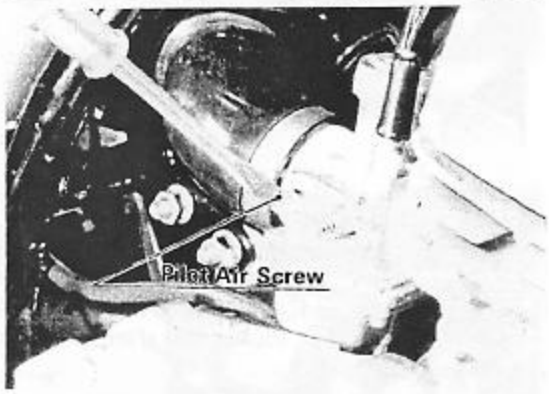
Table 1 Air Screw Setting

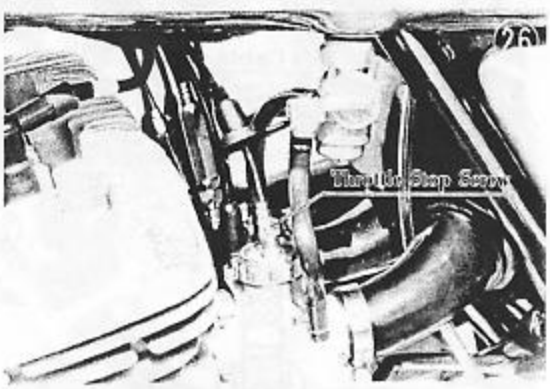
Model	Air Screw (turns out)	Idling Speed (r.p.m.)
S1	1¾	1,300~1,500
S1A, S1B	1¼	1,300~1,500
S1C, KH250-A5 KH250-B1	1½	1,200~1,300
S2, S2A	1½	1,300~1,500
S3, S3A	1¾	1,100~1,200
KH400-A3	1¼	1,100~1,200



c. Throttle Stop Screws

Warm up the engine for one or two minutes to bring engine up to normal temperature, where the gasoline will atomize properly.

Turn the individual throttle stop screws to bring the engine to the lowest stable rotational speed obtainable.

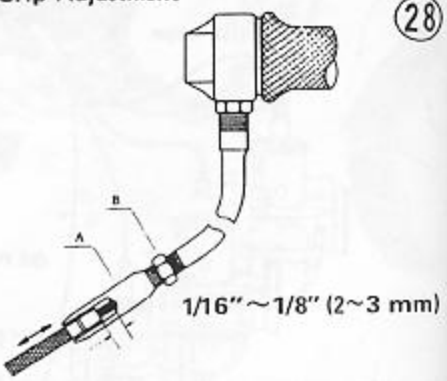


Hold your hands in back of the mufflers to check that the three exhaust pressures are equal. Make fine adjustments with the stop screws and/or air screws if this is necessary to obtain even exhaust pressure and stable idling.

d. Throttle Grip

Last, adjust the throttle grip play. To adjust the grip for the standard amount of play as shown in the diagram, turn throttle grip adjuster A and lock it in place with lock nut B.

Throttle Grip Adjustment (28)

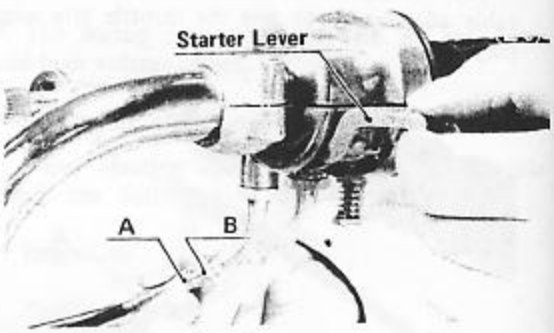


e. Oil Pump

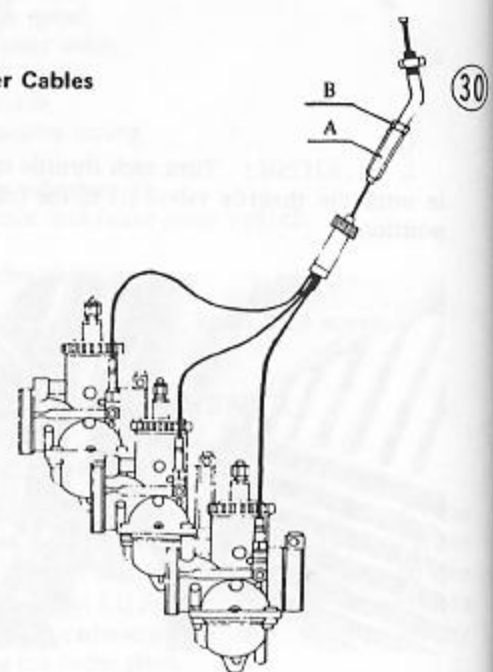
After these adjustments are completed, check that the oil pump adjustment is correct.

2) Starter Lever Adjustment

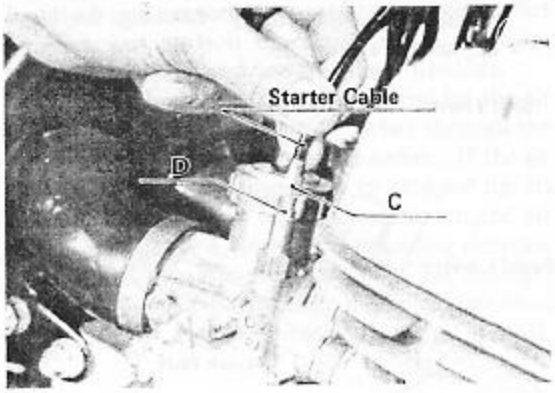
a. First give the starter lever sufficient play. Lever play is varied with starter lever adjuster A.



Starter Cables (30)



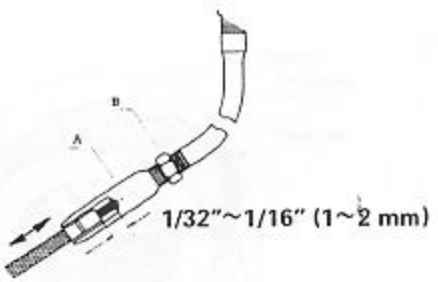
b. With the starter plungers in the fully closed position, adjust the outer sleeve of all starter cables for .04 – .08" (1–2 mm) play, in order to have all plungers start moving together. Adjustment is made with adjuster C while moving the cable sleeve up and down until only slight play is felt. Fix adjustment in place with lock nut D.



c. Last, adjust starter lever play as shown in the diagram. Turn starter lever adjuster A, locking it in place with lock nut B.

Starter Lever Adjustment

(32)



3) Oil Pump Adjustment

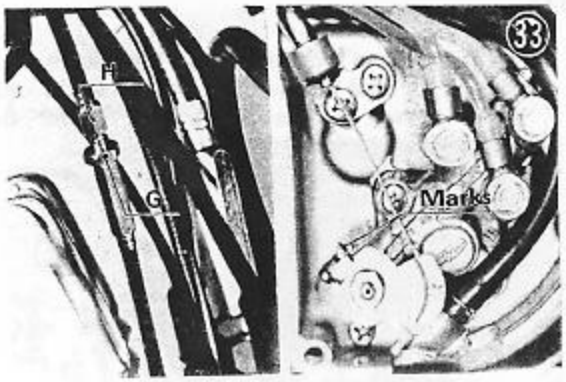
The oil pump must increase and decrease oil flow rate with throttle valve movement, minimum oil output corresponding to zero throttle valve opening.

With the throttle grip closed, use oil pump cable adjuster H to set the lever so that the mark on the oil pump lever and the mark on the lever stopper are aligned.

CAUTION:

1. Do not fail to tighten lock nut G after adjustment is made.

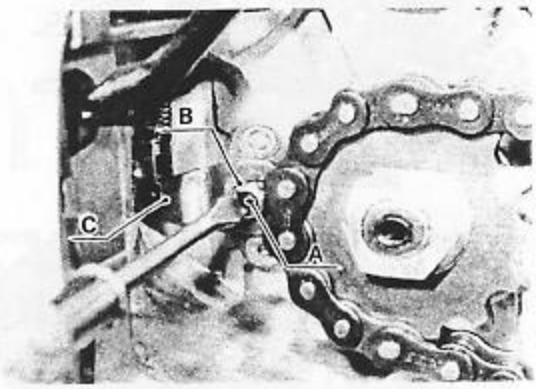
2. Be especially careful with this adjustment as improper adjustment may lead to piston seizure.



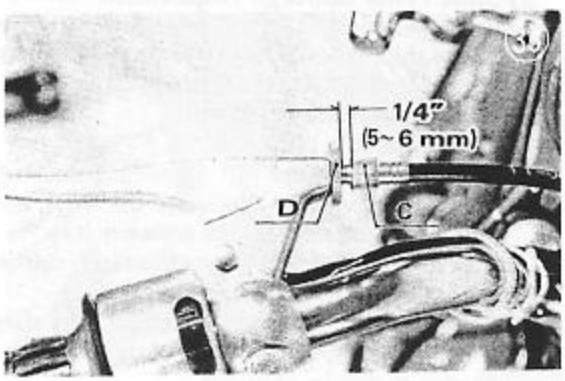
4) Clutch Adjustment

a. First adjust the release lever angle as outlined below.

(1) Loosen lock nut B and back out grooved screw A about 3 or 4 turns to give release lever C ample play.

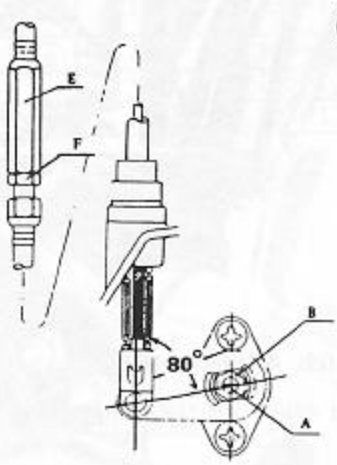


(2) Give the clutch hand lever play by loosening lock nut D and turning adjuster C, until the lever conforms with the measured position in the illustration.

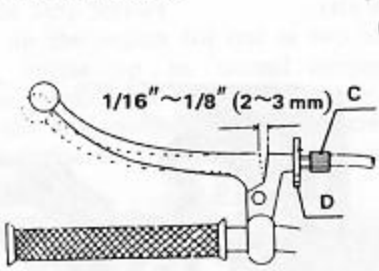


(3) Loosen lock nut F and turn clutch cable adjuster E until the release lever is at the 80° angle shown in the illustration. Hold the adjustment with lock nut F.

Release Lever Adjustment



Clutch Lever Adjustment



b. Next adjust the clutch itself. Turn in grooved screw A slowly until it suddenly becomes very hard to turn. This is where the clutch starts pushing on the screw and clutch operation begins. Hold the adjustment at this position with lock nut B.

c. Last adjust clutch lever play to the standard given in the illustration, by turning clutch lever adjuster C and locking it in place with lock nut D.

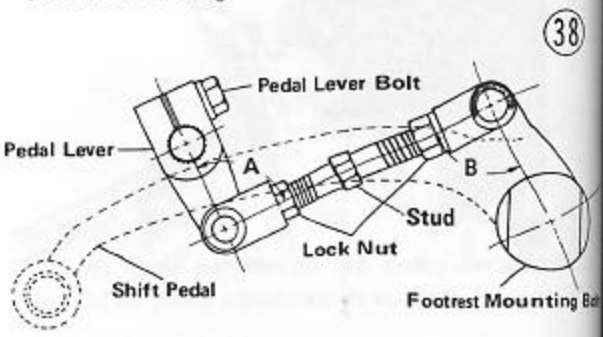
5) Shift Pedal Linkage Adjustment

To make the shift pedal function most effectively, the shift pedal links should be at 90° angles.

Improper angles of the shift pedal links may cause inaccurate shift operation.

a. First loosen both lock nuts.
b. Set angles A & B at 90° by turning the stud. Turning it clockwise decreases the angle, and turning it counterclockwise increases it.
c. After making the necessary adjustment, tighten the lock nuts.
   In case angle B can not be adjusted by only turning the stud, the position of the pedal lever serration should be changed.
d. Take out the pedal lever bolt.
e. Pull out the pedal lever. When the pedal lever can not be pulled out, loosen the footrest mounting bolt.
f. Reset the pedal lever so that angle B will be at 90°.
g. Screw in the pedal lever bolt, and tighten the footrest mounting bolt.
h. After making angle B adjustment, angle A should be adjusted by turning the stud as explained above.

Shift Pedal Linkage



III. Engine: Detailed Maintenance

1. AIR CLEANER

In order for gasoline to burn efficiently, it requires about 15 times its own weight in air. If this air is supplied directly from the dust-filled atmosphere, cylinder, piston and piston rings wear rapidly, carburetor air passages become dirt plugged, and carbon may build up in the combustion chamber and cause various troubles.

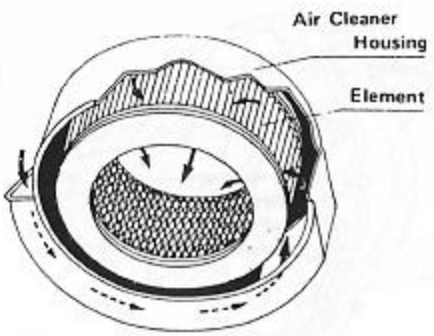
This dusty air must first be filtered by the air cleaner so that only clean air passes through the carburetor to the combustion chamber. If the air cleaner element becomes dirty or stopped up, its filtering efficiency is reduced and the engine air intake is hampered, with a corresponding decrease in combustion efficiency (and thus gas mileage) and output power. Therefore the air cleaner must be inspected and cleaned at regular intervals.

1) Construction

Figures 39 is a cross-sectional view of the S Series air cleaner. Air flow is in the direction of the arrows and is filtered by the element in the center.

Air Cleaner

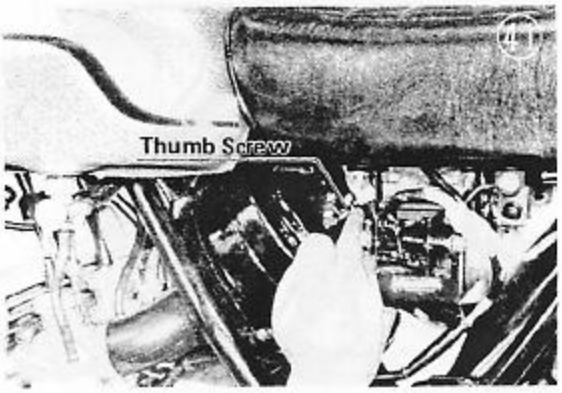
(39)



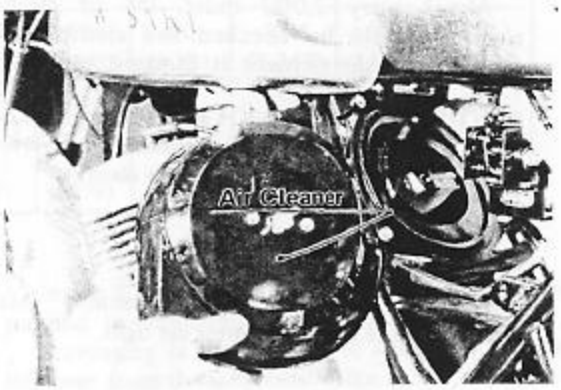
2) Disassembly

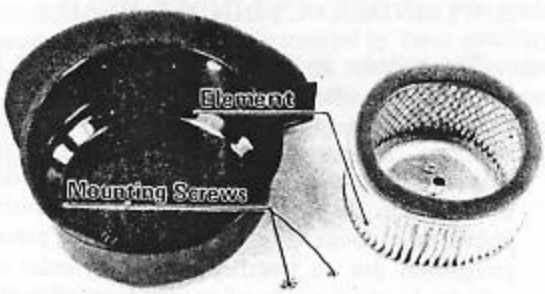
Remove side cover.

Loosen thumb screw.

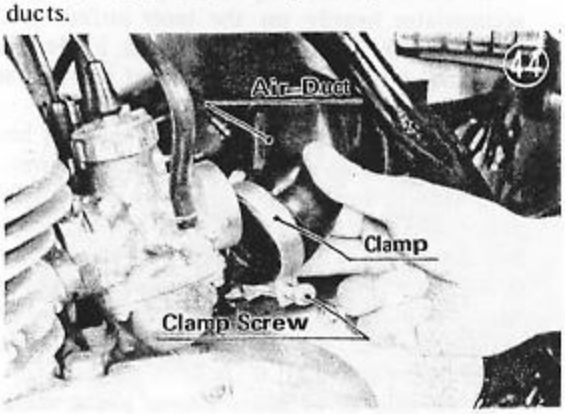


Pull air cleaner out through left side of frame. Take out two element mounting screws, remove element.

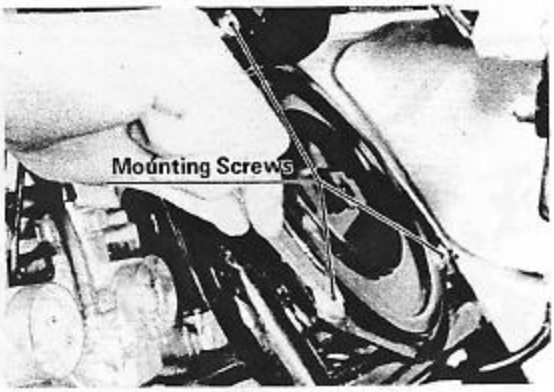




Remove three hose clamps and pull off air inlet ducts.



Take out three mounting bolts to remove air cleaner base plate from frame.



3) Overhaul

About every 2,000 miles, the air cleaner element should be checked and cleaned with gasoline. If the element is damaged, replace it.

CAUTION: The S and KH series element is a dry type; oil or gasoline/oil mixture should not be used to clean it.

4) Assembly

Assembly is the reverse of disassembly. After assembly make sure all clamps are tight.

2. CYLINDER · CYLINDER HEAD

The cylinder and cylinder head constitute the combustion chamber, and are exposed to extremely high temperatures while the engine is running. To prevent piston seizure; to prevent heat transformation of the shape or molecular structure of the cylinder, cylinder head, piston, piston ring, connecting rods, etc.; and to prevent preignition due to overheating, the cylinder and cylinder head are made of an aluminum alloy with good conductivity, and fins are provided on the exterior to further increase cooling efficiency.

If carbon formed by incomplete combustion accumulates heavily on the inner surface of the cylinder head, not only does this hinder heat radiation, but the carbon becomes red hot and causes overheating and preignition.

Compression in the combustion chamber has a direct relationship with engine output power; if the cylinder head is tightened down with less than normal torque, or if the head bolts are not tightened evenly, the head will warp and leaks will develop, with a resultant lowering of compression. Again, cylinder, piston and piston ring wear will cause a decrease in compression and consequently limit engine performance.

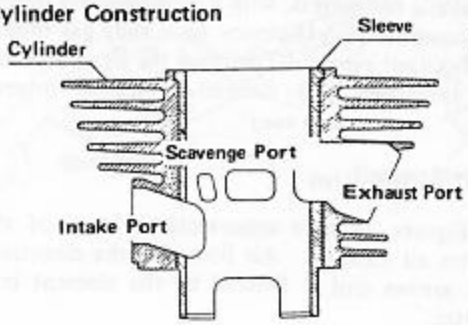
In the case of cylinder wear or piston seizure, restoration is possible with boring and honing.

1) Construction

The cylinder itself is light – made of aluminum alloy with a high cooling coefficient – and its inner surface is made wear resistant by casting into it a surface-hardened cast iron sleeve. The special fusion process by which the sleeve is bonded to the aluminum, averts the formation of any air pockets which might reduce heat conduction and decrease cooling efficiency.

In the inner surface of the cylinder, exhaust, scavenge and intake ports are provided, and these are opened and closed by the sides of the piston as it moves up and down inside the cylinder.

Cylinder Construction (46)



Port Timing (47)

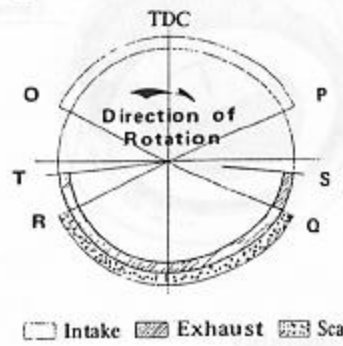
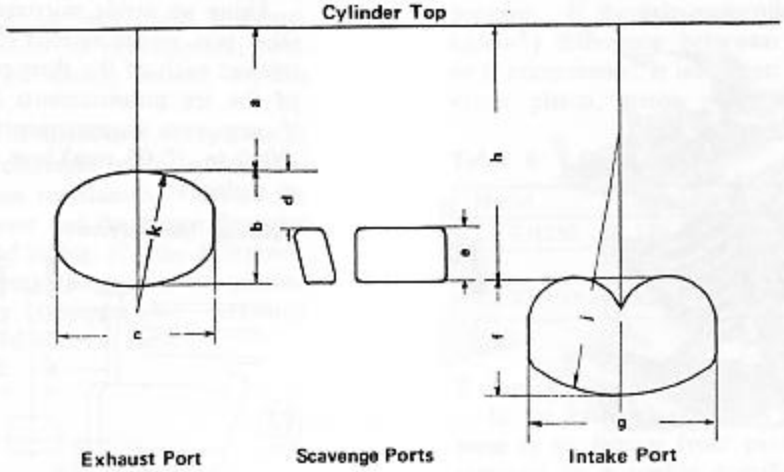


Table 2 Port Timing

Model		S1, KH250	S2	S3, KH400
Intake	Open 0°	74° BTDC	73° BTDC	73° BTDC
	Close P°	74° ATDC	73° ATDC	73° ATDC
Scavenge	Open Q°	62° BBDC	58° BBDC	58° BBDC
	Close R°	62° ABDC	58° ABDC	58° ABDC
Exhaust	Open S°	83° BBDC	89° BBDC	86° BBDC
	Close T°	83° ABDC	89° ABDC	86° ABDC

Port Measurements



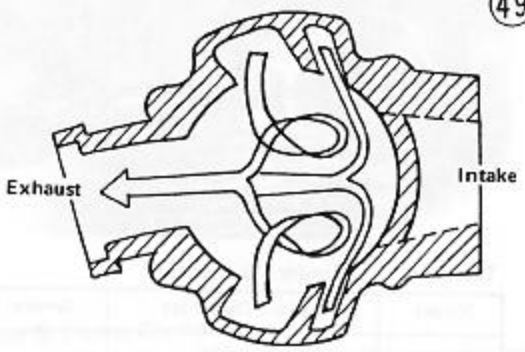
(48)

Table 3 Port Measurements [mm (inch)]

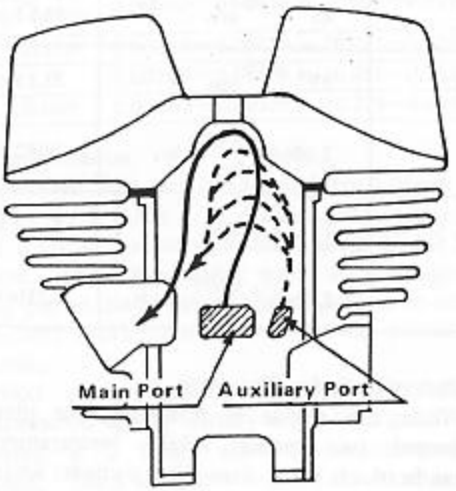
Model	A	B	C	D	E	F	G	H	J	K
S1, KH250	33.7 (1.327)	22 (.866)	30 (1.181)	8.4 (.331)	12.4 (.488)	22.6 (.890)	30 (1.181)	59.5 (2.343)	90 (3.543)	50 (1.969)
S2	31.0 (1.220)	24.0 (0.945)	35.5 (1.398)	12.5 (.492)	11.0 (.433)	22.6 (.890)	36 (1.417)	59.0 (2.323)	90 (3.543)	50 (1.969)
S3, KH400	33.0 (1.299)	22.5 (0.886)	36 (1.417)	11.0 (.433)	11.5 (.453)	22.6 (.890)	36 (1.417)	55.5 (2.185)	90 (3.543)	70 (2.756)

Scavenge Gas Flow Pattern (Four port system)

(49)



(50)



In the S and KH Series, the four-port scavenge method is employed to increase output power.

Scavenging is the process of replacing the gas left over from the last combustion cycle, with new gasoline mixture. With this four-port scavenge method, as shown in the diagram, the two main scavenge ports are supplemented by two auxiliary ports, providing an ideal gas circulation pattern and raising the scavenge efficiency level far above that of the two-port scavenging used in most of the piston valve engines up until now.

2) Disassembly

Remove head nuts. Remove cylinder heads and head gaskets.