YAMAHA
COMBINED
SERVICE MANUAL

COVERING

DT1E

DT2 DT3

RT1B

RT2 RT3

250cc THRU 360cc
ENDUROS
(1971 – 1973)

FOREWORD

This Service Manual for the Yamaha Enduro DT, RT Series are directed to acquaint both the owner and mechanic with the operation, service, and maintenance of his machine.

These Enduros are Yamaha's first fully street legal, large Displacement motorcycle designed to enable the owner to ride it on the street, use it for trail riding, or convert it with factory available parts into a competition-ready scrambler or motocrosser.

This manual and the technical and service information enclosed should be closely followed to insure continuous good performance, long life, and to enable you to properly maintain the machine.

YAMAHA MOTOR CO., LTD.
Engineering & Service Department

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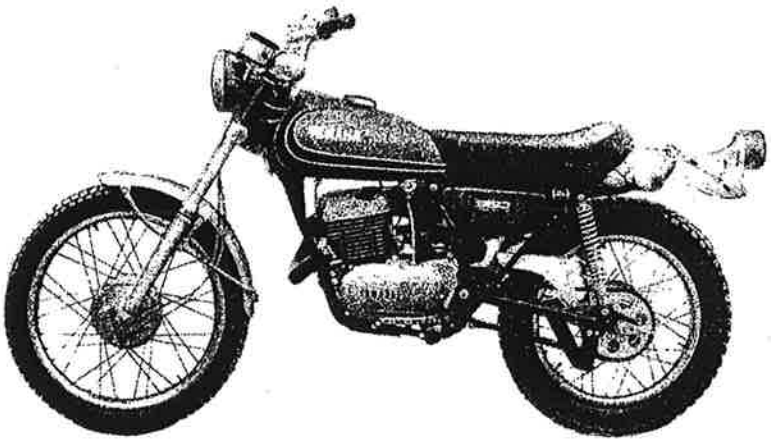
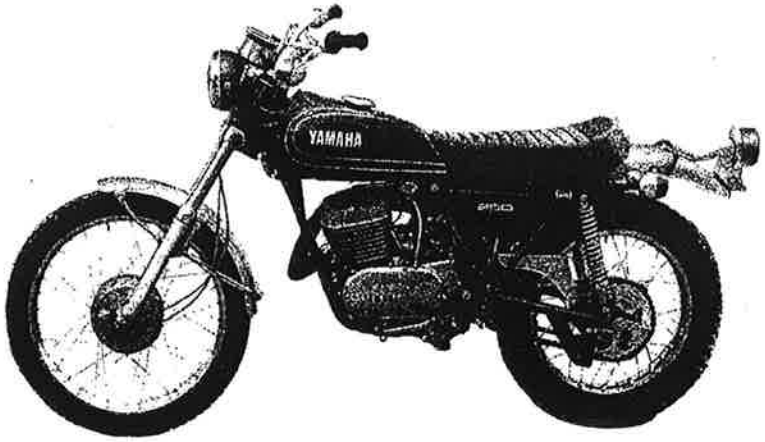
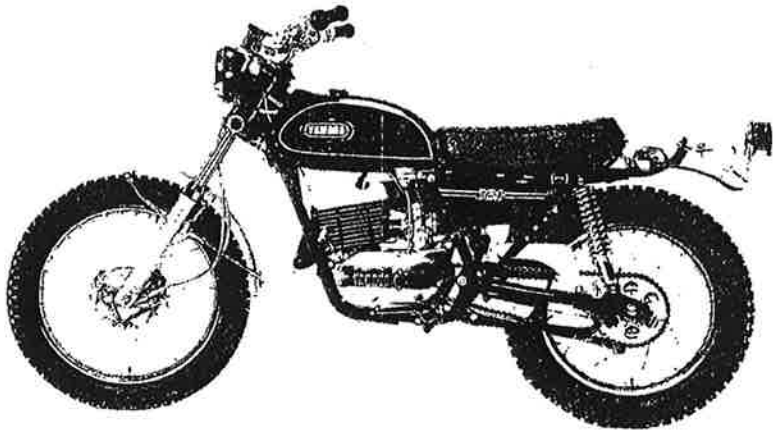
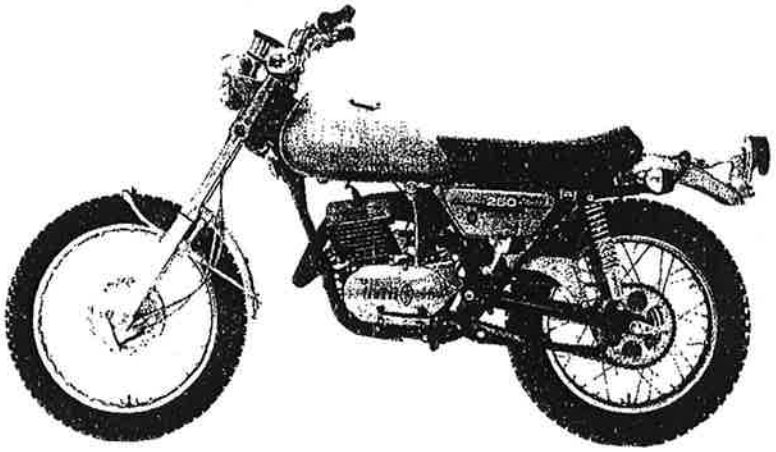


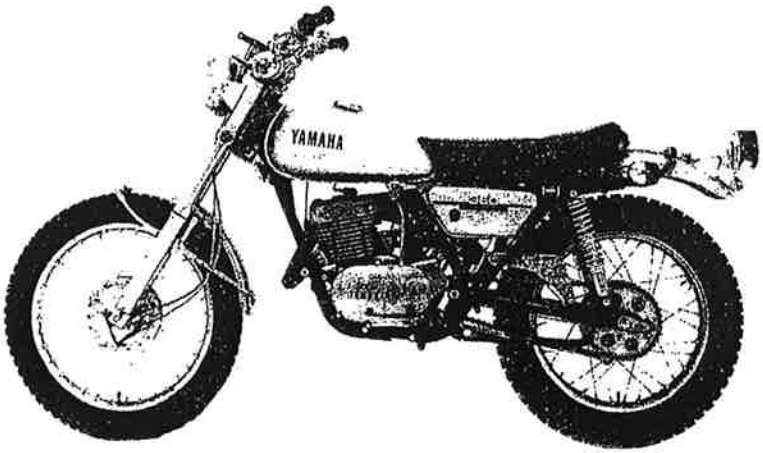
DT3



RT1-B







1-2 Specifications MODEL DT1-E

1. MODEL	DT1-E
2. HORSEPOWER @ RPM	23 @ 7,000
3. TORQUE @ RPM	17.5 @ 6,500
4. BORE & STROKE (mm)	70 x 64
5. ENGINE DISPLACEMENT	246cc 15.0 cu. in
6. NET WEIGHT (Appx.)	245 lbs.
7. COMPRESSION RATIO	6.4:1
8. IGNITION TIMING B.T.D.C. (mm) Retarded	–
Advanced	3.2mm ± .1
9. CONTACT BREAKER POINT GAP SETTING (mm) (inch)	.30-.40mm .012-.015"
10. SPARK PLUG AND GAP (mm)	B-8ES .5-.6mm
11. VOLT. REG. ADJ. (Volts @ rpm - no load)	MAGNETO
12. CUTOUT RELAY ADJ. (Cut in voltage)	
13. CONDENSER CAPACITY (Microfarad)	.22uF
14. PISTON SKIRT CLEARANCE (mm) (inch)	.040-.045mm .0016-.0018"
15. CARBURETOR TYPE & MANUFACTURER	VM26SH Mikuni
MAIN JET (M.J.)	# 160
AIR JET (A.J.)	–
NEEDLE JET (N.J.)	O-2
JET NEEDLE - clip position (J.N.)	5D1-3
CUTAWAY (C.A.)	2.5
PILOT JET (P.J.)	# 35
AIR SCREW (Turns out) (A.S.)	1½
STARTER JET (S.J.)	# 60
FLOAT LEVEL (mm) (F.L.)	15.1mm
16. AIR FILTER TYPE	Wet foam rubber
17. PRIMARY REDUCTION RATIO & METHOD	65/21 3.095 gear
18. SECONDARY REDUCTION RATIO & METHOD	44/14 3.143 chain
19. TRANS. GEAR RATIOS 1st (Internal) (No. teeth) (Overall)	2.533 38/15 24.64
2nd	1.789 34/19 17.41
3rd	1.304 30/23 12.69
4th	1.000 26/26 9.73
5th	.767 23/30 7.46
20. TRANS. OIL CAPACITY (Qt.)	1.06
21. OIL TANK OR ENGINE SUMP CAPACITY (Qt.)	1.7
22. FUEL TANK CAPACITY (U.S. Gal.)	2.5
23. FRONT FORK OIL CAPACITY	5.9 oz 175cc
24. TIRE SIZE (Front)	3.25-19
(Rear)	4.00-18
25. TIRE PRESSURE (Lbs.) (Front)	13
(Rear)	16
26. DRIVE CHAIN TENSION (Up & down freeplay)	20mm 25/32"
27. OIL PUMP STROKE ADJUSTMENT MIN. (mm)	.20-.25mm
MAX. (mm)	1.85-2.05mm
28. AUTOLUBE CABLE ADJUSTMENT (Throttle position)	At idle
29. VALVE CLEARANCE INTAKE	–
EXHAUST	–

MODEL DT2

1. MODEL (IBM I.D. NUMBER)	DT2 311
2. HORSEPOWER @ RPM	24 @ 7000
3. TORQUE @ RPM	18.3 @ 6000
4. BORE & STROKE (MM) (NO. OF CYLINDERS)	70x64x1
5. ENGINE DISPLACEMENT - INDUCTION SYSTEM	246cc 15.01CID Torq. Indn.
6. NET WEIGHT (APPROX.)	258 Lbs.
7. COMPRESSION RATIO	6.8:1
8. IGNITION TIMING B.T.D.C. (MM) RETARDED	θ
ADVANCED	3.2 ± .15mm
9. CONTACT BREAKER POINT GAP SETTING (MM) (INCH)	.35 ± .05mm .013
10. SPARK PLUG AND GAP (MM) (INCH)	NGK B-8ES .5-.6 .020-.023
11. STARTING ENGINE NUMBER	DT1F-105101
12. GASOLINE TANK COLOR	Pearl/Yellow Gold
13. PISTON SKIRT CLEARANCE (MM) (INCH)	.040-.045 .0016-.0018
14. RING GROOVE SIDE GAP (MIN) (MAX)	.07 Max.
15. RING END GAP (MIN) (MAX)	.2-.4mm
16. CARBURETOR TYPE & MANUFACTURER	VM26SH Mikuni
MAIN JET (M.J.)	#160
AIR JET (A.J.)	Drill 2.5mm
NEEDLE JET (N.J.)	N-8
JET NEEDLE-CLIP POSITION (J.N.)	5DP7-3
CUTAWAY (C.A.)	1.5
PILOT JET (P.J.)	#30
AIR SCREW (TURNS OUT) (A.S.)	1¼
STARTER JET (S.J.)	#60
FLOAT LEVEL (MM) (F.L.)	15.1mm
17. AIR FILTER TYPE	Wet Foam Rubber
18. PRIMARY REDUCTION RATIO & METHOD	65/21 3.095 Gear
19. SECONDARY REDUCTION RATIO & METHOD	44/14 3.142 Chain
20. TRANS. GEAR RATIOS 1ST (INTERNAL) (NO. TEETH) (OVERALL)	2.533 38/15 24.644
2ND	1.789 34/19 17.407
3RD	1.304 30/23 12.689
4TH	1.000 26/26 9.728
5TH	0.766 23/30 7.458
21. TRANS. OIL CAPACITY (CC) (TYPE)	1000 ± 50cc SAE10W30
22. OIL TANK OR ENGINE SUMP CAPACITY (QT.) (TYPE)	1.7
23. FUEL TANK CAPACITY (U.S. GAL.) (OCTANE RATING)	2.5
24. FRONT FORK OIL CAPACITY	175cc
25. TIRE SIZE (FRONT) (TYPE TREAD)	3.25-19 4PR
(REAR) (TYPE TREAD)	4.00-18 4PR
26. TIRE PRESSURE (LBS.) (FRONT)	14
(REAR)	17
27. DRIVE CHAIN TENSION (UP & DOWN FREEPLAY)	20mm ¾"
28. OIL PUMP STROKE ADJUSTMENT MIN. (MM)	.20-.25mm
MAX. (MM)	1.85-2.05mm
29. AUTOLUBE CABLE ADJUSTMENT (THROTTLE POSITION)	At Idle

MODEL DT3

MODEL – IBM I.D. NUMBER	Model/ID	DT3 311
STARTING ENGINE/FRAME NUMBER	E/F Nbr.	DT1F-135101
BASIC COLOR *(FUEL TANK)*	Color	Competition Green
NET WEIGHT	Weight	258 lbs.
ENGINE *(TYPE) (INDUCTION SYSTEM)*	Engine	2-stroke, 7-port, single/reed valve
BORE/STROKE/CYLINDERS/DISPLACEMENT	Displ.	70 x 64 x 1 246cc 15.01 CID
HORSEPOWER/TORQUE - FT. LBS.	HP/Torq.	24 @ 7000 18.3 @ 6000
COMPRESSION RATIO/NOMINAL PRESSURE	Compr.	6.8:1 ϕ
PISTON SKIRT CLEARANCE *(NOMINAL) (MAX. ALLOWABLE)*	Skirt Cl.	.040-.045mm .102mm (.004")
RING END GAP *(TOP) (2ND) (3RD)*	End Gap	.2-.4mm (All)
RING GROOVE CLEARANCE *(TOP) (2ND) (3RD)*	Groove	.07mm (All)
VALVE CLEARANCE *(ENG. COLD)* INTAKE/EXHAUST	Valves	ϕ
CARBURETOR *(MFR) (TYPE) (I.D. NUMBER)*	Carb.	Mikuni VM26SH 311E2
MAIN JET	M.J.	#160
NEEDLE JET	N.J.	N-8
JET NEEDLE/CLIP POSITION	J.N.	5DP7-3
CUT AWAY	C.A.	1.5
PILOT JET	P.J.	#30
AIR JET	A.J.	ϕ
STARTER JET	S.J.	#60
AIR SCREW *(TURNS OUT)*	A.S.	1-1/4
FLOAT LEVEL	F.L.	15.1mm
AIR FILTER *(TYPE) (QUANTITY)*	Filter	Wet foam rubber X1
DRIVE – PRIMARY *(TYPE) (TEETH) (RATIO)*	Primary	Gear 65/21 3.095
SECONDARY *(TYPE) (TEETH) (RATIO)*	Second.	Chain 44/14 3.142
TRANSMISSION RATIOS 1ST *(TEETH) (RATIO) (O.A.)*	1st Gear	38/15 2.533 24.644
2ND	2nd	34/19 1.789 17.407
3RD	3rd	30/23 1.304 12.689
4TH	4th	26/26 1.000 9.728
5TH	5th	23/30 0.766 7.458
6TH	6th Gear	ϕ
CAPACITIES – TRANSMISSION *(QUANTITY) (TYPE)*	Trans.	1000± 50cc SAE 10W30 "SE" motor oil
OIL TANK OR ENGINE SUMP *(QUANTITY) (TYPE)*	Tnk/Sump	1.6 qts. Yamalube
FUEL TANK *(QUANTITY) (MINIMUM OCTANE)*	Fuel Tank	2.5 gals.
FRONT FORKS *(QUANTITY) (TYPE)*	Forks	175cc SAE 10W30 or Spec. type
TIRES FRONT/REAR *(SIZE) (NOMINAL PRESSURE)*	Tires	3.00-21 4PR/13PSI 4.00-18 4PR/17PSI
ELECTRICAL – CHARGING SYSTEM *(MFR) (TYPE)*	Gen.	Mitsubishi Flywheel Magneto
NO LOAD VOLTAGE ADJUSTMENT	Volt Adj.	ϕ
MAXIMUM OUTPUT(1)	Output	ϕ
FIELD COIL *(and/or)* CHARGING COIL RESISTANCE	Field	ϕ
BATTERY *(MFR) (MODEL) (RATING)*	Battery	G. S. 6N4-2A-2 6V 4AH
HEADLIGHT/TAILLIGHT RATINGS	Lights	6V35/35W 6V5.3/17W
IGNITION COIL SPARK GAP *(MIN.)/PRI. RES./SEC. RES.*	Spark	7mm .9Ω 6.5KΩ
CONDENSER CAPACITY	Condens.	0.25uf
POINT GAP *(NOMINAL)/SPARK PLUG (TYPE) (GAP)*	Point	.35-.05mm/NGKB-8ES .5-.6mm/.020"-.023"
TIMING	Timing	3.0 ± .15mm BTDC

MODEL RT1-B

1. MODEL	RT1-B
2. HORSEPOWER @ RPM	30 @ 6,000
3. TORQUE @ RPM	26.0 @ 5,500
4. BORE & STROKE (mm)	80 x 70
5. ENGINE DISPLACEMENT	351cc 21.4 cu. in.
6. NET WEIGHT (Appx.)	258 lbs.
7. COMPRESSION RATIO	6.3:1
8. IGNITION TIMING B.T.D.C. (mm) Retarded	–
Advanced	2.9mm ± .1
9. CONTACT BREAKER POINT GAP SETTING (mm) (inch)	.30-.40mm .012-.015"
10. SPARK PLUG AND GAP (mm)	B-9ES .5-.6mm
11. VOLT. REG. ADJ. (Volts @ rpm - no load)	MAGNETO
12. CUTOUT RELAY ADJ. (Cut in voltage)	
13. CONDENSER CAPACITY (Microfarad)	.22uF
14. PISTON SKIRT CLEARANCE (mm) (inch)	.055-.060mm .0022-.0024"
15. CARBURETOR TYPE & MANUFACTURER	VM32SH Mikuni
MAIN JET (M.J.)	#240
AIR JET (A.J.)	–
NEEDLE JET (N.J.)	O-4
JET NEEDLE - clip position (J.N.)	6CF1-2
CUTAWAY (C.A.)	1.5
PILOT JET (P.J.)	#30
AIR SCREW (Turns out) (A.S.)	1¾
STARTER JET (S.J.)	#60
FLOAT LEVEL (mm) (F.L.)	8.5mm
16. AIR FILTER TYPE	Wet foam rubber
17. PRIMARY REDUCTION RATIO & METHOD	65/21 3.095 gear
18. SECONDARY REDUCTION RATIO & METHOD	39/15 2.600 chain
19. TRANS. GEAR RATIOS 1st (Internal) (No. teeth) (Overall)	2.533 38/15 20.38
2nd	1.789 34/19 14.40
3rd	1.304 30/23 10.49
4th	1.000 26/26 8.05
5th	.767 23/30 6.17
20. TRANS. OIL CAPACITY (Qt.)	1.06
21. OIL TANK OR ENGINE SUMP CAPACITY (Qt.)	1.7
22. FUEL TANK CAPACITY (U.S. Gal.)	2.5
23. FRONT FORK OIL CAPACITY	5.9 oz. 175cc
24. TIRE SIZE (Front)	3.25-19
(Rear)	4.00-18
25. TIRE PRESSURE (Lbs.) (Front)	13
(Rear)	16
26. DRIVE CHAIN TENSION (Up & down freeplay)	20mm 25/32"
27. OIL PUMP STROKE ADJUSTMENT MIN. (mm)	.20-.25mm
MAX. (mm)	1.85-2.05mm
28. AUTOLUBE CABLE ADJUSTMENT (Throttle position)	At idle
29. VALVE CLEARANCE INTAKE	–
EXHAUST	–

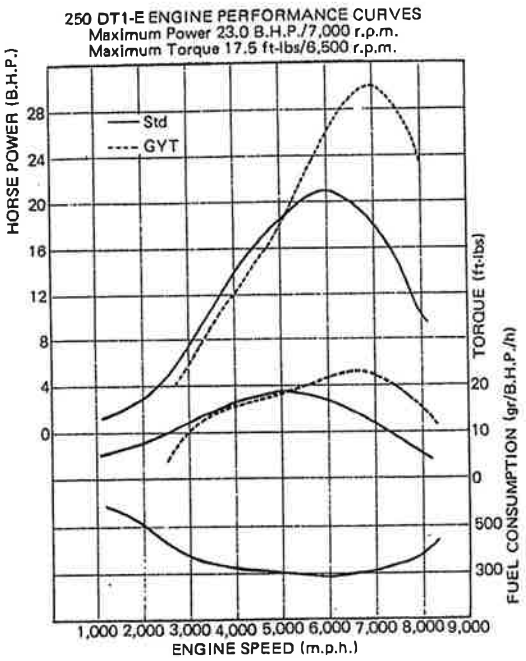
MODEL RT2

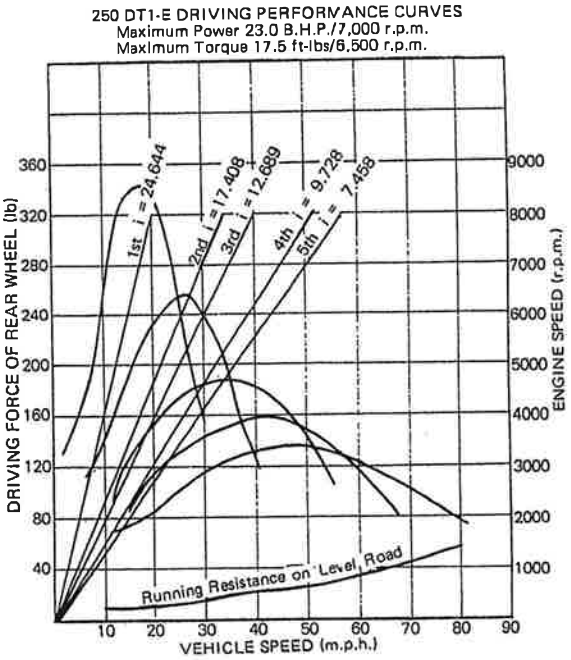
1. MODEL (IBM I.D. NUMBER)	RT2 308
2. HORSEPOWER @ RPM	32 @ 6000
3. TORQUE @ RPM	27.7 @ 5500
4. BORE & STROKE (MM) (NO. OF CYLINDERS)	80x70x1
5. ENGINE DISPLACEMENT - INDUCTION SYSTEM	351cc 21.4CID Torq. Indn.
6. NET WEIGHT (APPROX.)	262 Lbs.
7. COMPRESSION RATIO	6.3:1
8. IGNITION TIMING B.T.D.C. (MM) RETARDED	θ
ADVANCED	2.9 ± .15mm
9. CONTACT BREAKER POINT GAP SETTING (MM) (INCH)	.35 ± .05mm .013
10. SPARK PLUG AND GAP (MM) (INCH)	NGK B-9ES .5-.6 .020-.023
11. STARTING ENGINE NUMBER	RT1-100101
12. GASOLINE TANK COLOR	Silver
13. PISTON SKIRT CLEARANCE (MM) (INCH)	.045-.050 .0018-.0020
14. RING GROOVE SIDE GAP (MIN) (MAX)	.07mm
15. RING END GAP (MIN) (MAX)	.3-.5mm
16. CARBURETOR TYPE & MANUFACTURER	VM32SH Mikuni
MAIN JET (M.J.)	#230
AIR JET (A.J.)	2.0
NEEDLE JET (N.J.)	P-0
JET NEEDLE-CLIP POSITION (J.N.)	6DH3-3
CUTAWAY (C.A.)	3.0
PILOT JET (P.J.)	#45
AIR SCREW (TURNS OUT) (A.S.)	1½
STARTER JET (S.J.)	#60
FLOAT LEVEL (MM) (F.L.)	8.5mm
17. AIR FILTER TYPE	Wet Foam Rubber
18. PRIMARY REDUCTION RATIO & METHOD	65/21 3.095 Gear
19. SECONDARY REDUCTION RATIO & METHOD	39/15 2.600 Chain
20. TRANS. GEAR RATIOS 1ST (INTERNAL) (NO. TEETH) (OVERALL)	2.533 38/15 20.387
2ND	1.789 34/19 14.401
3RD	1.304 30/23 10.497
4TH	1.000 26/26 8.048
5TH	0.766 23/30 6.170
21. TRANS. OIL CAPACITY (CC) (TYPE)	1000 ± 50cc SAE 10W30
22. OIL TANK OR ENGINE SUMP CAPACITY (QT.) (TYPE)	1.7
23. FUEL TANK CAPACITY (U.S. GAL.) (OCTANE RATING)	2.5
24. FRONT FORK OIL CAPACITY	175cc
25. TIRE SIZE (FRONT) (TYPE TREAD)	3.25-19 4PR
(REAR) (TYPE TREAD)	4.00-18 4PR
26. TIRE PRESSURE (LBS.) (FRONT)	14
(REAR)	17
27. DRIVE CHAIN TENSION (UP & DOWN FREEPLAY)	20mm ¾"
28. OIL PUMP STROKE ADJUSTMENT MIN. (MM)	.20-.25mm
MAX. (MM)	1.85-2.05mm
29. AUTOLUBE CABLE ADJUSTMENT (THROTTLE POSITION)	At Idle

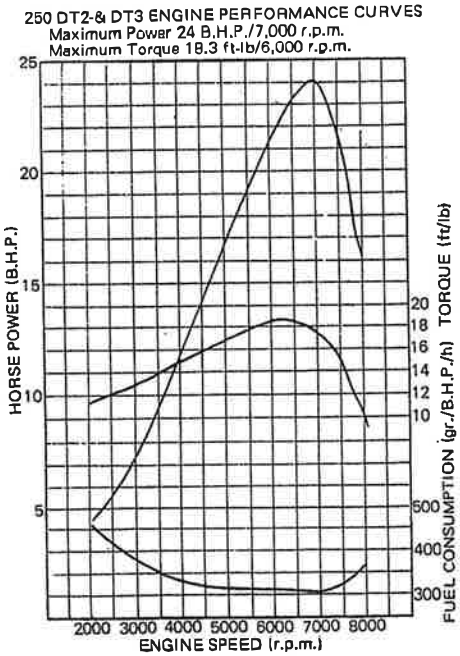
MODEL RT3

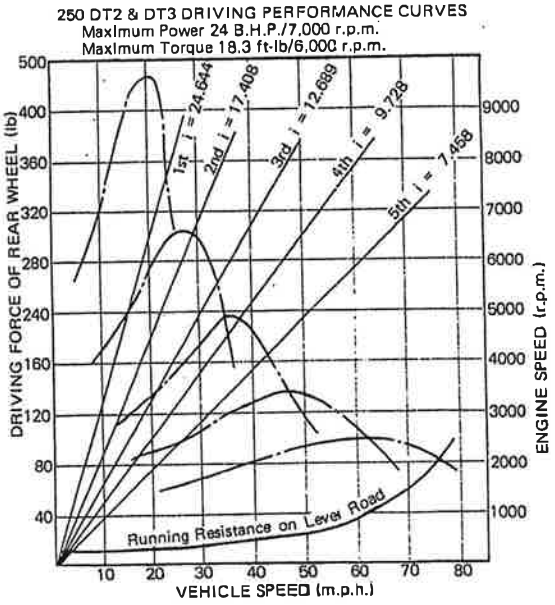
MODEL – IBM I.D. NUMBER	Model/ID	RT3 308
STARTING ENGINE/FRAME NUMBER	E/F Nbr.	RT1-125101
BASIC COLOR *(FUEL TANK)*	Color	Baja Brown
NET WEIGHT	Weight	262 lbs.
ENGINE *(TYPE) (INDUCTION SYSTEM)*	Engine	2-stroke, 7-port, single/reed valve
BORE/STROKE/CYLINDERS/DISPLACEMENT	Displ.	80 x 70 x 1 351cc 21.46 CID
HORSEPOWER/TORQUE - FT. LBS.	HP/Torq.	32 @ 6000 27.7 @ 5500
COMPRESSION RATIO/NOMINAL PRESSURE	Compr.	6.3:1 ϕ
PISTON SKIRT CLEARANCE *(NOMINAL) (MAX. ALLOWABLE)*	Skirt Cl.	.045-.050mm .102mm (.004")
RING END GAP *(TOP) (2ND) (3RD)*	End Gap	.3-.5mm (All)
RING GROOVE CLEARANCE *(TOP) (2ND) (3RD)*	Groove	.07mm (All)
VALVE CLEARANCE *(ENG. COLD)* INTAKE/EXHAUST	Valves	ϕ
CARBURETOR *(MFR) (TYPE) (I.D. NUMBER)*	Carb.	Mikuni VM32SH 308E2
MAIN JET	M.J.	#230
NEEDLE JET	N.J.	2.0
JET NEEDLE/CLIP POSITION	J.N.	6DH3-3
CUT AWAY	C.A.	3.0
PILOT JET	P.J.	#45
AIR JET	A.J.	2.0
STARTER JET	S.J.	#60
AIR SCREW *(TURNS OUT)*	A.S.	1½
FLOAT LEVEL	F.L.	21.4mm
AIR FILTER *(TYPE) (QUANTITY)*	Filter	Wet foam rubber X1
DRIVE – PRIMARY *(TYPE) (TEETH) (RATIO)*	Primary	Gear 65/21 3.095
SECONDARY *(TYPE) (TEETH) (RATIO)*	Second.	Chain 39/15 2.600
TRANSMISSION RATIOS 1ST *(TEETH) (RATIO) (O.A.)*	1st Gear	38/15 2.533 20.387
2ND	2nd	34/19 1.789 14.401
3RD	3rd	30/23 1.304 10.497
4TH	4th	26/26 1.000 8.048
5TH	5th	23/30 0.766 6.170
6TH	6th Gear	ϕ
CAPACITIES – TRANSMISSION *(QUANTITY) (TYPE)*	Trans.	1000± 50cc SAE 10W30 "SE" motor oil
OIL TANK OR ENGINE SUMP *(QUANTITY) (TYPE)*	Tnk/Sump	1.6 qts. Yamalube
FUEL TANK *(QUANTITY) (MINIMUM OCTANE)*	Fuel Tank	2.5 gals.
FRONT FORKS *(QUANTITY) (TYPE)*	Forks	175cc SAE 10W30 or Spec. type
TIRES FRONT/REAR *(SIZE) (NOMINAL PRESSURE)*	Tires	3.00-21 4PR/13PSI 4.00-18 4PR/17PSI
ELECTRICAL – CHARGING SYSTEM *(MFR) (TYPE)*	Gen.	Mitsubishi Flywheel Magneto
NO LOAD VOLTAGE ADJUSTMENT	Volt Adj.	ϕ
MAXIMUM OUTPUT'''	Output	ϕ
FIELD COIL *(and/or)* CHARGING COIL RESISTANCE	Field	ϕ
BATTERY *(MFR) (MODEL) (RATING)*	Battery	G.S. 6N4-2A-2 6V 4AH
HEADLIGHT/TAILLIGHT RATINGS	Lights	6V35/35W 6V5.3/17W
IGNITION COIL SPARK GAP *(MIN.)*/PRI. RES./SEC. RES.	*Spark*	7mm .9Ω 6.5KΩ
CONDENSER CAPACITY	Condens.	0.25uf
POINT GAP *(NOMINAL)*/SPARK PLUG *(TYPE) (GAP)*	Point	.35± .05mm/NGK B-9ES .5-.6mm/.020"-.023"
TIMING	Timing	2.9± .15mm BTDC

1-3 Performance Curves





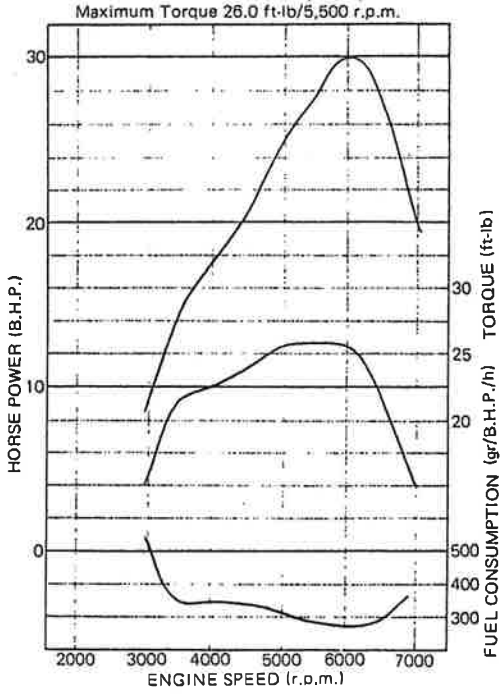




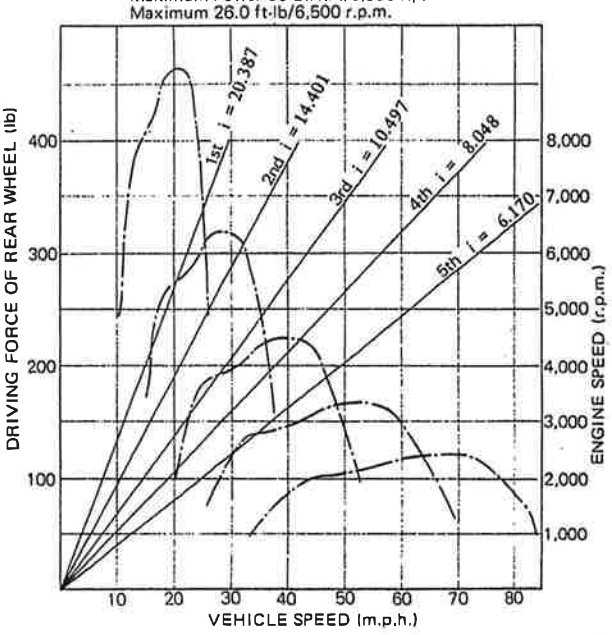
GENERAL - Performance Curves

Performance Curves

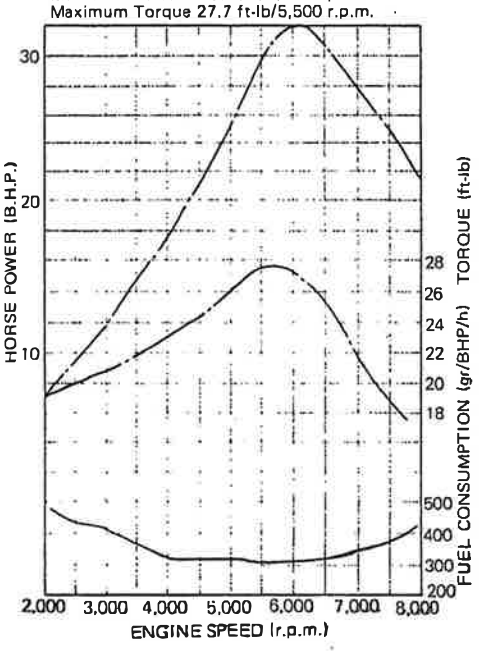
360 RT1-B DRIVING PERFORMANCE CURVES
Maximum Power 30 B.H.P./6,000 r.p.m.
Maximum Torque 26.0 ft-lb/5,500 r.p.m.



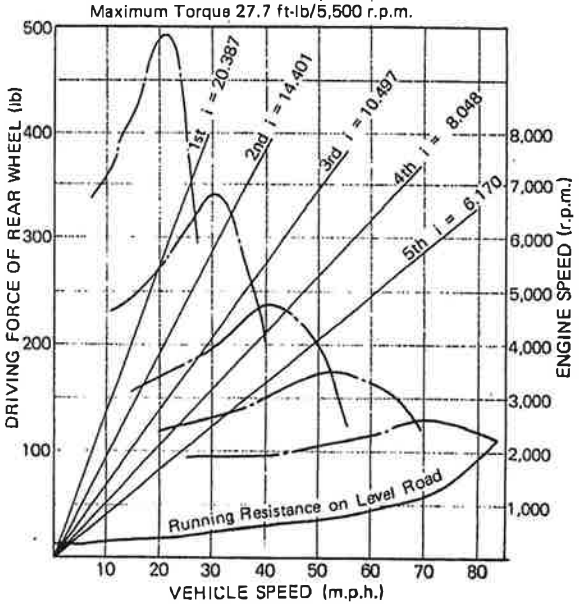
360 RT1-B ENGINE PERFORMANCE CURVES
Maximum Power 30 B.H.P./6,000 r.p.m.
Maximum 26.0 ft-lb/6,500 r.p.m.



360 RT2 & RT3 ENGINE PERFORMANCE CURVES
Maximum Power 32B.H.P./6,000 r.p.m.
Maximum Torque 27.7 ft-lb/5,500 r.p.m.



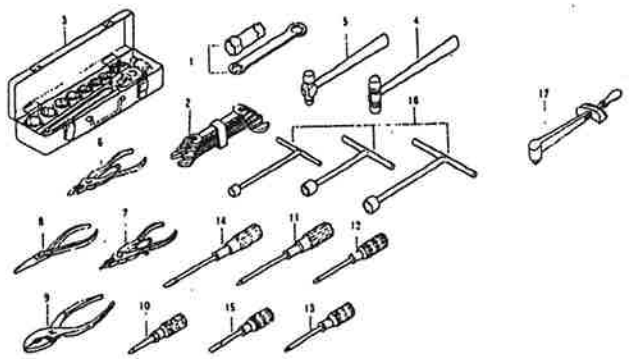
360 RT2 & RT3 DRIVING PERFORMANCE CURVES
Maximum Power 32 B.H.P. 6,000 r.p.m.
Maximum Torque 27.7 ft-lb/5,500 r.p.m.



1-4 Tools and Instruments for Shop Service

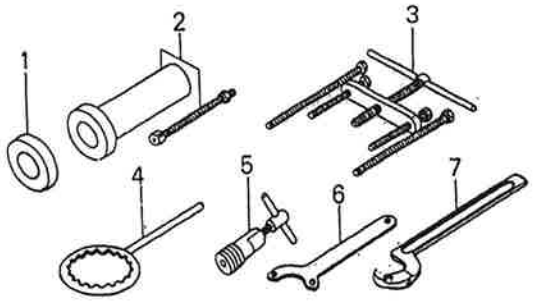
The following tools and instruments are required to service the DT and RT Series.

1. General Tools



1 Plug wrench 23 x 29mm
2 A set of wrenches
3 A set of socket wrenches
4 Plastic tip hammer
5 Steel hammer
6 Circlip pliers (ST type)
7 Circlip pliers (TR type)
8 Needle nose pliers
9 Pliers
10 Phillips-head screwdriver
11 Phillips-head screwdriver (L)
12 Phillips-head screwdriver (M)
13 Phillips-head screwdriver (S)
14 Slot-head screwdriver (M)
15 Slot-head screwdriver (S)
16 T-handle socket wrench
17 Troque wrench

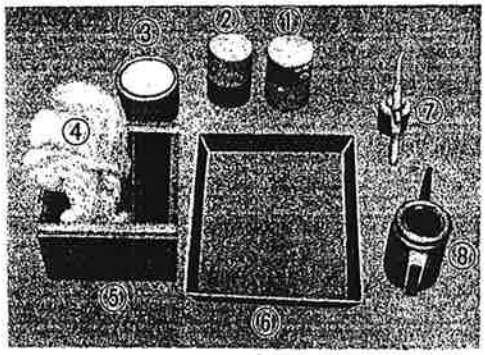
2. Special Tools and Instruments



1 Crankshaft puller adaptor
2 Crankshaft assembling tool (for YF1 and YG1)
3 Crankcase disassembling tool
4 Clutch holding tool
5 Flywheel magento puller
6 Flywheel magento holding tool
7 Exhaust pipe wrench

In addition, an electro-tester, a tachometer (engine r.p.m. meter), a hydrometer, etc. are needed.

3. Other Materials



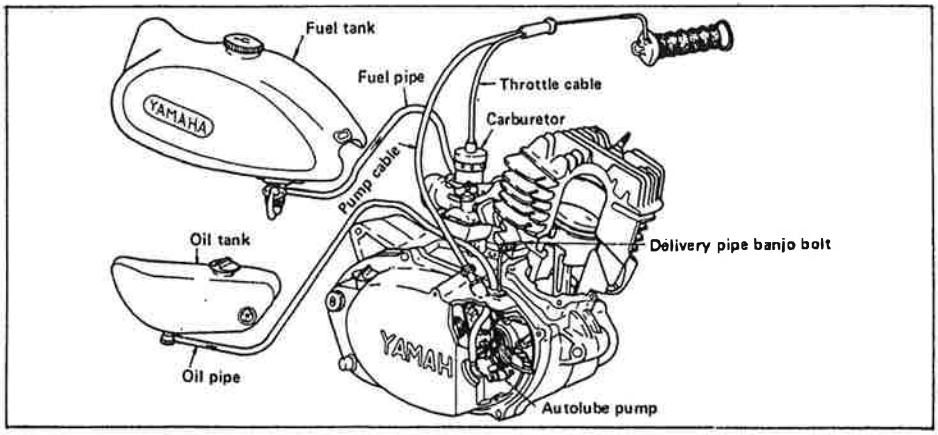
1 Yamaha Bond No. 4 & 5
2 Autolube oil
3 Grease
4 Wiping material
5 Overhauling stand
7 Oiler
8 Oil jug

The use of a wooden box as shown in the above photo 5 will facilitate engine service and overhaul. Consumable parts (such as gaskets) and replacement parts must also be on hand.

CHAPTER 2. YAMAHA AUTOLUBE
(Automatic Separate Lubricating System)

2-1 What is YAMAHA Autolube?

Conventional 2-stroke engines are lubricated by oil premixed in gasoline, but YAMAHA's Autolube furnishes an automatic, separate lubrication system. That is, the oil in a separate oil tank is automatically regulated by the oil pump and fed to the engine according to engine speed and load.



2-2 Features of YAMAHA Autolube

The oil pump is driven by the engine through a reduction gear, and is connected to the carburetor throttle cable controlled by the accelerator grip.

The oil pump automatically regulates the volume of lubricating oil according to engine speed and throttle valve opening, thus pumping the optimum amount of oil for engine lubrication under any operating condition.

This "automatic separate lubrication" does not merely eliminate disacvantages in the conventional pre-mix system, but it further improves the performance and efficiency of 2-stroke designs by eliminating certain oil-starvation conditions which formerly existed.

A) The Autolube feeds an optimum amount of lubricating oil to the engine under any operating condition, thus featuering:
   * Less oil consumption.
   * Less carbon accumulation.
   * Less exhaust smoke.
   * Improved lubricating efficiency.

B) The Autolube simplifies fuel supply, thus featuring:
   * Using straight gasoline directly in the gas tank.
   * Less fuel contamination.

C) The Autolube improves the reliability of lubrication, thus eliminating:
   * Special care concerning oil/fuel mixing ratio.

2-3 Handling the Oil Pump

The oil pump is a precision-machine assembly. Make no attempt to disassemble it. When you remove the oil pump from the engine, protect it from dust, dirt, etc., and after reinstalling it, bleed and adjust the pump correctly. Proper handling will keep the pump free from trouble.

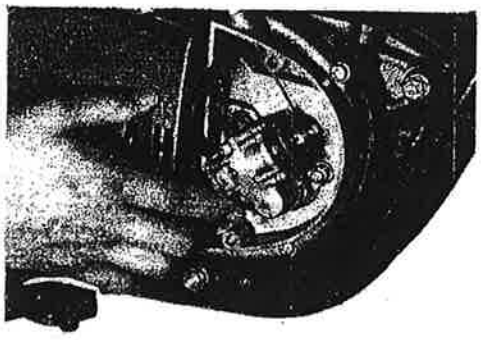
The oil pump is similar in both mechanism and construction to other Autolube systems. The only difference is the employment of a 5.5ϕ plunger because of the larger need for oil of 250 or 360 cc single cylinder engine.

2-3-A Checking Minimum Pump Stroke

1) Checking

a. Fully close the accelerator grip.

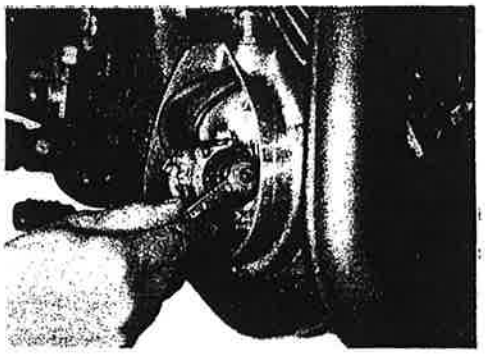
b. Turn the oil pump starter plate in the direction of the arrow marked on the plate. Keep the gap as wide as possible by observing it with the eye. Then measure the gap between adjusting pulley and the adjusting plate.



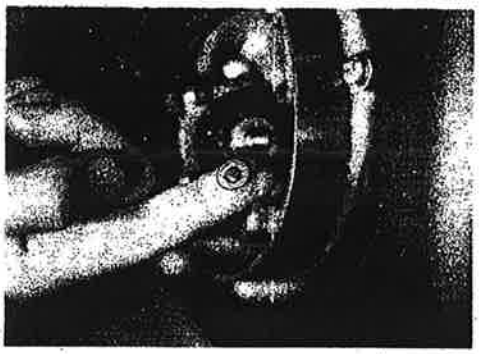
c. Insert a feeler gauge (0.15 mm) into the gap.
When the gap allows it to enter
····· Stroke is correct.
When the gap does not allow
····· Stroke is insufficient.

2) Adjustment

a. Remove the adjusting plate lock nut, and then remove the adjusting plate.



b. Install a 0.1 mm adjusting shim where the adjusting plate was.



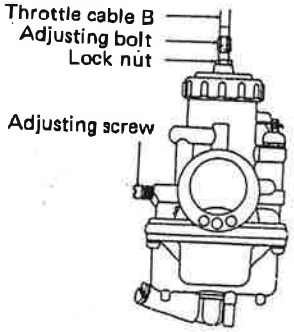
c. Reinstall the adjusting plate lock nut, and measure minimum stroke
When the gap allows a 0.20 mm feeler gauge to enter but does not allow a 0.25 mm, the stroke is correctly adjusted.
Minimum stroke adjustment limit..... 0.15 mm
Stroke adjustment tolerance ..... 0.20 to 0.25 mm

2-3-B Carburetor and Autolube Cable Adjustments

Perform the preceeding steps in Section 2-3-A to check minimum stroke, and adjust the Autolube and carburetor cables.

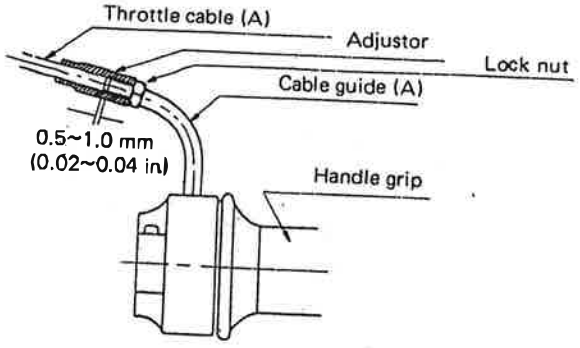
1) Throttle Cable Adjustment

a. To adjust the throttle cable free play with the engine at idle, begin by removing all slack from throttle cable B.



Then remove all the free play from throttle cable A. Loosen or tighten the throttle cable adjusting screw until all slack has been taken up. Next, screw the cable adjustor in at the carburetor until there is 1 mm free play (1/32") in the cable at the top of the carburetor.

b. The next adjustment is at the throttle grip. Loosen the lock nut and screw the adjustor in or out, whichever is necessary to get 0.5–1.0 mm of free play at the cable end.

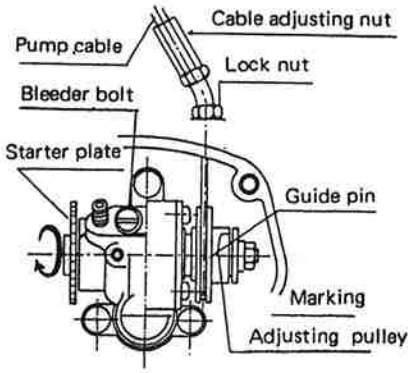


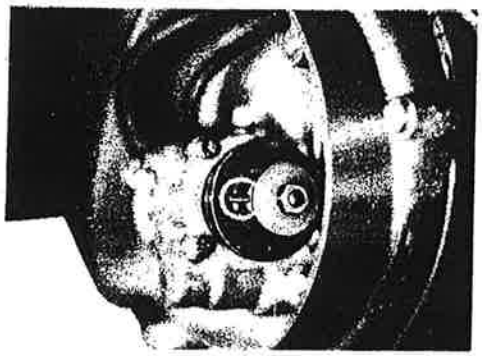
Twist the throttle grip to check the play of throttle cable A. If the play is excessive or insufficient, adjust the free play with the adjusting screw.

2) Autolube Cable Adjustment

a. Adjust the pump cable so that the marking (arrow) on the Autolube pump adjusting pully is aligned with the guide pin.

Begin by fully closing the accelerator grip, then slowly turning it back again so that the slack in the throttle cable is completely taken up. Next, adjust the pump cable so that the marking on the pump adjusting pulley will be aligned with the guide pin, as shown below. The point of adjustment is at the end of the cable just before it enters the case. Loosen the lock nut and screw the adjustor in or out whichever direction is necessary to obtain the correct adjustment.

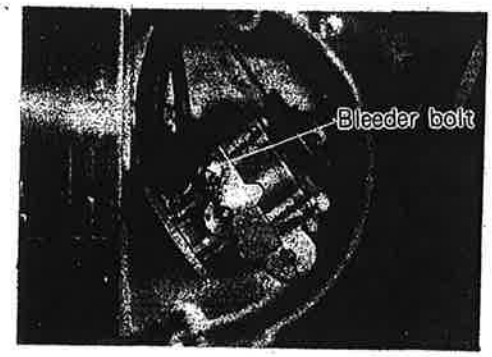




2-3-C Bleeding

When the pump has been removed or the Autolube oil has run out, air will enter the pump. The air will cause an irregular flow of oil after the pump is mounted again or the oil tank is refilled. In order to prevent such an irregular flow of oil, bleed the pump in the following manner.

1) Remove the bleeder bolt.



2) Next, rotate the starter plate in the direction of the arrow marked on the plate. Continue turning the plate until no air remains, and tighten the bleeder bolt. To facilitate this bleeding, fully open the accelerator grip and rotate the starter plate. As the plunger stroke becomes greater, the air can be more quickly bled.

CHAPTER 3 ENGINE

The DT, RT Series engines have been designed with emphasis on both low speed trail riding and high speed road riding. The incorporation of the evenly spaced five-speed transmission and five or seven-port induction system insures complete riding versatility for the owner. The width, height, and weight of the engine has been kept at a bare minimum to insure ease of handling in the roughest terrain.

Disassembly and assembly of the engine and its components should be done in the following manner and order. This will insure correct maintenance and service work for the owner and mechanic.

Preparation for Disassembly of the Engine:

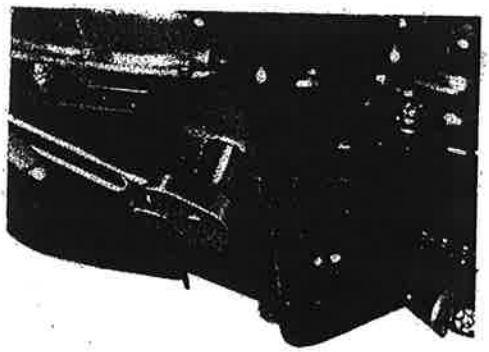
1) All dirt, mud, dust, and foreign material should be thoroughly removed from the exterior of the engine before removal and disassembly. This will prevent any harmful foreign material from entering the interior of the engine assembly.
2) Before engine removal and disassembly, be sure you have proper tools and cleaning equipment so you can perform a clean and efficient job.
3 During disassembly of the engine, clean and place all parts in trays and in order of disassembly. This will ease and speed assembly time and insure correct re-intallation of all engine parts.

3-1 Engine Removal

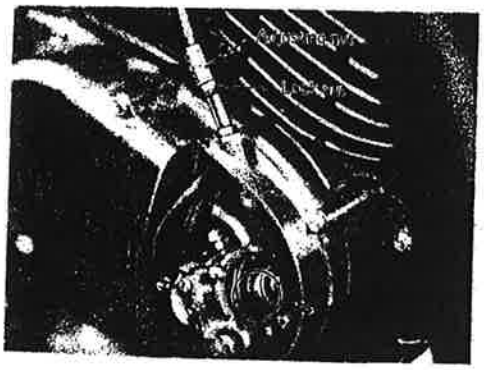
1. Start the engine and warm it up for a few minutes, then turn off the engine and drain the transmission oil.

Volume of oil: (1.0 qt) 1,000 c.c.

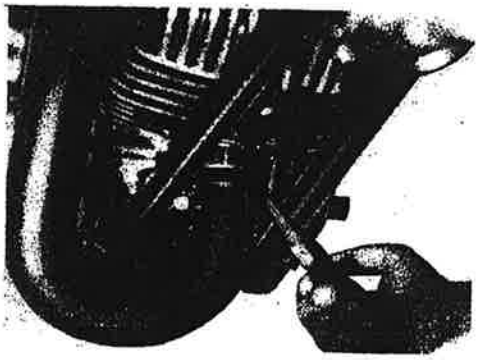
(SAE 10W/30 Motor Oil)
TYPE "SE"



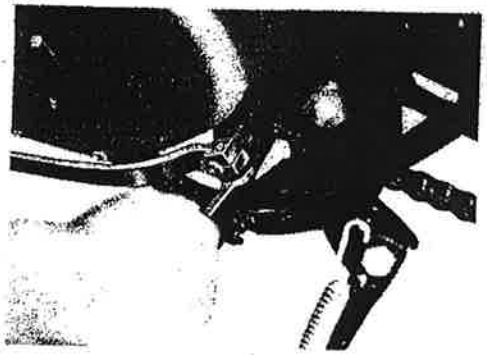
2. Disconnect the decompression cable (360) and Autolube cable.



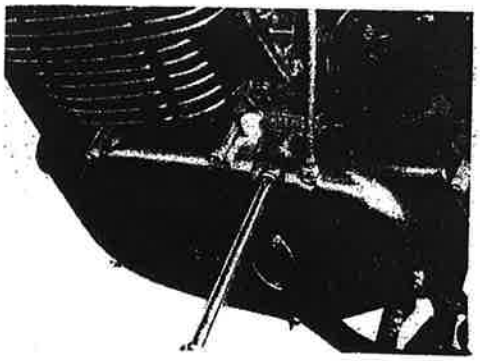
3. Remove the muffler.



4. Remove the change pedal.

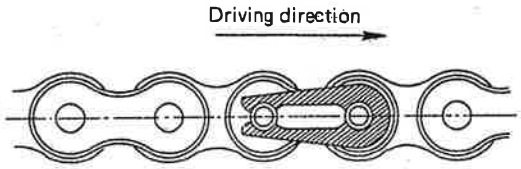


5. Remove the chain cover and then disconnect the clutch cable.



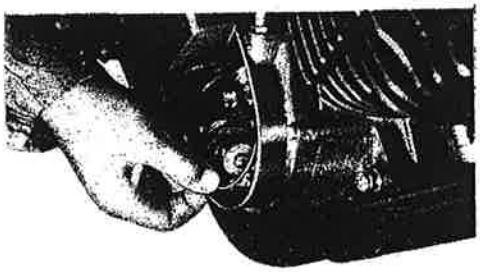
6. Disconnect the master link and remove the chain.

When replacing the chain, be sure that master link is facing in the correct direction.



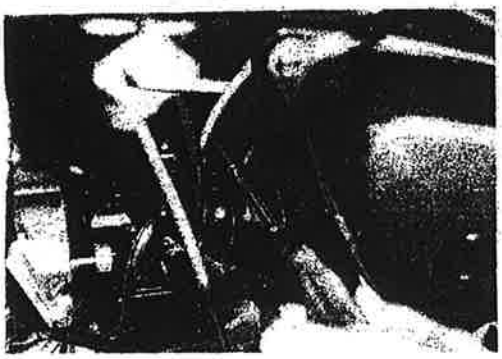
After replacing, adjust the chain free play to 25 mm (1 in.) total at the center of the lower section with the rear wheel on the ground, with the rider in position.

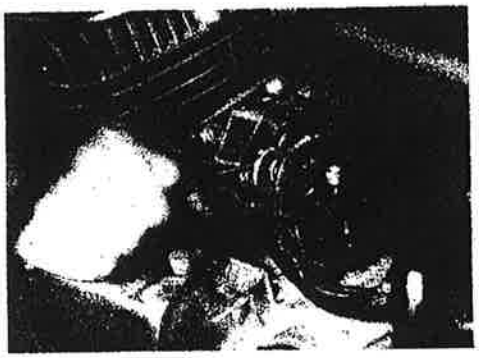
7. Remove the pump cover and pump cable.



8. Remove the tachometer cable.

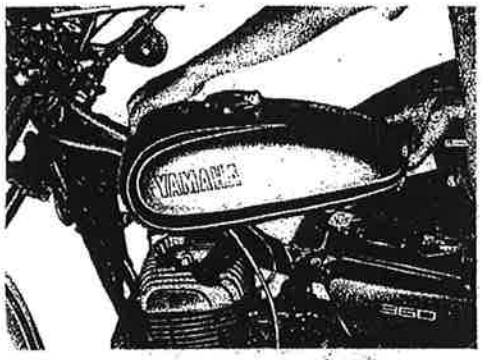
9 Remove the carburetor.



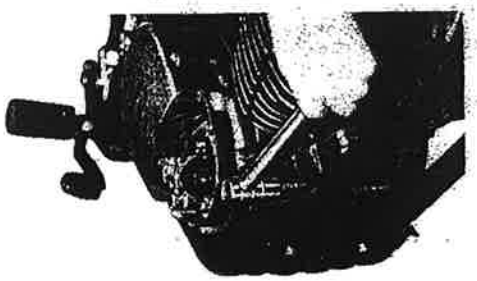


10. Disconnect the oil line at the bottom of the tank. Plug the tank fitting to prevent oil drainage.

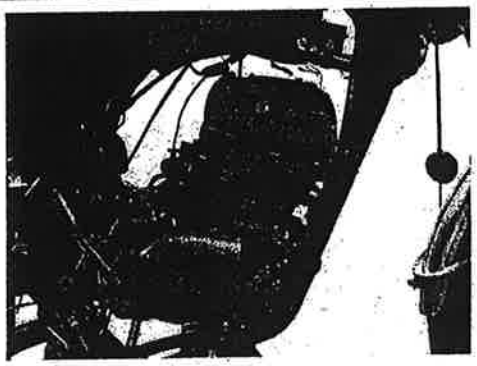
11. Disconnect the fuel line and remove the fuel tank.



12. Remove the four engine mounting bolts.



13. Remove the engine from the frame.



3-2 Cylinder Head

The cylinder head is bolted on the cylinder with special nuts.

	DT1-E	DT2, DT3	RT1-B	RT2, RT3
Cylinder head volume (c.c.)	34.0	30.0	50.0	48.0

A. Removing

DT Series: Loosen all four cylinder head nuts evenly, a ¼ turn at a time, and in a "cross" pattern. This prevents head surface warpage.

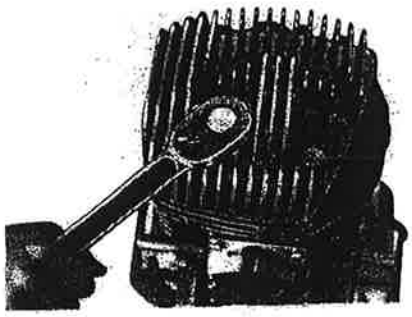
RT Series: First loosen all four 8mm nuts evenly, a ¼ turn at a time, in a "cross" pattern. Then repeat this procedure for the 10mm nuts.

B. Installing

Replace the head gasket if gouged, ripped, creased, or damaged such that it would not totally seal. Next, install the head and tighten all four 10mm nuts in a "cross" pattern, in 3 progressively tighter torque ratings, until recommended torque specs are reached.

NOTE: On the RT Series head nuts, tighten the 10mm nuts first, then tighten the 8mm nuts to specs. Follow the same progressive procedure on all 8mm nuts.

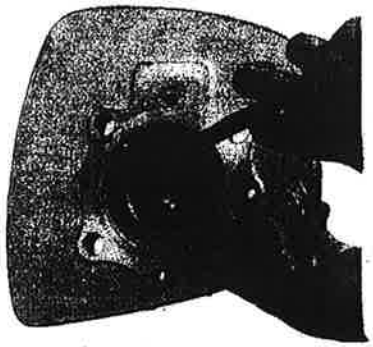
Cylinder head tightening torque: 3.5~4.0 kg-m (25~30 ft-lbs) for 10 mm bolts
2.0 kg-m (15 ft-lbs) for 8 mm bolts (RT series)



C. Removing Carbon Deposits

Carbon deposits on the combustion chamber dome and piston crown will result in an increase in the compression ratio as well as preignition and engine overheating.

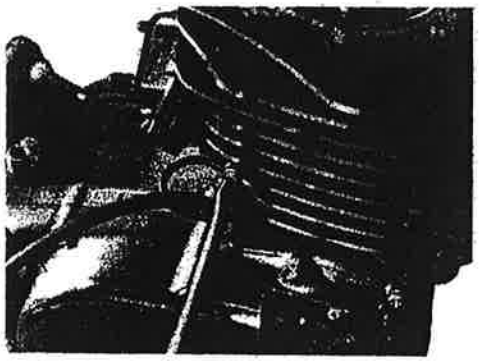
Scrape the dome and piston crown clean. Do not gouge the material, use a blunt scraper.



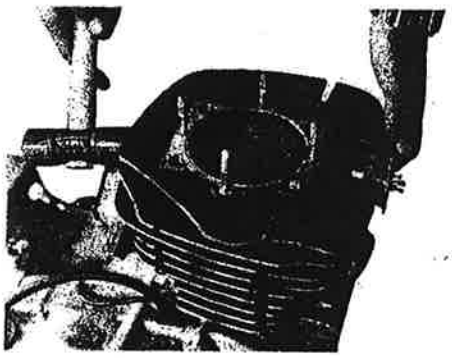
3-3 Cylinder

A. Removing the Cylinder

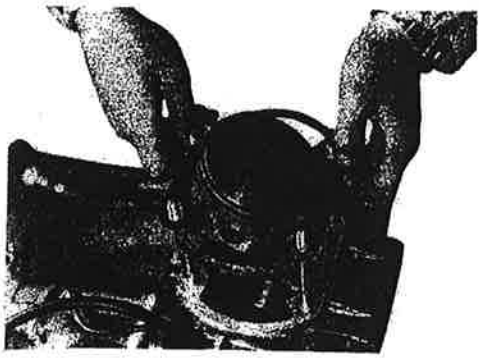
1) Remove the oil delivery line banjo bolt from cylinder.



2) Remove the cylinder by striking it lightly with a plastic or rubber hammer.

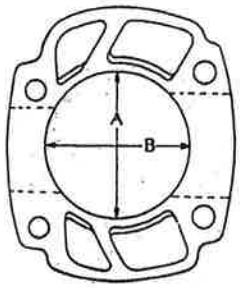


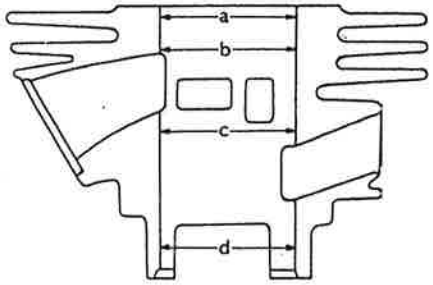
3) Always replace the cylinder base gasket when reassembling cylinder.



B. Checking the Cylinder for Wear

1) Measure the amount of cylinder wall wear with a cylinder bore measuring micrometer or cylinder gauge. (Measure it at four depths by positioning the instrument in line and then at right angles to the crankshaft.) If the difference between the maximum and minimum diameter exceeds 0.05 mm (0.0019"), rebore and hone the cylinder to the next over size.





2) The clearance between the piston and the cylinder is:

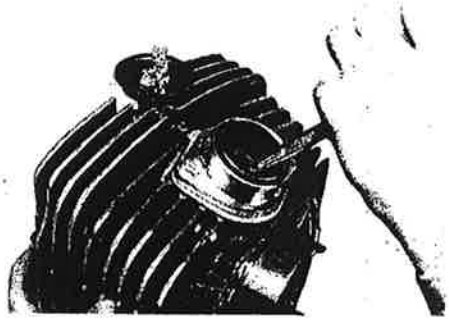
0.040~0.045 mm (0.0014~0.0018") (DT1-E, DT2, DT3)
0.045~0.050 mm (0.0018~0.0020") (RT1-B, RT2, RT3)

C. Cylinder Reconditioning

1) Pistons are available in 0.25 and 0.50 mm (0.010" and 0.020") oversizes.
2) Cylinder should be rebored and honed to the diameter of the oversize piston plus the minimum allowable clearance.
3) The error between the maximum and minimum cylinder diameters after boring and honing should be no more than 0.02 mm (0.0008").

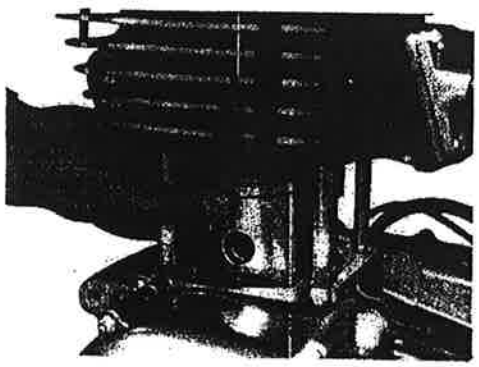
D. Removing Carbon Deposits

Scrape off the carbon accumulation in the exhaust port of the cylinder with a hacksaw blade dulled at one end.



E. Installing the Cylinder

Align the ring ends with the locating pins in each ring groove.
Thoroughly coat the rings, piston walls wrist pin and bearing with oil.
Next, insert the piston into the cylinder.
Take care not to damage the rings.

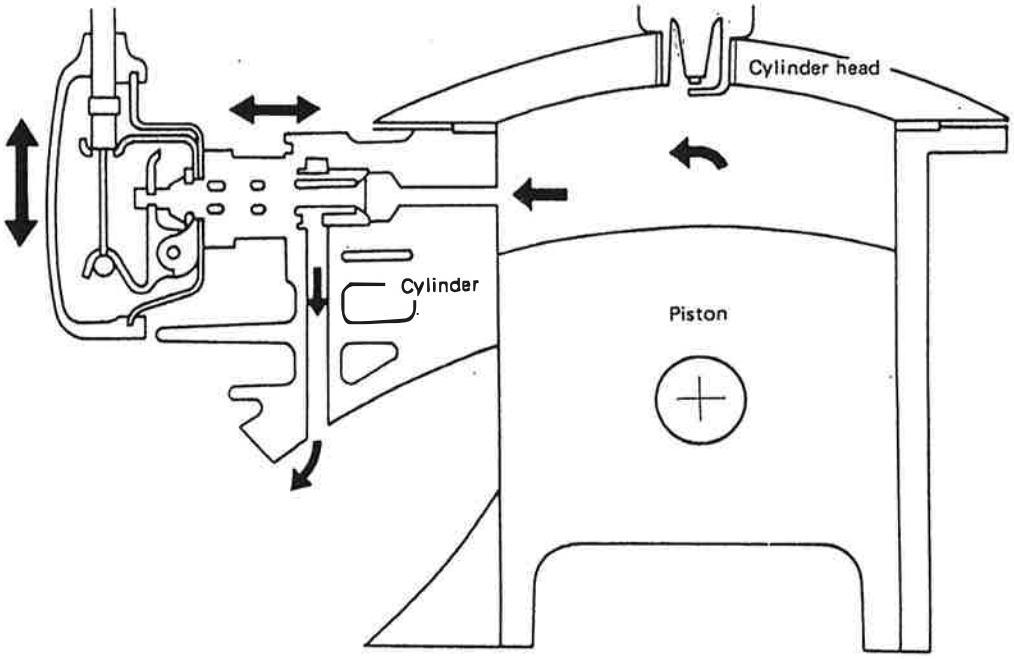


F. Decompression Device (RT1-B, RT2, RT3)

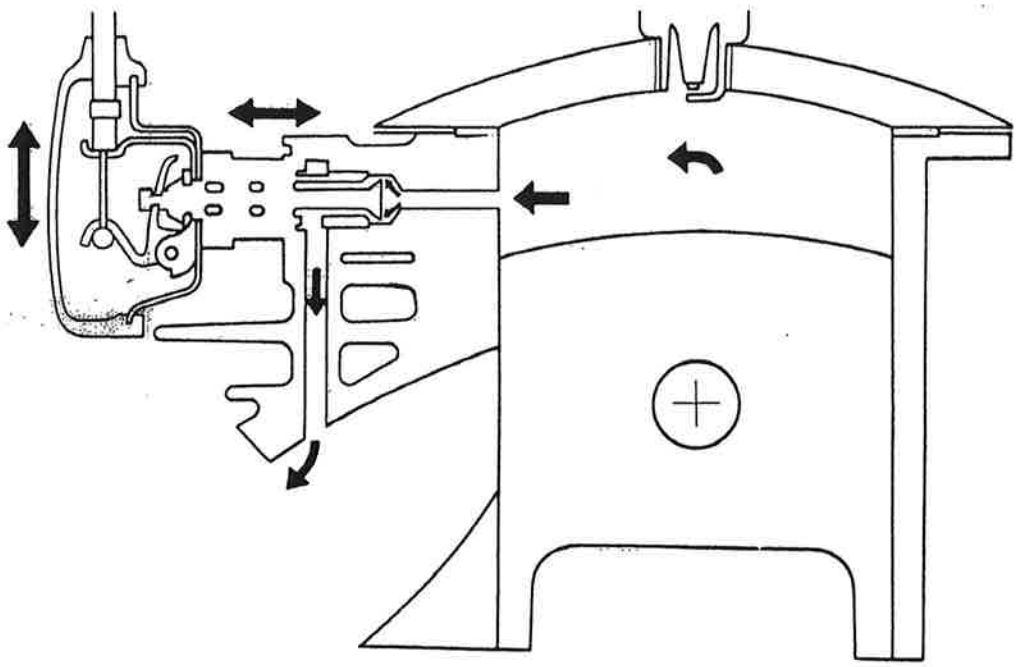
The decompression device, which is adopted for the RT Series, features ease of handle. It is so designed that the engine can be started and kept run with the decompression lever in the pulled-out position.

a. Construction

With the decompression lever pulled out, the compressed air-fuel mixture and the burned gases in the cylinder are forced out through the decompression port in the cylinder to the exhaust gas passage.



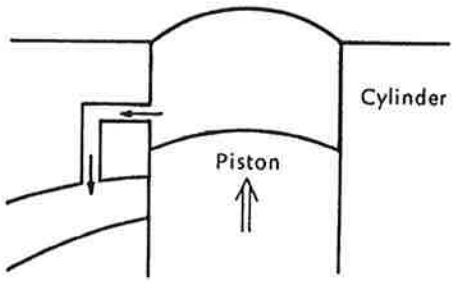
Decompression valve closed



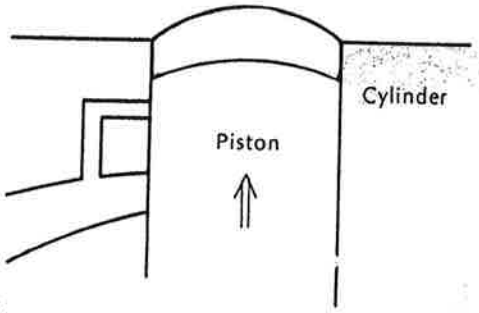
Decompression valve open

b. Operation

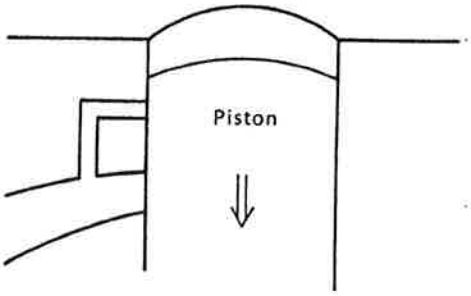
1) In the compression stroke, the compression pressure passes to the exhaust gas passage through the decompression valve until the piston closes the decompression port in the cylinder.



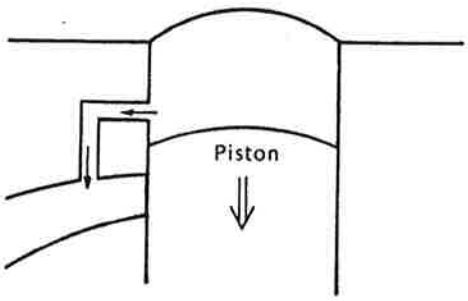
2) As the piston rises further in the compression stroke and closes the decompression port, the compression pressure continues to build up.



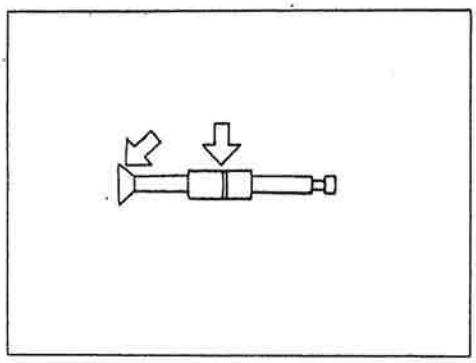
3) In the explosion and expansion strokes, the piston starts down, and until it passes the decompression port, the explosion and expansion strokes are in process as in the case of a conventional two-stroke engine.

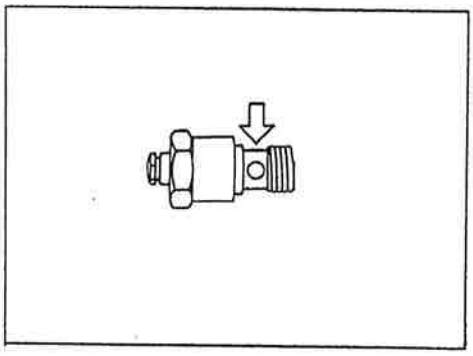


4) As the expansion stroke advances and the piston opens the decompression port, the explosion pressure passes to the exhaust gas passage of the cylinder.

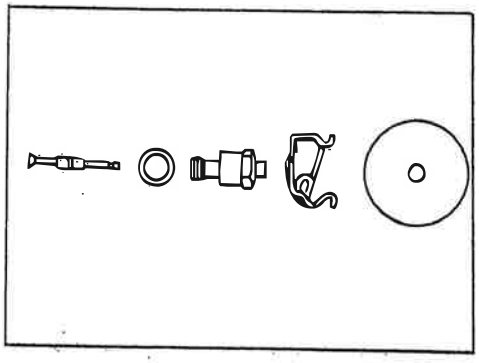


c. Carbon removal
Remove the decompression holder (screwed-in type), and remove the deposit from the decompression valve, decompression holder and passages (related to decompression) in the cylinder.





Note:
It is always advisable, when the decompression device is reassembled, to replace the gasket and O-ring. When the valve face is found excessively worn or unevenly worn, both valve and holder should be replaced.



Caution
After reassembling the decompression device, be sure to check it for compression pressure leaks.

3-4 Reed Valve Construction and Handling

Construction of the Reed Valve

a. Valve

The valve is made of special flexible stainless steel and designed to open and close the inlet port.

b. Case

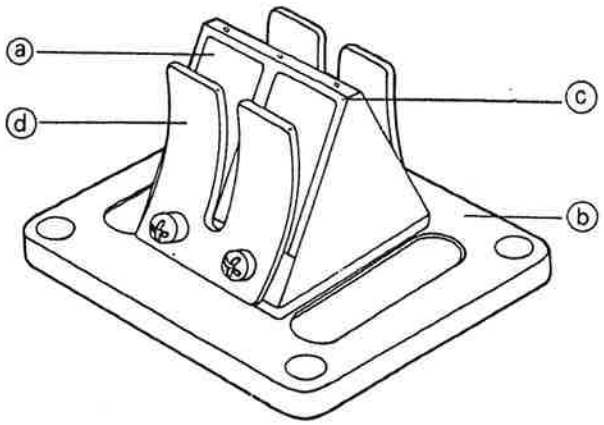
The case is made of a die-cast aluminum alloy.

c. Gasket

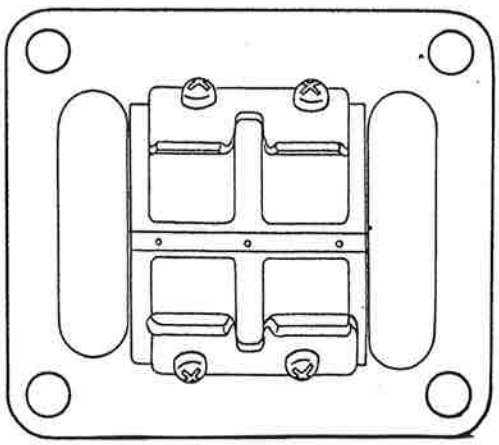
Made of heat-and oil-resisting rubber, the gasket is "welded to the case by heat.

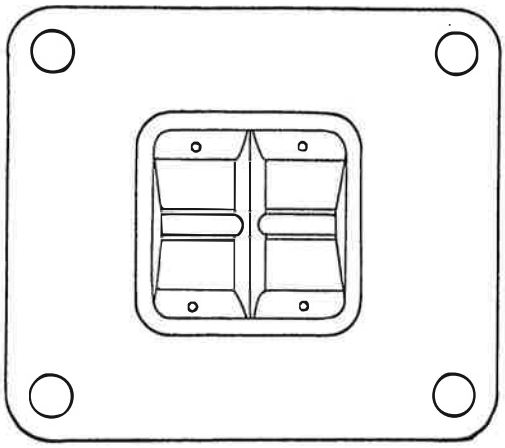
d. Valve Stopper

The valve stopper is made of highly-durable cold-rolled stainless steel plate, and controls the movement of the valve.



a. Valve
b. Case
c. Gasket
d. Valve stopper





Handling of the Reed Valve

As explained earlier, the reed valve is operated by changes in the crankcase pressure and by the inertia effect of the fuel-air mixture stream. It is a high-precision work, and therefore, it must be handled with special care.

a. Storage

The reed valve must be stored in a clean and dry place and must not be exposed to the sun. Particularly, it must be kept free from salt. Avoid allowing your hand to touch the valve.

b. Inspection

(a) Valve

Check the valve for cracks and breakage.

(b) Valve stopper

The valve stopper limits the movement of the reed valve. The movement of the valve end measured from the gasket is controlled to a certain limit.

Normal movement:	DT2, DT3	9.3 + 0.3 mm
	RT2, RT3	9.3 +0.3 mm

* If the valve stopper is positioned more than the specified distance from the gasket, it will shorten the life of the valve and poor performance will result.

(c) Set-screw

The valve and valve stopper should be fastened with the set-screw. Tightening torque should be correct, otherwise, the valve and valve stopper will be deformed.

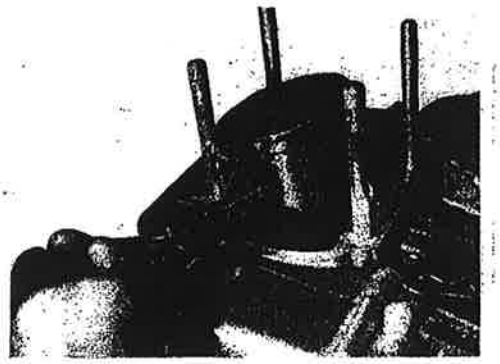
(d) Gasket

The gasket is "welded"to the case by heat. It should be checked for separation from the case. If the gasket becomes loose, it may fail to achieve a good seal with the valve.

c. Valve Service

The reed valve can not be perfect, if any of its components – valve, valve stopper, gasket case and set-screw – is faulty. If so, it is advisable to replace the whole assembly, instead of replacing a faulty part.

3-5 Piston Pin



A. Pulling out the Piston Pin

Remove the clips at both ends of the piston pin with needle nose pliers, and press out the piston pin with a finger or a slot-head screwdriver.

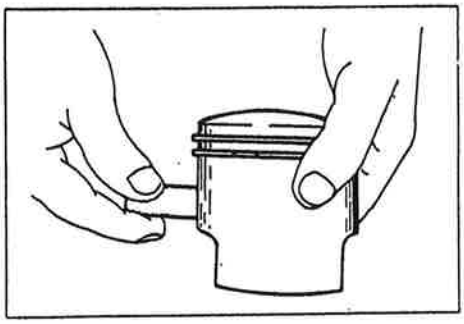
Note:

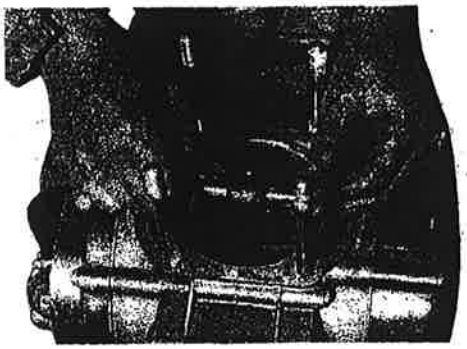
Before removing the piston pin clips, cover the crankcase with a clean rag, so you will not accidentally drop the clip or other foreign particles into the crankcase.

B. Piston-to-Piston Pin Fit

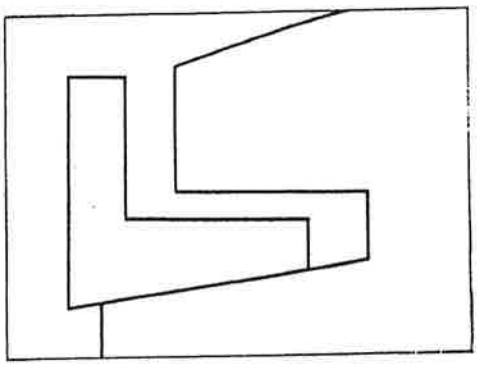
The piston pin should fit snugly in its bore so that it drags a little as you turn it. If the pin is loose, replace the pin and/or the piston.

If the pin has step-wear in its center, replace the needle bearing as well as the piston pin. Check the small end of the connecting rod for wear by inserting the piston pin and bearing.

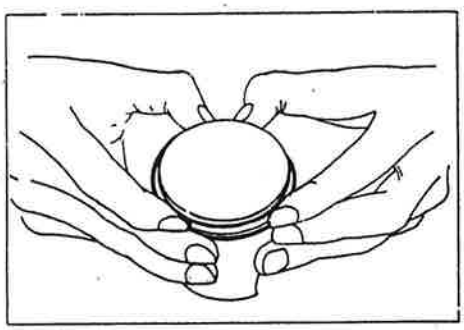




The L Type Keystone Ring is installed in the top ring groove. This type ring increases sealing efficiency due to direct combustion pressure that forces the outer edge tightly against the cylinder surface. There is also less frictional loss as the ring only pushes against the cylinder when there is pressure above the ring. The ring is "relaxed" the remainder of the time.

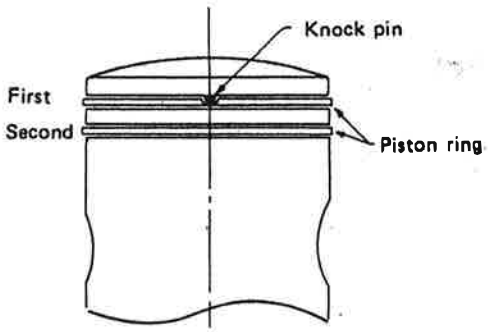


The lower ring edge has a 7° taper. This also permits more efficient sealing, plus reduces ring sticking.



A. Removing the Piston Rings

Put your thums at each end of the piston ring and pull the piston ring ends apart. Remove the ring by moving the ring off the piston on the other side of the ring ends.



B. Installing the Piston Ring

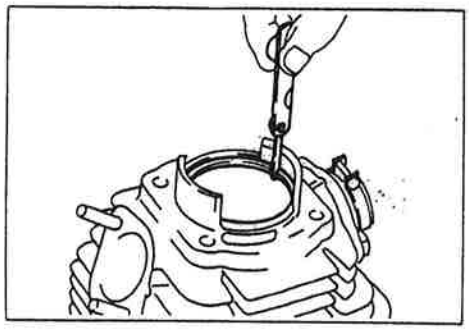
First fit the No. 2 ring over the piston, and then the No. 1 ring, and align their end gaps with the locating pin in each ring groove.

The printing on all rings must face up to position the gap properly at the pin.

C. Checking the Piston Rings

1) Measuring piston ring wear

Put the ring into the cylinder so that the ring is parallel to the cylinder bottom edge, and then measure the end gap with a feeler gauge.



Piston ring end gap

DT1-E	0.2–0.4mm
DT2, DT3, RT1-B, RT2, RT3	0.3–0.5mm

2) Removing carbon

Carbon on the piston rings and in the ring grooves will make the rings stick in the piston, thus causing gas blow-by.

Remove the rings from the piston, and clean the carbon from the rings and rings grooves.

3-7 Piston

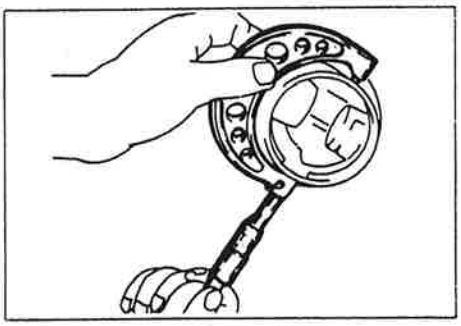
The piston is made of a high-silicon aluminum alloy.

A. Checking and Correcting the Piston to Cylinder Wall Clearance

1) Measuring piston clearance

Piston clearance is the difference between the minimum cylinder bore diameter and the maximum outside diameter of the piston.

As described in 5-3 Cylinder, piston clearance should be specified below:



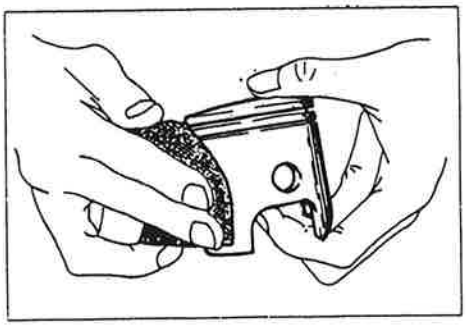
0.040~0.045mm	DT1-E, DT2, DT3
0.045~0.05mm	RT1-B, RT2, RT3

To determine the maximum piston diameter, measure the piston with a micrometer at right angles to the skirt 10 mm (3/8 in) from its bottom edge.

2) Checking and correcting scratches on the piston

A piston showing signs of seizure will result in noise and loss of engine power. it will also cause damage to the cylinder wall.

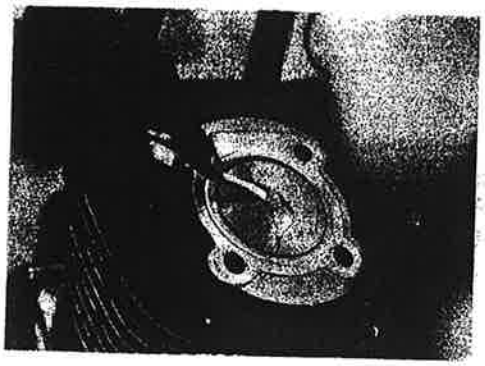
If a piston that has seized is used again without correction, another seizure will develop at the same area. Lightly sand the seizure "high spot" on the piston with #400 sandpaper until smooth. If the marks are deeper than 0.002" or are over a large surface, replace the piston.



3) Removing carbon

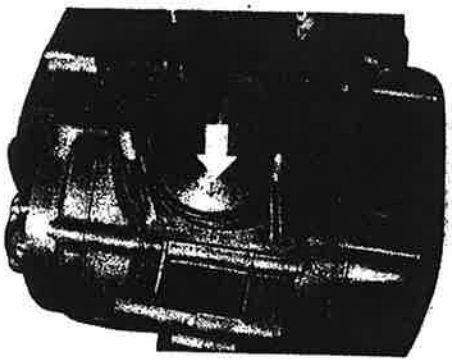
Remove carbon accumulations on the piston head with a screwdriver or a saw-blade.

Carbon and gum accumulations in the piston ring groove will result in piston ring seizure. Remove all carbon from the ring groove.



B. Piston Installation Direction

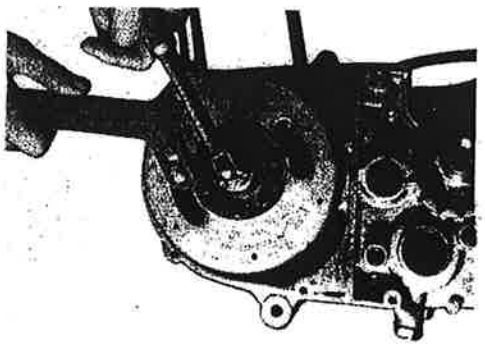
Install the piston with the arrow mark on the head pointing forward (toward the exhaust port of the cyliner.)



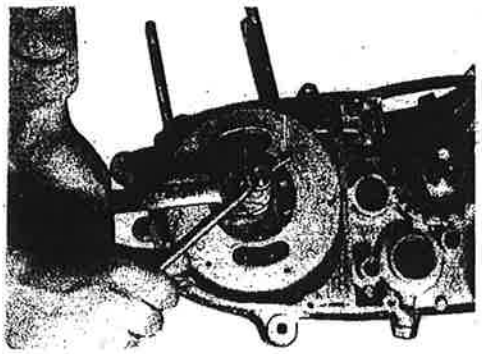
3-8 Flywheel Magneto

A. Remove the dynamo cover, and then remove the gasket. Replace it if damage.

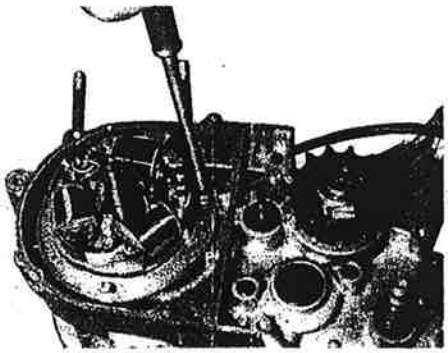
B. Remove the nut using a flywheel magneto holding tool.



C. Install the flywheel magneto puller.
(It has a left-hand thread.)
After the puller is secure, tighten the push screw and the flywheel will break loose, If necessary, tap the end of the tool smortly with a hammer to break the magneto free.



D. Remove the three screws holding the flywheel magneto base to the crankcase and remove the flywheel magneto base.

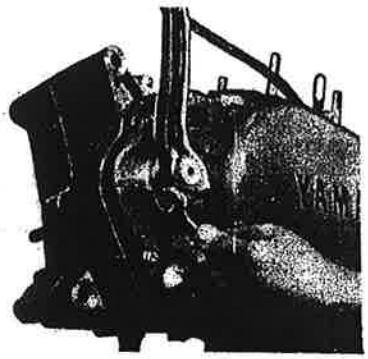


E. Remove the woodruff key.
It is advisable to place the woodruff key on the flywheel magnets (using its magnetic force) while the key is removed for engine service in order to keep it from becoming lost.

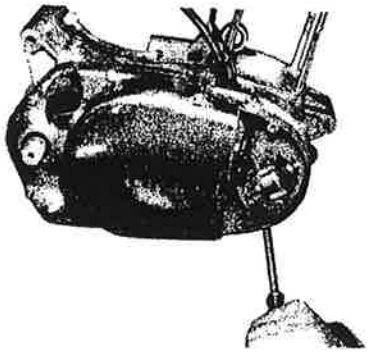
3-9 Crankcase Cover (R.H.)

A. Removal

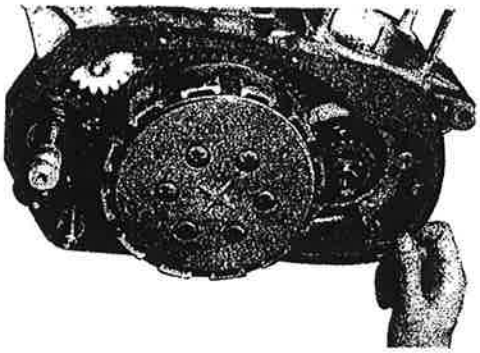
1) Remove the kick crank mounting bolt and the crank.



2) Remove the pan head screws holding the crankcase cover, and then remove the case cover. (The cover can be removed without taking off the oil pump.)



3) Remove the crankcase cover gasket. Replace it if damaged.

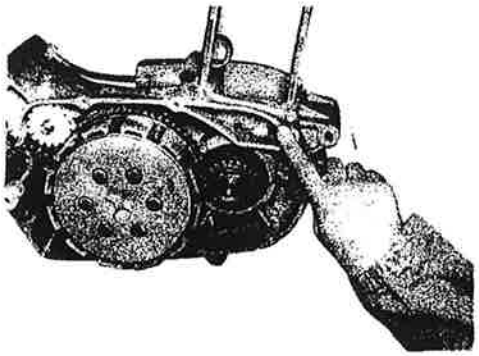


B. Installation

Spread YAMAHA Bond No. 5 over the mating surface of the right-hand crankcase. Place the crankcase cover gasket on the crankcase, apply Yamaha Bond No. 5 and install the right-hand crankcase cover. Be sure to apply YAMAHA Bond No. 5 to the mating surface, otherwise, the crankcase may leak.

Note:

When installing the crankcase cover (R), make sure that the pump drive gear (made from synthetic resin) is correctly engaged with the primary drive gear.



3-10 Clutch

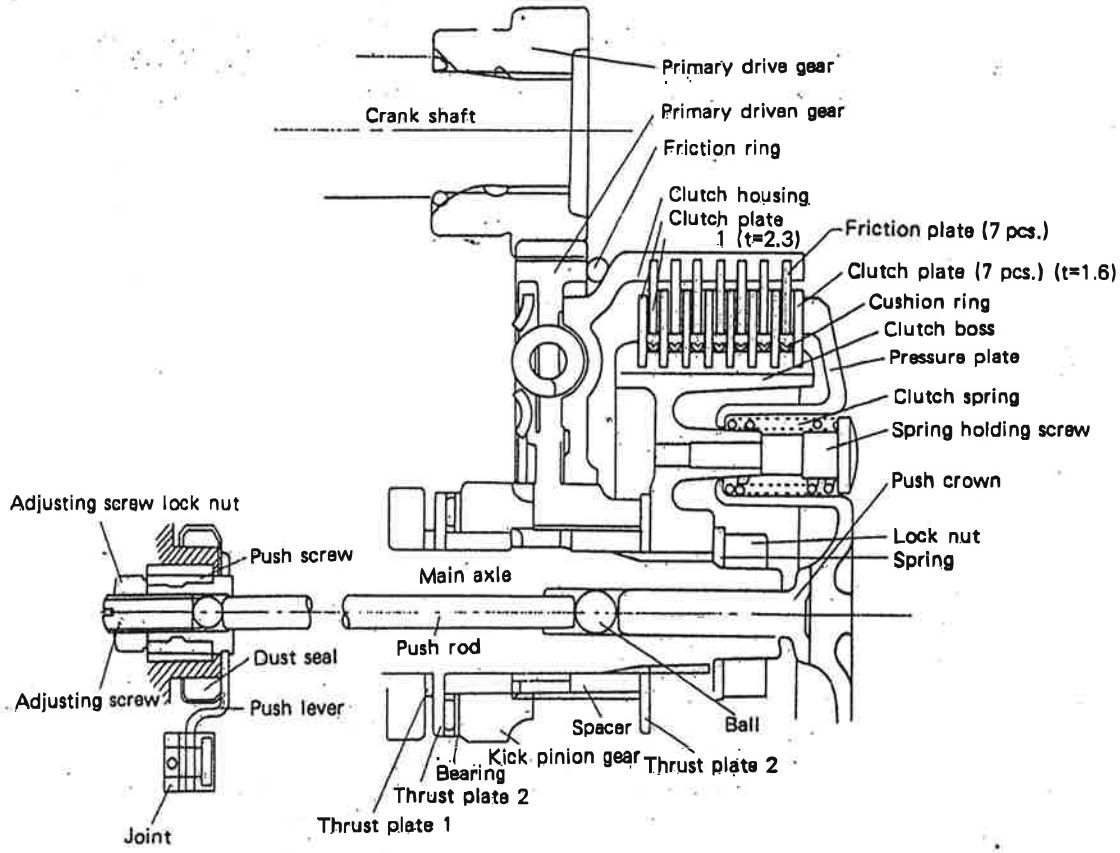
The clutch is a wet, multi-disc type, consisting of six (seven on 360cc) molded cork friction plates and seven clutch plates in the clutch housing which is mounted on the transmission main axle.

To disengage the clutch, an inner push rod system is employed. The primary driven gear, coupled with the clutch housing, is meshed with a kick pinion gear allowing starting by kicking the starter with the clutch disengaged (or engaged in neutral).

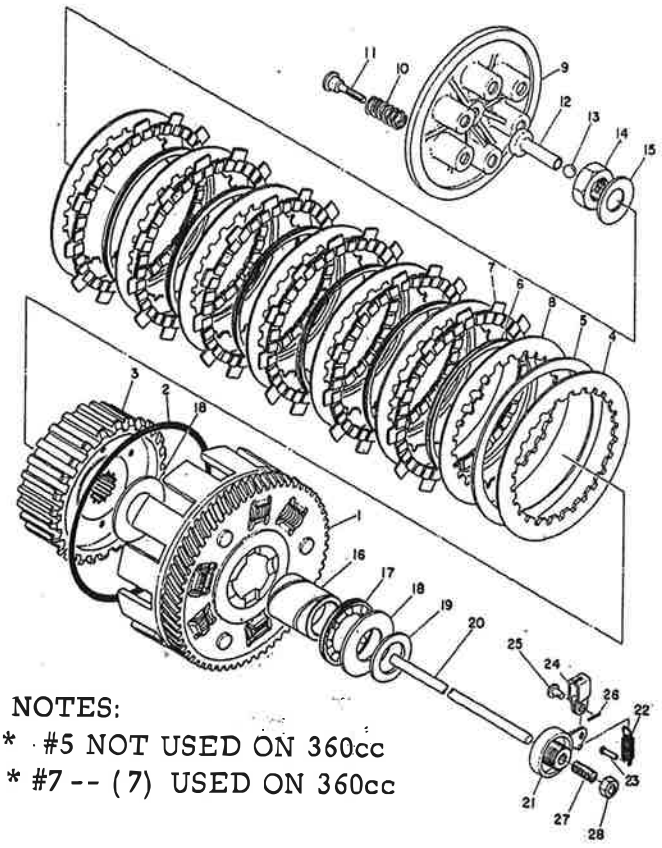
A shock absorber consisting of coil springs is between the primary driven gear and the clutch housing.

The primary drive gear has 21 teeth, and the primary driven gear 65 teeth.

(Primary reduction ration.....65/21 = 3.095)



CLUTCH

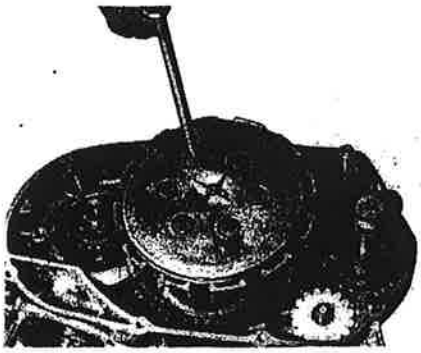


NOTES:
* #5 NOT USED ON 360cc
* #7 -- (7) USED ON 360cc

1	214-16150-00	. DRIVEN GEAR COMP. (65T)
2	93211-15149	. O-RING
3	214-16371-01	. BOSS, clutch
4	214-16324-00	. PLATE, clutch 1
5	214-16332-00	. SPACER
6	168-16367-00	. RING, cushion
7	168-16321-00	. PLATE, friction
8	168-16325-00	. PLATE, clutch 2
9	214-16351-00	. PLATE, pressure
10	137-16333-00	. SPRING, clutch
11	137-16337-01	. SCREW, spring
12	174-16356-00	ROD, push
13	93505-16006	BALL (5/16 inch)
14	156-16174-00	NUT, lock
15	214-16119-00	SPRING, belleville
16	214-16181-00	SPACER
17	93141-23307	BEARING
18	170-16164-00	PLATE, thrust 2 (25-50-2)
19	170-16154-02	PLATE, thrust 1 (25.2-34-2)
20	183-16357-00	ROD, push
21	214-16340-00	PUSH LEVER ASS'Y
22	137-16345-00	SPRING, return
23	132-16346-00	HOOK, spring
24	214-16389-00	JOINT
25	214-16379-00	PIN
26	91401-10010	PIN, cotter
27	214-16343-00	SCREW, adjusting
28	214-16344-00	NUT, adjusting

A. Removing the Pressure Plate

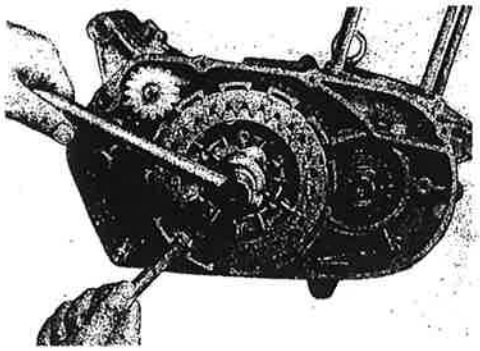
Remove the six clutch spring holding screws, and take out the pressure plate and push crown.



B. Removing the Clutch Boss

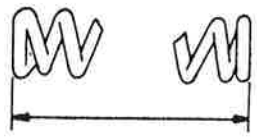
Install the clutch holding tool on the clutch boss.

Loosen the lock nut, and then remove the clutch boss.

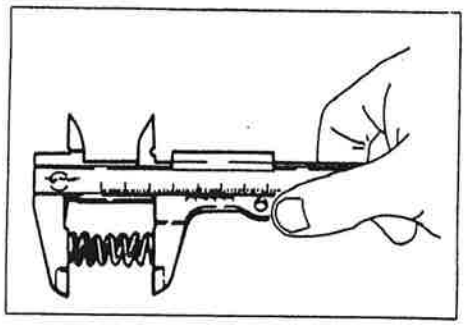


C. Checking the Clutch Spring

If the free length of the spring is 1 mm (0.04 in.) or more shorter than the standard free length, replace it.



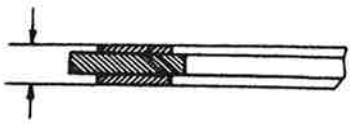
Free length 36.4 mm. (1.433 in.)

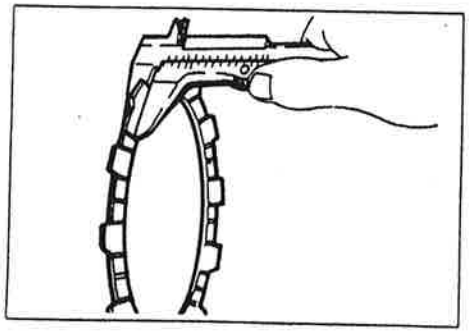


D. Checking the Friction Plates

Inspect the friction plates for wear. Replace them if they show 0.3 mm (0.012 in.) or more, uneven contact.

Standard thickness 3.0 mm. (0.118 in.)





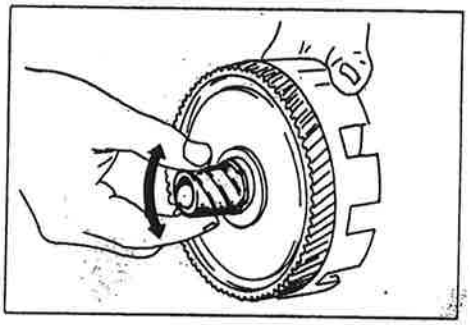
E. Clutch Housing Assembly (integrated with the primary driven gear)

A rubber friction ring is placed on the outside of the clutch between the primary driven gear and the clutch housing in order to reduce gear noise at low engine speeds.

1) Inspection

Insert the primary gear retaining collar (spacer) in the primary driven gear boss and check it for radial play.

If any scratches are found, replace it so it will not impair clutch action. If the play is excessive (allowable clearance is between 0.009 ~ 0.048 mm), replace the gear retaining collar because it will cause excessive noise.



F. Checking the Primary Gear Retaining Collar (Spacer)

Place the primary gear retaining collar over the main axle and again check it for radial play.

If play exists (allowable clearance is between 0.020~0.062 mm) replace the gear retaining collar.

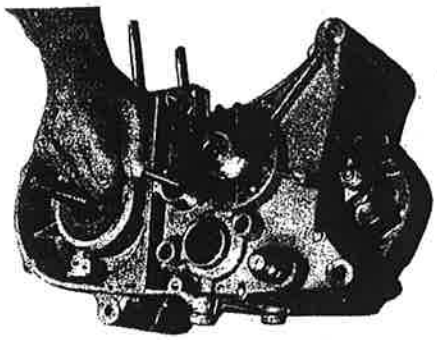
Replace any collar with step-wear on its outer surface.

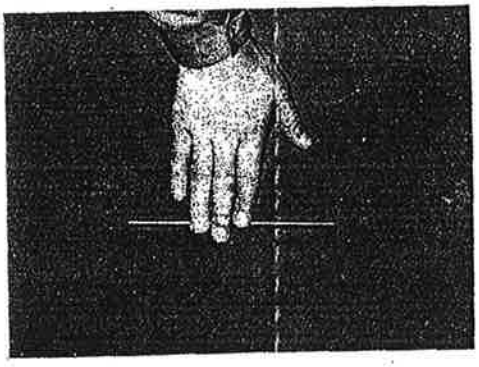
G. Fitting Cushion Rings

A cushion ring is installed between each of the clutch boss and the friction plates to insure even engagement and complete disengagement of the plates. When fitting cushion rings, be sure they are flat and not twisted.

H. Checking the Push Rod

Remove the push rod and roll it over a surface plate. If the rod is bent, straighten or replace it.





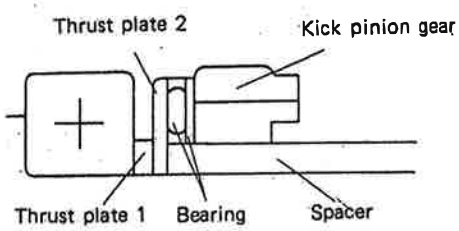
I. Caution on Re-assembling the Clutch

On both ends of the primary gear spacer are thrust washers and thrust bearings. If these washers and bearings are incorrectly installed, or omitted, the clutch boss will rub against the primary driven gear, impairing clutch action.

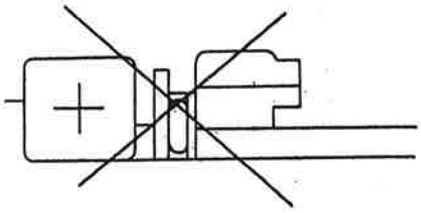
The thrust bearing assembly fits on the primary retaining collar, but it may slip out of place when installing clutch boss.

Therefore, apply grease to both surfaces of the bearing to make it stick to the gear retaining collar.

Correct



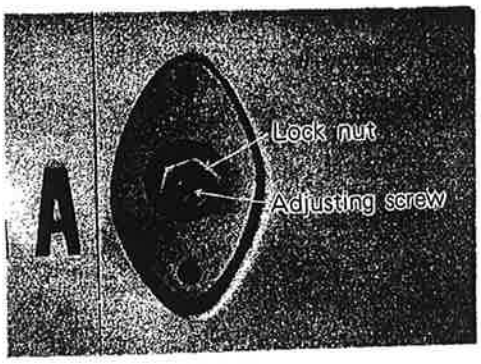
Incorrect



J. Adjusting the Clutch

1) Adjusting the Push Screw

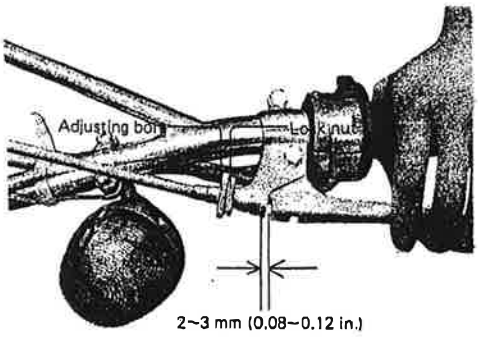
Remove the clutch adjusting cover and loosen the push screw lock nut. Rotate the push screw in to a lightly seated position, and back it off 1/4 turn to get the proper spacing. Then fully tighten the lock nut.



2) Adjusting the Clutch Cable Tension.

The clutch cable adjustment changes after being used for a long time.

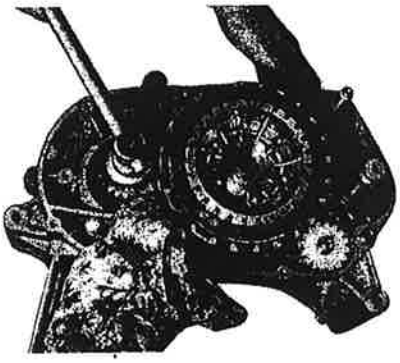
Occasionally the cable must be Re-adjusted so that the play of the clutch handle is from 2 to 3 mm (1/16-1/8 in) at the pivot.

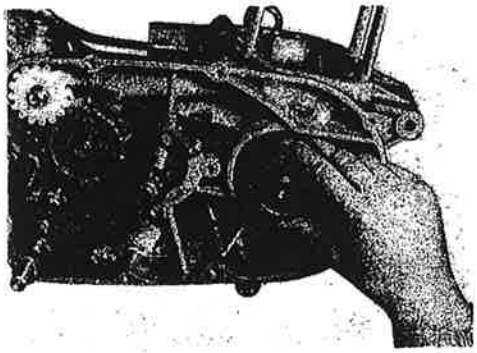


3-11 Primary Drive Gear

A. Removal

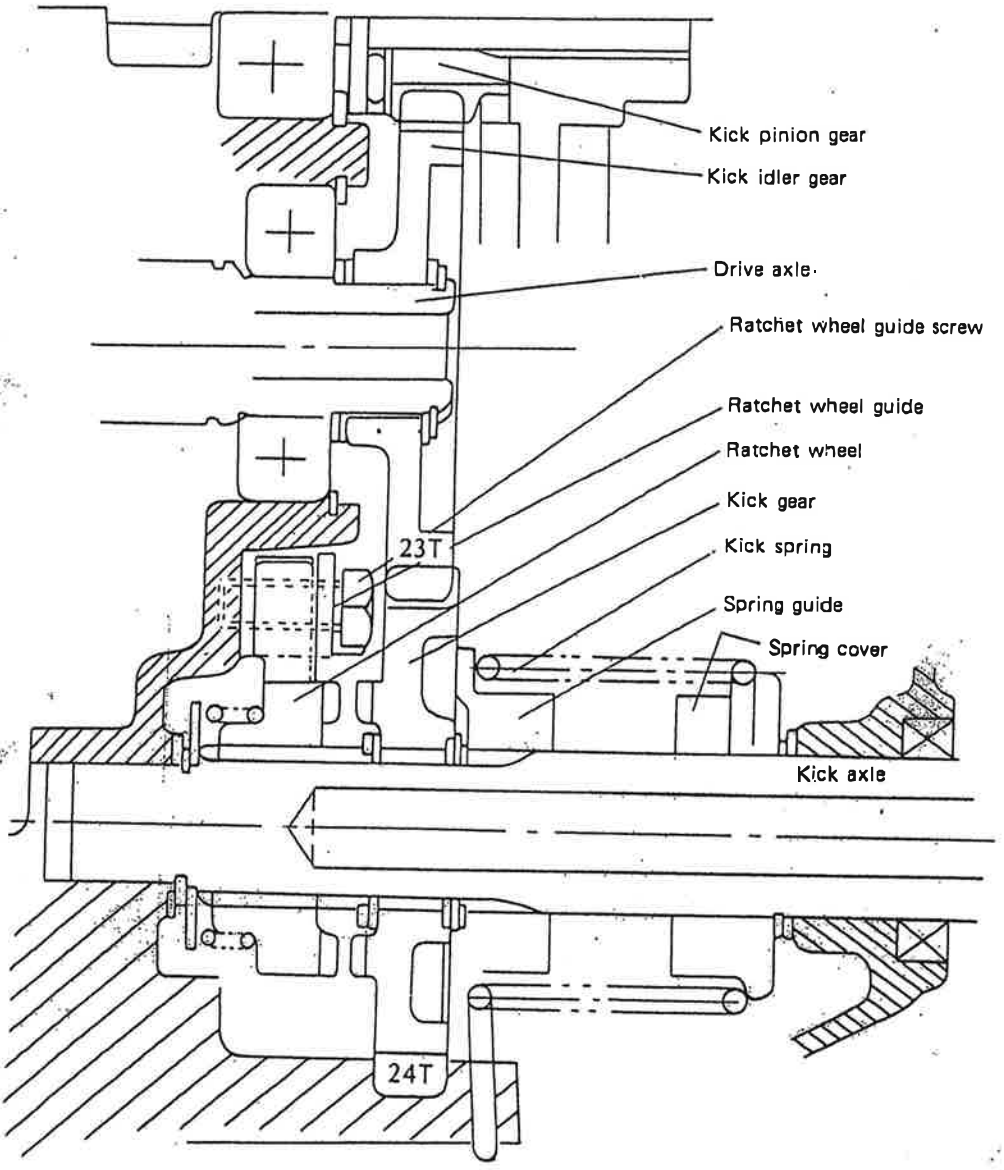
Feed a rolled-up rag between the teeth of the primary drive gear and the primary driven gear to lock them, and loosen the primary drive gear lock nut.

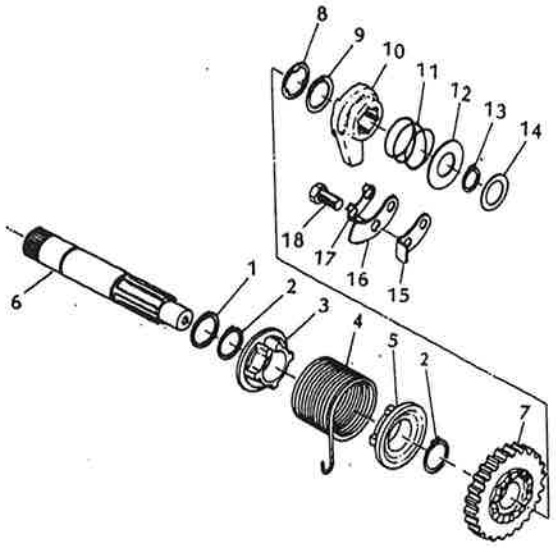




3-12 Kick Starter Mechanism

The kickstarter employs the primary kick system. To start the engine, you just kick the starter with the clutch disengaged or engaged. The ability to start the engine with the clutch disengaged can be a great advantage when racing. When the kick shaft rotates, the ratchet wheel is disengaged from the ratchet wheel guide and meshes with the kick gear. The rotation of the kick gear is transmitted through the idler gear to the kick pinion that is engaged with the primary driven gear.

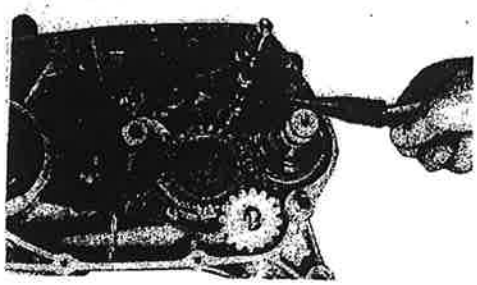




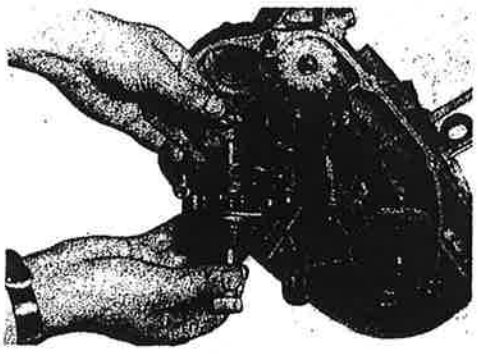
1. SHIM (2)
2. CIRCLIP
3. COVER, spring
4. GUIDE, spring
6. AXLE, kick
7. GEAR, kick
8. WASHER
9. CLIP
10. WHEEL, ratchet
11. SPRING, ratchet wheel
12. COVER, spring
13. CIRCLIP
14. SHIM (1)
15. STOPPER
16. GUIDE, ratchet wheel
17. WASHER, lock
18. SCREW, ratchet wheel guic

A. Removal

1) Remove the kick spring .



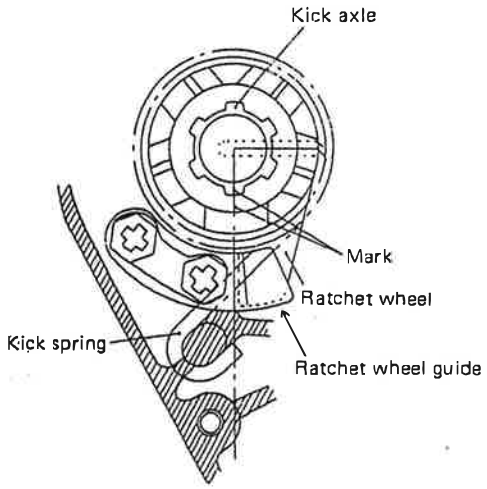
2) Then remove the kick starter assembly. Note the location of any shims.

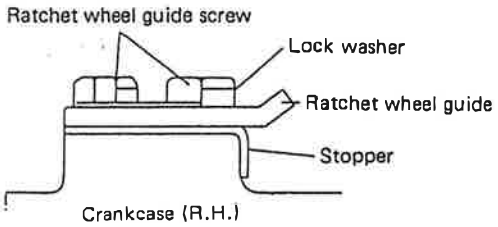


B. Reverse the Sequence for Reinstallation

Notes on Assembling.

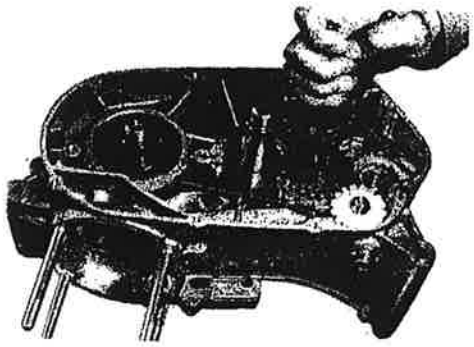
1) Align the marking on the kick starter axle with that of the ratchet wheel.
2) When installing the kick starter ass'y in the crankcase, slide the ratchet wheel pawl over the ratchet wheel guide toward the stopper attached to the case. Make sure that the pawl is in close contact with the stopper. Then pull the spring forward and hook it on the stopper.





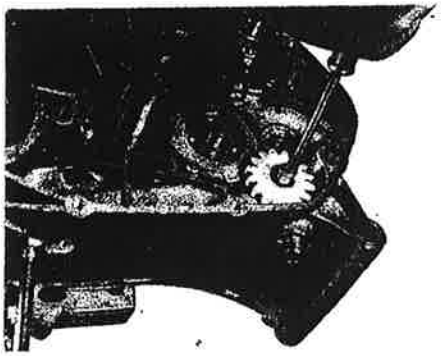
C. Removing the Kick Idler Gear

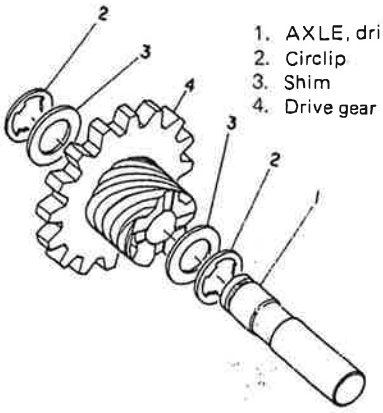
Remove the circlip with clip pliers, and then the kick idler gear can be easily removed.



D. Removing the Tachometer Drive Gear

The tachometer drive gear is engaged with the kick idler gear to convey the revolutions per minute of the crankshaft to the tachometer through the tachometer cable.





3-13 Shift Mechanism

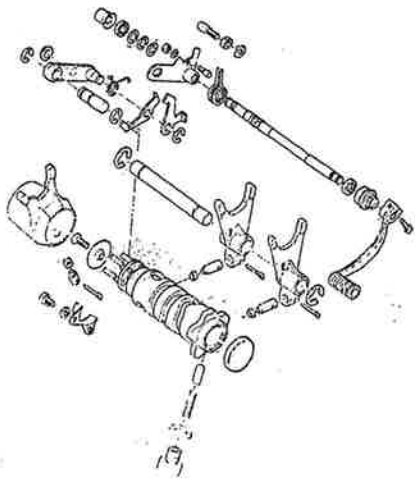
There are two types of shift mechanisms used on the DT/RT Series machines. The early type used on the DT1-E & RT1-B has one shift fork which is part of the shift cam drum and two other shift forks which are installed on a guide bar parallel to the cam drum.

The later type, used on DT2/3 & RT2/3 machines, has three separate shift forks installed on two guide bars.

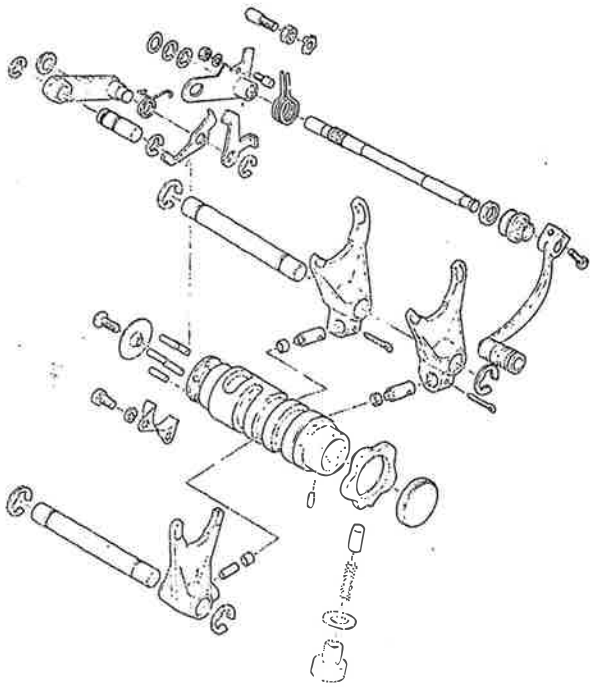
These three shift forks slide back and forth in the slotted guides that are grooved in the shift drum. A safety device has been provided to prevent the shifter from by-passing the next gear when a quick or hard shift is made. This provides dependability and assurance for correct shifting for the desired gear even under the roughest conditions such as competition racing.

A see-saw type shifting arrangement is used that enables the rider to shift quickly and easily down for the lower gears and up for the higher gears. Neutral position is located between first and second gears.

SHIFTER (DT1/RT1 TYPE)

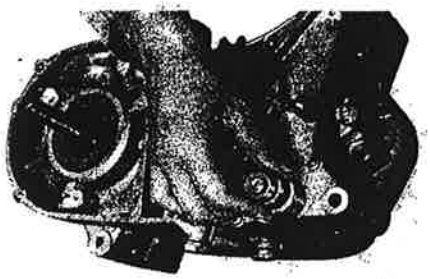


SHIFTER (DT2/3 & RT2/3 TYPE)



A. Removing the Change Axle Assembly

1) Remove the change axle sealing boot.



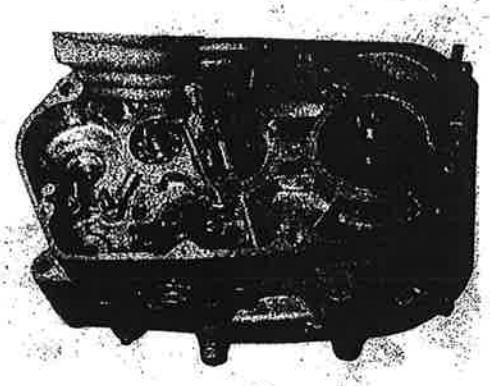
2) Pull out the change shaft assembly.

B. Checking the Gear Shift Parts

1) Check the gear shift return spring. A broken or fatigued gear shift return spring will impair the return action of the shifting mechanism.

C. Removing the Change Lever 3 and 4

Remove the "E" clip with a slot-head screwdriver. The change lever can now be removed.



D. Checking the Change Lever Spring

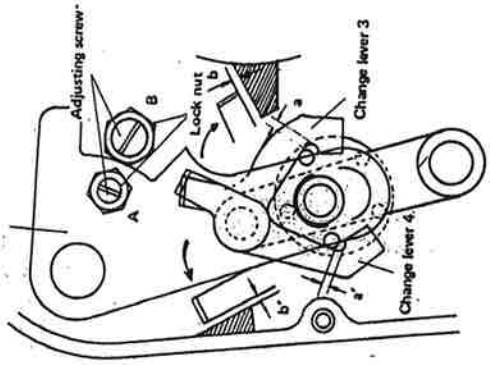
Check for a fatigued or broken change lever spring. A faulty change lever spring may result in an improper shifting sequence.

E. Gear Change Adjustment

1) Fully move the gear change lever up and down and turn the adjusting bolt (eccentric bolt) on the case so that the clearance (a) will become equal to the clearance (a'). (a) is the clearance between the bent part of change lever 3 and the stopper (shaded area in the drawing) and (a') is the clearance between the bent part and the stopper. The stopper is a device for preventing the shifter from overrunning the correct position. After the adjustment, lock the adjusting screw with the lock nut.

2) Next turn the adjusting screw (eccentric screw) on change lever 1 so that the clearance (b) will become even with the clearance (b') on each gear position.

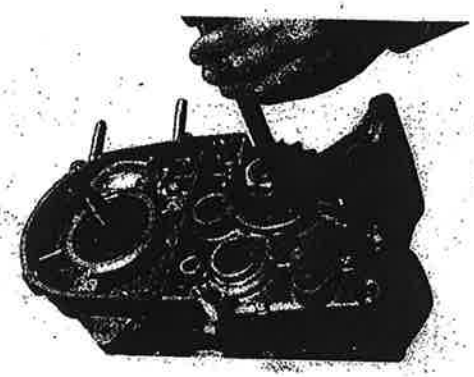
(b) is the clearance between the pin and change lever 4. After the adjustment, lock the adjusting screw with the lock nut. Recheck your adjustment by shifting through several gears.



3-14 Drive Sprocket

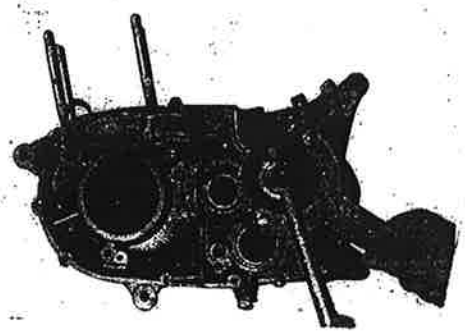
A. Removal

1) Straighten the bent edge of the lock washer with a blunt-ended metal punch.



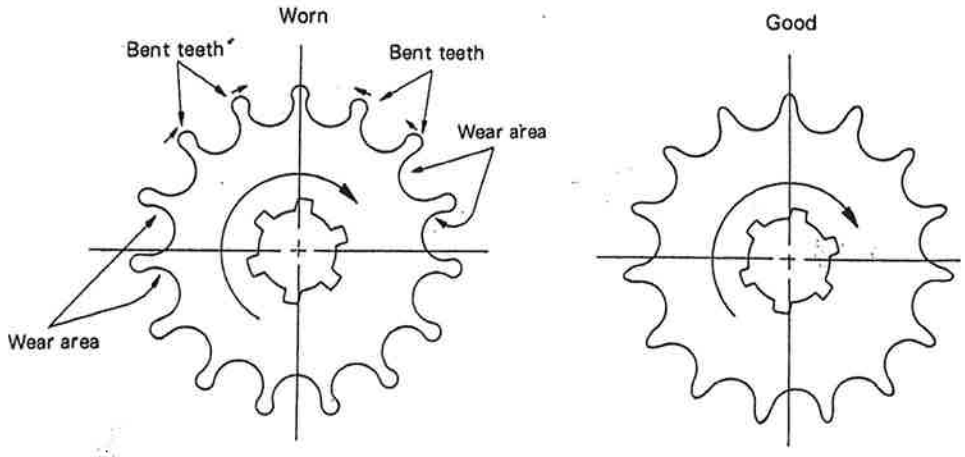
2) Keep the drive sprocket from turning with the flywheel magneto holding tool, and remove the sprocket nut.

If the flywheel magneto puller is not available, shift the transmission to low gear, and fit a monkey wrench on the sprocket nut. Then tap the handle of the wrench with a hammer and the shock will loosen the nut.



B. Inspection

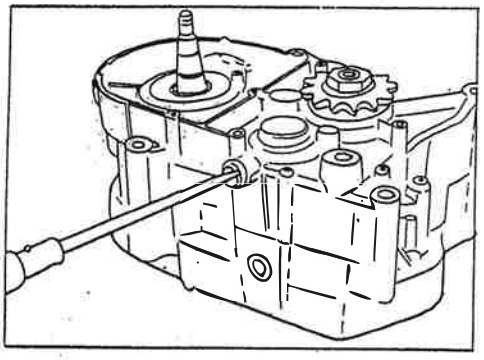
A worn drive sprocket will result in excessive chain noise, and shorten the life of the chain. Check the sprocket for worn teeth, and replace if they are worn.

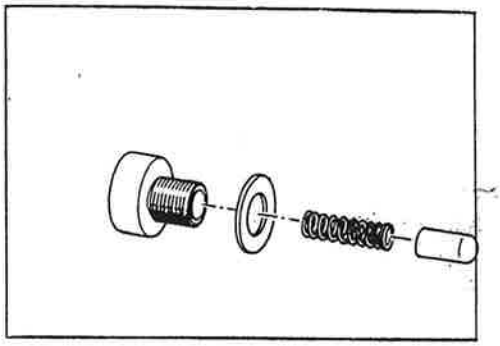


3-15 Crankcase

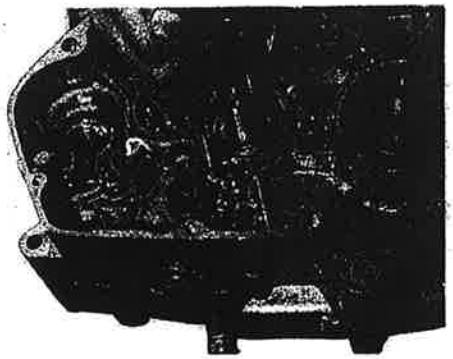
A. Separating

1) Remove the neutral stopper.

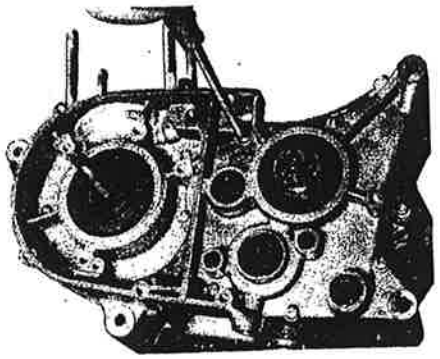




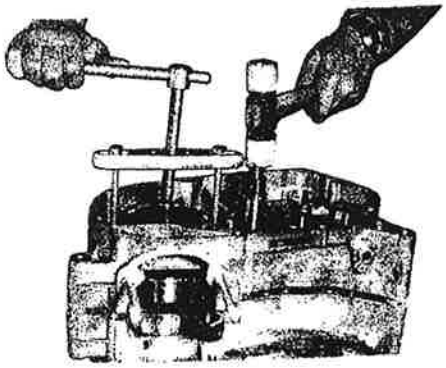
2) Remove the change lever guide.



3) Remove the pan head screws from the left crankcase.



4) Install the crankcase separating tool on the right crankcase. Divide the crankcase while tapping the main axle and the crankcase alternately with plastic tip hammer.



Note:

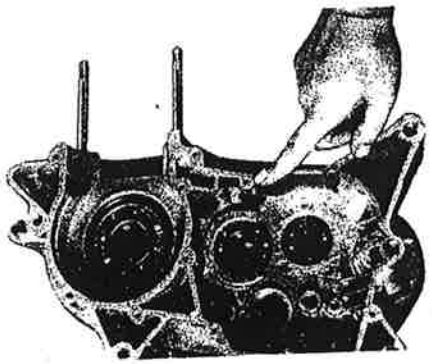
Fully tighten the bolts of the crankcase dividing tool, and keep the tool in a horizontal position.

The crankcase is designed to split into two halves, right and left.

Only one drain plug is provided for both the transmission and clutch housings. Both housings can be drained at once by removing the drain plug.

B. Reassembling

When reassembling the crankcase, be sure to apply YAMAHA BOND No. 4 to the mating surfaces of both halves.

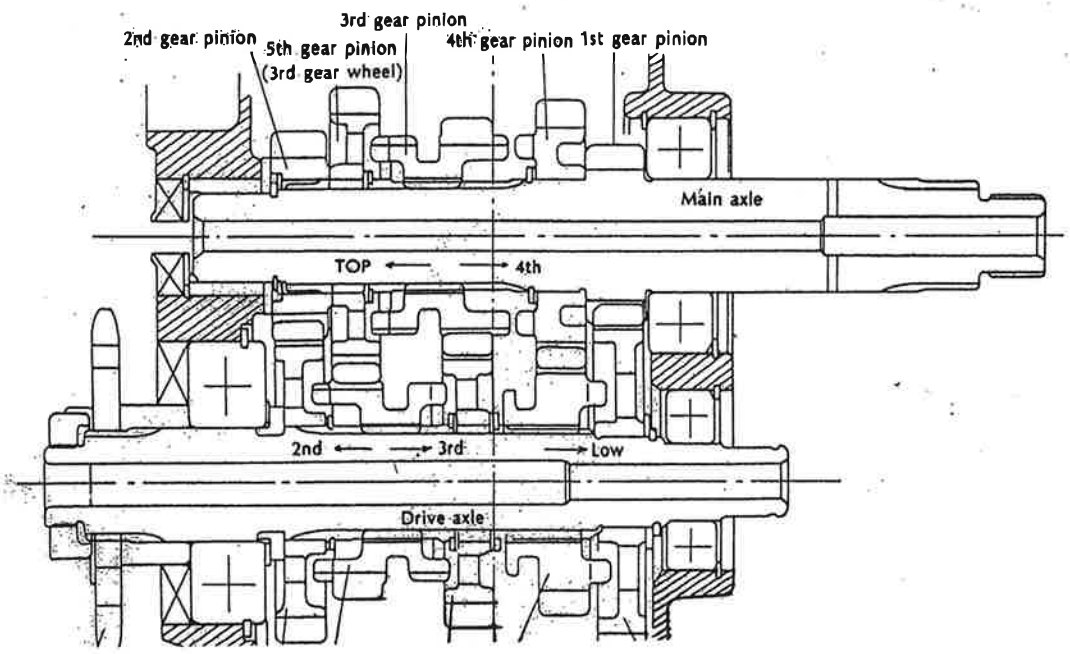


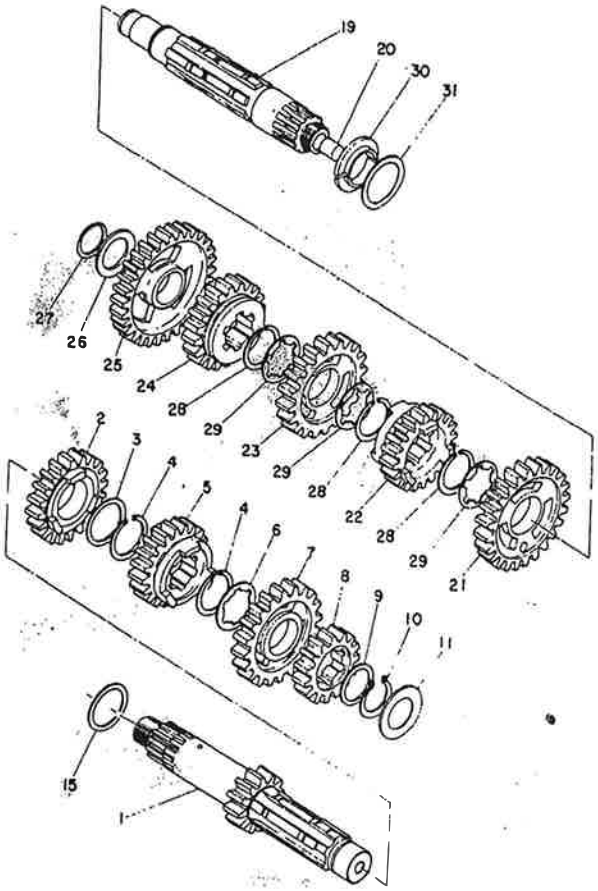
3-16 Transmission Assembly

The constant mesh, wide ratio 5-speed transmission makes it possible to fully utilize the performance of the engine throughout the entire speed range from low to high. The top pinion is identical in type to the third gear wheel, and the third gear pinion is identical to the top gear wheel.

For layout of the transmission and related parts, refer to figure below. The primary reduction ratio is 65/21=3.095. Therefore the total reduction ratios will be; Primary reduction ratio x Transmission gear reduction x Secondary reduction ratio = Total reduction ratio.

	DT1-E	DT2, DT3	Total	RT1-B	RT2, RT3	Total
1st reduction ratio	65/21	3.095		65/21	3.095	
2nd reduction ratio	44/14	3.142		39/15	2.600	
1st	38/15	2.533	24.644	38/15	2.533	20.387
2nd	34/19	1.789	17.408	34/19	1.789	14.401
3rd	30/23	1.304	12.689	30/23	1.304	10.490
4th	26/26	1.000	9.728	26/26	1.000	8.048
5th	23/23	0.766	7.458	23/30	0.766	6.170





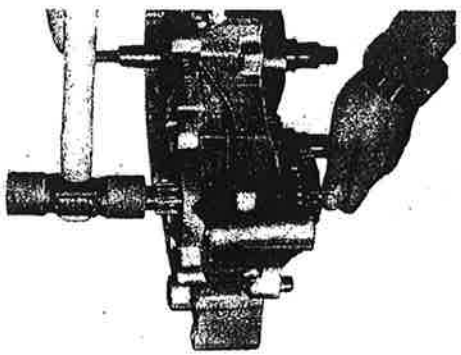
1. AXLE, main
2. GEAR, 4th pinion
3. WASHER, gear hold (25-32-1)
4. CIRCLIP
5. GEAR, 3rd pinion
6. WASHER, gear hold
7. GEAR, 3rd wheel
8. GEAR, 2nd pinion
9. WASHER, gear hold (20-25-1)
10. CIRCLIP
11. SHIM (20-2-33-1)
12. BEARING
13. CIRCLIP
14. OIL SEAL
15. SHIM, main axle (25-1-31-0.1, 0.2, 0.3)
16. BEARING
17. CIRCLIP
18. GEAR, kick pinion
19. AXLE, drive
20. PLUG blind
21. GEAR, 2nd wheel
22. GEAR, 3rd pinion
23. GEAR, 3rd wheel
24. GEAR, 4th wheel
25. GEAR, 1st wheel
26. WASHER, gear hold (20-30-1.5)
27. CIRCLIP
28. CIRCLIP
29. WASHER, gear hold
30. SPACER, drive axle
31. SHIM, drive axle (25-34-0.3, 0.4, 0.5)

A. Removal

Remove the transmission and shifter as a unit.

B. Reinstallation

Reinstall the transmission and shifter as a unit in the left crankcase half after they are sub-assembled. They cannot be installed separately. The transmission unit must be in neutral during installation.



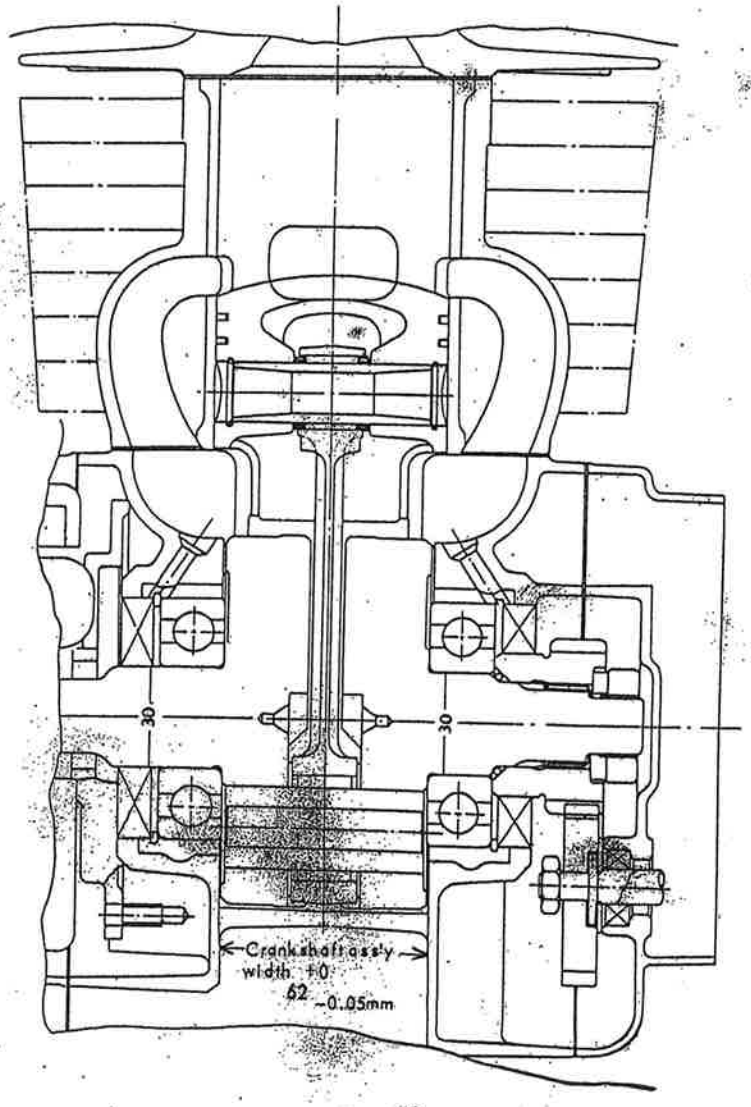
ENGINE · Crankshaft

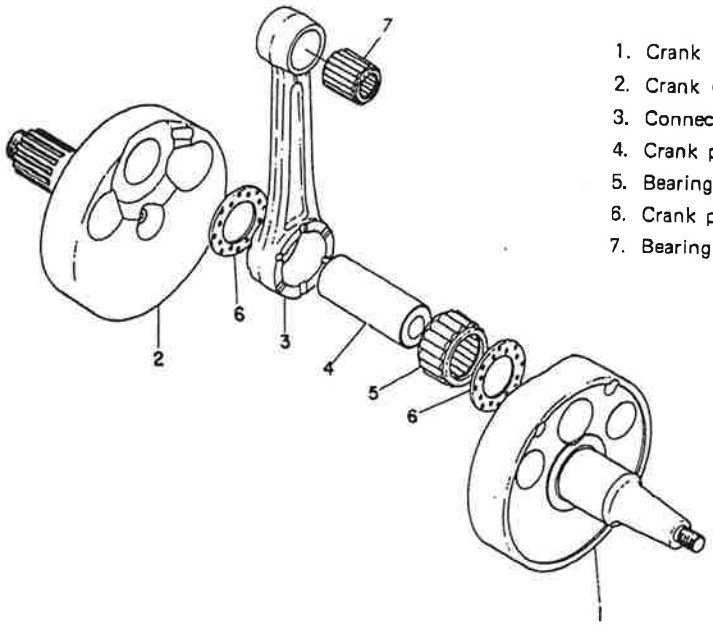
3-17 Crankshaft

The crankshaft requires the highest degree of accuracy in engineering and servicing of all the engine parts.

The crankshaft is also more susceptible to wear, and therefore, it must be handled with special care.

To increase the inertia force of the crank, the diameter of the crankshaft is increased to 30 mm (1.18 in.) the thickness of the flywheel to 26 mm (1.02 in.) and its diameter to 110 mm (4.33 in.)





1. Crank (L.H.)
2. Crank (R.H.)
3. Connecting rod
4. Crank pin
5. Bearing, connecting rod big end
6. Crank pin washer
7. Bearing, connecting rod small end

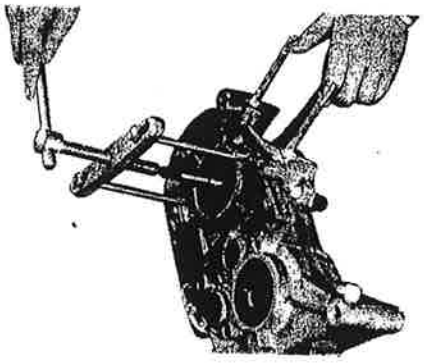
Crankshaft component parts

A. Removing the Crankshaft Assembly

Remove the crankshaft assembly with the crankcase separating tool.

Note:

Fully tighten the bolts of the crankcase dividing tool, and keep the tool parallel to the crankcase surface.



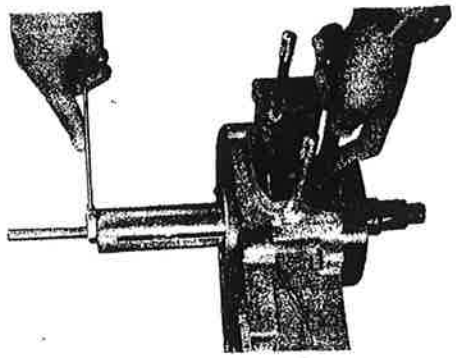
B. Installing the Crankshaft Assembly

Install the crankshaft assembly by using the crankshaft tool and the crank fitting spacer. Hold the connecting rod at top dead center with one hand while turning the handle of the setting bolt with the other.

Note:

1) The crankshaft setting tool is same as those used for YG1, and YF1.

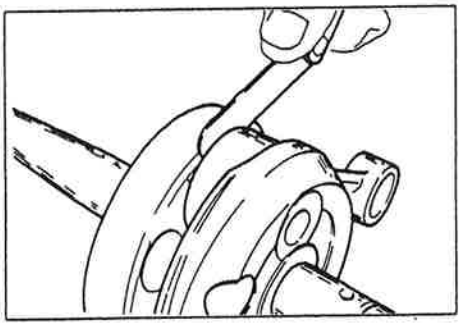
2) The crank fitting spacer is required because the crankshaft is larger in diameter. In addition, the oil seal is larger in outside diameter than the crankshaft setting tool body.

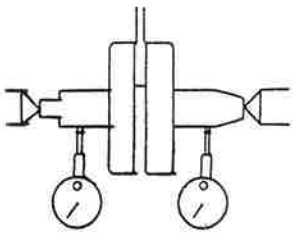


C. Inspection and Servicing

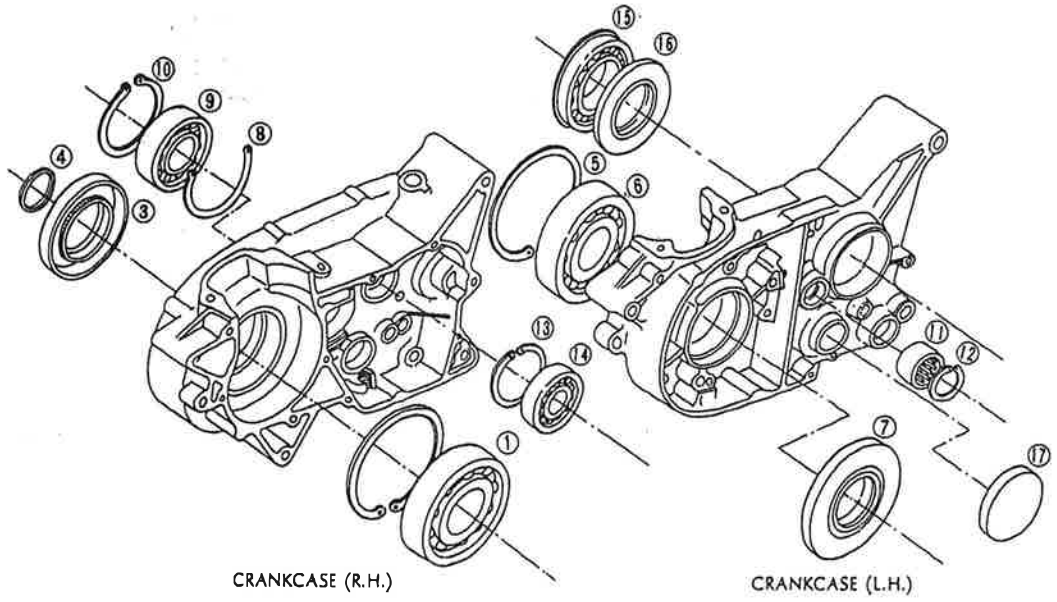
1) Checking the crankshaft components

Check connecting rod axial play at small end (to determine the amount of wear of crank pin and bearing at large end).	Small end play should not exceed 2 mm (0.078 in).	If small end play exceeds 2 mm, disassemble the crankshaft, check connecting rod crank pin and large end bearing. Replace defective parts. Small end play after reassembly should be within 0.8–1.0 mm (0.031–0.04 in).
Check the connecting rod for axial play at large end.	Move the connecting rod to one side and insert a feeler gauge. Large end axial play should be within 0.4–0.5 mm (0.019 in).	If excessive axial play is present, (0.6 mm or more) disassemble the crankshaft and replace any worn parts.
Check accuracy of the crankshaft ass'y runout. (Misalignment of parts of the crankshaft)	Dial gauge readings should be within 0.02mm (0.0008 in.).	Correct any misalignment by tapping the flywheel with a brass hammer and by using a wedge.





3-18 Bearings and Oil Seals

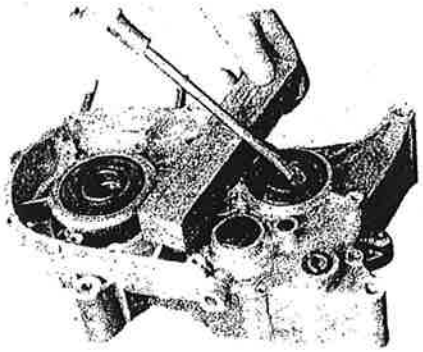


1.	Bearing 6306 (B6306)	7.	Oil seal SW30-72-10	13.	Circlip
2.	Circlip.R-72	8.	Circlip 25.1-31-0.3	14.	Bearing 6203 (B6203 Special)
3.	Oil seal SW42-72-10	9.	Bearing 6205 (6205E Special)	15.	Bearing 6305NR (B6305NR)
4.	O-ring 3.2-24.5	10.	Circlip	16.	Oil seal SD-35-62-6
5.	Circlip R-72	11.	Bearing 20-26-16		
6.	Bearing 6306 (B6306)	12.	Circlip 25.1-31-0.1		

1. Removal and Installation

1) Removal

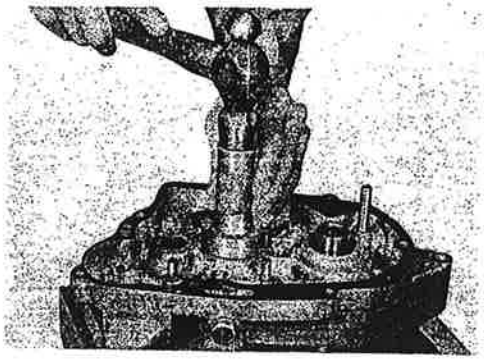
a. Pry the oil seals out of place with a slot head screwdriver. Always replace the oil seals when overhauling the engine.



Note:

Place a piece of wood under the screwdriver to prevent damage to the case.

b. Remove the bearing with a bearing puller.



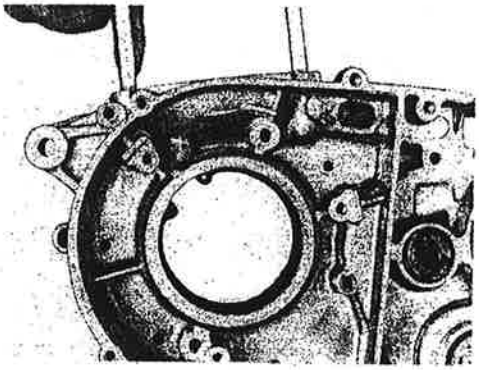
2) Installation

Install bearings and oil seals with their stamped manufacture's marks or numerals facing outward. (In other words, the stamped letters must be on the exposed view side.)

When installing bearings pack them with grease.

The crankshaft bearing circlip should be installed so that the circlip end gap is aligned with the arrow marked on each of the crankcase halves.

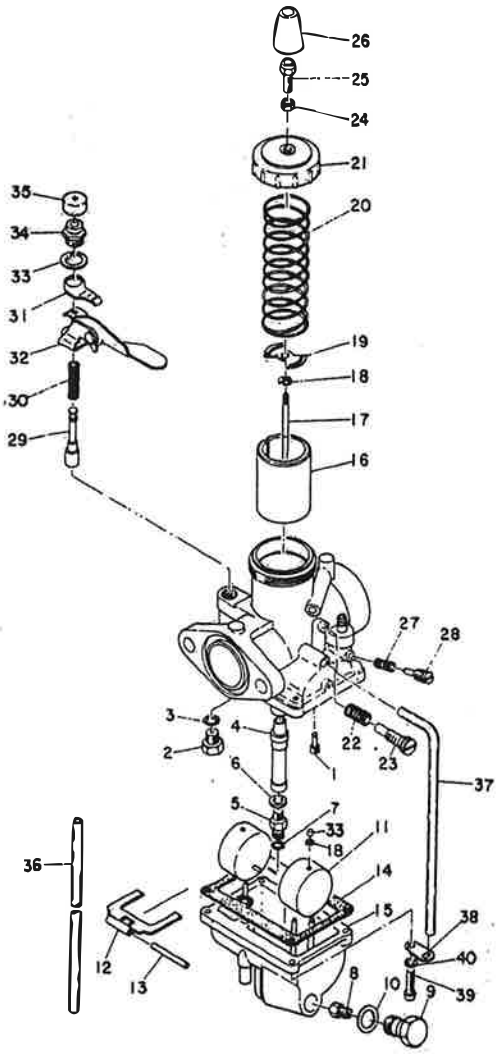
Bearing installation is most easily accomplished by heating the crankcase in an oven to 200°F.



3-19 Carburetor

The standard DT Series are equipped with VM 26SH (26 mm) carburetor and RT Series are VM 32SH (32 mm) that are equipped with a built-in starter jet.

The carburetor is bolted to a 30 mm thick bakelite insulator that is between the carburetor and cylinder. This insulator provides more than adequate heat insulation. The carburetor floats have been specially designed to keep the float level from fluctuating due to vibration or shock. The main jet is installed in such a manner to provide quick and easy replacement from the outside by merely removing the jet holder on the bottom left side of the carburetor float bowl.



1. Pilot jet
2. Valve seat ass'y
3. Valve seat washer
4. Main nozzle
5. Needle jet setter
6. Needele jet washer
7. O-ring
8. Main jet
9. Banjo bolt
10. Gasket
11. Float
12. Float arm
13. Float pin
14. Float chamber gasket
15. Float chamber body
16. Throttle valve
17. Needle
18. Clip
19. Spring seat
20. Throttle valve spring
21. Mixing chamber top
22. Throttle stop spring
23. Throttle screw
24. Wire adjusting nut
25. Wire adjusting screw
26. Cap
27. Air adjusting spring
28. Air adjusting screw
29. Starter plunger
30 Plunger spring
31. Starter lever plate
32. Starter lever
33. Cap
34. Plunger cap
35. Plunger cap cover
36. Overflow pipe
37. Air vent pipe
38. Plate
39. Pan head screw
40. Spring washer

A. Checking the Carburetor

1) Float

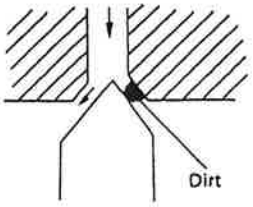
Remove the float and shake it to check if gasoline is inside. If fuel leaks into the float while the engine is running, the float chamber fuel level will rise and make the fuel mixture too rich. Repalce the float if it is deformed or leaking.

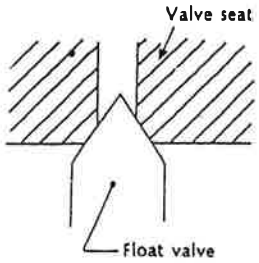
2) Float valve

Replace the float valve if its seating end is worn with a step or if it is scratched. Check the float valve spring for fatigue. Depress the float valve with your finger, and make sure that it properly seats against the valve seat when released. If the float valve spring is weakened, fuel will overflow, flooding the float chamber while the gas is on.

3) Overflowing

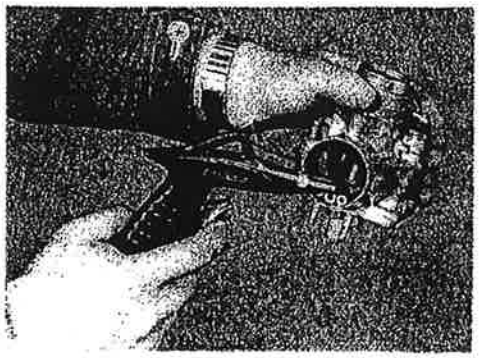
If fuel overflows, check the carburetor as described in 1) and 2) above. If neither 1) nor 2) cures the overflowing, it may be caused by dirt or dust in the fuel preventing the float valve from seating properly. If any dirt or dust is found, clean the carburetor, petcock and gas tank.





4) Cleaning the carburetor

Disassemble the carburetor, and wash all its parts in a suitable solvent. Then blow all the parts off with compressed air. All jets and another delicate parts should be cleaned by blowing compressed air through them.

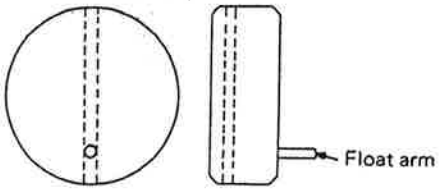


B. Float Level Adjustment

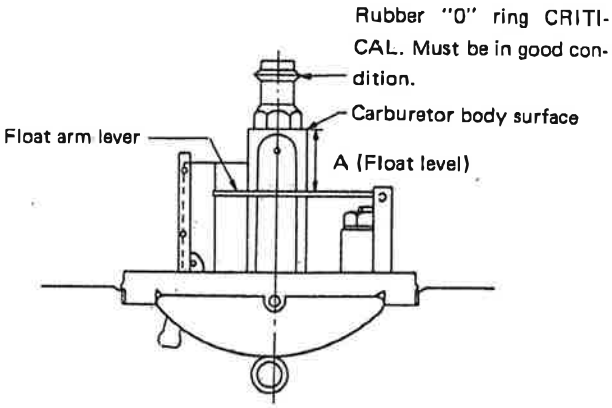
The carburetor float level is checked by the Yamaha factory during assembly and testing. But rough riding, a worn needle valve, or bent float arm can cause the float level to fluctuate. If the float level raises, this will cause a rich fuel/air mixture that can cause poor performance and spark plug fouling. If the float level decreases, this can cause a lean fuel/air mixture that can result in engine damage.

If the machine is subjected to continuous rough riding or many miles of travel, the float level should be checked and set regularly and in the following manner.

Carburetor float setting:
(with needle spring unloaded)



When replacing the float valves, place float arm towards the bottom side of float bowl.



Set at center line.
Carburetor body must be held upside down when setting float level.

1) Remove the float chamber body, and turn over the mixing body. Let the float arm rest on the needle valve with the spring fully expanded.
2) Then measure the distance "A" from the float arm lever to the float chamber joint surface.

   Standard measurement of "A": 0.56 in. (14.1 mm) DT1-E, DT2, DT3
   0.33 in. (8.5 mm) RT1-B, RT2, RT3
3) When the A distance measured is less than recommended, bend the tang up. If it is greater, bend the tang down (with carburetor body upside down).

C. Idle Mixture–Idle Speed Adjustment

Turn the idle mixture screw in until lightly seated, then back it out by reference to following data. There is no need to experiment. This is a factory setting that can be set with the engine stopped.

No further adjustment is required. Engine idle speed is set by warming up the engine completely and then screwing the idle speed screw in or out, whichever direction is necessary for the specified engine idle speed.

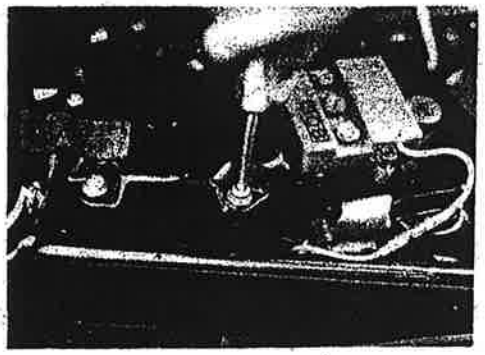
D. Carburetor Setting Table

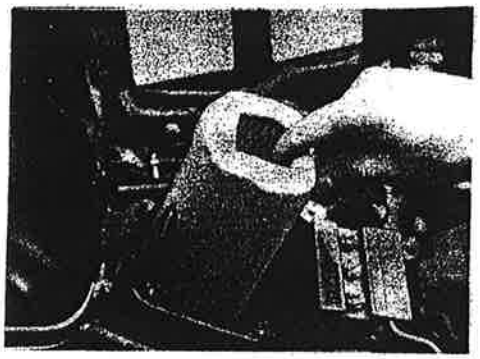
Abbreviation	Specifications			
	DT1-E	DT2, DT3	RT1-B	RT2, RT3
M.J.	#160	#160	#240	#230
N.J.	0-2	N-8	0-4	P-0
J.N.	5D1-3	5DP7-3	6CF1-2	6DH3-3
P.J.	35	30	30	45
G.S.	60	60	60	60
C.A.	2.5	1.5	1.5	3.0
A.S.	1½	1¼	1¾	1½
Idling speed (r.p.m.)	1200~1400	1300~1400	1400~1500	1400~1500

3-20 Air Cleaner

A. Removal

To remove the air filter, open the seat cover and remove four air cleaner mounting screws. Then the element can be removed.





B. Cleaning

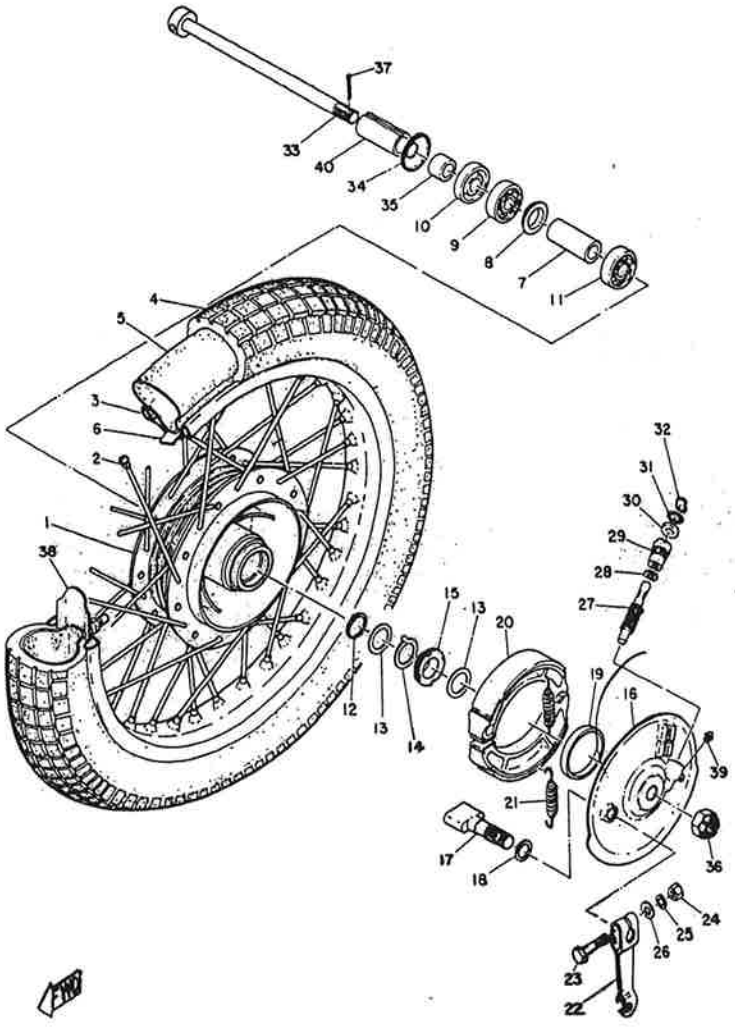
Wash the foam filter thoroughly in solvent until all dirt has been removed. Squeeze all the solvent out. Pour oil onto the filter (any grade of 20 or 30 wt), work it completely in, and then squeeze out the surplus oil. The filter should be completely impregnated with oil, but not "dripping" with it.

CHAPTER 4 CHASSIS

The DT, RT Series have been designed for versatility and a combination of uses. It is equipped with all necessary street legal equipments to insure pleasurable road or street riding. These machines can be quickly converted to a competition machines and tehe-fore have been engineered to have minimum weight factor. Yet with the reduction in weight, rigidity, strength, and safety have been incorporated in the design of the frame to provide unexcelled competition machines.

4-1 Front Wheel

The DT1-E, DT2, RT1-B and RT2 are equipped as standard with a 3.25-19" Trials Universal tires, and DT3 and RT3, with 3.00-21".

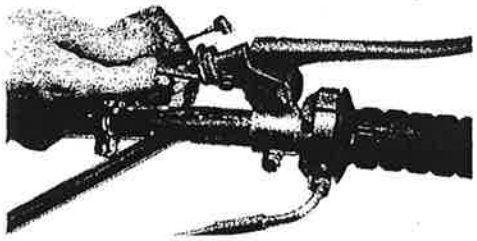


1. Hub
2. Spoke set
3. Rim
4. Front tire
5. Front tube
6. Rim band
7. Bearing spacer
8. Spacer flange
9. Bearing (B6202)
10. Oil seal (SD-20-35-7)
11. Bearing (B6202RS)
12. Circlip (S-22)
13. Thrust washer (2) (22.5-19-1)
14. Meter clutch
15. Drive gear
16. Brake shoe plate
17. Shaft cam
18. Camshaft shim (12.2-22-0.5)
19. Oil seal (SDD-50-62-7)
20. Brake shoe complete
21. Brake shoe return spring
22. Cam shaft lever
23. Bolt
24. Nut
25. Spring washer
26. Plain washer
27. Meter gear
28. Thrust washer (1) (7-12-0.8)
30. Oil seal (SD-7-14-4)
31. O-ring (2.4-13.8)
32. Stop ring
33. Wheel shaft
34. Hub dust cover
35. Wheel shaft collar
36. Shaft nut
37. Cotter pin
38. Bead spacer
39. Grease nipple
40. Collar

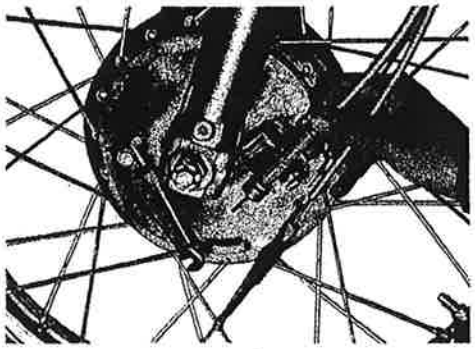
This tire gives the rider assurance of maximum performance and safety for both road riding and trail riding. To insure against tire slippage on the rim, a tire bead lock had been installed in the wheel. The front wheel brake size is 150 mm x 30 mm (59 x 1.18 in). A labyrinth seal is installed between the wheel hub and brake plate to provide a seal against dirt and water.

A. Removal

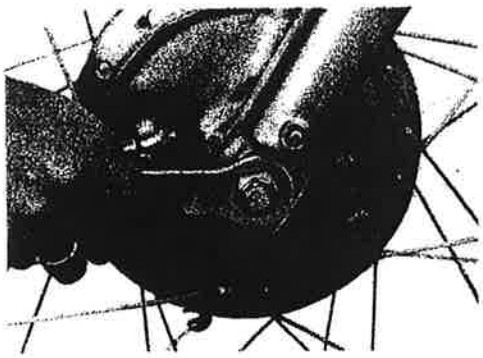
1) Disconnect the brake cable at the front brake lever.



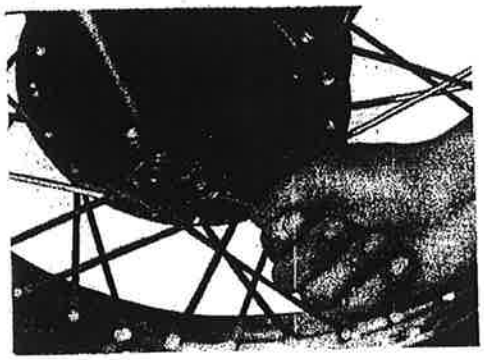
2) Disconnect both the brake cable and speedometer cable from the front wheel hub plate.



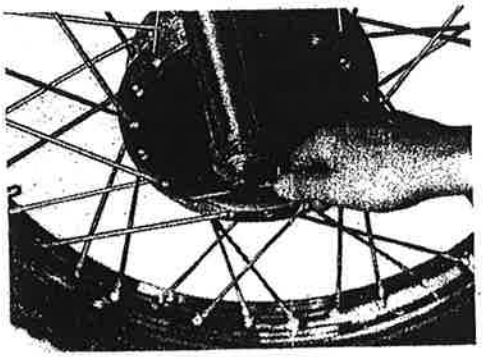
3) Remove the cotter pin and then remove the front axle lock nuts.



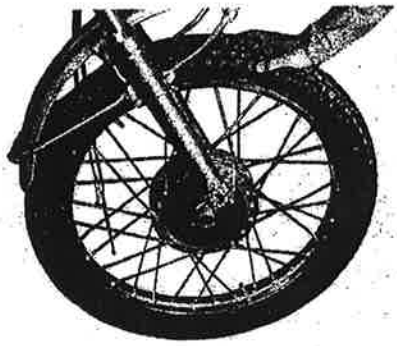
4) Loosen the front wheel axle lock nuts.



5) Pull out the front wheel axle by simultaneously twisting and pulling on the axle.



6) Raise the front of the machine and set it on a box. Then remove the wheel assembly.

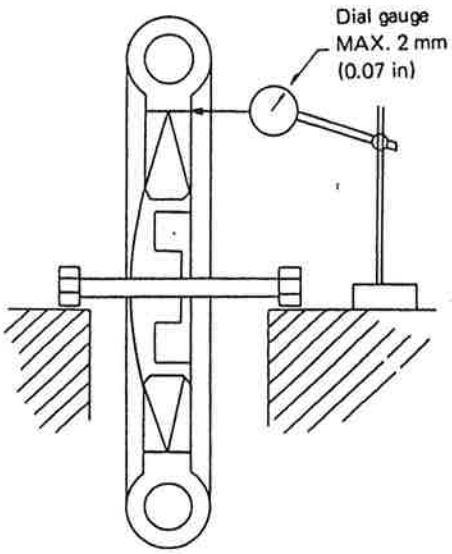


B. Checking

1) Run out of the rim

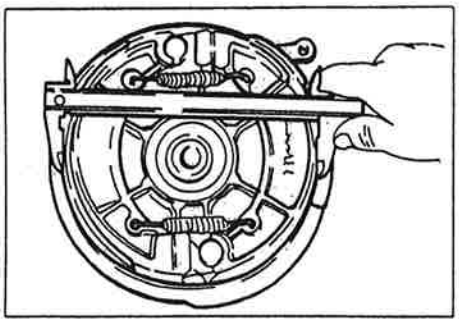
As shown in figure, measure the runout of the rim with a dial gauge.

Runout limits: 2 mm (0.07 in.) or less



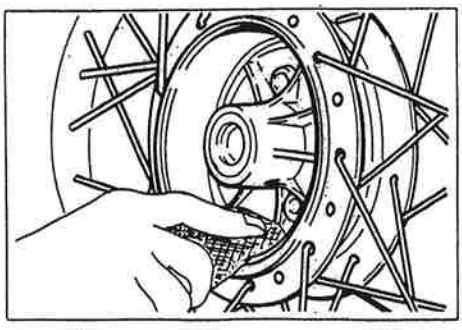
2) Brake shoe

Measure the outside diameter at the brake shoe with slide calipers. If it measures less than 146 mm (5.75 in.), replace it. Smooth out a rough shoe surface with sandpaper or with a file.



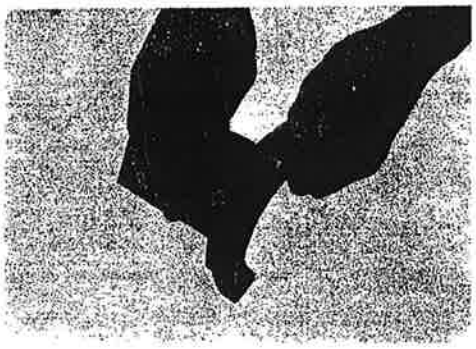
3) Brake drum

Oil or scratches on the inner surface of the brake drum will impair braking performance or result in abnormal noise. Clean or smooth out the surface with a rag soaked in laquer thinner or with wet sandpaper.



4) Check the spokes. If they are loose or bent, replace or tighten them. If the machine is ridden in rough country often, or raced, the spokes should be checked regularly.

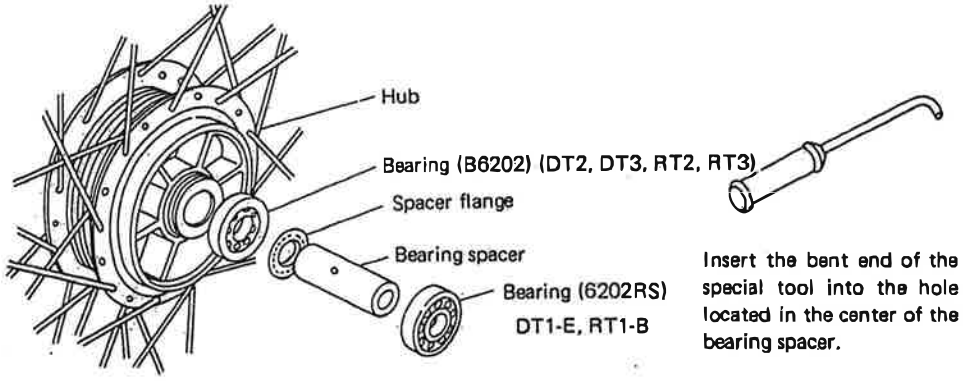
5) Repairing the brake shoe
If the brake shoe has uneven contact with the brake drum or scratches, smooth out the surface with sandpaper or hand file.



6) If the tire is excessively worn, replace the tire.
7) Check the tires for damage regularly.
8) If the bearings allow excessive play in the wheel or if it does not turn smoothly, replace the bearing(s).

Replacing the Wheel Bearing

a. First, clean the outside of the wheel hub.
b. Insert the bent end of the special tool (as shown in figure) into the hole located in the center of the bearing spacer, and drive the spacer out from the hub by tapping the other end of the special tool with a hammer. (Both bearing spacer and spacer flange can easily be removed.)
c. Then push out the bearing on the other side.
d. To install the wheel bearing, reverse the above sequence. Be sure to grease the bearing before installation and use the bearing fitting tool (furnished by Yamaha.)

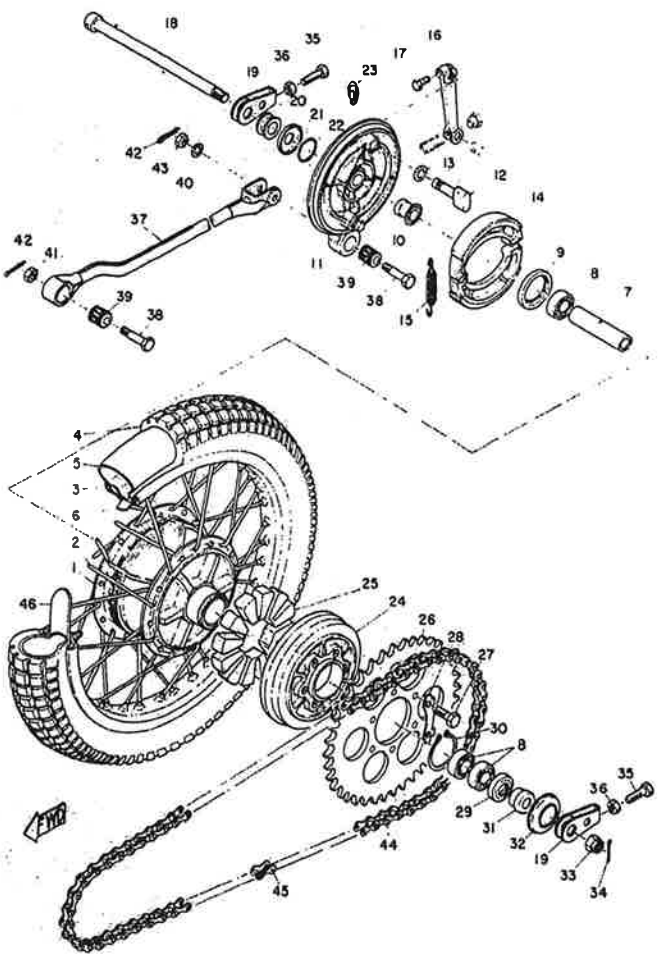


9) Replace a bent or damaged front wheel axle.
10) If the tooth surface of the helical speedometer drive gear is excessively worn, replace it.
11) Check the lips of the seals for damage or wear. Replace if necessary.

4-2 Rear Wheel

The rear wheel is 18-in. size, and the rear tire is the 4.00-18 Trials Universal. It is also good for road riding. Two rim locks are provided to prevent tire slippage in the rim. The single leading shoe type brake is of the 150 mm x 30 mm size. A labyrinth seal between the wheel hub and the brake plate is provided to prevent water and dust leakage. The brake tension bar is of link design to minimize the shifting of the brake cam lever position when the rear swing arm is moving up and down.

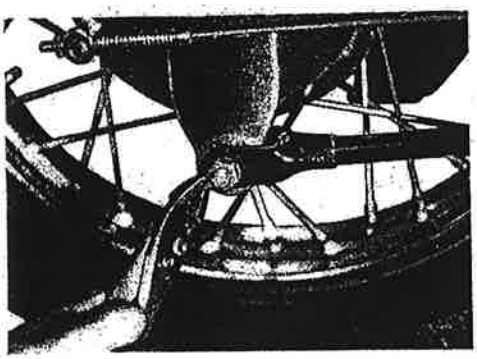
The rear fender is steel and rubber mounted on the frame. It is also wide enough to protect the engine unit from dust and water.

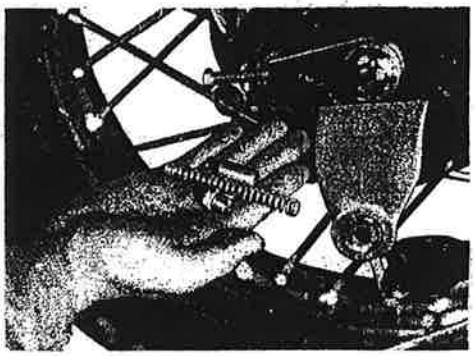


1 Hub
2 Spoke set
3 Rim (1.85B-18)
4 Rear tire (4.00-18-4PR)
5 Tube (4.00-18)
6 Rim band (4.00-18)
7 Bearing spacer
8 Bearing (B6203)
9 Oil seal (SO-46-56-4)
10 Shaft bushing
11 brake shoe plate
12 Camshaft
13 Camshaft shim (14.2-24-0.5)
14 Brake shoe comp.
15 Return spring
16 Camshaft lever
17 Bolt
18 Wheel shaft
19 Chain puller
20 Wheel shaft collar
21 Plate dust cover
22 O-ring (2.4-31)
23 Grease nipple
24 Hub clutch
25 Clutch damper
26 Sprocket wheel gear
27 Fitting bolt
28 Lock washer
29 Oil seal (DD-25-40-9)
30 Circlip (R-52)
31 Shaft collar
32 Dust cover
33 Shaft nut
34 Cotter pin
35 Chain puller bolt
36 Nut
37 Tension bar
38 Tension bar bolt
39 Bushing
40 Spring washer
41 Slotted nut
42 Cotter pin
43 Nut
44 Chain (DK520D-102L) DT Series
Chain (DK520D-100L) RT Series
45 Chain joint
46 Bead spacer

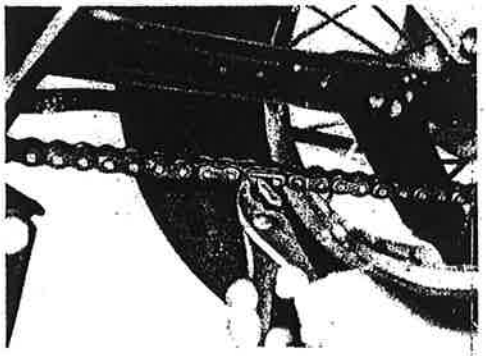
A. Removal

1) Remove the tension bar and brake rod from the rear shoe plate.

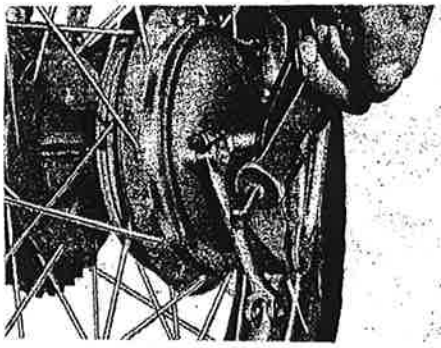




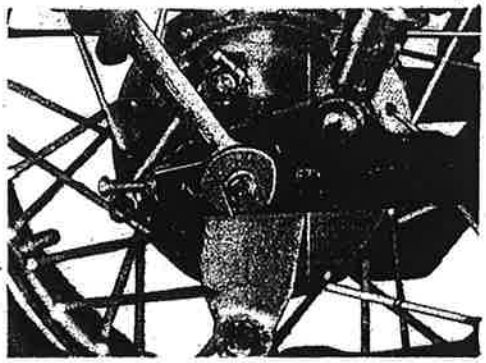
2) Disconnect the master link of the chain and remove the chain.



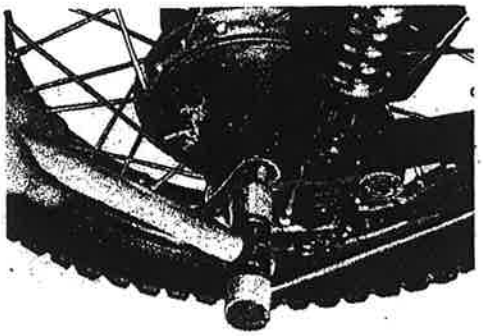
3) Loosen the chain tension adjusting nuts and bolts on both right and left sides.



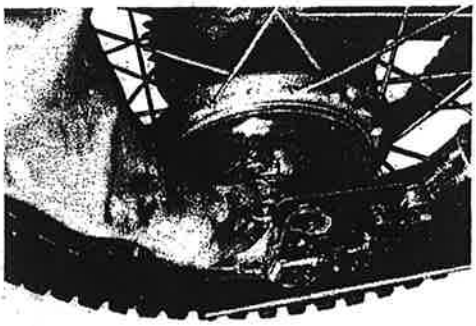
4) Remove the rear wheel shaft nut.



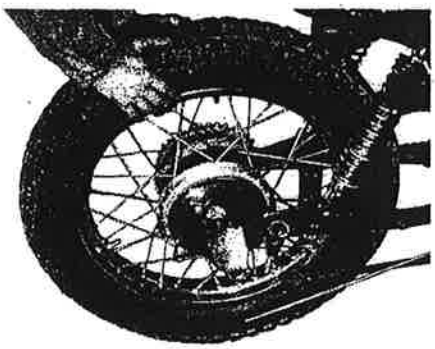
5) Pull out the rear wheel shaft by striking it with a plastic tip hammer.



6) Remove the right-hand chain puller and distance collar.



7) Lean the machine to the left and remove the rear wheel assembly.



Replacing Tires

1) Removal

a) Remove the valve cap and lock nut (12 mm) from the tire valve, and deflate the tire.

b) Loosen the bead spacer lock nut (10 mm). Two bead spacers are provided for the rear wheel, and one for the front wheel.

c) Twist the bead spacer until it slips off the edge of the wheel rim.

d) Remove the tire from the wheel rim by the use of two tire levers. (Exercise care to avoid damaging the inner tube with the levers.)

It is noted that to remove the inner tube, one side of the tire should be pried out of the wheel rim.

2) Installation

a. Pull the bead spacer toward the wheel rim flange.

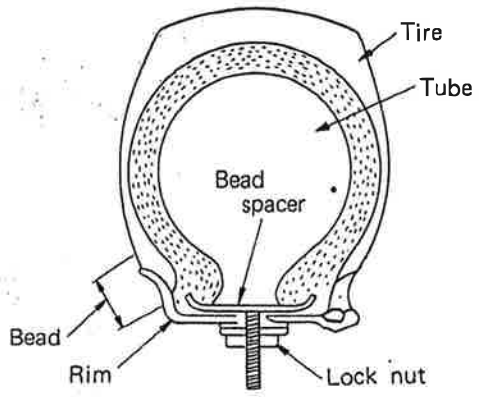
b. Replace the tube between the tire and the wheel rim, and half inflate the tube. Be sure that the valve stem is directed toward the wheel shaft. Install the tube in over the same side of the rim that the tube is removed from. Deflate the tube.

c. Mount the tire on the wheel rim by the use of tire levers. For this operation, it is advisable that the bead on one side of the tire be pushed in toward the rim flange.

d. To avoid pinching the tube between the tire and the rim, tap the tire with a hammer.

e. Tighten the bead spacer lock nut.

f. Tighten the tire valve lock nut, and inflate the tire to the recommended pressure, then install the valve cap.



B. Inspection

1) Runout of the rim

Check the rim for runout in the same way as the front wheel.

Maximum limit of runout ..... 2 mm (0.07 in.) or less

2) Brake shoe

Check the brake shoe in the same way as the front wheel.

Minimum limit ..... 146 mm (5.75 in.)

3) Brake drum

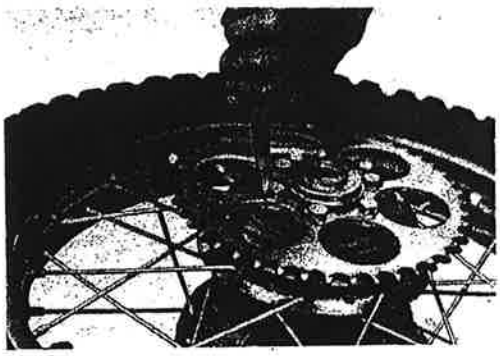
Check the brake drum in the same way as the front wheel.

4) The spokes are measured in the same way as the front wheel. A loose spoke should be tightened.
5) If the bearing(s) have excessive play or do not turn smoothly, replace.
6) If the tire or the pattern is worn out, replace the tire.
7) If the lip of the oil seal is damaged or warped, replace it.

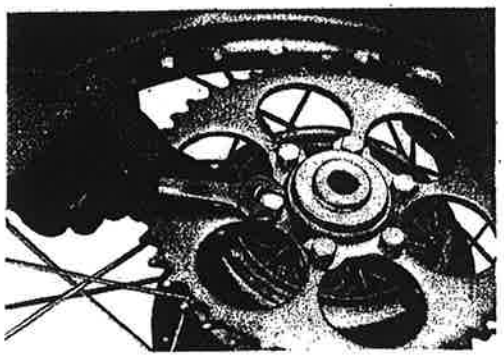
4-3 Rear Wheel Sprocket

A. Removal

1) Removing the sprocket
   a. Bend the lock washer ears flat.

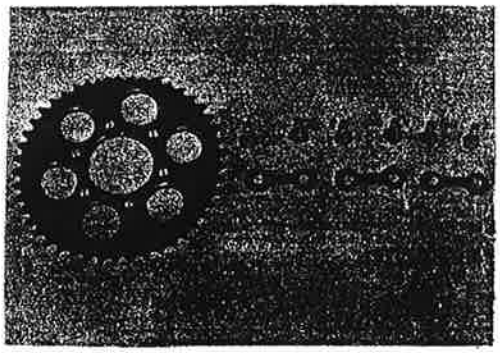


   b. Remove the sprocket mounting bolts.



B. Checking

1) Check the lock washer and hexagonal bolt for breakage and damage. If the lock washer is not bent over the hexagonal bolt head or broken, or if the bolt is loose, the sprocket can become loose.
   Make sure that both lock washers and the mounting bolts are tight.



4-4 Tires and Tubes

1) Normal tire pressure

Though tire pressure is the rider's choice, the standard tire pressure is as follows.

a. On-the-road-riding

Front	.....	13 lbs/in^2	(0.9 kg/cm^2)
Rear	.....	16 lbs/in^2	(1.1 kg/cm^2)

b. Off-the-road riding

Front	.....	8.5 lbs/in^2	(0.6 kg/cm^2)
Rear	.....	10 lbs/in^2	(0.7 kg/cm^2)

4-5 Front Forks

The DT, RT Series are equipped with competition designed telescopic double dampening front forks. These specially designed front forks provide excellent riding comfort along with handling superiority. The maximum stroke travel is almost 7 inches (175 mm).

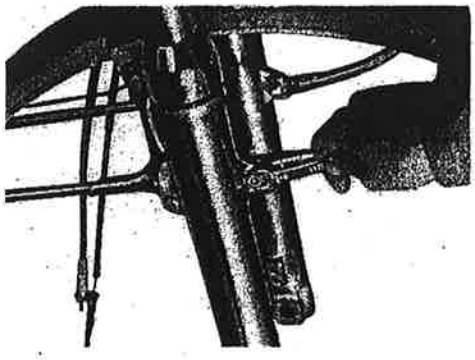
The combination of fork stability and long stroke travel provides safety and handling ease for the rider over even the roughest of terrain. This front fork design also reduces weight, eases maintenance, and gives functional and attractive appearance.

The simplicity and dependability of the front forks is provided by the installation of the fork spring inside of the fork tube.

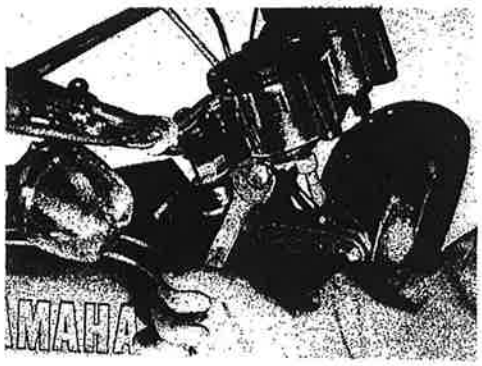
A. Removal

1) Remove the front fender.

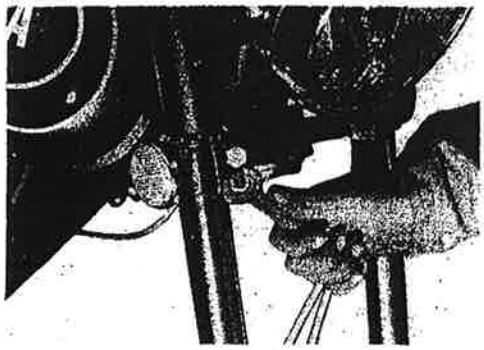
The light-weight aluminum front fender is rubber-mounted on the stay.



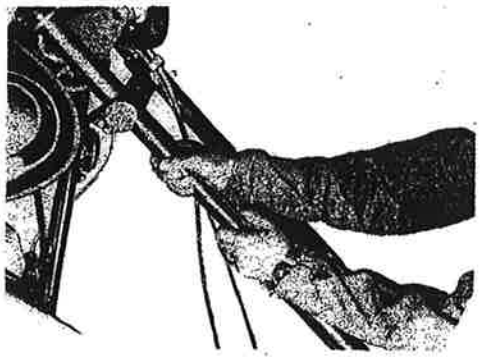
2) Loosen the arrow marked bolt.



3) Loosen the inner tube pinch bolts on the underbracket.

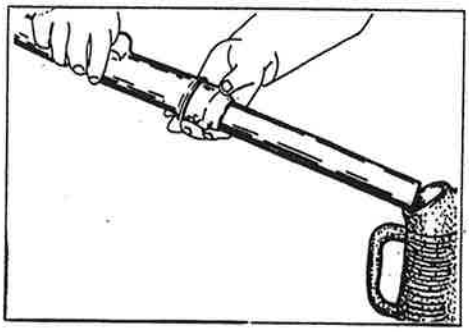


4) Pull the outer tube downward.

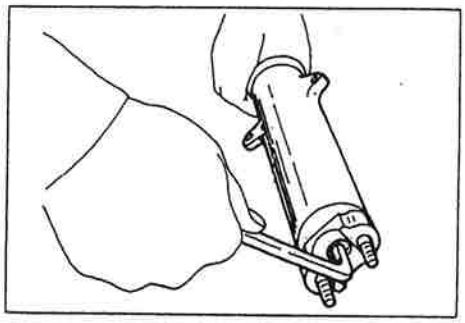


B. Disassembling the Inner and Outer Tubes

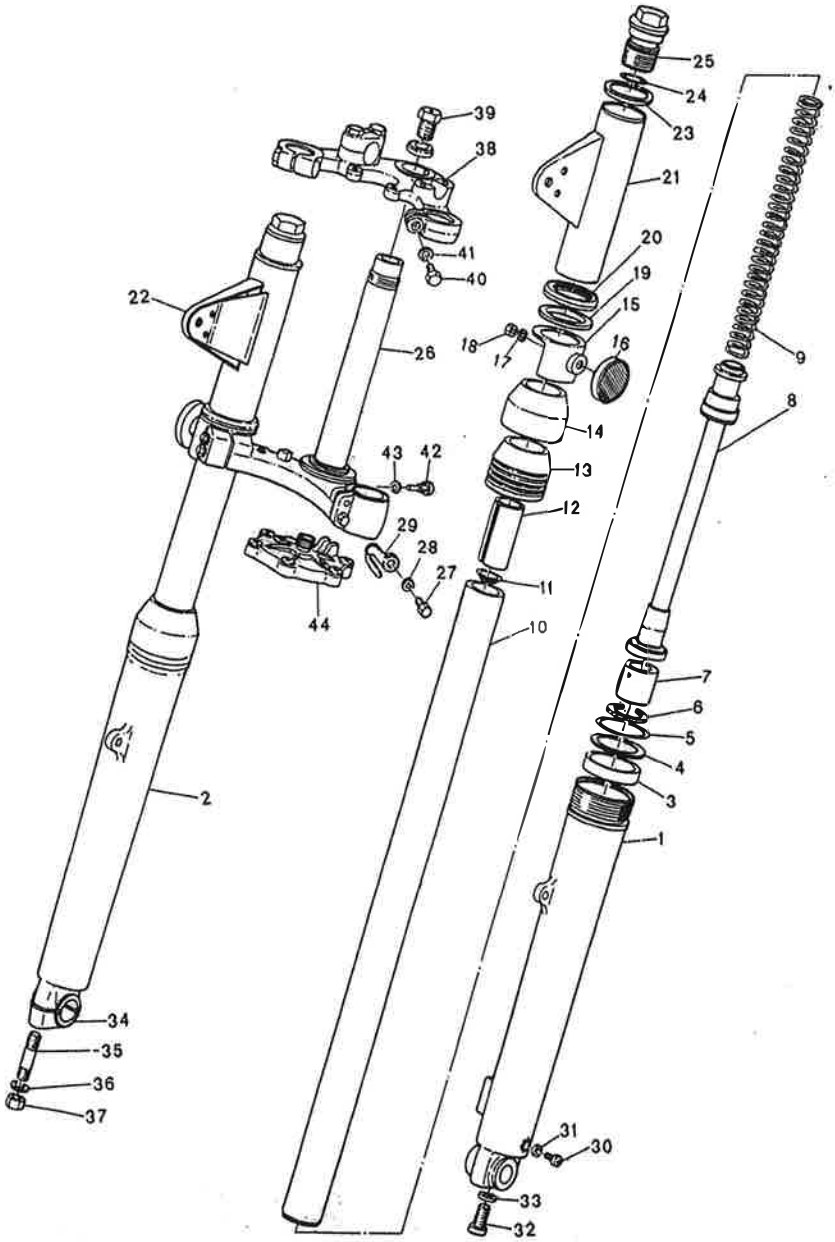
1) Drain the oil from the fork.



2) Remove the special bolt from the bottom of the outer tube.



3) The inner tube can be separated from the outer.



1. TUBE, outer left
2. TUBE, outer right
3. OIL, seal
4. WASHER, oil seal
5. CLIP, oil seal
6. CIRCLIP
7. PISTON
8. CYLINDER, comp.
9. SPRING, fork
10. TUBE, inner
11. SEAT, spring upper
12. SPACER
13. SEAL, dust
14. COVER, dust seal
15. COVER, outer
16. REFLECTOR
17. WASHER, spring
18. NUT
19. PACKING (lamp stay)
20. GUIDE, cover under
21. COVER, upper left
22. COVER, upper right
23. GUIDE, cover upper
24. PACKING
25. BOLT, cap
26. UNDER, bracket comp.
27. BOLT, under bracket
28. WASHER, spring
29. HOLDER, wire
30. PLUG, drain
31. GASKET, drain plug
32. BOLT
33. PACKING
34. HOLDER, axle
35. BOLT, axle holder
36. WASHER, spring
37. NUT
38. CROWN, handle
39. BOLT, steering fitting
40. BOLT
41. WASHER, spring
42. BOLT
43. WASHER, spring
44. HANDLE, damper ass'y

C. Checking

1) Inner tube

Check the inner tube for bending or scractches. If the bend is slight, it can be corrected with a press. It is recommended, however, to replace the tube if possible.

2) Oil seal

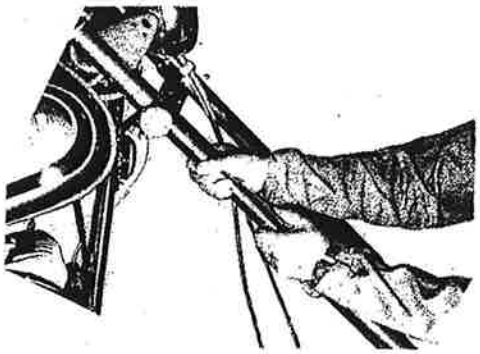
When disassembling the front fork, replace the oil seal in the outer tube nut.

D. Assembling

1) For assembling the front fork, reverse the order of disassembling. Check if the inner tube slides in and out smoothly.

2) Installing the fork on the frame

a. Bring up the front fork to the correct position and tighten the underbracket mounting bolts.



b. Pour oil into the inner tube through the upper end opening. Front fork oil: Motor oil SAE 10W/30 175 cc. (5.85 oz.) per fork leg.

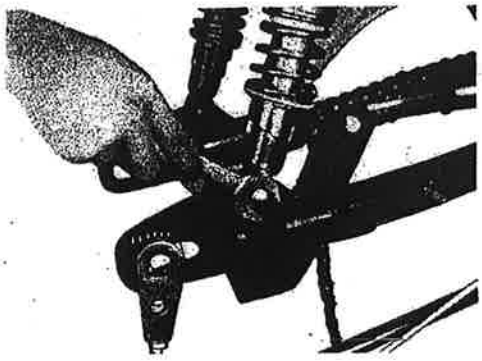
c. Install the cap bolt.

4-6 / Rear Shocks

The rear shocks have a maximum stroke of 90 mm (3.54 in.). The rear cushion features superb damping and 3 or 5-position adjustable springs, that allow the rider to adjust the rear shocks to suit any riding condition.

A. Checking the Condition of the Damping Units

1) Remove the rear shock assembly.



2) Compress the shocks by applying weight as shown in figure and release it.

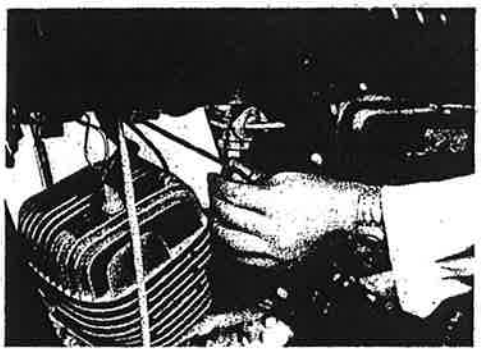
If the shock quickly restores halfway and then slowly returns to the original position after it reaches 10 mm (3/8 in.) before the original position, the rear shocks are in good condition. But if the cushion returns quickly to the original position, check the cushion for oil leakage, and replace the assembly if oil leaks are appearent.

4-7 Gas Tank

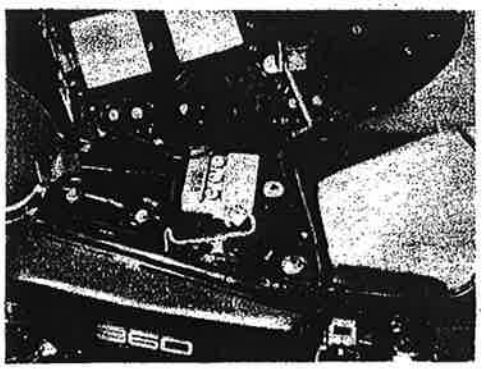
The gas tank has been shaped so that the rider can freely change his riding position. The front of the tank slips into the tank stays and the rear is held by rubber band.
Tank capacity: 9.5 litres (2.5 gals).

A. Removing

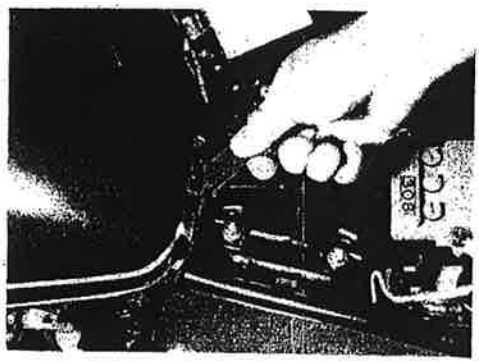
1) Set the petcock lever at "Stop" position and disconnect the fuel line at the petcock.



2) Open the seat.



3) Remove the rubber band.



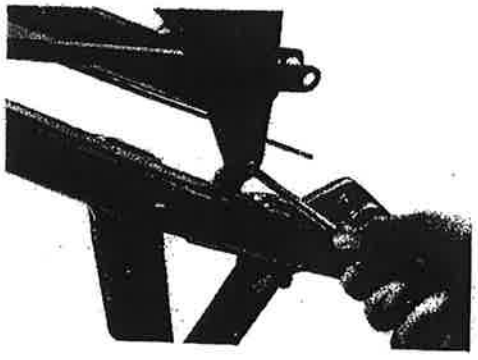
4) Remove the gas tank by sliding it back to clear tank stays and then lifting up.

4-8 | Rear Swing Arm

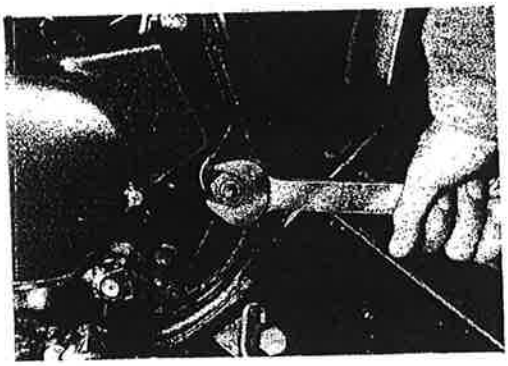
The rear swing arm is made of square steel tubing that improves the strength and torsional rigidity. The pivot employs permanently lubricated bearings.

A. Removing

1) Remove the chain case mounting bolts.

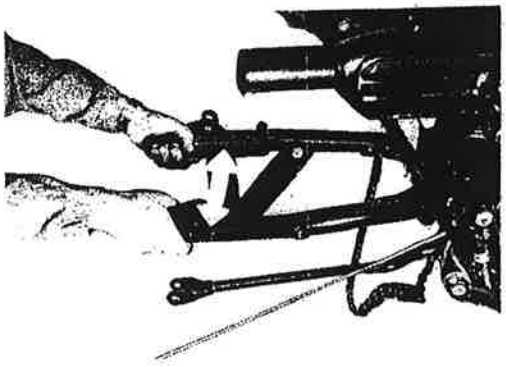


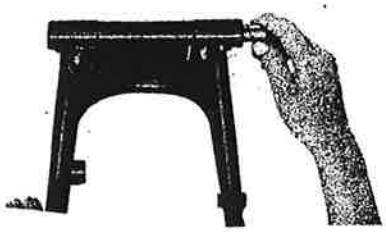
2) Remove the rear swing arm shaft nut, pull out the shaft, and remove the rear swing arm.



B. Checking

1) Check the play of the rear swing arm by shaking it from side to side as shown in figure, with the rear swing arm installed. If the play is excessive, replace the rear swing arm bushing or the rear swing arm shaft.
2) Insert the bushing as indicated in figure, and check it for play. If the play is excessive, replace the bushing.





3) Grease the rear arm shaft periodically.

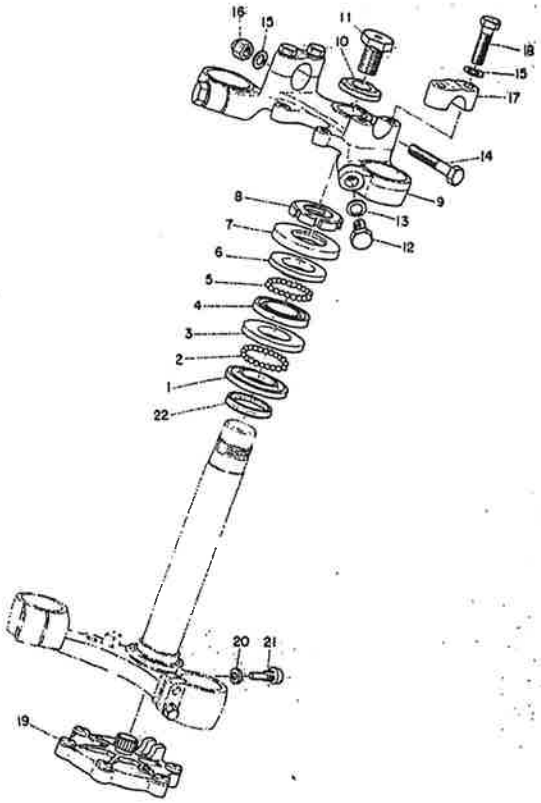
Replacing Rear Swing Arm Bushings

On motorcycles being habitually used for on-the-street riding, rear swing arm bushings should be replaced every 10,000 km (6,000 miles).

The same may not apply to those used for racing or rough riding. Replacement should be made according to machine condition such as excessive play of the rear swing arm, or hard steering (wander, shimmy or rear wheel hop), or upon request of the customer.

4-9 Steering Head

A. Sectional View of the Steering Head



1	RACE, ball 1
2	BALL (1/4 inch)
3	RACE, ball 2
4	RACE, ball 2
5	BALL (3/16 inch)
6	RACE, ball 1
7	CAVER, ball race
8	NUT, fitting
9	CROWN, handle
10	WASHER, crown
11	BOLT, steering fitting
12	BOLT
13	WASHER, spring
14	BOLT
15	WASHER, spring
16	NUT, crown
17	HOLDER, handle upper
18	BOLT
19	OIL DAMPER ASS'Y
20	WASHER, spring
21	BOLT
22	SEAL, dust

B. Checking

Ball races and steel balls

Check the ball races and steel balls for pitting or wear. Check them very carefully if the machine has been in long use. If they are worn or cracked, replace all of them, because defective ball races or steel balls adversely affect the maneuverability of the machine.

Replace any ball race having scratches or streaks resulting from wear. Clean and grease the balls periodically.

Note:

Do not use a combination of new balls and used races or vice versa. If any of these are found defective, replace the whole ball and race assembly.

4-10 Oil Tank, Battery Box and Tool Box

The oil tank is located on the left side under the seat. It is designed to be as narrow as possible so that it will not contact the rider's lower limbs when he stands upright on the footrests. To fill the Autolube oil tank, lift the seat and the tank cap will be exposed. Oil tank capacity.....1.6 litres (1.7 qt).

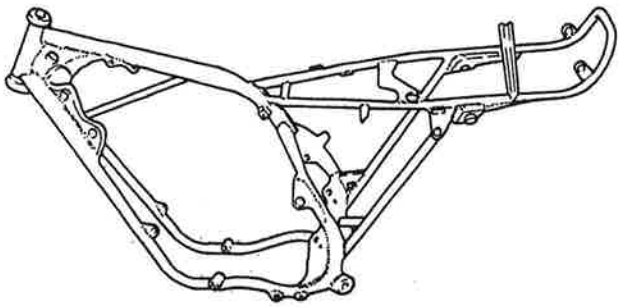
The battery box and the air cleaner case is located under the seat.

4-11 Frame

The double cradle-type frame is made of high tension steel tubes that provide strength, rigidity and light weight. Other dimensional features include higher ground clearance, narrower width, and longer wheelbase. The engine is bolted to the frame at four positions.

Caster:

DT1-E, DT2, RT1-B, RT2	60°30′
DT3, RT3	60°



4-12 Handlebars

The upswept type longer handlebars are ideal for motocross events and are provided with deep-cut pattern grips to prevent hand slippage. The lever holder is provided with an adjusting screw to set clutch and brake cable play.

The meter bracket is mounted on the front of the handle crown to carry the speedometer on its left side and the tachometer on its right side.

4-13 Miscellaneous

The footrest is made of a single steel tube extending under the lower part of the frame and is bolted to the frame. The engine guard is bolted to the frame to protect the entire crankcase·····covering from the exhaust system to the drain plug.

CHAPTER 5 ELECTRICAL SYSTEM

5-1 Description

The Yamaha DT, RT Series Electrical Systems are designed to facilitate lightweight, functional operation and simplicity.

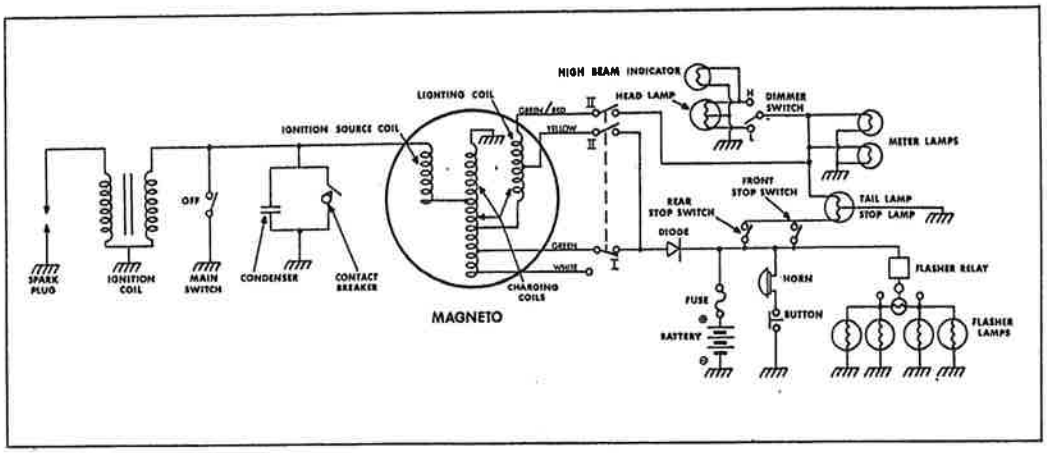
Yet with these features, the Ignition System and Lighting System facilitate dependable engine operation and all necessary lighting equipment. A 6 volt battery is used in conjunction with the flywheel magneto. All of the light bulbs have been increased in output to insure sufficient night riding visibility.

5-2 Table of Component Parts

DT1-E, RT1-B Parts	Manufacturer	Model & Type
Flywheel magneto	Mitsubishi Elec.	FZA-1AL (DT1-E) FZC-1AL (RT1-B)
Spark plug	N.G.K.	B-8ES (DT1-E) B-9ES (RT1-B)
Headlight	Koito Mfg.	6V,35W/35W
Speedometer	Nippon Seiki	
Tachometer	Nippon Seiki	
Main switch	Asahi Denso	
Ignition coil	Mitsubishi Elec.	HP-E
Horn	Nikko Kinzoku	MF-6
Battery	Nippon Battery	MV1-6D
Rectifier	Mitsubishi Elec.	DS10HJ1
Fuse	Osachi Mfg.	10A
Stop switch	Niles Parts	SH40E
Taillight/Stop light	Stanley Elec.	6V.5.3W/17W
Flasher light		6V,17W
High beam indicator		6V.1.5W
Flasher pilot light		6V.3W

DT2, RT2 Parts	Manufacturer	Model & Type
Flywheel magneto	Mitsubishi Elec.	FZA-1BL
Spark plug	N.G.K.	B-8ES (DT2) B-9ES (RT2)
Headlight	Koito Mfg.	6V.35W/35W
Speedmeter	Nippon Seiki	
Tachometer	Nippon Seiki	
Main switch	Asahi Denso	
Ignition coil	Mitsubishi Elec.	HD-A4
Horn	Nikko Kinzoku	MF-6
Battery	Nippon Battery	6N4-2A-2
Rectifier	Mitsubishi Elec.	DS10HJ$_8$-8
Fuse	Osachi Mfg.	10A
Stop switch	Niles Parts	SH40E
Taillight/Stop light	Stanley Elec.	6V,5.3W/17W
Flasherlight		6V.17W
High beam indicator		6V.1.5W
Flasher pilot light		6V.3W

5-3 Connection Diagram

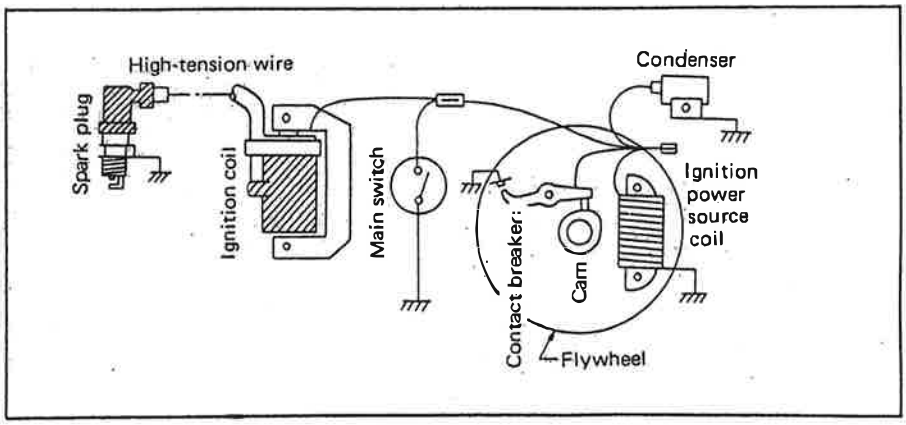


5-4 Ignition System – Function and Service

Function:

The ignition system consists of the components as shown in figure. As the flywheel rotates, the contact breaker points begin to open and close, alternately. This make-and-break operation develops an electromotive force in the ignition source coil and produces a voltage in the primary coil.

The ignition coil is a kind of transformer, with a 150 turn ratio of the primary to the secondary winding. The voltage (150–300V) which is produced in the primary coil, is stepped up to 12,000–14,000V by mutual-induction, and the electric spark jumps across the spark plug electrodes.



5-5 Ignition Timing

Example: RT1-B

Remove the head and attach the dial indicator holder. Next, insert the dial indicator in the holder. (See figure)

The piston should be brought to T.D.C. and the dial indicator set at zero.

The crankshaft should then be turned in reverse and the piston brought down below 2.9 mm before T.D.C. The flywheels should then be rotated forward until the piston reaches 2.9 mm. Wedge the governor fully open. (See figure)

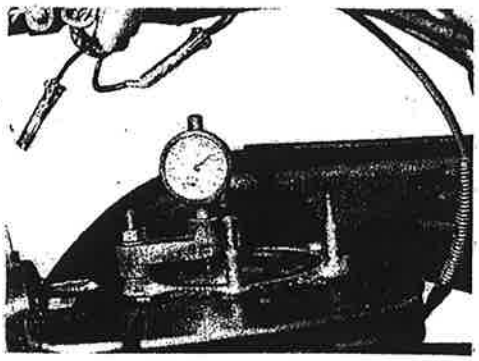
At this point the ignition points should just be opening. A low resistance point checker (100 ohms or less) should be used to determine the opening and closing position of the ignition points.

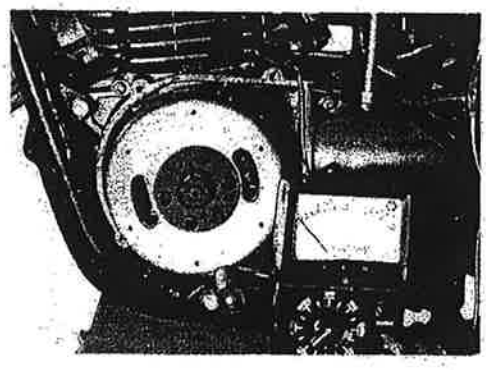
The adjustment of ignition timing of the DT1-E, DT2, DT3, RT2, and RT3 is the same in procedure and method as in the case of the RT1-B.

Ignition Timing

DT1-E	$3.2^{+0.2}_{-0.5}$ mm B.T.D.C.
DT2	$3.2^{+0.2}_{-0.5}$ mm B.T.D.C.
DT3	$3.2^{+0.2}_{-0.5}$ mm B.T.D.C.
RT1-B	$2.9^{+0.2}_{-0.5}$ mm B.T.D.C. (Governor wedged open)
RT2	$2.9^{+0.2}_{-0.5}$ mm B.T.D.C.
RT3	$2.9^{+0.2}_{-0.5}$ mm B.T.D.C.

Note: DT1-E, DT2, DT3, RT2 and RT3 are not provided with governor.

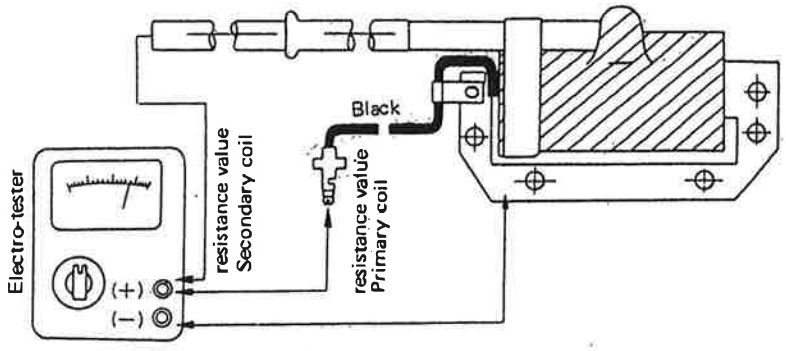




5-6 Ignition Coil

Primary coil resistance value	0.6 Ω ±10%	(20°C or 68°F)	DT1-E, RT1-B
	0.9 Ω ±10%	(20°C or 68°F)	DT2, DT3, RT2, RT3
Secondary coil resistance value	5.8 Ω ±10%	(20°C or 68°F)	DT1-E, RT1-B
	6.5 Ω ±10%	(20°C or 68°F)	DT2, DT3, RT2, RT3

(For measuring methods, refer to figure).



Note:

When measuring the secondary coil resistance value, disconnect the plug cap. Otherwise, the resistance of the 5kΩ noise suppressor incorporated in the plug will be added to the tester reading.

Spark Test:

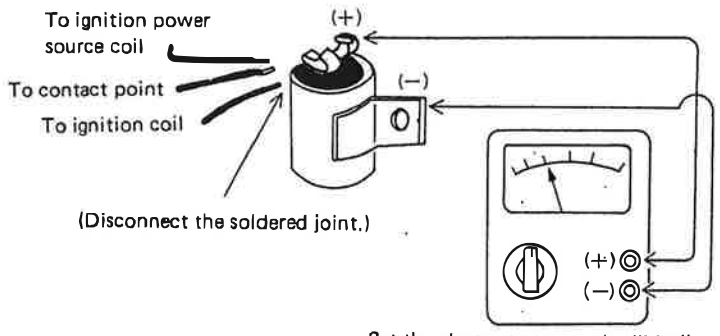
Remove the spark plug from cylinder head and reconnect the high voltage lead. Then ground the spark plug and see if it sparks as you crank the kickstarter.

If it sparks 7 mm or so and has white blue color, the ignition coil should be considered to be in good condition.

5-7 Condenser

The condenser instantly stores a static electric charge as the contact breaker points separate, and the energy stored in the condenser discharges instantly when the points are closed. If it were not for the condenser, an electrical charge would arc across the separating contact points, causing them to burn. The condenser minimizes the burning of the contact points, greatly affecting the flow of current in the primary winding of the ignition coil.

If the contact points show excessive wear, or the spark is weak (the ignition coil is in good condition), check the condenser.



Set the electro-tester on the "MΩ" position.

Insulation resistance tests should be conducted by connecting the tester as shown in figure. If the pointer swings fully and the reading is more than 3MΩ the insulation is in good condition. If the insulation is punctured, the pointer will stay pointing to the 0—1000Ω reading.

Note:

After this measurement, the condenser should be discharged by connecting the positive and negative sides with a thick lead wire.

Capacity tests can be performed by simply setting the tester to the condenser capacity. The tester should be connected with the condenser in the same way as in the case of the insulation resistance test. Before this measurement, be sure to set the tester correctly.

If the reading is within 0.22μF ±10%, the condenser capacity is correct.

5-8 Charging System

The charging system consists of the flywheel magneto (charging and lighting coils), rectifier, and battery.

1. Flywheel Magneto

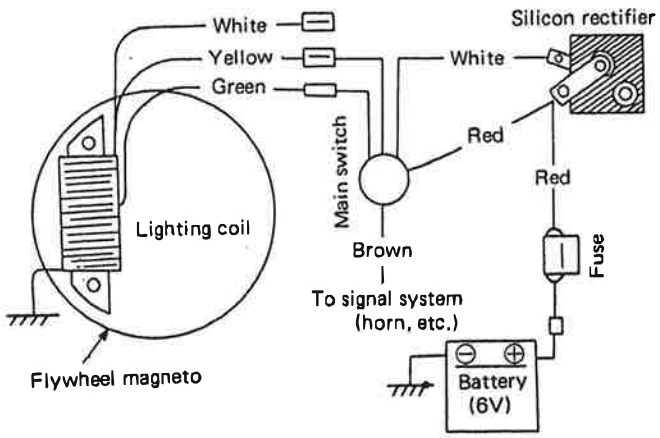
As the flywheel rotates, an alternate current is generated in the charging and lighting coils and is then converted to a half-wave D.C. current by means of a silicon rectifier. This half-wave D.C. current charges the battery.

Charging Capacity (daytime)

Green lead:	Charging begins	at 2,500 r.p.m.
	2.0A or less	at 8,000 r.p.m.
White lead:	0.15A or more	at 2,500 r.p.m.
	4.0A or less	at 8,000 r.p.m.

Charging Capacity (nighttime)

Green/Red:	Charging begins	at 2,000 r.p.m.
	1.2A ±0.4	at 8,000 r.p.m.



Lighting Capacity (night time)
(With normal loads and normal wiring)

5.5V or more at 2,500 r.p.m.
7.5V or less at 8,000 r.p.m. on lighting circuit

★The charging and lighting capacity is obtained when the battery is fully charged. If the battery is in a low state of charge and low voltage, the charging rate will not be exactly the same as above. However, it is desirable that the figures are as close as possible. If there is a large discrepancy, charge the battery and recheck the circuit.

How to Increase Charging Capacity

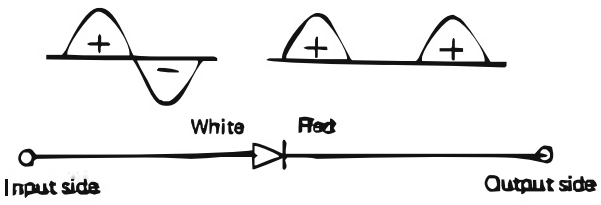
The flywheel magneto's green lead wire is connected to the wire harness' green lead. But if the battery is continuously in a low state of charge, connect the magneto's white lead to the wire harness' green lead. This will increase the charging rate.

2. Silicon Rectifier

The alternate current, which is generated by the flywheel magneto is rectified and charges the battery. For this rectification, a single-phase halfwave silicon rectifier is employed.

Characteristics: Rated output – 4A
Rated peak inverse voltage – 400V

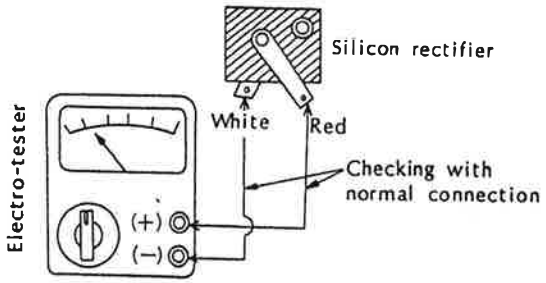
Polarity:



a. **Checking the Silicon Rectifier**

For measurements, a voltmeter can be used.

However, this section discusses only the checking method by means of the ohmmeter.



(Set the tester on "Resistance.")

b. **Checking with Reversed Connection**

Connect the tester's red lead (+) to the silicon rectifier's red terminal, and connect the tester's black lead (−) to the rectifier's white terminal.

Standard value: 9−10Ω.

If the tester's pointer will not swing back from the over scale, the rectifier is defective.

c. **Checking with Normal Connection**

Reverse the tester leads.

Standard value:

If the pointer will not swing, the rectifier is in good condition. If the pointer swings, the rectifier is faulty.

3. **Operational Note**

The silicon rectifier can be damaged if subjected to overcharging. Special care should be taken to avoid a short circuit and/or incorrect connection of the positive and negative leads at the battery. Never connect the rectifier directly to the battery to make a continuity check.

5-9 Battery

The battery is a 6 volt-2AH (DT1-E, RT1-B) and 6 volt-4AH (DT2, DT3, RT2, RT3) unit that is the power source for the horn, taillight, and stoplight. Because of the fluctuating charging rate due to the differences in engine R.P.M., the battery will lose its charge if the horn and stoplight are excessively used at low R.P.M. The charging of the battery begins at about 2,500 R.P.M.

Therefore, it is recommended to sustain engine R.P.M. at about 2,500 to 3,500 R.P.M. to keep the battery charged properly. If the horn and stoplight are used frequently, the battery water should be checked regularly as the continuing charging will dissipate the water.

If the battery will not retain a charge (and the battery is in good condition), the white wire of the flywheel magneto can be connected to the green wire of the wiring harness. This will

increase the charging rate but if the machine is ridden for long periods of time with this wiring connection, the battery can be overcharged and damaged.

1. Checking

1) If sulfation occurs on the battery plates due to lack of electrolyte, it will show as white accumulations. The battery should be replaced.
2) If the bottoms of the cells are filled with corrosive material falling off the plates, the battery should be replaced.
3) If the battery shows the following defects, it should be replaced.
   - o The voltage will not rise to a specific value even after long hours charging.
   - o No gassing occurs in any cell. (bubbles during charging)
   - o The 6V battery requires a charging current of more than 8.4 volts in order to supply a current at a rate of 1 AMP per hour for 10 hours.

2. Service Life

The service life of a battery is usually 2 to 3 years, but lack of care as described below will shorten the life of the battery.

1) Negligence in re-filling the battery with electrolyte.
2) Battery being left discharged.
3) Over charging by rushing charge. (2AH battery requires 0.2A charge rate)
4) Freezing.
5) Filling with water containing impurities when re-filling the battery.

3. Storage

If any motorcycle is not going to be used for a long time, remove the battery and have it stored by a battery service shop. The following instructions should be observed by shops equipped with chargers.

1) Recharge the battery.
2) Store the battery in a cool, dry place, and avoid temperatues below 0°C (32°F).
3) Recharge the battery before mounting it on the motorcycle and/or every 1–2 months.

4. Service Standards

Battery: MV1-6D (DT1-E, RT1-B), 6N4-2A-2 (DT2, DT3, RT2, RT3)

Battery Spec.	6V-2AH (DT1-E, RT1-B) 6V-4AH (DT2, DT3, RT2, RT3)	
Electrolyte specific gravity and quantity	1.26–1.27, 110 cc (DT1-E, RT1-B) 1.26–1.27, 200 cc (DT2,DT3,RT2,RT3)	At full charge
Initial charging current	0.2A for 25 hours (DT1-E, RT1-B) 0.4A for 25 hours (DT2,DT3,RT2,RT3)	Brand new motorcycle
Charging current	0.2A for 13 hours (DT1-E, RT1-B) 0.4A for 13 hours (DT2,DT3,RT2,RT3) (Charge until specific gravity reaches 1.26–1.27)	When discharged
Refilling	Distilled water up to the max. level line	Once a month

5-10 Checking the Main Switch (removed from the chassis)

Key "0" position (Off)

Black ↔ Switch body

Key "1" position

(for day)

Green ↔ White

Red ↔ Brown

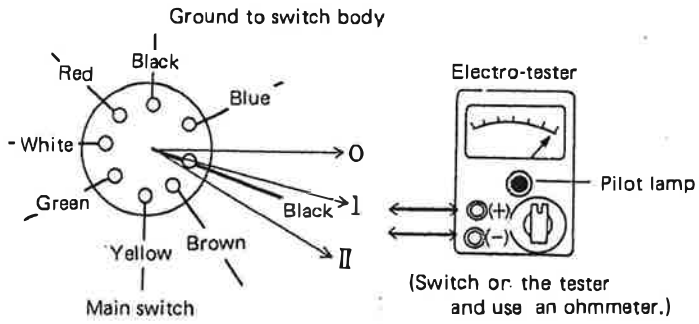
Key "II" position

(for night)

Yellow ↔ White

White ↔ Blue

Red ↔ Brown



If the readings on the above six measurements are nearly 0Ω, and no shortcircuit is noticed between the terminals, as well as between the lead terminal and the switch body, the main switch is in good condition.

5-11 Spark Plug

The life of a plug and its discoloring vary according to the habits of the rider. At each periodic inspection, replace burned or fouled plugs with suitable ones according to the color and condition of the bad plugs.

One machine may be ridden only in urban areas at low speeds, whereas another may be ridden for hours at high speeds, so confirm what the present plugs indicate by asking the rider how long and how fast he rides, and recommend a hot, standard, or cold plug accordingly. It is actually ecnomical to install new plugs every 3,000 km (2,000 miles) since it will tend to keep the engine in good condition and prevent excessive fuel consumption.

1. How to "Read" Spark Plug (Condition)

a. Best.....When the porcelain around the center electrode is a light tan color.

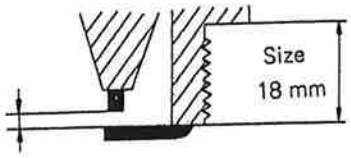
b. If the electrodes and porcelain are black and somewhat oily, replace the plug with a hotter-type for low speed riding.

c. If the porcelain is burned white and/or the electrodes are partially burned away, replace the plug with a colder-type for high speed riding.

2. Inspection

Instruct the rider to:

Inspect and clean the spark plug at least once a month or every 1,000 km (500 miles). Clean the electrodes of carbon and adjust the electroce gap to 0.5–0.6 mm (0.020–0.023"). Be sure to use standard plug as replacements to avoid any error in reach.



0.5~0.6 mm (0.023 in.)

Standard

DT1-E	B-8ES
DT2	B-8ES
DT3	B-8ES
RT1-B	B-9ES
RT2	B-9ES
RT3	B-9ES

5-12 Lighting and Signal Systems

The lighting and signal systems consist of the horn and stoplight (power source-battery) and the headlight, taillight, meter lamps, high beam indicator, speedometer and tachometer (power source-flywheel magneto).

1. Headlight

The headlight has (a double filament) 6V, 35W bulb, and a 6V, 1.5W high beam indicator on top of the shell. A beam direction adjusting screw is fitted on the right side of the light rim so that the horizontal direction of the beam can be adjusted (not vertical).

2. **Taillight and Stoplight**

A 6V, 5.3W taillight and a 6V, 17W stoplight are mounted. The lens of the taillight is provided with reflectors on the sides-rear, right and left.

3. **Horn**

The horn is a 6V, flat type, and has a tone-volume adjusting nut on its back. After adjustment is made, apply paint or lacquer to the nut for water proofing purposes.

4. **Speedometer**

A circular type speedometer is rubber mounted on the bracket. It has a built-in tripmeter and a odometer. For illumination, a 6V, 3W bulb is provided.

5. **Tachometer**

An independent tachometer is mounted separately from the speedometer. The revolutions per minute of the crankshaft are conveyed from the kick idler gear through the gear unit to the tachometer. The meter lamp is of the 6V, 3W type.

Note:

Use bulbs of the correct capacity for the headlight, taillight, meter lamp and high-beam indicator which are directly connected to the flywheel magneto. If large capacity bulbs are used, the voltage will drop, giving a poor light. On the contrary, if smaller capacity bulbs are used, the voltage will rise, shortening the life of bulbs. Avoid the use of a 12V bulb, because shorter service life will result.

When the headlight beam switch is operated to change the beam from one to another, the headlight is designed to keep both bulbs burning during the change-over. This is to protect other light bulbs, meter lamps, taillight, etc., from burning out as a result of turning off the headlight, even temporarily. If one of these light bulbs is burnt out while the machine is running, it will overload other bulbs and shorten their Service Life. Reduce engine speed and replace a burnt bulb as quickly as possible.

IBM PARTS ORDER SYSTEM

In order to help our dealers to understand how our IBM system works, we are providing these hints:

1. Basic composition: 000-00000-00 (for standard parts)
2. Basic composition: 00000-00000 (for interchangeable parts)

1. STANDARD PARTS: These 10 digits are divided in three (3) sections: a-b-c

   A. These first three digits represent the original model in which this part was used.

164-00000-00)	Identifies the YL2/YL2C model (100 cc)
165-00000-00)	
166-00000-00)	
167-00000-00)	
168-00000-00)	Identifies the YR1 model (350 cc)
169 00000-00)	Identifies the YDS5E model (250 cc)
170-00000-00)	
171 00000-00)	Identifies the YM2C model (350 cc)
172-00000-00)	
173-00000-00)	Identifies the YCS1E model (180 cc)
174-00000-00)	
177-00000-00)	Identifies the TD1C model (250 cc Racer)

You will also find that some of these "three-digit" numbers will interchange with, or are used for other models.

In addition to the various "Three digits" that we mentioned above and which are assigned originally for those models, we also have quite a few "three digit" models that are not sold in this country.

B. The next FIVE DIGITS represent the Section and Actual Part No.

The FIRST DIGITS of this "five digit section" represent the section of the m/c to which the part belongs, i.e.:

000-	1	0000-	00	(1) represents the ENGINE section.
000-	2	0000-	00	(2) represents the FRAME section.
000-	8	0000-	00	(3) represents the ELECTRIC or WIRING section.

The SECOND & THIRS digits represent the location of the part within the sections (Engine-Frame-Electric).

EXAMPLES: (ENGINE SECTION)

000-1 **13** 11-00 Cylinder	(13) identifies the Crankcase area.
000-1 **16** 01-00 Ring set Std.	(16) identifies the Piston area.
000-1 **74** 01-00 Main axle ass'y	(74) identifies the Transmission area.
000-1 **41** 01-00 Carburetor ass'y (L)	(41) identifies the Carburetor area.

EXAMPLES: (FRAME SECTION)

000-2 **22** 10-00 Rear cushion	(22) identifies the Rear Fender area.
000-2 **31** 36-00 Outer tube R	(31) identifies the Front Fork area.
000-2 **41** 71-00 Knee grip L	(41) identifies the Tank/Seat area.
000-2 **53** 86-00 Collar, sprocket shaft	(53) identifies the Rear Wheel area.

EXAMPLES: (ELECTRIC/WIRING SECTION)

Any part number that you find within this "five-digit" section which starts with the number 8 is a component of the ELECTRIC/WIRING section, i.e.:

000-**8** 1910-20 Regulator
000-**8** 2510-10 Main switch assembly
000-**8** 2590-10 Wire harness assembly
000-**8** 2116-00 Lead wire (–)
000-**8** 2540-00 Neutral switch assembly

The FOURTH AND FIFTH digits are the ACTUAL PART NUMBER.

000-141 **01** -00 Carburetor (L)	(01) identifies the Carburetor (L).
000-141 **02** -00 Carburetor (R)	(02) identifies the Carburetor (R).
000-113 **11** 01 Cylinder (L)	(11) identifies the Cylinder (L).
000-113 **21** -01 Cylinder (R)	(21) identifies the Cylinder (R).
000-241 **71** -00 Knee grip (L)	(71) identifies the Knee Grip (L).
000-241 **72** -00 Knee grip (R)	(72) identifies the Knee Grip (R).

C. The last TWO DIGITS 9th and 10th in the "10 Digit" series, advises you of any changes, corrections or modifications to the original part.

EXAMPLES:

(YCS1) 174-18511-**00** FORK, shift (1) – This gear was modified for better performance and therefore the number was changed to read.

174-18511-**01**

If we get a further modification this part, and we hope not the number will then read:

174-18511-**02** or **03**

2. INTERCHANGEABLE PARTS:

These "10 digits" are divided into 2 sections of "5 digits" each.

These series ALWAYS start with the number "9" followed No. 1, 2, 3 or 4 plus 8 more numbers.

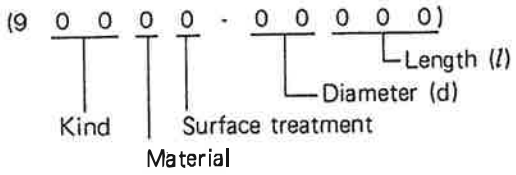
91000-00000 number is used for Bolts, Cotter Pins, etc.

92000-00000 number is used for Screws, Nuts, etc.

93000-00000 number is used for Oil Seals, O-Rings, Bearings, etc.

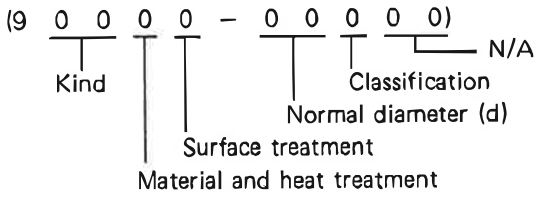
94000-00000 number is used for Tires, Rims, Spark Plugs, etc.

2A) BOLT, PIN AND SCREW



Kind	Parts	Shape	Kind	Parts	Shape
11	Bolt		21	Screw, oval head	
12	Bolt		22	Screw, flat head	
13	Bolt		23	Screw, cylinder head	
14	Pin, cotter		24	Screw, crown head	
15	Pin, clevis		25	Screw, pan head	
16	Pin, spring		26	Screw, oval head	
18	Pin, dowel		27	Screw, flat head	

2B) NUT AND WASHERS



Kind	Class	Parts	Shape	Kind	Class	Parts	Shape
28	1	Nut		29	1	Washer, spring	
28	2	Nut		19	1	Washer, plain	
28	3	Nut		29	3	Washer, tooth	
28	5	Nut, slotted		29	4	Washer, tooth	
28	7	Nut, crown					

2C) OTHERS (9000-00000)

Oil seal	93100-00000	Tire	94100-000
"O" ring	93200-00000	Tube	94200-0000
Bearing	93300-00000	Band, rim	94300-00000
Circlip	93400-00000	Rim	94400-00000
Ball	93500-00000	Chain	94500-00000
Pin, dowel B	93600-00000	Joint, chain	94600-00000
Grease nipple	93700-00000	Spark plug	94700-00000

In addition the "10 digits" that we have mentioned above, we have 2 more digits that must be included in the part number whenever there is a COLOR part involved. The IBM COLOR CHART consists of the following numbers:

000-00000-00-22	Candy red	000-00000-00-24	Light vermilion (red)
000-00000-00-25	Yamaha yellow	000-00000-00-33	Deep black
000-00000-00-34	Super black	000-00000-00-35	Silver
000-00000-00-44	Candy blue (new)	000-00000-00-81	Primer

Please do not fail to include this color number when ordering painted parts.

MILLIMETERS TO INCHES

	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
0		.0039	.0079	.0118	.0157	.0197	.0236	.2760	.0315	.0354
1	.0394	.0433	.0472	.0512	.0551	.0591	.0630	.0669	.0709	.0748
2	.7890	.0827	.0866	.0906	.0945	.0984	.1024	.1063	.1102	.1142
3	.1181	.1200	.1260	.1299	.1339	.1378	.1417	.1457	.1496	.1535
4	.1575	.1614	.1654	.1693	.1732	.1772	.1811	.1850	.1890	.1929
5	.1969	.2000	.2047	.2087	.2126	.2165	.2205	.2244	.2283	.2323
6	.2362	.2402	.2441	.2480	.2520	.2559	.2598	.2638	.2677	.2717
7	.2756	.2795	.2835	.2874	.2913	.2953	.2992	.3031	.3071	.3110
8	.3150	.3189	.3228	.3268	.3307	.3346	.3386	.3425	.3465	.3504
9	.3543	.3583	.3622	.3661	.3701	.3740	.3780	.3819	.3858	.3898
10	.3937	.3976	.4016	.4055	.4094	.4134	.4173	.4213	.4252	.4291

0.01 mm = 0.0004" 0.03 mm = 0.0012" 0.05 mm = 0.0020" 0.07 mm = 0.0028" 0.09 mm = 0.0035"
0.02 mm = 0.0008" 0.04 mm = 0.0016" 0.06 mm = 0.0024" 0.08 mm = 0.0031" 0.10 mm = 0.0039"

INCHES TO MILLIMETERS

		0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
		0.254	0.508	0.762	1.016	1.270	1.524	1.778	2.032	2.286
0.1	2.540	2.794	3.048	3.302	3.556	3.810	4.064	4.318	4.572	4.826
0.2	5.080	5.334	5.588	5.842	6.096	6.350	6.604	6.858	7.112	7.366
0.3	7.620	7.874	8.128	8.382	8.636	8.890	9.144	9.398	9.652	9.906
0.4	10.160	10.414	10.668	10.922	11.176	11.430	11.684	11.938	12.192	12.446
0.5	12.700	12.954	13.208	13.462	13.716	13.970	14.224	14.478	14.732	14.986
0.6	15.240	15.494	15.748	16.002	16.256	16.510	16.764	17.018	17.272	17.526
0.7	17.780	18.034	18.288	18.542	18.796	19.050	19.304	19.558	19.812	20.066
0.8	20.320	20.574	20.828	21.082	21.336	21.590	21.844	22.098	22.352	22.606
0.9	22.860	23.114	23.368	23.622	23.876	24.130	24.384	24.638	24.892	25.146
1.0	25.400	25.654	25.908	26.162	26.416	26.670	26.924	27.178	27.432	27.686

0.001" = 0.0254 mm 0.003" = 0.0762 mm 0.005" = 0.1270 mm 0.007" = 0.1778 mm 0.009" = 0.2286 mm
0.002" = 0.0508 mm 0.004" = 0.1016 mm 0.006" = 0.1524 mm 0.008" = 0.2032 mm 0.010" = 0.254 mm

LUBRICATION INTERVALS

PAGE	ITEM		REMARKS	TYPE	INITIAL				THEREAFTER EVERY		
					250	500	1000	2000	1000	2000	4000
	Autolube	PRE OP CHK	See Service Notes	#1	See Notes Below						
	Transmission		Warm engine before draining	#2		0		0		0	
	Drive Chain		Lube/Adjust as required	#3	See Notes Below						
	Drive Chain		Remove/clean/lube/adjust	#3				0		0	
	Air Filter		Foam Type	#9	See Notes Below						
	Control & Meter Cables		All - Apply thoroughly	#4		0	0			0	
	Throttle Grip & Housing		Light Application	#5			0			0	
	Tach & Speedo Gear Hsgs.		Light Application	#5				0			0
	Rear Arm Pivot Shaft		Zerk - Apply until shows	#6			0			0	
	Brake Pedal Shaft		Light Application	#5			0			0	
	Change Pedal Shaft		Light Application	#5			0			0	
	Stand Shaft Pivot(s)		Light Application	#5			0			0	
	Front Forks		Drain comp./chk. specs.	#3		chk		0			0
	Steering Ball Races		Inspect thoroughly/med. pack	#7				0			0
	Point Cam Lubr. Wick		Very light application	#8			0				0
	Wheel Bearings		Do not over-pack	#7				0			0

1. Check tank level before each ride or every 100 miles. Top off when oil level is at sight glass or before any long trip. Use the following lubricant (in order of preference):

   (1) Yamalube, or (2) Two-stroke oil labeled "BIA Certified for Service TC-W"

2. For average operation at ambient temperatures of 30 - 90°F. use SAE 10W-30 type "SE" motor oil.

3. Use SAE 10W-30 type "SE" motor oil. (If desired, specialty type lubricants of quality manufacture may be used.)

   NOTE: Drive chain must be lubricated every 200 - 250 miles. If unit is subjected to extremely hard usage, chain must be inspected constantly and serviced as required.

4. Use SAE 10W-30 type "SE" motor oil. (if desired, or at ambient temperatures below 30°F. a graphite base "dry" lubricant of quality manufacture may be used.)

5. Light duty: Lithium soap base (white) grease. Heavy duty: Standard 90 wt. lube grease (Do not use 90 wt. lube grease on throttle grip/throttle housing.)

6. Use standard 90 wt. lube grease -- smooth, not coarse.

7. Medium-weight wheel bearing grease of quality manufacture – preferably waterproof.

8. Light-weight machine oil.

9. Use SAE 10W-30. Must be damp with oil at all times to function properly. Always clean before oiling. Apply oil moderately; do not over-oil. Clean and oil monthly or every 500-1,000 miles; more often if possible. If unit is subjected to extremely hard usage, such as dirt riding, etc., clean and lube filter daily.

MAINTENANCE & LUBRICATION CHARTS

Interval recommendations and lubricant types listed in the Maintenance and Lubrication Charts are based upon general averages. Extremes in environment or usage may dictate shorter maintenance intervals, different lubricants, or shorter lubrication intervals.

Therefore, all recommendations regarding types and intervals are to be considered a guide only. Intervals should not be exceeded but may be shortened as required. Lubricant types may be up-graded, but never down-graded.

PERIODIC MAINTENANCE INTERVALS

PAGE	ITEM		REMARKS	INITIAL				THEREAFTER EVERY	
				250	500	1000	2000	1000	2000
	Brake System (complete)	ALSO PRE-OPERATION CHECK	Check/Adj. as req'd. -repair as req'd.		0	0			0
	Clutch		Check/Adjust as required		0	0			0
	Battery		Top-off/Chk. spec. gravity monthly or →	0		0		0	
	Spark Plug		Inspect/clean or replace as req'd.	0	0	0		0	
	Wheels & Tires		Pressure/Spoke Tension/runout	0	0	0		0	
	Fittings & Fasteners		Tighten before each trip and /or →	0	0	0		0	
	Autolube		Cable operation/Adjustment ①	0	0	0			0
	Drive Chain		Tension/Alignment ②	0	0	0		0	
	Transmission Level Check		Unit level/Engine warm	0	0	0		0	
	Air Filter		Foam type - See Service Notes ③	0	0	0		0	
	Fuel Petcock		Clean/flush tank as req'd.	0		0			0
	Ignition Timing		Adjust/clean or replace pts. as req'd.		0	0			0
	Carburetor Adjustment		Check operation/synch./fittings		.0	0			0
	Carburetor Overhaul		4,000 - 8,000 mi. as required						
	Cylinder Compression		Preventive Maintenance Check		0	0			0
	Decarbonize Engine		Includes Exhaust System			0			0

SERVICE NOTES:

1. Check Autolube tank level before each ride or every 100 miles. Top off when oil level shows at sight glass or before any long trip. See "Lubrication Intervals" for type oil.
2. Drive chain must also be lubricated every 200-250 miles. If unit is subjected to extremely hard usage, such as racing or dirt riding, chain tension, alignment, lubrication, and cleanliness must be checked constantly. See "Lubrication Intervals" for additional details.
3. Foam element air filters must be damp with oil at all times to function properly. Remove, clean, and oil filter at least once per month or every 500-1,000 miles; more often if possible. See "Lubrication Intervals" for additional details.

NOTE: If unit is subjected to extremely hard usage, such as dirt riding, etc., clean and lube filter daily.

PRE-OPERATION CHECK CHART

ITEM	ROUTINE	PAGE
BRAKES	Check operation/adjustment	
CLUTCH	Check operation/lever adjustment	
AUTOLUBE TANK	Check oil level/top-off as required	
TRANSMISSION	Top-off as required	
DRIVE CHAIN	Check alignment/adjustment/lubrication	
BATTERY	Check electolyte level weekly/top-off monthly	
SPARK PLUG(S)	After break-in - check color/cond'n weekly/1,000 mi.	
AUTOLUBE PUMP	Check for proper cable operation	
AIR FILTER	Foam type - must be clean and damp w/oil always	
WHEELS & TIRES	Check pressure/runout/spoke tightness/axle nuts	
FITTINGS/FASTENERS	Check all - tighten as necessary	
LIGHTS/SIGNALS	Check headlight/tail - stop lights/turn signals, etc.	

Pre-operation checks should be made each time the machine is used. Such an inspection can be thoroughly accomplished in a very short time; and the added safety it assures is more than worth the time involved.

CLEANING AND STORAGE

A. Cleaning

Frequent thorough cleaning of your motorcycle will not only erhance it's appearance but will improve general performance and extend the useful life of many components.

1. Before cleaning the machine:
   a. Block off end of exhaust pipe to present water entry; a plastic bag and strong band may be used.
   b. Remove air cleaner or protect it from water with plastic covering.
   c. Make sure spark plug(s), gas cap, oil tank cap, transmission oil filler cap and battery caps are properly installed.
2. If engine case is excessively greasy, apply degreaser with a paint brush. Do not apply degreaser to chain, sprockets, or wheel axles.
3. Rinse dirt and degreaser off with garden hose, using only enough hose pressure to do the job. Excessive hose pressure may cause water seepage and contamination of wheel bearings, front forks, brake drums, and transmission seals. Many expensive repair bills have resulted from improper high-pressure detergent applications such as those available in coin-operated car washes.
4. Once the majority of dirt has been hosed off, wash all surfaces with warm water and mild, detergent-type soap. An old tooth brush or bottle brush is handy to reach those hard-to-get-to places.
5. Rinse machine off immediately with clean water and dry all surfaces with a chamois skin, clean towel, or soft absorbent cloth.
6. Immediately after washing, remove excess moisture from chain and lubricate to prevent rust.
7. Chrome-plated parts such as handlebars, rims, spokes, forks, etc., may be further cleaned with automotive chrome cleaner.
8. Clean the seat with a vinyl upholstery cleaner to keep the cover pliable and glossy.
9. Automotive-type wax may be applied to all painted and chrome-plated surfaces. Avoid combination cleaner-waxes. Many contain abrasives which may mar paint or protective finish on fuel and oil tanks.
10. After finishing, start the engine immediately and allow to idle for several minutes.

B. Storage

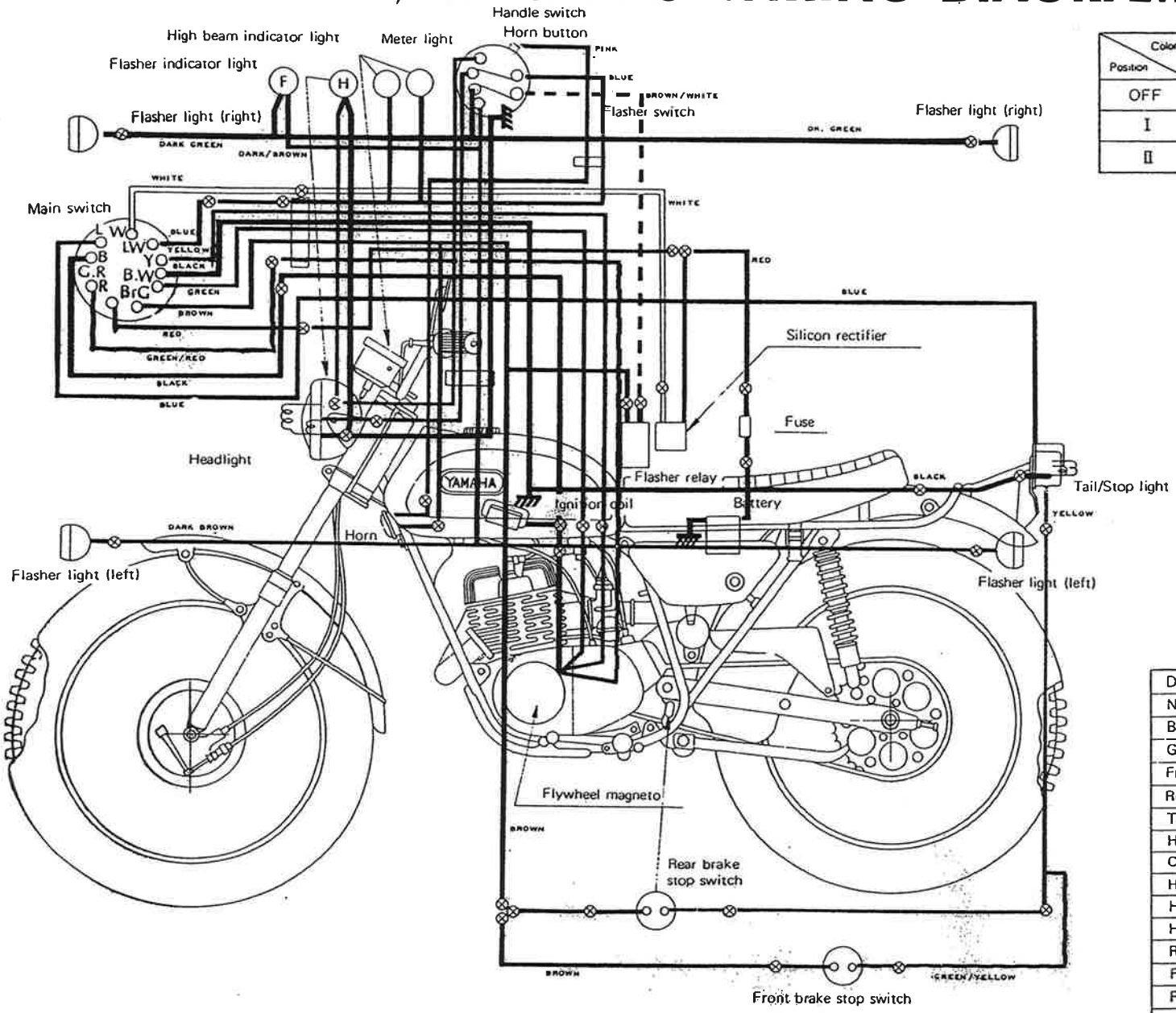
Long term storage (30 days or more) of your motorcycle will require some preventive procedures to insure against deterioration. After cleaning machine thoroughly, prepare for storage as follows:

1. Drain fuel tank, fuel lines, and carburetor float bowl(s).
2. Remove empty fuel tank, pour a cup of 10W to 30W oil in tank, shake tank to coat inner surfaces thoroughly and drain off excess oil. Reinstall tank.
3. Remove spark plug(s), pour about one tablespoon of 10W to 30W oil in spark plug hole(s) and reinstall spark plugs. Kick engine over several times (with ignition off) to coat cylinder walls with oil.
4. Remove drive chain. Clean thoroughly with solvent and lubricate with graphite-base chain lubricant. Reinstall chain or store in a plastic bag (tie to frame for safe-keeping).
5. Lubricate all control cables.
6. Remove battery and charge. Store in a dry place and re-charge once a month. Do not store battery in an excessively warm or cold place (less than 32°F or more than 90°).
7. Block up frame to raise both wheels off ground. (Main stands can be used on machines so equipped.)
8. Deflate tires to 15psi.
9. Tie a plastic bag over exhaust pipe outlet(s) to prevent moisture entering.
10. If storing in humid or salt-air atmosphere, coat all exposed metal surfaces with a light film of oil. Do not apply oil to rubber parts or seat cover.

Torque Specifications

Size	Kg/M	Ft. Lbs.	In. Lbs.
6mm	1.0	7	90
7mm	1.5	11	135
8mm	2.0	15	180
10mm	3.5-4.0	26-29	300-350
12mm	4.0-4.5	29-33	350-400
14mm	4.5-5.0	33-37	400-450
17mm	5.8-7.0	40-50	500-600
Sp. Pl.	27-29	19-21	230-250

DT / RT SERIES WIRING DIAGRAM



Position \ Color	E	B	R	Br	L	G	W	GR	LW	Y
OFF	○	○								
I			○	○		○	○			
II			○	○	○		○	○	○	○

Chart of wire colors

Daytime charging circuit	Green
Night time charging circuit	Green/Red
Battery (S+) circuit	Red
Ground circuit	Black
Front brake stop light circuit	Green/Yellow
Rear brake stop light circuit	Yellow
Tail light circuit	Blue
Head/Meter light circuit	Blue (L.W.)
Common circuit	Brown
Headlight main circuit	Yellow
Headlight sub circuit	Green
Horn circuit	Pink
Rectifier circuit	White
Flasher light (right) circuit	Dark green
Flasher light (left) circuit	Dark [illegible]
Flasher relay circuit	