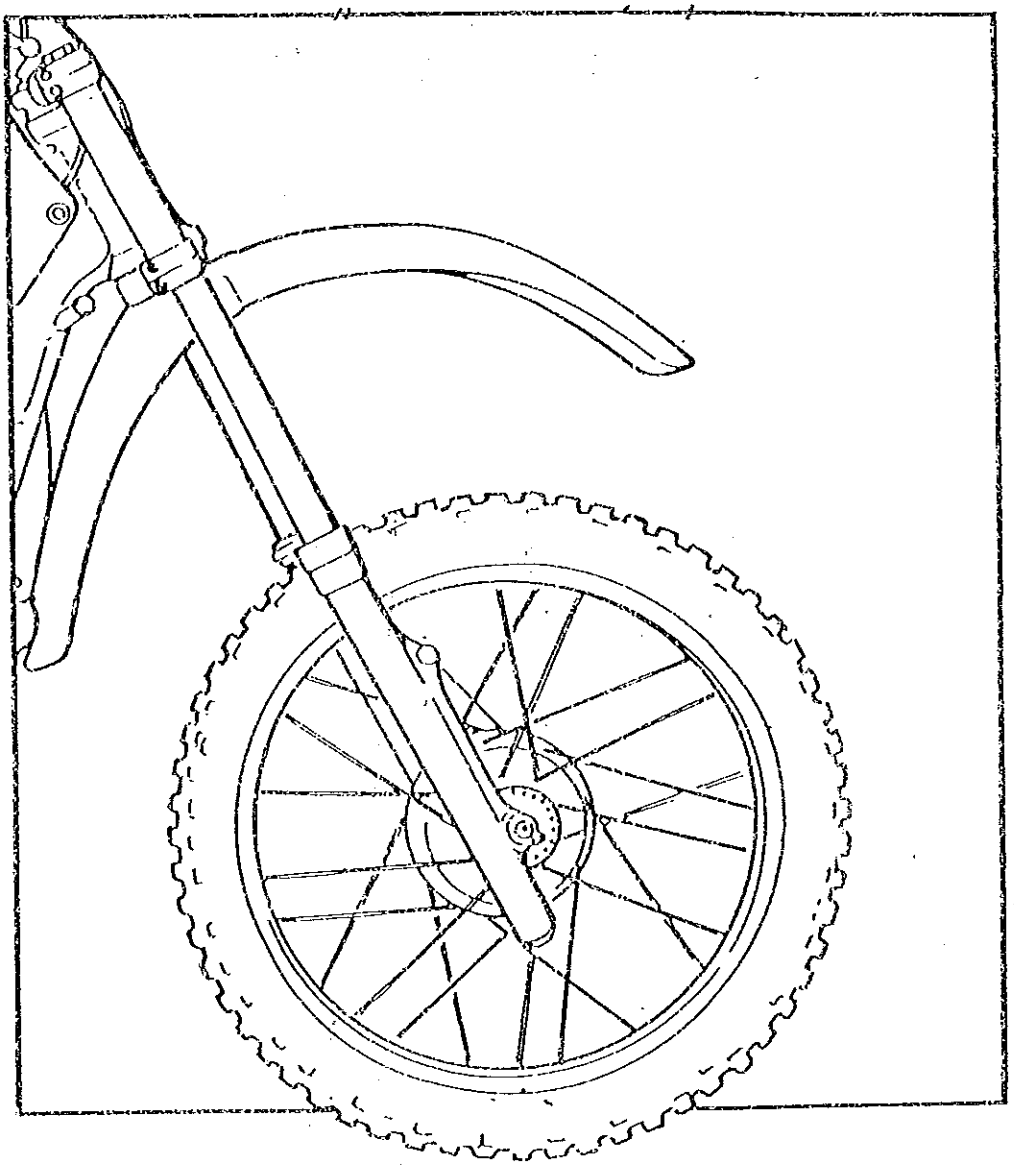
ARMSTRONG



250 MX L/C
500 MX
560 Sonic
200 A.S.E.
250 A.S.E.
350 A.S.E.
500 A.S.E.

OPERATOR'S MANUAL

CCM MOTORCYCLES LIMITED
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735 002 042

TROUBLE SHOOTING GUIDE (ALL MODELS)

All models

TROUBLE	CAUSE	REMEDY
Steering is hard	1. Overtightened steering stem. 2. Broken steering stem bearings.	Adjust. Replace.
Front wheel shimmies.	1. Deformed rim. 2. Loose or damaged front wheel bearings. 3. Loose spokes. 4. Loose axle and related parts. 5. Unbalanced wheel. 6. Tire badly seated.	Replace or straighten. Replace. Tighten, true the wheel. Tighten. Repair. Repair.
Front suspension is soft.	1. Insufficient fork oil. 2. Collapsed springs.	Drain or replenish. Replace.
Front suspension is hard.	1. Excessive air pressure. 2. Incorrect fork oil: viscosity too high. 3. Excessive fork oil.	Bleed upper air valve check lower fork reservoir condition. Replace. Drain or replenish.
Rear wheel shimmies.	1. Deformed rim. 2. Loose or damaged rear wheel bearings. 3. Loose spokes. 4. Loose axle and related parts. 5. Unbalanced wheel. 6. Tire badly seated.	Replace or straighten. Replace. Tighten, true the wheel. Tighten. Repair. Repair.
Rear suspension is soft.	1. Weak springs. 2. Faulty shocks (white power).	Replace. Replace or see your dealer.
Rear suspension is hard.	1. Bent shock absorber rods. 2. Springs too stiff. 3. Faulty shocks (white power).	Replace. Check and readjust spring preload. Replace or see your dealer.
Braking is poor.	1. Improper brake shoe contact. 2. Brake lining fouled with oil, grease or dirt.	Repair or replace. Replace.
Brake free-play is excessive.	1. Improper adjustment. 2. Worn brake shoes 3. Worn brake cam. 4. Improper arm position. 5. Worn wheel bearings	Adjust. Replace. Replace. Repair. Replace.

TROUBLE	CAUSE	REMEDY
Blue exhaust fume.	1. Excessive oil in crankcase. 2. Worn valve seals. 3. Worn or broken ring(s).	Check engine, valve and oil circulation. Replace. Replace.
Transmission fails to shift smoothly.	1. Shift drum index lever is jammed/ broken. 2. Bent shift shaft. 3. Bent shift forks. 4. Loose pawl positioning cam.	Repair or replace. Repair or replace. Replace. Repair.
Change pedal fails to return.	1. Broken gearshift return spring. 2. Bent shift shaft.	Replace. Replace.
Clutch slips	1. Improperly adjusted clutch. 2. Weak clutch springs. 3. Worn or deformed friction plates.	Adjust. Replace. Replace.
Clutch drags.	1. Improperly adjusted clutch. 2. Unequal clutch spring tension. 3. Deformed clutch plates.	Adjust. Replace. Replace.

TROUBLE	CAUSE	REMEDY
Engine does not have sufficient power.	1. Clogged air cleaner. 2. Deteriorated or old fuel. 3. Incorrect plug gap. 4. Incorrect ignition timing. 5. Clogged carburetor jets. 6. Incorrect float height. 7. Carbon build up in muffler resonator. 8. Worn cylinder and worn or stuck piston rings. 9. Head gasket leaks. 10. Worn valve(s).	Clean or replace. Replace. Adjust or replace. See your dealer. Clean. Adjust. Clean. Repair or replace. Repair or replace. Adjust, repair or replace.
Engine overheats.	1. Lean fuel mixture. 2. Incorrect ignition timing. 3. Excessive carbon deposit on cylinder head/piston.	Replace jet. Contact your dealer. Clean, have your dealer verify ring condition.
Engine operation is erratic at high speed.	1. Clogged air cleaner element. 2. Excessive plug gap. 3. Incorrect float level. 4. Faulty ignition system.	Clean or replace. Adjust or replace. Adjust. Contact your dealer.
Ignition fails to spark.	1. Fouled spark plug. 2. Faulty emergency cut-out switch. 3. Faulty ignition system.	Replace. Replace. Contact your dealer.
Spark plug electrodes are fouled.	1. Incorrect spark plug heat range. 2. Rich mixture (rich carburation or clogged air filter). 3. Worn or broken rings.	Replace, perform a plug test. Adjust or clean. Contact your dealer.
Spark plug electrodes are burned.	1. Loose spark plug. 2. Incorrect heat range. 3. Lean mixture. 4. Incorrect ignition timing. 5. Overheating engine.	Tighten. Use specified plug, perform a plug test. Replace jet. Contact your dealer. See "engine overheats".
Engine operation is erratic at low speed.	1. Carburetor air screw is improperly adjusted. 2. Excessive spark plug gap or dirty electrodes. 3. Incorrect float level. 4. Faulty ignition system.	Adjust. Adjust or replace. Adjust. Contact your dealer.

TROUBLE SHOOTING GUIDE (FOUR-STROKE MODEL)

Four-stroke model

TROUBLE	CAUSE	REMEDY
Engine fails to start or does not start easily	1. No fuel is flowing to carburetor.	
	a) Faulty carburetor float needle. Check for worn tip.	Replace.
	b) Clogged fuel line.	Clean.
	2. Deteriorated or old fuel.	Replace.
	3. Flooded engine.	Start the engine with the throttle fully opened. In extreme cases, remove the spark plug turn the shutt-off valve to "OFF" hold the engine stop switch depressed and kick start until excess fuel is expelled.
	4. Insufficient compression.	
	a) Head gasket leaks.	
	b) Worn valves or improper adjustment.	Repair.
	c) Worn or stuck piston rings.	Replace.
	d) Worn cylinder.	Rebore oversize.
	e) Improper drive belt timing.	Contact your dealer.
	5. No spark at plug.	Check for fouled or defective spark plug. Disconnect spark plug wire, unscrew plug and remove from cylinder head. Reconnect wire and ground exposed plug on engine fins being careful to hold away from spark plug hole. Follow engine starting procedure and check for spark. If no sparks appear, replace spark plug and if necessary, check the following items.
	a) Fouled plug.	Replace.
	b) Wet plug.	Dry off and try again or replace.
	c) Faulty magneto.	Repair.
	d) Open or short circuit in ignition.	Check for moisture at the amplifier connector. Check for corroded, dirty or broken connectors. Check emergency cut-out switch. Clean or replace.
	e) Faulty ignition sytem.	Contact your dealer if needed.
Engine stalls frequently.	1. Fouled plug.	Repair of replace.
	2. Clogged fuel lines	Clean.
	3. Clogged carburetor jets.	Clean.
	4. Compression leaks.	Repair.
	5. Intake manifold leaks.	Repair.

TROUBLE	CAUSE	REMEDY
Spark plug electrodes are fouled.	1. Incorrect fuel/oil mixture. 2. Incorrect spark plug heat range. 3. Rich mixture (rich carburation or clogged air filter). 4. Worn or broken rings.	Drain fuel and renew. Replace, perform a plug test. Adjust or clean. Contact your dealer.
Spark plug electrodes Are burned.	1. Loose spark plug. 2. Incorrect heat range. 3. Lean mixture. 4. Incorrect ignition timing. 5. Overheating engine.	Tighten. Use specified plug, perform a plug test. Replace jet. Adjust. See "engine overheats".
Engine operation is erratic at low speed.	1. Carburetor air screw is improperly adjusted. 2. Excessive spark plug gap or dirty electrodes. 3. Incorrect float level. 4. Incorrect ignition timing. 5. Faulty electronic control unit. 6. Short circuit in magneto.	Adjust. Adjust or replace. Adjust. Adjust. Replace. Replace.
Transmission fails to shift smoothly.	1. Improper gearbox oil or oil level. 2. Shift drum index lever is jammed/ broken. 3. Bent shift shaft. 4. Bent shift forks. 5. Loose pawl positioning cam.	Change or top up. Repair or replace. Repair or replace. Replace. Repair.
Change pedal fails to return.	1. Broken gearshift return spring. 2. Bent shift shaft.	Replace. Replace.
Clutch slips.	1. Improperly adjusted clutch. 2. Weak clutch springs. 3. Worn or deformed friction plates.	Adjust. Replace. Replace.
Clutch drags.	1. Improperly adjusted clutch. 2. Unequal clutch spring tension. 3. Deformed clutch plates.	Adjust. Replace. Replace.

TROUBLE	CAUSE	REMEDY
Engine stalls frequently.	1. Fouled plug. 2. Restriction in the gas cap vent. 3. Clogged fuel lines. 4. Clogged carburetor jets. 5. Crankcase compression leaks. 6. Intake manifold, or rotary valve cover leaks.	Repair or replace. Gently suck on the ventilation hole located on the bottom center of the gas cap. If restriction persists, replace the gas cap. Clean. Clean. Repair. Repair.
Engine does not have sufficient power.	1. Clogged air cleaner. 2. Deteriorated or old fuel. 3. Incorrect plug gap. 4. Incorrect ignition timing. 5. Clogged carburetor jets. 6. Incorrect float height 7. Carbon build up in muffler resonator. 8. Worn cylinder and worn or stuck piston rings. 9. Cracked or crushed expansion chamber.	Clean or replace. Replace. Adjust or replace. Adjust. Clean. Adjust. Clean. Repair or replace. Repair or replace.
Engine overheats.	1. Lean fuel mixture. 2. Incorrect ignition timing. 3. Excessive carbon deposit on cylinder head/piston. 4. Low coolant level.	Replace jet. Adjust. Clean. Add coolant.
Engine operation is erratic at high speed.	1. Clogged air cleaner element. 2. Excessive plug gap. 3. Incorrect float level. 4. Faulty electronic control unit. 5. Short circuit in magneto. 6. Crankcase compression leaks. 7. Broken or cracked expansion chamber.	Clean or replace. Adjust or replace. Adjust. Replace. Replace. Repair. Repair or replace.
Ignition fails to spark.	1. Fouled spark plug. 2. Faulty emergency cut-out switch. 3. Faulty electronic control unit. 4. Short circuit in magneto.	Replace. Replace. Replace. Replace.

TROUBLE SHOOTING GUIDE (TWO-STROKE MODELS)

Two-stroke models

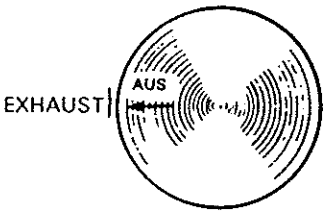
TROUBLE	CAUSE	REMEDY
Engine fails to start or does not start easily	1. No fuel is flowing to carburetor.	
	a) Clogged fuel filter.	Replace.
	b) Faulty carburetor float needle. Check for worn tip.	Replace.
	c) Clogged fuel line.	Clean.
	2. Deteriorated or old fuel.	Replace.
	3. Raw gas in crankcase.	Start the engine with the throttle fully opened. In extreme cases, remove the engine crankcase drain plug, turn the shutt-off valve to "OFF" hold the engine stop switch depressed and kick start until excess fuel is expelled.
	4. Insufficient compression.	
	a) Crankcase compression leaks at oil seal.	Repair.
	b) Crankcase compression leaks at crankcase mating surfaces.	Repair.
	c) Worn or stuck piston rings.	Replace.
	d) Worn cylinder.	Rebore oversize.
	e) Rotary valve or rotary valve cover leaks.	Repair or replace.
	5. Reed valve leak (500).	Repair or replace.
	6. No spark at plug.	Check for fouled or defective spark plug. Disconnect spark plug wire, unscrew plug and remove from cylinder head. Reconnect wire and ground exposed plug on engine fins being careful to hold away from spark plug hole. Follow engine starting procedure and check for spark. If no sparks appear, replace spark plug and if necessary, check the following items.
	a) Fouled plug.	Replace.
	b) Wet plug.	Dry off and try again or replace.
	c) Faulty magneto.	Repair.
	d) Open or short circuit in ignition.	Check for moisture at the electronic control unit connector boot. Check for corroded, dirty or broken connectors. Check emergency cut out switch. Clean or replace.
	e) Faulty electronic control unit.	
	f) Refer to "Ignition trouble shooting chart".	Contact your dealer if needed.

Pre-race check list ✓

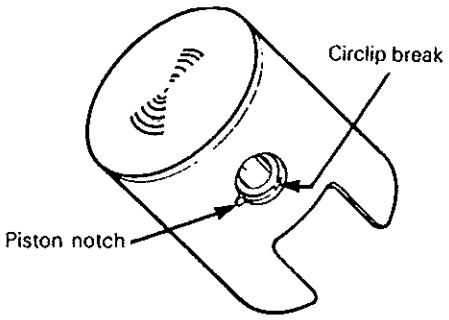
	Date performed							
- Clean motorcycle.....								
- Inspect for damage.....								
- Change transmission oil[1].....								
- Change engine oil[2].....								
- Check coolant level[1].....								
- Check magneto.....								
- Check electronic box plug.....								
- Check high tension lead.....								
- Clean and seal carburetor.....								
- Clean air box.....								
- Clean throttle twist-grip ass'y.....								
- Service air filter.....								
- Seal cable grommets.....								
- Check ignition timing.....								
- Inspect front wheel & spokes.....								
- Inspect front brake.....								
- Check steering bearings.....								
- Service front forks.....								
- Inspect and adjust front brake cable.....								
- Inspect rear wheel & spokes.....								
- Adjust the front fork air pressure.....								
- Inspect sprockets.....								
- Clean and lubricate drive chain.....								
- Inspect swing arm pivot.....								
- Check shock damping and keepers.....								
- Retorque lower link bolts.....								
- Adjust drive chain.....								
- Inspect and adjust rear brake.....								
- Service muffler.....								
- Tighten kick start and gear change clamp screws.....								
- Check all nuts and bolts.....								
- Check tire pressure.....								
- Check clutch adjustment.....								
- Test ride motorcycle.....								
Check:								
1) Brakes.....								
2) Gear shifting.....								
3) Clutch operation.....								
4) Acceleration.....								
5) Cruising.....								
6) Handling.....								
7) Spark plug condition.....								
8) Idling.....								
9) Overall performance.....								

[1] Two stroke models
[2] Four stroke model

250 A.S.E	Compression Ratio		Fuel Requirement
	12.5:1	Stock	Unleaded Regular
Remove 1 head shim	13.0:1	Mod.	Unleaded Premium
Remove 2 head shims	13.5:1	Mod.	100 LL Aviation



Once the circlips are installed, turn each circlip so that the circlip break is not directly in line with piston notch. Using very fine emery cloth, remove any burrs on piston caused by circlip installation.



Apply a light coat of oil and re-install the cylinder, cylinder head shim(s) (if any) and cylinder head. Torque the cylinder head nuts in a criss-cross sequence (refer to cylinder base nuts and cylinder head nuts retorque in "Maintenance").

- Ignition unit:

Remove the magneto cover and spray the components with a metal protector (LPS 3 or equivalent). Clean the crankcase/magneto cover mating surfaces and seal using silicone sealant.

▼ **CAUTION: Modifications/adjustments mentioned in "Race pre-paration" are guidelines only. It is highly recommended that dealer assistance be obtained when preparing your vehicle.**

Performance tips:

Increased performance can be obtained by changing compression ratios on the 200, 250 A.S.E. models. The chart below can be used as a guide to your fuel needs.

200 A.S.E	Compression Ratio		Fuel Requirement
-	11.5:1	Stock	Unleaded Regular
Remove 2 head shims	12.3:1	Mod.	Unleaded Premium
Machining required	13.2:1	Mod.	100 LL Aviation

Occasionally check the piston/cylinder clearance:

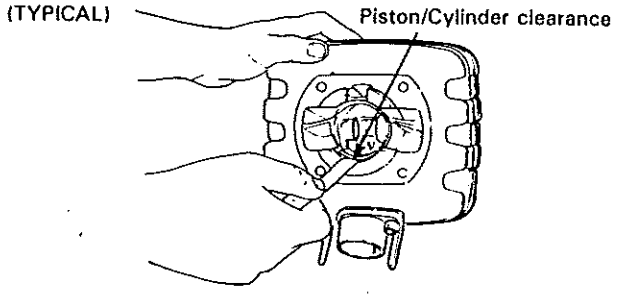
Remove the cylinder head, the cylinder head shim(s) (if any) and the cylinder from the engine.

Place a clean cloth over crankcase to prevent circlips from falling into crankcase then use a pointed tool to remove circlips from piston.

Remove the piston pin using a suitable remover.

▼ **CAUTION: When tapping piston pin in or out of piston, hold piston firmly in place to eliminate the possibilities of transmitting shock and pressure to the connecting rod.**

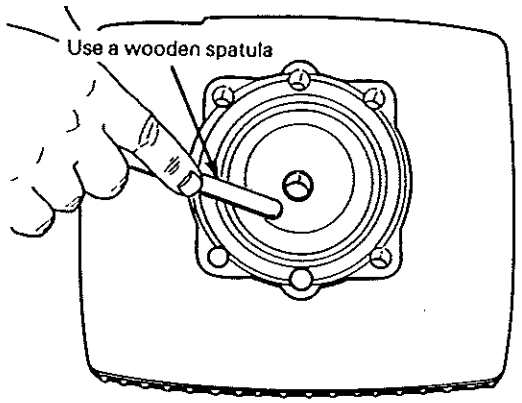
Check the clearance, with the piston in the cylinder, using a feeler gauge.



PISTON RING END GAP		
Model	Standard	Service limint
250 MX L/C	0.08 mm (0.003") - 0.10 mm (0.004")	0.16 mm (0.006")
500 MX	0.10 mm (0.004") - 0.12 mm (0.005")	0.20 mm (0.008")
560 SONIC MX	0.05 mm (0.002") - 0.07 mm (0.003")	0.20 mm (0.008")
200 A.S.E.	0.06 mm (0.002") - 0.08 mm (0.003")	0.14 mm (0.005")
250 A.S.E.	0.06 mm (0.002") - 0.08 mm (0.003")	0.14 mm (0.005")
350 A.S.E.	0.06 mm (0.002") - 0.08 mm (0.003")	0.14 mm (0.005")
500 A.S.E.	0.10 mm (0.004") - 0.12 mm (0.005")	0.20 mm (0.008")

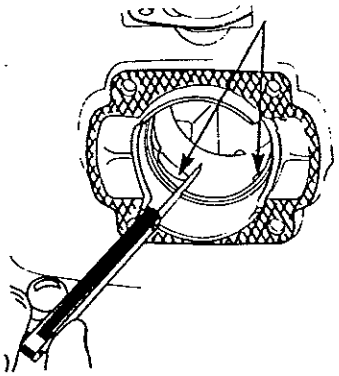
At assembly, place the piston over the connecting rod with the letters AUS, over an arrow on the piston dome, facing direction of the exhaust port.

(TYPICAL)



Occasionally check the ring end gap:

Position ring under the transfer ports. Using a feeler gauge, check ring end gap. If gap exceeds specified toterance the ring should be replaced.



PISTON RING END GAP		
Model	Standard	Service limint
250 MX L/C	0.20 mm (0.008") - 0.35 mm (0.014")	1.0 mm (0.040")
500 MX	0.25 mm (0.010") - 0.40 mm (0.016")	1.2 mm (0.047")
560 SONIC MX	0.30 mm (0.012") - 0.50 mm (0.020")	1.0 mm (0.040")
200 A.S.E.	0.20 mm (0.008") - 0.35 mm (0.014")	1.0 mm (0.040")
250 A.S.E.	0.20 mm (0.008") - 0.35 mm (0.014")	1.0 mm (0.040")
350 A.S.E.	0.20 mm (0.008") - 0.35 mm (0.014")	1.0 mm (0.040")
500 A.S.E.	0.25 mm (0.010") - 0.40 mm (0.016")	1.2 mm (0.047")

RACE PREPARATION

Race preparation

Total enjoyment of the pleasures of off-road riding is the result of many factors. These can be broken down into those relating to the rider, and those relating to the machine.

The rider must possess some measure of skill, conditioning and determination.

Your Operator's Manual contains many fine recommendations and instructions to help you on the trail.

Follow the guidelines of the maintenance checklist regularly and particularly before any major ride and you will enjoy many miles of healthy outdoor physical activity.

Start the motorcycle and test ride. Run through all the gears, checking for performance, braking and handling, etc... Note the suspension action and throttle response. Then proceed with required maintenance.

IMPORTANT: Observe all Warnings and Cautions mentioned throughout this manual which are pertinent to the item being checked. When component conditions seem less than satisfactory, replace with genuine Armstrong parts.

Preparation hints

The best race preparation can be attained by carefully following the information throughout this manual, however the following tips may be useful for the serious minded racer:

Front fork:

It is not recommended to add air pressure in fork tubes. However, the fork resistance can be fine tuned by changing the fork oil grade (SAE 5 - SAE 10) and/or by adding oil in 20 mL (0.7 fl. oz) increments. Carefully test ride the motorcycle between any change. For fork servicing (see "Lubrication & Maintenance").

Engine performance (two stroke models)

Maximum engine performance can be attained by performing the following:

Regularly remove carbon deposit from piston/cylinder head:

	✓
Change spark plug	
Change transmission oil[1]	
Change engine oil[2]	
Change fork oil	
Check steering stem adjustment	
Check throttle cable for damage and free operation	
Inspect brake condition and operation	
Inspect oil seals for possible cuts or leaks	
Check valve adjustment[2]	
Set engine timing[1]	
Check electrical wiring (broken wires, damaged insulation)	
Inspect condition of frame components	
Check tightness of all bolts, nuts and lower link bolts	
Retorque cylinder head bolts	
Adjust carburetor	
Adjust the clutch	
Check rear shock gas pressure (see your dealer)	
Check the coolant level 250 MX L/C	

[1] Two stroke models only [2] Four stroke model only

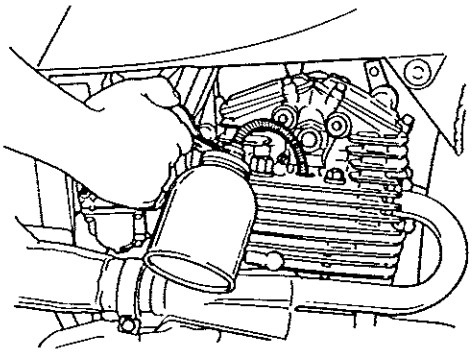
- When re-starting engine, expel excess storage oil by removing spark plug and cranking engine

- Clean and gap spark plug and install.

○ NOTE: When the engine is started, it may smoke more than usual until all the storage oil is burned away.

▼ CAUTION: (Four stroke model) After a storage period it is possible that some oil of the backbone reservoir drains in the engine sump. It is necessary to drain the engine sump and to replenish the backbone prior to starting the engine (see "Lubrication & Maintenance").

(TYPICAL)



Rotate the engine slowly a few turns to insure good oil coating on the cylinder wall and related parts. Reinstall the spark plug. The oil coating will prevent moisture from damaging the engine.

▼ **CAUTION: To prevent ignition system damage, depress the emergency cut-out switch while rotating the engine.**

Fuel system

Empty the fuel tank by disconnecting fuel line. The carburetor can be emplied by removing the float bowl (see maintenance section).

◆ **WARNING: Gasoline is flammable and explosive under certain conditions. Always use caution and keep away from open flame or spark.**

Drive chain

Clean and soak in chain oil overnight. Drain and wipe off excess oil. Install and adjust.

Tires

Support the motrocycle so that suspension is released and the tires are not in contact with the ground. This will prevent flat spots due to cord deformation.

○ **NOTE: Protect the motorcycle with a cover to prevent dust accumulation during storage.**

Pre-Season preparation chart

To simplify the pre-season preparation, we have drawn up a small chart. The chart indicates only the basic servicing points to be performed at the pre-season preparation. Always refer to the regular maintenance schedule (page 13) for complete servicing.

Avoid the use of harsh detergents and high pressure car wash sprays as they may cause damage to paint and metal surfaces and corrode electrical connections.

◯ NOTE: Avoid spraying directly onto the carburetor, the electronic box, the muffler opening, the fuel and oil caps and the wheel bearings.

Using a sponge, cloth or brush, apply a liberal quantity of soapy water to thoroughly remove any remaining dirt.

Rinse away all traces of soap and dirt with a low pressure water spray.

Check the C.D.I. plug for trapped water.

Fully pack, as necessary, the electronic control connector block and rubber boot, the high tension connection and the protector boot with dielectric grease such as Dow Corning DC4 or equivalent.

▼ **CAUTION: To prevent moisture, make sure no air is trapped in. Do not use silicone sealant as contacts will corrode.**

Lubricate the drive chain and the pivot points of all levers and cables.

Start the motorcycle, allow it to warm then test-ride for several minutes.

◆ **WARNING: Wet brake linings reduce braking ability. Ride with care until brakes respond properly.**

◯ NOTE: If the engine fails to start, check the float bowl for water. Refer to the Carburetor Servicing Section.

Storage preparation

Engine

◯ NOTE: On four stroke model, change engine oil and filter (see "Lubrication & Maintenance").

With piston at bottom dead center, remove the spark plug and pour approximately 50 mL (2 fl. oz) of motor oil in the cylinder through the spark plug hole.

Wheel bearing inspection

With the motorcycle mounted on a stand or box to hold the wheels clear of the ground, rotate the wheels slowly and check for loose or noisy bearings.

NOTE: If wear or damage is suspected, the bearing must be replaced.

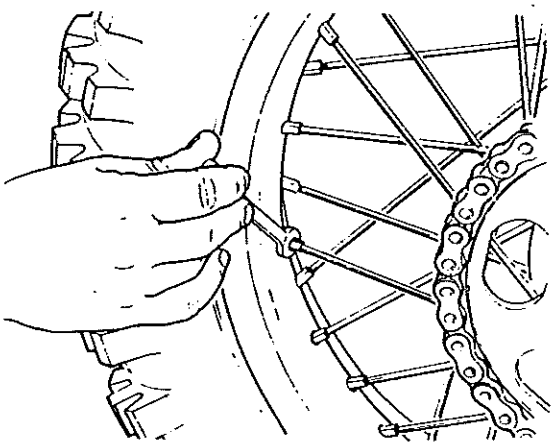
Tires

Check the tire pressure and adjust as required.

Spokes

Therefore spokes are subjected to extreme forces and may become loose, they must be frequently inspected and tightened as necessary.

CAUTION: Loose or overtightened spokes will cause rim run out and/or damage.



Motorcycle cleaning

To maintain pride in ownership and to encourage routine inspection and adjustments, keep your new motorcycle clean and carefully maintained.

NOTE: Frequent cleaning will facilitate visual inspection of frame, swing arm, wheels, and other critical components for wear or damage.

An effective way to clean your motorcycle is with a degreasing solvent and warm, soapy water, rinse using low pressure spray.

The dimensions in the chart can serve as a starting point. Spring preload is controlled by turning the lock ring on the shock body. Shortening or lengthening the spring length will increase or decrease the preload. Before adjusting the spring preload, first measure your motorcycle (without rider) from the seat bolt to the axle bolt. The shock should be fully extended. Next, sit on your motorcycle and measure between the same two points. If the machine drops more than 100 mm (3.94"), increase the preload by 1/8" increments. If the machine drops less than 80 mm (3.15"), decrease the preload by 1/8" increments. The optimum adjustment range is between 80 mm (3.15") and 100 mm (3.94").

NOTE: Before any pretuning of the rear shock is made, it is recommended that the shock is used at least 30 minutes at its preadjusted setting.

CAUTION: Dealer assistance is needed to properly rebuild and/or properly set the "White Power" shock.

NOTE: The rear shock nitrogen gas pressure should be 1600 kPa (232 PSI).

NOTE: It is recommended that the shock oil be changed every 3-4 months for pro riders and every 6-12 months for recreational riders.

REAR SUSPENSION SPRING CHART		
VEHICLE	SPRING LBS	SPRING NUMBER
250	360	215
	325	WP58
	375 opt.	H015
500/560	400	WP22

FRONT FORK SPRING RATE	
A.S.E.	39.17 lb/in
MX, Sonic	21.0 lb/in

Function

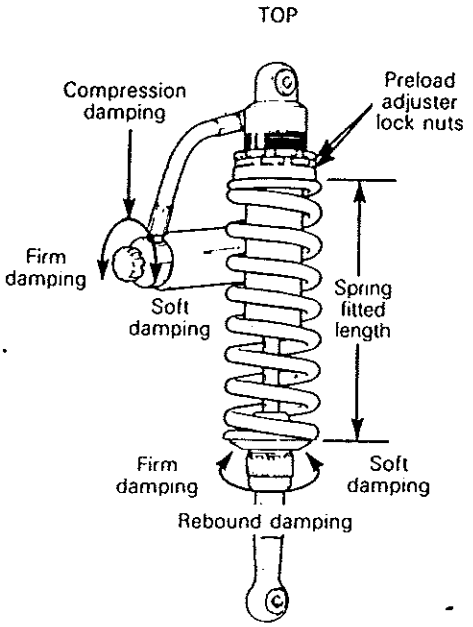
The principal advantage behind the rising rate damping system is to offer soft suspension during the initial movements of the wheel travel and firm damping at full wheel travel. This is accomplished by using a bell crank type lever system.

Adjustments

The rear suspension is provided with three (3) types of adjustment:

A) Compression damping:
The compression damping knob has seven positions numbered from 1 through 7. Number 1 position will be the softest setting. Rotating counter-clockwise will increase the damping until number 7 is reached which is the stiffest position.

B) Rebound damping:
The rebound damping knob has eleven positions numbered from 1 through 11. When the number 1 is aligned with the punch mark, this will be the softest setting. Rotating clockwise will increase the damping until number 11 is reached, which is the stiffest position. Some caution must be used when setting rebound damping. Too much will not allow the shock to recycle quickly enough to accept the next bump. The result will be "paking up" of the suspension and it will remain bottomed throughout the rough sections.



C) Spring pre-load:

Spring preload may vary from rider to rider depending upon their weight and abilities. Preload can be changed by screwing the two lock nuts up or down to compress the spring to different lengths.

Front suspension

Although your motorcycle has been designed for an average rider's weight and for average racing conditions, the suspension of your motorcycle can be adjusted to suit your personal preference.

Resistance

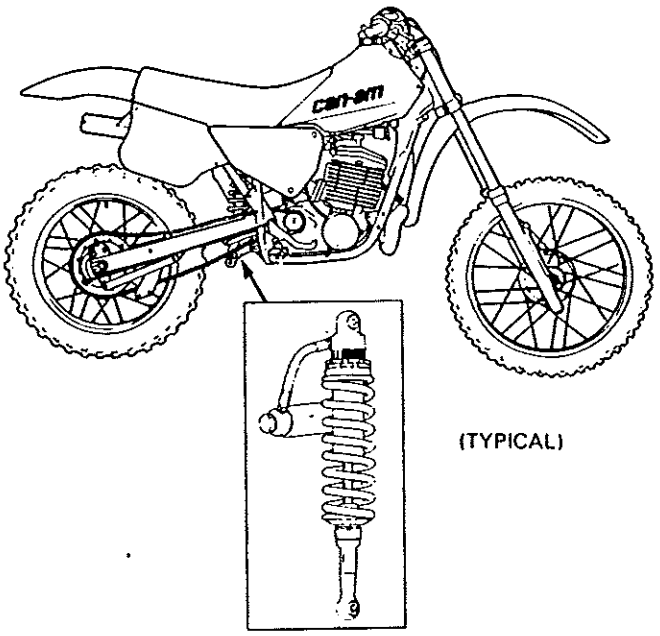
The fork resistance is directly affected by the oil viscosity; the higher the viscosity, the stiffer the resistance. Your motorcycle is supplied with SAE 5W fork oil as it is considered best for normal use.

NOTE: For best results, zero air pressure is recommended.

Rear suspension lower shock linkages

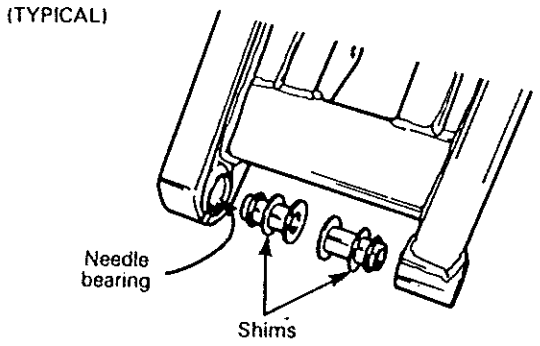
Rear suspension/adjustments

Using a waterproof grease, lubricate the shock linkage heim joints. Pack grease under heim joint top hat and O-ring.



Rear suspension

Your new CAN-AM motorcycle is equipped with the latest in rear suspension components. The QUAD LINK II ™ rising rate damping system uses a single nitrogen/oil "White Power" shock absorber.



Remove the needle bearings.

NOTE: Rust and dirt may jam the needle bearings. Use the proper diameter adaptor and press the needle bearings out of the swing arm.

Carefully clean the needle bearings and flanged bushing before re-assembly.

NOTE: The flanged bushing should move freely without any free play in needle bearing.

At installation apply grease to all the components.

NOTE: If clearance is noticed between a flanged bushing and the frame or the engine mount boss, other shims may be required at that particular flanged bushing. Remove or add shim(s) until the swing arm is perfectly slip tight. Shims are available from your dealer.

NOTE: Lubricate the swing arm needle bearings every 480 km (300 miles).

Insert the swing arm pivot bolt.

Torque to 88-100 N·m (65-75 lbf·ft).

Check the swing arm for any slack or free-play.

Manually lift the swing arm to its highest position and release it; the swing arm must go downward by its own weight.

NOTE: An excessive tension when moving the swing arm could be caused by an inner sleeve that is too tight in the needle bearings or by a wrong shim between the engine mount boss and the flanged bushings.

Torque the steering stem clamp screw and the fork tube clamp screws to 20-27 N·m (15-20 lbf·ft).

Fork angle

The standard frame angle is 28°.

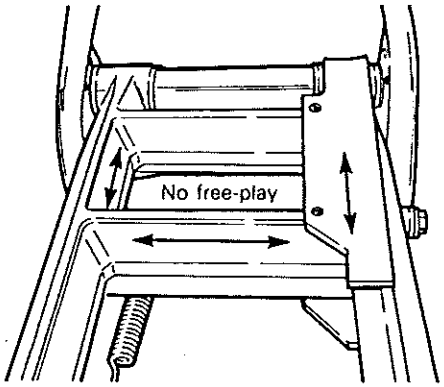
The standard fork angle is 28° and is not adjustable.

They provide the optimum steering and handling for most types of riding.

Swing arm

Regularly check the swing arm for any looseness and for needle bearing or sleeve wear, also inspect for cracks.

(TYPICAL)



The swing arm should be removed and the needle bearings lubricated periodically.

Proceed as follows:

Mount the motorcycle on a stand or a box.

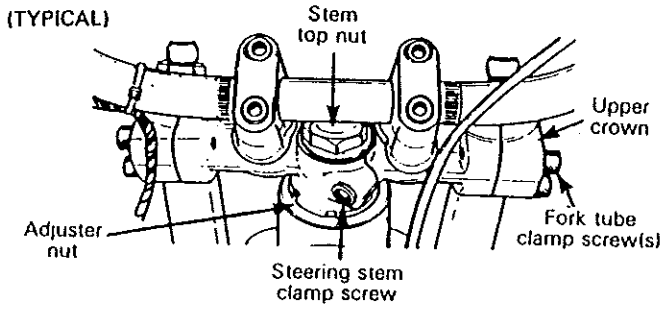
Remove the drive chain and the rear wheel ass'y.

Remove the swing arm pivot bolt, pull the swing arm away from its position.

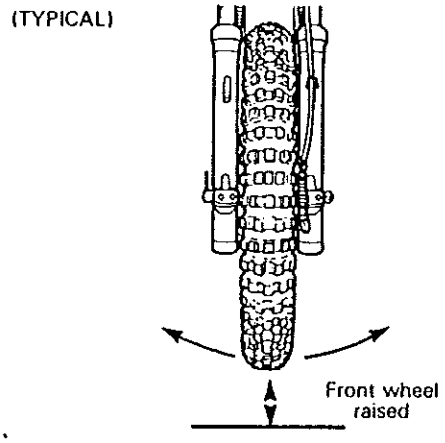
NOTE: Observe the position of the shim/s on the side of flanged bushing.

Loosen the stem top nut and all the screws retaining the upper crown.

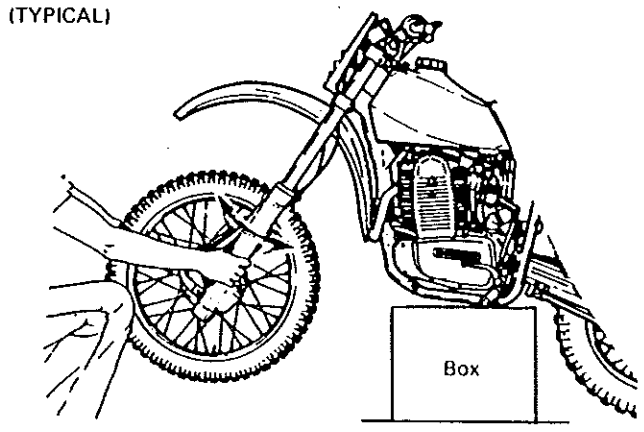
Tighten the adjuster nut until steering becomes snug, but not tight.



Check by turning steering from one side to the other for any flat spot or uneven tension. If any is noticed the steering head must be dismantled and checked.



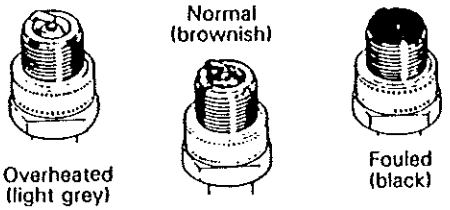
Also, the steering head must be checked, if any radial play is noticed. To check, proceed as illustrated:



Tap upper crown down against the adjuster nut then apply Loctite no. 242 blue (medium strength) adhesive sealant on the cap nut threads and torque to 49-52 N•m (36-38 lbf•ft).

Disconnect spark plug wire and remove spark plug.
Check condition of plug

- A brownish tip reflects ideal conditions (correct carburetor, jetting, spark plug heat range; etc.).
- A black insulator tip indicates fouling caused by: wrong type of spark plug (heat range) fuel mixture too rich, air filter dirty, oil consumption.
- A light grey insulator tip indicates a lean mixture caused by; advanced ignition timing, engine overtheating, fuel mixture too lean, clogged carburetor jet; wrong spark plug heat range, or a leaking seal or gasket.



Silencer

The silencer is replaceable and may be removed for cleaning.

○ NOTE: On 200, 250, 350 A.S.E., 500 L/C, models for maximum performance and reliability the silencer must be repacked with fiberglass every six(6) hours of operation time.

◆ WARNING: Removal, modification or failure to maintain silencer in effective working order may constitute a violation of existing federal, state or provincial regulations.

▼ CAUTION: Be sure all cables, hoses and wires are routed away from exhaust pipe. Use electrical tape or tie raps as necessary.

Steering

Steering stem adjustment

Lift the front wheel off the ground using a stand or a box under the motorcycle.

Examples of suitable timing lights: SUN PTL 45
Snap-on MT 215 B
Bosch EFAW 169 A
Marquette 41-220

On 500 A.S.E., 500 MX, remove the magneto cover.

On 250 MX L/C, 200 A.S.E., 250 A.S.E., 350 A.S.E., 560 Sonic, remove the timing inspection plug from the magneto cover.

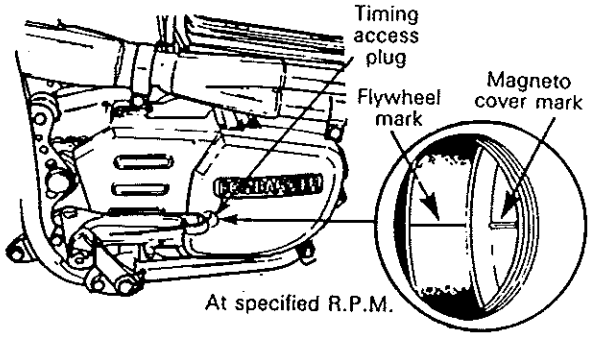
NOTE: Use a separate battery to supply timing lamp.

Start the engine and allow it to warm.

WARNING: To prevent powerful electric shock, do not touch the high tension wire while the engine is running.

NOTE: The flywheel has two timing marks, one for minimum advance, the other for maximum advance. With a view facing the flywheel, the right hand one is the maximum advance timing mark and the left hand one is the minimum timing mark.

Point the timing light beam straight into the inspection hole and rev the engine for a brief instant to 1200 RPM (minimum advance timing mark) and repeat at 6,000 RPM (maximum advance timing mark).



Check the timing marks alignment at specified RPM. If timing is correct, the magneto cover mark and flywheel mark will align as shown.

If the timing was incorrect, it is an indication of an ignition problem. See your dealer.

Spark plug

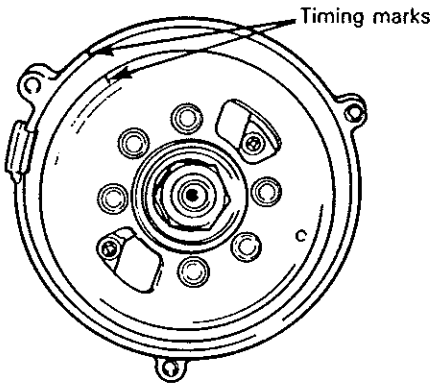
Recommended spark plug:

200 A.S.E.	:	NGK B9ES
250 MX L/C	:	NGK B9ES
250 A.S.E.	:	NGK B8ES
350 A.S.E.	:	NGK B8ES
500 MX	:	NGK B8ES
500 A.S.E.	:	NGK B8ES
560 Sonic MX	:	NGK D8EA

500 MX, 500 A.S.E.

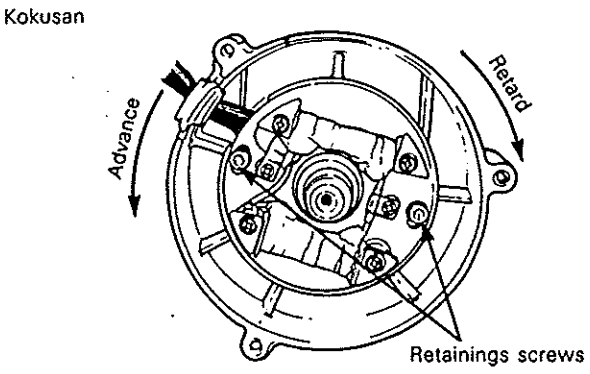
Basic timing BTDC: 20° ± 1, 3.32 mm (0.130").

See if the flywheel and the stator plate marks are aligned.



If the marks do not align, stator plate must be adjusted. To adjust, remove the flywheel using the puller P/N 420 977 661. Loosen the stator retaining screws and move the plate in appropriate direction. Refer to the illustration. Tighten screws after adjustment. Reinstall the flywheel and retaining nuts with "Loctite 242" blue (medium strength) on threads and then torque to 90-100 N·m (66-74 lbf·ft).

▼ **CAUTION: Make sure the stator plate screws and flywheel nuts are properly tightened.**



Stroboscopic timing lamp timing procedure (2 stroke models)

◯ NOTE: The ignition components are affected by temperature variation, therefore, timing must be checked, when engine is cold, after maximum 20 seconds idling.

◯ NOTE: Only stroboscopic timing lights utilizing capacitor or inductive pick-ups can be used to indicate correct spark setting without disturbing the electronic equilibrium of the ignition circuit.

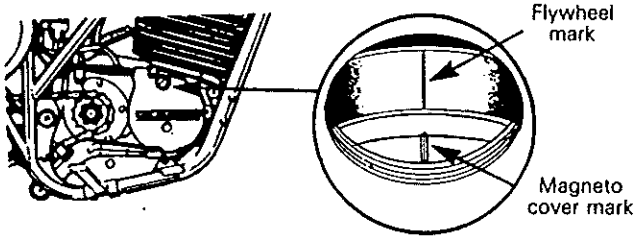
- Loosen adaptor lock nut, then holding gauge with dial face toward magneto screw adaptor in spark plug hole.
- Slide gauge far enough into adaptor to obtain a reading, then finger tighten adaptor lock nut.
- Rotate the rear wheel until the piston is at top dead center.
- Unlock the outer ring of the dial and turn it until "0" on the dial aligns with the pointer.
- Lock the outer ring in position.

Rotate the flywheel backward and slightly beyond t e specified distanc before Top Dead Center. Then, gently rotate forwa d until the specified distance before Top Dead Center is reach d.

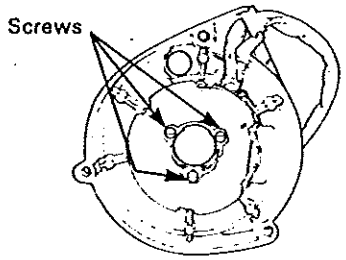
Basic timing before top dead center:

200 A.S.E.	:	14° ± 1, 1.07 mm (0.042")
250 A.S.E.	:	14° ± 1, 1.07 mm (0.042")
350 A.S.E.	:	14° ± 1, 1.07 mm (0.042")
250 MX L/C	:	15° ± 1, 1.30 mm (0.051")
500 A.S.E.	:	20° ± 1, 3.32 mm (0.130")
500 MX	:	20° ± 1, 3.32 mm (0.130")
560 Sonic MX	:	marks align at 1200 and at 5000 RPM

Look through the inspection hole to see if the flywheel and magneto cover marks align.



If the marks do not align, stator plate must be adjusted. To adjust, loosen the stator plate retaining screws and move the plate in appropriate direction. Refer to the illustration. Tighten screws after adjustment.



NOTE: To determine the amount of rotation given to the stator plate, use the stator plate mark with the magneto cover mark as a reference point.

CAUTION: Make sure the stator plate screws are well secured.

Ignition system

Your motorcycle is fitted with a capacitor discharge ignition system which consists of a magneto, an electronic control unit and an emergency cut-out switch.

Regularly check all electrical connections for dirt or corrosion.

Fully pack, as necessary, all connectors and the high tension connection with dielectric grease Dow Corning DC4, or equivalent.

▼ **CAUTION: To prevent moisture, make sure no air is trapped in. Do not use silicone sealant as contacts will corrode.**

Top dead center gauge timing marks verification (2 stroke models)

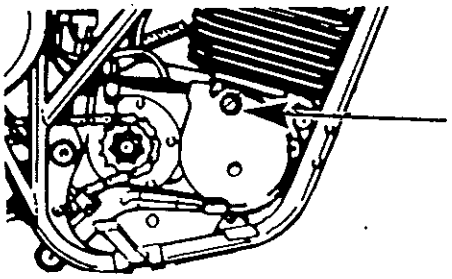
▼ **CAUTION: Timing mark verification cannot be used as a timing procedure, therefore always check the timing (using a stroboscopic timing light) at specified RPM after the marks have been aligned.**

Mount the motorcycle on a box or stand with the rear wheel raised.

Disconnect spark plug wire and remove spark plug.

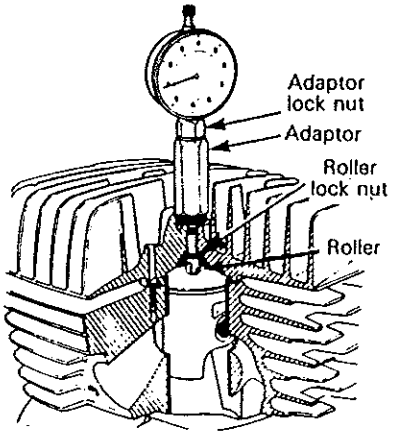
On 500 A.S.E. and 500 MX, remove the Magneto cover.
On 200 A.S.E., 250 A.S.E., 350 A.S.E., 250 MX L/C and 560 Sonic, remove the inspection plug on the Magneto cover.

(TYPICAL)



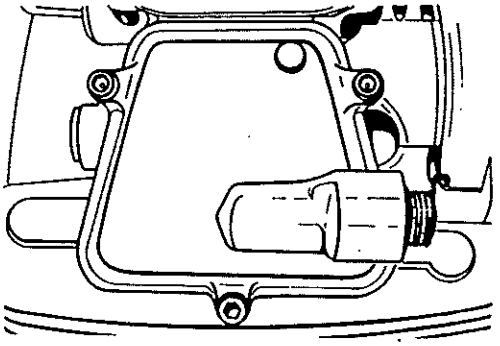
Install and adjust T.D.C. gauge (dial indicator) on engine as follows:

- With gauge in adaptor, adjust roller parallel with dial face. Tighten roller lock nut.



If valve clearance is incorrect, loosen the lock nut and turn the adjusting screw until correct clearance is obtained. Tighten the lock nut, recheck valve clearance.

When all the valve clearances are properly set, check cover seal condition, replace if necessary. Reinstall the cover, tightening hexagonal screws to 8 N•m (6 lbf•ft).



Reinstall the timing hole plug, reinstall the fuel tank (see tank installation).

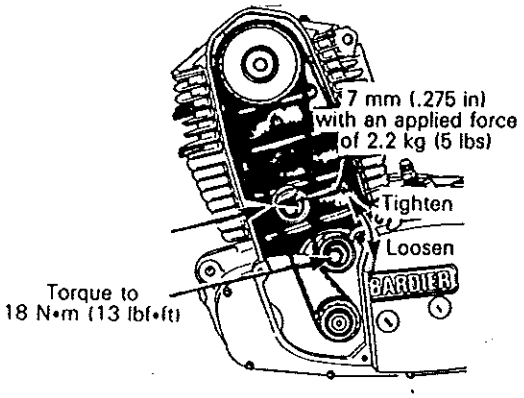
Camshaft drive belt deflection (four stroke model)

- Remove the four(4) screws retaining the belt cover.

▼ CAUTION: Note each screws position.

The belt should be at 7 mm (.275 in) from the guide roller with an applied force of 2.2 kg (5 lbs), if not loosen the belt tensioner, adjust and retorque to 18 N•m (13 lbf•ft).

Recheck the belt deflection.



Check seal cover condition, reinstall the screws in their proper location and tighten to 8 N•m (6 lbf•ft).

560 Sonic (8422)

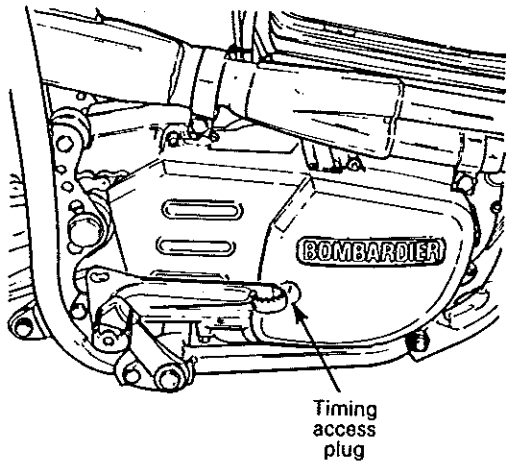
Torque head nuts gradually in a criss-cross pattern to:
The two (2) nuts M8: 25 N•m (18.4 lbf•ft).
The four (4) nuts M10: 40 N•m (29.5 lbf•ft).

Valve clearance adjustment (four stroke model)

With a cold engine, remove the fuel tank.

Remove the timing access plug.

(TYPICAL)

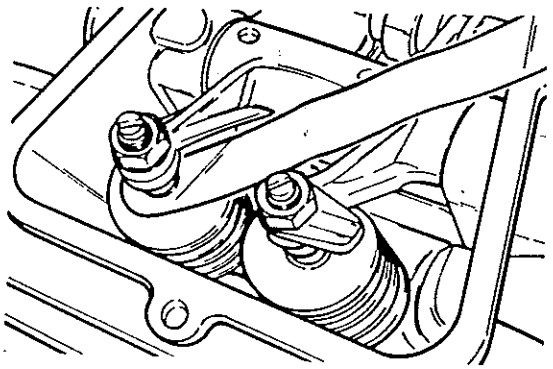


Remove the spark plug and rotate the engine slowly (using the kick start lever) until the coloured timing mark is visible through the timing hole. (Check in the belt cover window, the coloured mark should not be visible. If the yellow mark, or a small portion of it, is visible through the belt cover window, turn the crank one whole turn).

▼ **CAUTION: Ensure that the piston is at the top of the compression stroke.**

Remove valve covers

Check each valve clearance between the valve stem and the adjusting screw by inserting a 0.1 mm (0.004 in) feeler gauge.



Pry carburetor body towards air box, out of front connection hose.

Twist carburetor body away from engine inlet port and remove carburetor.

To remove float chamber, remove 4 chamber screws and tap chamber side with screwdriver handle.

Cylinder and cylinder head retorque

200 A.S.E. (8534)

NOTE: On this engine type the cylinder head must be removed to retorque the cylinder retaining nuts.

Loosen cylinder head nuts in a criss-cross sequence to prevent head warpage.

Retorque the cylinder retaining nuts to 30 N•m (22 lbf•ft).

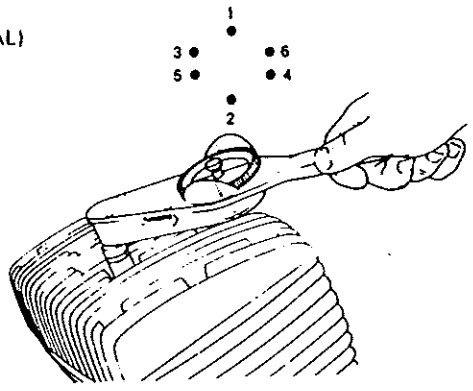
Torque the cylinder head nuts in a criss-cross sequence to 15 N•m (11 lbf•ft).

250 A.S.E. (8535)
250 MX L/C (8420)
500 MX (8421)
350 A.S.E. (8540)
500 A.S.E. (8537)

Torque cylinder head retaining nuts gradually in criss-cross sequence to :

200 A.S.E.: 22 N•m (16 lbf•ft)
250 A.S.E.: 22 N•m (16 lbf•ft)
250 MX L/C: 22 N•m (16 lbf•ft)
350 A.S.E.: 22 N•m (16 lbf•ft)
500 A.S.E.: 36 N•m (26 lbf•ft)
500 MX : 36 N•m (26 lbf•ft)

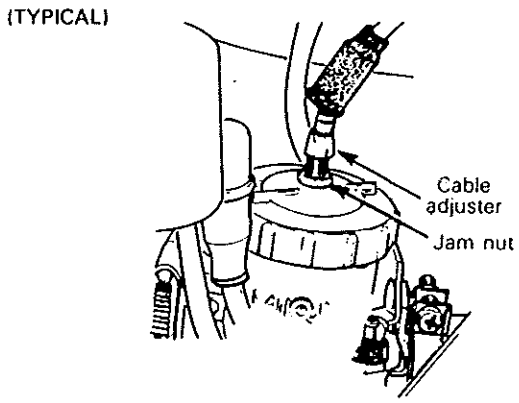
(TYPICAL)



Throttle adjustment

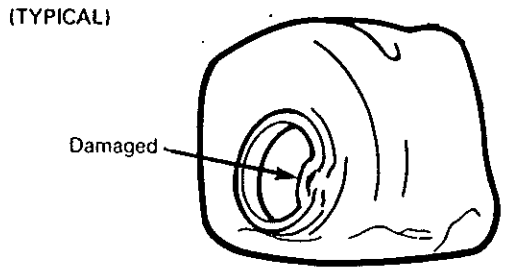
Using the cable adjuster located on the throttle slide chamber cover, set cable slack to 1.6 mm (1/16").

◆ WARNING: Before adjusting, make sure that the other end of the cable housing is well seated and top of carburetor is tight.



◆ WARNING: Before starting engine, carburetor slide must be free to snap back to idle position. Make sure the rubber grip does not rub on the throttle housing or the handlebar end.

▼ CAUTION: Make sure not to overtighten the air box boot hose clamp. Air box flange may distort sufficiently to allow entry of foreign particles.



Carburetor bowl cleaning

With the fuel valve on "OFF" position, disconnect the fuel line.

Completely loosen both carburetor retaining hose clamps, and rotate carburetor towards clutch side.

Remove carburetor top plate and the slide assembly.

▼ CAUTION: Handle slide with care.

Carburetor adjustments

Mixture adjustment

With the motorcycle held in a vertical position, gently turn air screw in until it stops, then back it out to specifications (see technical data).

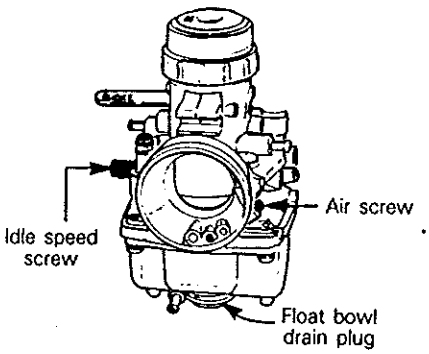
Idle speed

Start the engine and allow it to warm.

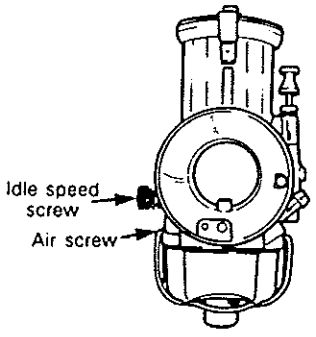
Adjust idle speed screw in or out for desired idle speed (see technical data).

NOTE: The air screw can be turned in or out (within 1/4 turn of basic setting) to achieve smoothest idle possible. Readjust idle speed if necessary.

MIKUNI



BING



CAUTION: Do not attempt to set the idle speed by using the air screw. Severe engine damage can occur.

CARBURETOR TECHNICAL DATA

1986 ARMSTRONG CARBURETION							
	250 MX L/C	500 MX	560 Sonic	200 ASE	250 ASE	350 ASE	500 ASE
Carburetor type	Mikuni	Bing	AMAL	Mikuni	Mikuni	Mikuni	Bing
Carburetor Number	VM 34	40 mm	40 MM L2040/301	VM 34	VM 34	VM 34	40 mm
Main Jet	270	185	340	280	300	300	185
Needle Jet	159P8	292	106	159P8	159P6	159P8	292
Air Jet							
Idle Jet	35	65	25	35	40	40	65
Jet Needle/Position	6DH7-3	8G6-3	2A1 -3	6DH7-3	6DG4-3	6DH4-3	8G6-3
Float Level	Level w/body	------	-------	------	-------	-------	-------
Pilot Air Screw	1 1/4	1 1/4	1 1/2	1 1/4	1 1/4	1 1/4	1 1/4
Slide Cutaway	2.5	180	3.0	2.0	3.0	3.0	180
Engine Idle Speed	1,500	1,500	1,200	1,500	1,500	1,500	1,500
Fuel Grade	Regular unleaded	------	-------	------	-------	------	-------

Air filter servicing

Clean the access panel area. Unlock the screws retaining the access panel (located on the right side of vehicle).

Unscrew the air filter retaining nut.

▼ **CAUTION: Do not allow dirt or dust to fall into the air box opening**

Clean the air filter with air filter cleaner and degreaser or by rinsing thoroughly in cleaning solvent. Allow to air dry.

○ **NOTE:** The air filter compound used should be of a heavy viscosity such as Silkolene foam filter oil (Silkolene number 2702-434) or equivalent.

Pour filter compound onto the air filter and work it well into the foam until it is completely saturated.

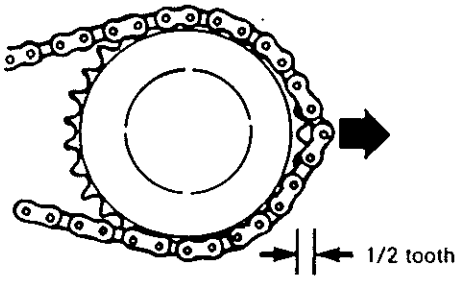
Gently squeeze out excess oil.

Inspect the interior of the air box. If dirt has entered, remedy the cause before reassembly.

Install in reverse order.

○ **NOTE:** Generously grease the sealing edge of the air filter before installation.

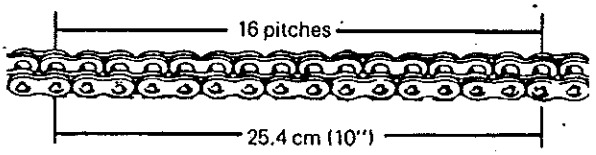
▼ **CAUTION: Ensure that the filter is well secured in place.**



▼ CAUTION: A worn chain will cause severe sprocket damage.

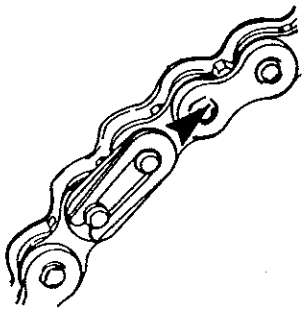
◯ NOTE: Worn sprockets assume a "hooked" appearance. As soon as this condition is noticed, the sprocket should be replaced to prevent rapid chain wear.

The length of 16 pitches of a new chain (no. 520 or 530) is 25.4 cm (10"). If the chain has "stretched" more than 25.9 cm (10 7/32"), for 16 pitches, it must be replaced.



◯ NOTE: Chain must be clean for this measurement.

At assembly, the master link clip must be installed with its closed end facing the direction of chain travel.

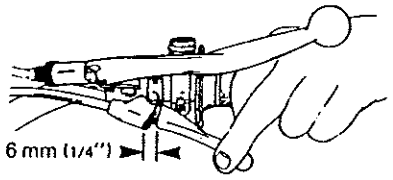


▼ CAUTION: At installation, do not overspread the clip.

Decompressor adjustment

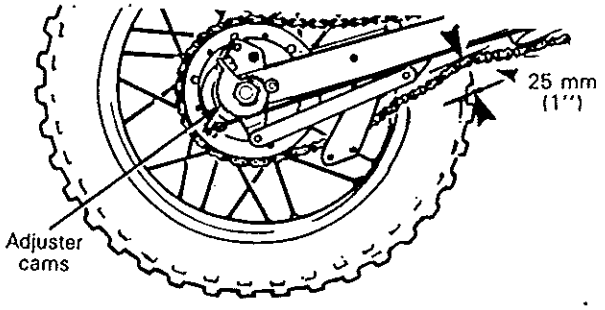
560 Sonic

Loosen the jam nut, turn the adjuster nut clockwise or counterclockwise until a distance of 6 mm (1/4") is obtained as illustrated.



Drive chain adjustment

Loosen the rear axle nut and move each adjuster cam equally to tighten or loosen chain.



Adjust the drive chain in order to obtain 25 mm (1") minimum free-play on lower chain run with the machine in the unladen condition.

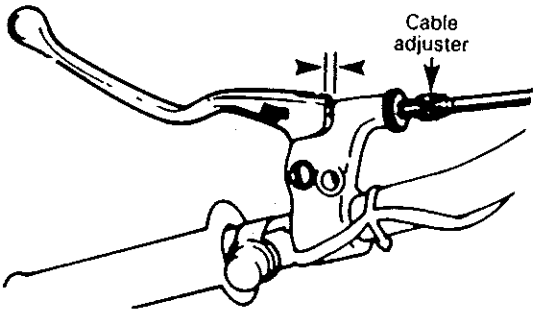
NOTE: The chain free-play must be measured at the chain's tightest point (machine in the unladen condition).

CAUTION: A too small drive chain free-play may damage the rear wheel adjusters and/or transmission mainshaft bearing.

Drive chain servicing

An easy way to estimate chain wear is to check if the link can be pulled away from sprocket.

If you can see more than half a tooth on sprocket, replace the drive chain and check the sprockets.

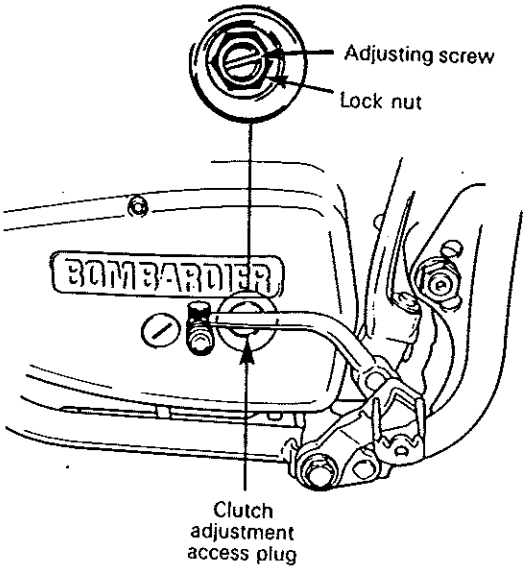


Major adjustment

Loosen the clutch cable adjuster (at handlebar) to provide maximum slack.

Remove the clutch adjustment access plug and loosen the 11 mm lock nut.

Turn the slotted adjusting screw in until contact is made with the release bearing. Then turn screw out 1/8 - 1/4 turn from contact point.

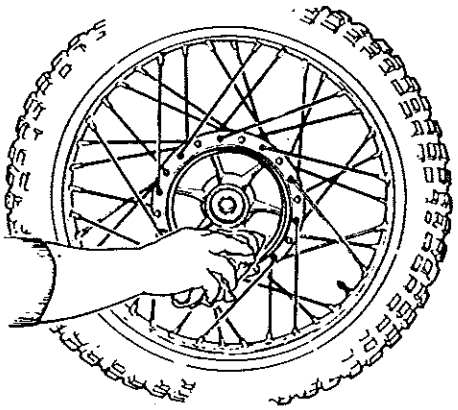


Carefully retighten the 11 mm lock nut to secure the clutch adjustment. Replace the access plug.

Brake shoes (rear)

The brake shoes should be in good, safe working order. Therefore, we recommend that you frequently service, inspect and clean the brake. If necessary clean the brake shoes with a solution of soapy water.

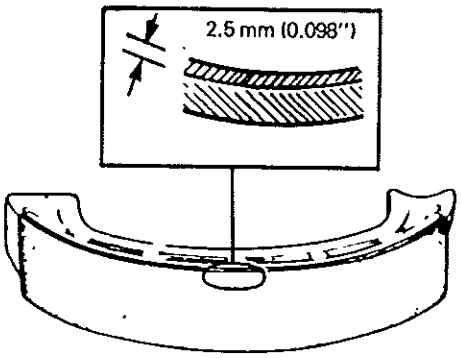
Clean and dry thoroughly.



◆ WARNING: Frequently, inspect the brake shoes for wear.

The minimum lining thickness sould not be less than: 2.5 mm (0.098").

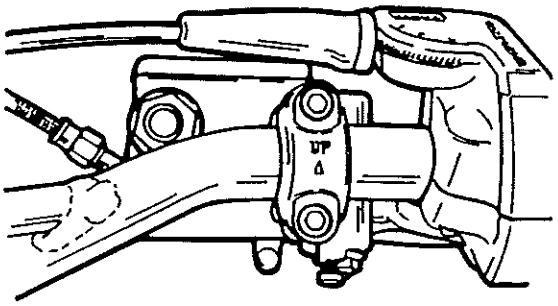
Refer to maintenance section for wheel removal and installation.



Clutch adjustment

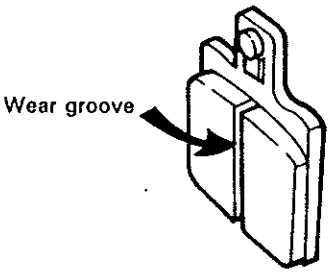
Minor adjustment

Adjust the cable adjuster to provide 8-9 mm (5/16 - 3/8") slack, between clutch lever and housing.



WARNING: Frequently, check the brake fluid level and do not let level fall below sight window.

Brake shoes (Front)



WARNING: Frequently, inspect the brake parts for wear.

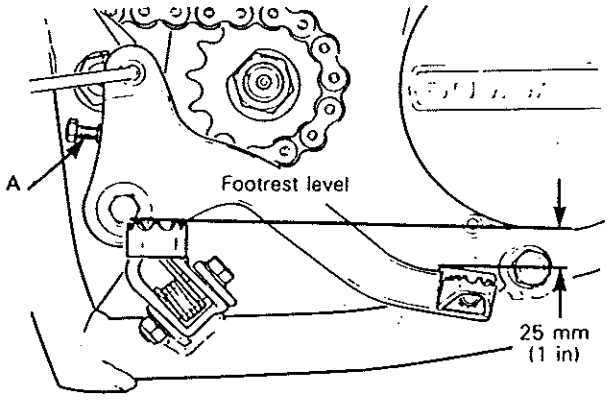
The minimum lining thickness should not be less than wear groove indicator.

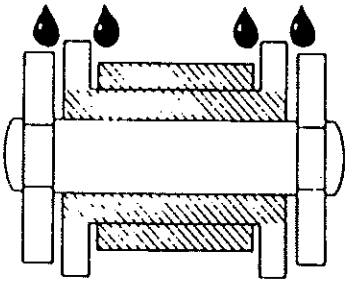
Brake adjustment (rear)

Turn the brake rod adjusting nut until the brake pedal free travel is 25 mm (1").

The brake pedal height can be adjusted as desired by screwing or unscrewing the pedal stopper bolt.

(TYPICAL)





◯ NOTE: Chain lube is available from your dealer.

Control lubrications

Apply a small quantity of oil to all pivot points, cables and occasionally grease the brake pedal pivot.

MAINTENANCE

Brake

Brake adjustment (front)

◯ NOTE: Disc brakes are self adjusting.

Front brake - bleeding

The front brake system on your new Armstrong is a hydraulic disc type and is shipped dry of fluids, therefore, bleeding is necessary. The procedure is simple and can be done in a matter of minutes. The master cylinder on the handlebars must be filled with Dot 4 brake fluid to within 5 mm (3/16") of reservoir top.

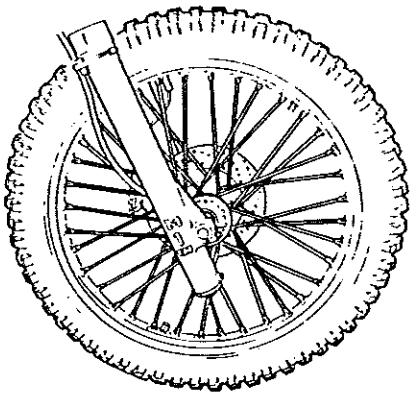
▼ **CAUTION: Brake fluid can cause damage to some plastic and painted surfaces. Please avoid spillage onto these areas.**

Attach a vacuum bleeder such as the "Mityvac brake bleeder" to the bleeder nut. Pump the vacuum pump 10 to 15 times. Then, open the bleeder nut.

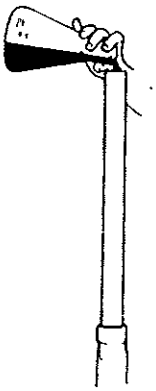
◆ **WARNING: Do not let the master cylinder run out of fluid. Allowing air to enter the system will necessitate starting the bleeding procedure from the beginning.**

When the fluid reservoir is low, close the bleeder nut and replenish the fluid level. Repeat bleeding procedure until all air is expelled from the system.

Remove fork spring retaining cap and the drain plug, pump the fork up and down to allow the fork oil to drain completely.



Replace the drain plug.
Fill the fork with 500cc (16.9 oz) of SAE 5 oil. (See Marzocchi fork manual for further information).



Reinstall the fork spring retaining cap(s) then torque to: 40-54 N•m (30-40 lbf•ft).

Torque fork tube(s) clamp screw(s) (top crown) to 24 N•m (18 lbf•ft).

Drive chain lubrication

With the frame supported on a center stand to hold the rear wheel clear of the ground, rotate the wheel and clean the chain with a stiff bristle brush.

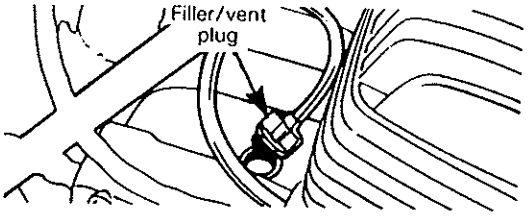
Then apply a liberal quantity of chain oil to each roller and link.

Using a chain spray lubricant, direct spray as shown for maximum penetration to the chain inner surfaces.

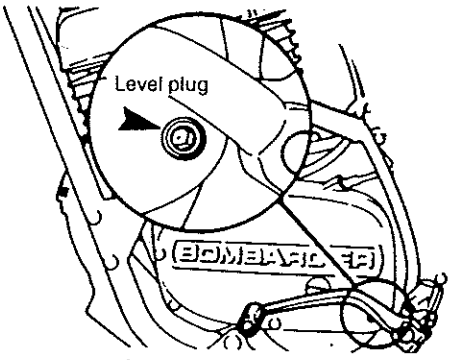
NOTE: Allow sufficient time for lubricant to thichen before riding.

Remove the filler/vent plug and refill the transmission with approximately 1200 mL (40 fl. oz) of SAE 30 motor oil until oil reaches the level orifice.

(TYPICAL)



(TYPICAL)



NOTE: Hold motorcycle upright to check oil level. The level plug is located behind gear change lever.

Replace the level plug, the filler/vent plug and the vent tube.

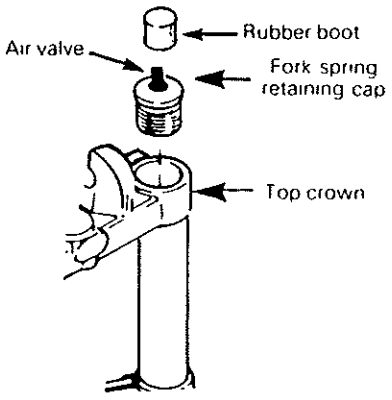
Fork oil change

NOTE: This operation should be performed on one fork leg at a time.

To change the fork oil, proceed as follows:

Slacken the fork tube clamp screw(s) (top crown).

(TYPICAL)

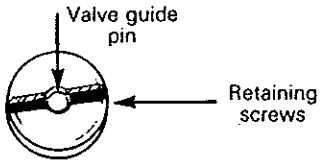


Check also the rubber part for damage or wear and replace if necessary.

Reinstall in reverse order and torque:

- the check valve to 7 N•m (5 lbf•ft)
- the filter cover screws to 8 N•m (6 lbf•ft)

▼ **CAUTION: At assembly, ensure that check valve guide pin is properly indexed with the inside retaining screw hole.**



Refill backbone with clean oil as mentioned in engine oil change.

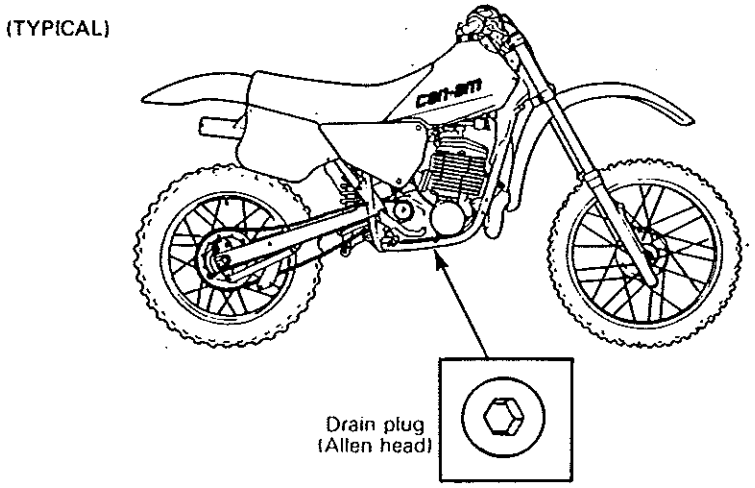
◯ NOTE: To correctly verify the engine oil level see "Pre-ride inspection".

Transmission oil change (two stroke models)

Start the engine and allow it to warm.

Stop the engine.

Remove the drain plug and completely drain oil.



The drain plug tip is magnetized and should be cleaned of metal particles.

Install the drain plug.

▼ CAUTION: Do not cross-thread or overtighten.

When installing a new filter, lubricate the filter seal with clean oil to ease installation and prevent seal damage.

Clean the filter cover and install a new cover seal.

Reinstall the filter cover and tighten the retaining screws to 8 N•m (lbf•ft).

Oil line filter

Your new 560 Sonic will have an inline oil filter which should be cleaned at the same intervals as the oil filter. The filter is locate on the oil inlet line between the frame and engine. The filter should be removed and the 30 mm nut removed from the filter end. Remove and clean the inner screen in a solvent. Reassemble.

◆ **WARNING: Care should be taken when using solvents. Some can be flammable and could cause personal injury. Always wear eye protection when using cleaning solvents.**

Oil filling

Use 3000 cc (.80 gal. U.S./.65 gal. imp.) of 10W/30 winter or 20W/50 summer motor oil to refill the engine. Check oil level, ensure the oil level touches the gauge (washer).

Start the engine, check for any oil leaks (plugs, filter cover, sump screen cover, hoses), allow the engine to warm and then stop the engine and recheck oil level, if not within the safe range readjust.

Engine check valve inspection

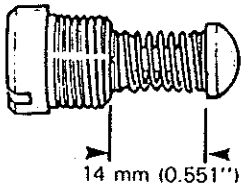
Drain the backbone and engine sump oil in a suitable pan.

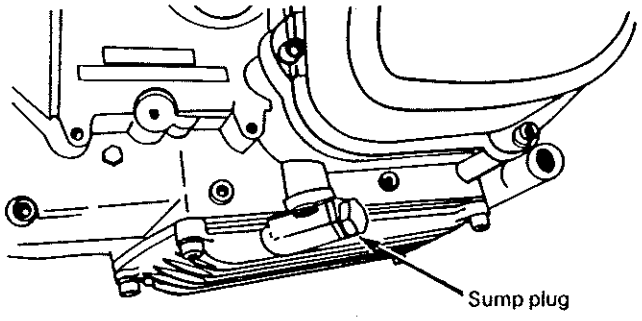
Remove the filter cover and the filter.

Using a screwdriver remove the check valve retaining screw, pull out the check valve.

Inspect for dirt on the check valve or on the check valve seat, clean if necessary.

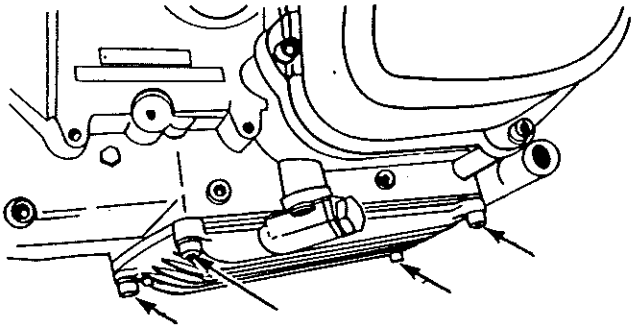
Check its operation by pushing the spring, it should come back freely. The spring MUST not be broken.





Engine sump oil filter screen

After draining the engine oil, remove the six screws retaining the filter screen cover. Clean the filter screen and the cover. Check "O" rings condition replace if necessary. Reinstall the filter screen and the cover. Torque the screws to 8 N•m (6 lbf•ft).

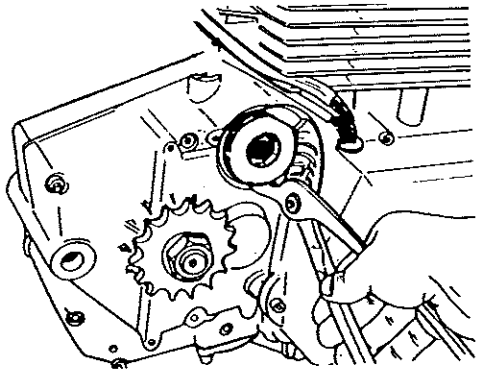


▼ CAUTION: Verify "O" rings condition and replace if necessary.

Engine filter servicing

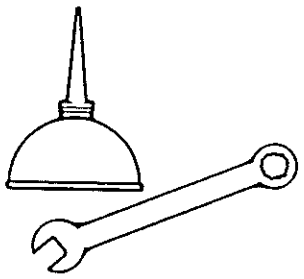
Remove the engine sprocket guard.

Remove the three screws retaining the filter cover; using slip joint pliers, pull out the filter.



LUBRICATION

Frequency



Routine maintenance is necessary for all mechanized products, and the motorcycle is no exception. A weekly vehicle inspection contributes to the life span of the motorcycle as well as maintain reliable operation.

Engine oil change (four stroke model)

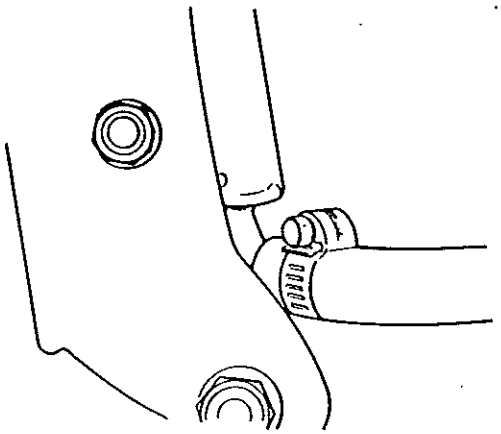
NOTE: This engine and transmission use the same oil.

To completely drain the engine oil, it is necessary to drain the engine pump and the frame backbone.

Backbone oil draining

Remove lower oil hose from front frame down tube and drain oil into suitable pan. After draining the frame oil; check oil hoses condition (replace if necessary).

(TYPICAL)



Engine sump oil draining

With the motorcycle in a vertical position, remove the engine sump plug and drain the oil in a suitable pan.

After draining the oil clean and reinstall the plug, torque to 20 N·m (15 lbf·ft).

LUBRICATION AND MAINTENANCE

Lubrication and maintenance schedule

250 MX L/C (8420) 500 MX (8421) 560 Sonic (8422) 200 A.S.E. (8534) 250 A.S.E. (8535) 350 A.S.E. (8540) 500 A.S.E. (8537)	Daily or as required	After 480 km (300 miles)	APPROX. Every 1600 km (1000 miles)	APPROX. Once a year	See page
1. Cleaning the motorcycle	•				49
2. Engine and backbone oil change[2]		•	•		19
3. Engine filter change[2]		•	•		20
4. Engine filter screen and backbone oil strainer[2]		•	•		20
5. Camshaft drive belt deflection[2]			•		37
6. Valve clearance[2]			•		36
7. Spark plug		•	•	•	42
8. Air filter servicing	•	•	•		31
9. Clean carburetor.				•	34
10. Carburetor adjustment		•	•		33
11. Throttle adjustment		•	•		34
12. Clutch adjustment		•	•		28
13. Transmission oil change[1]		•		•	22
14. Drive chain lubrication	•	•			24
15. Drive chain adjustment	•	•	•		29
16. Rear brake adjustment	•				26
17. Steering bearing adjustment		•	•		42
18. Fork oil change		•	•	•	23
19. Retorque QUAD LINK ™ bolts		•		•	45
20. Swing arm verification			•	•	44
21. Grease swing arm bearings		•		•	45
22. Wheel bearing inspection			•	•	45
23. Check and tighten spokes and sprocket bolts	•	•	•		49
24. Rear shock pressure	•	•			47
25. Retorque cylinder base nuts and cylinder head nuts		•		•	35
26. Check coolant level[3]	•				15

[1] Two stroke models only
[2] Four stroke model only
[3] Liquid coolend engines

Two stroke models

Use a small throttle opening while using the kick starter.

Four stroke model

It is highly recommended to let the throttle to idle position while using kick starter.

Riding the vehicle

After the engine has warmed and is running smoothly, the motorcycle is ready to ride.

Pull in clutch lever and engage 1st gear pressing down on gear change lever.

Simultaneously release clutch and gradually open throttle to assure a smooth positive start.

When the engine has reached sufficient RPM disengage the clutch, lift the gear lever to shift into 2nd gear while simultaneously closing the throttle. Release the clutch and open the throttle to further accelerate.

NOTE: With adequate coordination and practice, shifting will become smooth and precise.

Use this same procedure to shift progressively up to 3rd, 4th, etc...

When slowing or stopping, use front and rear brakes simultaneously and coordinate down shifting with the rate of deceleration so as to stop in 1st gear.

Stopping the engine

Hold the emergency cut-out switch depressed until the engine stops.

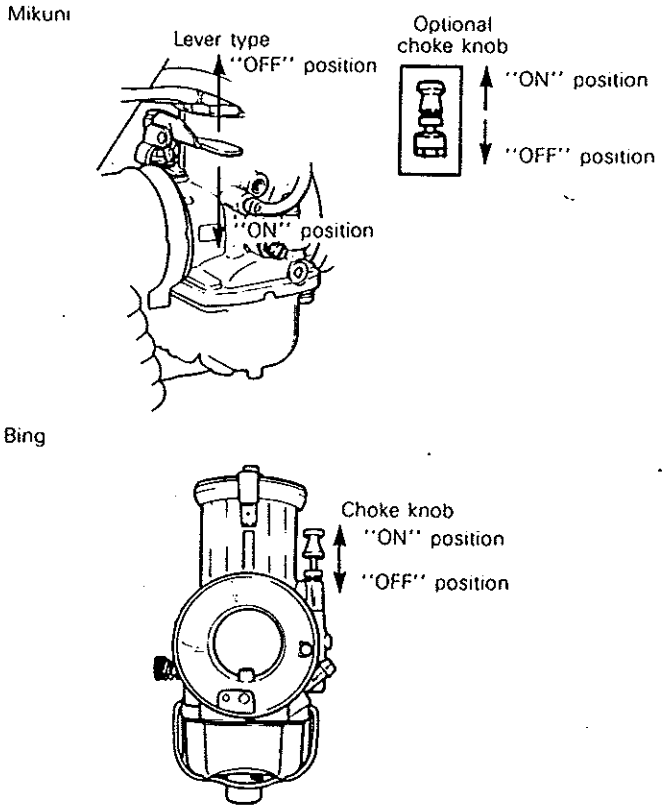
Turn the fuel control valve to "OFF" position.

Check oil level (pre-ride inspection).

Turn fuel control valve pointer to "ON" position.

Select transmission neutral position.

Engage choke.



(Four stroke model) fold kick start pedal out and press down until the colored spot is visible through the belt cover window on the engine.

(Two stroke models) fold kick start pedal out and press down until engagement is felt.

NOTE: Throttle must remain closed during choke operation.

Kick pedal down with a rapid, follow through motion.

Return choke to the off position by pulling up the lever.

Run engine at moderate RPM until warm.

Warm engine

Use the same procedure but do not use choke.

PRE-RIDE INSPECTION

Throttle action

Be sure throttle is free and will snap back to "OFF" position.

Emergency cut-out switch

Be sure switch will stop engine.

Rear brakes

Adjust if necessary (25 mm free travel to the end of lever).

Clutch control lever

If necessary, adjust to 8-9 mm (5/16 - 3/8") free-play between clutch lever housing and lever (refer to clutch adjustment page).

Drive chain

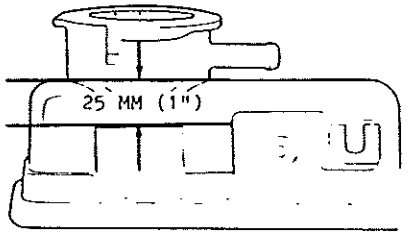
Adjust if necessary, and lubricate.

Tire pressure

Ground condition	Front	Rear
Dry and rocky	98 kPa (14 P.S.I.)	98 kPa (14 P.S.I.)
Soft, wet, muddy	84 kPa (12 P.S.I.)	84 kPa (12 P.S.I.)

Coolant level 250 models

A 50/50 mixture of anti-freeze and distilled water should be added to the radiator within 13 mm (.5") of the filler neck.



NOTE: Always use ethylene-glycol anti-freeze containing corrosion inhibitors specifically recommended for aluminum engines.

Starting procedure

Cold engine

If the oil level is visibly near the gauge in the filler neck but does not touch it: Ride the motorcycle in order to allow the engine to reach its full operational temperature and recheck after a long idle period. If not within the safe range readjust.

If the oil level is not visible in the filler neck: It is probably because part of the oil is in the sump. Proceed as follows:

- Start the engine and allow it to run.
- Check if the oil is circulating properly by looking into the filler neck (you should see pulses of oil coming from the return oil line).

If the oil is not circulating: Stop the engine and check for the following:

- engine with little or no oil
- air lock in inlet oil line
- defective oil pump
- blocked oil lines

If the oil is circulating: Allow the engine to reach its full operational temperature by allowing it to run at various engine RPM for several minutes. Then allow the engine to idle for approximately 5 minutes.

This should balance the feed and scavenge oil pump sections and will allow the scavenger section to slowly raise the oil level up to the gauge.

NOTE: The length of time needed to raise the oil level in the backbone will vary depending of engine temperature, idle RPM, type of oil, etc.

After the idle period recheck the oil level to the gauge. If not within the safe range, readjust.

NOTE: Use high quality oil 10W/30 for temperature below 15.5°C (60°F) or 20W/50 for temperature above 15.5°C (60°F).

NOTE: Avoid mixing oil and gas directly in your motorcycle tank. However if this has to be done, be sure to respect the proper fuel/oil ratio and to close the fuel control valve during this procedure.

Lubrication system (Four stroke model)

The 560 Sonic MX motorcycle features a backbone oil reservoir and a double rotor oil pump with a feed and a scavenger section. It also has a check valve to prevent backbone draining in engine sump while stopped. The scavenger pump section has 3 times the feed pump section capacity and works against gravity.

This explains why the oil level in the backbone reservoir will vary depending on engine temperature, engine RPM, quantity and type of oil, and length of time the motorcycle is operated.

Key points to remember:

- The backbone oil capacity is 3.18 liters (0.7 imp. gal. - 0.75 U.S. gal.). Always insure to pour the proper oil quantity after an oil change.

- If the exhaust is not smoking and the engine has no oil leak, you can assume that all the oil is still there, either in the sump, the backbone reservoir or both.

- Always check first if the oil is circulating by looking in the filler neck. This is more important than the level itself.

- If the backbone oil level is good before a storage period but drops significatitly during storage, check for stuck or damaged check valve or for a leak between the oil pump body in crankcase.

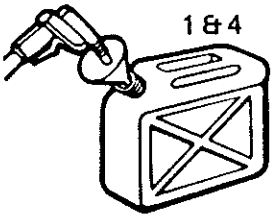
Engine oil check

Check engine oil level with the engine cold and the motorcycle in a vertical position.

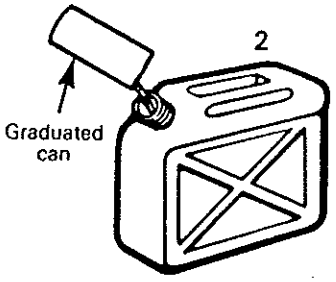
The oil level should be within 38 mm (1.5") of the filler neck top portion.

◆ WARNING: Gasoline is flammable and explosive under certain conditions. Always perform procedures in a well ventilated area. Do not smoke or allow open flames or sparks in the vicinity. If gasoline fumes are noticed while driving, the cause should be determined and corrected without delay. Never add fuel while engine is running.

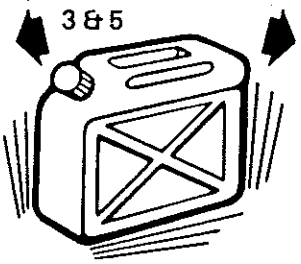
1. Pour approximately the fourth of the desired gasoline quantity into a clean container.



2. Add oil amount corresponding to the desired quantity of gasoline.



3. Replace container cap and shake the container thoroughly.



4. Add the remainder of the gasoline.

5. Once again thoroughly agitate the container. Then using a funnel with a fine mesh screen to prevent the entry of foreign particles, transfer mixture from container into the tank.

○ NOTE: When using pre-mixed fuel, always shake the container thoroughly as the oil has a tendency to settle.

◆ WARNING: Never 'top up' gas tank before placing the vehicle in a warm area. At certain temperature, gasoline will expand and overflow.

FUEL AND OIL

Fuel/oil mixing (two stroke models)
Recommended gasoline (all models)

- All 1986 Can-Am motorcycles are tuned to operate on regular unleaded fuel at the correct oil mixing ratio.

▼ **CAUTION: 350 A.S.E. must use 92 octane minimum.**

▼ **CAUTION: Never experiment with naphtha, methanol or similar products.**

◆ **WARNING: Never use a lighted match or open flame to check fuel level.**

Recommended oil

Oil must be added to the gasoline in pre-measured amounts then both oil and gasoline should be thoroughly mixed together before fueling the tank.

Use Bombardier oil available from your dealer. This type of oil meets the lubrication requirements of the Bombardier-Rotax engine.

If Bombardier oil is unavailable substitute with a high-quality 2 cycle oil. The oil gas mix must meet the vehicle requirements. See oil manufacturer recommendations on container.

▼ **CAUTION: Never use outboard oils, straight mineral oils.**

Fuel mixture ratio

The importance of using the correct fuel mixture cannot be overstressed. An incorrect fuel ratio results in serious engine damage. Recommended fuel ratios are:

- 200 A.S.E., 250 A.S.E., 250 MX L/C, 350 A.S.E.: 40 to 1.
- 500 MX, 500 A.S.E.: 25 to 1.

Fuel mixing procedure

Never mix directly in the motorcycle tank. The best way to mix the gasoline and the oil is to use two clean containers, either plastic or metal. Fill the first one with the oil and gas. Draw from the first one to the second one until empty; then use the second one to fill your motorcycle.

First inspection

As with any precision piece of mechanical equipment, we strongly suggest that after the first few hours of operation specific items be checked by your dealer (see check list). This inspection will give you the opportunity to discuss the unanswered questions you may have encountered during the first hours of operation.

NOTE: Inspections are at the expenses of the vehicle owner.

FIRST INSPECTION CHECK LIST	250 MX L/C (8420) 250 A.S.E. (8535) 350 A.S.E. (8540) 560 Sonic (8422) 500 MX (8421) 200 A.S.E. (8534) 500 A.S.E. (8537)
1. Clean motorcycle	
2. Change transmission oil [1]	
3. Change engine oil and filter [2]	
4. Clean engine sump screen [2]	
5. Valve adjustment [2]	
6. Camshaft drive belt deflection [2]	
7. Fork oil change	
8. Drive chain and cables lubrication	
9. Cylinder base nuts and cylinder head retorque [1]	
10. Check and adjust (except Sonic MX) ignition timing	
11. Air filter servicing	
12. Carburetor adjustment	
13. Throttle adjustment	
14. Clutch adjustment	
15. Steering bearing adjustment	
16. Check and tighten spokes and sprockets bolts	
17. Front and rear brake adjustment	
18. Drive chain adjustment	
19. Retorque engine flywheel nut	
20. Muffler servicing	
21. Retorque quad link bolts (rear suspension)	
22. Check coolant level	

[1] Two stroke models only

[2] Four stroke model only

We recommend that you have your dealer sign this inspection certification.

Date of inspection

Dealer signature

BREAK-IN PERIOD

Break-in period

Continued excellence of performance and reliability depend, to a great degree, upon the care and treatment of the entire motorcycle during the initial period of operation.

When first riding a new or reconditioned motorcycle, or after replacing the piston, or rings, operate the motorcycle for the first hour using not more than half throttle and shifting gears so that the engine does not lug.

▼ **CAUTION: Excessive high RPM may cause engine damage.**

First half hour

Make any necessary corrections or adjustments of controls, spokes, drive chain, etc... (See "Lubrication & Maintenance").

Check for loose nuts, bolts and fasteners. Tighten them if necessary.

(Four stroke model) check engine oil level.

Remove the engine flywheel nut. Clean threads properly, then, apply Loctite adhesive sealant 242 Blue (medium strength) on threads and retorque to

200 A.S.E	:	75-80 N·m (55-60 lbf·ft)
250 A.S.E	:	75-80 N·m (55-60 lbf·ft)
250 MX L/C	:	75-80 N·m (55-60 lbf·ft)
350 A.S.E	:	75-80 N·m (55-60 lbf·ft)
500 A.S.E	:	90-100 N·m (66-74 lbf·ft)
500 MX	:	90-100 N·m (66-74 lbf·ft)
560 Sonic	:	90-100 N·m (66-74 lbf·ft)

Repeat after 5 hours

▼ **CAUTION: Due to its larger bore, special attention must be brought to the 500 MX engine break-in period.**

First five hours

Do not run the engine at excessive RPM.

Shift gears frequently to keep the engine running freely at a moderate RPM range without subjecting it to extreme loads (lugging, overreving, etc.).

Retorque sprocket bolts.

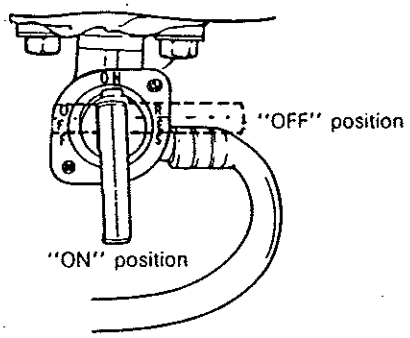
Always allow engine to warm before riding.

J) Side stand

The side stand fits to the left side of the vehicle.

▼ CAUTION: Do not sit on motorcycle while it is supported by the side stand or damage could occur to the swing arm or stand.

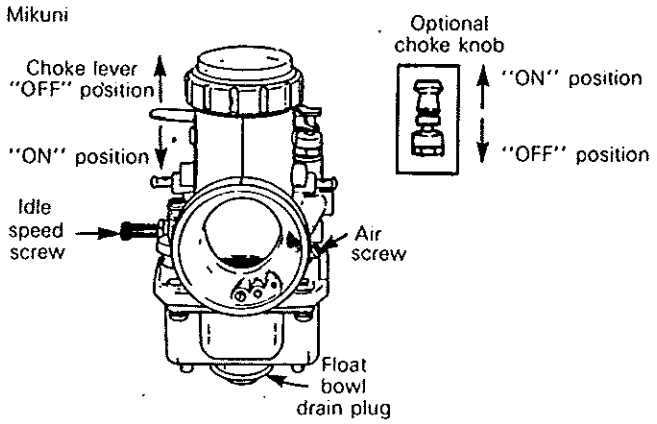
At "OFF" -valve turned frontward- the fuel flow is stopped.

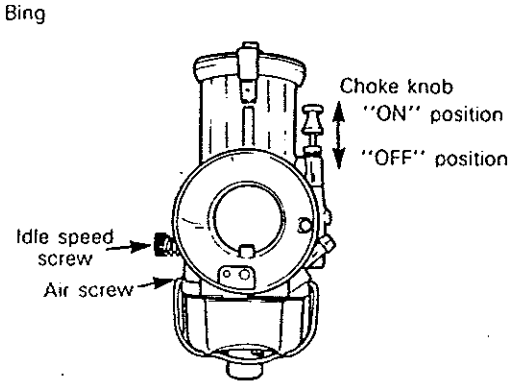


NOTE: Fuel valve should be off whenever engine is stopped.

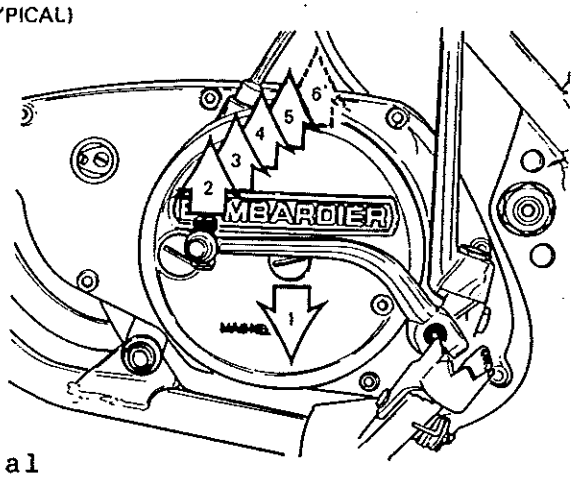
I) Choke

The choke knob is located on the left side of the carburetor. To engage choke, push down the lever or pull on the knob. To disengage, pull up the lever or push down the knob. The choke should always be used for easier cold engine starts. After engine is warm however, it is not necessary to use choke when starting. Do not operate vehicle with choke on.





(TYPICAL)



G) Kick start pedal

Two stroke models

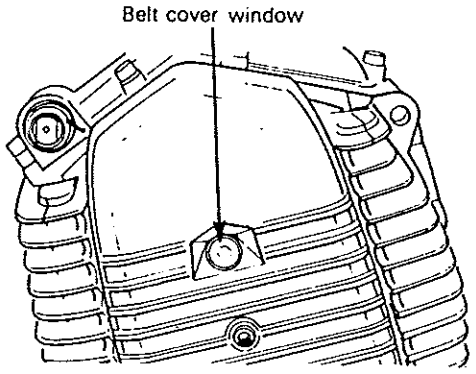
To start engine, gently press pedal down until engagement is felt, then kick down with a rapid, follow through motion.

To start engine in other than neutral, disengage clutch.

Four stroke model

To start engine, gently press pedal down to rotate engine until the light colored spot is visible through the belt cover window on the engine, then kick down with a rapid, follow through motion.

To start engine in other than neutral, position, disengage clutch.



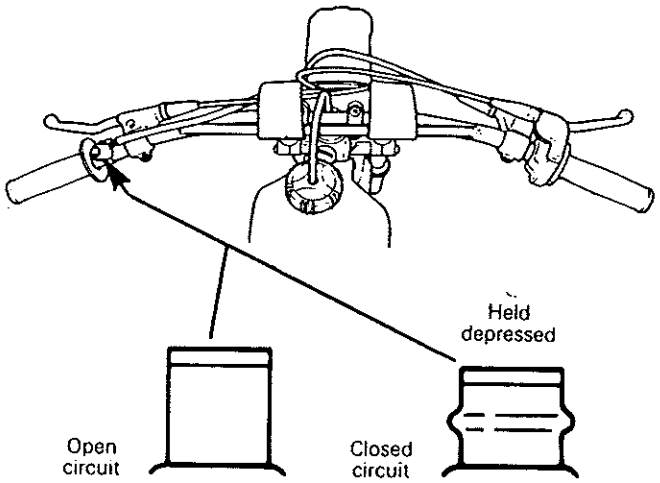
H) Fuel control valve

Located on right side of the gas tank, the fuel valve will control fuel flow.

At "ON" -valve turned down- the tank will drain except for the reserve quantity.

B) Emergency cut-out switch

The cut-out switch is thumb operated and must be held depressed until the engine stops.



◆ WARNING: If the button has been used in an emergency situation the source of malfunction should be determined and corrected before restarting the engine. Declutching and braking will also stop the vehicle.

C) Front brake lever

The front brake lever, when pulled towards handlegrip, will apply the front brake.

D) Rear brake pedal

The rear brake pedal, when depressed, will apply the rear brake.

E) Clutch control lever

The clutch control lever, when pulled towards handlegrip, will disengage the clutch.

F) Gear change lever

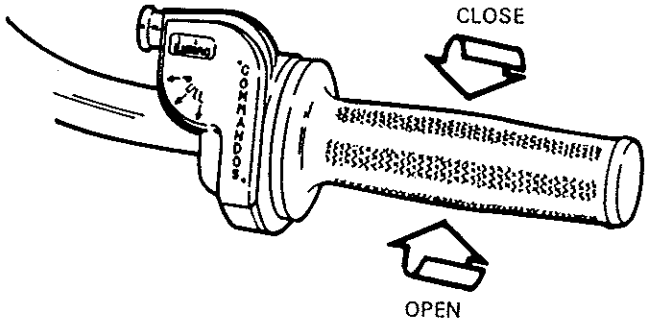
The gear change lever operates a progressive shift, positive stop mechanism. One full stroke of the lever will shift only one gear position. The lever is spring loaded to return to its static position. Lifting lever up will progressively engage higher gears and pressing lever down will engage lower gears.

Neutral is located between 1st and 2nd gear.

A) Throttle control

To open the throttle, turn the twistgrip towards you as shown. (See arrow).

To close the accelerator, turn twistgrip as shown. (See arrow).



◆ WARNING: If throttle does not snap back to "OFF" position when released, do not start motorcycle until the situation is corrected. (See dealer if necessary).

The throttle control features a quick "1/4 turn" action and removable cover allows quick cable removal.

Throttle cable change

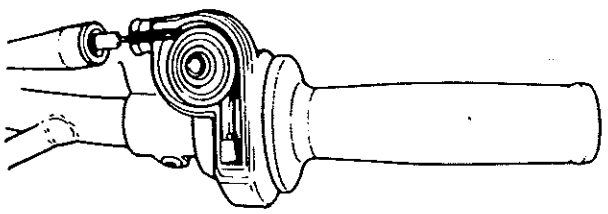
Removal

Pull out rubber boot from cable guide tube.
Remove the throttle cover by pulling it as indicated on the cover.

Fully extend the throttle cable then remove from the throttle control.

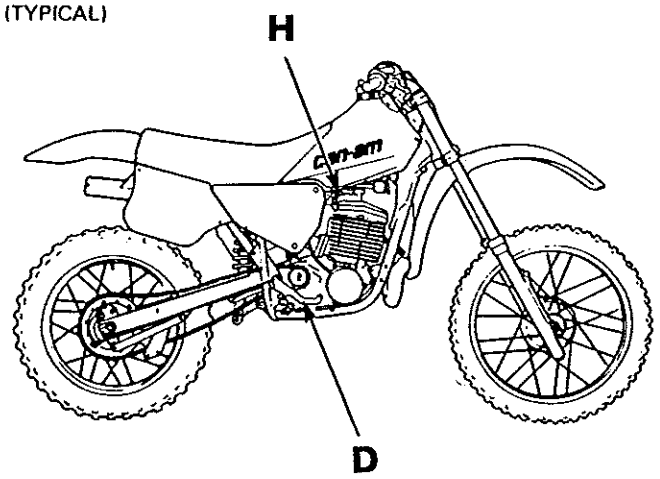
Installation (while motor is off):

Fully extend inner cable and hold inner cable at outer housing end between thumb and forefinger. Install inner cable end into throttle control cable reel and route around cable pulley. While slowly releasing cable, lower it into the cable guide tube. Reinstall throttle cover and replace rubber boot.



CONTROLS/INSTRUMENTS

(TYPICAL)



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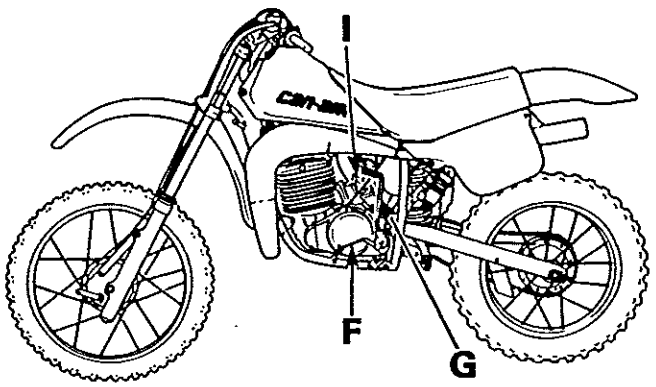

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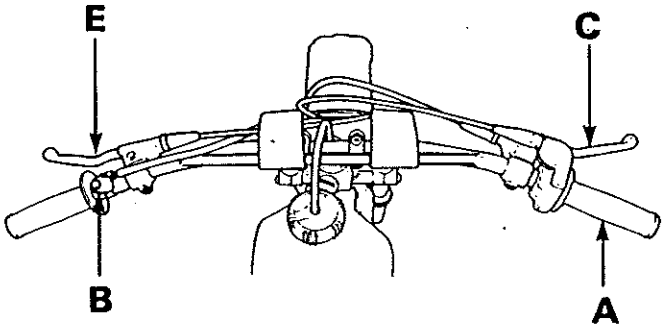

A) Throttle control
B) Emergency cut-out switch
C) Front brake lever
D) Rear brake pedal
E) Clutch control lever
F) Gear change lever
G) Kick start pedal
H) Fuel control valve
I) Choke

SAFETY IN MAINTENANCE

Observe the following precautions:

- Throttle mechanism should be checked for free movement before starting engine.
- Never run the engine at high RPM when in neutral. Running an unloaded engine can prove to be dangerous.
- Gasoline is flammable and explosive under certain conditions. Always perform procedures in a well ventilated area. Do not smoke or allow open flames or sparks in the vicinity. If gasoline fumes are noticed while driving, the cause should be determined and corrected without delay.
- Maintain your vehicle in top mechanical condition at all times.
- Only perform procedures as detailed in this manual. Unless otherwise specified, engine should be turned OFF and cold for all lubrication and maintenance procedures.
- Installation of other than "stock" equipment, could severely affect the stability and safety of your vehicle. Avoid adding on accessories that alter the basic vehicle configuration.
- The Rotax engine can be stopped by depressing the emergency cut-out switch. (ASE'S Only)
- Since the engine cooling is in effect only when the vehicle is in motion, it is recommended that you do not allow the engine to idle for more than brief periods. Prolonged idling and low speed operation may cause engine damage.
- The vehicle is designed for the driver only. No provision has been made for a passenger.

Please read and understand all other warnings contained elsewhere.

IMPORTANT: For procedures not covered in this manual which may be required less frequently than those mentioned, please contact your dealer.

THIS MANUAL SHOULD REMAIN WITH THE VEHICLE AT THE TIME OF RESALE.

ARMSTRONG WORKSHOP MANUEL & GENERAL INFORMATION