



# 350 / 604 FOUR-STROKE OWNER'S MANUAL 1991

Updated 02/2015



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# STARTING PROCEDURE

## Cold Start

- Step One: Turn the fuel petcock to the open position.
- Step Two: Pull the choke up to the open position.
- Step Three: Prime the engine. Kick the engine over until the compression is high. Pull the compression release in a little – just to get over the compression. Repeat this a few times.
- Step Four: Line up the white mark on the timing window and give it a hard kick with the throttle slightly open. From our experience, 99% of the time the engine will start on the first kick.

## Electric Starter

Skip steps Three and Four and press the starter button.

## Warm Start

To start the engine when it is warm, just line up the white mark on the timing window, and kick it with the throttle slightly open.

## Down Hill Start

Shift the engine into neutral, then push the compression release on and coast the bike up to speed. Once up to speed, shift the engine into second gear *without the clutch*. Let the engine turn over a few times, then release the compression lever. The engine should start right up.

# FRONT FORK

## Operational Maintenance

To achieve optimum performance from your White Power 4054 front forks, follow these maintenance procedures.

After every two races or eight hours of riding, loosen the breather plugs (located on top of the upper fork cap) a few turns to release air pressure build-up. Also, pull the fork wipers down and clean around the seal area after a build-up of dirt occurs. After every four races or thirty-five (35) hours of riding, or when damping becomes erratic, change the fork oil.

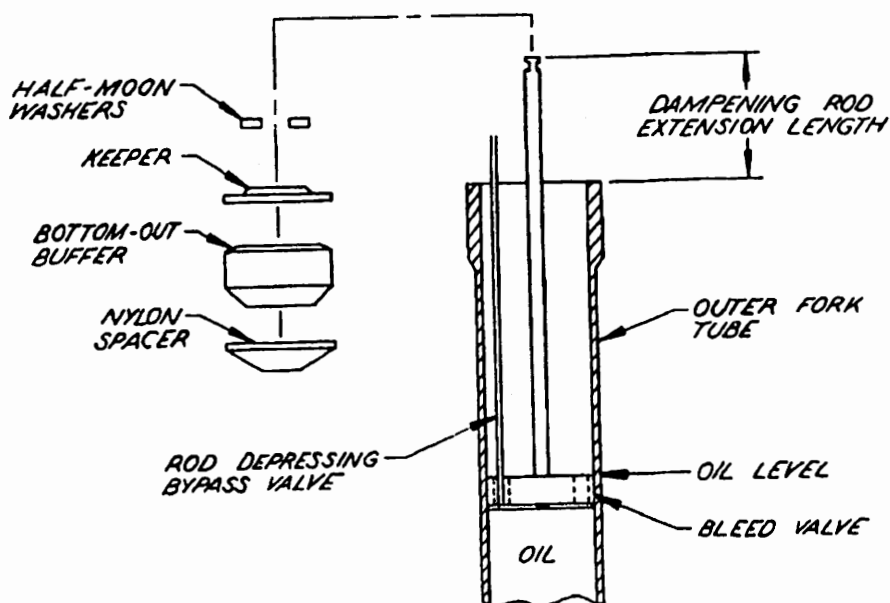
## Oil Replacement

To replace the fork oil, loosen the breather plugs to release any air pressure built up in the fork. Loosen both the upper fork cap and lower fork cap approximately one turn. Remove the front wheel, brake caliper and the brake line guides. Do not remove the brake line from the caliper. Remove the fork tube from the triple clamps and turn the fork upside down. The bottom fork cap should be facing up. Unscrew the bottom fork cap and remove the preload spacer and fork spring. Drain the fork oil and pump the fork a few times to drain the remaining oil. Replace the fork spring and preload spacer, and screw on the fork cap. Turn the fork over and unscrew the top cap and compress fork slightly to remove the half-moon washers. Pull out the keeper by pressing on one side and compressing the fork. Remove the bottom-out buffer and nylon spacer. Turn the fork over and drain the remaining oil.

Next, compress the fork so you can see the bypass valve. Take a thin rod (1/8" or less O.D.) and lightly depress in one of the six holes in the valve as shown in *Figure 1* (Page 4). This will allow the oil to drain down to the lower fork leg when poured. The standard oil level measurement location in the White Power 4054 fork is where the oil comes up flush with the distance between the top of the dampening rod to the top of the outer fork top, as shown in *Figure 1*.

From our racing experience, we recommend the oil level be flush with the top of the bleed valve when the dampening rod is extended 4-1/2" (130mm) from the fork tube. We recommend Bel-Ray HVI 10W shock and fork oil.

**Figure 1**



The quantity of oil in the fork - 20 to 23 ounces of 10 weight oil only affects the last fifty per cent of the travel. The more oil in the fork, the less the fork will have a tendency to bottom out. Never exceed an oil level height of 5-11/16" (150mm) and never go below 3-15/16" (120mm).

**EXAMPLE:**

	Dampening Rod Length From Oil Level		Fork Action
(STANDARD)	3-15/16"	(120 mm)	Soft
	5-1/8"	(140mm)	Medium
	5-11/16"	(150 mm)	Hard

The standard free length of the rear spring is approximately 8-11/16" (220 cm). This length can vary slightly from spring to spring. The preload should be approximately 1/4" (6 mm). (If the preload falls out of the 1/8" - 1/2" dimensional boundary while obtaining the 2" - 3" of suspension sag, a heavier or lighter spring rate is necessary.)

### EXAMPLE:

<u>Sag</u>	<u>Preload</u>	<u>Comments</u>
2" (50 mm)	7/16" (11 mm)	Good
3" (76 mm)	1/4" (6 mm)	Good
3" (76 mm)	5/8" (16 mm)	Heavier spring rate needed
2" (50 mm)	1/8" (3 mm)	Lighter spring rate needed

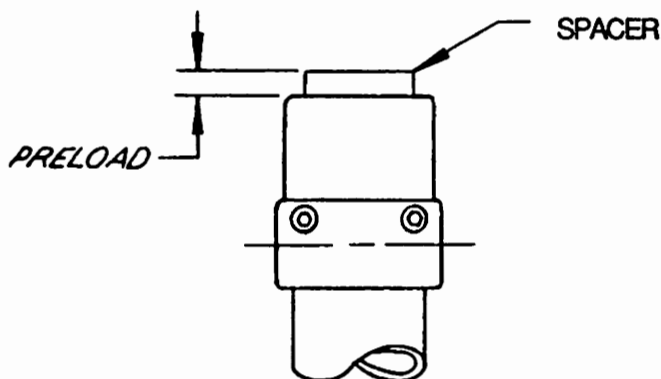
### Spring Rates available:

Kg/mm	8.7	9.2	9.7
Lb./in.	485	515	540

### 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 initial travel will be softer. See *Figure 2* for preload measurement.

**Figure 2**

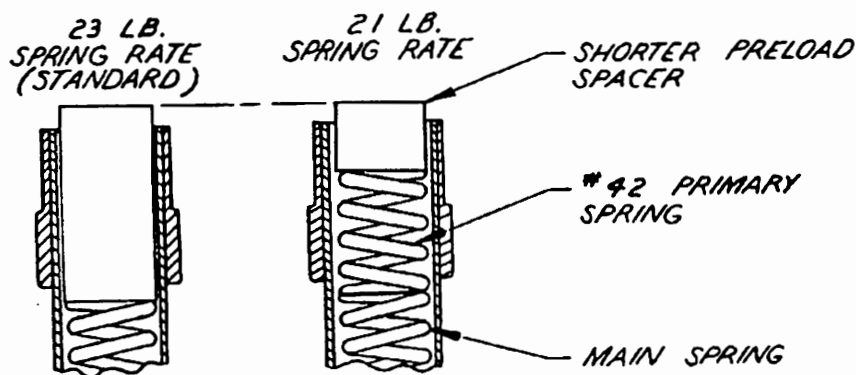


<b>EXAMPLE:</b>	<u>PRELOAD LENGTH</u>	<u>FORK ACTION</u>
	0" (0 mm)	Soft
	3/16" (5 mm)	Medium
	3/8" (10 mm)	Hard

## Spring Rate

If the fork action is too stiff through the entire range of travel while using the shortest dampening rod length and the shortest preload length, we recommend changing the standard 25 lb. fork spring rate to a 23 lb. fork spring rate. The spring rate can be changed by adding a small primary spring to the main spring. See *Figure Three* for installation.

**Figure 3**



# REAR SHOCK

## Rear Suspension Sag

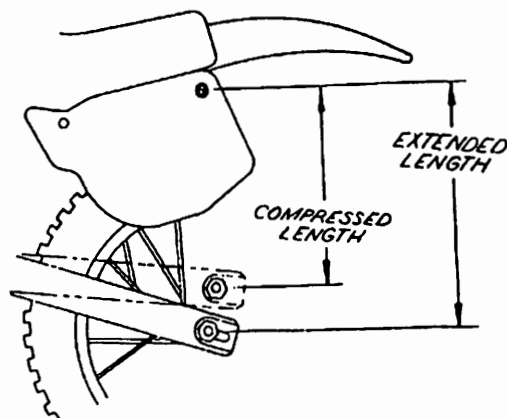
The rear suspension should sag 2" - 3" (51 - 76 mm) when sitting on the bike in normal riding position. This small sag requirement is due to the A-Track Chain Torque Eliminator, which increases the usable rear suspension. From our experience, we recommend that for motocross racing, 2" to 2-1/2" (51 - 64 mm) of sag is best; for trail riding use up to 3" (76 mm).

Prop the bike up on a center stand so 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 plate's rear attachment screw (as shown in *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 plate's rear attachment screw. The distance is the usable travel length. Subtract the usable travel length from the extended travel length. The difference between the two equals the suspension sag.

$(\text{Extended Travel Length} - \text{Usable Travel Length}) = \text{Suspension Sag}$

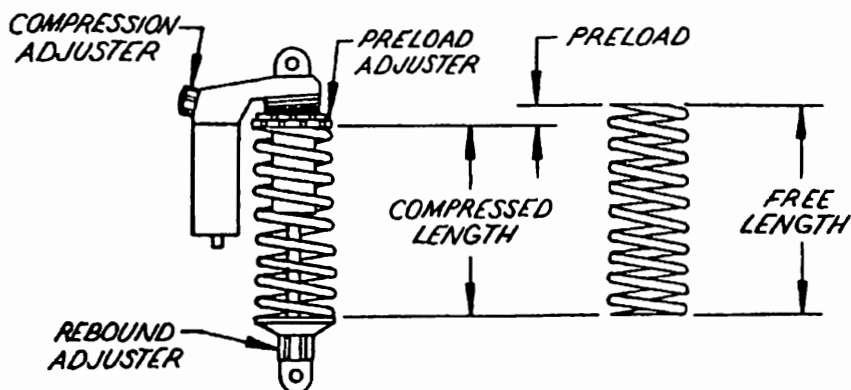
**Figure 4**



To achieve your desired suspension sag it will be necessary to adjust the rear shock's preload. The preload is equal to the free length of the rear spring minus the compressed length of the spring.

$$(\text{Free Length} - \text{Compressed Length}) = \text{Preload}$$

**Figure 5**



## Compression Dampening

The compression dampening adjustment knob is shown in Figure 5. There are seven (7) compression settings from which to choose. Turn the knob counterclockwise until it stops; at this position the compression dampening is set at the softest rate. To increase dampening, turn the adjustment knob clockwise one setting (click) at a time.

There is no standard setting for the compression dampening; this is determined by track conditions and each rider's ability. From our racing experience, we recommend you set the compression dampening between one (1) and four (4).

## **Rebound Dampening**

The rebound dampening adjustment wheel is located under the spring retainer as shown in Figure 5. There are eleven (11) rebound settings from which to select. Setting one (1) is the weakest absorption – the shock absorber extends fast after compression. Setting eleven (11) is the strongest absorption – the shock extends slowly after compression. Like the compression dampening, the rebound dampening does not have a standard setting. From our racing experience, we recommend you set the rebound dampening between four (4) and seven (7).

# DRIVE CHAIN

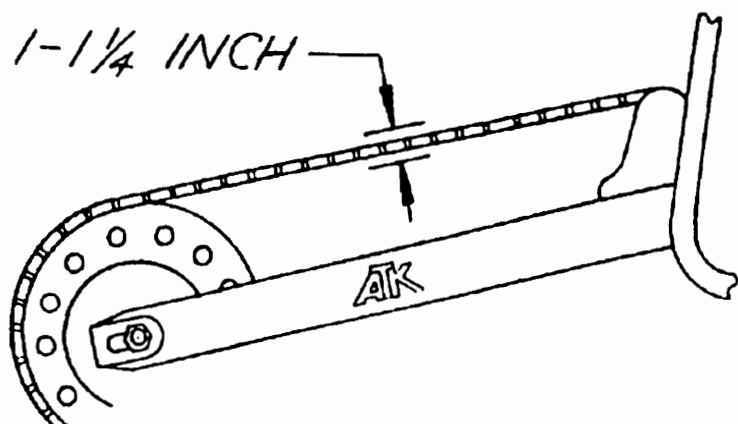
## Chain Tension

Shift the transmission into neutral. Check the slack in the upper drive chain midway between the A-Trak's top roller and the rear sprocket. Drive chain slack should be adjusted to allow 1" to 1-1/4" (25 - 31 mm) vertical movement by hand as shown in figure 6. The minimal slack requirement is due to the design characteristics of the A-Trak Chain Torque Eliminator, which keeps the chain at a constant slack throughout the suspension travel.

## 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**



# **BRAKES**

## **Rear Brakes**

### **Hydraulic Brake Maintenance**

#### **Brake Fluid**

Fluid level should be approximately 1/8" (3 mm) below the edge of the reservoir when refilling. Never let the fluid level get below the visual indicator. When refilling, use DOT 3 or DOT 4 Hydraulic Brake Fluid.

#### **Brake Pads**

To check the pad thickness, remove the plastic cover shown in Figure 7. Pad thickness should be no less than 1/16" (1.5 mm). If pad thickness is less than 1/16", replace by removing the pad retainer pin.

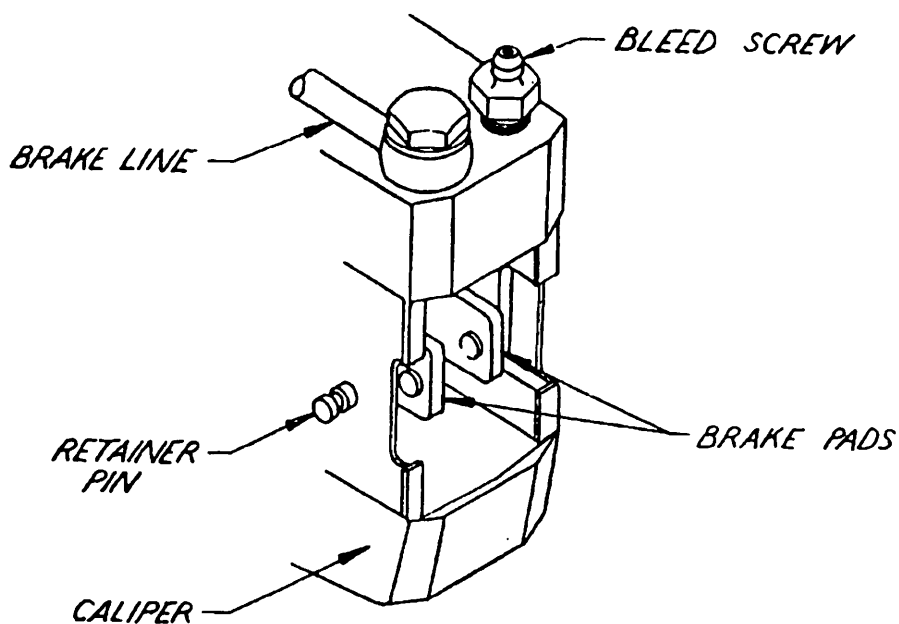
#### **Bleeding the Brake**

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

Check the fluid level in the reservoir and top up if required. Remove the dust cap from the bleed screw. Attach a rubber hose with an internal diameter of 1/4" (6 mm) and approximately 24" (610 mm) in length to the bleed screw. Place the end of the hose in a glass jar filled with approximately 1" (25 mm) of hydraulic fluid. Make sure the end of the hose stays submerged in the hydraulic fluid throughout the entire bleed process.

Actuate the brake lever several times and hold in the braked position. Open the bleed screw 1/2 turn and depress the brake lever. Close the bleed screw after the brake lever has reached its maximum position. Continue this operation until no air bubbles can be seen coming from the hose immersed in the hydraulic fluid. At intervals, make certain the reservoir is kept topped up, otherwise air will again enter the system.

**Figure 7**

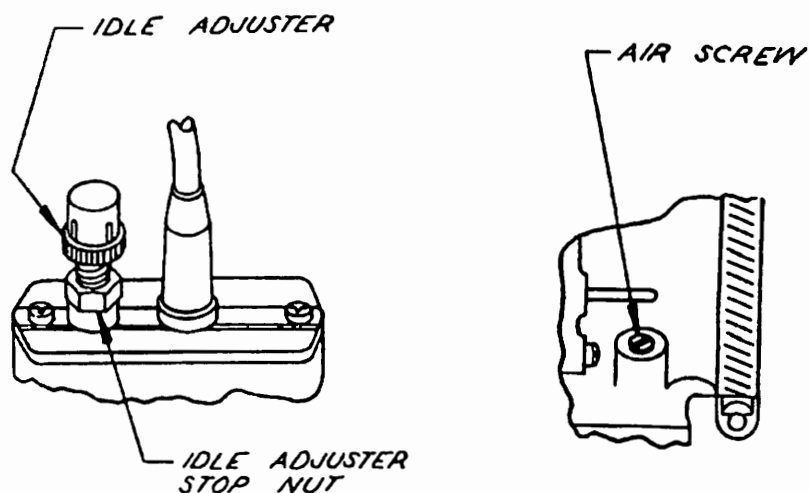


# CARBURETOR

## Idle Adjustment

Remove the seat and engine breather filter, and push the breather hose to the side. Turn in the air screw (clockwise) until it lightly seats. Turn it back out 1-1/2 turns. (See *Figure 8*). Start the engine and let it warm up. To raise the idle, turn the idle adjuster clockwise; to lower the idle, turn it counter-clockwise. Once you have reached your desired idle speed, tighten down the idle adjuster stop nut.

**Figure 8**



## Air Filter Cleaning

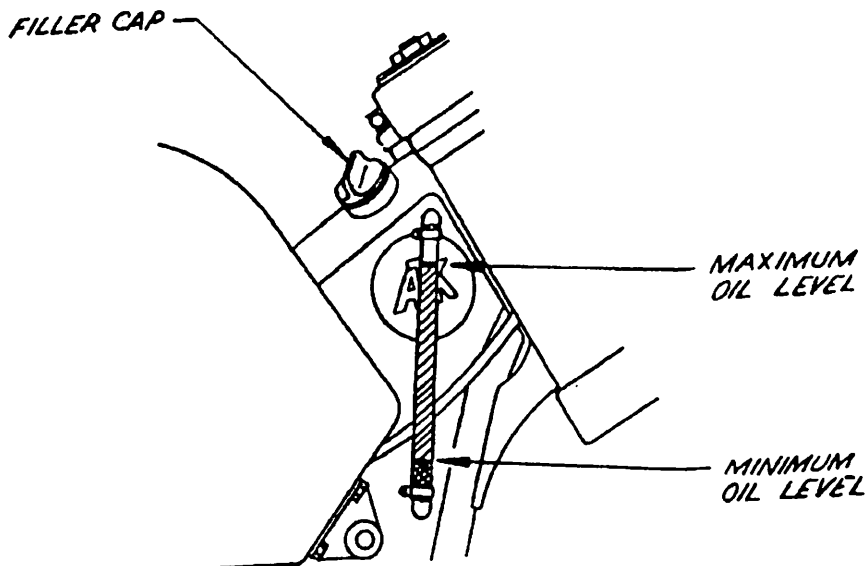
To ensure optimum performance from your engine, the air filter should be cleaned once every eight hours of non-competitive riding. To clean the air filter, remove the seat and loosen the hose clamp which attaches the air filter to the carburetor. Pull the air filter out of the air box. Spray on K & N's filter cleaner and degreaser to dissolve the dirt and oil. Rinse with warm water in reverse flow. Let the air filter dry out completely and spray with K & N filter oil. Install the filter back on the carburetor.

# ENGINE MAINTENANCE

## Oil Level

Never overfill the oil tank. Severe engine damage can occur. Check the oil level after the engine is warmed up and has been running for at least 15 minutes. There should never be pressure in the oil tank. When the filler cap is removed, oil should not run out of the filler cap while the engine is running. If so, take the drain plug out of the engine and drain the oil from the sump. The engine's oiling system is a dry sump design. As the motorcycle sits for a while, oil runs from the oil tank through the oil pump into the crankcase and empties the oil tank. No oil may show in the check hose. After the engine has been running, oil gets pumped back into the oil tank. This is when the oil level should be checked. (See Figure 9 for the correct oil level.)

**Figure 9**



## Oil Change

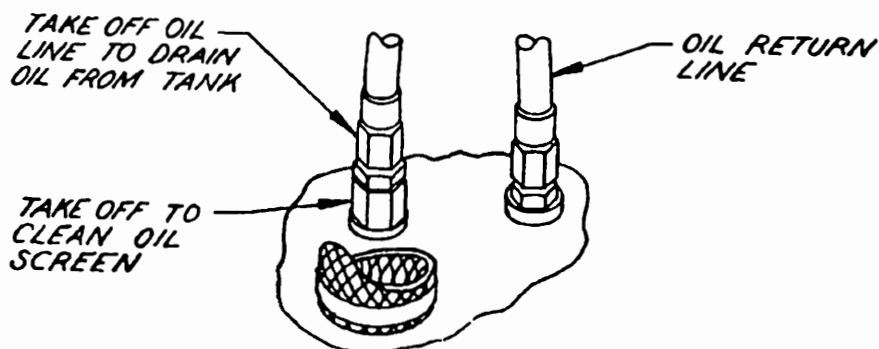
**Engine Oil Recommendation :** Use only high detergent, premium quality motor oil certified to meet U.S. automobile manufacturers' requirements for service classification SE or SF. Motor oils intended for Service SE or SF will display this designation on the container. The use of special oil additives is unnecessary and will only increase operating expenses.

**CAUTION:** Engine oil is a major factor affecting the performance and service life of the engine. Non-detergent, vegetable or castor-based racing oils are not recommended.

Change the oil and oil filter every 20 hours of riding. Unscrew the oil line from the oil screen located at the bottom of the front down tube; drain the oil. Every 5th oil change clean the oil screen on the bottom of the frame downtube. After all the oil has drained out of the oil tank, unscrew the fitting into which the oil line was screwed, as shown in *Figure 10*. Clean the small oil screen inside of it. Screw the fitting back into the engine. Reconnect the oil hose back to the engine.

Position the motorcycle level on the stand. Unscrew the drain plug out of the engine. Once the oil stops pouring out, kick the engine over a few times to force out the remaining oil. Screw back in the drain oil plug.

**Figure 10**

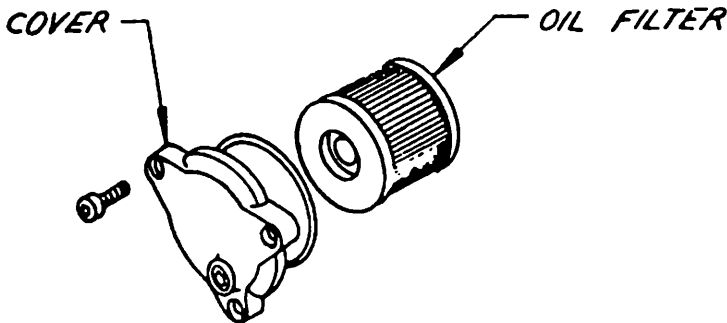


# Oil Filter Replacement

To replace the oil filter, remove the countershaft disc and chain guide, unscrew the three allen head socket screws and remove the filter cover as shown in *Figure 11*. After oil filter replacement, fill the oil tank with 2 to 2-1/2 quarts of 20W-50 Bel-Ray Extra or Maxima Premium Oil. If temperatures are below 50° F (10° C) use 10W-40 Bel-Ray Extra Premium Oil. Other viscosities shown in the chart below may be used when the average riding temperature in your riding area is within the indicated range.

	x	SAE	20W	50 >>	
	x	SAE	20W	40 >>	
x	SAE	10W	40 >>		
x	SAE	10W	30 >>		
0	20	40	60	80	100°F

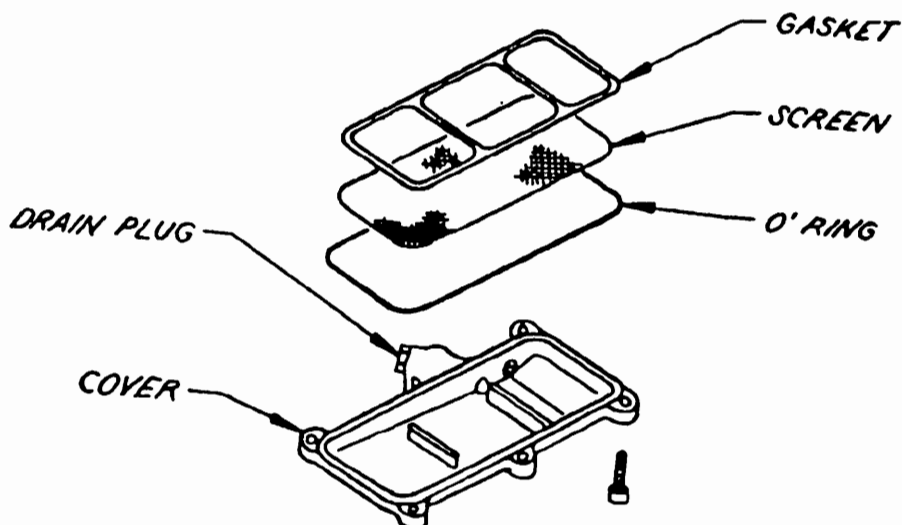
**Figure 11**



# Oil Sump Screen Cleaning

Clean the engine's oil screen every third oil change. After you have drained the oil out of the engine, unscrew the six allen head socket screws and remove the oil sump cover as shown on *Figure 12*. Before cleaning the screen in solvent, clean the cover and screen thoroughly. When remounting the oil sump cover, make sure you have the proper O-ring alignment.

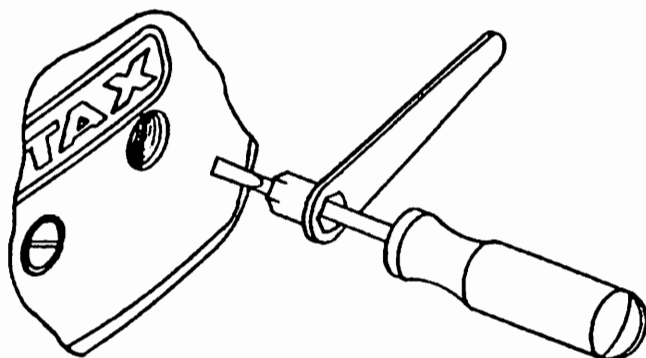
**Figure 12**



## Clutch Adjustment

Remove the clutch cable from the clutch hand lever. Remove the rear screw plug. Use the wrench provided in the tool kit. (See *Figure 13*). Screw in the threaded pin until it stops, then unscrew the pin 1/2 turn. Retighten the lock nut. Install the clutch cable to the clutch hand lever and allow 1/8" (3 mm) of slack in the cable.

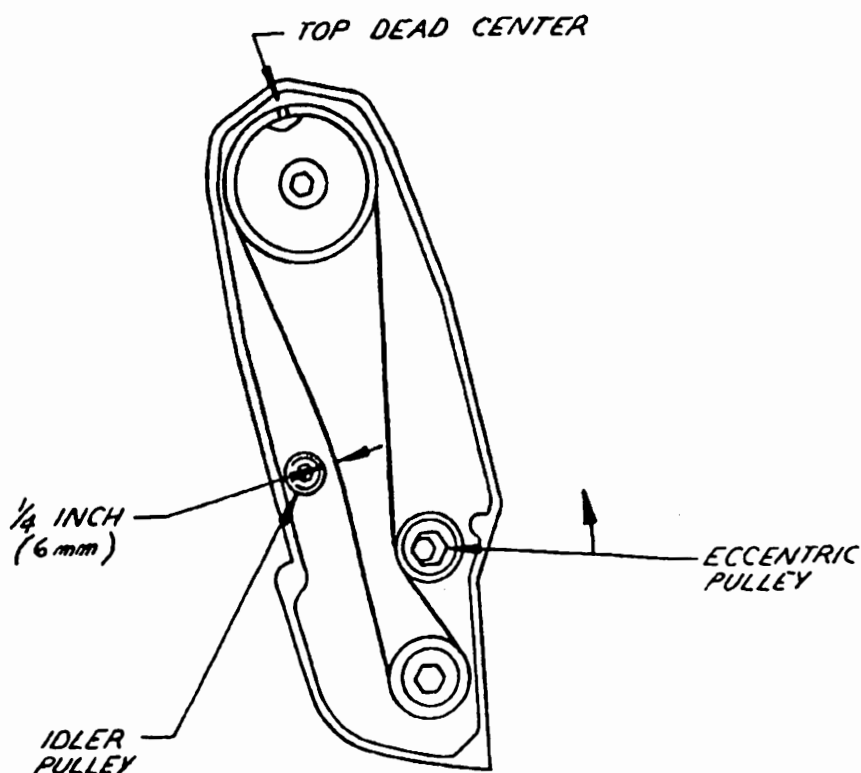
**Figure 13**



## Cam Belt Adjustment

Turn the cold engine over to top dead center. Remove the cam belt cover. Turn the engine to top dead center of compression stroke with valves closed. The belt should be able to be pushed easily off the idler pulley, approximately 1/4". The belt should tighten when the engine heats up. Never over-tighten the belt - breakage may occur.

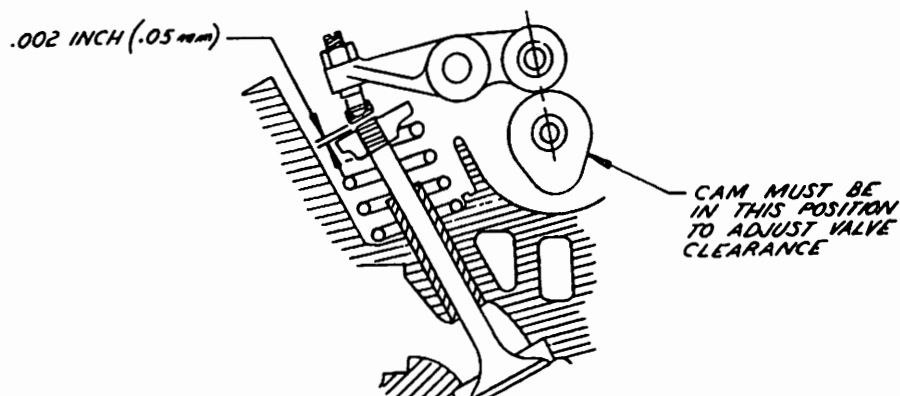
**Figure 14**



## Valve Adjustment

Check the valves every 30 hours of riding time. Valve clearance is .002" (0.05 mm) when the engine is cold. (See *Figure 15*).

**Figure 15**



## Ignition

The ignition timing is set by the factory and cannot be changed. It needs no maintenance.

# TECHNICAL DATA

Engine:	Rotax 4 stroke
Bore and Stroke:	94 m x 81 mm
Displacement:	562 cc
Compression Ratio:	9.8:1
Carburetion:	Mikuni 38 mm Flat Slide
Air Filtration:	K & N High Flow
Lubrication:	Dry Sump System with Main Stream Oil Filter
Oil Capacity:	2.5 Quarts
Ignition:	CDI Electric Advancing System
Electric:	3 Phase Generator, 12 V, 190 W Output, Battery 9 A.H.
Horsepower/RPM (measured at rear wheel):	
	Spark Arrester with 670 Cam: 43 @ 8500 RPM
	Spark Arrester with 860 Cam: 48 @ 8500 RPM
	Open Exhaust with 860 Cam: 51 @ 9500 RPM
Transmission:	5 speed
Primary Ratio:	76/32, 1:2.375
1st Gear:	31/13, 1:2.384
2nd Gear:	23/13, 1:1.769
3rd Gear:	21/15, 1:1.400
4th Gear:	19/17, 1:1.118
5th Gear:	21/23, 1:0.913
Countershaft Sprocket:	15T
Rear Wheel Sprocket:	48T
Gas Tank Capacity:	4.6 Gallons
Chain:	520 D.I.D. O Ring, 110 links
Wheelbase:	58 inches (1473 mm)
Ground Clearance:	13.5 inches (343 mm)
Seat Height:	37 inches (950 mm)
Dry Weight:	246 lbs. (111.5 kg); Electric Starter 263 lbs.
Suspension, Front:	White Power Upside Down Forks with Brembo Disc Brake
	Travel: 11.8" (300 mm), 650cc oil capacity, Bel-Ray SAE 10
Suspension, Rear:	Single White Power with Adjustment Compression and Rebound Dampening
	Travel: 13.0" (330 mm)
Frame:	Chrome Moly Frame with Integrated Oil Tank
Swingarm:	Swingarm with A-Trak Chain Torque Eliminator Built-in with ball swingarm bearings.
Spark Plug:	NGK D8EA, Autolite 4153
Recommended Oil:	Bel-Ray Extra Premium 20W-50; Below 50 degrees F (10 degrees C) use 10W-40