



**OWNER'S MANUAL
1988**



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PRE RIDE INSPECTION

Before jumping on your machine and blasting around, take caution and check the condition of some important items.

1. Be sure throttle is free and that it will snap back to a closed position.
2. With the engine running, see if the Kill-Button will stop the motor.
3. Will the brakes stop the wheels?
4. Is the chain adjusted correctly?
5. The air pressure in the tire's should be 14 lbs in the front and 10-12 lbs in the rear.
6. Turn fuel petcock lever to the on position.
NOTE: Close to off position when not in use.
7. Read the rest of this operators manual!!

BREAK IN PERIOD

A little bit of care in the way you treat your motorcycle during its initial operation, will reward you with extended life and increased performance.

In the first THREE HOURS of operation, the engine should not be subject to excessive and prolonged RPM nor extreme loads. In other words Do Not Lug the motor down nor Rev for extended periods.

During the break in period, adjustments may be necessary to the clutch, throttle, spokes, drive chain, and nuts and bolts.

Both front and rear brakes require a seating in process of the pads to the disc.

Fuel and Oil

Operate your ATK with the best fuel you can obtain. We recommend (92 Octane) unleaded premium at the correct oil mixing ratio.

Never experiment with methanol, naphtha, or similar products (Avoid Octane Boosters completely. Use instead, all or part Race or Aviation fuel mix).

When selecting an oil to mix with your gas, use a high quality 2 cycle oil. Mix the oil according to manufacturer recommendations on the container.

Recommended Fuel Ratios:

250---40 to 1.

406---32 to 1.

Note: When using pre-mixed fuel, shake the container thoroughly as the oil might settle.

Never use an open flame to check the fuel level.

Gasoline is flammable and explosive under certain conditions.

Do not add fuel while engine is running.

White Power Upside Down Forks

Routine Maintenance

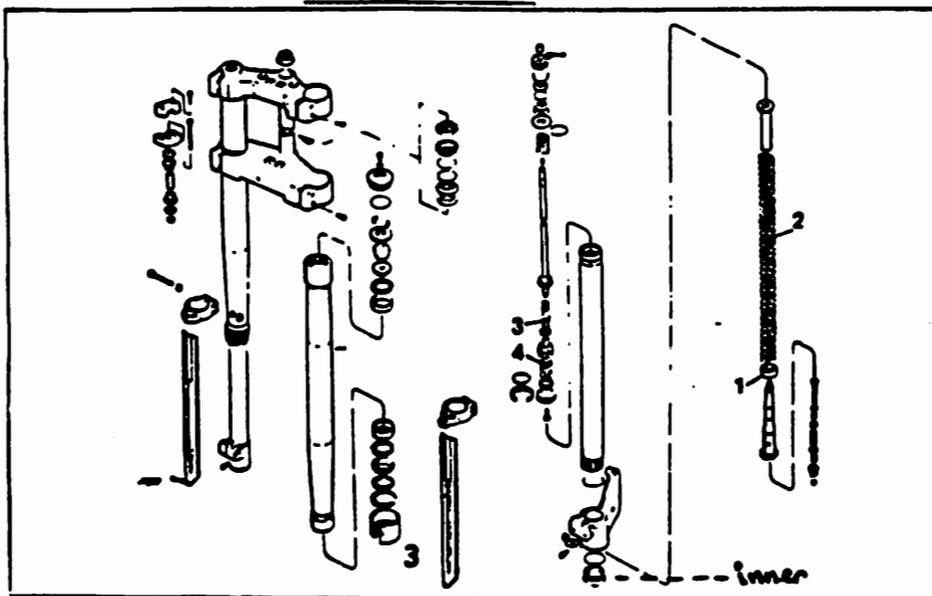
To achieve the best performance from your forks, follow these guidelines.

1. Release any air pressure that may buildup after a session of riding.
2. Pull the fork wipers down and clean around the seal area after a build-up of dirt occurs.
3. Change the fork oil every fifty hours of operation or when damping becomes erratic.

Oil Replacement

1. Release any air pressure buildup.
2. Loosen top and lower fork caps before removal from the machine.
3. Remove the front wheel, brake caliper assy. and brake line guides and lay back at side of machine.
4. Pull forks from machine, invert and unscrew inner tube fork cap. Remove preload spacer (if fitted) and fork spring.
5. Drain the oil out and replace spring, spacer and cap.
6. Turn the fork over and unscrew top cap. Compress fork slightly to remove the half moon washers.
7. To remove the keeper below the washers, press on oneside and compress fork.
8. Pull out the remaining bottom out buffer and nylon spacer. Drain any remaining oil.
9. When compressing the fork the dampening rod will extend out of the fork and inside the bypass valve will come into clearer view.

Fork Schematic



10. This bypass valve has six holes in it with a shim on the other side that must be opened to allow the oil to pass. You must do this when re-filling or bleeding air out. Use a long rod 1/8" diameter or less to depress the valve thru one of the holes. This allows the oil to drain down into the lower fork leg.
11. Pour in approximately 18-21 ounces of Bel-Ray HVI 10W shock and fork oil.
12. To bleed the air from the inner tube you must keep the valve open for about 3 minutes. Wait till there are no more air bubbles in the oil.
13. The standard measurement of the oil level is when the damping rod is extended (120mm) from the fork tube, yet at the same time keeping the oil level flush with the bleed valve (Bypass valve.)
14. Quantity of the oil in the fork affects only the last fifty percent of the travel. More oil in the fork will result in less tendency to bottom out.
15. Never exceed an oil level height of 130mm and never go below 100mm.

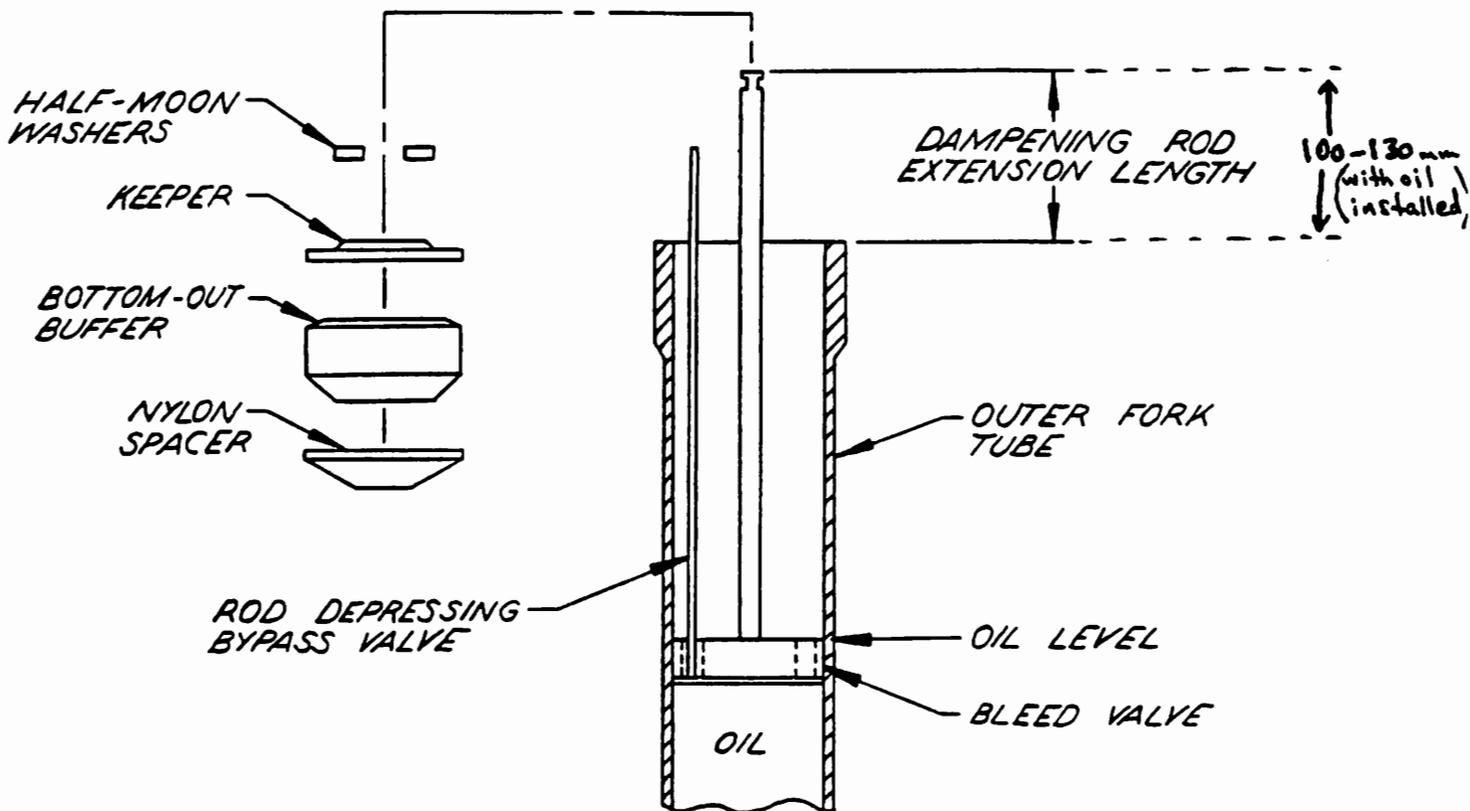


FIGURE 1

PRELOAD ADJUSTMENT

To change the initial stage of travel in the fork, decrease or extend the length of the preload spacer. By decreasing the length of the preload, the softer the initial travel will be. See figure for preload measurement.

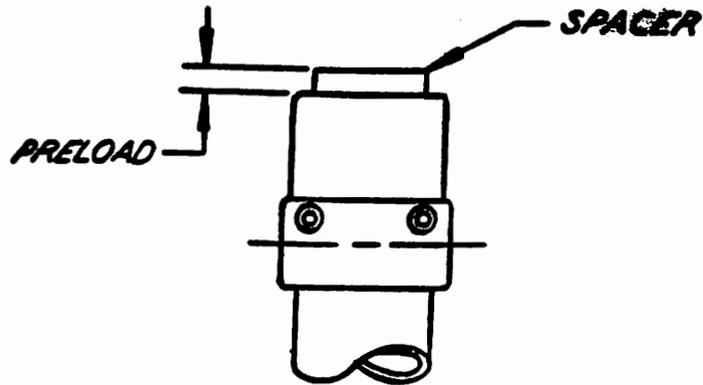


FIGURE 2

FIGURE 2

EXAMPLE

<u>PRELOAD LENGTH</u>	<u>FORK ACTION</u>
0 Inch (0mm)	LIGHT
1/8 Inch (3mm)	MEDIUM
1/4 Inch (6mm)	HEAVY

SPRING RATE

If increased bottoming is noticed, then front fork springs are too light. An optional ATK Multi-Rate Fork Spring Kit is available in a 23-25 lb range through your ATK Dealer.

REAR SHOCK

REAR SUSPENSION SAG

The rear suspension should sag 2-3 inches (51-76mm) when sitting on the bike in normal riding position. This small sag requirement is due to the A-Trak chain torque eliminator, which increases in usable rear suspension. From our experience we recommend that for motocross racing 2-2½ inches (51-64mm) of sag is best. For trail riding use up to 3 inches.

Prop the bike up on a center stand so that the rear wheel is off the ground, thus unloading the rear spring of the bike's weight. Measure the distance between the center of the axle to the center of the left side number plates rear attachment screw as shown on figure 4. This distance is the extended travel length. Take the bike off the stand and sit on it in your normal riding position. Measure the new distance between the center of the axle to the center of the left side number plates rear attachment screw. This distance is the usable travel length. Subtract the usable travel length from the extended travel length and the difference between the two is the suspension sag.

$$\begin{array}{r} \text{EXTENDED TRAVEL LENGTH} \\ - \text{USABLE TRAVEL LENGTH} \\ \hline = \text{SUSPENSION SAG} \end{array}$$

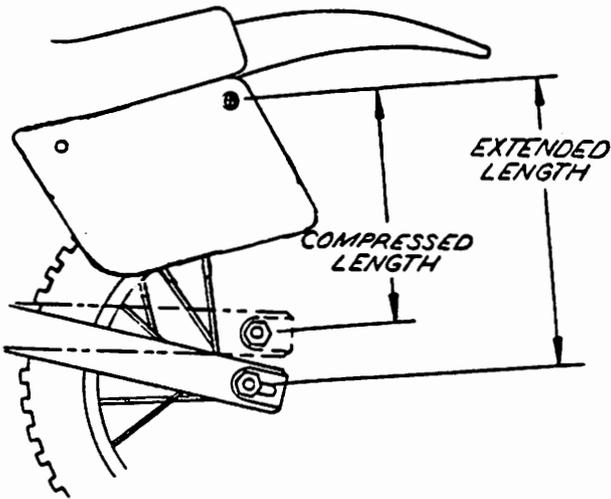


FIGURE 4

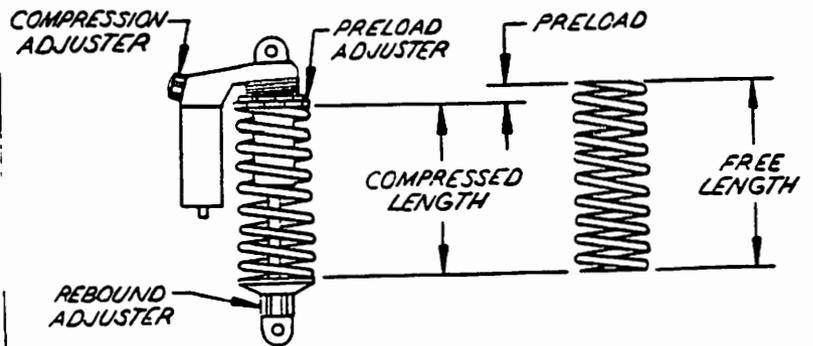


FIGURE 5

To achieve your desired suspension sag it will be necessary to adjust the rear shock's preload as shown on figure 5. The preload equals the free length of the rear spring minus the compressed length of the spring.

$$\begin{array}{r} \text{FREE LENGTH} \\ - \text{COMPRESSED LENGTH} \\ \hline = \text{PRELOAD} \end{array}$$

The standard free length of the rear spring is 8 11/16 inches (220mm). This length can vary slightly from spring to spring. The preload should be adjusted to within 0" and 1/2". The preload must never exceed 1/2 inch (13mm). If the preload falls out of the 0-1/2 inch dimensional boundary while obtaining the 2-3 inches of suspension sag, a heavier or lighter spring rate is necessary.

EXAMPLE

<u>SAG</u>	<u>PRELOAD</u>	<u>COMMENTS</u>
2" (50mm)	1/8	GOOD
3" (76mm)	0	GOOD
3" (76mm)	5/8" (16mm)	HEAVIER SPRING RATE NEEDED
2" (50mm)	0	LIGHTER SPRING RATE NEEDED

REAR SPRING RATES AVAILABLE

Kg/mm	7.8	8.2	8.7	9.2	9.7
LB/IN	435	460	485	515	540

COMPRESSION DAMPENING

The compression dampening adjustment knob is shown on figure 5. There are seven compression settings to choose from. Turn the knob counter clockwise until it stops, at this position the compression dampening is set at the softest rate. To increase compression dampening turn the adjustment knob clockwise one setting (click) at a time.

There is no standard setting for the compression dampening. Track conditions and each riders ability determines this. From our racing experience we recommend that you set the compression dampening between one thru four.

REBOUND DAMPENING

The rebound dampening adjustment wheel is located under the spring retainer as shown on figure 5. There are eleven rebound dampening settings to select from. Setting one is the weakest absorbtion--the shock absorber extends fast after compression. Setting eleven is the strongest absorption position--the shock extends slowly after compression. Like the compression dampening, the rebound dampening does not have a standard setting.

DRIVE CHAIN

CHAIN TENSION

Shift the transmission into neutral. Check the slack in the upper drive chain midway between the A-Trak top roller and the rear sprocket. Drive chain slack should be adjusted to allow 1 3/4 inch (44mm) vertical movement by hand as shown on Figure 6. This minimal slack requirement is due to the design characteristic of the ATK chain torque eliminator.

CHAIN MAINTENANCE

The drive chain should be checked, cleaned, and lubricated after every ride. Never use an engine degreaser or solvent on the chain to clean it, this may damage the rubber o-rings. When lubricating the chain always use a lube designed for o'ring chains. The A-Trak chain torque eliminator rollers are maintenance free.

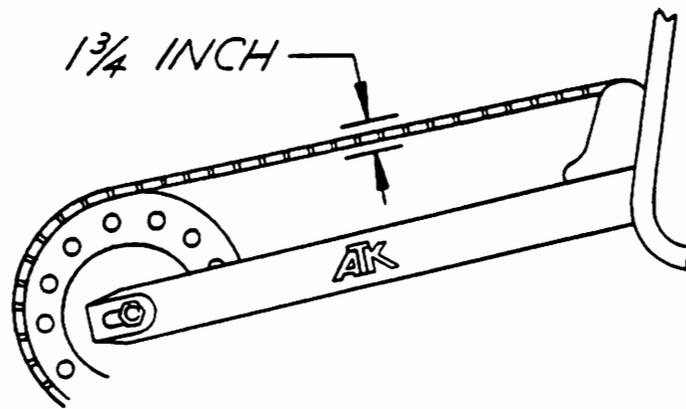


FIGURE 6

4-1

FIGURE 6

Rear Brake Adjustment

The countershaft disc rear brake is the most effective stopping system ever designed.

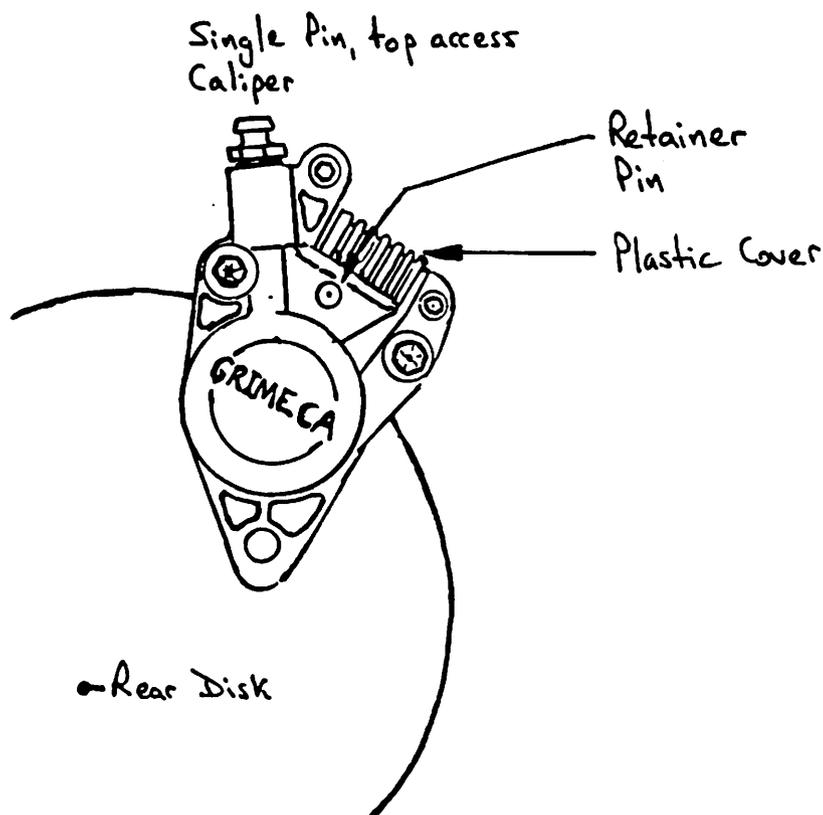
Applying the brake has no effect on the suspension. Therefore, those riders who steer with the rear brake or drag the rear brake will cause the brake fluid to heat up, which will cause excessive pad wear.

NOTE: DON'T DRAG THE BRAKE---SLOWING ONLY

AP-Lockheed Racing fluid used in race cars is a higher temperature brake fluid, which is an alternative from the standard DOT-5 brake fluid.

Pedal height is important. Adjust the pedal tip low enough below the operators boot so that it will not be applied unknowingly.

Free Play adjustment between the Master cylinder piston and actuating rod should never be nonexistent, (1/16" to 1/8".)



Rear Brake Reservoir Fluid Level

Keep the fluid level of DOT 5 topped up at all times. Remove Allen screw cap at top of reservoir and fill to the 2nd thread in filler hole.

Rear Brake Pads

The brake pads should be checked after every Race or Ride. Minimum pad thickness is 1/16" (1.5mm).

Brake pads are easily replaced by popping plastic cover off with a small screwdriver. Remove cotterpin from retainer pin (this is located on the back side of the caliper).

Pull retainer pin. Pads may now be replaced.

Note: On reinstallation of retaining pin use a new cotter pin and secure properly.

BRAKES

HYDRAULIC BRAKE MAINTENANCE

FRONT BRAKE FLUID

Fluid level should be approximately 1/8 inch (3mm) below the edge of the reservoir when refilling. Never let the fluid level get below the visual indicator. When refilling use DOT 5 hydraulic brake fluid.

FRONT BRAKE PADS

Pad thickness should be no less than 1/16 inch (1.5mm). If pad thickness is less than 1/16 inch, replace by removing pad retainer pin.

BLEEDING THE BRAKE

If air is sucked into the hydraulic system due to low fluid level or a break in the brake line occurs, it is necessary to bleed the system in order to purge the air out.

Check the level of fluid in the reservoir and top up if required. Remove the dust cap from the bleed screw. Attach a rubber hose of internal diameter of 1/4 inch (6mm) and approximately 24 inches (610mm) in length to the bleed screw. Place the end of the hose in a glass jar filled with approximately 1 inch (25mm) of hydraulic fluid. Make sure that the end of the hose stays submerged in the hydraulic fluid thru the entire bleed process. Activate the brake lever several times and hold in the braked position. Continue this operation until no air bubbles can be seen coming from the hose. At intervals make certain that the reservoir is kept topped up, otherwise air will enter the system again.

Air Filter

The unique snorkel air intake has been designed to minimize the impact of dust, mud, and water, yet increases its ability to receive an abundant amount of clean, cool air. Responsiveness of the Rotax motor has been increased due to the high volume still air chamber. Due to the K&N's extreme amount of air flow capabilities, (3 times more surface area) combined with its location on the motorcycle, cleaning the filter is not required as often.

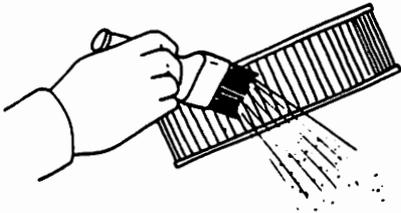
Read Below Instructions Carefully!!



AIR FILTER SERVICE INSTRUCTIONS

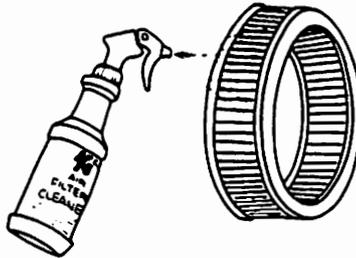
1. PRE-CLEANING

Tap the element to dislodge any large embedded dirt, then gently brush with a soft bristle brush. *(Note: If complete cleaning is not practical at this time, re-oil the element and re-install in your vehicle.)*



2. SPRAY ON CLEANER

Spray K&N air filter cleaner liberally onto the entire element and let soak for 10 minutes.



3. PAN CLEANING

Large K&N elements can be rolled or soaked in a shallow pan of K&N air filter cleaner. Remove immediately and let soak for approximately 10 minutes.



4. CLEANING HINTS

Use only K&N air filter cleaner.

- NO gasoline cleaning.
- NO steam cleaning.
- NO caustic cleaning solutions.
- NO strong detergents.
- NO high pressure car wash.
- NO parts cleaning solvents.

Any of these NO's can cause harm to the cotton filter media, plus shrink and harden the rubber end caps.

5. RINSE OFF

Rinse off the element with low pressure water. Tap water is OK. Always flush from the clean side to dirty side. This removes the dirt and does not drive it into the filter.



6. DRYING HINTS

Always dry naturally. After rinsing, shake off the excess water and let the element dry naturally.

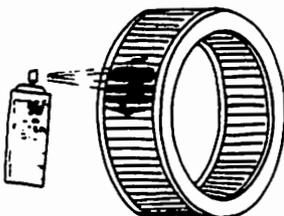
- DO NOT USE COMPRESSED AIR
- DO NOT USE OPEN FLAME
- DO NOT USE HEAT DRYERS

EXCESS HEAT WILL SHRINK THE COTTON FILTER MEDIA.

COMPRESSED AIR WILL BLOW HOLES IN THE ELEMENT.

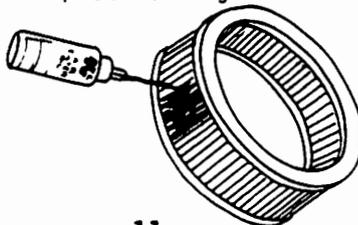
7. AEROSOL OILING

After cleaning air filter always re-oil before using. Spray K&N air filter oil down into each pleat with one pass per pleat. Wait 10 minutes and reoil any white spots still showing.



8. SQUEEZE BOTTLE OILING

After cleaning air filter always re-oil before using. Squeeze K&N air filter oil down into the bottom and along each pleat — only one pass per pleat. Let oil wick into cotton for 20 minutes. Re-oil any white spots still showing.



9. OILING HINTS

Never use a K&N air filter without oil. *(The filter will not stop the dirt without the oil.)* Use only K&N formulated air filter oil.

K&N air filter oil is a compound of mineral and animal oil blended with special polymers to form a very efficient tack barrier. Red dye is added to show just where you have applied the oil. Eventually the red color will fade but the oil will remain and filter the air.

- NEVER USE Automatic Transmission Fluid.
- NEVER USE Motor Oil.
- NEVER USE Diesel Fuel.
- NEVER USE WD-40, LPS, or other light weight oils.

ENGINE MAINTENANCE

CLUTCH ADJUSTMENT

If you feel major adjustment is required , loosen the clutch adjustor at the handlebar to provide maximum slack of the cable.

Remove the clutch adjustment access plug on the left sidecover. There is an 11mm lock nut and a slotted adjusting screw.

NOTE: Special wrench is provided in the tool kit to loosen the 11mm locknut.

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

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

TRANSMISSION OIL CHANGE

Start the engine and allow it to warm up briefly. Remove the 6mm Allen head bolt from the bottom of engine and completely drain the oil.

NOTE: Don't remove the 17mm bolt head kickstart spring retaining bolt. The drain plug tip is magnetized and should be cleaned of metal particles before installing the drain plug.

Remove the filler/vent plug and refill the transmission with 1000cc (32 US oz) of a light viscosity gear oil until the oil reaches the oil level (6mm allen bolt) inspection hole. The level plug is located behind the gear change lever.

Examples of Light Viscosity Gear Oils:

Bel-Ray Light Viscosity

Mobil 1 75W-80

Amsoil 75W-80

Silkolene Gear oil Light 75W

Dura Lube Gear and trans oil LV

There are a number of other Light Viscosity Gear oils on the market, this list is meant as a partial example of available products only. In a pinch 20W-50 Motor oil may be used.

IGNITION TIMING

Your motorcycle is equipped with a capacitor discharge ignition which consists of a magneto, an electronic control unit and a Kill-Button.

Regularly check the electrical connections for dirt or corrosion. Apply a dielectric grease to all connectors and the high tension lead when necessary.

Timing of the engine can only be done with a stroboscopic lamp. Although timing marks can be verified by using a dial indicator. Static timing figures are as follows:

250: $14^{\circ} \pm 1$, 1.07 mm (0.042in)

406: $18^{\circ} \pm 1$, 2.26 mm (0.089in)

On all machines remove the timing inspection plug from the magneto cover and connect the timing light pickup to the high tension lead.

Point the light beam straight into the inspection hole and rev the engine to 5000 RPM for a brief instant. If the timing is correct the magneto cover mark and flywheel mark will align with each other.

If timing was incorrect, remove magneto cover. Loosen the stator retaining screws then move the stator plate in the advance or retarded direction to correct the misalignment. Tighten the stator plate screws.

Start the engine to recheck the alignment of the timing marks with the timing light.

SPARK PLUGS

Recommended Plugs

ATK	HGK	Bosch	Auto Lite
250	B8ES	W275T2	# 4053
406	B8ES	W275T2	# 4053

TO CHECK CONDITION OF SPARK PLUG

- A Brownish tip reflects correct jetting and plug range.
- A black insulator tip indicates a rich condition.
- A grey tip warns you of too lean an operating temperature. Advanced ignition timing, engine overheating, fuel mixture too lean, clogged carburetor jetting, wrong spark plug heat range or a leaking seal or gasket.

MIKUNI Performance Starts Here

RACING CARBURETORS

TMX SERIES

TMX 35 and 38

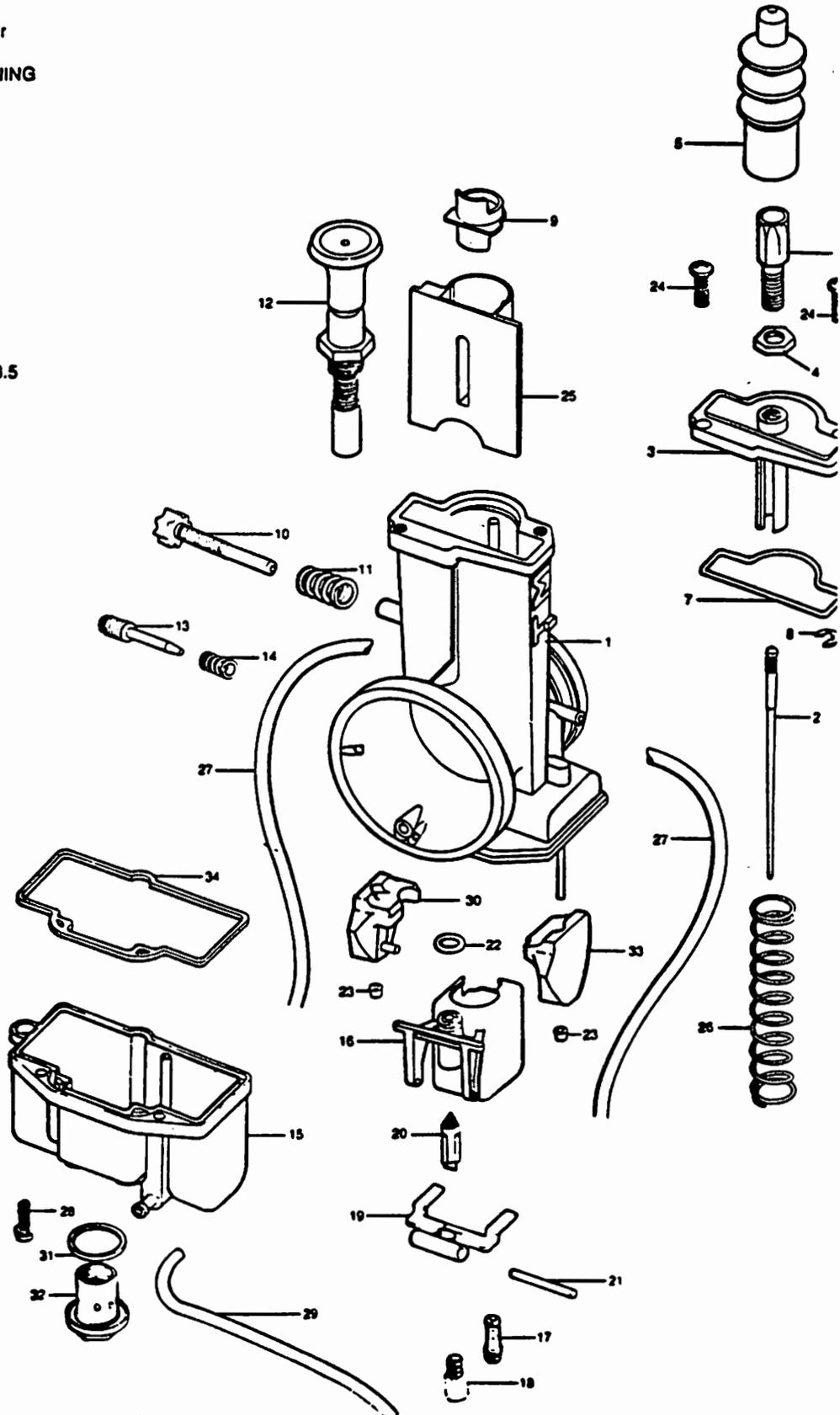
Stock 250 M.J. 350 -- N. 6EN1-53 -- P.J. 15

Stock 406 M.J. 370 -- N. 6EJ12-57 -- P.J. 15

(Recommendations for Sea Level only)

MIKUNI TMX SERIES PARTS LIST

No.	Description	Part Number
1	MIXING BODY CARB	TM38SS11
2	JET NEEDLE	J8-SEE TUNING
3	COVER, CARB TOP	776-19014
4	LOCK NUT, ADJUSTER	B30/247
5	CAP, RUBBER	VM34/282
6	ADJUSTER, CABLE	VM30/77
7	O-RING, TOP COVER	616-93009
8	E-RING, NEEDLE CLIP	BS32/126
9	RING, RETAINING	TM38/54
10	ADJUSTER, IDLE STOP	603-25008
11	SPRING, IDLE ADJUST	N110209
12	PLUNGER, STARTER ASSBLY	TM38/57
13	SCREW, AIR ADJUSTER	603-36002
14	SPRING, AIR SCREW	VM15/112
15	CHAMBER, FLOAT BOWL	TM38/48
16	VALVE SEAT, NEEDLE	620-260023.5
17	PILOT JET	VM22/210
18	MAIN JET	4/042
19	ARM, FLOAT	VM36/15
20	NEEDLE VALVE ASSBLY	788-26005
21	PIN, FLOAT ARM	VM20/315
22	O-RING, NEEDLE VALVE	KV/10
23	CAP, FLOAT RETAINER	VM26/42
24	SCREW, TOP COVER	CW2-0412
25	THROTTLE VALVE	832-41002
26	SPRING, T.V.	730-13019
27	HOSE, VENT	888-24Q11
28	SCREW, FLOAT BOWL	CW2-0308
29	HOSE, OVER FLOW	888-23022
30	FLOAT, LEFT SIDE	859-52021
31	O-RING, DRAIN PLUG	VM28/254
32	DRAIN PLUG	TM38/44
33	FLOAT, RIGHT SIDE	859-52020
34	GASKET, FLOAT BOWL	TM38/52



ENGINE CLEARANCE

PISTON RING END GAP

<u>ATK</u>	<u>STANDARD</u>	<u>SERVICE LIMIT</u>
250	0.20 mm (0.008 in) - 0.35 mm (0.014in)	1.0 mm (0.040in)
406	0.25 mm (0.010 in) - 0.40 mm (0.016in)	1.2 mm (0.047in)

PISTON TO CYLINDER CLEARANCE

<u>ATK</u>	<u>STANDARD</u>	<u>SERVICE LIMIT</u>
250	0.06 mm (0.002 in) - 0.08 mm (0.003 in)	0.14 mm (0.005)
406	0.08 mm (0.003 in) - 0.09 mm (0.0035 in)	0.18 mm (0.007)

Increased performance can be obtained by changing compression ratios on the 250, and 406. The chart below can be used as a guide to your fuel needs.

<u>250</u>	<u>Compression Ratio</u>	<u>Fuel Requirement</u>
	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

<u>406</u>	<u>Compression Ratio</u>	<u>Fuel Requirement</u>
4x0.2 mm shims	10.0:1	Stock Unleaded Regular
Remove 3 shims	10.8:1	Mod. Unleaded Premium
Remove 4 shims	11.0:1	Mod. 100 LL Aviation

TORQUE SPECIFICATIONS

<u>Part Name</u>	<u>Torque (ft. lb)</u>
Front axle	30
Front axle pinch	6-8
Rear axle nut	65-75
Swing arm pivot nut	65-75
Triple clamp allens	15-20
Engine mount	25-30
Flywheel nut	65-75
Clutch hub nut	60-70
Primary drive nut	60-70
Countershaft nut	40-50
Cylinder head nuts 8mm	16-18
Cylinder head nuts 10mm	26-28
Shock eye bolts	30-35

The table below, relating tightening torque to thread diameter and pitch, lists the basic torque for the bolts and nuts on ATK motorcycles.

<u>Diameter (mm)</u>	<u>ft. lb.</u>
5	2.5-3.5
6	4.5-5.5
8	10.0-13.5
10	19.0-25.0
12	30-45
14	55-75
16	80-120
18	120-160
20	160-240

Technical Data ATK 250, 406

	250	406
Displacement	248.4cc	399cc
Bore and Stroke	72x61 mm	84x72 mm
Gear Ratios	1-3,000:1 2-2,070:1 3-1,571:1 4-1,353:1 5-1,222:1 6-1,150:1	1-2,384:1 2-1,769:1 3-1,400:1 4-1,118:1 5-0,913:1
Compression Ratio	12.5:1	10.0:1
C/S Rear sprocket	15/50	15/50
Ignition	Motoplat	Motoplat
Carburetor	Keihin	Keihin
Chain	520	520
Oil Capacity	1qt.	1qt.
Air Filter	K&N	K&N
Weight	208	216
Steering Angle	27°	27°
Wheelbase	57"	57"
Seat Height	37"	37"
Ground Clearance	14"	14"
Fuel Capacity	3.0 gals	3.0 gals
Front Fork	11.8"	11.8"
Rear Shock	12.0	12.0
Front Brake	4-Piston Caliper Disc	
Rear Brake	2-Piston Caliper C/S Disc	
Front Tire	3.00-21"	3.00-21"
Rear Tire	110-100x18	110-100x18
Fork Capacity	650 cc	650 cc
Shock Pressure	180lbs	180lbs

Special Tools

<u>Ref. No.</u>	<u>Description</u>
1	Seal insertion jig (clutch cover)
2	Seal insertion jig (tranny main shaft 406)
3	Seal insertion jig (tranny main shaft 250)
4	Seal insertion jig (crankshaft clutchside 250)
5	Plastic Ring insertion jig clutch side
6	Plastic Ring insertion jig mag side
7	Puller assy.
8	Clutch hub locking tool (old style)
9	Clutch hub locking tool (new style)
10	Protection Cap
11	Guide sleeve for oil seal (main shaft)
12	Crankshaft locking bolt
13	Flywheel puller
14	Bearing puller
15	Hexagonal screw
16	Allen bolts
17	Clutch adjustment wrench
18	Crankcase separator puller
19	Slotted head screw
20	Half ring for puller
21	Ring for puller
22	Puller plate assy.(crankshaft)

