommended to verify that the headlamp, the stop/tail lamp and the engine cut-off switch are in good working order.

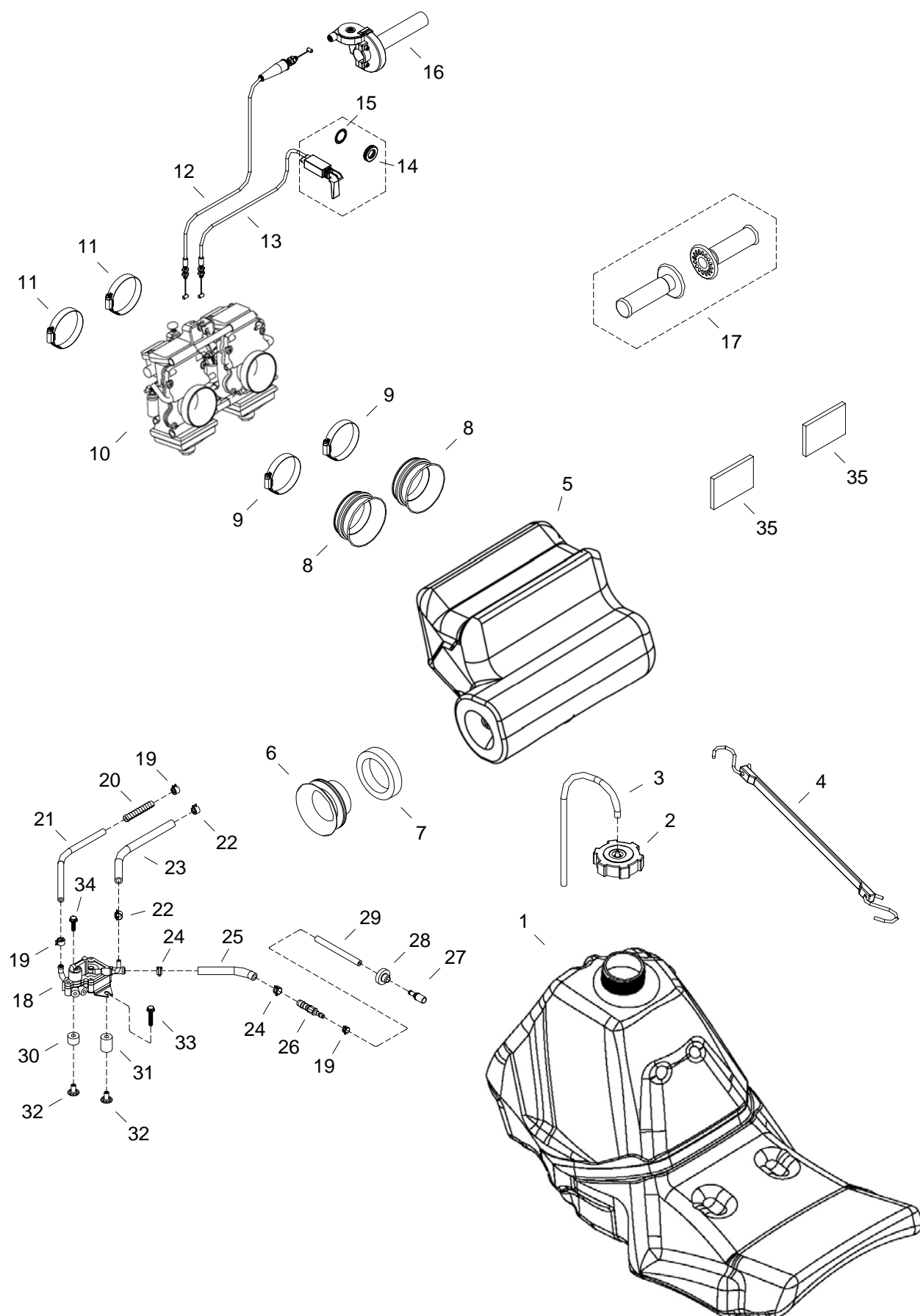
TORQUE TABLE

ITEM	N-m	kg-m	lbf-ft	lbf-in
Torque Limiter bolts (6)	6.2	0.62	4.6	55
Rear Suspension mounting bolts (4)	51	5.1	38	450
Rear Suspension lower swingarm bolts (2)	90	9	66	792
Recoil starter housing bolt	7	0.7	5	62
Primary clutch bolt	90	9	66	792
Secondary clutch bolt	31.7	3.17	23	276
Taper-Lock installation setscrews	14	1.4	10.4	125
Spark plugs	25	2.5	18	216
Handlebar mounting bolts	36.5	3.65	27	324
Triple clamp bolts	6.8	0.68	5	60
Fork pivot bolts	45	4.5	33	396
Ski runner nuts (4)	19	1.9	14	168
Lower clamp nuts	23	2.3	17	204
Ski saddle/fork adaptor nut	85	8.5	63	756

For any other bolt or screw that is not mentioned in the list, please refer to the following table.

BOLT DIAMETER (MM)	GRADE " 8.8 "				GRADE " 10.9 "			
	N-m	kg-m	lbf-ft	lbf-in	N-m	kg-m	lbf-ft	lbf-in
6	10	1	7	84	15	1.5	11	132
8	25	2.5	18	216	36	3.6	27	324
10	49	4.9	36	432	72	7.2	53	636
12	85	8.5	63	756	125	12.5	92	1104

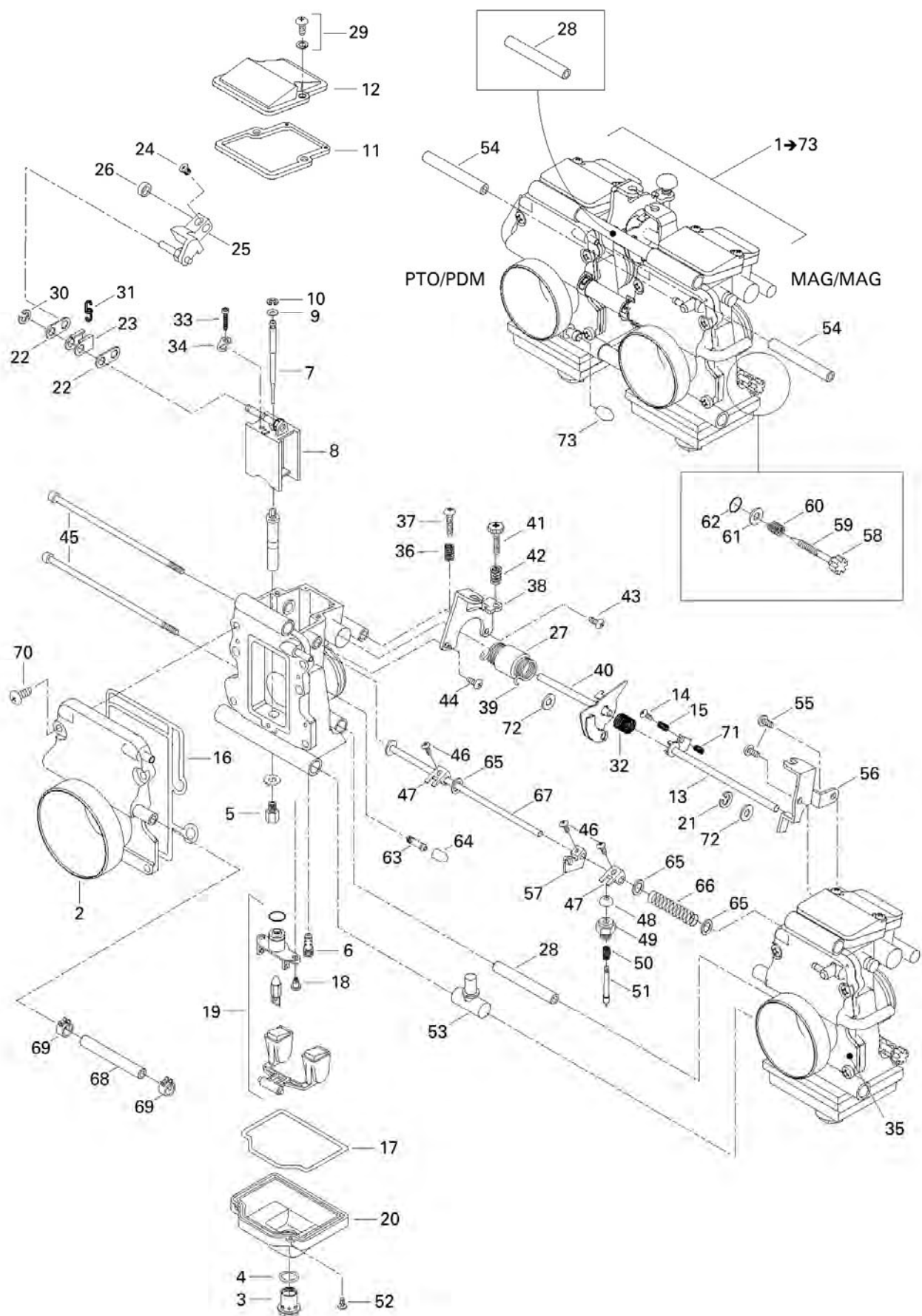
FUEL SYSTEM



FUEL SYSTEM 3 - 2

Fuel System			
Ref.	P/N	Qty	Part Descriptions
1	ADB-SH1	1	Fuel tank 31L
2	322111-BKL	1	Gas tank cap
3	907301	1	7/32" gas tank (overflow)
4	SH15	1	Rubber Strap 15"
5	ADB-0140	1	Air box
6	508,000,240	1	Intake horn
7	508,000,199	1	Foam
8	508,000,132	2	Intake adaptor
9	508,000,346	2	Gear clamp
10	415,128,729	1	TM40 Carburetors (racked together, as a pair)
11	512,059,835	2	Gear clamp
12	07-0401	1	Throttle cable
13	512,059,110	1	Choke cable
14	512,059,094	1	Plastic nut
15	394,103,300	1	Lock washer (interior tooth)
16	01-0054	1	Twist throttle
17	24-1101	1	Grips (pair)
18	403,901,811	1	Fuel pump
19	414,420,700	3	Spring clamp (green)
20	14-349	1	Tubing
21	415 080 200-1	1	Hose (pump - carburetor)
22	414,415,200	2	Spring clamp (red)
23	415,079,800	1	Impulse hose
24	513,032,979	2	Spring clamp (dark green)
25	513,033,022	1	Hose
26	420,874,370	1	Male connector
27	07-241	1	Fuel filter
28	570,135,100	1	Grommet
29	415 080 200-4	1	Hose (connector - tank)
30	SH 092	1	Short spacer
31	SH 091	1	Long spacer
32	170-103	2	" T " Nut
33	SN328-016	1	Hexagon flange head cap screw 1/4-20 x 1 1/4
34	SN328-014	1	Hexagon flange head cap screw 1/4-20 x 3/4
35	8461k133-1	2	Adhesive rubber pad 1/8" thick x 2" wide

CARBURETORS (TM 40)



Carburetors (TM 40)			
Ref.	P/N	Qty	Part Descriptions
1	403,138,740	1	TM40 Carburetors (racked together, as a pair)
2	404,162,017	1	Funnel (PTO)
3	404,161,955	2	Screw
4	404,161,945	2	O-ring
5	404,106,200	2	Main jet 380
6	404,161,944	2	Pilot jet 17.5
7	404,162,016	2	Needle 9DHI12-58-3
8	404,162,020	2	Piston Valve 2.0
9	404,137,600	2	Packing
10	404,152,200	2	E-ring
11	404,161,940	2	Gasket
12	404,161,939	2	Cover
13	404,162,006	1	Throttle shaft
14	-XXX-	1	Screw
15	-XXX-	1	Adjustment spring
16	404,161,935	2	O-ring
17	404,161,961	2	O-ring
18	404,161,933	4	Screw
19	404,161,932	2	Float
20	404,161,960	2	Float Body
21	707,200,027	1	E-ring
22	404,162,007	4	Plate
23	404,162,008	2	Holder
24	404,161,928	2	Screw
25	404,162,009	2	Lever
26	404,161,926	2	Ring
27	404,161,925	1	Ring
28	404,161,924	2	Ring
29	404,161,923	4	Screw
30	404,138,300	2	E-ring
31	404,162,010	2	Spring
32	404,162,011	1	Spring
33	404,161,920	2	Screw
34	404,161,919	2	Plate
35	404,162,012	1	Funnel (MAG)
36	404,161,918	1	Spring (PTO)
37	404,161,917	1	Screw (PTO)
38	404,162,022	1	Bracket (PTO)
39	404,162,014	1	Spring
40	404,162,015	1	Throttle shaft
41	404,137,500	1	Adjustment screw
42	404,161,913	1	Spring

Carburetors (TM 40)			
Ref.	P/N	Qty	Part Descriptions
43	404,161,912	1	Screw
44	404,136,100	1	Screw
45	404,161,911	2	Screw
46	404,161,910	3	Screw
47	404,161,909	2	Lever
48	404,140,000	2	Cap
49	404,136,900	2	Holder guide
50	404,161,908	2	Spring
51	404,161,907	2	Plunger ass'y
52	404,161,906	2	Screw
53	404,161,905	1	Nipple
54	404,162,001	2	Hose
55	404,161,903	2	Screw
56	404,162,000	1	Bracket
57	404,161,901	1	Starter lever
58	404,161,899	2	Cap
59	404,161,898	2	Adjuster
60	404,161,897	2	Spring
61	404,161,896	2	Washer
62	404,161,895	2	Packing
63	404,153,400	2	Nipple
64	404,154,900	2	Cap
65	404,161,894	3	Packing
66	404,103,500	1	Spring
67	404,161,981	1	Shaft ass'y
68	404,161,956	1	Hose
69	404,161,957	2	Clip
70	404,138,800	8	Screw
71	-XXX-	1	Spring
72	270,500,118	2	Packing
73	270,500,095	2	Closure cap

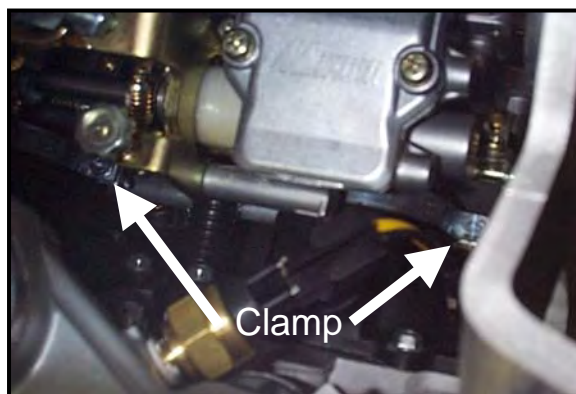
REMOVAL

Loosen clamps # 9 retaining air box # 5 to carburetor assembly and remove air box.

Disconnect the carburetor support block that is located at the middle-bottom of the carburetor assembly. Pull rearwards on the upper portion of the block to disconnect it completely.

Loosen clamps # 11 retaining dual carburetor assembly to carburetor sockets.

Disconnect throttle and choke cables.



▼ CAUTION

Always loosen the LOWER nut when removing the throttle or choke cable as to avoid disturbing the settings of either.

Remove dual carburetor assembly, pinch and disconnect fuel line. Take care to recuperate fuel.

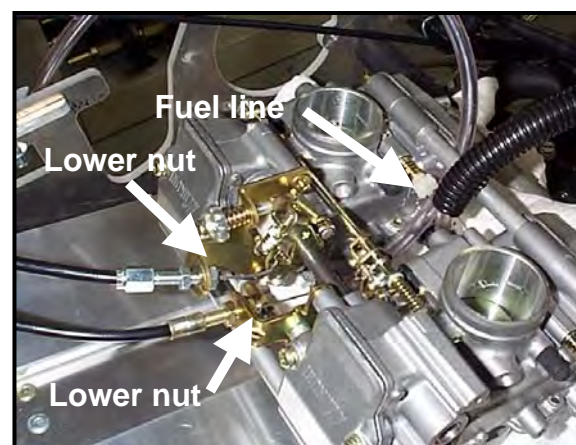


◆ WARNING

Fuel is flammable and explosive under certain conditions. Always wipe off any fuel or oil spillage from the vehicle. Ensure work area is ventilated. Do not smoke or allow open flames or sparks in the vicinity.

CLEANING AND INSPECTION

The entire carburetor should be cleaned with an all-purpose cleaner and dried with compressed air before disassembly.



▼ CAUTION

Heavy duty carburetor cleaner may be harmful to the float material and to the rubber parts, O-ring, seats, etc. Therefore, it is recommended to remove those parts prior to cleaning.

▼ CAUTION

Carburetor body and jets should be cleaned with carburetor cleaner following manufacturer's instructions. When jets are very dirty or coated with varnish and gum, replace them.

◆ WARNING

Solvents with a low flash point such as gasoline, naphtha, benzol, etc., should not be used as they are flammable and explosive.

Inspect the condition of the tip of the fuel inlet valve. If the tip is worn, replace both the valve and its seat.

● NOTICE:

Install only a snowmobile carburetor inlet valve as it is designed to function with a fuel pump.

Check to see if the throttle slide is worn and replace it if required.

Check for fuel that may have soaked into float # 8; replace as necessary.

Check float for cracks or other damage affecting free movement; replace as necessary.

Inspect throttle and choke cables and housings for any damage. Replace as necessary.

DISASSEMBLY AND RE-ASSEMBLY

● NOTICE:

To ease the carburetor disassembly and assembly procedure, it is recommended to use carburetor tool kit (P/N 404 112 000)

20 FLOAT BOWL

Unscrew drain screw # 3 and screw # 52. Remove float bowl.

19 FLOAT AND NEEDLE VALVE ASS'Y

Unfasten both screws # 18 then, pull out float and needle valve assembly # 19.

Upon re-assembly, apply Loctite 243 on screw threads.

5 MAIN JET

The main jet installed in the carburetor has been selected for a temperature of - 20°C (0°F) at sea level. Different jetting can be installed to suit temperature and/or altitude changes. A service bulletin will give information about calibration according to altitude and temperature.

Main jet # 5 may be removed without removing float bowl # 20 by first removing drain screw # 3.

6 PILOT JET

Use narrow screwdriver from carburetor tool kit (P/N 404 112 000) to unfasten pilot jet # 6.

◆ WARNING

It is critical to the free operation of the throttle slide that the 2 connecting plates as assembled in one carburetor be of the exact same length. Always replace the connecting plates by a pair of new ones that were matched at the factory for length and discard the old ones. Simultaneously replace all the plates of the carburetors of a same rack.

● NOTICE:

Do not disassemble throttle slide needlessly.

▼ CAUTION

After throttle slide reassembly, proceed with a leak test. See below for procedure.

7 NEEDLE

Remove carburetor cover # 12.

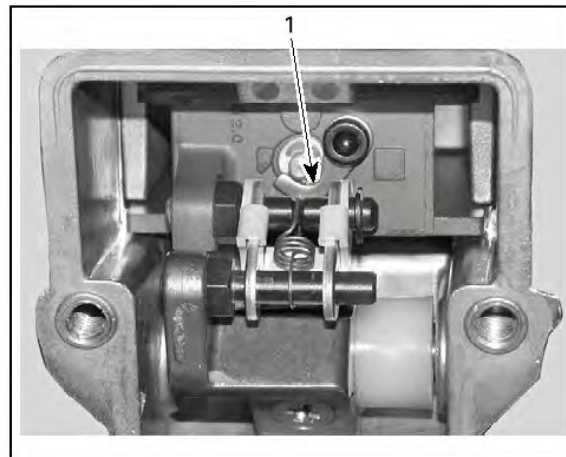
Loosen needle retainer screw # 33.

Fully open throttle and hold in this position for the following step.

Move aside needle retainer # 34.

1. Needle retainer moved aside.

Turn dual carburetor assembly upside down to free needle # 7. Take care not to loose plastic washer # 9 under needle circlip # 10.



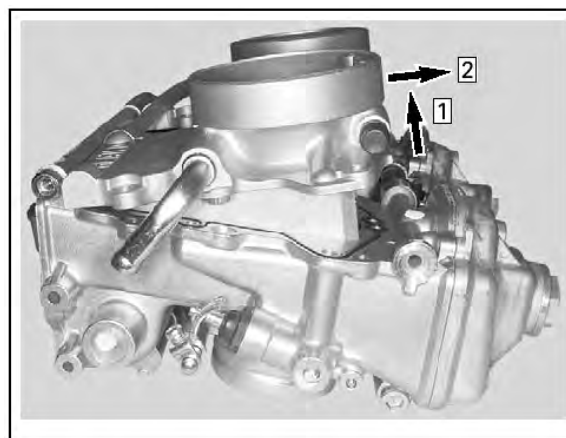
2 INTAKE SPICKET

Unscrew throttle slide cover screws # 70.

Open throttle 3/4 wide and hold it there.

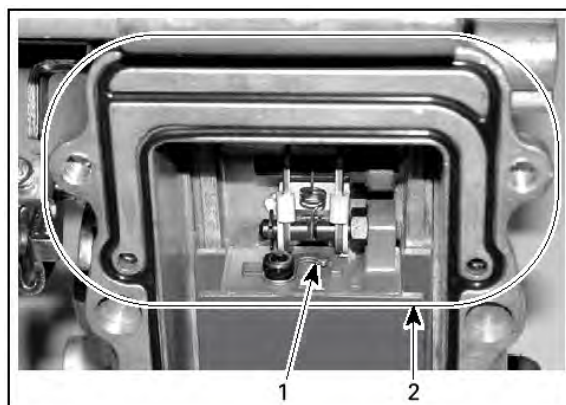
Lift throttle slide covers bottom first until they are free from carburetor bodies. Then, slide them out.

1. Lift bottom first
2. Slide out



After inserting throttle slide cover in place and before installing screws, ensure O-ring gasket is properly seated in its groove especially in the area around vent nipple. See illustration at right.

1. Needle retainer
2. Ensure O-ring gasket is properly seated in nipple area.



CARBURETOR ADJUSTMENTS

Adjustments should be performed following this sequence:

- Pilot screw adjustment
- Carburetor synchronization and throttle slide height (preliminary idle speed adjustment)
- Throttle cable adjustment
- Choke cable adjustment
- Final idle speed adjustment (engine running).

Mikuni TM 40	Setting	
	MAG	PTO
Pilot jet	17.5	17.5
Air screw	1.5 turns	1.5 turns
Slide cutaway	2.0	2.0
Needle	9DHI12-58-3	9DHI12-58-3
Main jet	380	380
Fuel level	N/A	N/A
-	-	-

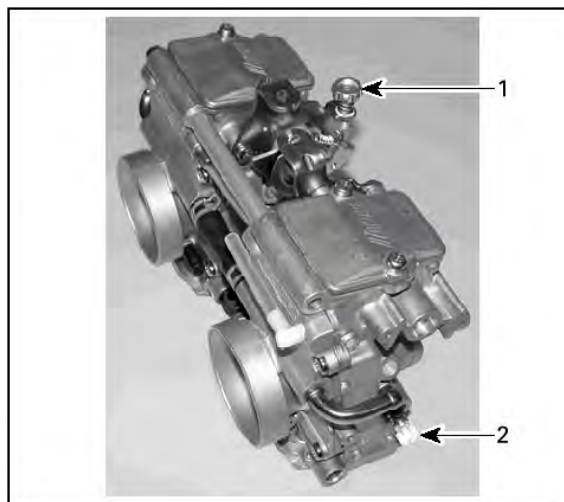
PILOT SCREW ADJUSTMENT

Completely close the pilot screw (until a slight seating resistance is felt) then back off as specified.

Turning screw clockwise leans mixture and conversely, turning it counter-clockwise enriches mixture.

Refer to “DIMENSIONS AND TOLERANCES” for the exact specifications.

- 1- Idle speed screw
- 2- Pilot screw (one on each carburetor)



CARBURETOR SYNCHRONIZATION AND THROTTLE SLIDE HEIGHT (PRELIMINARY IDLE SPEED ADJUSTMENT)

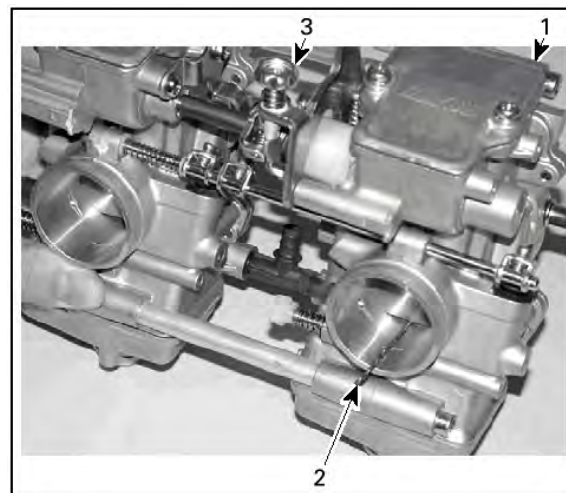
First proceed on PTO carburetor.

Use a drill bit to measure the throttle slide height (see table at right) on outlet side of carburetor (engine side).

Model	Throttle slide height (drill bit size) $\pm 0.1 \text{ mm } (\pm 0.004")$
Snow hawk 600 HO 2004	1.6 mm (0,063")
-	-

- 1- Adjust PTO carburetor first
- 2- Drill bit used as a gauge to measure throttle height
- 3- Idle speed screw

Adjust by turning idle speed screw # 41.

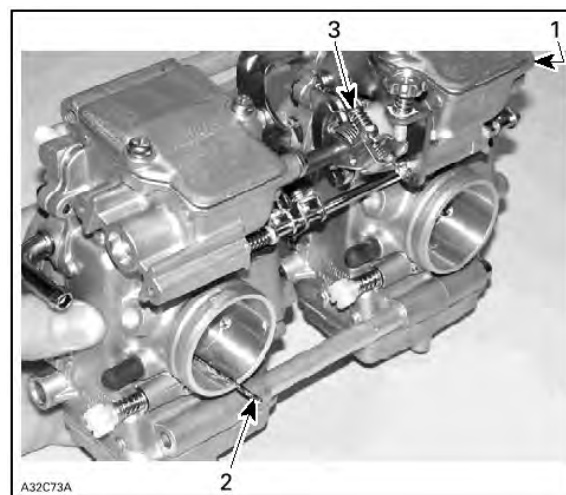


For MAG carburetor, proceed using the synchronization screw. Use the same drill bit used for the PTO carburetor to measure throttle slide height. Turn synchronization screw to adjust.

- 1- PTO carburetor adjusted first
- 2- Drill bit used as a gauge to measure throttle height.
- 3- Synchronization screw

● NOTICE:

Make sure that throttle cable does not hold the throttle slide. Loosen cable adjuster accordingly



Final idle speed adjustment (engine running at idle speed) should be within 1/2 turn of idle speed screw from preliminary adjustment.

INSTALLATION

▼ CAUTION

Never allow throttle slide(s) to snap shut.

To re-install the carburetor, carry out the removal operations in the reverse order.

Be sure that the carburetor assembly is properly inserted into the engine intake sockets before tightening the two hose clamps. (A small amount of white grease can help here) After this, be sure to reconnect the black plastic carburetor support block to the lower shaft at the middle-bottom of the carburetor assembly.

THROTTLE CABLE ADJUSTMENT

Adjust throttle cable as per following procedure:

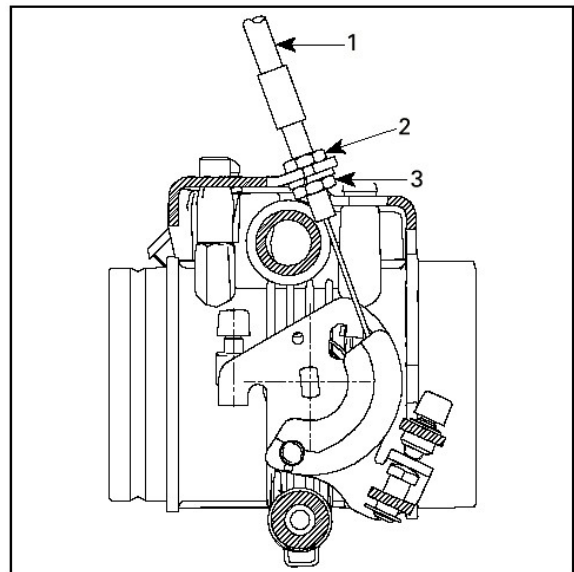
Loosen throttle cable housing adjusting and locking nuts.

Connect throttle cable barrel to carburetor cam lever # 40.

While holding throttle lever to wide open throttle position, pull on the throttle cable until mechanism touches the stopper. In this position, turn cable housing adjusting nut and tighten lock nut.

Also ensure that, when throttle is released to idle position, the idle adjusting screw end touches its stopper.

- 1- Throttle cable
- 2- Adjusting nut
- 3- Locking nut



CHOKE CABLE ADJUSTMENT

Adjust choke cable as per following procedure:

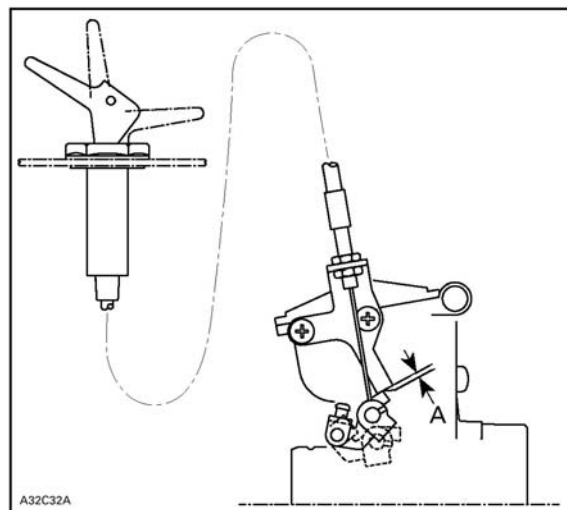
Loosen choke cable housing adjusting and locking nuts.

Connect choke cable on starter lever # 57.

While choke lever is fully open, pull choke cable until starter lever reaches the stopper. Tighten cable housing adjusting and locking nuts in this position.

As a confirmation, the gap between the stopper and the bracket should be within 0 and 0.5 mm (0 and 1/64 in).

A - Within 0 and 0.5 mm (0 and 1/64 in)



Idle Speed Final Adjustment

Start engine and allow it to warm then adjust idle speed to specifications by turning idle speed screw clockwise to increase engine speed or counterclockwise to decrease it.

Refer to **Chapter 15 – Dimensions and Tolerances** for the specifications.

● **NOTICE:**

*Do not attempt to set the idle speed by using the pilot screw.
Severe engine dam-age can occur.*

FUEL PUMP

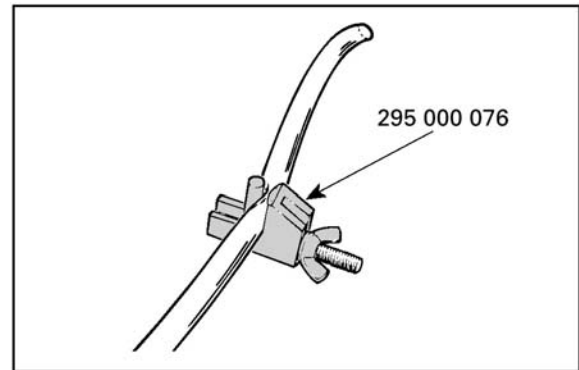
REMOVAL

Install a hose pincer (P/N 295 000 076) on fuel supply line close to pump inlet.

Disconnect fuel outlet line(s).

Disconnect impulse line.

Remove screws securing fuel pump to chassis.



PUMP VERIFICATION

Check fuel pump valves operation as follows:

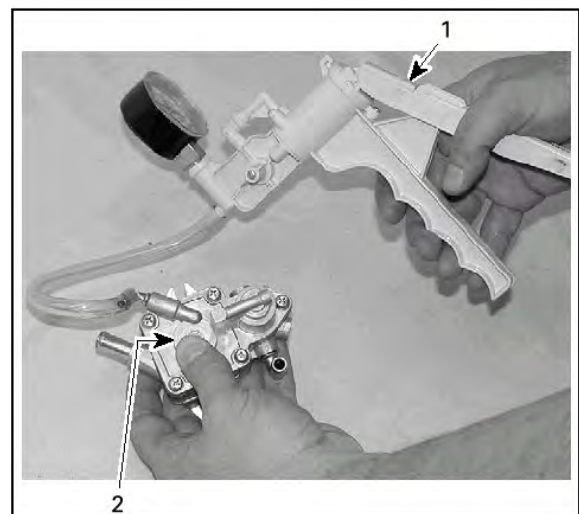
Connect clean plastic tubing to the inlet nipple and alternately apply pressure and vacuum with pump of leak test kit. The inlet valve should re-lease with pressure and hold under vacuum.

Repeat the same procedure at the outlet nipple. This time the outlet valve should hold with pressure and also under vacuum.

Check impulse diaphragm and gasket as follows:

Connect clean plastic tubing to the impulse nipple and plug vent hole on top cover with a finger. Either applies pressure or vacuum using the pump (P/N 529 021 800) from the Engine leak tester kit. The diaphragm/gasket must not leak.

- 1- Pump
- 2- Plug vent hole



CLEANING AND INSPECTION

Check fuel pump valves operation as follows:

The entire pump should be cleaned with general-purpose solvent before disassembly.

Fuel pump components should be cleaned in general purpose solvent and dried with compressed air.

◆ WARNING

Solvent with a low flash point such as gasoline, naphtha, benzol, etc., should not be used as each is flammable and explosive.

Inspect diaphragm. The pumping area should be free of holes, tears or imperfections. Replace as needed.

INSTALLATION

Inverse removal procedure.

◆ WARNING

Perform a pressure test to ensure there is no leak in the fuel system.

ENGINE REMOVAL

Unfasten or remove the following parts of the vehicle:

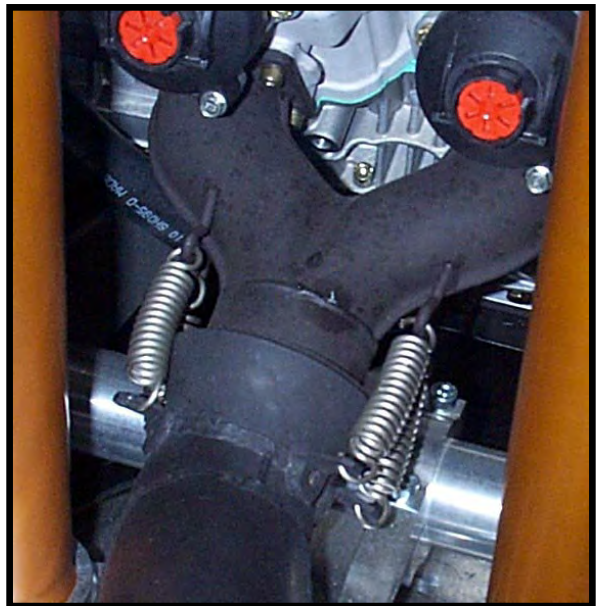
Remove the hood, bellypan and rear module from the vehicle. Removing the bellypan will require that you remove the ski as well.

Exhaust Pipe

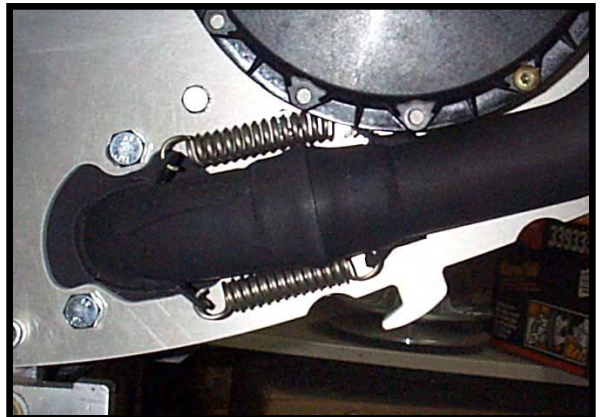
- Remove the hose clamp retaining the exhaust pipe as well as the two forward brackets (P/N's SH032L and SH032R).



- Remove the four springs that hold the exhaust pipe tight against the Y-manifold.

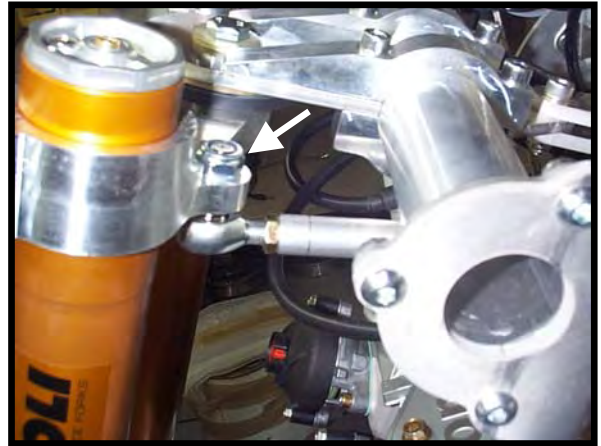


- Remove the two exhaust springs that hold the exhaust pipe tight with the exhaust canister.
- Now free, pull the exhaust pipe forward to remove the pipe completely from the vehicle.
- Plug the outlet of the Y-manifold with a clean cloth.



Front Fork

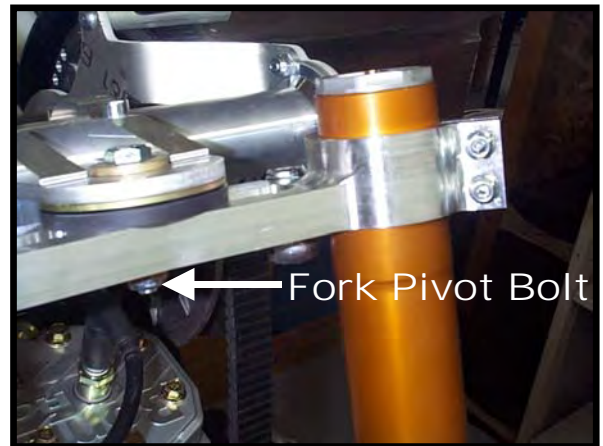
- Unfasten the tie rod end which connects the steering column to the upper triple clamp.



- Unfasten the two fork pivot bolts that retain the fork to the vehicle. The upper bolt is shown at right, the other is directly below it.

● **NOTICE:**

Use a crate or box to support to support the vehicle just under the drive sprockets when removing the fork.

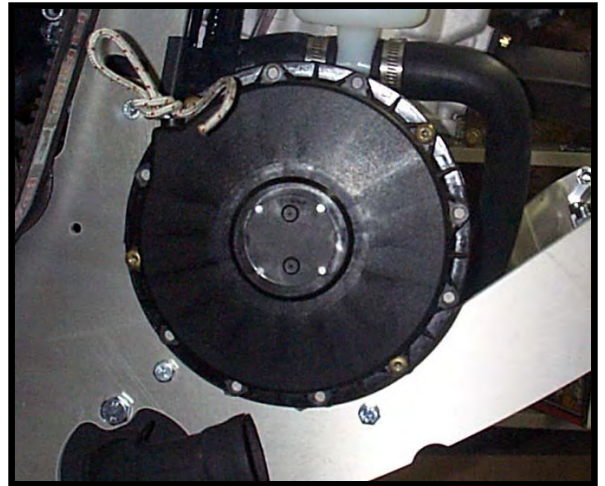


Recoil Starter

- Using a flat-head screwdriver, push the knot out of the recess in the starter handle. Since it is often easier, cut the cord just before the knot while holding the cord securely such that it does not slip and go into the recoil housing. Make a new knot in the cord once the starter handle has been removed to prevent this from happening.

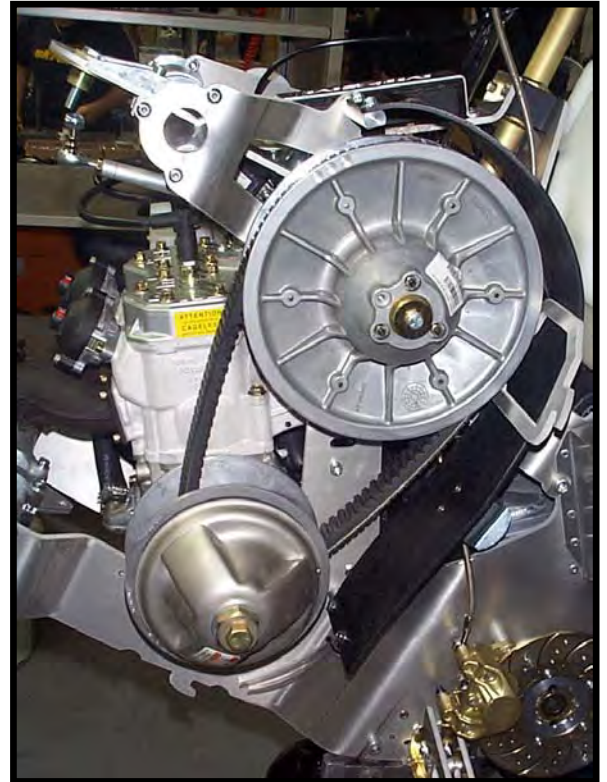


- Make a knot as shown at right.



Secondary Clutch

- Open the secondary clutch using the the spacer tool (P/N 529 008 700). For more details, see **Chapter 8 – Primary Transmission System.**
- Remove the bolt retaining the secondary clutch to the jackshaft and then slide the secondary off the jackshaft at the same time removing the drive belt.
- Using the primary clutch holder tool (P/N 529 027 600), remove the primary clutch bolt.
- Using the primary clutch puller (P/N 529 022 400) remove the primay clutch from the engine.



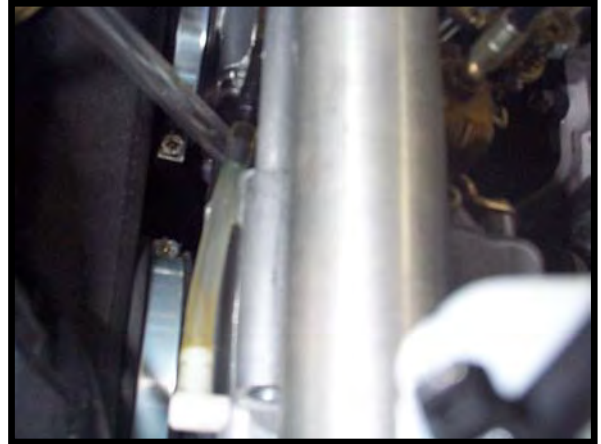
Fuel Tank

- Remove the rubber latch retaining the fuel tank and place it as shown on the right to have free access to the airbox and carburetors.



Airbox

- Loosen the two hose clamps that fasten the air box to the rear of the carburetors and remove the airbox completely.



Carburetors

- Unfasten the black plastic clip that supports the bottom of the carburetors. Push the top of it forward to snap it out of place. Rotate it sufficiently to allow clearance.
- Loosen the two hose clamps that fasten the carburetors to the engine intake boots and then remove the carburetors completely, as a pair.



Engine Connector

- Cut the tie-wrap and disconnect the two-piece housing that connects the Crank Position Sensor (CPS) to the wiring harness (blue and white/yellow wires). This connector is located just above the jackshaft, near the ignition coil and the water pump oil reservoir.
- The engine-side of the Crank Position Sensor (CPS) wire then passes down the height of the chassis – towards the magneto – and is attached to the tube that goes from the water pump oil reservoir to the water pump itself via a tie-wrap. Cut this tie-wrap as well.

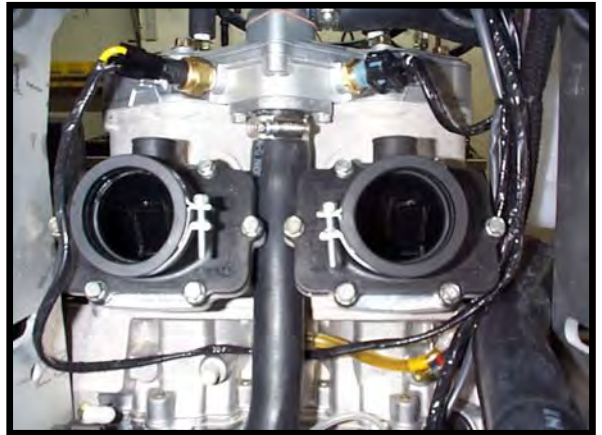


ENGINE REMOVAL 4-5

- Cut the tie-wraps that secure the wires from the engine to the voltage regulator. Then disconnect the four-place housing (yellow, yellow and yellow wires) and the two-place housing (green and black wires) that is next to the four-place housing.



- Unplug the two wires from the two temperature sensors located at the rear of the head of the engine.



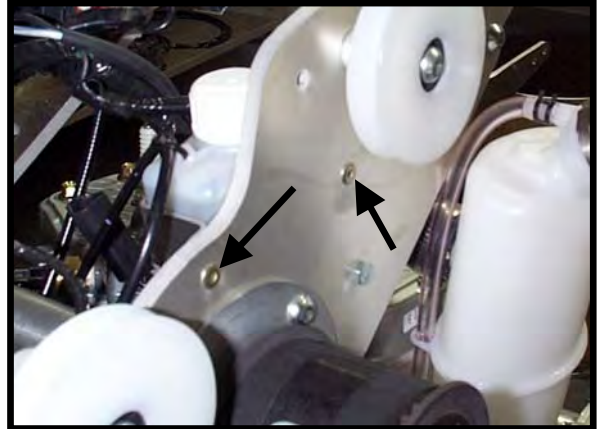
Impulse Hose

- Disconnect the impulse hose from the crankcase of the engine.



Water Pump Oil Reservoir

- Using a drill and a 3/16 in. bit, drill out the two rivets that secure the water pump oil reservoir to the MAG side chassis.
- Cut the tie-wrap that secures the choke cable to the oil reservoir hose.



Cooling System

- Loosen the hose clamp that holds the forward cooling hose to the water pump housing inlet at the front of the engine. With a bucket below this point, let the coolant drain from the system **completely**.
- Loosen the hose clamp on the reservoir end of the short hose that runs from the head to the reservoir and disconnect the hose from the reservoir, as shown at right.

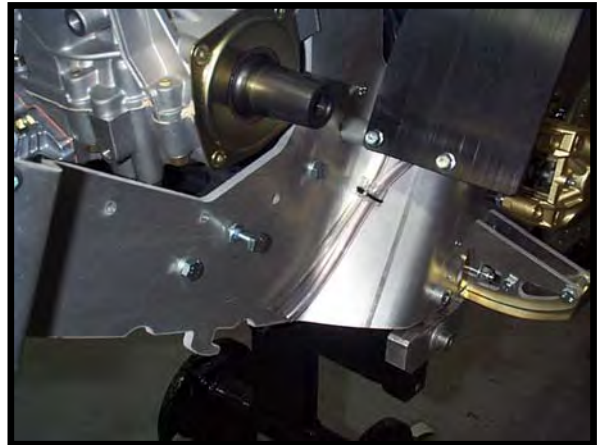


ENGINE REMOVAL 4-7

- Loosen the hose clamp farthest towards the PTO side on the PTO side heat exchanger and disconnect the hose there. This hose runs from the head of the engine to the inlet of the tunnel-mounted heat exchangers and should remain connected to the engine when removing.



- Now that all of the peripheral equipment has been disconnected, unscrew and remove the 4 bolts (per side) that secure the engine plate to each side of the chassis.
- PTO side bolts (x 4)



- MAG side bolts (x 4)



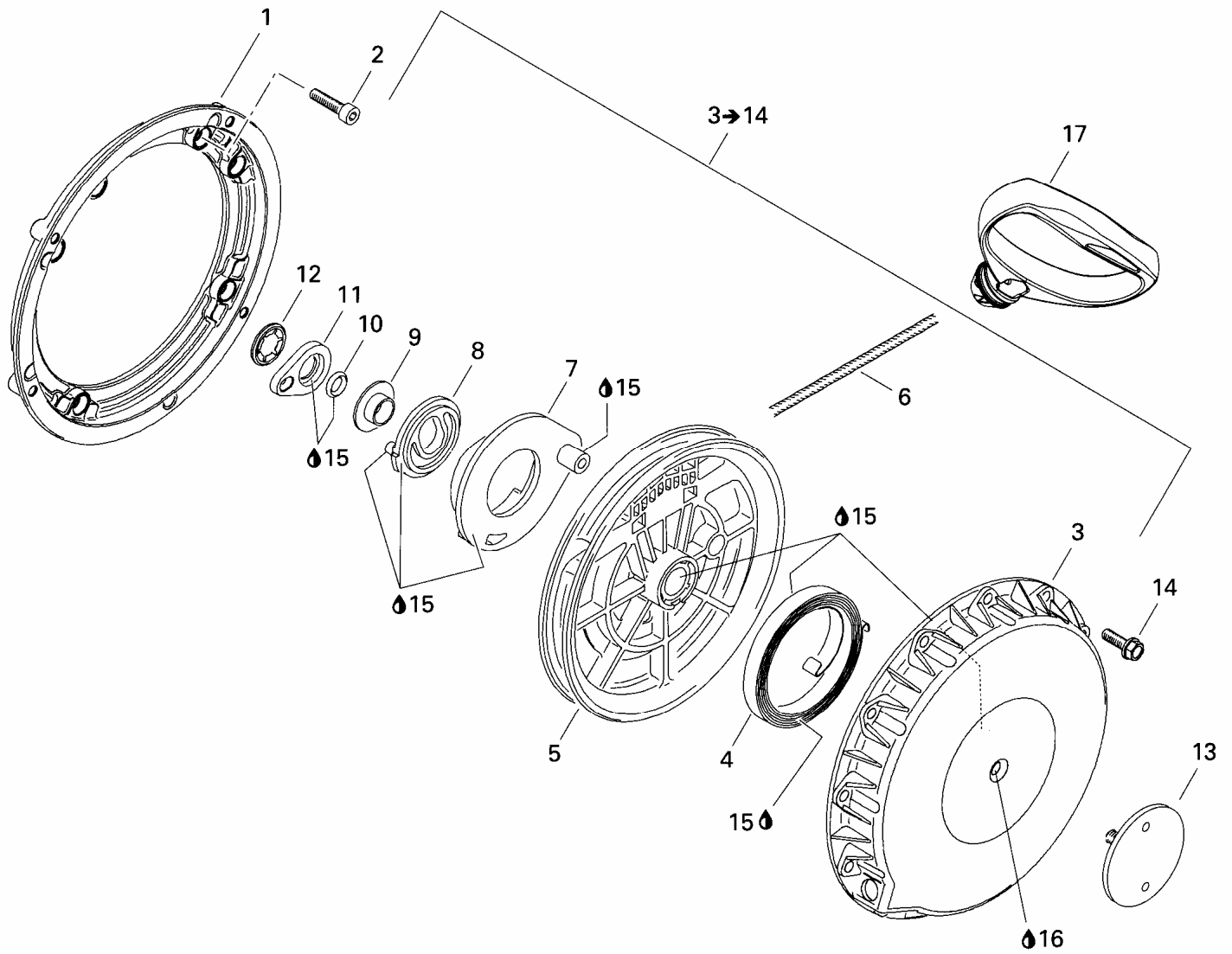
- Now the engine can be completely removed from the vehicle.

Re-Installing Engine

To re-install the engine, follow the instructions above in the reverse order. However, pay close attention to the following details :

- Ensure that the 4 (per side) engine plate bolts are well torqued to **37 N-m (27lbf-ft, 325 lbf-in)**. Loctite 243 is recommended here.
- Ensure the correct alignment of the clutches and the preload/deflection of the drive belt.
- Ensure that each cable, wire and hose is properly connected and its original routing is used. (**See Chapter 17 – Wire, Cable and Hose Routing** for more details.)
- Ensure that each coolant line is re-installed using the original routing and that each hose clamp is well tightened.
- Re-fill the coolant reservoir to the Cold Level line before attempting to start the vehicle. It is recommended to elevate the front of the vehicle about 12 in. off the ground when adding coolant to the system to ensure that all of the air bubbles will escape. See **Chapter 6 – Cooling System** for more details.

REWIND STARTER



REWIND STARTER			
Ref.	P/N	Qty	Part descriptions
1	420810865	1	Connecting flange
2	420241236	4	Socket head screw M6 x 16
3-12	420889764	1	Rewind starter
3	420811404	1	Starter housing
4	420939115	1	Rewind spring
5	420852286	1	Rope sheave
6	412500200	1	Starter rope (2200mm)
7	420852297	1	Pawl
8	420852305	1	Pawl lock
9	420847925	1	Stage sleeve
10	420250400	1	O-ring
11	420852520	1	Lock ring
12	420845560	1	Locking element
13	-	1	Positioning pin
14	420941256	4	Hex collar screw M6 x 20
15	420899763	@	Molykote PG 54, 10g
16	293530011	@	Sealant, Sikaflex black # 221
17	572084400	1	Starter grip

INSPECTION

● NOTICE:

Due to dust accumulation, rewind starter must be periodically cleaned, inspected and re-lubricated.

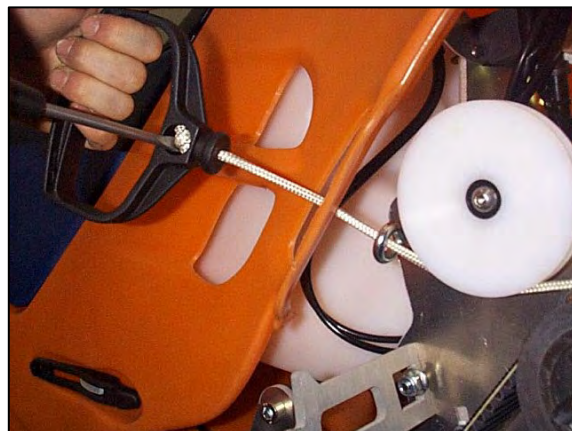
◆ CAUTION

It is of the utmost importance that the rewind starter spring be lubricated periodically using Molykote PG 54 (P/N 420 899 763). Otherwise, rewind starter component life will be shortened and/or rewind starter will not operate properly under very cold temperatures.

- Check if rope # 6 is fraying, replace if so.
- When pulling starter grip, mechanism must engage within 30 cm (1 ft) of rope pulled. If not, disassemble rewind starter, clean and check for damaged plastic parts. Replace as required, lubricate, reassemble and recheck. Always replace O-ring # 10 every time rewind starter is disassemble.
- When releasing starter grip, it must return to its stopper and stay against it. If not, check for proper spring preload or damages. Readjust or replace as required.
- When pulling starter grip 10 times in a row, it must return freely. If not, check for damaged parts or lack of lubrication. Replace parts or lubricate accordingly.

REMOVAL

- Using a small screwdriver, extract rope knot from starter grip # 17. Cut rope close to knot. Tie a knot near starter.
- Remove screw # 14 securing rewind starter to engine then remove rewind starter.



ROPE REPLACEMENT

- Pull out rope. Hold rewind starter in a vise. Slide rope and untie the knot. Pull out the rope completely.

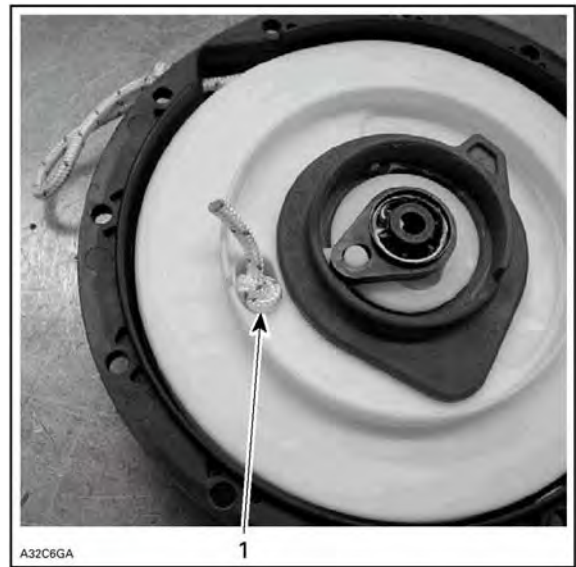
1) Knot to be untied.

● NOTICE:

When rope is completely pulled out, spring preload is 4 ½ turns.

DISASSEMBLY

- Undo knot previously tied at removal. Let sheave get free to release spring preload.
- Cut locking element # 12 and discard. Remove lock ring # 11, O-ring # 10, stepped sleeve # 9, Pawl lock # 8 and Pawl # 7.
- Remove sheave # 5 from starter housing # 3. Hold the spring with a screwdriver.
- Pull out knot and then pull out rope # 6.



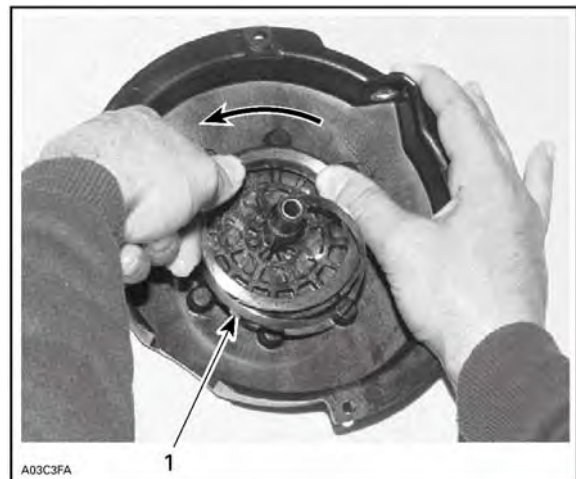
ASSEMBLY

At assembly, position spring # 4 outer end into spring guide notch then wind the spring counter clockwise into guide.

▼ WARNING

Since the spring is tightly wound inside the guide it may fly out when rewind is handled. Always handle with care.

1) Outer end into guide notch

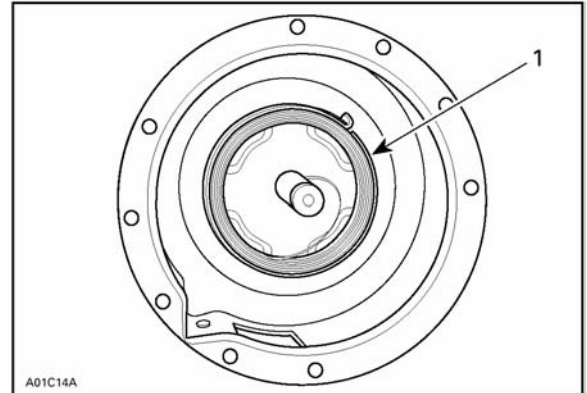


◆ CAUTION

It is of the utmost importance that the rewind starter spring be lubricated periodically using Molykote PG 54 (P/N 420 899 763). Otherwise, rewind starter component life will be shortened and/or rewind starter will not operate properly under very cold temperatures.

- Lubricate spring assembly and 1cm (1/2 in) wide on bottom of housing with Molykote PG 54.

1) Molykote PG 54



◆ CAUTION

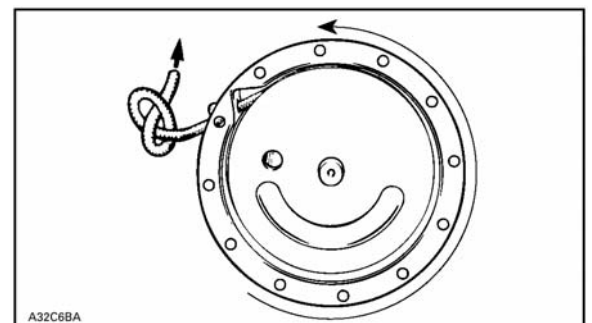
The use of standard multi-purpose grease could result in rewinding starter malfunction.

- To install rope # 6, insert rope into sheave # 5 orifice and lock it by making a knot, leaving behind a free portion of about 25 mm in length. Fuse rope end with a lit match and insert it into sheave.
- Free portion inserted into the sheave.
- Lubricate housing post with silicone compound grease. Install sheave.



To adjust cord tension:

- Wind rope on the sheave and place the rope sheave into the starter housing making sure that the sheave hub notch engages in the rewind spring hook.
- Rotate the sheave counter-clockwise until rope end is accessible through rope exit hole. This will give 1/2 turn of preload.
- Pull the rope out of the starter housing and temporarily make a knot to hold it.



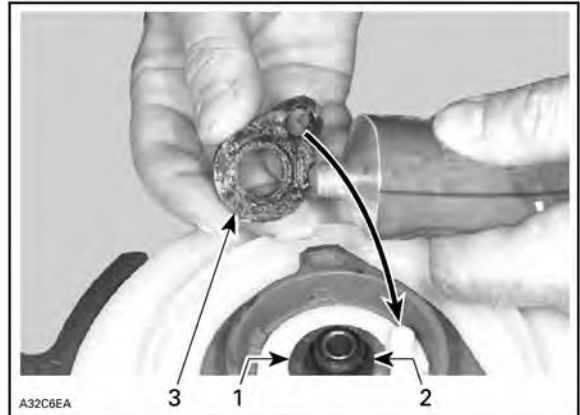
- Lubricate pawl # 7 with Molykote PG 54 (P/N 420 899 763) then install over rope sheave.
- Lubricate pawl lock # 8 with Molykote PG 54. Install over pawl.
- Instal stepped sleeve # 9 with its sleeve first. Lubricate a new O-ring # 10 and lock ring # 11 whit Molykote PG 54. Install over pawl lock.

1) Stepped sleeve

2) O-ring

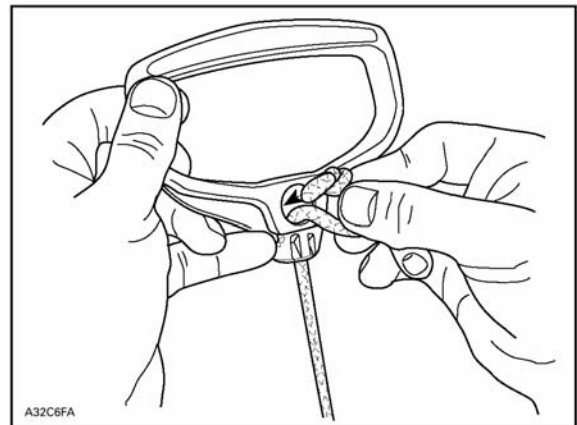
3) Lock ring

- Install the locking element nut # 12.

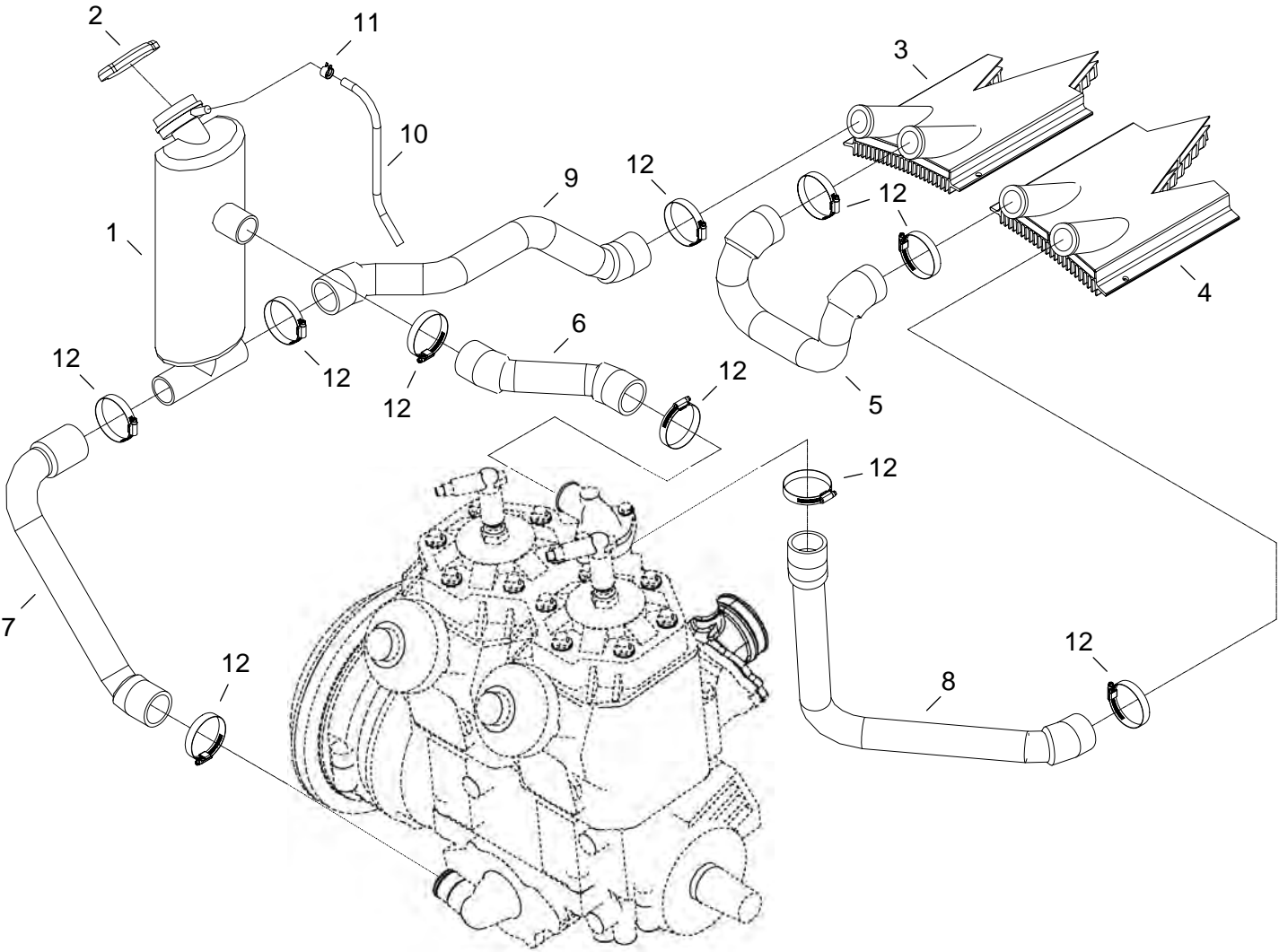


INSTALLATION

- Fuse rope end with a lit match.
- Thread starter rope # 6 over guide pulleys and through eye bolt.
- Reinstall rewind starter assembly on engine.
- Pass rope through starter grip # 17 and tie a knot in the rope end. Insert rope end down and pull the starter grip over the knot.



COOLING SYSTEM



COOLING SYSTEM 6 - 2

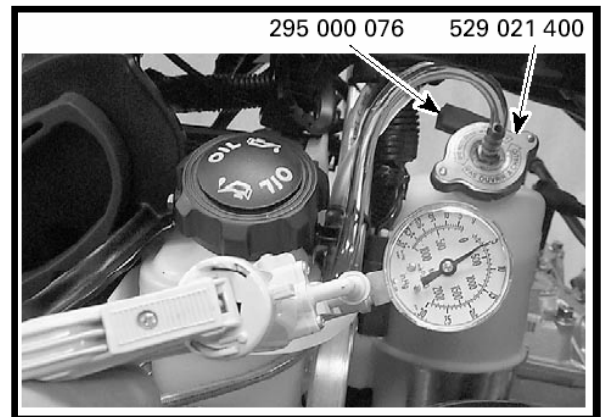
Cooling System			
Ref.	P/N	Qty	Part descriptions
1	509000281	1	Coolant reservoir
2	509000187	1	Closure cap
3	SH-108SA	1	MAG side heat exchanger
4	SH-109SA	1	PTO side heat exchanger
5	SH-093	1	Coolant tube #4
6	SH-094	1	Coolant tube #3
7	SH-095	1	Coolant tube #1
8	SH-096	1	Coolant tube #5
9	SH-097	1	Coolant tube #2
10	-	1	Overflow tube
11	414554800	1	Spring clamp (black)
12	408800400	10	Hose clamp (geared)
-	278001016	1	Temperature sensor (Bosch, Blue, MAG side)
-	512047000	1	Temperature sensor (Indebras, Black, PTO side)
-	420922517	1	Thermostat (42°)
-	420931272	1	Thermostat sealing ring

◆ WARNING

This vehicle is equipped with a liquid cooling system. **ALWAYS** ride with the rear deflector pad installed and in conditions where there is enough snow to properly cool the engine. If the red temperature light on the steering column should ever illuminate, stop immediately and let the vehicle cool down, and then find some snow. **NEVER** continue to operate the vehicle with the temperature light illuminated as severe engine damage will occur.

COOLING SYSTEM LEAK TEST

- Install special radiator cap (P/N 529021400) included in engine leak tester kit (P/N 861749100) on coolant tank.
- Install hose pincher (P/N 295000076) on the overflow hose. Using pump also included in the kit and pressurize the entire system through the coolant reservoir to 100 kPa (15 PSI).
- Check all hoses and cylinder/base for coolant leaks. Spray all connections with a soapy water solution and look for air bubbles.



INSPECTION

Check the general condition of hoses and clamp tightness.

DRAINING THE SYSTEM

To drain the cooling system:

- Siphon the coolant mixture from the coolant tank.
- Disconnect the hose at the water pump inlet housing to drain coolant from engine.
- When the coolant level is low enough, lift the rear of the vehicle to drain the heat exchangers.

◆ WARNING

Never drain or refill the cooling system when the engine is hot.

DISASSEMBLY AND ASSEMBLY

Temperature sensors:

- Apply Loctite 592 (P/N 413 702 300) thread sealant to temperature sensor threads to avoid leakage.

Pressure Cap (No. 2):

- Check if the cap pressurizes the system. If not, install a new 90 kPa (13 PSI) cap (do not exceed this pressure).

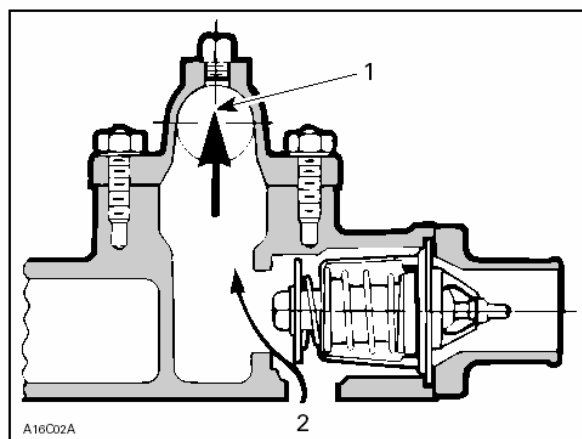
Thermostat:

To check the thermostat, put it in a basin of water and gradually heat it. The thermostat should start to open when water temperature nears 42°C (108°F). It will be almost fully open at 50°C (122°F).

ENGINE	TEMPERATURE
All	42°C (108°F)

The thermostat is a double action type:

- (1) Its function is to give faster warm up of the engine by controlling a circuit; water pump — engine — coolant tank. This is done by bypassing the heat exchanger radiator circuit and using what it called a short circuit during warm up, i.e. before the coolant temperature reaches 42°C (108°F).

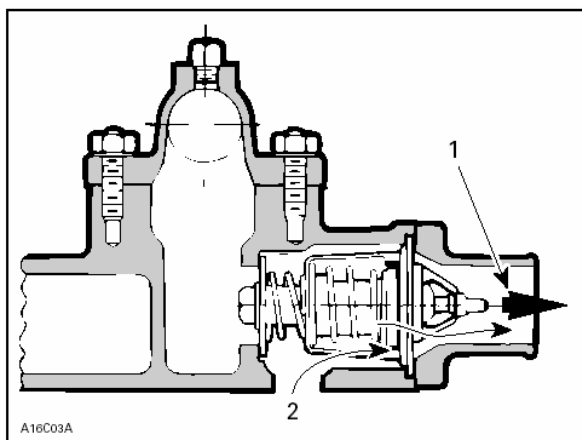


TYPICAL — CLOSED THERMOSTAT, COLD ENGINE

1. To reservoir
2. From cylinders

- (2) When the liquid is warmed enough, the thermostat progressively opens the circuit; water pump — engine — heat exchangers — coolant tank to keep the liquid at the desired temperature. (See the diagram of the exploded view on page 6-1).

These 2 functions have the advantage of preventing a massive entry of cold water into the engine.



TYPICAL — OPEN THERMOSTAT, WARM ENGINE

1. To radiators
2. From cylinders

COOLING SYSTEM REFILLING PROCEDURE

▼ CAUTION

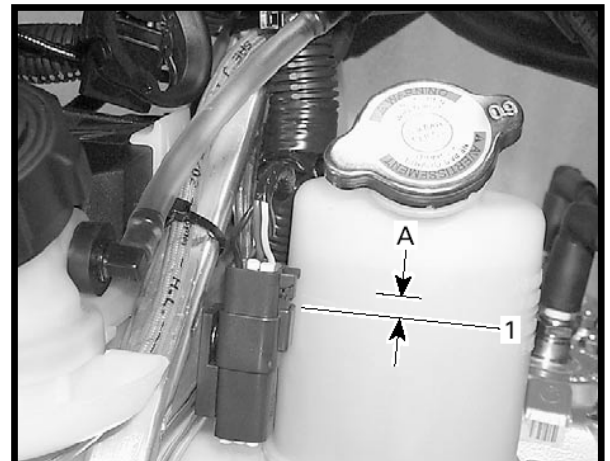
To prevent the formation of corrosion or freezing, always re-fill the system with the recommended premixed coolant.

REFILLING PROCEDURE

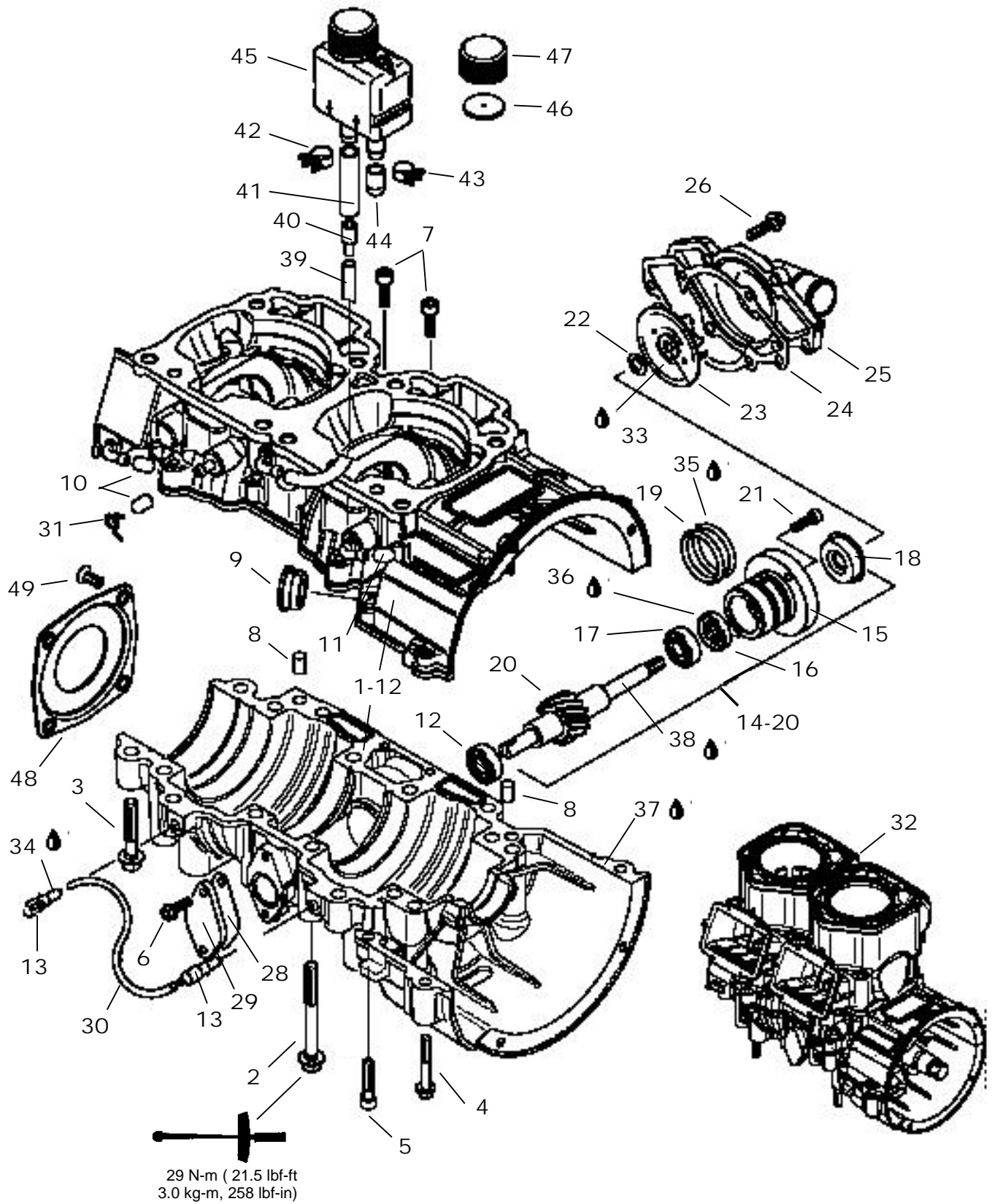
● NOTICE:

Use the 50/50 premixed coolant rated for -37°C (- 35°F) (P/N 293 600 038).

- Do not reinstall pressure cap.
- With engine cold, refill coolant tank up to COLD LEVEL line.
- Start engine. Refill up to line while engine is idling until rear heat exchangers are warm to the touch (about 4 to 5 minutes).
- Always monitor coolant level while filling tank to avoid emptying.
- Install pressure cap.
- Lift rear of vehicle and support it safely.
- Blip the throttle 3 - 4 times to bring engine speed to 7000 RPM.
- Apply the brake to stop the track.
- Lower vehicle back on ground and add coolant up to 15 mm (1/2 in) above the COLD LEVEL line, as shown at right.
- Lift front of vehicle approximately 60 cm (24 in) and support it safely. Let the vehicle idle for two minutes like this
- Put the vehicle back on the ground and add coolant up to 15 mm (1/2 in) above the COLD LEVEL line.
- When the engine has completely cooled down, recheck coolant level in coolant tank and refill up to the line if needed.
- Check for coolant mixture freezing point. The specification is - 37°C (- 35°F). Adjust as necessary.



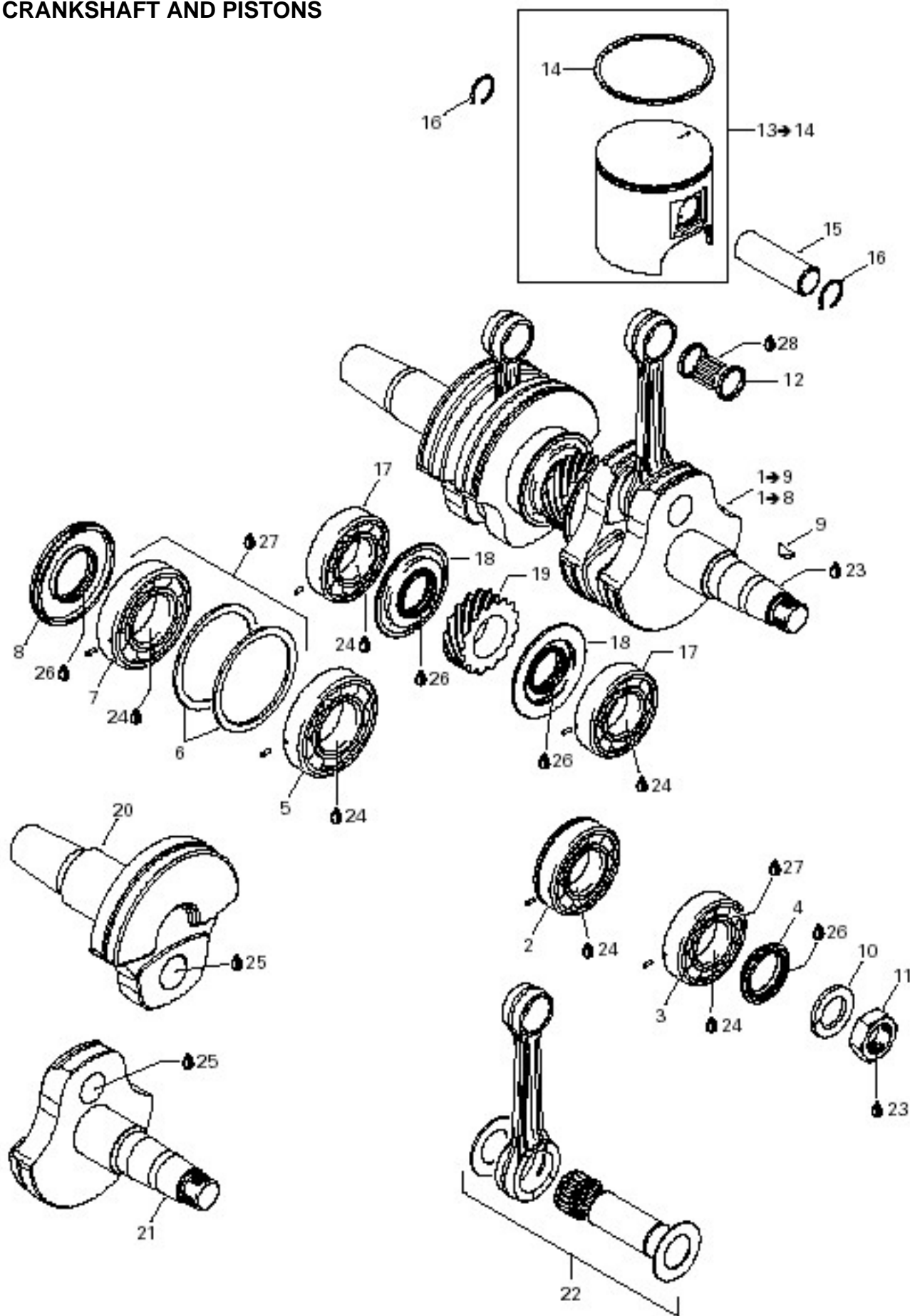
ENGINE / BOTTOM END



Engine / Bottom End			
Ref.	P/N	Qty	Part Descriptions
1-12	420889083	1	Crankcase ass'y
2	420640836	10	Hex. collar screw M8 x 75
3	420640431	6	Hex. collar screw M8 x 45
4	420640311	2	Hex. collar screw M6 x 45
5	205063044	1	Socket head screw M6 x 30
6	420941925	2	Screw M5 x 16
7	420840401	2	Socket head screw M6 x 22
8	290632010	2	Dowel pin
9	420860965	1	Cable Grommet
10	420960770	2	Cap
11	420960777	1	Cap
12	420232100	1	Ball Bearing
13	420956510	2	Check Valve
14-20	420837421	1	Water Pump Assy
15	-	1	Step Collar
16	420230195	1	Oil Seal
17	420232100	1	Ball Bearing
18	420650370	1	Oil Seal
19	420950890	2	O-Ring
20	-	1	Water Pump Shaft
21	420840511	2	Socket Head Screw M5 x 16
22	420227945	1	Washer
23	420222505	1	Water impeller
24	420931810	1	Gasket
25	420922630	1	Water pump housing
26	420240031	6	Hex screw M6 x 25
27	420230400	1	O-ring
28	420931565	1	Gasket
29	420810825	1	Block-off plate
30	414413800	-	Oil Line
31	420938190	1	Clamp
32	420059340	-	Short Block Assy 593HO
33	293800060	10mL	Loctite 243
34	413711400	10mL	Loctite 648
35	413707000	-	Molykote 111
36	420899271	400g	Petamo Grease, GHY133N
37	420297906	30mL	Sealing compound
38	413802900	12 x 1L	Injection Oil

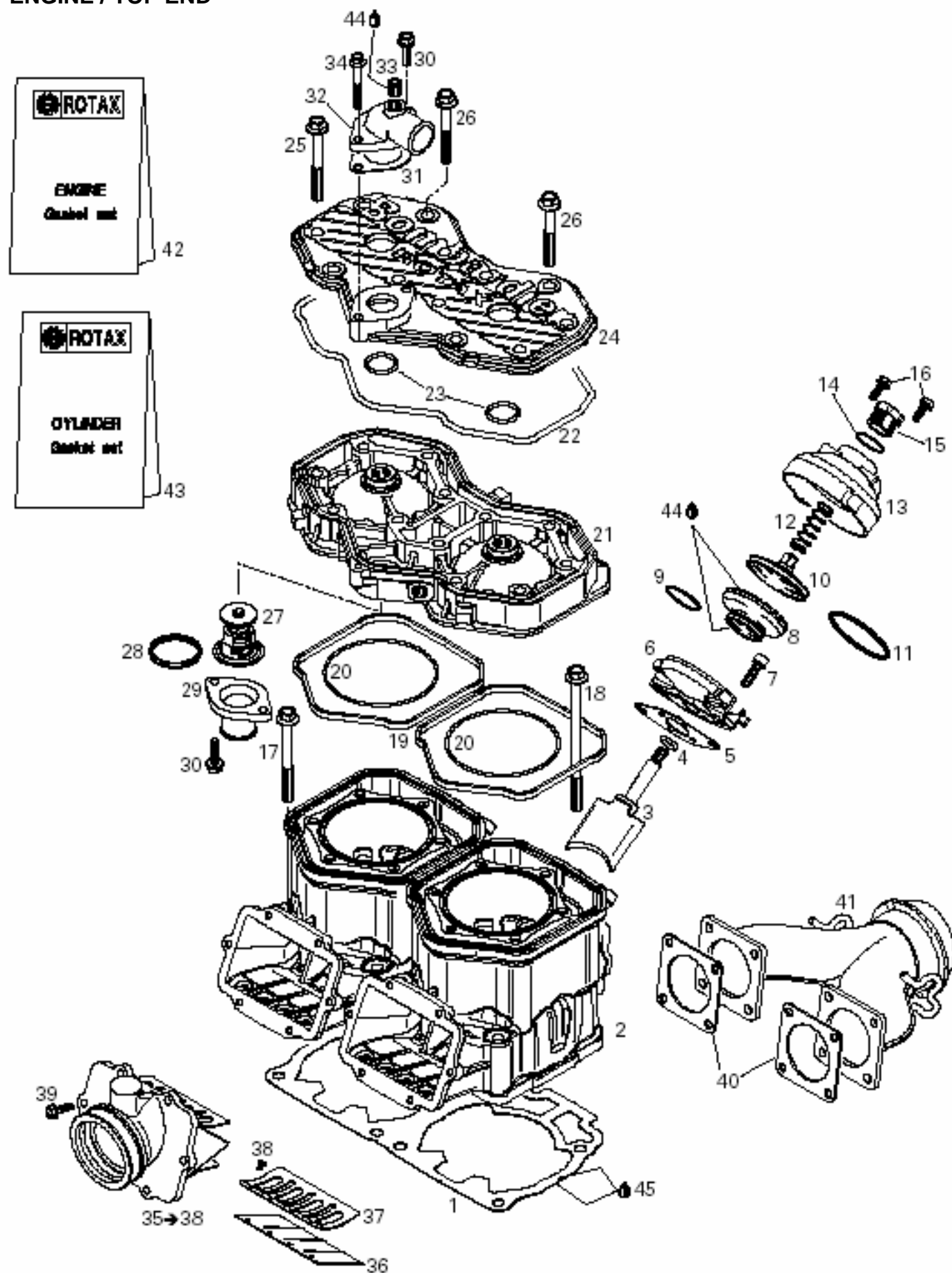
Engine / Bottom End			
Ref.	P/N	Qty	Part Descriptions
39	420974535	-	Oil Line
40	420874370	1	Reducer fitting
41	420956239	-	Oil Line
42	420951260	1	Clamp
43	420951240	1	Clamp
44	420960279	1	Cap
45-47	420956240	1	Oil Reservoir Assy
46	420850350	1	Rubber Gasket
47	420956250	1	Oil Cap
48	420812420	1	Oil Seal Cover
49	420941430	4	Countersunk screw M6 x 20

ENGINE / CRANKSHAFT AND PISTONS



Engine / Crankshaft and Pistons			
Ref.	P/N	Qty	Part Descriptions
1 - 9	420889090	1	Crankshaft Assy
2	420832635	1	Brg. 6207
3	420832575	1	Brg. 6207
4	420931792	1	Oil Seal
5	420832606	1	Brg.
6	420926190	1	Washer
7	420832600	1	Brg.
8	420931285	1	Oil Seal
9	420246015	1	Woodruff key
10	420945759	1	Lock Washer 22mm
11	420842230	1	Hex Nut M22
12	420832425	2	Needle Brg.
13-14	420889181	2	Piston Assy (71.89mm)
14	420815290	2	Semi-trapez ring
15	420916410	2	Gudgeon pin
16	420845106	4	Piston Circlip
17	420832575	1	Brg. 6207
18	420931455	2	Oil Seal
19	420834355	1	Central Gear (15 teeth)
20	420819709	1	Crankshaft (PTO section)
21	420819739	1	Crankshaft (MAG section)
22	420889093	1	Rod Repair Kit (MAG)
-	420889094	1	Rod Repair Kit (PTO)
23	293800060	10mL	Loctite 243
24	293800070	8oz	Loctite 767, anti-seize lubricant
25	413711400	10mL	Loctite 648
26	420899271	400g	Petamo Grease, GHY133N
27	293550021	50g	Isoflex Grease
28	413802900	12 x 1L	Injection Oil

ENGINE / TOP END



Engine / Top End			
Ref.	P/N	Qty	Part Descriptions
1	420931895	1	Base Gasket 0.8 mm
	420931894	-	Base Gasket 0.7 mm
	420931892	-	Base Gasket 0.6 mm
	420931893	-	Base Gasket 0.5 mm
2	420613710	2	Nicasil Cylinder
3	420854650	2	Exhaust Valve Guillotine
4	420430110	2	O-ring
5	420931542	2	Gasket
6	420854455	2	Valve Housing
7	205062544	4	Socket head screw M6 x 25
8	420260729	2	Bellows
9	420838253	2	Spring Clamp
10	420854449	2	Exhaust Valve
11	290239048	2	Hose Spring
12	420239944	2	Spring
13	290911558	2	Valve Cover
14	420430220	2	O-ring
15	420241221	2	Adjuster Screw
16	420241270	4	Screw M5 X 25
17	420640524	4	Hex collar screw M10 x 80
18	420640534	4	Hex collar screw M10 x 120
19	420931590	2	Rubber Ring Seal
20	293300026	2	O-ring
21	420613700	1	Cylinder Head (Silver)
22	290950320	1	O-ring
23	420430782	2	O-ring
24	420923460	1	Cylinder Head Cover (Silver)
25	420841306	10	Hex collar screw M8 x 65
26	420941621	2	Hex collar screw M8 x 56.5
27	420922517	1	Thermostat (42°C)
28	420931272	1	Sealing Ring
29	420922025	1	Outlet Socket
30	420941250	3	Screw M6 x 20
31	420850338	1	Gasket
32	420922062	1	Curved Neck Outlet
33	420240480	1	Plug Screw 1/8-27 NPT
34	420941451	1	Hex collar screw M8 x 40
35-38	420867879	2	Intake Socket Assy
36	420924680	4	Reed Petal
37	420924695	4	Reed Petal Stop
38	420941215	12	Screw M3 x 5

ENGINE (CYLINDERS / HEAD / BASE) 7 - 8

Engine / Top End			
Ref.	P/N	Qty	Part Descriptions
39	420941925	12	Screw M5 x 16
40	420850552	2	Gasket
41	420673070	1	Exhaust Manifold
42	420889920	1	Engine Gasket Set
43	420889925	1	Cylinder Gasket Set
44	420297906	30mL	Sealing Compound
45	293800038	50mL	Loctite 518

TOP END

● NOTICE:

The engine must be removed from the chassis to carry out the following operations. See **Chapter 4 – Engine Removal** for details.

TROUBLESHOOTING

Before completely disassembling the engine, check airtightness. Refer to the section named LEAK TEST AND ENGINE DIMENSION MEASUREMENT at the end of this chapter.

CLEANING

- Discard all gaskets and O-rings.
- Clean all metal components in a non-ferrous metal cleaner.
- Scrape off carbon formation from cylinder exhaust port cylinder head and piston dome using a wooden spatula.

● NOTICE:

The letters “AUS” (over an arrow on the piston dome) must be visible after cleaning.

- Clean the piston ring groove with a groove cleaner tool or with a piece of broken ring.

DISASSEMBLY

RAVE System

● NOTICE:

RAVE stands for Rotax Adjustable Variable Exhaust.

- Remove spring clip or screws no. 16, cover no. 13 and spring no. 12.
- Remove spring no. 11.
- Unscrew valve piston no. 10.
- Remove bellows no. 8 and spring no. 9.
- Remove cylindrical screws. Remove valve housing no. 13.
- Pull out exhaust valve no. 3. (see right)



RAVE VALVE PARTIALLY REMOVED

2, Cylinder

Remove spark plugs, coolant outlet no. 32. Unscrew cylinder head cover no. 24 then cylinder head no. 21.

13, Piston

Place a clean cloth or rubber pad (P/N 529 023 400) over crankcase. Then with a pointed tool inserted in piston notch, remove both circlips no. 16 from piston no. 13.



TYPICAL

ENGINE (CYLINDERS / HEAD / BASE) 7 - 10

All engines are equipped with cageless piston pin Bearings, as shown at right.

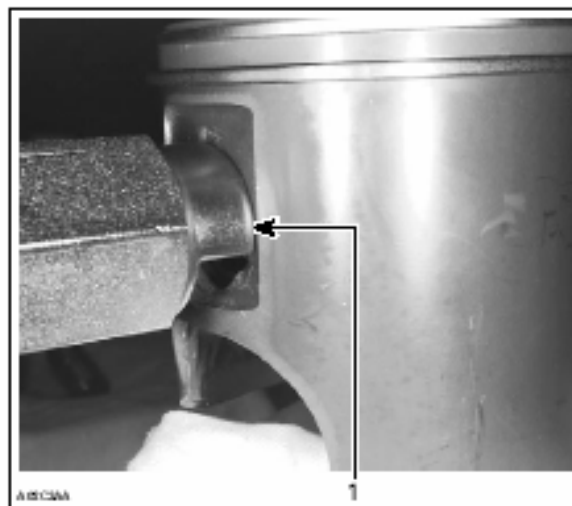


Once the head and cylinder(s) has been removed, Use piston pin puller (P/N 529 035 503) along with 20 mm sleeve kit (P/N 529 035 542). Use also a locating sleeve.

● **NOTICE:**

The locating sleeve is the same that contains new cageless bearing.

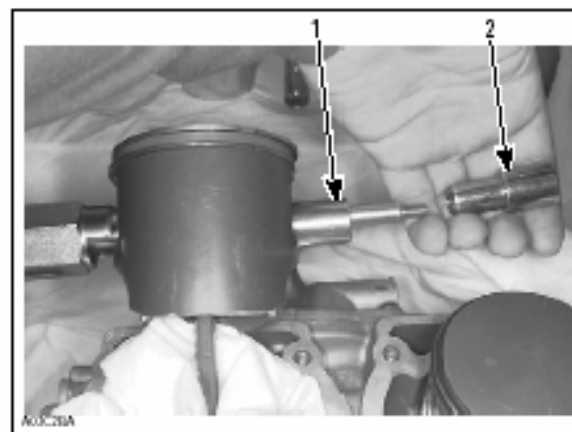
Insert piston pin puller (P/N 529 035 503) making sure it sits squarely against piston as shown at right.



TYPICAL

1. Properly seated all around

Install sleeve (1) then shouldered sleeve (2) over puller rod as shown at right.



TYPICAL — INSTALLATION OF SLEEVE KIT

1. Sleeve

2. Shouldered sleeve

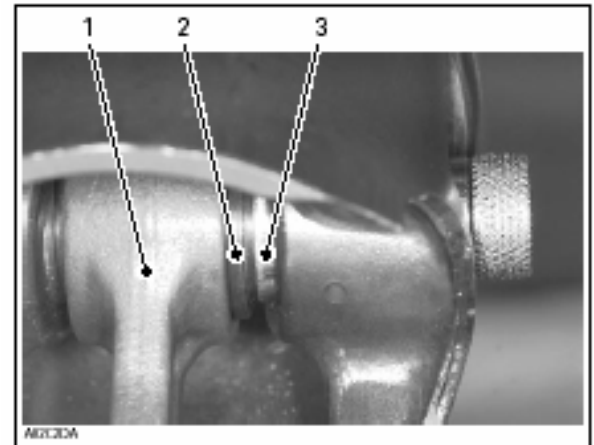
Screw in (LH threads) extracting nut.

Pull out piston pin no. 15 by unscrewing puller until shouldered sleeve end is flush with thrust washer of piston pin bearing.

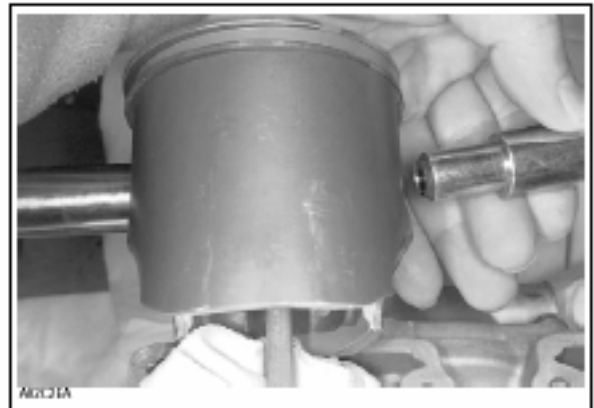


TYPICAL — PISTON PIN EXTRACTION

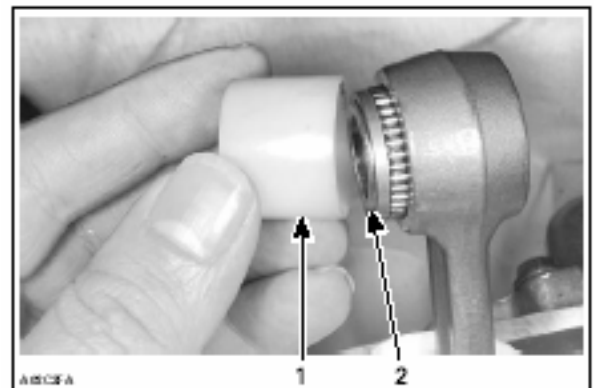
Remove puller. Pull out shouldered sleeve carefully.



Remove piston from connecting rod.



Install locating sleeve. Then push the needle bearings, thrust washers and sleeve into the upper connecting rod journal



TYPICAL
1. Locating sleeve
2. Sleeve

INSPECTION

● NOTICE:

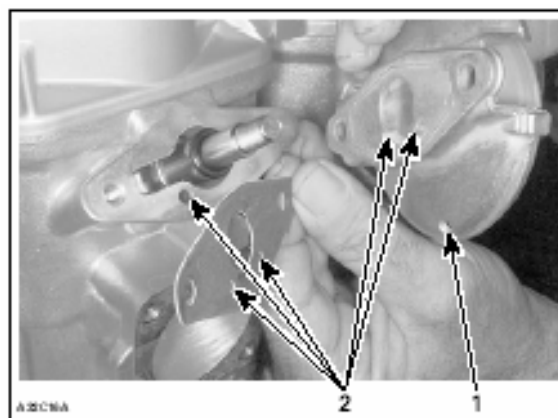
For details, Refer to LEAK TEST AND ENGINE DIMENSIONS MEASUREMENT AT THE END OF THIS CHAPTER.

RAVE System

Check valve rod housing and cylinder for clogged passages.

● NOTICE:

Oil dripping from draining hole (No. 1) indicates a loose spring or damaged bellows.



1. Draining hole
2. Passages

8, Bellows

Check for cracked, dried or perforated bellows.

12, Spring

ENGINE TYPE	SPRING P/N	COLOR	WIRE DIA. mm (in)	FREE LENGTH mm (in)	PRELOAD IN N (LBF) AT COMPRESSED LENGTH OF 14 mm (.551 in)
593 HO	420 239 944	Brown	0.9 (.035)	48.5 (1.91)	15.9 (3.56)
793	420 239 940	Yellow	0.8 (.031)	48.5 (1.91)	10.5 (2.36)

ASSEMBLY

RAVE System

Install RAVE valve (noting which is the top side when it was removed) Tighten red cap no. 15 screw to bottom.

2,13, Cylinder and Piston

Before inserting piston in cylinder, lubricate the cylinder with new injection oil or equivalent.

24,21,2, Cylinder Head Cover, Cylinder Head and Cylinder

Make sure parts sealing surfaces are flat. Refer to LEAK TEST AND ENGINE DIMENSION MEASUREMENT at the end of this chapter and look for CYLINDER HEAD WARPAGE.

When installing a new cageless bearing, replace half plastic cages with sleeve.

● NOTICE:

All 593 HO engine cageless bearings have 28 needles.



A02C2GA

- Oil needle bearing with injection oil.
- Grease thrust washers and install them on each end of needles. The grease will help to hold them in place.
- Insert cageless bearing into connecting rod.
- Heat piston with a 100 W lamp or a heat gun before piston installation to make the insertion of the pin much easier.



A02C24A

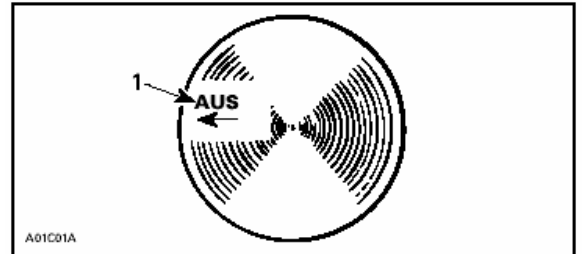
TYPICAL — CAGELESS BEARING AND SLEEVE INSTALLED

▼ CAUTION

Piston temperature must not exceed 46°C (115°F). Never use direct flame to heat the piston and never freeze the pin.

At assembly, place the pistons over the connecting rods with the letters "AUS" (over an arrow on the piston dome) facing towards the exhaust port.

1. Exhaust



A01C01A

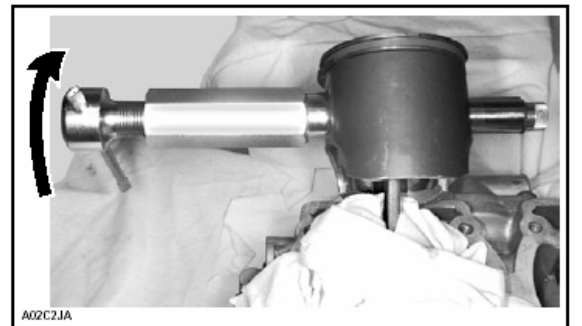
Install shouldered sleeve.



A02C21A

TYPICAL — SHOULDERED SLEEVE INSTALLATION

Install piston pin puller and turn handle until piston pin is correctly positioned in piston.



A02C2JA

All Models

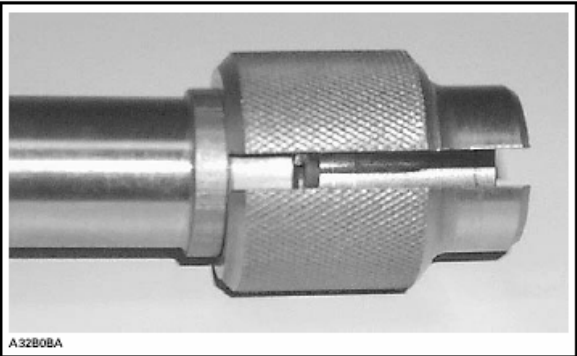
<p>▼ CAUTION</p>
<p>Always install new circlips. To minimize the effect of acceleration forces on circlip, install each circlip so the circlip break is at 6 o'clock as illustrated. Use appropriate piston circlip installer.</p>

ENGINE TYPE	PISTON CIRCLIP INSTALLER (P/N)
All	529 035 686

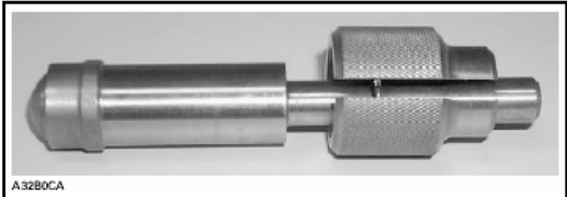
Use circlip installer (P/N 529 035 686) to install new mono-hook circlips no. 16. Insert circlip into support so that, when installed in piston groove, the tab faces upward.



With round end of pusher, position circlip perpendicularly to the support axis.



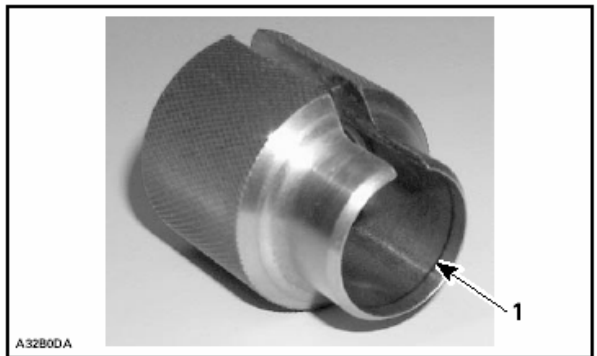
With the other end of the pusher, push circlip into the support groove.



Using a plastic hammer, tap the pusher to put the circlip in place. Make sure to install new circlips with the tab toward the top as per the following photos.

▼ CAUTION

Always install new mono-hook circlips. If circlip installation fails at the first attempt, always retry with a new one because, on a second attempt, the circlip will lose its normal retaining capabilities.



1. Groove

▼ CAUTION

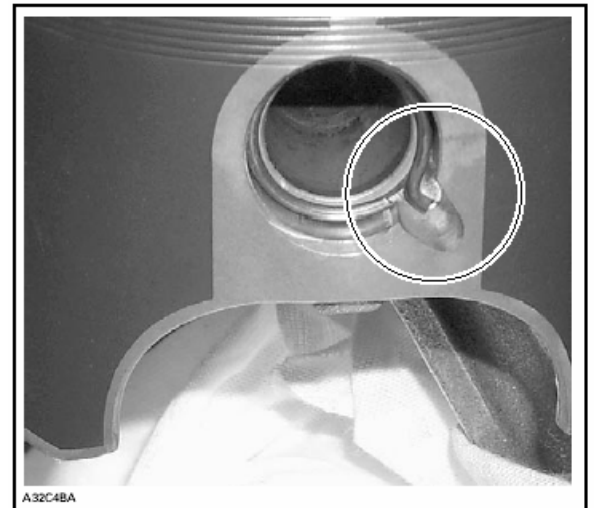
Circlips must not move freely after installation; if so, replace them. Clean cylinders and crankcase mating surfaces with Loctite Chisel (P/N 413708500). Coat crankcase mating surface with Loctite 518 (P/N 293800038). Choose the right gasket thickness according to combustion chamber volume. Refer to LEAK TEST AND ENGINE DIMENSION MEASUREMENT. Install it on the crankcase. Coat gasket with Loctite 518.



CIRCLIP READY TO BE INSTALLED ON PISTON

▼ CAUTION

Always install a gasket of the proper thickness. Failure to do so may cause detonation and severe engine damage. Before inserting piston in cylinder, lubricate the cylinder with new injection oil or equivalent. Install cylinders. Do not tighten. Install new rubber ring and round O-rings on each cylinder.



TAB TOWARD TOP

● NOTICE:

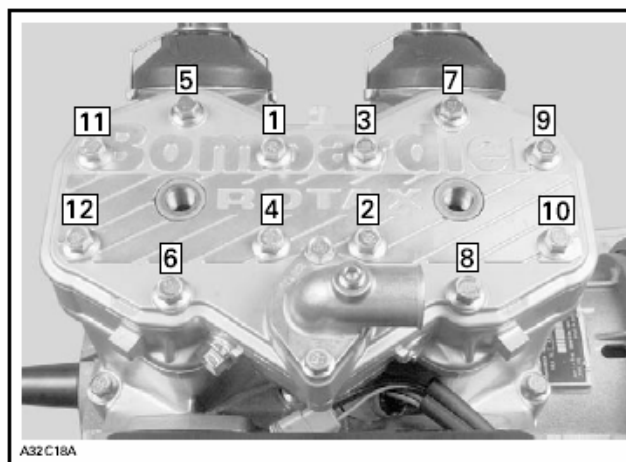
Carefully clean screws before reinstallation, specifically under screw head.

Install exhaust manifold with gaskets. Do not tighten yet.

Torque cylinder screws in a crisscross sequence as per the following table:

M8	29 N•m (21 lbf•ft)
M10	40 N•m (29 lbf•ft)

At assembly, torque cylinder head screws to **29 N-m (21 lbf-ft)** in the illustrated sequence at right.



Tighten exhaust manifold bolts to **23 N-m (17 lbf-ft)** in a criss-cross sequence.

Apply Loctite 243 (P/N 293 800 060) on screws threads. Install outlet socket and tighten screws to **12 N-m (106 lbf-in)**. Note position of longer screw.

1. Longer screw

35, Reed Valve

All Engines

Blades have a curved shape. Install with their curve facing reed block.

With blade stopper no. 37 removed, check reed valve for proper tightness. There must not be any play between blade and valve body when exerting a finger pressure on blade at blade stopper location.

In case of a play, turn blade upside down and recheck. If there is still a play, replace blade and/or valve body.

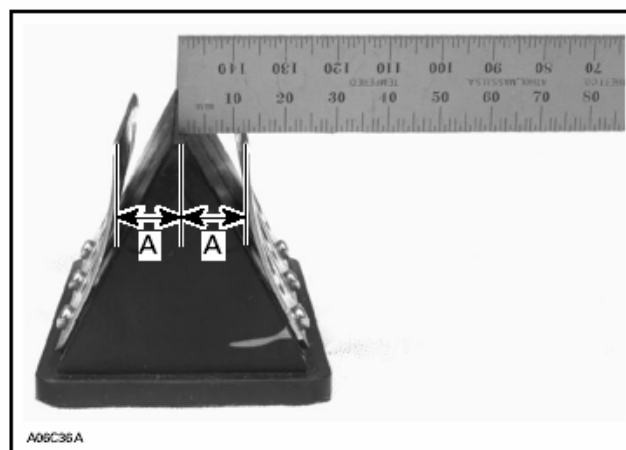
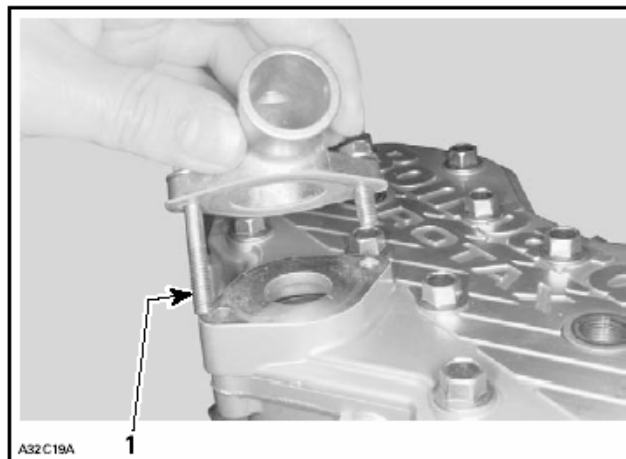
Check distance from blade stopper outer edge and distance from center of reed valve block.

TYPICAL

A. $18.7 - 0, + 0.75 \text{ mm} (.736 - 0, + .030 \text{ in})$

Bend blade stopper as required to obtain the proper distance.

Blade stoppers may slightly interfere with cylinder during installation. Adjusted distance will be reduced automatically upon installation.



BOTTOM END

● NOTICE:

The engine must be removed from the chassis to carry out the following operations. See **Chapter 4 – Engine Removal** for details.

CLEANING

- Discard all gaskets and O-rings.
- Clean all metal components in a non-ferrous metal cleaner. Use gasket remover (P/N 413708500) accordingly.
- Remove old paste gasket material from crankcase mating surfaces with gasket remover (P/N 413708500)

▼ CAUTION

Never use a sharp object to scrape away old sealant as score marks incurred are harmful to crankcase sealing.

DISASSEMBLY

General

To remove drive pulley, refer to **Chapter 8 – Primary Transmission System**. To remove magneto, refer to CDI SYSTEM in **Chapter 14 – Electrical System**.

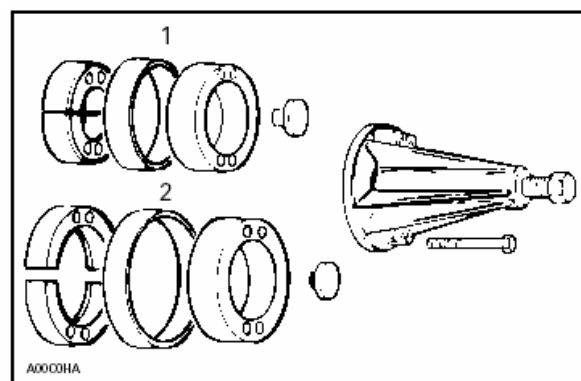
2,3,5,7 Crankshaft Bearings

To remove bearings from crankshaft, use a protective cap and special puller, as illustrated.

1. PTO side
2. MAG side

This includes the following parts:

P/N	Description
420940755	M16x1.5x150 Screw
420840681	M8x40 Screw (4)
420841201	M8x70 Screw (4)
420876552	Crankshaft protector PTO All engines except 247
420876557	Crankshaft protector MAG All engines except 247
420977490	Puller Ring (Use with half rings 420977475 or 420276025)
420977475	Half Ring (2) For 72mm OD brgs.
420276025	Half Ring (2) For 62mm OD brgs.
420977480	Puller Ring
420977494	Puller Ring (Use with half rings 420977479)
420977479	Half Ring (2) For 80mm OD brgs.
420876330	Half Ring (2) For 52mm OD brgs.



INSPECTION

NOTE: Refer to LEAK TEST AND ENGINE DIMENSIONS MEASUREMENT (End of this chapter)

ASSEMBLY

Coat lip of all seals with Petamo grease (P/N 420 899 271).

5, Crankshaft Bearing

Smear anti-seize lubricant (P/N 413 701 000) on part of crankshaft where bearing fits.

Prior to installation, place bearings into an oil container filled with injection oil previously heated to 75°C (167°F). This will expand the bearing and ease installation.

Some bearings must be lubricated with Isoflex grease (P/N 293 550 021).

▼ CAUTION

Use only the recommended Isoflex grease. Make sure not to push Isoflex grease between outside bearing race and half crankcase. Use a sharp object to scrape away old sealant as score marks incurred are harmful to crankcase sealing.

● NOTICE:

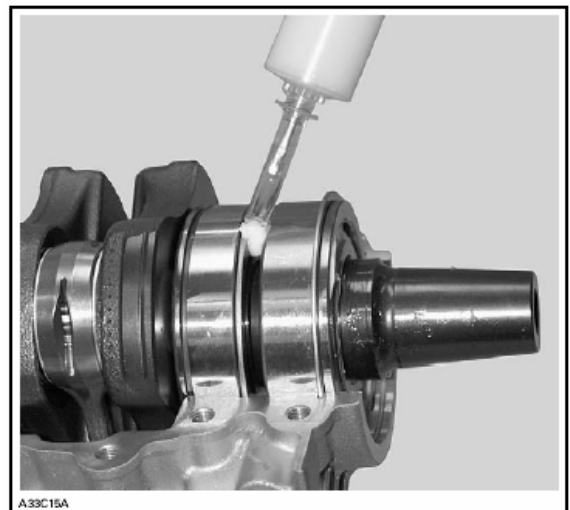
The 50 g tube corresponds to 50 cc of grease.

Put 50 to 55 mL of grease in a syringe.

▼ CAUTION

Do not exceed the recommended amount of grease.

Fill inner side of PTO side bearing with Isoflex grease (about 10 mL) as shown at right.



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PTO SIDE BEARING FILLED WITH ISOFLEX GREASE

With the syringe, fill the outer ball bearing and inner side of outer seal with 40 to 45 mL of Isoflex grease as shown at right.

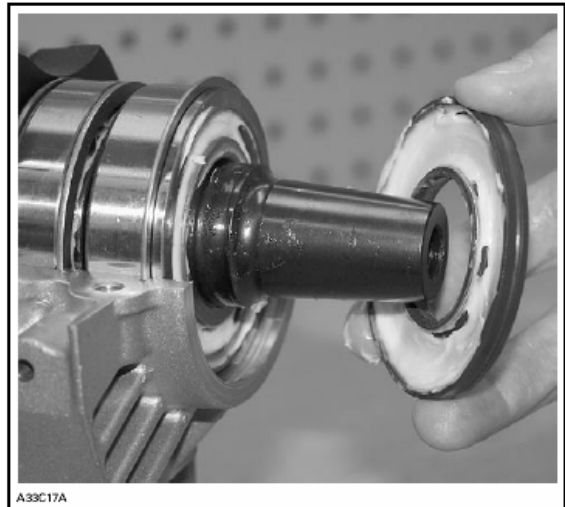
Apply 6 mL of grease to MAG side outer bearing.

● **NOTICE:**

If replaced with new bearing, do not apply grease as new bearings come with grease already applied.



BALLS COATED WITH A SEAM OF GREASE



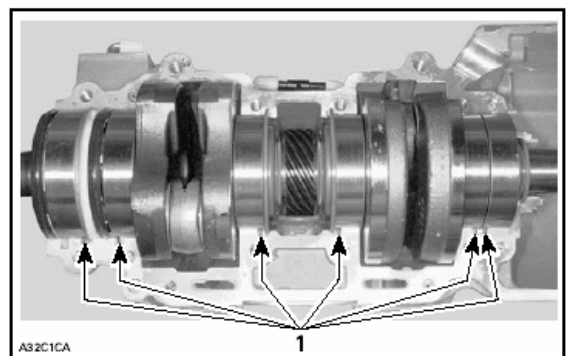
FILL WITH GREASE AND SET IN PLACE

At crankshaft installation, position drive pins as illustrated.

1. *Position pins*

Pour 50 mL (2 U.S. oz) of injection oil in the pan under central gear to lubricate pump gearing as per photo.

1. *Oil bath*

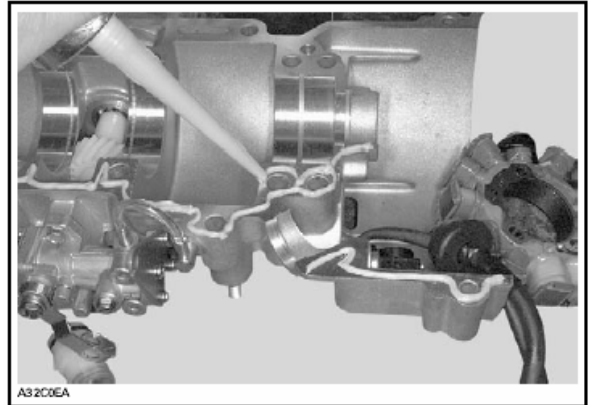


Crankcase Assembly

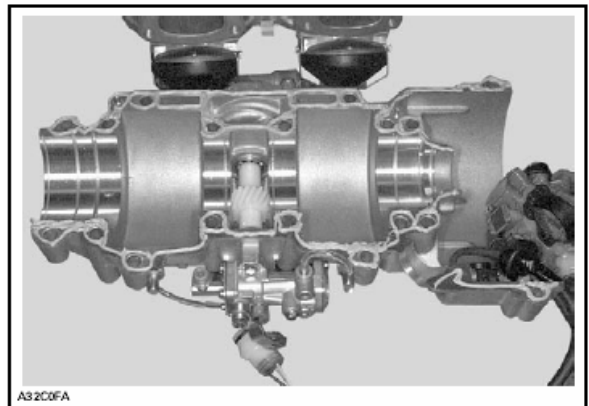
IMPORTANT: The total assembly sequence, including sealing compound spreading, screwing and torquing of bolts according to the proper sequence, must be performed within 10 minutes. **Do not wait between each bolt torquing. All bolts must be torqued in a row.**

Before screwing together both parts of crankcase, seal it with sealing compound (P/N 420 297 906). Make sure surfaces are **perfectly** clean and degreased before applying sealing compound.

Spread a seam of **1.2 mm (1/16 in)** maximum in diameter on the surface of lower crankcase half.



As far as possible, sealing compound must be applied in one run to avoid any risks of leakage through the crankcase.

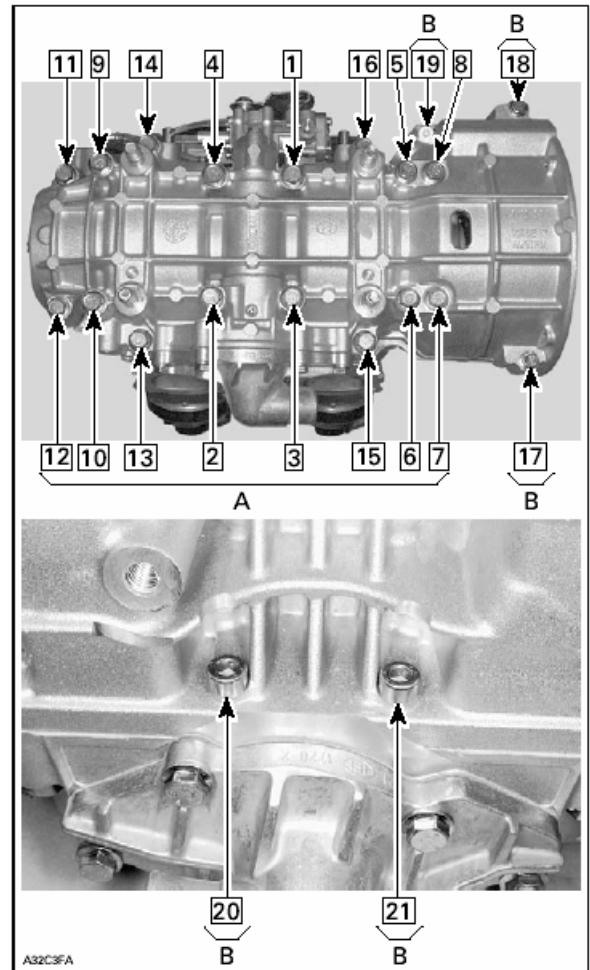


*SEAMING COMPLETED — CONTACT SURFACES COVERED
AND SCREW HOLES SURROUNDED*

Screw all crankcase bolts in place in the following sequence and to the appropriate torque; this must be done in two steps, torquing: first, screw bolts up to 60% of the final torque (**18 N-m (13.5 lbf-ft)** for most of the bolts), then, tighten to the required torque (**i.e. 29 N-m (21 lbf-ft)**).

A. Torque bolts 1 through 16 to **29 N-m (21 lbf-ft)**

B. Torque bolts 17 through 21 to **9 N-m (80 lbf-in)**



BREAK-IN

After rebuilding an engine, always observe a break-in period as described in **Chapter 1 – General Instructions**.

LEAK TEST AND ENGINE MEASUREMENT

LEAK TEST

The following gives verification procedures for 593 HO engines.

PREPARATION

1. Remove tuned pipe.
2. Install plug over exhaust manifold.
3. Remove carburetors.
4. Insert plugs in intake rubber boots. Tighten with existing clamps.
5. Using a hose pincher (P/N 295 000 076), block impulse hose.
6. Install air pump on exhaust plug.

● **NOTICE:**

If necessary, lubricate air pump piston with mild soap.

▼ CAUTION

Using hydrocarbon lubricant (such as engine oil) will damage rubber seal of pump piston.

7. Activate pump and pressurize engine to 34 kPa (5 PSI). Do not exceed this pressure.
8. Engine must stand this pressure during 3 minutes.

– If pressure drops before 3 minutes, check tester kit by spraying a soapy solution on pump cylinder, all plugs and fittings.

– If tester kit is leaking, bubbles will indicate where leak comes from.

– If tester kit is not leaking, check engine as per the following procedure.

PROCEDURE

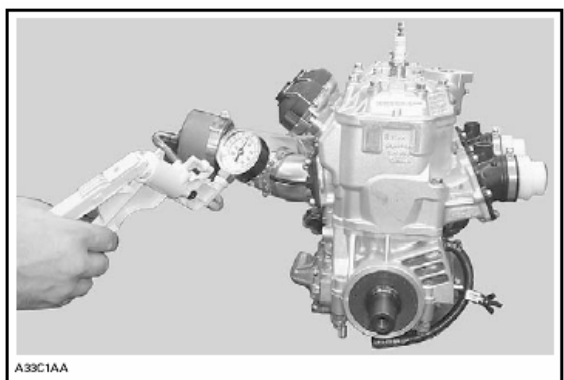
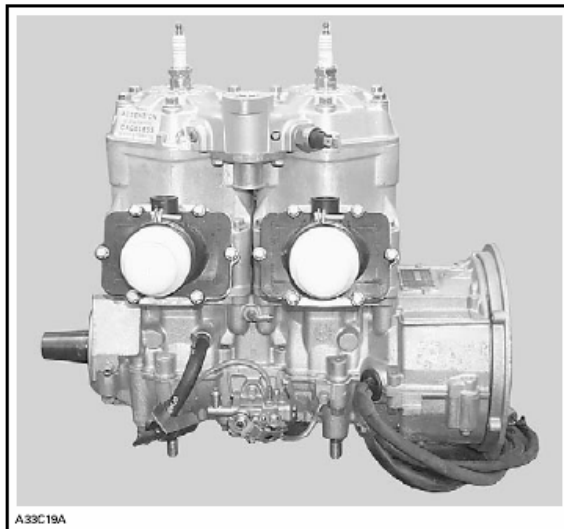
● **NOTICE:**

A flow chart has been prepared as a visual reference. Page 7-25 and 7-26 of this chapter.

Using the flow chart and the following text, pressurize area to be tested and spray soapy solution at the indicated location.

**TEST PRESSURE: 34 kPa (5 PSI)
for 3 minutes**

– If there is a leak at the tested location, it is recommended to continue testing the next item before overhauling the engine. There is a possibility of more than one leak.



– If there is no leak at the tested location, continue pumping to maintain pressure and continue with the next item until the leak is found.

Engine

Check the following:

1. All jointed surfaces and screw/stud threads of engine:

- spark plug base, insulator
- cylinder head
- RAVE valve bellows, piston and housing
- cylinder
- crankcase halves (joint)
- oil injection pump mounting flange (O-ring)
- coolant pump housing
- bleed screws/plugs.

2. Remove cooling system cap.

Check for air bubbles in antifreeze. It indicates defective cylinder head O-ring or cylinder base gasket.

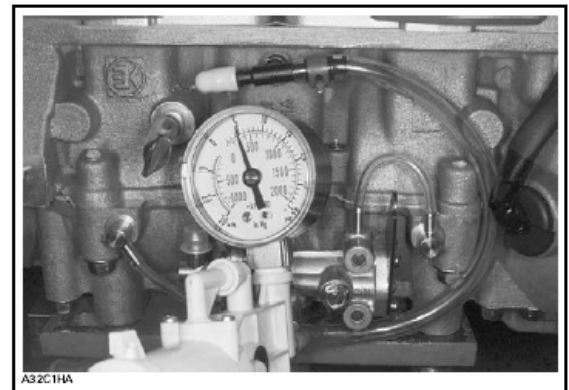
3. Remove drive pulley then check crankshaft outer seal.

4. Remove rewind starter and magneto system then check crankshaft outer seal.

5. Check pump shaft gear oil reservoir.

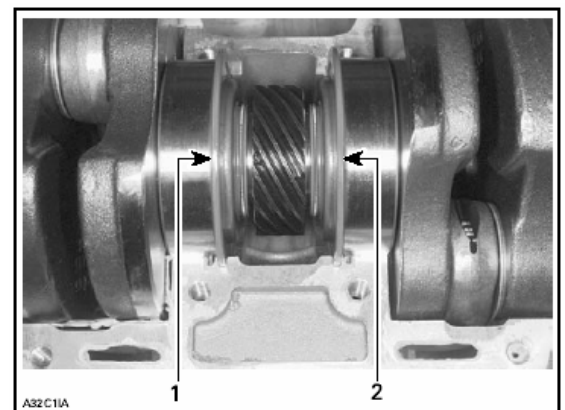
Pump Shaft Oil Gear Reservoir

Install air pump on adapter and pressurize as shown at right. If pressure drops, it indicates a defective crankshaft inner seal.



CRANKSHAFT INSTALLED IN UPPER HALF CRANKCASE

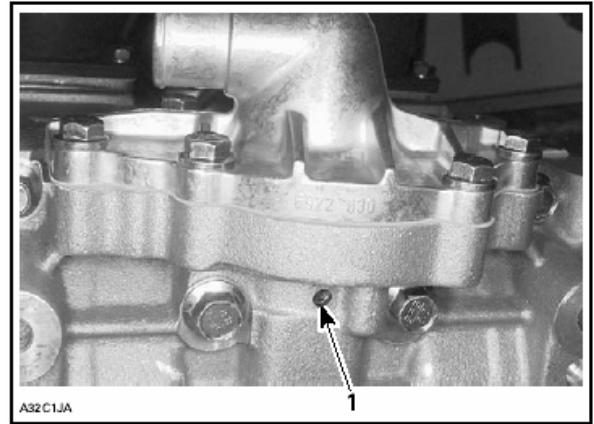
1. Crankshaft inner seal on PTO side
2. Crankshaft inner seal on MAG side



1. Check weep hole below coolant pump housing with soapy water.

1. Weep hole

If there is a leak, it indicates that a pump shaft is defective (oil seal beside coolant ceramic seal).



2. Leaks can be also on the oil pump side, which is blocked off on the Snow Hawk 600HO. Check this mounting area and the two mounting bolts for leaks.

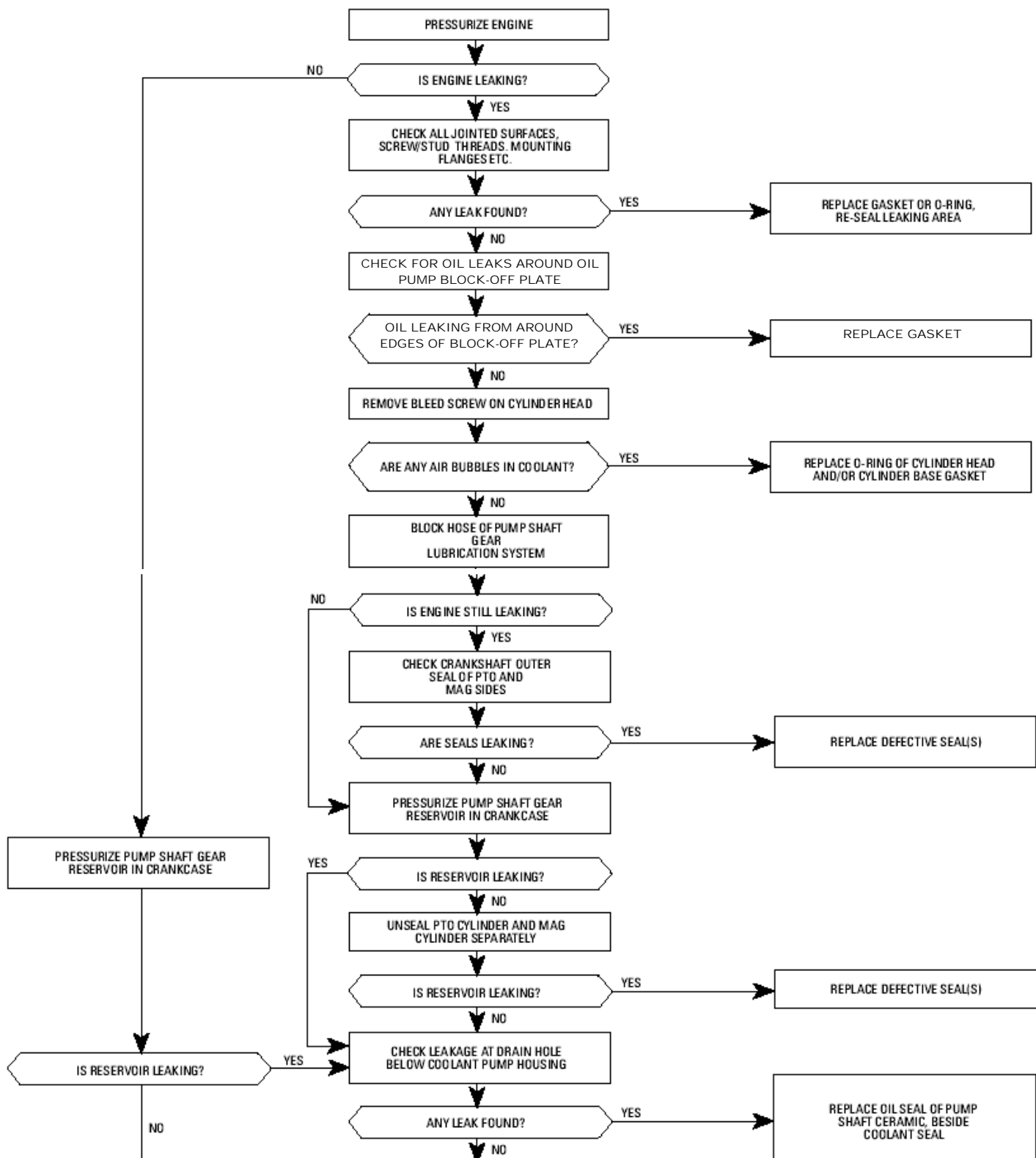
3. If leak still persists, it indicates a defective casting somewhere in the engine.

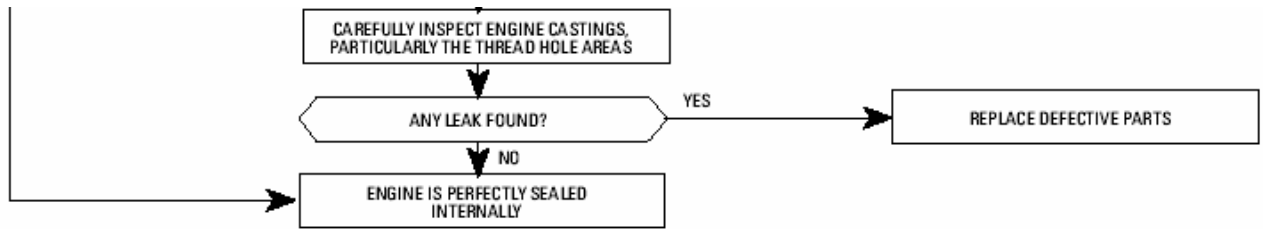
Disassemble engine and carefully check for defects in castings. Pay attention to tapped holes which may go through engine sealed area and thus lead to leakage.

FINALIZING REASSEMBLY

After reassembling engine, always recheck for leakage.

ENGINE LEAK VERIFICATION FLOW CHART





ENGINE DIMENSION MEASUREMENT

This section covers the 593HO engine type.

CYLINDER HEAD WARPAGE

ENGINE TYPE	MAXIMUM
All	0.05 mm (.002 in) per 50 mm (2 in) of surface
	0.5 mm (.020 in) for total length of cylinder head

Check gasketed surface of the cylinder head with a straightedge and a feeler gauge.

CYLINDER TAPER

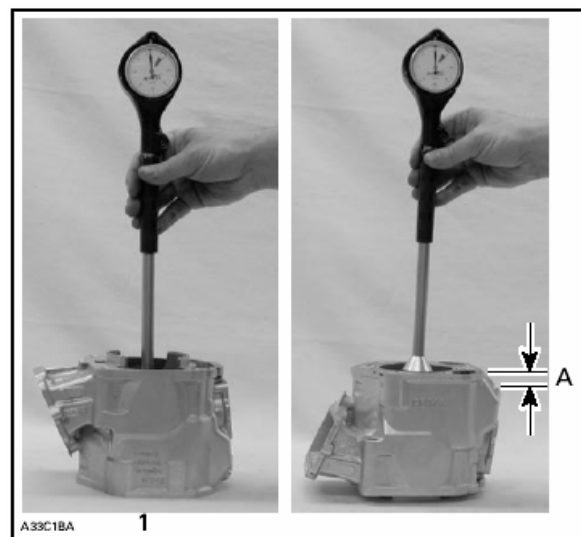
ENGINE TYPE	MAXIMUM
All	0.10 mm (.004 in)

Compare cylinder diameter 16 mm (5/8 in) from top of cylinder to just below its intake port area. If the difference exceeds the specified dimension the cylinder should be rebored and honed or should be replaced. Nikasil cylinder can be honed using diamond hone but cannot be rebored.

● NOTICE:

Be sure to restore the chamfer around all cylinder sleeve port openings.

1. Below the intake port
A. 16 mm (5/8 in) from top



CYLINDER OUT OF ROUND

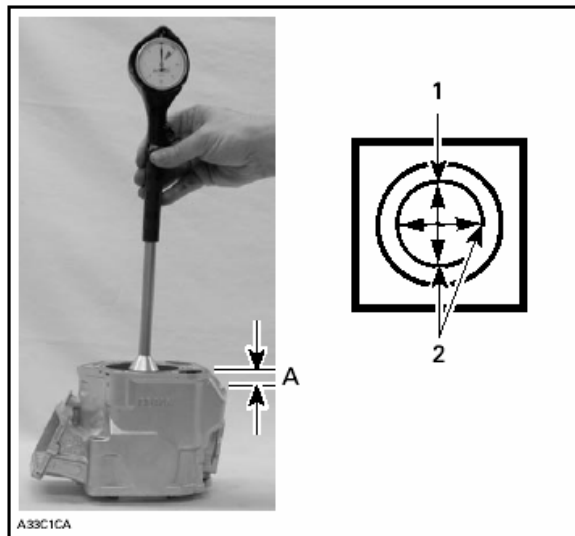
ENGINE TYPE	MAXIMUM
All	0.08 mm (.003 in)

Measuring 16 mm (5/8 in) from top of cylinder with a cylinder gauge, check if the cylinder out of round is more than the specified dimension. If larger, cylinder should be rebored and honed or should be replaced. Nikasil cylinder can be honed using diamond hone but cannot be rebored.

● **NOTICE:**

Be sure to restore the chamfer around all cylinder sleeve port openings.

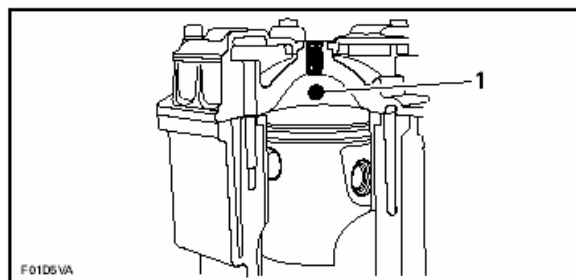
1. Piston pin position
2. Measures to be compared
- A. 16 mm (5/8 in)



COMBUSTION CHAMBER VOLUME MEASUREMENT

The combustion chamber volume is the region in the cylinder head above the piston at Top Dead Center. It is measured with the cylinder head installed on the engine.

1. Combustion chamber

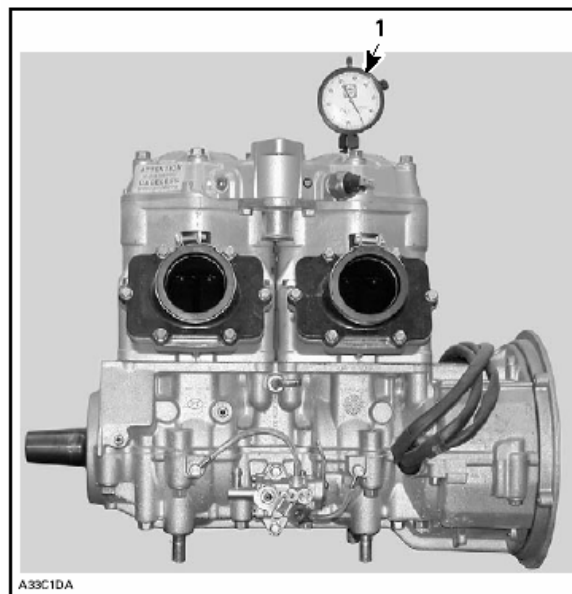


● **NOTICE:**

When checking the combustion chamber volume, engine must be cold, piston must be free of carbon deposits and cylinder head must be leveled.

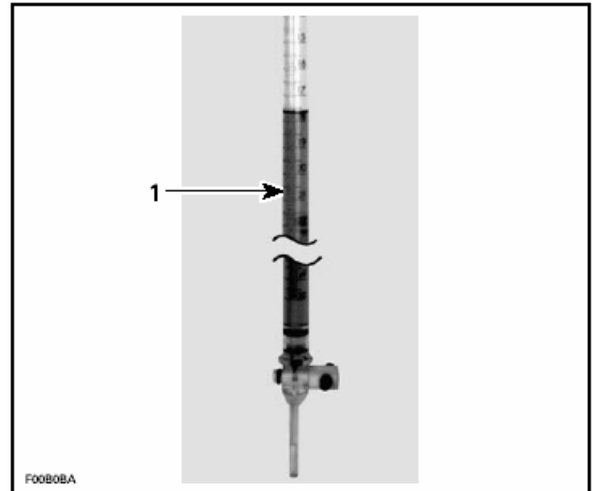
1. Remove both spark plugs and bring one piston to Top Dead Center using a TDC gauge.

1. Bring piston to TDC



2. Remove cylinder head.
3. Seal piston ring gap with a small amount of grease.
4. Reinstall cylinder head.
5. Obtain a graduated burette (capacity 0 - 50 cc) and fill with an equal part (50/50) of gasoline and injection oil.

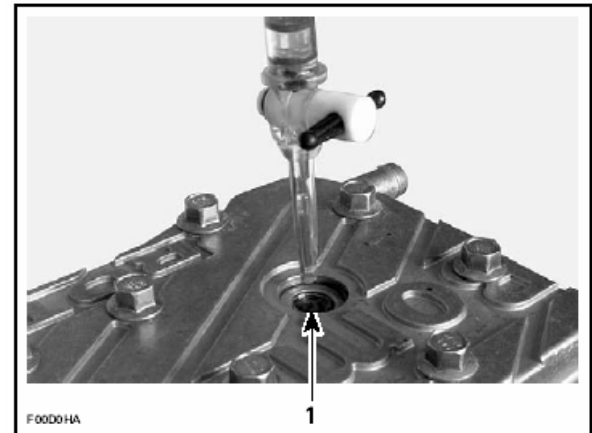
1. Graduated burette (0 - 50 cc)



6. Open burette valve to fill its tip. Add liquid in burette until level reaches 0 cc.

7. Inject the burette content through the spark plug hole until liquid touches the top spark plug hole.

. Top of spark plug hole



● **NOTICE:**

The liquid level in cylinder must not drop for a few seconds after filling. If so, there is a leak between piston and cylinder. The recorded volume would be false. Reseal the piston ring gap and follow the instruction provided above.

8. Let burette stand upward for about 10 minutes, until liquid level is stabilized.

9. Read the burette scale to obtain the quantity of liquid injected in the combustion chamber.

● **NOTICE:**

When the combustion chamber is filled to top of spark plug hole, it includes an amount of 2.25cc corresponding to the spark plug well.

10. Repeat the procedure for the other cylinder.

ENGINE TYPE	COMBUSTION CHAMBER VOLUME (cc) (up to top thread of spark plug hole)
593 HO	28.65 \pm 1.2
793	38.6 + 1.7, - 1.6

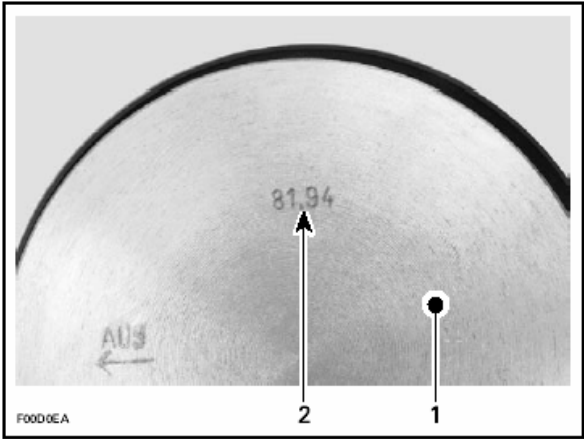
11. Install a thicker or thinner cylinder/crankcase gasket (refer to *Parts Catalogs*) in order to obtain the specified combustion chamber volume or the nearest.

ENGINE TYPE	CHANGE IN COMBUSTION CHAMBER VOLUME (cc) FOR EVERY 0.1 mm (.004 in) OF GASKET THICKNESS
593 HO	0.41
793	0.53

USED PISTON MEASUREMENT

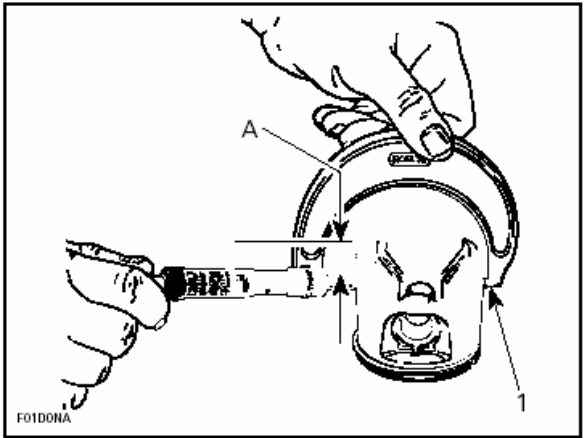
Note the measurement on the piston dome.

- 1. Piston dome
- 2. Piston measurement



Using a micrometer, measure piston skirt at 15 mm (.590 in) perpendicularly (90°) to piston pin.

- 1. Measuring perpendicularly (90°) to piston pin axis
- A. 15 mm (.590 in)



ENGINE TYPE	MAXIMUM PISTON SKIRT WEAR mm (in)
All	0.15 (.006)

The measured dimension must not be less than 0.15 mm (.006 in) of the one scribed on piston dome. Otherwise, install a new piston.

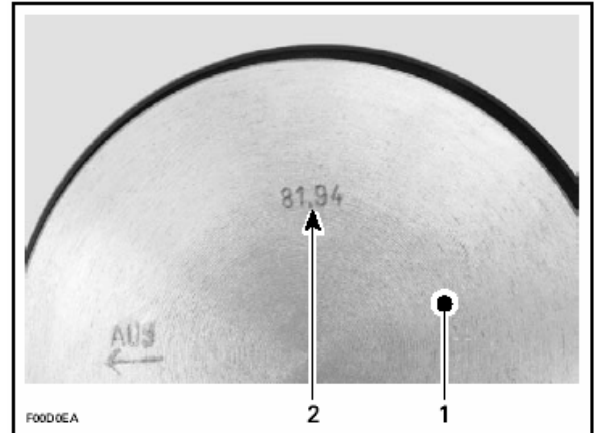
CYLINDER/PISTON CLEARANCE

Used and New Pistons

IMPORTANT: Make sure used piston is not worn more than specified. See USED PISTON MEASUREMENT above.

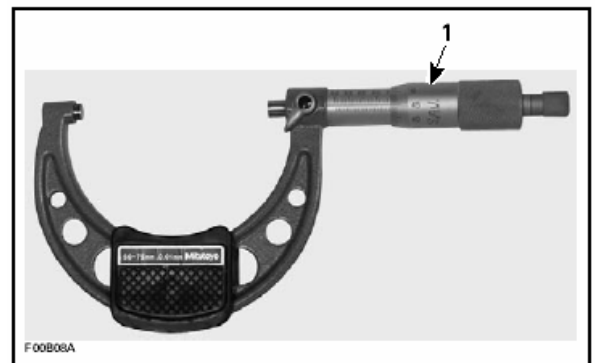
Take the measurement on the piston dome.

1. Piston dome
2. Piston measurement



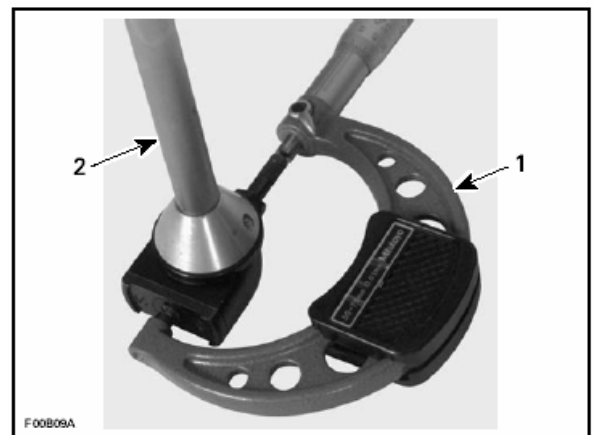
Adjust and lock a micrometer to the specified value on the piston dome.

1. Micrometer set to the piston dimension

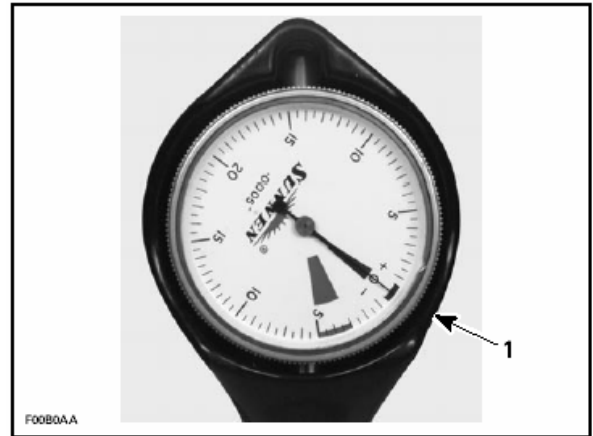


With the micrometer set to the piston dimension, adjust a cylinder bore gauge to the micrometer dimension and set the indicator to 0.

1. Use the micrometer to set the cylinder bore gauge
2. Dial bore gauge



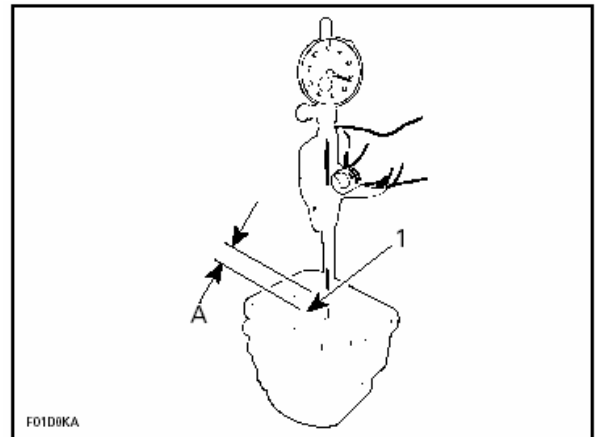
1. Indicator set to 0 (zero)



IMPORTANT: Always remove cylinders from crankcase before measuring.

Position the dial bore gauge at 16 mm (5/8 in) below cylinder top edge.

1. Measuring perpendicularly (90°) to piston pin axis
A. 16 mm (5/8 in)



Read the measurement on the cylinder bore gauge. The result is the exact piston/cylinder wall clearance. If clearance exceeds specified tolerance, replace cylinder.

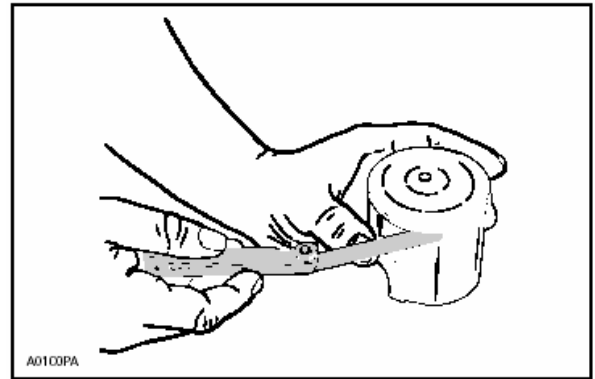
● **NOTICE:**

Make sure the cylinder bore gauge indicator is set exactly at the same position as with the micrometer, otherwise the reading will be false.

IMPORTANT: The total piston/cylinder clearance (actual cylinder diameter minus actual piston skirt diameter) should be within 0.30 mm (.012 in).

RING/PISTON GROOVE CLEARANCE

Using a feeler gauge check clearance between rectangular ring and groove. Replace piston if clearance exceeds specified tolerance. Refer to **Chapter 15 – Dimensions and Tolerances**.



RING END GAP

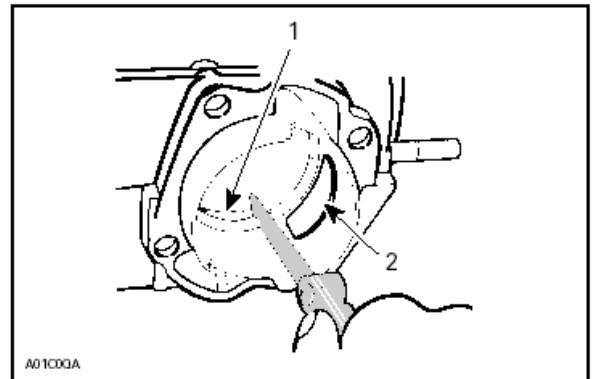
Position ring half-way between transfer ports and intake port.

● NOTICE:

In order to correctly position the ring in the cylinder, use piston as a pusher.

Using a feeler gauge, check ring end gap. Replace ring if gap exceeds specified tolerance. Refer to **Chapter 15 – Dimensions and Tolerances**.

1. Transfer port
2. Intake port



CRANKSHAFT DEFLECTION

Crankshaft deflection is measured with a dial indicator.

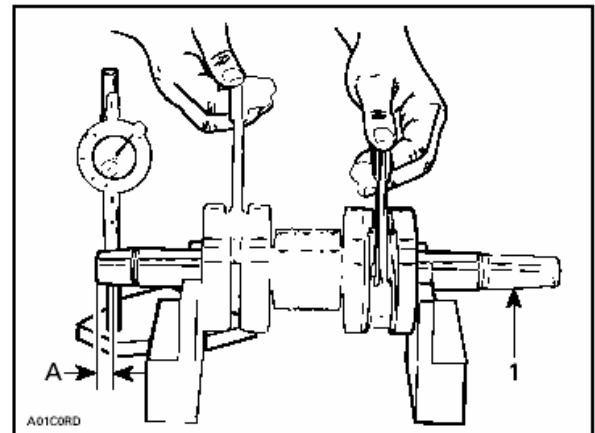
Measuring (in crankcase)

First, check deflection with crankshaft in crankcase. If deflection exceeds the specified tolerance, recheck deflection using V-shaped blocks to determine the defective part(s). See below.

Measuring (on bench)

Once engine is disassembled, check crankshaft deflection on V-shaped blocks. If deflection exceeds the specified tolerance, it can be worn bearings or a bent crankshaft. Remove crankshaft bearings and check deflection again on V-shaped blocks to determine the defective part(s). See measurement A in following illustration.

1. Measure at mid point between the key and the first thread
- A. 3 mm (1/8 in)



Crankshaft Deflection on PTO Side

ENGINE TYPE	MAXIMUM ON PTO SIDE mm (in)
All	0.06 (.0024)

Crankshaft Deflection on MAG Side

ENGINE TYPE	MAXIMUM ON MAG SIDE mm (in)
All	0.05 (.002)

Crankshaft Deflection in Center of Crankshaft

ENGINE TYPE	MAXIMUM IN CENTER OF CRANKSHAFT mm (in)
All	0.08 (.0031)

● NOTICE:

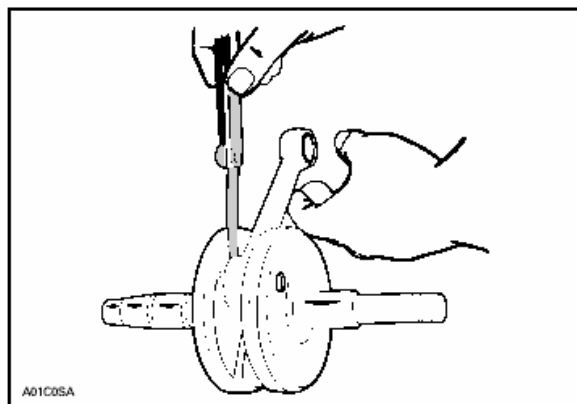
Crankshaft deflection cannot be correctly measured between centers of a lathe.

If the deflection exceeds the specified tolerance, crankshaft should be repaired or replaced.

CONNECTING ROD BIG END
AXIAL PLAY

ENGINE TYPE	NEW PARTS MIN. - MAX.	WEAR LIMIT
All	0.39 - 0.74 mm (.015 - .029 in)	1.20 mm (.047 in)

Using a feeler gauge, measure distance between thrust washer and crankshaft counterweight. If the distance exceeds specified tolerance, repair or replace the crankshaft.



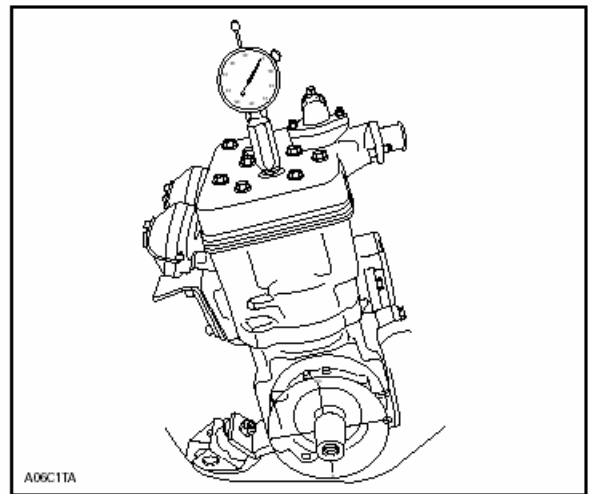
CRANKSHAFT END-PLAY

End-play is not adjustable but it should be between **0.10 - 0.30 mm (.004 - .012 in)**.

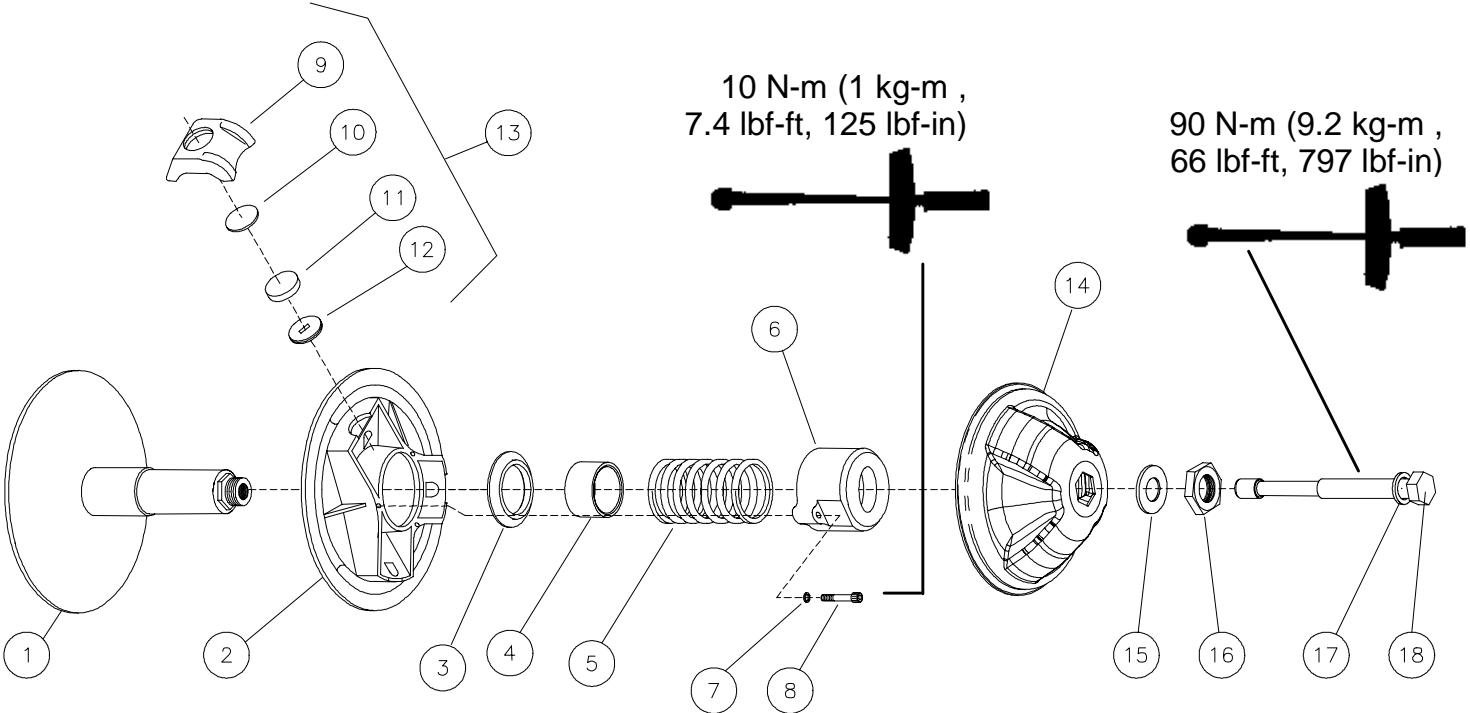
CHECKING CRANKSHAFT ALIGNMENT

- Install a degree wheel (P/N 529 035 607) on crankshaft end.
- Remove both spark plugs.
- Install a TDC gauge (P/N 414 104 700) in spark plug hole on MAG side.
- Bring MAG piston to top dead center.
- Rotate degree wheel (not crankshaft) so that 360° mark aligns with center of crankcase. Scribe a mark on crankcase.
- Remove TDC gauge and install it on center cylinder.
- Bring PTO piston to top dead center. Degree wheel must rotate with crankshaft.

Interval between cylinders must be **180° ± 0.5**. Any other reading indicates a misaligned (twisted) crankshaft.



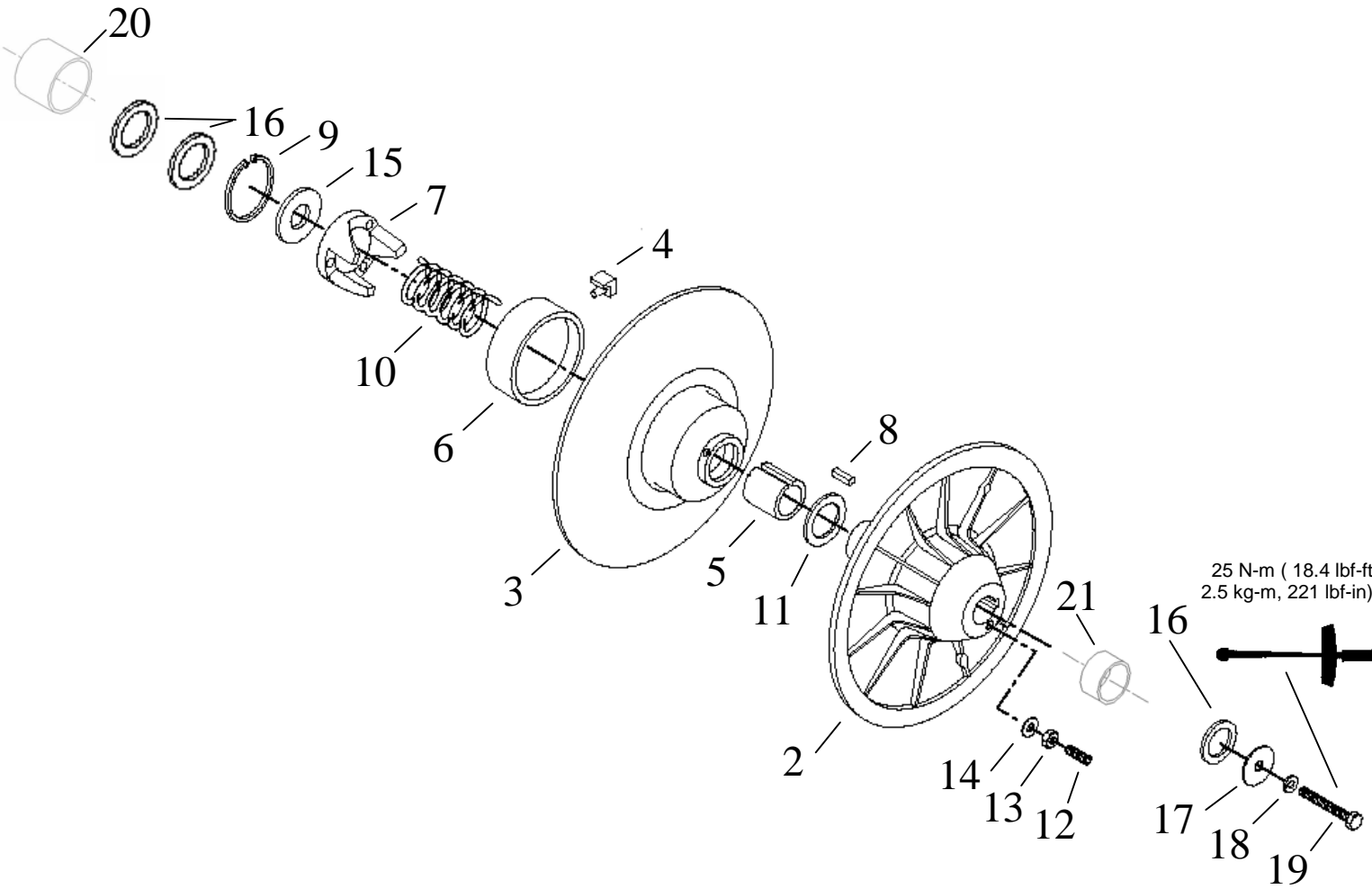
PRIMARY TRANSMISSION SYSTEM / PRIMARY CLUTCH



PRIMARY TRANSMISSION SYSTEM 8-2

Primary Transmission System / Primary Clutch			
Ref.	P/N	Qty	Part Descriptions
1-14	0400-0152	1	Primary Clutch Assembly
1	0405-0071	1	Fixed sheave
2	0410-0022	1	Sliding sheave
3	0150-1014	1	Spring seat
4	0440-2018	1	Spring Compression Limiter
5	0151-1007	1	Spring
6	0440-0005	1	Spring Cover
7	420-2453-700	3	Lock Washer
8	0080-0021	3	Socket Head Screw
9	0130-3006	3	Slider Block
10	X-81-3	15	Mass (small)
11	0135-3001	3	Mass (large)
12	X-7	3	Threaded Cap
13	0130-0153	3	Arm Assembly
14	0115-3042	1	Plated Cover (D1)
15	0080-0162	1	Machined Washer
16	V16J1	1	Nut

PRIMARY TRANSMISSION SYSTEM / SECONDARY CLUTCH



PRIMARY TRANSMISSION SYSTEM 8-4

Primary Transmission / Secondary Clutch			
Ref.	P/N	Qty	Part Descriptions
1-15	8000-0001	1	Secondary Clutch Assembly
2	504 1416 00	1	Fixed Sheave
3	504 1432 00	1	Sliding Sheave Assembly
4	414 9180 00	3	Cam Slider blocks
5	415 0112 00	1	Small Garlock bushing
6	860 4230 00	1	Large Garlock bushing
7	417 1264 22	1	Helix 50° - 44°
8	414 8208 00	1	Key
9	371 9031 00	1	Retaining Ring
10	414 5589 00	1	Preload Spring (beige)
11	504 1419 00	1	Washer
12	223 5630 65	3	Bolt M6x 30
13	228 0610 45	3	Nut M6
14	420 2453 70	3	Washer
15	504 1418 00	1	Washer
16	504 1082 00	3	Shim
17	517 0787 00	1	Washer
18	000 0004 42	1	Lock Washer
19	000 0295 30	1	Hex Head Bolt M8 x 30
20	SH255	1	Inner Jackshaft Alignment Collar
21	SH256	1	Outer Jackshaft Alignment Collar

GENERAL INFORMATION

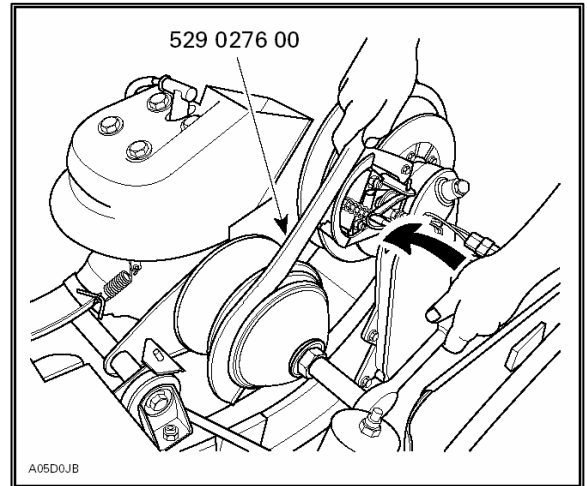
Certain parts of the primary clutch can be replaced (recoil spring, calibration disk, etc.) to improve the performance of the vehicle at high altitude. The High Altitude Technical Data included at the end of this manual contains all the information required for calibration at high altitude.

▼ CAUTION

Such modifications should only be carried out by experienced mechanics because of the effect the modifications could have on vehicle performance.

◆ WARNING

Any repair of the primary clutch must be carried out by an authorized Snow Hawk dealer or by a competent person. When installing parts, follow to the letter all the points given in the procedure and respect the assembly tolerances.



REMOVAL (PRIMARY CLUTCH)

- Use the primary clutch tool (P/N 529027600) to hold the clutch in place.
- Remove the mounting bolt (No. 18).
- Insert the primary clutch extractor (P/N 529022400) then take out the primary clutch.

DISMANTLING

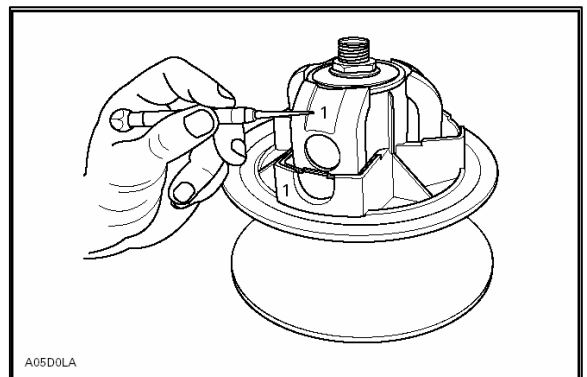
- Unscrew the cover-retaining nut and remove the tab washer below it.
- Identify the blocks (No. 1) and note their respective positions to assist with re-assembly. **It is very important that the blocks go back in the same positions.**

Spring cover

- The clutch spring exerts a high pressure on its cover.

◆ WARNING

The clutch spring is very rigid. Never try to dismantle the spring cover without the correct tools.



- Use a spring compressor (P/N 529027300) to ease disassembly.
- Install the tools as indicated. Remove the 3 Allen screws (No. 8) that hold the spring cover in place and then unscrew the compressor.

PRIMARY TRANSMISSION SYSTEM 8-6

- Remove the guide washer (No. 4).

CLEANING

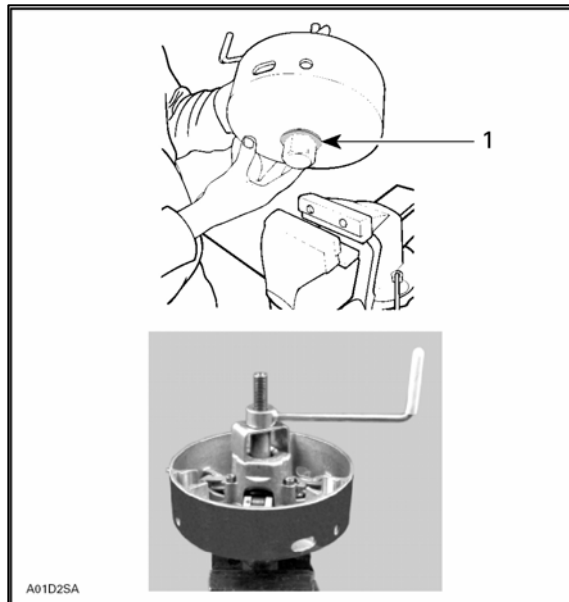
Clean the faces of the pulley and the shaft with very fine steel wool and a dry cloth. With a clean, dry cloth, clean the interior socket of the sliding half-pulley.

INSPECTION

Make sure the sliding sheave doesn't exhibit an excessive amount of play and that the shaft of the fixed sheave is not damaged. Replace these parts if necessary.

REASSEMBLING

- Install the guide washer (No. 4).
- To install the spring cover, use a spring compressor (P/N 529027300). Tighten the Allen screws to **10 N-m (7.4 lbf-ft, 88 lbf-in, 1 kg-m)**
- Be careful to install the blocks in their respective positions with their curved end facing the cover.
- Be careful to place the arrow of the cap in line with the mark on the sliding sheave and that of the fixed pulley.
- Tighten cover nut No 16 to **128 N-m (95 lbf-ft)**.



INSTALLATION

- Tighten the primary clutch-retaining bolt (No. 18) to between **90 and 100 N-m (between 66 and 24 lbf-ft)**.
- Re-install the drive-belt.
- Lift up and immobilize the rear of the vehicle and place it on a mechanical support.

◆ WARNING

Make sure that the track is free of anything that could be projected out of its rotation field. Keep hands, feet, tools and clothes away from the tread. Make sure that no one is near the vehicle.

- Have the vehicle accelerate at low speed (maximum 30 km/h or 20 mi/h) and apply the brake. Repeat 5 times.
- Check once more to make sure the torque is between 90 and 100 N-m (between 66 and 24 lbf-ft.).

◆ WARNING

After the first ten hours of vehicle use, the transmission must be inspected to make sure that the primary clutch retaining bolt is well tightened.

REMOVAL (SECONDARY CLUTCH)

- Remove the drive-belt of the vehicle.
- Remove retaining bolt No. 19, lock washer No. 18, washer No. 17, the shims No. 16 and the outer alignment collar, No. 21, then remove the secondary clutch from the jackshaft.

Jackshaft

If the jackshaft must be removed, see **Chapter 9 – Primary Transmission System**.

DISASSEMBLY

- Use a spring compressor (P/N 529027300).
- Remove retaining ring No. 9 and washer No. 15 to remove the cam from the 2 sheaves.
- Insert this pin in the groove of the key (1)

◆ WARNING

The secondary clutch cam is equipped with a spring. Use the tool indicated above.

CLEANING

Large bushing and small bushing

During the break-in period (about 10 hours of use), the teflon on the bushing moves toward the surface of the cam or of the shaft. The result is a light, constant friction of teflon against Teflon, so it is normal to note a coating of grey teflon on the cam or on the shaft. Do not remove this coating: it is not dust.

When it is necessary to remove a coating of dust from the cam or from the shaft, use a dry cloth to avoid removing the teflon that has been deposited there.

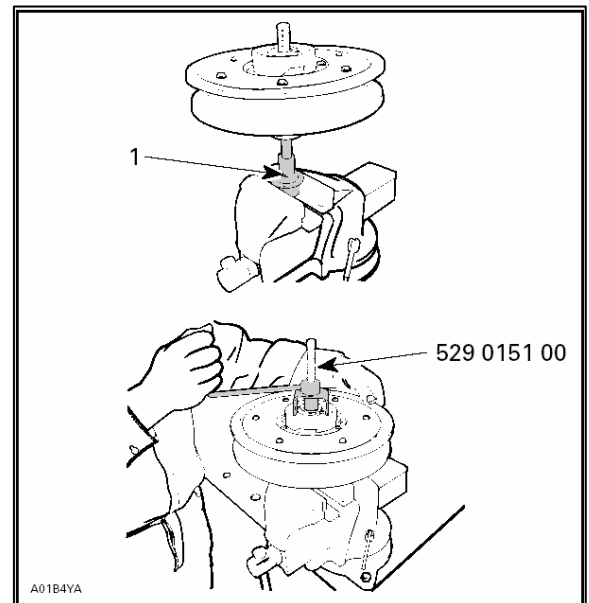
Cleaning the sheaves

Use Loctite Safety Solvent (P/N 413708200).

INSPECTION

Bushings

Make sure there are no cracks or scratches on the bushings and that they can move freely when installed on the fixed half-pulley.



Using a bore dial gauge, measure the diameter of the bushing. These measures must be taken at least 5mm (1/4 in) from the edge of the bushing.

Replace the bushing if their diameter is greater than the prescribed limit of wear.

Wear limits on the secondary clutch Garlock Bushings mm (in)

Small Bushing	38.30 (1.508)
Large Bushing	89.15 (3.510)

Slider Blocks

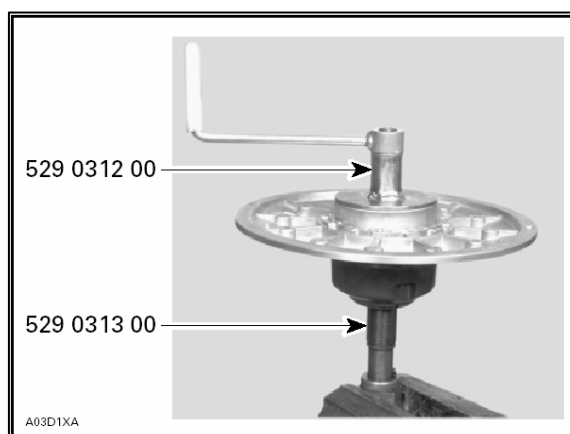
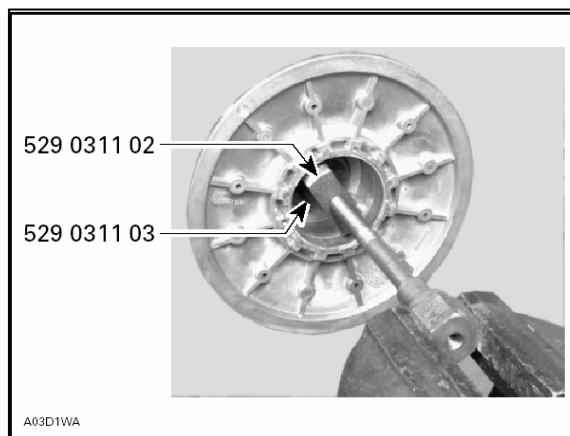
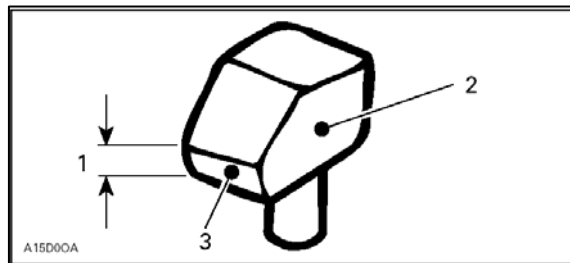
Check to see if the slider blocks are worn. Replace them when the thickness at the base is reduced to 1 mm (.039 in) or less.

1. Measure the thickness of the base here
2. Sliding sheave here
3. Lower side

Replacing the bushing

Large bushing

- Remove the three Allen screws. Heat the screws to break the Loctite bond.
- Remove the 3 slider blocks.
- Install an application plate (P/N 529031103) inside the sliding sheave.
- Place the extractor (P/N 529031102) under the bushing.
- Install the extractor screw head in a vise.
- Turn the sheave manually to take out the old bushing.
- Before installing the bushing, file the bore of the sliding sheave to remove any burrs from the bore.
- Coat the outside diameter of the bushing with Loctite 609 (P/N 413703100). Place the new bushing at the opening of the sliding sheave, and then tap it gently to install it correctly in the sliding half-pulley. Use tools (P/N 529031200 and 529031300) to install the bushing.
- Install the 3 Allen screws and the washers supplied with the new bushing.



Small bushing

● NOTICE:

The procedure described below can be carried out using a press and the same tools.

- Install the extractor in a vise.
- Heat the part where the bushing is located. Turn the extractor handle and the half-pulley at the same time to take the bushing out.

IMPORTANT :

The screws and washers of the large bushing must be removed before the small bushing is installed.

- Coat the outside circumference of the bushing with Loctite 609 (P/N 413703100).
- Install the bushing as shown in the picture.

REASSEMBLING

Cam slide

- When replacing the slider blocks, always install 3 new slider blocks to ensure uniform pressure on the cam. To re-assemble the parts of the secondary, carry out the operations for disassembly in the reverse order.

Cam

- Coat the inside of the cam with anti-seize compound.

INSTALLATION

Jackshaft and anti-seize compound

▼ CAUTION

Always apply anti-seize compound (P/N 413701000) on the jackshaft before the final installation of the pulley.

Re-install the secondary clutch by carrying out the operations for removing it, in reverse order

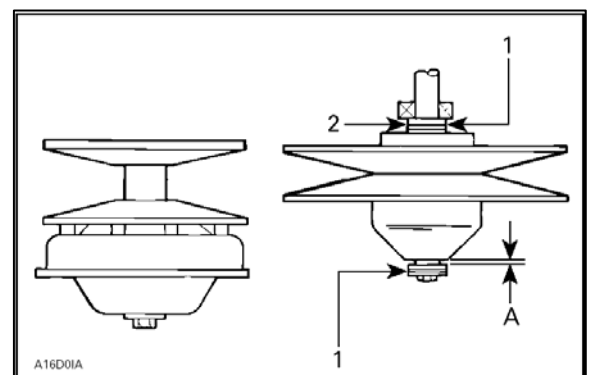
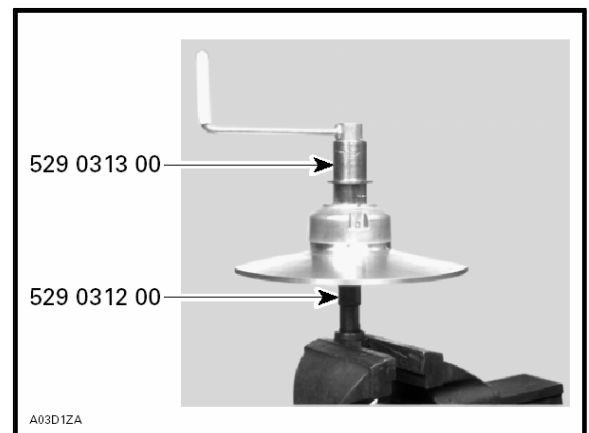
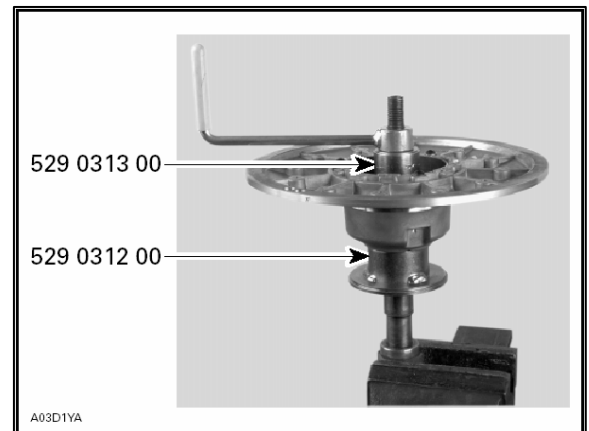
Check the axial play of the secondary clutch on the countershaft by pushing the pulley toward the outside housing so that it comes into contact with the inside shims (P/N 504108200). Measure the axial play where the fixing screw is situated between the shim(s) and the pulley. See the illustration.

TYPICAL - AS SEEN FROM ABOVE

1. Shims (P/N 504108200) (if needed)

2. Contact

A. 0 to 1 mm (0 to 3/64 in)



Secondary Clutch retaining bolt

Tighten the bolt to **25 N-m (18 lbf - ft)**.

ADJUSTMENT

Spring

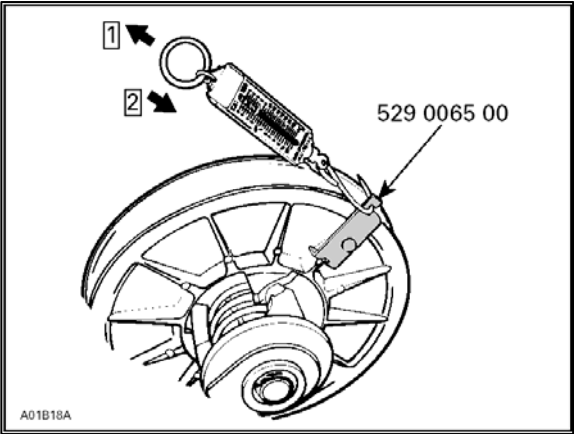
General information

During the break-in period for the new spring, it is normal for the spring to settle slightly. The initial preload on the spring is slightly higher to compensate for this settling. The characteristics apply after the full break-in period (around 10 hours of use).

Initial spring preload

To verify the initial spring preload, use a spring scale hook (P/N 529 0065 00) and a spring scale.

- Remove the drive belt.
- Install the hook on the sliding sheave. Prevent the fixed sheave from turning and using a spring scale, pull on the sliding sheave perpendicularly to the axis of the pulley.
- Take a first measurement when the sliding half-pulley begins to turn. Let it turn 10 mm (3/8 in) Hold the spring scale in this position. Gently slacken the tension on the spring scale and take the second measurement when the sliding sheave begins to close. The initial spring preload will be the average of these two measurements.



TYPICAL

Step 1 : 1st measurement

Step 2 : 2nd measurement

To correct the initial spring preload, place the end of the spring in the cam turning it clockwise to increase the preload and in the opposite direction to decrease it.

The original spring preload of the Snow Hawk 600HO secondary clutch is **6.8 kg or 14.9 lbf**

● NOTICE:

If it is not possible to correct the initial torsion of the spring, try putting the other end back in the sliding sheave (holes A, B and C).

1 st Measure (at opening)	2 nd Measure (at closing)	Initial Spring Preload
$\frac{\quad + \quad}{2}$		=
3.8 kg (8.4 lb) (at opening)	3.4 kg (7.9 lb) (at closing)	3.6 kg (8 lb) Actual
$\frac{\quad + \quad}{2}$		= Initial Spring Preload

CLUTCH ALIGNMENT

GENERAL INFORMATION

Since the two clutches are rigidly mounted, the only alignment dimension that requires inspection is the distance between the inside of the fixed sheave of the primary clutch (inner sheave) and the inside of the fixed sheave of the secondary clutch (outer sheave). This alignment data serves as a reference for the assembly as well as defining the dimensions that offer a satisfactory deflection of the belt.

The objective of the adjustment of alignment of the clutches is to guarantee the efficiency of the transmission system. Furthermore, an efficient operation as well as a minimum of wear on the belt can only be obtained when the clutches are properly aligned.

▼ CAUTION

Before verifying the adjustment of the pulleys, make sure the rear suspension has been installed on the vehicle and that the tension and alignment of the track have been checked. Always check the adjustment of the clutches whenever the suspension is adjusted.

◆ WARNING

If the alignment procedure for the clutches is not carried out correctly, the snowmobile could move slowly forward at low speed.

The alignment data takes into account the following dimensions:

X = The distance between the inside of the fixed sheave of the primary clutch (inner sheave) and the inside of the fixed sheave of the secondary clutch (outer sheave) = **15mm (0.590 in)**

● NOTICE:

If possible, using a flatbar of length 55-60 cm (24 in) and a width of 15mm (0.590 in) can be used as a guide to space the two sheaves apart correctly, in one operation.

PROCEDURE

- Remove the drive belt.
- While turning and pushing the sliding half-pulley, open the secondary clutch. Insert the flatbar into the secondary clutch and the primary clutch.
- If there is a gap on either side of the flatbar that rests in the two clutches, add shims (P/N 504108200) to either side of the secondary clutch to re-align the system.

DRIVE BELT

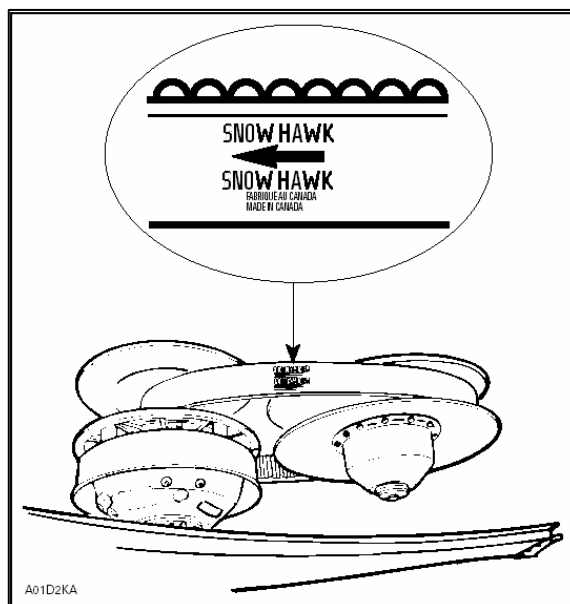
MODEL	P/N	WIDTH NEW	MINIMUM WIDTH (WEAR LIMIT)
SNOW HAWK 600HO	138-4628U3	1.375 ± 0.030	1.250 ± 0.030

DIRECTION OF ROTATION

In order for the drive-belt to last as long as possible it must be installed as is shown in the illustration respecting the direction of rotation.

● NOTICE:

In the case of a belt that has already been used, mark it and reinstall it such that it will be used in the same direction.



MEASURING THE DEFLECTION OF THE DRIVE BELT

● NOTICE:

The deflection must be measured each time a new drive belt is installed.

● NOTICE:

To get a precise measurement when verifying the deflection of the belt, it is recommended that the belt first be used over a break-in distance of 50 km (30 mi.).

Before verifying the deflection of the belt, make sure that the vehicle is equipped with the correct drive belt.

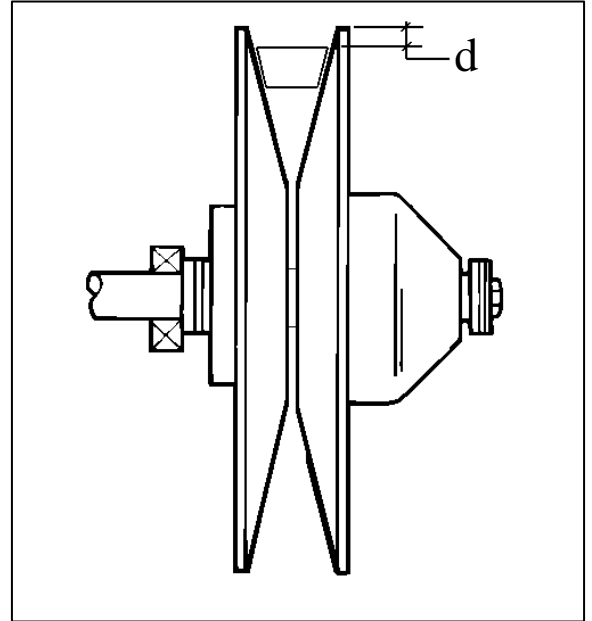
To obtain maximum performance from the vehicle, adjust the belt tension according to the specifications given in the table on the right.

Model	Deflection mm (in)	Force kg (lb)	Distance into secondary clutch
Snow Hawk 600HO	32 (1 1/4)	6.8 (15)	1-3 mm

● **NOTICE:**

Contrary to a snowmobile, the belt of the Snow Hawk is pre-inserted into the secondary clutch from 1 to 3 mm.

D = 1 to 3 mm



CHECKING DRIVE BELT TENSION

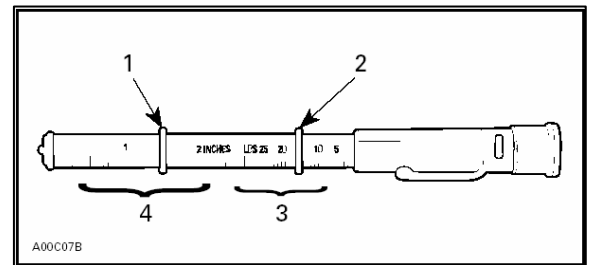
- Place a ruler on the drive belt.
- Use the tension gauge (P/N 414348200) to verify the tension of the drive belt.

1. Lower ring

2. Upper ring

3. Force

4. Deflection



- Slide the lower ring of the deflection scale to the required measurement.
- Slide the upper ring of the deflection force scale to zero.
- Exert pressure until the lower ring comes even with the ruler and note the force on the upper scale (above the ring).

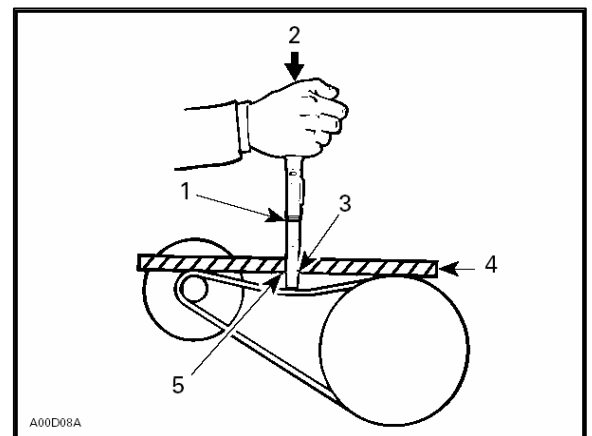
1. Upper ring

2. Exert the required pressure

3. Lower ring

4. Reference ruler

5. Deflection



ADJUSTMENT OF THE DEFLECTION

Adjust the deflection using the Allen screws (1) in the picture on the right.

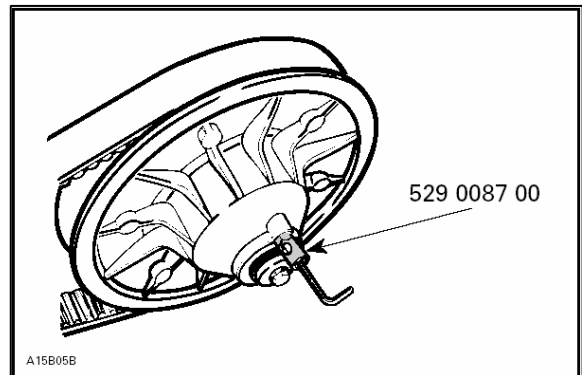
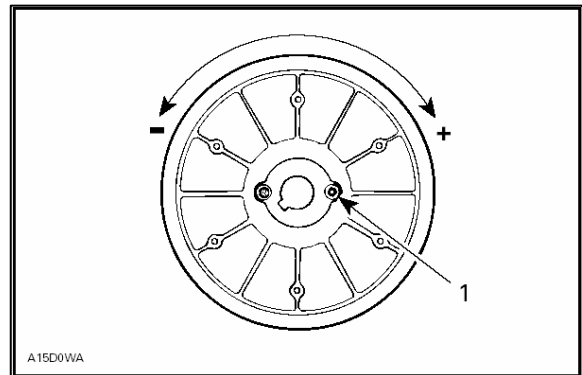
- To increase the deflection: turn the Allen screws clockwise.
- To decrease the deflection: turn the Allen screws counter clockwise.

1. Allen screw and locknut

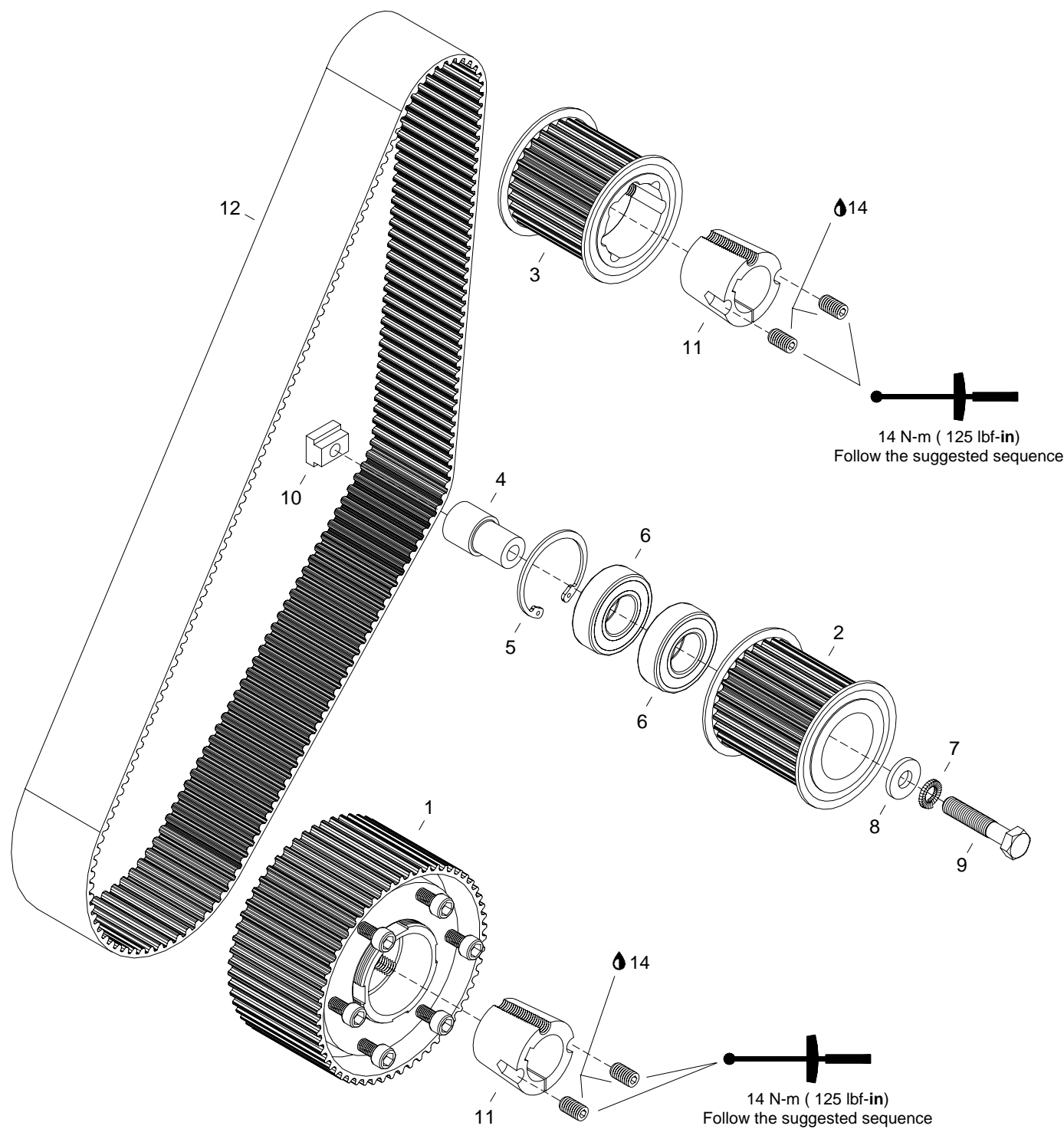
● NOTICE:

Turn the Allen screws a quarter turn at a time and then turn the secondary clutch to allow the drive belt to take its place in the pulley. Verify the deflection and repeat if necessary.

- Hold the Allen screws while tightening the lock nut so as not to upset the adjustment. Use adjustment tool (P/N 529008700).
- Hold the Allen screws with the key and tighten the nut with the socket. Use the socket handle from the tool kit.



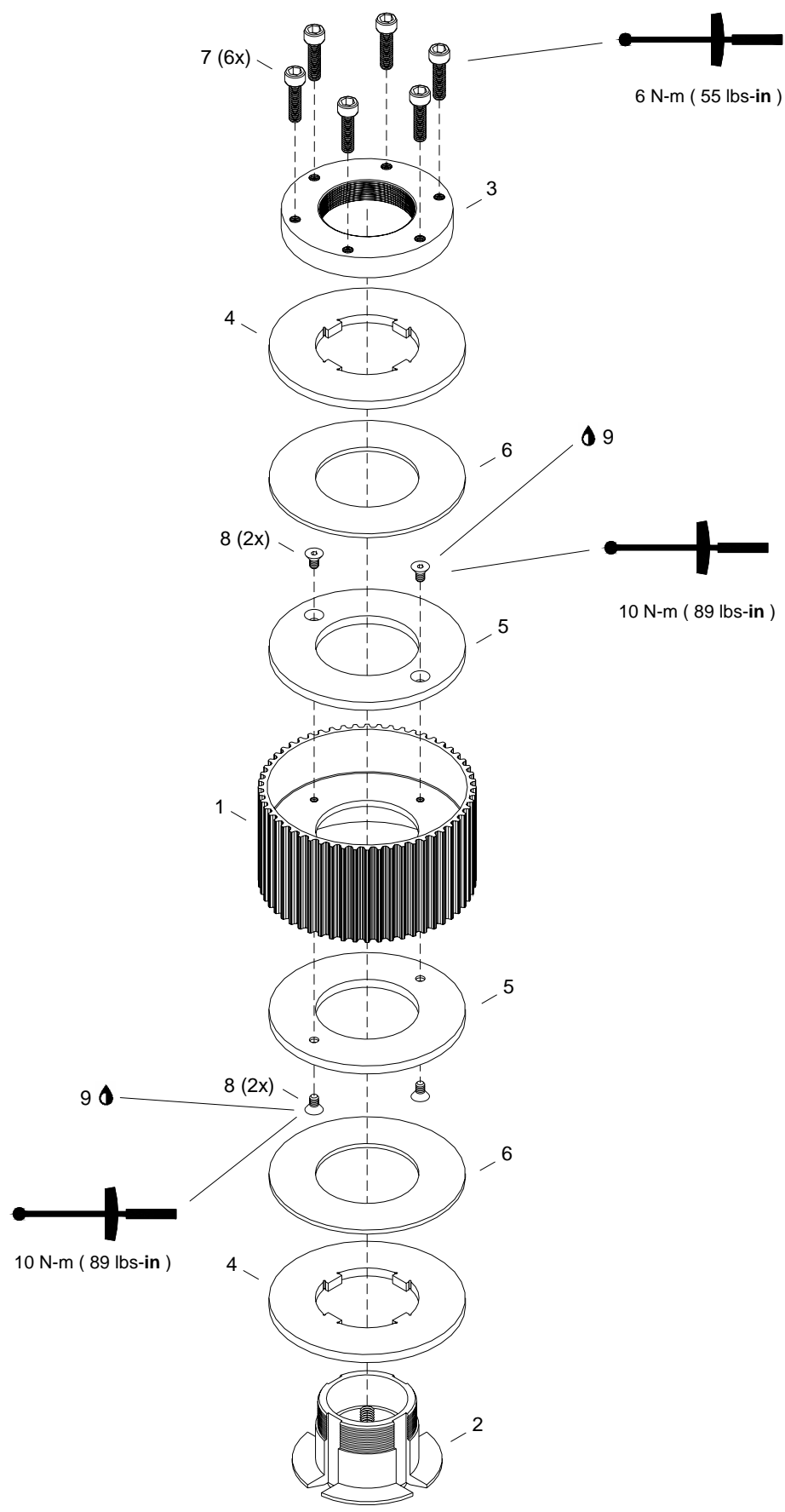
SECONDARY TRANSMISSION SYSTEM



SECONDARY TRANSMISSION SYSTEM 9 - 2

Secondary transmission system			
Ref.	P/N	Qty	Part descriptions
1	TL-01	1	Torque limiter assembly
2	SH-203R	1	Tensioner sprocket 28T
3	SH-201R	1	Drive sprocket 28T
4	SH-204	1	Tensioner shaft
5	184-153	1	Retaining ring
6	6004-2RS KML	2	Roller bearing, tensioner
7	409.716	1	Washer
8	441.1	1	Split spring lock washer
9	20238P	1	Hexagon head cap screw M10 x 1.5 x 60MM
10	90974 A116	1	Sliding T-nut
11	1215X30	2	Taper lock
12	1280PTH8M-60	1	60mm Cog belt
13	43990092	1	Tensioning tool
14	293800060	@	Loctite 243, 10 ml
-			

TORQUE LIMITER SYSTEM

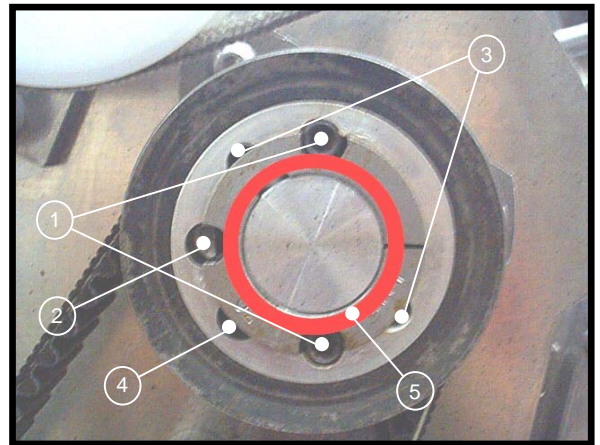


Torque limiter system			
Ref.	P/N	Qty	Part descriptions
1	TL-003	1	Drive sprocket 56T
2	TL-001	1	Hub
3	TL-002	1	Aluminum threaded disk
4	TL-004	2	Outside pressure plate
5	TL-005	2	Inside pressure plate
6	6525K1 O.D. 5"	2	Wearing pad
7	21653P	6	Socket head cap screw M8 x 1.25 x 30MM
8	22097P	4	Flat head socket cap screw M6 x 1.0 x 8MM
9	293,800,060	@	Loctite 243, 10 ml
-			

Removal of cog belt

To gain access to the entire secondary transmission system, you must first completely remove the cab and belly pan. See **Chapter 1 – General Instructions** for details.

- Loosen the bolt that holds the tensioner sprocket in place. (See top picture at the right)
- Remove the tension on the cog belt system by unscrewing the tensioning bolt shown in the top picture at the right. Continue until the belt is no longer tight against the teeth of the tensioner sprocket. **ALTERNATIVELY**, if you wish to leave the belt tension as-is, you can simply remove the bolt that runs through the center of the tensioner sprocket and leave the tensioning bolt as-is.
- Remove the tensioner sprocket completely. (# 2 on secondary transmission system)
- Remove the two setscrews that hold the taper lock and the 28-tooth upper drive sprocket in place. (Position 1) Using a punch, hit the taper lock 2-3 times in the shaded zone shown at right (Position 5) to loosen the grip between the taper lock and the sprocket.



● NOTICE:

If either of the installation holes (shown as "Position 1" in the picture in the sidebar at the right) becomes damaged, the taper lock can be rotated 45° CCW in the sprocket bore and can then use the installation holes shown in "Position 3".

- Insert and thread in one of these two setscrews into the extraction hole (Position 2), at a maximum torque of **14 N-m (125 lbf-in)**. The sprocket and taper lock assembly should now be free to slide off the shaft.
- At this point, begin to slide the belt off of the lower 56 tooth drive sprocket and simultaneously slide the entire 28 tooth driven sprocket assembly and belt off the jackshaft as shown in the picture at the right.



Installation of Cog Belt

Installation of a new cog belt is essentially the same as the steps outlined above, but in reverse order. One must pay special attention to the re-installation of the taper lock system:

1. Thoroughly clean the jackshaft and sprocket bore.
2. Align the 28-tooth sprocket and taper lock flush with the end of the jackshaft.
3. Applying Loctite 243, install the two installation set screws into position 1 or 3.
4. Torque the two set screws to **14 N-m (125 lbf-in)**
5. Tap the taper-lock face several times in the shaded region with a steel punch and re-tighten the setscrews.
6. Tap again and re-torque to **14 N-m (125 lbf-in)**.

◆ WARNING

Loctite 243 must be used for both installation setscrews to prevent them from loosening under use. Failure to do so could result in personal injury.

Hand-tighten the tensioner sprocket bolt (Ref. No. 9 in the exploded view) and then proceed to re-apply tension to the system by tightening the tensioning bolt.

When tensioned properly, the secondary transmission system must have a deflection of **7.3 mm (0.288")** under a load of **6.44 kg (14.2 lbs)** applied midspan between the upper most and lowest cog sprockets. This tension must be verified using special tensioning tool P/N 414348200. The picture at the right demonstrates how to use a straightedge as a reference when verifying this value and also where the measurement should be taken.

▼ CAUTION

Failure to provide or verify the correct tension in the secondary transmission system could lead to premature belt and/or component failure.



Inspection of Secondary Transmission System

- Check that the roller bearings in the tensioner sprocket bore are functioning properly.
- Check for excessive dry surface cracking of the rubber in the cog belt. If excessive surface cracks are present, replace belt.
- Check that the secondary transmission system is dry and free of dirt, grime or debris. If necessary, clean the belt and sprockets with a non-corrosive cleaner.

◆ WARNING

Never operate the vehicle with the cab and/or bellypan removed. Failure to do so could result in personal injury.

TORQUE LIMITER SYSTEM

DISASSEMBLY

- Lightly loosen the 6 Allen bolts (part # 7 on the exploded view of the torque limiter) in a criss-cross pattern.
- The threaded aluminum disc (part # 3 on the exploded view) can now be removed by hand.
- After removing the threaded aluminum disc proceed to removing the core, the pressure plates and the friction plates. Next, remove the small Allen screws holding the final pressure plate to the cog sprocket and remove the pressure plates.

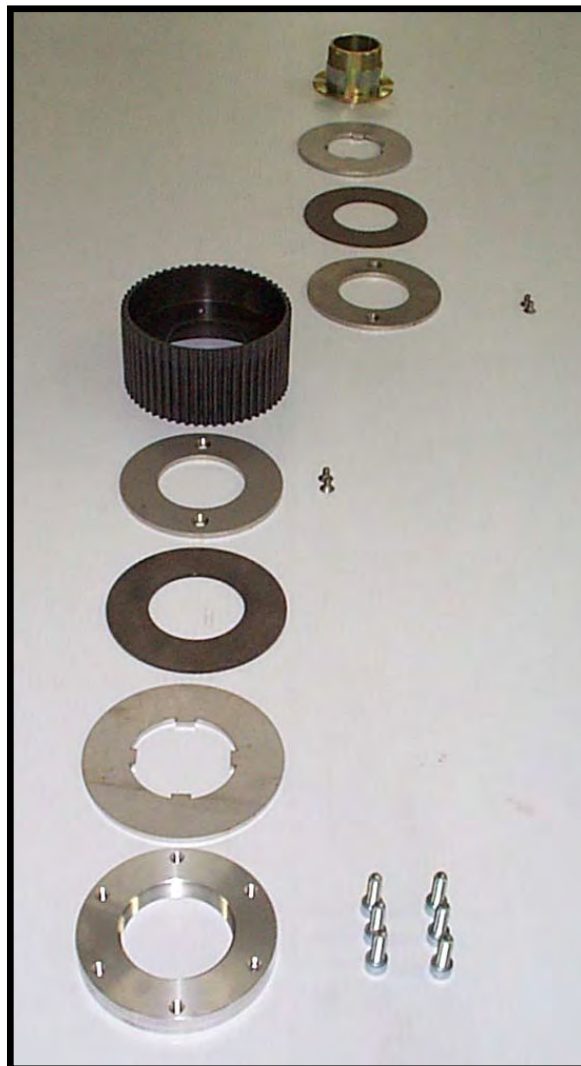
CLEANING

- All of the torque limiter components should be clean before reassembly. The parts can be cleaned using brake cleaner.

INSPECTION

● NOTICE:

Because so much dirt and dust accumulates inside the torque limiter, it should be periodically cleaned and inspected.



◆ WARNING

After approximately 10 hours of use, it is necessary to verify the torque of the 6 allen head screw (part # 7) of the torque limiter. The required torque for normal operation is 6 N-m (55 lbf-in).

- Verify the friction plates (part # 6) to ensure that they are not cracked or damaged. Replace if required.
- Verify the pressure plates # 4 and # 5 to ensure they are not scratched. If so then they can be repaired using a fine sand paper or released.
- Verify that the cog sprocket is not damaged. If damaged, replace with a new one.

REASSEMBLY

- Install pressure plate # 5 inside the cog sprocket # 1 using the small Allen screws # 8. Use loctite 243 on the Allen screw and torque to **10 N-m (89 lbf-in)**.
- Reassemble the torque limiter as shown in the exploded view on page 9-3.
- Once the pressure plates # 4 and the friction plates # 6 are properly installed, hand tighten the threaded aluminum disc # 3 until it stops; then loosen by a ½ turn.
- To complete reassembly, tighten the 6 Allen bolts # 7 in a criss-cross pattern to a torque of **6 N-m (55 lbf-in)**.



INSTALLATION

Install the torque limiter as described in the previous section on installation of the secondary drive cog belt.

- Lift up and immobilize the rear of the vehicle and place it on a mechanical support.

◆ WARNING

Make sure that the track is free of anything that could be projected out of its rotation field. Make sure that no one is near the vehicle.

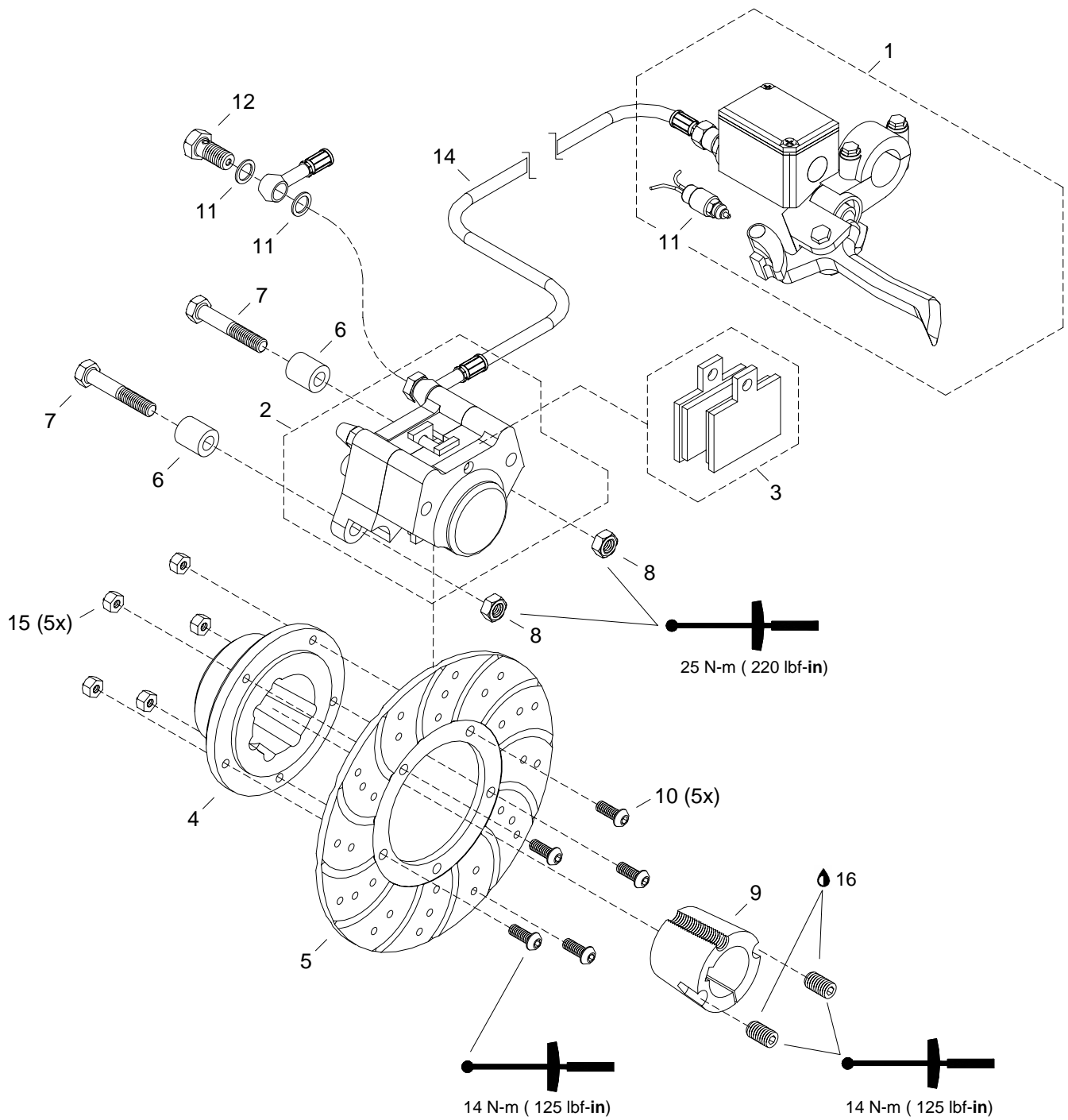
- Have the vehicle accelerate at low speed (maximum 30 km/h or 20 mi/h) and apply the brake. Repeat 5 times.
- Ensure that the torque of the 6 Allen bolts # 7 is still at **6 N-m (55 lbf-in)**.



◆ WARNING

After approximately 10 hours of use, it is necessary to verify the torque of the 6 allen head screws (part # 7) of the torque limiter. The required torque for normal operation is 6 N-m (55 lbf-in).

HYDRAULIC BRAKE SYSTEM



Hydraulic brake system			
Ref.	P/N	Qty	Part descriptions
1	10.6707.81	1	Master cylinder
2	20.6951.50	1	Caliper
3	107.6949.11	1	Replacement brake pad
4	SH 048	1	Brake hub
5	TDSH7-3116	1	Brake disc
6	SH 039	2	Brake caliper spacer
7	053.8.45	2	Hexagon head cap screw M8 x 1.25 x 45MM
8	23164	2	Nylon nut M8 x 1.25
9	1215X30	1	Taper lock (c/w setscrews)
10	22204P	5	Button head cap screw M6 x 1.0 x 20MM
11	06.2196.13	2	Copper washer
12	06.2228.42	1	Banjo bolt
13	110.4671.91	1	Microswitch
14	70.3003A	1	Steel braided brake line
15	24411	5	Stove nut M6 x 1.0
16	293,800,060	@	Loctite 243, 10 ml
-			

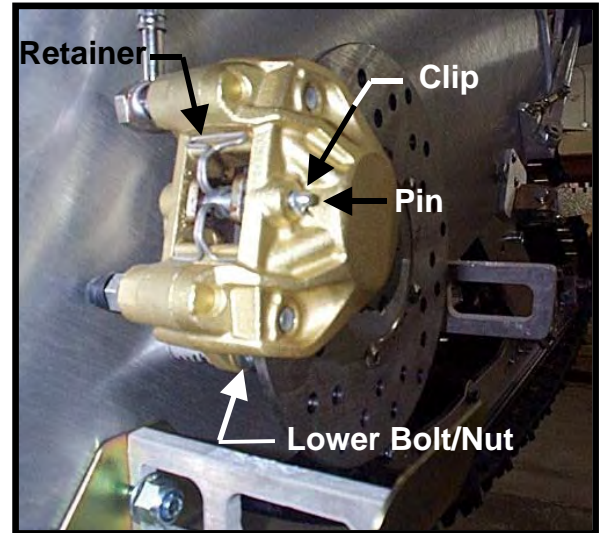
Removal/Installation of Brake Disc and/or Hub

To gain access to the brake system, the cab and belly pan must be completely removed. See **Chapter 1 – General Instructions** for details.

To remove the brake disc and/or hub, the brake caliper must first be rotated up and out of the way. To do this, the lower M8 bolt that holds the caliper in place must be removed from inside the tunnel. The nut that holds this bolt in place is shown at the right.

● NOTICE:

If the intent is to change brake pads only, the caliper must be completely detached from the chassis of the vehicle with the brake line remaining secure.



Holding this nut with an open-end wrench, remove the bolt from inside the tunnel with a socket and ratchet.

Loosen the other (upper) bolt holding the caliper tight to the chassis as well, then swing the caliper up and clear of the disc. Re-tighten the upper bolt and nut enough to hold the caliper in this “swung up” position. Now completely clear from the brake disc itself, the disc can be removed either with or without the aluminum hub.

Brake Disc Only: Remove the five M6 x 16 button head bolts. (Reference No. 10 in the exploded view at the beginning of this chapter)

Brake Disc and Hub: Follow the procedure outlined on page 9-3 of **Chapter 9 – Secondary Transmission System** that outlines the removal of the Taper-Lock bushing and hub.

Cleaning and Inspection

Clean the brake parts with an all-purpose cleaner. Dry the parts well with compressed air when finished.

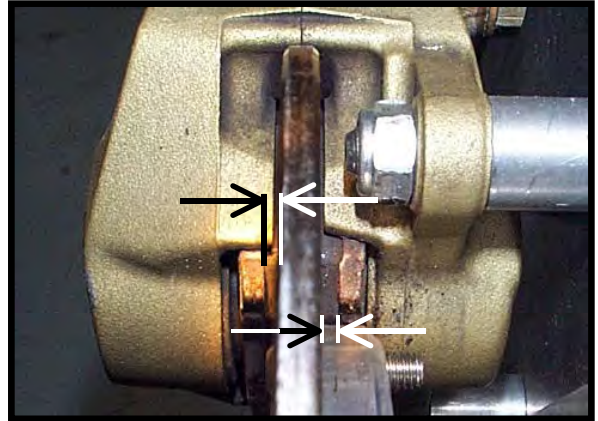
▼ CAUTION

Do not clean the brake pads with the cleaner. Brake pads must be replaced with new ones.

Verify that the thickness of the pad material (as shown between the arrows in the photo at the right) is greater than 1 mm (1/32 in). If the thickness is found to be less than this, replace the pads.

▼ CAUTION

Always replace the brake pads as a set.



Brake Pad Replacement:

To replace the brake pads, proceed as follows:

- Completely remove the caliper from the chassis of the vehicle by removing the two bolts that secure it.
- Remove the clip at the end of the pin, shown in the picture on page 10-3 of this chapter.
- Using a steel punch and a hammer, push the pin completely out of the brake caliper casting. Be sure to push the pin from the side shown in the picture at the right.
- Remove the retainer clip shown in the picture on page 10-3 of this chapter.
- Remove the pads and replace with a set of new ones.

Re-assemble the brake caliper and reinstall it on the chassis following the steps outlined above in the reverse order.



Brake Disc:

Verify whether the brake disc is scratched, cracked or discolored by heat and replace as required.

▼ CAUTION

Never machine the brake disc.

Re-/Installation of Brake Disc and/or Hub

Brake Disc Only: Install the five M6 x 16 button head bolts with Loctite 243 and torque to **14 N-m (125 lbf-in)**. (Reference No. 10 in the exploded view at the beginning of this chapter)

Brake Disc and Hub: Follow the procedure outlined on page 9-4 of **Chapter 9 – Secondary Transmission System** that outlines the installation of the Taper-Lock bushing and hub. As an alignment reference, the brake disc must ride approximately midway between the two brake pads.

Re-attach the caliper to the chassis by securing the two mounting bolts that hold it in place and torque each to **25 N-m (220 lbf-in)**.

Adjustment / Maintenance

Change the brake fluid each year.

It is very important to have a sufficient amount of brake fluid in the reservoir at all times to avoid the creation of air bubbles in the system. If air should become trapped in the system, follow the procedure outlined below.

Pump the brake lever several times to build pressure in the system. While holding the lever in the “brakes applied” position with force, slightly unscrew the bleeder valve with a wrench (see figure at right) to ensure that all air is purged from the system. As the brake lever approaches the handlebar, re-tighten the bleeder valve.

Repeat several times or until the flow of fluid from the bleeder valve is completely free from air bubbles.

Ensure that the bleeder valve is tight and the rubber cover is placed over the fitting for protection when finished.



Brake Fluid

DOT 4 (DOT 5 for intense use)

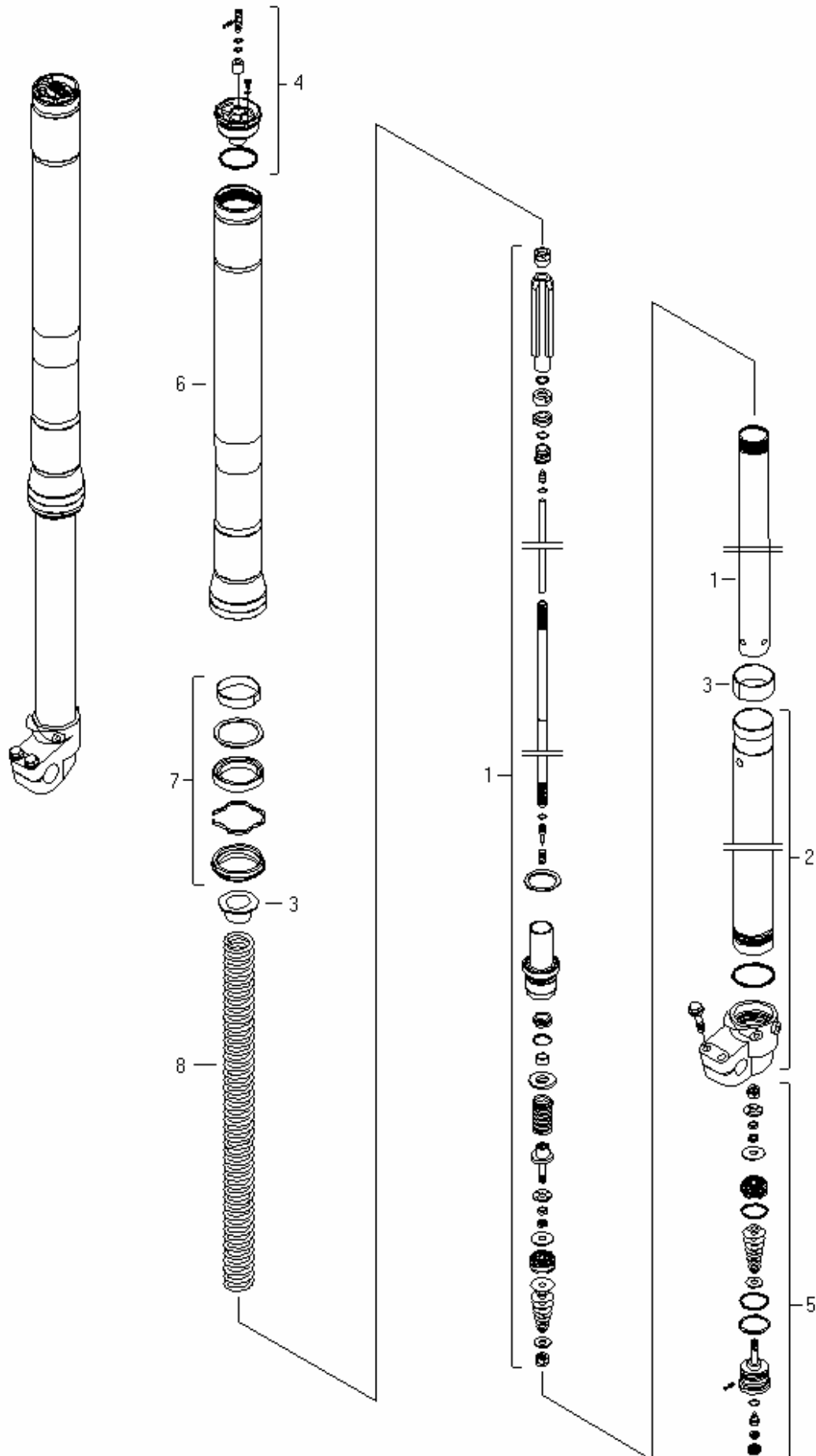
● NOTICE:

Never use DOT 4 brake fluid for intense or competition use.

Brake Fluid Level

Refer to Section 2.5 of **Chapter 2 – Periodic Maintenance** for details.

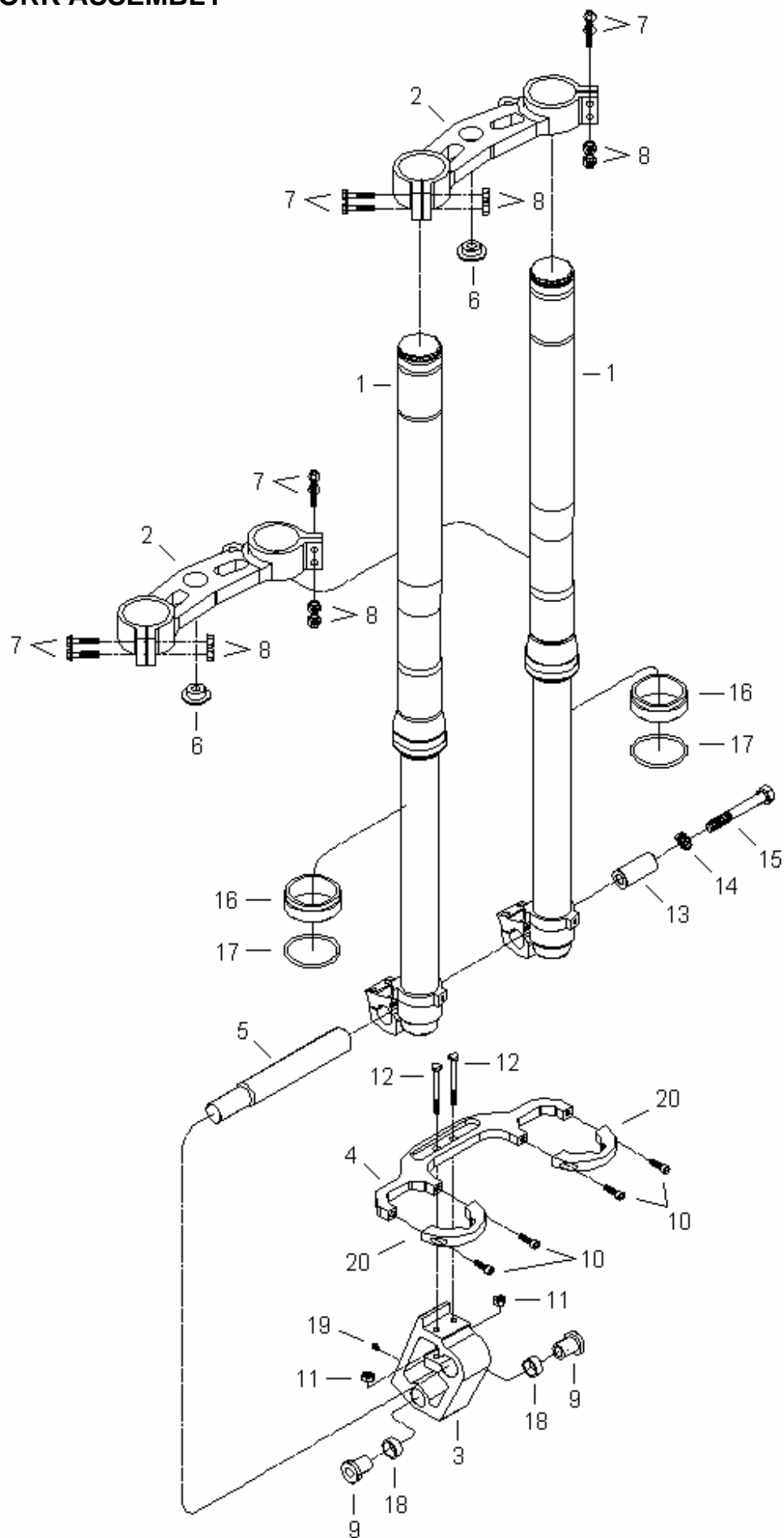
FRONT FORK



FRONT FORK AND TWIN-AXIS SKI 11 – 2

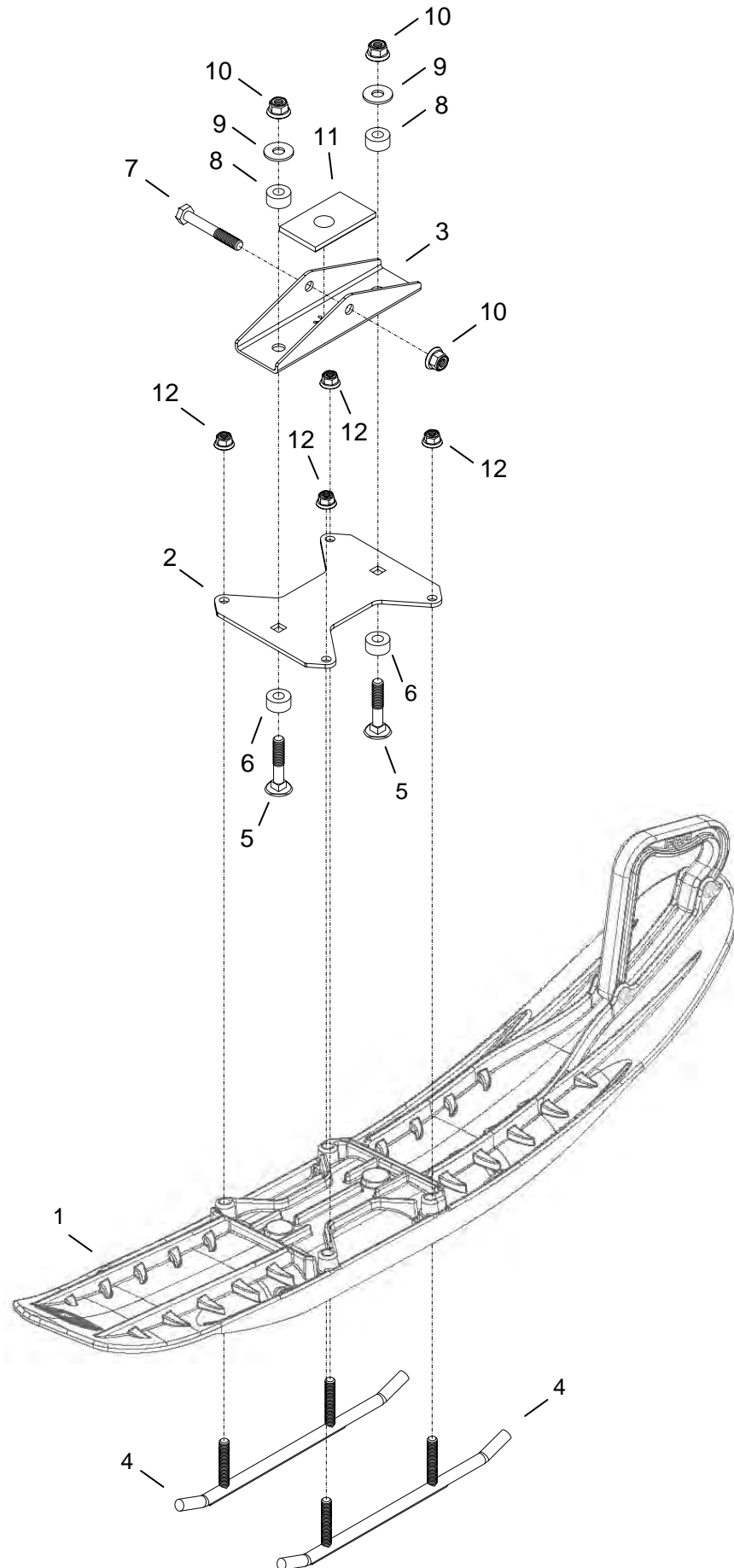
Front Fork			
Ref.	P/N	Qty	Part Descriptions
-	791,464,018	2	Fork Leg Assembly
1	849350102	2	Cartridge
2	849310511	2	Inner Tube
3	849340059	2	Fork Seal and Bushing Kit
4	849311568	2	Top Cap Assy.
5	849350103	2	Compression valve Assy.
6	949409760	2	Outer Tube
7	949603733	2	Lower Spring Seat
8	949313954	2	Spring
-			

FRONT FORK ASSEMBLY



Front Fork Assembly			
Ref.	P/N	Qty	Part Descriptions
1	791.464.018	2	Front fork leg USD 46mm
2	SH-028	2	Triple clamp
3	SH-024	1	Aluminum fork adaptor
4	SH-019	1	Lower clamp
5	SH-059	1	Fork shaft
6	SH-066	2	Fork lower steering bushing
7	061.6.30	8	Hex head flange bolt M6x30
8	23162F	8	Flanged locknut M6
9	SH-051	2	Steel "T" Bushing
10	084.6.2	4	Button head bolt M6x20
11	23162	2	Locknut M6
12	20169P	2	Hex head bolt M6x65
13	SH-060	1	End shaft bushing
14	442.12	1	1/2" Spring lock washer
15	057.12.90	1	Hex head bolt M12 x 90
16	SH-044	2	Fork collar
17	236 304	2	O-ring
18	P64.12	2	Hardened bushing 3/4" I.D 1" O.D x 3/4"
19	2106	1	Grease fitting
20	SH-083	2	Lower fork adaptor
-			

TWIN-AXIS SKI ASSEMBLY



Twin-Axis Ski Assembly			
Ref.	P/N	Qty	Part Descriptions
1	RD0170	1	Ski (black)
2	SH-311	1	Base plate
3	SH-309	1	Adaptor plate
4	SH-813	2	Carbide Runner 60°
5	8310120065ELZN	2	Carriage Bolt M12x65
6	P05000050095A	2	Gold polyurethane bushing
7	20279P	1	Hex head bolt M12x80
8	P05000050090A	2	Red polyurethane bushing
9	341-109P	2	7/16" washer
10	23167F	3	Flanged locknut M12
11	SH-310	1	Rubber ski cushion
12	12462100001	4	Flanged locknut M10
:-			

TWIN AXIS SKI

The twin-axis ski is a new development for 2004. The basic idea is that the ski can now stay flat when the vehicle is at a lean angle of up to approximately 20°. It is the gold and red polyurethane bushings that permit such movement and the adjustment of the two locknuts (No. 1 at right) can make a significant difference to the handling characteristics of the vehicle.



Tightening the nuts:

- Tightening the nuts (No. 1 above right) will compress the polyurethane bushings and cause the front end to feel more stiff and less forgiving. The resulting stiffer front end will be more responsive and have a quicker turning feel.
- The stock settings have 5/8" of thread protruding above the end of the locknuts, which is great for a novice rider and is near the minimum preload setting possible for the bushings. **DO NOT** slacken the locknuts further than the stock settings.
- **ALWAYS** adjust the two locknuts together.
- **NEVER** increase the preload on the polyurethane bushings by more than 1/8" at a time.

Loosening the nuts:

- Loosening the nuts (No. 1 above right) will allow the polyurethane bushings to extend more and make the front end feel very forgiving.
- If the front end feels "darty" or feels as though it "hunts" for ruts, slackening these nuts may be a good idea.
- **ALWAYS** adjust the two locknuts together.
- **NEVER** decrease the preload on the polyurethane bushings by more than 1/8" at a time.

FRONT FORK

Removal

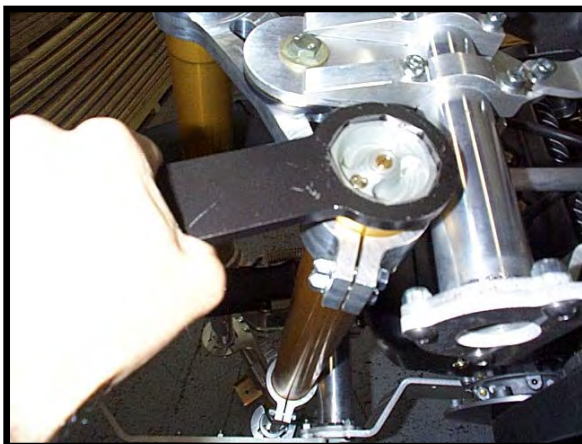
- Loosen the fork leg top cap before removing the leg from its supports.

Disassembly

- Clean the fork.

● NOTICE:

The Paioli tool kit (P/N 449 450 020) is needed to perform modifications such as seal replacements and complete fork disassembly. For smaller operations such as fluid changes and/or compression valving adjustments, the supplied special tool is sufficient.



▼ CAUTION

Scratches or other damage to inner tube surfaces or gasket edges may cause oil leaks.

Scratches and other damage must be avoided. Use a mild detergent or an automobile cleaning product to dislodge any dirt.

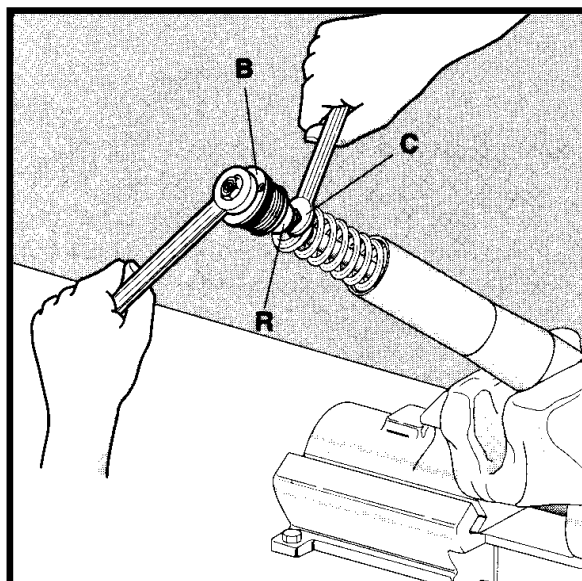
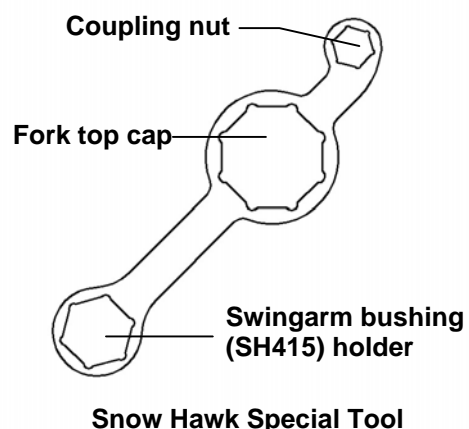
▼ CAUTION

An inadequate dismantling of the fork leg top cap may damage the rebound adjustment needle resulting in a malfunction of the system.

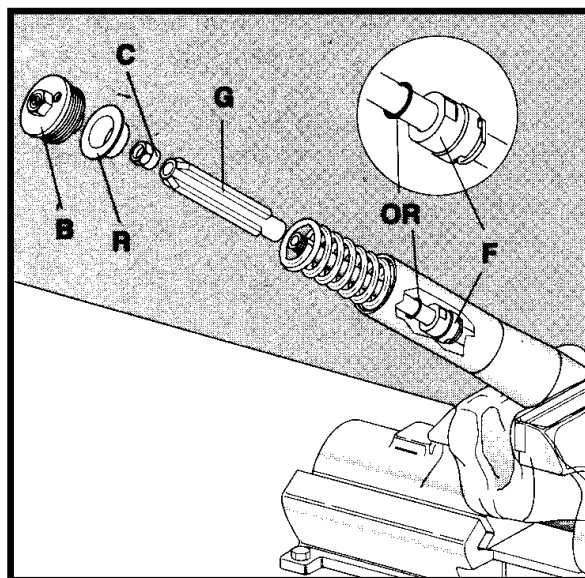
To prevent such a situation, set the rebound adjustment to its fastest position (by turning it counterclockwise) before taking the cap off.

Take note of the initial position of this adjustment by counting the number of "clicks" between the initial position and the point where a slight resistance is felt (turning clockwise).

- Unscrew the fork leg top cap completely while holding the outer tube. Lower the outer tube slowly until it comes into contact with the lower section of the inner tube.
- Using your hand, push the top part of the spring down to provide enough space to insert the open end of a spanner wrench.



- Unscrew the lock nut (C) from the piston rod and remove the fork leg top cap (B).
- Remove the upper spring retainer (R), the lock nut (C), the fork spring guide (G) and the O-ring (F).



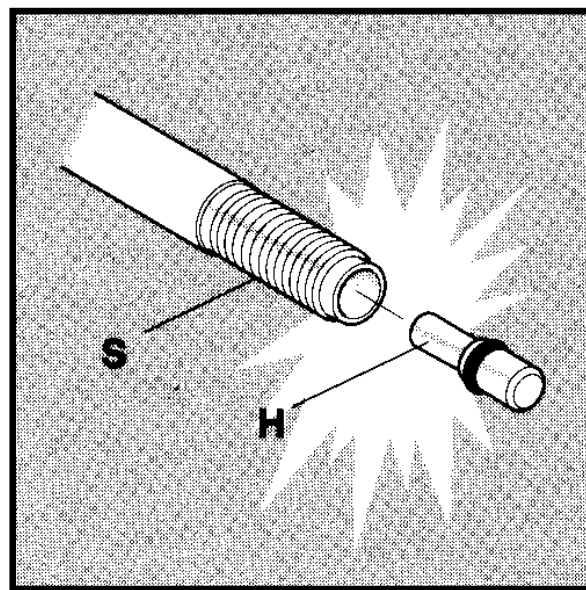
● **NOTICE:**

When the fork leg is turned upside down, the push rod, the needle and the return spring will fall from the piston rod. It is possible to collect them by turning the strut over slowly and keeping a finger near the tip of the piston rod.

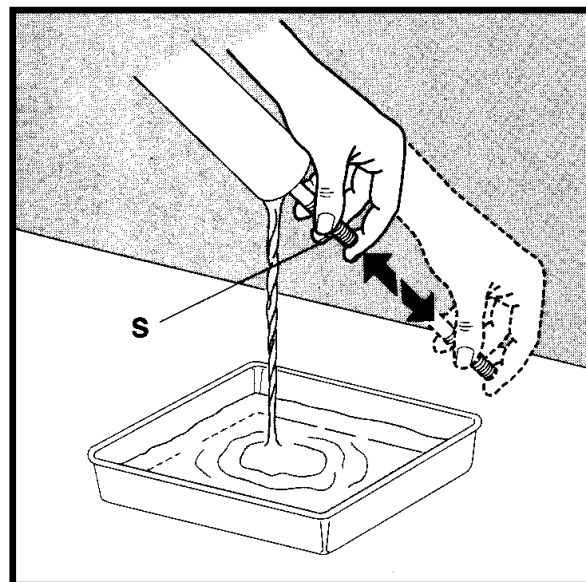
▼ **CAUTION**

A damaged piston rod, needle or return spring may affect performance on the rebound stroke.

Be careful not to lose or damage any of those parts.



- Depress the piston rod (S) completely 8 to 10 times to force all the oil out.



- Install the lower part of the inner tube in a vise.

▼ CAUTION

Exerting too much pressure on the lower part of the inner tube can damage it and affect the stability of the ride.

Do not overtighten.

- Remove the rubber cap (M) located under the lower part of the inner tube.
- Remove the spring stop washer (S).
- Unscrew and remove the cartridge, by inserting a 14 mm allen key in the compression adjustment, and by inserting the special "T" tool (T) (long tube, three prongs at one end) provided with the maintenance tool kit into the cartridge head.

● NOTICE:

Before unscrewing the cartridge, make sure the special tool (T) is well fitted into the socket in the cartridge head.

- Empty the content of the cartridge (L) by pumping the piston rod (G) several times, until the cartridge is empty.

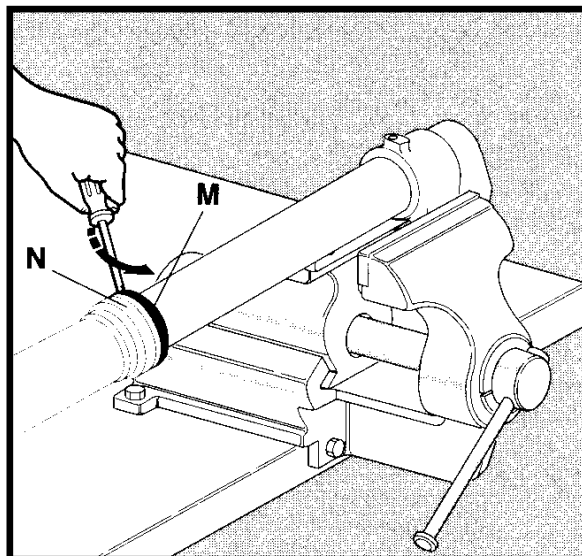
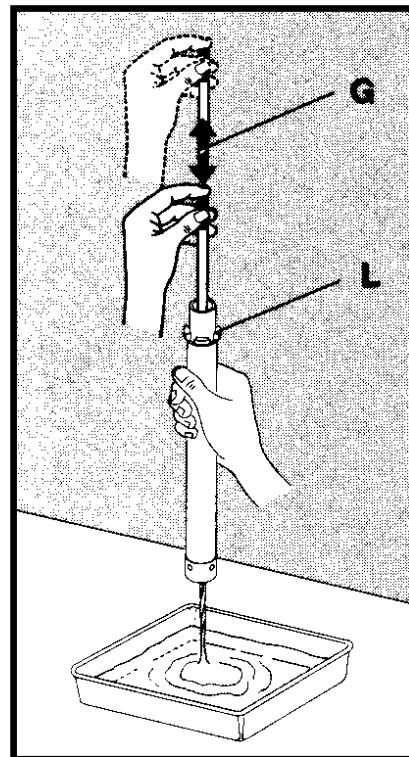
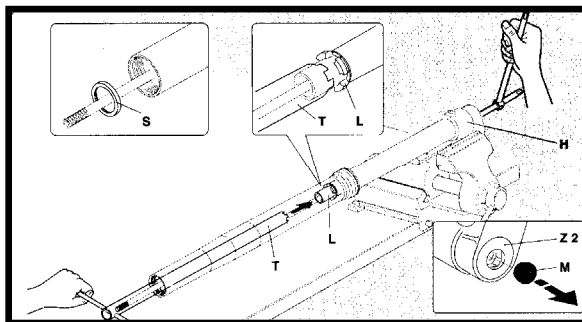
◆ WARNING

Never attempt to modify the cartridge!

Refer to authorized personnel to carry out this operation.

Modifications to the cartridge carried out by an unauthorized person can compromise the security of the operator and invalidate the warranty.

- Move the outer tube slowly back and forth for a few complete strokes to make sure it is in good working order.
- Remove the dust seal (M).

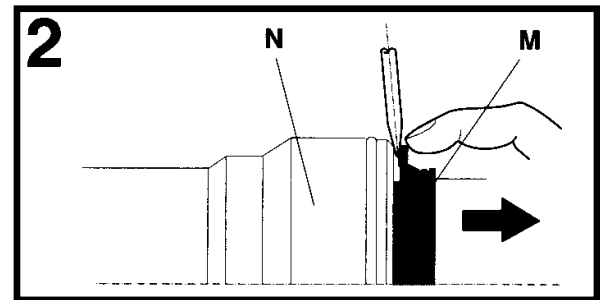
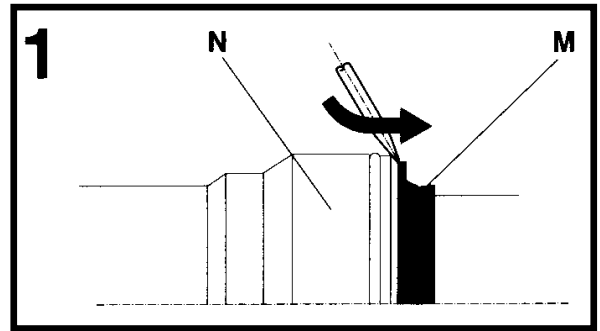


▼ CAUTION

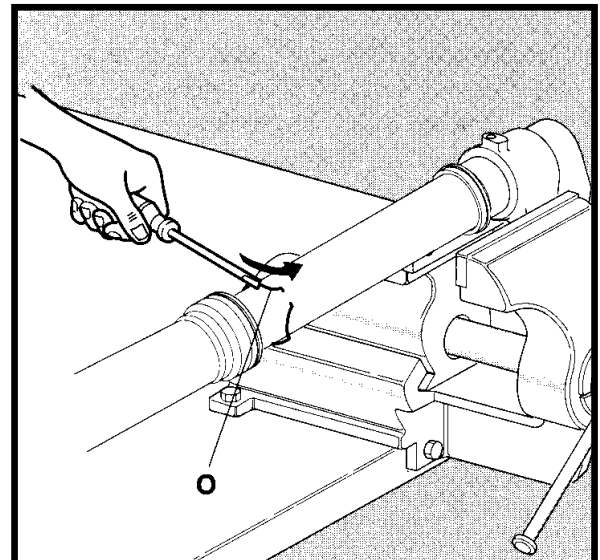
Scratches on the outer tube will cause oil leaks.

Be careful not to scratch the outer tube while removing the dust seal.

- Use a flat screwdriver to remove the dust seal.

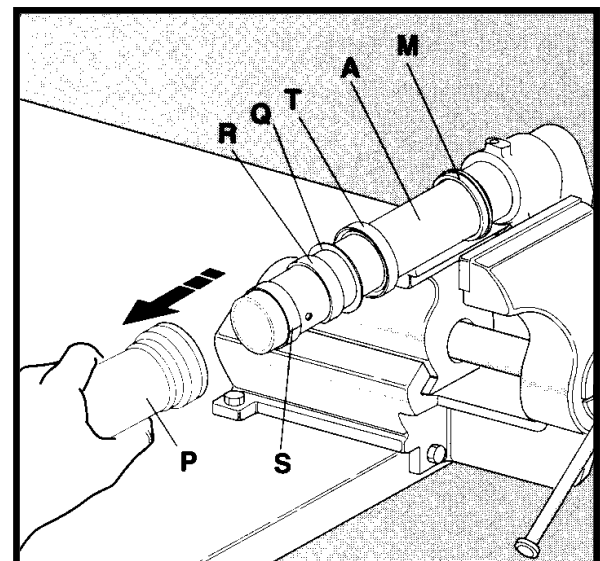


- Remove the stop ring.



- With a few sharp blows, pull the outer tube (P) out to separate it from the inner tube (A).

- The oil seal (T), the washer (Q), the dust seal (M) and the inner (R) and outer (S) bushings can be found on the inner tube. They must be removed and replaced with new parts.



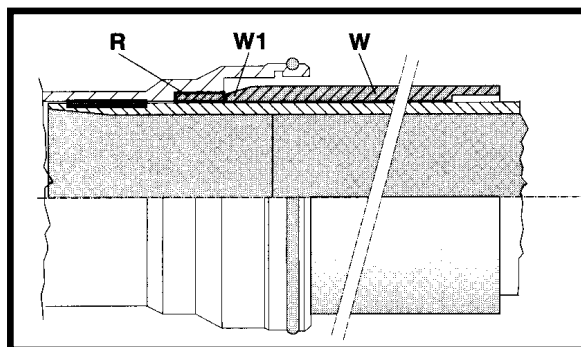
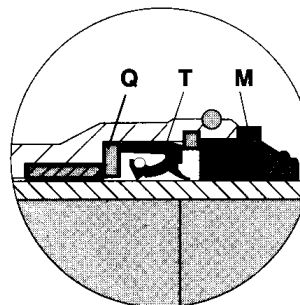
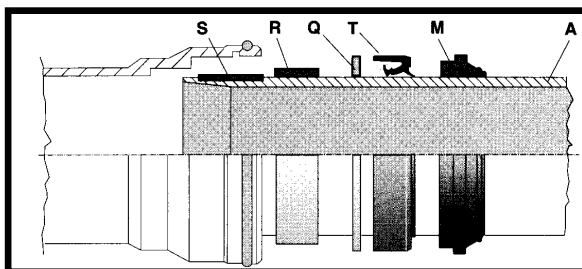
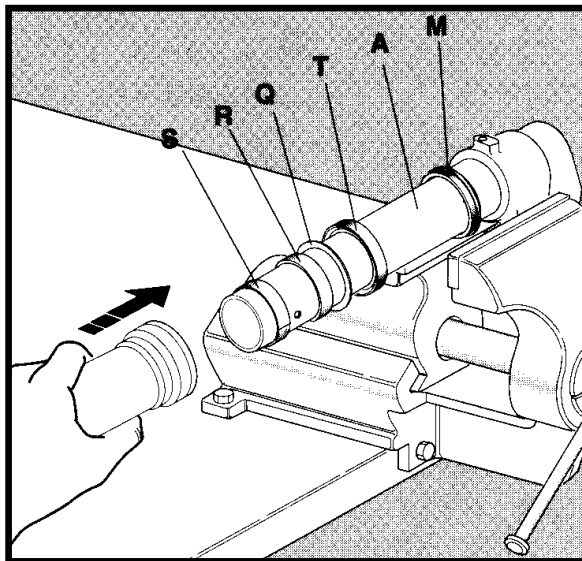
Reassembly

- Remove all the elements from the inner tube, one at a time, and clean the tube.
- Replace the seals and bushings with new ones, following the prescribed sequence. (See the illustration)

● NOTICE:

While installing seals, wrap the end of the strut with a band of adhesive tape so that the seals will not be damaged by the sharp edge.

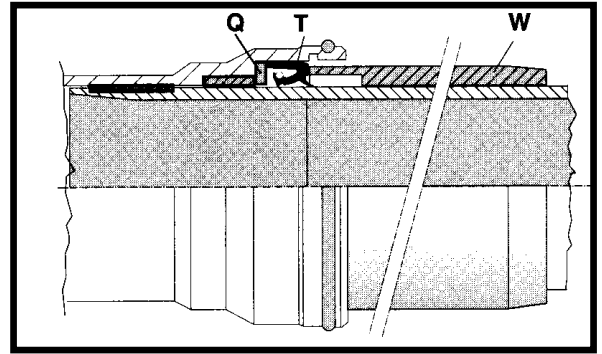
- Make sure the bushings (S & R) are well inserted in their respective positions by using the special tool (W) designed for that purpose and included in the fork maintenance tool kit.



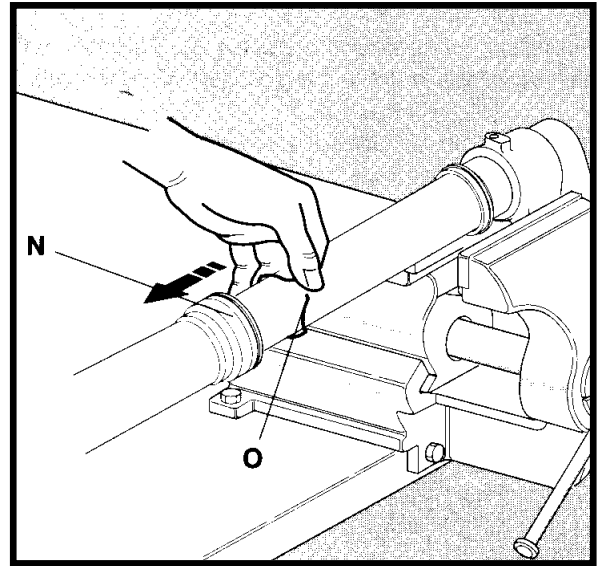
◆ WARNING

The oil and dust seals (T & M), contrary to the bushings ((S & R) and the washer (Q), must absolutely be installed on the inner tube in a specific direction for the fork to operate properly.

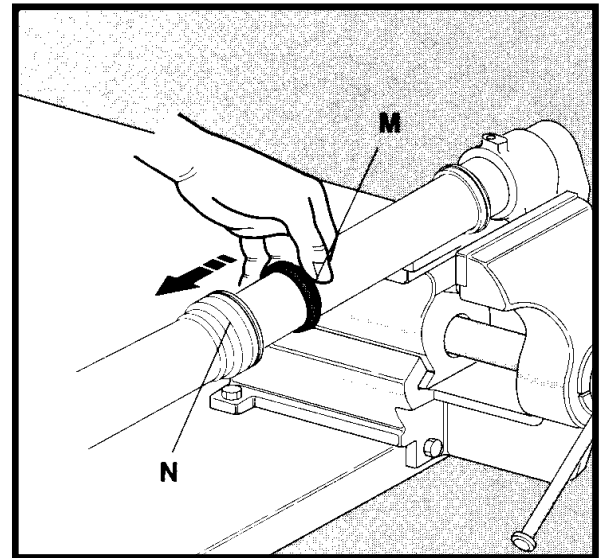
- Once the bushings (S & R) are correctly installed, use the other end of the special tool (W) to insert the washer (Q), and then the oil seal (T).



- Re-install the stop ring (O).

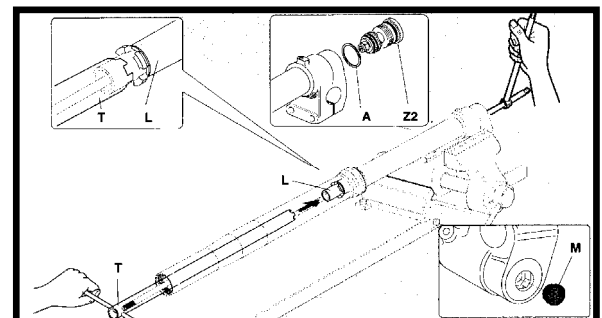


- Re-install the dust seal (M).



- Using a 14 mm allen key and the special tool (T), re-install the cartridge (L) the compression adjustment (Z'') and the washer (A).

- Use a torque wrench to tighten the cartridge to **25 N-m (2.5 kg-m, 18.4 lbf-ft)**.



● NOTICE:

Before adjusting the torque, make sure the special tool (T) is well fitted into the socket at the end of the cartridge.

- Re-install the rubber cap (M).
- Install the spring stop washer (S).
- Make sure the O-ring (OR) is still in place. If not, re-install it and push it against the stroke stop (F) to secure it.
- Install the spring guide (G).
- Install and screw the lock nut (C) up against the guide until a slight resistance can be felt.
- Hold the fork leg in a vertical position, fully compressed, and fill it with fork fluid up to 50 mm (2 in) from the top of the outer tube.

Recommended fluid: Cartridge fork fluid, S.A.E. 15W

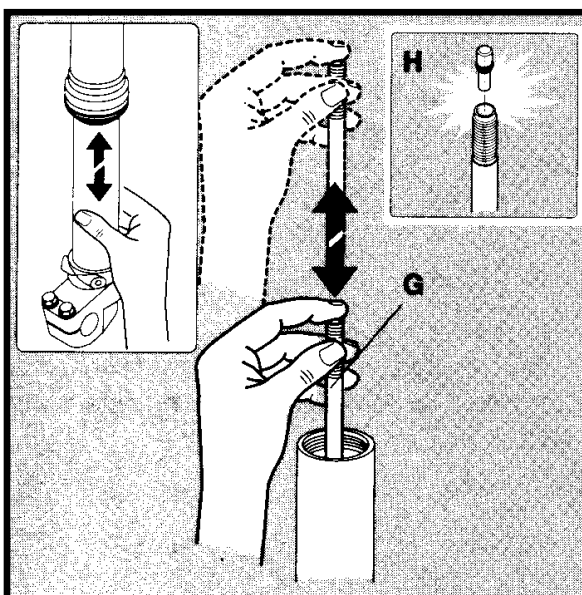
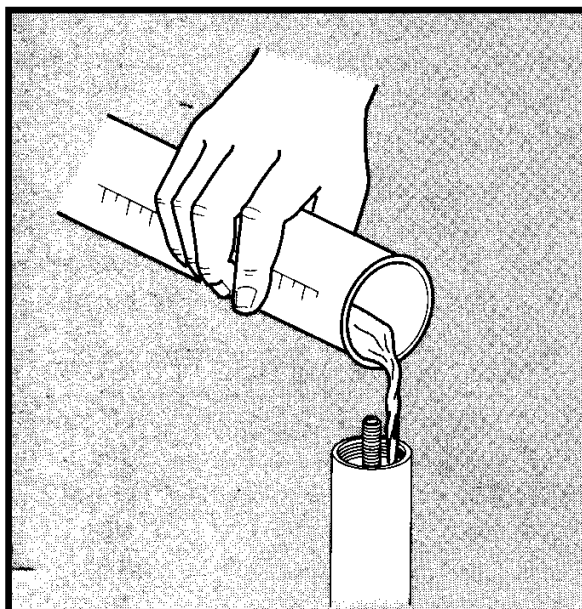
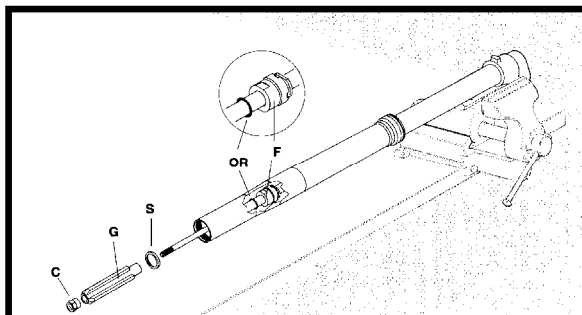
- Move the piston rod in and out, in a series of complete alternating strokes, until a continual resistance can be felt during a complete stroke.

● NOTICE:

It is possible that fluid will have to be added a few times before reaching the point where a continuous resistance can be felt during a complete stroke.

◆ WARNING

Keep a finger pressed against the opening of the piston rod since the needle, if it has not been taken out, can be ejected during this operation. If this happens, re-install the needle after the operation has been completed.



- With the fork leg still in a vertical position and fully compressed, adjust the fluid level.

Recommended level: X = 85 mm (3-5/16 in)

● **NOTICE:**

It may be necessary to add or remove some fluid to reach the recommended level.

▼ CAUTION

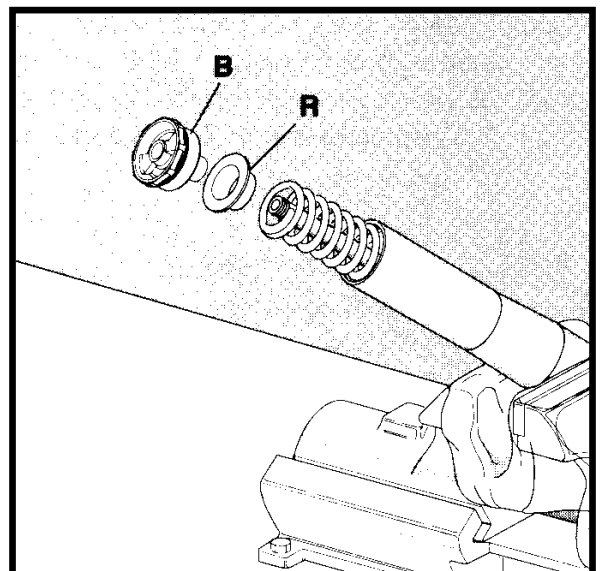
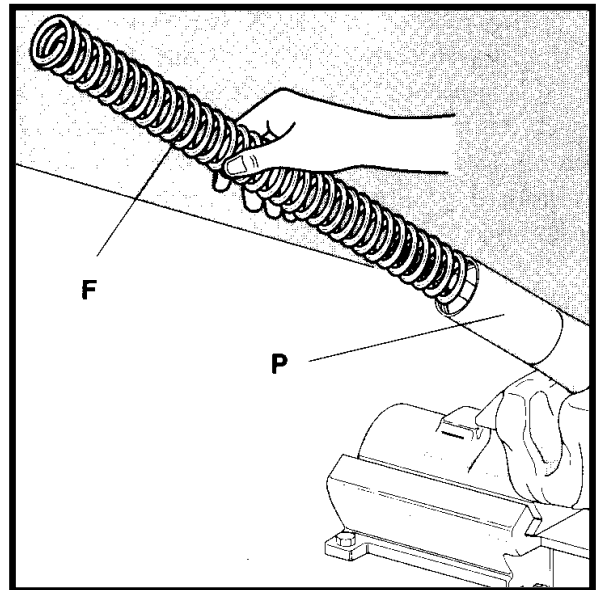
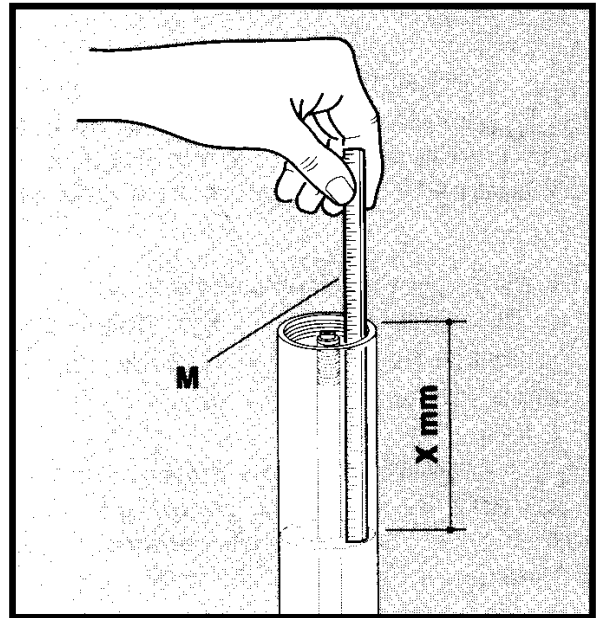
The fluid level can be modified but must remain between 85 mm and 120 mm.

- Insert the needle return spring, the needle and the push rod.
- Install the spring (F) inside the strut (P).

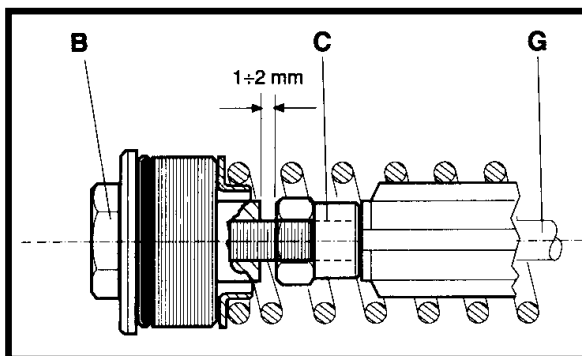
● **NOTICE:**

When the coils are closer to one another at one end of the spring, this end must be placed facing the upper part of the fork leg (i.e. towards the top cap).

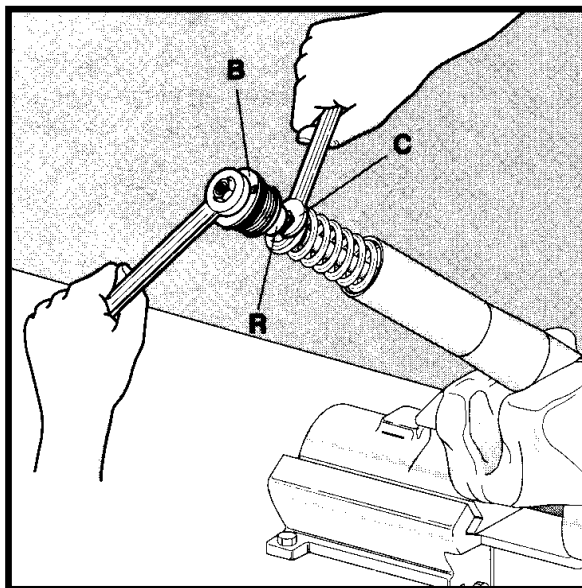
- Install the upper spring retainer (R) and the top cap (B) of the strut.



- The top cap (B) must be screwed on until the piston rod (G) touches the bottom of the cap (B) before the cap comes into contact with the lock nut (C). The space between the cap (B) and the nut (C) must be between 1 - 2 mm (0.040 – 0.080 in).



- Using your hand, push the top part of the spring down to provide enough space to reach the lock nut (C) with the open end of a 17 mm wrench.
- Use a torque wrench and the special tool to adjust the torque to **18 – 20 N·m (1.8 – 2.0 kg·m, 13.2 – 14.75 lbf·in)**.
- Screw the strut top cap onto
- the outer tube. Again, use the torque wrench and the special tool to adjust the torque to **25 N·m (2.5 kg·m, 18.4 lbf·in)**.



INSTALLATION

Follow the same procedure as for the removal but in the reverse order.

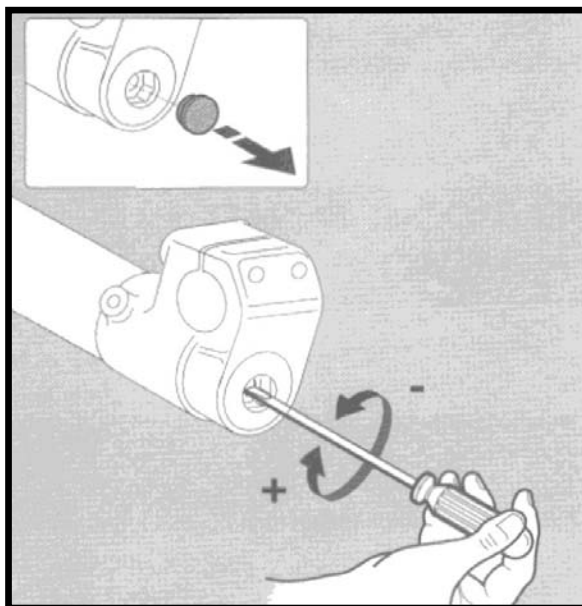
Adjustment of the front fork

- Compression

Using a screwdriver, it is possible to choose a precise setting for the speed of compression from a range of 26 positions, depending on the conditions of the terrain and the purpose for which the vehicle is used.

+ → **Stiffer** (Slower)

- → **Softer** (Faster)

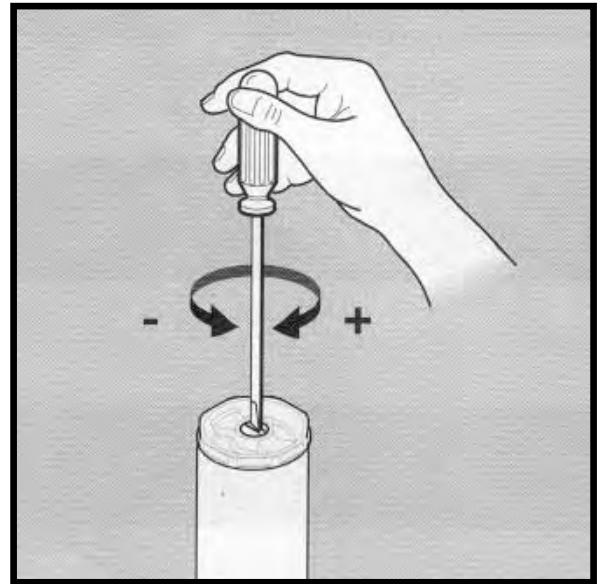


- Rebound

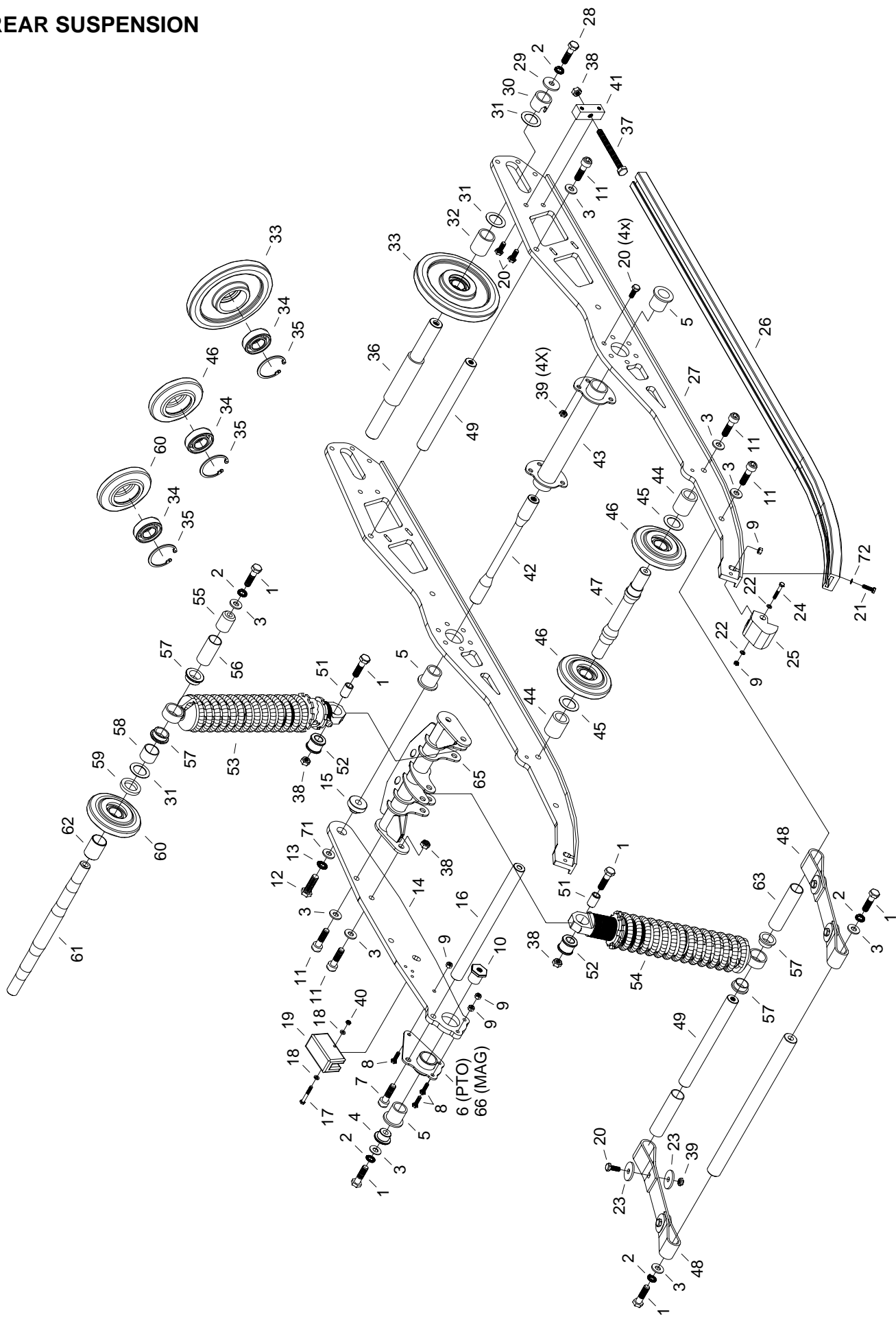
Using a screwdriver, it is possible to choose a precise setting for the speed of rebound from a range of 28 positions, depending on the conditions of the terrain and the purpose for which the vehicle is used.

+ → **Stiffer** (Slower)

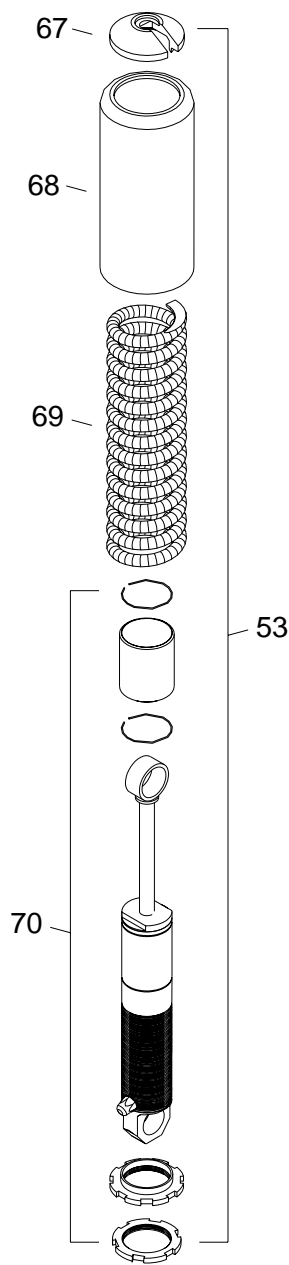
- → **Softer** (Faster)



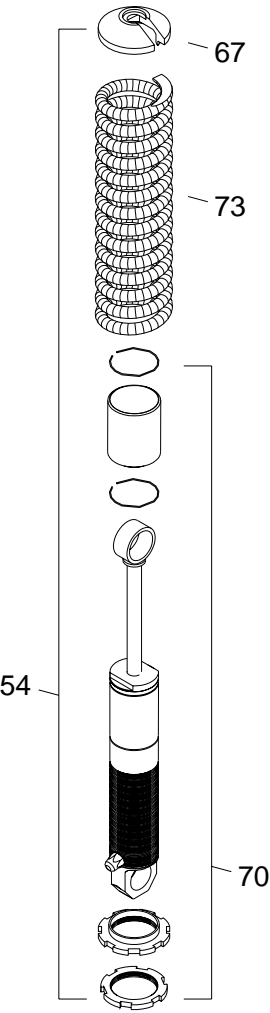
REAR SUSPENSION



REAR SHOCK



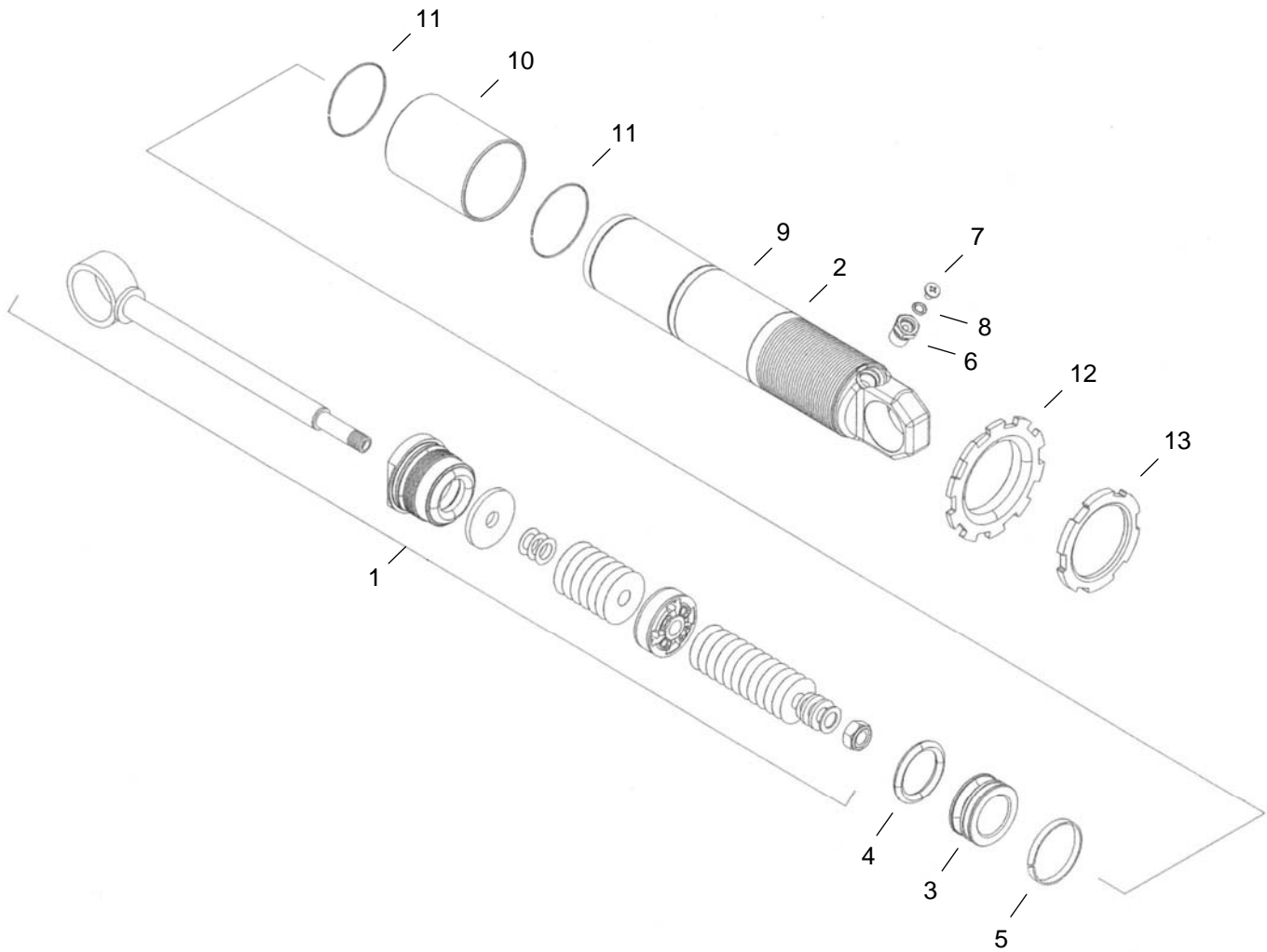
MIDDLE SHOCK



Rear suspension			
Ref.	P/N	Qty	Part descriptions
1	30628	9	Hexagon head cap screw M10 x 1.5 x 45MM (Grade 10.9)
2	21111P	8	Lock washer M10
3	181-188	16	Washer 3/8 I.D
4	SH-416	2	Outer bushing
5	SF-2836-20	4	Oilite bushing
6	SH-43-SAG	1	Bushing housing (Left side)
7	21682P	2	Socket head cap screw M10 x 1.5 x 35MM
8	20159P	6	Hexagon head cap screw M6 x 1.0 x 20MM
9	23162	10	Nylon nut M6 x 1.0
10	SH-415	2	Front inside swinarm bushing
11	21681P	10	Socket head cap screw M10 x 1.5 x 30MM
12	20272P	2	Hexagon head cap screw M12 x 1.75 x 45MM
13	342-121P	2	Lock washer 1/2
14	SH-402	2	Swingarm
15	SH-421	2	Swingarm press fit bushing
16	SH-411	1	Swingarm middle shaft
17	20144P	2	Hexagon head cap screw M5 x 0.80 x 40mm
18	21084P	4	Washer M5
19	570,063,000	2	Rubber stopper
20	825-8CP	12	Hexagon head cap screw M8 x 1.25 x 25MM
21	22205P	2	Button head socket cap screw M6 x 1.0 x 25MM
22	21085P	4	Washer M6
23	517,078,700	8	Limiter strap washer M8
24	20165P	2	Hexagon head cap screw M6 x 1.0 x 45mm
25	025-00	2	Rail cap
26	04-218-22	2	Hyfax
27	SH-401	2	Slide rail
28	250,000,019	2	Hexagon head cap screw M10 x 1.5 x 35MM
29	503,183,300	2	Washer M10 (spécial)
30	503,189,809	2	Rear axle outer spacer
31	504,108,200	6	Shim
32	503,139,600	2	Rear axle inner spacer
33	503,189,568	2	165mm idler wheel assy. (plastic)
34	405,404,500	6	Bearing 6205
35	371,907,700	6	Retaining ring
36	SH-414	1	Rear axle shaft
37	20246CP	2	Hexagon head cap screw M10 x 1.5 x 110MM
38	23166	7	Nylon nut M10 x 1.5
39	23164	12	Nylon nut M8 x 1.0
40	23161	2	Nylon nut M5 x 0.80
41	057-00	2	Track tensioner block
42	SH-412	1	Pivot shaft

Rear Suspension			
Ref.	P/N	Qty	Part descriptions
43	SH-63SA	1	Lower shaft axle assy.
44	023-00	2	PVC spacer
45	BR14L	2	Shim
46	R3250C-1 001B	2	83mm idler wheel assy. (plastic)
47	010-00	1	Wheel axle
48	SH-424	2	Limiter strap
49	SH-425	2	Lower shaft axle assy.
50	SH-428	1	Upper shaft axle assy.
51	503,163,700	3	Lower shock eye steel bushing
52	414,942,300	3	Lower shock eye rubber bushing
53	No reference	2	Rear shock assy
54	No reference	1	Middle shock assy
55	014-00	2	Adaptor
56	SH-418	2	Upper shaft spacer
57	062-01	6	Upper shock eye bushing
58	SH-419	2	Spacer
59	018-00	2	Nylotron shim
60	RD0171	2	100mm idler wheel assy. (plastic)
61	SH-420	1	Upper shaft
62	SH-426	1	Spacer
63	SH-427	2	Spacer
64	016-00	0	Bushing SAE-660
65	SH44-SA	1	Lower shock support
66	SH43-SAD	1	Bushing housing (Right side)
67	013-00	3	Spring hat
68	503,188,930	2	Spring cover
69	C-417-1950-9875	2	Rear spring 348 LB/IN
70	11300-10362	3	Rear shock KAYABA
71	181-190	2	Washer 1/2 (spécial)
72	341-103P	2	Washer 3/16
73	C-375-2665-10375	1	Middle spring 280 LB/IN

SHOCK EXPLODED VIEW



Shock			
Ref.	P/N	Qty	Part descriptions
1-13	11300-10362	3	Shock assembly
1	11303-21209	1	Rod assembly
2	11301-05056	1	Shock body
3	11301-03303	1	Floating piston
4	11301-03006	1	O-ring
5	11301-03805	1	Piston bushing
6	11302-09919	1	Compressed air valve
7	11201-90604	1	Screw
8	11301-03021	1	O-ring
9	11201-92151	1	Label
10	11301-91030	1	Collar
11	11301-03207	2	Stop ring
12	11301-03922	1	Spring preload adjustment collar
13	11301-90513	1	Jam nut

Rear suspension adjustment

The rear suspension can be adjusted in two places

- 1- Rear spring preload adjustment.
- 2- Middle spring preload adjustment.

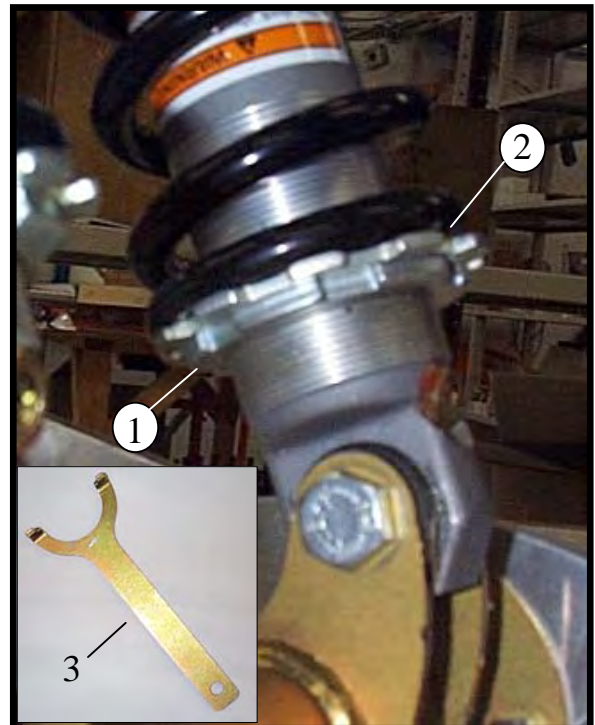
Spring tension

Loosen the jam nut # 1.

Using the special tool # 3, turn the spring preload adjustment collar # 2, turning it CW to stiffen the rear suspension feeling and turning it CCW to soften the rear suspension feeling.

When the adjustment is finished, tighten the jam nut # 1 once more.

- 1- Jam nut
- 2- Spring adjustment ring
- 3- Special tool



Rear spring preload

The adjustment of the rear spring makes it possible to stiffen the suspension if it reaches the limit of its travel and to make it feel softer if the driver is the one absorbing the impacts instead of the suspension.

● NOTICE:

A properly set rear shock preload results in a 3-4" rear suspension sag with the rider on board.

Middle spring preload

Stiffen the middle spring: This puts less pressure on the front ski.

Softer the middle spring: This puts more pressure on the front ski.

Shock Maintenance

This type of shock absorber can be completely rebuilt. It can be calibrated, the shims can be replaced, or the sealing rings can be replaced as need be. The driver can choose the precise adjustment that corresponds to his or her driving style.

DISASSEMBLY

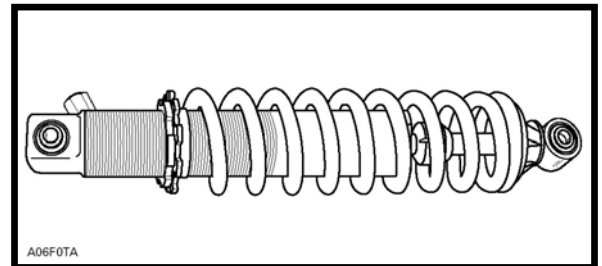
Free nitrogen (N^2) pressure by removing the needle-type valve.

◆ WARNING

Nitrogen gas is under extreme pressure. Use caution when releasing this gas volume. Protective eye wear should be used.



Remove the shock absorber spring by unscrewing the pre-load collar and jam nut then by removing the spring retainer hat. To carry out these operations, use tool (P/N 861 7439 00).

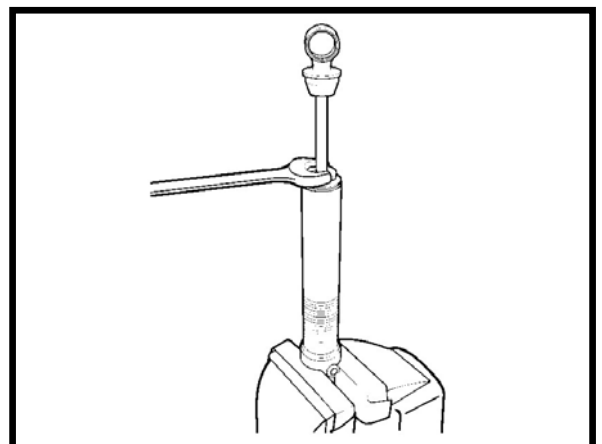


Install the shock absorber in a vise then remove the shock body cap (complete) from the body of the shock absorber using a 32 mm (1.25 in) open-end wrench. Unscrew the cap in a counter-clockwise direction.

● NOTICE:

Before unscrewing the pre-load collar and jam nut, mark their position so as to be able to reinstall them correctly. To find out their original adjustment, refer to the end of the present section.

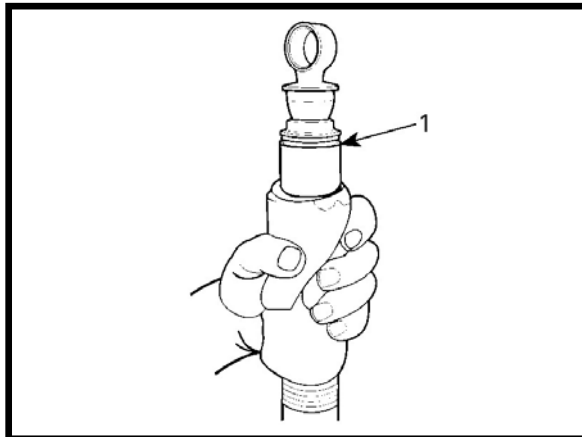
Shock body cap (complete) has been removed, gently lift the rod of the shock absorber and remove it from the body.



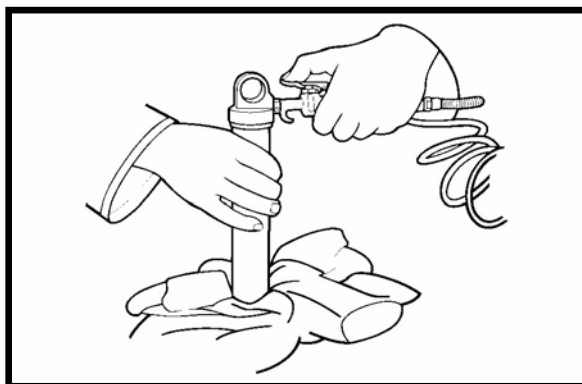
● NOTICE:

Pull the rod of the shock absorber out gently to avoid spilling oil or damaging the top cap and seal with the threads on the body of the shock absorber. Wrap it in a cloth when removing the shock absorber piston to soak up any oil that might run down the sides.

Store the old oil in a container. Never re-use this old oil when rebuilding a shock.



Remove the needle-type valve. Using compressed air, carefully extract the floating piston from the body of the shock absorber. Cover the opening of the shock absorber with a cloth to catch the floating piston. Make sure there is enough space in the cloth for the piston when it comes out.

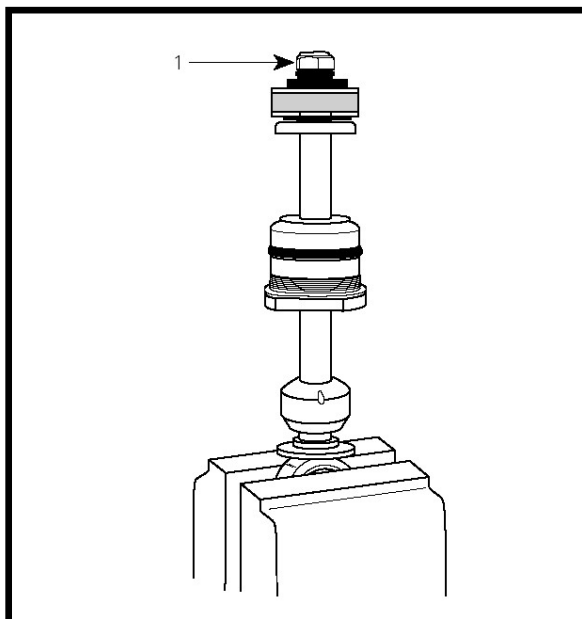


◆ WARNING

Always wear safety glasses and use a compressed air gun approved by the O.H.S.A when working with compressed air.

Clean the body of the shock absorber thoroughly using an appropriate solvent. Dry it using compressed air and inspect it carefully to detect any imperfections or marks indicating wear in the bore. Replace the shock absorber in case of wear.

Put the shock absorber rod in a vise and then remove the piston and the shims.



After removing the parts, always lay them out in the order in which they were dismantled.

● **NOTICE:**

In general, it is recommended that the lock nut from the shock absorber rod be replaced after the absorber has been reassembled 4 times to ensure adequate locking friction.

● **NOTICE:**

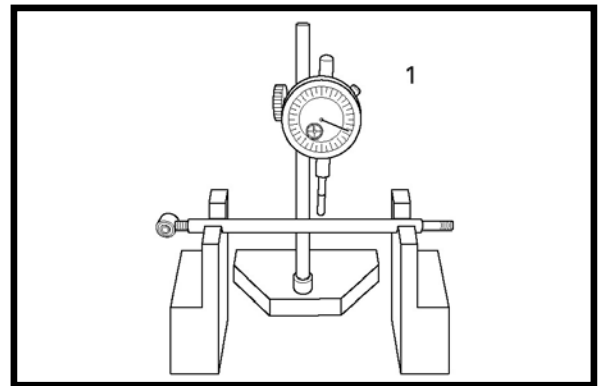
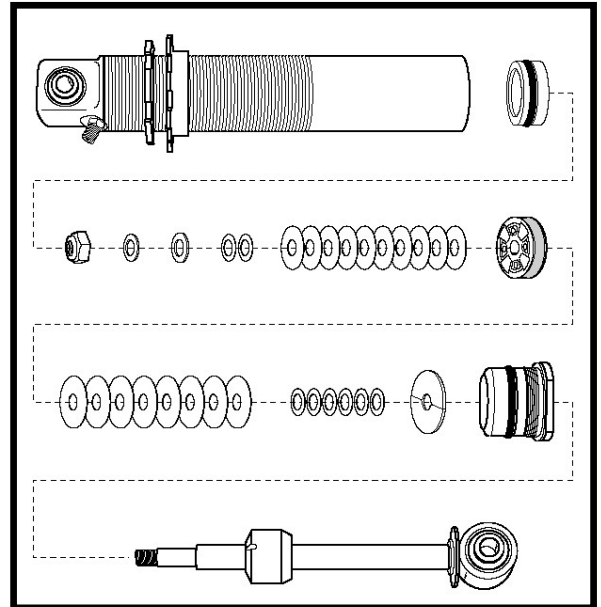
If it is necessary to re-calibrate the valves, it is absolutely essential to identify the order in which the shims are stacked (the number of shims and their thickness). The casing of the ring seal does not need to be removed if it is only an operation of re-calibration.

The shims can be measured using a sliding caliper or a micrometer.

The shock absorber rod is plated. It must be inspected in order to detect any visible marks of wear on the surface.

If there is a leak in the ring seal, it will be necessary to measure the camber of the rod which must not exceed 0.025 mm (.001 in).

Once the new shims or the replacement shims have been selected, reassemble everything by carrying out, in reverse order, the same operations as for dismantling. Tighten the piston nut between 11 and 13 N-m (1.1 and 1.3 kg-m, 8 and 9.5 lbf-ft)



▼ **CAUTION**

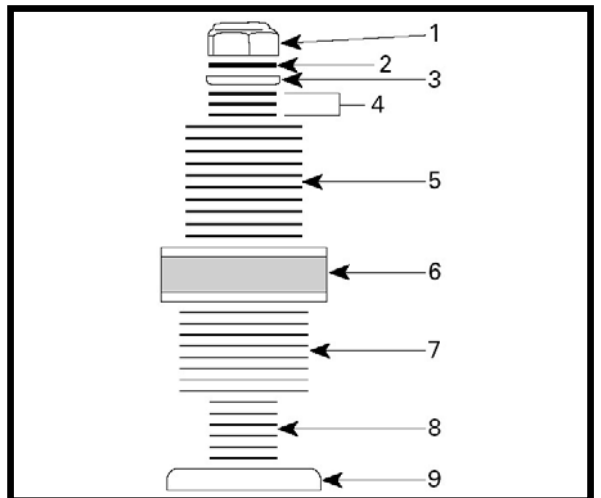
The nut for the rod of the shock absorber can only be used 4 times before it is replaced. Use only an original part to replace it; do not substitute any other kind of part for it.

Make sure that the number of washers between the nut of the shock absorber rod and the lock nut leave a sufficient number of threads for the nut of the shock absorber rod.

Install the lock nut with the rounded part facing down.

● **NOTICE:**

The stack of rebound shims must not touch the threads of the rod. The washer(s) under the nut on the rod prevent the nut from going to the end of the shoulder of the shock absorber rod.



REBOUND

Leave a play of about 0.203 mm (0.008 in) between the stack of shims and the lock nut.

When adjusting the shock absorber to increase the rebound damping, always use shims measuring 26 mm (1.02 in) against the piston to close the piston openings well. Even though the total thickness is the same, a large number of thin shims offer less damping effect than a small number of thick shims.

When adjusting the shock absorber to decrease the rebound damping, always use at least 3 shims measuring 26 mm (1.02 in) against the piston to prevent any breakage that could be caused by wear.

There are 4 kinds of pistons whose number of grooves varies between 0, 2, 4, and 6 according to the rapidity of the rebound. These grooves offer variations in the damping in relation to the shims.

COMPRESSION

When adjusting the shock absorber to increase the compression damping, always use shims measuring 30 mm (1.18 in) against the piston to close the piston openings well. Even though the total thickness is the same, 2 thin shims offer less damping than one thick shim.

When adjusting the shock absorber to decrease the compression damping, always use at least 3 shims against the piston to prevent any breakage that could be caused by wear.

Always use at least one washer measuring 0.114 mm (the use of 2 or more is recommended) between the stack of shims and the lock nut washer so that the shims will have enough space to work.

During compression the grooves of the lock nut must face the stack of shims.

GENERAL INFORMATION

Calibrating the shock absorber so that there is too much damping is a frequent error. When this is done, the suspension has too much give. The suspension cannot carry out a complete extension after the compression caused by a bump. After some time, the suspension becomes sluggish and no longer performs the movements of compression and extension efficiently.

Calibrating the shock absorber so that there is not enough damping means the damping will either be insufficient or badly controlled.

In such a case, the shock absorber moves up and down almost without any restriction. When going over a bump, the symptom most often noticed is that the snowmobile bounces.

P/N	Qty	Original Configuration Rear Shocks Shim Stack (Compression)
414 8883 35	1	Damping shim Ø15 x 0.203
414,888,323	1	Damping shim Ø26 x 0.153
414 8883 18	9	Damping shim Ø30 x 0.203

P/N	Qty	Original Configuration Rear Shocks Shim Stack (Rebound)
414 8883 37	2	Damping shim Ø15 x 0.114
414 8883 22	6	Damping shim Ø26 x 0.203

● NOTICE:

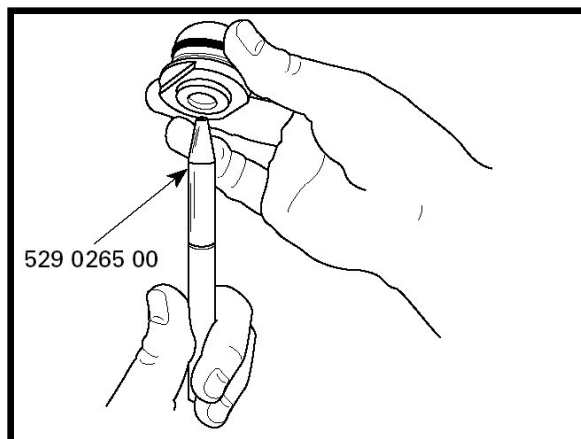
Carry out a meticulous inspection of the shims and replace any bent shims in order to get perfect calibration.

Not having enough damping might lead to believe that bubbles have formed in the shock absorber because the gas pressure is not high enough. Although such a situation is rare, checking the gas pressure is recommended.

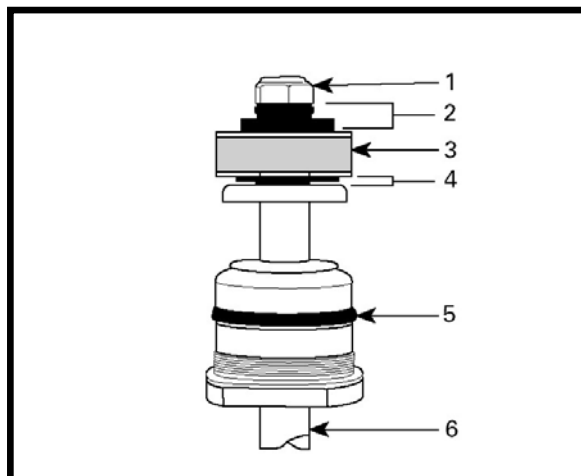
To replace the housing of the ring seal, use a ring seal guide (P/N 529 0265 00) to guide the ring seal over the shock absorber rod. Lubricate the guide before using it.

▼ CAUTION

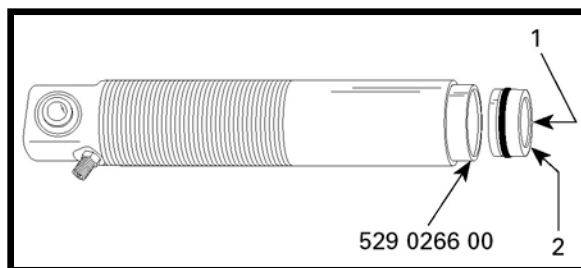
The ring seal will be damaged if the guide is not used.



Reassemble the shock absorber rod (complete) while taking care to correctly assemble the stack of shims according to the damping needed.



Install the floating piston in the body of the shock absorber. Use grease with a molybdenum bisulphide base (ex: G-N Molykote Paste P/N 413 7037 00) to help the O-ring to pass more easily over the threads of the body of the shock absorber using the piston guide (P/N 529 0266 00).



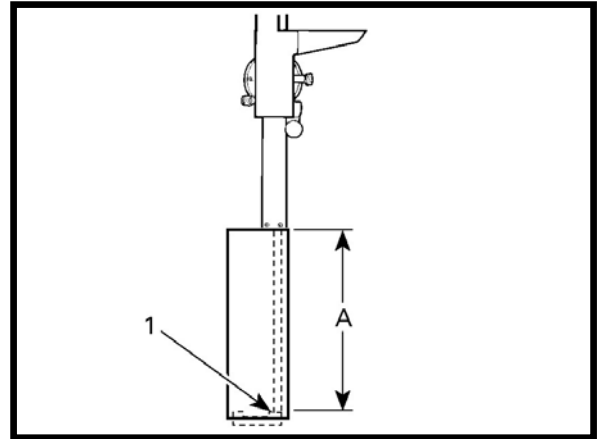
● **NOTICE:**

Using G-N Molykote Paste (P/N 413 7037 00) lubricate the inside of the piston guide.

Install the piston to a depth of **A = 141.0 mm (5.55 in)**. Measure this distance starting from the upper end of the shock absorber.

● **NOTICE:**

If the floating piston is installed too far down in the body of the shock absorber, a light pressure exerted through the hole in the needle valve will push the piston up



◆ **WARNING**

Be very careful when using compressed air. Cover the opening in the shock absorber with a cloth to reduce any risk of injury.

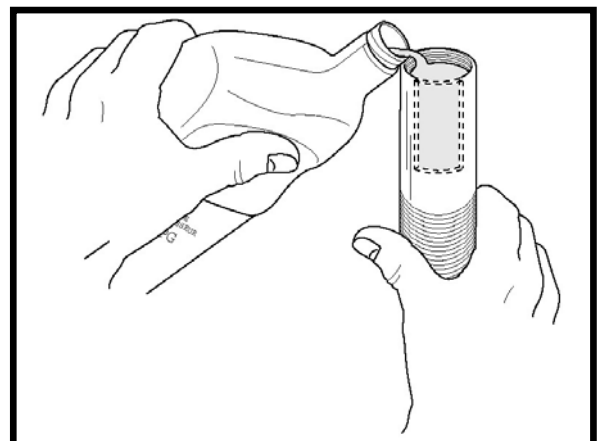
◆ **WARNING**

There is a risk that compressed air containing humidity will contaminate the gas chamber and cause the floating piston to rust.

◆ **WARNING**

Always wear safety glasses when working with compressed air.

Replace the shock absorber oil by HGP Bombardier shock absorber oil (P/N 413 7094 00). Fill up to about 10 mm (0.393 in) from the base of the threads of the ring seal housing.

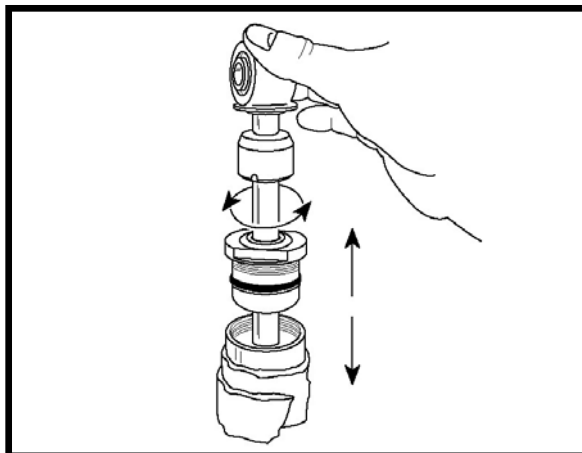


Insert the shock absorber rod (complete) in the body of the shock absorber. Lightly lubricate the ring seal of the piston with shock absorber oil to make installation easier.

Install the ring seal housing near the piston. Check the shock absorber oil capacity to make sure there is no air in the body of the shock absorber when it is being reassembled.

● **NOTICE:**

Some oil will spill during the installation of the shock absorber so wrap it in a rag to absorb this oil.



◆ **WARNING**

Take care not to damage the threads of the body of the shock absorber when inserting the piston.

It might be necessary to jiggle the rod slightly to make it easier to place the piston in the bore of the body of the shock absorber.

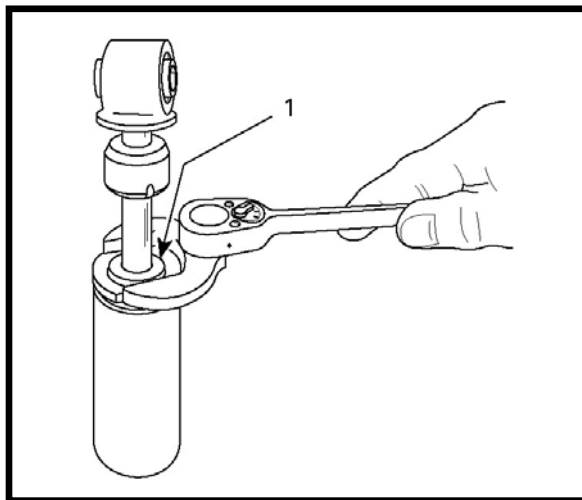
Gently insert the piston into the body of the shock absorber. A slight up-and-down movement might be needed to allow the air to pass through the piston (complete).

● **NOTICE:**

When the shock absorber rod is installed hastily, there is risk that the floating piston will be moved out of its initial position. This will have a negative effect on the way the shock absorber works.

Place the piston of the shock absorber rod in the oil and add a certain quantity of oil up as far as the base of the threads of the body of the shock absorber.

The ring seal housing can now be screwed into the body of the shock absorber. Proceed gently to allow for the oil flow of the shock absorber.



ADJUSTING THE NITROGEN PRESSURE

Nitrogen (N_2) can now be added to the body of the shock absorber. Replace the needle valve.



Adjust the pressure regulator to 2070 KPa (300 lb/in²) of nitrogen. This pressure will re-establish the shock absorber pressure at its optimum level.

▼ CAUTION

Do not exceed the recommended pressure.

◆ WARNING

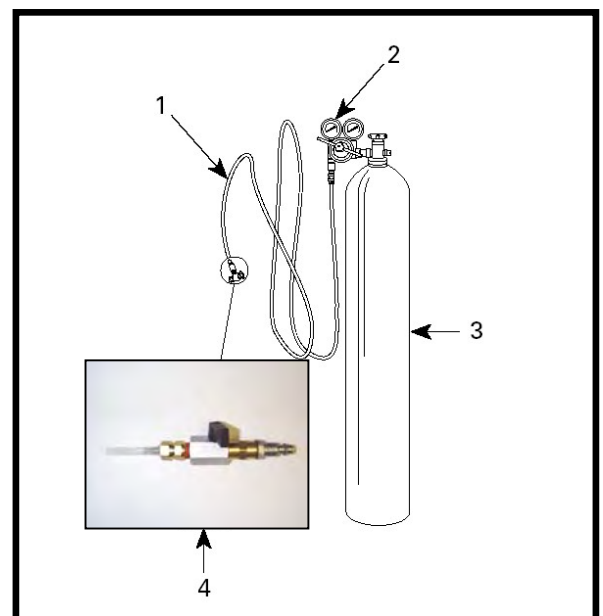
Always wear safety glasses when working with high pressure gas. Never point gas under pressure at anyone.



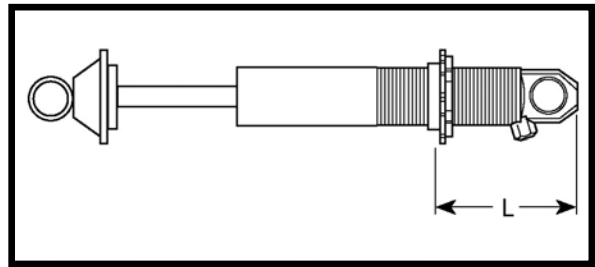
● NOTICE:

Make sure there are no gas or oil leaks. Carry out any necessary repairs before going on the next step.

1. Hose
2. Regulator
3. Nitrogen bottle
4. Charging tool (needle)



Replace the spring retainer hat, then the spring. Next, screw the pre-load rings up to the spring. Adjust the pre-load according to the length of the spring. The shock absorber can now be installed on the vehicle. **L = Position # 2**



MISCELLANEOUS INFORMATION

- Never replace nitrogen by another gas. Nitrogen was chosen for its qualities as an inert gas: since it is dry (no humidity) it does not contaminate the gas chamber of the shock absorber.
- When stacking shims, 2 thin shims stacked together are as thick as one thick shim, but offer less resistance than the latter. Refer to the table SHIM EQUIVALENCE FOR THE SAME DIAMETER as illustrated in this section#.
- When stacking shims for rebound, always use shims measuring 22 mm (1.02 in) in diameter against the piston. Use at least 3 shims for the stack to avoid bending or breaking. Leave a play of about 0.203 mm (0.008 in) between the stacks of shims and the lock nut washer.
- When stacking shims for compression, always use shims measuring 30 mm (1.181 in) in diameter against the piston. Use at least 3 shims for the stack to avoid bending or breaking. Install at least one washer measuring 0.114 mm (installing 2 or more of them is recommended) between the stack of shims and the lock nut washer.

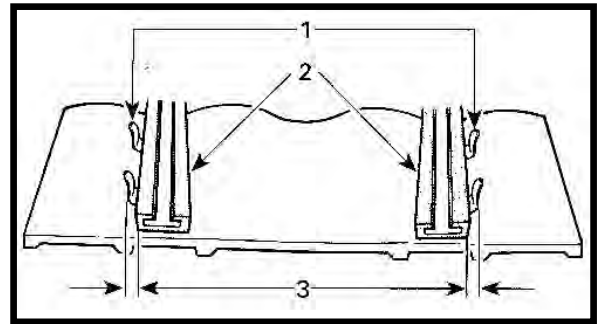
Track Alignment

▼ CAUTION

The track of each SNOW HAWK™ was aligned and adjusted in the factory but it is recommended that the following be checked.

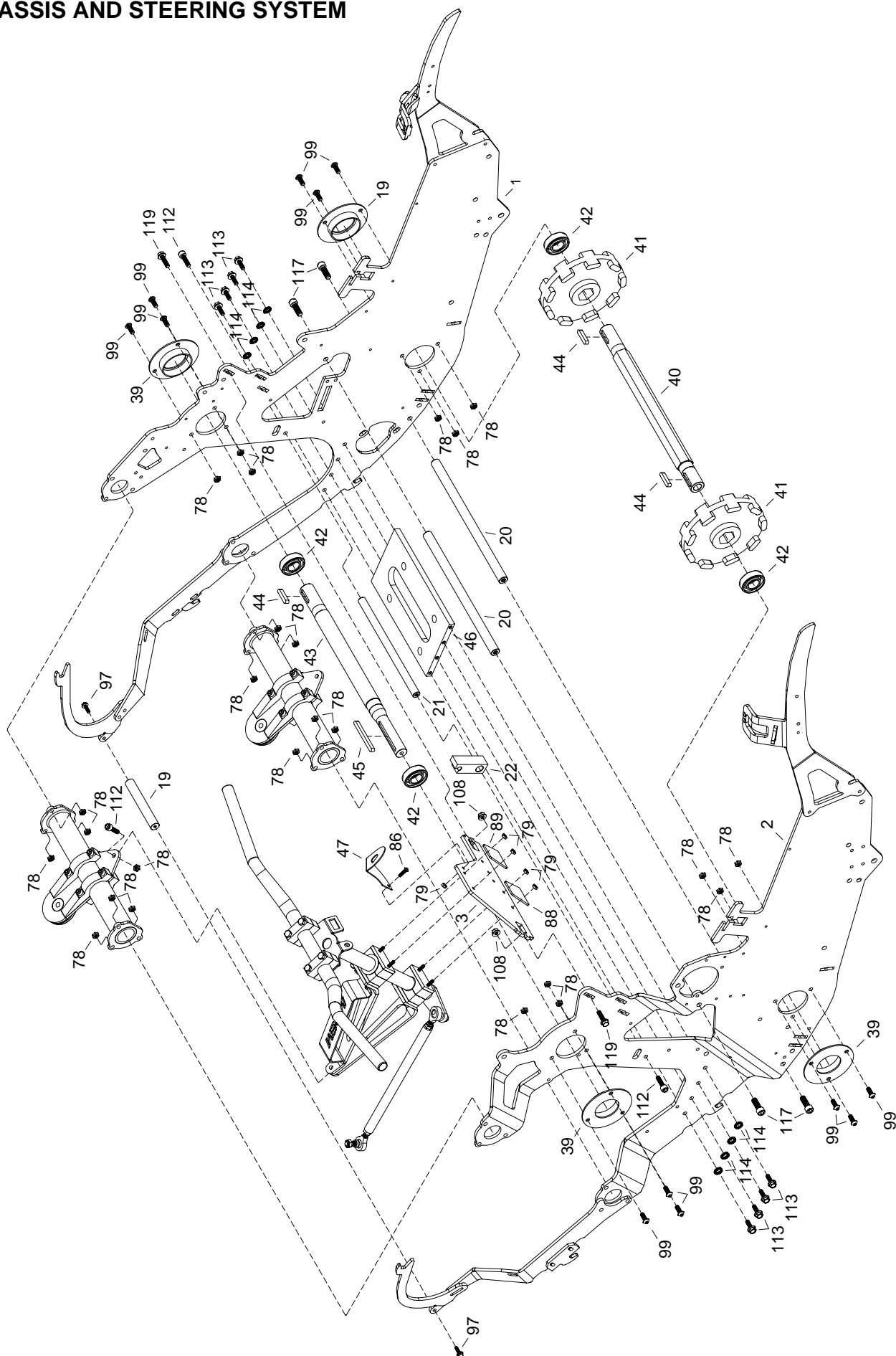
- The alignment of the track

1. Guides
2. Hyfax (slides)
3. Equal distance

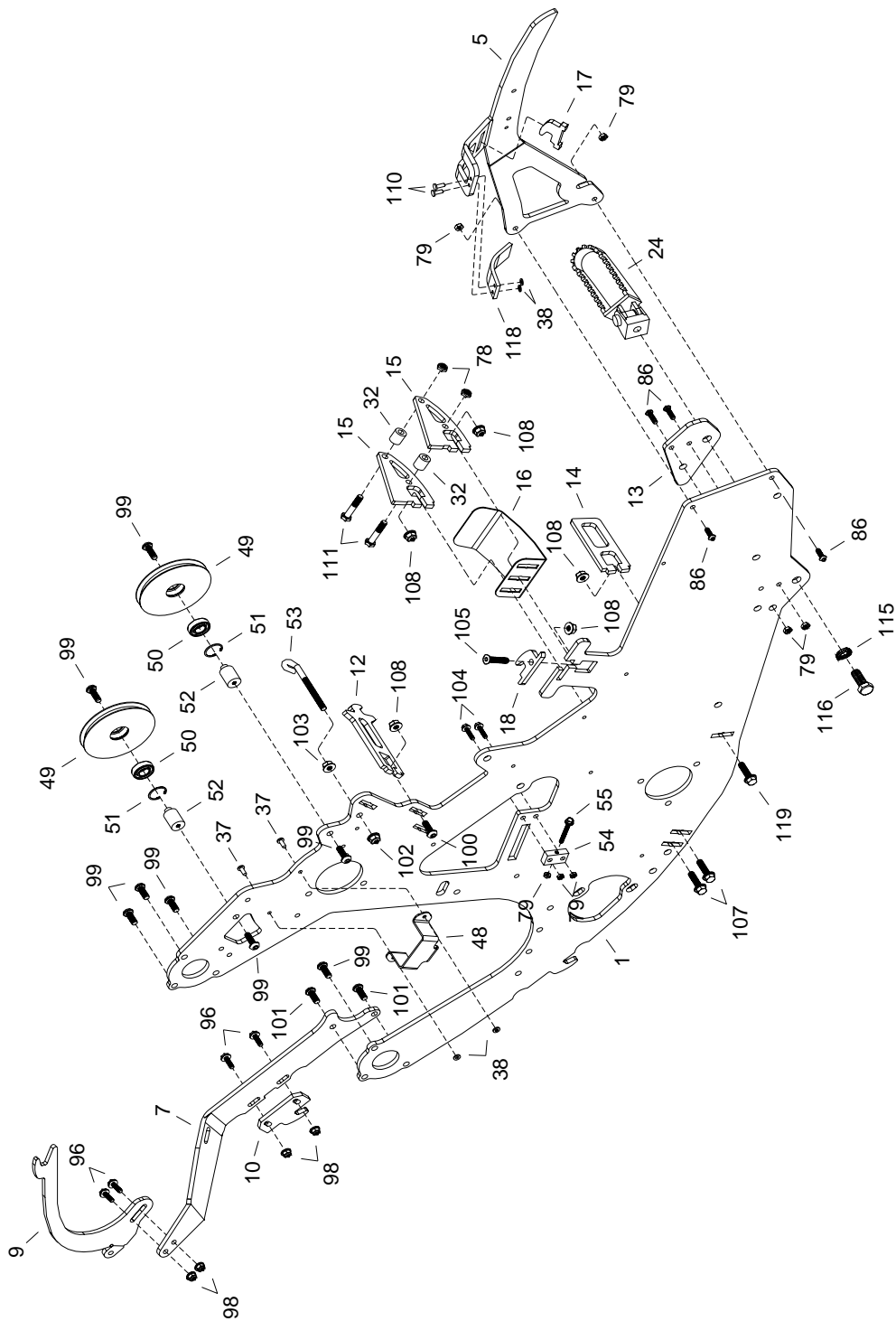


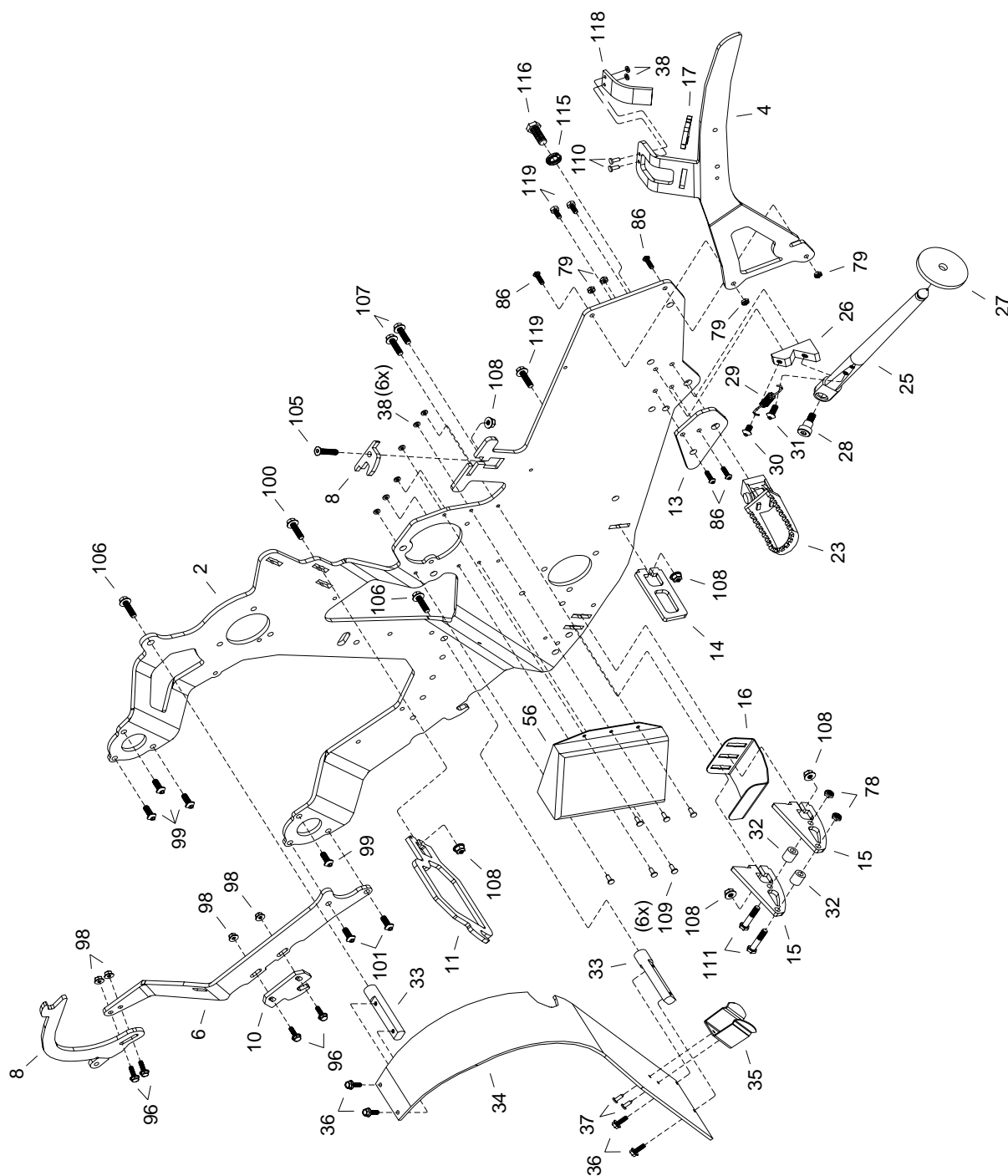
- Track tension

The track must have a free deflection of about 40 mm (1 ½"), just below the lower pivot of the swing arm (which is the midpoint of the rail), when the rear of the vehicle is supported and the track is hanging freely.

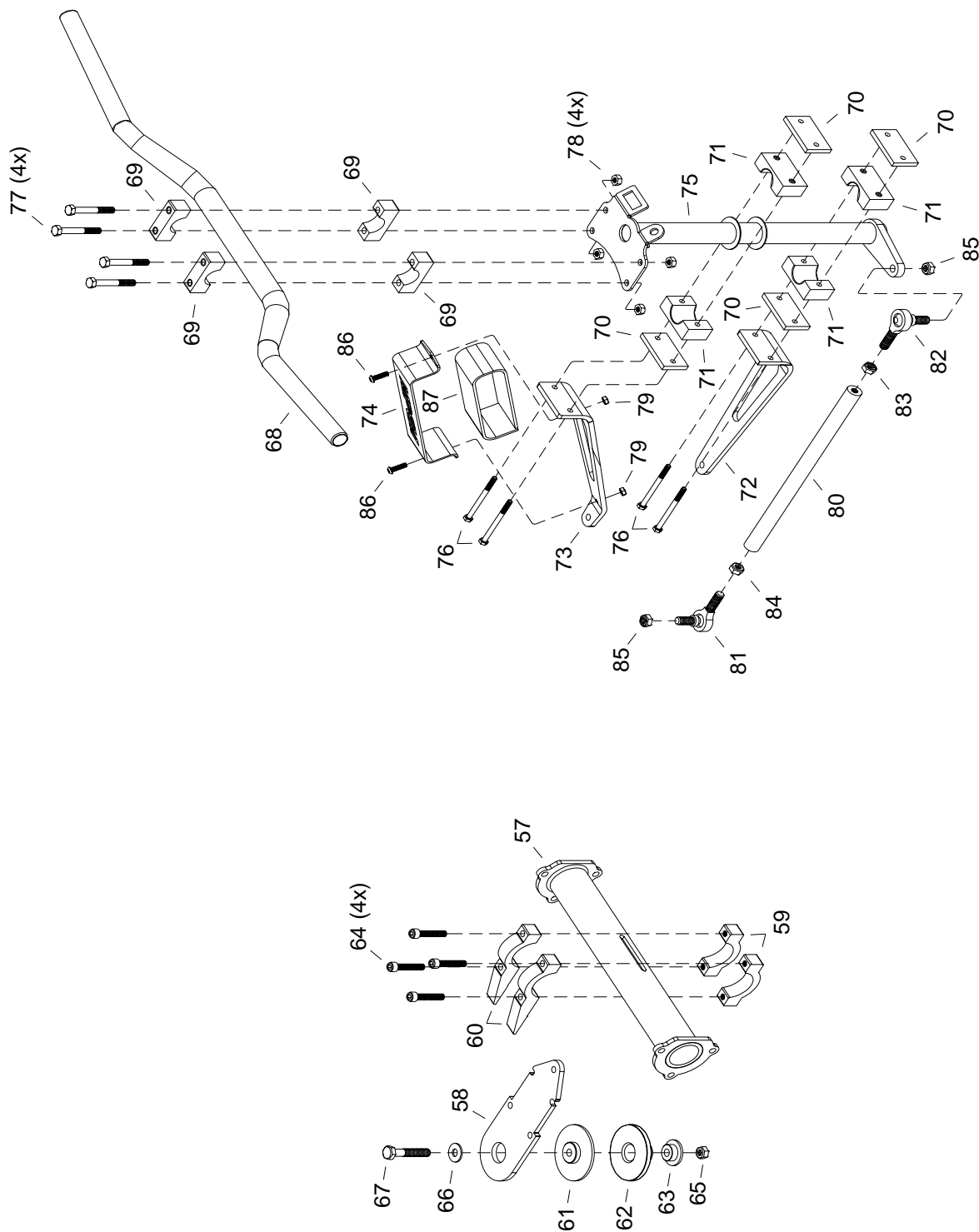


CHASSIS AND STEERING SYSTEM

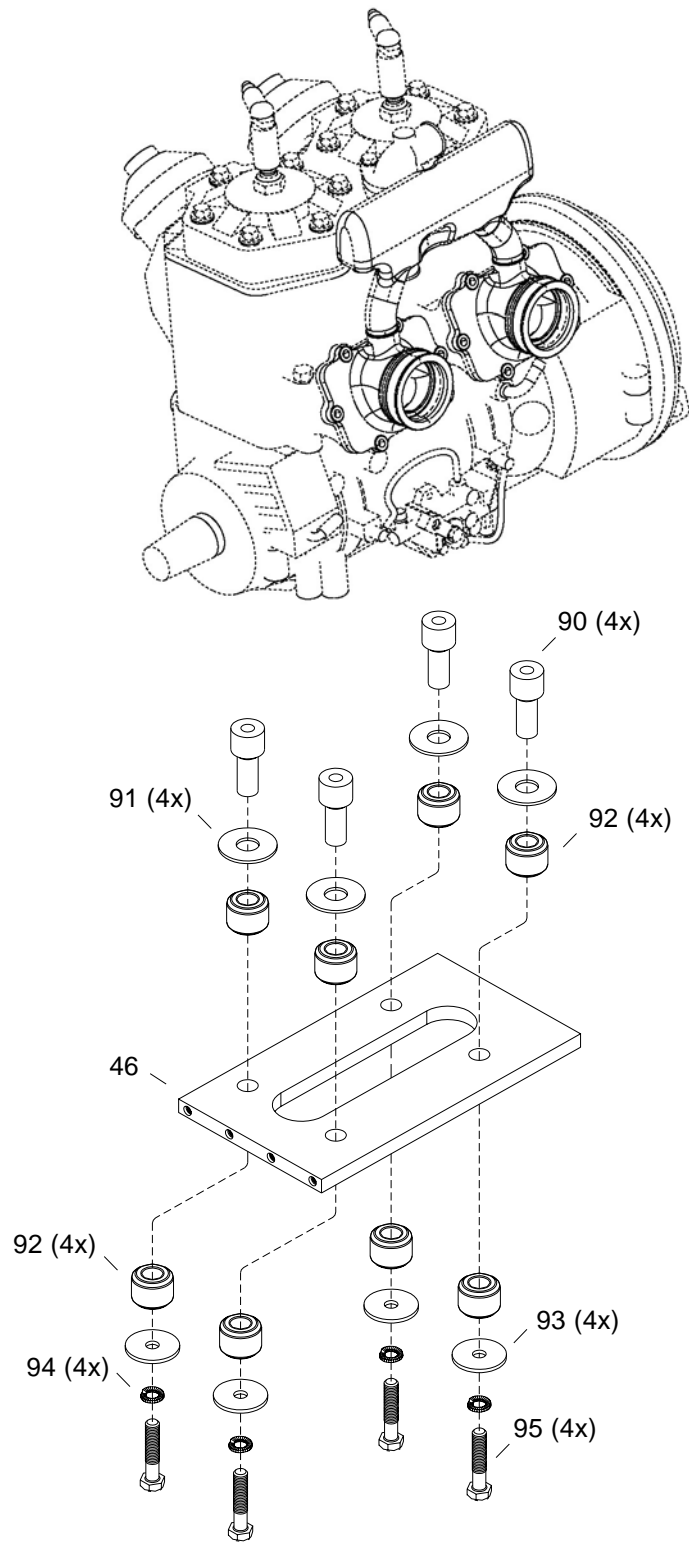




CHASSIS AND STEERING SYSTEM



CHASSIS AND STEERING SYSTEM



Chassis			
Ref.	P/N	Qty	Part Descriptions
1	SH-001	1	Frame right side (MAG)
2	SH-002	1	Frame left side (PTO)
3	SH-116	1	Handle bar plate support
4	SH-003L	1	Rear frame left side (PTO)
5	SH-003R	1	Rear frame right side (MAG)
6	SH-033L	1	Left front chassis extension (PTO)
7	SH-033R	1	Right front chassis extension (MAG)
8	SH-032L	1	Left front hood bungee hook (PTO)
9	SH-032R	1	Right front hood bungee hook (MAG)
10	SH-035	2	Front belly pan bungee hook
11	SH-030	1	Left side belly pan bungee hook (PTO)
12	SH-031	1	Right side belly pan bungee hook (MAG)
13	SH-117	2	Foot peg stiffener
14	SH-061	2	Rear lateral protector
15	SH-062	4	Front lateral protector
16	SH-080	2	Belly pan side shield support
17	SH-036	2	Rear module rear bungee hook
18	SH-118	2	Rear module front bungee hook
19	SH-038	1	Front chassis spacer
20	SH-020	2	Long chassis spacer
21	SH-021	1	Short chassis spacer
22	SH-120	1	Carburator support
23	SH11-SAG	1	Left peg (PTO)
24	SH11-SAD	1	Right peg (MAG)
25	SH-111	1	Kickstand arm
26	SH-110	1	Kickstand adaptor
27	SH-112	1	Kickstans floater
28	339-163AI	1	1/2" shoulder screw socket screw
29	02-108	1	Kickstand spring
30	404-337AI	1	Button head socket cap screw 5/16" x 1/2" L
31	337-213AI	1	Button head socket cap screw 5/16" x 3/4" L
32	SH-039	4	Front lateral protector spacer
33	SH-047	2	Belt garde support
34	SH-046	1	Belt garde cover
35	12-164-01	1	Belt holder spare
36	061.6.16	4	Hexagon head flange bolt M6 x 1.0 x 16MM (Grade 10.9)
37	BNO1-0618	4	Pop rivet 3/16" (medium)
38	341-102P	12	3/16" pop rivet backing plate
39	SH-015	4	Bearing housing
40	SH-251	1	Sprocket shaft
41	04-108-39	2	Sprocket 9 teeth
42	6206-2RSJEMC3	4	Bearing 6206

CHASSIS AND STEERING SYSTEM 13-7

Chassis			
Ref.	P/N	Qty	Part Descriptions
43	SH-250	1	Jackshaft
44	SH-253	3	Key 1.5" L
45	SH-254	1	Key 3.375" L
46	SH-084	1	Engine support
47	SH-034	1	Choke bracket
48	SH-129	1	Oil tank bracket
49	SH-058	2	Hand starter wheel
50	6000LLEC	2	Bearing 6000
51	184-110	2	Retaining ring
52	SH-057	2	Handle starter wheel spacer
53	MM9489T26	1	Eyebolt 5/16-18 x 1"
54	SH-042	1	Belt tensioner block
55	20172CP	1	Hexagon head cap screw M6 x 1.0 x 80MM (full threaded)
56	SH-119	1	Air intake
57	SH01-SA	2	Fork clamp tube
58	SH-005	2	Fork clamp support
59	SH-013	4	Bottom clamp stiffener
60	SH-012	4	Top clamp stiffener
61	SH-043	2	Fork steel bushing
62	SH-050	2	Fork MOS2 bushing
63	SH-066	2	Fork bushing
64	21655P	8	Socket head screw M8 x 1.25 x 40MM
65	23166	2	Nylon nut M10 x 1.5
66	503,183,300	2	Washer 10MM spécial
67	20237P	2	Hexagon head cap screw M10 x 1.5 x 55MM
68	446274	1	Handle bar
69	SH-016	4	Handle bar clamp
70	SH-054	4	Rubber steering damper
71	SH-049	4	Plastic half steering bushing
72	SH-089	1	Bottom handle bar stiffener
73	SH-008	1	Top handle bar stiffener
74	SH-128	1	MPEM bracket
75	SH14-SA	1	Steering colomn
76	BH67010.9P	4	Hexagon head cap screw M6 x 1.0 x 70MM (Grade 10.9)
77	20207P	4	Hexagon head cap screw M8 x 1.25 x 60MM
78	23164	33	Nylon nut M8 x 1.25
79	23162	18	Nylon nut M6 x 1.0
80	SH-055	1	Threaded aluminum drive rod
81	506,151,492	1	RH ball joint
82	506,151,495	1	LH ball joint
83	250,100,016	1	LH hexagon jam nut M10
84	732,610,010	1	RH hexagon jam nut M10

Chassis			
Ref.	P/N	Qty	Part Descriptions
85	368.10.125	2	Nylon nut M10 x 1.25
86	22204P	11	Button head socket cap screw M6 x 1,0 x 20MM
87	8461k133-2	1	Adhesive rubber strip 1/8" thick x 2" wide x 16" L
88	SH-132	1	Adhesive rubber strip (PTO) [modified #8461K133]
89	8461k133-1	1	Adhesive rubber strip 1/8" thick x 2" wide (MAG)
90	SH-085	4	Engine support adaptor
91	341-114P	4	Washer 5/8
92	DDR6261	8	Rubber damper
93	92140A118	4	Washer M10 large
94	21111P	4	Lock washer M10
95	20242P	4	Hexagon head cap screw M10 x 1.5 x 80MM
96	061.6.25	8	Hexagon head flange bolt M6 x 1.0 x 25MM (Grade 10.9)
97	20159P	2	Hexagon head flange bolt M6 x 1.0 x 20MM (Grade 10.9)
98	23162F	8	Nylon flange nut M6 x 1.0
99	22214P	20	Button head socket cap screw M8 x 1.25 x 20MM
100	22215P	2	Button head socket cap screw M8 x 1.25 x 25MM
101	22216P	4	Button head socket cap screw M8 x 1.25 x 30MM
102	336-103	1	Hexagon flange stove nut 5/16"
103	2946	1	Nylon flange nut 5/16-18
104	22205P	2	Button head socket cap screw M6 x 1.0 x 25MM
105	22121P	2	Flat head socket cap screw M8 x 1.25 x 30MM
106	22225P	2	Button head socket cap screw M10 x 1.5 x 25MM
107	29530	4	Hexagon head flange bolt M8 x 1.25 x 30MM
108	23164F	12	Nylon flange nut M8 x 1.25
109	1661-0619	6	Aluminum pop rivet 3/16
110	BS01 0622	4	Aluminum pop rivet 3/16 (long)
111	084.8.40	4	Hexagon head cap screw M8 x 1.25 x 40MM
112	084.8.30	2	Socket head cap screw M8 x 1.25 x 30MM
113	057.8.30	8	Hexagon head cap screw M8 x 1.25 x 30MM
114	21110P	8	Lock washer M8
115	442.12	2	Lock washer 1/2"
116	20269P	2	Hexagon head cap screw M12 x 1.75 x 30MM
117	21681P	4	Socket head cap screw M10 x 1.5 x 30MM
118	SH-071	2	Rear module rear bungee hook positioner
119	061.8.25	4	Hexagon head flange bolt M8 x 1.5 x 30MM

Body - Hood			
Ref.	P/N	Qty	Part Descriptions
-	ADB-097	1	BLACK HOOD
-	ADB-098	2	BLACK HOOD GUIDE
-	1661-0619	10	3/16" ALUMINUM POP RIVET
-	19-113B	3	TIE WRAP 5.5"(L) x 1/8" (w) BLACK
-	BLAA68-100N	2	ALU POP RIVET 3/16" DIA (LARGE HEAD)
-	SH-125	1	HOOD - PTO SIDE HEAT SHIELD @ NOSE
-	SH-126	1	HOOD - MAG SIDE HEAT SHIELD @ NOSE
-	SH600D01	1	MAG - HOOD - HAWK
-	SH600D02	1	PTO - HOOD - HAWK
-	SH600D07	1	MAG - HOOD - TOP OF HOOD
-	SH600D08	1	PTO - HOOD - TOP OF HOOD
-	SH600D09	1	HOOD - ROTAX 600HO DECAL
-	SH600D10	1	MAG - HOOD - HAWK HEAD
-	SH600D11	1	PTO - HOOD - HAWK HEAD
-	SH600D12	1	HOOD - AD BOIVIN LOGO
-	SH600D13	2	HOOD - SNOW - DECAL
-	SH600D14	1	MAG - HOOD - NOSE DECAL
-	SH600D15	1	PTO - HOOD - NOSE DECAL
-	5937	6	HEAD LIGHT SPRING
-	284118	2	RUBBER HOOK "BUNGEE"
-	AN-125	1	HEAD LAMP, SAE J280 APPROVED
-	SH-069	1	GRILL - COOLING DUCT [REAR OF CAB]
-	SH-070L	1	GRILL - PTO SIDE
-	SH-070R	1	GRILL - MAG SIDE
-	SH-075	1	HEAD LAMP HEAT SHIELD
-	SH-081	2	WEARING PLATE (stainless steel 16 gage)
-	341-102P	8	3/16" POP RIVET BACKING PLT.
-	400-288	4	ELASTIC NUT #8-32
-	400-579A	2	SCREW #8-32 X 1 3/4"
-	402-637	2	SCREW #8-32 X 2 1/2"
-	SH-615	1	DECAL - WARNING - DASH

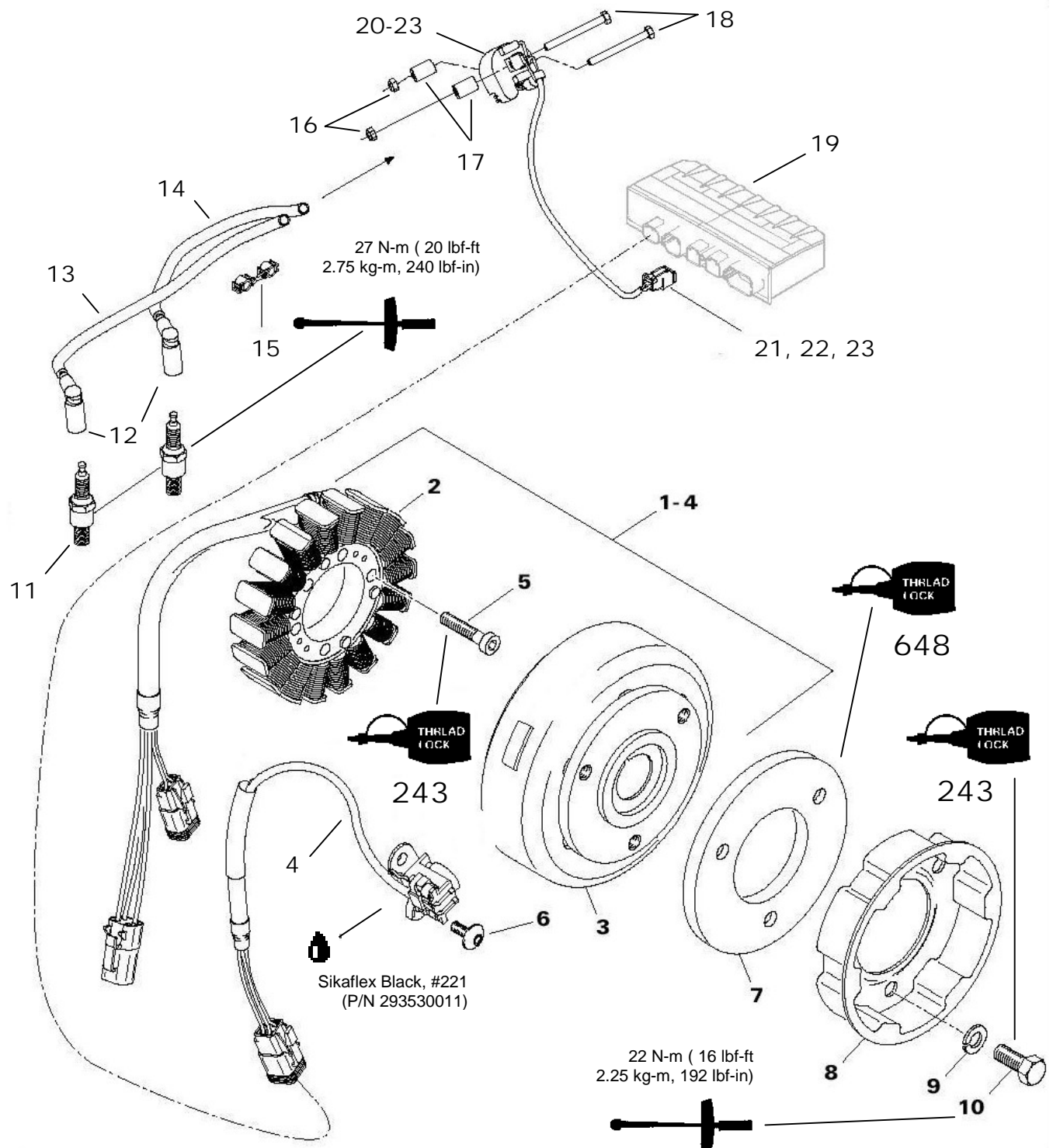
Body - Bellypan			
Ref.	P/N	Qty	Part Descriptions
-	284118	8	RUBBER HOOK "BUNGEE"
-	1661-0619	6	3/16" ALUMINUM POP RIVET
-	1661-0619N	13	BLACK ALUMINUM RIVET FOR 2 NEW GRILLS
-	341-102P	17	3/16" POP RIVET BACKING PLT.
-	ADB-094	1	BLACK BELLYPAN
-	BLAA68-100N	10	ALU POP RIVET 3/16" DIA (LARGE HEAD)
-	BLSS64-100N	2	3/16" PIPE BUMPER POP RIVETS
-	SH-065	1	PTO BELLYPAN PROTECTOR
-	SH-068	1	PTO SIDE GRILL
-	SH-081	6	WEARING PLATE (stainless steel 16 gage)
-	SH-082	1	BELLYPAN PROTECTOR
-	SH-113	1	SMALL BRAKE GRILL
-	SH-115	1	MAG SIDE GRILL NOIR
-	SH-133	1	TOOL POCKET 600HO
-	1661-0619	4	3/16" ALUMINUM POP RIVET
-	341-102P	4	3/16" POP RIVET BACKING PLT.
-	SH-121	1	BELLYPAN - MAG SIDE HEAT SHIELD @ PIPE STINGER
-	SH-122	1	BELLYPAN - FORWARD HEAT SHIELD (UNDER PIPE)
-	SH-123	1	BELLYPAN - REAR HEAT SHIELD (UNDER CANISTER)
-	SH-124	1	BELLYPAN - MAG SIDE HEAT SHIELD @ AIR VENT
-	SH600D03	1	MAG - BELLYPAN - LONG SIDE DECAL
-	SH600D04	1	PTO - BELLYPAN - LONG SIDE DECAL
-	SH600D16	1	MAG - BELLYPAN - TRIANGLE DECAL
-	SH600D17	1	PTO - BELLYPAN - TRIANGLE DECAL
-	SH-610	1	DECAL - REFLECTOR - SIDE BELLYPAN (MAG)
-	SH-611	1	DECAL - REFLECTOR - SIDE BELLYPAN (PTO)

CHASSIS AND STEERING SYSTEM 13-11

Body - Rear Module			
Ref.	P/N	Qty	Part Descriptions
-	ADB-100	1	BLACK REAR MODULE
-	150789P	1	SEAT ASSY 600HO
-	22205P	2	BUTTON HEAD M6x25 @ SEAT
-	BLAA68-100N	4	ALU POP RIVET 3/16" DIA (LARGE HEAD)
-	SH600D05	1	MAG - TAIL - NUMBER PLATE
-	SH600D06	1	PTO - TAIL - NUMBER PLATE
-	336772	1	REAR LAMP MODEL 218 STOP/TAIL-12V
-	284118	4	RUBBER HOOK "BUNGEE"
-	169-113	2	PUSH NUT
-	176-115	2	WELL NUT M6 @ SEAT
-	333-105	4	ELASTIC HEX. NUT 1/4"@ SEAT BASE
-	341-102P	4	3/16" POP RIVET BACKING PLT. (BUNGEEES)
-	341-103P	2	WASHER 3/16
-	341-103P	4	WASHER 3/16 @ SEAT BASE
-	SH-612	1	DECAL - REFLECTOR - SIDE TAILSECTION (MAG)
-	SH-613	1	DECAL - REFLECTOR - SIDE TAILSECTION (PTO)
-	SH-618	1	DECAL - WARNING LABEL - PREMIX
-	ADB-0092	1	SEAT BASE

Body - Tunnel Cover			
Ref.	P/N	Qty	Part Descriptions
-	SH-108SA	1	RADIATOR RIGHT
-	SH-109SA	1	RADIATOR LEFT
-	341-102P	10	3/16" POP RIVET BACKING PLT.
-	BNO1-0618	10	POP RIVET 3/16" DIA MEDIUM
-	SH-086	1	ALUMINUM TUNNEL REINFORCEMENT PLATE
-	SN328-014	1	FLANGE HEX HEAD 1/4-20 X 3/4" (fuel pump)
-	SN328-016	1	FLANGE HEX HEAD 1/4-20 X 1 1/4" (fuel pump)
-	170-103	2	T-SCREW FOR FUEL PUMP
-	341-102P	10	3/16" POP RIVET BACKING PLT.
-	ADB-101	1	BLACK TUNNEL COVER
-	513032979	2	SPRING CLAMP (light green) (Pump-2-adaptor)
-	513033022	0.2	RUBBER HOSE (Pump-2-adaptor)
-	403,901,811	1	FUEL PUMP 600HO
-	420,874,370	1	FUEL LINE ADAPTOR (b/t fuel pump and tank)
-	BNO1-0618	10	POP RIVET 3/16" DIA MEDIUM
-	BSO1-0622	9	LONG 3/16" POP RIVET
-	SH-078	1	TUNNEL COVER HEAT SHIELD
-	SH-087	2	SHORT ALUMINUM SPACER
-	SH-088	1	UHMW TUNNEL SLIDER
-	SH-091	1	FUEL PUMP LONG ALUMINUM SPACER
-	SH-092	1	FUEL PUMP SHORT ALUMINUM SPACER

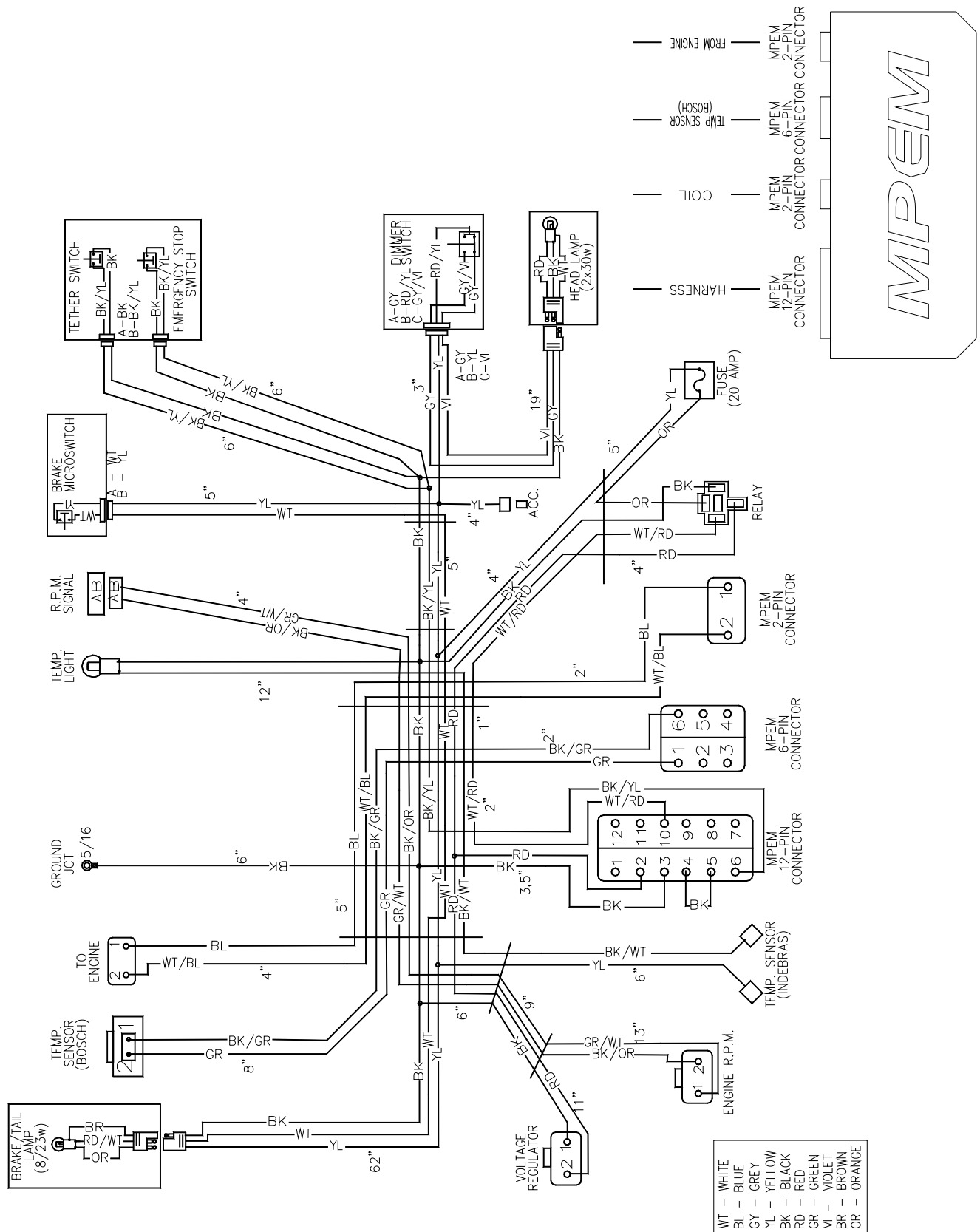
CDI SYSTEM



ELECTRICAL SYSTEM 14-2

Electrical System			
Ref.	P/N	Qty	Part Descriptions
1-4	-	1	Magneto (12V, 360W) (STD)
2	410922946	1	Stator Assy
3	410922953	1	Flywheel (STD)
4	410922951	1	Pick-up Assy (STD)
5	205063044	3	Socket Head Screw M6x30
6	420640321	2	Screw M5x16
7	420866756	1	Counter Weight
8	420852532	1	Starting Pulley
9	420945752	1	Lock Washer 8mm
10	207182044	1	Hex Head Screw M8x20
11	512059552	2	BR9ECS Spark Plug
12	-	2	Spark plug cap
13	512059696	1	Spark plug wire (375mm) with cap
14	512059695	1	Spark plug wire (300mm) with cap
15	410914600	1	Plastic Clip
16	23162F	2	Locknut M6
17	517203200	2	Spacer

WIRING DIAGRAM



Electrical System - Wiring Harness			
Ref.	P/N	Qty	Part Descriptions
-	515175684	1	Dimmer Switch
-	410105500	1	Emergency Stop Switch
-	515175571	1	Tether Switch
-	515145900	1	Tether Switch Nut
-	515151500	1	Tether Cap and Cord
-	410109700	1	Overheat Lamp
-	278001016	1	Bosch Temperature Sensor (Blue)
-	512047000	1	Indebras Temperature Sensor (Black)
-	AN-125	1	Head Lamp Assy
-	336772	1	Tail Lamp Assy
-	515176100	1	Voltage Regulator
-	512059923	1	MPEM
-	515175704	1	Female Terminal Housing (12-circuit) @ MPEM (Deutsch)
-	278000631	4	Male Terminal (used in P/N 515175665)
-	278000632	10	Female Terminal (used in Deutsch connectors)
-	515175670	1	Female Housing (2-circuit) @ MPEM (Deutsch)
-	515175673	1	Female Housing (6-circuit) @ MPEM (Deutsch)
-	409209900	1	Female Housing (5-circuit) @ Relay (Deutsch)
-	410113200	1	Relay
-	561503100	4	Female Relay Terminal
-	515175588	1	Housing @ Bosch Temp. Sensor
-	278000998	2	Female Terminal @ Bosch Temp. Sensor
-	278000999	2	White Rubber Gasket @ Bosch Temp. Sensor
-	278001673	1	Female Housing @ Voltage Regulator
-	278001671	1	Female Locking Wedge @ Voltage Regulator
-	515175567	2	Female Terminal @ Voltage Regulator (Big)
-	515175665	2	Male Housing
-	409010400	4	Female Housing (1-circuit)
-	409010100	4	Female Terminal (used in P/N 409010400)

CDI SYSTEM

● NOTICE:

The following procedures can be carried out without removing the engine from the vehicle. Only the body panels must be removed. For more details, see **Chapter 1 – General Instructions**.

CDI means Capacitor Discharge Ignition System

CLEANING

Clean all metal components in a non-ferrous metal cleaner.

▼ CAUTION

Clean stator and magneto using only a clean cloth.

DISASSEMBLY

3, Magneto Flywheel

To gain access to magneto assembly, remove the following parts:

- All body panels
- rewind starter
- starting pulley no. 8.

To remove magneto flywheel retaining nut on the end of the crankshaft (not shown in exploded view):

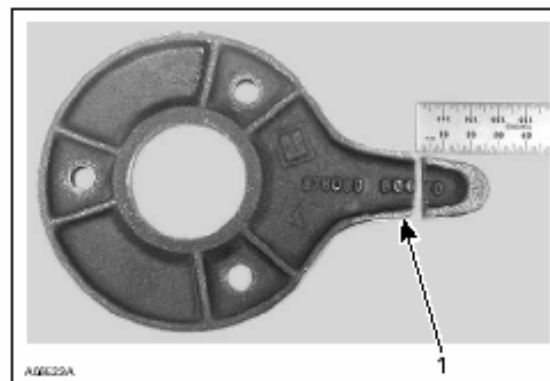
- Use magneto puller ring (P/N 420 876 080). This puller must be modified as shown at right. (cut 25mm from the tab)

- Install puller ring with its tab in magneto housing opening (No 1 at right).

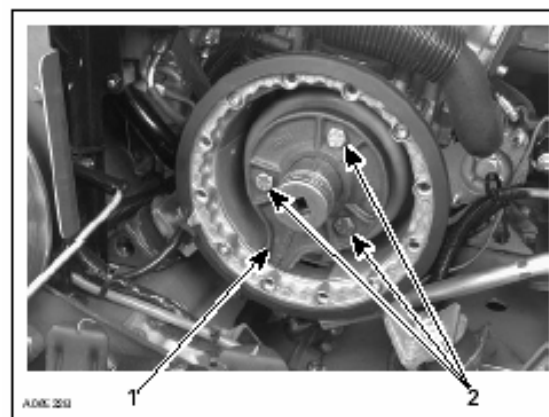
▼ CAUTION

Use only M8 x 30 mm screws (No. 2 at right) to bolt puller to magneto.

- Remove magneto flywheel nut and lockwasher using a 30 mm socket machined to 40 mm (1.580 in) outside diameter by 16 mm (5/8 in) long.

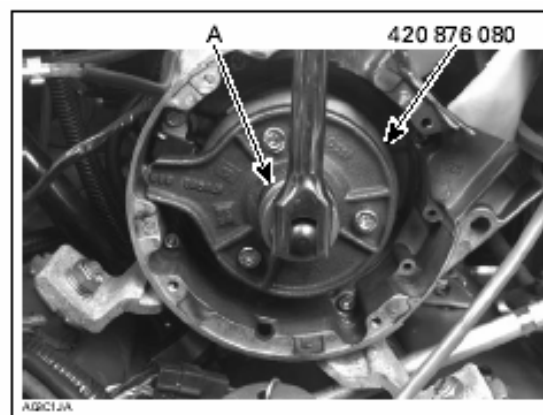


1. Cut by 25 mm (1 in)



TYPICAL

1. Tab in magneto housing opening
2. M8 screws



TYPICAL

- A. 30 mm socket

● NOTICE:

To correctly remove a threadlocked fastener, first tap on the fastener to break the threadlocker bond. This will help avoid breakage.

- To remove magneto flywheel, install the crankshaft protector (P/N 420 876 557) onto the end of the crankshaft.
- Screw puller (P/N 529 022 500) into puller ring.
- Tighten puller bolt and at the same time, tap on bolt head using a hammer to release magneto flywheel from its taper.

4, Trigger Coil

Magneto and stator no. 2 must be removed before removing the trigger coil.

To replace the trigger coil no. 4:

- Disconnect trigger coil connector housing.
- Remove grommet from crankcase where trigger coil wire exits magneto housing.
- Remove retaining screws no. 6.
- Remove trigger coil and carefully pull wires.
- Install new trigger coil and other parts removed.

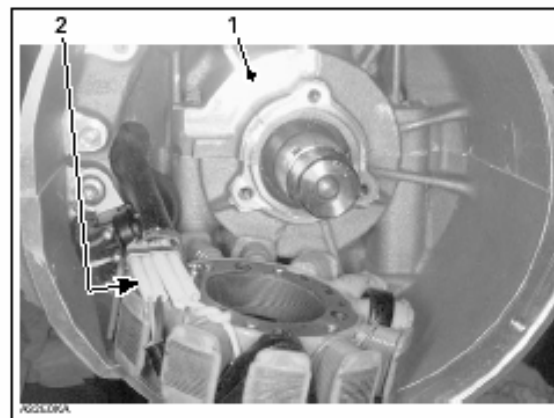
ASSEMBLY

2, Stator

- Position stator (No. 2 at right) so that its wire protectors are over crankcase recess (No 1 at right).

3, Magneto Flywheel

- Clean crankshaft extension (taper) and apply Loctite 243 (blue) on taper, then position Woodruff key, flywheel and lock washer on crankshaft.
- Clean nut threads and apply Loctite 243 (blue) then tighten magneto nut to **125 N-m (92 lbf-ft)**.
- At reassembly, coat all electric connections except Deutsch housings (waterproof grey housing) with silicone dielectric grease (P/N 293 550 004) to prevent corrosion or moisture penetration.



TYPICAL

- 1. Crankcase recess
- 2. Wire protectors

▼ CAUTION

Do not use silicone “sealant”, this product will corrode electrical contacts. Do not apply silicone dielectric grease on any Deutsch (grey) housing otherwise the housing seal will be damaged.

IGNITION TIMING

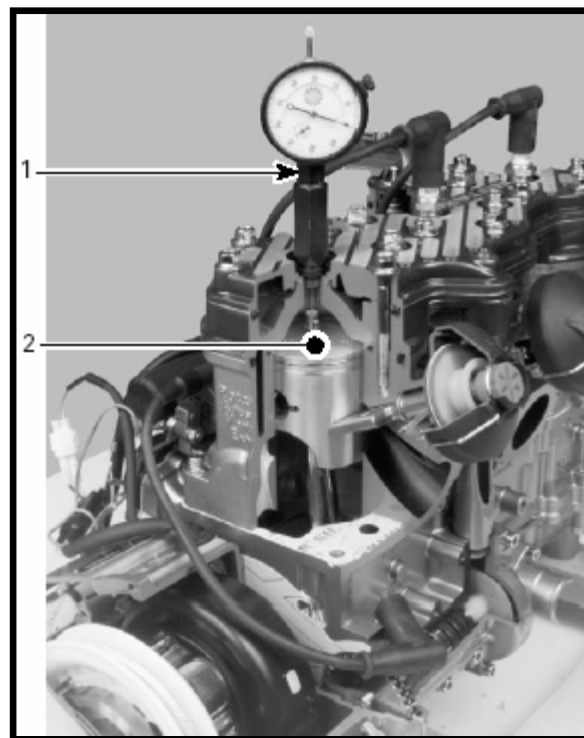
593 HO and 793 Engines

Normally ignition-timing adjustment should not be required. It has been set at the factory and it should remain correctly adjusted since every part is fixed and not adjustable. The only time the ignition timing might have to be changed would be when removing and reinstalling the magneto housing, replacing the crankshaft, the magneto flywheel, the trigger coil or the MPEM. If the ignition timing is found incorrect, first check for proper crankshaft alignment. This might be the indication of a twisted crankshaft. Refer to **Chapter 7 - Engine (Cylinders/Head/Base)** for more details. The ignition timing can be checked with either the engine hot or cold.

Also, the ignition timing is to be checked at 3500 RPM with a timing light.

Engine break-in retard timing for the Snow Hawk 600HO is as follows the first hour of operation.

ENGINE	ENGINE RETARD TIMING (°)/DURATION (h)
600HO	- 3°/1 h



TYPICAL
1. TDC gauge on MAG side
2. MAG side piston at TDC

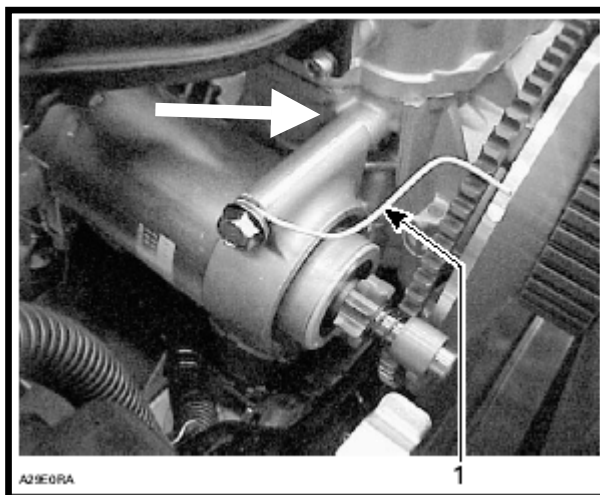
● NOTICE:

Between 3000 and 4000 RPM, the spark advance does not change. So when checking ignition timing at 3500 RPM, a change in engine speed within ~ 500 RPM will not affect the timing mark when checked with the timing light.

Scribing a Timing Mark

- Clean the area around the MAG side spark plug, and remove it.
- Install the TDC gauge in the spark plug hole, (magneto side) and adjust as follows:
 - a. Position the MAG piston at approximately TDC.
 - b. Assemble the gauge with the adaptor and tighten the roller lock nut. Do not tighten the adaptor lock nut.
 - c. Screw the adaptor into the spark plug hole and tighten to prevent movement in the plug hole.
 - d. Position the dial face toward the PTO. Move the gauge down until the needle just begins to move, then move down a further 5 or 6 mm (approximately 1/4 in). Tighten adaptor lock nut by hand.

- Locate the piston TDC position as follows:
 - a. Slowly rotate the drive pulley back and forth across TDC while observing the needle. Note that the needle stops moving only as the piston is changing direction.
 - b. Rotate the dial face so that "0" is in line with the needle when it stops moving.
 - c. Again, slowly rotate the drive pulley back and forth across TDC and adjust the dial face to "0", until the needle always stops exactly at "0" before changing direction.
 - d. "0" now indicates exact TDC.
- Rotate the drive pulley clockwise, one-quarter turn then carefully rotate it counterclockwise until the needle indicates the specified measurement, indicated in **Chapter 15 – Dimensions and Tolerances**.
- Twist a wire as shown and use it as a pointer. Install the wire on what would be the upper starter bolt. Although there is no electric starter on any Snow Hawk, you can use the upper threaded hole in the crank case as a mounting position, indicated by the white arrow.
- With the TDC gauge indicating specified timing (shown at right), scribe a mark on the primary clutch inner half in line with the pointer end (shown at lower right).



Checking Ignition Timing

Use timing light (P/N 529 031 900), shown at lower right.

To check the ignition timing, refer to the illustration and proceed as follows:

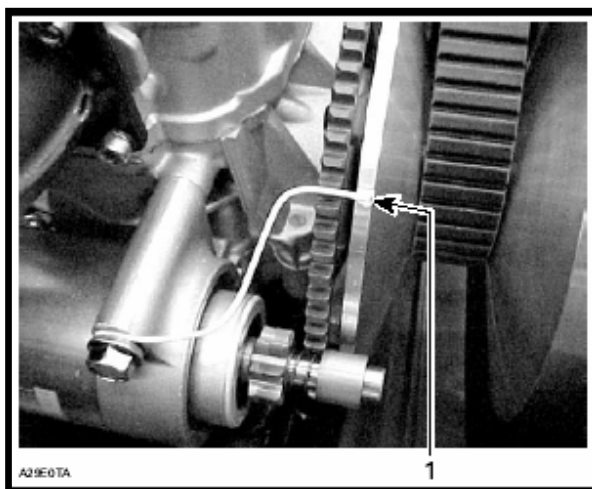
◆ WARNING

Place the tips of the ski against a wall. Lift the rear of the vehicle so that the track does not touch the ground and install it on a support.

Make sure that no one goes in front of or behind the vehicle while the engine is running.

Keep away from the track and do not wear loose-fitting clothing which could be caught up in the moving parts.

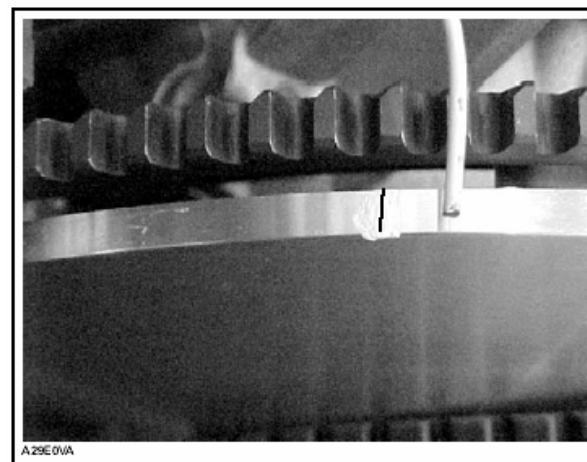
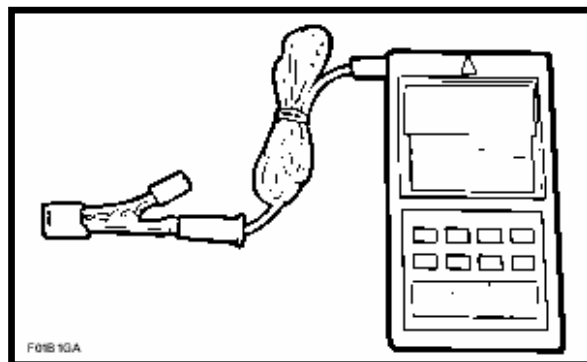
- Connect the timing light pick-up to a spark plug cable.
- Connect a digital induction type tachometer (P/N 529 014 500), as shown on the following page.
- Start the engine and point the timing light on the timing mark. Bring the engine to 3500 RPM for a brief instant.



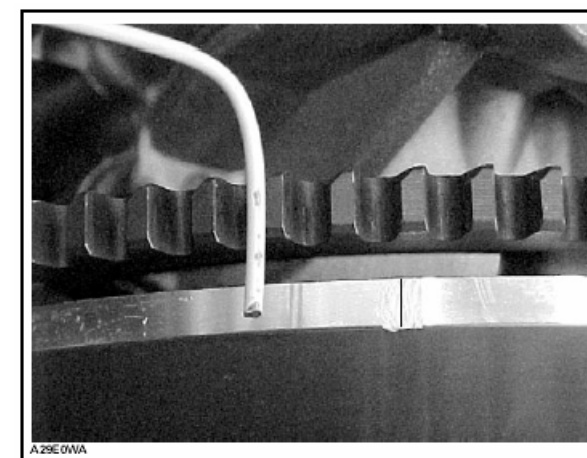
- The timing mark must be aligned with the pointer end. If such is not the case, note if the timing is retarded or advanced. Tolerance is $\pm 1^\circ$.

Changing Timing

As a Snow Hawk dealer, there is no immediate way to alter the MPEM's internal timing settings other than to send the unit back to us and have us reset the unit for you or have your local Bombardier dealer change the settings using his programmer.



TIMING RETARDED BY ABOUT 2°



TIMING ADVANCED BY ABOUT 2°

SYSTEM TESTING

IGNITION SYSTEM TESTING SEQUENCE

In case of ignition problems, check the following in the prescribed order until the problem can be solved.

1. Sparking/spark plug condition.
2. Electrical connectors.
3. DESS switch and engine cut-out switch.
4. Generator coil.
5. Trigger coil(s).
6. MPEM voltage.
7. High voltage coil.
8. Buzzer testing.

LIGHTING SYSTEM TESTING SEQUENCE

1. Electrical connectors.
2. Magneto output (lighting generator coil).

Testing Conditions

Voltage measurements are always taken upon starting the vehicle. Readings when the engine is running will be higher than the indicated range. All part temperatures must be approximately 20°C (68°F) (room temperature), otherwise the readings could be distorted.

Analysis of Readings

Voltage Readings

When testing the different magneto components, it is important to take into consideration that readings vary according to the force applied onto the manual starter. It is therefore important to employ enough force upon each trial. The reading must be 3 times within or above the range indicated in the corresponding table. If the reading is too low, the part is considered to be defective and must be replaced.

Resistance Readings

Place multimeter selector switch to ohms in order to measure resistance. Readings must be within the indicated range. Otherwise, the part is considered to be defective and must be replaced.

▼ CAUTION
When taking measurements, it is useless to try and start the vehicle since the readings would then be distorted.

Intermittent Ignition Problems

It is difficult to make an attempt at diagnostics in the case of intermittent ignition problems. Thus, problems occurring only when the engine operating temperature is normal must be checked in similar conditions. In most cases when problems are caused by temperature or vibrations, these can only be solved by replacing parts. Most problems cannot be detected when the engine is stopped.

Multiple Problems

As a matter of fact, more than one component can be defective at the same time. As a result, if the problem remains although a part was replaced, start the entire troubleshooting process over from the beginning in order to identify the other defective component.

1. SPARKING

During this operation, it is important to use the snowmobile spark plug and not a new one. Bring the plug in contact with the engine. Pull rewind starter. If no spark is produced, replace the spark plug with a new one and do the test again.

2. ELECTRICAL CONNECTOR TESTING

Make sure that none of the connectors are disconnected.

3. ENGINE CUT-OFF SWITCH TESTING

Disconnect connector housings and check the resistance as indicated in IGNITION table. If the readings are acceptable, go on to the next step. If the readings are inadequate, individually check each switch as follows.

Tether Cord Switch

Using a multimeter check by connecting probes to BLACK and BLACK/YELLOW wires. The multimeter should indicate a closed circuit (0̃) in the 'operating' position and an open circuit (0.L M̃) in the 'off' position.

If the readings do not correspond to the above mentioned values, replace the switch. If none of these tests are conclusive, the problem finds its source in the main wiring harness.

Proceed as follows:

Engine Cut-Off Switch

Unplug the switch block connected to the main wiring harness from the engine cut-off switch. Check using a multimeter by connecting probes to the appropriate wires. Refer to the corresponding IGNITION AND ELECTRICAL SYSTEM TESTING table values in this subsection. The multimeter should indicate an open circuit (0.L M̃) in operating position and if the circuit is closed (0̃) in the off position.

● NOTICE:

For the next step, no switch must be connected to the main wiring harness.

Disconnect all switches from the main wiring harness and check the continuity of each wire by connecting probes to the end of wires of the same color. Repeat with all other wires. It is important to mention that all wires of the same color within a given harness are connected together. These wires should therefore have a closed circuit. On the other hand, BLACK and BLACK/YELLOW wires must have an open circuit (0.L \bar{M}). Repair or replace if necessary.

4. GENERATOR COIL TESTING

Resistance Testing

- Disconnect the housing between the magneto and the MPEM.
- Connect multimeter probes to appropriate wires and measure the resistance. Refer to the corresponding IGNITION AND ELECTRICAL SYSTEM TESTING table in this subsection.
- Compare readings with those appearing in the IGNITION table.

Voltage Testing

When manually starting the engine while the spark plug is installed, the engine will tend to accelerate beyond the compression point. This will result in higher magneto output power.

- Disconnect the housing between the magneto and the MPEM.
- Connect the multimeter probes to the appropriate wires. Refer to the corresponding ignition and electrical system testing table in this subsection. Bring the selector switch to and the scale to 00.0 Vac.
- Activate the manual starter and check the values indicated by the multimeter.
- Repeat this operation 3 times.
- Compare readings with those appearing in the IGNITION table.



5. TRIGGER COIL TESTING

Resistance Testing

- Connect the probes to the appropriate wires from the trigger coil housing. Refer to the corresponding IGNITION AND ELECTRICAL SYSTEM TESTING table in this subsection.
- Compare these readings with those appearing in the IGNITION table.

Voltage Testing

- Connect the probes to the appropriate wires from the trigger coil housing. Refer to the corresponding IGNITION AND ELECTRICAL SYSTEM TESTING table in this subsection.
- Activate the manual starter and check the values indicated by the multimeter.
- Repeat this operation 3 times.
- Compare these readings with those appearing in the IGNITION table.



6. MPEM VOLTAGE TESTING

- Disconnect the housing between the module and the high voltage coil.
- Connect the multimeter probes to the RED and the BLACK wires coming out from the module. Place the selector switch and the scale to 00.0 Vac.
- Activate the manual starter and check the values indicated by the multimeter.
- Repeat this operation 3 times.
- Compare these readings with those appearing in the IGNITION table.



7. HIGH VOLTAGE COIL TESTING

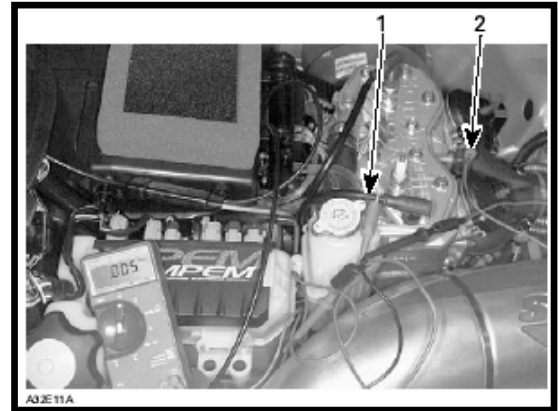
Resistance Testing

- Unplug housing between high tension coil and MPEM.
- Connect the multimeter probes to the WHITE/BLUE and the BLACK wires and measure the resistance.
- Compare these readings with those appearing in the IGNITION table.



Voltage Testing

- Disconnect spark plug cap from spark plug.
- Fasten alligator clip to spark plug cable, near the spark plug (position No. 1 at right).
- Connect other multimeter wire to engine (ground), then place selector switch and scale to 0.00 Vac.
- Activate the manual starter and check the values indicated by the multimeter.
- Repeat this operation 3 times.
- Compare these readings with those appearing in the IGNITION table.

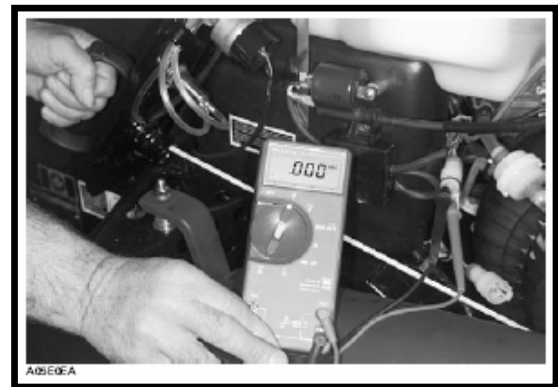


CONCLUSION

If none of the above testing operations produced valid results, it is strongly recommended to keep on testing according to the list appearing in the resistance column of the IGNITION table. Set the multimeter as indicated.

LIGHTING GENERATOR COIL VOLTAGE TESTING

- Disconnect the housing from the engine (YELLOW and GREEN wires).
- Connect the multimeter probes to the YELLOW and GREEN wires as described in the IGNITION AND ELECTRICAL SYSTEM TESTING table. Place the selector switch and scale to 0.00 Vac.
- Activate the manual starter and check the values indicated by the multimeter.
- Repeat this operation 3 times.
- Compare these readings with those appearing in the IGNITION AND ELECTRICAL SYSTEM TESTING table.



CONCLUSION

If none of the above testing operations produced valid results, it is strongly recommended to keep on testing according to the list appearing in the Resistance column of the LIGHTING table. Set the multimeter as indicated.



360W SNOW HAWK 600HO IGNITION AND ELECTRICAL SYSTEM TESTING TABLE





PART	TEST TO BE PERFORMED	WIRE COLOR	RESISTANCE VALUE (OHMS)	VOLTAGE (VOLTS, V)	NOTE
Engine stop switches	Running insulation	BL and BL/YL	0.L	-	Engine stop switches must be in run position.
	Continuity in stop position	BL and BL/YL			Engine stop switches must be in stop position.
MPEM	Ground connection	BL and body ground	00.0 to 00.5	-	-
MPEM Power	Power from regulator	RD and BK	-	3 to 5 Vdc	While cranking engine.
Trigger coil No. 1 (STD)	Resistance and Output	WT/BL and BL	190 to 300	0.200-0.350 Vdc	While cranking engine.
MPEM Output Voltage	Voltage to ignition coil	WT/BL and BK	-	225-275 Vdc	With tether cap in place and with engine stop switches in run position. While cranking engine.
High Voltage Coil	Primary winding resistance	WT / BL and BK	00.2 to 00.5	-	Disconnect the ignition coil from the MPEM.
	Secondary winding resistance spark plug wires and caps included	Between both spark plug caps	14.5 k to 23.5 k	-	Do not attempt to remove spark plug caps from the wires.
	Secondary winding resistance spark plug wires removed	Male terminal to male terminal	9.6 k to 14.4 k	-	With spark plug wires removed from high voltage coil.
	Secondary winding voltage	BK and engine	-	1.5-2.5 Vdc	Do not probe in to spark plug cap with spark plug wires removed from spark plug.
Lighting generator coil	Output	YL, YL and GR	00.0 - 00.5 3 times	3.5-5.5 Vac 3 times	Do the test between A and B, A and C and B and C using the manual starter.
	Coil insulation	YL and engine	0.L M	-	The term engine refers to the metal parts connected to the magneto housing.
Relay	Coil	-	-	10.5-13.6 Vdc	Engine Idling (1500-1800 RPM)
	Contacts	-	-	0.00-0.11 Vdc	Engine Idling (1500-1800 RPM)



● NOTICE:

If voltage is present at the coil and contact, replace the relay. An approved automotive spark plug tester is preferred for testing the secondary winding voltage. Ignition will not work if the engine stop switches are in the kill position.

DIMENSIONS AND TOLERANCES

	ENGINE		
	Engine type		Rotax 593 HO
	Bore	mm (in)	72.00 (2.835)
	Stroke	mm (in)	73.00 (2.874)
	Displacement	cm ³ (in ³)	594.40 (36.27)
	Compression Ratio		12.25
	Max RPM Range		7900-8100
	Piston ring type (1 st , 2 nd)		ST/N.A.
	Piston ring opening (new)	mm (in)	0.4 (0.016)
	(wear limit)	mm (in)	1.00 (0.039)
	Piston ring/groove clearance (new)	mm (in)	0.045 (0.0018)
	(wear limit)	mm (in)	0.2 (0.008)
	Piston/Cylinder clearance (new)	mm (in)	0.105 +/- 0.023 (0.041 +/- 0.0009)
	(wear limit)	mm (in)	0.2 (0.008)
	Maximum connecting rod axial play (new)	mm (in)	0.39 (0.0154)
	(wear limit)	mm (in)	1.20 (0.0472)
	Maximum crankshaft axial play	mm (in)	0.3 (0.012)
	Maximum crankshaft deflection at PTO	mm (in)	0.06 (0.024)
	ELECTRICAL		
	Magneto output	W	360
	Ignition type		CDI
	Spark plug type		NGK BR9ECS
	Spark plug gap (Pre-gapped)	mm (in)	0.45 (0.018)
	Ignition timing BTDC (@ 3500 RPM w/headlamp turned on)	mm (in)	2.79 (0.110)
	Trigger Coil	Ω	190-300
	Generating Coil	Ω	N.A.
	Lighting Coil	Ω	0.1-1.0
	High Tension Coil	Ω	N.A.
	Fuse	A	20

	CARBURETION			
	Carburator type		Mikuni TM40	
	Main jet (MAG/PTO)		380 / 380	
	Needle Jet		P-0	
	Pilot jet		17.5	
	Needle Identification - Clip Position		9DHI12-58-3	
	Slide cutaway		2.0	
	Float adjustment	mm (in)	N.A.	
	Aircscrew position		1.6 turns	
	Idle RPM		1600	
	Fuel type		Unleaded 87	
	Fuel : Oil Ratio		40 : 1	
	COOLING SYSTEM			
	Type		Liquid	
	Mixture ratio		50/50	
	Thermostat opening temperature	°C (°F)	42 (108)	
	Radiator Cap Opening Pressure	kPa (psi)	90 (13)	
	TORQUES			
	Cylinder head bolts N-m (lbf-ft)		29 (21)	
	Exhaust manifold bolts		22 (16)	
	Crankcase/Cylinder Nuts or Bolts		29 (21)	
	Magneto Ring Nut		125 (92)	
	Axial fan nut		N.A.	
	Primary clutch bolt		90 (66)	
	Secondary clutch bolt		31.7 (23)	
	Taper-Lock installation setscrews		14 (10.4)	
	Spark plugs		27 (20)	
	Handlebar mounting bolts		36.5 (27)	
	Fork leg bolts (in triple clamps)		6.8 (5)	
	Fork pivot bolts		45 (33)	
	Ski runner nuts		22 (16)	
	Lower clamp bolts		23 (17)	
	Ski saddle/fork adaptor nut		85 (63)	
	PRIMARY TRANSMISSION			
	Primary clutch		IBC Powerbloc Gen II	
	Number of weights per arm		1 Lg, 5 Sm (18 total)	
	Primary spring colour		Vi / Vi / Br / Rd	
	Engagement RPM		3400-3600	
	Secondary clutch		Formula	
	Secondary clutch spring pretension	kg (lbf)	6.8 15	
	Secondary spring colour		Beige	
	Helix type (progressive)		50° - 44°	
	Alignment Dimension X (see Chapter 8 - Primary.....)	mm (in)	15 (0.590)	
	Primary transmission belt P/N		138-4628U3	
	Width of primary trans. Belt (new)	mm (in)	34 (1.34)	
	(wear limit)	mm (in)	31.75 (1.25)	
	Drive belt adjustment	Deflection	mm (in)	32 (1.25)
		Force	kg (lbf)	6.8 (15)

	SECONDARY TRANSMISSION			
	Drive sprocket number of teeth		28	
	Driven sprocket number of teeth		56	
	Secondary transmission belt P/N		1280PTH8M-60	
	Cog belt adjustment	Deflection	mm	7.3
		(in)	(0.288)	
		Force	kg	6.44
			(lbf)	(14.2)
	CHASSIS			
	Overall length		mm	2698
			(in)	(105)
	Overall width		mm	835
			(in)	(32.5)
	Overall height		mm	1233
			(in)	(48)
	Dry weight		kg	170
			(lb)	(375)
Track width		mm	308	
		(in)	(12)	
Track length	(ST/LT)	mm	3074 / 3495	
		(in)	(121 / 136)	
Track adjustment	Deflection	mm	40 -50	
		(in)	(1.5 - 2)	
		Force	kg	freely hanging
			(lbf)	freely hanging
	FRONT SUSPENSION			
	Type		Inverted, 46mm Paioli	
	Travel		mm	308
			(in)	(12)
	Oil level		mm	85
		(in)	(3.3125)	
Oil type			SAE 15W	
	REAR SUSPENSION			
	Type		Expert Xtreme	
	Travel		mm	405
			(in)	(16)
	Sag (with rider)		mm	100
			(in)	(4)
	Shock type			KYB, rebuildable
	Oil Type			KYB, No. snow
	Hyfax P/N			04-218-22
	FLUIDS			
	Fuel tank capacity		L	30
			U.S. gal.	9.5

WIRE, CABLE AND HOSE ROUTING

◆ WARNING

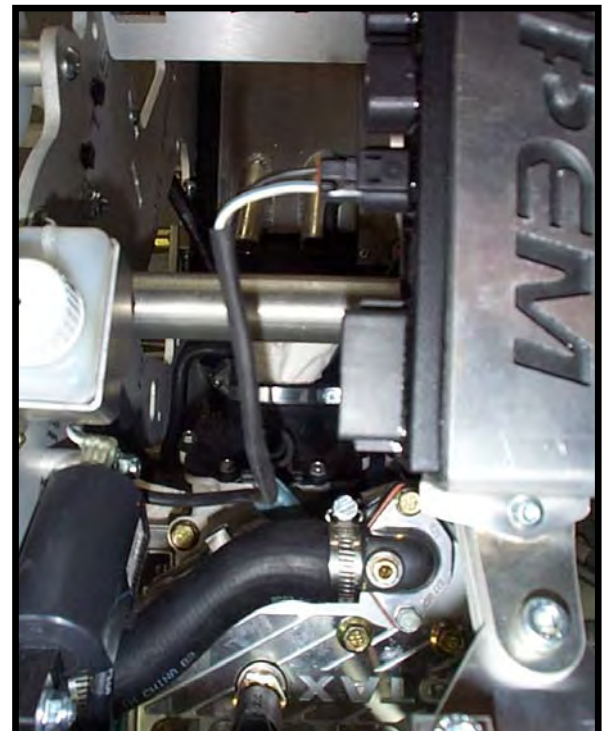
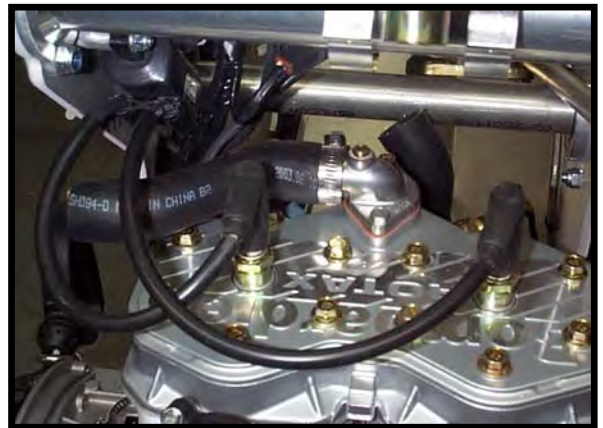
Make sure that all the wires are well set in the terminals and that the connector holders are well installed. Keep the wires away from any rotating, moving, heating or vibrating part. If necessary, use good retaining devices.

When reassembling, it is important to always re-install the wires to the stock positions.

SPARK PLUG WIRES AND MPEM

When changing the ignition coil or either of the ignition wires, it is important that the wires are re-installed in exactly the same position.

- The two ignition wires must be installed as shown at right.
- The ignition coil power connector connects to the MPEM in the first 2-pin connector from the front of the vehicle as shown at right.

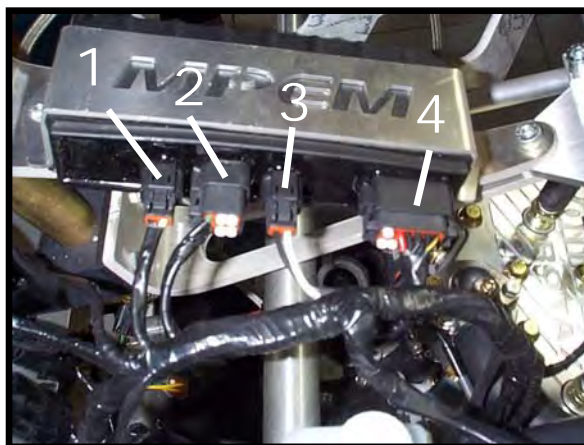


◆ WARNING

The MPEM has a built in key guide at each socket to ensure that the correct connections find their place. If there is difficulty to make a connection with one of the housings, check the wiring diagram to make sure the location is correct.

MPEM

1. 2-circuit housing (BL and WT/BL wires)
2. 6-circuit housing
3. 2-circuit housing (BK and WT/BL wires)
4. 12-circuit housing



MAIN CHASSIS GROUND CONNECTION

The main chassis ground of the entire electrical system is located on the MAG side chassis rail just above the ignition coil, as indicated at right.



◆ WARNING

It is of utmost importance that the bolt AND locknut securing the ground connection's ring lug to the chassis is well tightened in full contact with the chassis. A bad ground connection can cause other component failures.

The main wiring harness is divided into several segments immediately after the MPEM. The following three sections go vertically up the steering plate and towards the steering column.

Temperature Warning Light

1. Two 1-circuit connectors (BK and BK/WT wires)

Fuse

2. Fuse and fuse housing, installed with one rivet on the choke cable bracket.

Relay

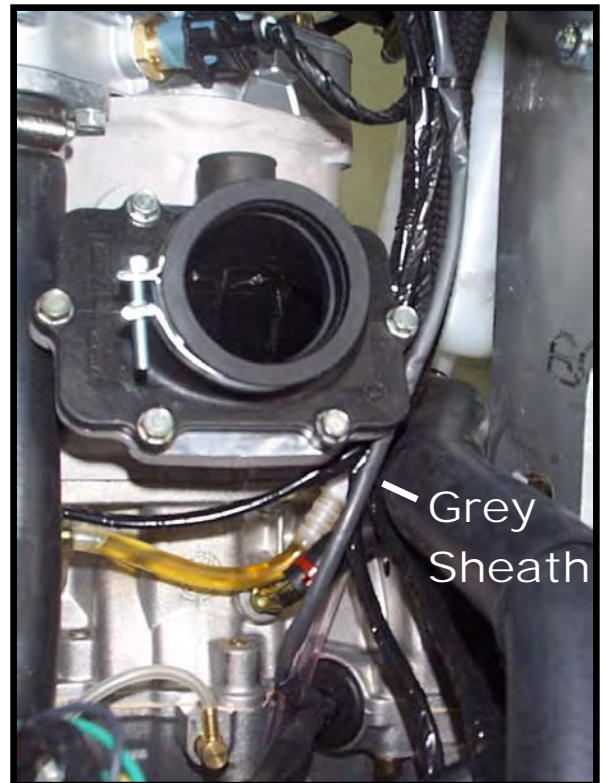
3. Relay and connector, installed with one rivet on the vertical steering plate.



Near the base of the engine, close to the magneto, there are two cables. One is covered by a grey sheath and has a 2-circuit connector at its end (BL and WT/YL wires)

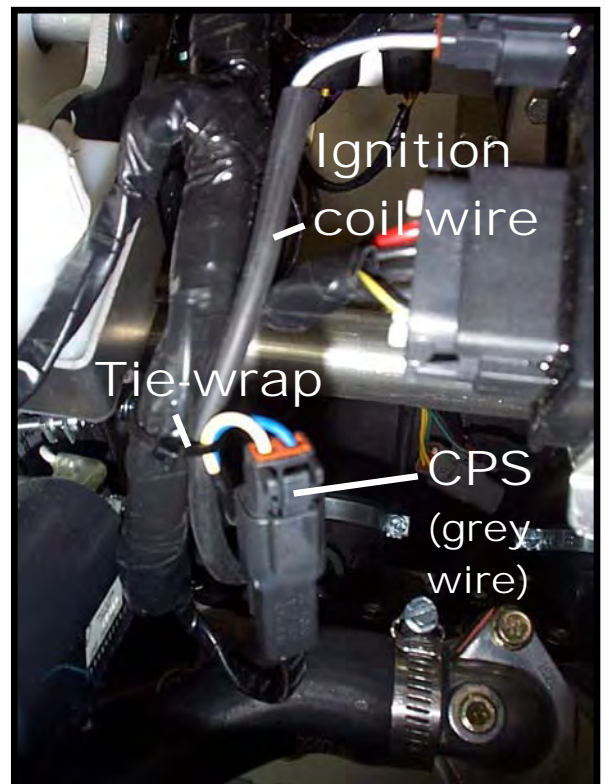
This is the wire from the Crankshaft Position Sensor (CPS),

The grey-sheathed wire then travels upward between the MAG side intake socket and the MAG side chassis as shown at right.



The 2-circuit housing from the CPS (BL and WT/YL wires) is connected to the main wiring harness as shown at right.

At the upper end of the cable, near where the ignition coil is mounted, a nylon tie-wrap is used to connect the CPS cable and the ignition coil wires together with the main wiring harness to avoid striking any moving parts when the vehicle is in operation, as shown at right.



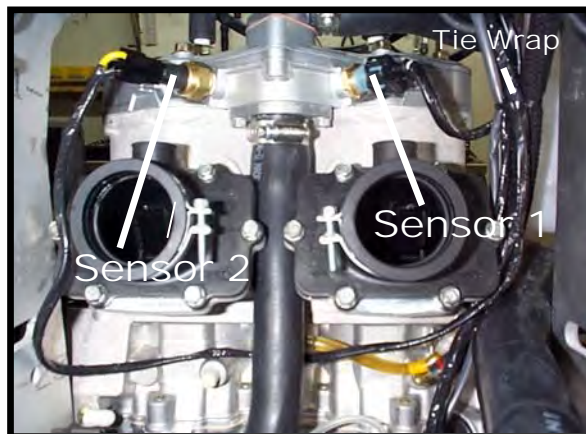
Temperature Sensors

There are two temperature sensors on the Snow Hawk 600HO.

The first temperature sensor is blue (Bosch), is located on the MAG side of the head and uses a special 2-circuit connector (GR and BK wires) it is shown as Sensor No. 1 at right.

Once the connector is connected to the main wiring harness, use a nylon tie-wrap to secure the sensor wire, the CPS wire and the main wiring harness to the rigid oil tube running from the small water-pump oil reservoir to the rear of the engine, as shown at right. This connection **MUST NOT** obstruct the flow of oil from the reservoir to the engine!

The second temperature sensor is black (Indebras), is located on the PTO side of the head and uses the two 1-circuit connectors (YL and BK/WT wires). This cable is routed under the MAG side intake socket, around the vertical coolant tube and then under the PTO side intake socket and then directly to the temperature sensor.

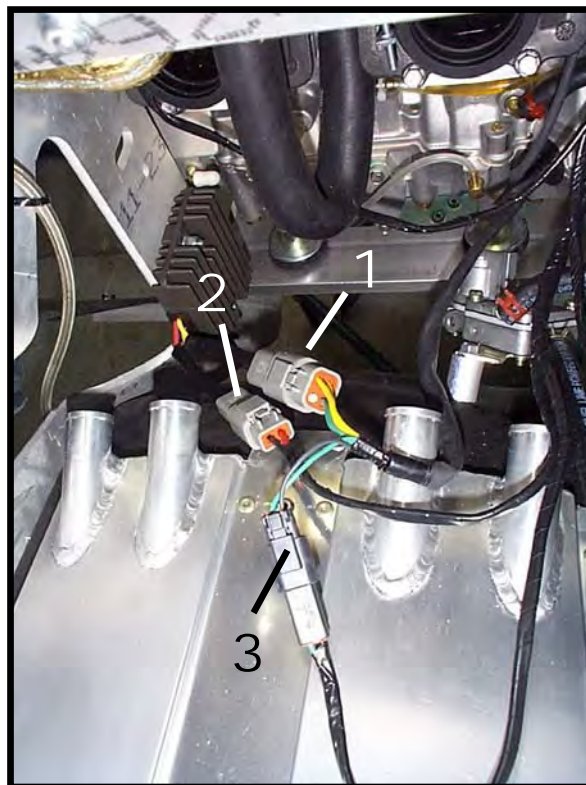


◆ WARNING

It is very important that all wires and cables be installed in exactly the same positions as from the factory. There are many moving parts in the compact engine bay of the Snow Hawk 600HO and the wires must clear all of these.

Voltage Regulator

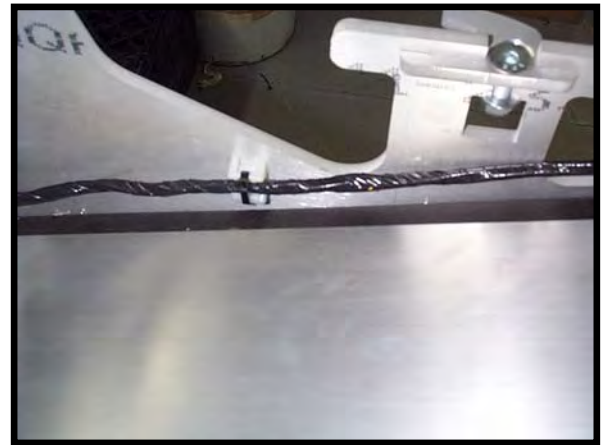
1. The voltage regulator uses a special female, grey 4-circuit connector (YL, YL and YL wires) to directly connect to the magneto through a special male, grey 4-circuit connector (YL, GR and YL)
2. The 2-circuit female connector from the voltage regulator (RD/BL and BK wires) connects to the 2-circuit male connector (RD/BL and BK) on the main wiring harness.
3. The 2-circuit connector (GR and BK wires) from the magneto connects to the main wiring harness via the 2-circuit connector (GR/WT and BK/RD wires).



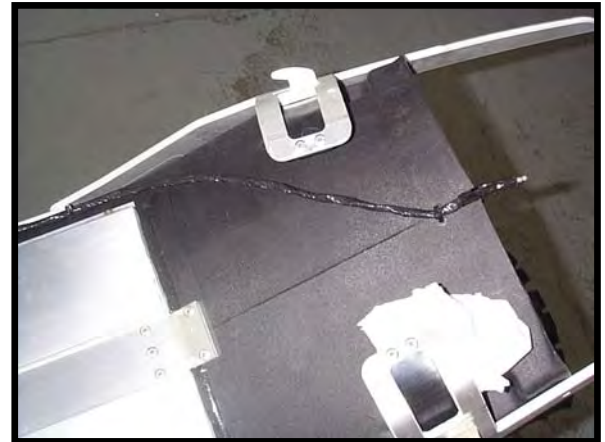
Once the connectors are all well connected, group all of the cables from the voltage regulator, the magneto and parts of the main wiring harness and tie them together with one nylon tie wrap for compactness as shown at right.



From here, the tail lamp wire (WT, BK and RD wires) must pass under the engine impulse hose and along the MAG side chassis towards the rear as shown at right.



The end of the tail lamp wire should be secured with two tie wraps – one near the end of the heat exchangers where the cable must change direction, one at the very end of the tunnel cover using the two holes supplied - as shown at right.



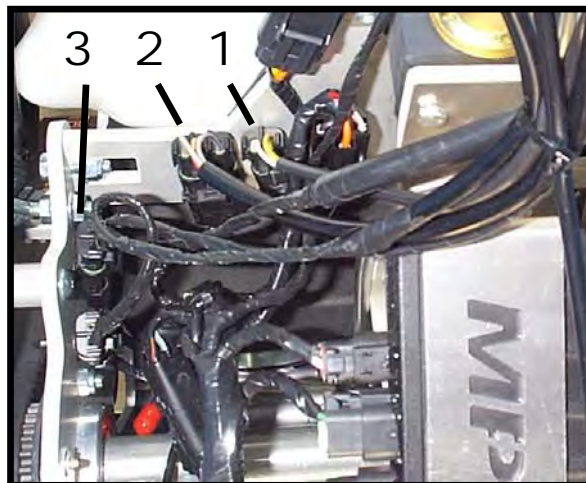
Handlebar-Mounted Devices/Switchgears

1. Brake switch

The 2-circuit connector from the brake switch (YL and YL/WT wires) connects to the 2-circuit connector on the main wiring harness (YL and WT wires).

2. Dimmer switch

The 3-circuit connector from the dimmer switch (GY, RD/YL and GY/BK wires) connects to the 3-circuit connector on the main wiring harness (GY, YL and VI/WT).



3. Tether switch

The 2-circuit connector from the tether switch (BK and BK/YL wires) connects to the 2-circuit connector on the main wiring harness (BK and BK/YL wires).

4. Emergency stop switch

The 2-circuit connector from the emergency stop switch (BK and BK/YL wires) connects to the 2-circuit connector on the main wiring harness (BK and BK/YL wires).

5. Headlamp Connector



Once all of the connectors are seated, group the handlebar accessory, headlamp and throttle cable together with a nylon tie wrap. **MAKE SURE** that this grouping does not affect the cycling of the throttle cable or the steering of the vehicle in any way.



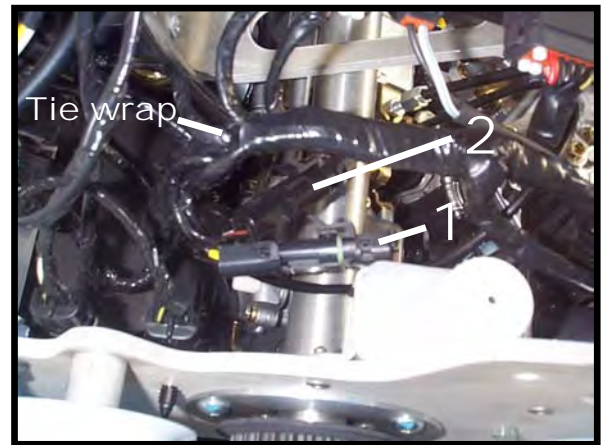
Place the emergency stop switch, the dimmer switch and the brake switch wires underneath the crashpad as shown at right.



RPM Output Signal and Accessory Connector

1. Single-circuit connector (YL wire) for accessories (i.e. handwarmers, visor outlet, etc.).
2. 2-circuit connector (GR/WT and BK/RD wires) for an optional tachometer.

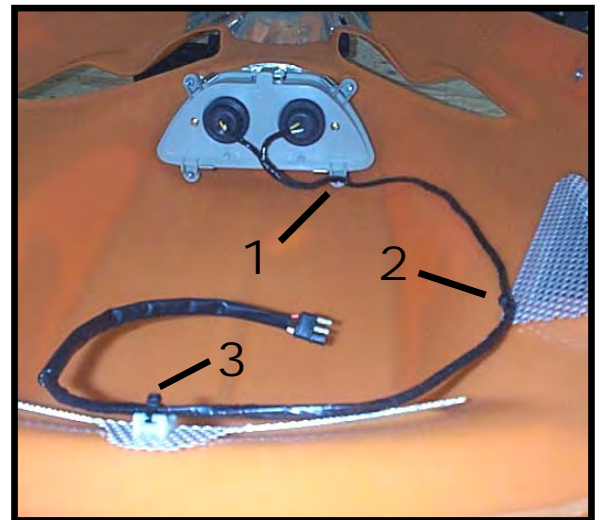
Using a nylon tie-wrap, attach the two wires to the main wiring harness as shown at right.



Hood

The headlamp cable underneath the hood is attached to the hood in three places:

1. On the PTO side installation screw.
2. On the PTO vent grill.
3. On a cable tie block fixed to the rear grill.



CABLE ROUTING

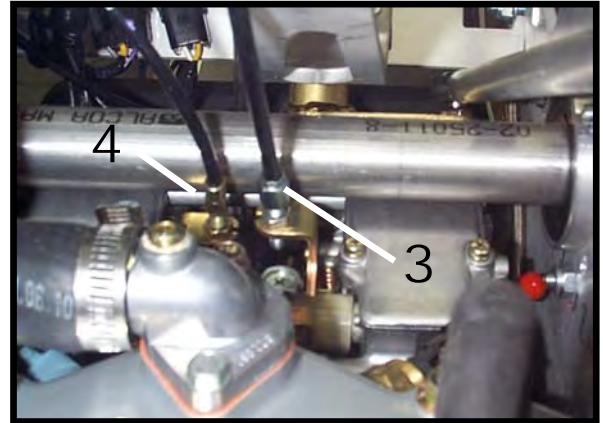
Throttle Cable

1. The upper end of the throttle cable is attached to the twist throttle itself. The cable then passes in front of the handlebar and steering column.
2. Connect the throttle cable to the bundle of handlebar accessory wires with a nylon tie wrap. The cable then passes over the MPEM and then downward to the carburetors and the throttle slide actuator rack as shown on the following page.



3. Throttle Cable

4. Choke Cable



Choke Cable

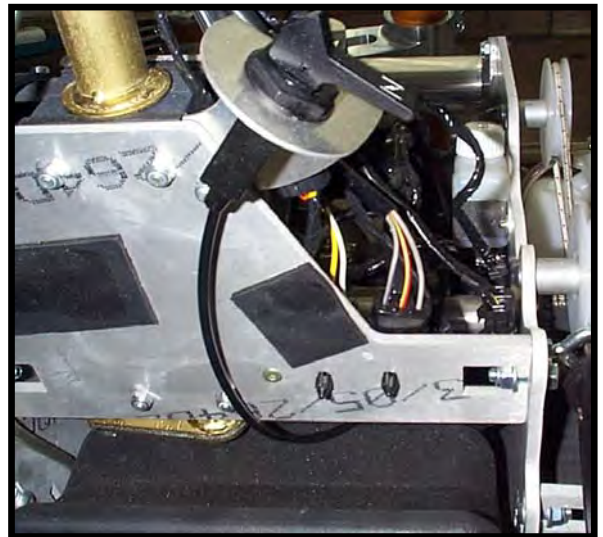
The choke cable is attached to a raked system on the carburetors and is then routed vertically upwards, under the main wiring harness and is then attached to the small oil reservoir with a nylon tie wrap as shown at right.



The cable then passes completely under the steering plate and up to the angled choke support bracket as shown at right.

● NOTICE:

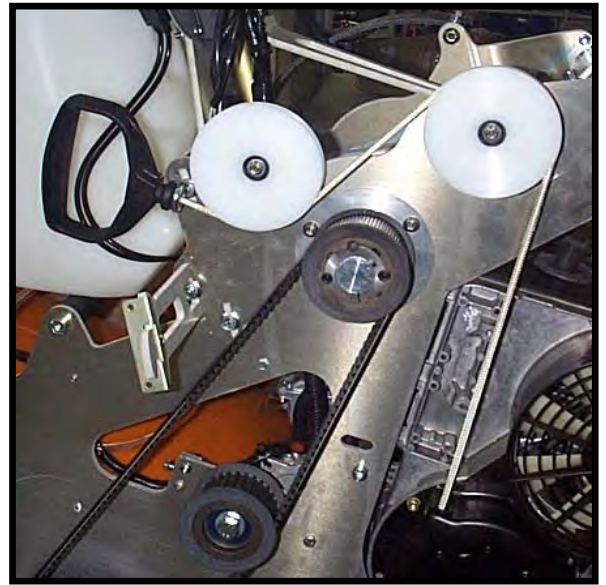
*For installation or adjustment of either the choke cable or the throttle cable, see **Chapter 3 – Fuel System**.*



Rewind Starter Cord**(503 shown, 600HO identical)**

1. Pass the rewind starter cord over the forward pulley.
2. Then under the rearward pulley.
3. Then, slide the rewind starter rode through the eyebolt.

Install the D-ring starter handle immediately and tie a secure knot.

**HOSE ROUTING****◆ WARNING**

Always ensure that all hoses are well attached at both ends, that they are in good physical condition, that they are well away from any moving part or heat source. If ANY surface cracks are present, replace the hose immediately.

Steel-Braided Brake Hose

- The brake hose is attached at its upper end to the brake master cylinder.
- The hose is then routed in front of the handlebars and steering column.
- The brake hose must be free to move and slide if necessary and must not interfere with the movement of the steering of the vehicle in any way.

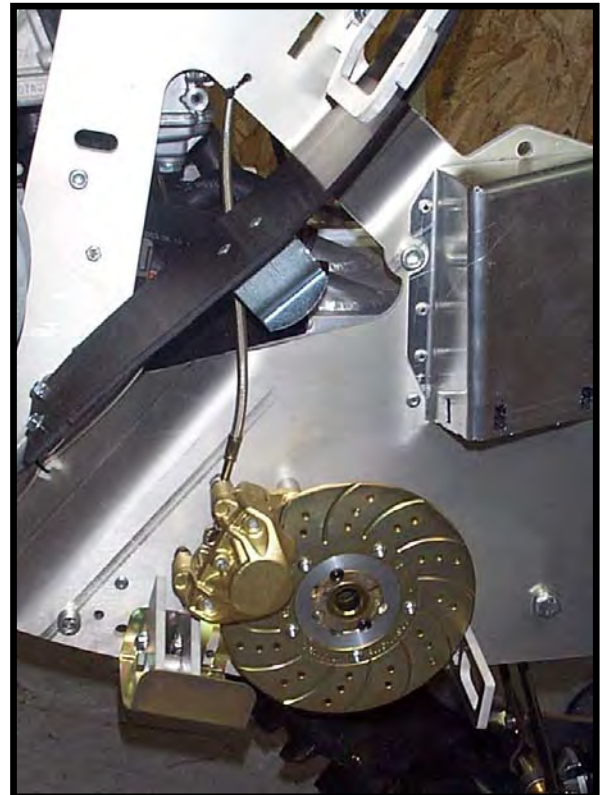


WIRE, CABLE AND HOSE ROUTING 16-10

- The brake hose then passes behind the steering plate and is attached with one nylon tie wrap at the corner.
- The second tie wrap is located in a hole just above the triangular cut-out in the PTO side of the chassis.



- The hose is then routed out through this cut-out, under the belt guard towards the brake caliper and is connected there.



Fuel hoses

Fuel pump

The fuel pump uses 3 hoses to function properly:

1. Impulse (Vacuum) Hose

Once installed onto the pump, the impulse hose follows the MAG side chassis and is then connected to the rear of the engine, as shown at right. Ensure that the spring clamps are well placed.

2. Fuel Hose from Fuel Tank

The black 5/16 in. fuel line follows the MAG side chassis towards the rear of the vehicle and is then connected via a reducer to the 1/4 in. clear fuel line that goes into the fuel tank.

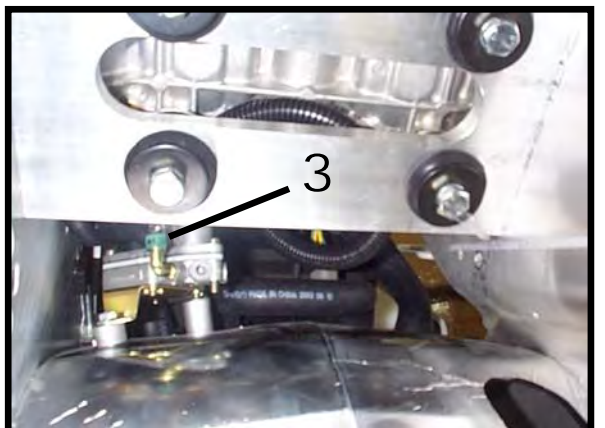


The clear line must pass between the fuel tank and the airbox. **ENSURE** that the fuel line does NOT become pinched.



3. Fuel supply line (to carburetors)

The carburetor fuel supply line is routed from the pump, between the engine plate and engine itself and then back up and into the black tee connection at the base of the rack of carburetors. Ensure that the spring clamps are well secured.



◆ WARNING

It is very im[portan that all of these hoses are installed exactly as shown in the photos at right.

Overflow/Vent hoses and Carburetor vent hoses

Coolant Reservoir

The coolant overflow/air bleeder line is attached to the reservoir with a black spring clamp. The overflow hose is then routed downwards along the length of the reservoir and through a guide to a position that is between the coolant hose and the engine.



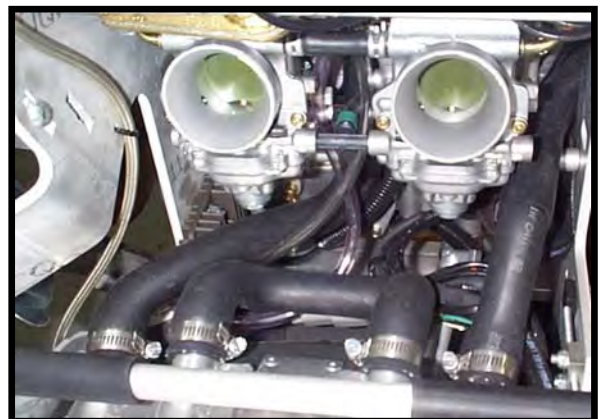
Fuel Tank

The fuel tank overflow line is routed from the gas cap itself under the handlebar and through the top plate of the steering column.

The hose is then tied to the rest of the handlebar accessory wires with a nylon tie wrap to secure it in place. The hose is then routed to the MAG side of the MPKM.



At this point, the hose is routed between the two carburetors, under the PTO-most coolant hose, through the triangular PTO chassis cut-out and is then secured to the chassis with a nylon tie wrap near the brake system.



Carburetor Vent Hoses

The individual carburetor vent hoses are tee'd together at the top of the assembly, near the centre. The vent hose is then routed between the two carburetors, under the PTO-most coolant hose, through the triangular PTO chassis cut-out and is then secured to the chassis with a nylon tie wrap near the brake system. Ensure that the hose does not become pinched.

As was explained for both the fuel vent hose and the fuel tank vent/overflow hose, the ends of these two hoses must be attached to the outside of the PTO side chassis as shown at right.





MODEL YEAR 2004 Snow Hawk 600HO

High Altitude Set-up Recommendations

CARBURETION GUIDE							
Altitude	Sea Level	2000ft	4000ft	6000ft	8000ft	10000ft	Qty
Item							
Main Jet	380	360	340	320	300	280	2
Jet Needle	9DHI12-58-3	-	-	-	-	-	2
Needle Position	3	3	3	2	2	2	-
Slide Cutaway	2.0	-	-	-	-	-	2
Pilot Jet	17.5	-	-	-	-	-	2
Mixture Screw (Pilot Screw)	1.5	-	-	2.0	-	-	-
Valve Seat	1.5	-	-	-	-	-	-
Needle Jet	-	-	-	-	-	-	2
Float Level	-	-	-	-	-	-	-
Idle (rpm)	1400-1800	-	-	-	-	-	-
Idle Throttle Valve Position (mm)	1.8	1.7	1.8	1.9	2.2	-	-

MAIN JET CHART							
Altitude	Sea Level	2000ft	4000ft	6000ft	8000ft	10000ft	Qty
Temperature							
-40°C -40°F	410	380	370	350	330	310	2
-30°C -20°F	390	370	350	330	310	290	2
-20°C -4°F	380	360	340	320	300	280	2
-10°C 14°F	370	350	330	310	290	270	2
0°C 32°F	360	340	320	300	280	260	2
10°C 50°F	350	330	310	290	270	250	2
20°C 70°F	330	310	290	270	250	230	2

Note: Always use plug color and piston wash as a definite guide.

Note: Shaded column represents factory settings.

DRIVE PULLEY (Primary)						
Altitude	Sea Level	2000ft	4000ft	6000ft	8000ft	10000ft
Clutching						
Spring	White/White (P/N 417 222 004) or Vi/Vi/Br/Rd (P/N 0151-1007)	-	-	-	-	-
# of Large Weights (per arm)	1	1	1	1	1	1
# of Small Weights (per arm)	5	4	3	2	1	0
Engagement RPM (+/- 100)	3400	-	-	3600	-	-
Max RPM (+/- 100)	8000	-	-	-	-	-

DRIVEN PULLEY (Secondary)						
Altitude	Sea Level	2000ft	4000ft	6000ft	8000ft	10000ft
Clutching						
Spring	Beige (P/N 414 558 900)	-	-	-	-	-
Helix Angle	50° - 44° (P/N 417 126 422)	-	-	-	-	-
Spring Tension	6.8 +/- 0/7 kgf 15 +/- 1.6 lbf	-	-	-	-	-

WARNING / LEGAL NOTICE

AD Boivin Design Inc. will not be held responsible for any physical injury – or death – occurred while riding a Snow Hawk. Like any other recreational vehicle, the Snow Hawk can be potentially dangerous if you do not follow these safety tips:

- Read the owner's manual carefully before operating the vehicle;
- Learn how to handle the vehicle progressively before riding on public trails;
- Drive according to your capabilities and terrain conditions;
- Always wear a helmet and other protective gear;
- Never drive under the influence of alcohol or any other drugs;
- Avoid any hazardous maneuvers;
- Do not let someone else drive your vehicle unless they are aware of the safety tips;
- Do not operate the vehicle on water, dirt or any other terrain conditions except snow;
- The Snow Hawk is designed for a single operator only, no passenger are allowed;

In order to validate your warranty coverage, please sign this form and send it back to us:

FAX: (418) 838-3957

MAIL: AD Boivin Design Inc.
700, Jean Marchand St.
Levis, QC G6V 9G6

Att: Rob Pilgrim, Snow Hawk Project Lead

I have read this form and understand it clearly.

Vehicle Owner Name (printed)

Vehicle Owner Name (signature)

Date

VIN