'87



RACING KIT PARTS

TZR 250 F-III

INSTRUCTION MANUAL

ROAD RACE











- Specifications are subjected to change for performance improvement without notice.
- These parts are intended exclusively for racing purposes. You are strictly requested not to use them for a public road.
- Further details please contact YAMAHA distributor.

TO : THE USER

This manual contains useful technical information which the user can make best use of in order to bring this high potential TZR250 into full play. It provides all the important data required for the installation of kit parts and helps even a beginner enjoy motor sports, if he reads this manual carefully and thoroughly.

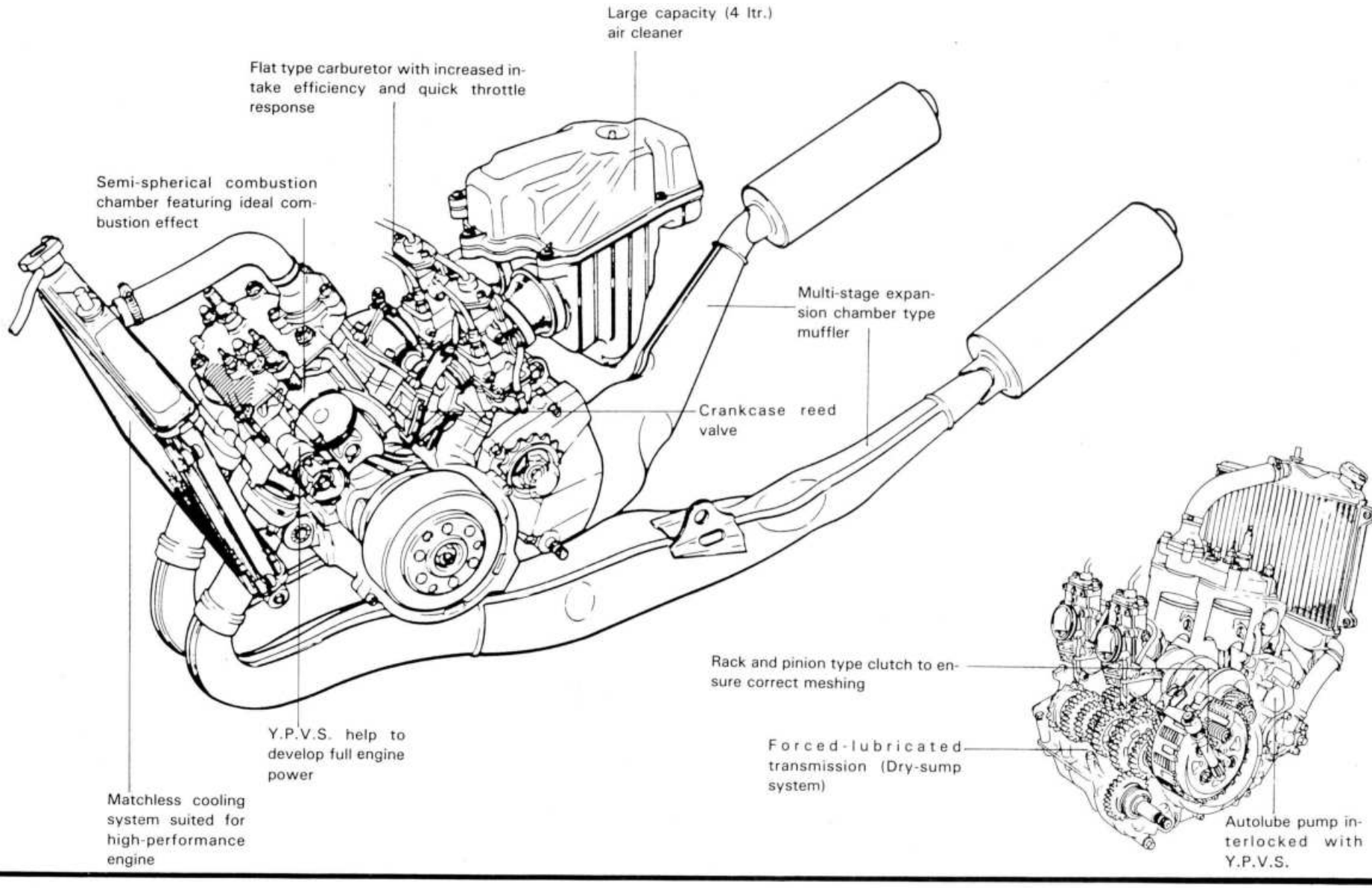
IMPORTANT
The kit parts are designed exclusively for racing.
Never use them for general street machines.
The use of these parts could be a violation of laws and regulations.

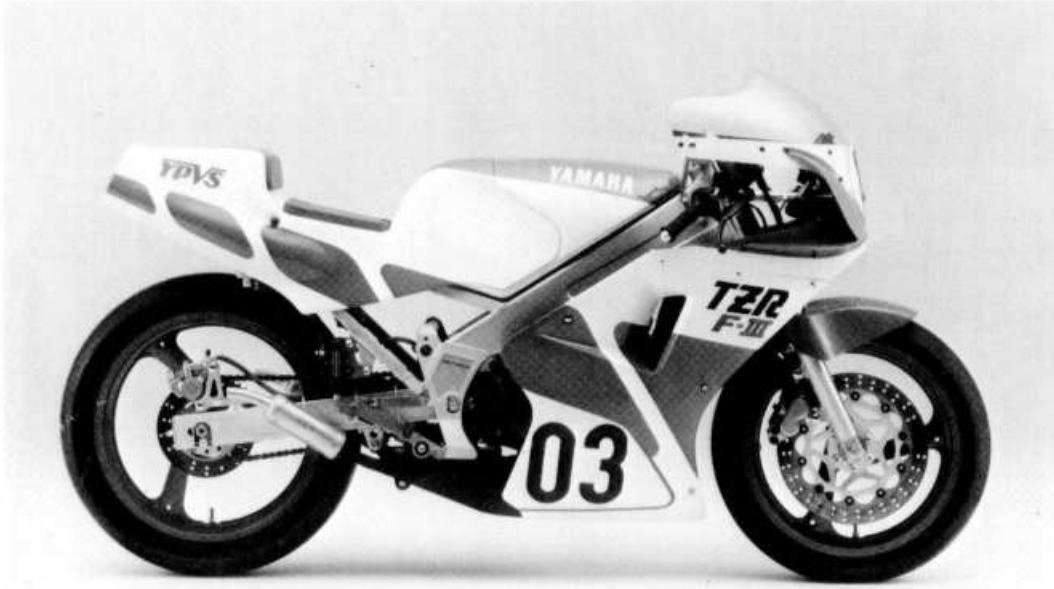
WARRANTY:
As noted earlier, the kit parts are designed exclusively for racing machines and therefore, unlike other machine parts, they are not be covered by the Warranty Policy.
It is advisable that the kit parts should be disassembled and checked prior to each race.



Photos or specifications are subject to change without notice.

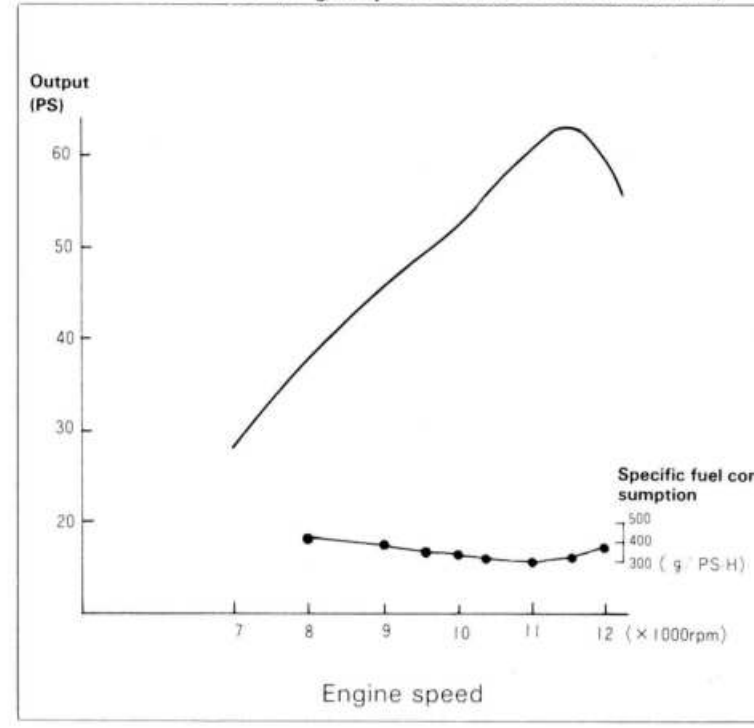
TZR250 ENGINE PERSPECTIVE VIEW







Performance curves (Engine performance with kit in use)



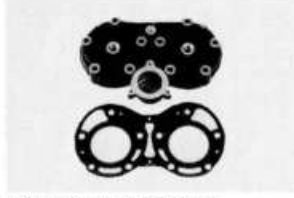
TZR KIT PARTS



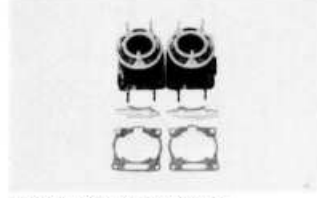
TZR250 KIT

• CHAMBER ASS'Y SET • CRANKSHAFT ASS'Y • PISTON • PISTON RING • C.D.I MAGNETO ASS'Y SET • DRIVE SPROCKET SET • IGNITION COIL ASS'Y • CARBURETOR SETTING PARTS SET • CLUTCH SPRING • KICK SHAFT PLUG SET • OIL PUMP PLUG • TZR250 SERVICE MANUAL • RACE KIT INSTRUCTION MANUAL

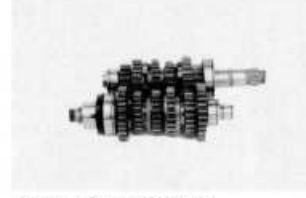
OPTION PARTS



CYLINDER HEAD SET



BODY CYLINDER SET



TRANSMISSION



TACHOMETER ASS'Y



EX CHAMBER ASS'Y



RADIATOR ASS'Y



YPVS CONTROL UNIT



SPARE SILENCER SET



WIRE HARNESS ASS'Y

MAINTENANCE NOTES

1. WASHING

Thoroughly wash out the dirt and dust from the frame and engine. Use care not to allow water to enter the engine.



2. NO FIRE

Never use an open fire near the machine.



3. RIGHT TOOLS

Use care not to damage any parts. Be sure to use the specified special tool, as required. Also, use the right tools and measuring instruments in the right manner. (Avoid using spanners (open-end wrenches) as much as possible. Use socket wrenches and closed wrenches.)



4. EXPENDABLE PARTS

Always use new gaskets (packing), O-rings, cotter pins, circlips, lock washers, etc. when servicing.

5. GENUINE YAMAHA PARTS

Always use genuine Yamaha parts and recommended parts, including oil and grease. Never use false parts.

6. INJURIES OR BURNS

Use special care so that you will not get injured or burnt while servicing the engine, exhaust pipe or muffler.



7. NOTES ON DISASSEMBLY AND ASSEMBLY

① In disassembly, make a check or measurement of parts, as required, and take note of the records which will be helpful in assembling.
② Separate the disassembled parts in groups by section so that you will not be confused when assembling.
③ Clean the disassembled engine and transmission parts in wash oil and blow them out with compressed air.
④ Proceed with assembling while checking the reconditioned parts and original data on parts.
⑤ Exercise special care to keep parts free of dust or other substances.
⑥ While checking the operation of each mechanism or parts, install parts.
⑦ Oil the contact surfaces of moving parts.
⑧ Strictly keep the specified torque.
⑨ When two mechanics work together, maintain a close communication between them.

8. BINDING WIRES

Be sure to bind parts with wires, when required.

TZR KIT PARTS KICK CRANK PLUG

The TZR250 transmission employs a dry-sump system. Therefore, cranking the engine with the kick shaft removed will fail to increase the oil tank pressure and thus, the transmission will seize up due to lack of oil. The kit contains two different types of plug sets. Be sure to use them.

PARTS LIST

		Part No.	Part name	Q'ty	Remarks
★	①	90338-30096	PLUG, blind	1	
★	②	90336-12048	PLUG, taper	1	

Parts marked with ★ are standard Yamaha parts and available through the general parts sales channel.

REFERENCE

In a sprint race, the kick crank may be removed but in a trials race, the kick crank must be installed under regulations. It is necessary to check the racing regulations and the removed parts should be treated with a rust-inhibitor and kept carefully so that they are not damaged.

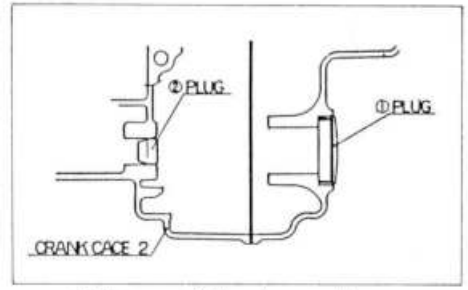
ADDITIONAL NOTES ON DISASSEMBLY AND ASSEMBLY

1. The plug should be force-fitted during the disassembly of the engine. (Force-fit of the plug tends to produce aluminum dust. Therefore, avoid force-fitting the plug during engine assembly.
2. After force-fitting the plug, be sure to wash the crankcase and crankcase cover.

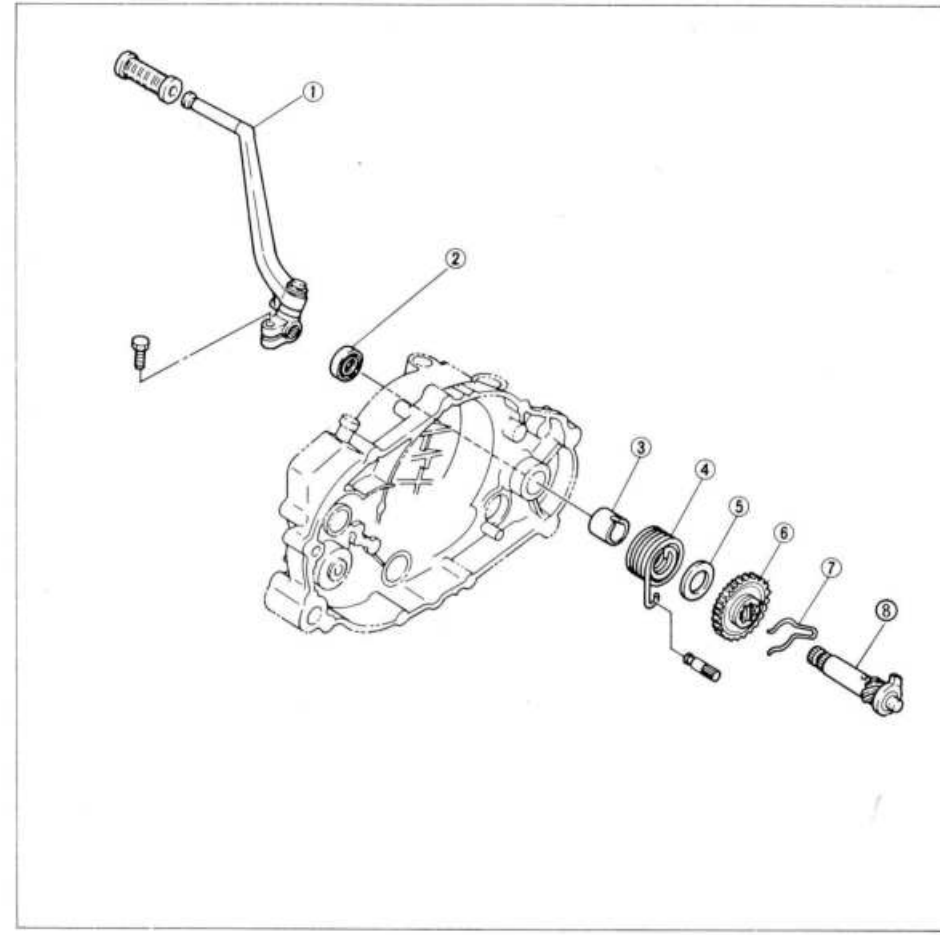
Force-fitting of plug into crankcase.



Force-fit the plug until it is flush with the crankcase surface.



Make sure of the plug position.



REMOVAL PARTS

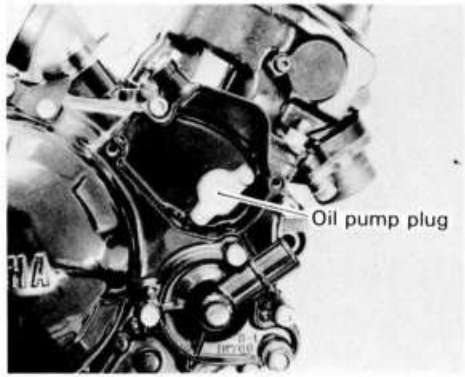
① Kick crank
② Oil seal
③ Spacer
④ Torsion spring
⑤ Plane washer
⑥ Kick gear
⑦ Clip
⑧ Kick shaft

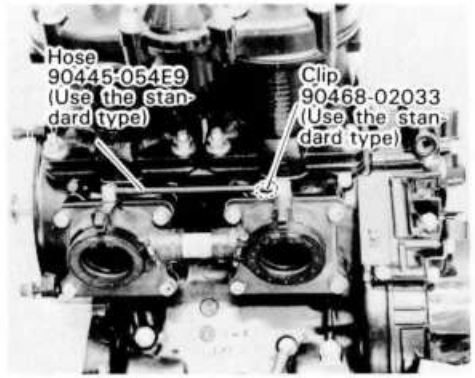
TZR KIT PARTS OIL PUMP PLUG

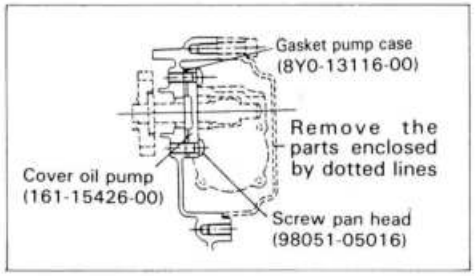
The TZR250 employs the Autolube separate oil lubrication system. When it is used as a racing machine, it has to reduce its weight by removing the Autolube pump. The kit contains a blind plug to close the opening after the pump is removed.

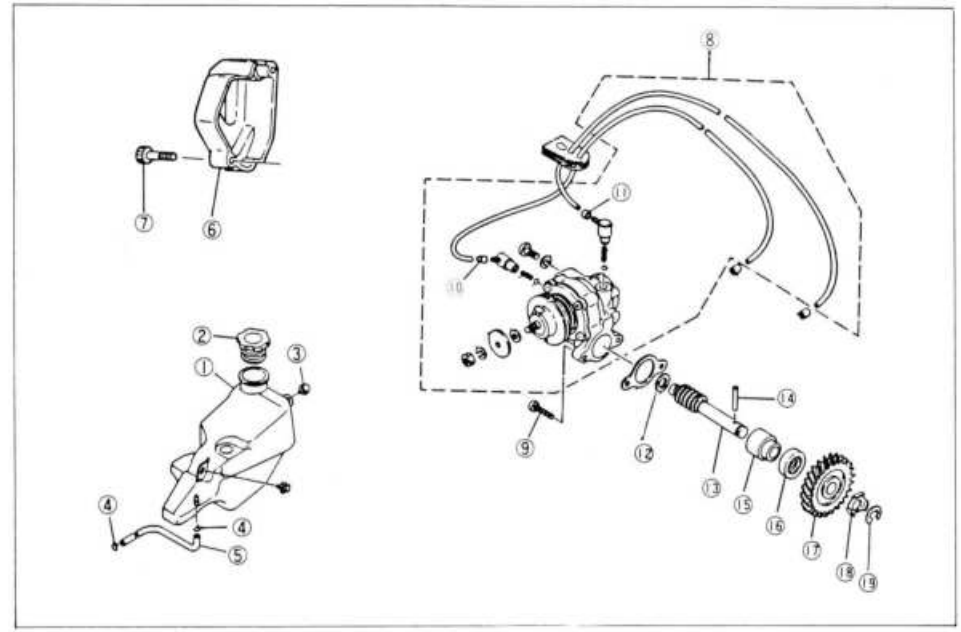
ADDITIONAL NOTES ON DISASSEMBLY AND ASSEMBLY

1. When removing the oil pump, the hose connecting the oil pump to the carburetor joint must be disconnected. When disconnecting the hose, close the carburetor joint oil passage with a plug (not specially designated) so that no air enters the oil passsage, or as shown in the photo (lower left), plug the oil passage with the removed hose clip. The cap on top of the carburetor joint can be turned using pliers.







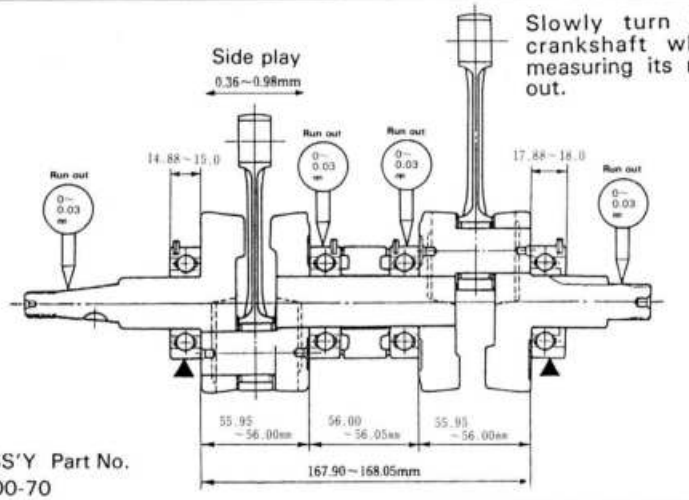


REMOVAL PARTS

① Oil tank
② Oil tank cap assembly
③ Bolt, with washer
④ Clip
⑤ Pipe 6
⑥ Cover, oil pump
⑦ Bolt
⑧ Oil pump assembly
⑨ Screw, pan head
⑩ Clip
⑪ Clip
⑫ Washer
⑬ Shaft, warm
⑭ Pin, dowel
⑮ Metal, warm shaft outer
⑯ Oil seal
⑰ Gear, pump drive
⑱ Washer, rock
⑲ Circlip

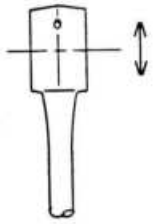
TZR KIT PARTS CRANKSHAFT

The lightweight crankshaft used in the TZR250 engine is the product that Yamaha has developed through many years of technical research to racing machined. It features outstanding durability which can stand the severest operating conditions in racing circuits. To improve the performance of the engine by installing the CDI unit contained in the kit, the crankshaft must be replaced with the one contained in the kit.



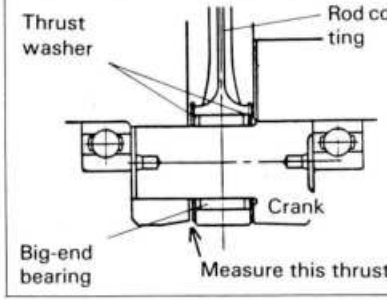
Slowly turn the crankshaft when measuring its run-out.

Crank ASS'Y Part No.
1KT-11400-70



Check for axial play.

If thrust play is evident, the big-end is faulty.



If the clearance measures more than 0.25~0.75mm, the thrust washer is deformed or the crank pin does not fit correctly. Replace the crankshaft assembly.

NOTES

1. When removing the crankshaft from the crankcase, use care not to lose the two dowel pins, two O-rings and one crankshaft bearing circlip.
2. Check the connecting rod big-end bearing. Also, check the discoloration of the small-end.
3. Check the crankshaft bearing for noise or looseness.
4. Always use a new oil seal when reassembling.
5. Never reuse the crankshaft which was reassembled once before.
   When checking the crankshaft, use the crankshaft dimensions shown left as reference values.
6. Evenly apply Yamaha Bond 1215 to the crankcase mating surfaces after installing the crankshaft in the crankcase, while using care not to clog the oil passages.
   Also, be sure to align the bearing locating pin with the locating pin hole in the crankcase slit.

★PERIODIC INSPECTION AND MAINTENANCE CHART

Item	After break-in	Prior to each run	Every 500km	Every 1000km	As required	Remarks
Check crankshaft				○		Check bearings, oil seals, etc.
Replace crankshaft					○	
Replace crankshaft bearings, etc.				○		When replacing crankshaft
Replace crankshaft oil seals, etc.				○		When replacing crankshaft
Replace big-end bearing				○		Replace as a set with connecting rod.

The following TZ250 parts are usable for the TZR250 kit crankshaft assembly

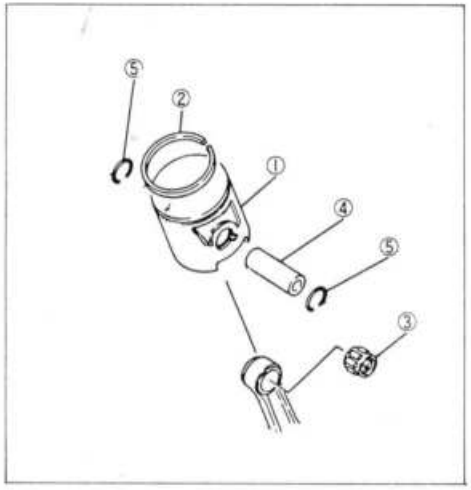
	Part No.	Part name	Remarks
1	49V-11651-00	Rod connecting	
2	90209-22071	Thrust washer	
3	93310-522N9	Bearing	Big-end side
4	93310-216JZ	Bearing	Small-end side

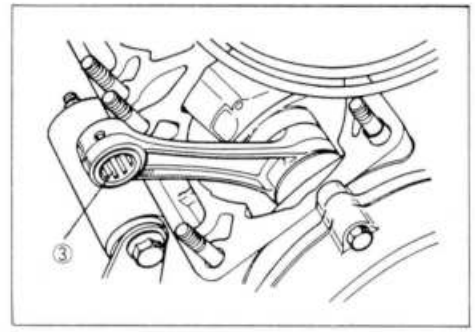
Parts marked with ★ are standard Yamaha parts and available through the general parts sales channel.

TZR KIT PARTS PISTON

The recent trend shows an increasing demand for high speed engines and thus, lightweight pistons are required. However, the strengt ı of pistons must be maintained, while their weight and vibration must be reduced. At the same time, connecting rods with robust big-end and small-end are required.
To meet these requirements, this racing piston uses only one piston ring so that at high speeds, flattering (up and down movement of the ring) can be prevented, which would otherwise reduce friction.

EXPLOSION DIAGRAM OF COMPONENT PARTS





- Coat the big-end and small-end bearings with engine oil.
- Insert the bearing ③ into the connecting rod.

PARTS LIST

		Pfrt No.	Part name	Q'ty	Remarks
	①	IKT-11631-70	Piston	1	
	②	IKT-11611-70	Ring, piston	1	
★	③	93310-316H7	Bearing		
★	④	137-11633-00	Piston pin		
★	⑤	4V2-11634-00	Piston pin crip		

Parts marked with ★ are standard Yamaha parts and available through the general parts sales channel.

1. Before installing a new piston, clean it with wash oil.
2. Remove any burrs along piston edges.
3. Fit the piston ring with the N7 orT7 mark facing upward and be sure to align the ring end gap with the ring locating pin.
4. Be careful not to open the ring ends more than required (17 ㎜). Use care not to twist the ring.
5. Apply engine oil to the piston pin and piston pin holes in the piston.
6. Fit the piston pin circlips so that their end gaps face upward or downward. (The circlips should be replaced with new ones, if they are reused twice or so.)
7. Be sure that the piston clearance is between 60 and 70 u.
8. When servicing the piston, check it for excessive side thrust, pits in the piston crown, aluminum deposits under the ring. Replace the piston and ring, as required.
9. Adjust the ring end gap to 0.35 -0.50 ㎜, when the ring is fitted.

★PERIODIC INSPECTION AND MAINTENANCE CHART

Item	After break-in	Prior to each run	Every 500㎞	Every 1000㎞	As required	Remarks
Check piston	○	○				Check for cracsks. Decarbonize.
Replace piston			○		○	
Check piston ring	○	○				Check ring end gap. Check for uneven wear.
Replace piston ring			○		○	Replace ring as a set with piston.
Check piston pin	○	○				Check for grooved wear or cracks.
Replace piston pin			○		○	Replace pin as a set with piston.
Check small-end bearing	○	○				Replace bearing as a set with piston.

※ To check the burning of the piston crown after operation, refer to "Carburetor Settings."

TZR KIT PARTS CLUTCH SPRING

The TZR250 clutch employs a rack and pinion meshing mechanism to ensure fail-free clutch operation. Being highly durable, it is capable of transmitting a torque of as high as 3.5 K.m at 9,000 rpm. The use of the kit will further increase the engine speed and power and therefore, a reinforcement clutch spring must be installed so that the machine can pick up speed much faster and efficiently after turning a corner.

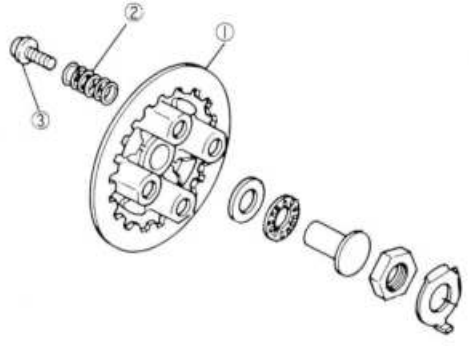
★ Checking the clutch spring

Measure the free length of the spring.

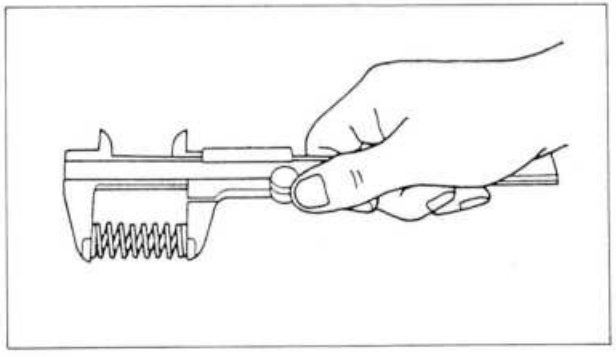
	Standard value	37.3 mm
	Min. allowable limit	35.3 mm

If the length is less than the min. allowable limit, the spring should be replaced.

EXPLOSION DIAGRAM OF COMPONENT PARTS



Spring load increase ratio....10%



PARTS LIST

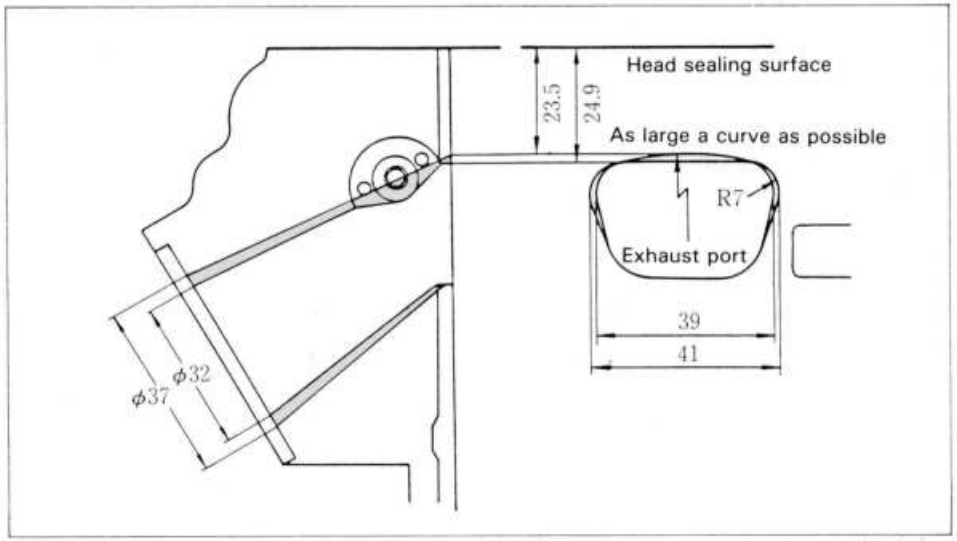
	Part No.	Part name	Q'ty	Remarks
★ ①	1KT-16351-00	Plate, pressure		
★ ②	90501-23700	Spring	8	
★ ③	90159-05011	Screw		

Parts marked with ★ are standard Yamaha parts and available through the general parts sales channel.

TZR KIT PARTS HEAD & CYLINDER TUNING

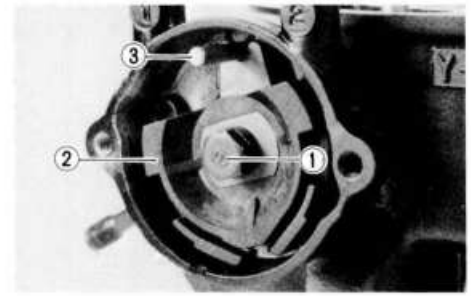
When emphasis is laid on engine performance, it is not advisable to replace the cylinder head with a fashionable new one. The modification of the exhaust system will not always lead to increased engine power. To the contrary, it often results in lower engine performance due to a widening imbalance of overall engine operation.
When tuning up a two-cycle engine, all the port timing must be properly coordinated. On the export port timing of a racing machine, normally the piston begins clearing the exhaust port when the piston position is about halfway (slightly less than 50% of the total stroke). If the timing is too early, the engine response will be adversely affected. The exhaust port with straight-cut upper edge gives a better response and stable performance, but the piston ring tends to catch on the edge. It is a generally accepted practice to cut the upper edge so that it curves, without reducing the compression pressure. (Refer to the diagram below.)

1 Machining of the exhaust port and YPVS valve



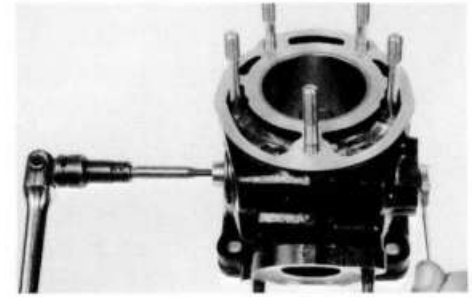
Port machining diagram (mm)

1. Insert a 4-mm-dia. pin into the pulley and loosen the pulley bolt (M6). Remove the YPVS valve and machine the exhaust port to the specified dimensions.

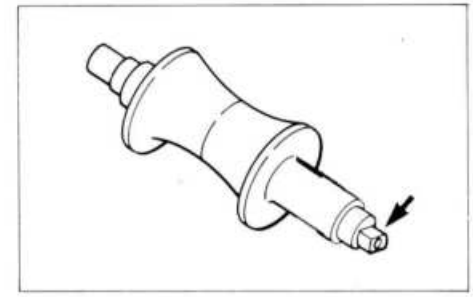


Removing the valve
- Pulley bolt ①
- Pulley ②
- 4-mm-dia. pin ③

Insert the pin into the pulley and remove the bolt.



- Lock the pulley with a spanner and remove the bolt connecting valves 1 and 2.



- Use care not to scratch valve 1 (for the left cylinder) by gripping the pulley with pliers.

NOTES

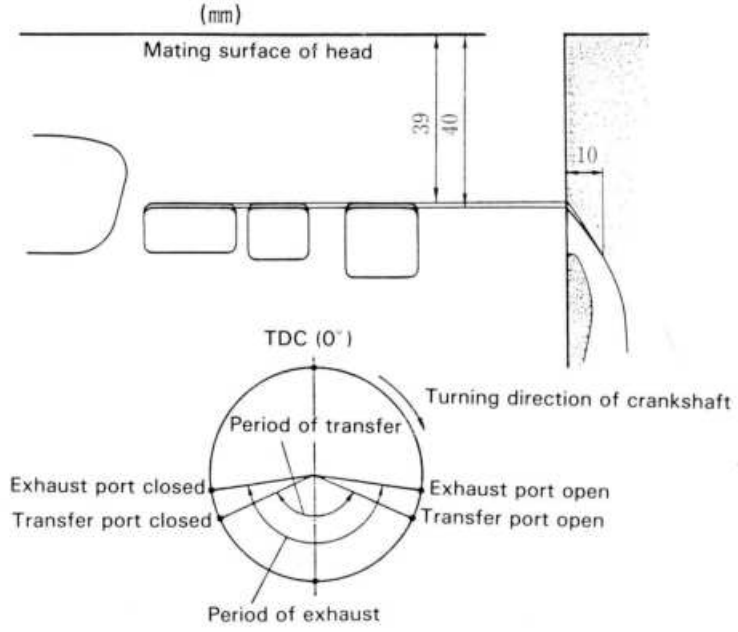
1. While oiling the whetstone for the router, perform operation.
2. Be careful not to cut the port excessively. Cut it little by little.
3. Hone the cylinder wall. Never use a scratched cylinder.
4. Smooth out the port edge (of the cylinder wall) with a fine oil stone so that the piston will not catch on it.

2. Using a router, chamfer the exhaust port (original diameter is 32 mm) to 37 mm in diameter.
3. Install the Y.P.V.S. valve in the cylinder body. While holding the valve at full-throttle position (refer to the diagram), smooth out the exhaust port and valve using a router.
   (When cutting the Y.P.V.S. valve, the valve mounting bolt will have to be cut. Cutting it will not lead to any problem.)
4. While cutting, sandpaper the port and valve from time to time and check that the surfaces are smooth enough.

2 Machining the transfer port (Not scavenging port)

When tuning the transfer port, the following factors must be taken into account, port timing, angle of deflected flow of air-fuel mixture, port length, crosssectional view, etc. However, what is required here is the modification of a street machine and therefore, the key point of modification is machining with importance on port timing. Origimally, the port timing has the optimum position and therefore, it is difficult to match the port timing to the engine by cutting the port.

1. Chamber the ports so that port timing is set as shown in the diagram.
2. Machine the port so that the machined surface is smooth over 10 mm from the port edge. (Finish should be done in the same manner as of the transfer port.
3. Using a water-resistant sandpaper, lightly smooth out the inner wall of the transfer port.

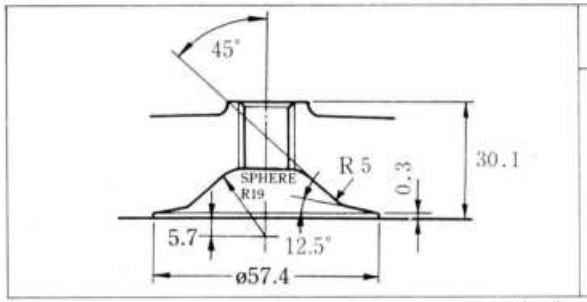


3 Machining the cylinder head

Tuning of the cylinder head will affected by the shape of the combustion chamber, volume, squish, water passage resistance, etc.
The TZR250 employs a semi-spherical combustion chamber which has proven to be best for racing machines. This type combustion chamber features high combustion efficiency and therefore, only the volume of the combustion chamber will be changed.

1. Hold the cylinder in a milling machine, and cut the thickness of the area from the spark plug position to the cylinder head mating surface to the dimensions shown in the diagram.
   (Cutting with a milling machine should be done little by little and in stages.)
2. Prepare a flat gauge whose profile is of the same as the combustion chamber and grip it in a lathe or milling machine. Machine the combustion chamber to the profile of the flat gauge. (The use of a hand router may be allowed, if it is used very carefully.)

Footnote:
The 45° is the angle formed by the cylinder head mating surface and the tangent line touching the spherical surface having a radius of 19 mm.

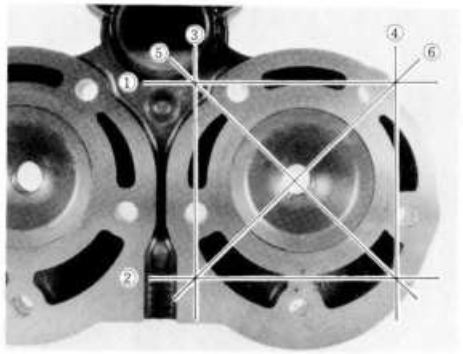


Cylinder head volume
11.4±0.2cm³ (With the BR-9ES installed)

(mm)

NOTES

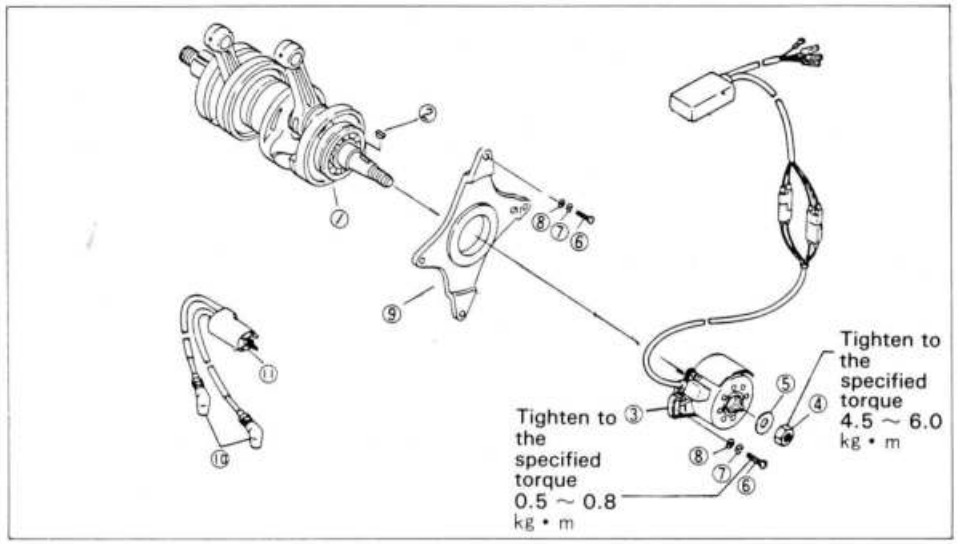
1. When installing the cylinder head, measure the mating surfaces in six directions using a straight edge. If the clearance is 0.03 mm or more, avoid using the cylinder head.
   (If warpage measures 0.05 mm or more, do not use such a cylinder head. Reconditioning will change the cylinder head volume.)
2. When machining, use care not to scratch the mating surface with the cylinder.
3. When assembling, measure the cylinder head volume, if possible, to check to see if it is within specification.



TZR KIT PARTS CDI MAGNETO

As the requirements for high performance engines, the ignition timing characteristics have been changed, along with reduced flywheel inertia moment.

Explosion diagram of component parts



PARTS LIST

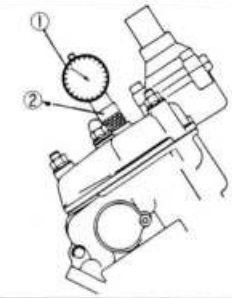
	Part No.	Part name	Q'ty	Remarks
	① 1KT-11400-70	Crank shaft Ass'y	1	
★	② 90280-04005	Key, woodruff	2	
	③ 1KT-85500-70	CDI Magneto Ass'y	1	
★	④ 90179-12335	Nut	1	
★	⑤ 90201-127E1	Washer plate	1	
★	⑥ 91316-06018	Bolt, hexagon	5	
★	⑦ 92906-06100	Washer spring	5	
★	⑧ 92901-06600	Washer plate	5	
	⑨ 1KT-85510-71	Plate generator	1	
★	⑩ 1MI-82370-21	Plug cap	2	
★	⑪ 1RK-82310-K0	Ignition coil Ass'y	1	

Parts marked with ★ are standard Yamaha parts and available through the general parts sales channel.

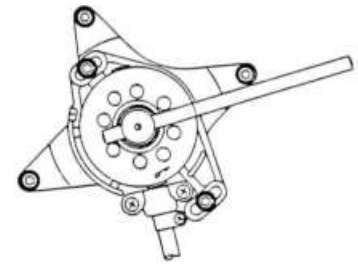
NOTES

1. Prior to each poeration, check the tighteners of the rotor, stator and generator plate. Also, check the ignition timing.
2. Never use an impact wrench to tighten or loosen the lock nut, or the crankcase or CDI magneto could be damaged. It is advisable to use a torgue wrench and rotor holding tool (90890-01235).
3. Check the CDI magneto periodically. The following are the main check points:
   - Check the rotor inner surface and stator orter surface for scratches.
   - Check the crankshaft key for damage.
     Note that these two parts will affect the ignition timing.
4. The 1986 TZR250 CDI magneto and CDI unit are not usable.
   (the retational direction and ignition characteristics are different.)
5. Avoid over-revving the engine at more than 15,000 rpm, or the CDI magneto could be damaged.

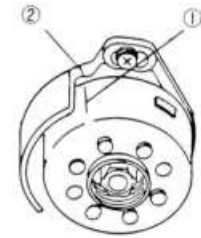
Checking ignition timing **0.84** mm B.T.D.C.



1. Set the dial gauge ①.
   - Dial gauge stand ②
     Remove both right and left spark plugs, and set the dial gauge stand on the left side cylinder head.



1. Set the piston at TDC.
   - Turn the rotor counterclockwise and set the left side piston at TDC (at which the dial gauge pointer changes the moving direction).
   - Set the dial gauge pointer at 0.



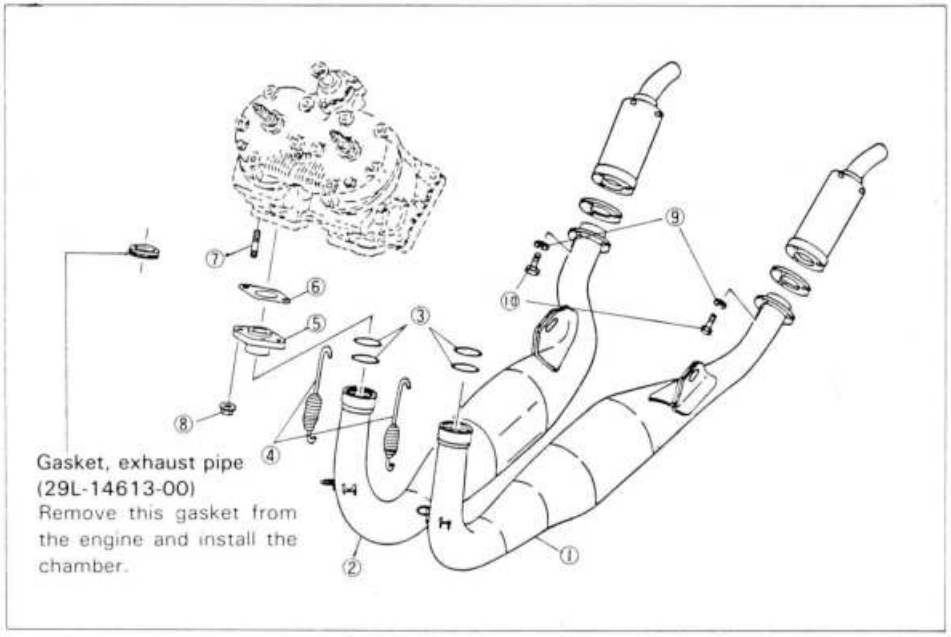
1. Check the ignition timing.
   - Match mark ① on rotor
   - Match mark ② on stator

   Turn the rotor clockwise, and check that the marks on the rotor and stator align at 0.84 mm before TDC.

TZR KIT PARTS EXHAUST-CHAMBER

Unlike the four engine, the two-cycle engine has no mechanically-controlled valve train. Therefore, the engine consrtuction is simpler but instead, it is difficult to set the porttiming, since the periods during which ports are open are partially overlapped with each otrer. Particulary, it is most difficult to minimice energy loss after the power stroke and sweep all the burnt gases out of the cylinder to fill it with a fresh mixture.
The exhaust chamber contained in the kit is so designed as to meet these requirementes and in addition, the crankcase reed valve ensuring better intake and exhaust efficiency is adopted to allow the TZR250 to display its maximum performance in racing circuits.

EXPLOSION DIAGRAM OF COMPONENT PARTS



PARTS LIST

		Part No.	Part name	Q'ty	Remarks
	①	1KT-14610-70	Exhaust pipe Ass'y 1	1	
	②	1KT-14620-70	// 2	1	
★	③	93210-46735	O-ring	8	
★	④	90507-20035	Spring	4	
	⑤	1KT-14612-70	Nut ring	2	
★	⑥	29L-14643-00	Gasket 3	—	
★	⑦	90116-08365	Bolt, stud	—	
★	⑧	90185-08097	Nut, self-locking	—	
★	⑨	92990-06100	Washer, spring	6	
★	⑩	97322-06020	Bolt	6	

Parts marked with ★ are standard Yamaha parts and available through the general parts sales channel.

NOTES

1. Romove the exhaust gasket (metallic) installed in the street type machine, since it becomes unnecessary when the ring nut is installed.
2. The new O-ring to be used to fit the exhaust pipe in the ring nut is hard. coat it with a lubricant or warm it up for easy operation.
3. Apply a silicone filler or quick drying liquid gasket to the contact surface of the exhaust pipe with the ring nut and silencer gasket.
4. When carbon and pitch (oil hard to volatile) are present inside the exhaust pipe, burn the pitch constituent using a gas burner, and heat up the exhaust pipe until no smoke comes out of the tail pipe.
5. To secure the silencer to the exhaust chamber, tighten the bolts to 1-1.2 kg.m.

★PERIODIC INSPECTION AND MAINTENANCE CHART

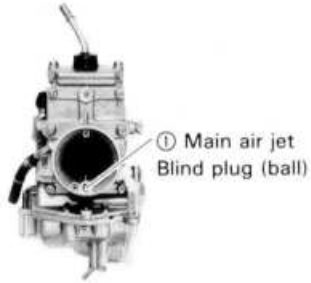
Item	After break-in	Prior to each run	Every 500km	Every 1000km	As required	Remarks
Check chamber	○	○				Check for cracks
Clean chamber					○	
Check spring	○	○				

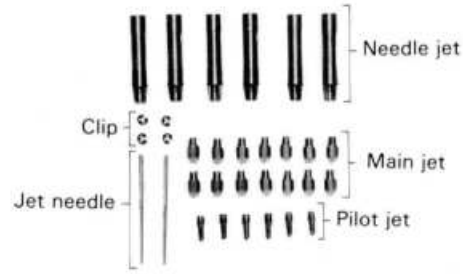
TZR KIT PARTS CARBURETOR SETTING

The TZR250 employs a fiat valve type carburetor featuring high intake efficiency and less resistace to air fiow.Inaddition, a shprter carburetor main bore (air horn) and a bown-draft design speed up the air floe to ensure better overall sarburetion, quick response and high power.

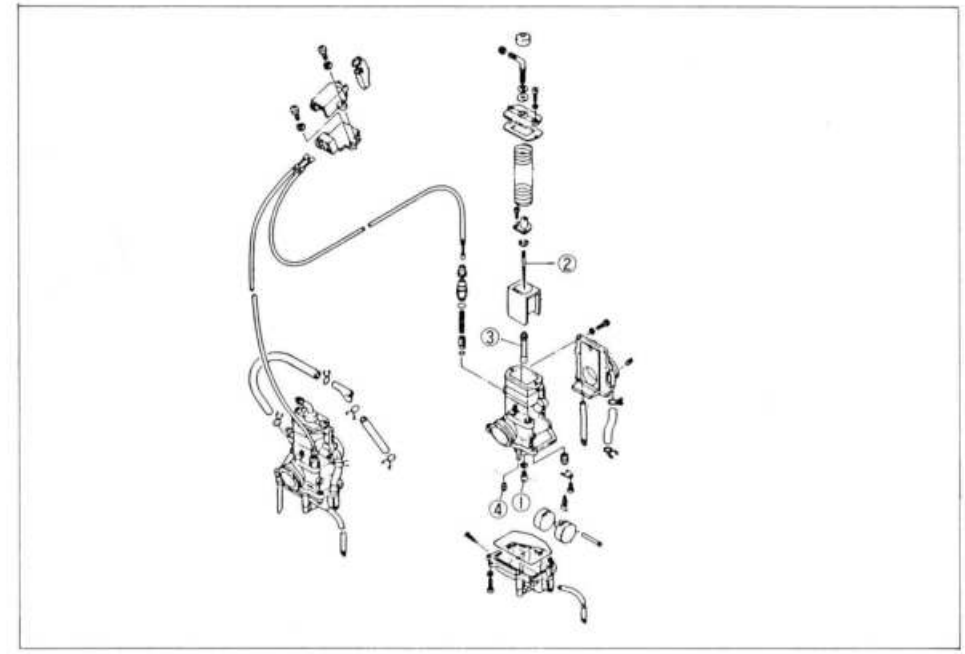
Specifications:

Carburetor model	TM28SS
Bore	28 mm diameter
Main jet set	#280.#290 #300.#310.#320.#330.#340.Two each
Jet needle	5EJ48 Two piece
Needle jet set	P-0, P-2, P-4, 0-8 Two each
Pilot jet set	#27.5, #25, #30 Two each





The best settings for another carburetor will not always the best for your carburetor, even if they are of the same model and used in the same model machines.
First, you should experience a feeling of carburetor performamce by riding a street type TZR250 around a circuit. Afer having full experience, you should start carburetor settings using kit parts. Toenble you to make a judgement as to whether muxtures are rich or lean, it is advisable to start carburetor setting by replacing with jets whose calibration numbers are larger or smaller in a few steps. Then, make a test ride and take a note of settings and engine performance.The rrecords will be of great help when you will make carburetor settings later on.



REFERENCE

Function of each jet

Setting parts	Throttle opening
	0 1/8 1/4 1/2 3/4 3/8 7/8 1
Pilot air jet	
Pilot jet	
Needle jet	
Jet needle	
Main jet	

Considering the function of each jet and the riders feeling of the engine, the carburetor should be set.

- ○ Changes in mixture strength due to weather conditions:
- ○ Cool air .... Lean-Enrich.
- ○ Warm air .... Rich-Lean out.
- ○ Humid air ... Rich-Lean out.
- ○ Dry air ..... Lean-Enrich.
- ○ High altitudes ....Rich-Lean out.

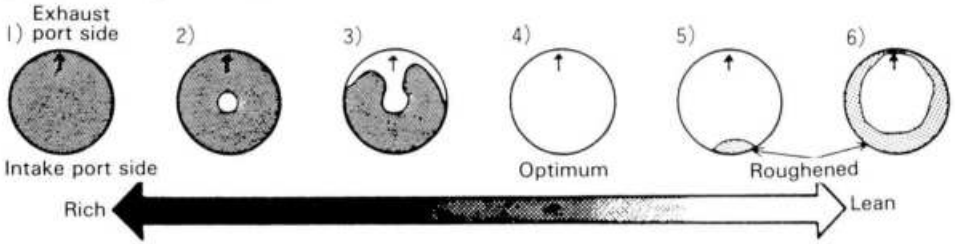
■Handling of oil and premix gasoline

Compared with mineral oil, vegetable oil is easy to separate from gasoline and therefore, they must be strirred thoroughly.Particularly in winter, the oils must be blended completely. Vegetable oil is more easily oxidized than mineral oil. Oxidized oil becomes less lubricative and therefore, if an oil can is opened, the whole oil should be used at one time. It is advisable to use up gasoline mixed with vegetable oil with 24 hours. After racing, drain the remaining gasoline in the tank into a can so that it can be used as wash oil.

■Reading the piston head

The state of combustion can be roughly judged by reading the spark plug but it can be more precisely diagnosed by checking the piston head.

■Discoloring of the piston head (Oil = Castrol A747 30:1 mixture)



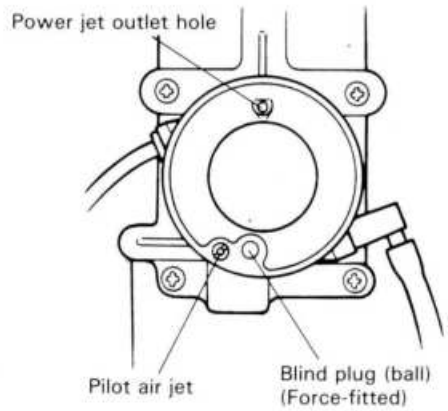
1) **The entire piston head is sooty and wet.**
2) **The piston head center dries up**
3) **The area from the piston head center to the exhaust port side dries up.**
4) **The entire surface of the piston head dries up in a tan color. (The carburetor should be so set the the piston head is tan.)**
5) **The piston head begins to be roughended from the intake port side tho the exhaust.**
6) **The piston head begins to be roughened from the intake port side to the exhaust.**

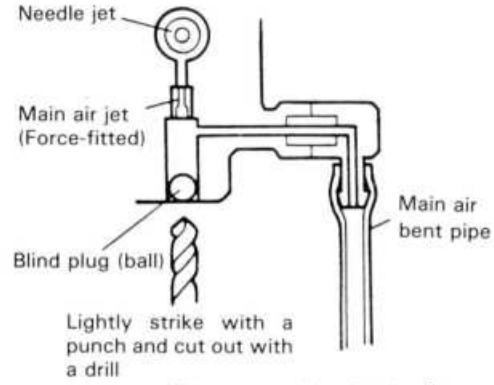
NOTES

1. Be sure to use gasoline for racing machines (sold in circuits).
2. When checking the spark plug immediately after ranning, it is advisable to keep the engine running and turn off the ignition switch so that the spark plug will not cool down.
3. If any abnormal noise is heard or engine performance becomes poor during a race, disengage the clutch immediately and close the throttle to check if the engine idles for safe operation. (Idling speed is 1,300 rpm.)
4. The piston crown is partly roughened and wet in some cases. It becomes wet depending on the methok of turning off the ignition when stopping the engine. supposing that the piston crown begins to roughen, the carburetor should be set.

■Modification of the main air circuit

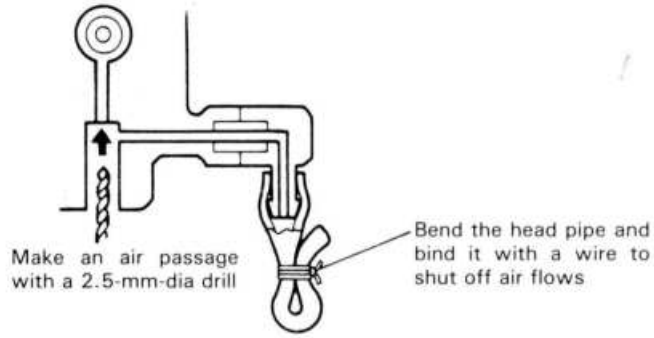
① Using a punch, lightly strike the main air blind plug (ball) in the funnel and by increasing the drill diameter in stages, cut out the plug.





[Cross-sectional view]

② The main jet is fitted in the body. Make a 2.5mm dia. through hole in the main jet (first start with making a 1.5 mm dia. hole air section only should be drill dimeter in steps). (The main air section only should be drilled.) Next, as shown, plug the air vent pipe hanging down from the carburetor.



[Cross-sectional view]

PARTS LIST

	Part No.	Part name	Q'ty	Remarks
★ ①	Main jet	—	14	7 series
②	Jet needle	—	2	
③	Needle jet	—	8	4 series
★ ④	Pilot jet	—	6	3 series

Parts marked with ★ are standard Yamaha parts and available through the general parts sales channel.

NOTES

1. After modifying the main air circuit, thoroughly wash it out to rekmove metal dust. Assemble the carburetor bodyand install.
2. Be sure to the spark plug "NGK heat range 10" or equivalent (with a built-in resistor) and by checking the discoloration of the piston head, select the proper spark plug.

Recommended spark plug: BR10EV (NGK) QN84 (Champion)

3. Make carburetor setting mainly by changing the main jet and needle jet, since change of the jet needle position will tesult in a delicate variation of engine performance, thus leading the engine trouble. There fore, avoik changing the fet needle position as much as possible.
4. To prevent truble such as engine such as engine seizure, first set the carburetor on the rich side and then, adjust it properly in steps.

■Break-in operation

After warming up the engine, perform break-in operation is very important. It will moving parts smooth out the contact surfaces of and get the rider used to the circuit.

1. Control the engine speed within 8,000 rpm and run around the circuit two or three times.
2. Bring the machine into the pits once and check for loose parts, oil leakage, or any other abnormality.
3. Next, control the engine speed within 9,000 rpm and run about 20 Km. (During this test rum, check if the riding position and carburetor settings are suitable.)
4. Again, move into the pits and check for any abnormality. Make inspections and adjustments with improtance on the clutch, brakes and drive chain. Adjust the carburetor and riding position best suit to your preference.
5. Run about 30 Km at 8,000 to 10,000 rpm.
6. Raise the engine speed up to 11,000 rpm and run about 5 Km.

NOTES

1. Warm-up operation should be mode in the area designated for warm-up purposes. Avoid warming up the engine in a paddock or pits.
2. After break-in operation, check and maintain the machine carefully so that it can be readily used for racing or normal street riding.

OPTION PARTS TRANSMISSION

The TZR250 features extra power and torque throughout the entire range from low to high speeds. One of the factors contributing to the swift and smooth acceleration that a racing machine offers is the power transmission. The TZR250 standard transmission is both highly durable and reliable but if kit parts are used, it can be converted into a cross-ratio transmisson.

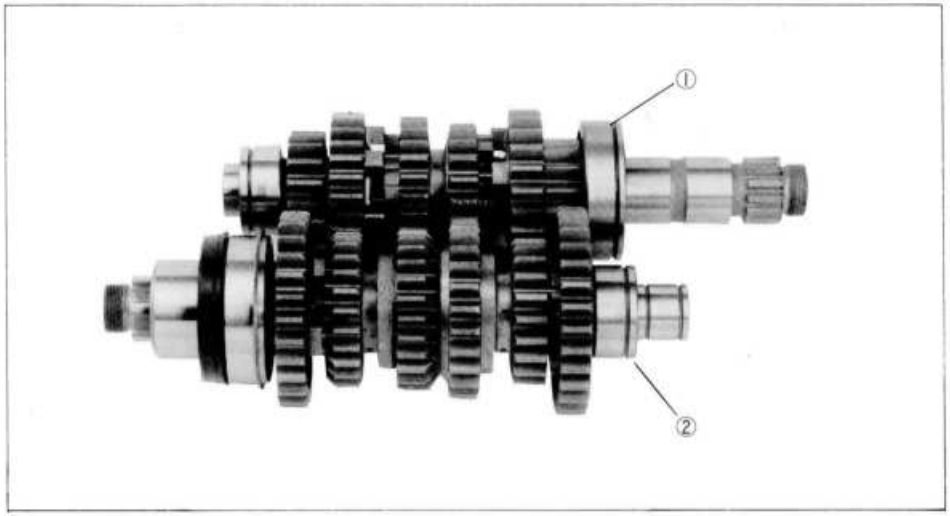
CROSS-RATIO TRANSMISSION GEAR RATIOS

		No. of teeth	Gear ratio			No. of teeth	Gear ratio
1st	P	14	2.142	4th	P	24	1.083
	W	30			W	26	
2nd	P	17	1.647	5th	P	26	0.961
	W	28			W	25	
3nd	P	19	1.315	6th	P	26	0.884
	W	25			W	23	

NOTES ON DISASSEMBLY AND SERVICE

1. Install circlips and eashers eith special care, and after assmbling, check the smooth operation of gears.
2. Check contact surfaces of moving parts for wrar or damage.
3. Apply molydenum grase and gear oil to the gear bores and splines of axles before assembling them.
4. The amount of wear of washers and circlips varies depending on their positions. When disassembled, they should put aside in order of removal.
5. If any gear requires replacement due to damage, replace it as a set with the mating gear and shift fork.
6. Always use a new oil seal (93102-35361) when reassembling the drive axle.

EXPLOSION DIAGRAM OF COMPONENT PARTS



PARTS LIST

	Part No.	Part name	Q'ty	Remarks
①	1KT-17410-70	Main axle Ass'y	1	
②	1KT-17420-70	Drive axle Ass'y	1	

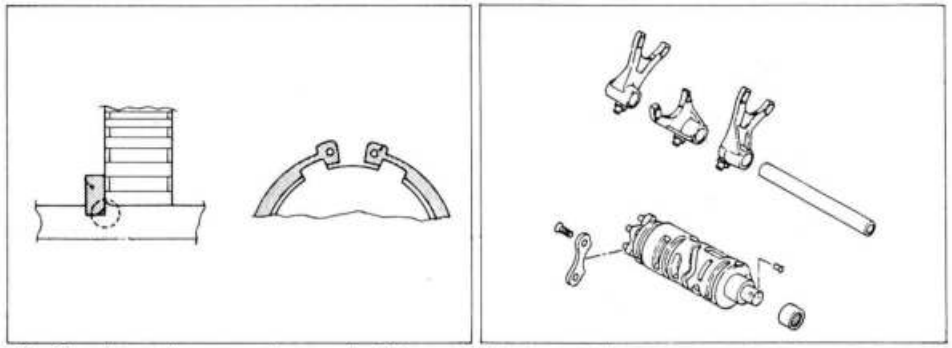
Parts marked with ★ are standard Yamaha parts and available through the general parts sales channel.

TRANSMISSION INSPECTION ITEMS

1. Check for worn dogs or pitted or damaged gear teeth. Of worn, pitted, or damaged − − − Replace.
2. Check for chipped dogs or scratched or burnt shift fork grooves. If dipped, scratched or burnt − − Replace.
3. Check for noisy or loose bearings.
   If nosiy or loose − −Replace.
4. Check that gears moves smoothly.
   If not slide smoothly
   If not rotate smoothly — — Recondition or replace.

SUGGESTION FOR TRANSMISSION REPLACEMENT

Replacement intervals of the transmission vary depending on the rider's preference course conditions or hous of operation. It is advisable, however, to replace the transmission each season.

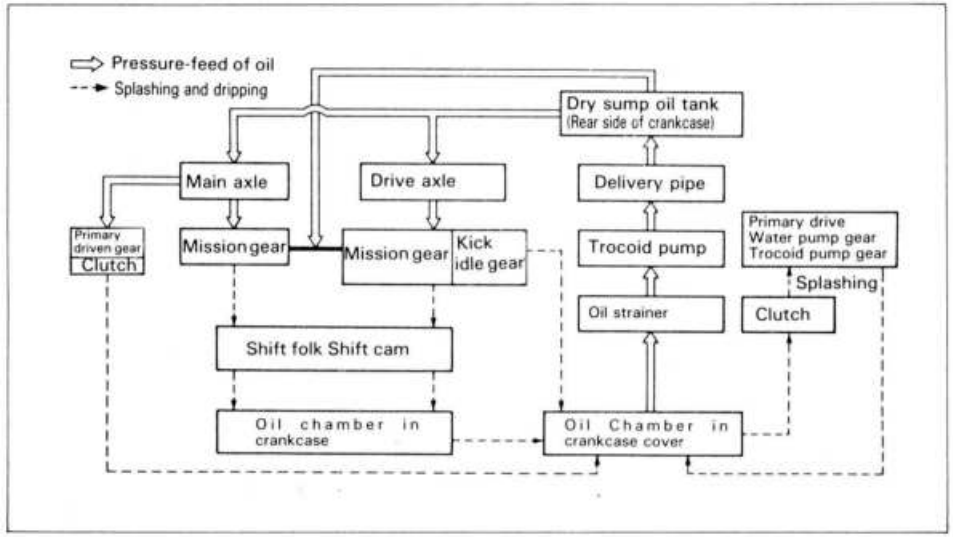


※ The above diagrams relate to the "Notes on disassembly" on the preceding page(P18).

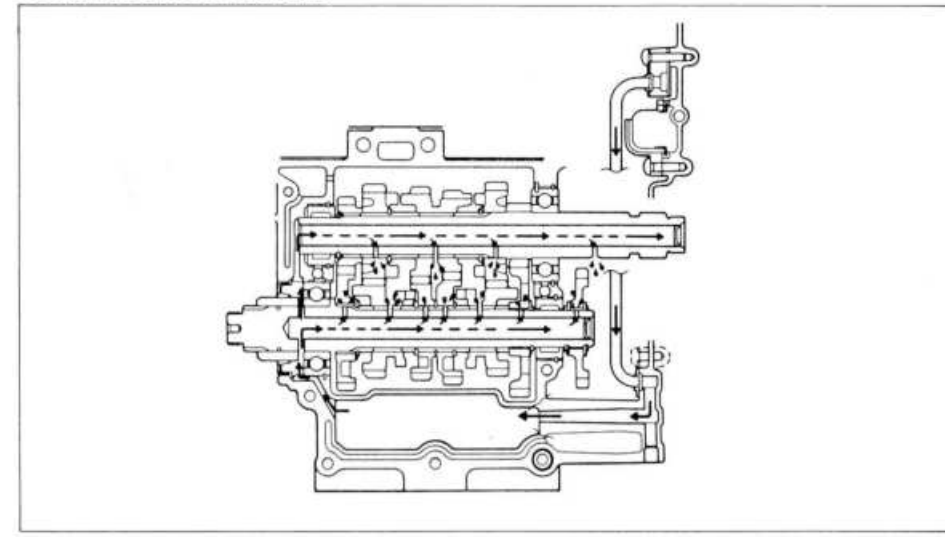
NOTES

- ○ Install the shift forks so that the stamped numbers face toward the right.
- ○ Position the shift forks in order of 1, 2 and 3 from the left.

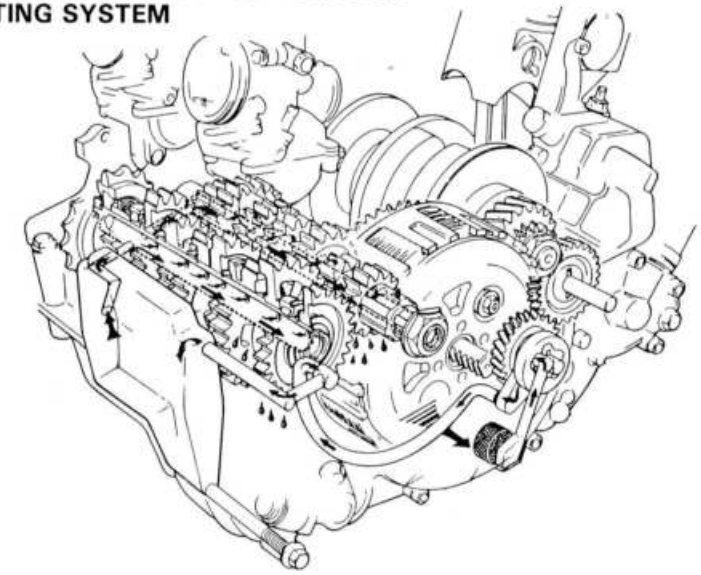
ROUTES OF LUBRICATING OIL



ROUTES OF CROSS-RATIO TRANSMISSION LUBRICATING OIL



PERSPECTIVE VIEW OF ENGINE LUBRICATING SYSTEM

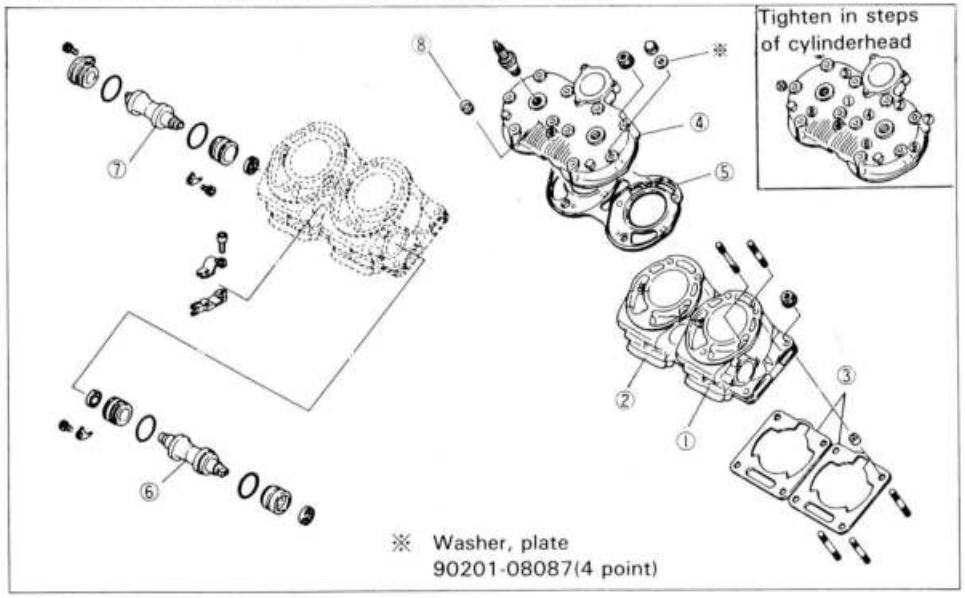


OPTION PARTS HEAD & CYLINDER

In the case of a two-cycle engine, the intake, exhaust and transfer ports and port timing are the determining factors in engine performance. Particularly in racing circuits, a swift and smooth build up of speed will affect the racing result.
this kit is designed exclusively for racing purposes and greatly helps the TZR250 develop its extra engine power and torque throughout the entire range of speeds.

Footnote:
If you do not get used to the tuning of the cyliner head and ports, the use of these optional parts is recommended for better engine performance.
Explosion view of component parts

EXPLOSION DIAGRAM OF COMPONENT PARTS



PARTS LIST

	Part No.	Part name	Q'ty	Remarks
①	1KT-11311-70	Body cylinder 1	1	
②	1KT-11321-70	Body cylinder 2	1	
③	1KT-1131A-70	Valve 1	1	
④	1KT-1132A-70	Valve 2	1	
★ ⑤	1KT-11351-00	Base gasket	2	
⑥	1KT-11111-70	Head, cylinder	1	
★ ⑦	1KT-11101-00	Head gasket	1	
★ ⑧	90344-51005	Plug, head	1	

Parts marked with ★ are standard Yamaha parts and available through the general parts sales channel.

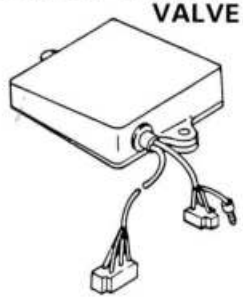
NOTES

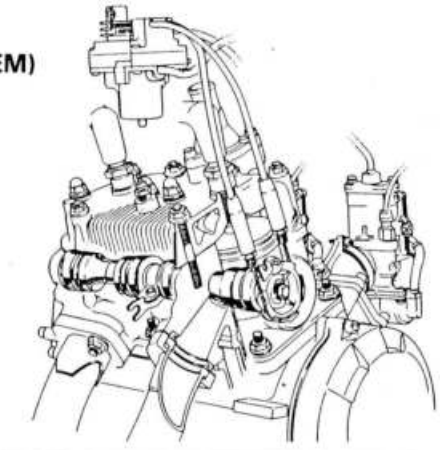
1. When removing the cylinder, use care not to allow drirt, dust or water to enter the engine.
2. Exercise care not to scratch the cylinder sleeve or contact surfaces of the cylinder and head.
3. Be careful not to scratch valve 1(for the left-side cylinder) when gripping the pulley with pliers.
4. After installing the cylinder, turn the crankshaft and make sure the piston moves up and down smoothly.
5. Always use a new gasket. (Be sure to use the gasket contained in the kit. Any other type gasket may interfere with the piston.
6. Tighten the cylinder head bolts to 2.7 kg.m in steps and in orderof numbers (shown on the head).
7. To prevent the leakage of cooling water due to a broken cap nut, it is necessaary to increase the number of washers (marker with ※ in the diagram on the right)
   Considering the stud bolt length.

OPTION PARTS YPVS CONTROL UNIT

The YPVS control unit, which control the optimum exhaust port timing,is indispensable for tuning up of the engine.

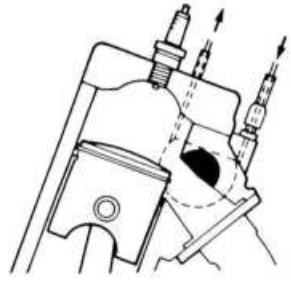
Y.P.V.S
(YAMAHA • POWER • VALVE • SYSTEM)





Y.P.V.S control unit Part No.
1KT-85830-70

A

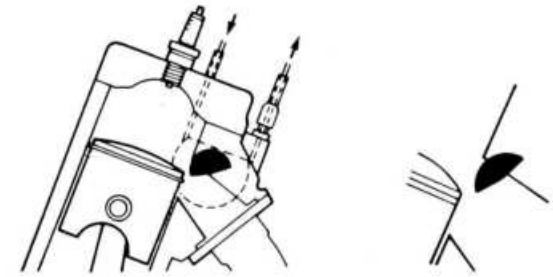


Remove one side of the chamber, and check for any step visually (by looking into the chamber in the direction of the arrow) or by stroking with your finger.



(YPVS adjustment) Turning on the main switch will cause the sub-motor to operate once and stop.When the sub-motor stops, the YPVScontrl unit opens fully as shown above.

B



If it stops in the position shown in Fig. B, adjust it in the position shown in Fig. A by turning the adjuster.

NOTES

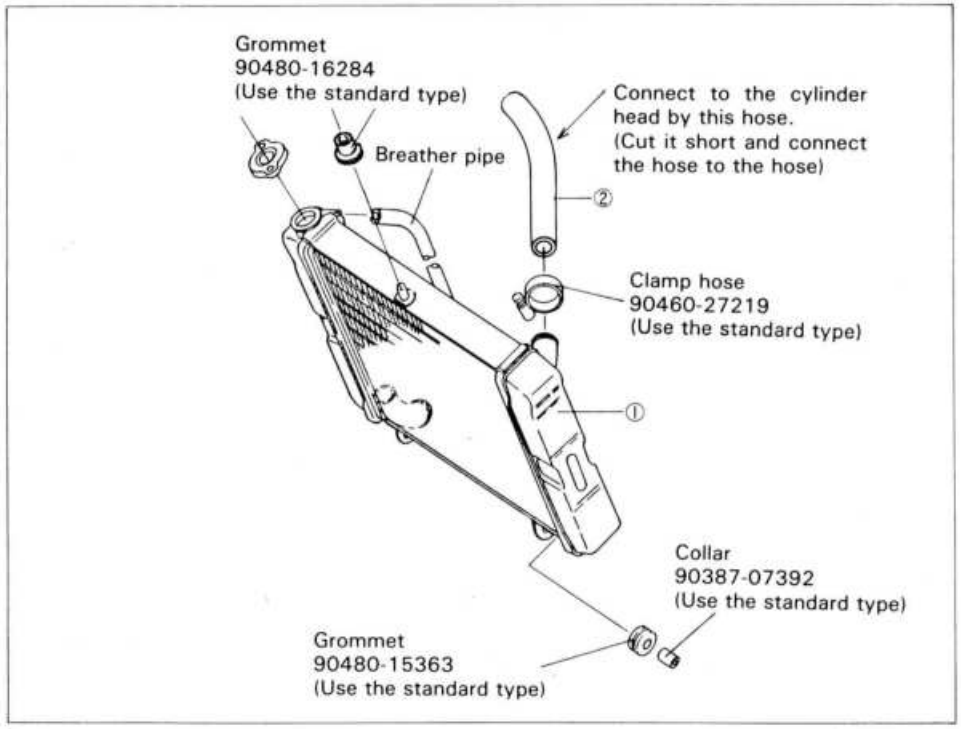
1. This YPVS control unnit is designed exclusiveiy for the TZR250 fitted with the F-III kit.
2. YPVS valve timing should be adjusted by referring to the 〈YPVS adjustment 〉 specified below.
3. When installing the pulley, set the valve in the full-open position.

〈YPVS adjustment 〉 Proceed as follows:

1. Replace the YPVS control unit.
2. Turn on the main switch. (The valve performs a cycie of actions.)
3. Viewing in the direction of the arrow (see Fig. A), check that the valve is full-open. If not full-open, adjust it by turning the adjuster.
   (Remove one side of the chamber. With your finger, chrck that there is a step between the port and vaive.

OPTION PARTS RADIATOR

The TZR250 cooling system is perfect for the high power and high torque engin. however, the use of the kit will require a more efficient cooling efficiency. To meets such a requirement, this large-side radiator is recommended.



NOTES

1. Fasten the hose band tightly.
2. Route the hoses using care not to flatten or allow air to remain inside hoses.
3. Connect the breather pipe to the recoverry tank as a preventive measure against the radiator blow.
4. When refilling the radiator, tilt the machine to the right and left sides to expel the air in the radiator.

PARTS LIST

		Part No.	Part name	Q'ty	Remarks
	①	1KT-12460-70	Radiator Ass'y	1	
★	②	1KT-12482-00	Pipe 2	2	

Parts marked with ★ are standard Yamaha parts and available through the general parts sales channel.

★PERIODIC INSPECTION AND MAINTENANCE CHART

Item	After break-in	Prior to each run	Every 500km	Every 1000km	As required	Remarks
Water level/leakage	○	○				
Function of radiator cap					○	Check with radiator cap tester.
Replace cooling water					○	Tapped water (drinking water)w
Replace cooling water hose					○	
Damage to radiator fins		○				Repair using slotted-head screwdriver or pliers.
Clean radiator			○			

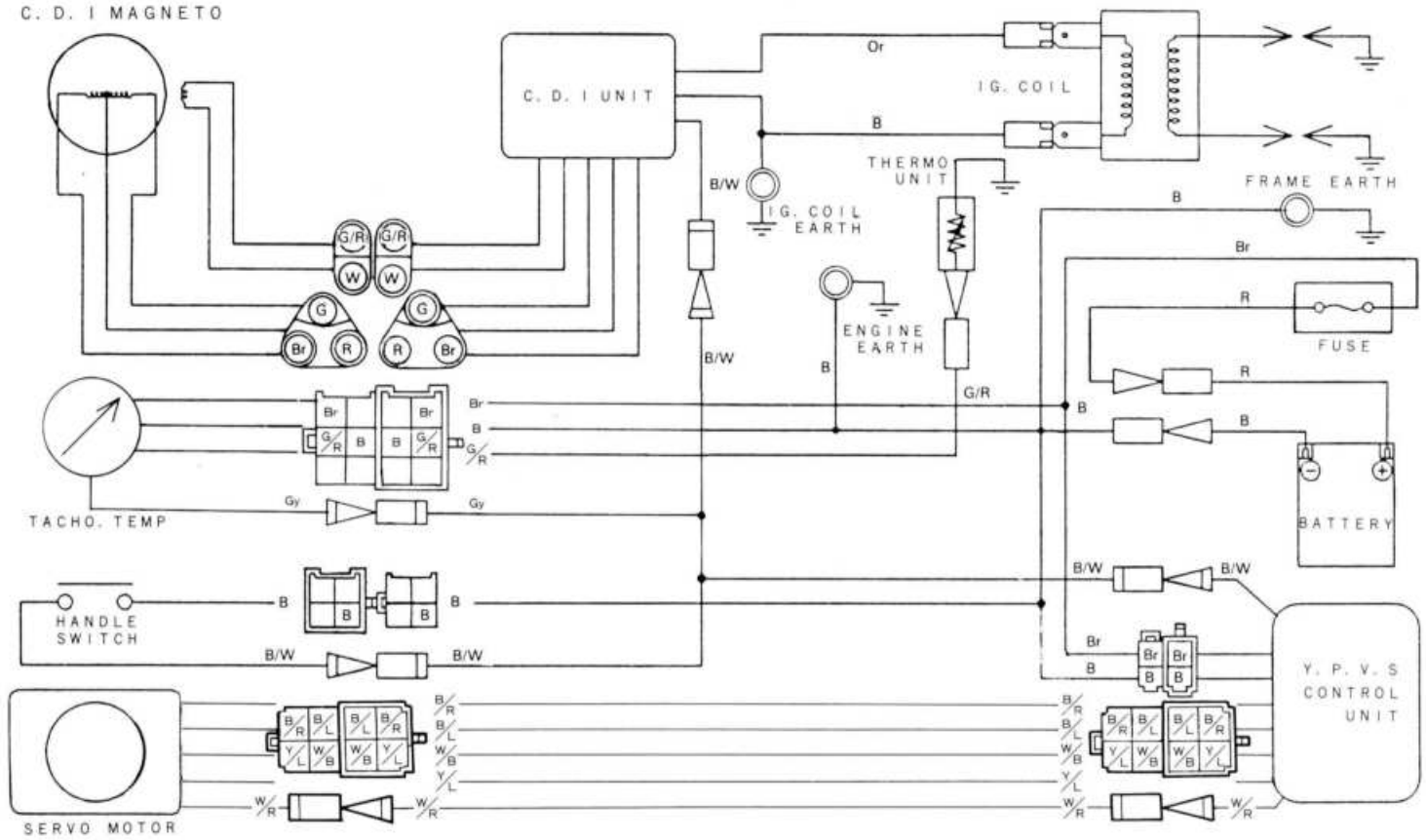
NOTES

1. Use tapped water for the radiator. Never use water containing calcium and magnssium or sea water.
2. Drain off the radiator completely to prevent rusting or the freezing of water after each race.
3. When Warming up the engine, avoid racing the engine at high speeds. (Run the engine speed at 5,000 to 6,000 rpm for a few minutes and check the water temperature gauge.)
4. During break-in operation, cover the radiator with gum tape so that the water temperature readings are 60 °to 75 °C. (Do not run the machine with the water temperature at below 60 °C.)
5. If the water temperature meter reading is higher than 90 °C, check the radiator for a lower water level or leakage.
6. The cooling water is still hot soon after stopping of the engine. Replace or add water after the engine has cooled down. (In this case, it is advisable to check and service other areas of the machine for better work efficiency until the engine cools down.)
7. Torepair the radiator, use a bond (Debucon, Araldyte) .Never use argon arc welding.

OPTION PARTS WIRE HARNESS

B; Black
W: White
R; Red
Br: Brown
G: Green
Gy: Gray
Or: Orange

G/R: Green/Red
B/W: Black/White
W/Y: White/Yellow
W/L: White/Blue
B/Y: BLack/Yellow
B/R: Black/Red



The wire harness designed specially for the TZR250 racer can beused with standard parts (excluding the ignition system).
That is,it can be used with the standard type tachometer, water temperature meter, handle switch (kill switch),battery, servo-motor and control unit. For better engine performance, it is advisable to install the control unit designed for the race kit. Except for theignition system, electrical parts should be connected in the standard arrange-ment, and the wire harness wire positions are the same as standard. Therefore, wiring is easy and simple, requiring a shorter time for connection.

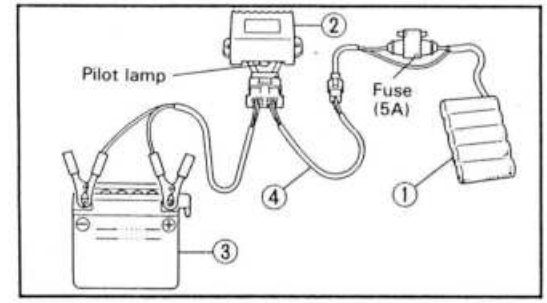
Use of TZ parts
When installing the lightweight TZ battery (49V-82110-00), replace the coupler with the type connectable to the TZ battery.
Also, a battery charger (49V-82107-00) and lead wire (49V-82117-00) will be required to purchase.

Ground terminal positions
1) Frame grounding ..... Secure to rectifier/regulator mounting position
2) Engine grounding..... Secure to CDI magneto mounting position.
3) Ignition coil grounding .. Secure to frame.

CHARGING THE BATTERY

- ○ Battery ①
- ○ Charger ②
- ○ Battery (12V, 20Ah) as power source ③
- ○ Lead wire ④

Connect the charger (accessory) to the battery and charge it from a battery whose capacity is 12V/20Ah or higher.
By watching the pilot lamp, check to see if the battery is being charged.
(However,avoid charging for more than 24 hours continuously.)



NOTES

1. Be sure to use a battery whose capacity is 12V/20Ah.
2. Besure to use the charger(accessory) for charging.
3. Make sure the source battery is fully chared.
   (At least,the starter motor can opperate with the battery.)
4. Avoid continue chring for more than 24 hours. the source battery may run down.)
5. Charge the battery pack by pack.
6. Use a full-charged battery for practice and racing.
7. Use a 5Afuse.

After each operation, be sure to disconnect the coupler between the battery and servo-motor. (Prevention of discharging.)



RACING KIT PARTS

TZR 250

F-III

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