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1. RIGHT AND LEFT SIDE VIEWS

TS90

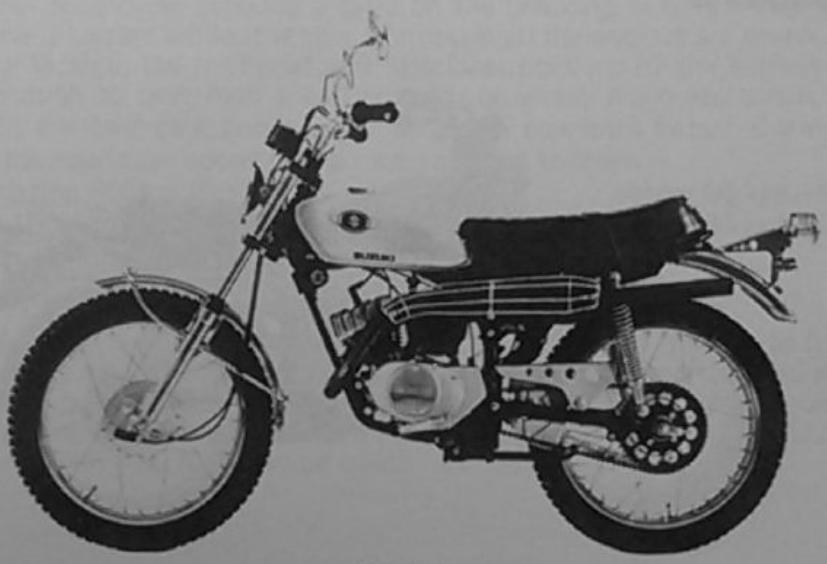


Fig. 1–1

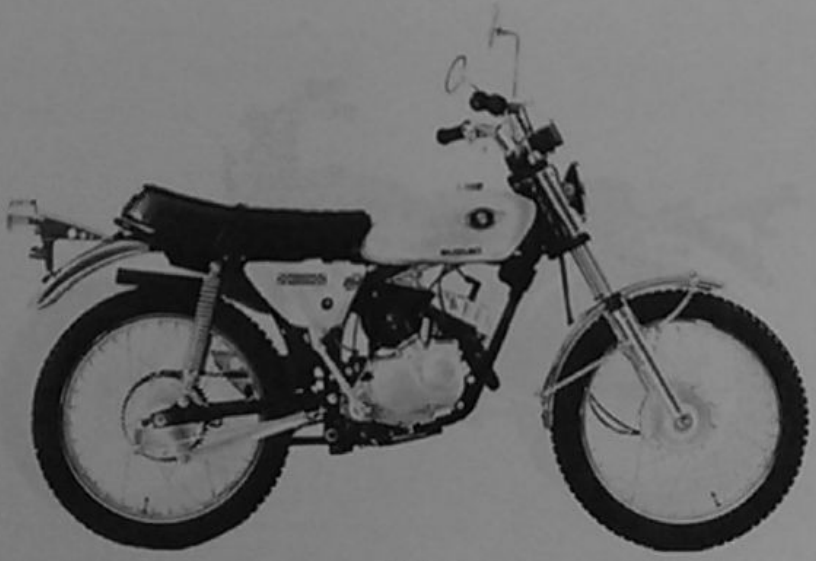


Fig. 1–2

TC90

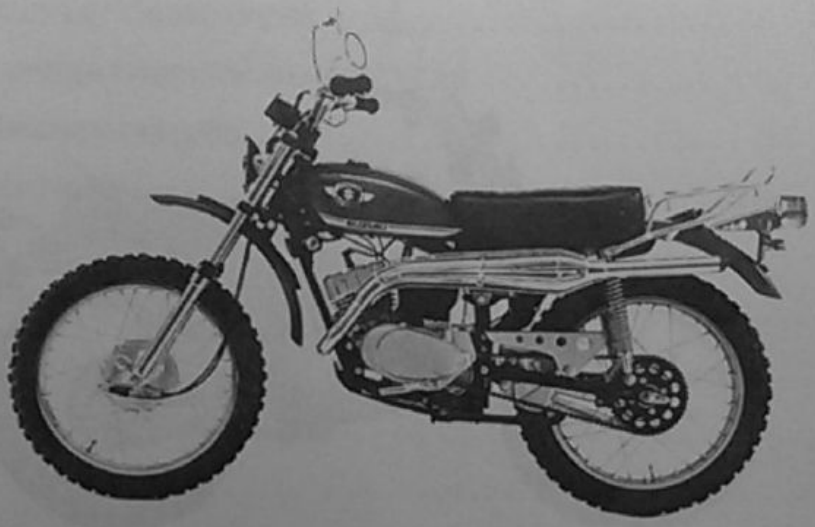


Fig. 1–3

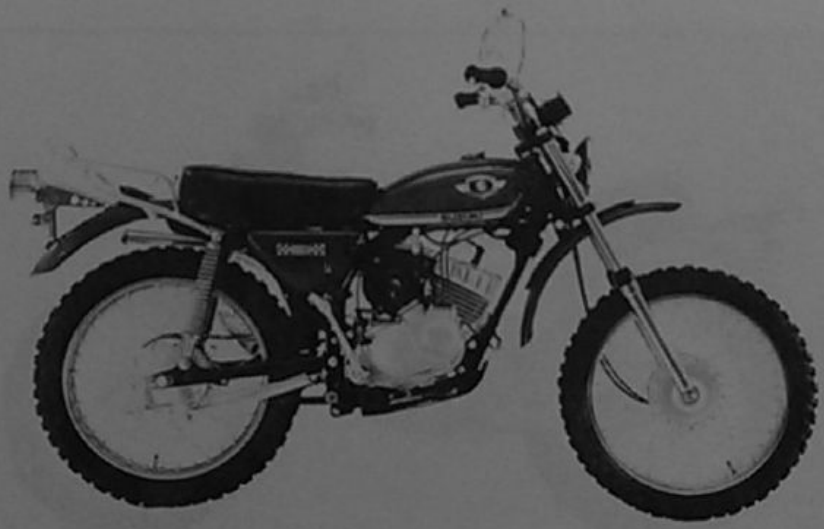


Fig. 1–4

2. TIPS ON OPERATING NEW MOTORCYCLE

Please advise your customers to faithfully observe these tips to keep their TS90 or TC90 in a peak condition and it will be ready to serve them with top performance at all times.

Breaking-in

The life of the motorcycle depends greatly on the breaking in of the engine and the way the motorcycle is treated while it is new. Although all the engines are motor-lapped before they leave the factory, the frictional and rotational portions of the engines are not run in completely enough to bear high speed rotation or severe strain and stress, so the engine must be given the best care possible just as with a new-born baby. During the break-in period, keep the maximum speed of the motorcycle as follows.

for the first 800km (500mi) . . . . . below 60 kph (40 mph)
up to 1600km (1,000mi) . . . . . below 80 kph (60 mph)

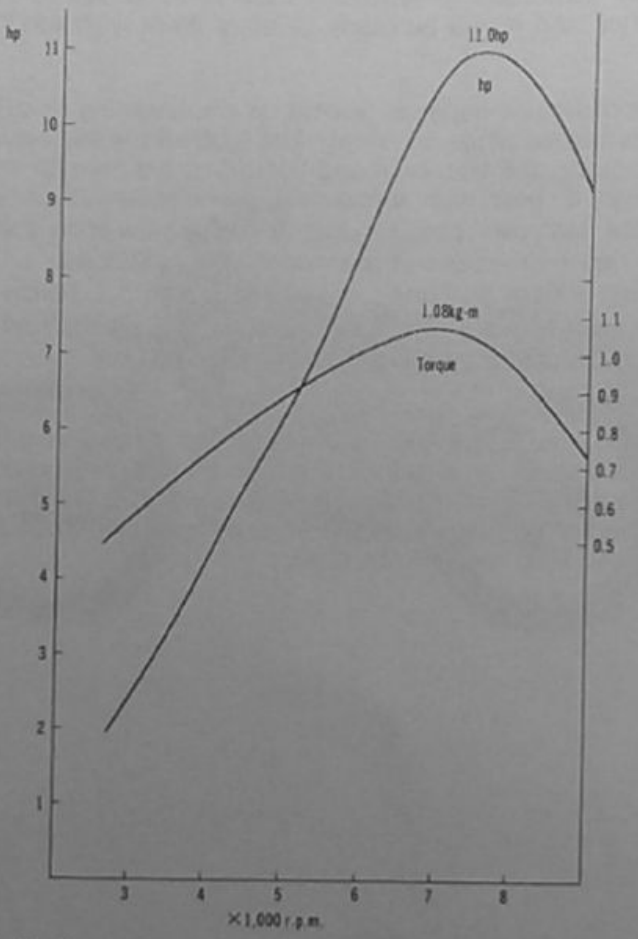
And it is not recommendable to force it to climb a steep hill.

Fuel & Lubrications

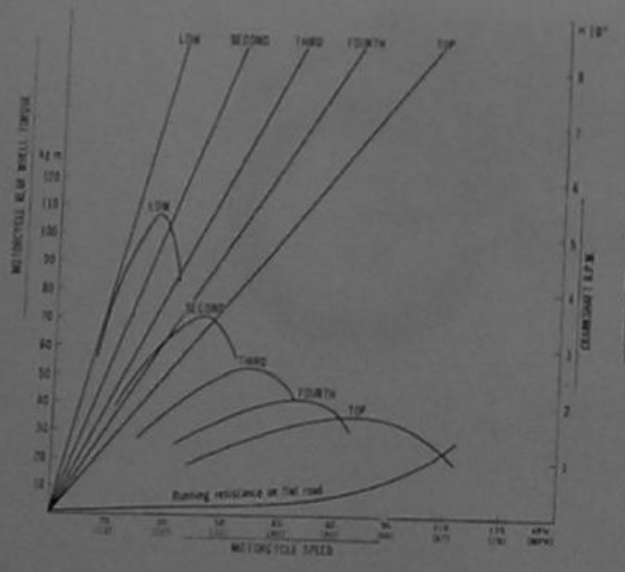
With C.C.I. System, the TS90/TC90 engine requires no gas/oil mixture as fuel unlike conventional 2-stroke engines. Put gasoline only in the fuel tank and lubrication oil in the oil tank. For the Suzuki C.C.I. System, use of Suzuki C.C.I. Oil is highly recommended, but if it is not available, non diluent (non-self mixing type) Two Stroke Oil or Outbourd Motor Oil with around SAE # 30 may also be used.

3. PERFORMANCE CURVES

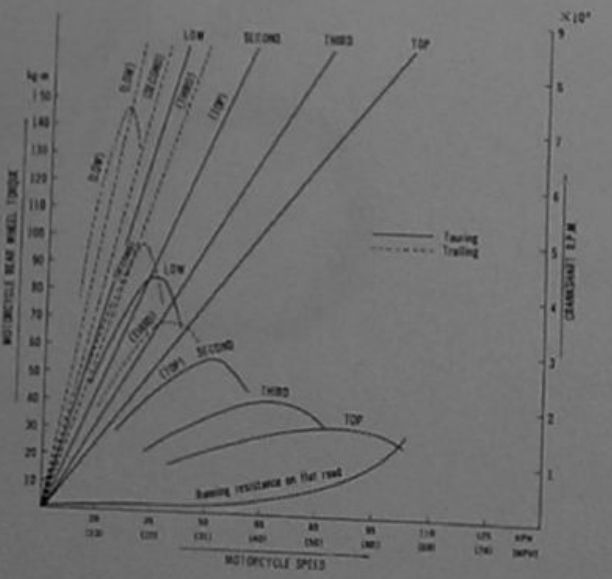
3–1. TS90/TC90 Engine Performance Curves



3–2. TS90 Motorcycle Performance Curves



3–3. TC90 Motorcycle Performance Curves



4. SPECIFICATIONS

Model Name	TS 90	TC 90
Dimensions		
Overall length	1,835 mm (72.3 in)	1,900 mm (74.8 in)
Overall width	830 mm (32.6 in)	830 mm (32.6 in)
Overall height	1,060 mm (41.7 in)	1,060 mm (41.7 in)
Wheel base	1,210 mm (47.7 in)	1,210 mm (47.7 in)
Road clearance	220 mm (8.67 in)	225 mm (8.9 in)
Tires, front	2.75-18 4PR	2.75 - 18, 4PR
rear	2.75-18 4PR	3.00 - 18, 4PR
Weight		
Dry weight	89 kg (197 lb)	90 kg (199 lb)
Performance		
Maximum Speed	105-112 kph (65-70 mph)	96-105 kph (60-65 mph)
Climbing ability	27°	30° and over
Engine		
Type	2-cycle air cooled gasoline	2-cycle air cooled gasoline
Weight	23.5 kg (51.8 lb)	22.5 kg (49.6 lb)
Cylinder	single inclined forward	single inclined forward
Bore X Stroke	47.0 mm X 51.8 mm (1.85 X 2.04 in)	47.0mmX51.8mm(1.85X2.04 in)
Piston displacement	89cc (5.43 cu-in)	89cc (5.43 cu-in)
Corrected compression ratio	6.8 : 1	6.8 : 1
Maximum horse power	11 hp/7,500 rpm	11 hp/7,500 rpm
Maximum torque	1.08 kg-m (7.82 lb-ft)/7,000 rpm	1.08 kg-m (7.82 lb-ft)/7,000 rpm
Starter	Kick	Kick
Fuel System		
Carburetor	Amal VM 19 SC	Amal VM 19 SC
Air cleaner	resin processed paper filter	resin processed paper filter
Fuel tank capacity	6 ltr (1.58/1.32 gal, US/Imp)	6 ltr (1.58/1.32 gal, US/Imp)
reserve	2 ltr (4.23/3.52 pt, US/Imp)	2 ltr (4.23/3.52 pt, US/Imp)

Model Name		TS 90	TC 90
Lubrication			
Engine		Posi-Force	Posi-Force
Oil tank capacity		1.2 ltr (1.27/1.55 qt, US/Imp)	1.2 ltr (1.27/1.55 qt, US/Imp)
Gear box		0.8 ltr (1.69/1.40 pt, US/Imp)	0.8 ltr (1.69/1.40 pt, US/Imp)
Ignition System			
Spark plug		B-77HC	B-77HC
Ignition		flywheel magneto	flywheel magneto
Ignition timing		20° BTDC 1.95 mm	20° BTDC 1.95 mm
Transmission System			
Clutch		wet, multi disc type	wet, multi disc type
Speeds		5 speeds constant mesh	4 X 2 speed constant mesh
Gear shifting		left foot lever operated return change type	left foot lever operated return change type
Gear ratios	low	2.818 (31/11)	2.5 (30/12) 4.34
	second	1.866 (28/15)	1.64 (23/14) 2.85
	third	1.388 (25/18)	1.21 (23/19) 2.10
	fourth	1.100 (22/20)	0.95 (18/19) 1.64
	top	0.870 (20/23)	
Primary reduction ratio		3.173 (73/23)	3.173 (73/23)
Final reduction ratio		3.642 (51/14)	3.357 (47/14)

- Specifications subject to change without notice.

5. REVOLUTIONARY "SUZUKI C.C.I."

Of the various lubrication systems for two-stroke engine, Suzuki C.C.I. developed by Suzuki Motor Co., Ltd. the world leading producer of two-stroke engines, is not only the newest but is guite the best by a large margin.
C.C.I. system supplies the correct amount of oil under pressure directly to the stressed points which need lubrication. This is the most advanced lubrication system in the world, because fresh oil, not old oil deteriorated after a long use as often seen in four-stroke engines, is always supplied directly to the specific engines parts needing lubrication rather than to the carburetor or cylinder inlet stub either of which systems will have oil's lubricating performance as the oil is thinned by gasoline.

Explanation of mechanism

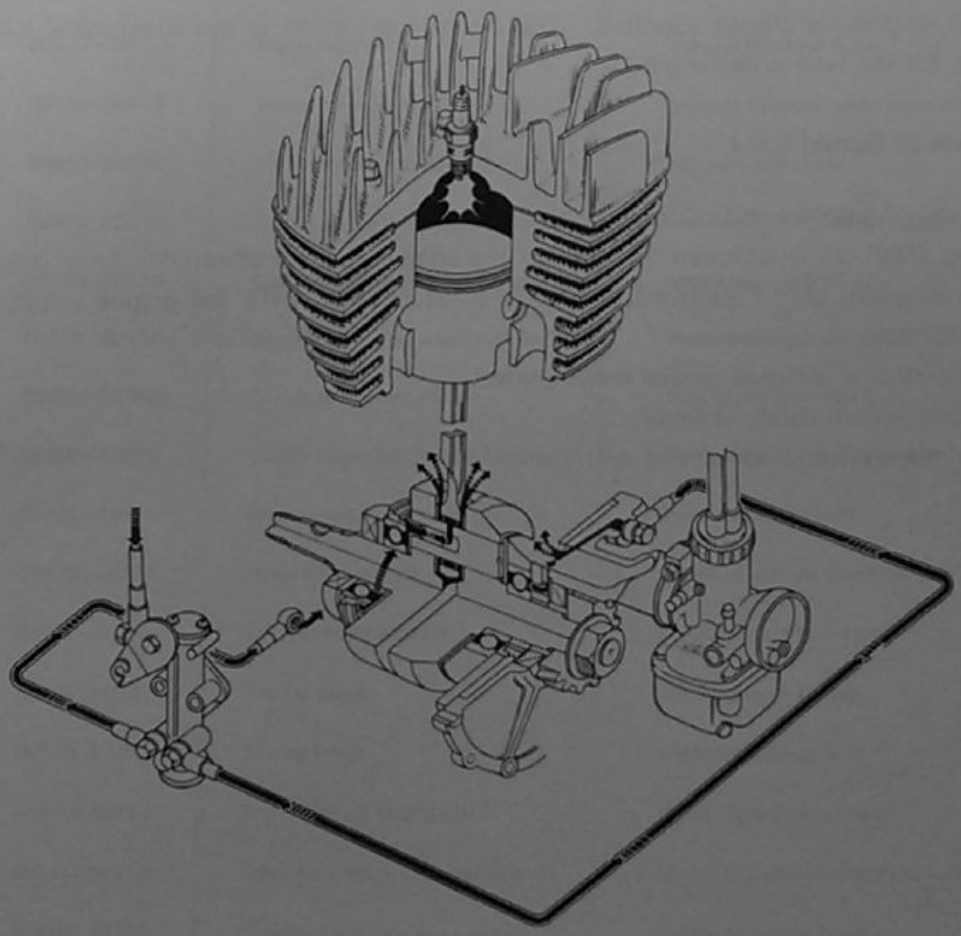


Fig. 5–1 Explanation of mechanism

Lubrication oil is supplied under pressure through two oil pipes by an oil pump and is completely separate from the gasoline supply.
Each oil pipe is separated into two at a junction, one of which leads to the crankshaft, and lubricates the crankshaft side bearing. After lubricating it, the oil passes through a passage in the crankpin and lubricates the needle roller bearing in the connecting rod big end. The oil is then sprayed into the crankcase by centrifugal force. The other oil channel supplies oil to the cylinder and lubricates the cylinder wall.
A part of the oil from this channel combines with oil sprayed from the connecting rod big end by centrifugal force and lubricates the con-rod small end needle roller bearing, piston and cylinder wall. The total amount of oil pumped is regulated by the oil pump control lever operated by the oil pump control cable, which is synchronized with the throttle cable and varies with the throttle opening. At the same time, the amount of oil supplied is also controlled by the engine speed thus the correct amount of oil, exactly the amount needed by the engine, is always supplied. Posi-Force lubrication is the most ideal lubrication system for the two-stroke engine.

Features of Suzuki C.C.I.

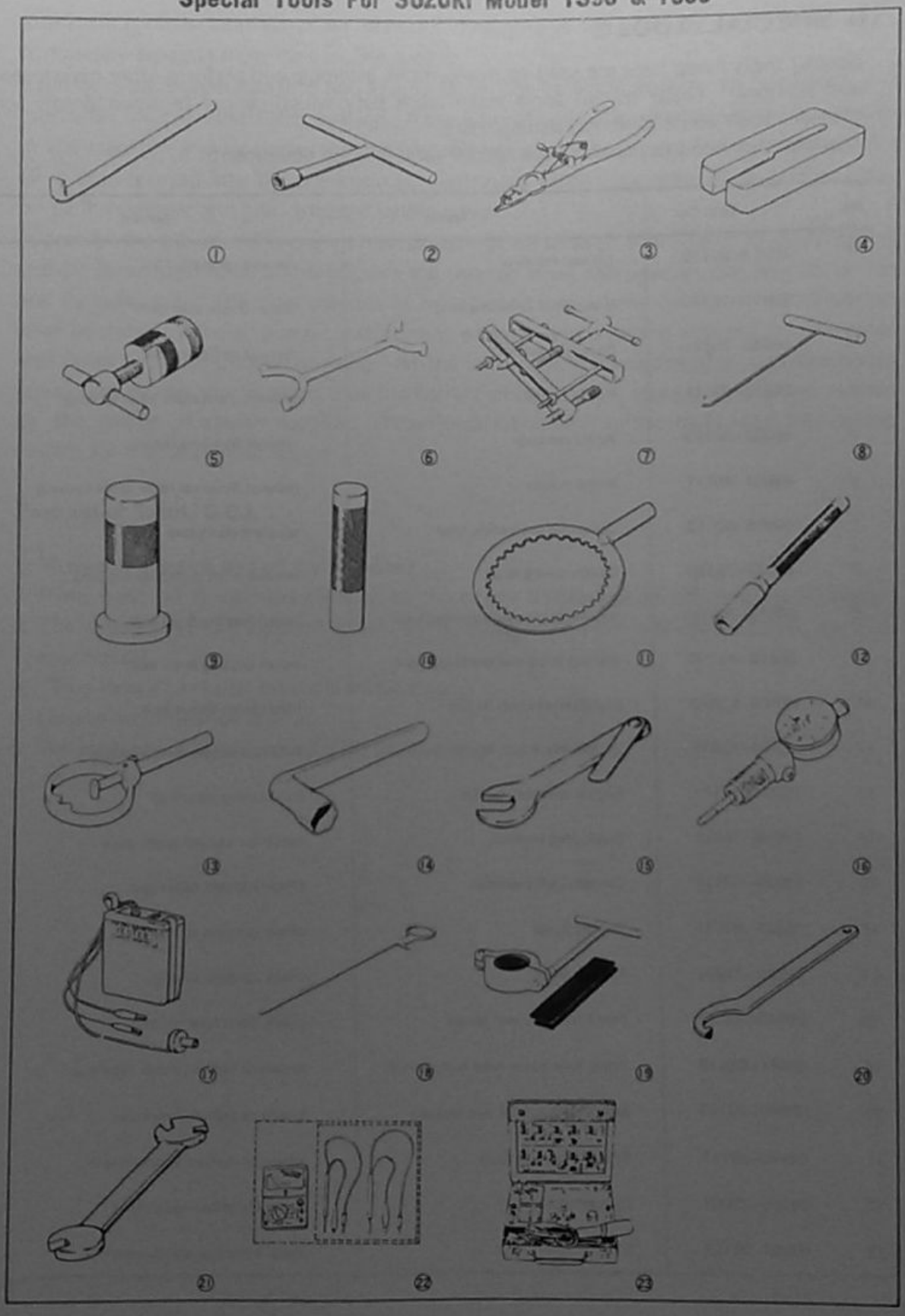
1. Mixing of gasoline and oil is eliminated.
2. Pure, fresh oil is supplied directly to the engine so lubrication efficiency is excellent.
3. The amount of oil supplied is strictly in accordance with the engine needs, so it is economical.
4. "Two-stroke" exhaust smoke is eliminated.
5. Carbon accumulation is small.
6. The motorcycle is not dirtied with oil.

6 SPECIAL TOOLS

Special tools listed here are used to disassemble, assemble and perform other maintenance and services. These specail tools make work easy which cannot be done simply with ordinary tools and also do not damage parts.
It is recommended to provide these special tools as shop equipment.

No.	Tool No.	Name	Service
1	09913–50110	Oil seal remover	remove oil seal
2	09910–10710	8 mm stud installing tool	install 8 mm stud bolt
3	09920–70111	Snap ring opener	remove or fit circlips
4	09910–20111	Piston holder	prevent crankshaft from turning
5	09930–30113	Rotor remover	remove flywheel rotor
6	09930–40111	Rotor holder	prevent flywheel rotor from turning
7	09910–80112	Crankcase separating tool	separate crankcase
8	09920–20310	Clutch spring hook	remove or fit clutch spring pins
9	09913–70110	Bearing & oil seal installing tool	install bearing & oil seal
10	09913–80110	Bearing & oil seal installing tool	install bearing & oil seal
11	09920–52310	Clutch sleeve hub holder	hold clutch sleeve hub
12	09920–60310	Clutch sleeve hub holder handle	hold clutch sleeve hub holder
13	09921–10111	Engine sprocket holder	hold engine sprocket
14	09930–10111	Spark plug wrench	loosen or tighten spark plug
15	09930–20111	Contact point wrench	check contact point gap
16	09931–00111	Timing gauge	check ignition timing
17	09900–27002	Timing tester	check ignition timing
18	09940–40112	Front fork oil level gauge	check front fork oil level
19	09941–00110	Front fork outer tube nut wrench	loosen or tighten outer tube nut
20	09940–20110	Steering stem lock nut wrench	loosen or tighten head nut
21	09940–60111	Spoke nipple wrench	loosen or tighten spork nipple
22	09900–25001	Pocket tester	check electrical equipment
23	09900–28101	Electro tester	check electrical equipment

Special Tools For SUZUKI Model TS90 & TC90



7. ENGINE

7–1. Work With Engine Dismounted From Frame

Remove the engine from the frame and separate the crankcase into two halves for these jobs.

	Part	Operation
1	Crankshaft	Inspect for shake, repair or replace Check bearing for wear, replace Check oil seals for leaking, replace
2	Transmission System	Check gears and shakes, adjust or replace Check bearings and bushings, replace
3	Gear System	Inspect shifting cam groove for damage, replace Inspect shifting forks for burned spots and wear, repair or replace
4	Kick Starter System	Inspect pinion for worn ratchet, replace Inspect pawl and pawl spring for wear and tension, replace

7–2. Removing Engine From Frame

The engine should be disassembled in an orderly sequence for easy and efficient work. Before begining the removal operation, throughly clean the engine with a steam cleaner or cleaning solvent to remove road dirt. Always use clean tools, and choose correct tools to avoid damaging parts.

Work according to the order of following figures.

Fig. 7–2–1
Directing fuel cock lever to "0" position

Fig. 7–2–2
Pulling fuel line from fuel cock

Fig. 7–2–3
Removing spark plug cap from spark plug

Fig. 7–2–4
Removing oil tank cover

Fig. 7–2–5
Removing oil tank set band

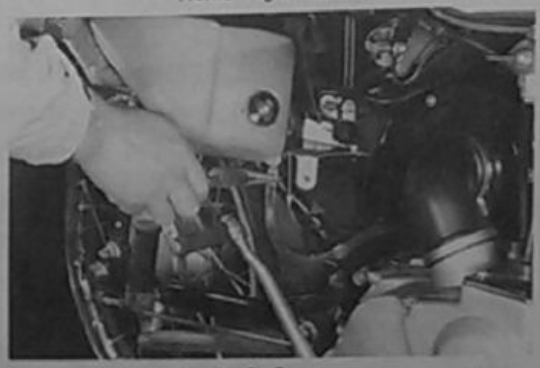


Fig. 7–2–6
Disconnecting oil line

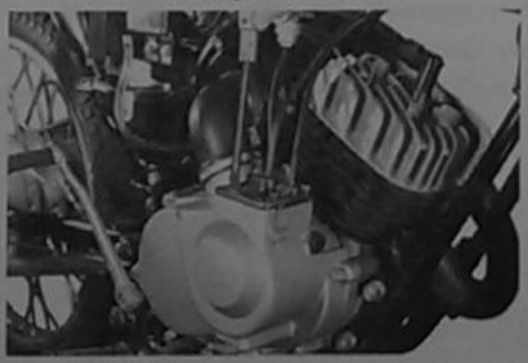


Fig. 7–2–7
Unscrewing carburetor rubber cap screws

Fig. 7–2–8
Slipping up carburetor rubber cap

Fig. 7–2–9
Unscrewing carburetor cover screws

Fig. 7–2–10
Disconnecting fuel line vacuum tube and over flow pipe

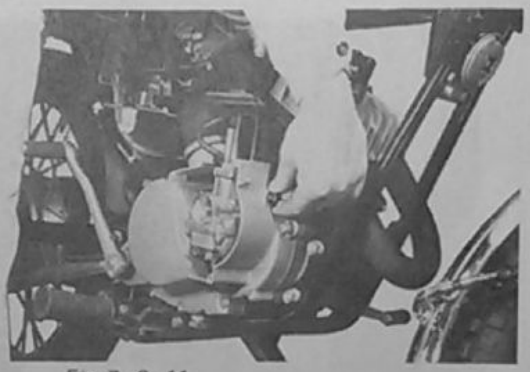


Fig. 7–2–11
Removing carburetor fitting hole plug

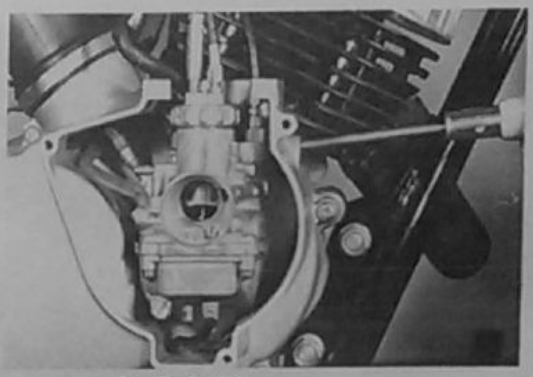


Fig. 7–2–12
Unscrewing carburetor clip bolt

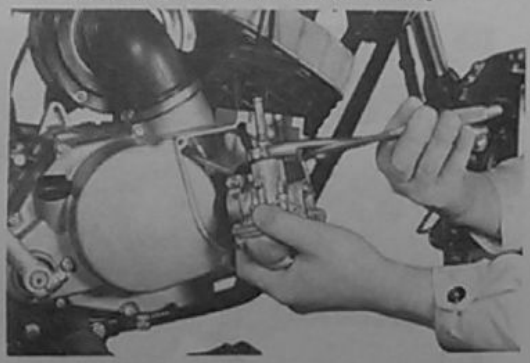


Fig. 7–2–13
Unscrewing mixing chamber cap

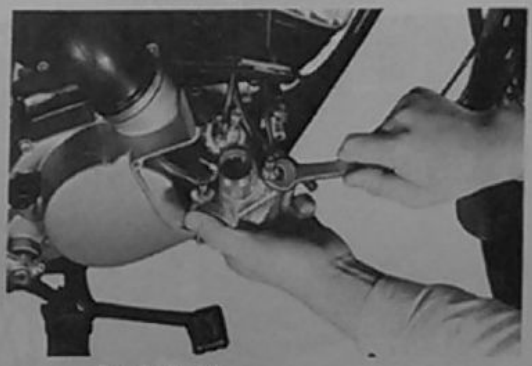


Fig. 7–2–14
Unscrewing starter plunger cap

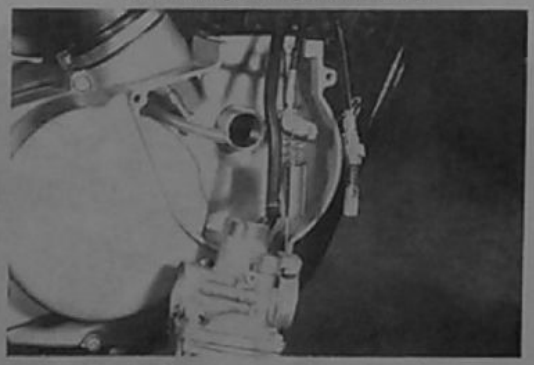


Fig. 7–2–15
Removing carburetor from engine

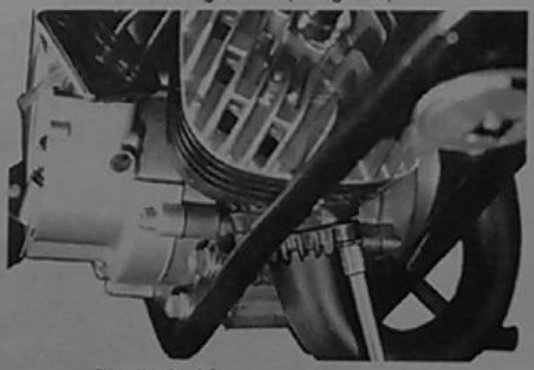


Fig. 7–2–16
Unscrewing exhaust fitting bolt

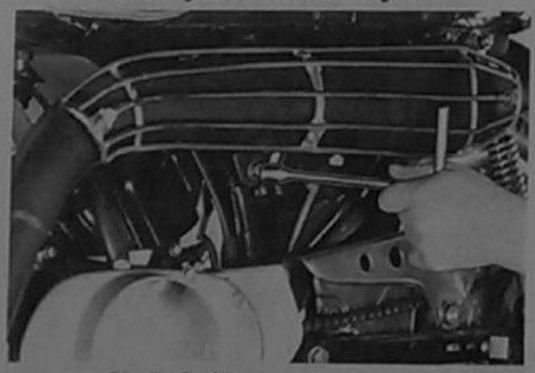


Fig. 7–2–17
Unscrewing muffler fitting bolt

Fig. 7–2–18
Unscrewing muffler fitting bolt

Fig. 7–2–19
Disconnecting magneto wire

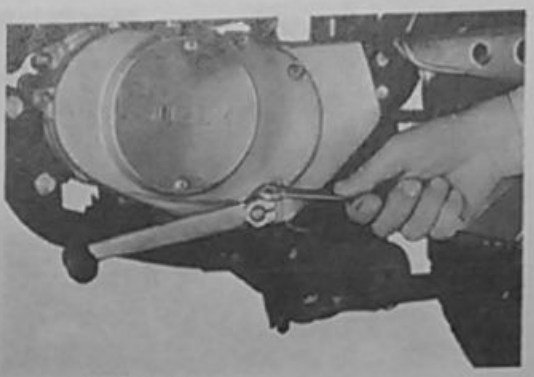


Fig. 7–2–20
Unscrewing gear shifting lever fitting bolt

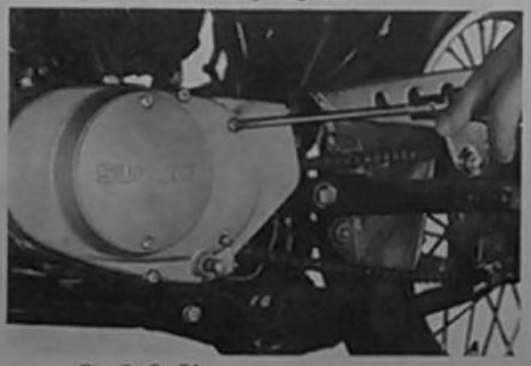


Fig. 7–2–21
Unscrewing crankcase left cover screws

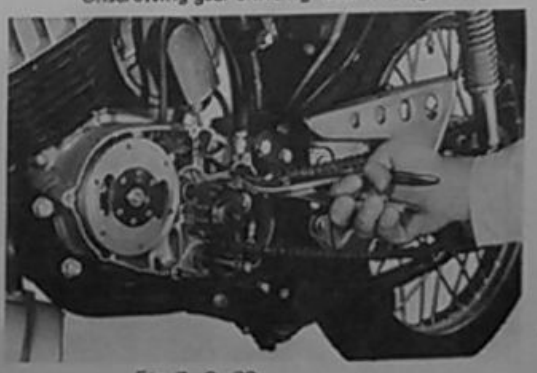


Fig. 7–2–22
Disconnecting drive chain

Fig. 7–2–23
Unscrewing oil pump cover screws

Fig. 7–2–24
Removing cable from oil pump control lever

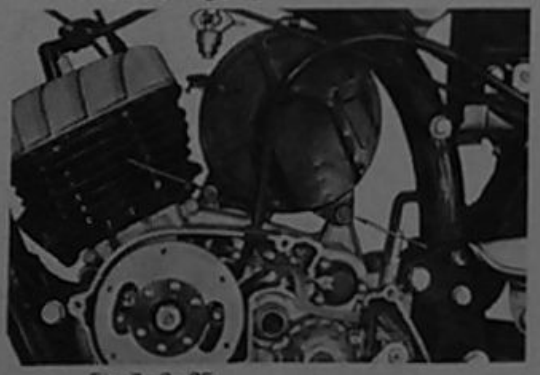


Fig. 7–2–25
Unscrewing air cleaner fitting screws

Fig. 7–2–26
Unscrewing air cleaner tube lower clamp

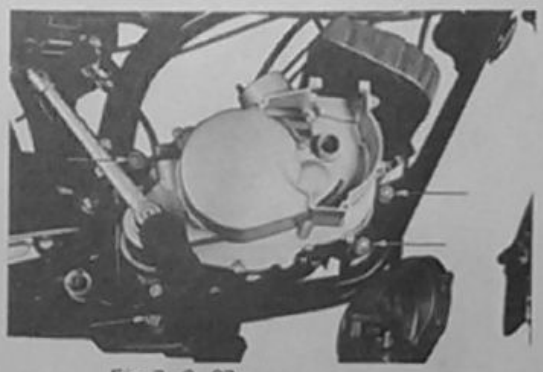


Fig. 7–2–27
Unscrewing engine mounting bolts

Fig. 7–2–28
Removing engine from frame

7–3. Tips on Disassembling Engine

The engine is the heart of the motorcycle and consists of precisely manufactured parts, which must be handled and assembled most carefully. When working on the engine, keep your hands and tools clean at all times.
Before beginning work, prepare work benches, necessary tools, clean rags and cleaning solvent for washing parts.

Disassemble the engine according to the following figures.

Fig. 7–3–1
Loosening drain plug with 21mm wrench

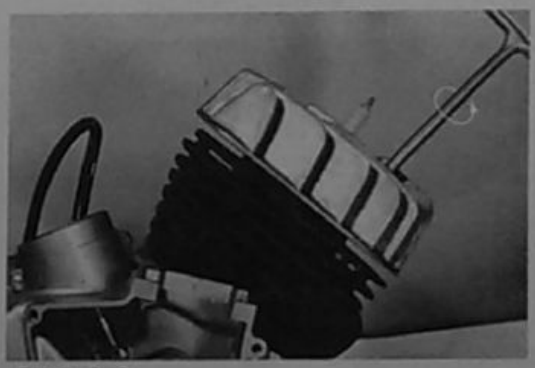


Fig. 7–3–2
Unscrewing cylinder head nuts with 14mm wrench

Fig. 7–3–3
Taking off cylinder head and cylinder head gasket

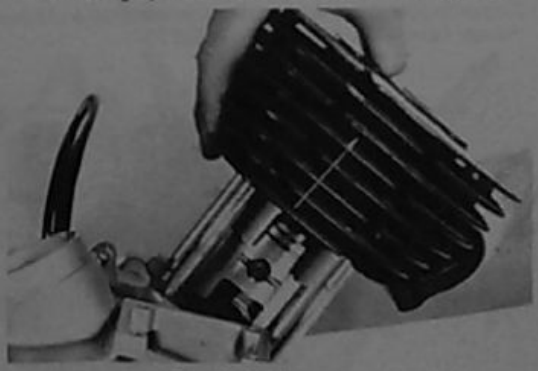


Fig. 7–3–4
Taking off cylinder

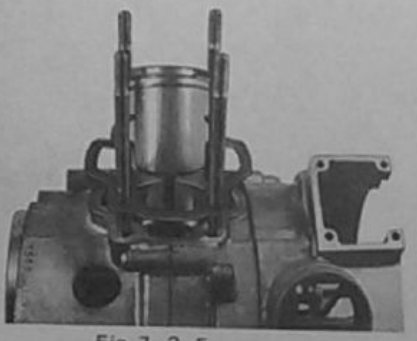


Fig. 7–3–5
Taking off cylinder gasket

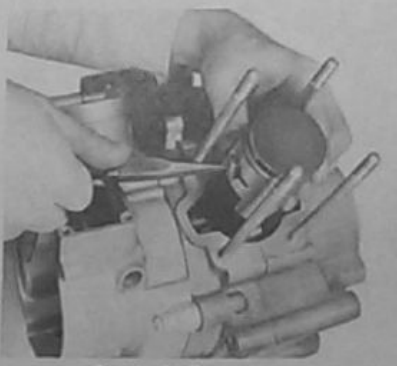


Fig. 7–3–6
Removing one piston pin circlip

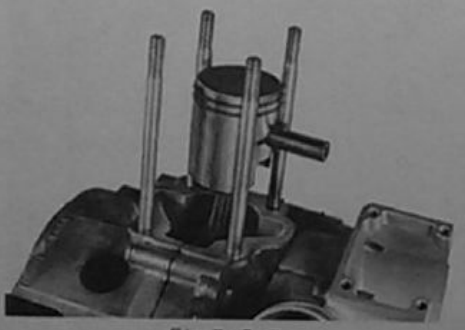


Fig. 7–3–7
Removing piston pin

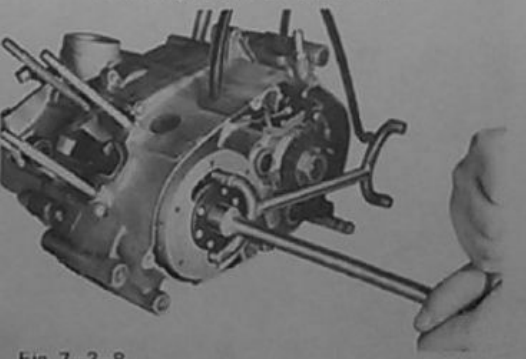


Fig. 7–3–8
Removing flywheel rotor nut with 17mm wrench and rotor holder (special tool No. 09930–40111)

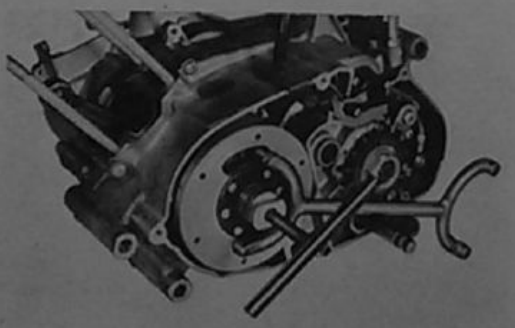


Fig. 7–3–9
Loosening flywheel rotor with rotor remover and rotor holder (special tool No. 09930–30113)

Fig. 7–3–10
Removing flywheel rotor

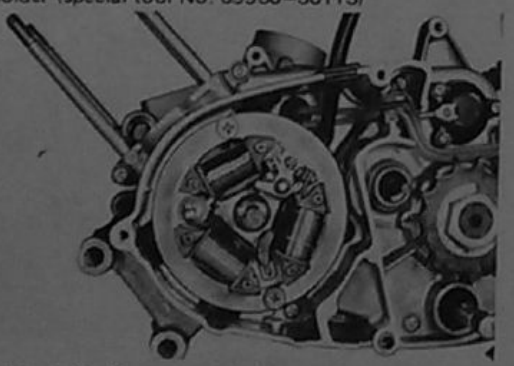


Fig. 7–3–11
Unscrewing starter and neutral switch wire fitting screws with cross head driver

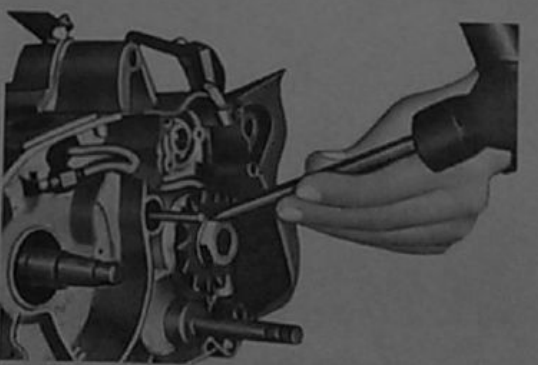


Fig. 7–3–12
Straightening sprocket washer with chisel and hammer

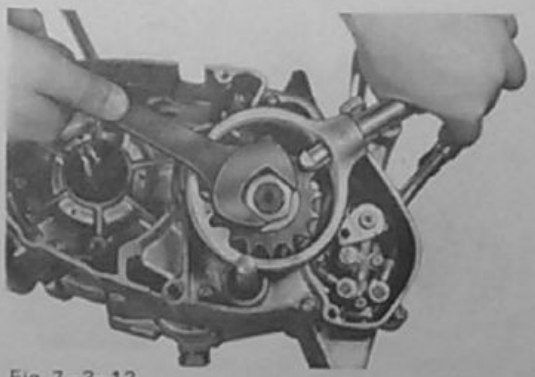


Fig. 7–3–13
Unscrewing sprocket set nut with 24mm wrench and sprocket holder (special tool No. 09930–10111)

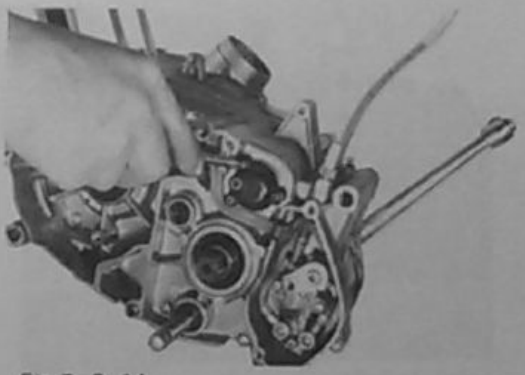


Fig. 7–3–14
Unscrewing neutral swich fitting screws with cross head driver

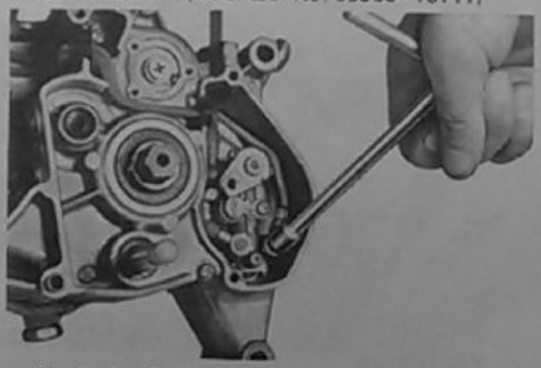


Fig. 7–3–15
Unscrewing oil line union bolt with 8mm wrench

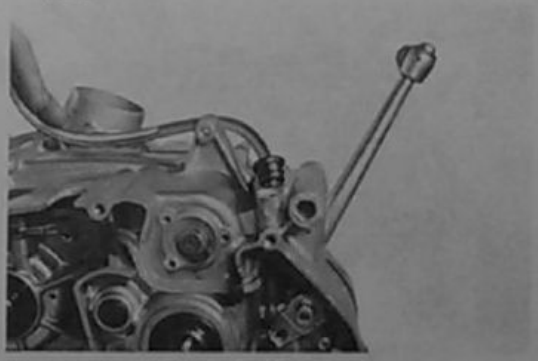


Fig. 7–3–16
Pulling up oil line gromet

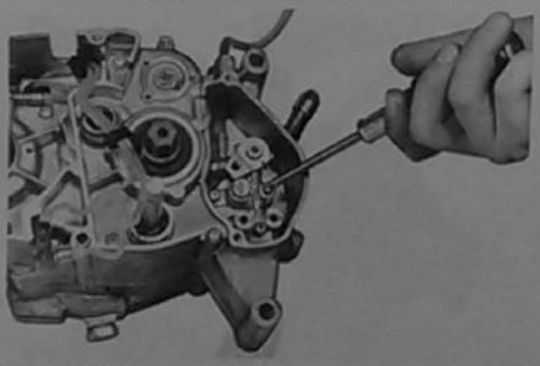


Fig. 7–3–17
Loosening oil pump fitting screws with cross head driver

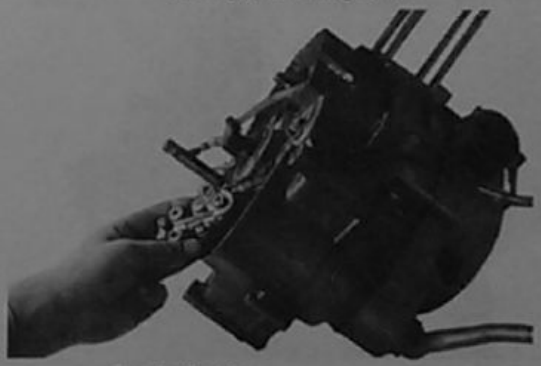


Fig. 7–3–18
Removing oil pump from engine

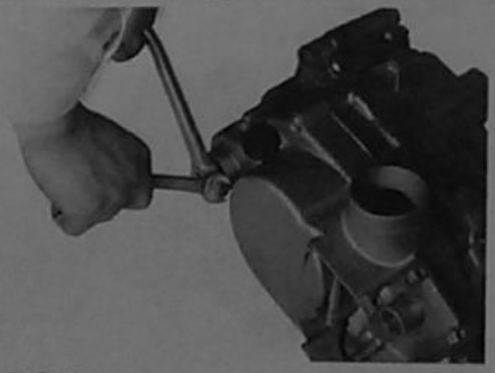


Fig. 7–3–19
Loosening kick starter lever fitting bolt and removing kick starter lever

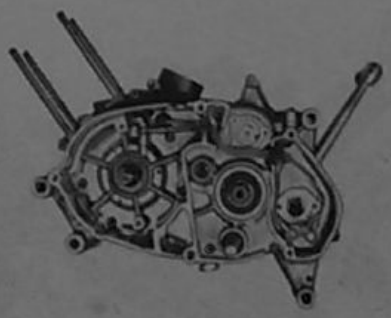


Fig. 7–3–20
Loosening left crankcase fitting screws with cross head driver

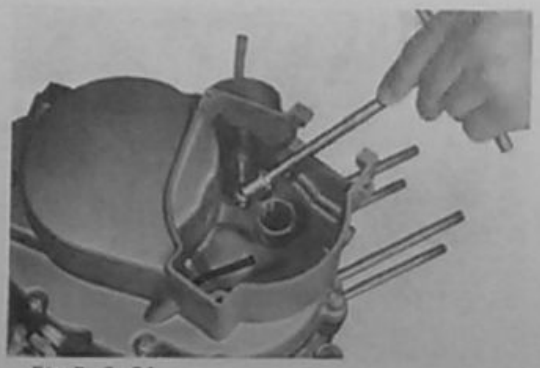


Fig. 7–3–21
Unscrewing oil line union bolt with 8mm wrench

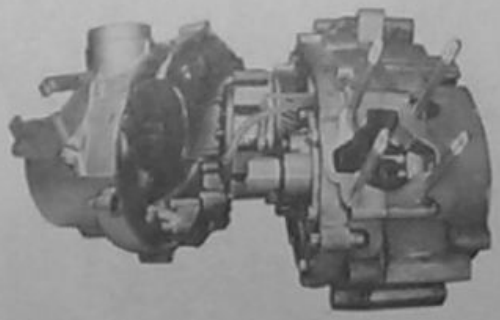


Fig. 7–3–22
Removing crankcase right cover

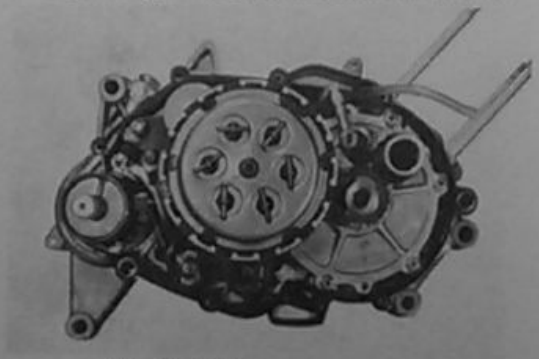


Fig. 7–3–23
Right crankcase side view

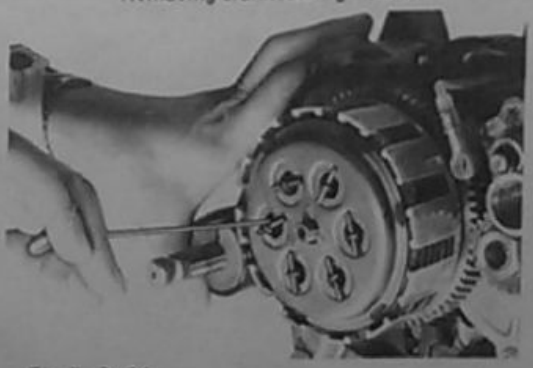


Fig. 7–3–24
Taking off clutch spring pins with clutch spring hook (special tool No. 09920–20310)

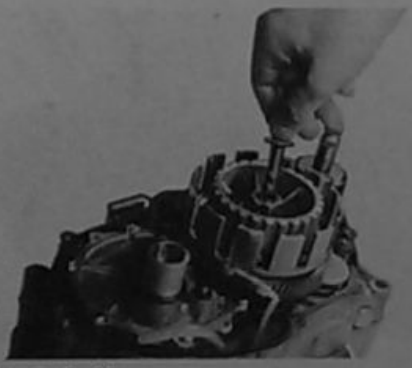


Fig. 7–3–25
Removing clutch release rod and clutch pressure plates

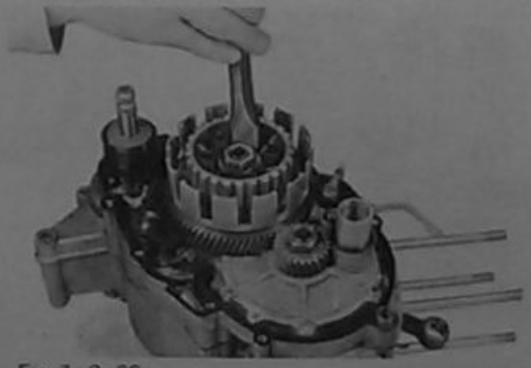


Fig. 7–3–26
Straightening clutch sleeve hub washer with chisel and hammer

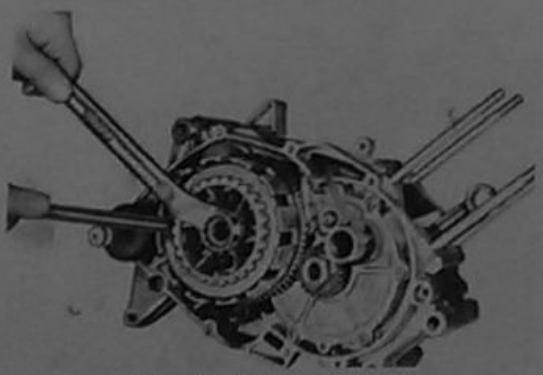


Fig. 7–3–27
Removing clutch sleeve hub

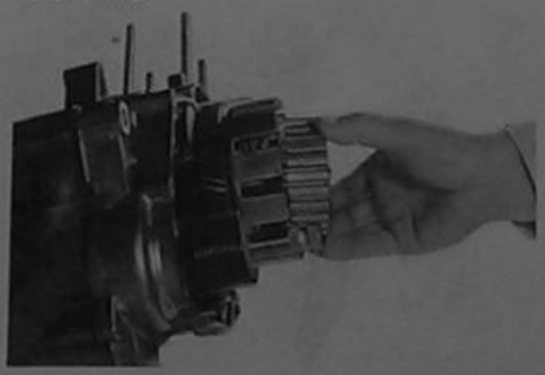


Fig. 7–3–28
Removing clutch housing gear

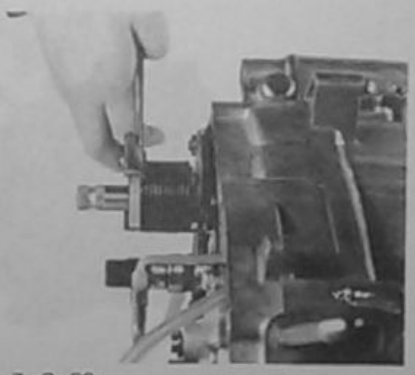


Fig. 7–3–29
Removing kick starter spring guide

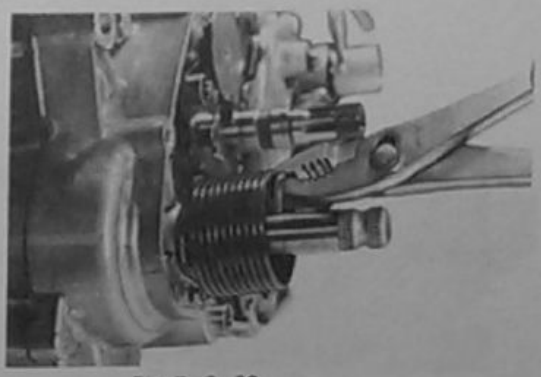


Fig. 7–3–30
Removing kick starter spring

Fig. 7–3–31
Straightening primary pinion washer with chisel and hammer

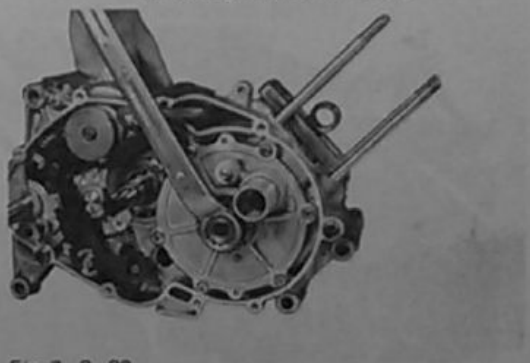


Fig. 7–3–32
Loosening primary pinion set nut with 23mm wrench and piston holder (special tool No. 09910–20111)

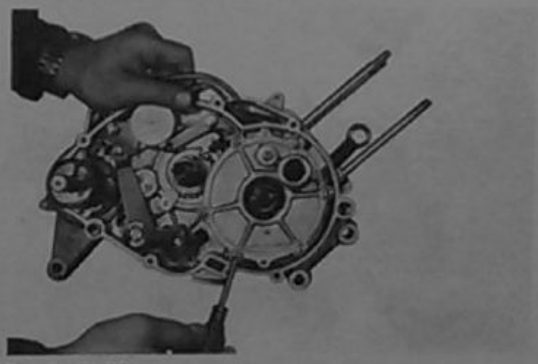


Fig. 7–3–33
Loosening outer valve seat fitting screws with cross head driver

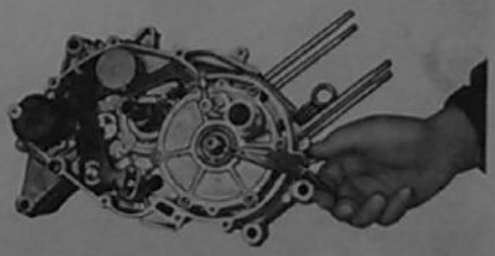


Fig. 7–3–34
Removing key from crankshaft

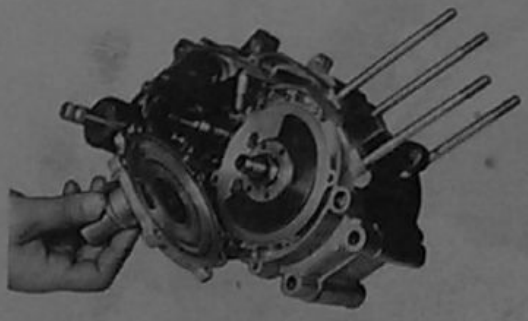


Fig. 7–3–35
Removing outer valve seat

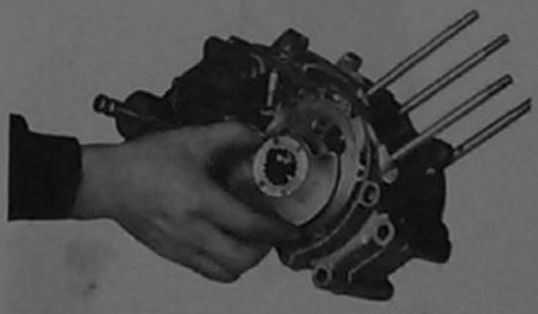


Fig. 7–3–36
Removing valve plate

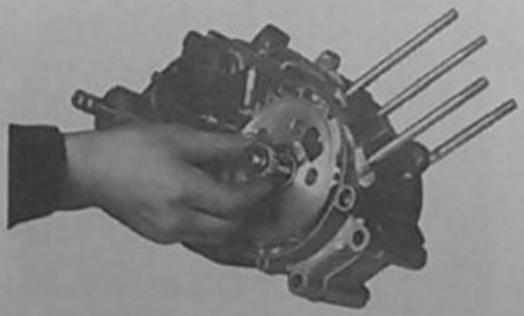


Fig. 7–3–37
Removing valve guide

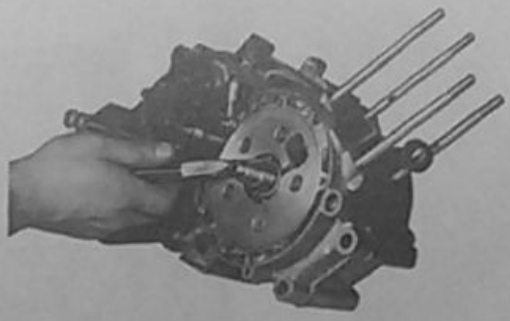


Fig. 7–3–38
Removing valve guide positioning piece from crankshaft

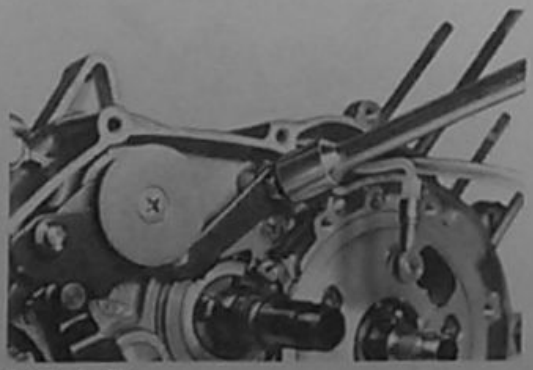


Fig. 7–3–39
Loosening shifting cam stopper bolt with 12mm wrench

Fig. 7–3–40
Loosening gear shifting cam pin retainer fitting screw

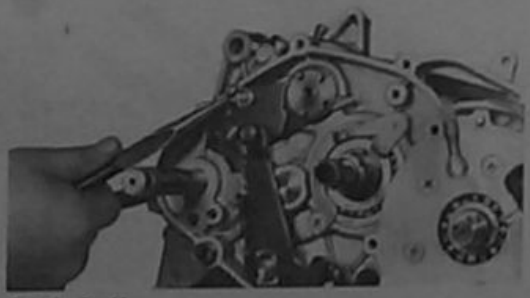


Fig. 7–3–41
Removing gear shifting cam guide and stopper set circlip

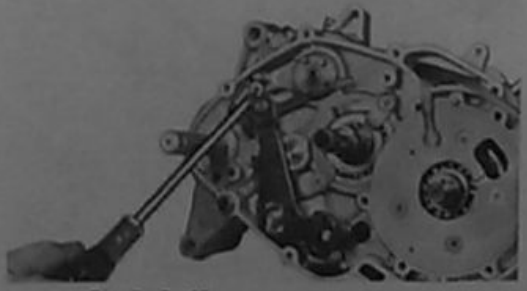


Fig. 7–3–42
Removing gear shifting cam guide

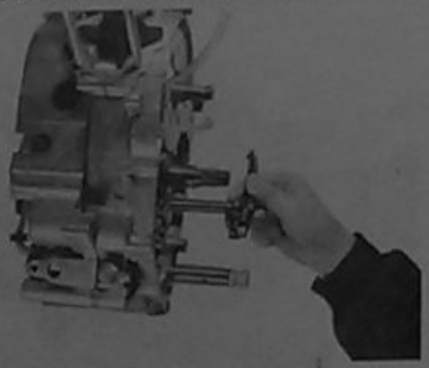


Fig. 7–3–43
Removing gear shifting shaft

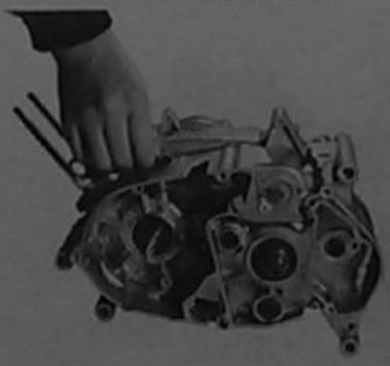


Fig. 7–3–44
Taking off oil line union bolt inspection cap

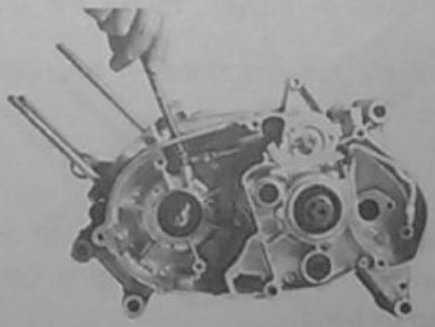


Fig. 7–3–45
Loosening oil line union bolt with 8mm wrench

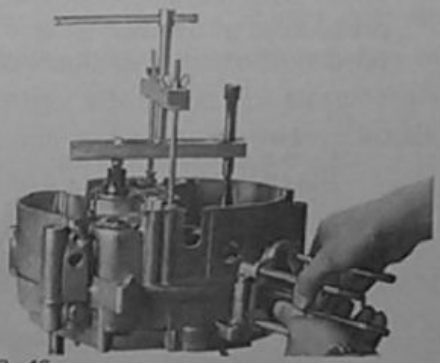


Fig. 7–3–46
Separating crankcase with crankcase separating tool (special tool No. 09910–80112)

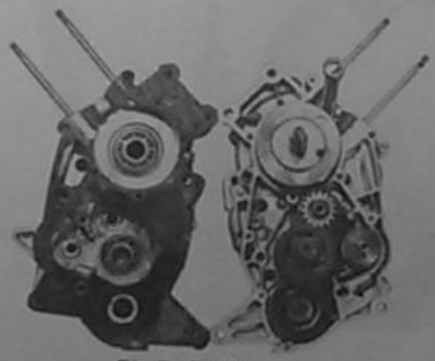


Fig. 7–3–47
Crankcase inside view

Fig. 7–3–48
Removing crankshaft from crankcase with a hammer

Fig. 7–3–49
Removing oil seal from crankcase

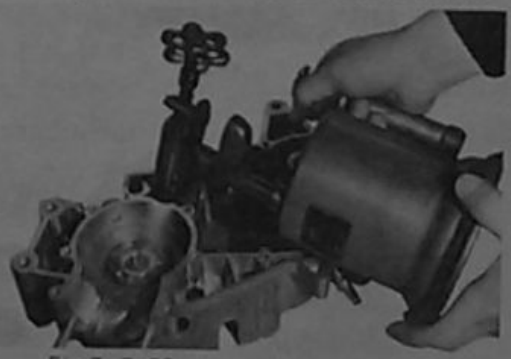


Fig. 7–3–50
Heating bearing outer race with a burner

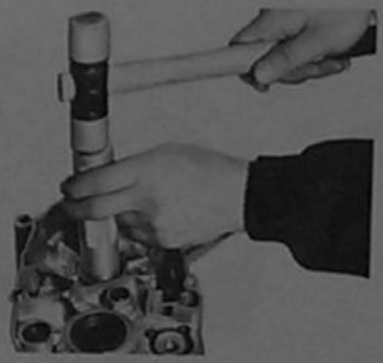


Fig. 7–3–51
Removing bearing from crankcase

7–4. Tips on Assembling Engine

When assembling the engine after necessary inspections or repairs, follow the inverse procedures of disassembling.
Special caution and important matters for assembling are described in this section.

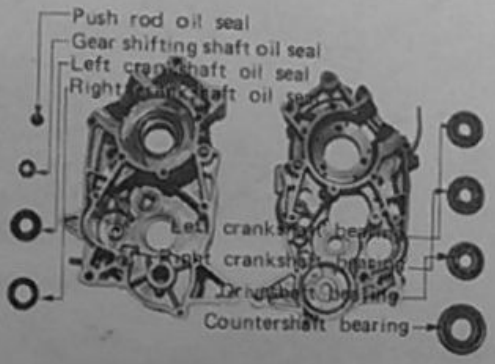


Fig. 7–4–1

When fitting bearings be sure to heat the crankcase around the bearing holes of crankcase with a burner until bearing can be installed by hand.

Fig. 7–4–2

When starting to assemble the crankshaft to the crankcase. Put the crankshaft into the crankcase right half , not into the left half.

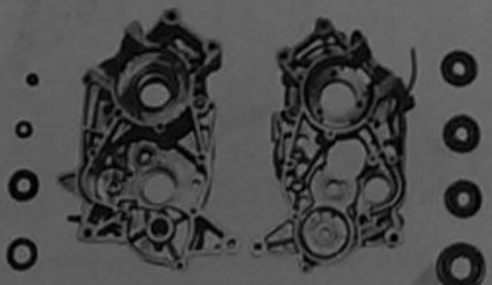


Fig. 7–4–3

When installing the oil seals, be sure to apply grease all round the lips, and unbend the lip of the oil seals by pulling the spacer up a bit with pliers without fail.

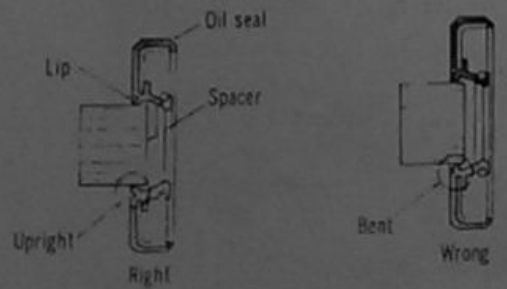


Fig. 7–4–4

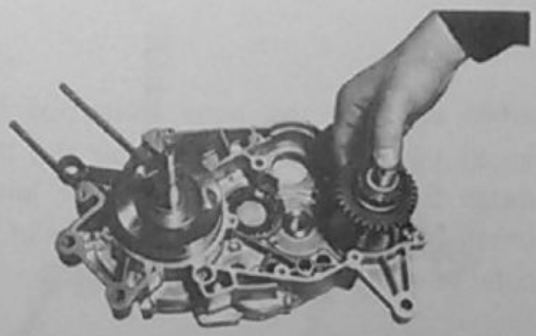


Fig. 7–4–5

When assembling the kick starter gear be sure to fit the three thrust washers, two of which on either side of the kick starter shaft large section and the other between the kick starter pinion and crankcase left half.

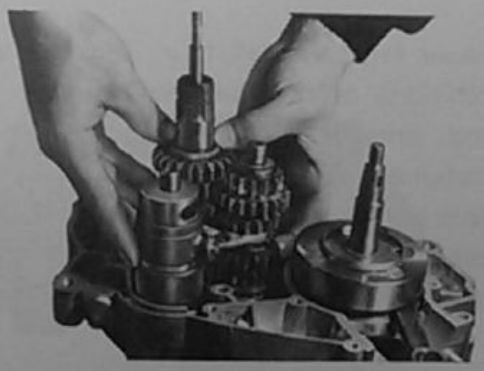


Fig. 7–4–6

For assembling the transmission gears it is the best way to assemble together with gear shifting cam on the crankcase right half.

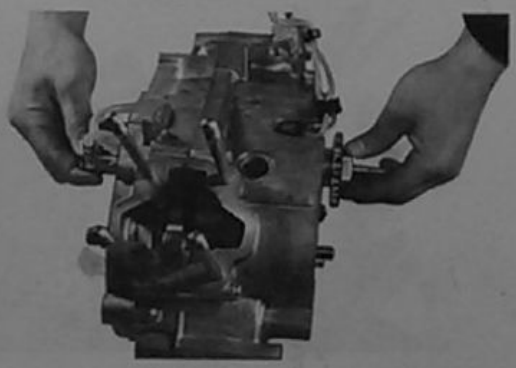


Fig. 7–4–7

When assembling crankcase, tighten 12 cross head screws in a criss-cross fashion to prevent the crankcase from warping and the crank chamber from compression leakage. After tightening the screws again check if all shafts turn easily and smoothly by rotating them by hand.

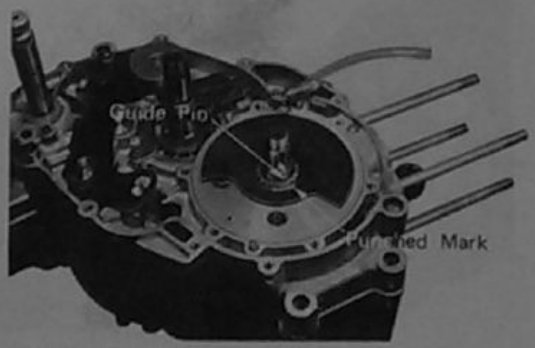


Fig. 7–4–8

Install the valve plate so that the timing mark punched on it faces outward and aligns with the valve guide pin set in the crankshaft.

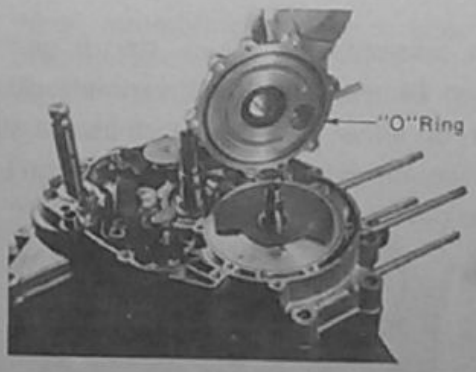


Fig. 7–4–9

When installing the outer valve seat first install the primary pinion spacer and then install the outer valve seat. Never fail to install an "0" ring to the inner surface of the outer valve seat.

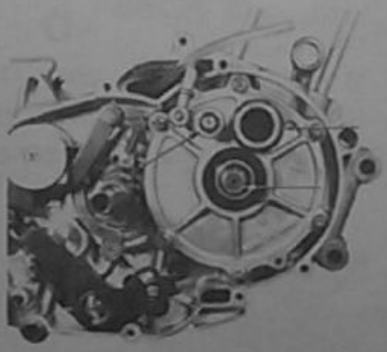


Fig. 7–4–10

Never fail to install four "0" rings in such positions as one between primary pinion and primary pinion spacer, another on carburetor inlet boss, the third on oil inlet boss of the outer valve seat, and the fourth between drive sprocket and drive sprocket spacer.

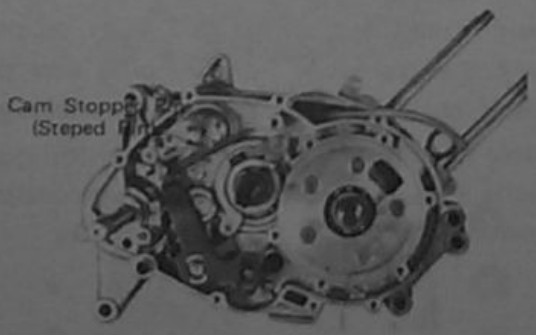


Fig. 7–4–11

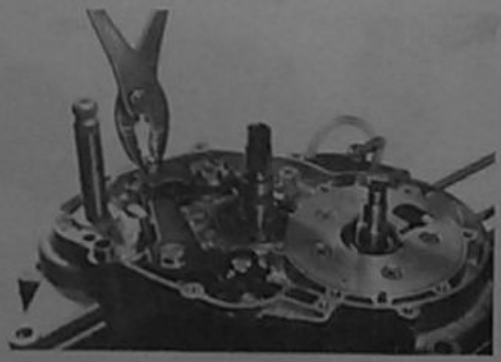


Fig. 7–4–12

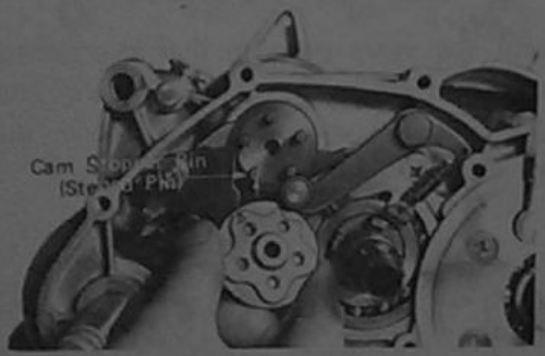


Fig. 7–4–13

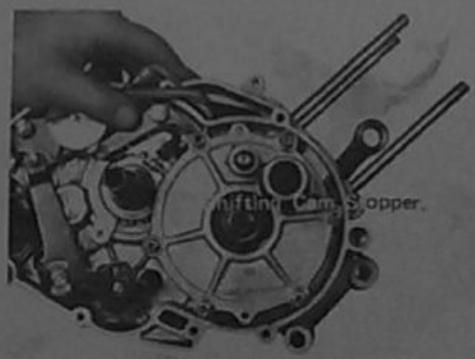


Fig. 7–4–14

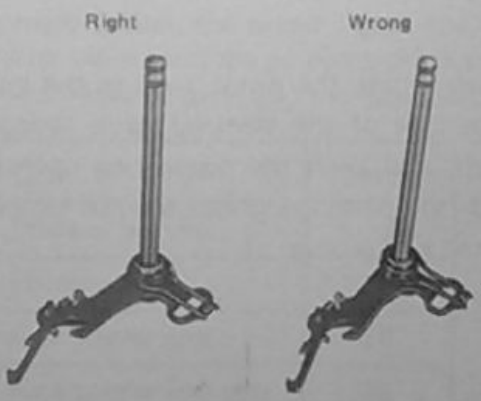


Fig. 7–4–15

Don't forget to place the stopper washer beneath the gear shifting cam stopper. Fig. 7–4–14.

Fit the gear shifting shaft return spring with less-bent side down to the shaft. Fig. 7–4–15.

Fig. 7–4–16

Make sure that the clutch spring bottom ends are kept in the same height with the bottom surface of the clutch sleeve hub and do not protrude.

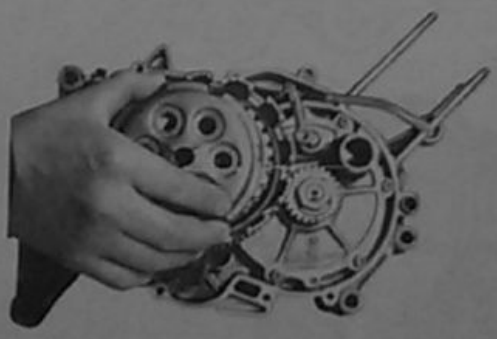


Fig. 7–4–17

Align the positioning mark on the clutch pressure plate with the mark on the edge of the clutch sleeve hub.

Fig. 7–4–18

When installing the oil pump on the crankcase, be sure to fit the driving piece on the kick starter pinion first, and then install the oil pump.

Fig. 7–4–19

When fitting the piston rings to the piston, take care of the stamped mark facing upward, and align the piston ring open ends with the piston ring locating pin set in the piston ring groove.

7–5. Engine Mechanism

7–5–1. Oil pump

The oil pump driving mechanism, the oil pump construction and the oil pump performance are descrided below.

□ Oil pump driving mechanism

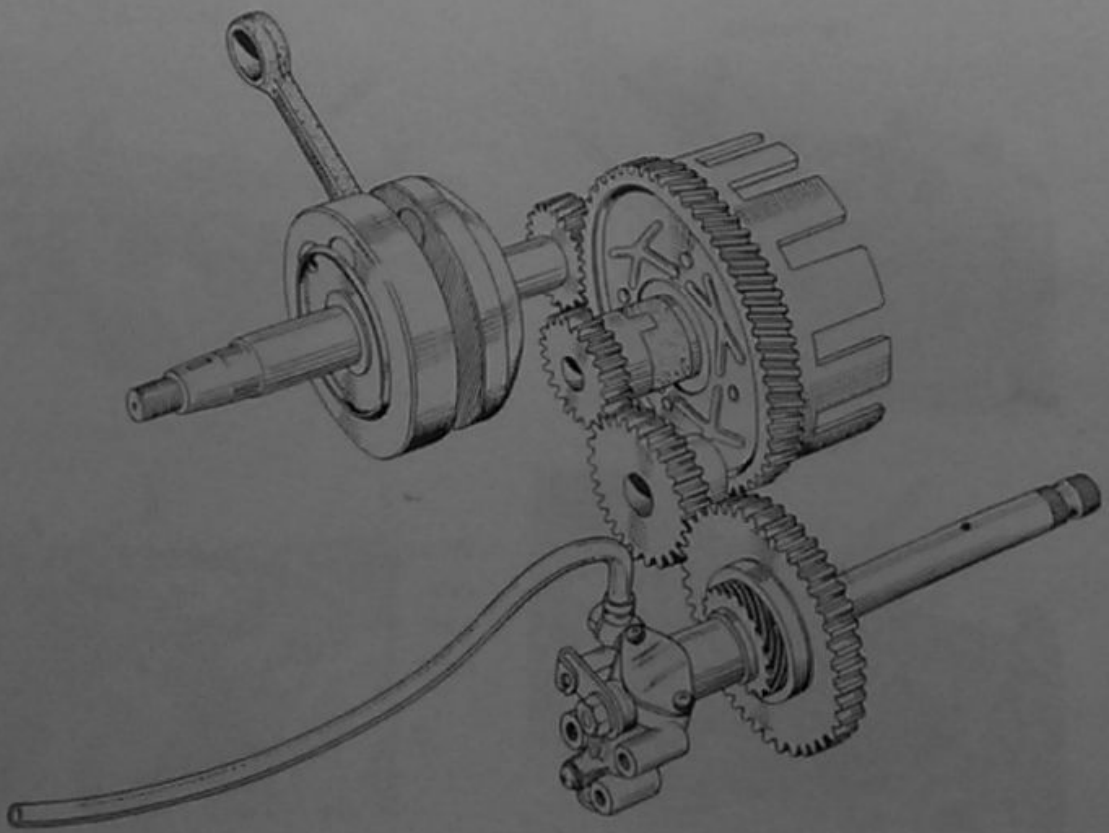


Fig. 7–5–1

The oil pump driving force is transmitted from the crankshaft to the oil pump through the primary pinion, the primary gear, the kick starter gear, the kick starter idle gear, the kick starter pinion and the oil pump driving piece.
The number of teeth and the reduction ratio are as follows.

Gear	Teeth
Primary pinion	23
Primary gear	73
Kick starter gear	16
Kick starter idle gear	26
Kick starter pinion	33

Oil pump reduction ratio: 73/23 X 33/16 = 6.54/1

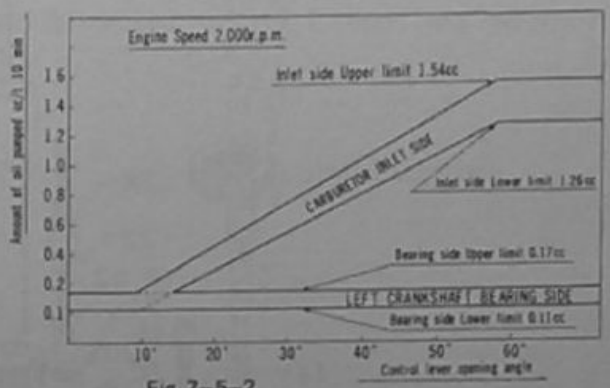


Fig. 7–5–2

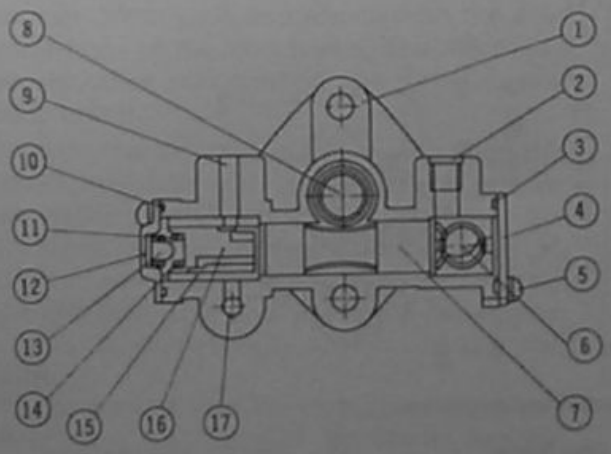


Fig. 7–5–3

1 Oil pump body
2 Intake port
3 "O" ring
4 Cam casing plate
5 Screw
6 Cam
7 Plunger
8 Driving worm
9 Bearing side discharge port
10 "O" ring
11 Wave washer
12 Sleeve cap
13 Retainer
14 Differential plunger spring
15 Differential plunger sleeve
16 Differential plunger
17 Inlet side discharge port

□ Adjusting oil pump control wire

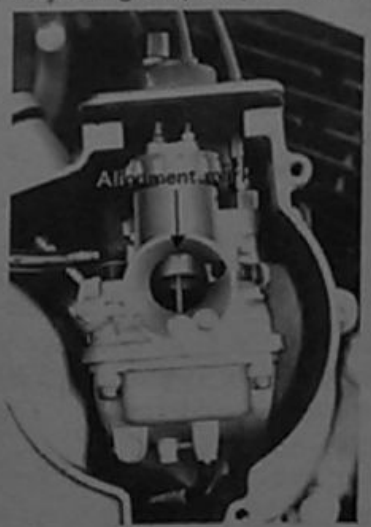


Fig. 7–5–4 Throttle valve aligning mark

By turning the throttle grip, align the upper side of the hole on the throttle valve with the upper part of the carburetor main bore.
Next use the wire adjuster to make the alignment markings on the oil pump match.

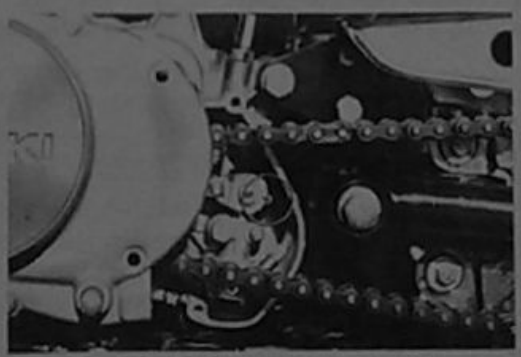


Fig. 7–5–5 Oil pump aligning marks

7–5–2. Carburetor

□ Carburetor Construction

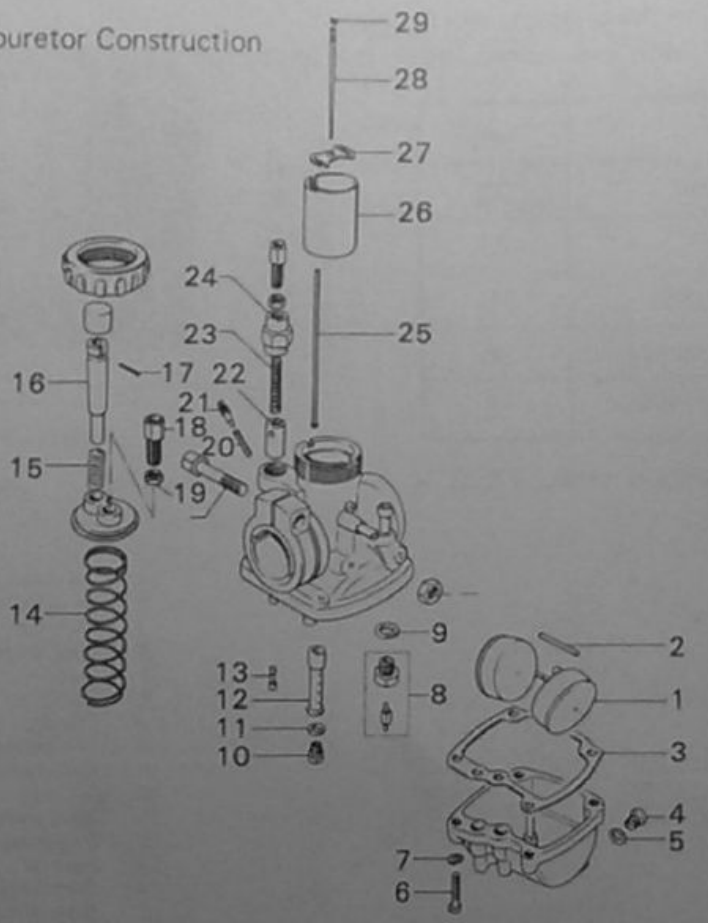


Fig. 7–5–6 Exploded view of carburetor

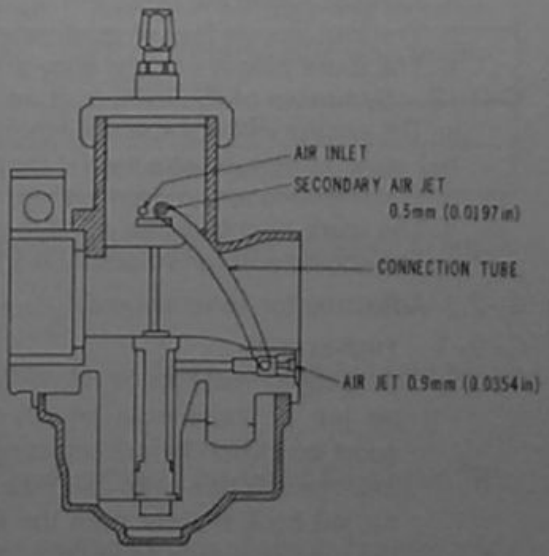
1.	Float	11.	Needle Jet Stop Washer	21.	Pilot Air Adjusting Screw
2.	Float Pin	12.	Needle Jet	22.	Starter Plunger
3.	Float Chamber Gasket	13.	Pilot Jet	23.	Starter Plunger Spring
4.	Drain Plug	14.	Throttle Valve Spring	24.	Starter Plunger Cap
5.	Drain Plug Gasket	15.	Throttle Valve Stop Screw Spring	25.	Throttle Valve Adjusting Rod
6.	Screw	16.	Throttle Valve Stop Screw	26.	Throttle Valve
7.	Lock Washer	17.	Cotter Pin	27.	Needle Clip Stopper
8.	Needle Valve Ass'y	18.	Cable Adjuster	28.	Jet Needle
9.	Needle Valve Seat Gasket	19.	Lock Nut	29.	Needle Clip
10.	Main Jet	20.	Pilot Air Adjusting Screw Spring		

The carburetor meters the amount of fuel which the engine requires. The carburetor supplies a proper fuel/air mixture according to various conditions. The VM19SC carburetor is used on the model TS90/TC90, which is very compact as the float chamber is unitconstructed with the mixnig chamber. The mixing chamber incorporates a starter system which supplies a specially rich fuel/air mixture for starting a cold engine. The starter system is operated by a lever fitted to the handlebar swhich box

□ Carburetor Specifications

	TS90 (Double Air Jet Type)	TC90 (Double Air Jet Type)
Main jet	#180	#180
Air Jet	1st 0.7 ϕ	0.9 ϕ
	2nd 1.0 ϕ	0.5 ϕ
Jet Needle	5F12-3, Clipped into 3rd groove	5F12, Clipped into 3rd groove
Needle Jet	E-1	E-1
Throttle valve	#2.5	#2.5
Pilot Jet	17.5	17.5
Pilot Outlet	0.6 ϕ	0.6 ϕ
Pilot Air Adjusting Screw	1.1/2 turns back open	1.1/4 turns back open
By Path	1.2 ϕ	1.4 ϕ
Needle Valve Seat	2.0	2.0
Starter Jet	#80	#80
Float Level	25.1 mm	25.1 mm

A piece of new mechanism is ingenuously contrived into these carburetors.
Double air jet type carburetor can take out the performance in accordance with the used conditions of the motorcycle. The secondary air jet takes action when the throttle valve fully opens.
Because the air inlet in the mixing chamber comes into line with the horizontal groove cut on the throttle valve. The secondary air jet corrects any tendency for richness of fuel/air mixture in the range of throttle opening over 75% and as a result, the engine output is drawn out sufficiently on the range.
The air sucked into the carburetor from the air jet and secondary air jet dilutes fuel/air mixture.



□ Adjusting

A. Adjusting idling

A–1. Preparations

A–1–1. Make sure the jet needles are clipped into the 3rd groove from top.

A–1–2. At full throttle adjust play in the throttle cables to 0.5–1.0 mm (0.02–0.04 in) with the throttle cable adjuster on the top of the carburetor.

A–1–3. Warm the engine up for a few minutes.

B. Adjusting system

B–1. Turn the pilot air screw on its pointed side down to the bottom, then turn it back out 1 1/2 (TS90), 1-1/4 (TC90) turns.

B–2. Start the engine in such conditions.

B–3. Adjust the throttle valve adjusting screw until the engine runs at its lowest rpm.

B–4. Turn the pilot air adjusting screw in and out within the range of 1/4 of a turn from the standard setting. (TS90 1-1/2 and TC90 1-1/4 turns out from the bottom). The engine rpm will increase and decrease in accordance with the turning of the screw. Find the position where the engine runs regularly and smoothly at the lowest rpm and fix the screw there.

B–5. After adjusting the pilot air adjusting screw, adjust the throttle valve adjusting screw again and determine the engine idling speed.

C. Adjusting fuel/air mixture

C–1. Checking mixture

Too rich or too lean fuel adversely affects engine performance. The fuel/air mixture can be adjusted by adjusting carburetor setting. Check to see that the fuel and air is properly mixed.

C–1–1. Symptom of too rich mixture

a. Exhaust fumes are dense and bluish white in color.
b. The motorcycle feels sluggish when running.
c. The spark plug is wet and dirty and becomes black in color.

C–1–2. Symptom of too learn mixture.

a. The engine will not idle smoothly.
b. Engine rpm fluctuates even if the throttle grip is held steady.
c. The engine is apt to overheat.
d. The spark plug beocmes white in color.
e. The engine will run smoothly if the starter channel is opened.

C–2. Adjusting for various speeds

C–2–1. High speeds.

A clogged main jet or needle jet can cause too lean a mixture, while a clogged air jet or loose main jet too rich a mixture. Therefore, make sure they are in good condition before adjusting the carburetor. From 3/4 to full throttle opening, the mixture ratio can be adjusted by the main jet. When the throttle grip is turned back slightly from the full throttle position, if the engine rpm increases the fuel mixture is too rich.

When the mixture is too lean, use a higher numbered main jet than the standard. When the mixture is too rich, use a lower numbered main jet.

C–2–2. Medium speeds

From 1/4 to 3/4 throttle opening, the mixture ratio can be adjusted by changing the position of the jet needle or by the throttle valve cutaway.

a. Adjusting with jet needle

There are five grooves at the upper part of the jet needle and they are counted from the top to the bottom, first, second, etc.

If the exhaust fumes are bluish white due to a too rich fuel mixture, lower the jet needle one notch by fitting the clip in the 2nd groove. The 3rd groove is standard setting.

If the engine seems to be dragging when the motorcycle is accelerating or runing, it indicates that the fuel mixture is too lean. Raise the jet needle by one notch.

b. Adjusting with throttle valve cutaway

A higher numbered throttle valve cutaway gives a leaner mixture and a lower numbered one a richer mixture. The standard throttle valve cutaway for TS90 and TC90 is #2.5.

A different size throttle valve cutaway, however, seriously affects engine operation below 1/4 throttle opening.

Do not change the throttle valve cutaway unless it is urgently necessary.

c. Low speeds.

A clogged pilot air passage or clooged pilot jet bleed holes can cause too rich a mixture and a clogged pilot jet or pilot outlet too lean a mixture. Make sure they are not clogged. From 1/8 to 1/4 throttle opening, the mixture ratio can be adjusted with the pilot air adjusting screw. Refer to the Adjusting idling section above.

Throttle Opening	Too Rich Mixture	Too Lean Mixture
0-1/8	Turn pilot air adjusting screw out	Turn pilot air adjusting screw in
1/8-1/4	* Use throttle valve with larger cutaway	* Use throttle valve with smaller cutaway
1/4-3/4	Lower jet needle	Raise jet needle
3/4-full	Use smaller numbered main jet	Use larger numbered main jet

* Refrain from replacing the throttle valve if possible and use other methods to adjust the carburetor.

D. Adjusting float level

To measure the float level of Model TS90 and TC90, follow the steps given below.

a. Remove the float bowl.
b. Hold the carburetor upside down.
c. Lower the float until the float tongue "A" just contacts the tip of float valve "B". Do not compress the float valve spring.
d. Measure the distance between the float bowl seeting surface of the carburetor body and the bottom of the float assembly
d-1. If your measurement is less than 25.1mm (0.988 in) bend the float torque towards the float valve "B".
d-2. If your measurement is more than 25.1mm (0.988 in) bend the float torque "A" away from the float valve "B".

Carburetor float level
25.1 mm (0.988 in)

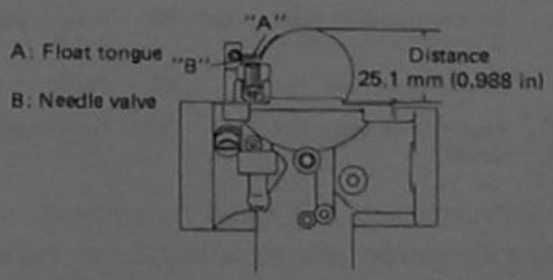


Fig. 7–5–7 Adjusting fuel level

7–5–3. TS90 Transmission

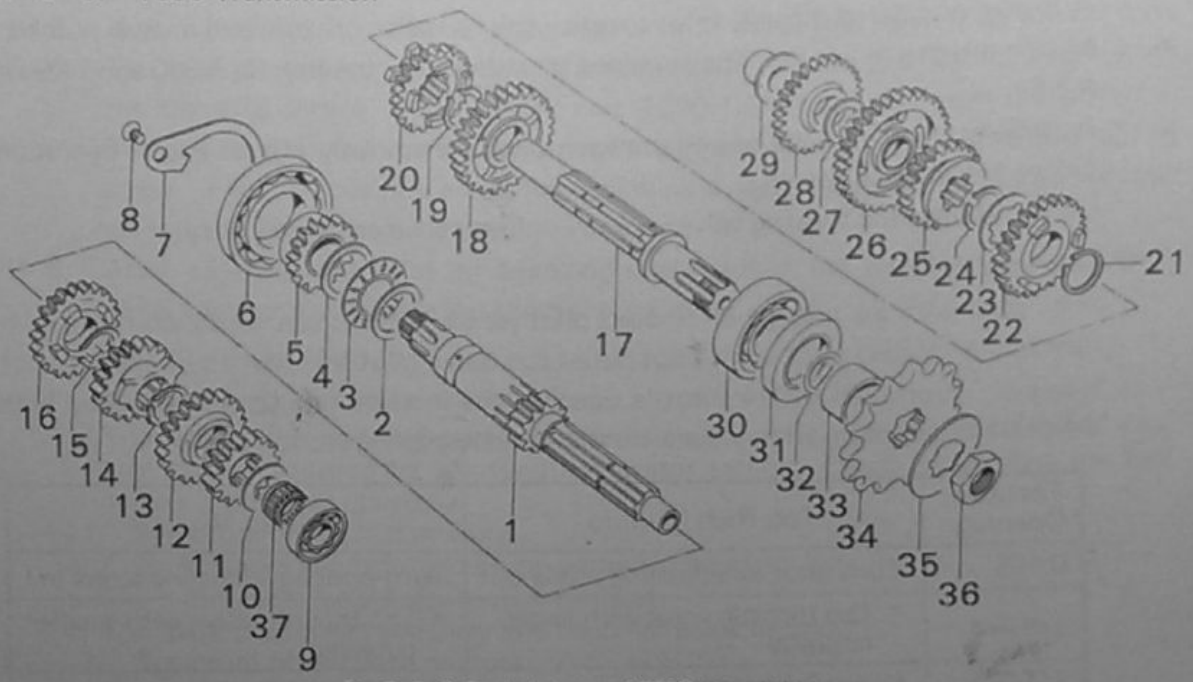


Fig. 7–5–8 Exploded view of TS90 transmission

1.	Counter Shaft L=182.5 N.T=11	14.	Third Drive Gear N.T=18	26.	First Driven Gear N.T=31
2.	Kick Starter Drive Gear Bearing Washer O.D=3, I.D=21, T=0.8	15.	Circlip	27.	First Driven Gear Washer O.D=24, I.D=15, T=1.0
3.	Kick Starter Drive Gear Bearing	16.	Top Drive Gear N.T=23	28.	Kick Starter idle Gear N.T=26
4.	Kick Starter Drive Gear Bearing Washer O.D=30, I.D=21, T=0.8	17.	Drive Shaft L=155	29.	Drive Shaft Bushing
5.	Kick Starter Driver Gear N.T=16	18.	Second Driven Gear N.T=28	30.	Drive Shaft Bearing O.D=47, I.D=20, T=14
6.	Counter Shaft Right Bearing O.D=62, I.D=30, T=1.0	19.	Circlip	31.	Drive Shaft Oil Seal O.D=40, I.D=24.7, T=7
7.	Countershaft Right Bearing Fitting Plate	20.	Fourth Driven Gear N.T=22	32.	Drive Shaft Bearing "O" ring
8.	Countershaft Right Bearing Fitting Plate Screw	21	Circlip	33.	Engine Sproket Spacer O.D=25, I.D=20, W=13.5
9.	Countershaft Left Bearing O.D=28, I.D=12, T=8	22.	Third Driven Gear N.T=25	34.	Engine Sprocket S.T.D N.T=14
10.	Countershaft Left Bearing Wash O.D=20, I.D=12, T=2.0	23.	Third Driven Gear Washer T=1.0	35.	Engine Sprocket Washer
11.	Second Drive Gear N.T=15	24.	Circlip	36.	Engine Sprocket Nut
12.	Fourth Drive Gear N.T=20	25.	Top Driven Gear N.T=20	37.	Needle Bearing
13.	Circlip				

A constant-mesh fine speed transmission is mounted on the TS90 to enable the rider to select the correct gear according to running speed.

The engagement of the pinion and the gear at each speed is descrided in this paragraph.

1. Neutral

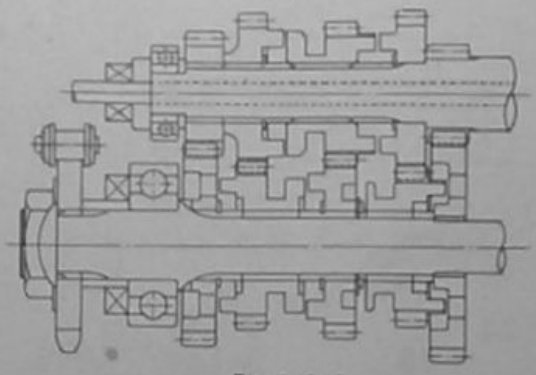


Fig. 7–5–9

2. Low speed

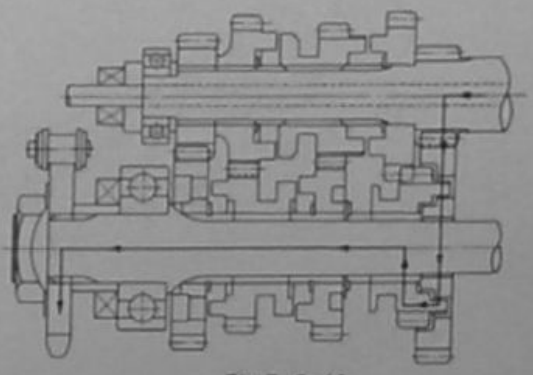


Fig. 7–5–10

3. Second speed

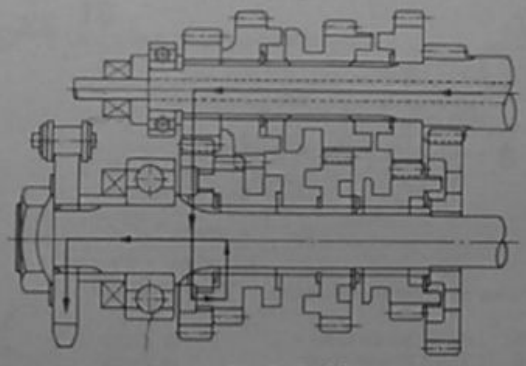


Fig. 7–5–11

4. Third speed

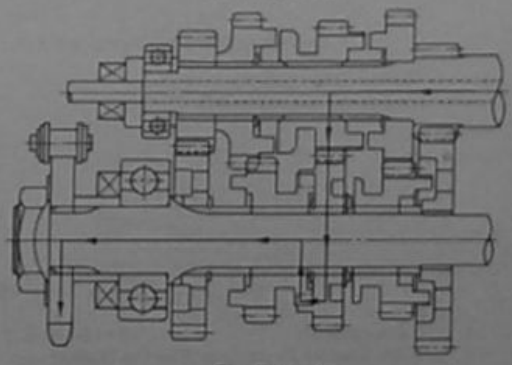


Fig. 7–5–12

5. Fourth speed

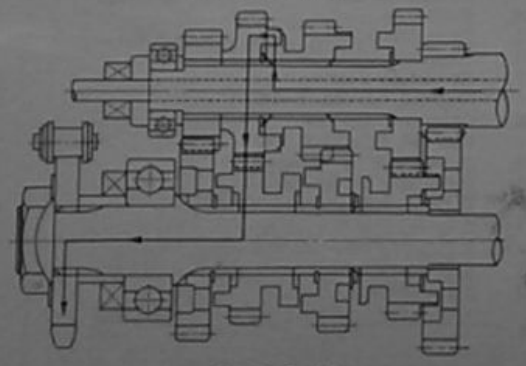


Fig. 7–5–13

6. Top speed

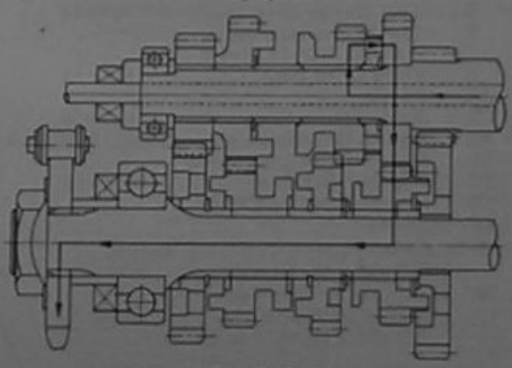


Fig. 7–5–14

7–5–4. TC90 Transmission

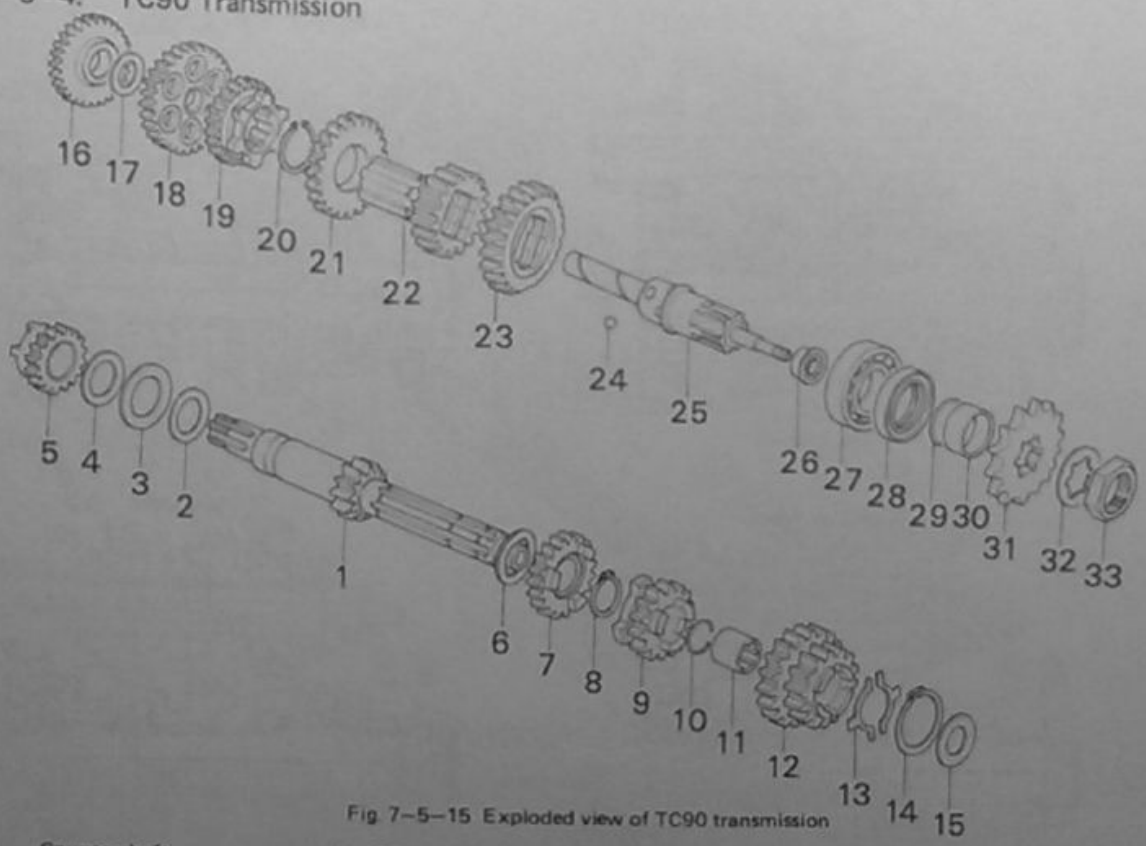


Fig. 7–5–15 Exploded view of TC90 transmission

1.	Countershaft	L=184.5, N.T=12	18.	First Driven Gear	N.T=30
2.	Kick Starter Drive Gear Bearing Washer O.D=30, I.D=21, T=0.8		19.	Third Driven Gear	N.T=23
3.	Kick Starter Drive Gear Bearing		20.	Circlip	
4	Kick Starter Drive Gear Bearing Wasehr O.D=30, I.D=21, T=0.8		21.	Second Driven Gear	N.T=23
5.	Kick Starter Drive Gear	N.T=16	22.	Fourth Driven Gear	N.T=18
6.	Third Drive Gear Washer O.D=20, I.D=17, T=1.0		23.	Reduction Gear	N.T=23
7.	Third Drive Gear	N.T=19	24.	Steel Ball	
8.	Circlip		25.	Drive Shaft	L=153
9.	Second Drive Gear	N.T=14	26.	Reduction Rod Oil Seal	
10.	Fourth Drive Gear Sleeve Circlip		27.	Driveshaft Bearing O.D=52, I.D=25, T=15	
11.	Fourth Drive Gear Sleeve		28.	Driveshaft Oil Seal O.D=44, I.D=29.4, T=7	
12.	Fourth Drive Gear	N.T=19	29.	Drive shaft "O" Ring	
13.	Fourth Drive Gear Ring		30.	Drive Sproket Specer O.D=30, I.D=25, T13.5	
14.	Circlip		31.	Engine Drive Sprocket S.T.D N.T=14	
15.	Countershaft Left Bearing Washer O.D=20, I.D=12, T=2.0		32.	Sprocket Washer	
16.	Kick Starter Idle Gear		33.	Sprocket Nut	
17.	First Drive Gear Washer O.D=24, I.D=15, T=1.0				

As the "SUZUKI Posi-Select Mechanism" is built in TC90, it is possible to readily convert the gearings from touring (trailing) to trailing (touring) each other by operating the posi-select lever.

A return type gear shifting mechanism and a 4 speed constant mesh gearing system for both the trailing and touring uses are incorporated in the transmission.

The engagement of the pinion and the gear at each speed in both the trailing and touring use is descrided in this paragraph.

1. Neutral

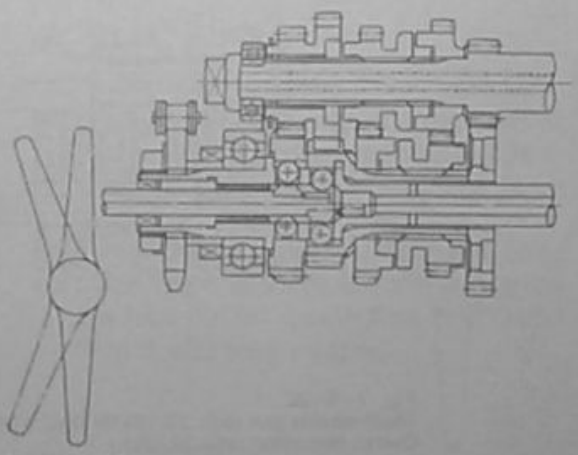


Fig. 7–5–16

2–1. Low speed (touring condition)

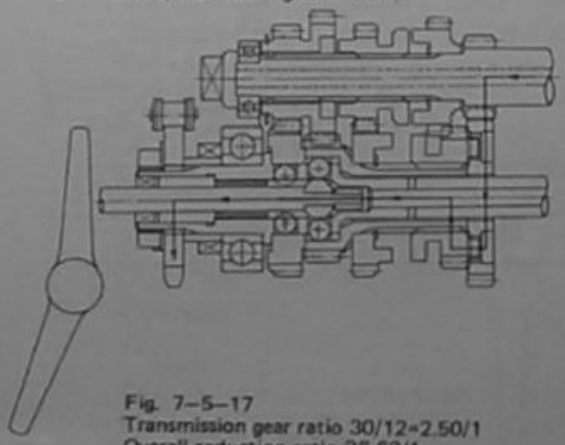


Fig. 7–5–17
Transmission gear ratio 30/12=2.50/1
Overall reduction ratio 26.63/1

2–2. Low speed (trailing condition)

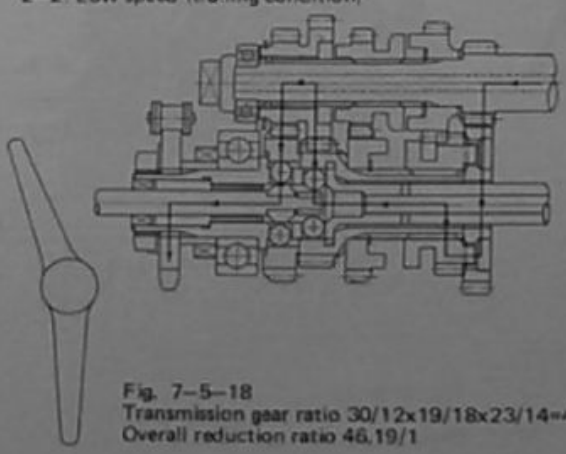


Fig. 7–5–18
Transmission gear ratio 30/12x19/18x23/14=4.34
Overall reduction ratio 46.19/1

3–2. Second speed (trailing condition)

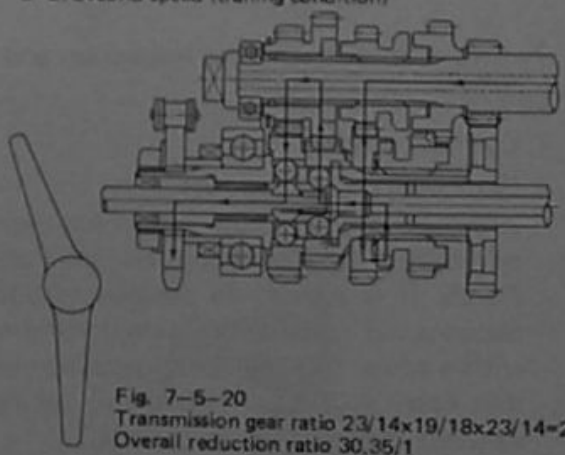


Fig. 7–5–20
Transmission gear ratio 23/14x19/18x23/14=2.85/
Overall reduction ratio 30.35/1

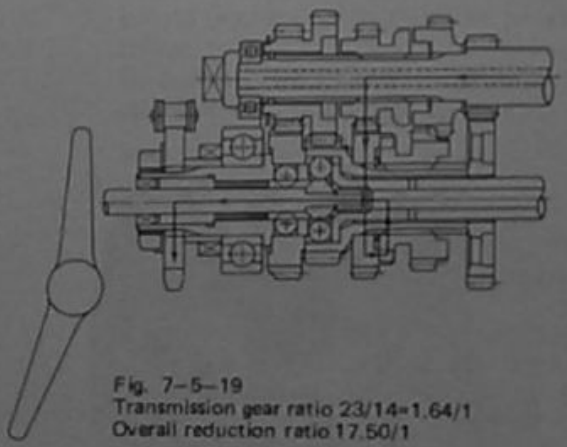


Fig. 7–5–19
Transmission gear ratio 23/14=1.64/1
Overall reduction ratio 17.50/1

4–1. Third speed (touring speed)

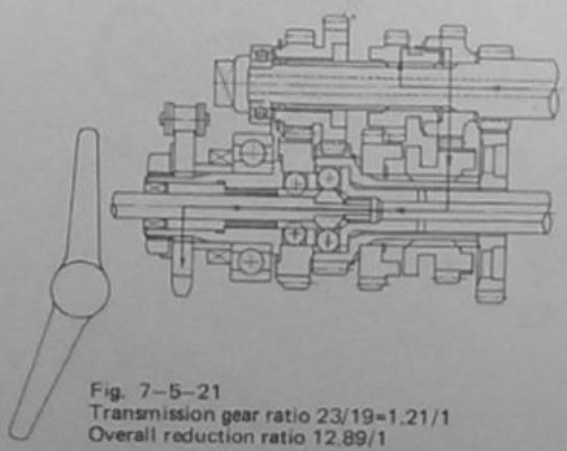


Fig. 7–5–21
Transmission gear ratio 23/19=1.21/1
Overall reduction ratio 12.89/1

4–2. Third speed (trailing condition)

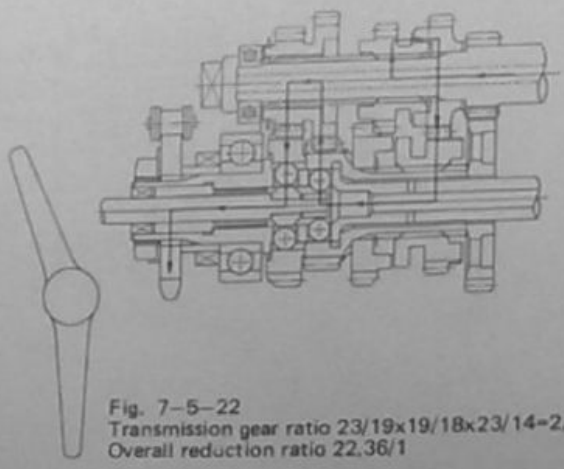


Fig. 7–5–22
Transmission gear ratio 23/19x19/18x23/14=2,10/1
Overall reduction ratio 22.36/1

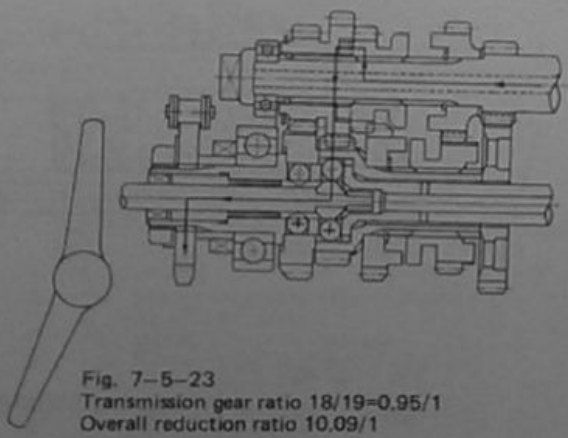


Fig. 7–5–23
Transmission gear ratio 18/19=0.95/1
Overall reduction ratio 10.09/1

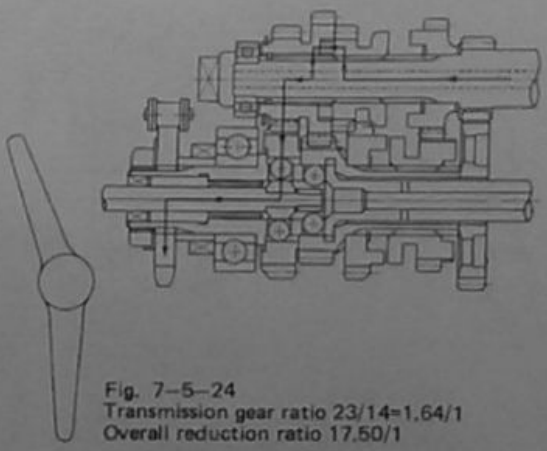


Fig. 7–5–24
Transmission gear ratio 23/14=1.64/1
Overall reduction ratio 17.50/1

7–5–5. Specification for Inspection and Repair

Engine

1. Cylinder head

A. Removing carbon deposits

Although carbon accumulation has been minimized by the adoption of Posi-Force, it is advised to remove carbon deposits in the combustion chamber with a screw driver bit or something like that every 6,000 km (4,000 mi) taking care not to damage dome surface.

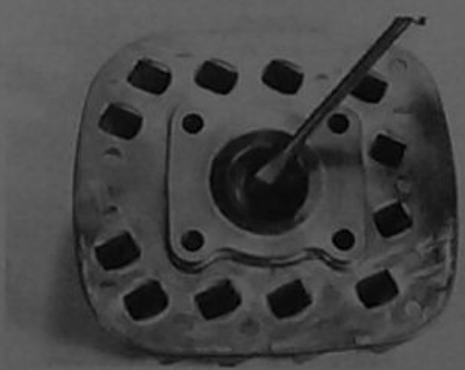


Fig. 7–5–25

B. Checking Warpage

The cylinder head is always exposed to extremely high pressure and temperature, so they can warp if used for a long time.

To repair a warped cylinder head place it on a surface plate and grind the face flat on it with first # 200 and then # 400 emery paper.

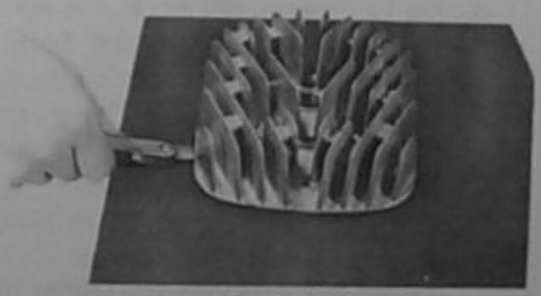


Fig. 7-5-26

C. Installing

Place cylinder head gasket between the cylinder head and cylinder and fit the cylinder head with 4 nuts.

Tighten then diagonally just the same as when loosening. Be sure to fit a flat washer under the cylinder head nut.

Cylinder head nut tightening torque
200~250 kg-cm (14.47~18.09 lb-ft)

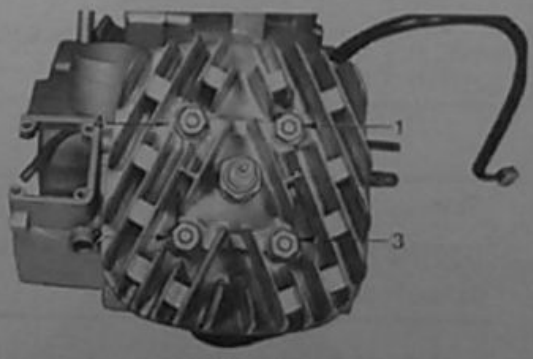


Fig. 7-5-27

2. Cylinder

A. Servicing

Carbon deposits accumulated around the exhaust port increase resistance to the passage of exhaust gas and cause loss in engine power and engine overheating.

Remove carbon deposits every 6,000 km (4,000 mi) with a scraper or screw driver.

Be careful not to scratch or score the cylinder wall or passage surface.

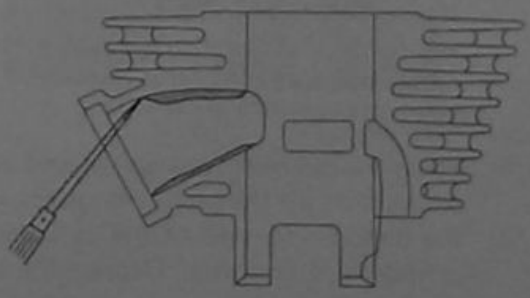


Fig. 7-5-28

B. Inspecting

Check the cylinder for wear. To determine the amount of wear, measure the cylinder bore with a cylinder gauge.

Measure the cylinder bore from front to back and from side to side at three points, 6mm (0.24 in) below the cylinder face (a), 5mm (0.20 in) above the exhaust port (b), 25mm (1.0 in) from the cylinder bottom (c).

If the figure obtained by subtracting the smallest mesurement from the largest one is over 0.05mm (0.002 in) rebore the cylinder.

Fig. 7-5-29

When refinishing the cylinder to oversize, first add to the standard cylinder bore size the oversize step. Before starting to measure the bore, it is apparently required to clean up the bore. This gives the exact size to which the cylinder should be refinished. Check carefully with an accurate cylinder gauge to get the exact size to be rebored. If this is accurately done, an oversize piston will fit with normal clearance. Oversize pistons are provided in 0.5mm (0.02in) and 1.0mm (0.04in) sizes.

Fig. 7-5-30

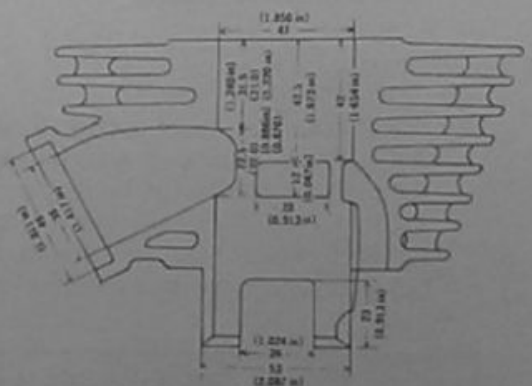


Fig. 7-5-31

Standard cylinder bore (measured at 9mm above exhaust port)	47.000-47.015 mm (1.850~1.851 in)

If must be noted that the edges of the ports need to be rounded after reboring the cylinder.

If they are not rounded, rapid wear of the piston rings and unpleasant cylinder noise with result. Round the edges with a hand grinder or file according to the dimensions prescribed in the illustration.

Installing

Place the cylinder base gasket and install the cylidner over the piston and four stud bolts seeing that all the piston rings are in the right position. Application of motor oil over the piston rings will fit the cylinder easily. Use new cylinder base gasket each time the cylinder are removed. Depress the kick starter lever to check the piston movement after it is installed.

3. Piston

A. Servicing

Remove carbon deposits from the top and piston ring grooves with a knife or tip of an old piston ring. Carbon deposits on the top increase compression and cause engine overheating and those in the piston ring grooves cause the piston rings to become stiff and seize, causing compression leakage.

Piston-cylinder clearance;

The standard piston-cylinder clearance is 0.055~0.065mm (0.0022~0.0026 in). The clearance is determind by subtracting piston diameter from cylinder diameter. The cylinder measurement should be taken at 5mm (0.2 in) above the exhaust port and the piston measurement at 20mm (0.787 in) above the piston skirt 90° from the piston pin holes. Replace the piston with a new one when it has worn to under 46.85 mm.

Fig. 7–5–32 Mrasuring piston diameter

	Standard	Limit
Clearance	0.055~0.065mm (0.0022~0.0026)	0.25mm (0.010)

C. Checking wear and damage:

Inspect the piston pin holes and piston ring locating pins for wear and the piston surface for burned spots, piston rings to turn in the grooves and possibly catch on the ports of the cylinder. If the piston has burned spots or scratches on its surface, cylinder noise is produced and engine rotation becomes unsmooth, resulting in loss of engine power. Further, the piston is apt to seize on these points. Replace if badly worn and repair burns or minor defects with #400 emery paper.

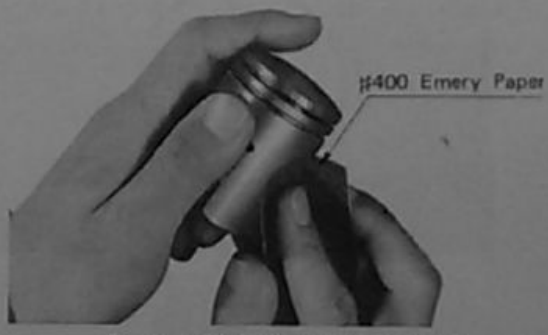


Fig. 7–5–33 Polishing piston surface

4. Piston Rings

A. Inspecting

Measure the end gap to check the piston rings for wear. To measure the end gap, first insert the ring into the lower part of the cylinder, where wear is the smallest, and then put a feeler gauge in the end gap. Use a piston to insert the the piston ring into the cylinder so that the ring is fitted square with the cylinder.

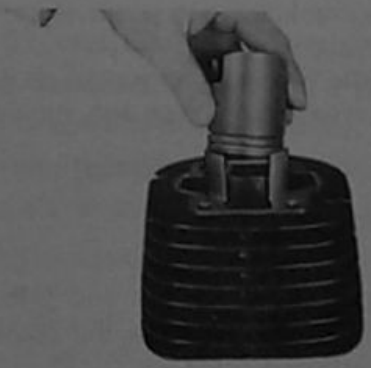


Fig. 7–5–34 Inserting piston ring into cylinder

B. Installing

Before installing the piston rings clear the ring grooves of the piston and piston rings of any foreign particles.
Fit the stamped mark side-up. Be sure to turn the rings in the grooves after installing them. If they do not turn smoothly, it indicates that foreign particles still exist.
Take the piston rings out of the grooves again and remove the foreign particles. Although the top and second rings are quite the same, be careful to fit them in the same groove as before in order to maintain mated condition in case used piston rings are reinstalled.

Fig. 7–5–35 Measuring end gap

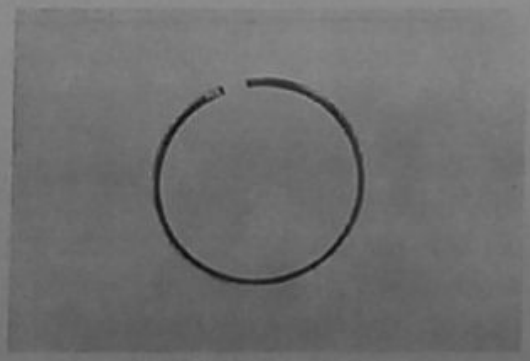


Fig. 7–5–37 Stamped mark

Fig. 7–5–36 Checking side clearance

5. Crankshaft

The crankshaft changes the up-and-down motion of the piston to circular motion to turn the rear wheel through the gearbox, sprockets and drive chain. The crankshaft assembly installed in the TS90 and TC90 engine consists of crank wheels, connecting rod and crank pin. The right and left crank wheels are unit-constructed with journals and combined with each other by the crank pin. On the left wheel is installed an oil guide plate which guides the oil passing through the left crankshaft bearing to the crankpin. The crankshaft assembly is supported by three ball bearings which are shrink-fitted in the crankcase and positively lubricated by the oil supplied under pressure from the oil pump.
A needle bearing is installed on both the large and small ends of the connecting rod, assuring smooth turning and minimum wear.

Inspecting, adjusting and repairing:

A. Crankshaft shake

If the crankshaft is not centered properly and shakes excessively, wear of the crankshaft bearings, piston cylinder and piston pin are hastened. Measure the crankshaft shake and adjust. To measure the crankshaft shake place the crankshaft on a V-block or a crankshaft measuring jig.

The crankshaft shake should be measured with a dial gauge on right and left crankshaft journals. (Fig. 7–5–38) The crankshaft should be repaired if it shakes over 0.06 mm (0.0023 in) when the crankshaft is turned slowly.

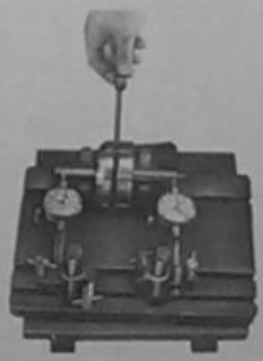


Fig. 7–5–38

	Standard	Limit
Crankshaft shake	below 0.06 mm (0.0024 in)	0.06 mm (0.0024 in)

The readings obtained will show the direction in which the wheels are out of truth. Lay the crankshaft assembly on the V-block and with a copper mallet give shaking wheels a light tap in the required direction. Again check the shake. Continue this work until the reading of the dial gauge is below 0.06mm (0.0024 in).
The crankshaft shake is caused by insufficient tightness between the crank pin and crank wheels worn bearings or stress put on the crankshaft when assembling the crankcase.

B. Connecting rod small end shake.

Rest the crankshaft assembly on the V-block and place the connecting rod at its top dead center position where the crankshaft shake is the largest. Place the feeler of the dial gauge against the small end. Incline the connecting rod to the left as far as it will go and then to the right and measure the connecting rod small end shake. (Fig. 7–5–39)
If the reading obtained is over 3 mm (0.118 in) repairing is required.

Fig.7–5–39

Limit of small end shake	3 mm (0.118 in)

The connecting rod shake is caused by worn large end eyes, crank pins, large end needle bearing etc. Disassemble the crankshaft by using disassembling jigs and a press and replace worn parts with new ones. When reassembling the crankshaft, apply oil to all joining sections and use specially designed assembling jigs and a press. After reassembling the crankshaft be sure to check the crankshaft shake and repair if necessary.

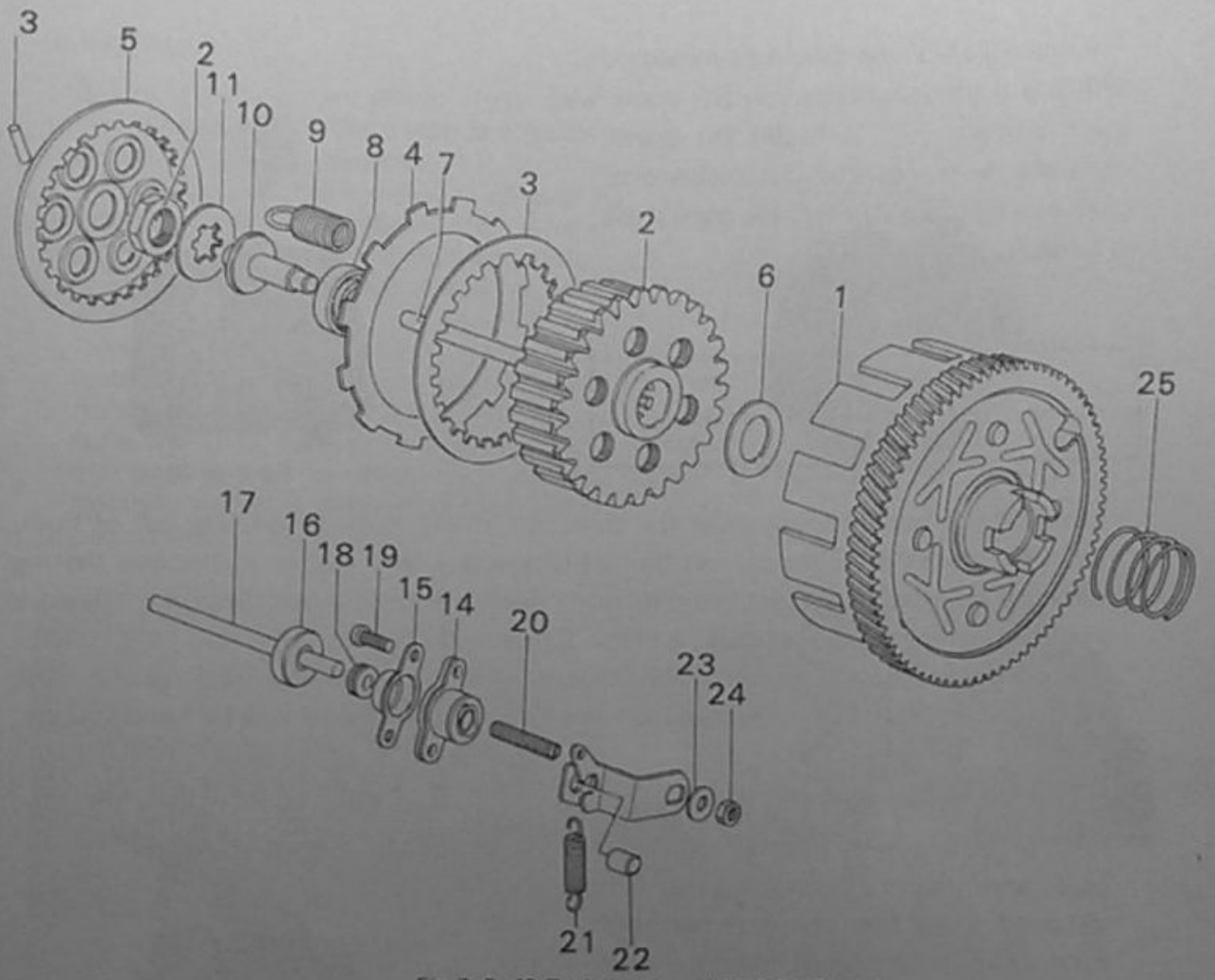


Fig. 7–5–40 Exploded view of TS90/TC90 clutch

1. Primary Drive Gear Ass'y
2. Clutch Sleeve Hub
3. Clutch Steel Plate
4. Clutch Cork Plate
5. Clutch Pressure Plate
6. Clutch Sleeve Hub Thrust Washer O.D=29, I.D=17, T=1.5
7. Push Rod
8. Clutch Pushpiece Oil Seal
9. Clutch Spring
10. Clutch Push piece
11. Clutch Sleeve Hub Washer
12. Clutch Sleeve Hub Nut
13. Clutch Spring Pin
14. Clutch Release Screw
15. Clutch Release Screw Cover
16. Push Rod Oil Seal
17. Push Rod
18. Clutch Release Screw Dust Seal
19. Clutch Release Screw Guide Screw
20. Clutch Release Adjust Screw
21. Clutch Release Return Spring
22. Release Arm End Piece
23. Washer
24. Nut
25. Primary Drive Gear Spring

The clutch is an important part of the engine, situated between the crankshaft and transmission gears.

The clutch transmits or breaks the engine power to the gears. The clutch mounted on this engine consists of five cork plates and steel plates, clutch housing and sleeve hub are submerged in motor oil in the clutch chamber.

This type of clutch is called a wet multi-plate clutch.

Inspecting;

A. Clutch Cork Plates

As the clutch has five cork plates and they are submerged in oil, wear is very small. After a long period, however, when the clutch plates become worn or warped, the clutch will slip even if the clutch adjustment is correct. Measure the thickness and warp of each cork plate with calipers and a feeler gauge.

	Standard	Limit	Operation
Thickness	3.0 mm (0.118 in)	2.8 mm (0.110 in)	Replace
Warpage	under 0.4 mm (0.016 in)	0.4 mm (0.016 in)	Replace

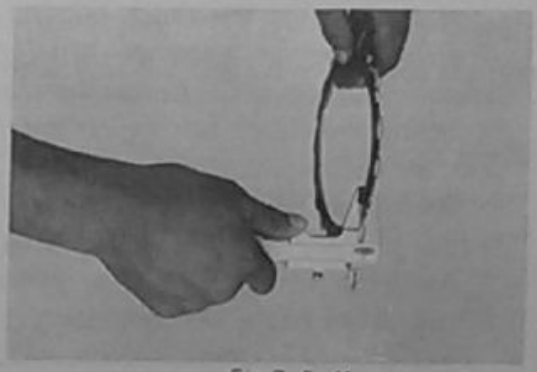


Fig. 7–5–41

B. Clutch Steel Plate

Five steel plates are used and they have knurls on their surfaces to prevent the clutch from dragging in cold weather. Check the thickness and warp of each steel plate with calipers and a feeler gauge.

	Standard	Limit	Operation
Thickness	1.6 mm (0.0630 in)	1.5 mm (0.059 in)	Replace
Warpage	under 0.1 mm (0.0039 in)	0.1 mm (0.0039 in)	Replace

Fig. 7–5–42

C. Clutch Spring

The clutch springs which have lost their tension also cause clutch slipping resulting in loss of power and rapid wear of the clutch plates.

Remove the clutch springs from the clutch sleeve hub by turning them out by hand and measure their free length with calipers.

	Standard	Limit	Operation
Free length	30.2 mm (1.1890 in)	31.2 mm (1.228 in)	Replace

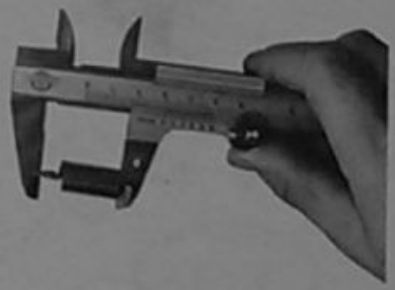


Fig. 7–5–43

When refitting the clutch springs, make sure that their bottom ends align with the clutch sleeve hub bottom surface and do not protrude. Use a square to check the clutch spring fitting.

Fig. 7–5–44

D. Play in axial direction

If the play of the clutch housing in the axial direction becomes large, rattling noise is produced. Check the play after fitting the clutch housing on the counter shaft as follows. First tighten the clutch sleeve hub, and then check it by moving the primary gear toward the axial direction after fitting the dial gauge feeler on the surface of the clutch housing.

	Standard	Limit
Axial play	0.1~0.25 mm (0.0039~0.0098 in)	0.3 mm (0.0118 in)

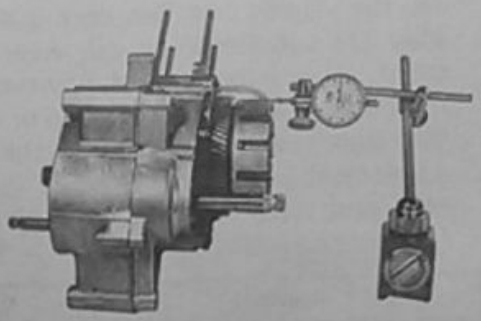
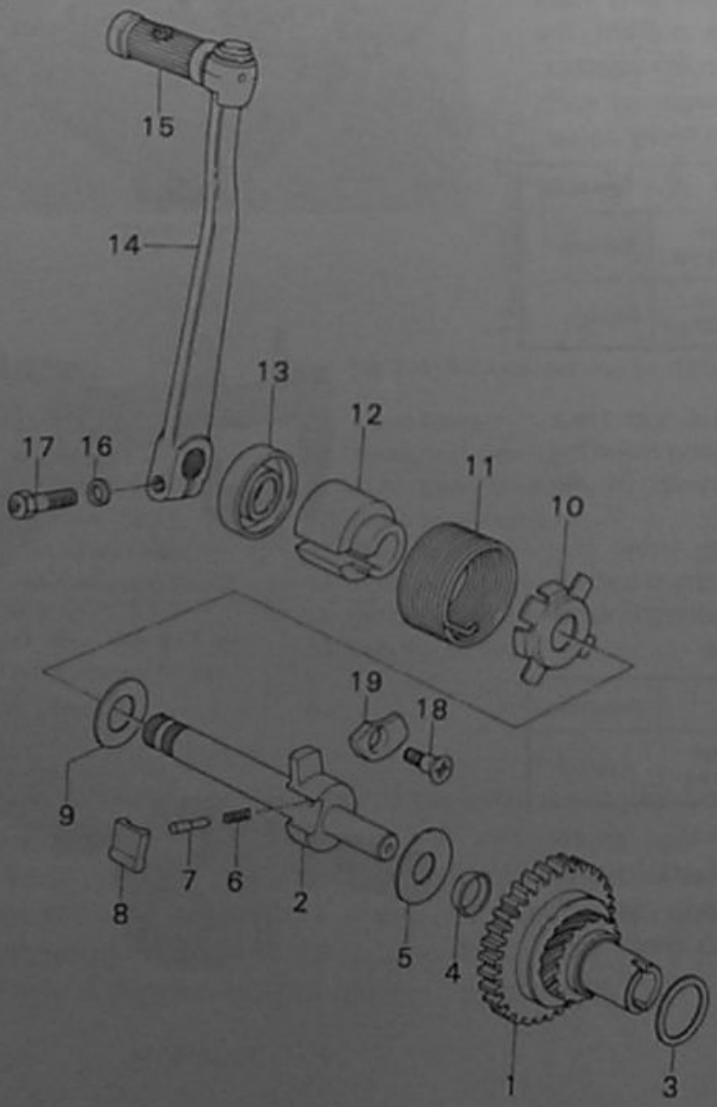


Fig. 7–5–45
Measuring play in axial direction

Exploded view of kick system



1. Kick Starter Drive Gear N.T=33
2. Kick Shaft
3. Kick Starter Drive Gear Washer O.D=27, I.D=20, T=1.0
4. Kick Starter Drive Gear Oil Seal
5. Kick Starter Shaft Left Washer O.D=30, I.D=12, T=1.5
6. Kick Starter Pawl Spring
7. Kick Starter Pawl Pin
8. Kick Starter Pawl
9. Kick Starter Shaft Right Washer O.D=30.5, I.D=16, T=0.5
10. Kick Starter Shaft Spring Holder
11. Kick Starter Shaft Spring
12. Kick Starter Shaft Spring Holder
13. Kick Shaft Oil Seal
14. Kick Lever
15. Kick Lever Rubber
16. Lock Washer
17. Bolt
18. Kick Starter Stopper
19. Kick Starter Stopper Screw

Fig. 7–5–46
Exploded view of kick system

Description

The model TS90/TC90 kick starter can be operated by pulling in the clutch lever even with the gears engaged, so long as the clutch is disengaged. It is not necessary to shift into neutral before starting the engine. This mechanism is called a primary kick starting system.

The kick starting action is transmitted to the engine in the order of kick starter shaft, kick starter pinion, kick starter idle gear, kickstarter gear, primary gear, primary pinion and crankshaft, as shown in Fig. 7–5–47. The engine can be started regardless of gear position if the clutch is disengaged.

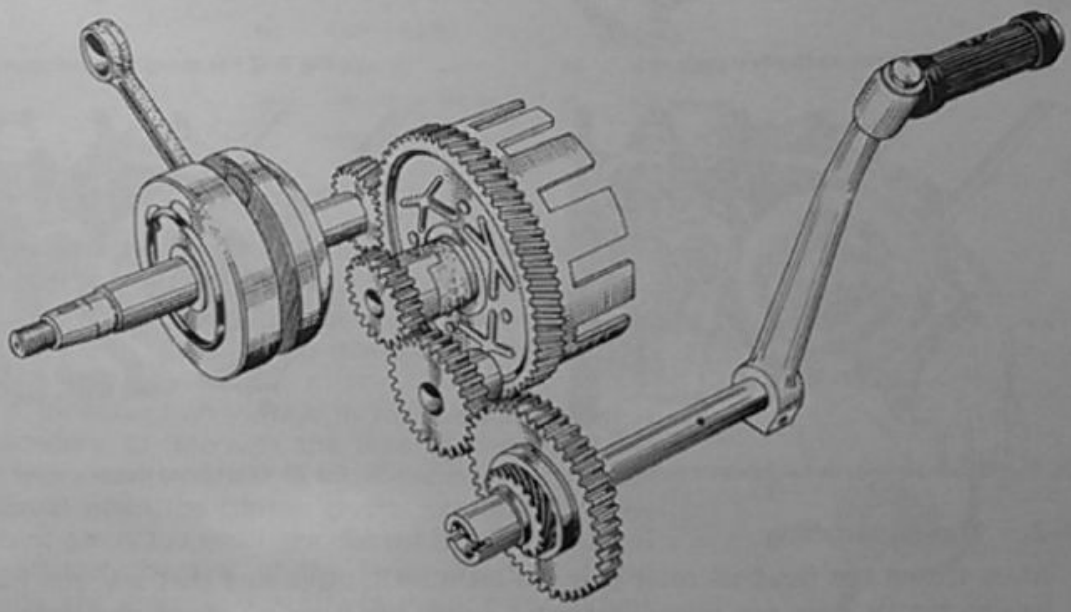


Fig. 7–5–47 Kick starter mechanism

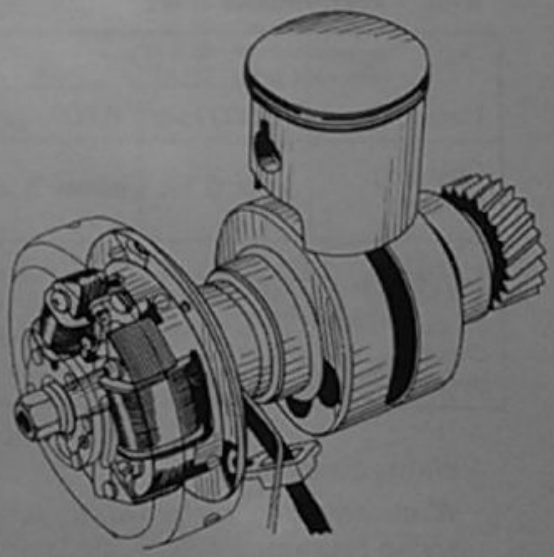
8. ENGINE ELECTRICAL EQUIPMENT

Construction and operation of flywheel magneto

When the magneto is turned in accordance with engine revolution, a voltage is generated in the magneto. The induced voltage is transformed into high voltage by the ignition coil and contact breaker points causing a spark in the spark plug.

The magneto used on the model TS90 (TC90) is called a flywheel magneto as the magnets serve as a flywheel for the crankshaft as well as a rotor.

In addition to this, this flywheel magneto has lamp coils to charge the battery and to light the head lamp and tail lamp during night riding.



8–1. Removing

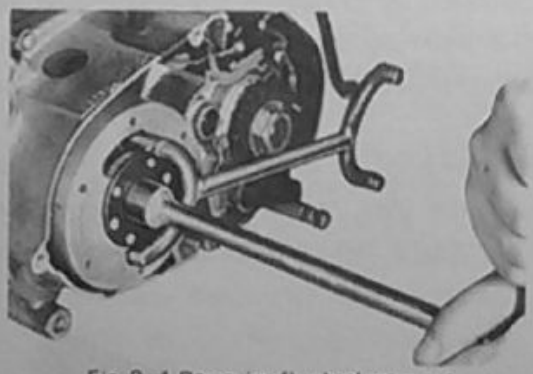


Fig. 8–1 Removing flywheel rotor nut

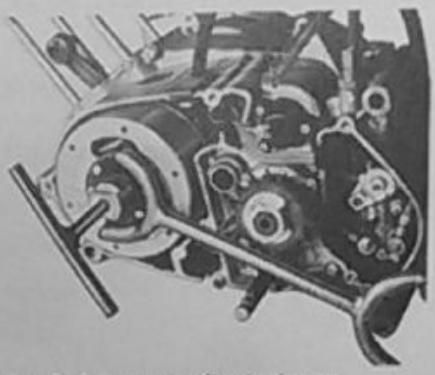


Fig. 8–2 Removing flywheel rotor

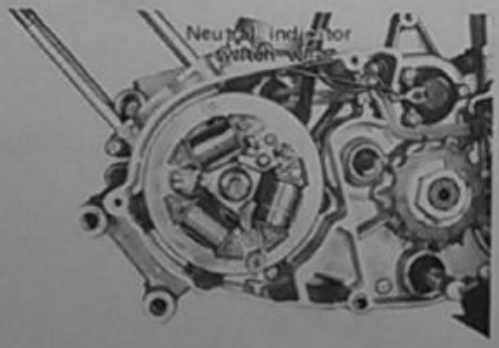


Fig. 8–3 Disconnecting neutral indicator switch wire

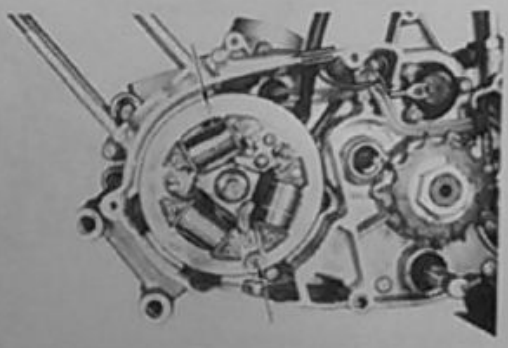


Fig. 8–4 Removing magneto stator

8–2. Tips on installing

When fitting the flywheel rotor over the crankshaft, make sure that any iron piece or foreign matter does not remain attracted inside the rotor. Tighten the rotor to the following tightening torque.

Tightening torque	350~500 kg-cm (25.32~36.16 lb-ft)

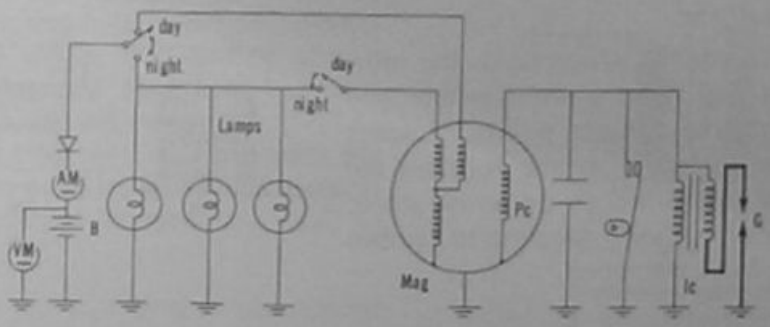
8–3. Performance chart

rpm / Item	Day		Night		Remarks
	2,000 rpm	8,000 rpm	2,000 rpm	8,000 rpm	
Charging Current	over 0.1A	below 3.2A			with battery fully charged and neutral indicator lamp turned on
Lighting Voltage (Use a fully charged battery)			over 6.0V	below 8.5V	with head lamp turned on

Wiring diagram

When checking performance, connect the electrical equipment in accordance with wiring diagram.

Wiring Diagram



Mag	Flywheel magneto	B	Battery
IC	Ignition Coil	AM	D. C. Ammeter
Lamps	Head lamp, tail lamp and lamp in speedometer	VM	D. C. Voltmeter
		G	Three prong gap tester

8–4. Contact breaker

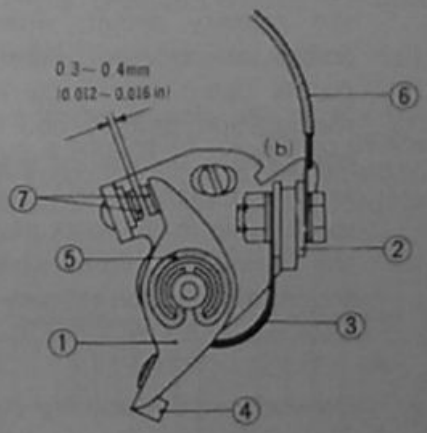
The contact breaker installed on the flywheel magneto stator is a kind of switch which cuts the primary current generated in the primary coil by the action of a rotating cam inside the flywheel rotor.

A. Point gap

To generate high voltage in the ignition coil, it is necessary to interrupt the flow of current in the primary coil, and the flow of the current is interrupted when the contact points just open. If the point gap is too small, the current is not interrupted completely because of the flying ark, and if too large, the absolute quantity of the primary current decreases.

As in both cases high voltage cannot be produced, the standard contact point gap should be 0.3~0.4 mm (0.012~0.016 in).

To measure the gap, use the thickness gauge which is fitted to the contact point wrench.



① Contact break arm
② Insulator
③ Spring
④ Cam follower
⑤ Circlip
⑥ Wire from primary coil
⑦ Contact breaker points

Fig. 8–5

B. Adjusting

If the contact point gap is larger than standard, loosen the screw (a) shown in Fig. 8–6. Insert a screw driver in slot (b) located on the contact base and move the base to the right to adjust the gap to the standard.

If the gap is smaller than standard move the base to the left to adjust the gap.

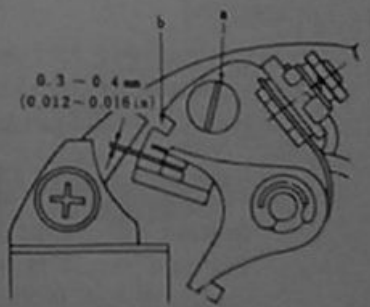


Fig. 8–6

C. Inspecting

1 Point surfaces

Remvoe the circlip which holds the moving point and fixed point together and disassemble the contact points. Inspect the point surfaces. If the surafces are burned or pitted, polish on an oil stone. Wash the points with gasoline to remove any oil before assembling.

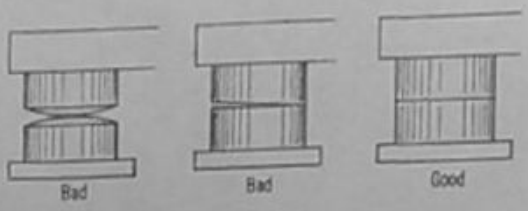


Fig. 8–7

8–5. Primary Coil

The primary coil is fitted to the stator of the flywheel magneto and an electromotive force is induced in the coil when the flywheel rotor turns. Electric current induced is alternative current. This alternative current forms one circuit, called the primary circuit, when the contact points are closed. When the contact points open, electric current flows into the ignition primary coil in the ignition coil, which is installed separately. High tension current whcih makes a strong spark jump in the spark plug is induced in the secondary coil, which is wound around the ignition primary coil.

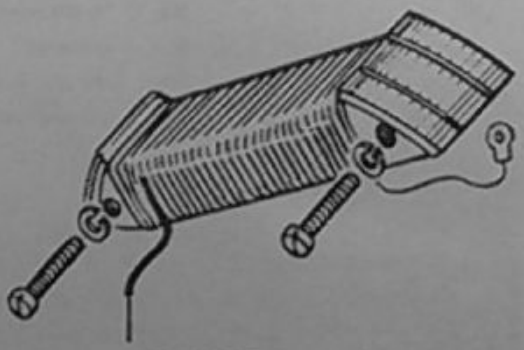


Fig. 8–8 Primary coil

A. Construction

One end of the primary coil wire is connected to the contact breaker and the other end is grounded. A blue wire goes from the primary coil to the condenser and then to the contact breaker. A black/yellow wire connects with this wire at the condenser and leads to the ignition primary coil.

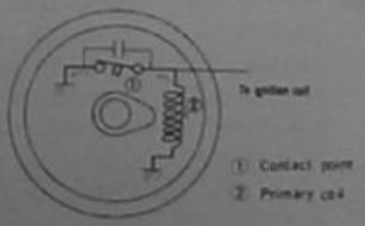


Fig. 8–9 Electric current flow with contact points closed

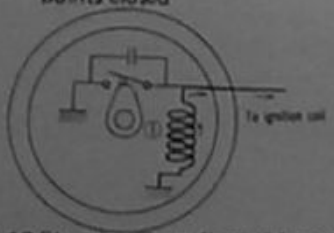


Fig. 8–10 Electric current flow with contact points open

B. Inspecting

Check conductivity and resistance of the primary coil using Suzuki pocket tester as shown in Fig. 8–11. Standard resistance is 1.9Ω.

Note: As the resistance is small, a very precise test meter is required. If the test result is not exactly the standard but is pretty close, the primary coil is probably in good condition.

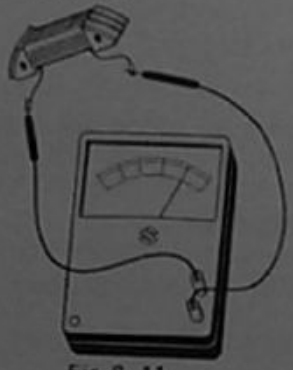


Fig. 8–11

8–6. Ignition Coil

The ignition coil is installed inside the flywheel magneto on conventional models but on this model the ignition coil is installed separately to obtain excellent cooling and increased insulation.
At the same time by this arrangement the layout of the parts leaves enough space so the life of coils is prolonged.

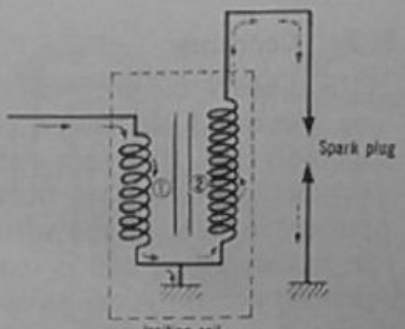


Fig. 8–12

A. Construction

The ignition coil is a kind of transformer which transforms low voltage electric current into high voltage current. The ignition coil consists of two windings. Comparatively thick enamelled copper wire about 0.5 mm (0.01969 in) in diameter is wound around the iron core about 370 times and thin enameled copper wire approximately 0.06 mm (0.00236 in) in diameter is wound around the core about 20,000 times.

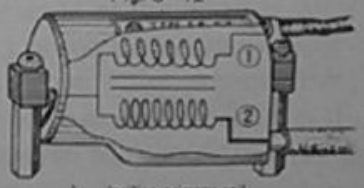


Fig. 8–13

The first coil is called the ignition primary coil and the other is the secondary coil. (Fig. 8–13)
One end of the ignition primary coil wire is connected to the primary coil of the flywheel magneto (black/yellow harness) and the other is grounded to the frame of the motorcycle together with the iron core. One end of the secondary coil is connected to the ignition primary coil inside the ignition coil and the other end (high tension cord) is connected to the spark plug.

B. Operation

When electric current generated in the primary coil of the magneto by the turning of the flywheel is cut by the contact breaker, electric current of approximately 300 volts is induced. This electric current flows momentarily into the ignition primary coil and high voltage electric current of from 13,000 to 20,000 volts is produced in the secondary coil.

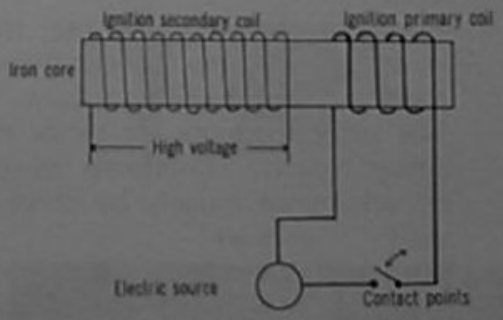


Fig. 8–14 Ignition coil operation

C. Inspecting

Check the ignition coil performance as shown in Fig. 8–15 using a battery as the electric source for the electro tester. Connect the primary coil terminal to the tester primary side positive terminal and the ignition coil fitting stay to the tester primary side negative terminal. Connect the high tension cord of the ignition coil to the tester secondary side positive terminal and the ignition coil fitting stay to the negative terminal. Use a three prong gap to check. (Fig. 8–15) Standard spark performance is over 6 mm (0.236 in).

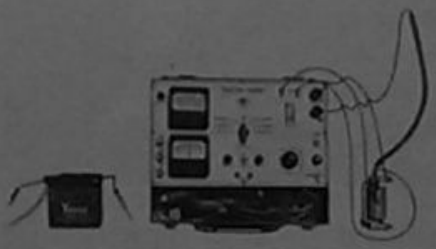


Fig. 8–15

8–7. Condenser

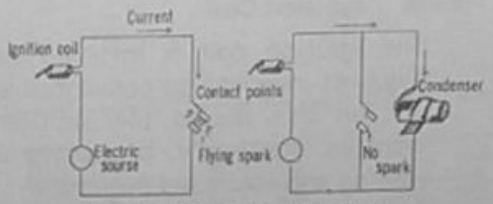


Fig. 8–16 Electric current flow

The primary current must be cut rapidly to generate high tension current in the ignition coil. If a spark arcs between the contact breaker points, fluctuation of the current is delayed and voltage generated in the secondary coil is reduced. It is necessary to prevent sparks from arcing in the contact points. A condenser is connected in parallel with the contact breaker to absorb electric energy and keep it from sparking in the contact breaker. The condenser capacity is its ability to absorb and charge electric energy. If the capacity is not sufficient sparks jump in the contact breaker, burning the contact points.

A condenser with too great capacity causes poor spark performance in the spark plug. It is necessary to use a condenser with the proper capacity.

The condenser must have a capacity of 0.18 μF ±10%

A. Inspecting

Set the electro tester to the "insulation resistance" position. Touch the tester terminals to the condenser terminal and the body. The condenser is in good condition if the tester needle shakes for a moment and then returns to its normal position (over 10 megohms) and stops. If the condenser is damaged, the tester needle will not return to its normal position.

Bring the condenser wire near the body so a spark will jump between the wire and the body. (Fig 8–17)

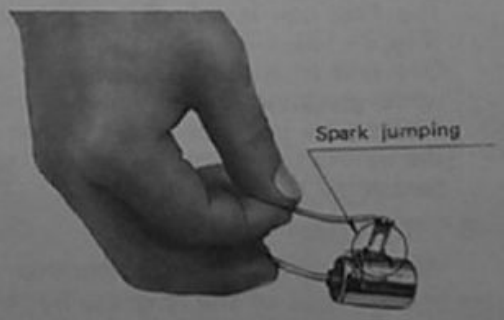


Fig. 8–17
Condenser spark jumping

The larger the spark the better the condenser capacity. Condenser capacity can be determined roughly by checking the spark.

Set the electro tester to the "condenser capacity" position to measure capacity accurately.

With the tumbler switch pulled down to "cal" position, align the tester needle with the standard capacity (μF) stamped on the identification plate which is attached to the side of the electro tester by turning the adjuster. Push the tumbler switch to "test" position and connect the inspection terminals to the condenser terminals. Standard condenser capacity is 0.18 μF.

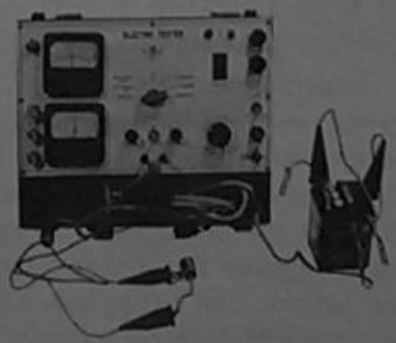


Fig. 8–18
Testing condenser capacity

8–8. Ignition Timing

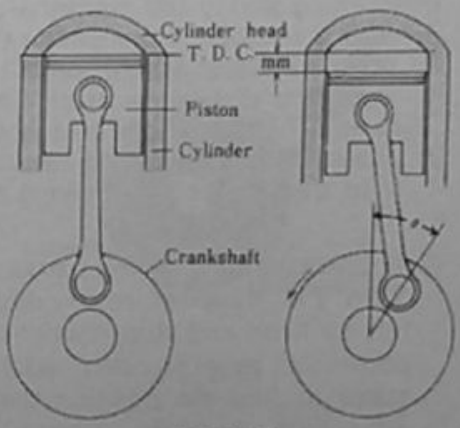


Fig. 8–19

Ignition timing is the most proper time to ignite the compressed gas in the compression process of the engine (on the upstroke of the piston), and is usually shown by the distance from T.D.C down to the top of the piston when the contact points just begin to open. It is also shown by the crankshaft rotating angle (θ) before T.D.C.

Whether ignition is timed properly or not influences sensitively on the performance of the motorcycle. Improper ignition timing causes decrease in h.p., overheating and increase in fuel consumption, etc. and resultantly shortens the life of the engine. So, ignition should be timed correctly. The relation between piston distance (mm) and crankshaft angle of TS90 and TC90 is shown below.

	← Timing retards			S T D	Timing advances →				
Piston distance (mm)	1.46	1.64	1.82	1.96 mm	2.20	2.42	2.66	2.90	3.12
Crank angle (°)	17°	18°	19°	20°	21°	22°	23°	24°	25°

A. Inspecting

Before checking ignition timing, be sure that contact point gap is set at 0.35 mm.

1. Checking with timing gauge and timing tester.

(1) Remove the spark plug and screw the timing gauge holder, with the timing gauge inserted in it, into the spark plug hole.

(2) The timing gauge should be set on the holder so that the movement of the piston may be clearly confirmed by the timing gauge, in the range of 5 mm before T.D.C.

(3) Use the timing tester to find the moment for contact points to begin opening.

There are two ways to connect the leadwires of timing tester.

(a) Clip one of tester wires on the black-wire from primary coil, and the other somewhere on engine.

(b) Remove inspection cap from crankcase left cover, and clip one of tester-wires on contact arm spring, and the other somewhere on engine.

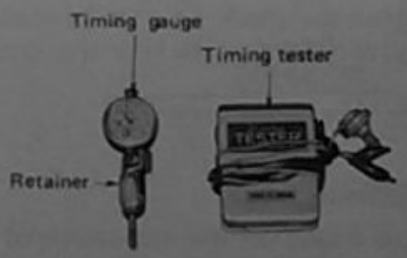


Fig. 8–20


Fig. 8–21

After connecting wires, turn on the knob of tester. But when the latter way is applied, be sure to turn on the ignition switch as well.

(4) Find out T.D.C. turning the crankshaft slowly. T.D.C. is the position where the pointer of the timing gauge just begins to move from right to left. Adjust the knurled ring until "0" on the dial aligns with the pointer, when the piston is at T.D.C.

(5) Turning slowly the crankshaft clockwise, in other words, in the opposite direction of engine rotation, tone of the timing tester buzzer changes. These changes tell you the precise position where contact points begin to open-that is, ignition timing.
Read the dial gauge at this moment, and you will see in mm the piston distance before T.D.C. If the piston distance is smaller than the standard given in the table above, ignition timing is retarded, and if larger, it is advanced. In either case, adjust it to the standard by moving the contact point referring to paragraph C "Adjusting"

B. 1. Checking with timing marks
Turn the flywheel rotor slowly to the left by hand and stop it when the contact points just begin to open. (Use the timing tester to find the position that the contact points just begin to open.) Check to see if timing mark on the crankcase aligned perfectly with timing mark on the flywheel. If the marks are aligned the ignition timing is correct. (Fig. 8–22 & 8–23).

Fig. 8–22

2. Checking with timing lamp
(Suzuki electro tester)
If the light of an electro tester lamp is thrown on the ignition timing marks with the engine running, the timing marks appear to stop at the position where the spark jumps in the spark plug. Check to see that the mark on the flywheel rotor align with the mark on the crankcase.

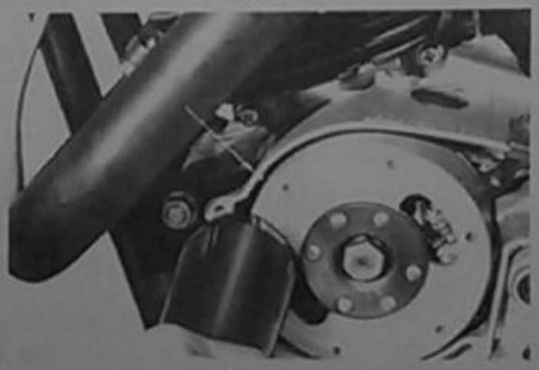


Fig. 8–23

C. Adjusting

If it is found on the inspection of the ignition timing that the piston is not at 1.96 mm before T.D.C. or the timing marks are not aligned, the engine cannot develop its top performance.
So it is necessary to check and adjust the timing periodically.
TS90 and TC90 ignition timing can not be adjusted by rotating flywheel magneto stator. It can be adjusted only by the contact point gap.
1. Adjusting with timing gauge and timing tester.
Remove the inspection cap from engine left cover. Set the same instruments as used for ignition timing inspection.

Find out T.D.C. by turning the crankshaft slowly. T.D.C. is the position where the pointer of the timing gauge just begins to move from right to left and vice versa. Adjust the knurled ring until "0" on the dial aligns with the pointer under such a condition that the piston is at T.D.C.
Turning slowly the crankshaft clockwise in other words, in the opposite direction of engine rotation, make sure that tone of the timing tester buzzer changes and the lamp on the tester goes out.
Adjust the point gap so that the tone of buzzer changes when the piston on up-stroke comes to the distance of 1.96 mm (0.077 in) from T.D.C.
In case the point gap is 0.35 mm, the ignition timing is adjusted to the standard (1.96 mm by piston distance) as a rule.

8–9. Charging System

8–9–1. Description

Two lamp coils are fitted along with the primary coil on the flywheel magneto stator and generates alternative current electricity when the flywheel rotor turns. This current is supplied to the head lamp, etc., and is changed into direct current by the selenium rectifier to charge the battery.

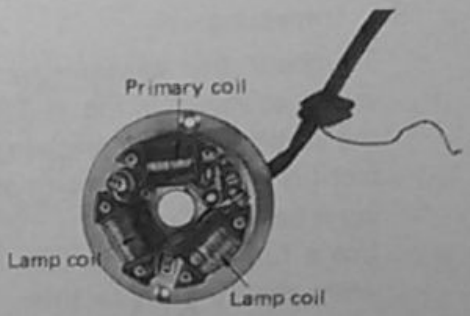
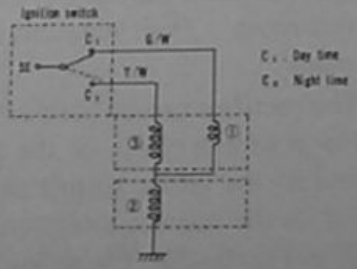


Fig. 8–24

8–9–2. Lamp coil

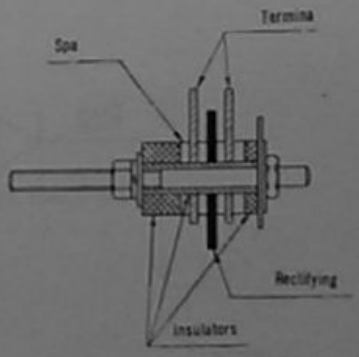
The coil ① is fine and others are thick. In day time, coils ① and ② are used to charge battery.
In night time, coils ① and ③ operate for battery charge and lamps.



8–9–3. Selenium rectifier

The selenium rectifier converts alternative current into direct current. It allows electric current to pass through it freely in one direction but nearly perfectly prevents current from flowing through it in the opposite direction.

A. Construction and specifications
The rectifier is made of nickel plated steel or aluminum plate on which selenium is melted and hardened, as shown in Fig. 8–25 and Fig. 8–26.
A small amount of foreign material is included in the selenium to promote the activity of the selenium. The layer of selenium on the plate is covered with cadmium or tin. Units are mounted in parallel or in series to obtain the necessary voltage and amperage and these are assembled with spacers and terminals plates. The unit is covered with waterproof paint to protect it from humidity and rust. A single plate rectifier for single phase half wave rectification is used on this model. (Fig. 8–27)



Sectional view of selenium rectifier
Fig. 8–25

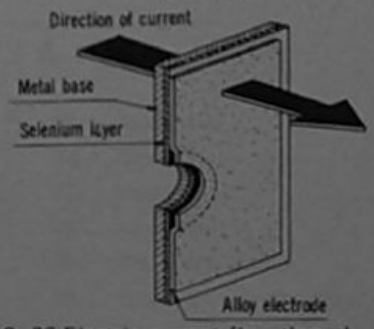


Fig. 8–26 Electric current flow through selenium rectifier

Electric current flow through selenium rectifier

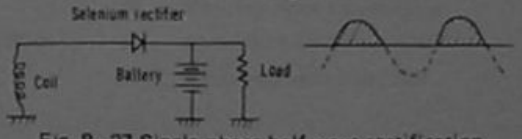


Fig. 8–27 Single-phase half wave rectification

B. Inspecting

To check the selenium rectifier, wire a circuit as shown in Fig. 8–28 and measure the reverse flow of electric current. The rectifier is in good condition if the reading is below 10 mA.

Use a fully charged 6 volt 4 AH battery when checking the rectifier. Connect the red wire from the rectifier to the battery positive terminal.

Check the rectifier with an ammeter first and confirm that the meter needle does not move. Then measure with a milliammeter.

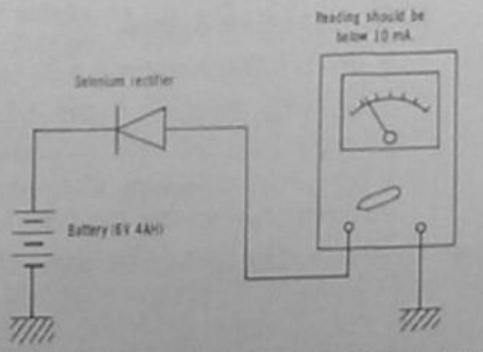


Fig. 8–28 Checking selenium rectifier performance

The rectifire can be used when the reading is below 10 mA. Standard is 1-2mA.

For a simple check of the selenium rectifire, wire a circuit as shown in Fig. 8–29 using one of the lamps from the speedometer. If the lamp is lighted by electric current flowing in the correct direction (A in Fig. 8–29) and not lighted in the opposite direction (B in Fig. 8–29), the selenium rectifire is in good condition.

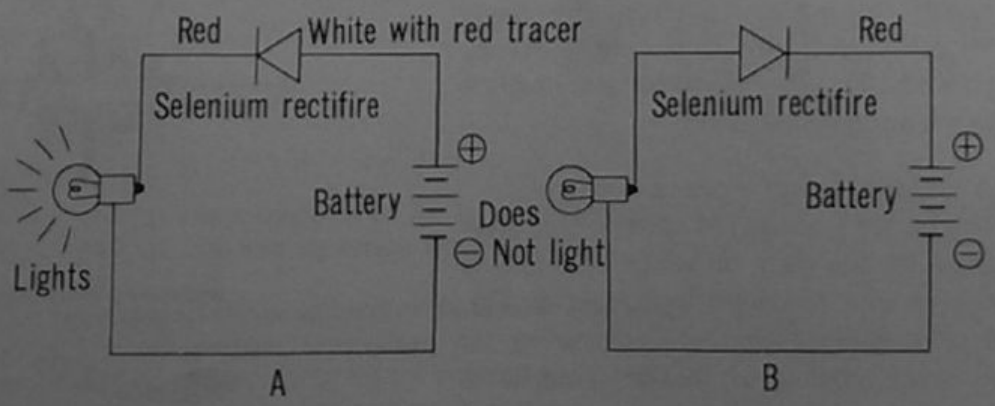
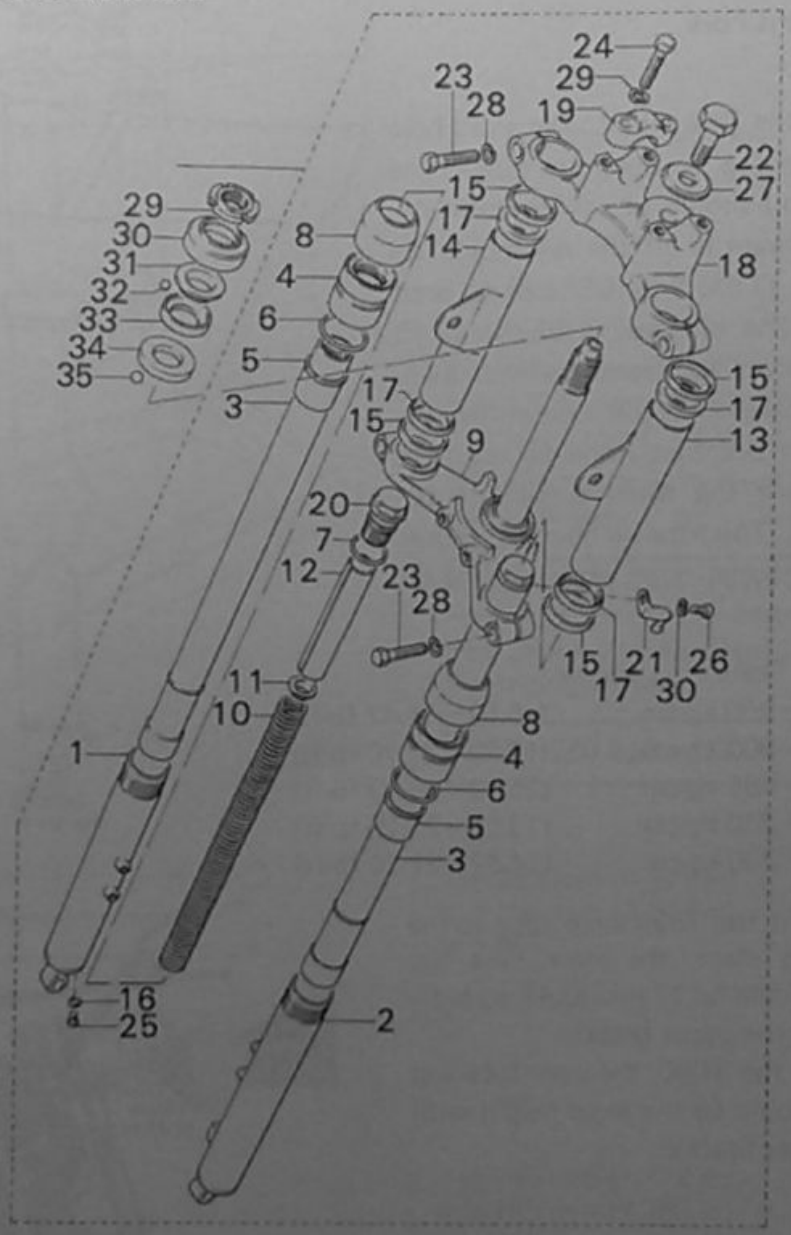


Fig. 8–29 Checking selenium rectifier performance

9. FRAME

Exploded view of front fork



1.	Right Outer Tube	13.	Left Fork Cover	25.	Drain plug
2.	Left Outer Tube	14.	Right Fork Cover	26.	Screw
3.	Inner Tube	15.	Fork Cover Seat	27.	Washer
4.	Outer Nut	16.	Drain Plug Gasket	28.	Lock Washer
5.	Sliding Metal	17.	Fork Cover Guide	29.	Steering Stem Nut
6.	"0" Ring	18.	Upper Bracket	30.	Steering Upper Dust Seal
7.	"0" Ring	19.	Handlebar Holder	31.	Steering Outer Upper Race
8.	Dust Seal	20.	Cap	32.	Steering Steel Upper Ball
9.	Steering Stem	21.	Wire Clip	33.	Steering Inner Upper Race
10.	Fork Spring	22.	Upper Bracket Fitting Bolt	34.	Steering Inner Lower Race
11.	Fork Spring Guide	23.	Fork Fitting Bolt	35.	Steering Steel Lower Ball
12.	Spacer	24.	Handlebar Holder Bolt		

9–1. Front Fork

Servicing

A. Pour the fork oil into the small hole on the top of the inner tube. The fork oil should be # 30 motor oil. The quantity of the oil should be 185cc (7.8/6.5 oz US/Imp) to each leg. The oil level is 80 mm (3.15 inch) from the top of the inner tube. The more oil in the fork, stiffer suspension becomes, while the less oil in the fork the softer suspension becomes. Too little oil however, causes an abnormal noise when running on rough road.

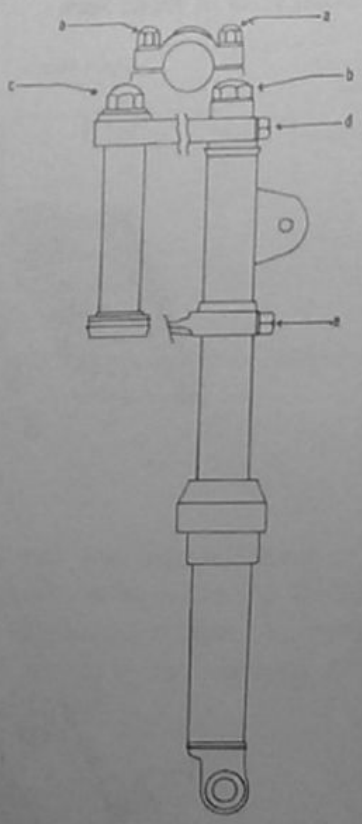


Fig. 9–1

Front Fork Tightening Torque.

a	= 90~200 kg-cm	(6.51~14.47 lb-ft)
b	= 150~300 kg-cm	(10.85~21.70 lb-ft)
c	= 350~530 kg-cm	(25.32~38.33 lb-ft)
d	= 180~280 kg-cm	(13.02~20.25 lb-ft)
e	= 200~300 kg-cm	(14.47~21.70 lb-ft)

B. When fit the TS90 inner tube to the steering stem, the inner tube top face should be 12 mm (0.47 in) higher than the upper bracket.
In case the TC90, the inner tube top face should be the same height with the upper bracket.

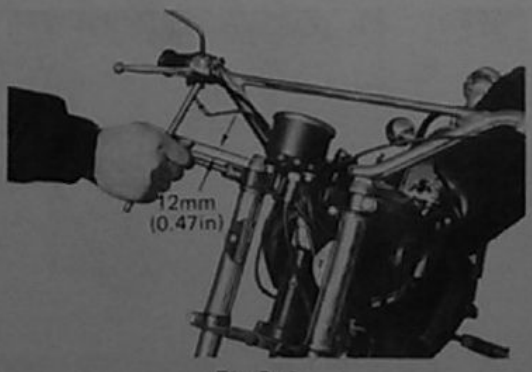


Fig. 9–2

9–2. Fuel Tank

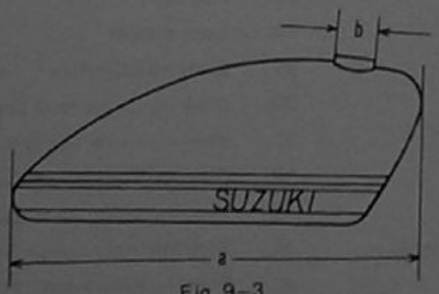


Fig. 9–3

a = 397 mm (15.630 in)
b = 54 (2.126 in)

9–3. Dual Seat

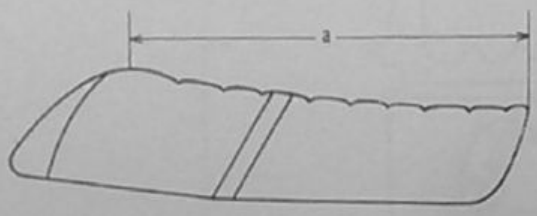


Fig. 9–4

a = 535 mm (21.063 in)

9–4. Rear Swinging Arm

Fig. 9–5

a = 437.3 mm (17.217 in)
b = 179.5 mm (7.067 in)
c = 194 mm (7.638 in)

Rear Swinging Arm Pivot Shaft Nut Tightening Torque

180~280 kg-cm (13.02~20.25 lb-ft)

Rear Shock Absorber Nut Tightening Torque

180~280 kg-cm (13.02~20.25 lb-ft)

9–5. Side Stand

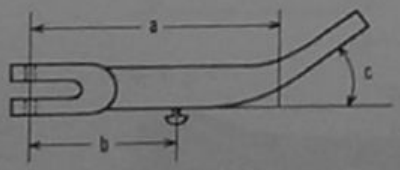


Fig 9–6

a = 253 mm (9.971 in)
b = 85 mm (3.346 in)
c = 60°

9–6. Front Hub Drum

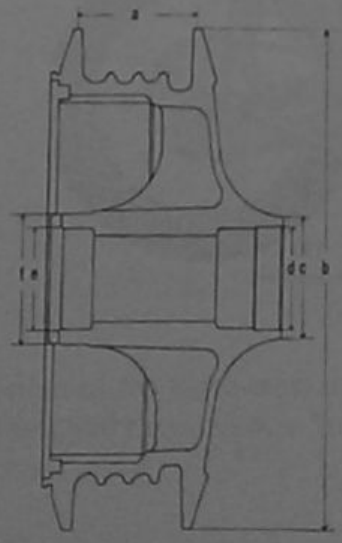


Fig. 9–7

a = 45 mm (1,772 in)
b = 185 mm (7,283 in)
c = 45 mm (1,772 in)
d = 38 mm (1,500 in)
e = 37 mm (1,457 in)
f = 48 mm (1,890 in)

Front Axle Nut Tightening Torque

360~520 kg-cm (26.03~37.61 lb-ft)

9–7. Rear Hub Drum

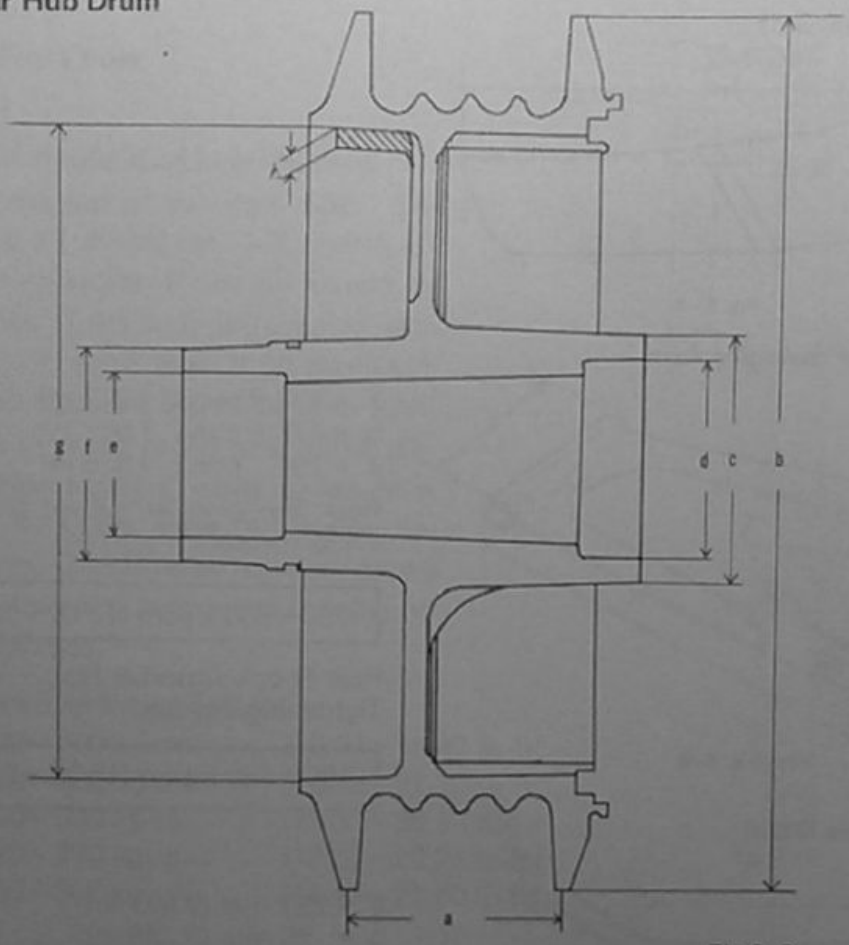


Fig. 9–8

a	= 45 mm	(1.772 in)
b	= 185 mm	(7.283 in)
c	= 53 mm	(2.087 in)
d	= 42 mm	(1.654 in)
e	= 35 mm	(1.378 in)
f	= 45 mm	(1.772 in)
g	= 138 mm	(5.433 in)
h	= 3 mm	(0.118 in)

Rear Axle Nut
Tightening Torque

360~520 kg-cm (26.03~37.61 lb-ft)

10. INSTALLATION OF TS90 MOTO-CROSS KIT

Installation of the Moto-cross tuning-up kit on the TS90 results in over 4 HP increase from 11 HP at 7,500 r.p.m. to over 15 HP at 9,500 r.p.m.

NSTALLATION INSTRUCTIONS

A. Engine:

10–1. Cylinder

Install the kit cylinder with one base gasket. Polish the inside of the ports for a slight power increase through smoother gas flow.

CAUTION: Ascertain that the cylinder's port edges are chamfered before installation, or rapid cylinder and ring wear will occur.

10–2. Cylinder Head and Gasket

Use the kit cylinder head with one cylinder head gasket included as that kit. Torque cylinder head nuts to 200~250 kg-cm (14.47~18.09 lb-ft)

Cylinder head capacity	9.5cc (0.58 cu-in)

10–3. Spark Plug

NGK B-8EN is recommended. A colder plug may be required for severe riding : use NGK B-9EN if necessary. A hotter spark plug B-77EC is also available.

10–4. Piston and Ring

Use the kit piston and ring available as the moto-cross kit. After 30 minutes of moderate operation, pull the cylinder and sand the piston and cylinder with # 400-grit emery cloth wherever localized scuffing and high spot are evident.

10–5. Carburetor

A VM 22SC is supplied in the kit. Specifications are as follows.

M.J	#140	P.J.	: #25
A.J	: 0.9ϕ	A.S.	: 1.¼
J.N	: 4DG6-3	V.S	: 2.0ϕ
N.J	: 0-0	G.S	: #80
C.A	#2.5	Feul level	28 ± 1 mm

10–6. Expansion Chamber

Use the muffler mounting flange and spring, and hook one end of the spring to the cylinder barrel. Mount the chamber with the rubber hanger mounts.

10–7. Ignition Timing

B.T.D.C 24° (2.4 mm, 0.945 in). Use the extension spindle with the dial indicator for the 3/4" reach spark plug hole. (Special tool number of dial gauge is 09931-00111). Set the contact point gap at 0.35 mm (0.14 inch).

10–8. Ignition System

When use the racing magneto, connect the black/yellow wire, from the magneto to the black/yellow wire of the ignition coil.

Remove the ignition switch from the circuit.

10–9. Engine Lubrication

a. Bleed air bubbles from the oil intake line and oil pump by loosening the bleed screw until bubbles are disappeared.

b. Remove the oil pump control cable.

USE 30 : 1 GAS/OIL MIXTURE IN THE FUEL TANK

Don't remove the oil pump, or the left main bearing and conrod big end will fail.

c. Use one of the following recommended castor-base oils for reliable lubrication.

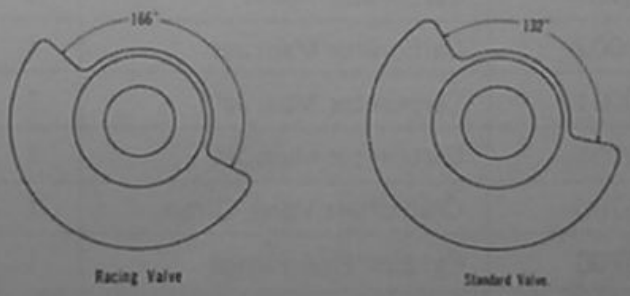
Castrol R30
Blendzall Green Label
Shell Supper M
Don Francisco's Two Shapper

Some mineral-base products which have worked well are:

Bardahl VBA Intercontinental Golden Spectro

10–10. Crank Rotary Valve

Use the exclusive crank rotary valve as shown below.



B. Transmission

	Standard gear number of teeth	Racing gear number of teeth
5th drive gear	23	22
5th driven gear	20	21

C. Frame

Remove all unnecessary weight-turn signal system, lighting equipment, battery, wiring harness.

The following moto-cross kit can be supplied from Suzuki and handled in such unit as a rule.

	Parts Number	Part Name		Remarks
	99104–07200	Moto-cross kit	1	For U.S.A.
	10000–25815	Moto-cross kit	1	Except U.S.A
1	11111–25710	Cylinder Head	1	For 100cc
2	11141–25700	Cylinder Head Gasket	1	For 100cc
3	11210–25710	Cylinder Comp.	1	For 100cc
4	12110–25710	Piston Comp.	1	For 100cc
5	12141–25700	Piston Ring	1	For 100cc
6	13200–25701	Carburetor Ass'y.	1	
7	09491–26002	Carburetor Main Jet	1	# 130
8	09491–30001	Carburetor Main Jet	1	# 150
9	09491–32001	Carburetor Main Jet	1	# 160
10	12410–25700	Crankshaft Valve Comp.	1	
11	14154–25700	Exhaust Pipe Flange	1	
12	14303–16200	Muffler Spring	1	
13	14310–25700	Muffler Ass'y	1	
14	14770–25740	Muffler Support Damper	1	
15	09108–06028	Exhaust Stud Bolt	2	
16	08321–21068	Washer	2	
17	09180–08046	Muffler Spacer	1	
18	27511–08710	Engine Sprocket	1	N.T=13
19	27511–08700	Engine Sprocket Washer	1	N.T=12
20	09167–20009	Engine Sprocket Washer	1	For Engine Sprocket N.T=12
21	64511–25750	Rear Sprocket	1	N.T=57
22	64511–25760	Rear Sprocket	1	N.T=60
23	09482–00027	Spark Plug	1	B-8EN

The following parts are not included in the kit and supplied as a unit.

	Parts Number	Part Name		Remarks
24	24251–25700	Fifth Drive Gear	1	N.T=22
25	24351–25700	Fifth Driven Gear	1	N.T=21
26	32100–25700	Magneto Ass'y	1	
27	62100–25700	Rear Absorber	2	
28	64511–25730	Rear Sprocket	1	N.T=52
29	64511–25770	Rear Sprocket	1	N.T=63
30	64511–25780	Rear Sprocket	1	N.T=68

11. TROUBLE SHOOTING

When trouble occurs with a motorcycle, it is important to find the source of the trouble as rapidly as possible. It is also necessary to perform only the work required to repair the machine and not bother with parts whcih are functioning correctly. The list of possible troubles and their causes given below should help the service man to repair motorcycles guickly without loss of effort.

11–1. If Engine is Hard to Start

Check fuel in the fuel tank first. When a proper amount of fuel is in the tank, check the following points.

Order	Description	Check Points	Action
1.	Check to see that fuel flows into carburetor	• If fuel does not enter into carburetor	
		1. Fuel strainer clogged	Remove and clean
		2. Fuel pipe clogged or damaged	Clean or replace
		3. Tank cap air vent clogged	Clean with a wire
		4. Fuel cock clogged	Clean with a wire
2.	Check to see that spark jumps in spark plug (Turn engine with kick starter.)	• If bule or hot spark jumps in the spark plug, check the following points	
		1. Ignition timing	Adjust
		2. Fuel	Check carburetion
		3. Carburetor float	Adjust or replace
		4. Engine compression	See specifications and adjust
		• If the spark is weak	
		1. Damage in spark plug	Replace
		2. Incorrect spark plug gap	Adjust
		3. Damage in spark plug cap	Replace
		4. Dirty contact points	Clean and adjust
		5. Bad insulation in condenser	Replace
		6. Damage in ignition coil or primary coil	Replace
		• If there is no spark	
		1. Damage in spark plug	Replace
		2. Dirty or wet spark plug	Clean
		3. Incorrect spark plug gap	Adjust
		4. Dirty or incorrect contact point gap	Clean and adjust
		5. Bad insulation in condenser	Replace
q		6. Damage in ignition coil or primary coil	Replace
		7. Damage in ignition switch	Replace
		8. Damage in wiring harnesses	Repair or replace
3.	Check to see that engine compression is proper. (Turn engine with kick starter.)	• If engine compression is improper	
		1. Worn cylinder and piston rings	Repair or replace
		2. Stiff piston rings on piston	Repair or replace
		3. Damaged cylinder head gasket	Replace
		4. Damaged cylinder base gasket	Replace
		5. Worn piston	Replace
		6. Improperly tightened spark plug	Tighten securely
		9. Gas leaks from crankcase joining	Repair or replace
		10. Damaged cylinder or cylinder head	Replace
		11. Damaged oil seals	Replace

These three things—fuel, spark and compression—are basic points for engine operation. To find engine troubles, first check these points.

11–2. If Engine Does Not Run Smoothly

Order	Description	Check Points	Action
1.	Turning throttle grip, check to see that engine rpm increases.	• If engine rpm increases, but motorcycle does not run fact:	
		1. Clutch slippage	Adjust or replace clutch plates
		• If engine rpm does not increase:	
		1. Improperly adjusted carburetor	Adjust
		2. Dirty air cleaner	Clean
		3. Clogged fuel line	Clean
		4. Improperly adjsuted ignition timing	Adjuste
		5. Clogged exhaust pipe and muffler	Clean
2.	Turning throttle grip, check to see that engine runs smoothly.	• When rapidly accelerated, engine does not run smoothly.	
		1. Improper ignition timing	Adjust
		2. Improperly working contact breaker	Adjust
		3. Improperly adjusted carburetor	Adjust
		4. Dirty spark plug	Clean and adjust
		• If engine does not run smoothly at low rpm:	
		1. Too early ignition timing	Adjust
		2. Dirty contact point	Clean and adjust
		3. Dirty or improperly adjusted spark plug	Clean and adjust
		4. Improperly adjusted carburetor pilot air adjusting screw	Adjust
		5. Clogged or damaged fuel line	Clean or replace
		6. Improperly working contact breaker	Adjust
		• If engine does not run smoothly at high rpm:	
		1. Clogged fuel tank cap air vent	Clean with a wire
		2. Clogged or damaged fuel line	Clean or replace
		3. Dirty or improperly adjusted spark plug	Clean and adjust
		4. Improperly working contact breaker	Adjust
		5. Too late ignition timing	Adjust
		6. Improperly adjusted carburetor	Adjust
		7. Dirty air cleaner	Clean
3.	Check to see that engine compression is proper.	See "If engine is hard to start" section	
4.	If engine overheats.	1. Improperly adjusted oil pump control lever clearance	Adjust
		2. Air in oil lines	Remove air
		3. Improper ignition timing	Adjust
		4. Carbon deposit in combustion chamber	Clean
		5. Carbon deposit in exhaust pipe and muffler	Clean
		6. Incorrect spark plug heat range	Replace with colder plug
		7. Low grade oil used	Replace with correct oil
		8. Clutch Slippage	Adjust or replace plates
		9. Brake dragging	Adjust
		10. Drive chain too tight	Adjust

11–3. If Abnormal Noise is Heard in Engine

Order	Description	Check Points	Action
		1. Too big clearance between piston and cylinder	Repair or replace
		2. Too big clearance between piston rings and grooves	Replace piston
		3. Piston rings stiff with carbon	Clean
		4. Worn con-rod big end	Replace
		5. Worn con-rod small end bearing	Replace
		6. Damaged piston rings	Replace
		7. Too early ignition timing	Adjust
		8. Defective primary pinion and gear	Replace
		9. Worn crankshaft bearings	Replace
		10. Defective transmission gears	Replace
		11. Defective transmission shaft bearings	Replace

11–4. If Engine Overheats

If engine overheats at high speed running after it is broken in, check to see if the oiling system is in good condition, the brake is dragging, or cylinder cooling fins are dirty. Inspect the following points.

Order	Description	Check Points	Action
1.	Check to see if oiling system is in good condition.	1. Improperly adjusted oil pump control lever clearance	Adjust
		2. Air in oil lines	Remove air
		3. Choked oil tank breather pipe	Correct
		4. Incorrect oil used	Use prescribed oils
2.	Check to see if engine compression is higher than standard	• Too high compression	
		1. Carbon deposits in combustion chamber	Remove carbon deposits
		2. Too thin cylinder head gasket	Replace
3.	Check carbon deposits	• Check for carbon deposits in muffler, exhaust pipe, exhaust port and combustion chamber	Disassemble and remove carbon deposits
4.	Check to see that piston rings move smoothly in grooves	• Piston rings stiff from carbon deposits	Remove carbon deposits
5.	Check to see that the clutch works properly	• Clutch slippage causes overheating of engine	Adjust or replace plates
6.	Check to see that the ignition timing is correct		Adjust
7.	Drive chain too tight		Adjust
8.	Incorrect spark plug heat range		Replace with colder plug
9.	Too lean fuel mixture		Adjust carburetor

11–5. If Engine Stops Abruptly During Running

If engine stops during running, first check to see if there is fuel in tank, wiring harnesses are connected etc. and inspect the following points.

Order	Description	Check Points	Action
1.	If engine stops abruptly	1. Seized piston	Repair or replace
		2. Seized crankshaft	Repair or replace
		3. Seized transmission gears	Repair or replace
		4. Spark plug bridged	Clean
		5. Defective ignition coil	Replace
		6. Troubles in ignition system	Repair or replace
		7. Clogged fuel line	Clean
2.	If engine stops gradually	1. Loose spark plug	Tighten securely
		2. Loose cylinder head	Tighten securely
		3. Damaged cylinder head gasket	Replace
		4. Clogged fuel line	Clean

11–6. Defective Brakes

First check the play in the front brake lever and the rear brake pedal. Inspect the following points.

Order	Description	Check Points	Action
1.	Insufficient braking	1. Worn brake linings	Replace
		2. Dirty brake linings	Clean
		3. Brake drum worn or dirty with mud or water	Replace or clean
		4. Worn brake cam	Replace
		5. Improperly working front brake wire	Adjust or replace
2.	Brake drags	1. Rust in moving parts	Repair
		2. Moving parts dirty with oil or insufficient lubricant	Clean and apply a proper amount of lubricant
3.	Abnormal noises are heard	1. Worn brake linings	Replace
		2. Foreign particles on brake linings	Clean
		3. Dirty brake drum	Clean

11–7. Defective Clutch

Order	Description	Check Points	Action
1.	Clutch slippage	1. Improperly adjusted clutch	Adjust
		2. Worn clutch springs	Replace
		3. Worn clutch plates	Replace
2.	If clutch drags	1. Improper weight oil	Replace
		2. Uneven clutch spring tension	Replace
		3. Defective clutch plate operation	Repair or replace

11–8. Gear Shifting Troubles

First check the clutch operation and amount of oil in the transmission chamber. Inspect the following points.

Order	Description	Check Points	Action
1.	Gear engagement	• If gears do not engage, check for	
		1. Damaged cam groove	Replace change cam
		2. Shifting forks not moved smoothly on cam	Repair scoring or burrs
		3. Damaged gear shifting fork	Replace
		4. Seized gears	Replace
2.	Gear shifting lever	• If gear shifting lever does not return to normal position, check for:	
		1. Damaged gear shifting shaft return spring	Replace
		2. Friction between gear shifting shaft and crankcase	Repair bent shaft or replace
3.	Jumping out of gear	• If the gears disengage while running, check for	
		1. Worn or bent gear shifting fork	Replace
		2. Worn gear dog teeth	Replace
		3. Worn or damaged gear shifting cam stopper spring	Replace gear

11–9. Bad Stabilization and Steering

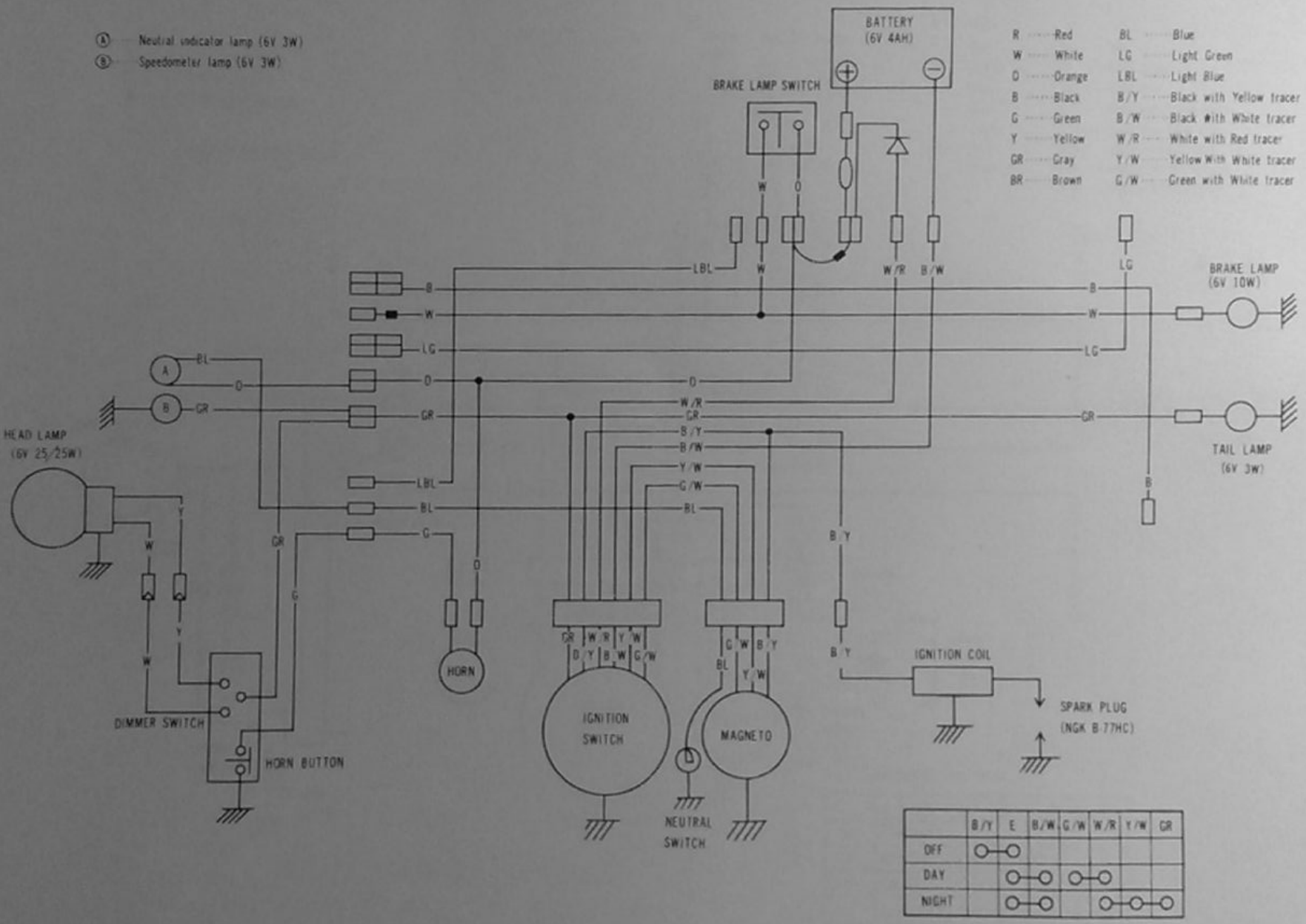
Order	Description	Check Points	Action
1.	Handlebar stiff	1. Steering stem lock nut too tight	Adjust
		2. Bent steering stem	Repair or replace
		3. Damaged steel balls	Replace
2.	Handlebar not stable	1. Incorrect wheel alignment	Adjust
		2. Play in front wheel fitting	Repair
		3. Damaged steel balls	Replace
		4. Bent fork stem	Repair or replace
		5. Worn or damaged bearing races	Replace
		6. Bent front fork	Repair or replace
		7. Bent swinging arm	Repair
		8. Incorrect fork oil level	Correct
		9. Worn fork spring	Replace
3.	Wheel is not true	1. Up-and-down play in hub bearings	Replace
		2. Deformed wheel rim	Repair or replace
		3. Loose spokes	Repair
		4. Chain too tight	Adjust
		5. Loose swinging arm fitting	Tighten
		6. Warped frame	Replace
		7. Incorrect tire pressure	Correct

PERIODICAL INSPECTION CHART

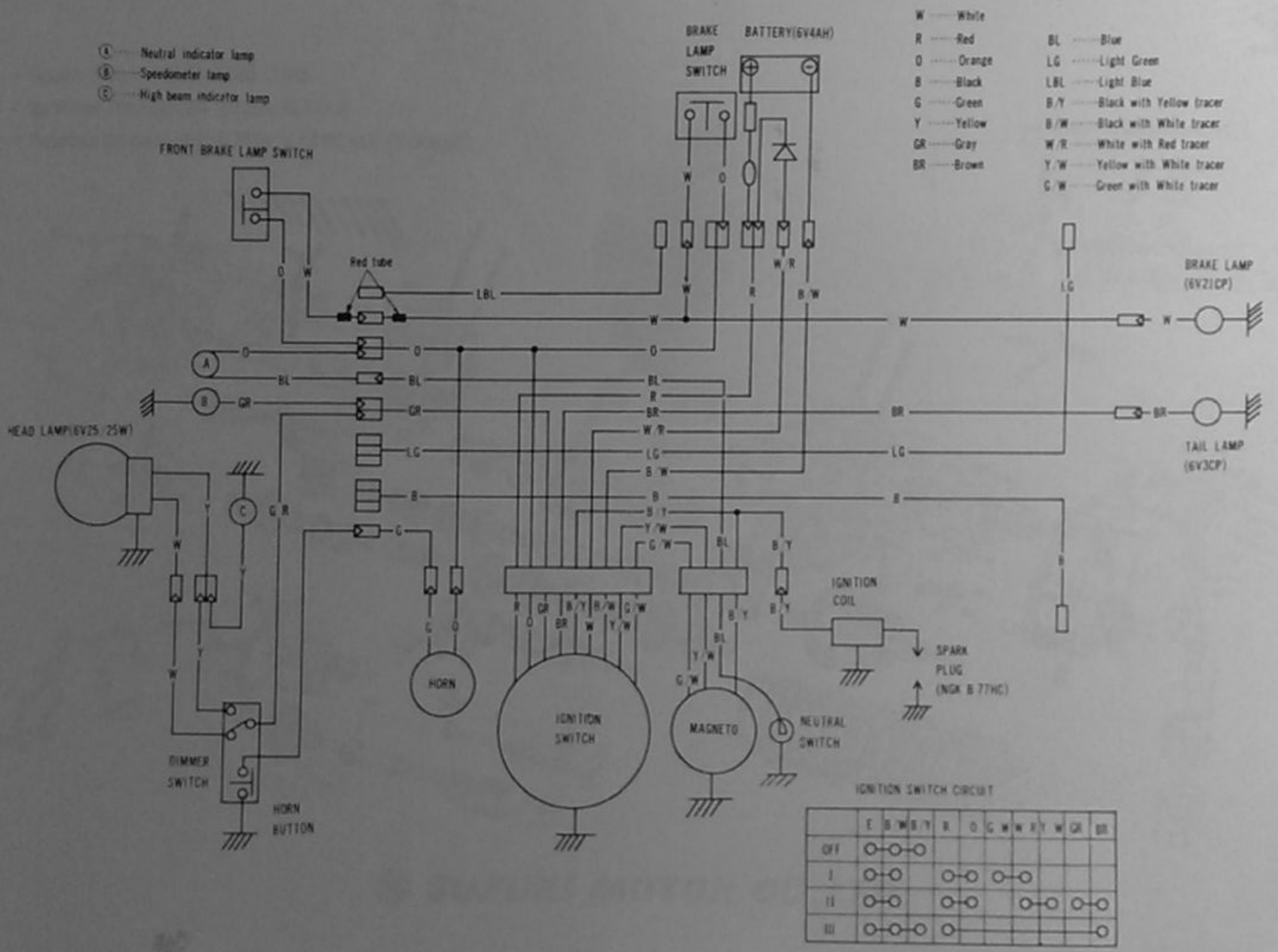
The chart below indicates time when inspections, adjustments and maintenance are required based on the distance the motorcycle runs, that is first 1,000km (750mi), and every 3,000km (2,000mi), 6,000km (4,000mi) and 12,000km (8,000mi) thereafter. According to the chart, advise users to make the motorcycle checked and serviced at your shop. See the appropriate section for instructions on making the inspection.

Distance (km)	1,000 km	Every 3,000 km	Every 6,000 km	Every 12,000 km
	750 mi	Every 2,000 mi	Every 4,000 mi	Every 8,000 mi
Oil pump	Check operation, adjust control lever adjusting marks	Check operation, adjust control lever adjusting marks		
Spark plug	Clean	Clean and adjust gap	Replace	
Gearbox oil	Change	Change		
Throttle, Brake and Clutch cables	Adjust play	Adjust play	Lubricate	
Carburetor	Adjust with throttle valve screw and pilot air screw	Adjust with throttle valve screw and pilot air screw		Overhaul and clean
Magneto	Check contact point gap and ignition timing. Retighten magneto nut	Check contact point gap and ignition timing. Lubricate contact breaker cam oil felt		Replace contact point
Cylinder head and Cylinder	Retighten cylinder and cylinder head nuts	Retighten cylinder and cylinder head nuts	Remove carbon	
Battery	Check and service electrolyte solution	Check and service electrolyte solution		
Fuel cock	Clean fuel strainer		Clean fuel strainer	
Drive chain	Adjust	Adjust and lubricate	Wash	
Brakes	Adjust play	Adjust play		
Air cleaner		Clean		
Throttle grip			Put grease in throttle grip	
Exhaust pipe and Muffler	Retighten exhaust pipe clamp and fitting screw	Retighten exhaust pipe clamp and fitting screw	Remove carbon	
Steering stem	Check play Retighten stem nuts		Check play Retighten stem nuts	
Bolts, Nuts and Spokes	Retighten		Retighten	
Oil outlet			Clean outlet union filter	

SUZUKI TS/TC90 WIRING DIAGRAM(Standard Specification)



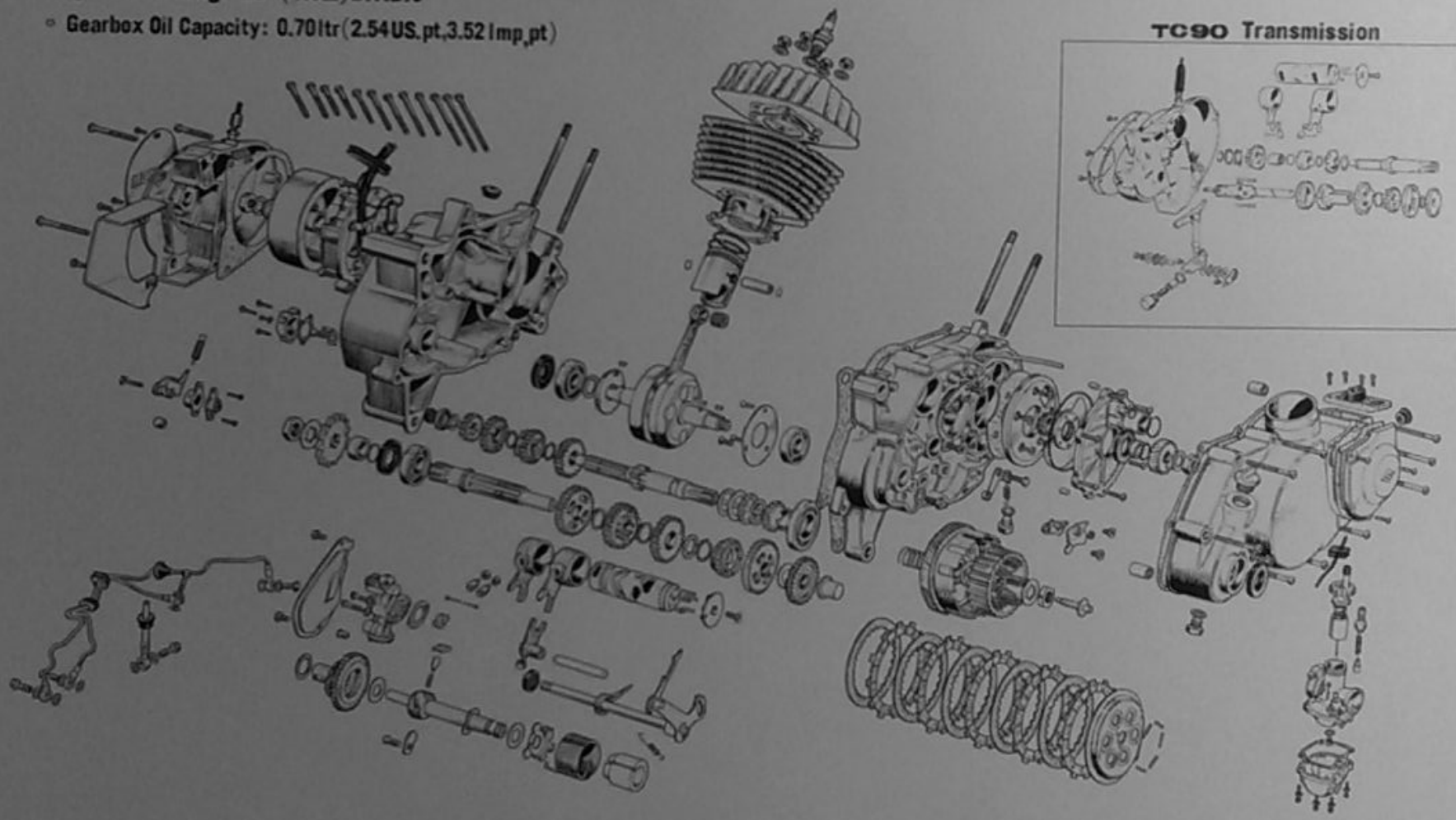
SUZUKI TS/TC90 WIRING DIAGRAM (For U.S.A & CANADA)



SUZUKI TS /TC90 ENGINE

- Spark Plug: NGK B-77HC (STD)
- Ignition Timing: 20° (1.9㎜) B.T.D.C
- Gearbox Oil Capacity: 0.70ltr (2.54US.pt,3.52Imp.pt)

TC90 Transmission



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