YAMAHA

DT250A / 360A

Service Manual

450-28197-10

NOTICE

This manual has been written by Yamaha Motor Company for use by Authorized Yamaha Dealers and their qualified mechanics. In light of this purpose it has been assumed that certain basic mechanical precepts and procedures inherent to our product are already known and understood by the reader.

Without such basic knowledge, repairs or service to this model may render the machine unsafe, and for this reason we must advise that all repairs and/or service be performed by an Authorized Yamaha dealer who is in possession of the requisite basic product knowledge.

Other information is produced by the U.S. distributor, Yamaha International Corporation (Canada distributor; Yamaha Motor Canada Ltd.), and is necessary to provide total technical coverage regarding the product.

The Research, Engineering, and Service Departments of Yamaha are continually striving to further improve all models manufactured by the company. Modifications are therefore inevitable and changes in specifications or procedures will be forwarded to all Authorized Yamaha Dealers and will, where applicable, appear in future editions of this manual.

YAMAHA
1974 DT250A - DT360A
COMBINED SERVICE MANUAL

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FOREWORD

This Service Manual has been written to acquaint the mechanic with the disassembly, reassembly, maintenance, and troubleshooting procedured required to provide optimum performance and longevity of the unit.

The information enclosed should be closely studied to avoid unnecessary repairs and to provide the owner with a sound, safe, dependable machine.

YAMAHA MOTOR CO., LTD.
SERVICE DEPARTMENT

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CHAPTER 1. GENERAL

1-1. Machine Identification

The frame serial number is located on the left-hand side of the headstock assembly. The first three digits identify the model. This is followed by a dash. The remaining digits identify the production number of the unit. Yamaha production usually begins at 000101.

The engine serial number is located on a raised boss on the upper rear, left-hand side of the engine. Engine identification follows the same code as frame identification.

Normally, both serial numbers are identical; however, on occasion they may be two or three numbers off.

Starting Serial Number	
DT250A	450-000101
DT360A	446-000101

Fig. 1-1 Frame Serial Number

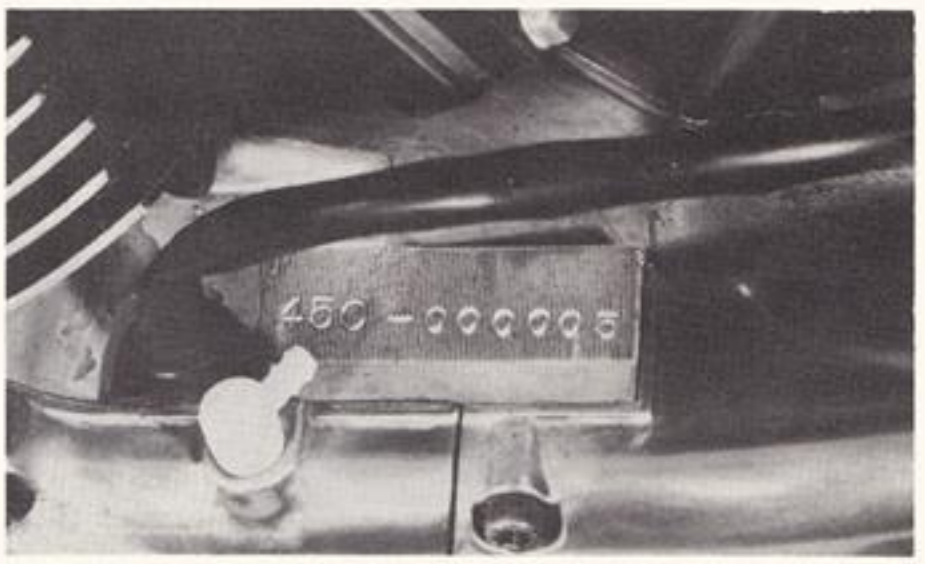


Fig. 1-2 Engine Serial Number

Fig. 1-3

1-2. Specifications

A. General Specifications

Model	DT250A	DT360A
Dimensions:		
Overall Length	46.46 in. (1,180 mm)	85.8 in. (2,180 mm)
Overall Width	34.3 in. (870 mm)	34.3 in. (870 mm)
Overall Height	44.9 in. (1,140 mm)	44.9 in. (1,140 mm)
Seat Height (unloaded)	32.1 in. (815 mm)	32.1 in. (815 mm)
Wheelbase	55.7 in. (1,415 mm)	56.1 in. (1,925 mm)
Min. Ground Clearance	7.9 in. (200 mm)	8.7 in. (220 mm)
Weight:		
Net	265 lbs. (120 kg)	276 lbs. (125 kg)
Performance:		
Min. Turning Radius	78.7 in. (2,000 mm)	78.7 in. (2,000 mm)
Braking Distance	15 m at 50 km/h (49.2 ft at 31 mph)	15 m at 50 km/h (49.2 ft at 31 mph)
Engine:		
Model/Type	450/2 Stroke Gasoline	446/2 Stroke Gasoline
Lubricating System	Separate Lubrication (YAMAHA Autolube)	Separate Lubrication (YAMAHA Autolube)
Cylinder	Single, Forward Inclined, Torque Induction	Single, Forward Inclined, Torque Induction
Displacement	15.01 cu. in. (246 c.c.)	21.42 cu. in. (351 c.c.)
Bore and Stroke	2.8 x 2.5 in. (70 x 64 mm)	3.1 x 2.8 in. (80 x 70 mm)
Starting System	Primary Kick Starter	Primary Kick Starter
Ignition System	Magneto Ignition	C.D.I. Ignition
Ignition Timing	3.2 mm B.T.D.C.	2.9 mm B.T.D.C.
Spark Plug	B-8ES	B-9ES
Carburetor:		
Type	VM28SS	VM30SS
M.J.	#140	#180
J.N.	5DP7–3	5EJ8–3
Air Cleaner:	Wet, Foam Rubber	Wet, Foam Rubber
Transmission:		
Clutch	Wet, Multiple-disk	Wet, Multiple-disk
Primary Reduction System	Gear	Gear
Primary Reduction Ratio	65/23 (2.826)	64/24 (2.666)
Capacities:		
Gasoline Tank/Type Fuel	9.0 ℓ (2.4 US gals) Low-Lead Gasoline	9.0 ℓ (2.4 US gals) Low-Lead Gasoline
Oil Tank/Type	1.5 ℓ (1.6 US qts.) SAE "SE" 10w/30	1.5 ℓ (1.6 US qts.) SAE "SE" 10w/30
Transmission/Type	1000 c.c. (1.05 US qts.) SAE "SE" 10w/30	1200 c.c. (1.25 US qts.) SAE "SE" 10w/30
Front Forks/Type	175 c.c. (6.0 ozs.) SAE "SE" 10w/30	175 c.c. (6.0 ozs.) SAE "SE" 10w/30
Gear Box:		
Type	Constant Mesh 5-speed Forward	Constant Mesh 5-speed Forward

Model		DT250A		DT360A	
Gear Box:					
Reduction Ratio	1st	38/15	(2.533)	38/15	(2.533)
	2nd	34/19	(1.789)	34/17	(1.789)
	3rd	30/23	(1.304)	30/23	(1.304)
	4th	26/26	(1.000)	26/26	(1.000)
	5th	23/30	(0.766)	23/30	(0.766)
Secondary Reduction System		Chain		Chain	
Secondary Reduction Ratio		47/14	(3.357)	44/15	(2.933)
Chassis:					
Model		450		446	
Frame		Tubular Double Loop		Tubular Double Loop	
Suspension System, Front		Telescopic Fork		Telescopic Fork	
Suspension System, Rear		Swinging, Arm		Swinging, Arm	
Cushion System, Front		Coil Spring, Oil Damper		Coil Spring, Oil Damper	
Cushion System, Rear		Coil Spring, Oil Damper		Coil Spring, Oil Damper	
Steering System:					
Caster		59°30'		59°30'	
Trail		5.28 in.	(134 mm)	5.28 in.	(134 mm)
Braking System:					
Type of Brake		Internal Expansion		Internal Expansion	
Operation System, Front		Right Hand Operation		Right Hand Operation	
Operation System, Rear		Right Foot Operation		Right Foot Operation	
Tire Size:					
Front		3.00–21–4PR		3.00–21–4PR	
Rear		4.00–18–4PR		4.00–18–4PR	
Flywheel Magneto:					
Model		FOOOTO1971		FOOOAO2171	
Manufacturer		MITSUBISHI		MITSUBISHI	
Battery:					
Model		6N4B-2A or 6N4B-2A-3		6N4B-2A or 6N4B-2A-3	
Capacity		6V 4AH		6V 4AH	
Lighting:					
Head Light		6V, 35W/35W		6V, 35W/35W	
Tail Light		6V, 5.3W		6V, 5.3W	
Stop Light		6V, 17W		6V, 17W	
Meter Light		6V, 3W x 2		6V, 3W x 2	
Flasher Light		6V, 17W		6V, 17W	
High Beam Indicator Light		6V, 1.5W		6V, 1.5W	

Note:

The Research and Engineering Departments of Yamaha are continually striving to further perfect all models. Improvements and modifications are therefore inevitable.

Inlight of this fact, all specifications within this manual are subject to change without notice. Information regarding changes is forwarded to all Authorized Yamaha Dealers as soon as available.

C. External Views

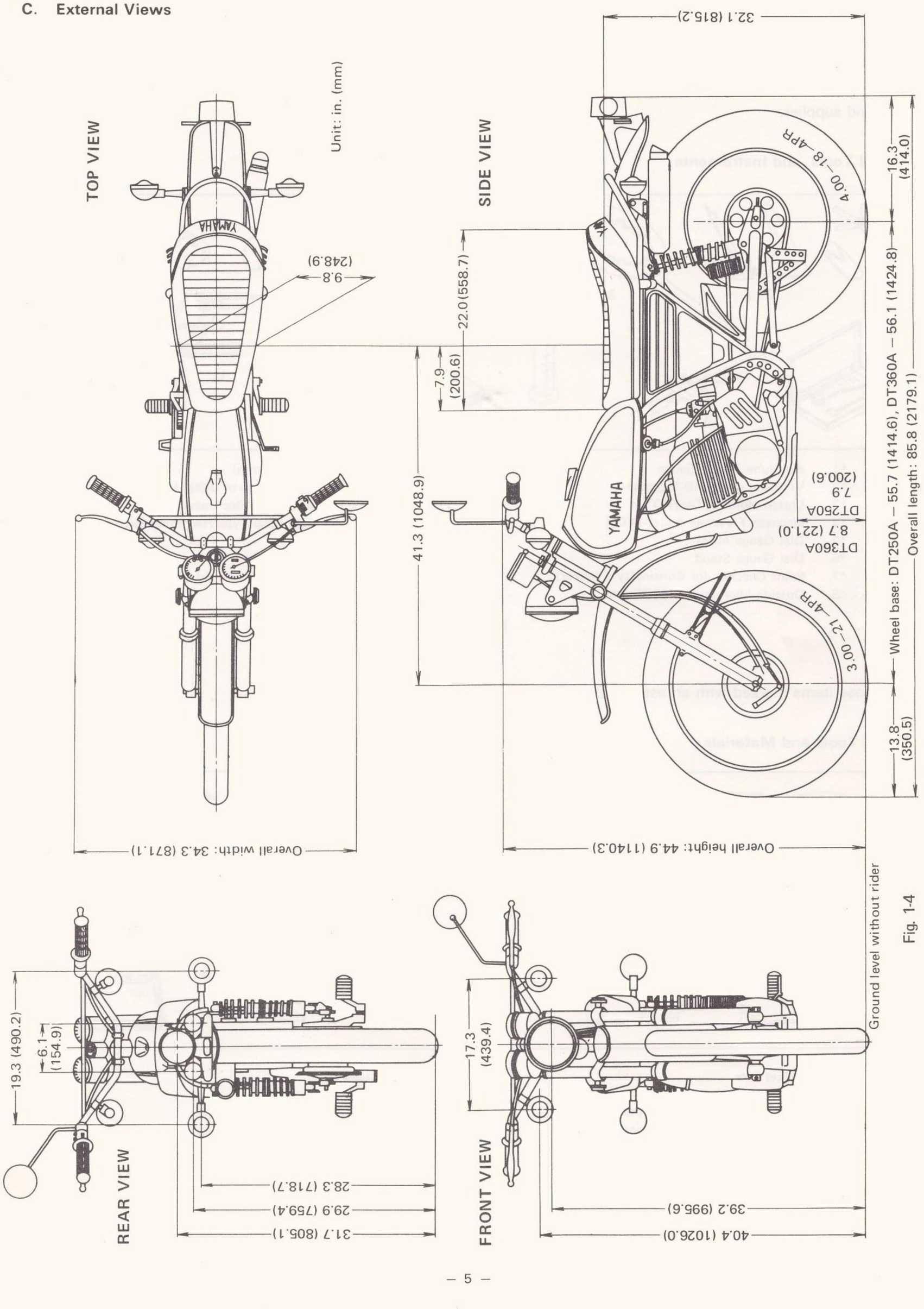
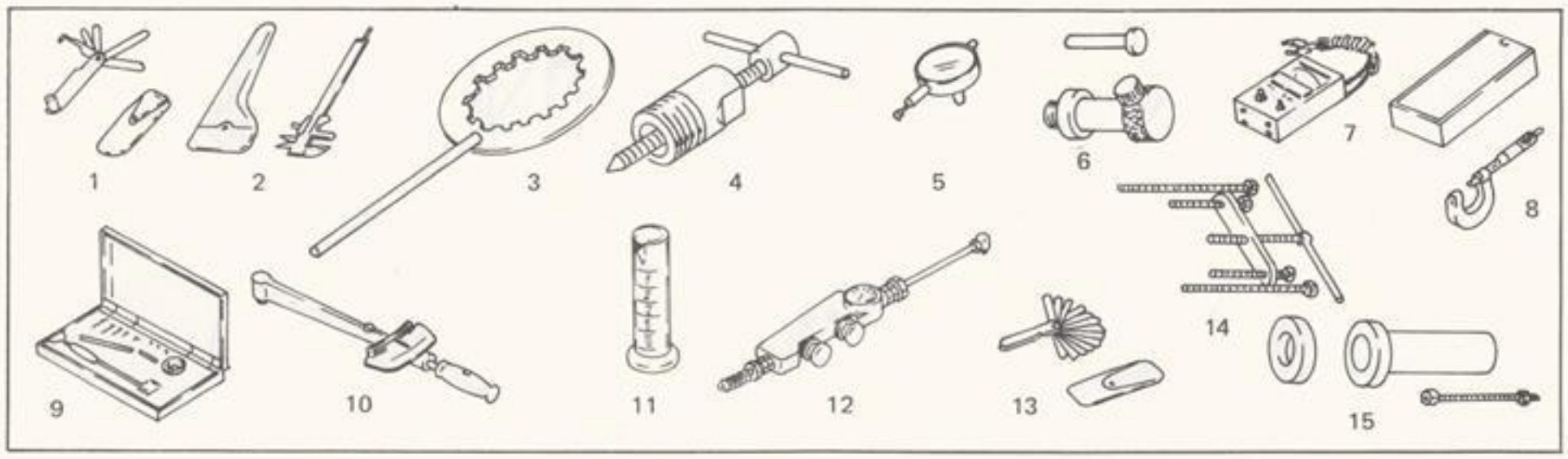


Fig. 1-4

1-3. Tools

The special tools is given below. For your convenience, we have also included a list of additional recommended hand tools and supplies.
tools and supplies.

Special Tools and Instruments



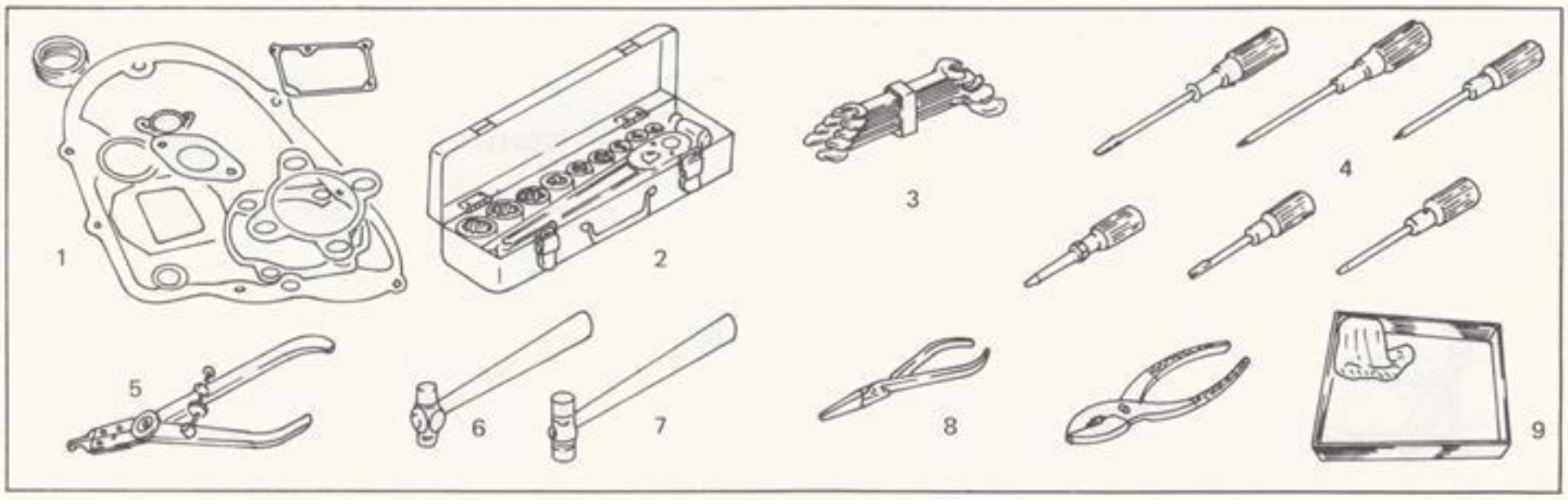
*1. Autolube Feeler Gauge
*2. Vernier Calipers (0-150mm)
*3. Clutch Holding Tool (DT1)
*4. Magneto Flywheel Puller (YGI)
*5. Dial Gauge (mm)
*6. Dial Gauge Stand
*7. Point Checker (or Continuity Checker)
*8. Outside Micrometer (50-75mm)
*9. Cylinder Gauge (50-100mm)
10. Torque Wrench (0-10 Kg-m or 0-600 in-lb
11. Measuring Cup (0-250cc, 10cc Increments)
12. Tire Pressure Gauge (Dial Type Recommended)
13. Feeler Gauge Set
14. Crankcase Disassembly Tool
15. Crankcase Assembly Tool with Adaptor

Fig. 1-5

Note:

Those items marked with an asterisk (•) available from Yamaha.

Genral Tools and Materials



1. Gasket Sets
*2. Socket Wrench Set (mm)
*3. Combination Wrench Set (mm)
4. Selection of Philips and Standard Screwdrivers
5. Circlip Pliers (outside)
6. Steel Hammer
7. Soft Faced Hammer
8. Selection of Pliers and Wire Cutters
9. Several Parts Trays and Shop Rags

Fig. 1-6

Note:

See torque chart for sizes required.

1-4. Maintenance Specifications

Item	DT250A			DT360A		
	Nominal (New)	Minimum Allowable	Maximum Allowable	Nominal (New)	Minimum Allowable	Maximum Allowable
AUTOLUBE						
Pump Plunger Diameter	5.5φmm	–	–	5.5φmm	–	–
Pump Stroke (Max. Throttle)	–	1.85 mm	2.05 mm	–	1.85 mm	2.05 mm
(Min. Throttle)	–	0.20 mm	0.25 mm	–	0.20 mm	0.25 mm
IGNITION						
Minimum Spark Gap	–	7 mm	–	–	7 mm	–
Ignition Coil-Primary Resistance	1.02Ω±10% at 20°C	–	–	0.61Ω±10% at 20°C	–	–
Ignition Coil-Secondary Resistance	5.9KΩ±20% at 20°C	–	–	6.0kΩ±20% at 20°C	–	–
Ignition Coil-Condenser Capacity	0.30μF	–	–	–	–	–
Ignition Point Gap	0.35 mm	0.30 mm	0.40 mm	–	–	–
Spark Plug Type/Manufacturer	B-8ES/N.G.K.	–	–	B-9ES/N.G.K.	–	–
Spark Plug Gap	–	0.5 mm	0.6 mm	–	0.5 mm	0.6 mm
Ignition Timing (B.T.D.C.)	3.2 mm	3.05 mm	3.35 mm	2.9 mm	2.75 mm	3.05 mm
ENGINE - TOP END						
Cylinder Head Volume	28.4 cc	27.9 cc	28.9 cc	47.0 cc	46.5 cc	47.5 cc
Cylinder Head Nut Torque	2.1~2.5kg-m	–	–	2.1~2.5kg-m	–	–
Cylinder Allowable Taper	0.008 mm	–	0.05 mm	0.008 mm	–	0.05 mm
Cylinder Allowable Out-of-Round	–	–	0.05 mm	–	–	0.05 mm
Cylinder Bolt Torque	4.2~4.5kg-m	–	–	4.2~4.5kg-m	–	–
Ring End Gap, FREE - Top	5.5 mm	–	–	5.0 mm	–	–
Ring End Gap, FREE - 2nd	5.5 mm	–	–	5.0 mm	–	–
Ring End Gap, Installed - Top	–	0.20 mm	0.40 mm	–	0.30 mm	0.50 mm
Ring End Gap, Installed - 2nd	–	0.20 mm	0.40 mm	–	0.30 mm	0.50 mm
Ring Groove Clearance - Top	–	–	–	–	–	–
Ring Groove Clearance - 2nd	–	0.03 mm	0.08 mm	–	0.03 mm	0.08 mm
Piston Clearance	–	0.040 mm	0.045 mm	–	0.040 mm	0.045 mm
ENGINE - CLUTCH						
Friction Plate Thickness	3.0 mm	2.7 mm	–	3.0 mm	2.7 mm	–
Clutch-Warp. Allowance	–	–	0.05 mm	–	–	0.05 mm
Housing Bushing I.D.	$33^{+0.007mm}_{-0.014mm}$	–	33.02 mm	$33^{+0.007mm}_{-0.014mm}$	–	33.02 mm
Bushing Spacer O.D.	$33^{-0.025mm}_{-0.041mm}$	–	32.95 mm	$33^{-0.025mm}_{-0.041mm}$	–	32.95 mm
Bushing/Spacer Clearance	0.020~ 0.040 mm	–	0.060 mm	0.020~ 0.040 mm	–	0.060 mm
Main Shaft O.D.	$25^{-0.020mm}_{-0.041mm}$	–	24.95 mm	$25^{-0.020mm}_{-0.041mm}$	–	24.95 mm
Bushing Spacer I.D.	$25^{+0}_{-0.01mm}$	–	25.02 mm	$25^{+0}_{-0.001mm}$	–	25.02 mm
Shaft/Spacer Clearance	0.020~ 0.051mm	–	0.060 mm	0.020~ 0.051mm	–	0.060 mm
Securing Nut Torque	600~700 in.-lbs (7.0~8.0kg-m)	–	–	600~700 in.-lbs (7.0~8.0kg-m)	–	–
Housing End Play	0.2 mm	0.1 mm	0.3 mm	0.2 mm	0.1 mm	0.3 mm
Spring Free Length	31.5 mm	30.5 mm	–	31.5 mm	30.5 mm	–

Item	DT250A			DT360A		
	Nominal (New)	Minimum Allowable	Maximum Allowable	Nominal (New)	Minimum Allowable	Maximum Allowable
1 Spring Set Max. Length Diff.	–	–	1 mm	–	–	1 mm
Primary-Drive, Gear "Lash" No.	0.2 to 0.6	–	–	23 to 27	–	–
Primary-Driven Gear "Lash" No.	42 to 49	–	–	45 to 52	–	–
Primary-Lash Tolerance	41 to 44	–	–	64 to 68	–	–
Primary-Reduction Ratio	2.826	–	–	2.666	–	–
Primary Drive Gear Securing Nut Torque	600~700 in.-lbs (7.0~8.0kg-m)	–	–	600~700 in.-lbs (7.0~8.0kg-m)	–	–
Kick Axle O.D.	–	24.947 mm	24.980 mm	–	24.947 mm	24.980 mm
Kick Gear I.D.	–	25.000 mm	25.021 mm	–	25.000 mm	25.021 mm
Axle/Gear Clearance	–	0.020 mm	0.074 mm	–	0.020 mm	0.074 mm
Ratchet Wheel Spring Free Length	17.2 mm	15.0 mm	–	17.2 mm	15.0 mm	–
ENGINE - TRANSMISSION						
Main Axle Width	–	24.980 mm	24.959 mm	–	24.980 mm	24.959 mm
Main Axle Clearance	0.5 mm	–	–	0.5 mm	–	–
Drive Axle Width	–	24.987 mm	25.000 mm	–	24.987 mm	25.000 mm
Drive Axle Clearance	0.5 mm	–	–	0.5 mm	–	–
Oil Type	Type "SE"	–	–	Type "SE"	–	–
Oil Quantity	1,000cc ± 50	–	–	1,200cc ± 50	–	–
ENGINE - CRANKSHAFT						
Small End Play	Less than 0.08 in. (2 mm)	–	–	Less than 0.08 in. (2 mm)	–	–
Large End Clearance	–	0.4 mm	0.5 mm	–	0.4 mm	0.5 mm
Runout-Clutch Side	–	–	0.03 mm	–	–	0.03 mm
Runout-Ignition Side	–	–	0.03 mm	–	–	0.03 mm
Flywheel Width	$64^{+0}_{-0.05}$	–	–	$64^{+0}_{-0.05}$	–	–
ELECTRICAL - LIGHTING and CHARGING						
Fuse Size	10A x 2pcs	–	–	10A x 2pcs	–	–
Charging Voltage						
Day @ 2,000 rpm	8.5V	–	–	7.0V	–	–
Day @ 8,000 rpm	8.5V	–	–	8.5V	–	–
Night @ 2,000 rpm	7.0V	–	–	8.0V	–	–
Night @ 8,000 rpm	8.0V	–	–	8.0V	–	–
Charging Amperage						
Day @ 2,000 rpm	1.8±0.5A	–	–	1.8±0.5A	–	–
Day @ 8,000 rpm	2.7±0.5A	–	–	3.0±0.5A	–	–
Night @ 2,000 rpm	0.7±0.3A	–	–	0.7±0.3A	–	–
Night @ 8,000 rpm	1.5±0.5A	–	–	1.3±0.5A	–	–

Item	DT250A			DT360A		
	Nominal (New)	Minimum Allowable	Maximum Allowable	Nominal (New)	Minimum Allowable	Maximum Allowable
CARBURETION						
Manufacturer	Mikuni	–	–	Mikuni	–	–
Model Number	VM28SS	–	–	VM30SS	–	–
I.D. Number	43860	–	–	44560	–	–
Venturi Size	28φmm	–	–	30φmm	–	–
Jet Needle/Clip Position	5DP7-3	–	–	5EJ8-3	–	–
Cut Away	2.0	–	–	3.0	–	–
Pilot Jet	#60	–	–	#60	–	–
Air Jet	25φ	–	–	drill 2.5φ	–	–
Starter Jet	#60	–	–	#60	–	–
Air Screw (Turns Out)	1-1/2	–	–	1-1/2	–	–
Idle Speed	1200~ 1,300 rpm	–	–	1200~ 1,300 rpm	–	–
Float Level	17.3±2.5mm	–	–	17.3±2.5mm	–	–
Reed Valve Securing Screw Torque	8.0 kg-cm	–	–	8.0 kg-cm		
CHASSIS						
Front Brake Shoe Diagram	150 mm	145 mm	–	150 mm	145 mm	–
Rear Brake Shoe Diagram	150 mm	145 mm	–	150 mm	145 mm	–
Front Axle Nut Torque	900~1,100 in.-lbs (10~12kg-m)	–	–	900~1,100 in.-lbs (10~12kg-m)	–	–
Front Axle Cap Nut Torque	175 in.-lbs (2.0kg-m)	–	–	175 in.-lbs (2.0kg-m)	–	–
Front Tire						
Manufacturer	Dunlop			Dunlop		
Pressure	13in.^{2}-lbs (0.9kg/cm^2)	–	–	13in.^{2}-lbs (0.9kg/cm^2)	–	–
Tread Type	Trials Universal	–	–	Trials Universal	–	–
Rear Tire						
Manufacturer	Dunlop			Dunlop		
Pressure	16in.^{2}-lbs (1.1kg/cm^2)	–	–	16in.^{2}-lbs (1.1kg/cm^2)	–	–
Tread Type	Trials Universal			Trials Universal		
Wheel Runout Limits-Lateral	0.08in.(2mm)	–	–	0.08in.(2mm)	–	–
Wheel Runout Limits-Vertical	0.08in.(2mm)	–	–	0.08in.(2mm)	–	–
Wheel Spoke-Torque-Front	27 in.-lbs (0.3kg-m)	–	–	27 in.-lbs (0.3kg-m)	–	–
Wheel Spoke-Torque-Rear	27 in.-lbs (0.3kg-m)	–	–	27 in.-lbs (0.3kg-m)	–	–
Drive Chain-Size						
Pitch	DID520D			DID520D		
No. of Links	102L			102L		
Driven Sprocket Securing Bolt Torque	170~220 in.-lbs (2.0~2.6kg-m)	–		170~220 in.-lbs (2.0~2.6kg-m)	–	–

Item	DT250A			DT360A		
	Nominal (New)	Minimum Allowable	Maximum Allowable	Nominal (New)	Minimum Allowable	Maximum Allowable
Front Fork Oil Capacity (each leg)	175cc (5.9 oz)	–	–	175cc (5.9 oz)	–	–
Type	SAE "SE" 10W/30	–	–	SAE "SE" 10W/30	–	–
Front Fork Cap Bolt Torque	868 in.-lbs (10kg-m)	–	–	868 in.-lbs (10kg-m)	–	–
Front Fork Pinch Bolt Torque	70~100 in.-lbs (0.8~1.2kg-m)	–	–	70~100 in.-lbs (0.8~1.2kg-m)	–	–
Steering Race Ball Quantity/Size - (Upper)	22/3/16"	–	–	22/3/16"	–	–
Steering Race Ball Quantity/Size - (Lower)	19/1/4"	–	–	19/1/4"	–	–
Steering Stem Pinch Bolt Torque	138~208 in.-lbs (1.6~2.4kg-m)	–	–	138~208 in.-lbs (1.6~2.4kg-m)	–	–
Handlebar Mounting Bolt Torque	95~150 in.-lbs (1.1~1.8kg-m)	–	–	95~150 in.-lbs (1.1~1.8kg-m)	–	–
Rear Cushion Oil Capacity	181cc (6.1 oz)	–	–	181cc (6.1 oz)	–	–
Rear Cushion Oil Grade (Type)	SAE "SE" 10W/30	–	–	SAE "SE" 10W/30	–	–
Rear Cushion Piston Rod Nut Torque	250~340 in.-lbs (3.0~4.0kg-m)	–	–	250~340 in.-lbs (3.0~4.0kg-m)	–	–
Rear Cushion Reservoir Cap Bolt Torque	434~520 in.-lbs (5.0~6.0kg-m)	–	–	434~520 in.-lbs (5.0~6.0kg-m)	–	–
Swing Arm Freeplay Limits	0.4in. (1.0mm)	–	–	0.4in. (1.0mm)	–	–
Swing Arm Pivot Bolt Torque	850~935 in.-lbs (10~11kg-m)	–	–	850~935 in.-lbs (10~11kg-m)	–	–
TORQUE VALUES						
Drive Sprocket Nut	600~770 in.-lbs (7.0~9.0kg-m)	–	–	600~770 in.-lbs (7.0~9.0kg-m)	–	–
Engine Mounting Bolt 10 mm	390.6~477.4 in.-lbs. (4.5~5.5kg-m)	–	–	390.6~477.4 in.-lbs. (4.5~5.5kg-m)	–	–
Engine Mounting Bolt 8 mm	217.0~251.7 in.-lbs (2.5~2.9kg-m)	–	–	217.0~251.7 in.-lbs (2.5~2.9kg-m)	–	–

1-5. Maintenance and Lubrication Intervals

These charts should be considered strictly as a guide to general maintenance and lubrication intervals. You must take into consideration that weather, terrain, geographical location, and variety of individual uses all tend to demand that each owner alter this time schedule to match his environment. For example, if the motorcycle is continually operated in an area of high humidity, then all parts must be lubricated much more frequently than shown on the chart to avoid damage caused by water to metal parts.

Page	Item	Remarks	Initial (miles)				Thereafter every (miles)		
			250	500	1,000	2,000	1,000	2,000	8,000
28 ~ 30	*Brake System (Complete)	Check/Adjust as required – Repair as required		○	○			○	
25, 26	*Clutch	Check/Adjust as required		○	○			○	
121	*Battery	Top-off/Check special grease as required – Monthly or →	○	○	○		○		
117, 118	*Spark Plug	Inspect/Clean or Replace as required	○	○	○		○		
144 ~ 151	*Wheels & Tires	Pressure/Spoke-tension/Runout	○	○	○		○		
–	*Fittings & Fasteners	Tighten before each trip and/or →	○	○	○		○		
22 ~ 25	*Autolube	Cable operation/Adjustment	○	○	○			○	
30, 31	*Drive Chain	Tension/Alignment	○	○	○		○	○	
26	*Transmission Oil Level Check	Includes transmission/Autolube tank 1	○	○	○		○		
20, 21	*Air Filter	Foam type – See "Service Notes 2, 4"	○	○	○		○		
–	Fuel Petcock	Clean/Flush tank as recommended	○		○			○	
15 ~ 18	Ignition Timing	Adjust/Clean or Replace parts as required		○	○			○	
19, 20	Carburetor Adjustment	Check operation/Synchromesh/Fittings		○	○			○	
98 ~ 108	Carburetor Overhaul	Clean/Repair as required – Refit/Adjust				○			○
–	Cylinder Compression	Check preventive maintenance		○	○			○	
–	Decarbonized Engine	Includes exhaust system			○			○	

* indicates pre-operational check items.

Service Notes:

1. Check Autolube tank level before each ride. Top off when oil level shows at the sight glass or before any prolonged use. See "Lubrication Intervals" for type oil to use.

2. Foam element air filters must be damp with oil at times to function properly. Remove, clean, and oil filter at least once per month or every 250 - 500 miles; whichever occurs first. (If extremely hard usage, such as dirt riding, clean and lube daily.) See "Lubrication Intervals" for additional details.

3. Pre-operational 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 assured the ricer is more than worth the minimal time involved.

4. For additional information regarding drive chain, engine oil level, wet-type air filter, see "Lubrication Intervals".

Page	Item	Remarks	Type	Period							
				Initial (miles)				Thereafter every (miles)			
				250	500	1,000	2,000	1,000	2,000	4,000	8,000
22	*Autolube	See "Service Notes"	#1	See "Service Notes"							
26	*Trans, Oil	Warm engine before draining	#2				○	Check	○		
155, 156	*Drive Chain	Lube/Adjust as required	#3	See "Service Notes"							
155, 156	*Drive Chain	Remove/Clean–Lube/Adjust	#3				○		○		
20, 21	*Air Filter	Foam Type	#9	See "Service Notes"							
–	Control & Meter Cables	All-Apply thoroughly	#4		○				○		
–	Throttle Grip & Housing	Light application	#5		○				○		
–	Tacho & Speedo Gear Housings	Light application	#5			○				○	
–	Rear Arm Pivot Shaft	Zirc-Apply until shows	#6			○			○		
–	Brake Pedal Shaft	Light application	#5			○			○		
–	Change Pedal Shaft	Light application	#5			○			○		
–	Stand Shaft Pivot	Light application	#5			○			○		
157 ~ 160	Front Forks	Drain completely/Check Specs.	#3		Check		○		Check	○	
–	Steering Ball Races	Inspect thoroughly–Med. pack	#7				○			○	
–	Point Cam Lubricating Wick	Very light application	#8			○				○	
–	Wheel Bearings	Do not overpark	#7				○			○	

* indicates pre-operational check items.

No.1 Check tank level before each ride. Top off when oil level is at sight glass or before any prolonged use. Use the following lubricant (in order of preference):

Yamalube, or; two-stroke oil labeled "BIA certified for service TC-W"

No.2 At ambient temperatures of 45 - 90° F, use 10W/30"SE". Do not use "additives" in oil.

No.3 Use 10W/30"SE" motor oil. (If desired, specialty type lubricants of quality manufacture may be used.)

"Drive Chains"—Lube every 150 - 200 miles. If severe usage, every 50-100 miles.

No.4 Use graphic bese type (specialty types available—use name-brand, quality manufacturer).

No.5 Light duty:smooth, light-weight, "white" grease. Heavy duty:standard 90wt. lube grease (do not use lube grease on throttle/houging).

No.6 Use standard 90wt. lube grease-smooth, not coarse.

No.7 Medium-weight wheel bearing grease of quality manufacturer-preferrably waterproof.

No.8 Light-weight machine oil.

No.9 Air filters-foam element air filters must be damp with oil at all times to function properly. Clean and lube monthly or per mileage.

If hard usage, clean and lube daily. Do not over-oil. Use SAE 10W/30"SE".

CHAPTER 2. ENGINE TUNING AND CHASSIS ADJUSTMENTS

In general, the following chapter covers those points on the motorcycle which would require servicing if the machine were just being set-up prior to delivery (new machine); coming in for a minor tune-up; or, if the engine or other components had been removed for overhaul or troubleshooting.

In other words, in addition to performing those adjustments required when a component is disassembled, the following items must be covered thoroughly prior to delivering the machine to the customer.

For more detailed information regarding individual components, please refer to the appropriate section further on in this manual, and/or the following:

Basic Assembly Manual
Individual Model Assembly Manual
Yamaha Shop Guide (Y.I.C.)
Basic Service Manual (Y.M.C.)

If the information is not available, or not clearly understood, contact your nearest Distributor.

In the United States:
Yamaha International Corp.,
P. O. Box 6600
Buena Park, California 90620
USA

In Canada:
Yamaha Motor Canada, LTD.
1350 Verdum Place
Richmond, B.C.
CANADA

Maintenance and Minor Repairs

The following sections provide information for the disassembly, troubleshooting and maintenance of various components of the motorcycle. If you do not have the necessary tools and an understanding of the mechanical principles involved, please refrain from attempting repairs. The use of improper tools and/or procedures can cause major damage to the unit with resultant additional repair costs.

2-1. Special Tools

A. Point Checker
P/N90890 - 03031

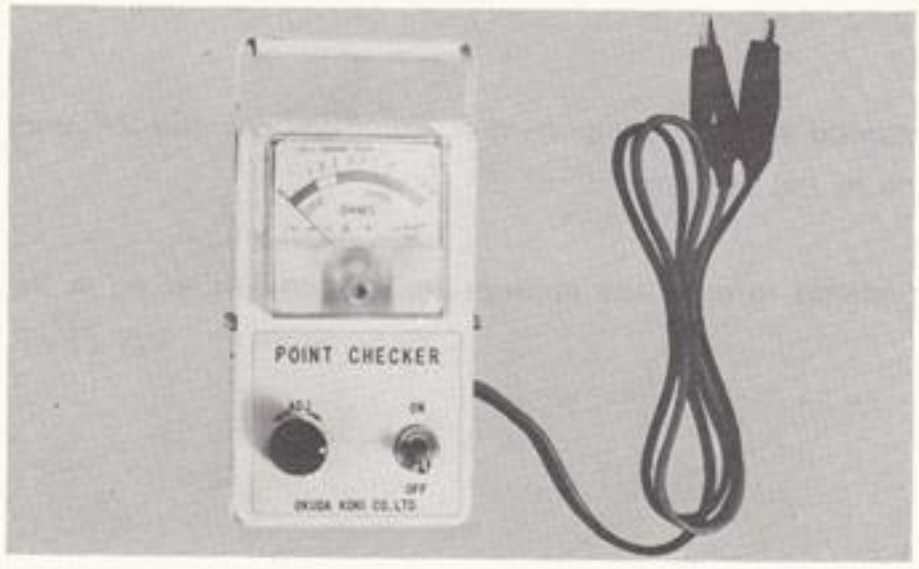


Fig. 2-1

B. Dial Gauge Assembly
P/N90890 - 03002

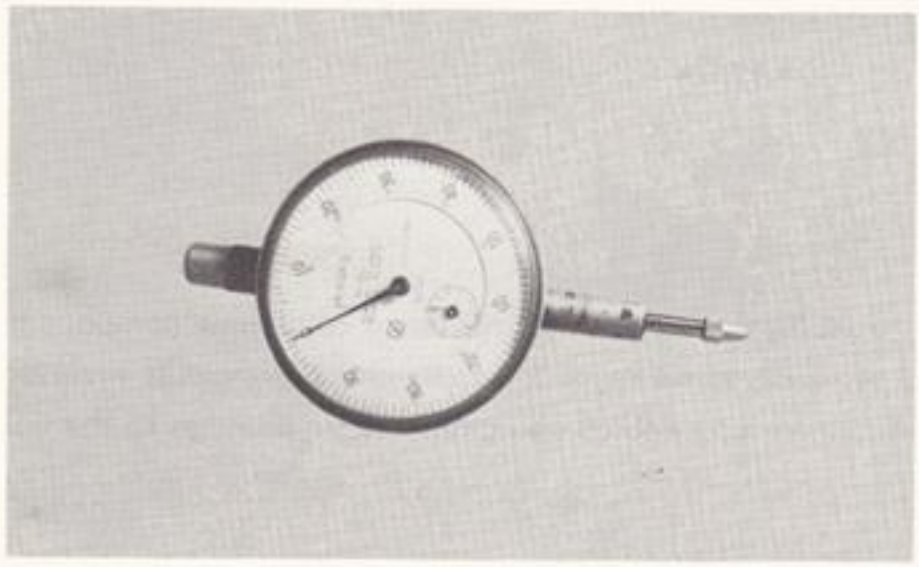


Fig. 2-2

C. Dial Gauge Stand
P/N90890 - 01039

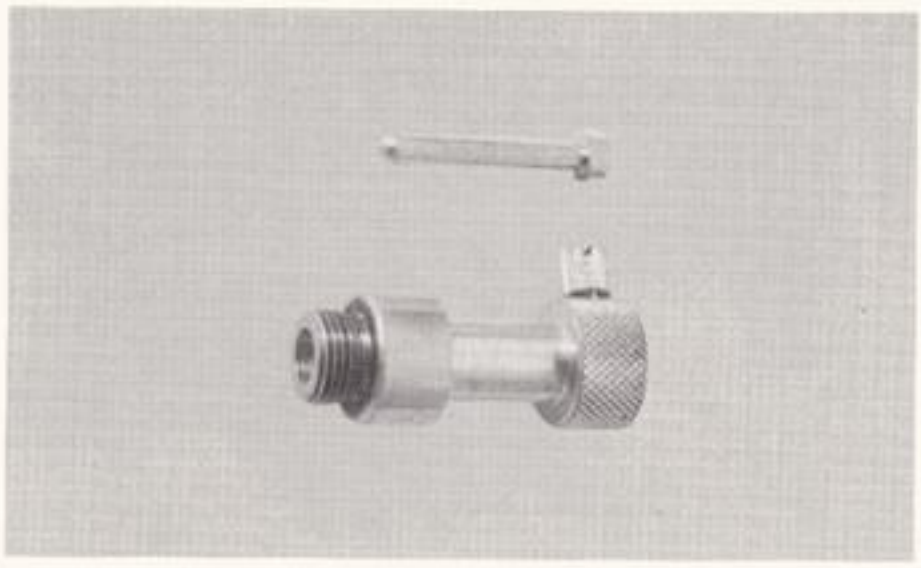


Fig. 2-3

D. Steering Nut Wrench
P/N90890-01051

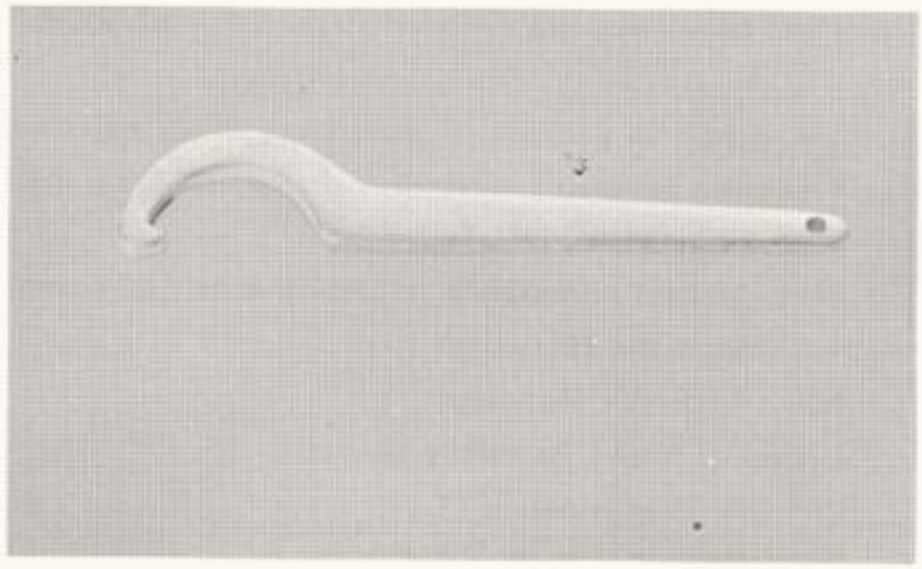


Fig. 2-4

E. Feeler Gauge
P/N90890-03001

Fig. 2-5

F. Hydrometer
P/N90890-03036

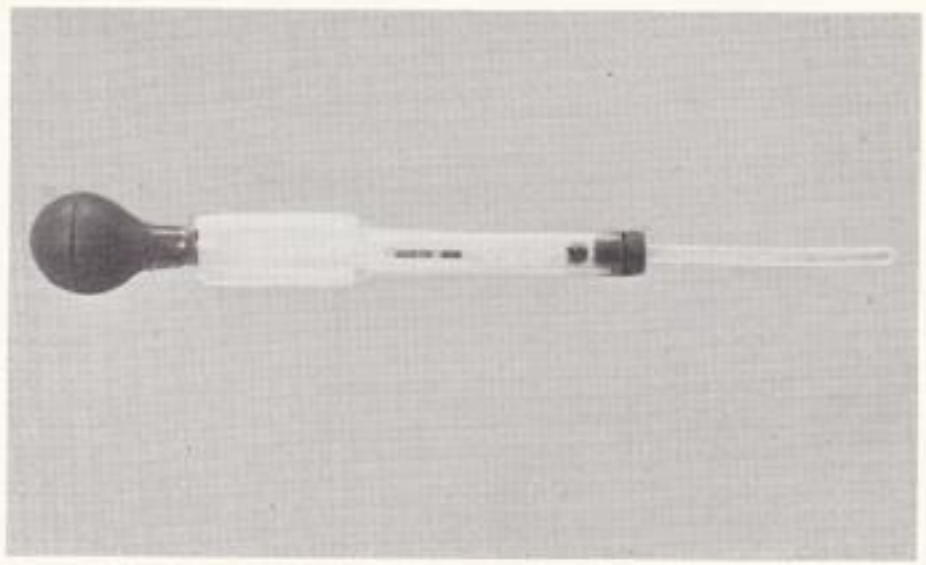


Fig. 2-6

2-2. Engine Tuning

A. Ignition Timing for Magneto (DT250A)

Ignition timing must be set with a dial indicator (to determine piston position) and a low-range ohmmeter (to determine exactly when contact breaker points begin to open). Proceed as follows:

1. Remove spark plug and screw Dial Gauge Stand into spark plug hole.

2. Insert Dial Gauge Assembly into stand.

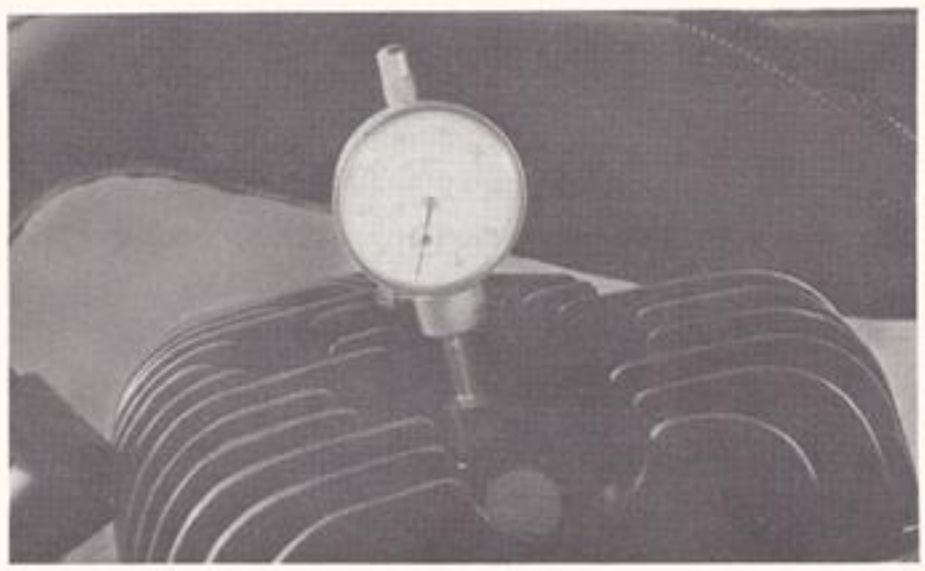


Fig. 2-7

3. Remove left engine crankcase cover.

4. Check point checker for full scale deflection. Connect red lead of Point Checker to black wire in wire harness coming from magneto.

5. Connect black lead of Point Checker to unpainted surface of cylinder fin or unpainted crankcase bolt or screw.

Fig. 2-8

6. Rotate flywheel until maximum point opening occurs. Measure. If beyond tolerance, loosen magneto backing plate screws (3) and rotate backing plate until within tolerance. Tighten securing screws thoroughly.

7. Rotate magneto flywheel until piston is at top-dead-center. Set the zero on dial indicator face to line up exactly with dial indicator needle. Tighten set screw on spark plug stand to secure dial gauge assembly. Rotate flywheel back and forth to be sure that indicator needle does not go past zero.

Fig. 2-9

8. Starting at T.D.C. rotate flywheel clockwise until dial indicator reads approximately 3.2mm (0.13") before-top-dead-center (B.T.D.C.).

Fig. 2-10

9. Slowly turn flywheel counter clockwise until dial indicator reads ignition advance setting listed in Specifications Table. At this time, the point checker needle should swing from "CLOSED" to "OPEN" position, indicating the contact breaker (ignition points) have just begun to open.

10. Repeat steps 8 and 9 to verify point opening position. If points do not open within specified tolerance, they must be adjusted.

11. Adjust ignition points by barely loosening Phillips-head screw and carefully rotating contact breaker assembly with a slotted screwdriver. Make minor adjustment and retighten Phillips-head screw before rechecking timing. Recheck timing by repeating steps 7 and 8.

12. When correct ignition timing has been accomplished, check maximum point gap by turning flywheel until maximum point opening occurs. Measure point gap with thickness gauge. See Specification Table.

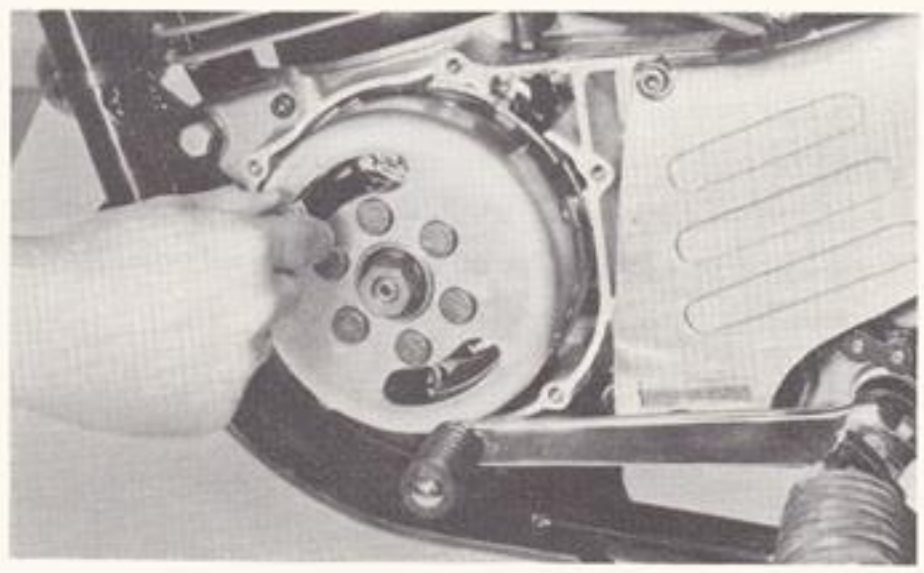


Fig. 2-11

Note:

If the maximum point gap is over tolerance and cannot be corrected, the point rubbing block is probably worn and the contact breaker assembly should be replaced. Do not attempt to behind fixed point bracket to decrease maximum point gap. This will only result in point misalignment, difficulty in setting timing and premature point failure.

Ignition Timing Specifications				
Model	Point Gap			Timing (B.T.D.C.)
	Nominal	Minimum	Maximum	
DT250A	0.014 in. (0.35 mm)	0.012 in. (0.30 mm)	0.016 in. (0.40 mm)	0.13 ± 0.006 in. (3.2 ± 0.95 mm)

13. Remove dial gauge assembly and stand.

14. Disconnect point checker.

15. Replace engine crankcase cover.

B. Ignition Timing, C.D.I., (DT360A)

Ignition timing must be set with a dial indicator to determine exact piston position. Proceed as follows:

1. Remove spark plug and screw Dial Gauge Stand into spark plug hole.

2. Insert Dial Gauge Assembly into stand.

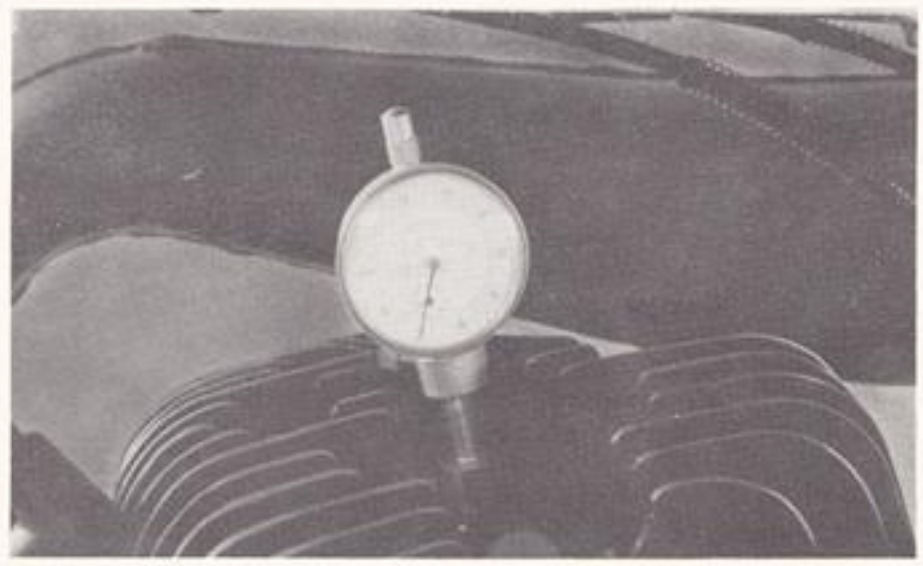


Fig. 2-12

3. Remove left engine crankcase cover.

Fig. 2-13

4. Rotate magneto flywheel until piston is at top-dead-center.
   Set the zero on dial indicator face to line up exactly with needle. Tighten set screw- Rotate flywheel back and forth to be sure that needle does not go past zero.

5. Starting at T.D.C., rotate flywheel clockwise until dial indicator reads approximately, 0.11 in. (2.9 mm) before-top-dead-center.

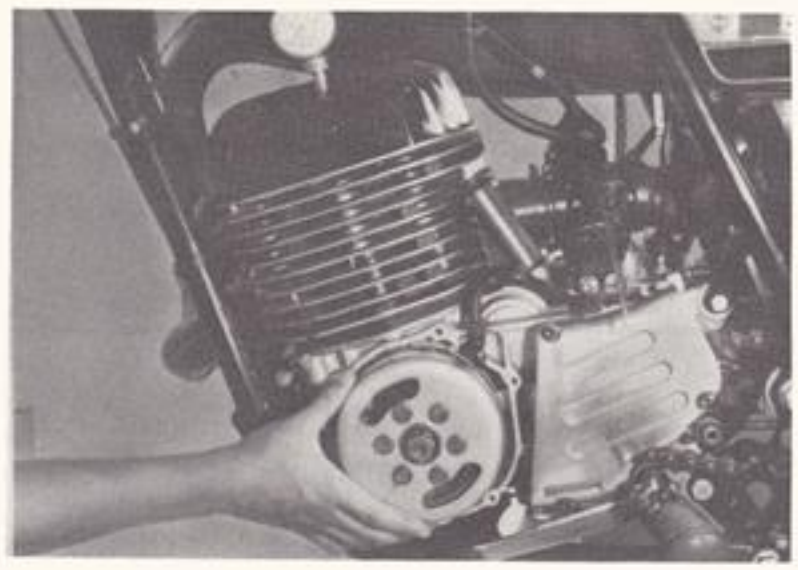
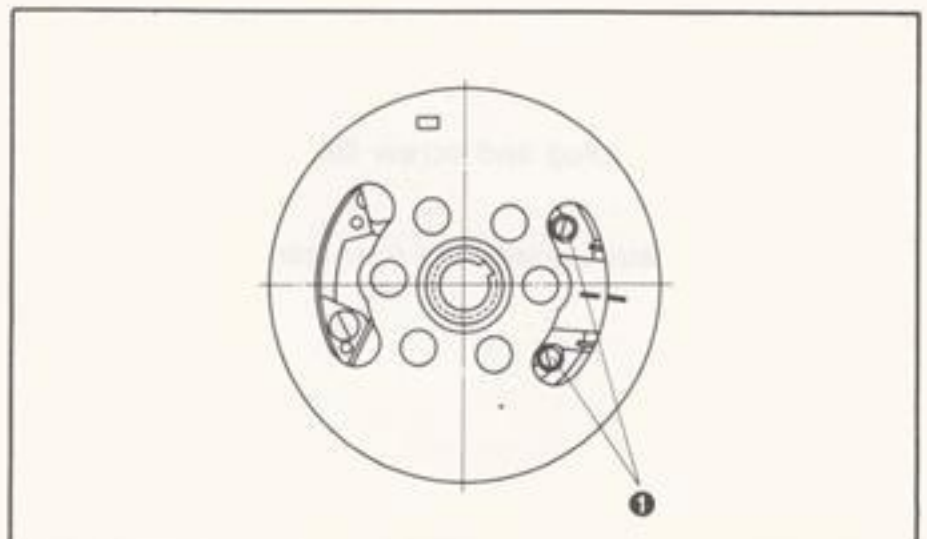


Fig. 2-14

6. Slowly turn flywheel counter-clockwise until dial indicator reads ignition advance setting listed in Specifications Table. At this time, the mark on the flywheel should line up with the mark on the pulser coil assembly.

7. If the marks are not in alignment, loosen the pulser set screws (2) and rotate the pulser until alignment is achieved. Tighten set screws thoroughly. Repeat steps 5 and 6.

Ignition Timing Specifications		
DT360A	2.9 ± 0.15 mm	B.T.D.C.



1. Pulser set screw

Fig. 2-15

C. Spark Plug

The spark plug indicates how the engine is operating. If the engine is operating correctly, and the machine is being ridden correctly, then the tip of the white insulator around the positive electrode of the spark plug will be a medium to light tan color. If the porcelain "donut" around the positive electrode is a very dark brown or black color, than a plug with a hotter heat range might be required. This situation is quite common during the engine break-in period.

If the insulator tip shows a very light tan or white color or is actually pure white or if electrodes show signs of melting, then a spark plug with a colder heat range is required.

Remember, the insulator area surrounding the positive electrode of the spark plug must be a medium-to-light tan color. If it is not, check carburetion, timing and ignition adjustments.

The spark plug must be removed and checked prior to using the machine. Check electrode wear, insulator color, and negative to positive electrode gap.

Spark Plug Gap: 0.20 - 0.24 in.-lbs (0.5 - 0.6 mm)

Engine conditions will cause any spark plug to slowly break down and erode. If erosion begins to increase, or if the electrodes finally become too worn, or if for any reason you believe the spark plug is not functioning correctly, replace it.

Standard Spark Plug:	
DT250A:	NGK B – 8 ES
DT360A:	NGK B – 9 ES

When installing the plug, always clean the gasket surface, use a new gasket, wipe off any grime that might be present on the surface of the spark plug, torque the spark plug properly.

Spark Plug Tightening Torque:	230 - 250 in.-lbs (2.5 - 3.0 kg-m.)

D. Carburetion and Air Filter

1. Carburetion

a. Idle Mixture and Idle Speed

The idle mixture and idle speed scres are separate adjustments but they must be adjusted at the same time to achieve an optimum operating condition at engine idle speeds.

1) Idle Mixture Screw

Turn idle mixture screw (No. 1) until it lightly seats, then back it out to turns specified in Carburetor Setting Table.

This adjustment can be made with engine stopped.

Fig. 2-16

2) Start the engine and let it warm up for 3 - 5 minutes.

3) Idle Speed Screw
Turn idle speed screw in or out to achieve smooth engine operation at idle speed specified in Carburetor Setting Table.

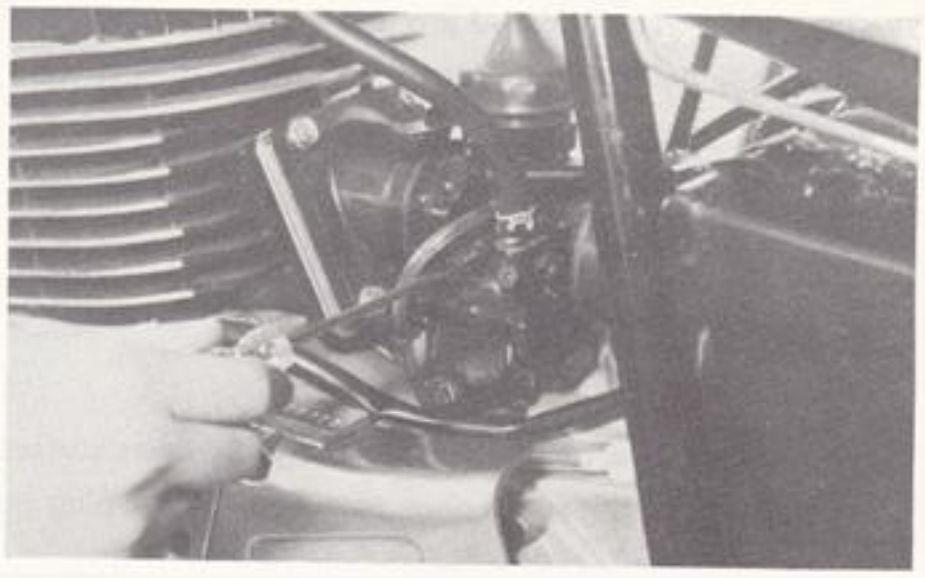
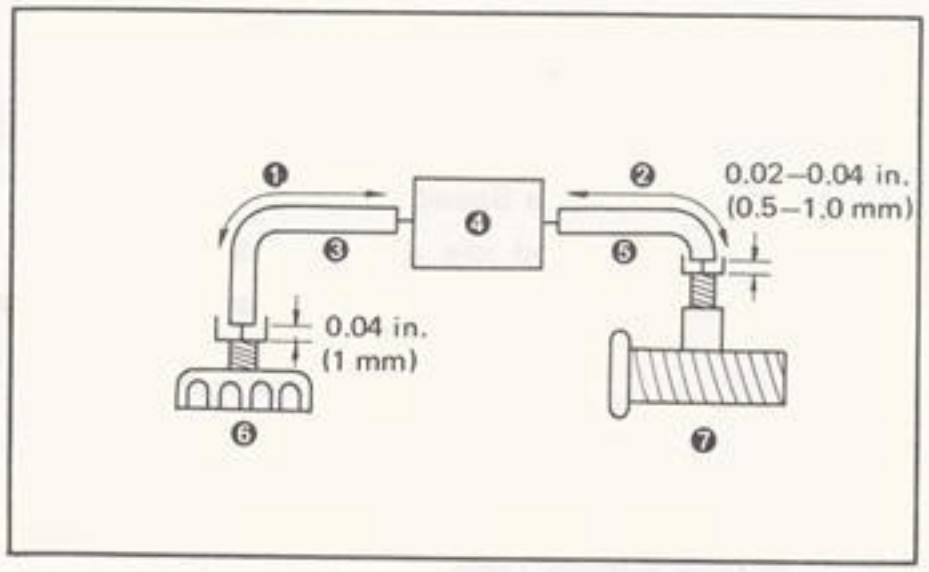


Fig. 2-17

b. Throttle Cable

1) After engine idle speed is set, make cable slack adjustment at cable adjustor near throttle grip. Loosen locknut and turn adjustor until there is 0.02 - 0.04 in. (0.5 - 1.0mm) slack between throttle cable housing and cable adjustor. Retighten locknut.
2) Loosen cable adjustor locknut (at top of carburetor) and turn cable adjustor until there is 0.04 in. (1.0mm) slack in cable "B". Retighten locknut.



1. Slide
2. Slide
3. Cable "B"
4. Junction Block
5. Cable "A"
6. Carburetor cap
7. Throttle Grip

Fig. 2-18

2. Air filter

a. Remove the air filter element assembly.

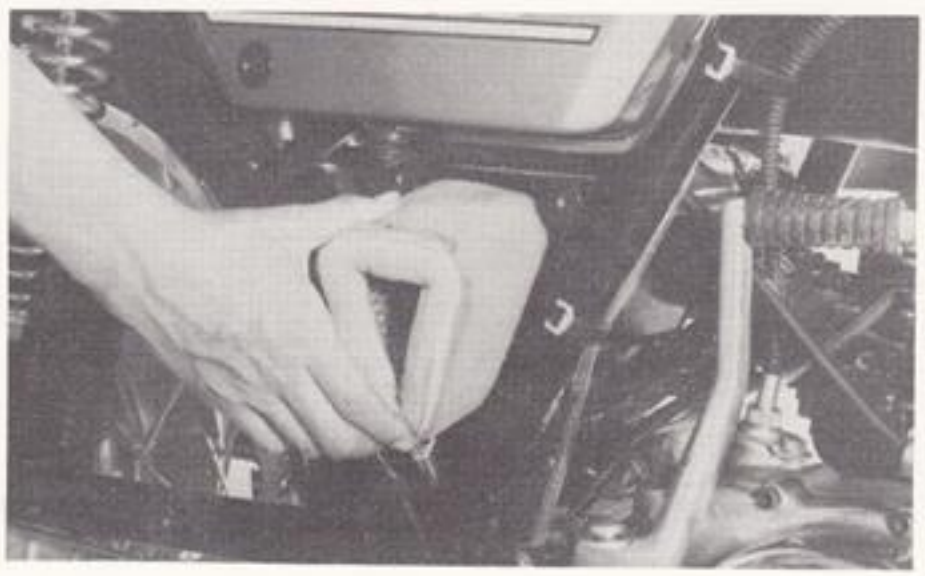


Fig. 2-19

b. Slip the element off the wire mesh guide.

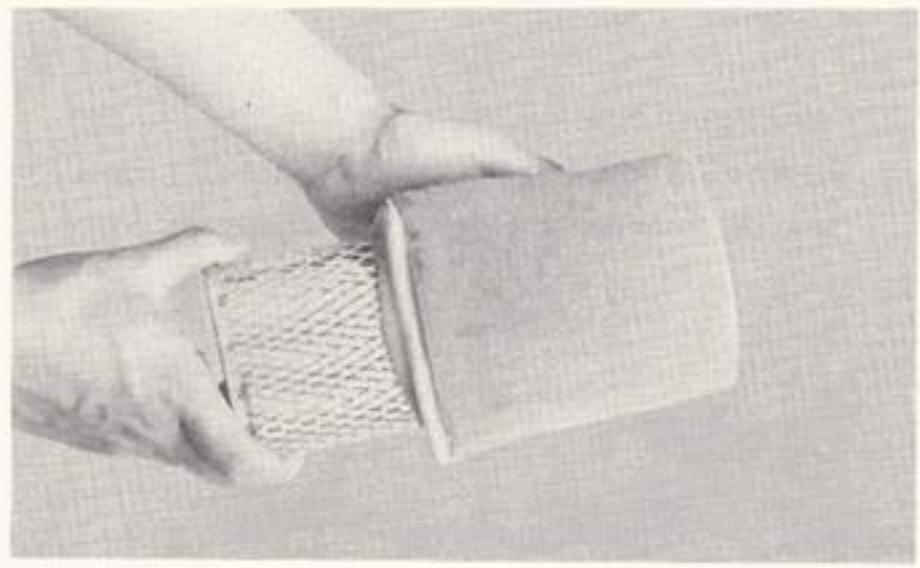


Fig. 2-20

c. Wash the element gently, but thoroughly, in solvent.

d. Squeeze excess solvent out of element and dry.

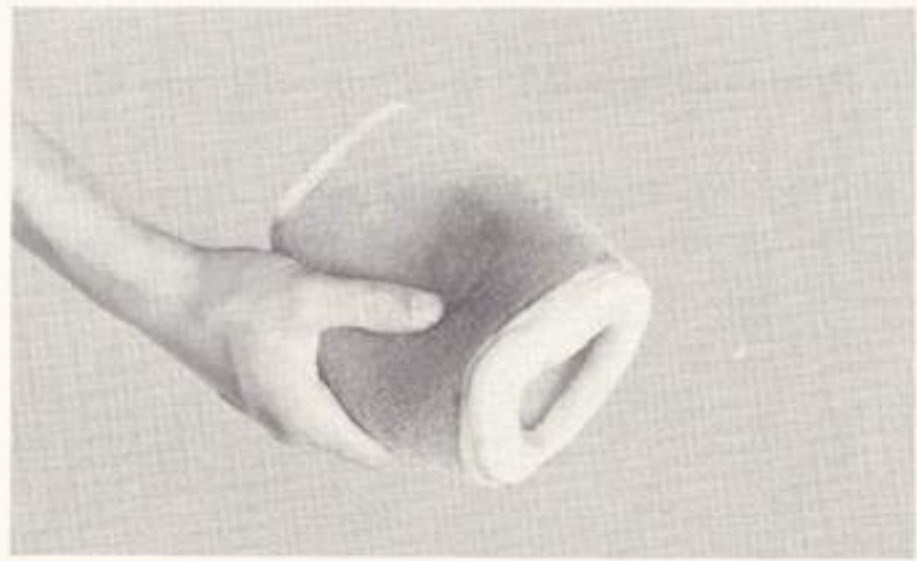


Fig. 2-21

e. Pour a small quantity of motor oil onto filter element and work thoroughly into the porous foam material.

Note:

In order to function properly, the element must be damp with oil at all times . . . . but not "dripping" with oil.

f. Re-insert the wire mesh filter element guide into the element.

g. Coat the uppear and lower edges of the filter element with 90wt lube grease. This will provide an air-tight seal between the filter case cover and filter seat.

h. Re-install the element assembly, case cover and seat.

Note:

Each time filter element maintenance is performed, check the air inlet to the filter case for obstructions. Check the air cleaner joint rubber to the carburetor and manifold fittings for an air-tight seal. Tighten all fittings thoroughly to avoid the possibility of unfiltered air entering the engine.

Caution:

Never operate the engine with the air filter element removed.

This will allow unfiltered air to enter causing rapid wear and possible engine damage. Additionally, operation without the filter element will affect carburetor jetting with subsequent poor performance and possible engine over-heating.

E. Adjusting Autolube

1. Cable Adjustment

a. Remove Autolube pump cover, which is located on forward portion of the right-hand crankcase cover.

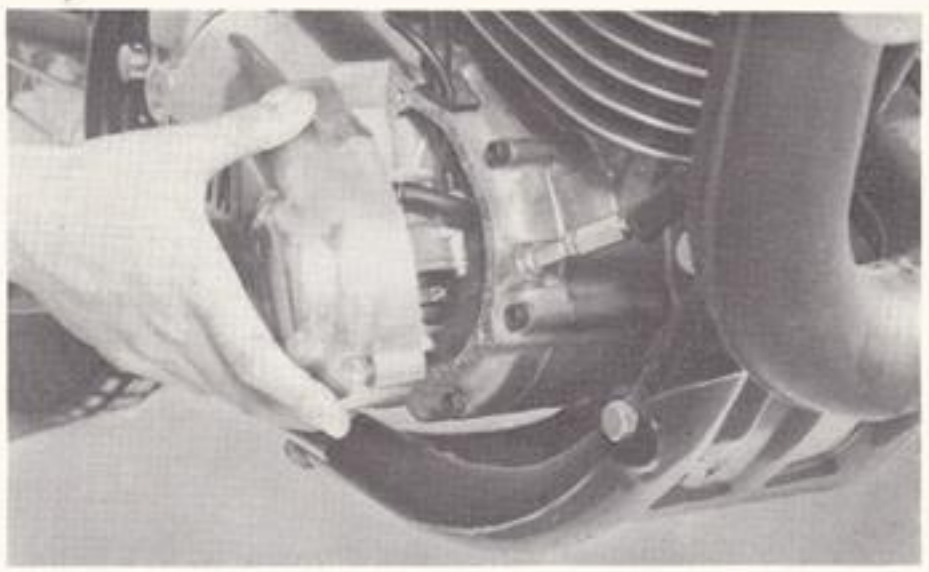


Fig. 2-22

b. Rotate throttle until all slack is removed from all cables. Hold this position.

c. Check to see that Autolube pump plunger pin is aligned with the mark on the Autolube pump pulley.

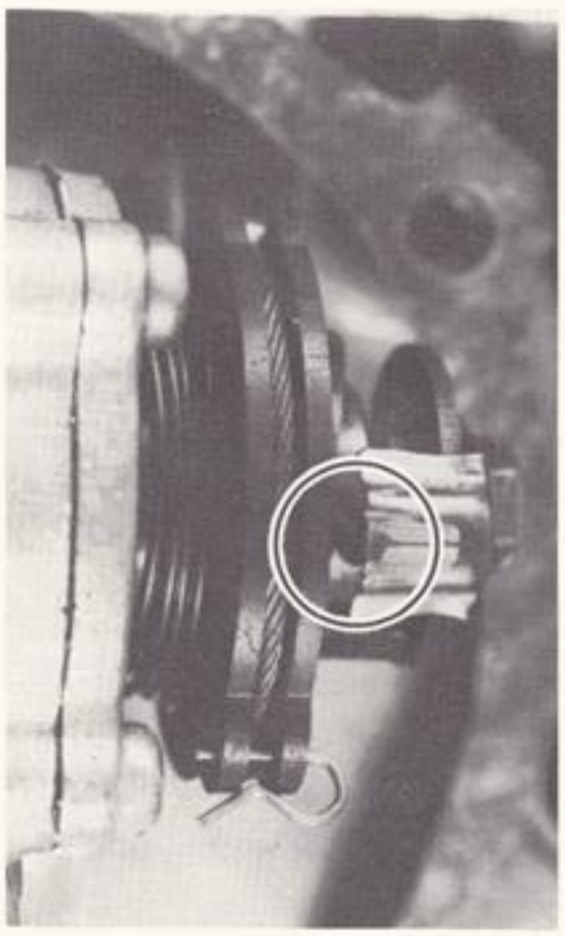
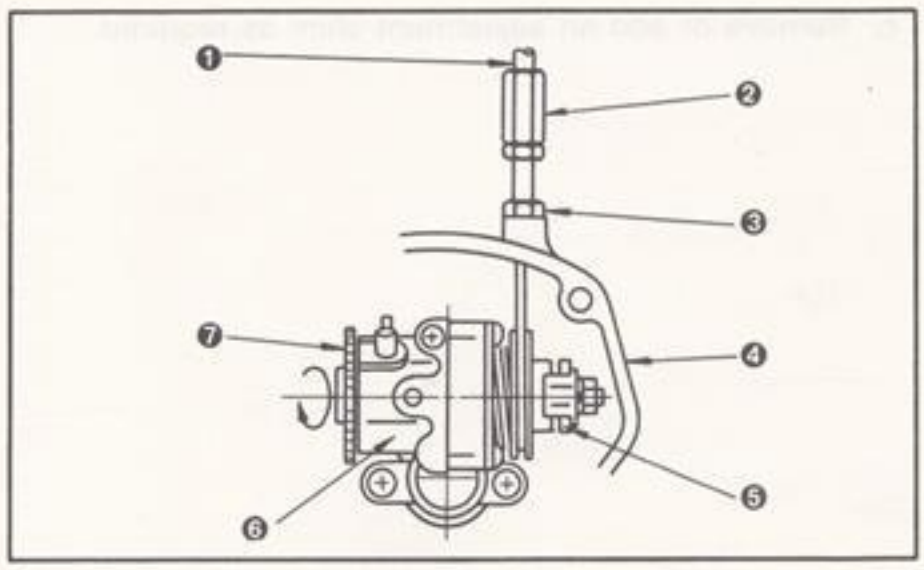


Fig. 2-23

d. If the mark and pin are not in alignment, loosen cable length adjustor lock nut on upper edge of crankcase cover and adjust cable length until alignment is achieved.
Tighten adjustor locknut.



1. Pump cable
2. Cable adjusting bolt
3. Lock nut
4. Crank case
5. Adjusting plate
6. Oil pump
7. Starter plate

Fig. 2-24

e. Rotate starter plate until the pump plunger moves fully out and away from the pump body to its outermost limit.

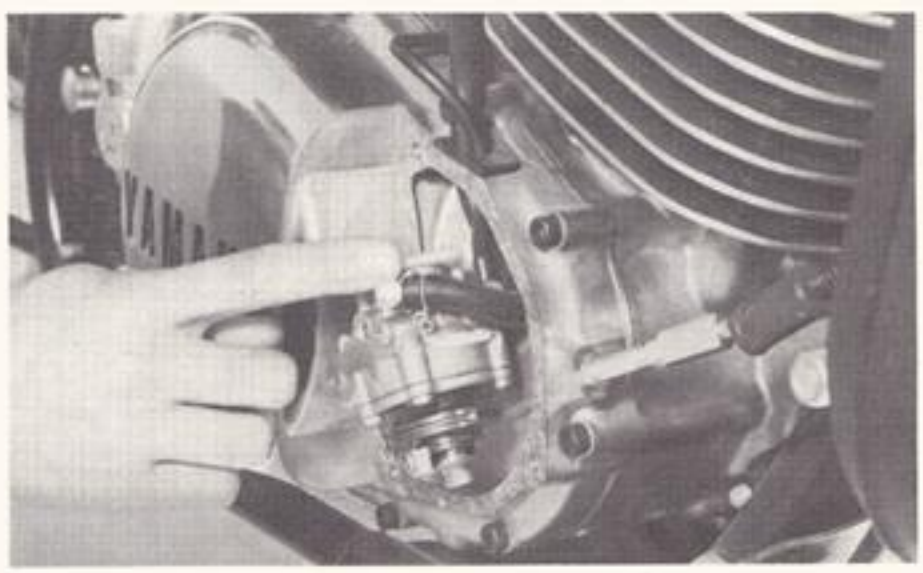


Fig. 2-25

2. Pump Stroke Adjustment

a. Measure gap between raised boss on pump cable pulley and pump stopper plate. If clearance is incorrect, remove adjust plate locknut and adjusting plate.

Minimum Pump Stroke:
0.008 - 0.010 in. (0.20 - 0.25mm)

Fig. 2-26

b. Remove or add an adjustment shim as required.

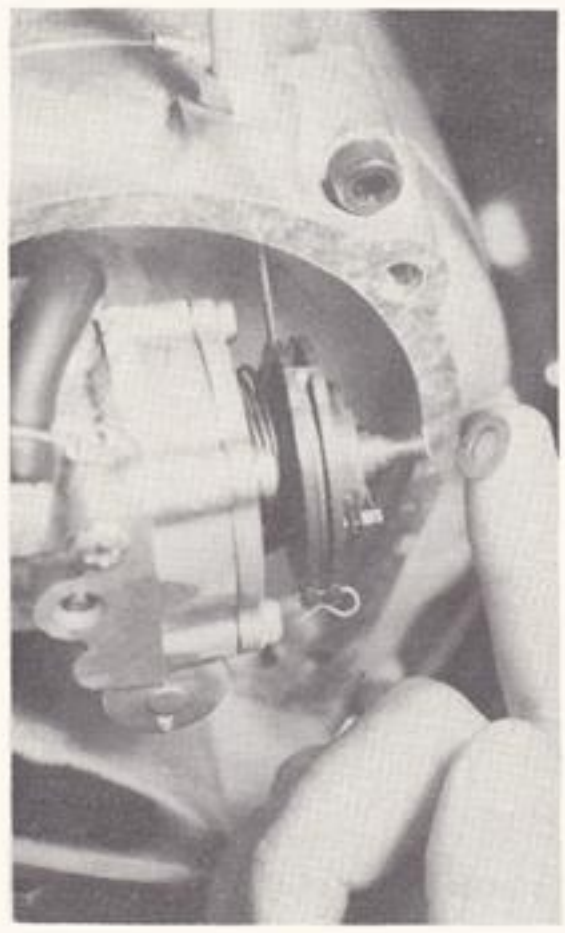


Fig. 2-27

c. Reinstall adjusting plate and locknut. Tighten the locknut.
Re-measure gap. Repeat procedure as required.

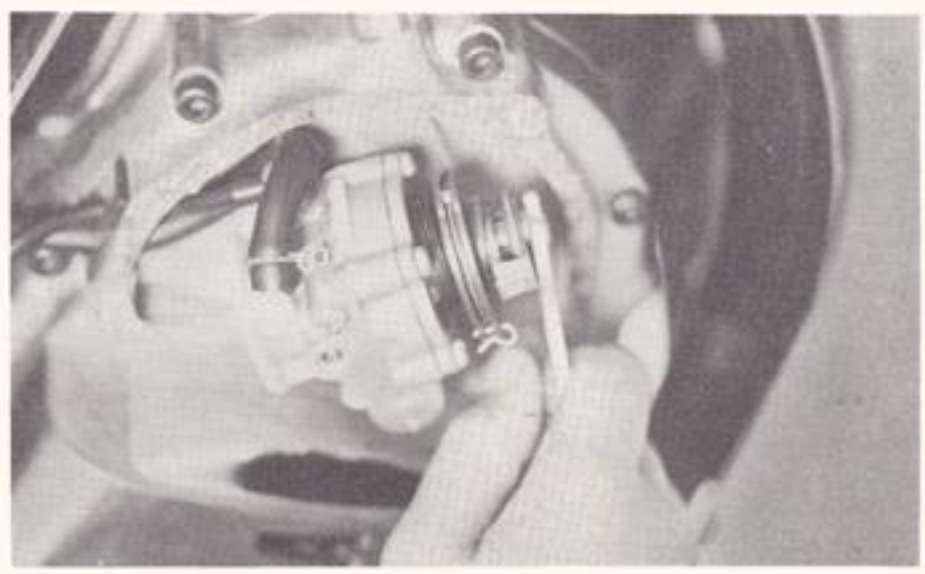


Fig. 2-28

3. Bleeding the pump

a. The Autolube pump and delivery lines must be bled on any of the following occasions:
   1) A new machine out of the crate.
   2) Whenever the Autolube reservoir tank has run dry.
   3) Whenever any portion of the Autolube system is disconnected.

b. Remove the pump cover.

c. Remove the pump bleed screw.

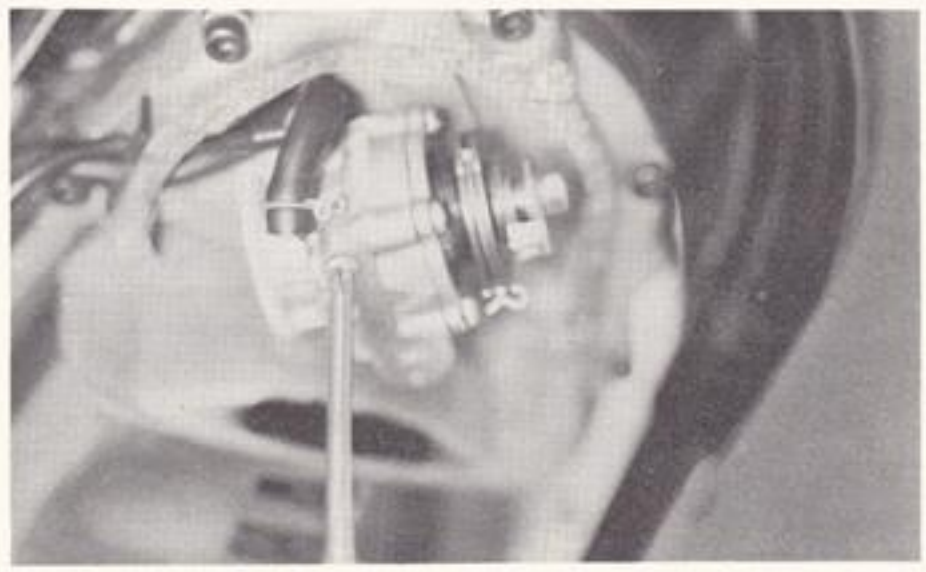


Fig. 2-29

d. Turn the throttle to the full open position.
e. Rotate the starter plate until a steady flow of oil, with no air bubbles, comes out.

Fig. 2-30

f. Re-install bleed screw and pump cover.

F. Clutch Adjustment

The clutch push lever is so designed that it is positioned 10° behind the push lever axle before it is operated and 10° ahead after it is operated. Therefore, if the clutch push lever does not move as specified, adjustment is necessary.

Proper clutch adjustment requires two separate procedures.

1. Loosen cable, adjust screw locknut.
2. Turn clutch cable adjustor (at lever) all the way into the lever.

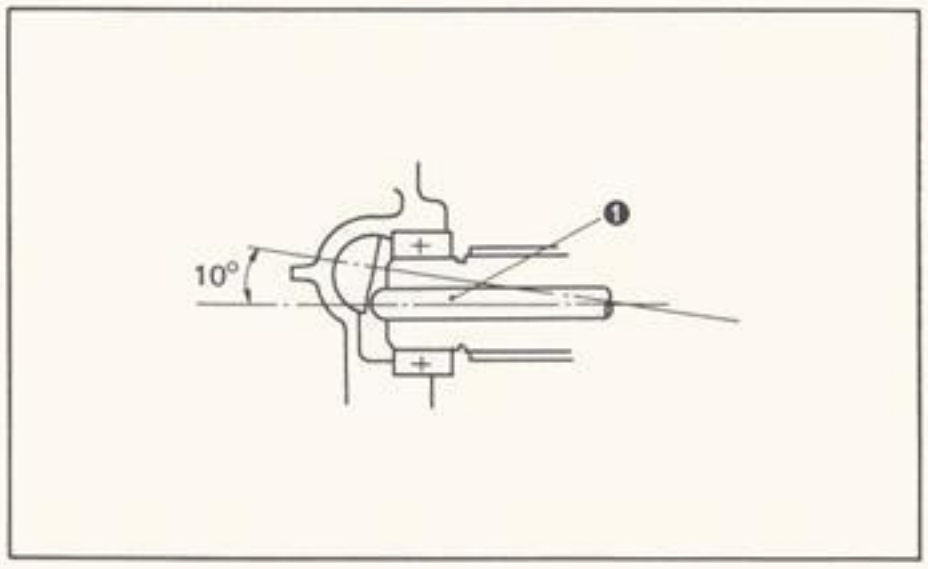
Fig. 2-31

Note:

The above procedure provides for maximum cable freeplay to allow for proper clutch actuating mechanism adjustment.

3. Remove left crankcase cover. If necessary, remove shifter lever.

4. Loosen adjustor locknut.
   Using a Phillips screwdriver, turn adjust screw in or out until clutch arm (located under the engine directly below the adjust screw), is 10° behind the main axle centerline.



1. Push rod 2

Fig. 2-32

5. Tighten locknut.

6. At clutch lever assembly, left handlebar, turn cable length adjustor in or out until freeplay at lever pivot equals 2 - 3mm.

7. Tighten adjusting bolt locknut.

8. Re-install side cover.

G. Transmission and Shifter

1. Transmission

a. The dip stick is located above and slightly in front of the kick crank. To check level, start the engine and let it run for several minutes to warm and distribute oil. Unscrew the dipstick and clean. Set it on the case threads in a level position. Remove and check level.

Fig. 2-33

Note:

Be sure the machine is level and on both wheels.

b. The stick has Minimum and Maximum marks. The oil level should be between the two. Top off as required.

Recommended Oil: Motor Oil, SAE 10W-30wt. Type "SE".

c. A drain bolt is located on the bottom of the crankcase. With the engine warm, remove the plug and drain oil. Re-install plug and add fresh oil.

Transmission Drain Plug Torque: 174 - 217 in.-lbs (2.0 - 2.5 kg-m)

Transmission Oil Quantity:	DT250A 1,000 ± 50cc DT360A 1,200 ± 50cc

Trnsmission oil should be replace several times during the break-in period. if the unit is used for competition, oil replacement should also be often. See Maintenance Chapter.

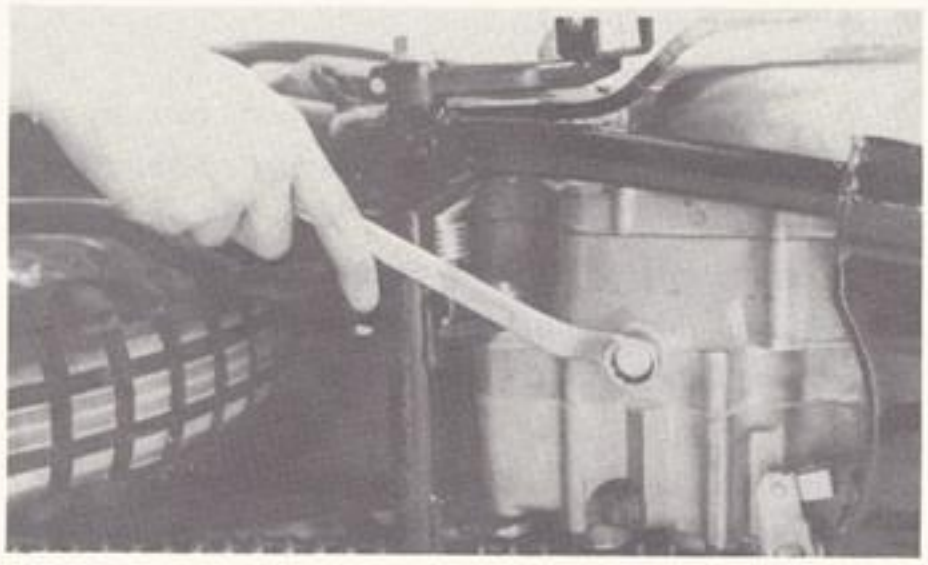


Fig. 2-34

Caution:

Under no circumstances should any additives be included with the transmission oil. This oil also lubricates and cools the clutch. Many additives will cause severe clutch slippage.

2. Shifting

A 5-speed transmission is employed. Low gear is at the bottom of the shift pattern; high gear at the top of the shift pattern; neutral is located half-way between first and second positions.

The shift mechanism is of the ratcheting type common to most motorcycles. Allow the lever to return to its "at rest" position prior to selecting another gear. Neutral is selected by pulling up or depressing on the shift lever halfway between first and second gears.

With the engine running in the neutral position, disengage the clutch (pull in-clutch lever), press down on the shift lever until low gear is engaged, remove foot from shift lever, increase engine speed slightly, slowly release clutch lever while advancing throttle. Repeat procedure for remaining gears.

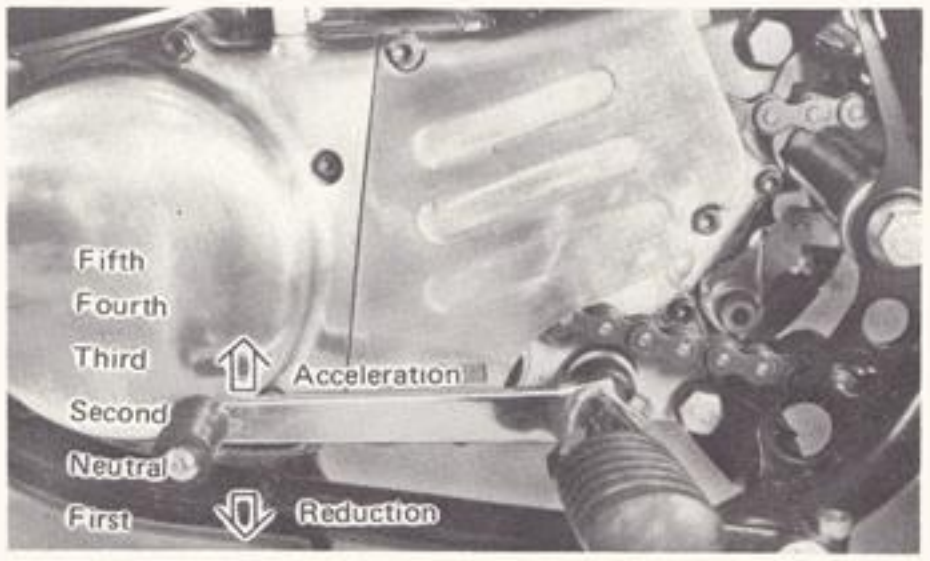


Fig. 2-35

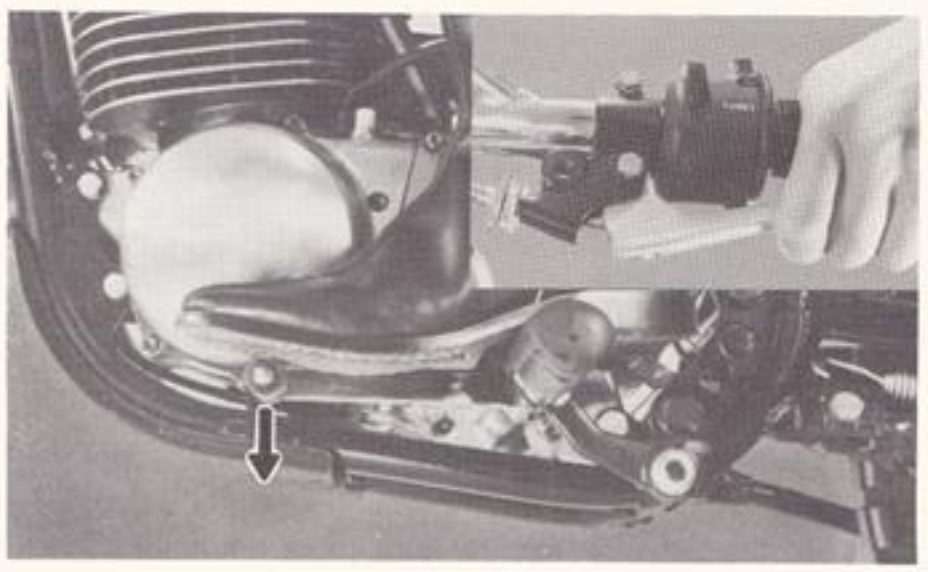


Fig. 2-36

H. Electrical

1. With the engine off, check for proper turn signal, horn, and stop light operation. (Battery operated.)

2. With the engine running at idle, check for proper high and low beam operation and operation of remaining lights and indicator lamps.

Note:

When servicing a new unit, or installing a new battery in an older unit, see battery section of electrical chapter for proper maintenance of battery.

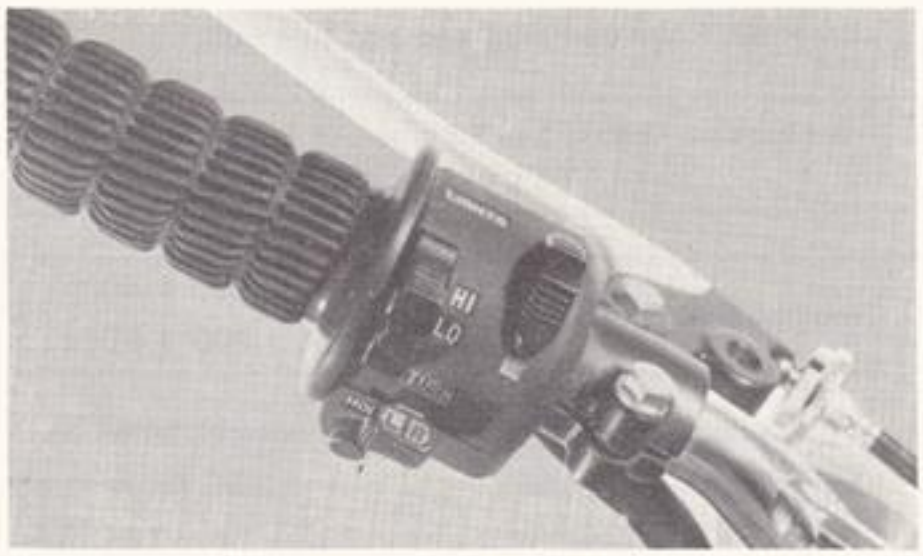


Fig. 2-37

2-3. Chassis Adjustments

A. Front Brake & Wheel

Front brake should be adjusted to suit rider preference with a minimum cable slack of 5 - 8mm play at the brake lever pivot point.
Adjustment is accomplished at the handle lever holder.

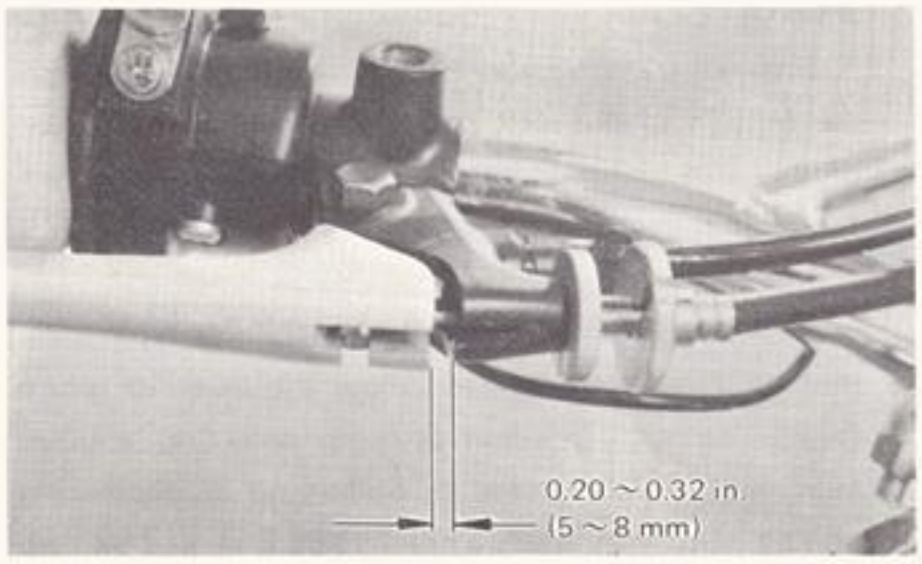


Fig. 2-38

1. Loosen the adjustor locknut.

Fig. 2-39

2. Turn the cable length adjustor in or out until adjustment is suitable.

3. Tighten the adjusting bolt locknut.

4. Raise the wheel off the ground. Spin.Check rim run out.

Rim Runout Limits	
Vertical	0.08 in. (2 mm)
Lateral	0.08 in. (2 mm)

Fig. 2-40

5. Check each spoke for tightness.

Spoke Torque	
Front Wheel	25 in.-lbs. (0.3 kg-m)
Rear Wheel	25 in.-lbs. (0.3 kg-m)

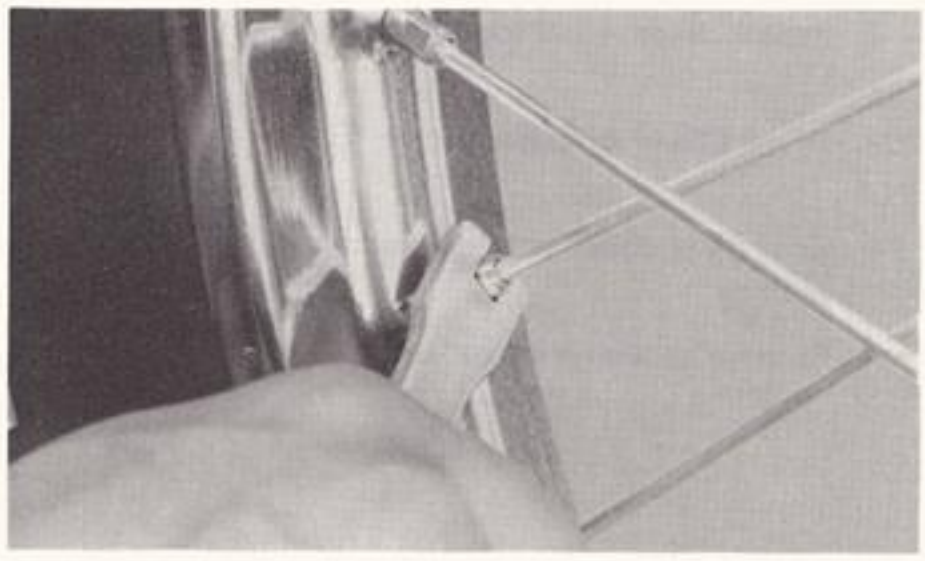


Fig. 2-41

6. Check axle nut

Front Axle Nut Torque:
868 - 1,042 in.-lbs (10 - 12 kg-m)

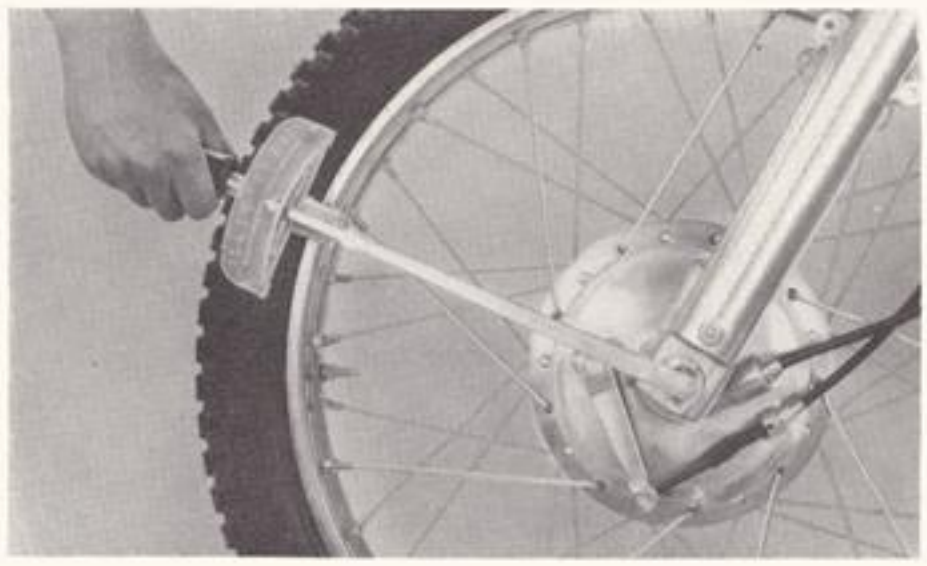


Fig. 2-42

B. Rear Brake & Wheel

Adjust rear brake pedal play to suit, providing a minimum of 25mm freeplay. Adjustment is accomplished as follows:

1. Using a 10mm wrench, turn the adjusting nut on the rear brake ferrule in or out until brake pedal freeplay is suitable (25mm minimum freeplay).

Fig. 2-43

Note:

Rear brake pedal adjustment must be checked whenever chain is adjusted or rear wheel is removed and then re-installed.

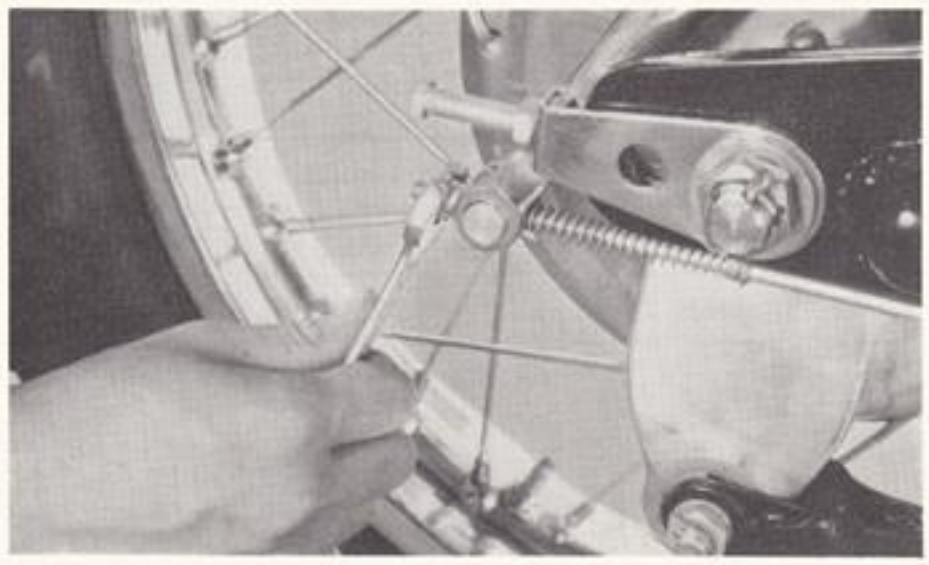


Fig. 2-44

2. Repeat steps 4 - 6 for front wheel.

C. Drive Chain Adjustment

To adjust drive chain, proceed as follows:

1. Remove rear axle cotter pin.

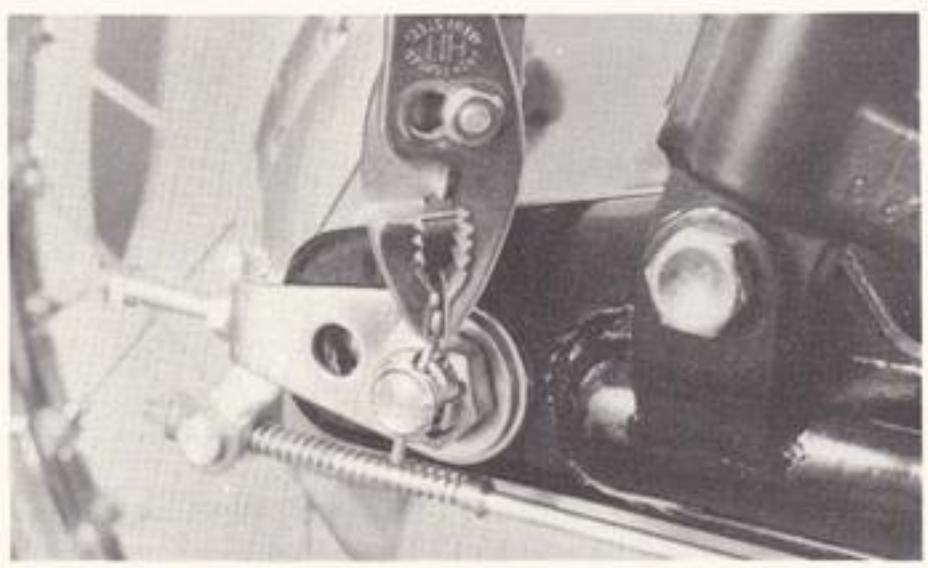


Fig. 2-45

2. Loosen rear axle securing nut.

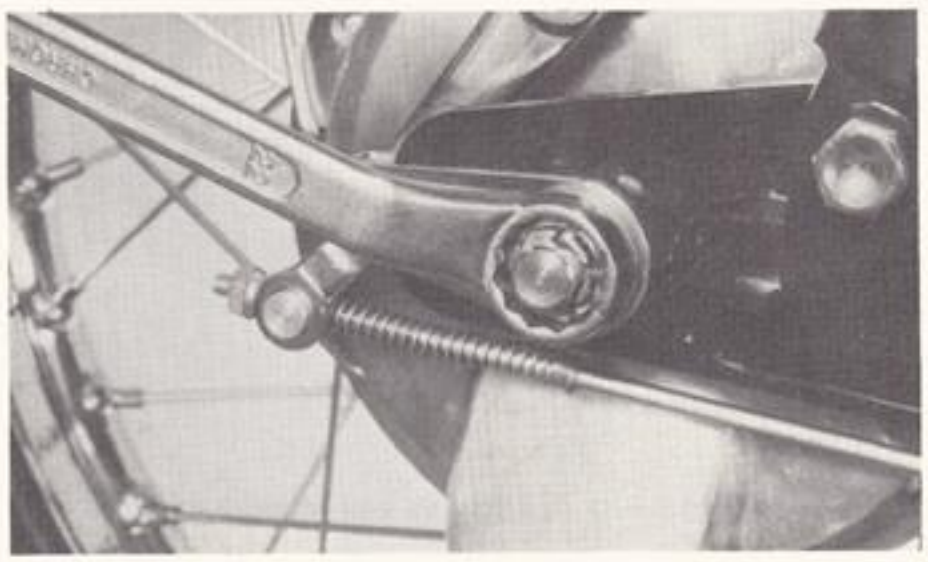


Fig. 2-46

3. With rider in position on machine, both wheels on ground, set axle adjustors until there is 15 to 20 mm slack in the drive chain at the bottom of the chain at a point midway between the drive and driven axles.

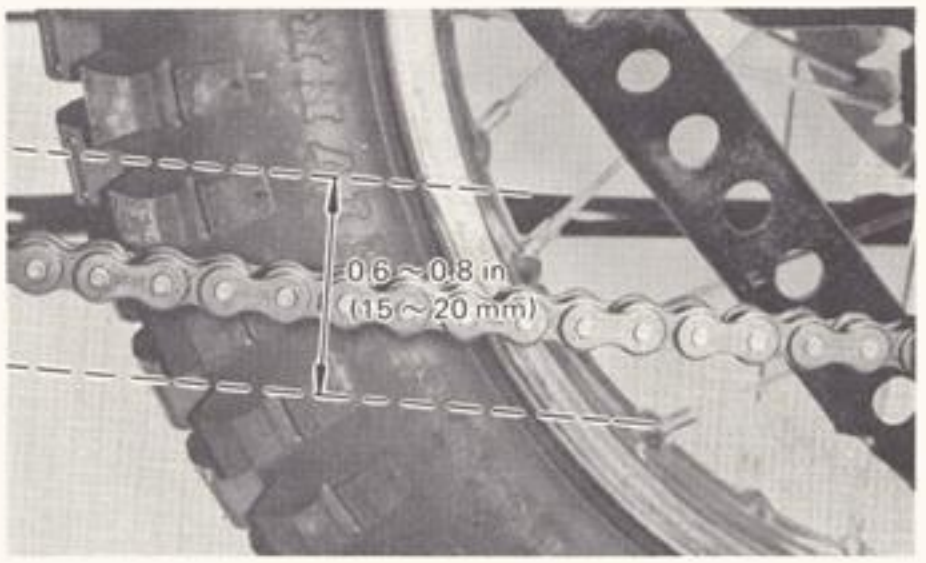


Fig. 2-47

4. Turn adjustors both left and right, until axle is situated in same positions as shown by position marks on swing arm axle tabs.

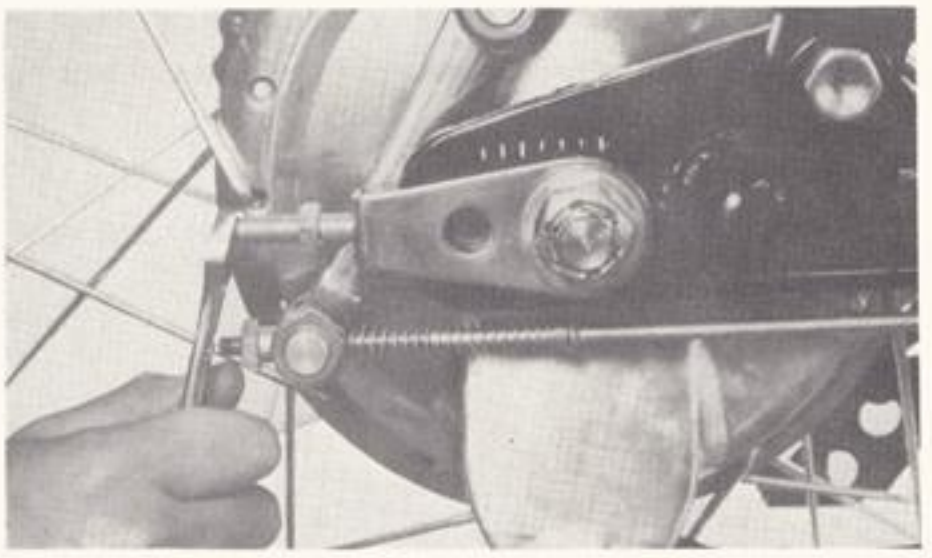


Fig. 2-48

5. Tighten the rear axle securing nut.

Axle nut torque: 868 - 1,042 in.-lbs (10 - 12 kg-m)

6. Install a new cotter pin, bend the ends over.

D. Suspension, Steering & Swing Arm

1. Steering Head Adjustment

The steering assembly should be checked periodically for any looseness. Do this as follows:

a. Block machine up so that front wheel is off the ground.

b. Grasp bottom of forks and gently rock fork assembly backward and forward. You will feel any looseness in the steering assembly bearings.

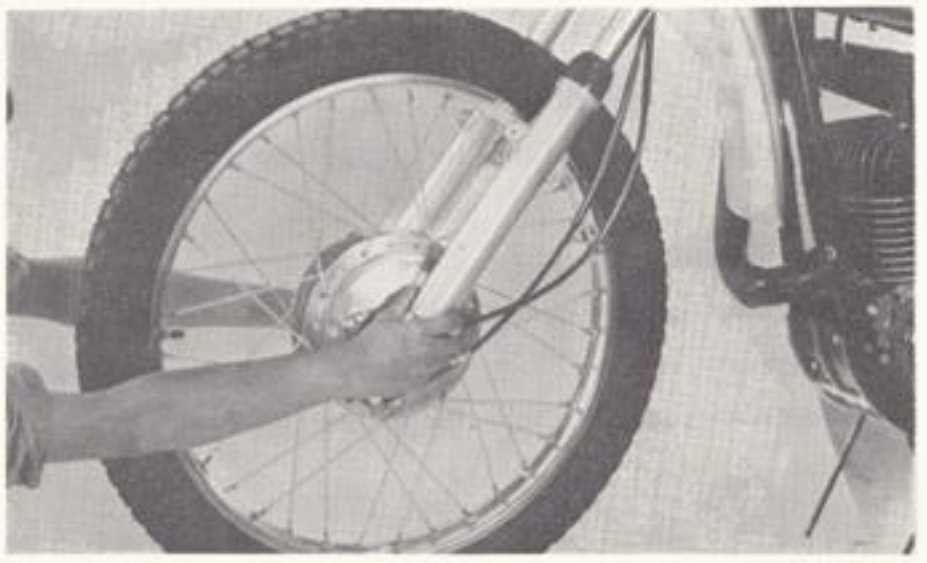


Fig. 2-49

c. If steering head needs adjustment, loosen steering fitting bolt and crown pinch bolt.

Fig. 2-50

d. Using steering nut wrench, adjust steering head fitting nut until steering head is tight without binding when forks are turned.

Note:

Excessive tightening of this nut will cause rapid wear of ball bearings and races.

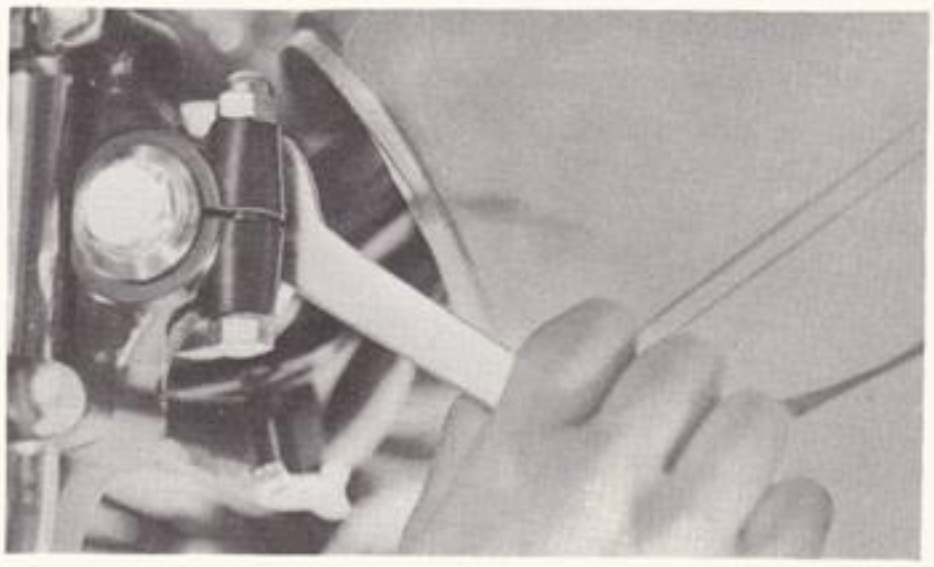


Fig. 2-51

e. Tighten crown pinch bolt and steering fitting bolt in that order.

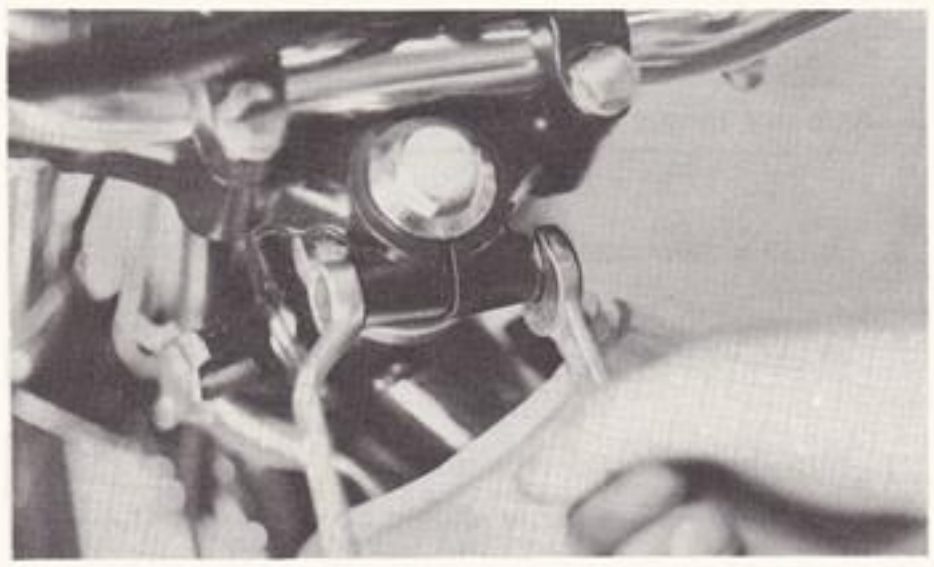


Fig. 2-52

2. Suspension

a. Check all suspension for proper operation.

b. Check all securing bolts for proper tightness.

3. Swing arm

a. Check for proper operation.

b. Check slack.

c. Check all securing bolts for proper tightness.

E. Miscellaneous

1. Check for proper cable routing of all components. See cable routing diagrams in appendices section of this manual.

2. Check for proper control location.

3. Check securing bolts on controls for proper tightness.

2-4. Miscellaneous

A. Gasoline and Oil

1. Gasoline

   Use gasoline with an octane rating of 86 +.

   Some regular gasolines and most midrange gasolines have such ratings. High-test or Ethyl grade gasolines usually have octane ratings in excess of 94. In addition, they often have considerable tetra-ethyl lead added, which can cause spark plug problems.

   Always use fresh, name-brand gasoline.....

   Low-lead or unleaded gasolines are suitable provided they meet the minimum (86 ₹) octane requirements.

Caution:

With the autolube feature it is unnecessary and even harmful to the engine to mix oil with the gasoline. Never mix oil with the gasoline. Always use straight gasoline.

2. Oil

a. Autolube Oil

We recommend that your first choice be Yamalube which can be purchased from any Authorized Yamaha Dealer. If for any reason you should use another type, the oil should meet or exceed BIA certification "TC-W". Check container top or label for service specification.

Caution:

Under extremely cold conditions (+32 degrees Fahrenheit or below) some oils become very thick and will not flow as readily to the autolube pump. This may cause oil pump starvation. Yamalube will flow normally to the pump at ambient temperatures down to zero degrees Fahrenheit.

Note:

See transmission section for proper oil to use.

b. Autolube Tank

Always check Autolube tank oil level before operating machine. If oil level shows at sight glass window:

1) Raise seat.
2) Remove filler cap and top off tank.

Fig. 2-53

B. Break-in

You must not put an excessive load on the engine during the first ten to twenty hours of operation.
If speedometer mileage is maintained, use the following break-in procedure:

0 to 100 miles

Avoid operation above one half throttle. (4000 r.p.m.)

100 to 250 miles

Avoid full throttle operation. Allow the motorcycle to rev freely through the gears but do not use full throttle at any time. Avoid prolonged operation above 5,000 r.p.m..

250 to 500 miles

Avoid prolonged full throttle operation. Avoid cruising speeds in excess of one half throttle or 6,000 r.p.m.. Vary speeds occasionally.

500 miles and beyond

Avoid full throttle operation. Avoid speeds in excess of r.p.m. red line. Vary speeds occasionally.

Note:

See owner's warranty guidebook for complete warranty information.

C. Pre-operation Check Chart

Item	Routine	Page
Brakes	Check Operation/Adjustment	28 ~ 36
Clutch	Check Operation/Lever Adjustment	25 ~ 26
Autolube Tank	Check Oil Level/Top-off as Required	33
Transmission	Check Oil Level/Top-off as Required	26
Drive Chain	Check Alignment/Adjustment/Lubrication	30 · 31
Spark Plug	After Break-in-check Color Condition Weekly/ 500 miles	117 · 118
Throttle	Check for Proper Throttle and Autolube Cable Operation	–
Air Filter	Foam Type-must be Clean and Damp with Oil Always	20 · 21
Wheels/Tires	Check Pressure/Runout/Spoke Tightness/Axle Nuts	28 · 29
Fittings/Fasteners	Check All-tighten as Necessary	–
Lights/Signals	Check Head Light/Tail-stop Light	28

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.

D. Cleaning and Storage

1. Cleaning

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

a. Before cleaning the machine:

1) Block off end of exhaust pipe to prevent water entry; a plastic bag and strong rubber band may be used.

2) Remove air cleaner or protect it from water with plastic covering.

3) Make sure spark plug, gas cap, oil tank cap, transmission oil level gauge cap and battery caps are properly installed.

b. If engine case is excessively greasy, apply degreaser with a paint brush. Do not apply degreaser to chain, sprockets, or wheel axles.
c. 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 detargent applications such as those available in coin-operated car washes.
d. 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.
e. Rise machine off immediately with clean water and dry all surfaces with a chamois skin, clean towel, or soft absorbent cloth.
f. Immediately after washing, remove excess moisture from chain and lubricate to prevent rust.
g. Chrome-plated parts such as handlebars, rims, spokes, forks, etc., may be further cleaned with automotive chrome plate.
h. Clean the seat with a vinyl upholstery cleaner to keep the cover pliable and glossy.
i. Automotive-type was 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.
j. After finishing, start the engine immediately and allow to idle for several minutes.

2. 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:
a. Drain fuel tank, fuel lines, and carburetor float bowls(s).
b. 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. Reinstalt tank.
c. 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.
d. Remove drive chain. Clean thoroughly with sólvent and lubricate with graphite-base chain lubricant. Reinstall chain or store in a plastic bag (tie to frame for safe-keeping).
e. Lubricate all control cables.
f. Remove battery and charge. Store in a dry-cool 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° F).
g. Block up frame to raise both wheels off ground. (Main stands can be used on machines so equipped.)
h. Deflate tires to 15 psi.
i. Tie a plastic bag over exhaust pipe outlet(s) to prevent moisture entering.
   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.

CHAPTER 3. ENGINE, CLUTCH AND TRANSMISSION

3-1. Special Tools

A. Press Box
P/N 90890-02202

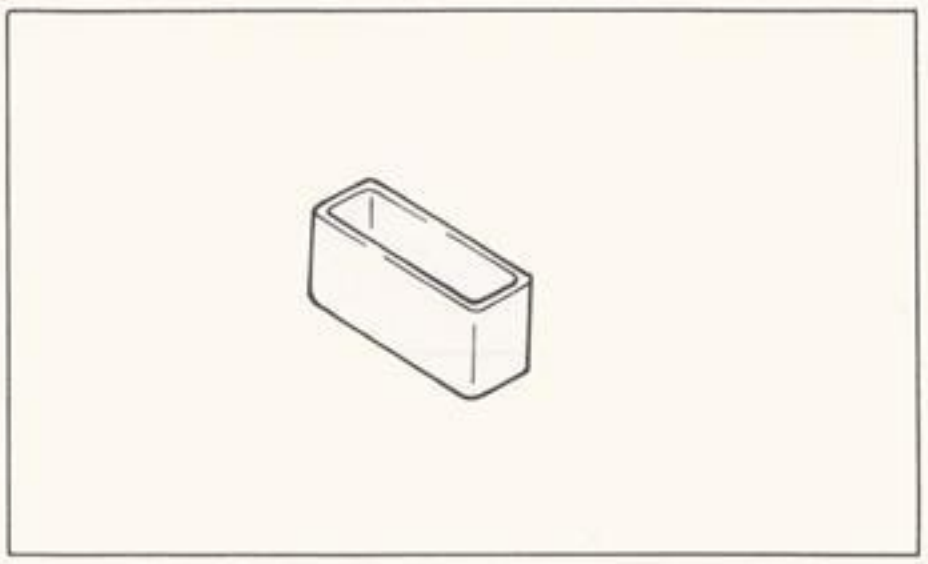


Fig. 3-1

B. Crankshaft Jig
P/N 90890-02300

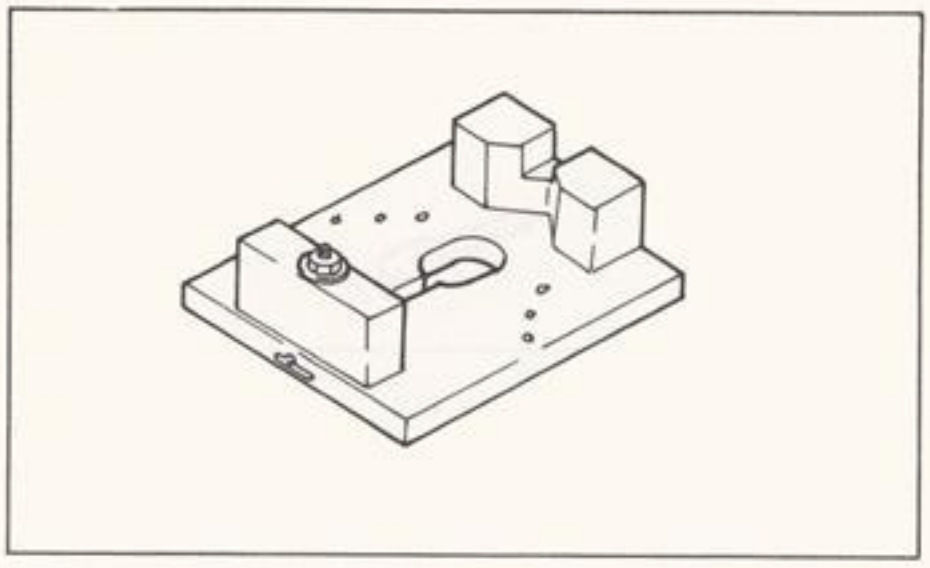


Fig. 3-2

C. Press Pin
P/N 90890-02203

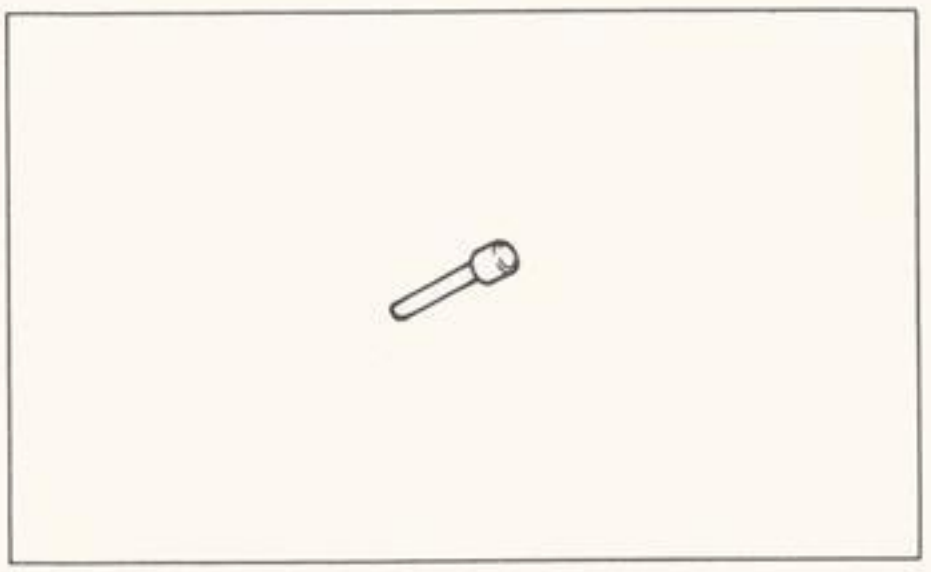


Fig. 3-3

D. Support Plates (2/Set)
P/N90890-02321

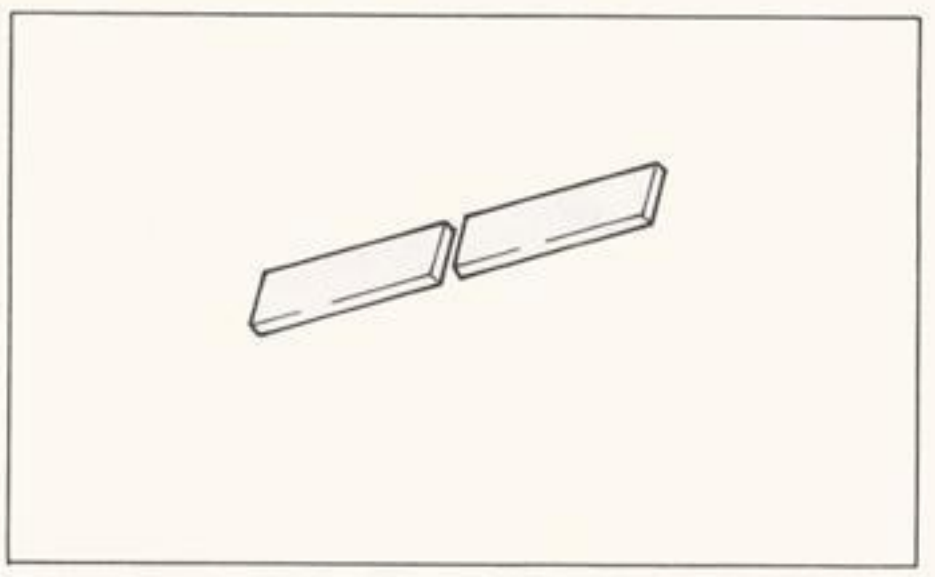


Fig. 3-4

E. Wedge
P/N 90890-02205

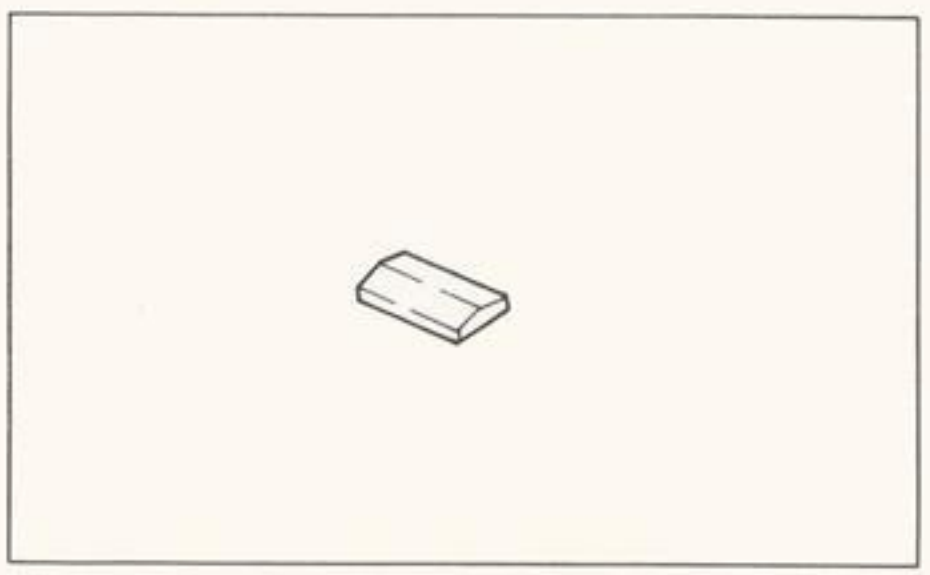


Fig. 3-5

F. Stops - 62mm
P/N 90890-02214

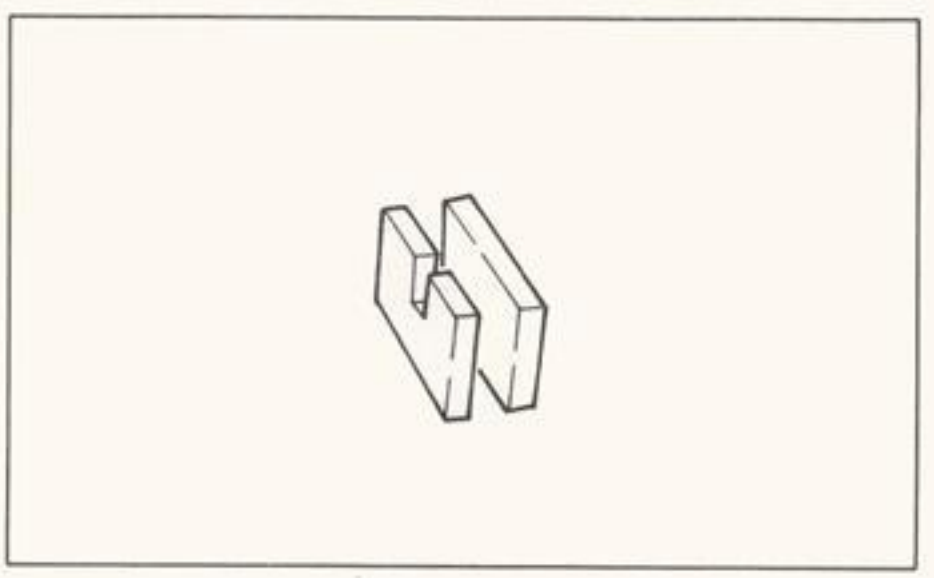


Fig. 3-6

G. Crank Shaft Separator

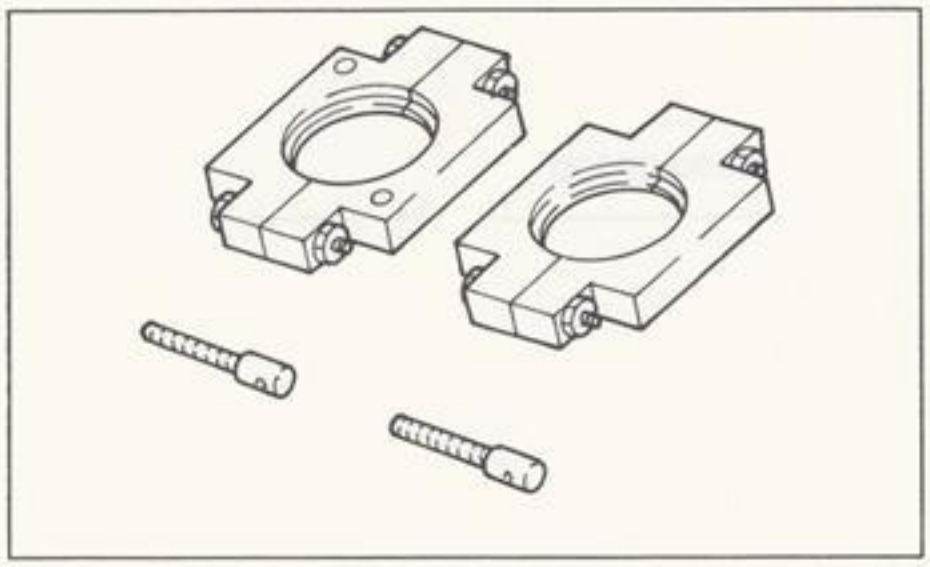


Fig. 3-7

H. Crank Setting
P/N 90890-01012

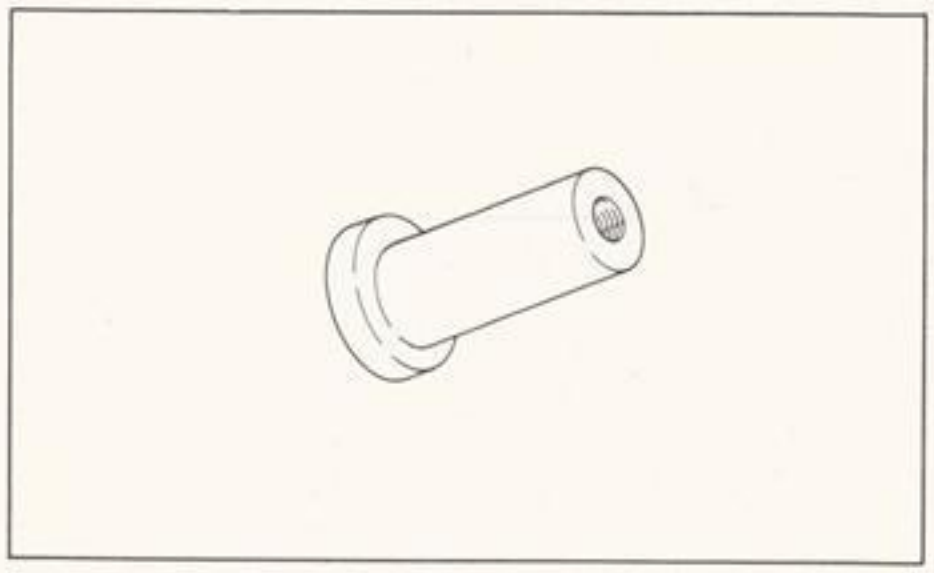


Fig. 3-8

I. Crank Setting Bolt
P/N 90890-01017

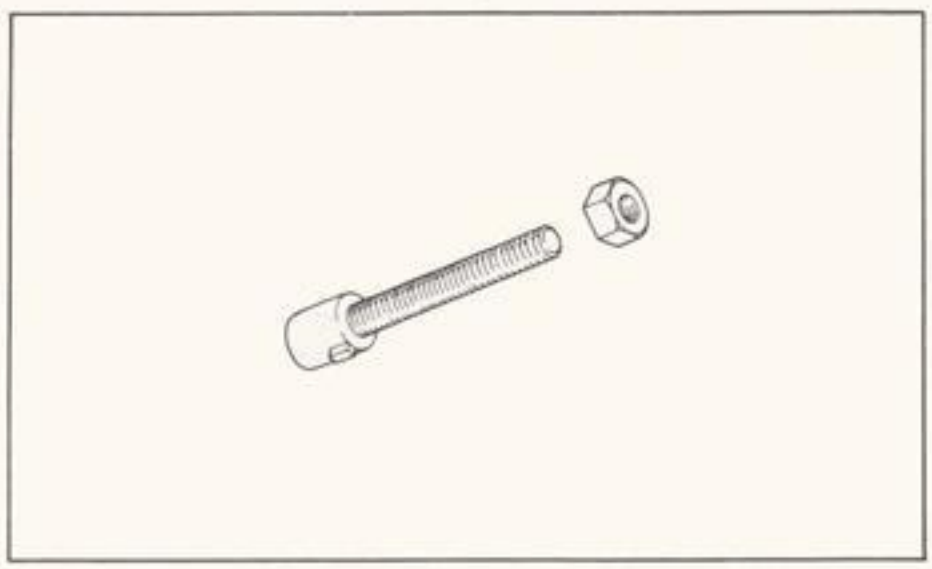


Fig. 3-9

J. Spacer
P/N 90890-01015

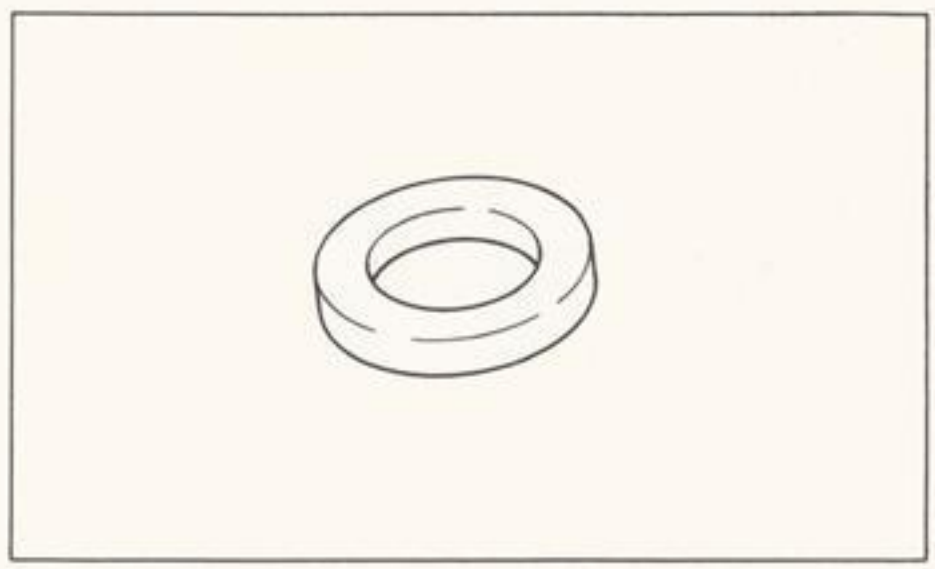


Fig. 3-10

3-2 Description

The DT 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 seven-port Torque 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.

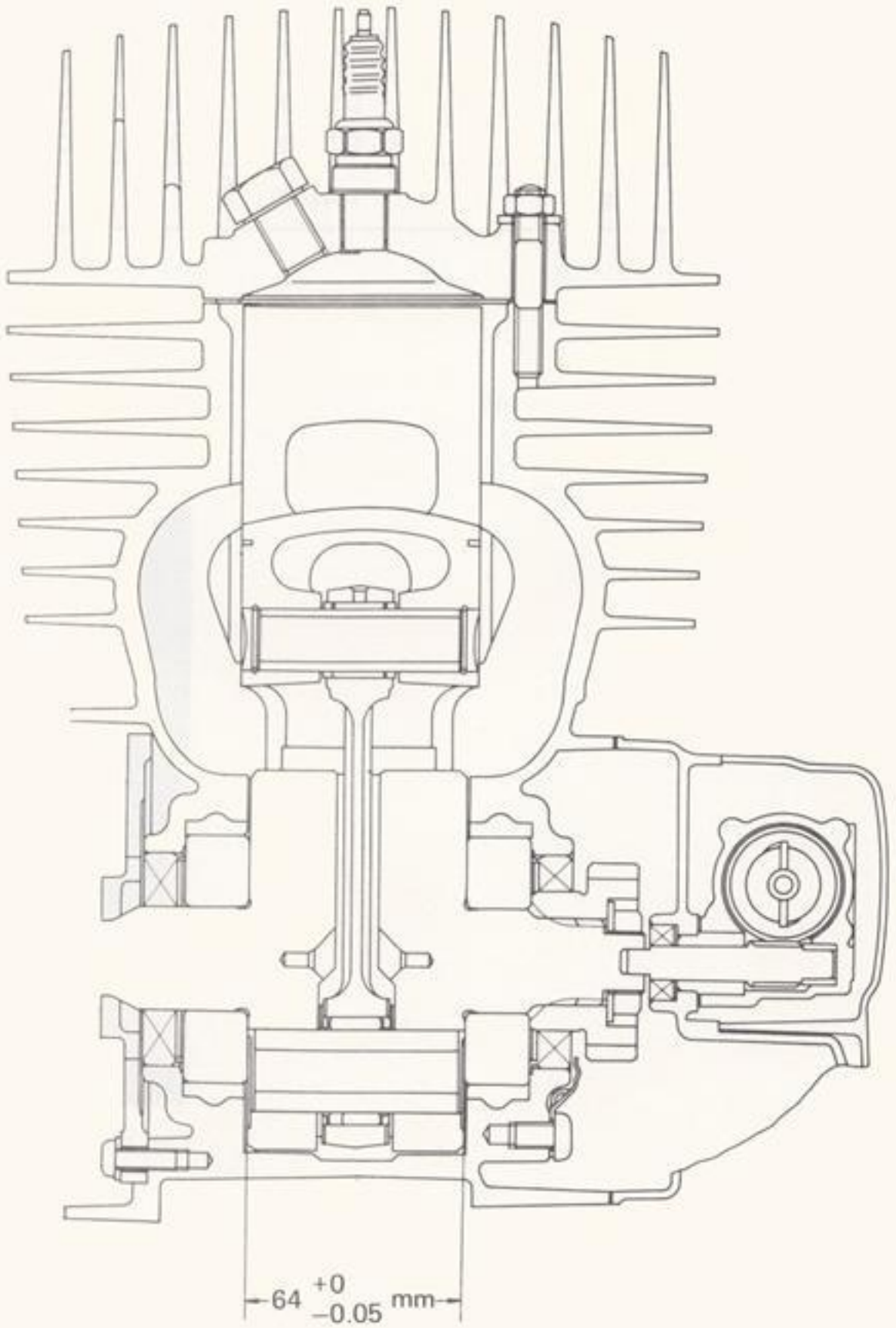


Fig. 3-11

3-3. Engine Removal

A. Preparation for Removal and Disassembly

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 enging 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-installation of all engine parts.
4. Start the engine and warm it for a few minutes; turn off and drain transmission oil.

Transmission Oil		
Volume	DT250A	1,000 ±50 CC
	DT360A	1,200 ±50 CC
Type	10W/30 "SE"	

B. Removal

1. Disconnect the decompression cable (DT360A).

Fig. 3-12

2. Remove pump cover.

Fig. 3-13

3. Remove oil tank feed line to the pump. Pull it through access hole in side cover and plug the end so oil will not run out of oil tank.

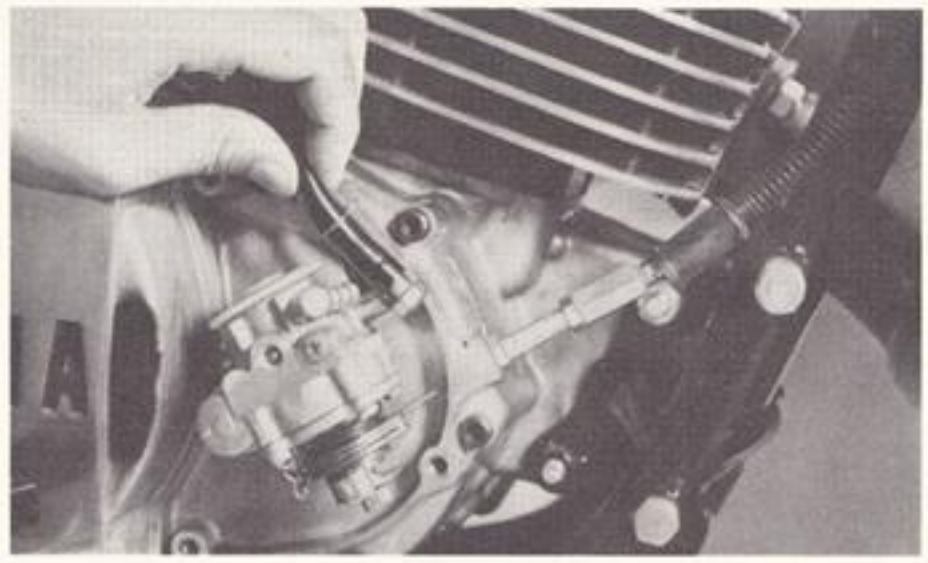


Fig. 3-14

4. Rotate the pump pulley to a full throttle position and remove the cable end from pulley seat.

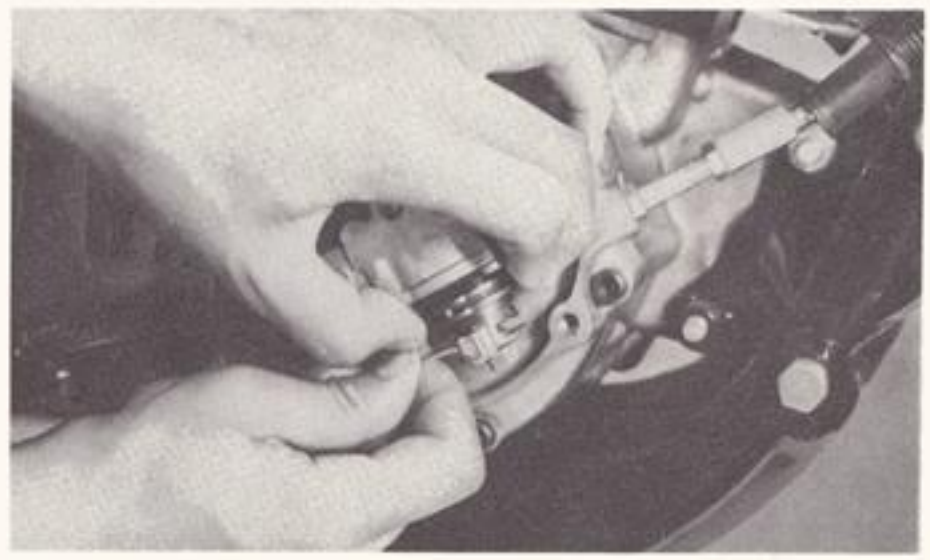


Fig. 3-15

5. Loosen the 10mm nut holding the Autolube pump cable adjuster to the side case. Remove the adjuster and cable complete.

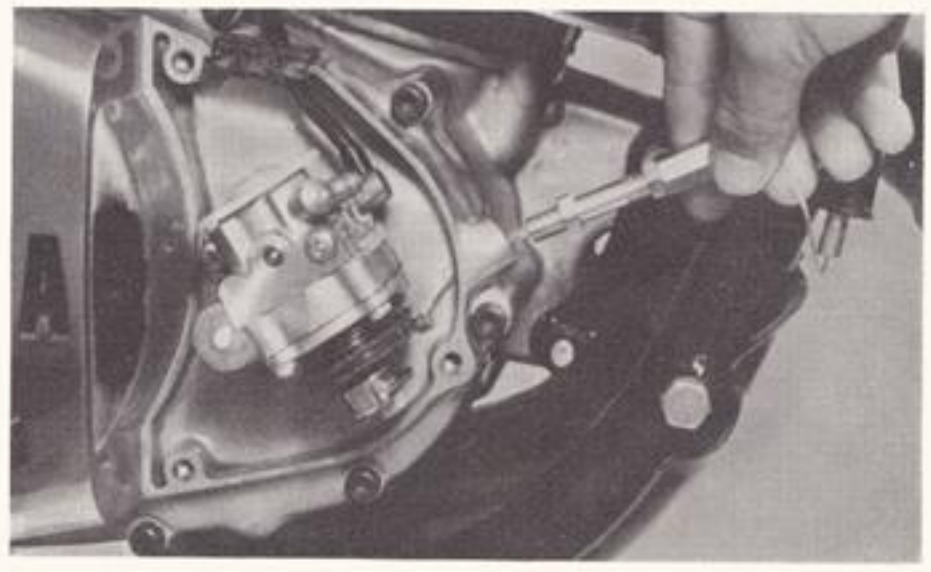


Fig. 3-16

6. Remove spark plug cap lead wire.

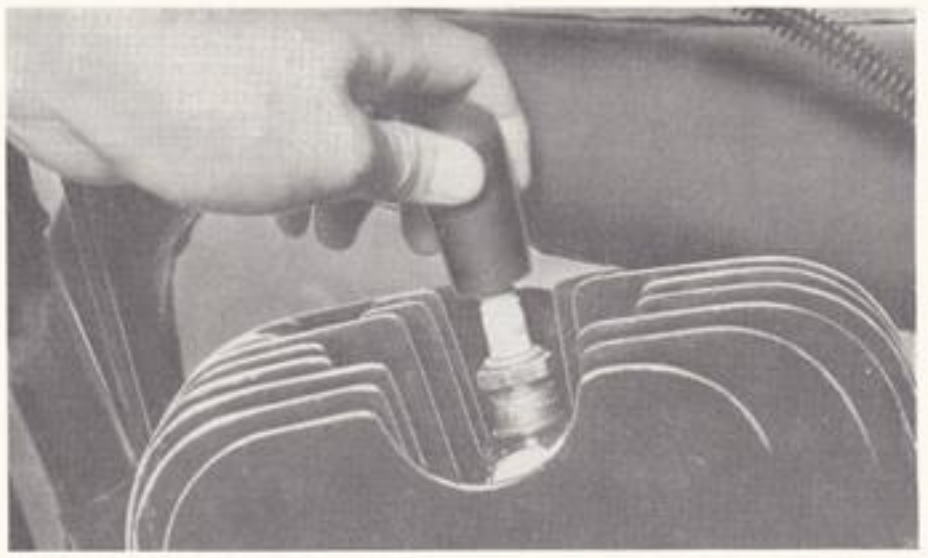


Fig. 3-17

7. Disconnect the tachometer cable.

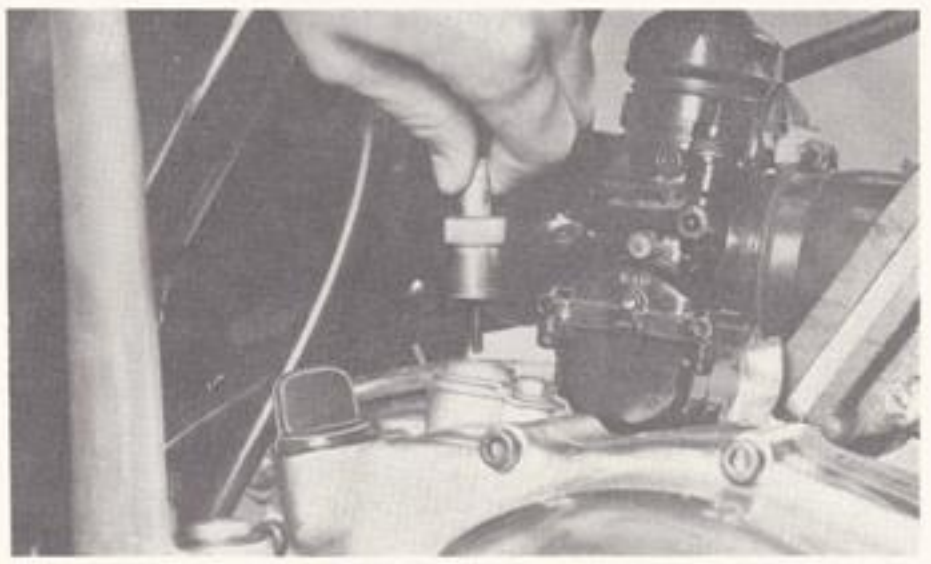


Fig. 3-18

8. Remove the muffler.

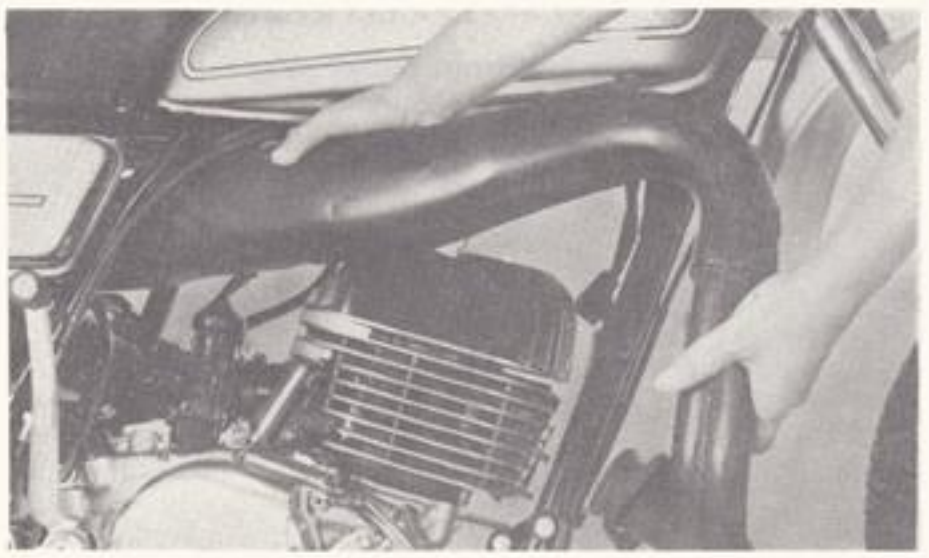


Fig. 3-19

9. Remove the change pedal.

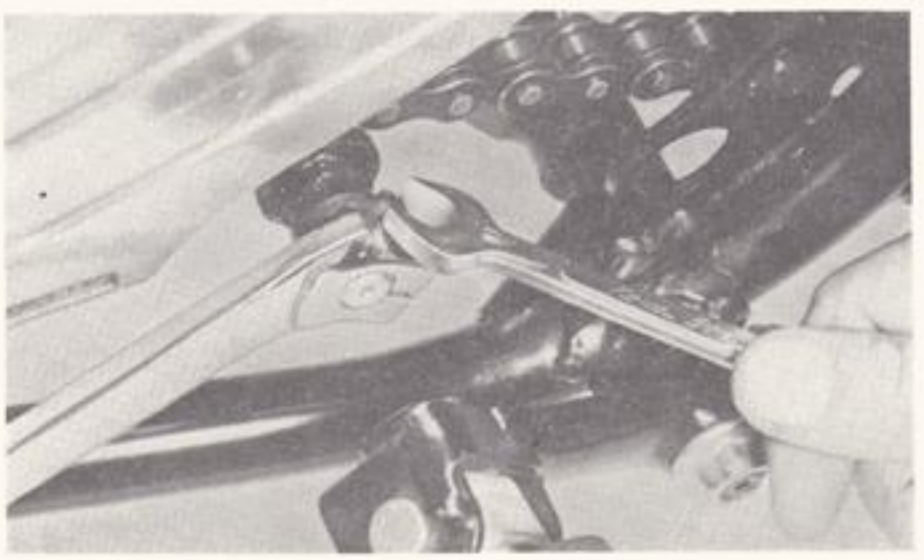


Fig. 3-20

10. Remove the chain cover and disconnect the clutch cable.

Note:

To ease future removal, remove drive sprocket at this time.

a. Bend down lock tab.

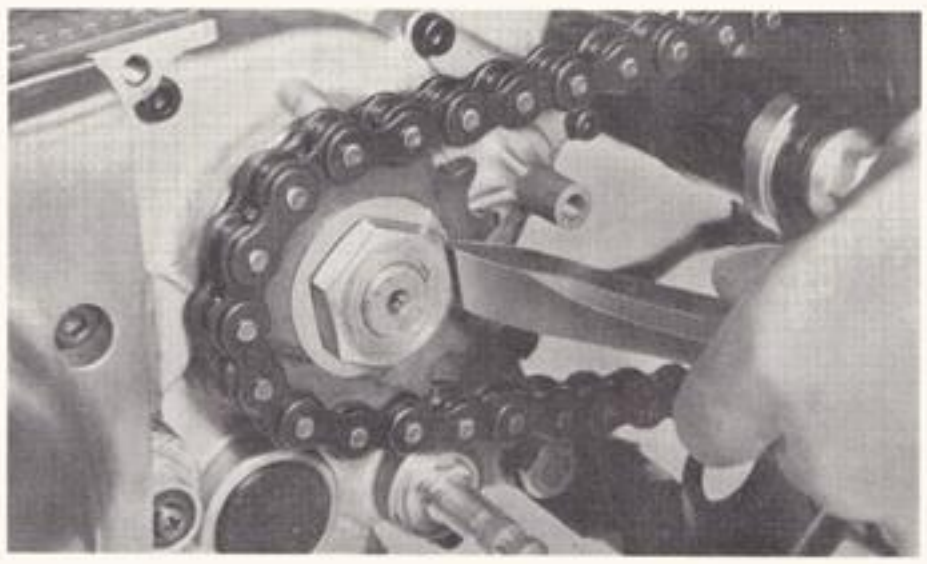


Fig. 3-21

b. Put transmission in gear.

c. Apply rear brake.

d. Remove sprocket securing nut.

Drive sprocket nut torque:
608 - 781in.-lbs (7.0 - 9.0kg-m)

11. Drive Chain

a. Disconnect the master link and remove the chain.

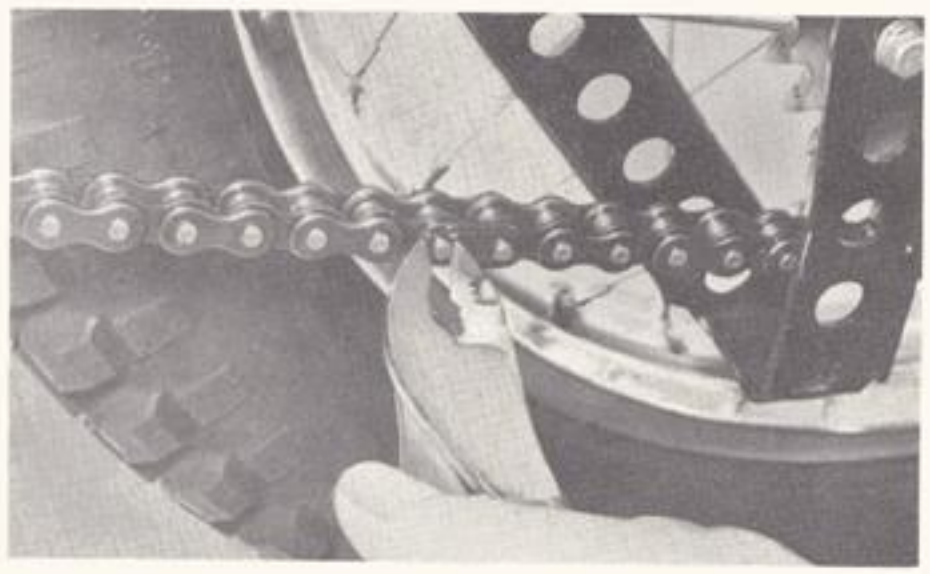
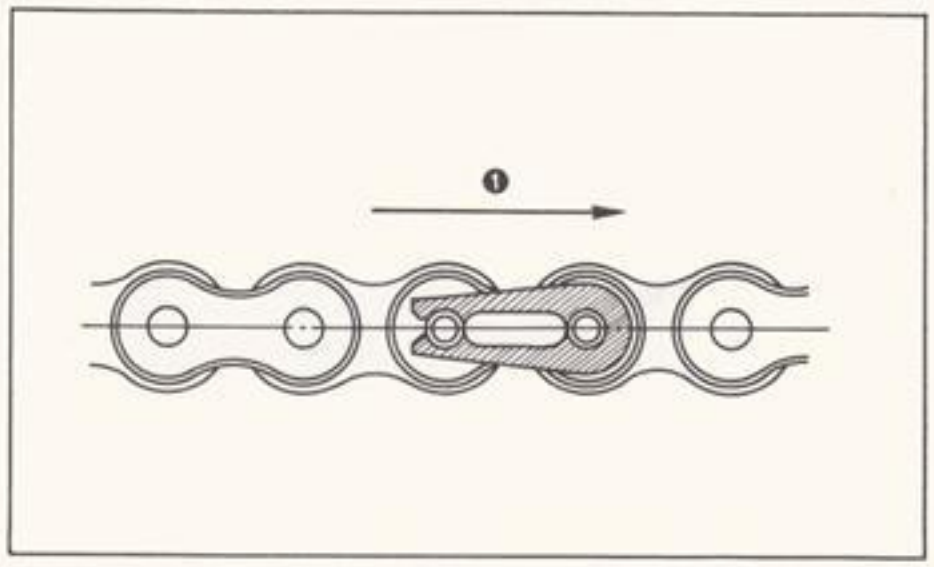


Fig. 3-22

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



1. Driving direction

Fig. 3-23

c. After replacing, adjust the chain free play to 0.8in. (20mm) total at the center of the lower section with the rear wheel on the ground, rider in position.

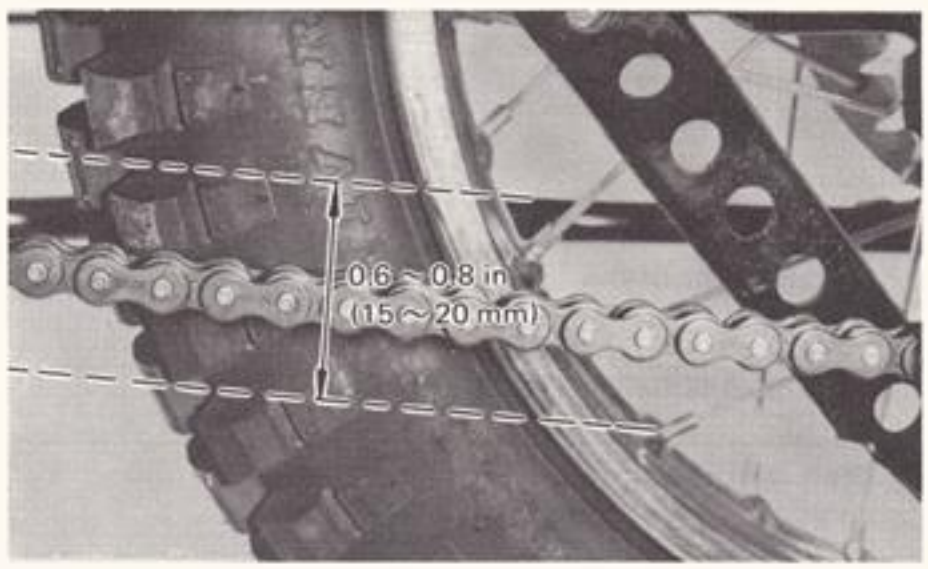


Fig. 3-24

12. Disconnect the engine wiring room connector located at the right, rear frame down tube.

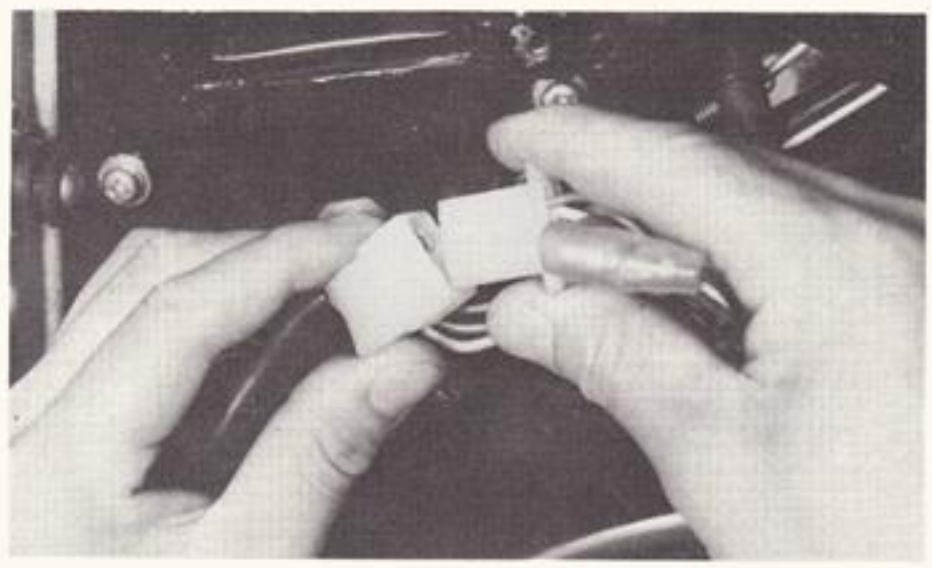


Fig. 3-25

13. Carburetor
    a. Loosen the two carburetor hose clamps.
    b. Remove the mixing chamber top and slide assembly.

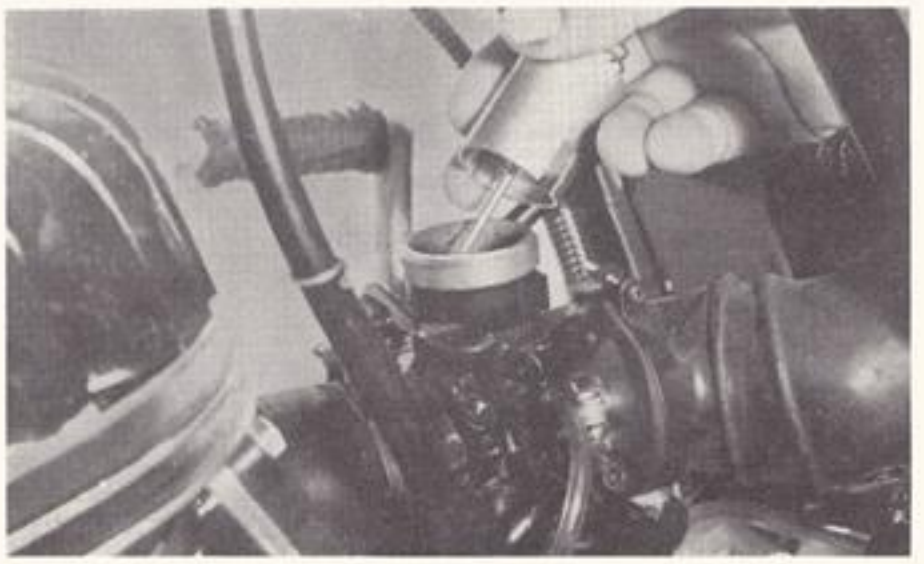


Fig. 3-26

    c. Remove the carburetor.

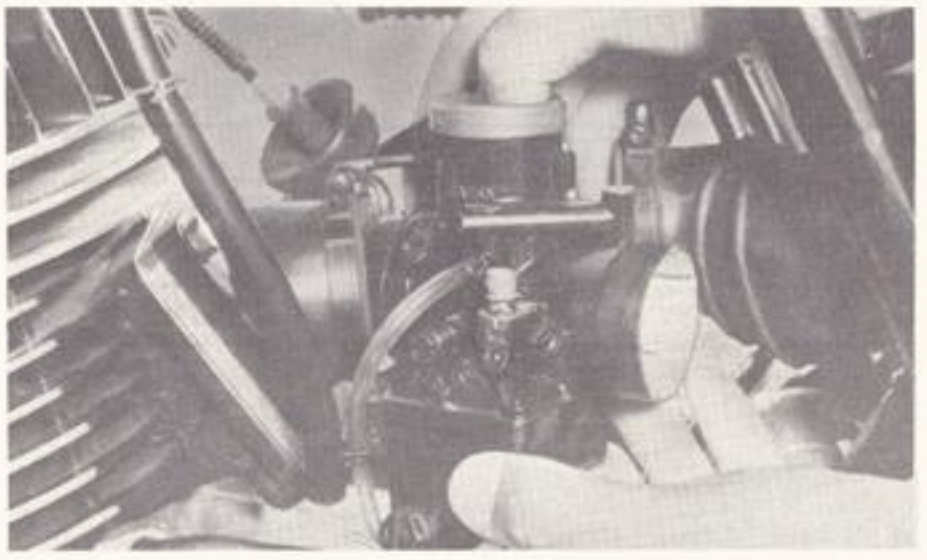


Fig. 3-27

14. Remove the bolt holding the rear of the fuel tank.

Fig. 3-28

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

Note:

Lift up rear of tank and slide back. During installation, note routing of all wires and cables. Install carefully to avoid disturbing Routing.

Fig. 3-29

16. Remove the four engine mounting bolts.

Tightening Torque	
Bolt Size	Torque
10 mm	391 ~ 478 in. (4.5 ~ 5.5 kg-m)
8 mm	217 ~ 252 in. (2.5 ~ 2.9 kg-m)

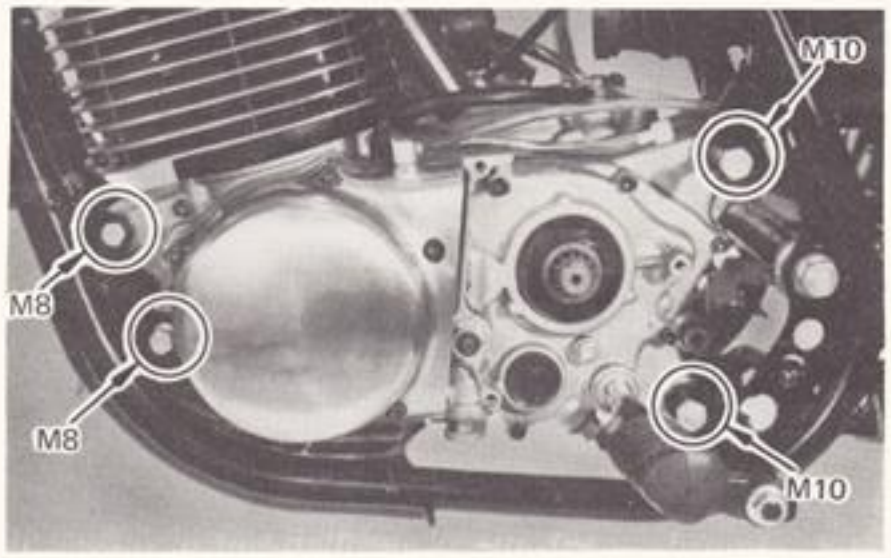


Fig. 3-30

17. Remove the engine from the frame.

Fig. 3-31

C. Installation

1. Reverse the foregoing procedure.
2. Pay particular attention to cable and wire routing and proper torque on fasteners and fittings.
3. See 2-2, Engine Tuning, for proper setup procedure.

3-4 Cylinder Head

	DT250A	DT360A
Cylinder Head Volume (c.c.)	$28.4^{\pm 0.5}$	$47.0^{\pm 0.5}$

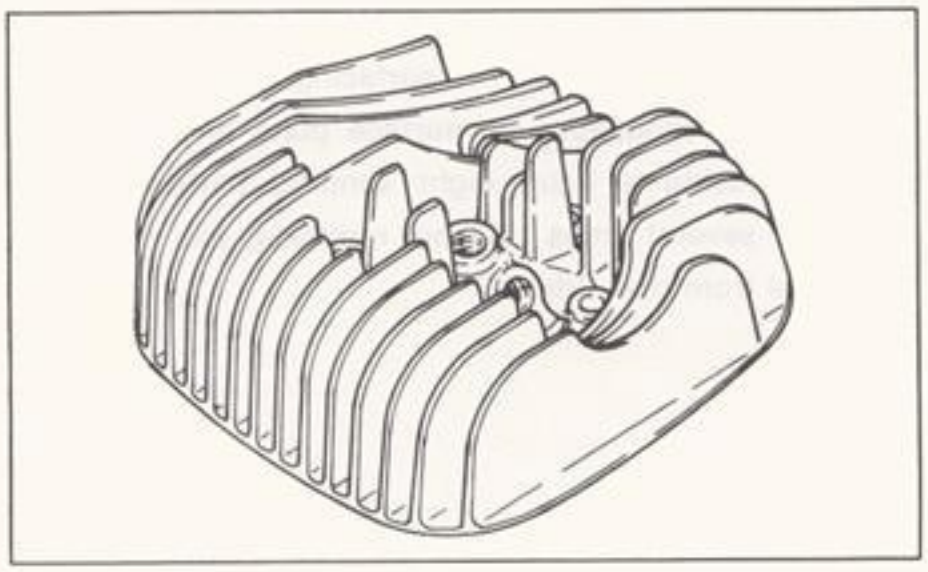


Fig. 3-32

A. Removal

Remove bolts (4) securing cylinder head to cylinder.
Remove cylinder head and gasket.

Note:

Break each nut loose (4/1 turn) prior to removing any one nut.

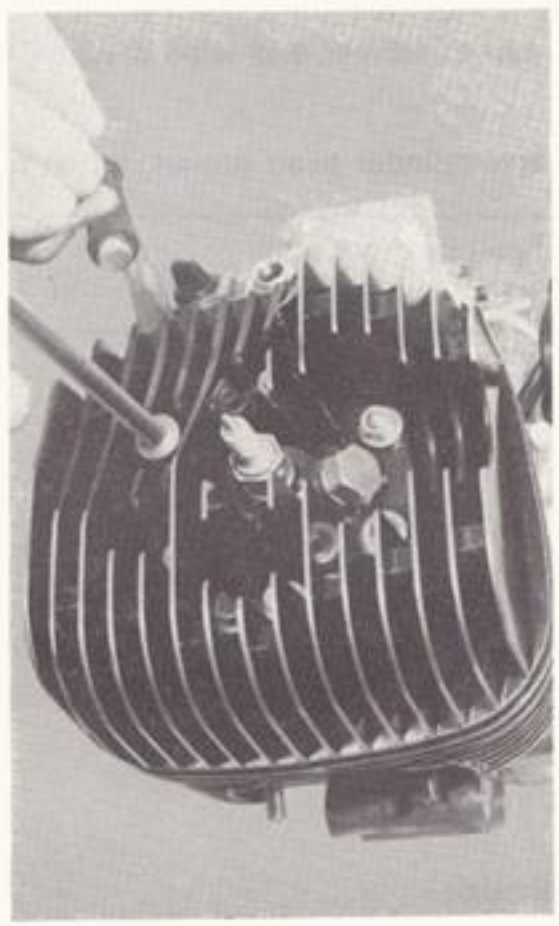


Fig. 3-33

B. Maintenance - Cylinder Head

1. Remove spark plug.

2. Using a rounded scraper, remove carbon deposits from a combustion chamber. Take care to avoid damaging the spark plug threads. Do not use a sharp instrument. Avoid scratching the aluminum.

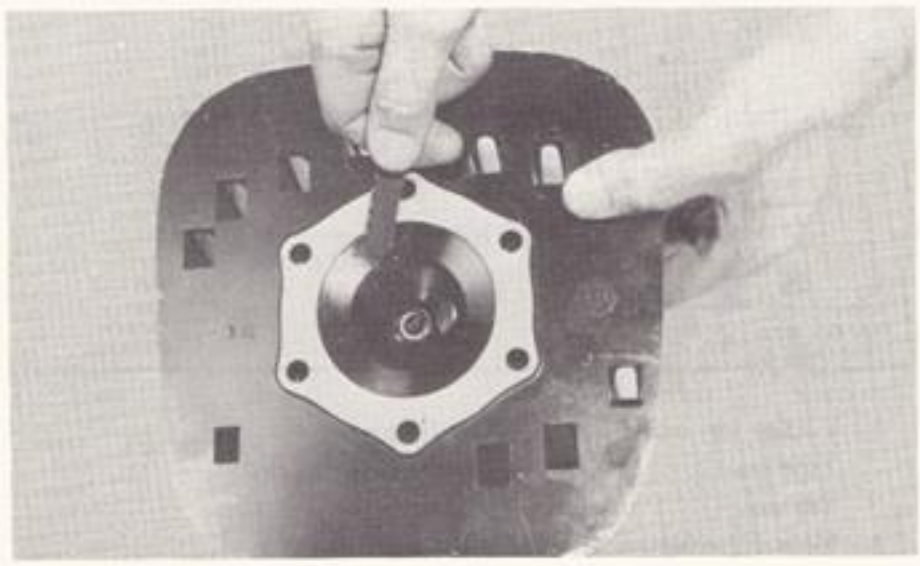


Fig. 3-34

3. Place head on a surface plate. There should be no warpage. Correct by re-surfacing. (Place 400-600 grit wet sandpaper on surface plate and re-surface head using a figure-eight sanding pattern. Rotate head several times to avoid removing too much material from one side).

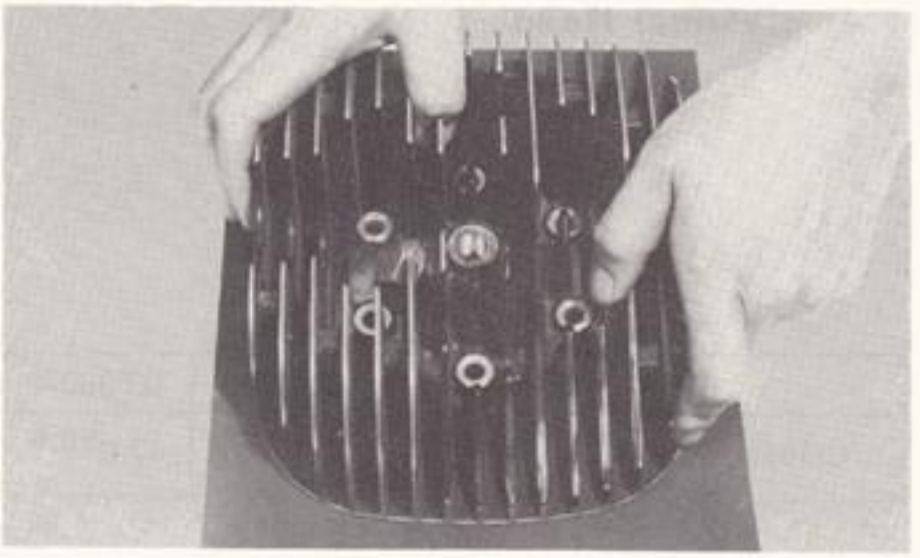


Fig. 3-35

4. Clean spark plug gasket mating surface thoroughly.
5. Wash head in solvent and wipe dry.

6. Install new cylinder head gasket during reassembly.

Cylinder head nut torque:
182 - 217in.-lbs (2.1 - 2.5kg-m)

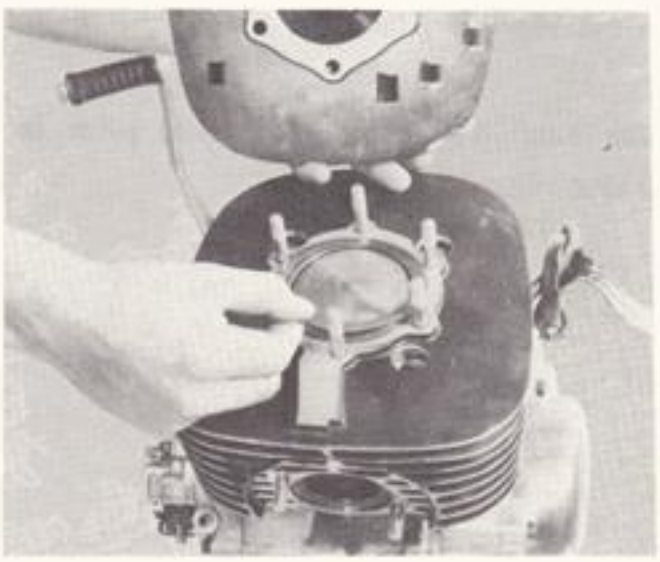
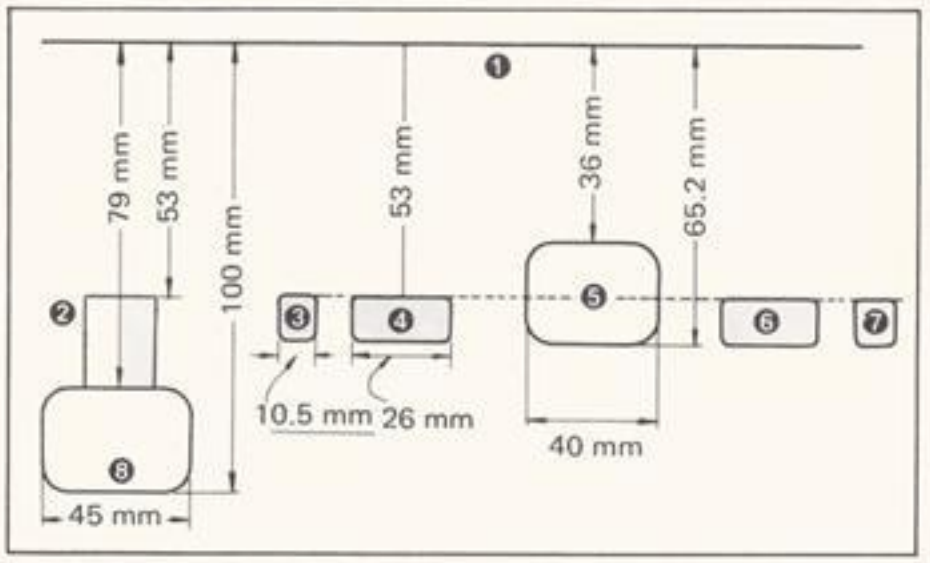


Fig. 3-36

3-5. Cylinder

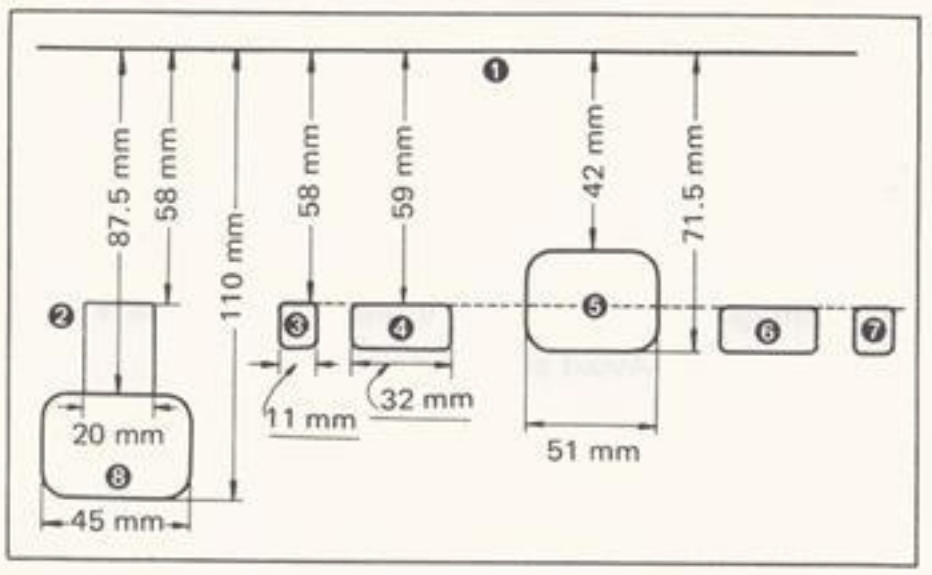
DT250A Cylinder Port Dimensions
(Fill in drawing below)



1. Top of cylinder
2. 7the port
3. 5th port
4. Main transfer port
5. Outlet port
6. Main transfer port
7. 5th port
8. Inlet port

Fig. 3-37

DT360A Cylinder Port Dimensions
(Fill in drawing below)



1. Top of cylinder
2. 7th port
3. 5th port
4. Main transfer port
5. Outlet port
6. Main transfer port
7. 5the port
8. Inlet port

Fig. 3-38

A. Removing Cylinder

1. Remove banjo bolt securing oil pump delivery line to cylinder.

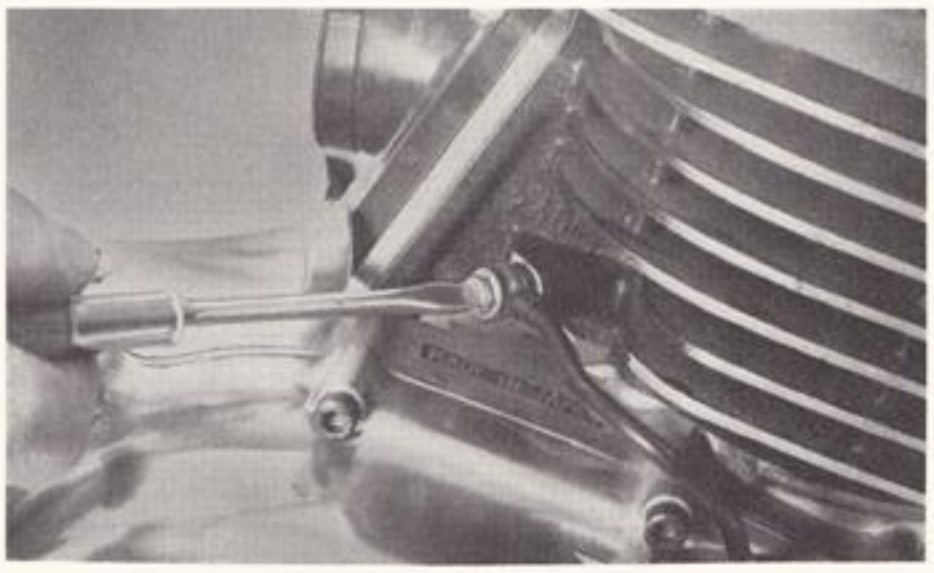


Fig. 3-39

2. Remove cap bolts securing cylinder to crankcase. (DT250 - 4, DT360 - 6).

Note:

Break each bolt loose (1/4 turn) prior to removing any one bolt.

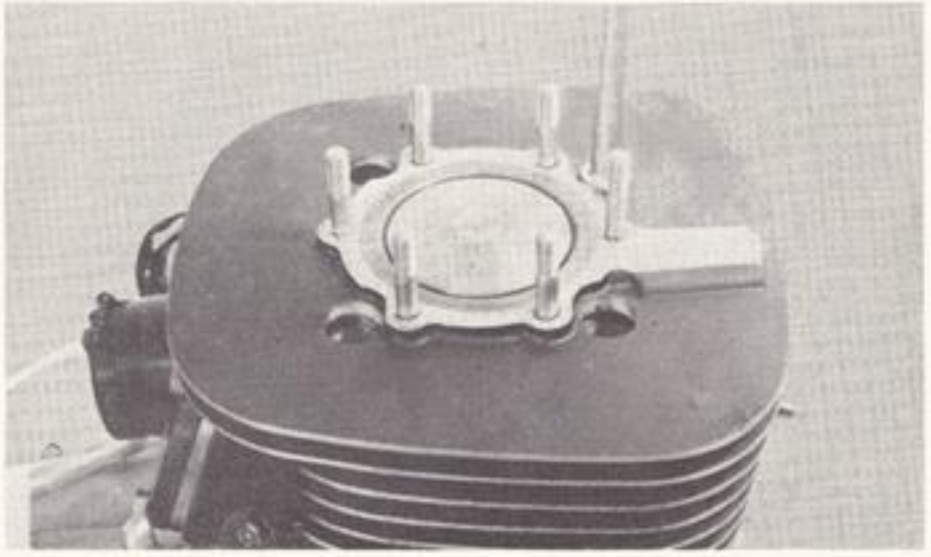


Fig. 3-40

3. If necessary, loosen the cylinder by striking it lightly with a rubber or rawhide hammer.

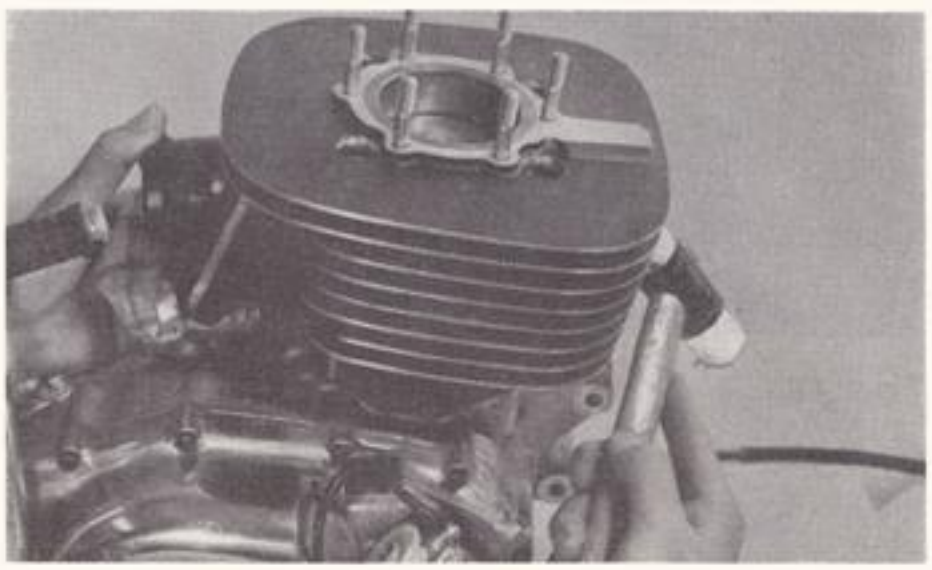


Fig. 3-41

4. With piston at Top Dead Center, raise cylinder until cylinder skirts clear crankcase. Stuff a clean shop rag into crankcase cavity, around rod, to prevent dirt and other foreign particles from entering. Remove cylinder.

Fig. 3-42

B. Maintenance - Cylinder

1. Remove reed valve assembly.

Fig. 3-43

2. Using a rounded scraper, remove carbon deposits from exhaust port.

Fig. 3-44

3. Remove cylinder base gasket and clean gasket seat on cylinder and crankcase thoroughly.

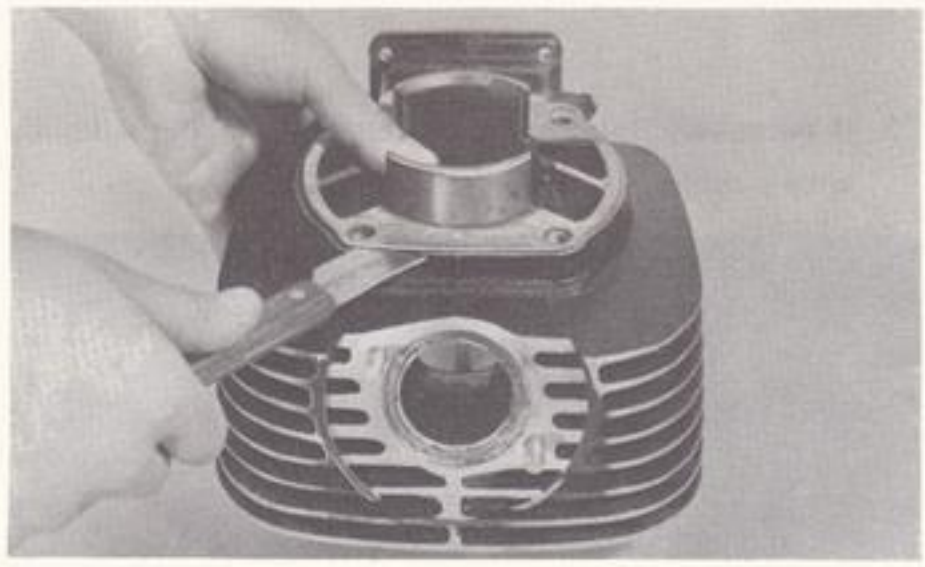


Fig. 3-45

4. Check cylinder bore. Using a cylinder hone, using smooth stones. Hone no more than required to avoid excess piston clearance.
5. Using a cylinder gauge set to standard bore size, measure the cylinder. Measure at eight points; at top, center, and 1/2" from bottom of skirts, in line with the wrist pin and at right angle to pin. Compare minimum and maximum measurements. If over tolerance, and not correctable by honing, rebore to next over-size.

Max. allowable taper:	0.002in.(0.05mm)
Max. allowable out-of-round:	0.0004in. (0.01mm)

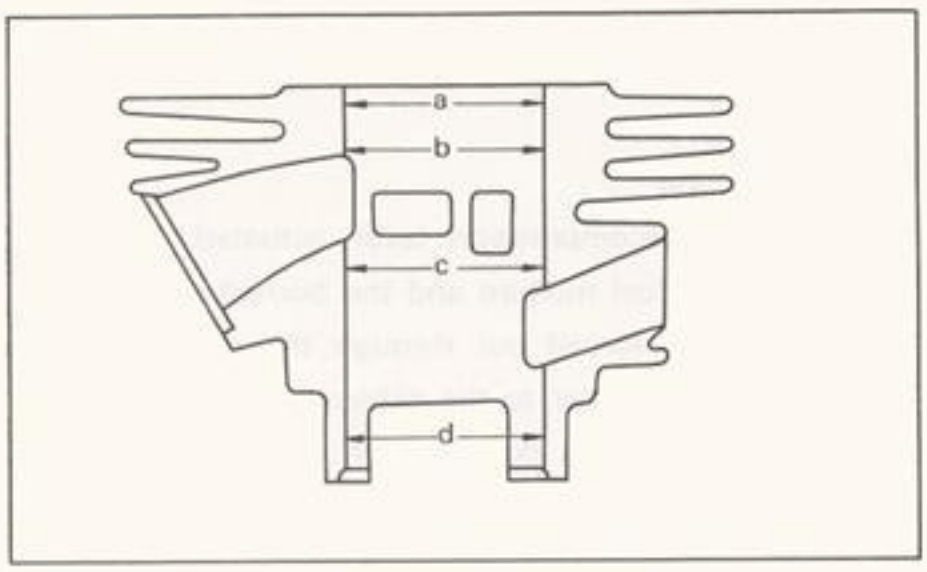


Fig. 3-46

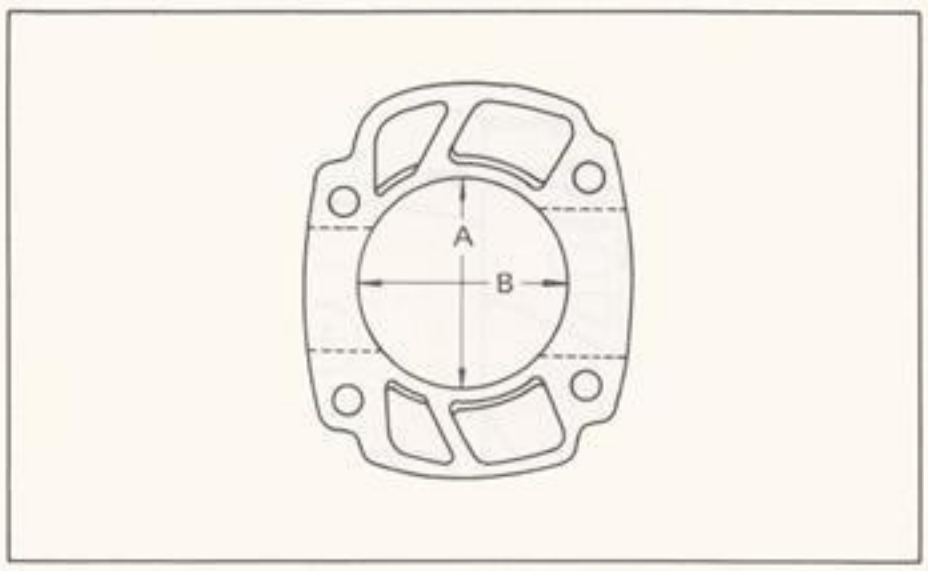


Fig. 3-47

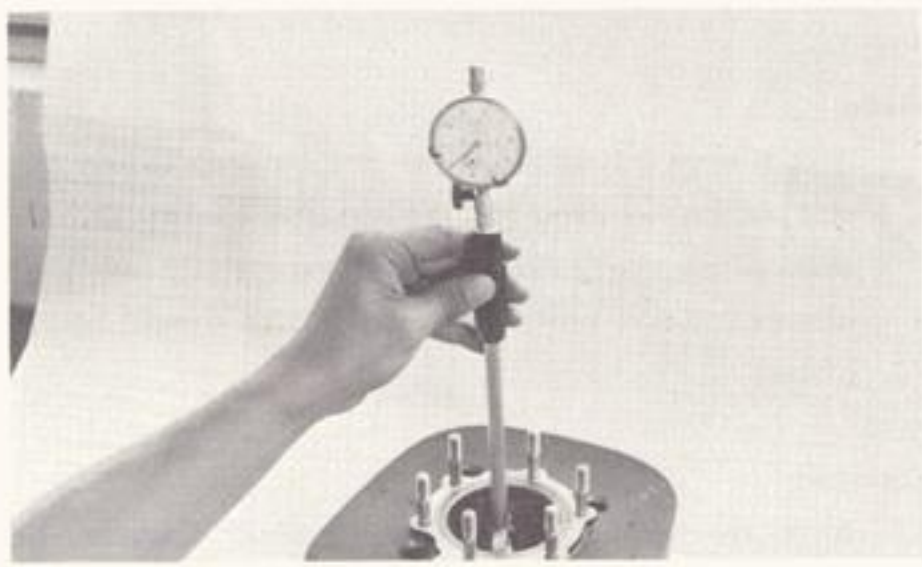


Fig. 3-48

6. Wash cylinder thoroughly with soap and water. Dry. Coat walls with light oil film immediately.

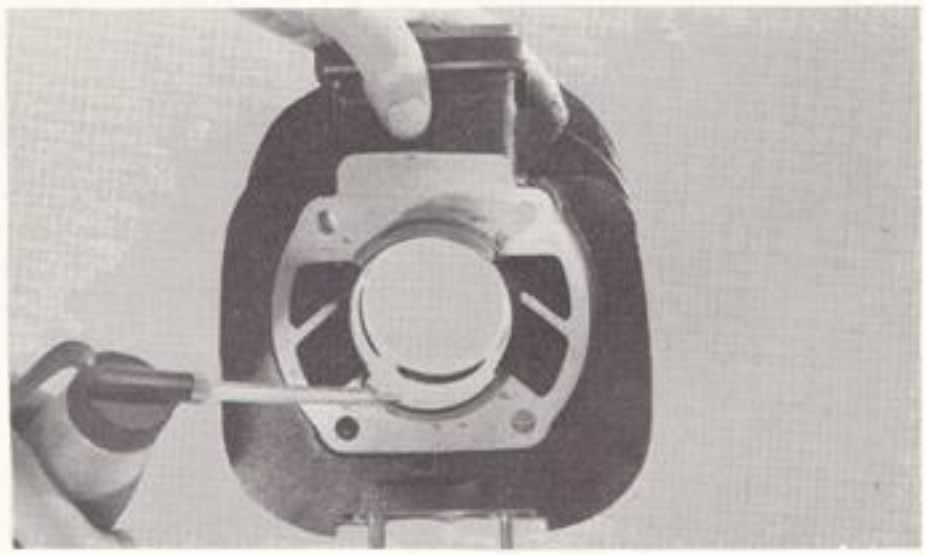


Fig. 3-49

7. During re-assembly, always use a new cylinder base gasket and torque cylinder bolts to specification.

Cylinder bolt torque:
365 - 391in.-lbs. (4.2 - 4.5kg-m)

C. Decompression Device (DT360A)

A decompression device is adopted for the 360cc engine. It is so designed to engine automatically when the kick lever is engaged.

1. Construction

   With the decompression lever actuated, 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. This effectively reduces compression pressure and eases the starting procedure.

2. Carbon Removal

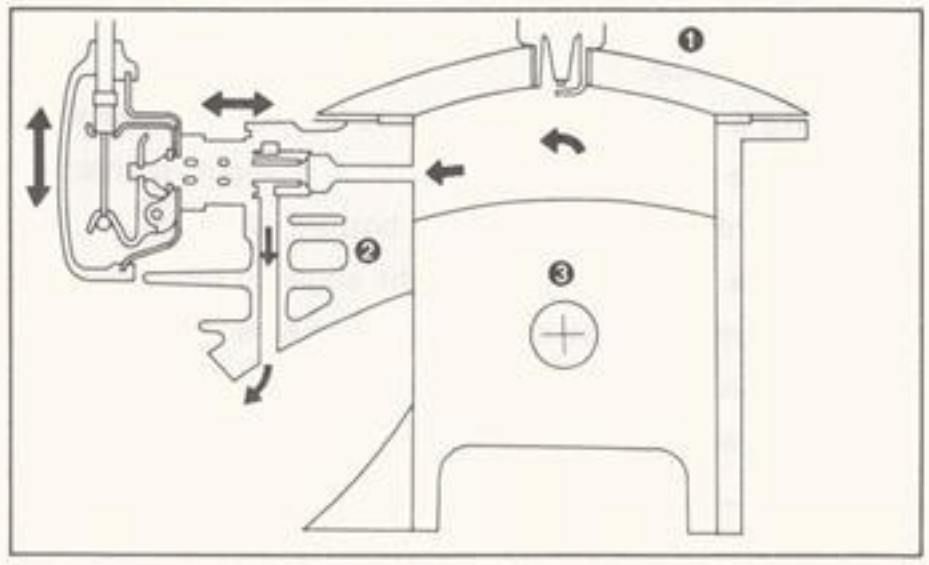
   Remove the decompression holder (screw-in type), and remove any deposits from the decompression valve, decompression holder, and passages.

Note:

It is always advisable, when the decompression device is reassembled, to replace the gasket and O-ring. When the valve 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.



1. Cylinder head
2. Cylinder
3. Piston

Fig. 3-50

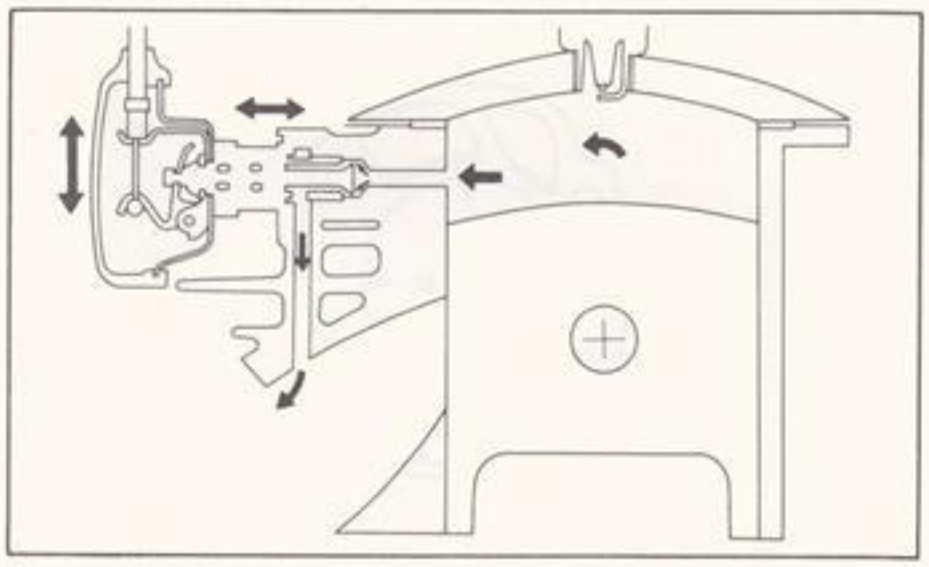


Fig. 3-51

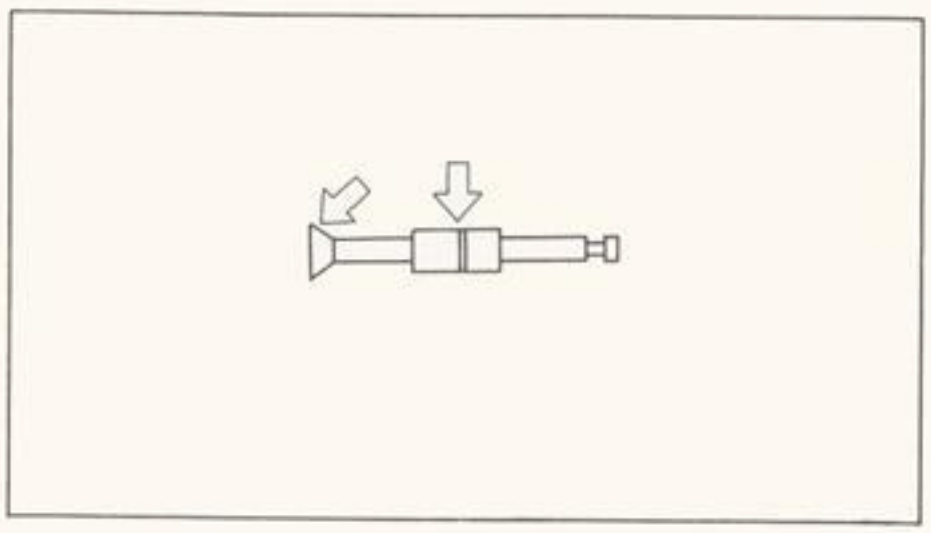


Fig. 3-52

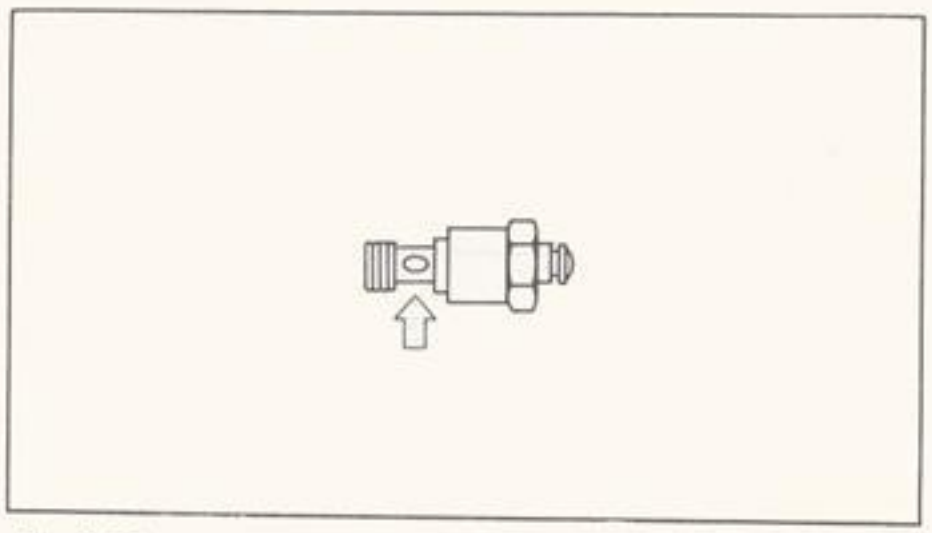


Fig. 3-53

D. Maintenance - Muffler/Spark Arrester

1. Using a rounded scraper, remove excess carbon deposits form manifold area of muffler. Check muffler gasket condition. The gasket seat is located around the cylinder exhaust port.

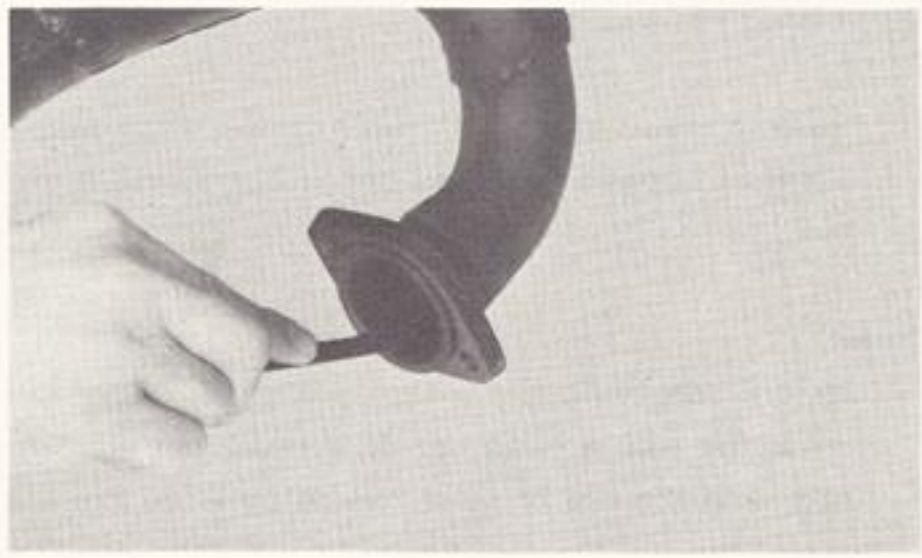


Fig. 3-54

2. Carbon deposits within the muffler may be removed by lightly tapping the outer shell with a hammer and then blowing cut with compressed air. Heavy wire, such as a coat hanger, may be inserted to break loose deposits. Use care.

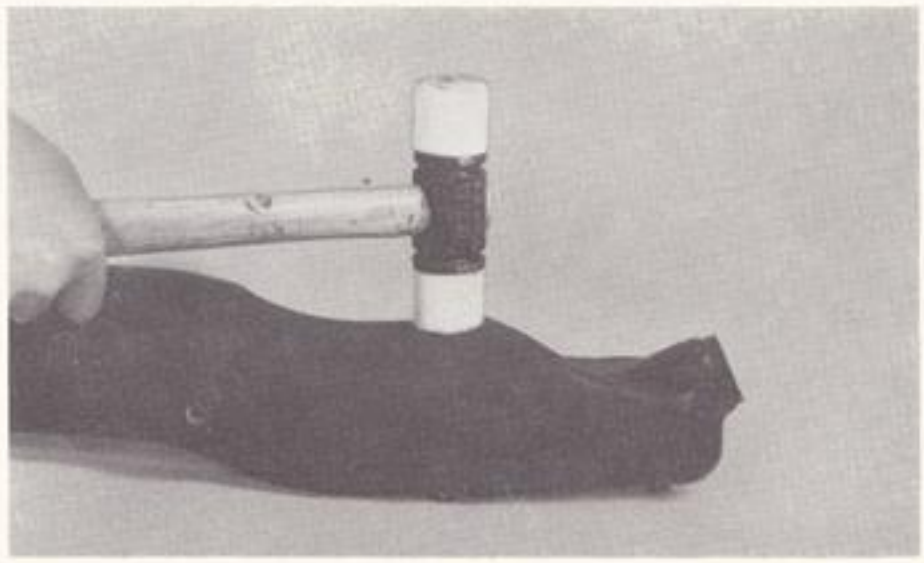


Fig. 3-55

3. Remove spark arrester. Remove Phillips screw holding baffle in place. Clean carbon out of baffle and arrester assembly with scraper. Re-install.

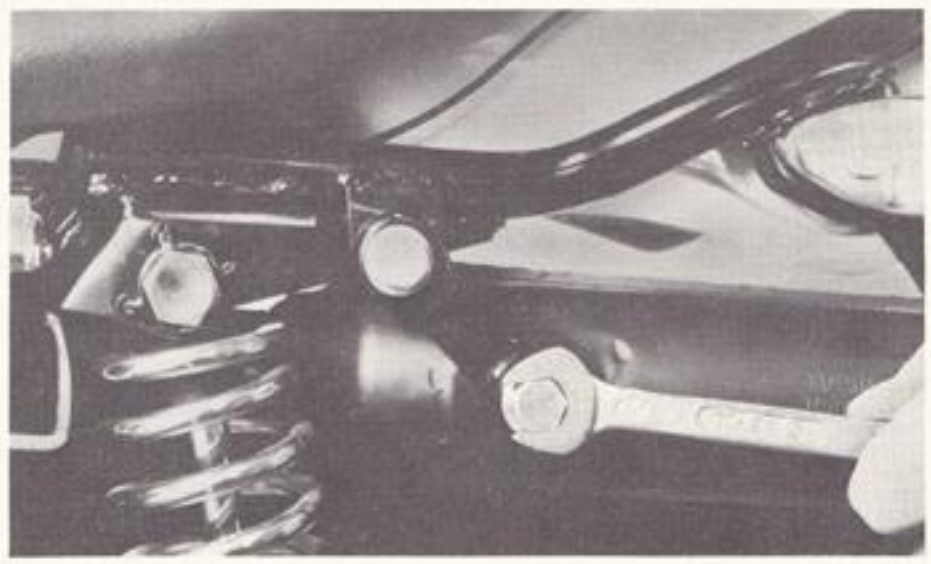


Fig. 3-56

3-6. Piston Pin

A. Piston Pin Removal

Remove piston pin clip (1) from piston. Push piston pin from opposite side and pull it out. Remove piston.

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.

Fig. 3-57

Fig. 3-58

B. Maintenance - Piston Pin and Bearing

1. Check the pin for signs of wear. If any wear is evident, replace pin and bearing.

2. Check the pin and bearing for signs of heat discoloration. If excessive (heavily blued), replace both.

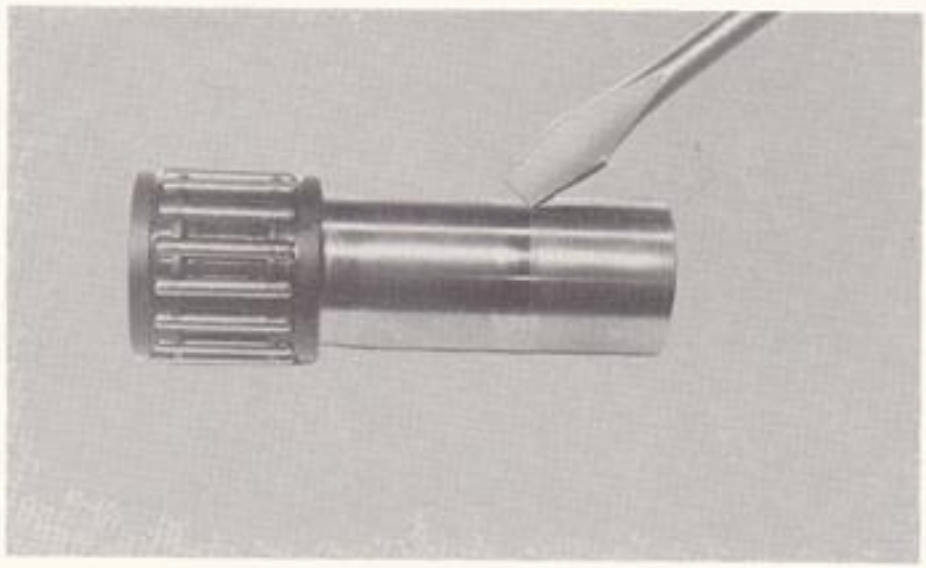


Fig. 3-59

3. Check the bearing cage for excessive wear. Check the rollers for signs of flat spots. If found, replace pin and bearing.

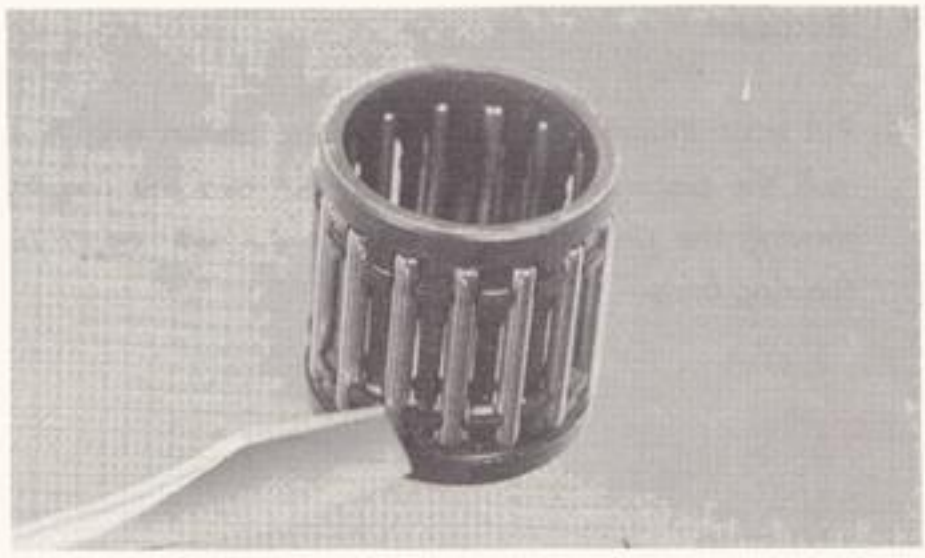


Fig. 3-60

4. Apply a light film of oil to pin and bearing surfaces. Install in connecting rod small end. Check for play. There should be no noticeable vertical play. If play exists, check connecting rod small end diameter and wear. Replace pin and bearing or all as required.

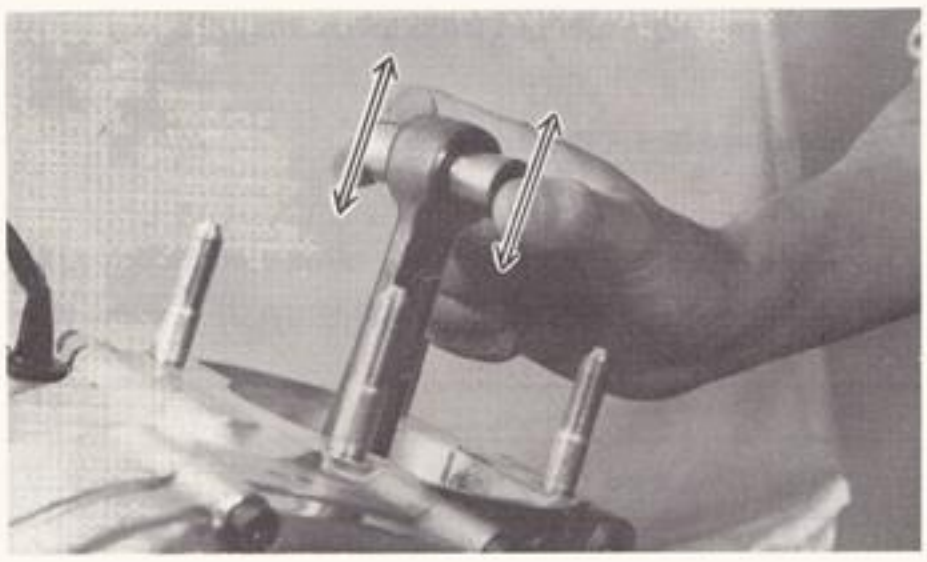


Fig. 3-61

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

Fig. 3-62

3-7. Piston Rings

L Type Keystone Ring

The L Type Keystone Ring is installed in the top ring groove as illustrated. The ring provides increased output through better combusion pressure sealing. The taper of 7° on the lower part of the ring aids in increased sealing and prevents sticking.

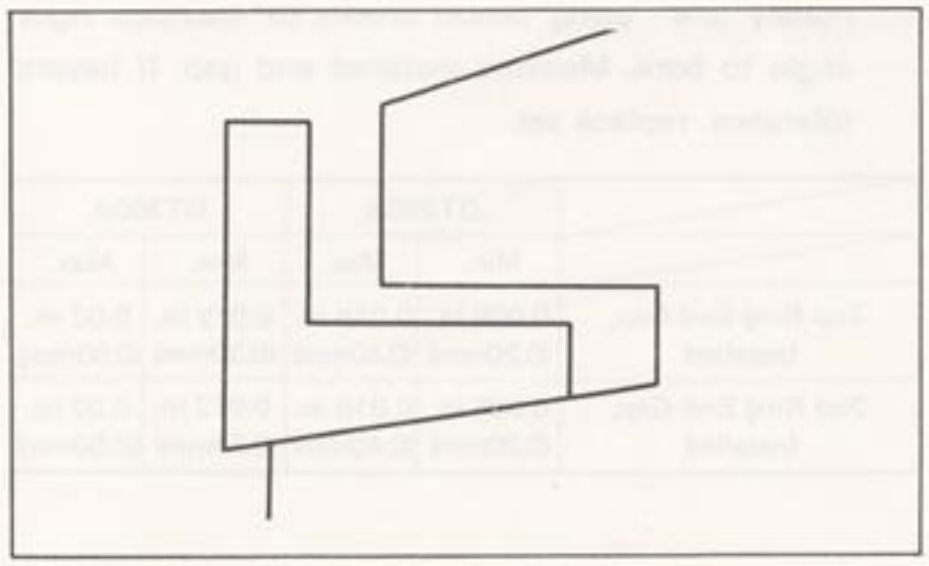


Fig. 3-63

A. Removal

1. Put your thumb at each end of the piston ring and pull the piston ring ends apart. Remove the ring by moving the ring off the piston at the side opposite the ring ends.

Fig. 3-64

2. Remove ring expander from lower ring groove.

B. Maintenance - Piston Rings

1. Check rings for scoring. If any severe scratches are noticed, replace set.
2. Measure ring end gap in free position. If beyond tolerance, replace set.

	DT250A	DT360A
Top Ring End Gap, Free	Approx. 0.22 in. (5.5 mm)	Approx. 0.20 in. (5.0 mm)
2nd Ring End Gap, Free	Approx. 0.22 in. (5.5 mm)	Approx. 0.20 in. (5.0 mm)

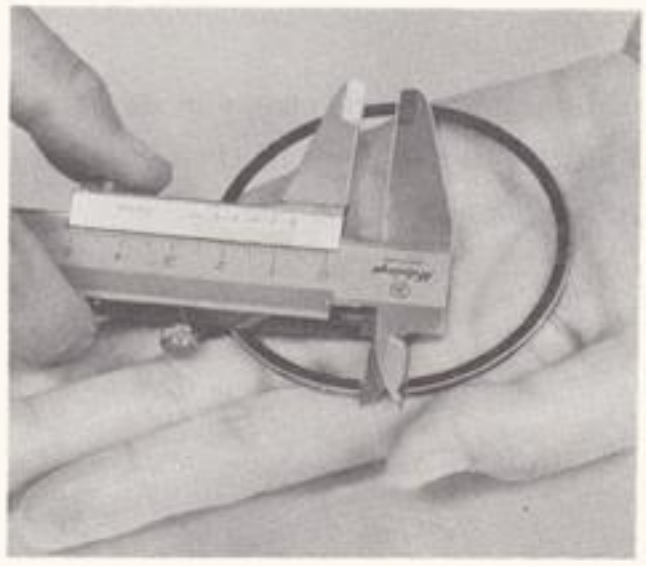


Fig. 3-65

3. Insert each ring into cylinder. Push down approximately 3/4" using piston crown to maintain right-angle to bore. Measure installed end gap. If beyond tolerance, replace set.

	DT250A		DT360A	
	Min.	Max.	Min.	Max.
Top Ring End Gap, Installed	0.008 in. (0.20mm)	0.016 in. (0.40mm)	0.012 in. (0.30mm)	0.02 in. (0.50mm)
2nd Ring End Gap, Installed	0.008 in. (0.20mm)	0.016 in. (0.40mm)	0.012 in. (0.30mm)	0.02 in. (0.50mm)

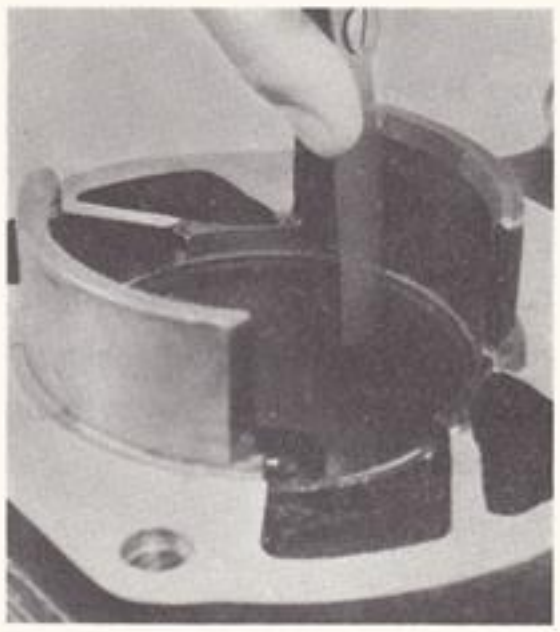


Fig. 3-66

4. Holding cylinder towards light, check for full seated, check cylinder. If cylinder not out-of-round, replace ring.

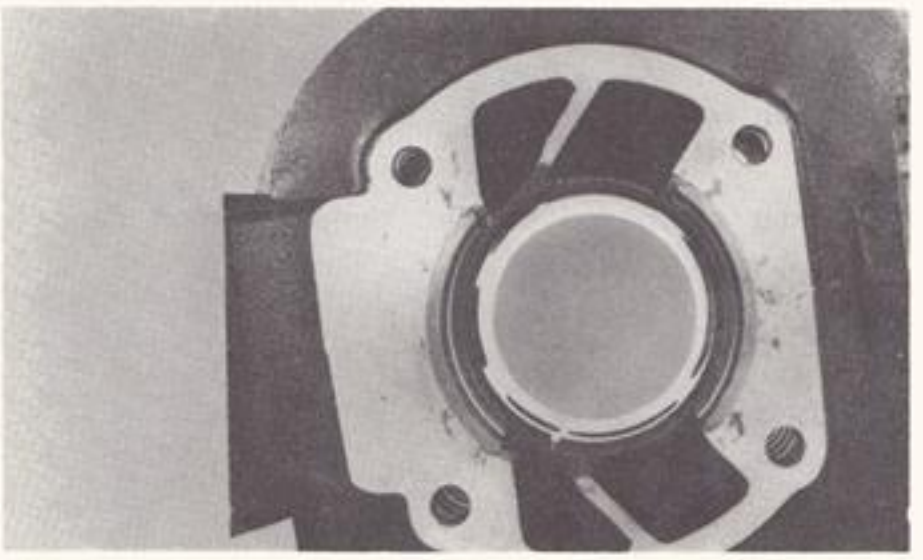


Fig. 3-67

5. Check ring expander. If worn excessively, or broken, replace set.

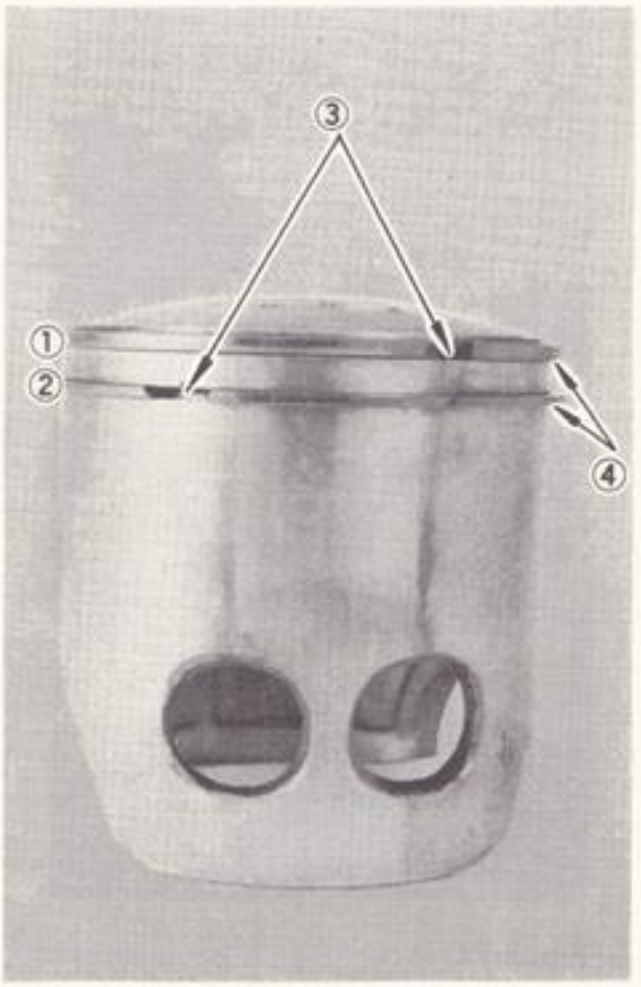
6. With rings installed in grooves, insert feeler gauge between ring side and groove. If beyond tolerance, replace ring and/or piston as required.

	DT250A		DT360A	
	Min.	Max.	Min.	Max.
2nd Ring Groove, Clearance	0.0012 in. (0.03mm)	0.0032 in. (0.08mm)	0.0012 in. (0.03mm)	0.0032 in. (0.08mm)

Fig. 3-68

C. Installing the Piston Ring

1. During installation, make sure ring ends are properly positioned on either side of locating pin in ring groove. Make sure ring expander is positioned in like manner. Apply liberal coating of two-stroke oil to rings.



1. First
2. Second
3. Knock pin
4. Piston ring

Fig. 3-69

2. New rings require break-in. Follow new machine break-in procedure.

3-8. Piston

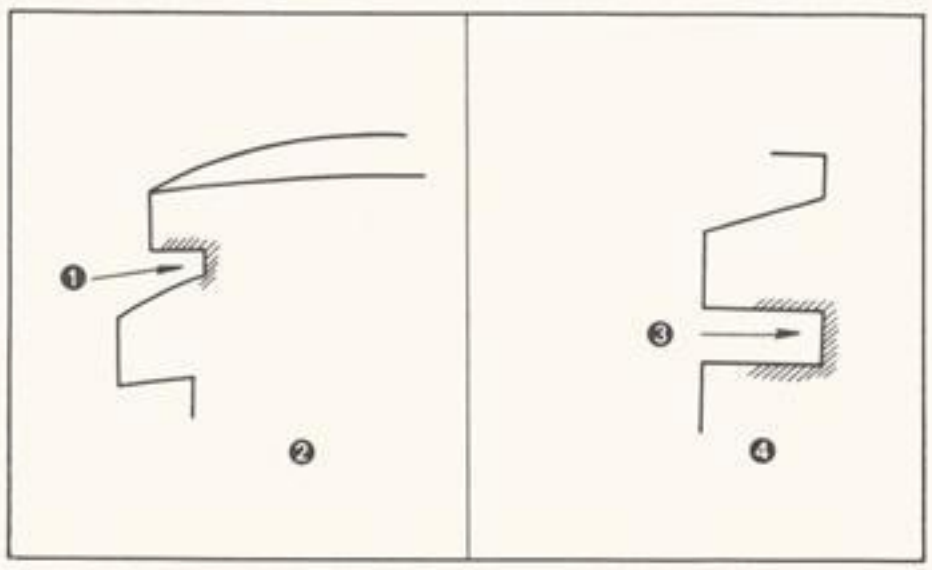
A. Maintenance - Piston

1. Using a rounded scraper, remove carbon deposits from piston crown.

Fig. 3-70

2. Break a used piston ring in two. File end square. Deburr edges to avoid scratching ring groove and clean carbon deposits from ring grooves.

Fig. 3-71



1. Carbon
2. Top ring
3. Carbon
4. Second ring

Fig. 3-72

3. Using 400-600 grit wet sandpaper, lightly sand score marks and lacquer deposits from sides of piston. Sand in cross-hatch pattern. Do not sand excessively.

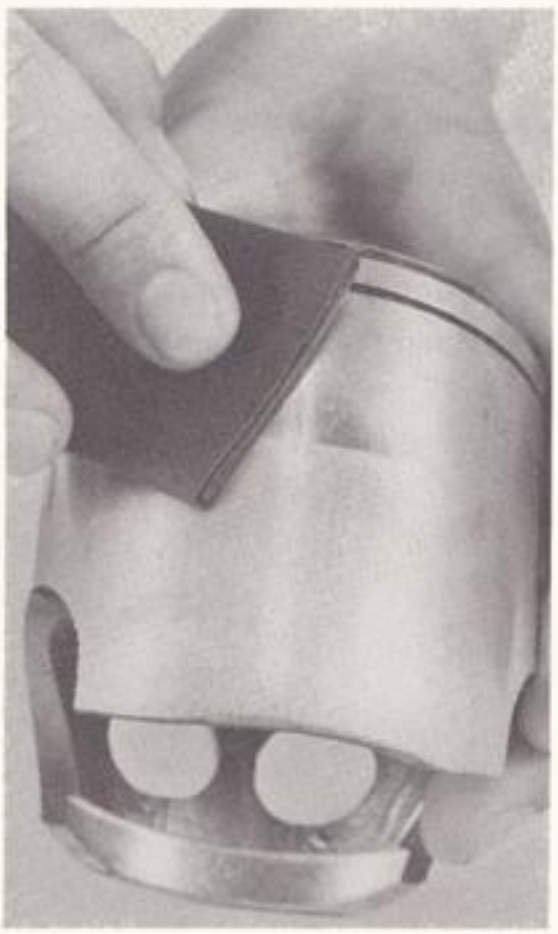


Fig. 3-73

4. Wash piston on solvent and wipe dry.

5. Using an outside micrometer, measure piston diameter. The piston is cam-ground and tapered. The only measring point is at right-angles to the piston pin holes about 1/2" from bottom of piston. Compare piston diameter to cylinder bore measurements.
   Piston maximum diameter subtracted from minimum cylinder diameter gives piston clearance. If beyond tolerance, hone cylinder to tolerance or re-bore to next over-size and fit new piston.

Fig. 3-74

DT250A	Min.	Max.
Piston Clearance	0.0016 in. (0.040 mm)	0.0018 in. (0.045 mm)
Maximum Wear Limit	0.004 in. (0.1 mm)	

DT360A	Min.	Max.
Piston Clearance	0.0016 in. (0.040 mm)	0.0018 in. (0.045 mm)
Maximum Wear Limit	0.004 in. (0.1 mm)	

B. Installation - Piston

1. During re-assembly, coat the piston skirt areas liberally with two-stroke oil.

2. Install new piston pin clip and make sure they are fully seated within their grooves.

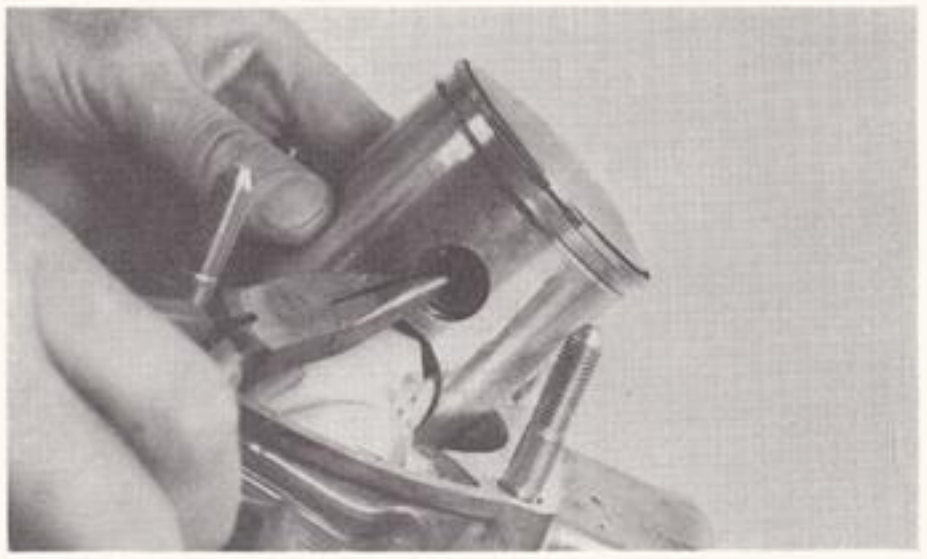


Fig. 3-75

3. Take care during installation to avoid damaging the piston skirts against the crankcase as the cylinder is installed. Note the two induction holes in the piston skirt. These must be to the rear during installation.

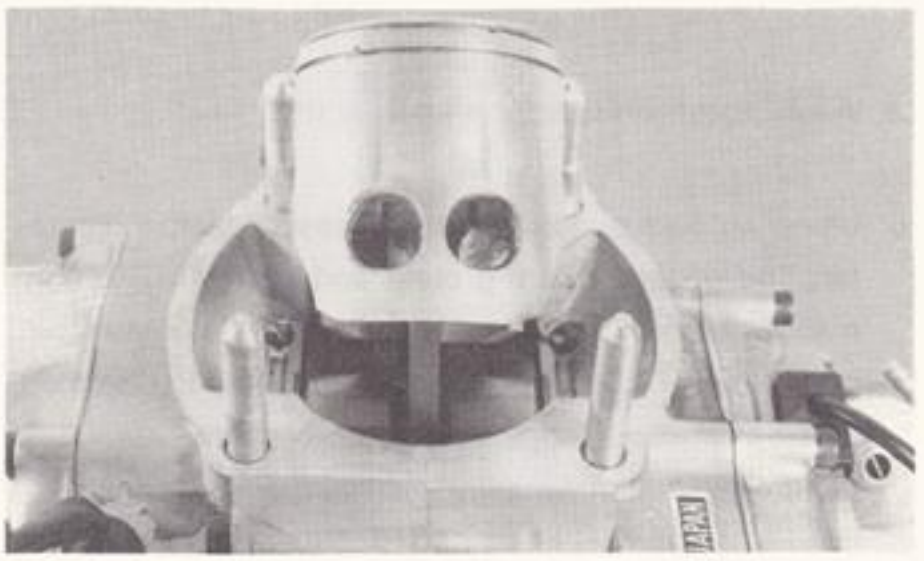


Fig. 3-76

4. Make sure the rings are properly positioned as the cylinder is installed.

3-9. Magneto Ignition

A. Flywheel Removal

Notes:

For timing procedure, see chapter 2, "Engine Tuning, Ignition Timing." For theory of operation and troubleshooting, see "Electrical" chapters.

1. Remove left crankcase cover.

2. Remove the flywheel securing nut with the magneto holder, and then remove. Lock washer and bevelled washer. Note installation order and direction.

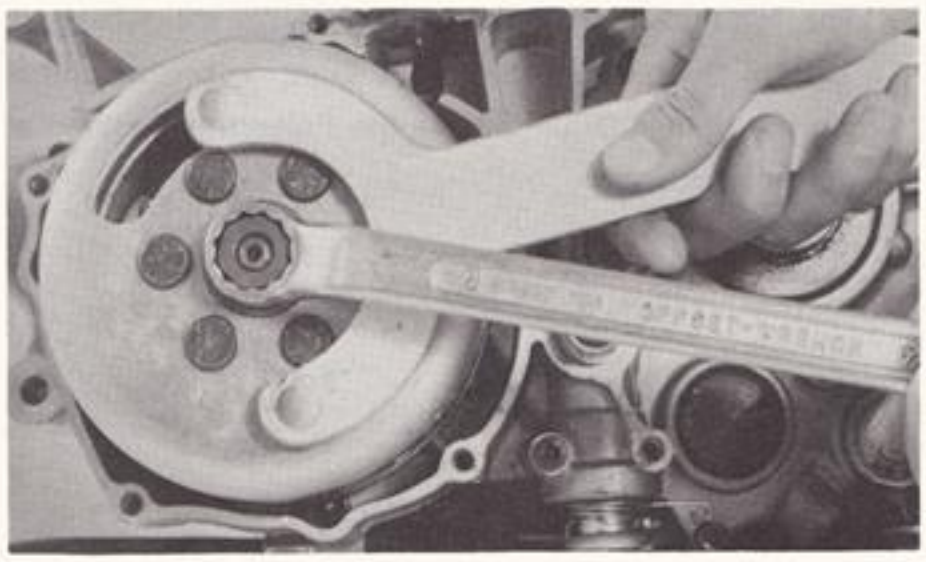


Fig. 3-77

3. Install the flywheel puller.

Note:

The puller body has a left-hand thread.

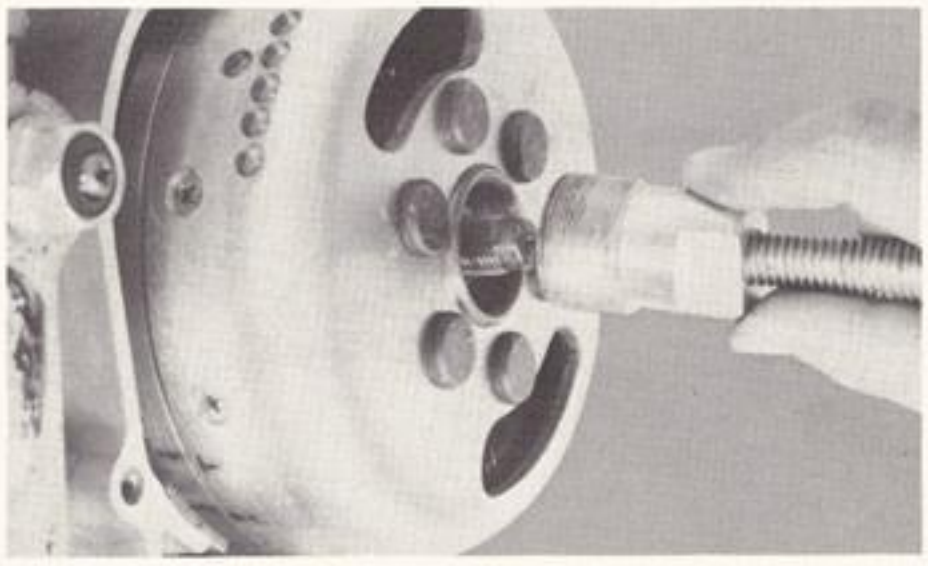


Fig. 3-78

4. Tighten the puller body thoroughly into the flywheel. While holding the body, tighten the push bolt. This will pull the flywheel off the tapered end of the crankshaft.

Note:

If the flywheel is frozen on the taper, keep pressure on the push bolt while tapping on the end of the bolt with light steel hammer.

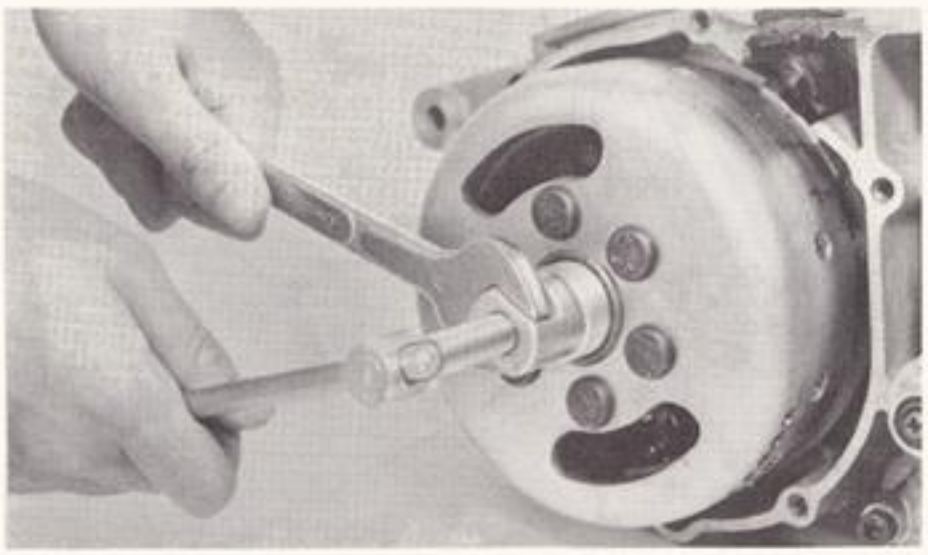


Fig. 3-79

5. With the flywheel removed,the magneto backing plate is exposed, allowing for replacement of any assembly therein.

6. The Ignition source coil is located on the left-hand side of the backing plate. The Lighting source coil is on the right. CDI units have the Pulser coil located at the bottom.

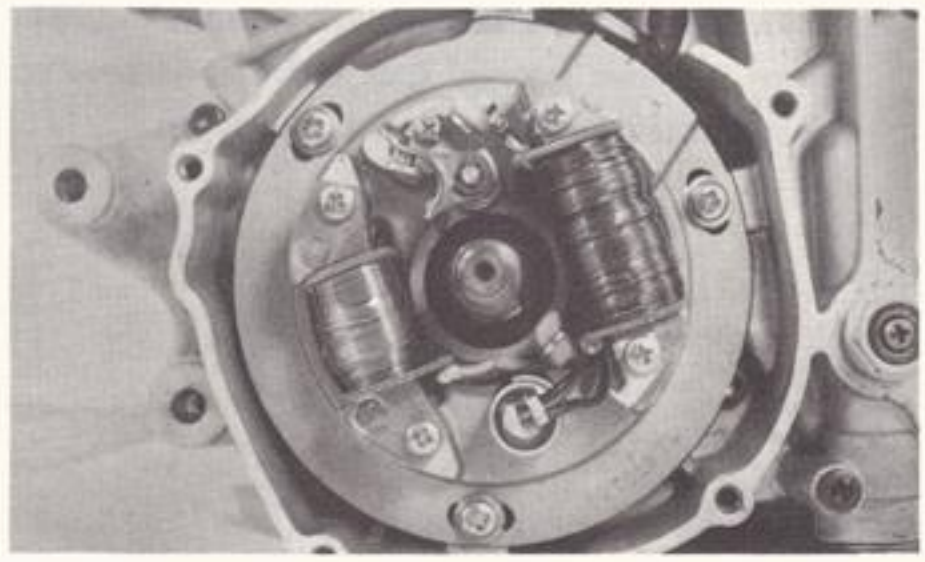


Fig. 3-80

Flywheel Magneto (DT250A)

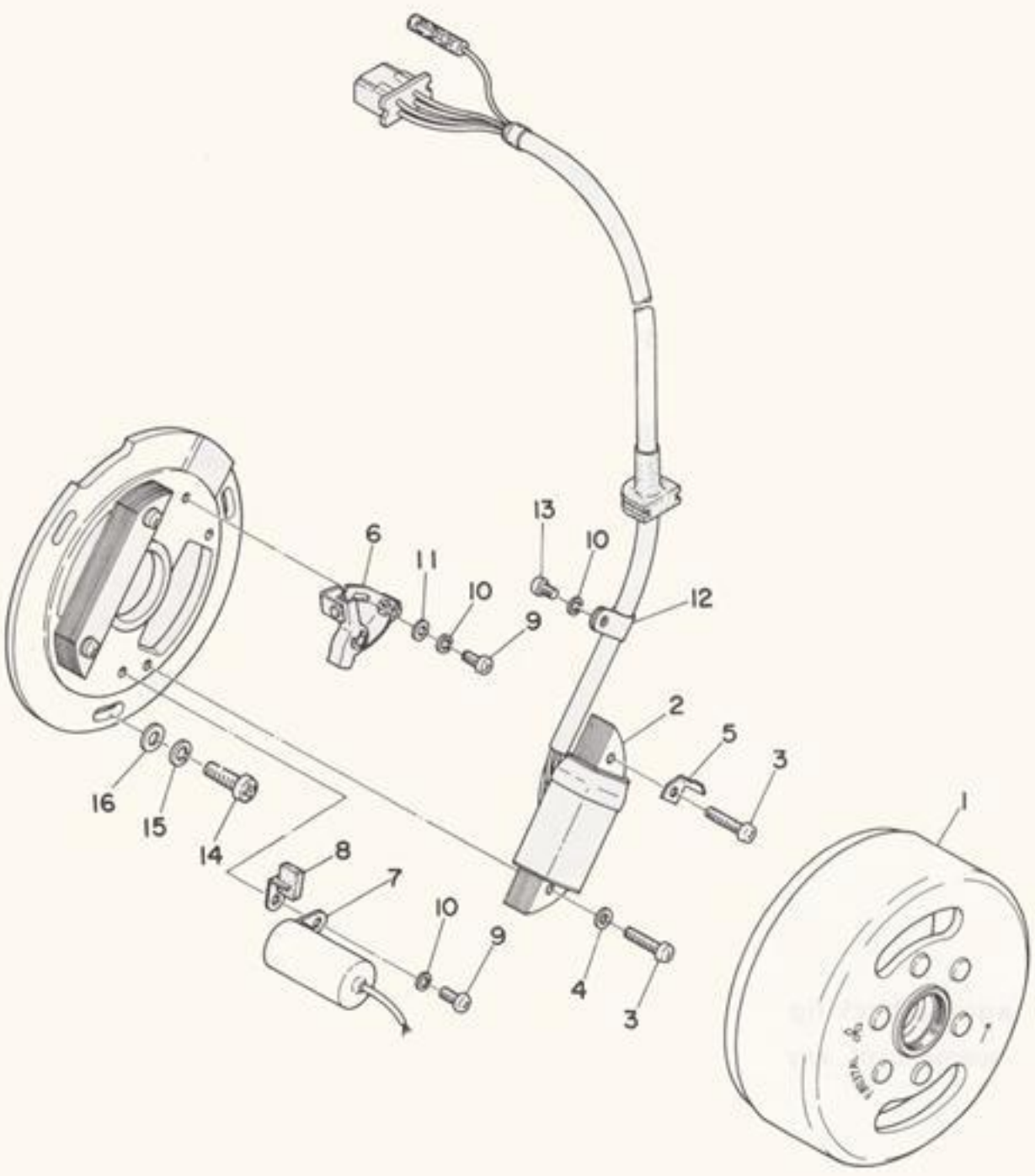
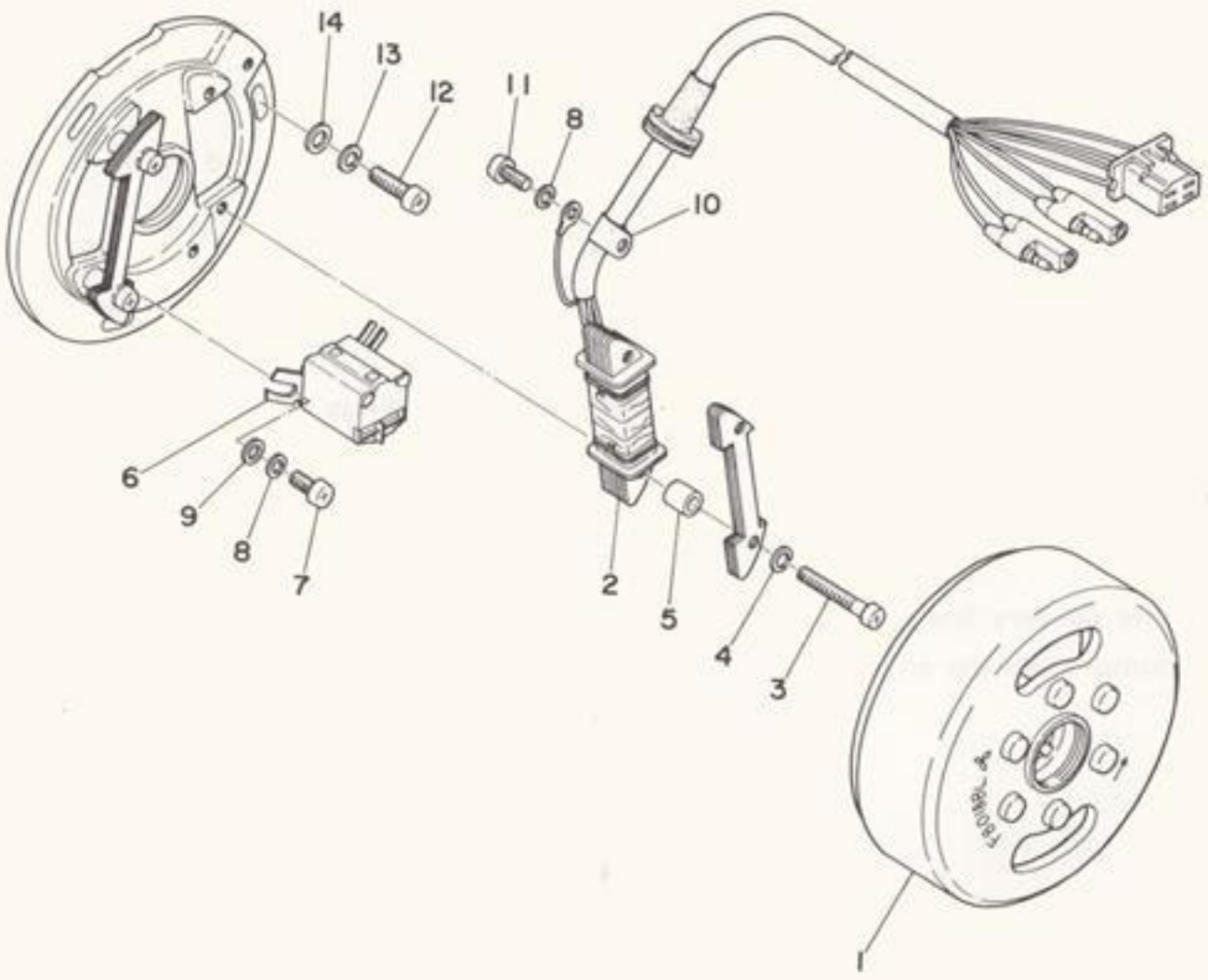


Fig. 3-81

1. Flywheel ass'y
2. Source coil
3. Pan head screw
4. Plain washer
5. Timing plate
6. Contact breaker ass'y
7. Condenser
8. Lubricator
9. Pan head screw
10. Spring washer
11. Plain washer
12. Lead clamp
13. Pan head screw
14. Pan head screw
15. Spring washer
16. Plain washer

C.D.I. Magneto (DT360A)



1. Flywheel
2. Charge coil
3. Pan head screw
4. Spring washer
5. Spacer
6. Pulser coil
7. Pan head screw
8. Spring washer
9. Plain washer
10. Lead clamp
11. Screw
12. Pan head screw
13. Spring washer
14. Plain washer

Fig. 3-82

B. Maintenance

1. Apply a few drops of light-weight machine oil or distributor lubricant to the point cam lubricating wick. (DT250A)
2. The ignition points can be lightly filed with an ignition point file or sanded with 400-600 grit sandpaper. Place a piece of clean paper between the points, let them close, and repeatedly remove the paper until no residue shows. The paper may be dipped in lacquer thinner or point cleaning fluid to provide a solvent to remove oil and sanding residue from point surfaces. (DT250A)
3. Point replacement should only occur when point gap exceeds maximum tolerance; when the points are severely pitted; or if the points become shorted or show faulty operation.

Note:

New points, when installed, should be per paragraph number two.

4. When replacing curtain components, soldering is required.
   Use a low wattage gun. Do not allow wiring to overheat as lacquer insulation on coil windings may by destroyed. The use of a heat sink is recommended.
5. When installing flywheel, make sure woodruff key is properly seated in keyway in crankshaft. Apply a light coating of lithium soap base grease to tapered portion of crankshaft end. Carefully install flywheel taking care to align for woodruff key. Install bevelled washer, lockwasher and lock nut. Tighten carefully to recommended torque value.

Flywheel securing nut torque:
608 - 651 in.-lbs (7.0 - 7.5 kg-m)

Note:

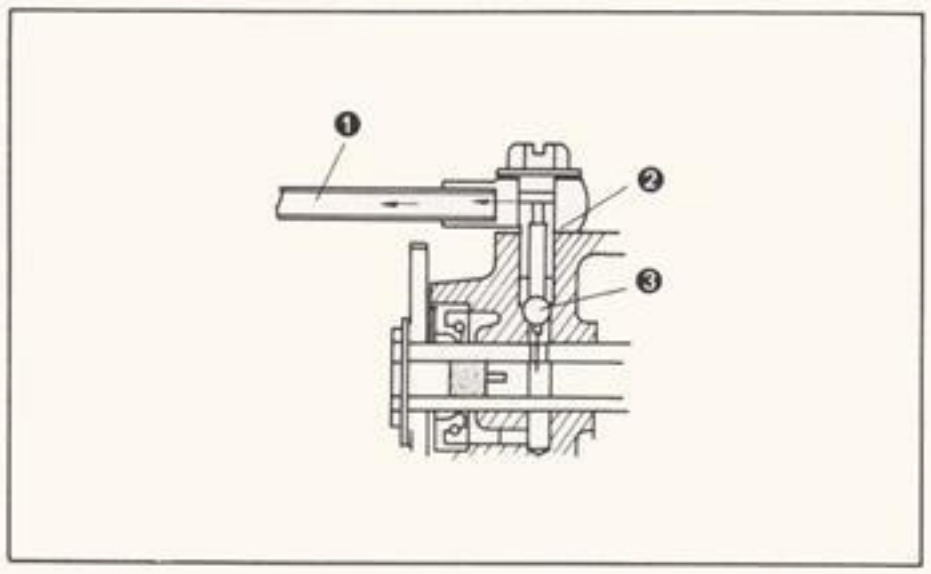
Whenever the flywheel is removed, ignition timing must be re-set.

3-10. Autolube

The adjustments and servicing of the Autolube pump are covered in Chapter 2, Section 2, Engine Tuning. The following information pertains to disassembly and troubleshooting of the pump assembly.

A. Description of Operation

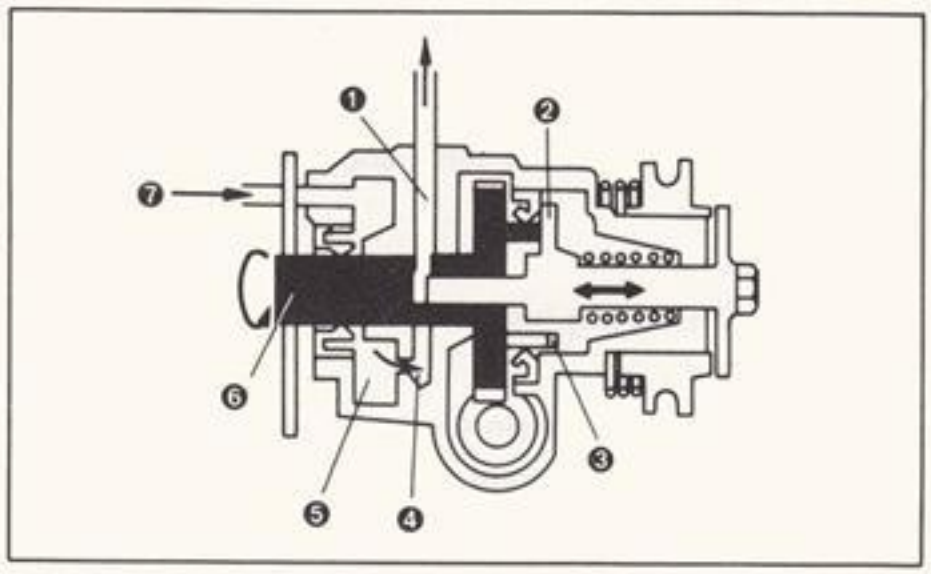
1. The pump is driven directly off the crankshaft through reduction gears. Its output is controlled by the throttle-grip setting and the engine rpm.
2. Oil flow to the pump from the Autolube reservoir tnak is via gravity feed. If Yamalube is used as a lubrication oil, normal ambient temperatures are of no concern as far as the possibility of oil viscosity limiting or impeding oil delivery to the pump.
3. Oil flow from the pump to the cylinder is via rubber tubing and banjo bolts and fittings. Oil is delivered directly into the cylinder intake port where it is atomized by the carburetor air stream prior to delivery to the bottom end and cylinder walls.
4. A spring-loaded check ball at the delivery line junction prevents backflow to the pump when the engine is not running.



1. Delivery pipe
2. Check-ball spring
3. Check-ball

Fig. 3-83

Pump Mechanism General Mechanical Features



1. Outlet
2. Guide pin
3. Cam
4. Inlet
5. Oil chamber
6. Distributor
7. Oil

Fig. 3-84

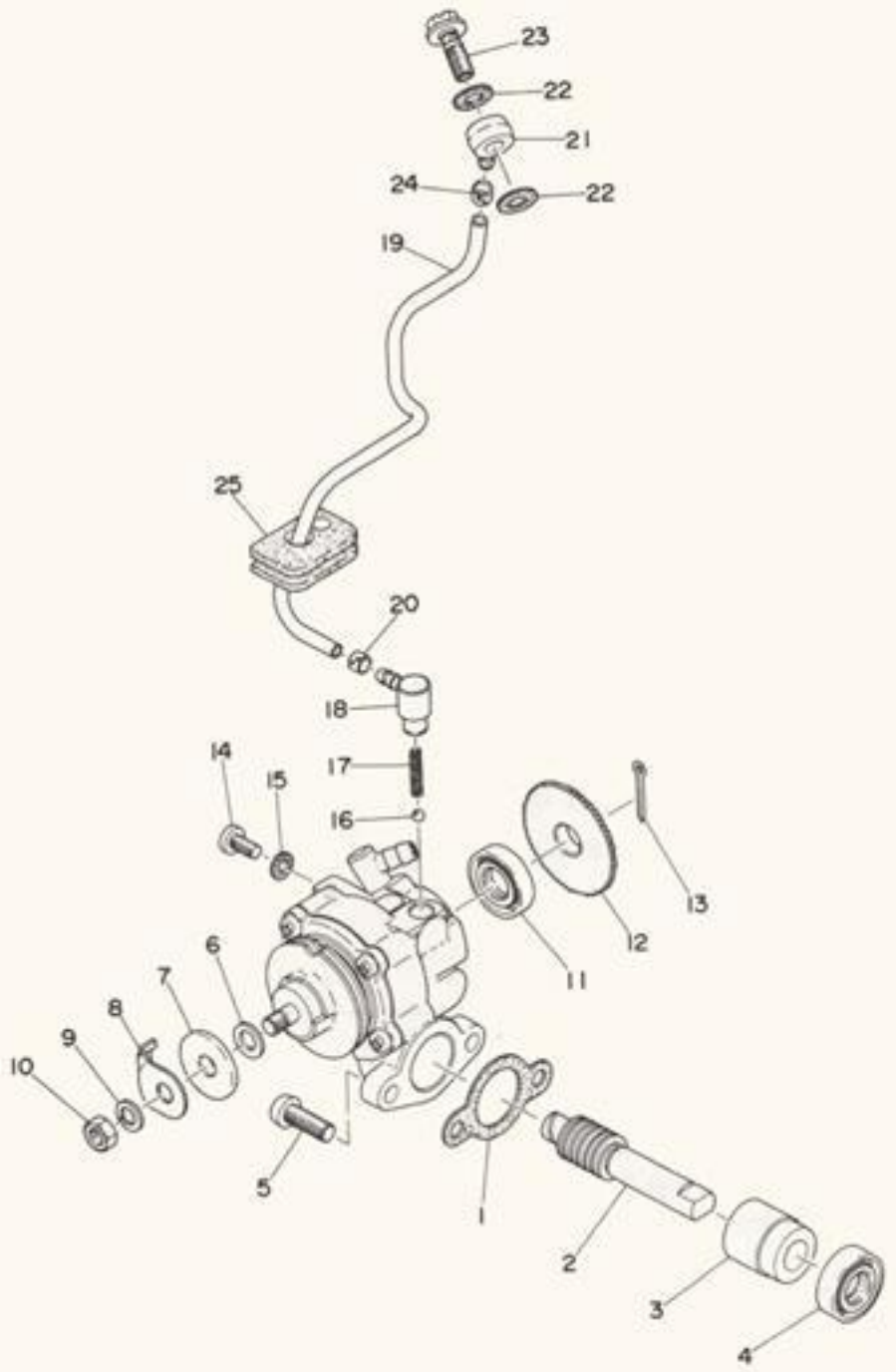
B. Removal and Disassembly

1. Remove pump cover.

2. Remove fitting on right-hand crankcase cover securing pump cable.

Fig. 3-85

Oil Pump



1. Pump case gasket
2. Worm shaft
3. Worm shaft outer metal
4. Oil seal (S-10-22-7)
5. Pan head screw
6. Plunger shim
7. Adjusting plate
8. Cover
9. Spring washer
10. Nut
11. Oil seal (S-10-21-5)
12. Starter plate
13. Cotter pin
14. Bind screw
15. Breather gasket
16. Ball (5/32 inch)
17. Check ball spring
18. Nozzle
19. Delivery pipe
20. Delivery pipe clip
21. Delivery pipe banjo
22. Banjo bolt gasket (6-13-0.5)
23. Banjo bolt
24. Delivery pipe clip
25. Oil pipe holder

Fig. 3-86

3. Remove cable end from pump pulley. Remove cable and fitting.

Note:

If side cover only is being removed, pump removal is not necessary. Proceed with steps 1, 3 and then reomve side cover.

4. Remove Phillips screws (2) securing pump to crankcase cover.
   Remove banjo fittings and delivery line. Remove pump.

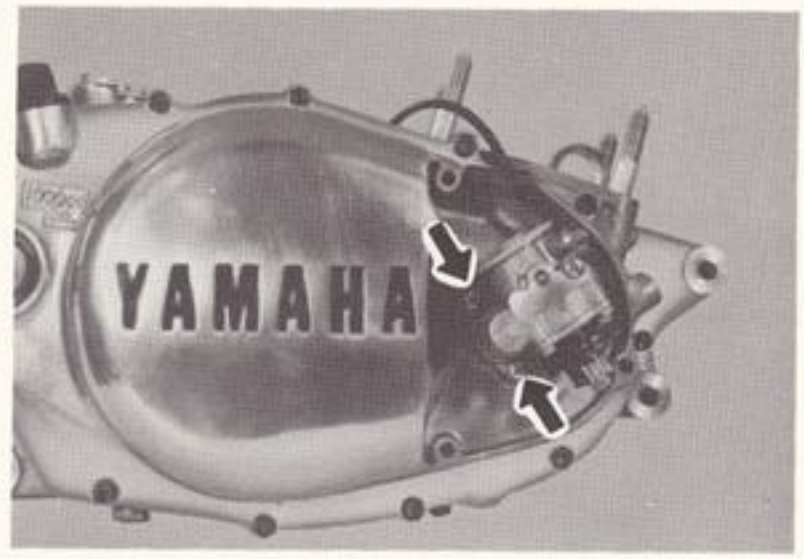


Fig. 3-87

5. The pump is a sealed unit. Its output has been checked at the factory, adjusted, and the pump assembled. Except for the components shown in the illustration, no further disassembly of the pump should be attempted.
6. Desassembly is straightforward and can be accomplished by reviewing the parts illustration.
   Reference numbers 2 - 10, worm shaft and drive gear components, require crankcase cover removal prior to disassembly.

C. Troubleshooting and Repair

1. Wear or an internal malfunction may cause pump output to vary from the factory setting.
   This situation is, however, extremely rare. If output is suspect, check the following:

a. Obstructions in delivery line to pump or from pump to cylinder.
b. Worn or damaged pump body seal or crankcase cover seal.
c. Missing improperly installed check ball or spring.
d. Improperly installed or routed oil delivery line(s).
e. Loose fitting(s) allowing air entry to pump and/or engine.

2. If all inspections show no obvious problems, and pump output is still suspect, connect a delivery line from the pump to a graduated container (cc). Keep the delivery line short. Rotate the pump bleed wheel while counting pump plunger strokes. If output is not to specification, replace pump assembly.

Autolube pump specifications

Pump Output @200 Strokes	Maximum Throttle		Minimum Throttle	
	Min.	Max.	Min.	Max.
DT250A	8.8cc	9.7cc	0.95cc	1.2cc
DT360A	8.8cc	9.7cc	0.95cc	1.2cc

Pump Stroke Length	Maximum Throttle		Minimum Throttle	
	Min.	Max.	Min.	Max.
DT250A	0.074 in. (1.85mm)	0.082 in. (2.05mm)	0.008 in. (0.20mm)	0.010 in. (0.25mm)
DT360A	0.074 in. (1.85mm)	0.082 in. (2.05mm)	0.008 in. (0.20mm)	0.010 in. (0.25mm)

Pump Gear Ratios	Primary Drive to Pump Drive Gear		Worm Shaft to Worm Wheel		Overall Reduction Ratio
	Teeth	Ratio	Teeth	Ratio	
DT250A		1	1/55	0.017	0.017
DT360A		1	1/32	0.031	0.031

	DT250A	DT360A
Pump Plunger Diameter	0.22 in. (5.5mm)	0.22 in. (5.5mm)

D. Reassembly and Installation

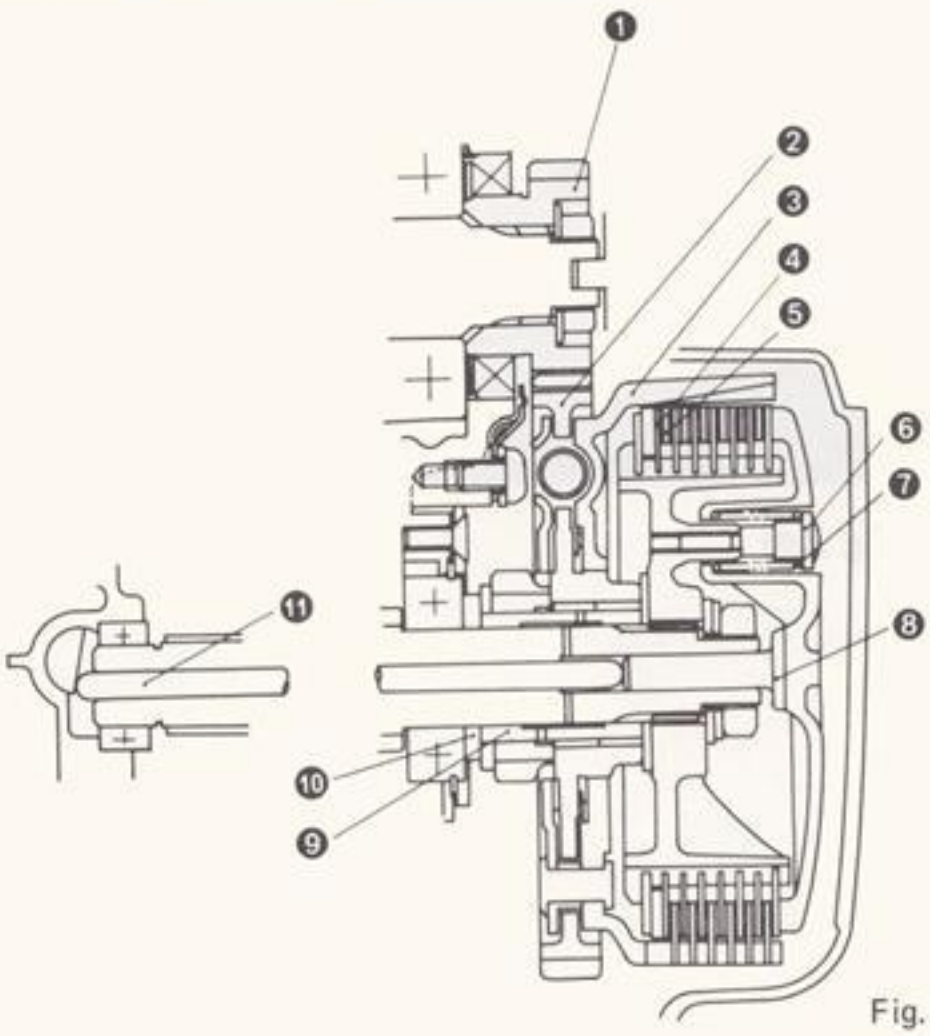
1. Always install a new pump case gasket.
2. During installation, make sure the worm shaft in the crankcase cover is properly meshed with the worm wheel in the pump body.
3. Whenever the pump cable is removed or the pump partially disassembled, the pump must be bled and the cable must be adjusted. See Chapter 2, paragraph E, Autolube Section.

3-11. Clutch

A. Description

The clutch is a wet, multi-disc type, consisting of molded cork friction plates (DT250A—7 pcs, DT360A—8 pcs) and eight 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 with the clutch disengaged (or engaged in neutral).

A shock absorber system consisting of coil springs is mounted between the primary driven gear and the clutch housing to absorb shock loads on the drive train.



1. Primary drive gear
2. Primary driven gear
3. Clutch housing
4. Clutch plate, 7 pcs.
5. Friction plate,
   DT250A . . . . . 7 pcs.
   DT360A . . . . . 8 pcs.
6. Spring screw
7. Clutch spring
8. Push rod 1
9. Spacer
10. Thrust plate
11. Push rod 2

Fig. 3-88

B. Removal and Disassembly

1. Cover Removal

a. Remove hexagon bolts securing right crankcase cover.

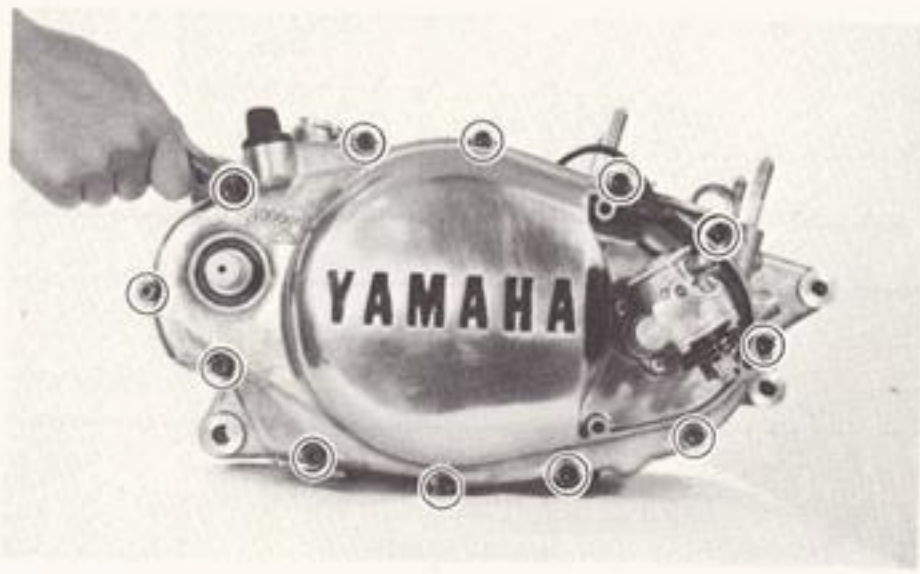


Fig. 3-89

b. Remove crankcase cover.
The crankcase cover can be removed with oul pump attached.

Note:
If cylinder in place, remove banjo bolt securing oil delivery line.

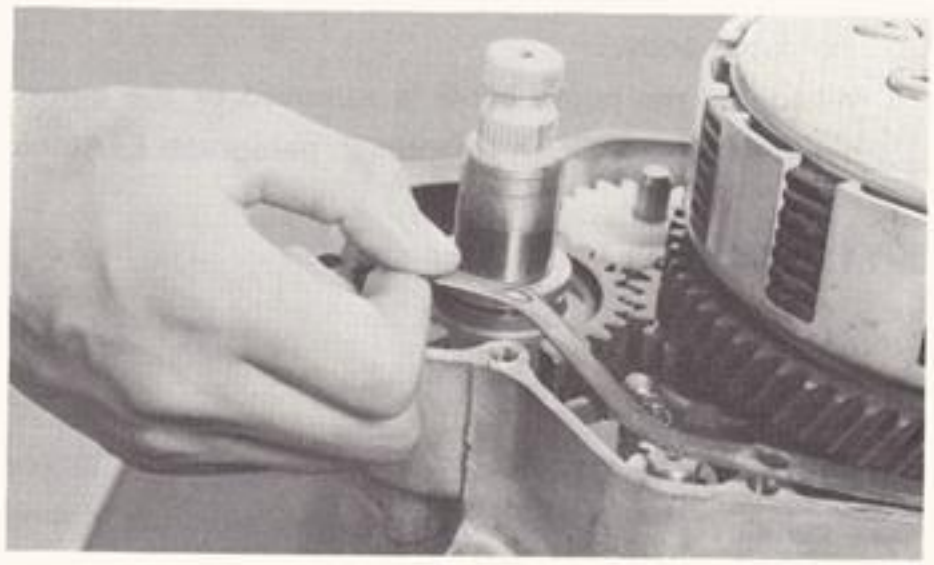


Fig. 3-90

c. Remove crankcase cover gasket. Replace during reassembly.

2. Cover Installation

a. Spread YAMAHA Bond No. 5 over the mating surface of the right-hand crankcase.

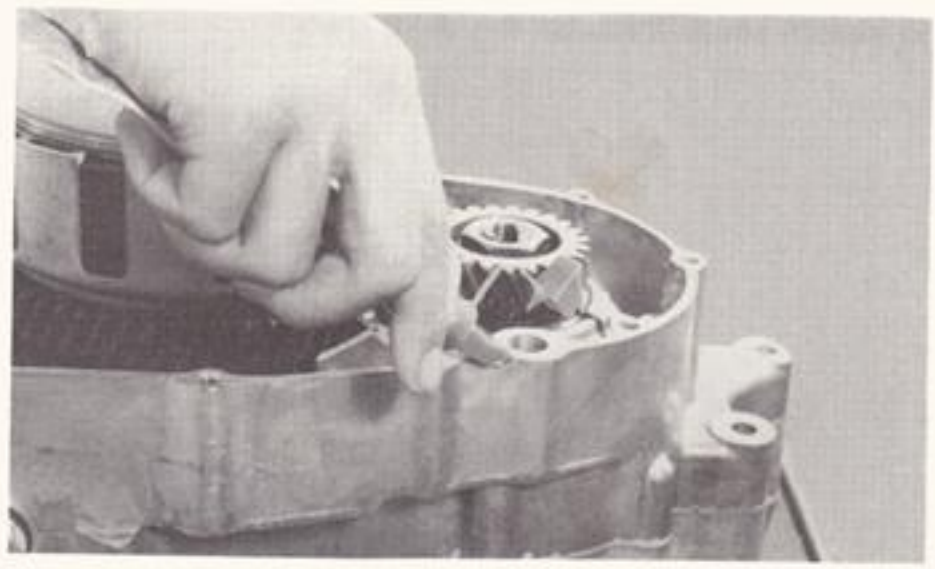
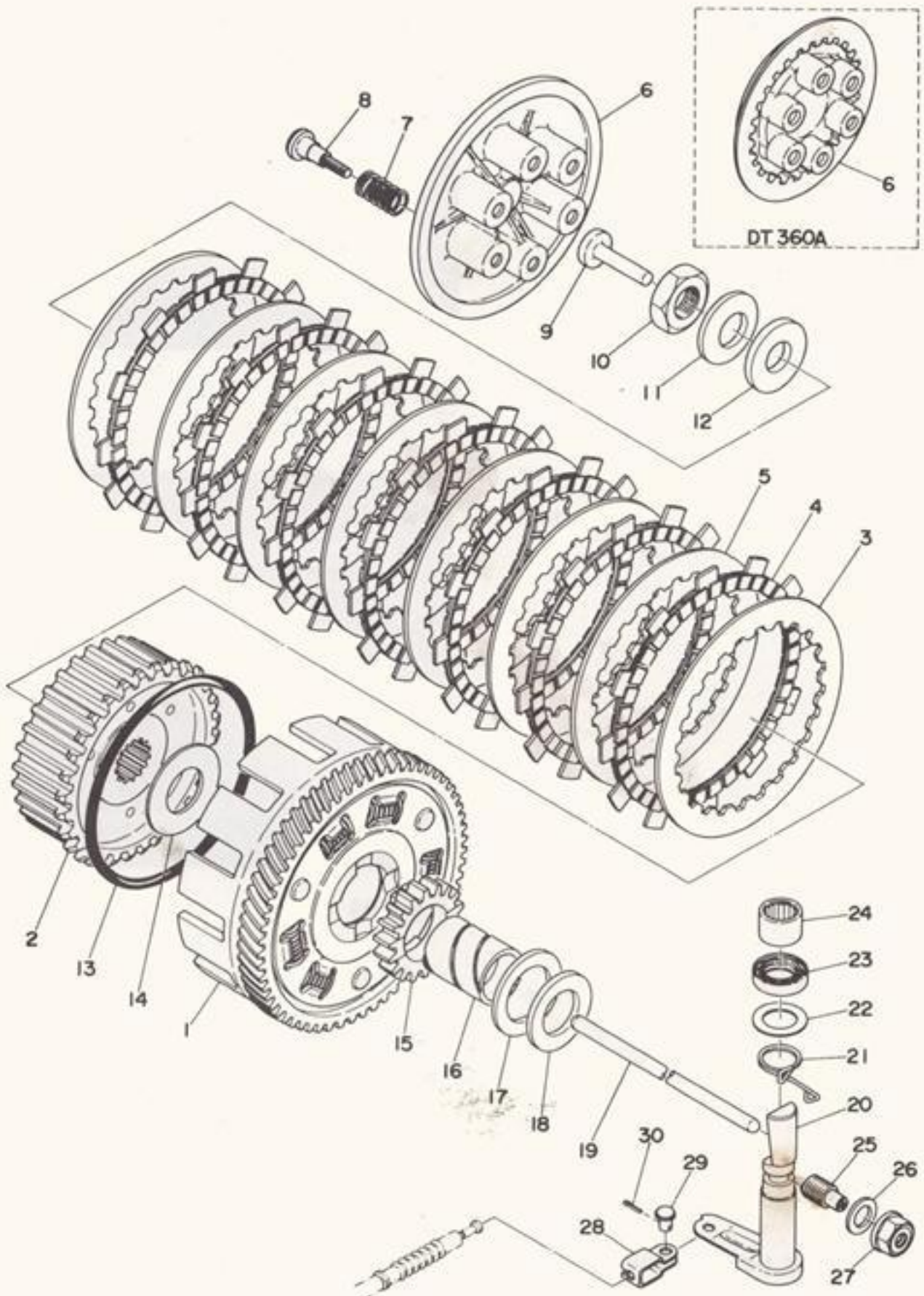


Fig. 3-91

b. Place the crankcase cover gasket on the crankcase.
c. Install the right-hand crankcase cover.

Note:
When installing the crankcase cover (R), make sure that the top of the oil pump worm shaft is correctly engaged with the groove of the top of the crankshaft.

Clutch



1. Primary driven gear comp.
2. Clutch boss
3. Clutch plate 1
4. Friction plate
5. Clutch plate
6. Pressure plate
7. Clutch spring
8. Spring screw
9. Push rod
10. Lock nut
11. Belleville spring (DT250A)
12. Spring washer (DT360A)
13. O-ring (5.7-109.6) (DT250A)
14. Thrust plate 2 (25-50-2)
15. Kick pinion gear
16. Spacer
17. Thrust plate 1 (33.1-47-3) (DT250A)
18. Thrust plate (25.1-42-4)
19. Push rod
20. Push lever axle
21. Return spring
22. Washer (17.5-28-0.6)
23. Oil seal (DS-17-28-6)
24. Bearing (15000)
25. Adjusting screw
26. Gasket
27. Adjusting nut
28. Joint
29. Pin
30. Cotter pin

Fig. 3-92

3. Remove clutch spring holding screws (6), pressure plate, and push rod.

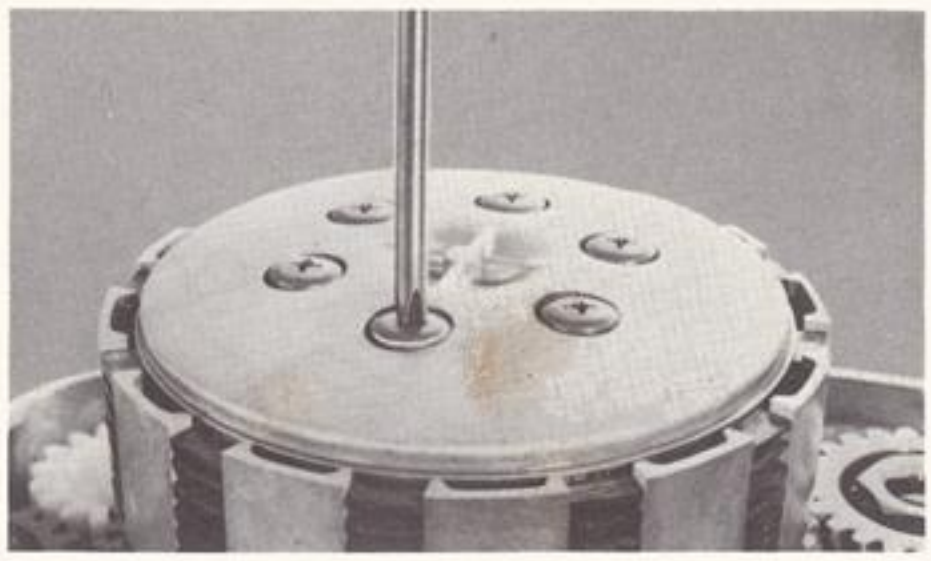


Fig. 3-93

4. Install clutch holding tool on clutch boss.
   Remove lock nut, washer, and clutch boss in that order.

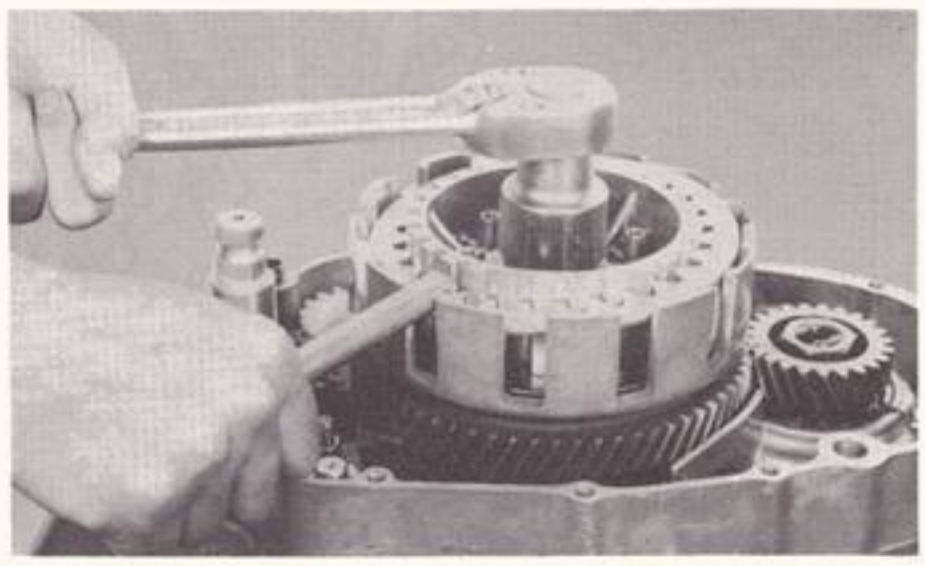
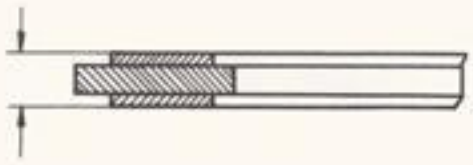


Fig. 3-94

5. If the clutch housing spacer remains on the transmission main shaft, remove it.
   Remove the thrust plate and thrust plate spacers.

C. Troubleshooting and Repair

1. Measure the friction plates at three or four points. If their minimum thickness exceeds tolerance, replace.



	New	Wear Limit
Friction Plate Thickness	0.12 in. (3.0mm)	0.11 in. (2.7mm)

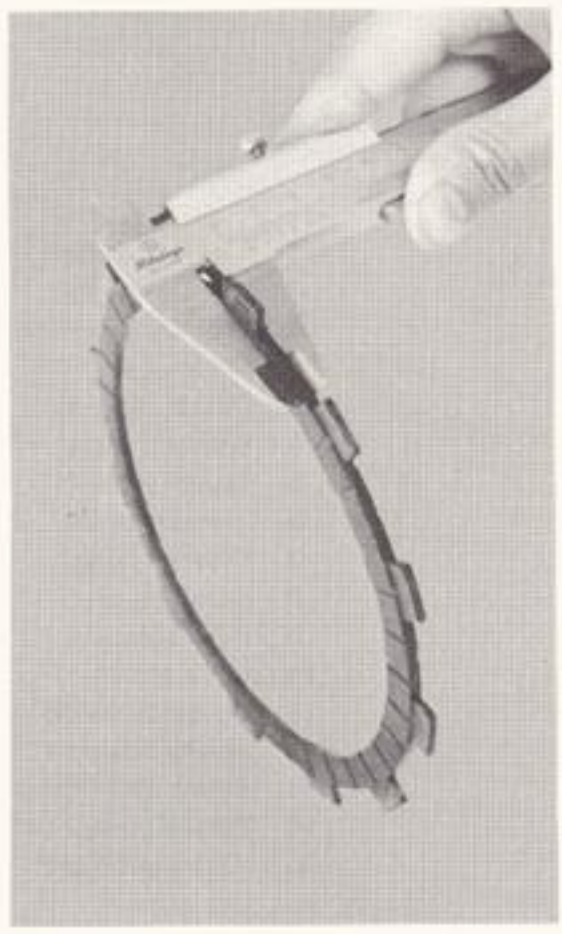


Fig. 3-95

2. Check the friction for signs of warpage and heat damage, replace as required.

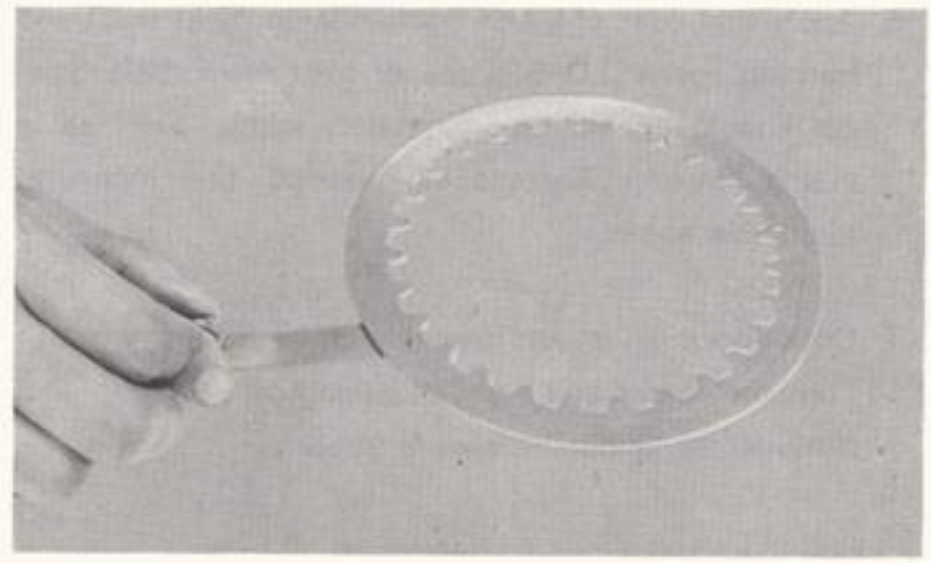


Fig. 3-96

3. Check each clutch plate for signs of heat damage and warpage. Place on surface plate (plate glass is acceptable) and use feeler gauge as illustrated. If warpage exceeds tolerance, replace.

Clutch plate warp. allowance: 0.002in. (0.05 maximum)

Note:

For optimum performance, if any plate requires replacement, it is advisable to replace the entire set.

4. Thoroughly clean the clutch housing and spacer. Apply a light film of oil on the bushing surface and spacer. Fit the spacer into the bushing. It should be a smooth, thumb-press fit. The spacer should rotate smoothly within the bushing. If appropriate measuring devices are available, measure the minimum I.D. of the clutch housing bushing and the maximum O.D. of the bushing spacer. If beyond tolerance, replace bushing and refit.

	Nominal	Maximum
Clutch Housing Bushing I.D.	$1.32^{+0.003}_{-0.006}$ in. $\left(33^{+0.007}_{-0.014}\ \text{mm}\right)$	1.32 in. (33.02mm)
Bushing Spacer O.D.	$1.32^{-0.0010}_{-0.0016}$ in. $\left(33^{-0.025}_{-0.041}\ \text{mm}\right)$	1.32 in. (32.95mm)
Bushing/Spacer Clearance	0.008 ~ 0.0016 in. (0.020 ~ 0.040mm)	0.024 in. (0.060mm)

Fig. 3-97

5. Check the bushing and spacer for signs of galling, heat damage, etc. If severe, replace as required.

	Nominal	Maximum
Main Shaft O.D.	$1.00^{-0.0008}_{-0.0016}$ in. $\left(25^{-0.020}_{-0.041}\ \text{mm}\right)$	0.998 in. (24.95mm)
Bushing Spacer I.D.	$1.00^{+0}_{-0.0004}$ in. $\left(25^{+0}_{-0.010}\ \text{mm}\right)$	1.000 in. (25.02mm)
Shaft/Spacer Clearance	0.0008 ~ 0.0020 in. (0.020 ~ 0.051mm)	0.024 in. (0.060mm)

Fig. 3-98

6. Apply thin coat of oil on transmission main shaft and bushing spacer I.D. Slip spacer over main shaft. Spacer should fit with approximately same "feel" as in clutch housing. Replace as required. See measurement tolerances.

7. Check dogs on driven gear (clutch housing).
   Look for cracks and signs of galling on edges.
   If moderate, deburr. If severe, replace.

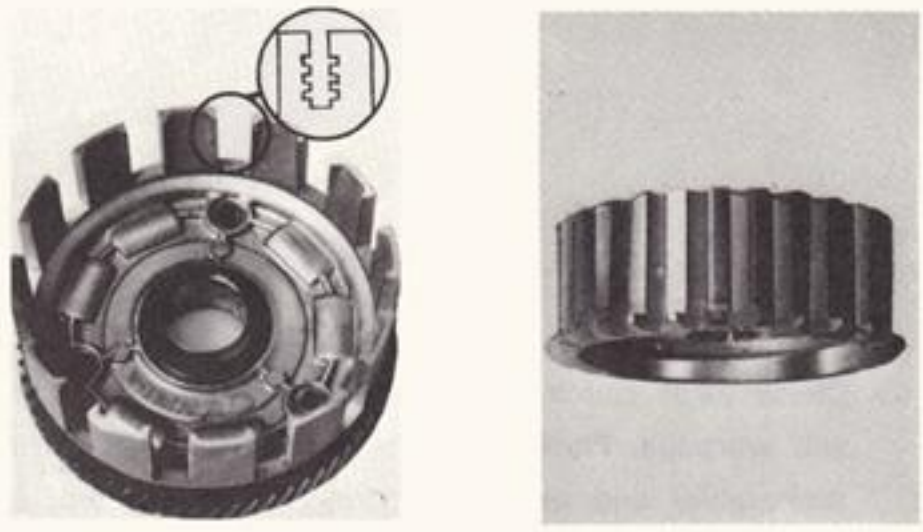


Fig. 3-99

8. Check splines on clutch boss for signs of galling.
   If moderate, deburr. If severe, replace.

Note:

Gaaling on either the friction plate dogs of the clutch housing or clutch plate splines of the clutch boss will cause erratic clutch operation.

9. Fit the clutch thrust plate (two pieces DT250A, one piece DT360A) a light film of oil on all parts. Check for smooth rotation. Check for signs of excessive wear, all parts. Replace as necessary.

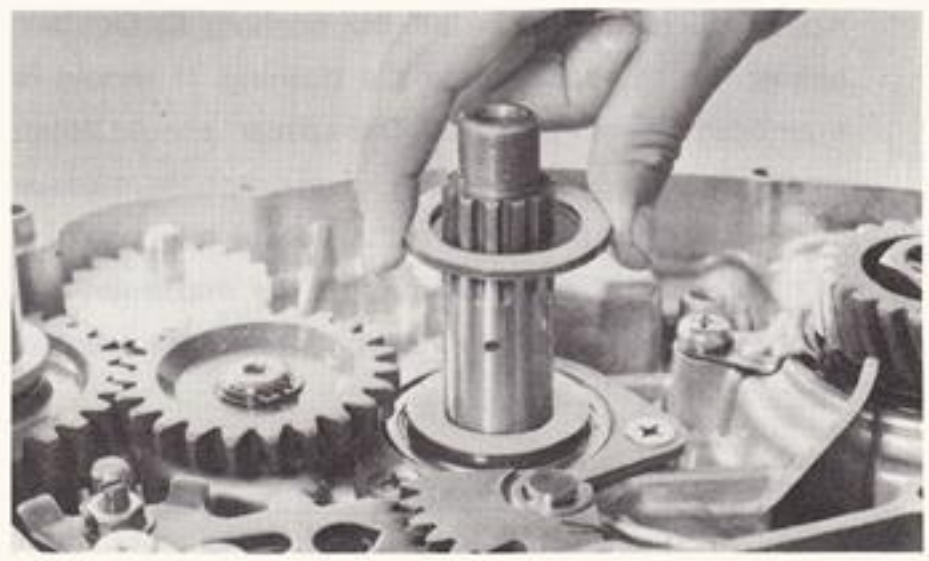


Fig. 3-100

10. If clutch operation has been abnormal, and the above procedures show no major failures, install the clutch housing on the transmission main shaft with thrust plates, and clutch boss in their proper positions for reassembly. Do not install clutch or friction plates. Install lock washers and clutch securing nut. Torque to standard assembly value.

Clutch securing nut torque:
600 - 700 in.-lbs (7.0 - 8.0 kg-m)

11. With transmission in neutral and primary driven gear stationary, clutch boss should turn without excessive drag within the clutch housing. If housing does not turn easily, indicating insufficient housing end play, check thrust plates and thrust bearing for incorrect thickness.
    Correct by installing thinner thrust plates.
    Clutch housing end play is given in table and can be measured with a dial gauge.

	Nominal	Minimum	Maximum
Clutch Housing End Play	0.008 in. (0.2mm)	0.004 in. (0.1mm)	0.012 in. (0.3mm)

12. Measure each clutch spring. If beyond tolerance, replace.

	New	Minimum
Clutch Spring Free Length	1.26 in. (31.5mm)	1.22 in. (30.5mm)

Note:

For optimum clutch operation it is advisable to replace the clutch springs as a set if one or more are faulty.

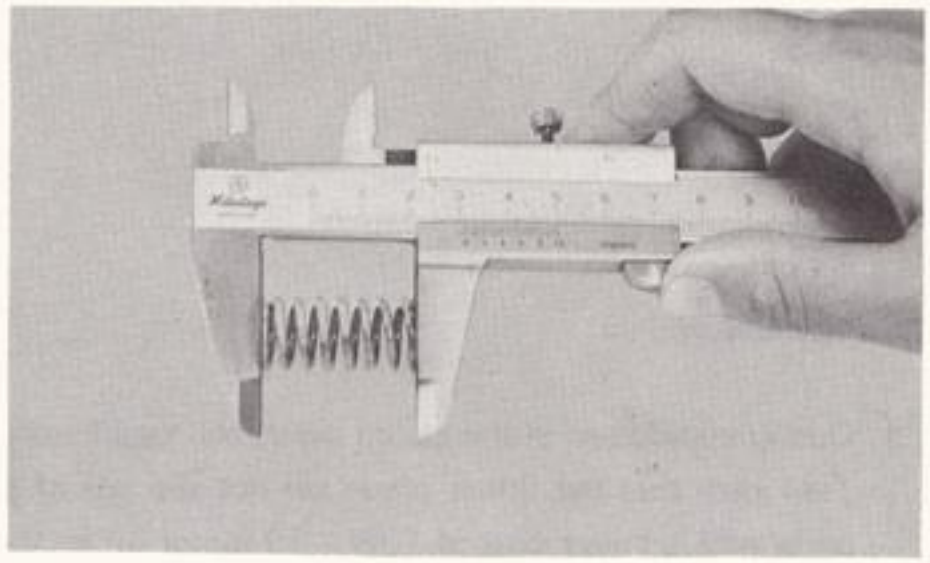
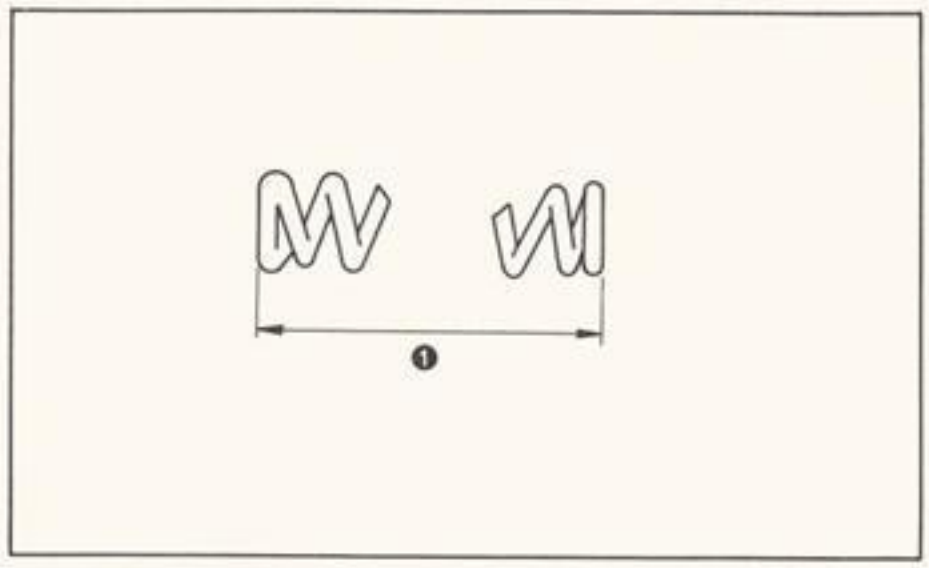


Fig. 3-101



1. Free length

Fig. 3-102

13. Stack the clutch spring set on a level surface.
    Rotate each spring until all are at approximately the same vertical angle and maximum apparent height. Place straight edge across set. If any spring exceeds tolerance, replace that spring.

Clutch spring set maximum length difference: 0.04in. (1mm)

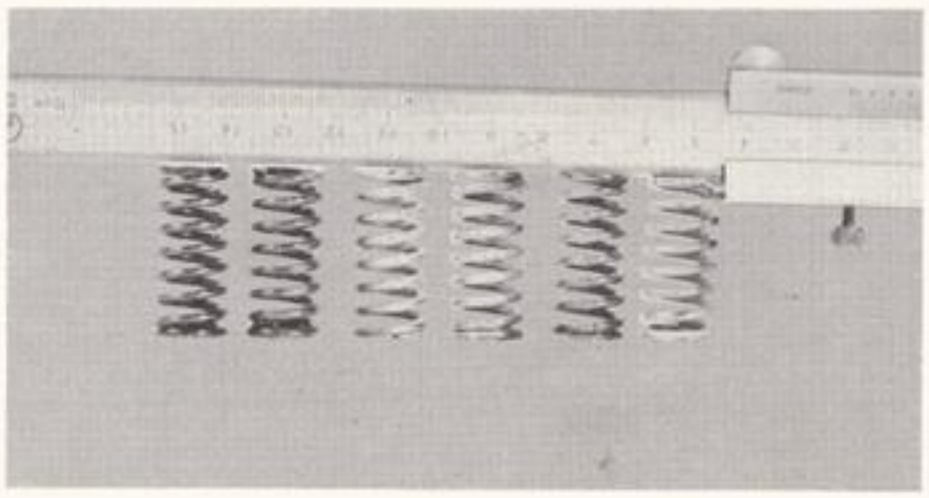


Fig. 3-103

14. Directly behind push rod No. 1 is push rod No. 2. This rod is fitted within the transmission main shaft. The push rod must be removed from the clutch side.
15. Lay the machine on its side, the push rod should slide out of the main shaft. If not, use a small magnet to retrieve.
16. Roll the push rod across a surface plate. If rod is bent, replace.

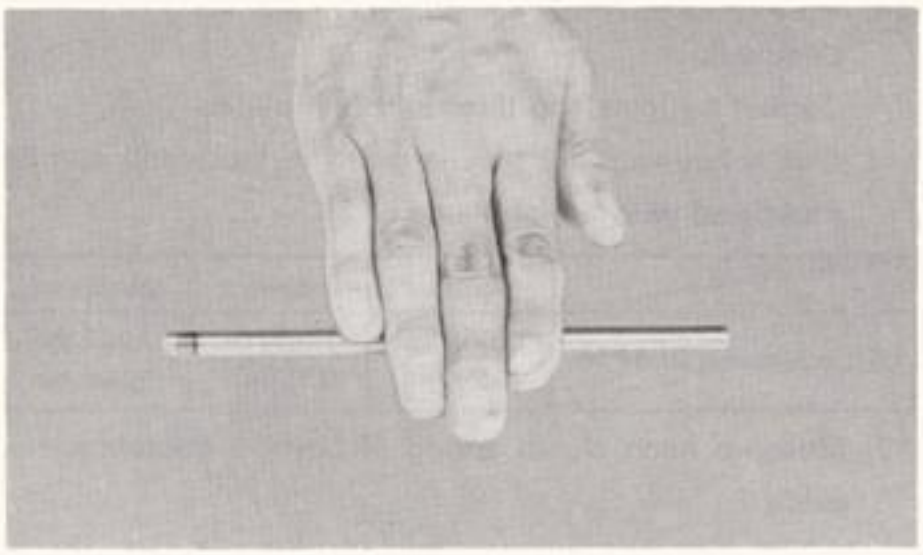


Fig. 3-104

D. Installtion

1. During installation of the clutch assembly, take care that the thickest clutch plate is installed on the clutch boss first. Take care that the thrust plates do not slip out of position as the housing and clutch boss are installed. Install all parts with a heavy coat of 10W - 30 motor oil on their mating surfaces.

Clutch securing nut torque: 607 - 695 in.-lbs (7.0 - 8.0 kg-m)

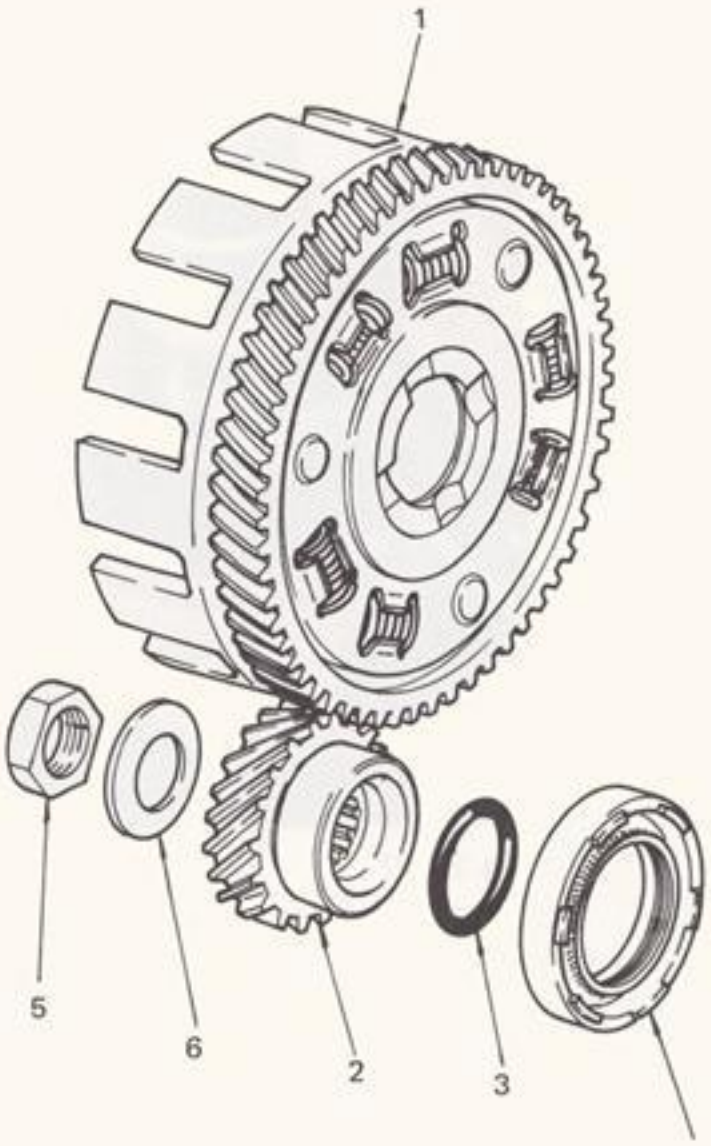
3-12. Primary Drive

A. Description

1. Primary drive is via helical cut gears. The drive gear is mounted on the crankshaft and the driven gear is integral with the clutch assembly and mounted on the transmission main shaft.

Primary Reduction Ratio			
Model	No. Teeth		Ratio
	Drive	Driven	
DT250A	23	65	2.826
DT360A	24	64	2.666

Primary Drive Gears



1. Primary driven gear complete
2. Primary drive gear
3. O-ring
4. Oil seal
5. Crank shaft nut
6. Belleville, spring

Fig. 3-105

B. Removal and Disassembly

With the right-hand crankcase cover removed, remove the primary drive gear securing nut and washer as follows:

Note:

The sicuring nut can most easily be removed with the clutch assembly installed.

a. Remove the clutch pressure plate, friction and clutch plates.

Fig. 3-106

b. Install the clutch holding tool so that the handle fits down between the dogs on the outer clutch housing.

c. 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 locknut. Remove the locknut, belleville spring, and the gear.

Fig. 3-107

C Troubleshooting and Repair

1. Check the drive gear for obvious signs of wear or damage from foreign material within the primary case. Repeat procedure for driven gear.

2. If primary drive gears exhibit excessive noise during operation, gear lash may be incorrect. Numbers are scribed on the side of each gear. Add these numbers. If their total exceesd tolerance, replace with a numbered gear that will bring total within specification.

Note:

This procedure is rarely repuired. However, if a gear must be replaced due to damage, it is always advisable to pay strict attention to the lash numbers during replacement.

Lash Numbers	DT250A	DT360A
Primary Drive Gear	02 to 06	23 to 27
Primary Driven Gear	42 to 49	45 to 52
Lash Tolerance	41 to 44	64 to 68

3. Check the shoulder on the primary drive gear where the crankshaft seal rides. It should not be severely worn or galled. If so, replace gear and seal.
4. Check the O-ring on the crankshaft. If damaged or misshapen, replace.

D. Reassembly and Installation

1. Primary driven gear installation is covered within Section 3-11-D, Clutch.
2. Reverse steps B-1-a - c for primary drive gear installation.

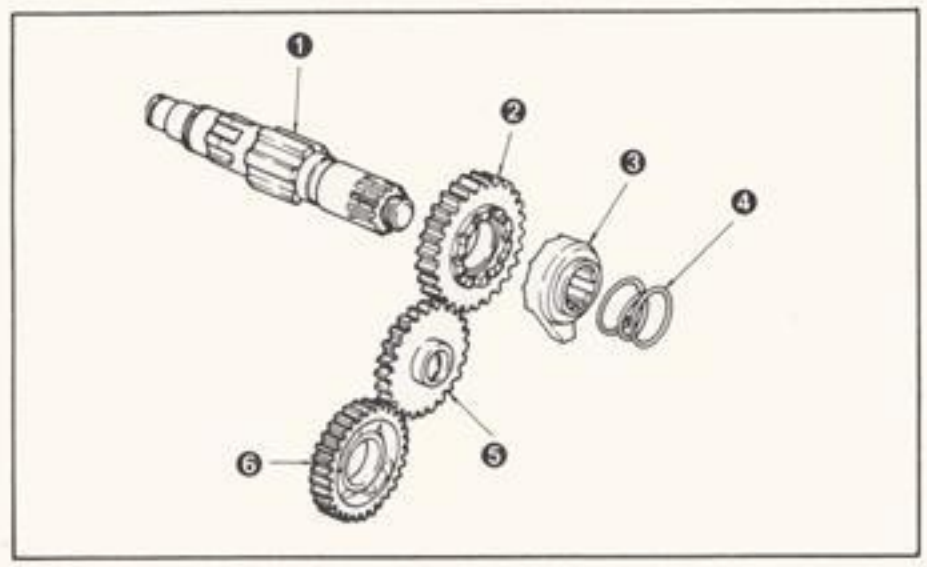
	Securing Nut Torque
Drive Gear	607 ~ 781 in.-lbs (7.0 ~ 9.0 kg-m)
Driven Gear	607 ~ 695 in.-lbs (7.0 ~ 8.0 kg-m)

3-13. Kick Starter and Tachometer Drive

A. Description

1. The kick starter employs a ratcheting mechanism wherein the kick gear is in constant mesh with the kick idler gear.

2. The engine can be started in any gear with the clutch engaged, or in neutral with clutch dis-engaged.



1. Kick axle
2. Kick gear
3. Ratchet wheel
4. Ratchet wheel spring
5. Kick idle gear
6. Kick pinion gear

Fig. 3-108

3. As the kick crank is depressed, the kick axle rotates freeing the ratchet wheel from its detent. The ratchet is pushed out by the ratchet wheel spring and engages the kick gear.
4. The ratchet wheel, which is splined to the kick axle, transfers torque through the kick gear, and kick idle gear to the kick pinion gear which is constantly engaged with the primary driven gear.

5. In the case of the DT360A, the kick mechanism is linked to a decompression relief valve within the cylinder to reduce compression pressure for easier starting. The actuating cable is connected to a link arm which is moved by the detent arm on the ratchet wheel.

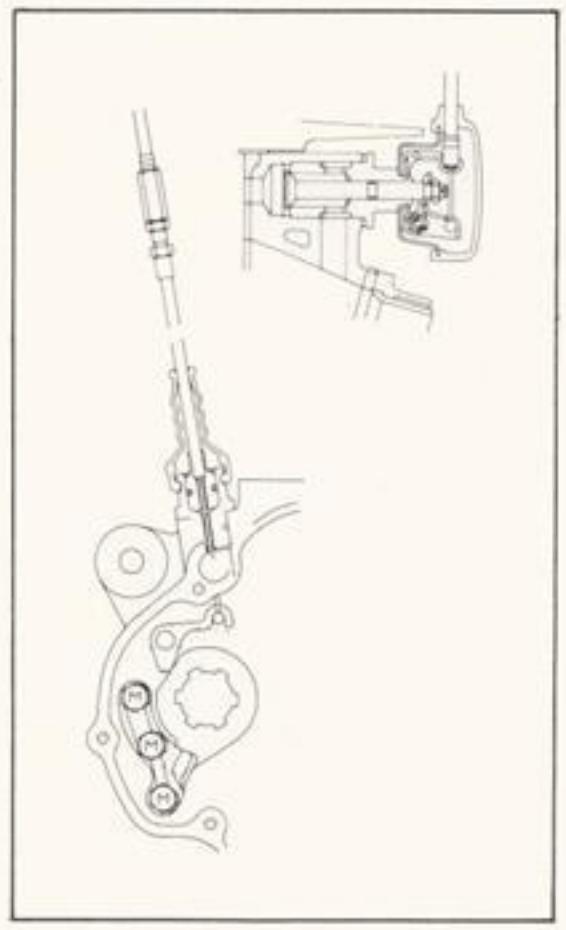
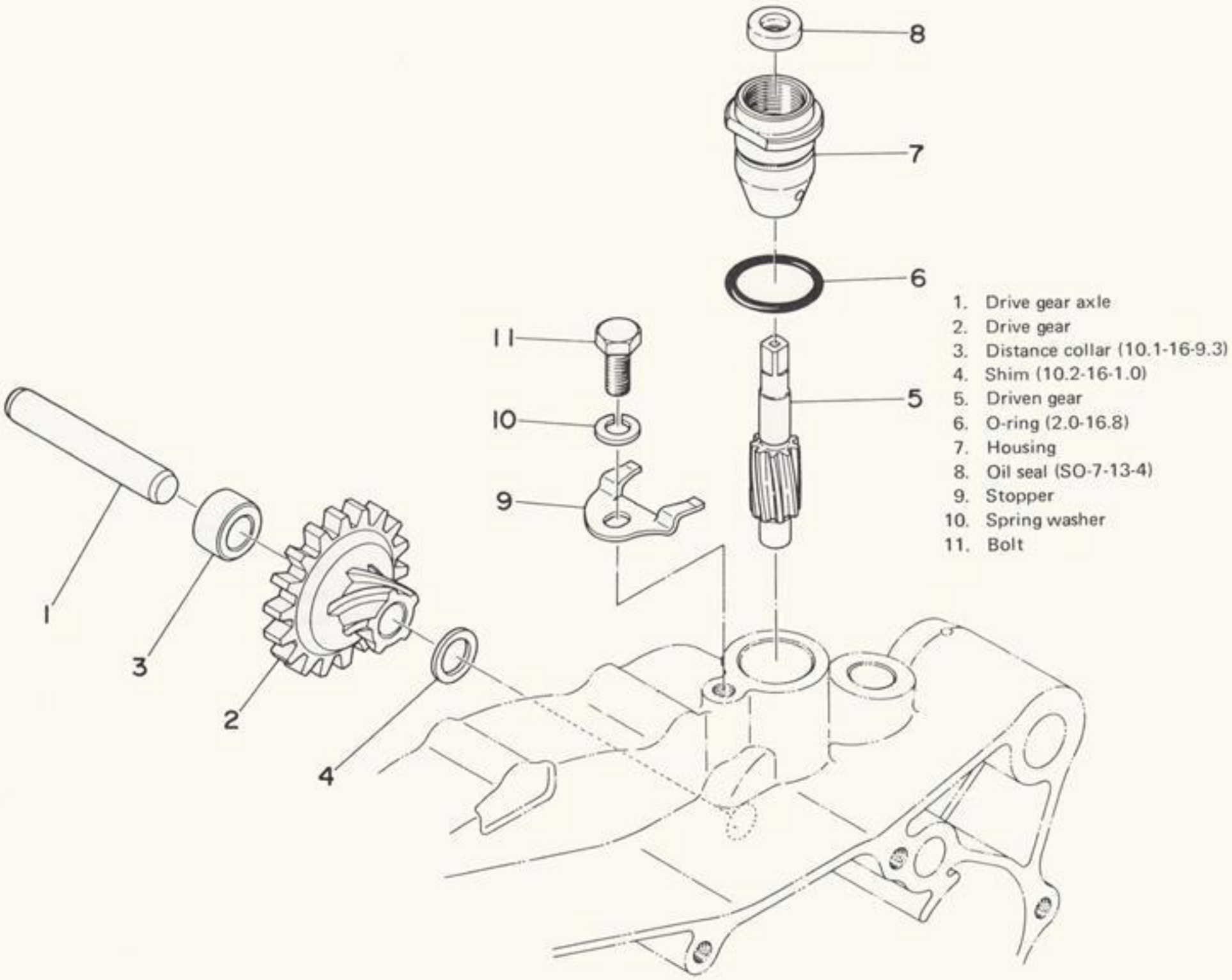


Fig. 3-109

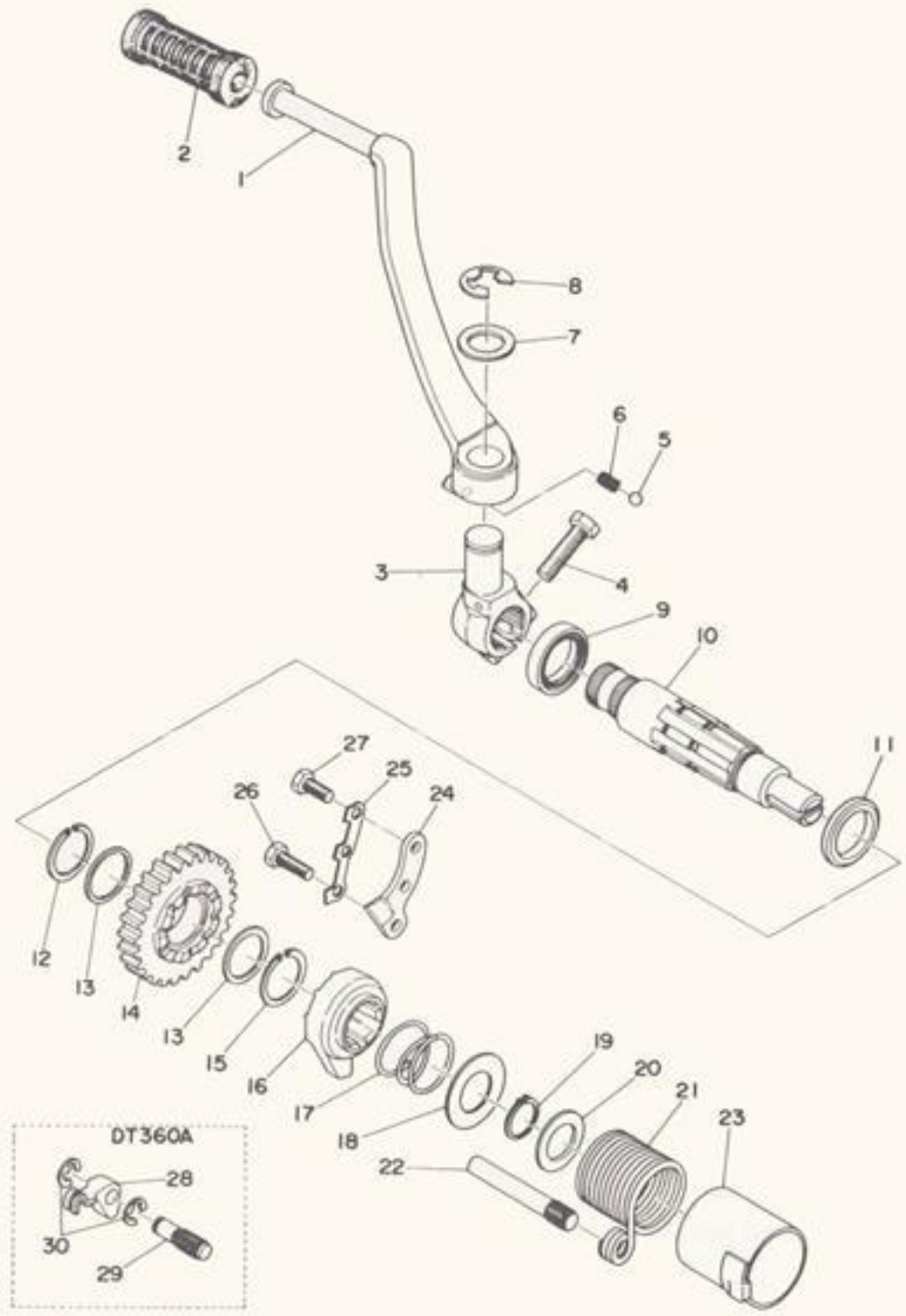
6. The tachometer drive gear is made of nylon and driven off the kick idle gear. Maintenance is rarely required. Should disassembly be required, follow the illustration.



1. Drive gear axle
2. Drive gear
3. Distance collar (10.1-16-9.3)
4. Shim (10.2-16-1.0)
5. Driven gear
6. O-ring (2.0-16.8)
7. Housing
8. Oil seal (SO-7-13-4)
9. Stopper
10. Spring washer
11. Bolt

Fig. 3-110

Kick Starter



1. Kick crank
2. Kick lever cover
3. Kick crank boss
4. Bolt
5. Ball (7/32 inch)
6. Stopper spring boss
7. Washer
8. Circlip (E-12)
9. Oil seal (SD-25-35-7)
10. Kick axle
11. Kick axle spacer (DT250A)
    Plain washer (DT360A)
12. Circlip (25ϕ special)
13. Gear hold washer
14. Kick gear
15. Circlip (25ϕ special)
16. Ratchet wheel
17. Ratchet wheel spring
18. Spring cover
19. Circlip (S-19)
20. Gear hold washer (20.2-30-1.5)
21. Kick spring
22. Kick spring stopper
23. Spring guide
24. Ratchet wheel guide
25. Lock washer
26. Bolt
27. Bolt
28. Link (DT360A)
29. Axle (DT360A)
30. Circlip (E-7) (DT360A)

Fig. 3-111

B. Removal and Disassembly

1. With the side cover removed, the kick axle assembly may be removed complete.

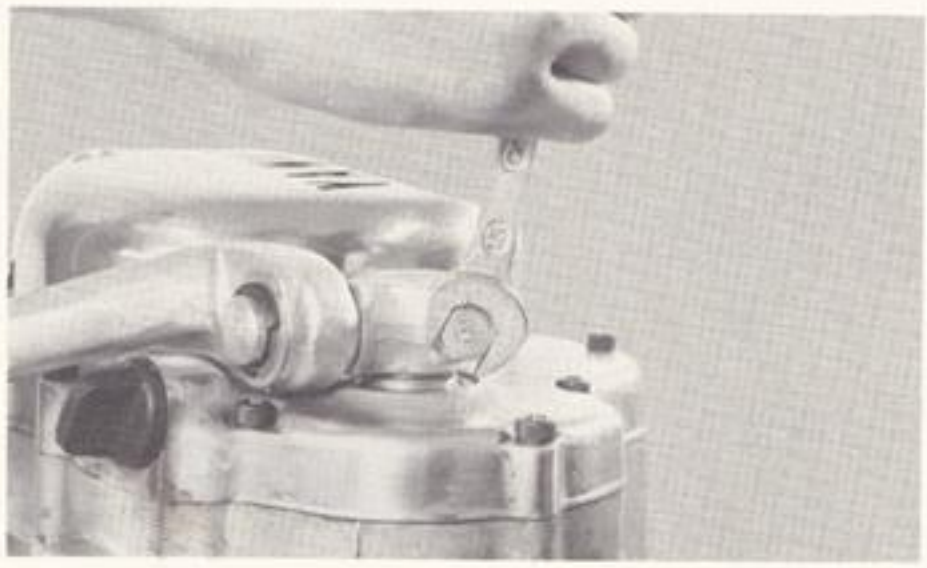


Fig. 3-112

2. Rotate the kick axle counter-clockwise approximately 45° and pull straight out.
   This procedure allows the ratchet wheel detent arm to clear the guide bolted to the crankcase.

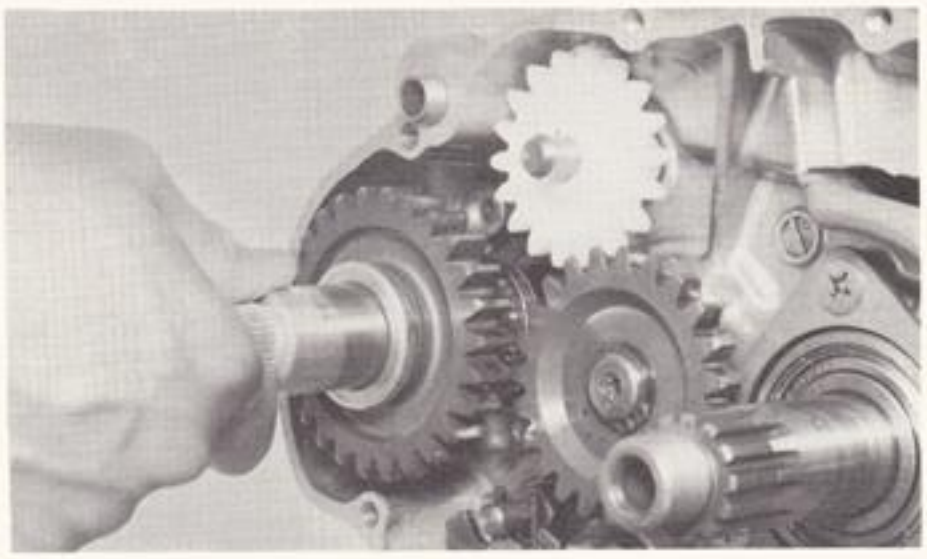


Fig. 3-113

Note:

The kick axle return spring is located within the crankcase assembly. Note how the leading edge of the torsion spring fits into a groove machined into the end of the cick axle.

Note:

The amount of preload on the spring during disassembly. The same preload must be exerted during reassembly in order to achieve proper detenting (disengagement) of the ratchet wheel.

3. The kick axle assembly may be disassembled by removing the circlips holding the kick gear, ratchet wheel, and ratchet wheel spring in place on the kick axle.
4. During disassembly, note the location of all parts as they are removed. Keep them in sequence to ease reassembly.

5. Removing the Kick Idler Gear
   Remove the circlip with clip pliers, and then the kick idler gear can be easily removed.

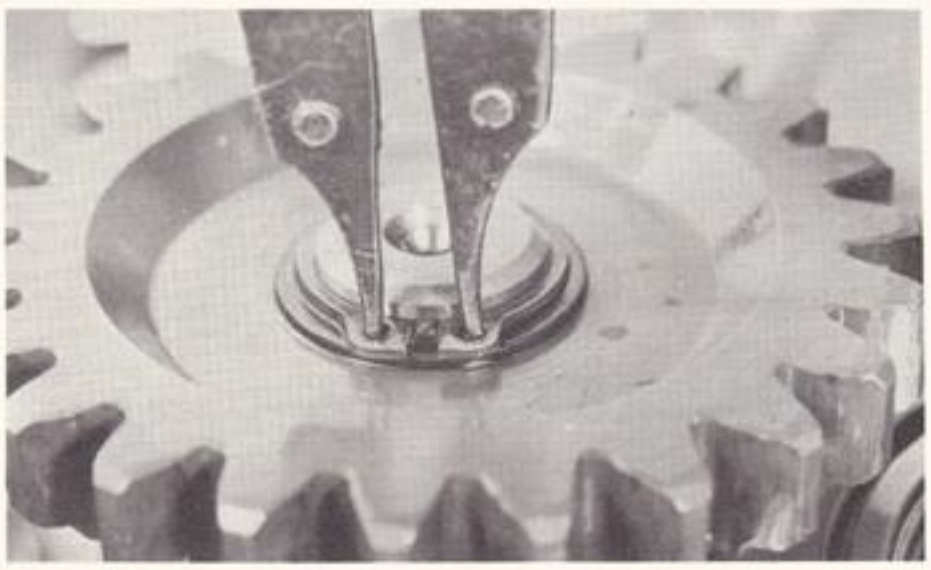


Fig. 3-114

6. 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. Pull up the tachometer drive gear and the tachometer drive gear can be removed.

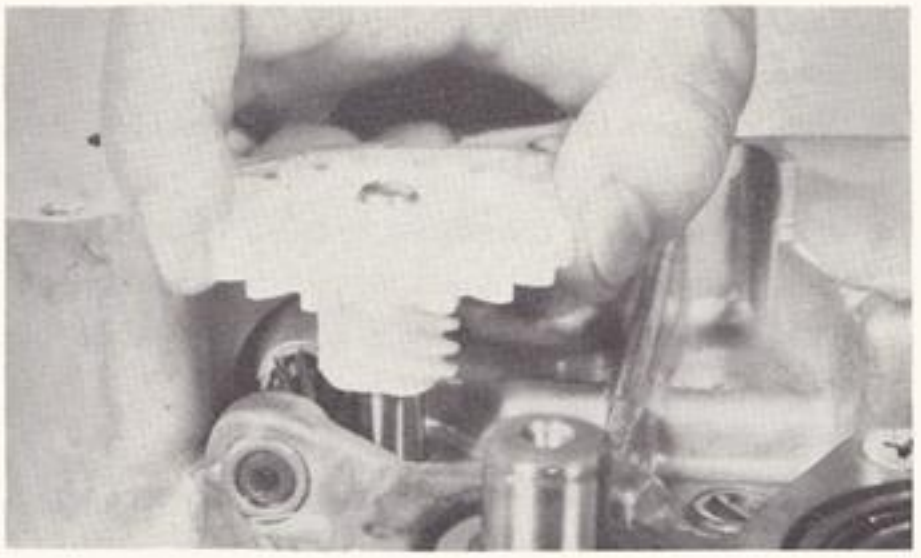


Fig. 3-115

C. Troubleshooting and Repair

1. Check the ratchet teeth on the kick gear and ratchet wheel. The mating edges should fit flush against each other. If there is severe rounding off, replace as set.
2. Check to see that the kick gear spins freely on the kick axle. If not, replace either or both as required. Replace if any signs of galling are found or if clearance is beyond specification.

Kick Axle to Kick Gear Clearance		
	Minimum	Maximum
Axle O. D.	0.998 in. (24.947mm)	0.996 in. (24.900mm)
Gear I. D.	1.000 in. (25.000mm)	1.061 in. (25.021mm)
Clearance	0.0008 in. (0.020mm)	0.003 in. (0.074mm)

3. Check to see that the ratchet wheel (splined) slides freely on the kick axle. Check for burrs or other damage. Replace as required.
4. Check axle and wheel splines for wear. The ratchet wheel is a fairly loose fit on splines. However, if wheel is so loose it "sets up" or "cocks" on shaft keeping ratchet wheel spring from forcing it out, replace.

5. Check ratchet wheel spring for fatigue. If free length shows spring has collapsed beyond specification, replace.

Ratchet Wheel Spring Free Length	
Nominal	Minimum
0.688 in. (17.2 mm)	0.600 in. (15.0 mm)

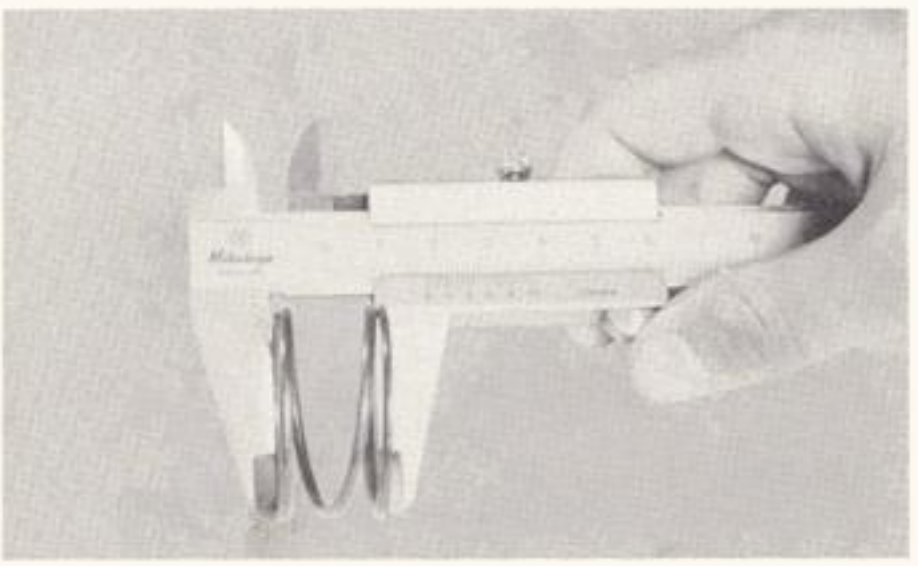


Fig. 3-116

D. Reassembly and Installation

1. Reassemble kick axle assembly.
   (See also, 3-13-B-4, foregoing).

2. Replace any circlips which do not fit snugly within their grooves; indicating they may have been stretched during disassemby.
3. With kick axle fully assembled, install in seat in crankcase. Note assembly procedures as outlined in 3-13-B-2, foregoing.
4. When assembly is completely installed, check for proper operation.
5. With model DT360A, check for proper decompression release cable operation. The link arm on the cable should not be actuated until the kick gear and ratchet wheel begin to engage. Use cable length adjustor on decompression cable to provide sufficient freeplay.

Note:

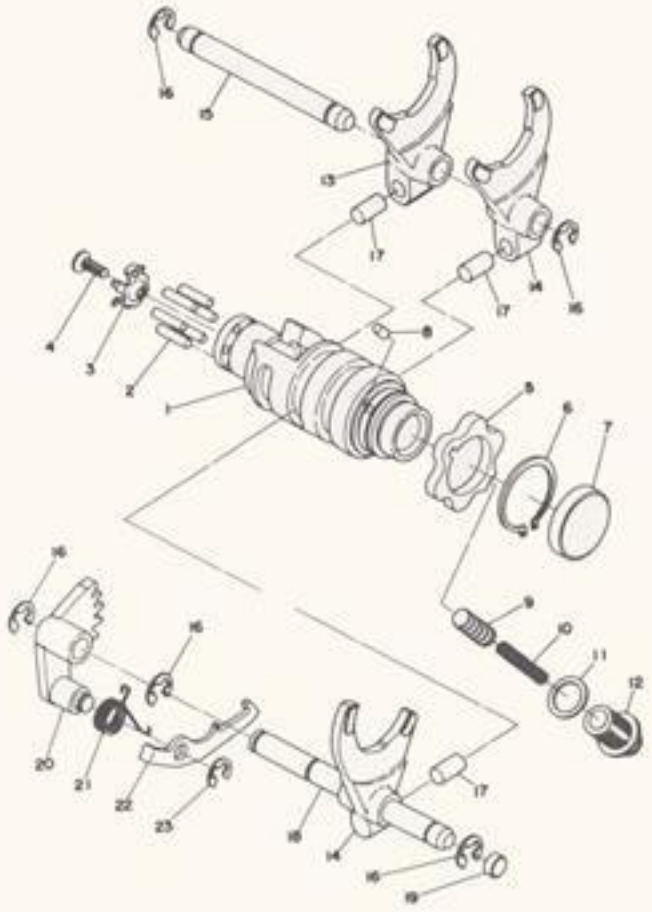
Insufficient freeplay in decompression cable can cause ratchet wheel detent to "hang-up" thereby impeding proper kick crank return action.

3-14. Shift Mechanism

A. Description

1. The shift mechanism is the ratcheting type with first gear located at the bottom of the shift pattern. Neutral is situated halfway between first and second gears.
2. The change pedal is splined to the change shaft which, in turn, is splined to change lever number one.
3. When the pedal is raised or depressed, the movement is transferred to change lever number one. Change lever number one is linked to change lever number two via the gear teeth on the levers. Change lever three is attached to lever two.
4. As the change shaft rotates, and the levers in their turn move, the ratchet arm on change lever three pushes or pulls one of the gear shift pins attached to the gear shift drum; turning it. A total of five pins are installed on the drum, providing a total of five positinve gear positions.

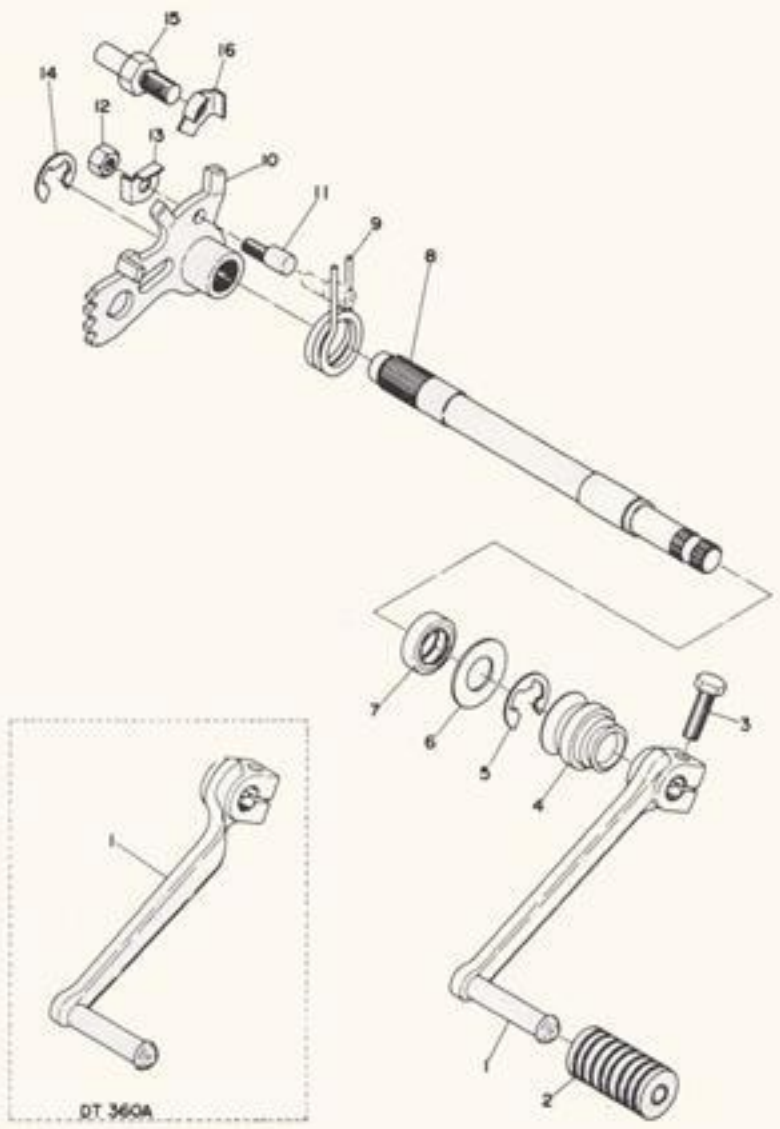
Shifter 1



1. Shift cam
2. Dowel pin (4-18)
3. Side plate
4. Flat head screw
5. Stopper plate
6. Circlip (S-30)
7. Blind plug
8. Dowel pin (4-8)
9. Cam stopper
10. Cam stopper spring
11. Drain plug gasket
12. Spring screw
13. Shift fork 1
14. Shift fork
15. Shift fork guide bar 2
16. Circlip (E-8)
17. Cam follower pin
18. Shift fork guide bar 1
19. Blind plug
20. Change lever 2
21. Spring
22. Change lever 3
23. Circlip (E-7)

Fig. 3-117

Shifter 2



1. Change pedal
2. Change pedal cover
3. Bolt
4. Sealing boot
5. Circlip (E-12)
6. Change axle washer
7. Oil seal (SDO-14-24-6)
8. Change shaft
9. Shift return spring
10. Change lever 1
11. Adjusting screw
12. Nut
13. Lock washer
14. Circlip (E-10)
15. Stopper screw
16. Lock washer

Fig. 3-118

5. As the drum turns, shift fork cam followers move along profiles grooved into the shift drum. This causes the shift forks to move. Each fork controls the movement of a gear within the transmission. Working in concert, their movement allows the selection of the various transmission ratios available.
6. On the opposite end of the shift drum is the stopper plate and mechanism. As the drum rotates, the stopper spring forces the stopper into the plate at each gear position, holding the transmission in that gear.

B. Disassembly and Troubleshooting

1. Remove the "E" clip securing change lever number two. Push down on change lever number three and remove the assembly.

Note:

Shifter maintenance and adjustment should be pervormed with clutch assembly removed.

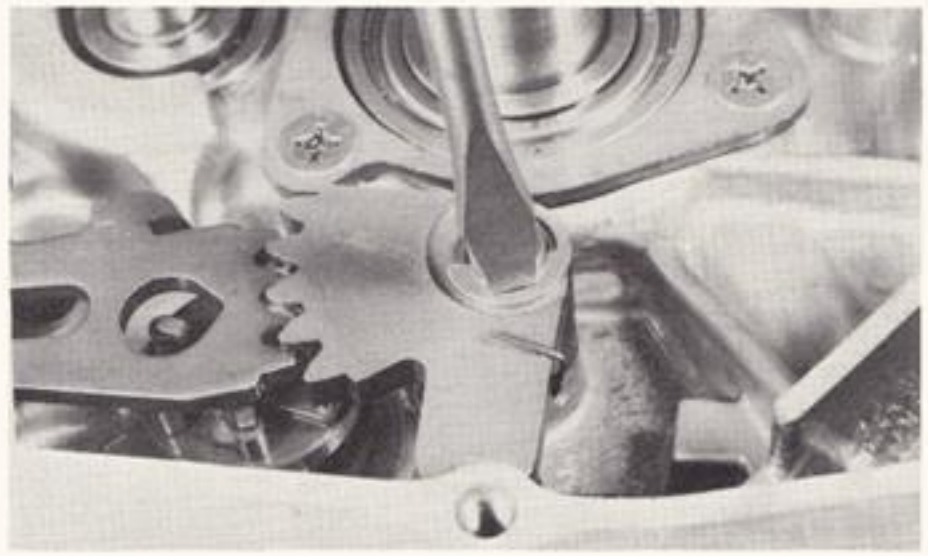


Fig. 3-119

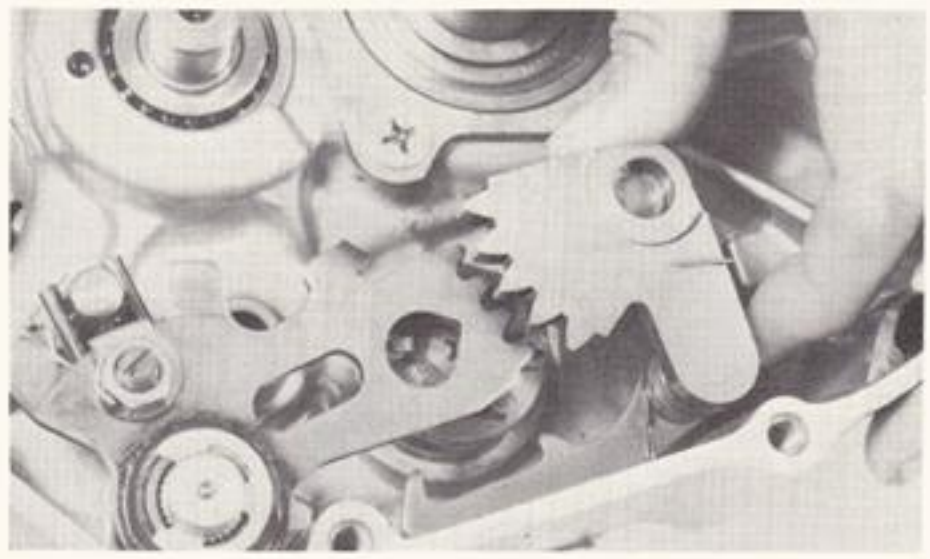


Fig. 3-120

2. With the change pedal in place on the shift, push down - then up. There should be no freeplay. If evident, the shaft return spring is fatigued, replace.

3. Check the return spring for change levers 2 and 3. If it will not hold change lever 3 firmly against the shift cam dowel pins, replace.

4. During reassembly, note the index marks on change levers 2 and center of change lever 1 Align.

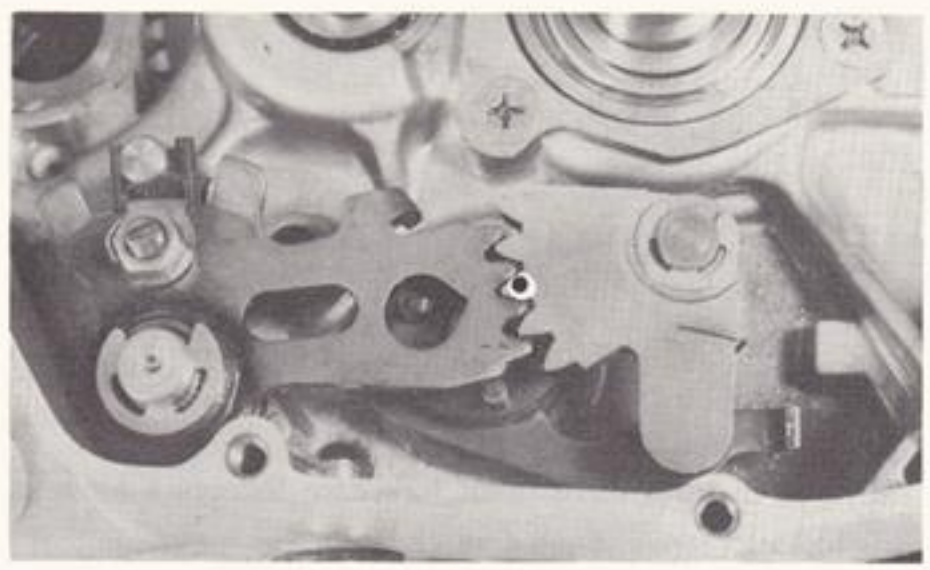


Fig. 3-121

C. Adjustment

1. In 2nd - 4th gear, check for proper centering. Change adjustment on screw (A) as required.

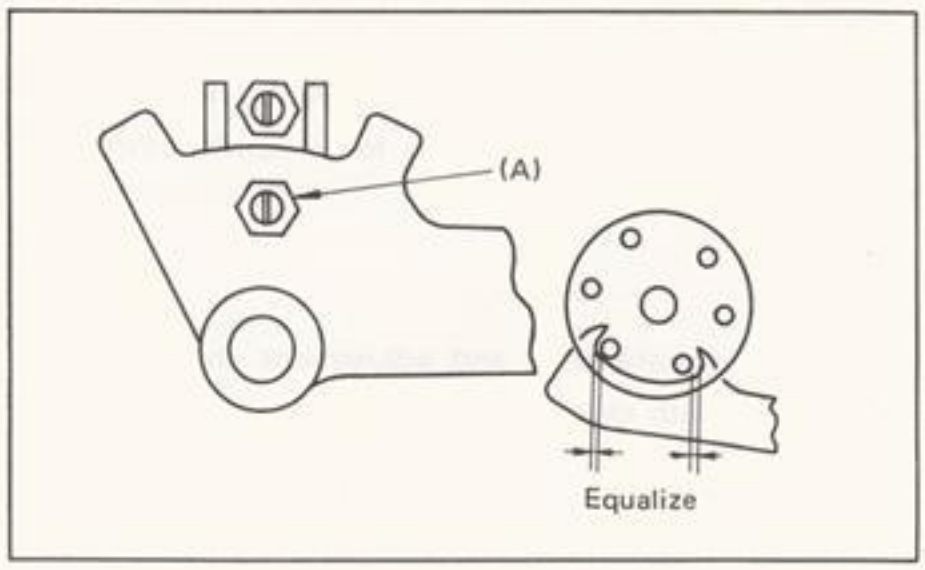


Fig. 3-122

2. Shift up from 2nd - 4th. Shift completely until arm on change lever No. 1 butts against stopper screw (B).

3. While arm is butted against adjusting screw, measure clearance between Change Lever No. 3 (C) and shift drum dowel pin(D).

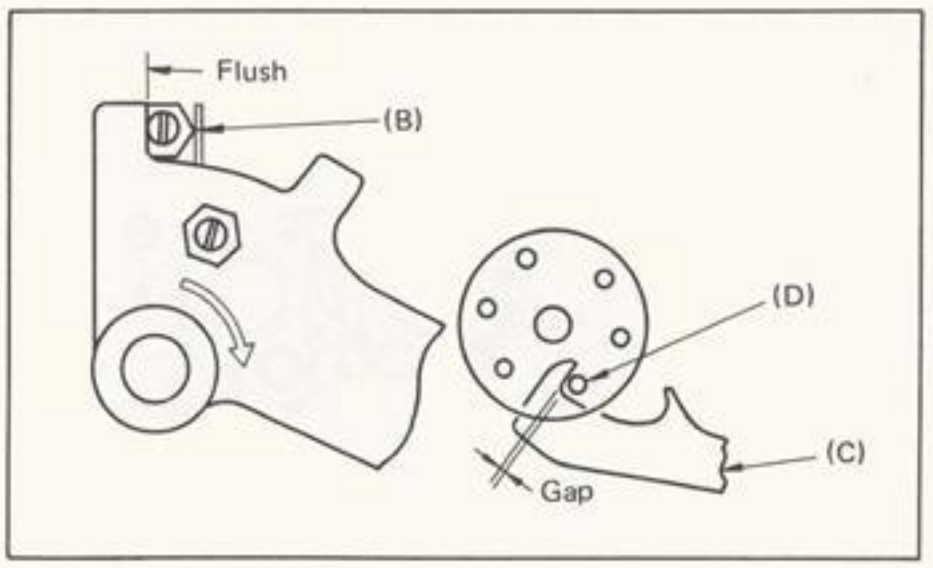


Fig. 3-123

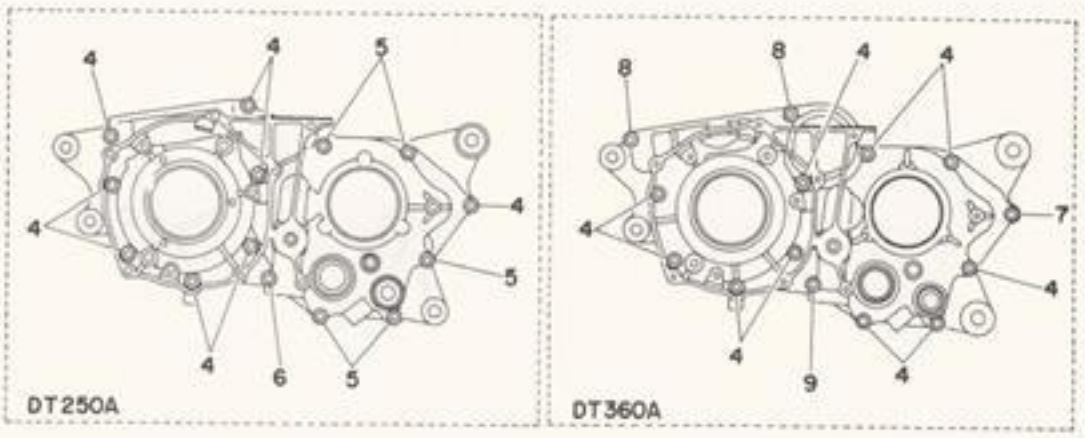
4. Repeat steps (2) and (3) shifting from 4th - 2nd. Clearance must equal (3) above. Change adjustment using screw (B) as required.
5. Repeat Step (1).

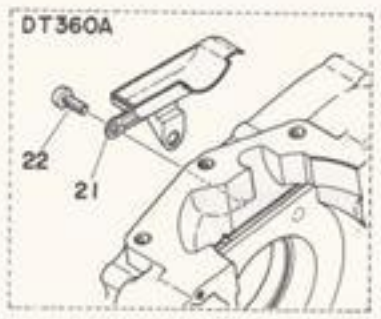
3-15 Crankcase

A. Description

1. The crankcase assembly is manufactured from die-cast aluminum alloy. It separates into right and left halves.
2. Air tight sealing between case halves is accomplished with a sealing agent. No gasket is used. In light of this fact it is important that the case halves be treated carefully and that no damage occur to the mating surfaces of the case halves.
3. Sealing of shafts is accomplished through the use of neoprene seals and/or O-rings. Two-stroke engines require hermetic sealing within the crankshaft area, it is adviseable to replace all seals and O-rings whenever the case halves are disassembled.

Crankcase





1. Left crank case
2. Right crank case
3. Dowel pin (8.4-12-16)
4. Bolt
5. Bolt (DT250A)
6. Bolt (DT250A)
7. Bolt (DT360A)
8. Bolt (DT360A)
9. Bolt (DT360A)
10. Engine mounting damper
11. Engine mounting spacer
12. O-ring (2.4-10.8)
13. Clamp
14. Clamp
15. Breather
16. Breather pipe
17. Drain plug
18. Drain plug gasket
19. Holder
20. Pan head screw
21. Cover (DT360A)
22. Pan head screw (DT360A)

Fig. 3-124

B. Notes on Disassembly

Note:

Review Sections 3-4, 3-14 for components which must be removed prior to crankcase disassembly.

Crankcase disassembly must not be attempted without the proper tools and special equipment as outlined in Section 3-1.

Additional components which must be removed:

1. Chain drive sprocket.
2. Shift drum cam stopper assembly.

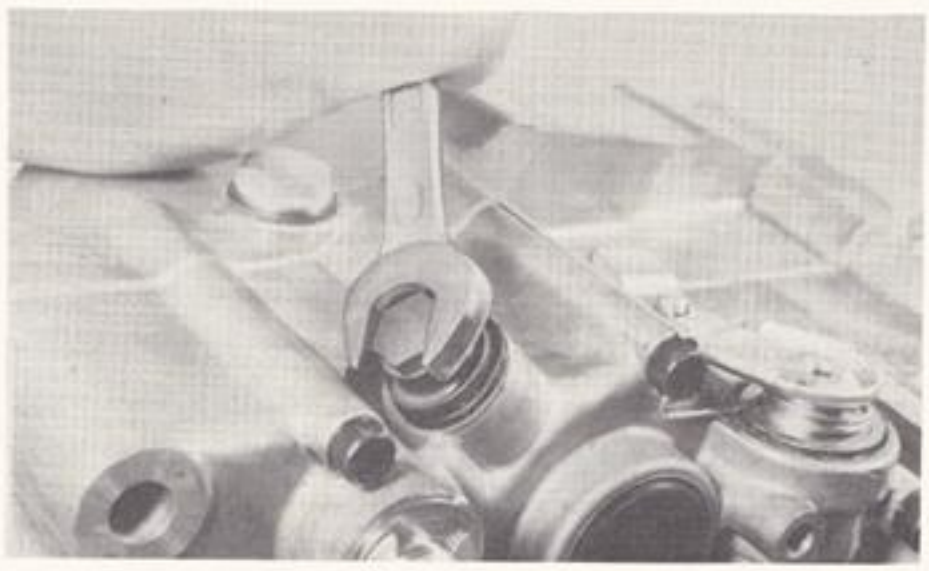


Fig. 3-125

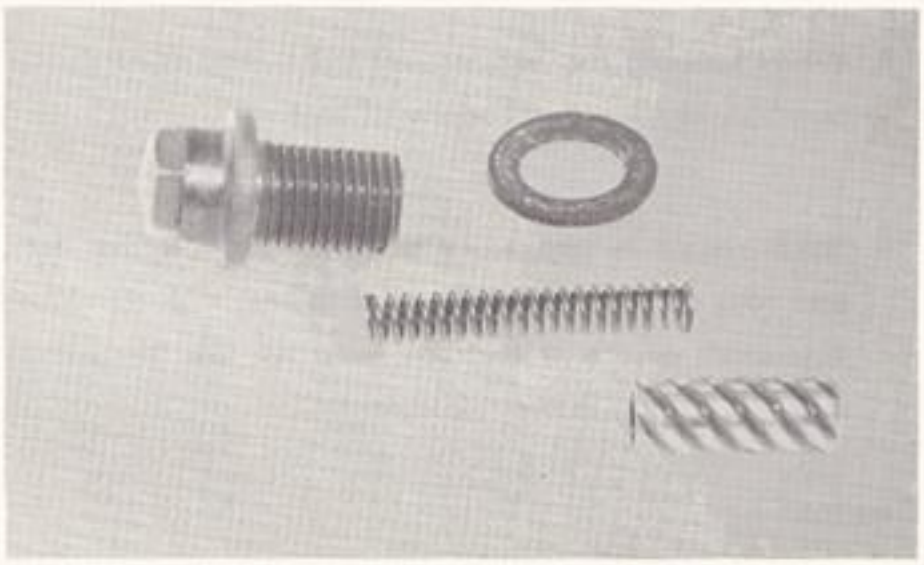


Fig. 3-126

3. Shift/lever mechanisms, complete.

When top end and all components within side covers are removed, proceed, to paragraph C.

C. Disassembly

1. Working in a cross-pattern, loosen all hexagon bolts 1/4 turn each until loose. Remove.

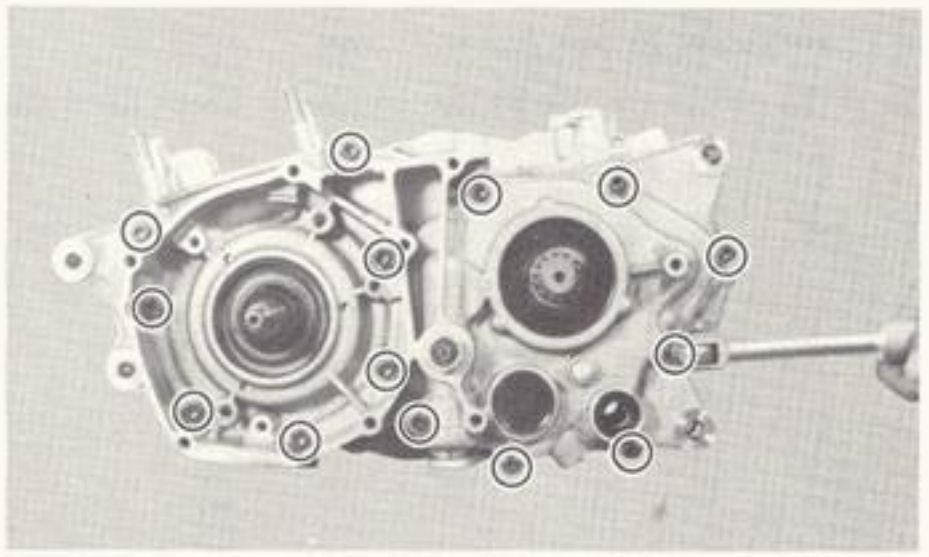


Fig. 3-127

2. Remove the holders.

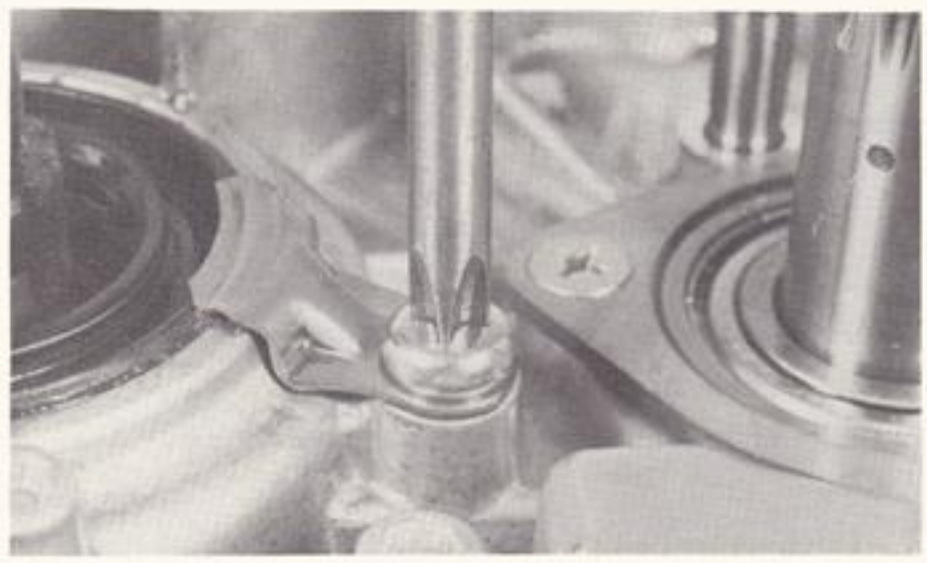


Fig. 3-128

3. Install crankcase separating tool, while setting the attachment between crankshaft end and separating tool center bolt. Tool may be used on either crankcase half, but it is easier to disassemble cases when tool is installed on right case half.
4. Fully tighten the tool securing bolts taking care to see that the tool body is level with the case. If necessary, one screw may be backed out slightly to level tool body.
5. While keeping the connecting rod at top dead center position, tighten push screw of tool.
6. As pressure is applied, alternately tap on the front and rear of the case half as it raises. If a transmission shaft or the shift drum hang up, tap them back into their seats in the left case half.

Caution:

Use a rubber or rawhide hammer to tap on the case half. Tap only on reinforced portions of case. Do not tap on gasket mating surface.

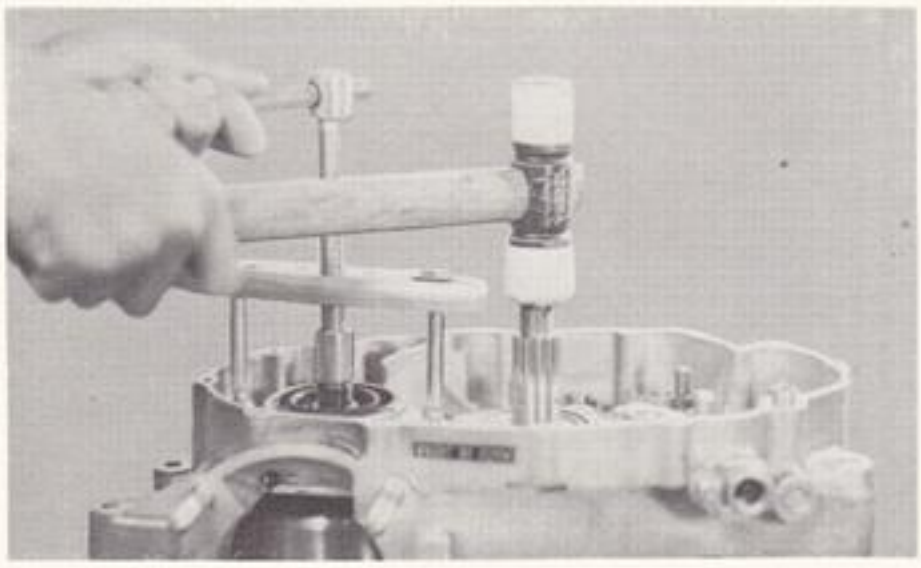


Fig. 3-129

7. Work slowly and carefully. Make sure the case halves separate evenly. If one end "hangs up." take pressure off the push screw, realign and start over.
8. If the halves are reluctant to separate, check for a missed securing screw or fitting. Do not force.

D. Troubleshooting and Repair

Note:

See Sections 3-16 - 3-18 prior to following.

1. Thoroughly wash the case halves in mild solvent.
2. Clean all gasket mating surfaces and crankcase half mating surfaces thoroughly.
3. Visually inspect case halves for any cracks, road damage, etc.
4. Check all fittings not previously removed for signs of loosening or damage.
5. If bearings have been removed, check their seats for signs of damage; such as the bearing spinning in the seat, etc.
6. Check oil delivery passages in transfer ports for signs of blockage.
7. If bearings have not been removed, oil them thoroughly immediately after washing and drying. Rotate the bearings looking for hard spots indicating damaged races or balls.
8. Check needle bearing(s) in transmission section for damage cases, needles, etc.
9. See Section 3-18, Bearings and Seals for further information.

E. Reassembly

Note:

Prior to reassembly, study Sections 3-16, 3-18.

1. After all bearings and seals have been installed in both crankcase halves and after the crankshaft and transmission have been placed into the left hand crankcase half, assemble the cases.
2. Place the case half in a horizontal position supported on its outside machined surface. Check for correct transmission installation Section 3-16, and make certain that all loose shims are in place.
3. Apply Yamaha Bond No. 4 to the mating surfaces of both case halves. Apply thoroughly, over all mating surfaces.

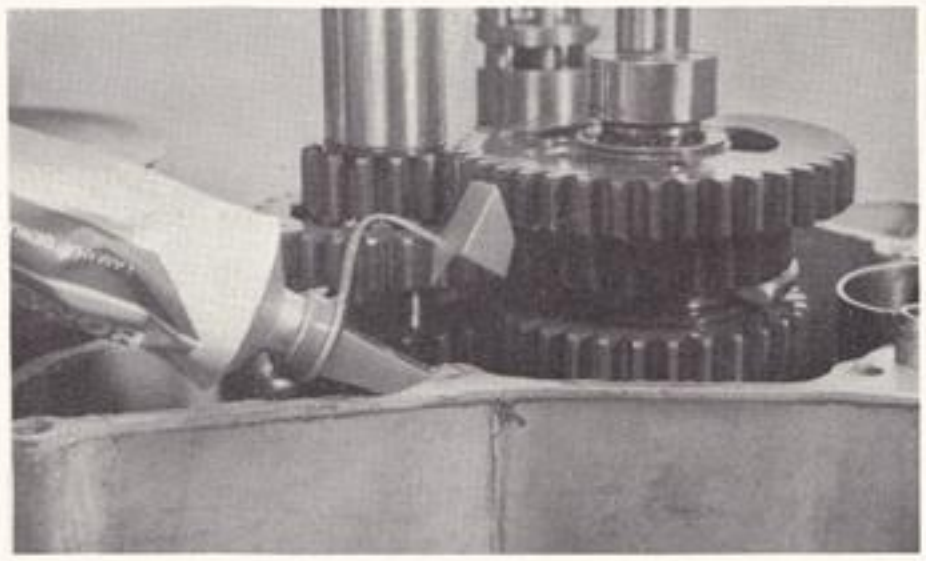


Fig. 3-130

4. Set righthand case half onto the shafts and install crank installing tool on righthand end of crankshaft.

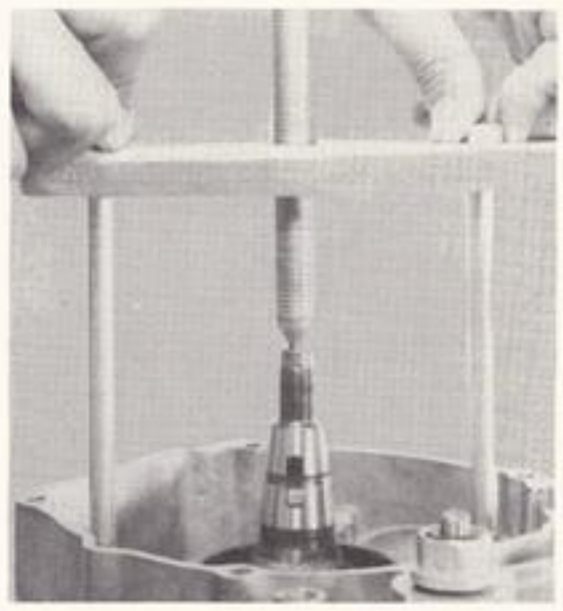


Fig. 3-131

5. Tighten tool, pushing righthand case downward while tapping on rear of case with soft hammer until completely seated against lefthand case.

6. Install all hexagon bolts and tighten by stages in a crisscross pattern starting around the crankshaft.

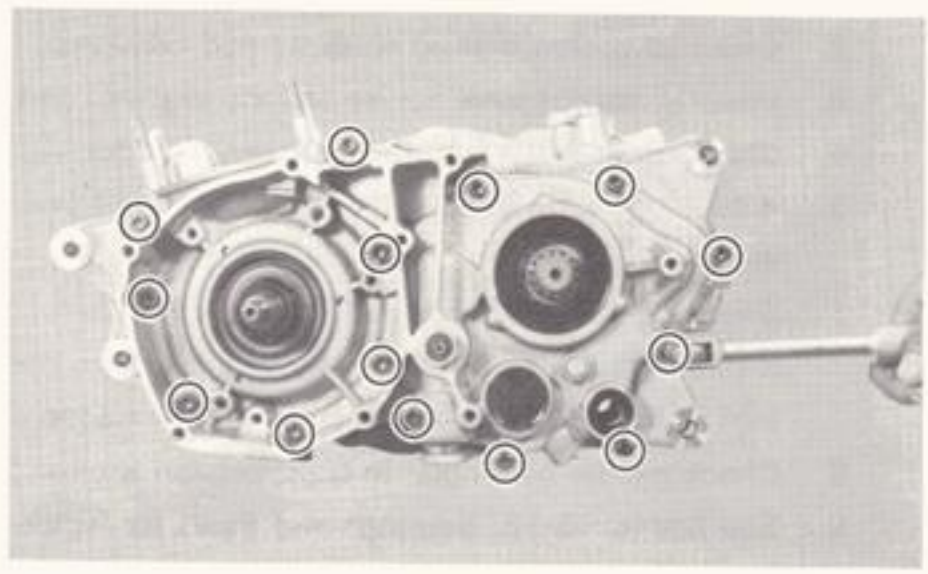


Fig. 3-132

3-16. Transmission

A. Removal and Disassembly

1. With the left case half in an upright position, the transmission assembly, shift forks, and shift cam assembly can be removed as an assembly. Tap lightly on the transmission drive shaft with a soft hammer to remove.

Note:

Remove assembly carefully. Note the positions of each part. Pay particular attention to the location and direction of shift forks.

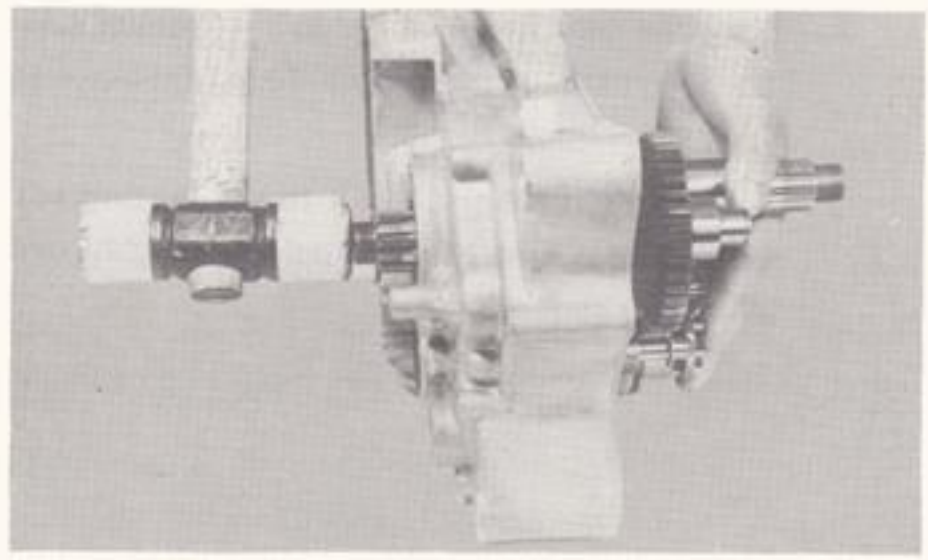


Fig. 3-133

2. Inspect each shift fork for signs of galling on tooth edges. Check for signs of bending. Make sure each fork slides freely on its guide bar.

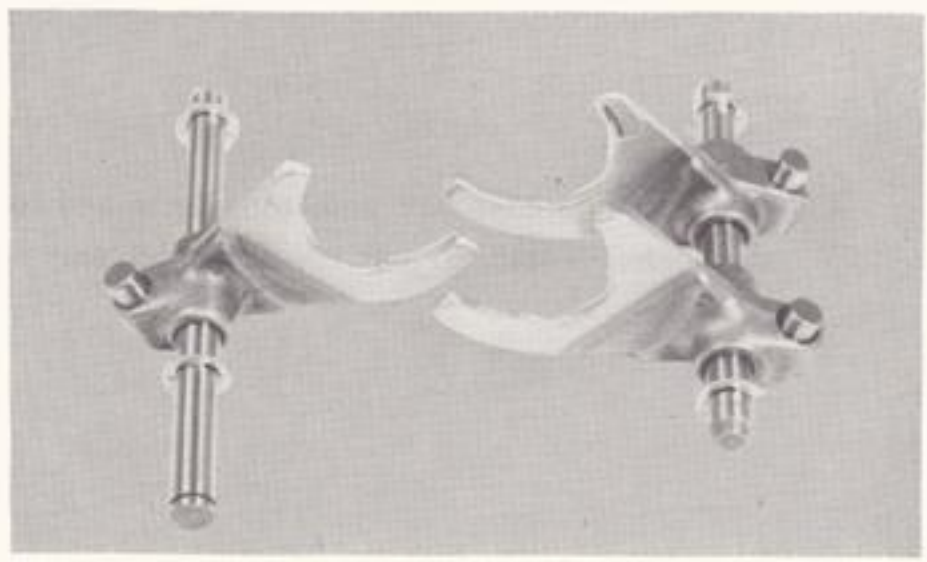


Fig. 3-134

3. Roll the guide bars across a surface plate. If any bar is out of true, replace.

4. Check the shift cam grooves for signs of wear or damage. If any profile has excessive wear and/or any indication of damage, replace cam.

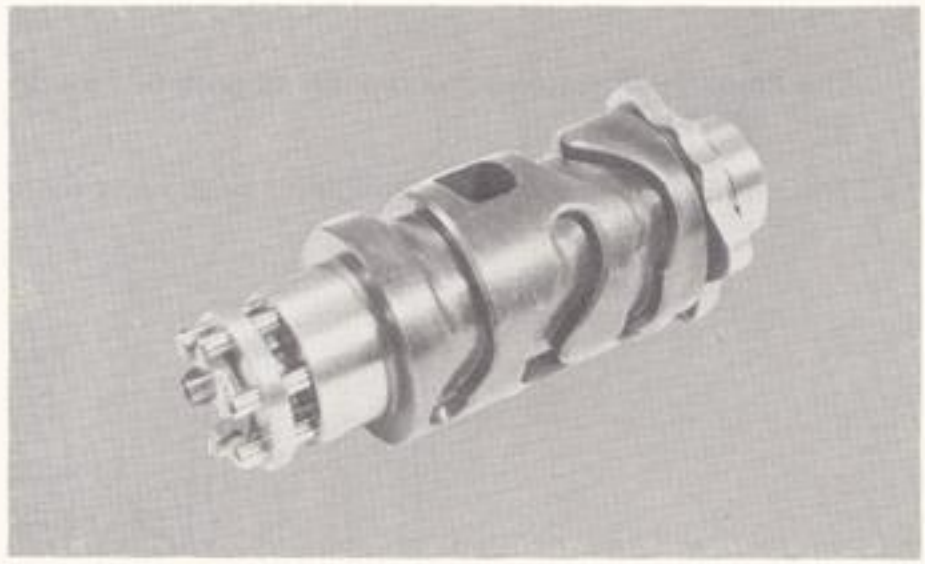


Fig. 3-135

5. Check the cam followers in each shift fork for wear. The follower should fit snugly into its seat in the shift fork, but not over-tight. Check the ends that ride in the grooves in the shift cam. If they are worn or damaged in any way, replace.
6. Check shift cam dowel pins (6) and side plate for looseness, damage, or wear. Repair as required.
7. Check the shift cam stopper plate and circlip for wear or looseness. Replace as required.
8. Check the transmission shifts using a centering device and dial gauge. If any shaft if bent, replace.
9. Carefully inspect each gear. Look for signs of obvious heat damage (blue discoloration). Check the gear teeth for signs of pitting, galling, or other extreme wear.
10. Check to see that each gear moves freely on its shaft.
11. Check to see that all washers and clips are properly installed and undamaged.
12. Check to see that each gear properly engages its counterpart on the shaft. Check the mating dogs for rounded edges, cracks, or missing portions. Replace as required.
13. After repairing transmission, and before installation in left crankcase half, measure transmission shaft overall widths.
14. Next, measure from each case half mating surface to the inner bearing race and/or seat that the transmission shaft end(s) fit into. Compare these measurements. If clearance is beyond specification, change shim thickness as required.

	Transmission Spacing		
	Overall Width		Allowable Clearance
	Minimum	Maximum	
Main Axle	0.9992 in. (24.980mm)	0.9984 in. (24.959mm)	0.020 in. (0.5mm)
Drive Axle	0.9995 in. (24.987mm)	1.000 in. (25.000mm)	0.020 in. (0.5mm)

B. Reassembly and Installation

1. Paying particular attention to the parts illustration, assemble the transmission shafts, shift cam, and shift forks and guide bars as an assembly.
2. Install the assembly into the left case half. Tap into place with soft hammer, as required, until all shafts are fully seated.
3. Check to see that all four parts move freely prior to installing right case half.

3-17. Crankshaft

A. Description

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

2. The crankshaft is more susceptible to wear, and therefore, the crank bearings must be inspected with special care.

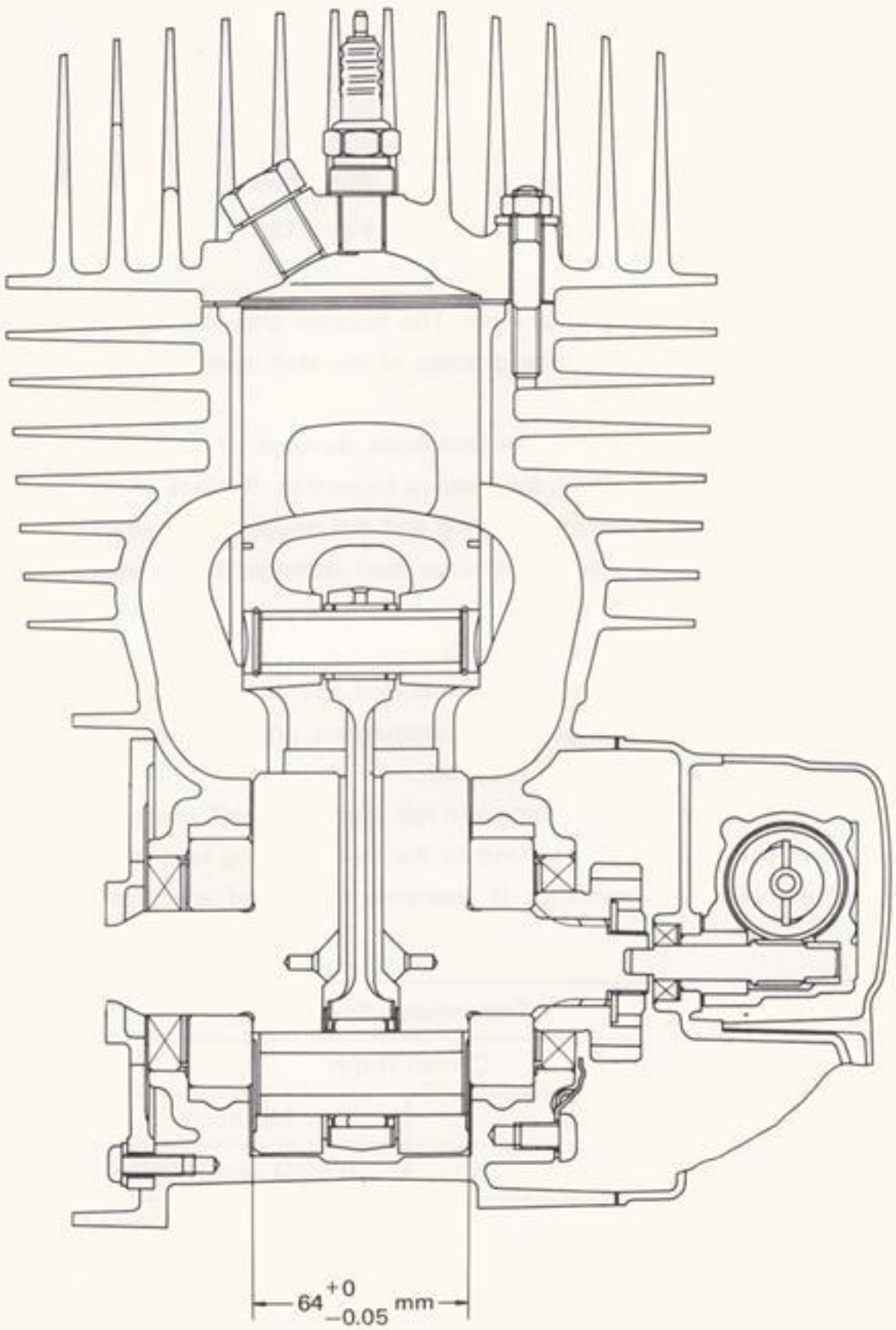
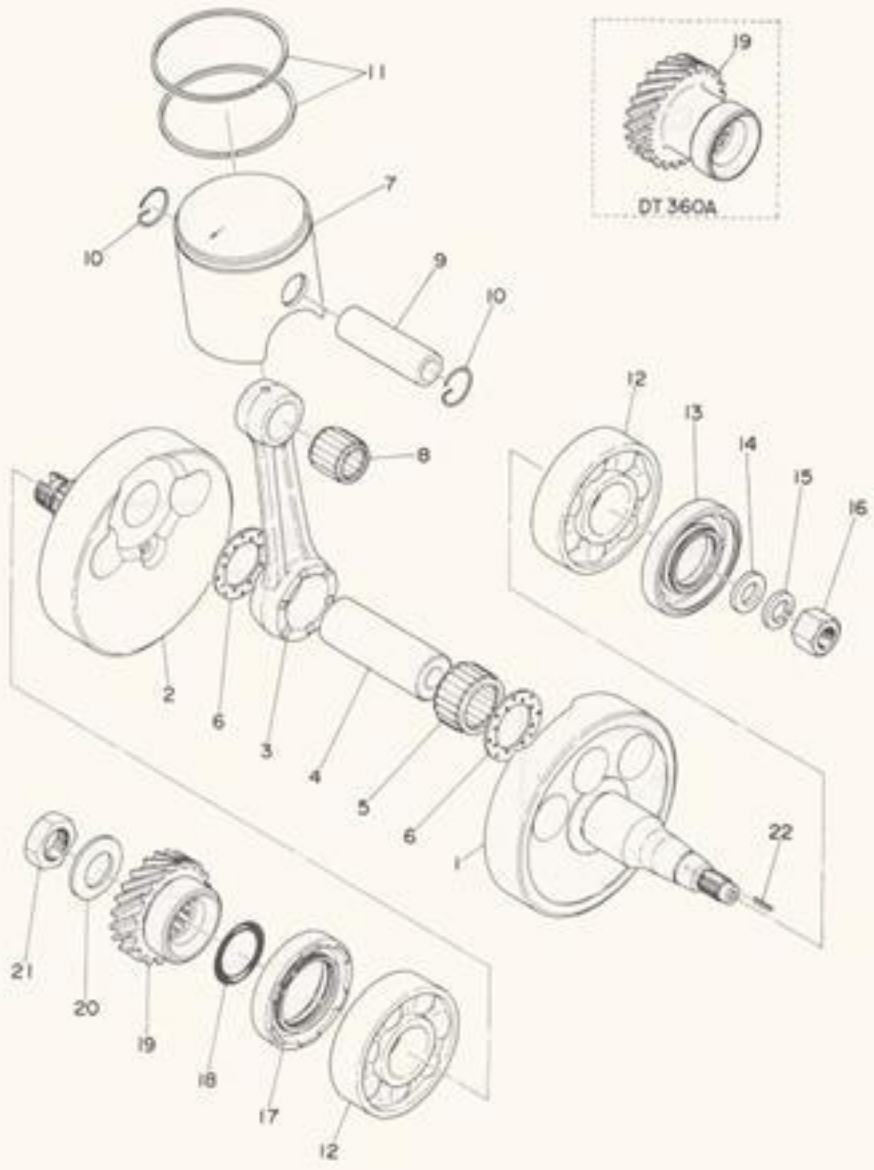


Fig. 3-136

Crank Piston



1. Left crank
2. Right crank
3. Connecting rod
4. Crank pin
5. Con-rod big end bearing
6. Crank pin washer
7. Piston
8. Con-rod small end bearing
9. Piston pin
10. Piston pin clip
11. Piston ring set
12. Bearing (B6306)
13. Oil seal (SW-30-62-10)
14. Washer 1
15. Spring washer
16. Crank shaft nut
17. Oil seal (SW-40-62-10) (DT250A)
    Oil seal (SW-38-62-10) (DT360A)
18. O-ring (3.1-24.4)
19. Primary drive gear
20. Belleville spring
21. Crank shaft nut
22. Woodruff key

Fig. 3-137

B. Crankshaft Assembly

1. Removal and Disassembly

a. Remove crankshaft assembly with the crankcase separating tool.

Note:

Fully tighten bolts of the crankcase separating tool, and keep tool body parallel with crankcase surface.

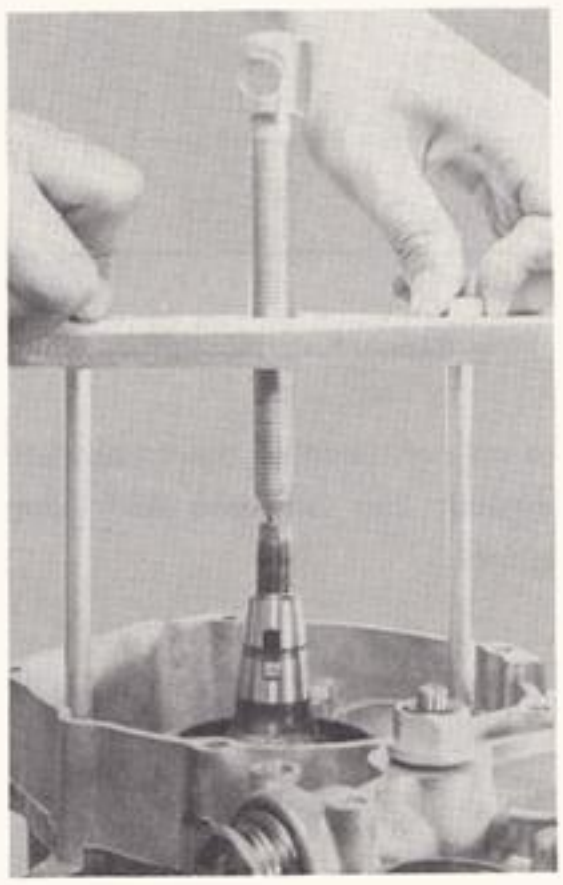


Fig. 3-138

2. Check crankshaft components per chart.

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 0.08 in. (2 mm).	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 Re-assembly Should be within 0.032 ~ 0.04 in. (0.8 ~ 1.0 mm).
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 0.016 ~ 0.020 in. (0.4 ~ 0.5 mm).	If Excessive Axial Play is Present, 0.024 in. (0.6 mm, or More) disassemble the Crankshaft and Replace Any Worn Parts.
Check Accuracy of the Crankshaft Assembly Runout. (Misalignment of Parts of the Crankshaft.)	Dial Gauge Readings Should be within 0.0012 in. (0.03 mm).	Correct Any Misalign-ment by Tapping the Flywheel with a Brass Hammer and by Using a Wedge.

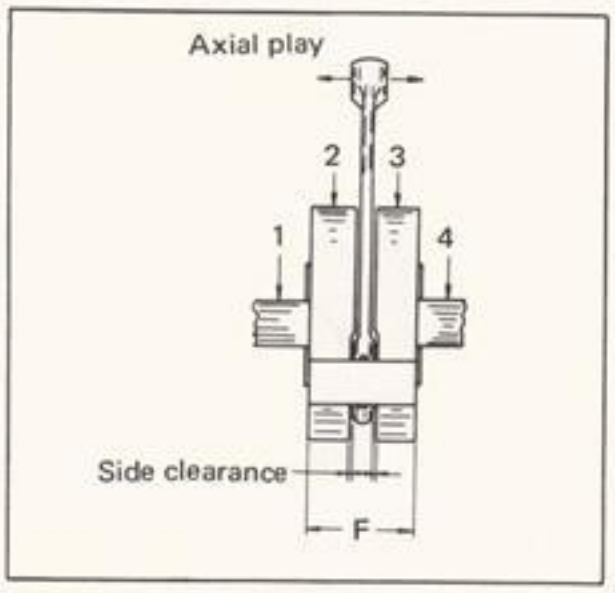


Fig. 3-139

Fig. 3-140

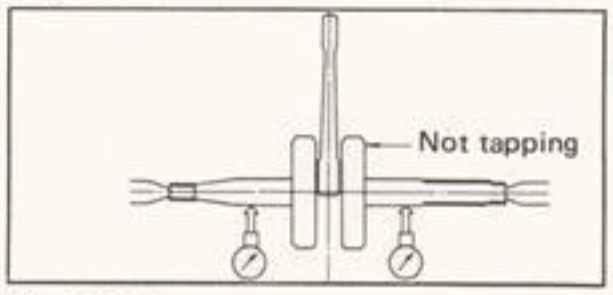


Fig. 3-141

Crankshaft Specifications

Unit : in.
Unit : (mm)

Model	Deflection Tolerance				Flywheel Width	Rod Clearance			
						Axial		Side	
	1	2	3	4	F	New	Max.	Min.	Max.
DT250A	0.0012 (0.03)	–	–	0.0012 (0.03)	64 +0.020 −0.050	0.032 ~ 0.04 (0.8 ~ 1.0)	0.08 (2.0)	0.016 (0.4)	0.020 (0.5)
DT360A	0.0012 (0.03)	–	–	0.0012 (0.03)	64 +0.020 −0.050	0.032 ~ 0.04 (0.8 ~ 1.0)	0.08 (2.0)	0.016 (0.4)	0.020 (0.5)

C. Reinstalling Crankshaft Assembly

1. Put shim on right side of the crankshaft, and install the crankshaft into left case half using crankshaft installing tool.

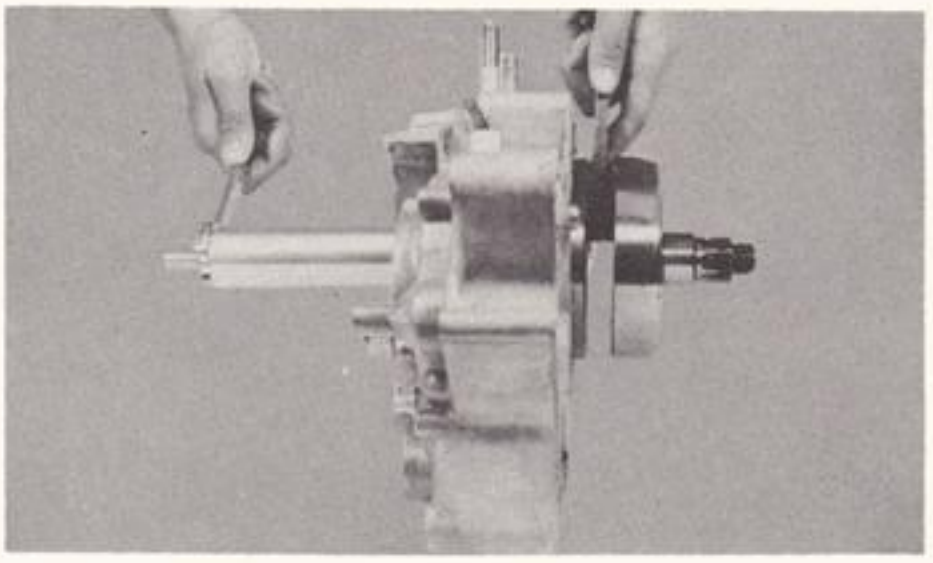


Fig. 3-142

2. Hold the connecting rod at top dead center with one hand while turning the handle of the installing tool with the other.

3. During reassembly, apply a liberal coating of two-stroke oil to the piston pin and bearing. Apply several drops of oil to the connecting rod, bid end. Apply several drops of oil into each crankshaft bearing oil delivery hole.

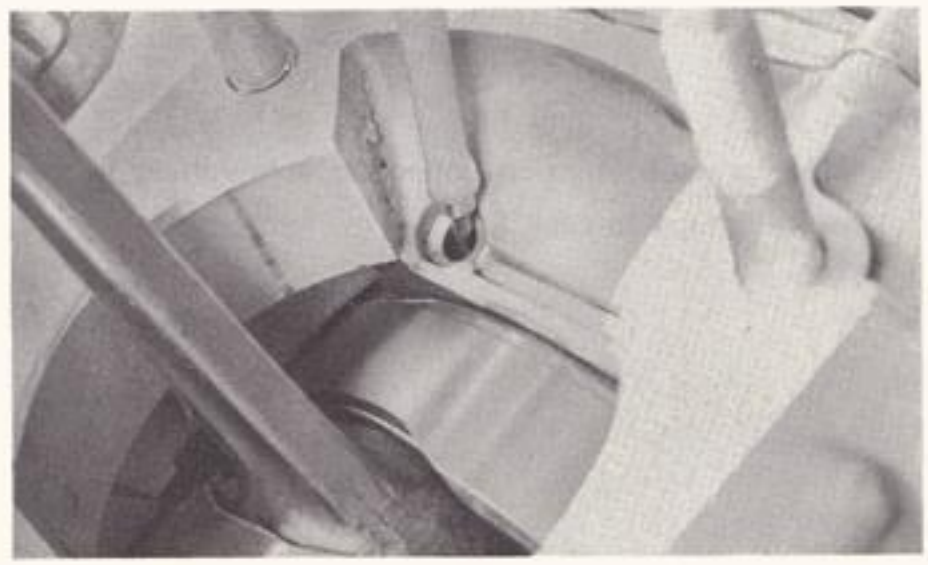
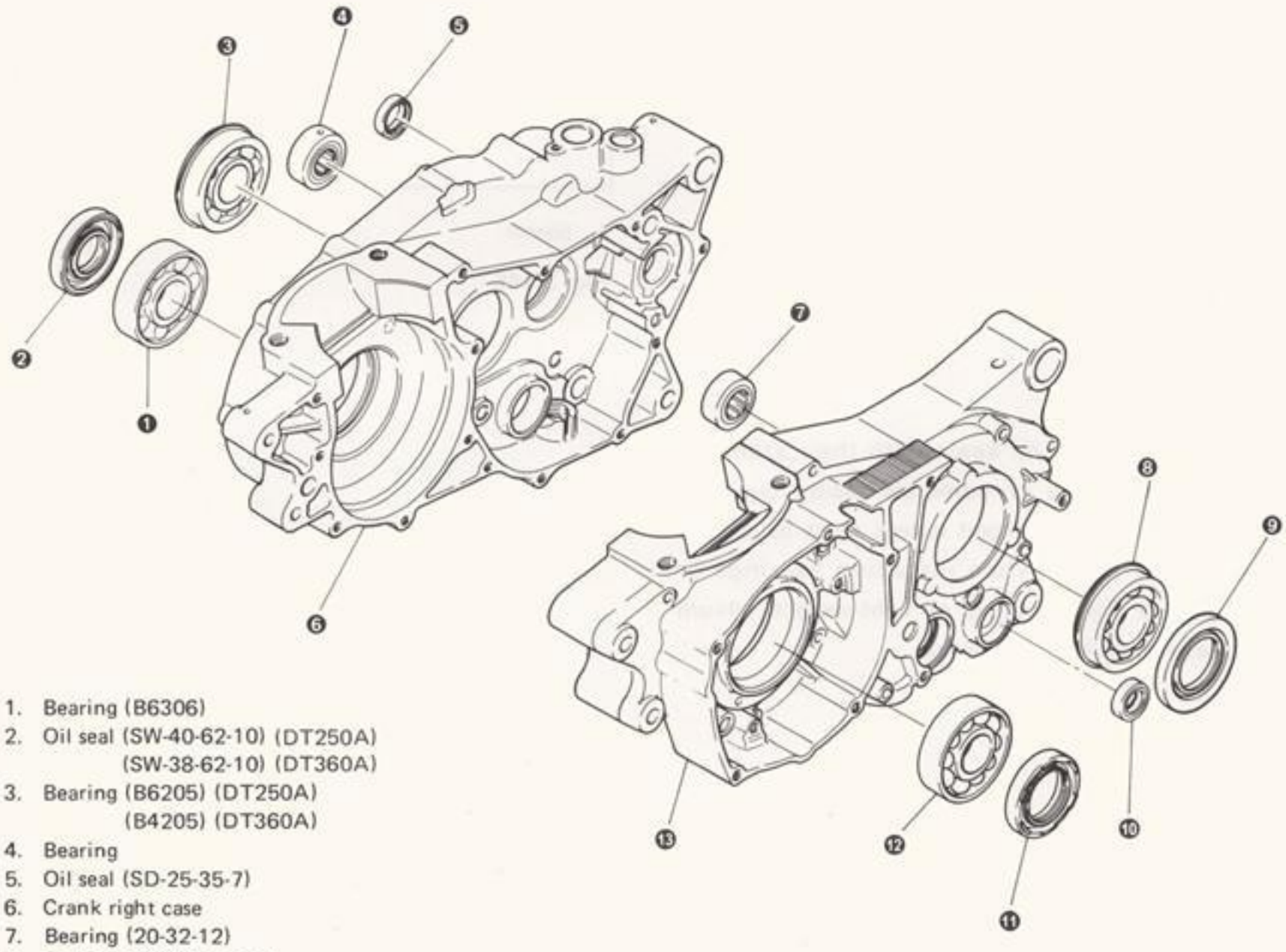


Fig. 3-143

3-18. Bearing and Oil Seals



1. Bearing (B6306)
2. Oil seal (SW-40-62-10) (DT250A)
   (SW-38-62-10) (DT360A)
3. Bearing (B6205) (DT250A)
   (B4205) (DT360A)
4. Bearing
5. Oil seal (SD-25-35-7)
6. Crank right case
7. Bearing (20-32-12)
8. Bearing (B6305 special)
9. Oil seal (SD-35-62-6)
10. Oil seal (SD0-14-24-6)
11. Oil seal (SW-30-62-10)
12. Bearing (B6306)
13. Crank left case

Fig. 3-144

A. Removal

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

Note:

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

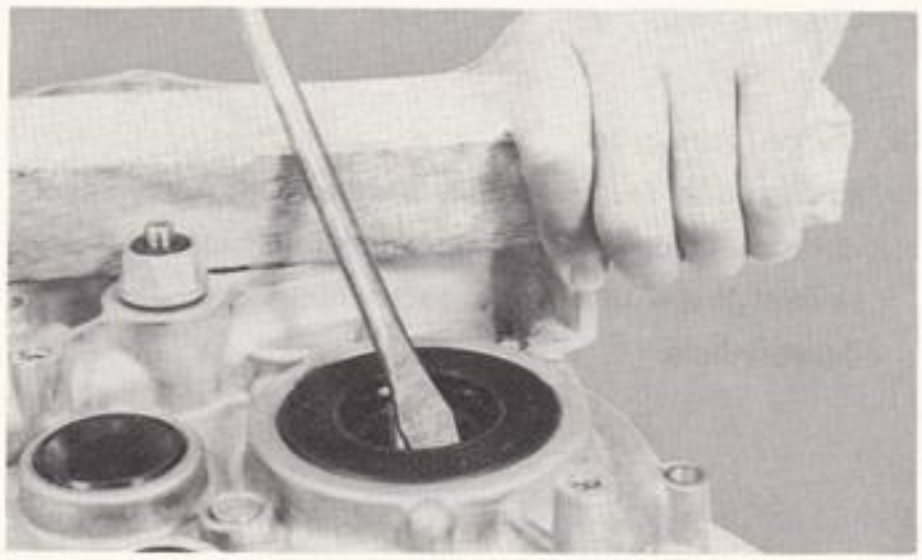
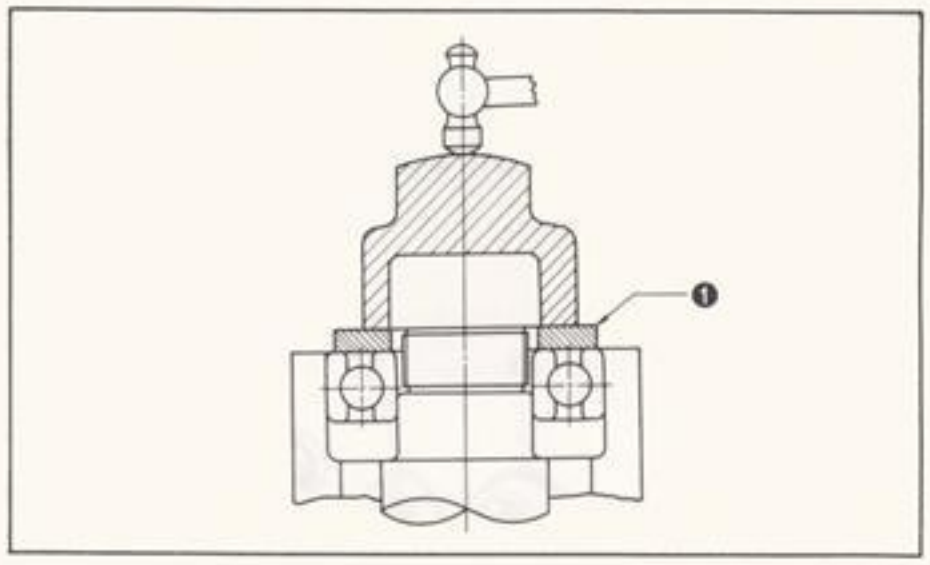


Fig. 3-145

2. Drive out bearings with a bearing tool.

Note:

Bearings are most easily removed or installed if the cases are first heated to approximately 200° - 250° F. However, cold removal and installation may be done satisfactorily.



1. Spacer

Fig. 3-146

B. Installation

1. Install bearings and oil seals with their stamped manufacturer's marks or numerals facing outward. (In other words, the stamped letters must be on the exposed view side). When installing bearings or seals, apply a light coating of light-weight lithium base grease to balls and seal lips.

CHAPTER 4. CARBURETION

4-1. Special Tools

A. Vernies Calipel
P/N 90890-03004

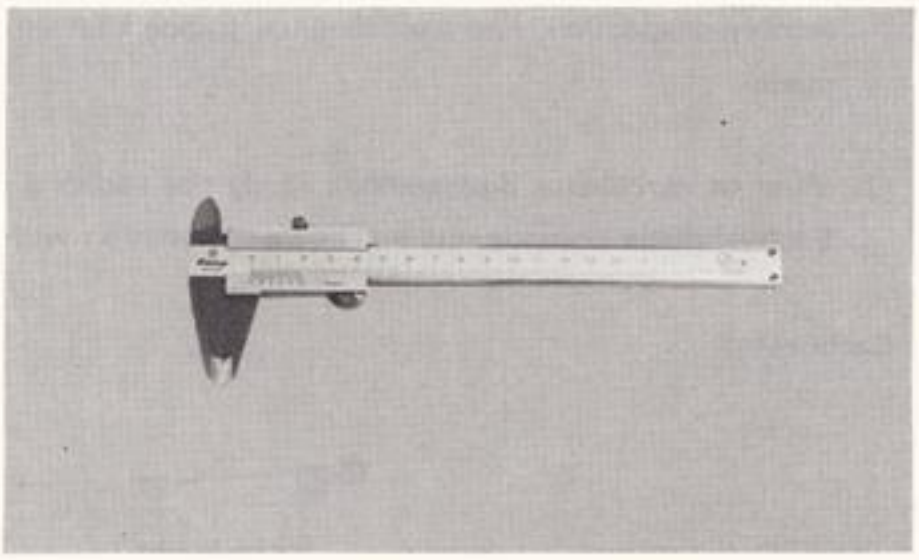


Fig. 4-1

4-2. Air Filter

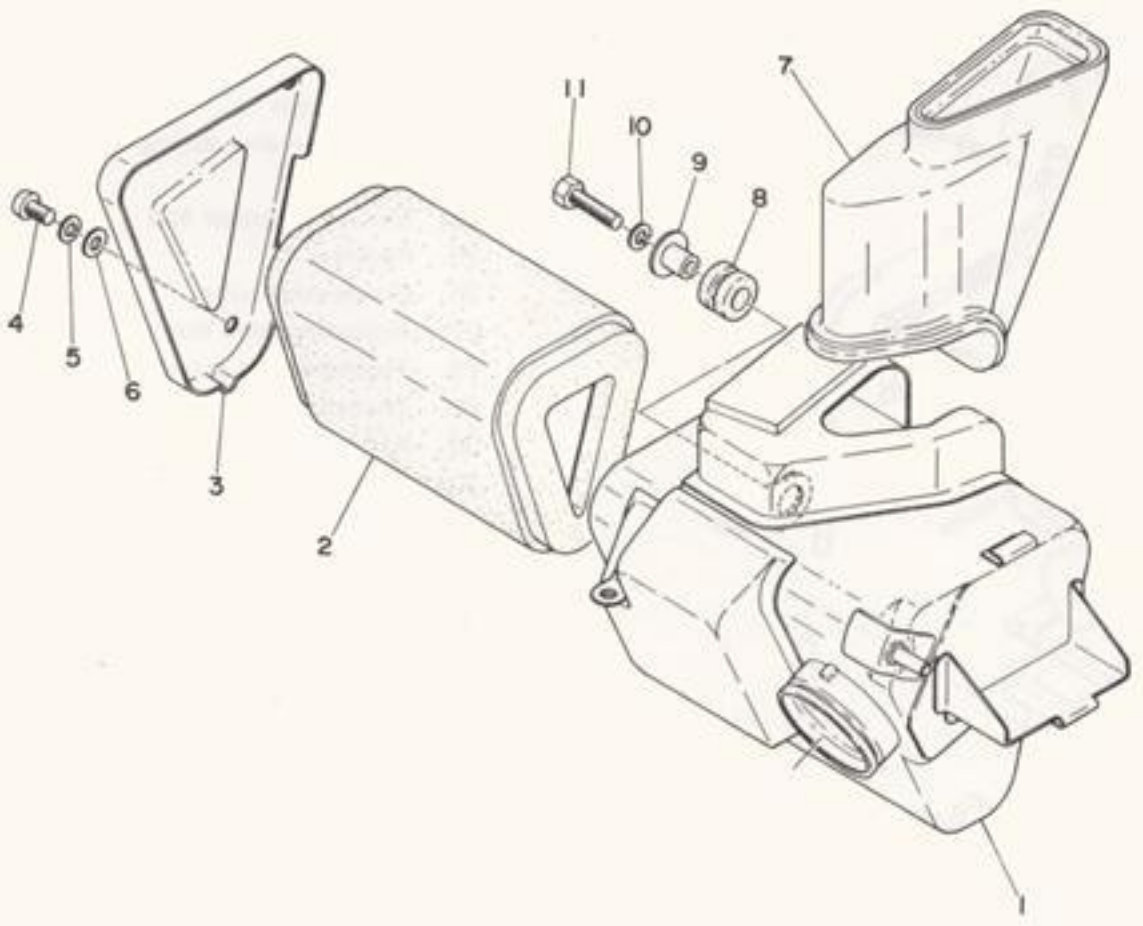
A. Description

1. The air filter is housed within a iron chamber below the oil tank.

2. The filter is made of Polyurethene foam with a stiff bristle covering.

3. For carburetion to function properly, the filter must be in place; must be clean; and must be damp with oil to provide adequate protection to vital engine parts.

Air Cleaner



1. Air cleaner case
2. Air cleaner element
3. Case cap
4. Pan head screw
5. Spring washer
6. Washer
7. Duct
8. Battery box damper 1
9. Fender collar
10. Spring washer
11. Bolt

Fig. 4-2

4. For air filter maintenance see Chapter 2, Section 2-D.

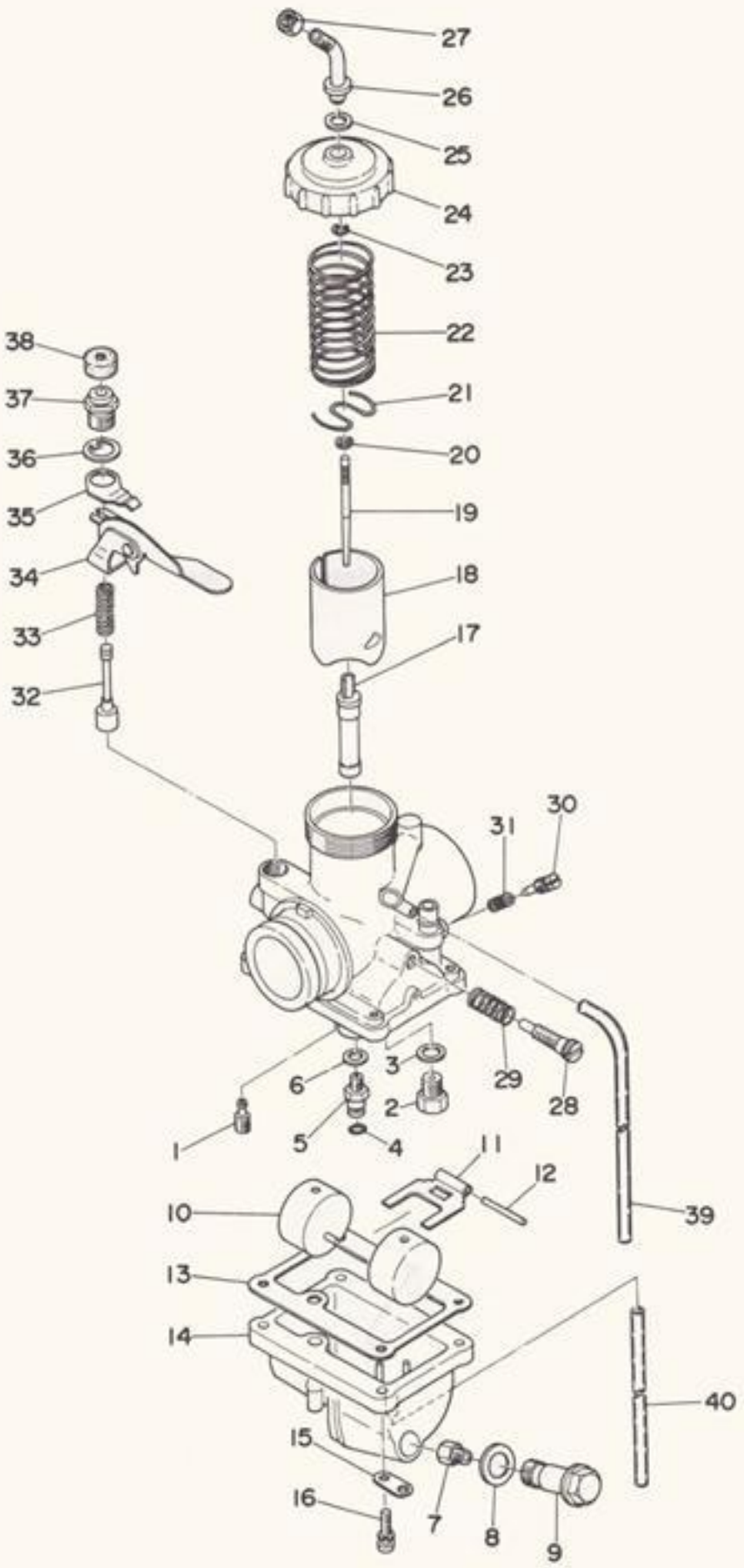
4-3. Carburetor

A. Description

1. The carburetor is of primary concern to proper engine operation. Considerable care should be taken during disassembly, inspection, and maintenance to see that all circuits are working correctly and that all adjustments properly made.

2. Prior to carburetor disassembly, study the sections on air filter, spark plug, Autolube and ignition timing thoroughly. Each of these components works in conjunction with the carburetor to provide maximum performance and longevity.

Carburetor



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

Fig. 4-3

B. Removal and Disassembly

1. Turn fuel petcock lever to the "OFF" position.

2. Remove the gasoline tank fuel line from fitting at carburetor.

Fig. 4-4

3. Loosen the hose clamps holding the carburetor to the air filter and intake joint rubbers.

Note:

For carburetor main jet replacement only, follow steps 1 through 3; then:

a. Rotate carburetor, exposing main jet cover bolt.

b. Remove bolt. Main jet is located directly behind bolt.

Fig. 4-5

Caution:

Removing the main jet cover bolt will allow the fuel in the float bowl to drain. Do not remove if engine is hot. Place a rag under carburetor to catch overflow. Remove bolt in well-ventilated area. Do not remove near open flame. Always clean and dry machine after reassembly.

c. Main jet screws into main nozzle body. Using a 6mm socket or "Spin-tite," remove main jet. Change as required. Re-install cover bolt and reassemble, reversing steps 1 through 3.

Main Jet Size (STD)	
DT250A	#140
DT360A	#180

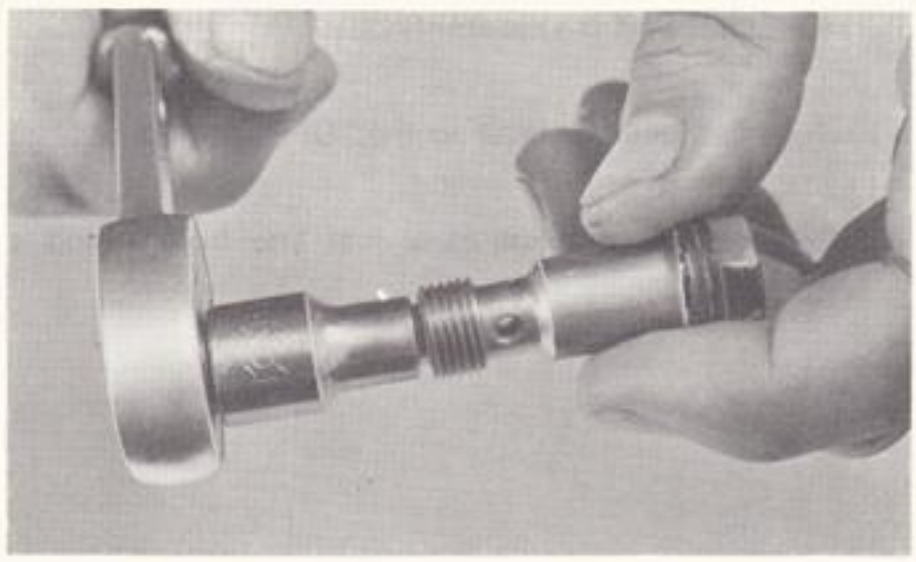


Fig. 4-6

4. Push the air cleaner joint (hose) off the carburetor inlet.

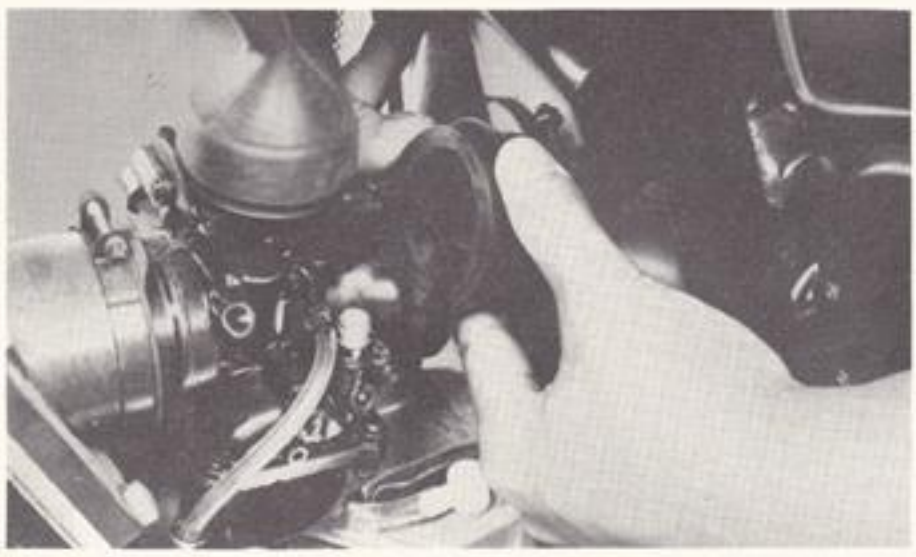


Fig. 4-7

5. Rotating the carburetor body, work it off the cylinder manifold joint.

Fig. 4-8

6. Nothing the presence, location and routing of all vent and overflow tubes, pull the carburetor toward you.

7. Lift the carburetor clear of the engine, push the mixing chamber cover off.

Fig. 4-9

8. Unscrew the mixing chamber top. Remove the slide and needle assembly.

Fig. 4-10

9. Remove main jet cover bolt and drain float bowl fuel into suitable container.

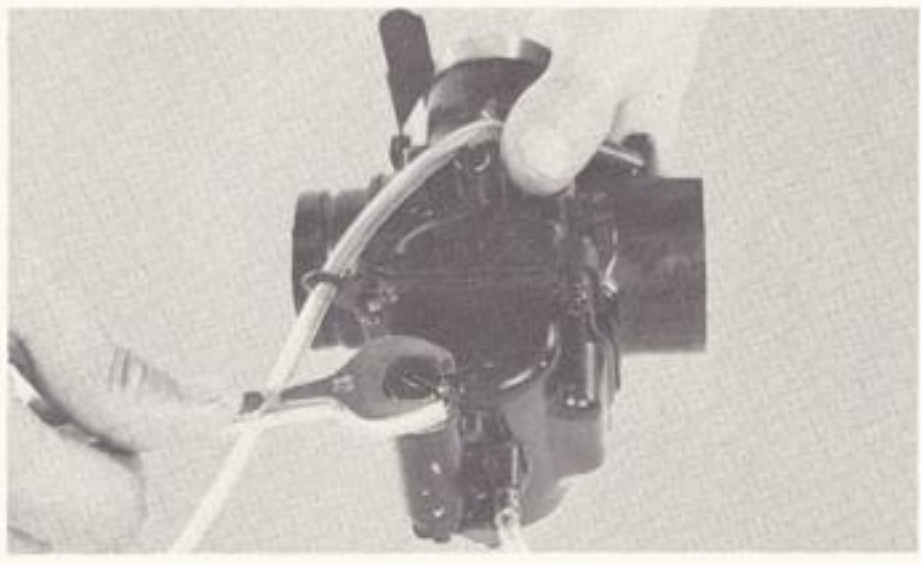


Fig. 4-11

10. Remove the Phillips screws (4) holding float bowl to body. With carburetor in upright position, remove float bowl.

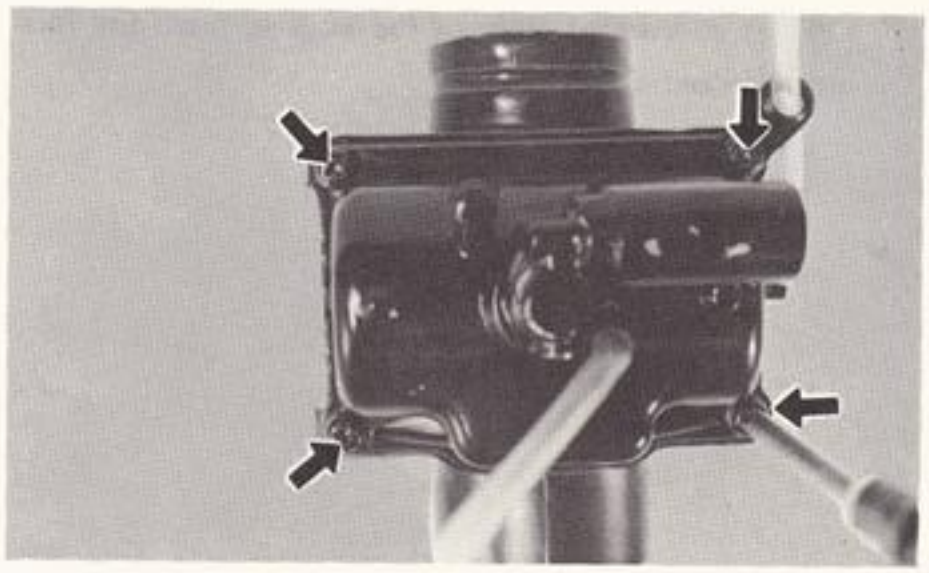


Fig. 4-12

11. Carefully set body aside and inspect each independent float within the float bowl cavity. Note their installation position. The float arm pin must be on the lower side of the float and in, toward the center.

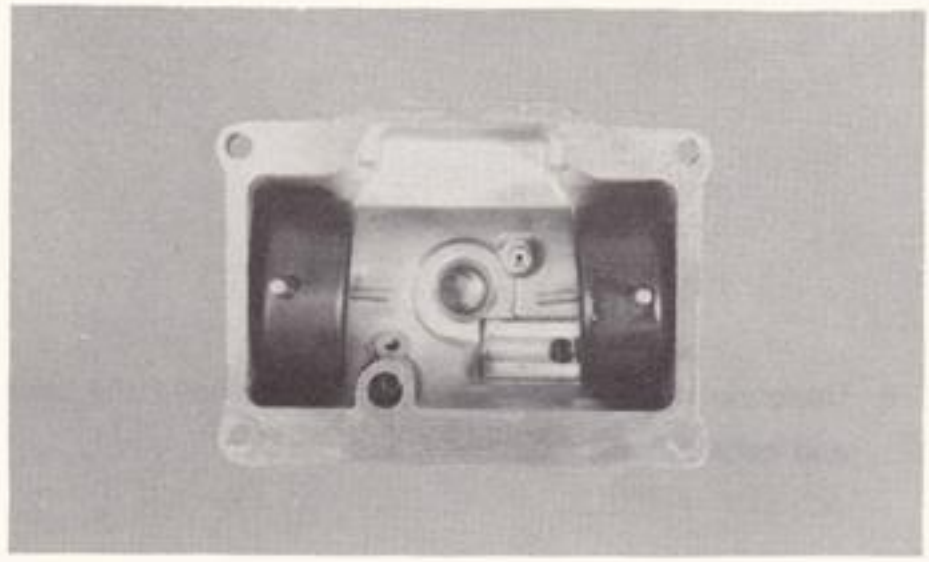


Fig. 4-13

12. Remove each float. If fuel has enterd a float, replace it. If a pin is loose or missing, or if the floats are damaged in any fashion, replace.

13. On the carburetor body, remove the pin securing the float arm.
Remove the arm.

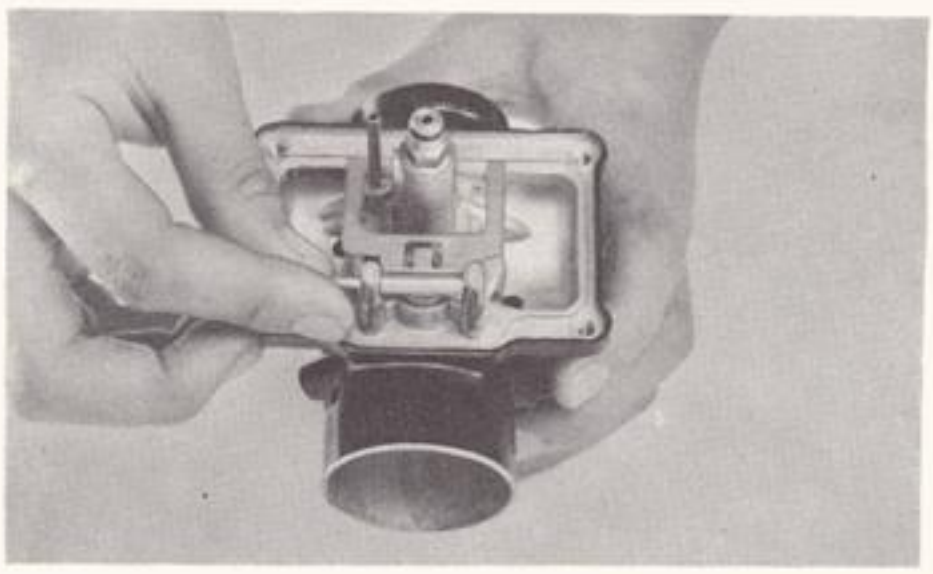


Fig. 4-14

14. Remove the inlet needle directly beneath the float arm tang.
    Inspect the needle and seat for signs of excessive wear or attached foreign particles.
    Replace as required. Always replace inlet needle and inlet valve seat as an assembly.

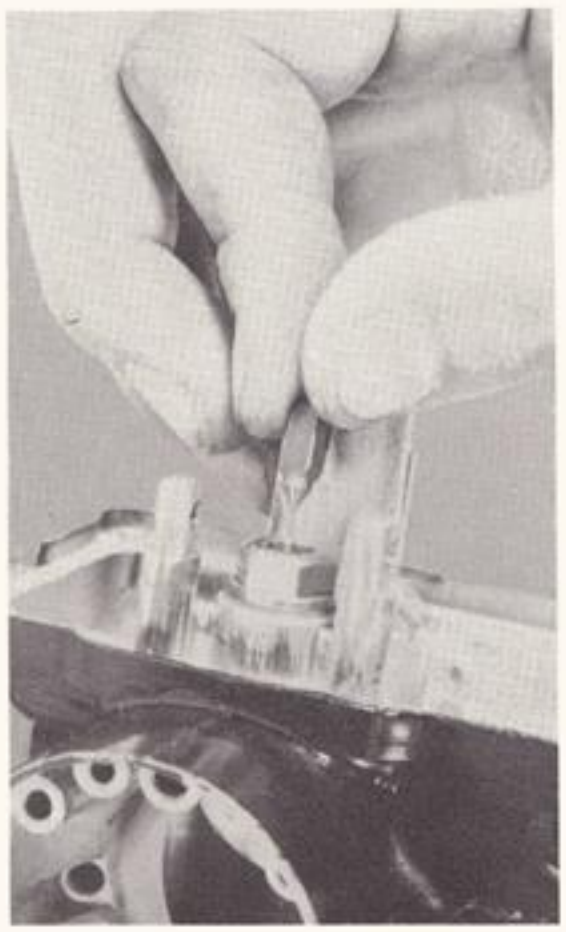


Fig. 4-15

15. Remove in order, the following components:

    a. Main Jet

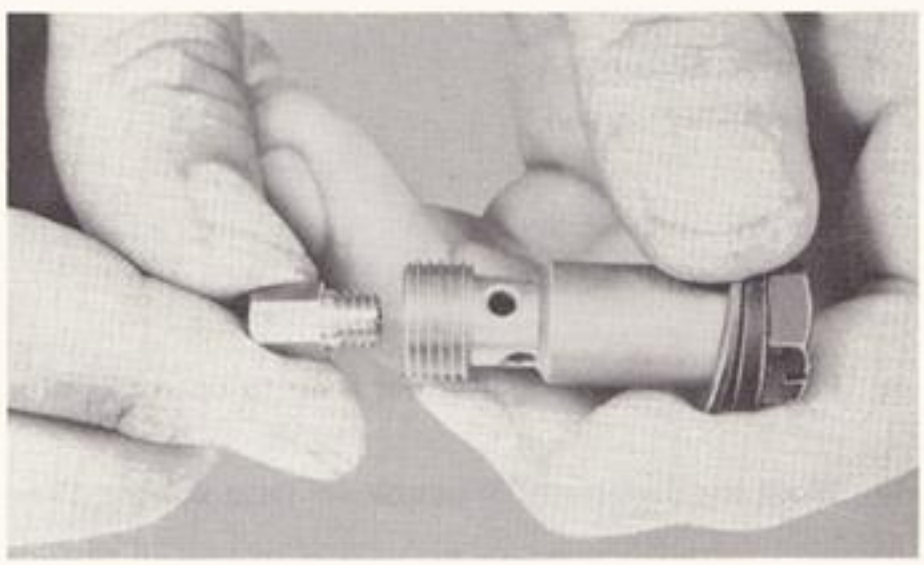


Fig. 4-16

    b. Pilot Jet

Fig. 4-17

c. Main Nozzle
(push from bottom through venturi).

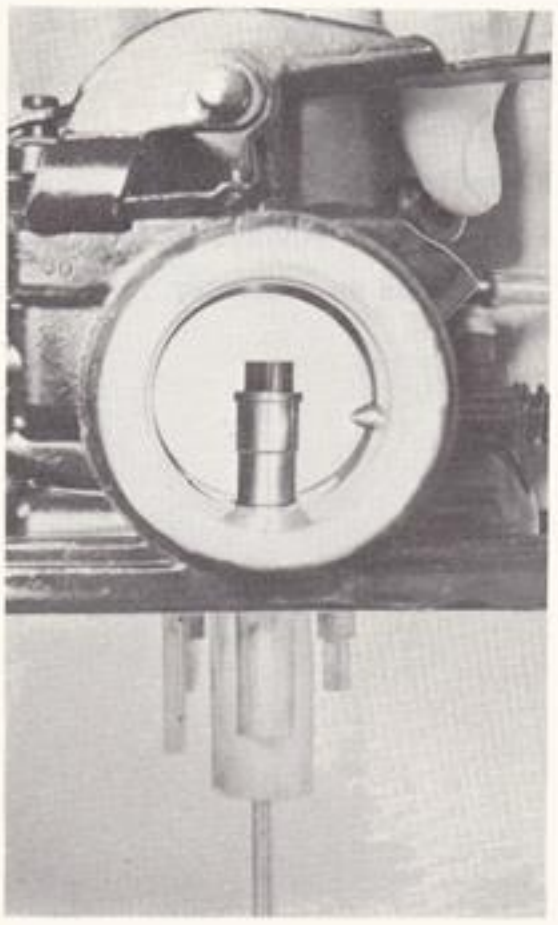


Fig. 4-18

d. Throttle Screw
(Idle Speed Screw).

e. Air Adjusting Screw
(Idle Mixture Screw).

16. Push down on the Starter Jet lever to open the circuit.

17. Wash the carburetor in petroleum base solvent. Wash all associated parts.

Note:

It is rarely necessary to "boil" the carburetor in a warm or hot carburetor bath. If deposits warrant this procedure, remove the Starter Jet Assembly to avoid damaging the jet's neoprene valve seat.

18. Using high pressure air, blow out all passages and jets.

Note:

Never direct high pressure air into carburetor with float bowl installed.
Damage to floats may occur.

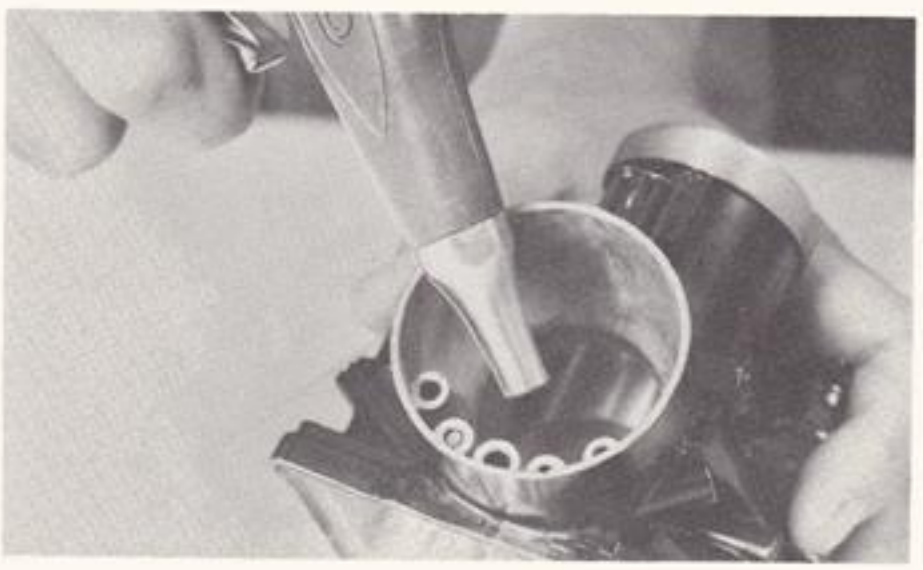


Fig. 4-19

19. Re-install all components with the exception of the float bowl.

Carburetor Specifications			
Part Name	Abbrev.	Model	
		DT250A	DT360A
Manufacturer - Model	–	Mikuni VM28SS	Mikuni VM30SS
I.D. Number	–	43860	44560
Venturi Size	–	1.12 ϕ in. (28 ϕmm)	1.2 ϕ in. (30 ϕ mm)
Main Jet	M. J.	#140	#180
Needle Jet	N. J.	0 – 0	0 – 8
Jet Needle/Clip Position	J. N.	5DP7-3	5EJ8-3
Cut Away	C. A.	2.0	3.0
Pilot Jet	P. J.	#60	#50
Air Jet	A. J.	2.5ϕ	(Drill 2.5ϕ)
Starter Jet	S. J.	#60	#60
Air Screw (Turns Out)	A. S.	1-1/2	1-1/2
Idle Speed (r.p.m.)	–	1,200 ~ 1,300	1,200 ~ 1,300
Float Level	F. L.	0.692 ± 0.10 in. (17.3 ± 2.5mm)	0.692 ± 0.10 in. (17.3 ± 2.5mm)

C. Troubleshooting and Repair

Cylinder porting, combustion chamber compression, ignition timing, muffler design, and carburetor size and component selection are all balanced to achieve optimum performance. However, variations in temperature, humidity and altitude, to name a few, will affect carburetion and consequently, engine performance.
The following list gives each of the major components of the carburetor that can be readily changed in order to modify carburetor performance if required.

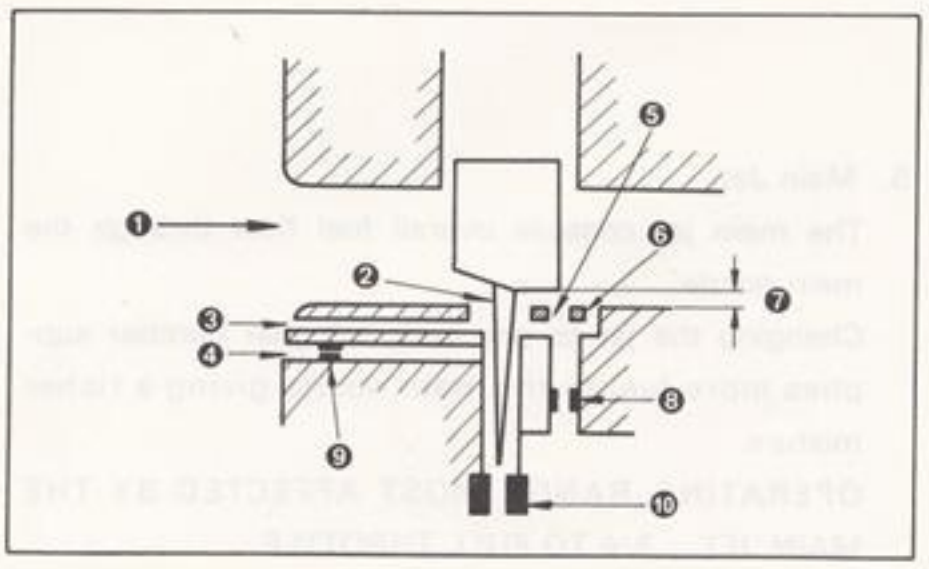
Note:

See "Mechanical Adjustment" for additional carburetor adjustments.

1. Idle Air Mixture Screw

   Controls the ratio of air to fuel in the idle circuit. Turning the screw in decreases the air supply giving a richer mixture. Normally, for Trials competition, the idle mixture screw is backed out to a lean position.

   OPERATING RANGE MOST AFFECTED BY THIS ADJUSTMENT: ZERO TO 1/8 THROTTLE



1. Main air
2. Jet needle
3. Pilot air
4. Bleed air
5. Bypass
6. Pilot outlet
7. Opening 0 to 1/8
8. Pilot jet
9. Air jet
10. Main jet

Fig. 4-20

2. Pilot Jet

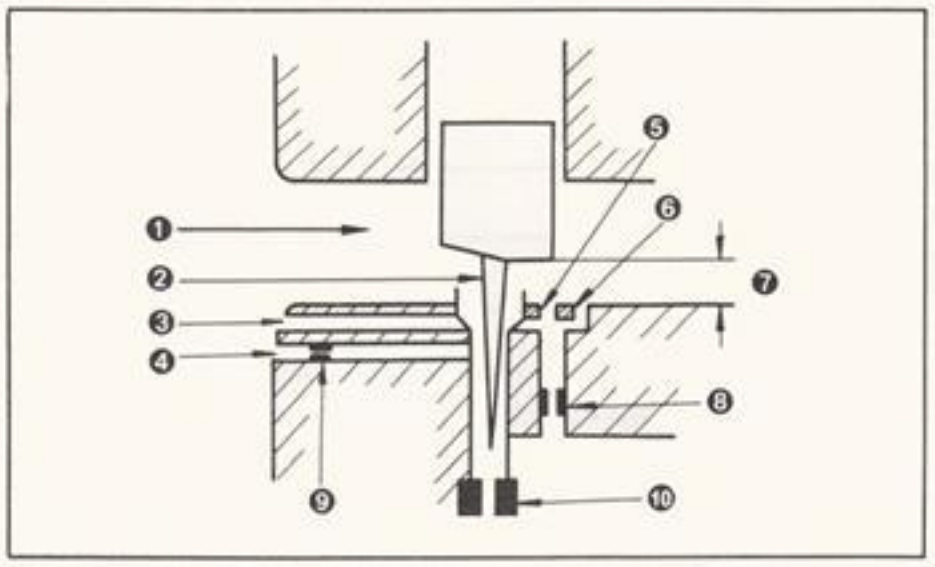
Controls the ratio of fuel to air in the idle circuit. Changing the jet to one with a higher number supplies more fuel to the circuit giving a richer mixture.

OPERATING RANGE MOST AFFECTED BY THIS JET: ZERO TO 1/8 THROTTLE.

3. Throttle Valve (Slide):

The throttle valve (slide) has a portion of the base cut away to control air flowing over the main nozzle. A wider angle (more "cutaway") will create a leaner mixture. Throttle valves are numbered according to the angle of the cutaway. The higher the number, the more cutaway, the leaner the mixture.

OPERATING RANGE MOST AFFECTED BY THE THROTTLE VALVE: 1/8 TO 1/4 (+) THROTTLE.



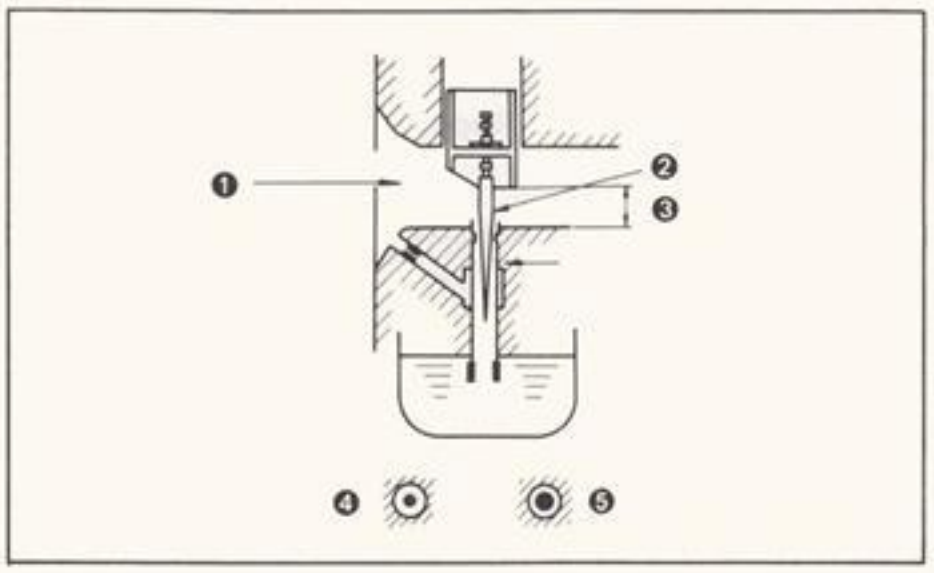
1. Main air
2. Jet needle
3. Pilot air
4. Bleed air
5. Bypass
6. Pilot outlet
7. Opening 1/8 to 1/4
8. Pilot jet
9. Air jet
10. Main jet

Fig. 4-21

4. Jet Needle

The jet needle is fitted within the throttle valve. The tapered end of the needle fits into the main nozzle outlet. Raising the needle allows more fuel to flow out of the nozzle outlet giving a richer mixture. There are five circlip grooves at the top of the needle. Moving the needle clip from the first, or top groove, through the fifth, or bottom groove, will give a correspondingly richer mixture.

OPERATING RANGE MOST AFFECTED BY THE JET NEEDLE: 1/4 TO 3/4 (+) THROTTLE.



1. Main air
2. Jet needle
3. Opening 1/4 to 3/4
4. 3/4
5. 1/4

Fig. 4-22

5. Main Jet

The main jet controls overall fuel flow through the main nozzle.

Changing the jet to one with a higher number supplies more fuel to the main nozzle giving a richer mixture.

OPERATING RANGE MOST AFFECTED BY THE MAIN JET: 3/4 TO FULL THROTTLE.

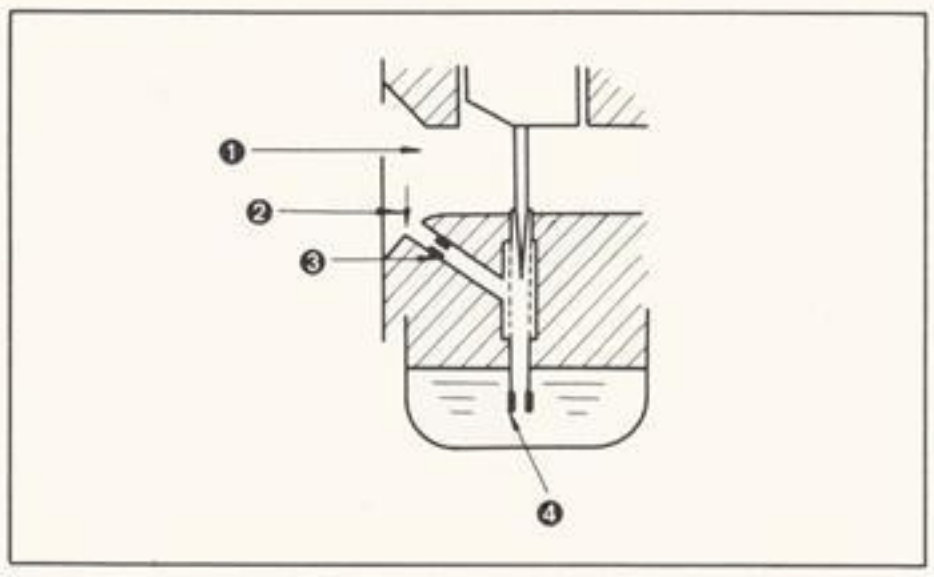


Fig. 4-23

1. Main air
2. Bleed air
3. Air jet
4. Main jet

Note:

Excessive changes in main jet size can affect overall performance.

Caution:

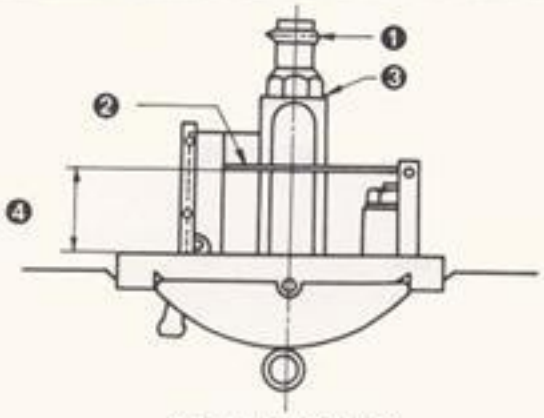
The fuel/air mixture ratio is a governing factor upon engine operating temperature.
Any carburetor changes, whatsoever, must be followed by a thorough test of spark plug temperature during actual engine operation.

6. Float Level

a. Float level is one factor within the carburetor which will change with use.

b. If float level within the carburetor float chamber body decreases, the fuel/air mixture ratio will be leaner. If the level increases, mixture will be richer.

c. The level is set according to the design of the carburetor and float bowl chamber. Under no circumstances should float level be altered in an attempt to correct a performance problem. Look for the problem in other, related components or carburetor circuits.



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

1. Rubber "O" ring CRITICAL/Must be in good condition.
2. Float arm lever
3. Carburetor body surface
4. Flont level

Fig. 4-24

d. Using a vernier caliper, measure the distance of the float arm from the top of the float chamber gasket seat (gasket removed) to the float arm.

Float level:
0.692±0.10 in. (17.3±2.5 mm)

Note:

The float arm should be just resting on, but not depressing, the spring loaded inlet needle.

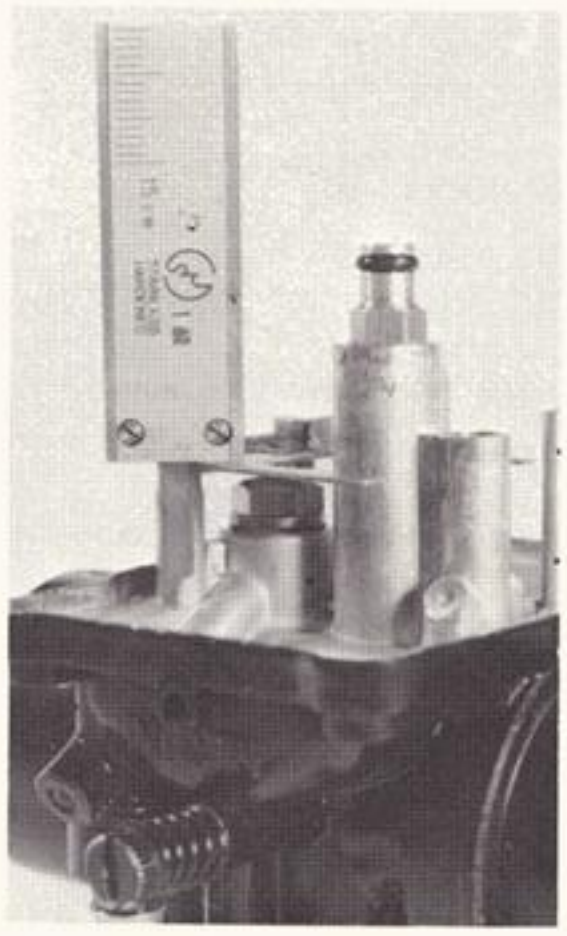


Fig. 4-25

e. To correct float arm height, bend the tang a slight amount as required.
Both the right and left sides of the float arm should measure indentically.
Correct as required.

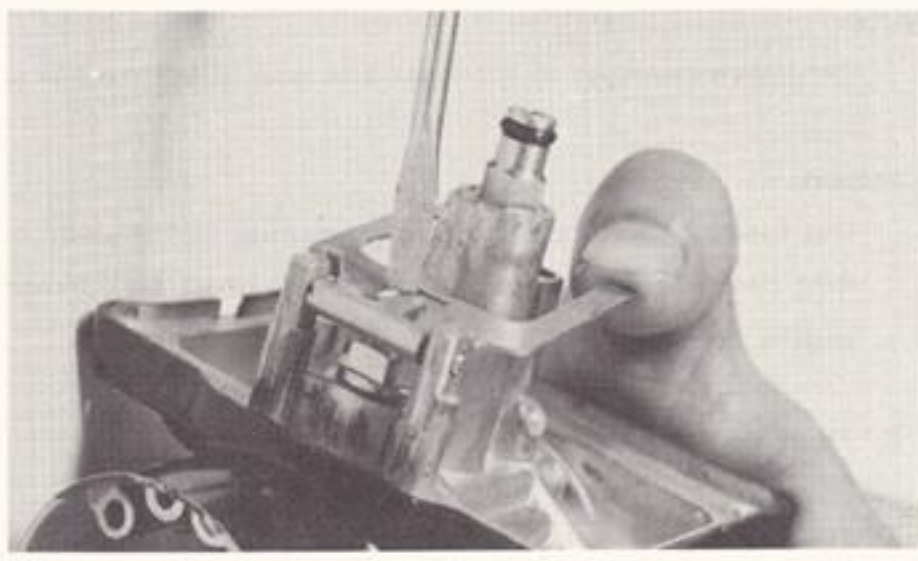


Fig. 4-26

D. Reassembly and Installation

1. Install the float bowl and main jet cover bolt.

2. Moving to machine, push needle out of seat in throttle valve (slide). Inspect for signs of bending, scratches or wear.
Replace as required.

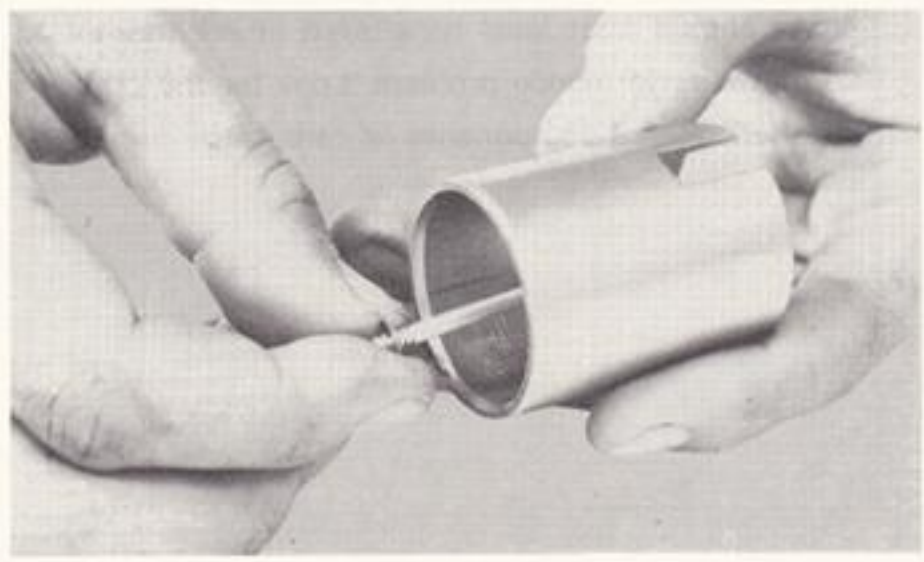


Fig. 4-27

3. Check needle clip position.
Clip position is counted starting with the first clip groove at the top of the needle.

	DT250A	DT360A
Jet Needle Type:	5DP7	5EJ8
Clip Position:	3	3

4. Check throttle valve (slide) for signs of wear. Insert into carburetor body and check for free movement. If slide, or body, is out of round causing slide to stick, replace.

5. Install throttle valve and needle assembly in carburetor mixing chamber. Tighten mixing chamber top as tight as possible by hand.
Do not use pliers or vice-grips as they may deform the mixing chamber shape, causing the throttle valve to stick during operation.

6. Install the mixing chamber top cover and all overflow and vent tubes. Re-install carburetor.
Check position and routing of all tubes. Check tightness of all fittings. Make sure carburetor is mounted in a level position.

7. After installation, re-adjust throttle cable and Autolube pump cable per directions in "Mechanical Adjustments."

4-4. Reed Valve Assembly

A. Description

1. Yamaha has designed a unique stainless steel reed valve located between the carburetor and cylinder. The valve works independently on a demand basis. There's no mechanical device, such as a rotary valve or piston skirt to govern its opening and closing.

2. Construction of Reed Valve Assembly

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.

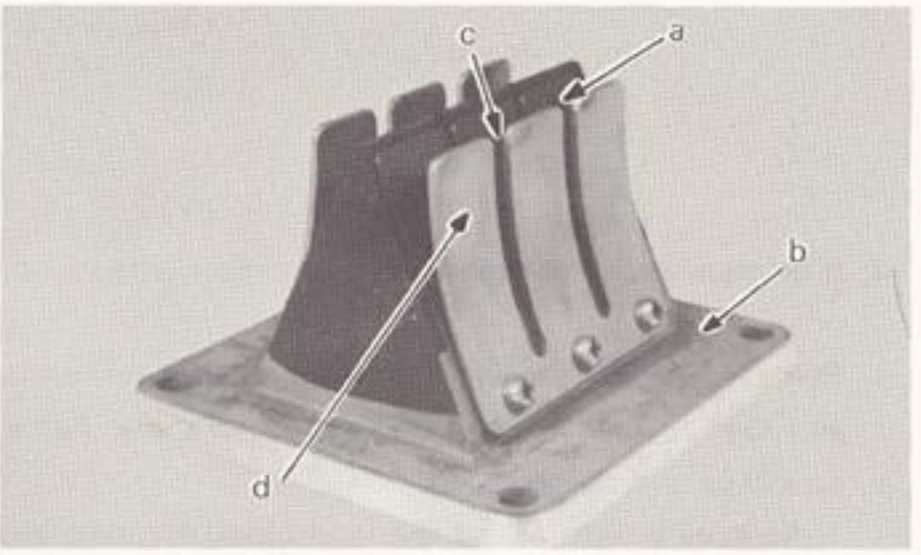


Fig. 4-28

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

3. Handling the Reed Valve

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

4. Storage

a. 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 touching the valve.

B. Removal and Troubleshooting

With carburetor removed, proceed as follows:

1. Remove the bolts (4) holding the intake manifold and reed valve assembly to cylinder.
Remove assembly.

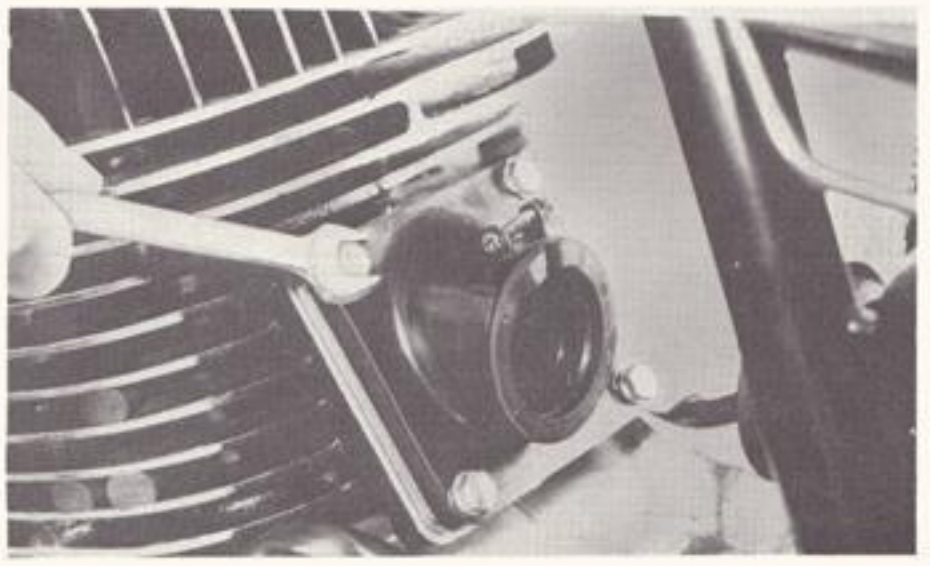


Fig. 4-29

2. Inspect rubber intake manifold for signs of weathering, checking or other deterioration.

3. Inspect reed petals for signs of fatigue cracks. Reed petals should fit flush or nearly flush against neoprene seats. If in doubt as to sealing ability, apply suction to carburetor side of assembly. Leakage should be slight to moderate.

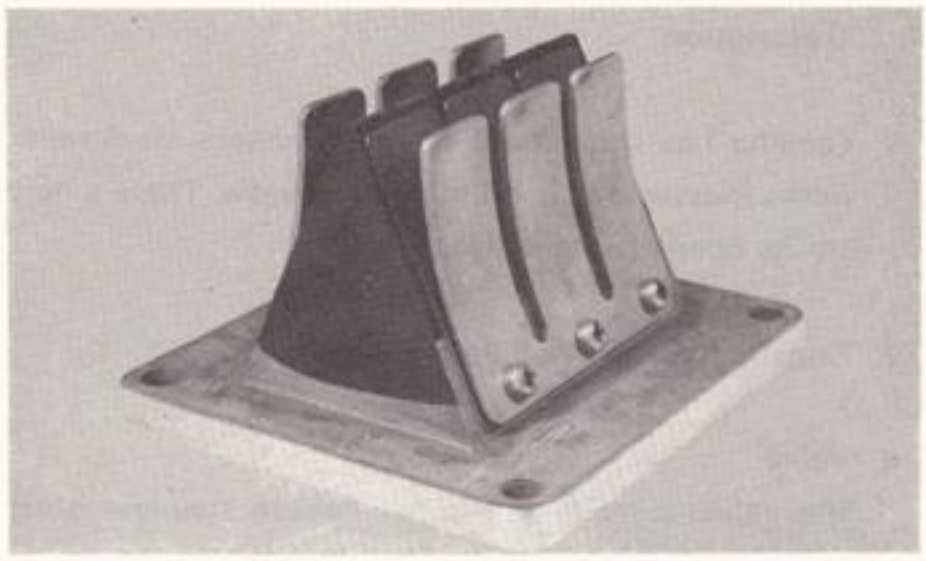


Fig. 4-30

4. If disassembly of the reed valve assembly is required, proceed as follows:

a. Remove Phillips screws (3) securing stopper plate and reed to reed block. Handle reed carefully. Avoid scratches and do not bend.
Note from which side of the reed block the reed and stopper plate were removed. Re-install on same side.

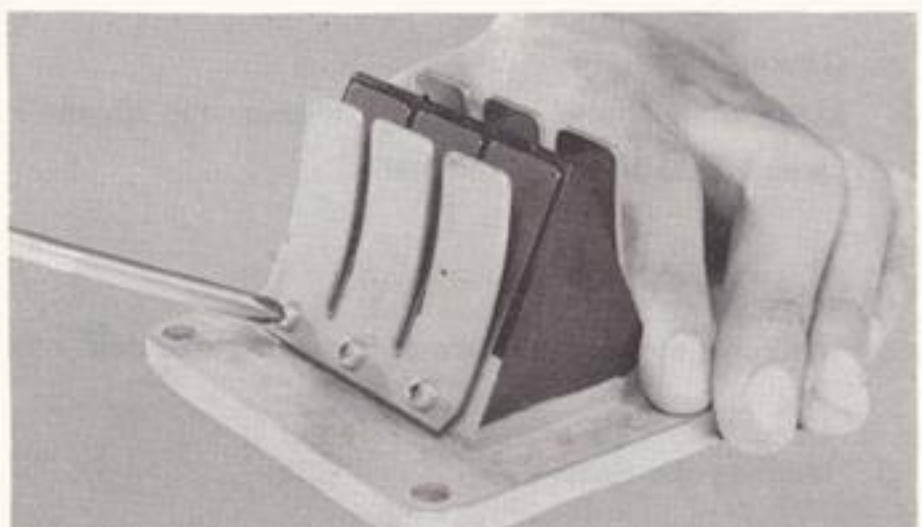


Fig. 4-31

b. During reassembly, clean reed block, reed, and stopper plate thoroughly. Apply a holding agent, such as "Lock-Tite," to threads of Phillips screws. Tighten each screw gradually to avoid warping.

Torque:
0.32 in.-lbs (8.0 kg-cm)

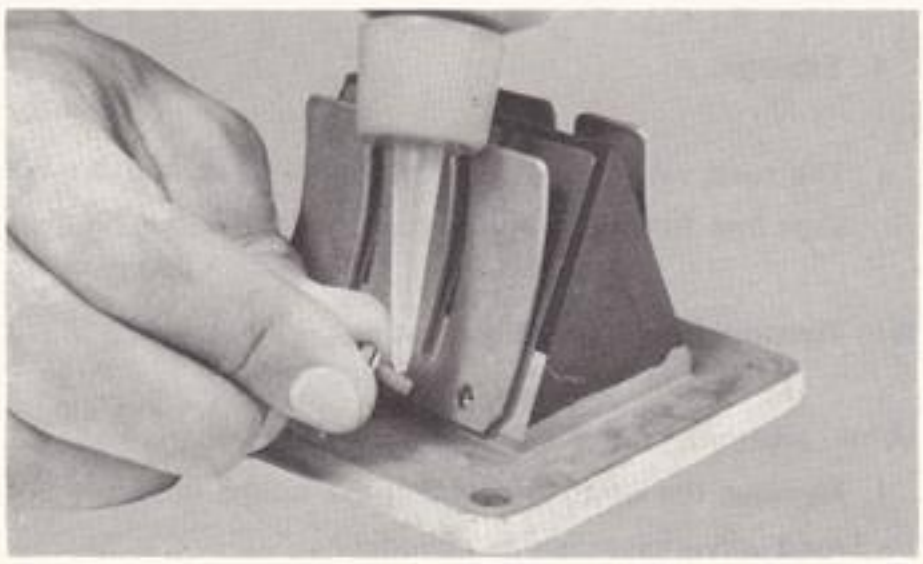


Fig. 4-32

Note:

During reassembly, note the cut in the lower corner of the reed and stopper plate. Use as aid to direction of reed installation.

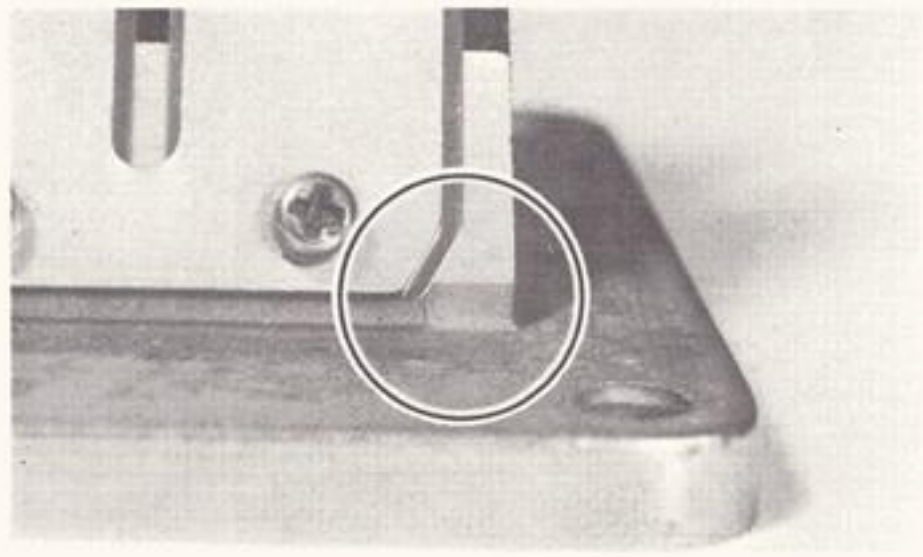


Fig. 4-33

5. During reassembly of the reed valve assembly and manifold, install new gaskets and torque the securing bolts gradually and in pattern. Tighten thoroughly.

CHAPTER 5. ELECTRICAL SYSTEM FOR DT250A AND DT360A

5-1. Special Tools

A. Pocket Tester

P/N90890-03029

Fig. 5-1

B. Electro Tester

P/N90890-03021

Fig. 5-2

5-2. Description

The DT250A/360A Series Electrical Systems are designed to facilitate lightweight functional 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.

The DT250A utilizes a Flywheel Magneto ignition system. The DT360A utilizes Capacitor Discharge. However, both models utilize a charging-coil which is excited by the magnetic flux of a rotating flywheel magneto.

Therefore, this chapter will discuss all portions of the electrical equipment that is similar on both models. For details regarding the ignition systems of each model, refer to the appropriate chapter.

A. Electrical Components

Part Name	DT250A		DT360A	
	Manufacturer	Type	Manufacturer	Type
Spark Plug	N.G.K	B-8ES	N.G.K.	B-9ES
Ignition Coil	Mitsubishi	F6T-40191	Mitsubishi	F6T-40191
Rectifier	Stanley	DE2340	Stanley	DE2340
Fuse	—	10A x 2PCS	—	10A x 2PCS
Battery	GS or FB	6N4B-2A or 6N4B-2A-3	GS or FB	6N4B-2A or 6N4B-2A-3
Rear Stop Switch	Asahi Denso	YST37S-001	Asahi Denso	YST37S-001
Head Light	—	6V 35W/35W	—	6V35W/35W
High Beam Ind. Bulb	—	6V 1.5W	—	6V 1.5W
Tail/Stop Light Bulb	—	6V 5.3W/17W	—	6V 5.3W/17W
Speedometer Bulb	—	6V 1.5W	—	6V 1.5W
Tachometer Bulb	—	6V 3W	—	6V 3W
Flasher Bulb(s)	—	6V 17W	—	6V 17W
Flasher Pilot Light	—	6V 3W	—	6V 3W
Flasher Relay	Nippon Denso	JEK-0070	Nippon Denso	JEK-0070

B. Connection Diagrams

DT250A

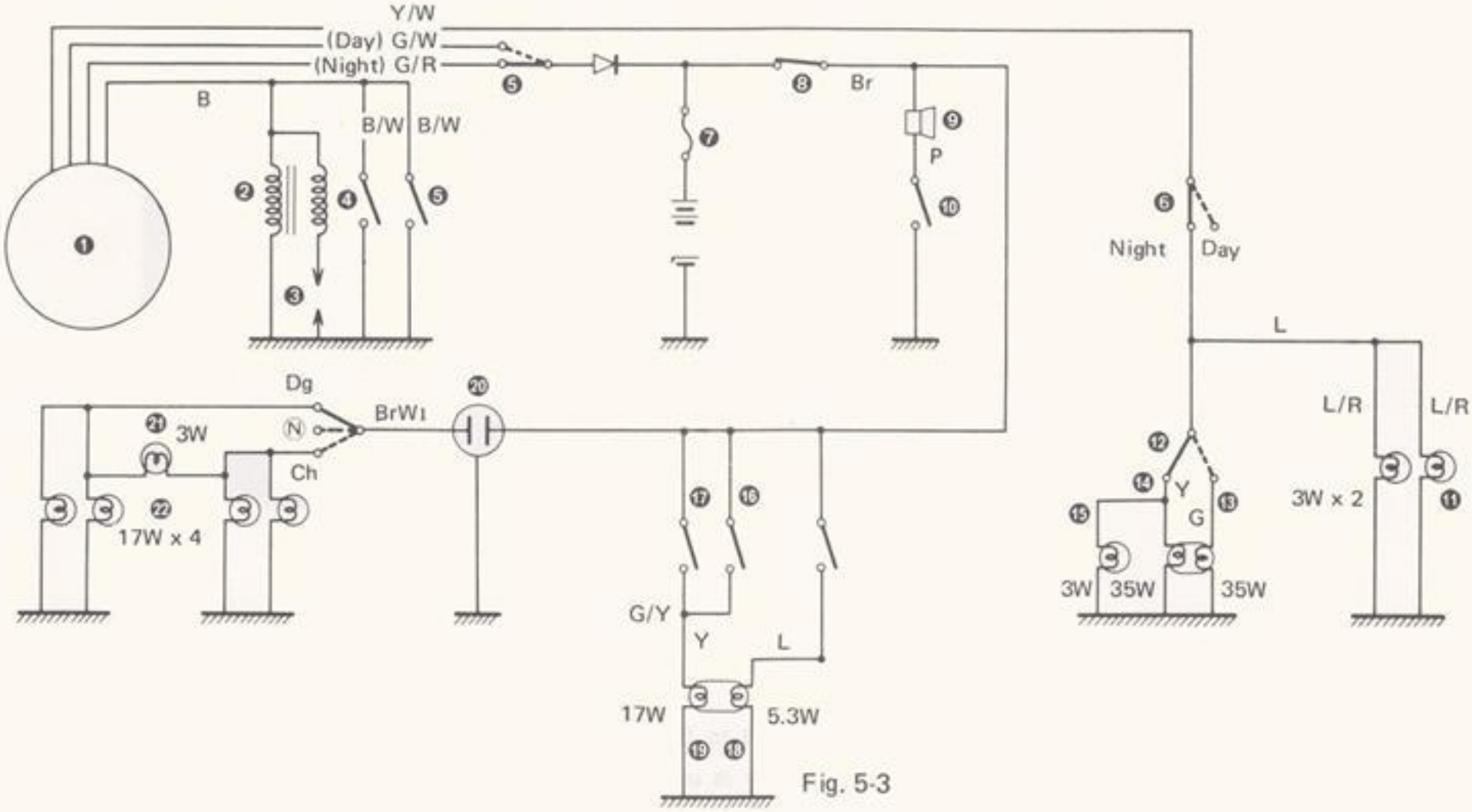
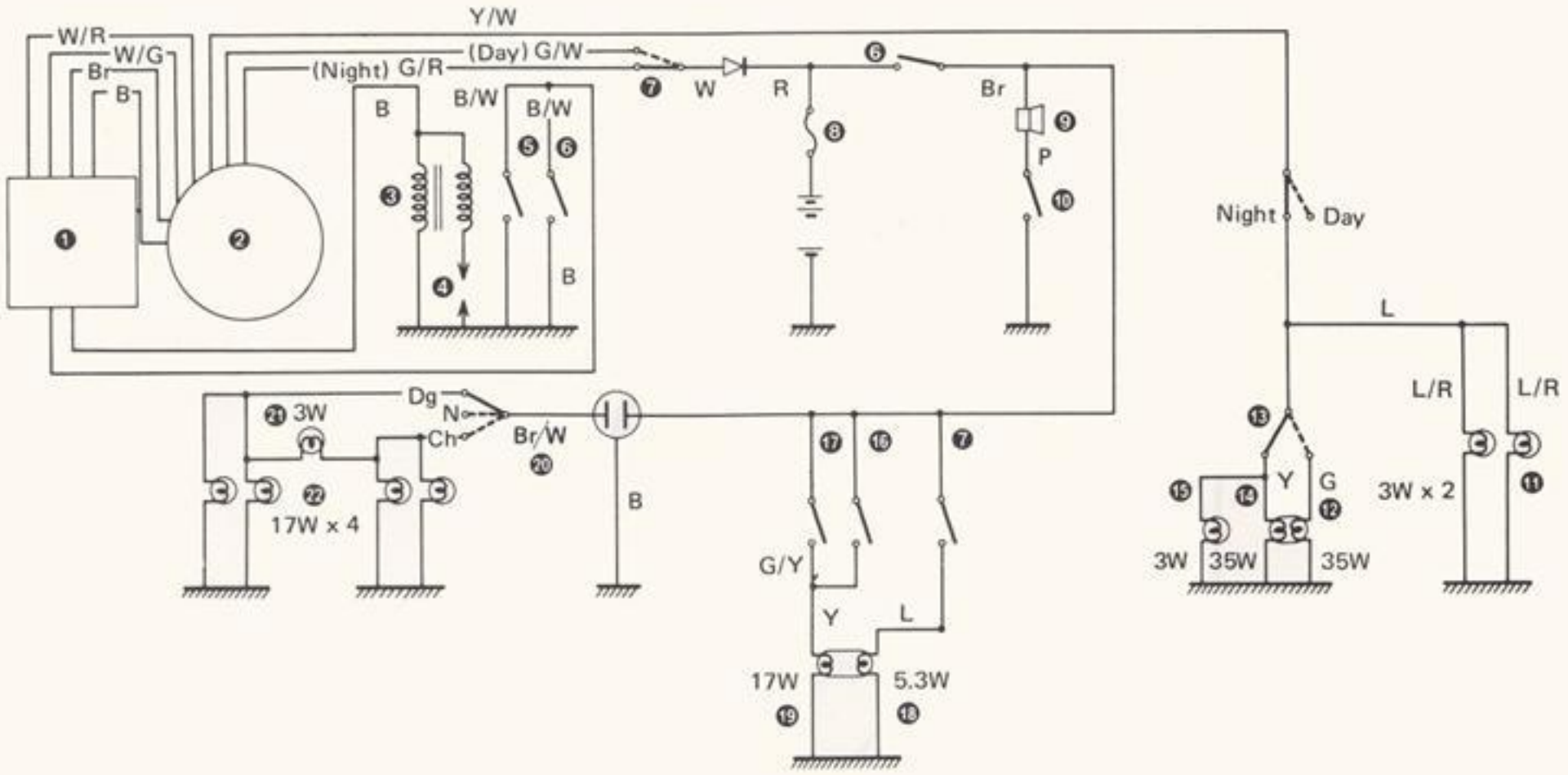


Fig. 5-3

1. F.W.M.
2. Ignition coil
3. Spark plug
4. Kill switch
5. Main switch
6. Lighting switch
7. Fuse
8. Main switch
9. Horn
10. Horn button
11. Meter lamp
12. Dimmer switch
13. Low beam
14. High beam
15. High beam indicator
16. Rear stop switch
17. Front stop switch
18. Tail lamp
19. Stop lamp
20. Flasher relay
21. Flasher indicator
22. Flasher lamp

DT360A



1. C.D.I. Unit
2. F.W.M.
3. Ignition coil
4. Spark plug
5. Kill switch
6. Main switch
7. Lighting switch
8. Fuse
9. Horn
10. Horn button
11. Meter lamp
12. Low beam
13. Dimmer switch
14. High beam
15. High beam indicator
16. Rear stop switch
17. Front stop switch
18. Tail lamp
19. Stop lamp
20. Flasher relay
21. Flasher indicator
22. Flasher lamp

Fig. 5-4

Electrical

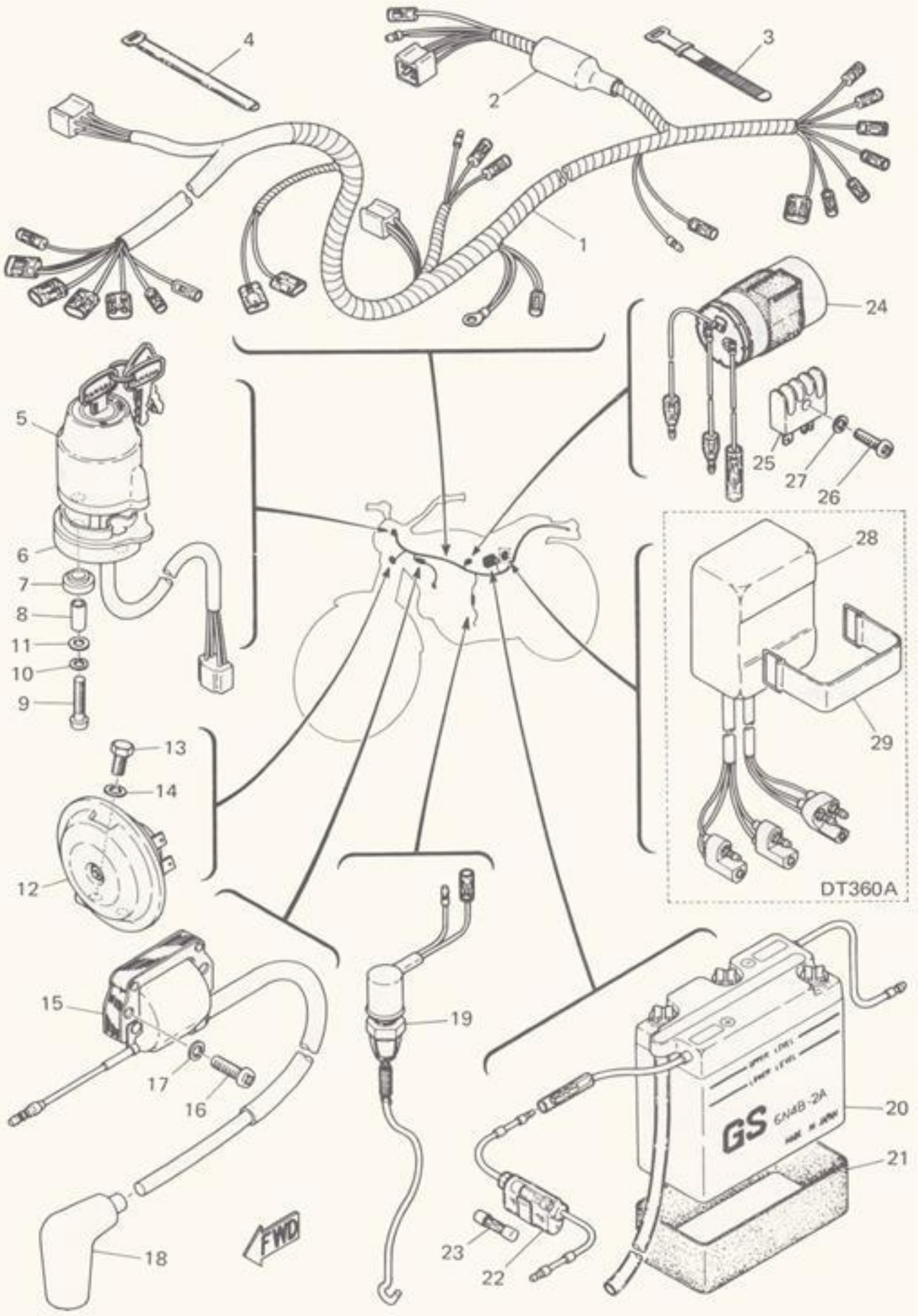


Fig. 5-5

1. Wire harness ass'y
2. Connector cover
3. Switch cord band
4. Band
5. Main switch ass'y
6. Main switch damper
7. Main switch damper 2
8. Main switch collar
9. Plain washer
10. Spring washer
11. Panhead screw
12. Horn
13. Bolt
14. Spring washer
15. Ignition coil ass'y
16. Panhead screw
17. Spring washer
18. Plug cap ass'y
19. Stop switch ass'y
20. Battery ass'y
21. Battery band
22. Fuse holder ass'y
23. Fuse (6V-10A)
24. Flasher relay ass'y
25. Rectifier ass'y
26. Panhead screw
27. Spring washer
28. C.D.I. Unit ass'y (DT360A)
29. Battery fitting band (DT360A)

5-3. Spark Plug

The life of a spark plug and its discoloring vary according to the habits of the rider. At each periodic inspection, replace burned or fouled plugs with suitable ones determined by 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 economical to install new plugs often since it will tend to keep the engine in good condition and prevent excessive fuel consumption.

A. How to "read" spark plug (condition).

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

Fig. 5-6

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

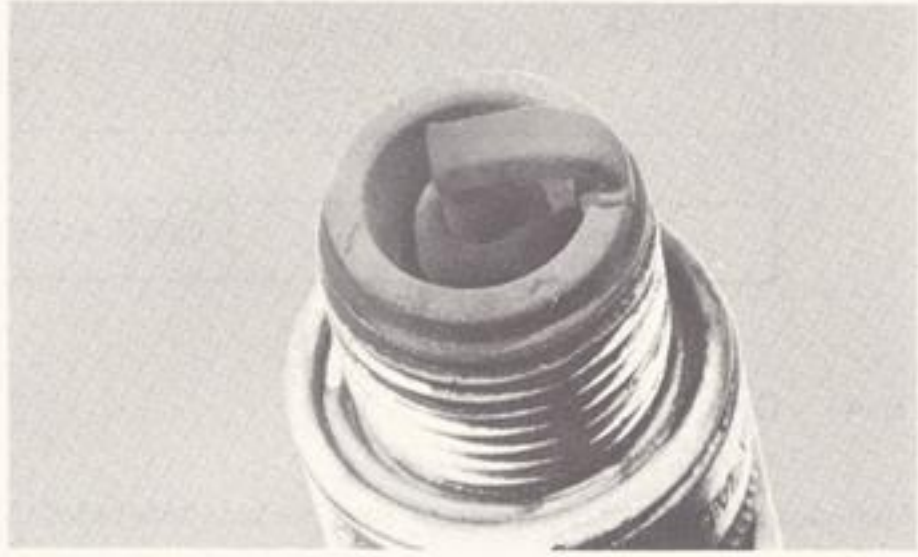


Fig. 5-7

3. 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.

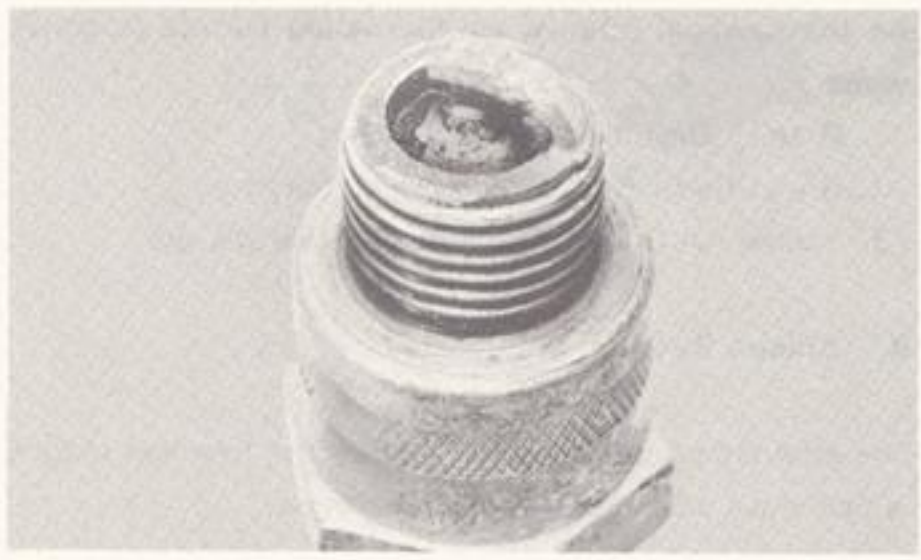


Fig. 5-8

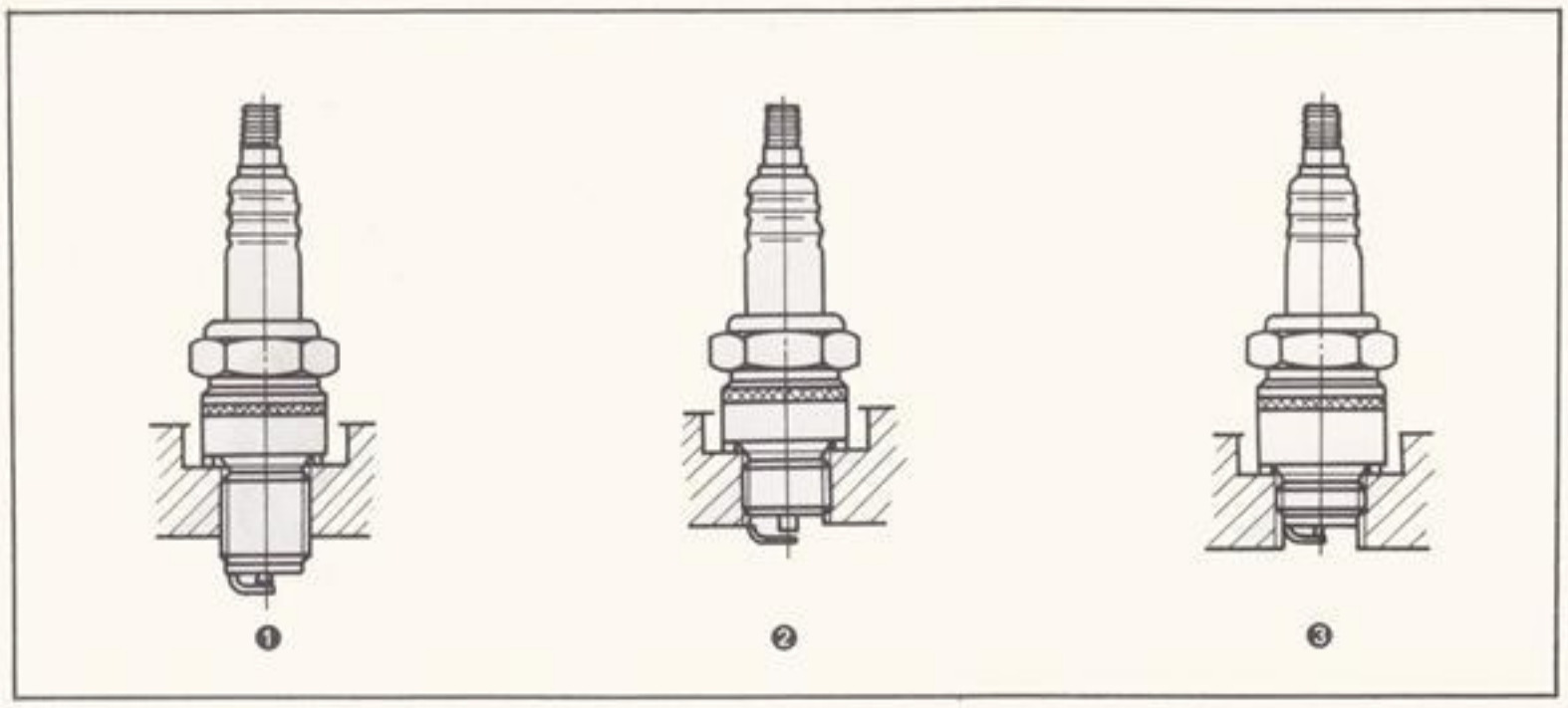
B. Inspection

Instruct the rider to:

1. Inspect and clean the spark plug at least once per month or every 500, 1000 miles.

2. Clean the electrodes of carbon and adjust the electrode gap.

3. Be sure to use proper reach plug as replacement to avoid overheating or fouling.



1. Excessive reach (will overheat)
2. Proper reach
3. Insufficient reach (will foul)

Fig. 5-9

	Model	
	DT250A	DT360A
Spark Plug Type	B–8ES	B–9ES
Spark Plug Gap	0.020 ~ 0.024 in (0.5 ~ 0.6mm)	0.020 ~ 0.024 in (0.5 ~ 0.6mm)

5-4. Charging System

The charging system consists of the flywheel magneto, the charging/lighting coil, rectifier, and the battery.

A. Flywheel Magneto

As the flywheel rotates, an alternating current is generated in the charging lighting coils. The coils have three output wires.

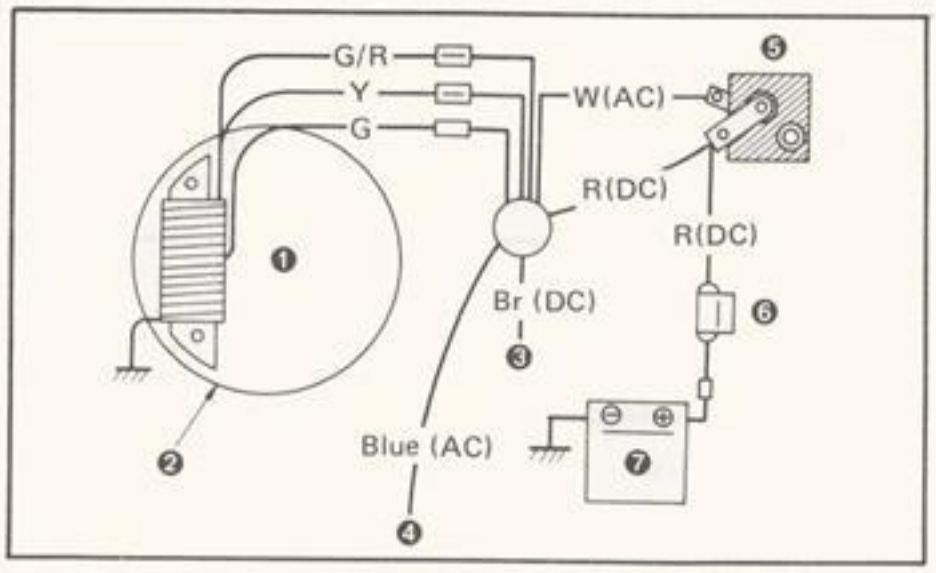
1. Green - Daytime battery charging.
2. Green/Red - Nighttime battery charging.
3. Yellow - A.C lighting (headlight, taillight, etc.)

B. Silicon Rectifier

The alternating current generated by the flywheel magneto must be rectified to charge the battery. For this rectification, a half-wave silicon rectifier is employed.

C. Circuit Switching

The various switches ("SW" below) select the proper coil coutput wire and route A.C. voltage for lighting and charging. They also direct D.C. voltage from the rectifier/battery to the various safety features (horn, signal lights, stoplight). See Section 5 - 7 for switch testing procedure.



1. Lighting charging coil
2. Flywheel magneto
3. To signal system (horn etc.)
4. To A. C. Lights
5. Silicon rectifier
6. Fuse
7. Battery 6V

Fig. 5-10

Function	Wire Connections
Daytime Charging	Green to White
Nighttime Charging	Green/Red to White
A.C. Lighting (Headlight, Taillight)	Yellow to Blue
D.C. Lighting	Red to Brown

D. Charging Output Test

1. Voltage Test

a. Raise seat and locate red battery wire connection.

b. Connect D.C. voltmeter as shown.

Fig. 5-11

c. Turn ignition switch to ON (daytime) position, start engine and note voltage readings at r.p.m.'s specified below.
d. Switch to nighttime (lights on) and note voltage readings at specified r.p.m.'s.

R.P.M.	Voltage	
	Daytime	Nighttime
2,000 r.p.m.	8.5V (DT250A) 7.0V (DT360A)	7.0V (DT250A) 8.5V (DT360A)
8,000 r.p.m.	8.5V	8.0V

2. Amperage test
a. Break the red wire connection at the battery and connect Ammeter as shown.
b. Start engine and take amperage readings at specified r.p.m.'s.
c. Turn on lights and note the readings.

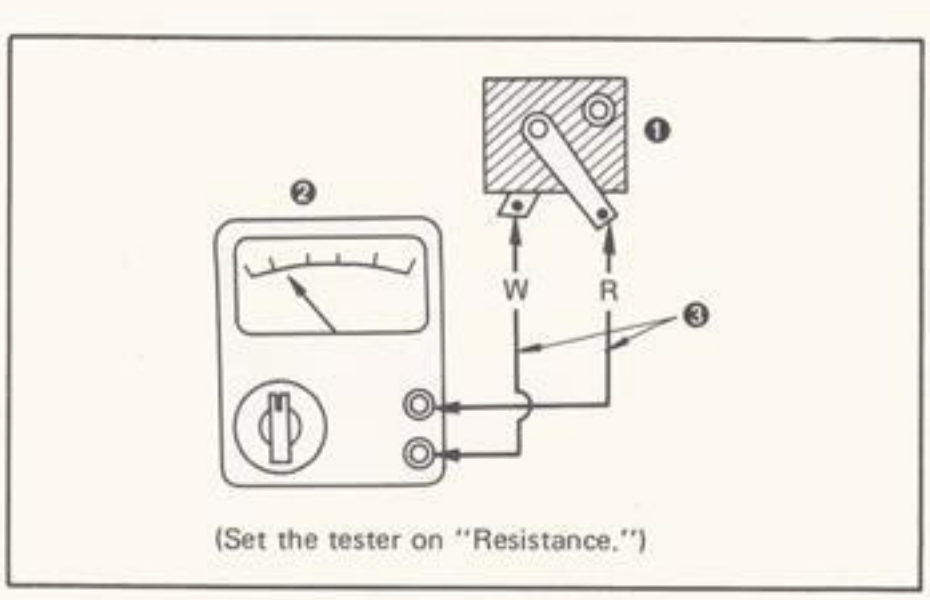
R.P.M.	Amperage	
	Daytime	Nighttime
2,000 r.p.m.	1.8 ± 0.5 A	0.7 ± 0.5 A
8,000 r.p.m.	2.7 ± 0.5 A (DT250A) 3.0 ± 0.5 A (DT360A)	1.5 ± 0.5 A (DT250A) 1.3 ± 0.5 A (DT360A)

E. Checking Silicon Rectifier

1. Checking with reversed connection
Connect the tester's red lead (3) to the silicon rectifier's red terminal, and connect the tester's balck lead (-) to the rectifier's white terminal.

Standard value : 9 ~ 10Ω

Reversed : ∞



(Set the tester on "Resistance.")

1. Silicon rectifier
2. Electro-tester
3. Checking with normal connection

Fig. 5-12

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

2. Checking with normal connection
Reverse the tester leads.
If the pointer will not swing, the rectifier is in good condition. If the pointer swings, the rectifier is faulty.

Warning
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.

5-5. Battery

The battery is a 6 volt - 4AH unit that is the power source for the horn, stoplight, neutral light and flasher lights. 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. 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 3,000 to 4,000 r.p.m. to keep the battery charged properly. If the horn and stoplight are used very often, the battery water should be checked regularly as continous charging will dissipate the water.

A. Checking

1. If sulfation occurs on plates due to lack of battery electrolyte, showing white accumulations, the battery should be replaced.
2. If the bottoms of the cells are filled with corrosive material falling off plates, the battery should be replaced.
3. If the battery shows the following defects, it should be replaced.

a. The voltage will not rise to a specific value even after long hours charging.
b. No gassing occurs in any cell.
c. The 6V battery requires a charging voltage of more than 8.4 volts in order to supply a current of lamp for 10 hours.

B. 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.

a. Negligence in re-filling the battery with electrolyte.
b. Battery being left discharged.
c. Over-charging by rushing charge.
d. Freezing
e. Filling with water or sulfuric acid containing impurities when re-filling the battery.

Service Standards

Battery Spec.	6V-4AH	
Electrolyte-Specific Gravity and 1.26, 160 c.c. Quanity		At Full Charge
Initial Charging Current	0.4 A for 25 Hours	Brand New Motorcycle
Charging Current	0.4 A for 10 Hours (Charge Until Specific Gravity reaches 1.26)	When Discharged
Re-filling of Electrolyte	Distilled Water Up to the Max. Level Line.	Once a Month

C. Storage

1. If motorcycle is not 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.

a. Recharge the battery.
b. Store the battery in a cool, dry place, and avoid temperatures below 0° C. (32° F).
c. Recharge the battery before mounting it on the motorcycle.

5-6. Lighting and Signal Systems

A. Description

The lighting system consists of the horn, headlight, taillight, stoplight, flasher lights, meter lamps and the battery. The battery supplies power only to the horn, stoplight, neutral light and flasher lights. Lighting coils in the flywheel magneto supply alternating current (A-C.) power for the headlight, taillight, meter lights, and for charging the battery through a silicon rectifier diode.

Warning:

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.

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.

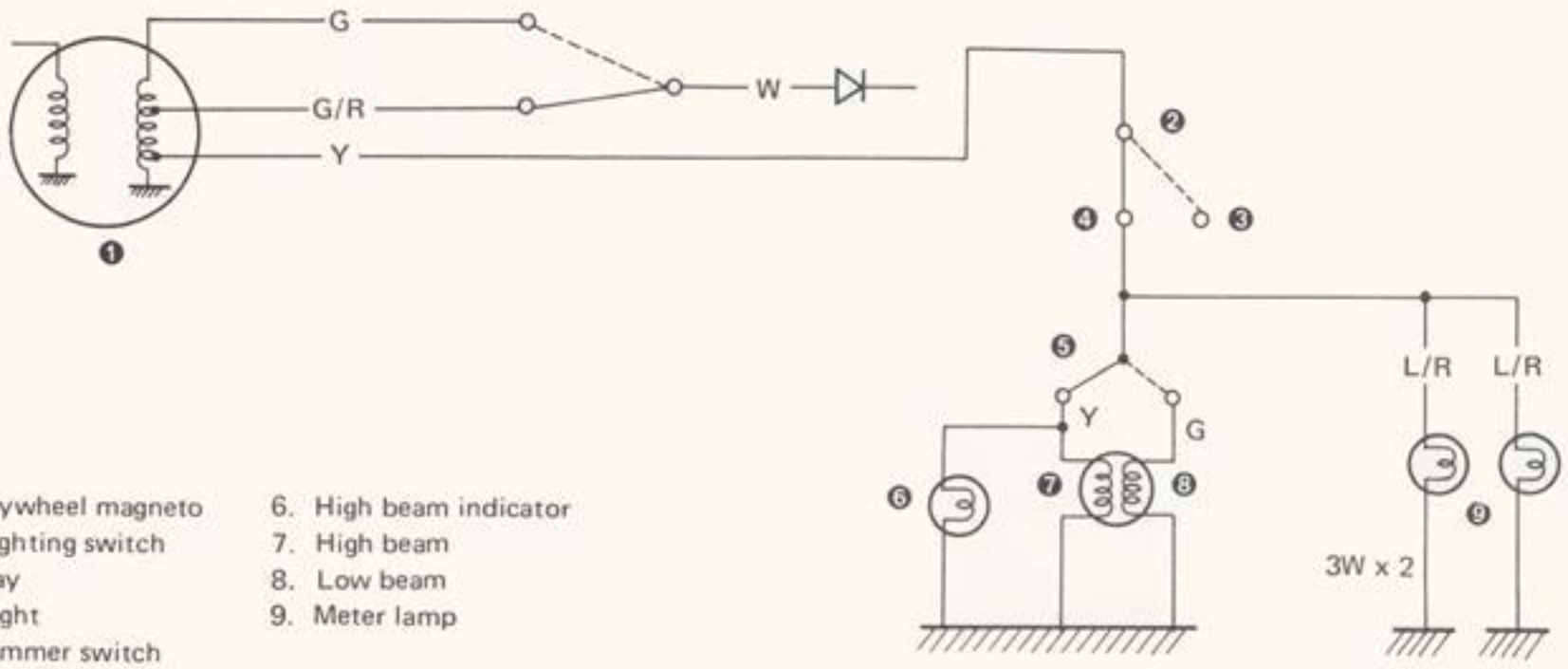
B. Light Bulbs and Horn

1. Headlight
   The headlight has a dual 6V, 35W/35W bulb. A high beam indicator light mounted in the tachometer has a 6V, 1.5W bulb.
2. Taillight and Stoplight
   A dual 6V, 5.3W taillight and 6V, 17W stoplight is mounted in the taillight assembly. The lens of the taillight is provided with reflectors on its three sides - rear, right and left.
3. Flasher Lights
   The flasher lights each have a 6V, 17W bulb. A flasher pilot light mounted in the tachometer has a 6V, 3W bulb.
4. Speedometer and Tachometer
   The speedometer and tachometer each have one 6V, 3W bulb for illumination.
5. Horn
   The horn is a 6V, flat type, and has a tone volume adjusting nut on its back.

C. Lighting Circuits

1. A.C. Circuit

As described previously, the headlight, and meter lights all operate on A.C. voltage provided directly by the lighting coil and flywheel. The lights operate when the lighting switch is pushed to the ON position.

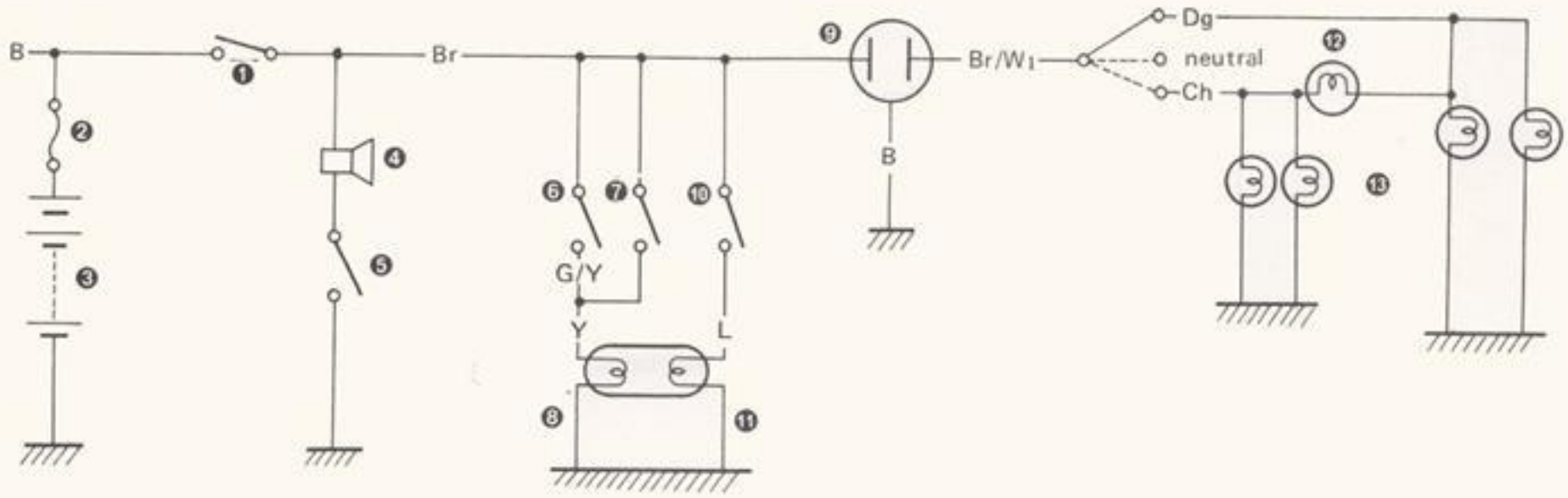


1. Flywheel magneto
2. Lighting switch
3. Day
4. Night
5. Dimmer switch
6. High beam indicator
7. High beam
8. Low beam
9. Meter lamp

Fig. 5-13

2. D.C. Circuit

The remaining lights and the horn operate on 6 V.D.C. provided by the battery.



1. Main switch
2. Fuse
3. Battery
4. Horn
5. Horn button
6. Front stop switch
7. Rear stop switch
8. Stop lamp
9. Flasher relay
10. Lighting switch
11. Tail lamp
12. Flasher indicator
13. Flasher lamp

Fig. 5-14

D. Lighting Tests and Checks - A.C. Circuit

1. A.C. Circuit Output Test

   With all A.C. lights in operation the circuit will be balanced and the voltage will be the same at all points at a given r.p.m.

a. Switch Pocket Tester to "AC20V" position.

b. Connect positive (+) test lead to yellow connection and negative (−) test lead to a good ground on the engine.

Fig. 5-15

c. Start engine, turn on lights and check voltage at each engine speed in table below.

Engine R.P.M.	Voltage
2,500 r.p.m.	5.5 V.A.C. or More
8,000 r.p.m.	8.0 V.A.C. or More

If measured voltage is too high or too low, check for bad connections, damaged wires or burned out bulbs throughout the A.C. lighting circuit.

Note:

This voltage test can be made at any point throughout the circuit and the readings should be the same as specified above.

2. Lighting Coil Resistance Check

   If voltage is too low in A.C. lighting circuit, check the resistance of in the yellow wire windings of the lighting coil.

a. Switch Pocket Tester to "Ω x 1" position and zero meter.

b. connect positive (+) test lead to yellow, green and green-red wire from magneto and negative (−) test lead to a good ground on engine. Read the resistance on ohms scale.

Fig. 5-16

Lighting Coil Resistance	0.25Ω ± 10% at 20°C or 68°F (DT250A) 0.23Ω ± 10% at 20°C or 68°F (DT360A)	Ground to Yellow Leads
Lighting Coil Resistance	0.35Ω ± 10% at 20°C or 68°F (DT250A) 0.54Ω ± 10% at 20°C or 68°F (DT360A)	Ground to Green/Red Leads
Lighting Coil Resistance	2.10Ω ± 10% at 20°C or 68°F (DT250A) 1.73Ω ± 10% at 20°C or 68°F (DT360A)	Ground to Green Leads

3. If A.C. lighting circuit components check out properly but circuit voltage is still excessive, go to charging circuit checks (Sec. 4 - 7). The two circuits share a common source coil. If voltage is low in charging circuit due to a defective battery, rectifier or connection, voltage will be too high in lighting circuit.

E. Lighting Tests and Checks — D.C. Circuit

The 6V battery provides power for operation of the horn, stoplight, neutral light and flasher lights. If none of the above operate, always check battery voltage before proceeding further. Low battery voltage indicates either a faulty battery, low battery water, or a defective charging system. See Section 4 - 7, Charging System, for checks of battery and charging system.

1. Horn does not work.
   a. Check for + 6 volts on brown wire to horn.
   b. Check for good grounding of horn (pink wire) when horn button is pressed.
2. Stoplight does not work.
   a. Replace bulb.
   b. Check for 6 volts on yellow wire to stoplight.
   c. Check for 6 volts on brown wire to each stop switch (front brake and rear brake switches).
   d. Check for ground on black wire to tail/stop light assembly.
3. Flasher light(s) do not work.
   a. Replace bulb.

b. Right Circuit.
   1) Check for +6 volts on dark green wire to light.
   2) Check for ground on black wire to light assembly.

c. Left Circuit
   1) Check for +6 volts on dark brown wire to light.
   2) Check for ground on black wire to light assembly.

d. Right and Left Circuits do not work.
   1) Check for +6 volts on brown/white wire to flasher switch on left handlebar.
   2) Check for +6 volts on brown wire to flasher relay.
   3) Replace flasher relay.
   4) Replace flasher switch.

5-7. Switches

The main keyswitch and the right and left handlebar switches may be checked for continuity or shorts with a Pocket Tester on the "Ω x 1" scale.

Wire Color Abbreviations			
Black – B	Pink – P	Green/Red – G/R	Dark Brown – Ch
Brown – Br	Yellow – Y	Green/Yellow – G/Y	Brown/White – Br/W
Blue – L	White – W	Black/White – B/W	
Red – R	Orange – O	Blue/White – L/W	
Green – Gr	Grey – Gr	Dark Green – Dg	

A. Main Switch

Switch Position	Wire Color			
	B	B/W	R	Br
OFF	○—○			
ON			○—○	

B. "Engine Stop" Switch (Right Handlebar)

Switch Position	Wire Color	
	B/W	Ground
OFF	○—○	
RUN		

C. "Lights" Switch (Left Handlebar)

Switch Position	Wire Color								
	G/W	W	G/R	Br	L/W	Y/W	L	Y	G
OFF	○—○								
ON		○—○		○—○		○—○			
HI							○—○		
LO							○—○		○

D. "Turn" Switch (Left Handlebar)

Switch Position	Wire Color		
	Dg	Br/W	Ch
OFF			
RIGHT	○—○		
LEFT		○—○	

E. "Horn" Button (Left Handlebar)

Switch Position	Wire Color	
	P	Ground
ON	○—○	

CHAPTER 6. ELECTRICAL — DT250A

6-1. Special Tools

A. Electro tester
P/N90890-03021

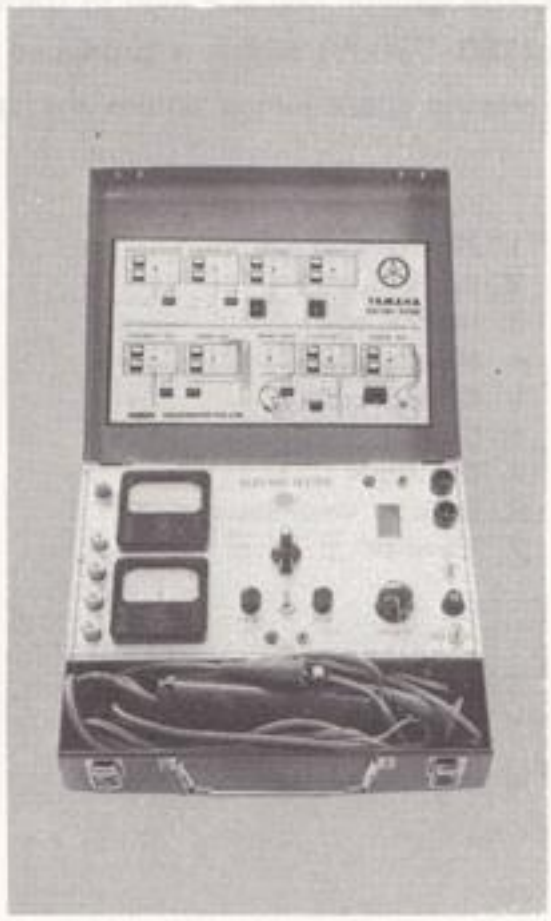


Fig. 6-1

B. Pocket tester
P/N90890-03029

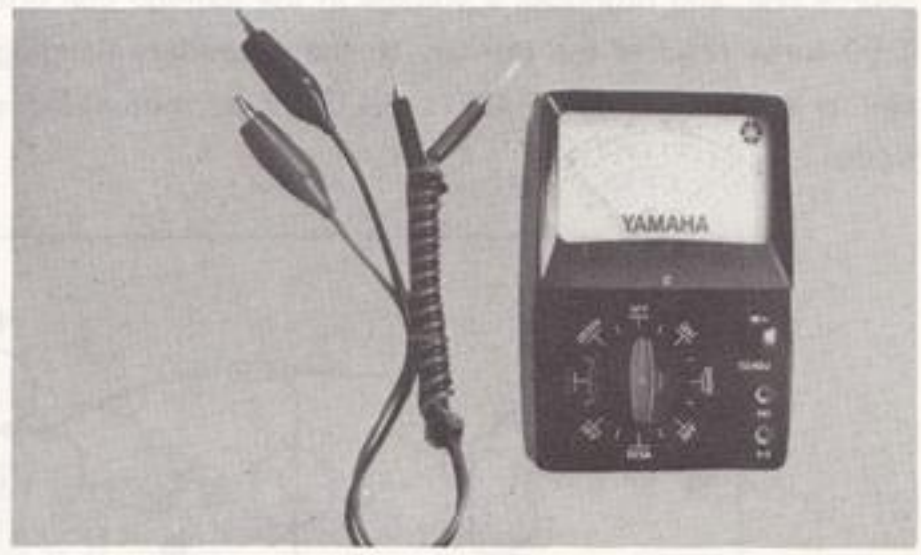


Fig. 6-2

6-2. Schematics

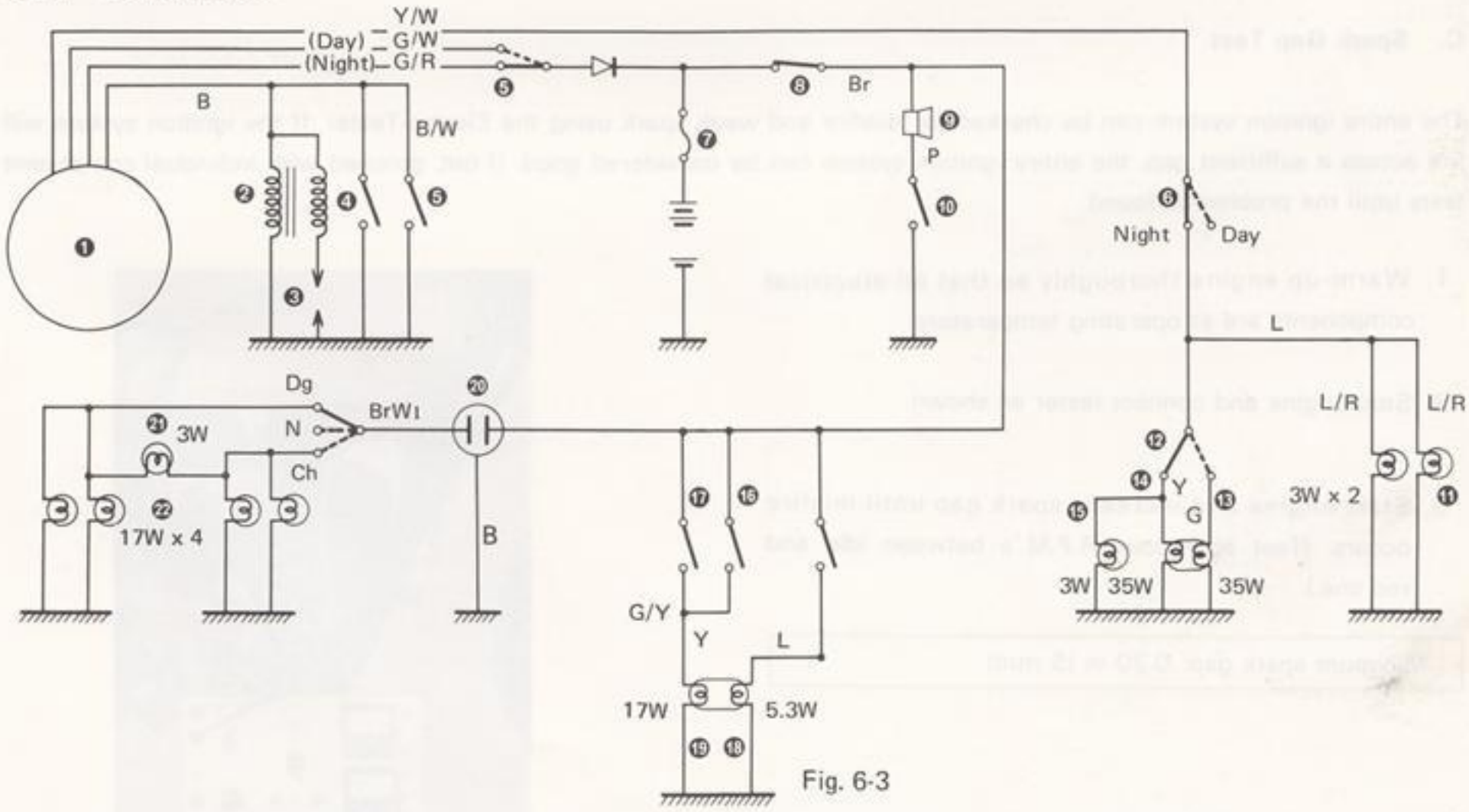


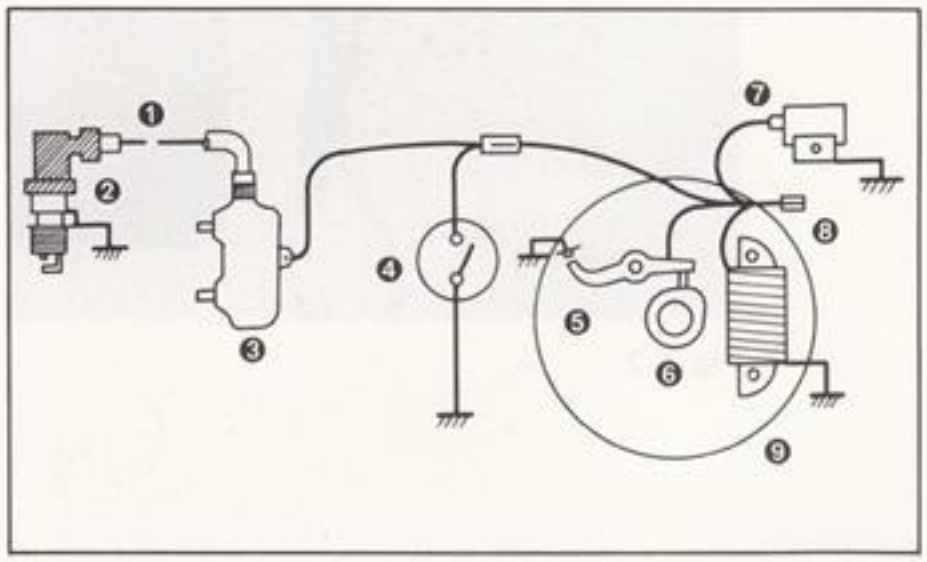
Fig. 6-3

1. F.W.M.
2. Ignition coil
3. Spark plug
4. Kill switch
5. Main switch
6. Lighting switch
7. Fuse
8. Main switch
9. Horn
10. Horn button
11. Meter lamp
12. Dimmer switch
13. Low beam
14. High beam
15. High beam indicator
16. Rear stop switch
17. Front stop switch
18. Tail lamp
19. Stop lamp
20. Flasher relay
21. Flasher indicator
22. Flasher lamp

6-3. Ignition System

A. Description of Operation

The ignition system consists of the components as shown below. 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 power source coil, and produces a voltage in the ignition coil primary windings. The ignition coil is a kind of transformer, with a 1:50 turns 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.



1. High-tension wire
2. Spark plug
3. Ignition coil
4. Main switch
5. Contact breaker
6. Cam
7. Condenser
8. Ignition power source coil
9. Flywheel

Fig. 6-4

B. Ignition Timing

Refer to Chapter 2. Engine Tuning, for ignition timing procedure.

C. Spark Gap Test

The entire ignition system can be checked for misfire and weak spark using the Electro-Tester. If the ignition system will fire across a sufficient gap, the entire ignition system can be considered good. If not, proceed with individual component tests until the problem is found.

1. Warm-up engine thoroughly so that all electrical components are at operating temperature.

2. Stop engine and connect tester as shown.

3. Start engine and increase spark gap until misfire occurs. (Test at various R.P.M.'s between idle and red line.)

Minimum spark gap: 0.20 in (5 mm)

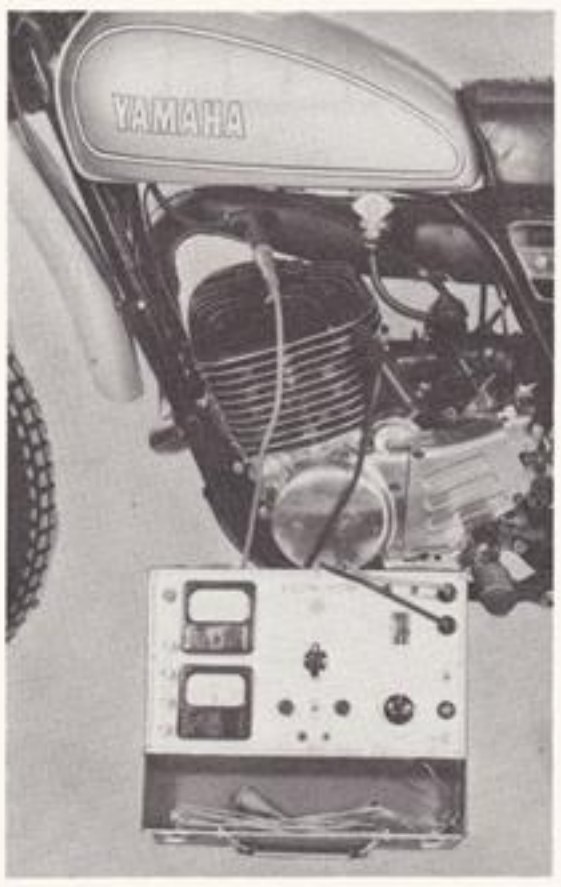


Fig. 6-5

D. Ignition Coil

1. Coil spark gap test

a. Remove fuel tank and disconnect ignition coil from wire harness and spark plug.

b. Connect Electrotester as shown.

c. Connect fully charged 6V. Battery to tester.

d. Turn on spark gap switch and increase gap until misfire occurs.

Minimum spark gap: 0.24 in.(6mm)

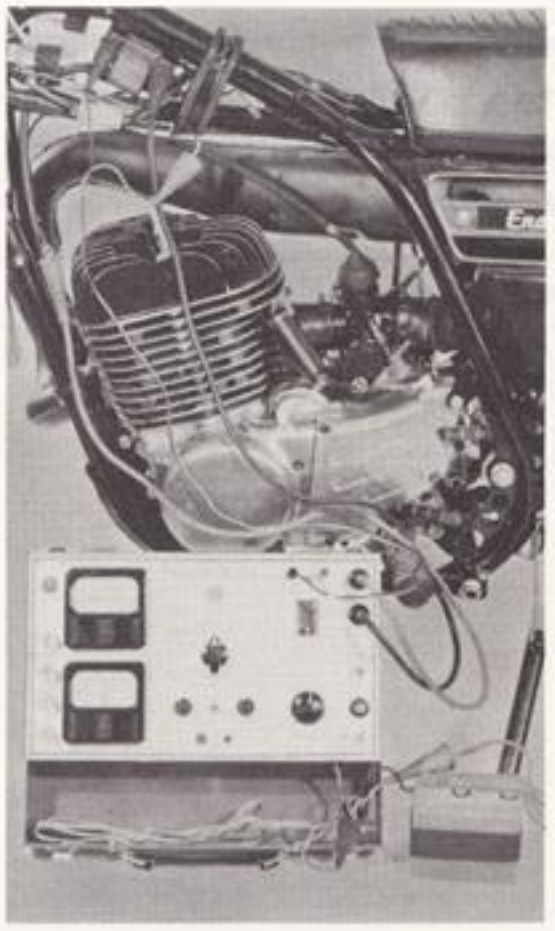
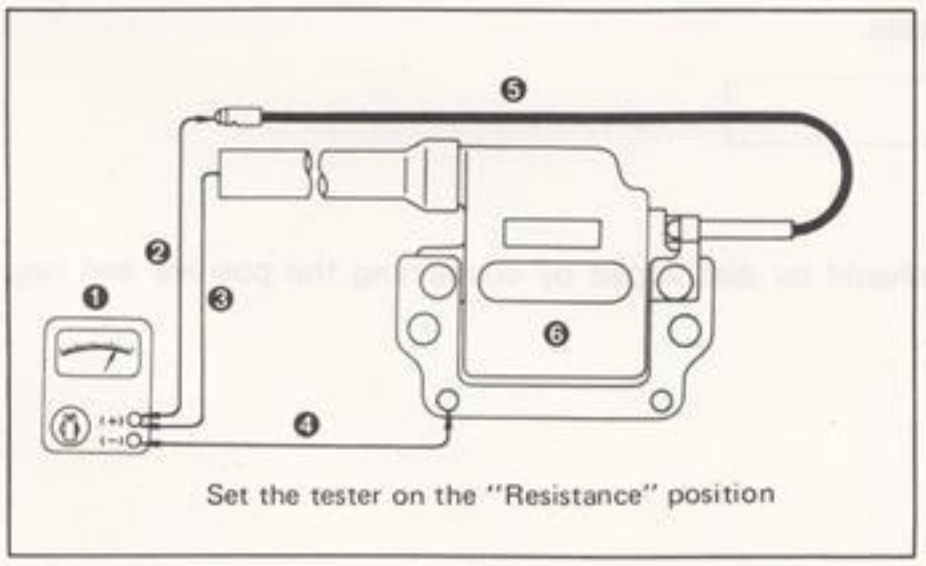


Fig. 6-6

2. Direct current resistance testing

Use a Pocket Tester or equivalent ohmmeter to determine resistance and continuity of primary and secondary coil windings.



1. Pocket-tester
2. Primary coil resistance value
3. Secondary coil resistance value
4. Ground
5. Primary lead wire
6. Ignition coil

Fig. 6-7

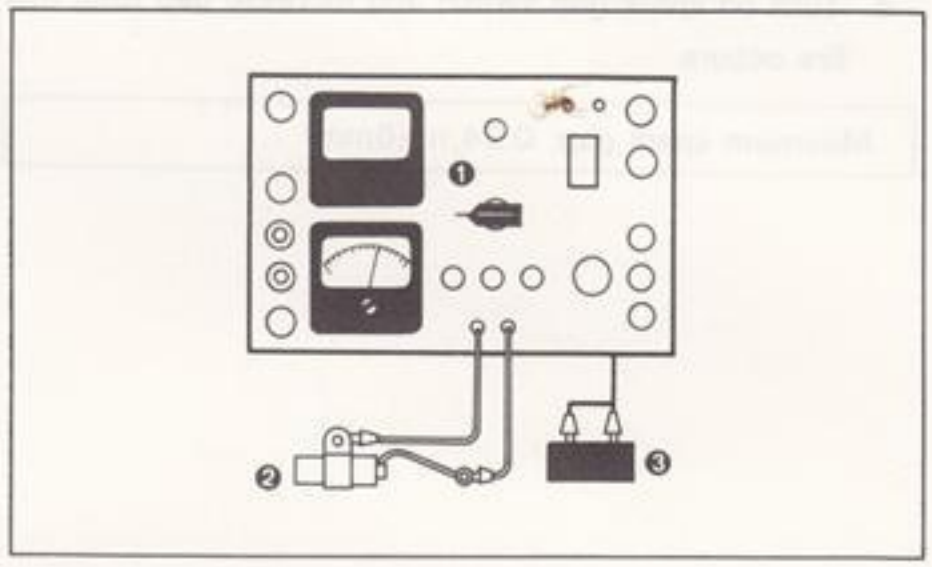
	Model	Temperature
	DT250A	
Primary Coil Resistance (Use (Ω x 1) Scale)	1.02Ω ±10%	20°C or 68°F
Secondary Coil Resistance (Use (Ω x 100) Scale)	5.9KΩ± 20%	20°C or 68°F

E. 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 electric arc would jump across the separating contact points., causing them to burn.
Burned contact points greatly affect 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.

1. Condenser insulation test (use electro-tester)
a. Set ohmmeter to highest resistance scale (Ω x 1000 or higher).
b. Remove condenser from engine and connect ohmmeter as shown below.
c. Resistance reading should be "Infinity" or very close to it.

Minimum resistance: 3MΩ



1. Capacity
2. Condenser
3. Battery

Fig. 6-8

2. Capacity test (use electro-tester)
a. Calibrate capacity scale.
b. Connect tester (same as insulation test).
c. Meter needle will deflect and return to center as condenser is charged.
After needle stops, note reading on μF scale.

Condenser cap: 0.30μF

Note:

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

CHAPTER 7. ELECTRICAL — DT360A

7-1. Special Tools

A. Electro tester
P&N90890-03021

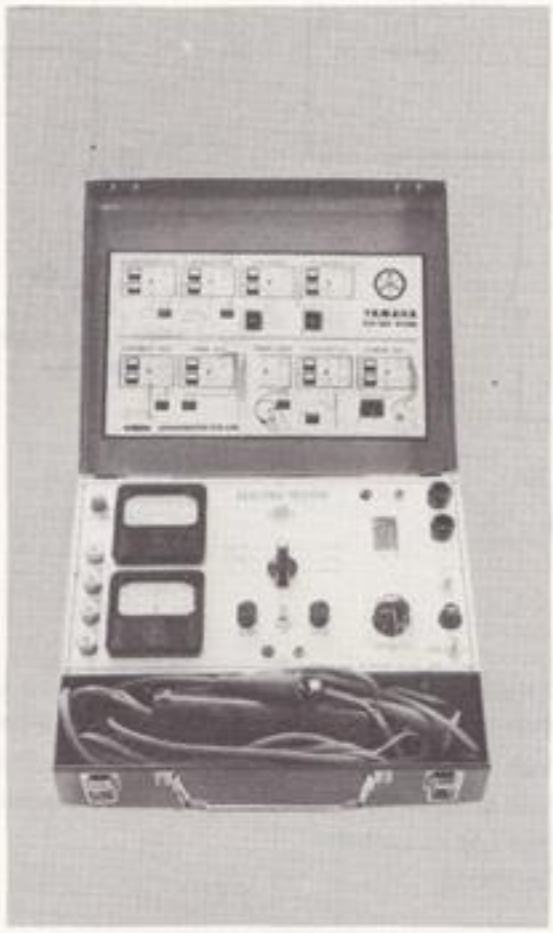
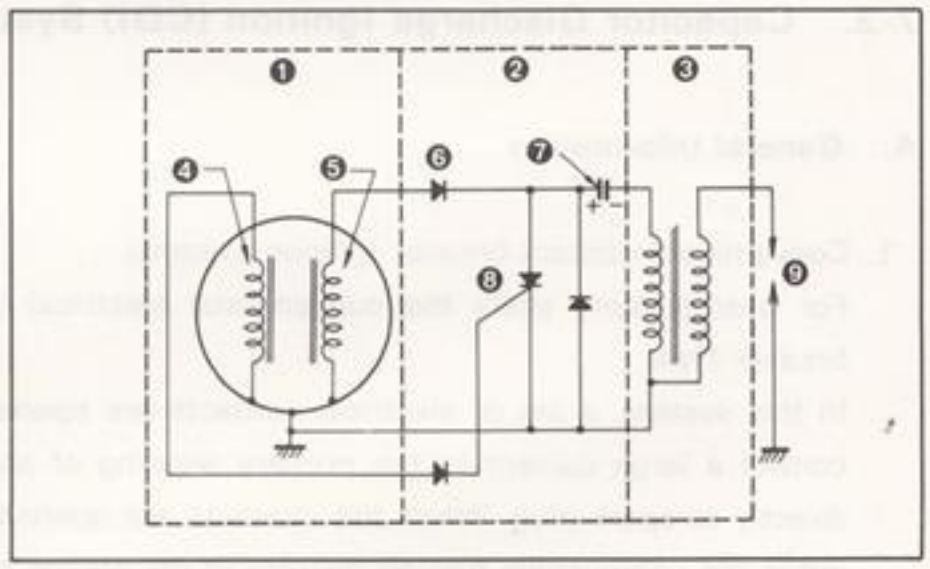


Fig. 7-1

B. Pocket tester
P&N90890-03029

Fig. 7-2

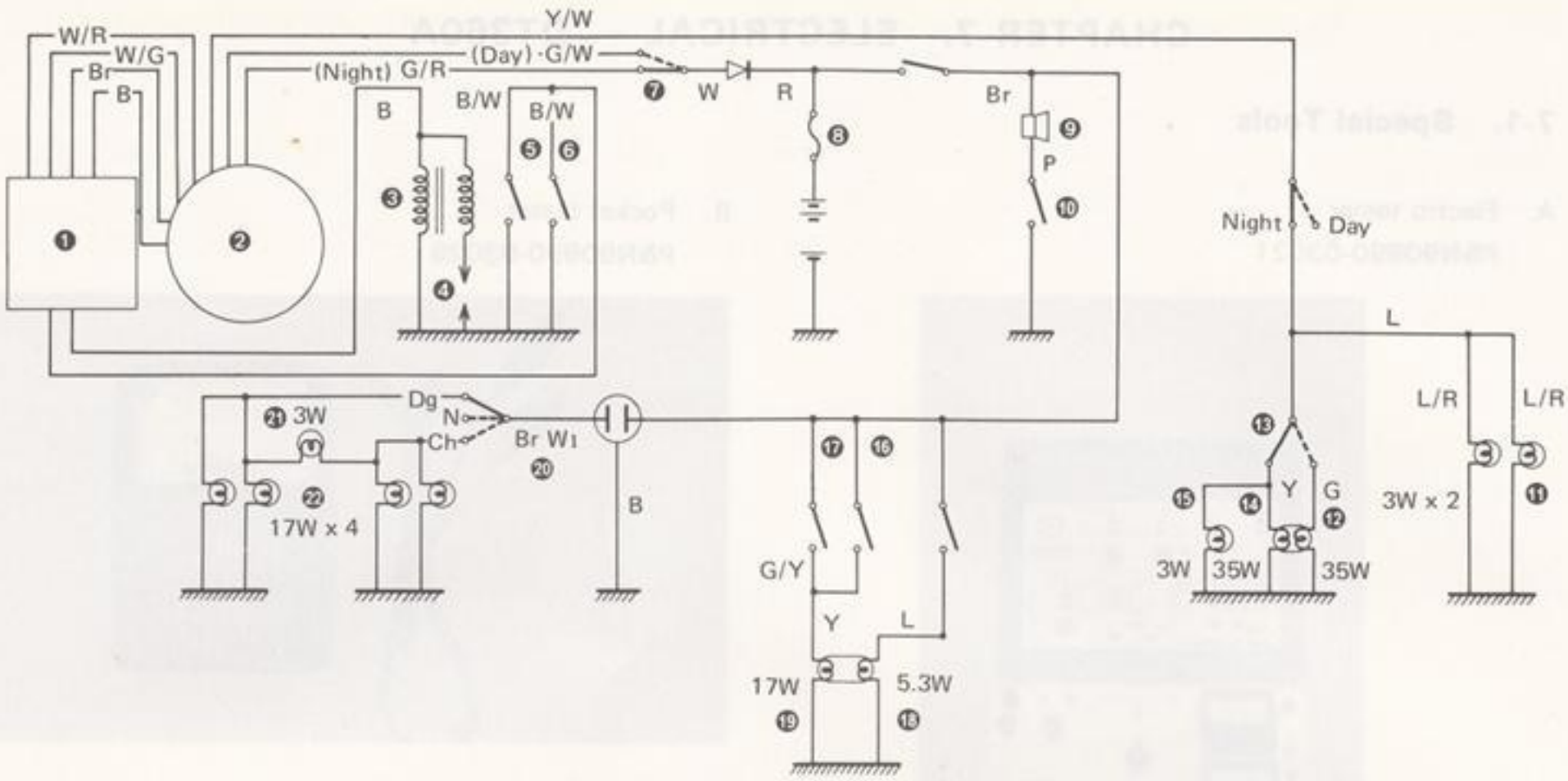
7-2. Schematics



C.D.I. Schematic

1. Magneto
2. C.D.I. Unit
3. Ignition coil
4. Pulser
5. Charging coil
6. Diode
7. Condenser
8. Thyristor
9. Spark plug

Fig. 7-3



1. C.D.I. Unit
2. F.W.M.
3. Ignition coil
4. Spark plug
5. Kill switch
6. Main switch
7. Lighting switch
8. Fuse
9. Horn
10. Horn button
11. Meter lamp
12. Low beam
13. Dimmer switch
14. High beam
15. High beam indicator
16. Rear stop switch
17. Front stop switch
18. Tail lamp
19. Stop lamp
20. Flasher relay
21. Flasher indicator
22. Flasher lamp

Fig. 7-4

7-3. Capacitor Discharge Ignition (CDI) System

A. General Information

1. Conventional contact breaker ignition systems.

   For over seventy years the conventional electrical ignition system for gasoline engines has been of the contact breaker type.

   In this system, a set of electrical contacts are opened and closed by mechanical means. The contacts are used to control a large current to the primary winding of an ignition coil. The secondary winding of this coil is connected directly to spark plug. When the contacts are opened a spark will be generated across the spark plug electrodes to ignite the combustible fuel/air mixutre in the engine combustion chamber.

   Because of the millions of cycles (opening and closing) of the contact breaker and the large currents used, the electrical contacts (points) are subject to pitting from electrical arcing. Corrosion from the atmosphere, dirt or grease on the contacts, mechanical misalignment, rubbing-block wear, and mechanical fatigue are additional factors which limit the useful life of the points and require their frequent replacement. Replacement of the contact breaker, adjustment of the breaker gap, and timing of the engine require the skill of a qualified mechanic with special tools. Most contact breaker systems also utilize a mechanical or vacuum spark advance sub-system to vary the spark timing. This sub-system is also susceptible to mechanical failure.

2. Capacitor Discharge Ignition (CDI)

   A capacitor discharge ignition (CDI) system eliminates the need for a mechanical contact breaker and its inherent disadvantages. A simple electronic circuit using a large storage capacitor and a Thyristor (Silicon Control Rectifier) provides a correctly-timed, high-intensity voltage to the spark plug.

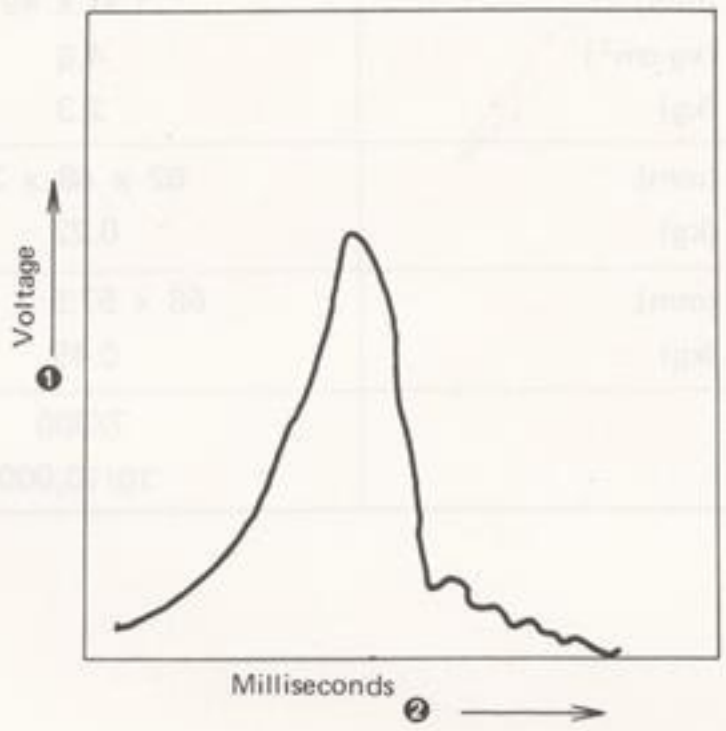
   The CDI system has many advantages. There is no contact breaker to wear out, become misaligned, or lose its efficiency because of pitted points, increased gap, or contamination. There is no mechanical adjustment required for the

contact gap because there are no electrical contacts (points). Only a screwdriver and dial gauge are required to set the timing. There is no mechanical spark advance system to maintain, either. An electronic circuit automatically provides the correct spark advance at all engine speeds.

3. Capacitor Discharge Ignition (CDI) (cont.)

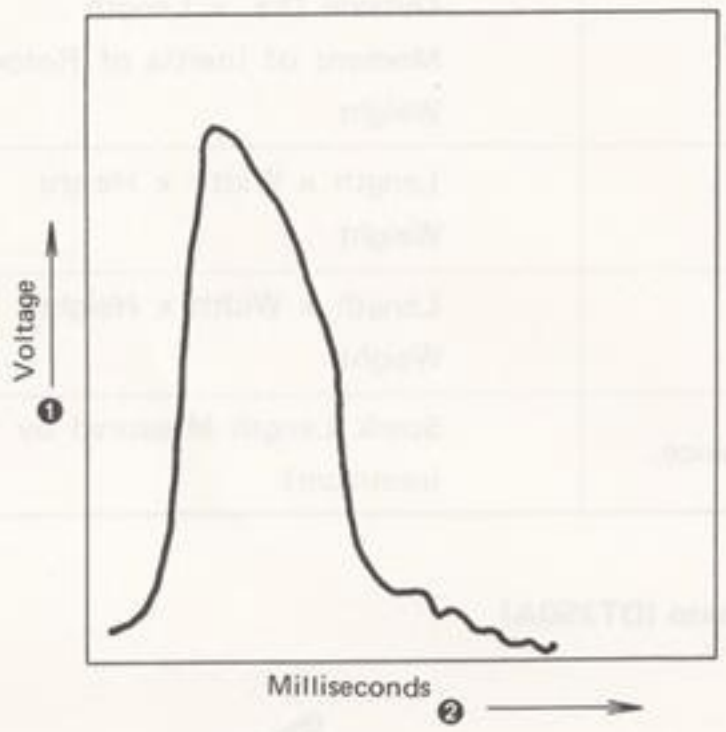
Finally, the CDI system provides a stronger, quicker primary current pulse.

This improves ignition performance, particulary at higher rpm's. Additionally, the stronger pulse inhibits misfire due to oil fouling and bridging.



IGNITION VOLTAGE CURVE
Contact Breaker System
(Typical)

Fig. 7-5



IGNITION VOLTAGE CURVE
Contact Breaker System
(Typical)

Fig. 7-6

B. Yamaha CDI System

1. The principal parts of the Yamaha CDI System and their primary function(s) are as follows:

a. Magneto - The Yamaha CDI magneto is mounted on the crankshaft and incorporates a charging coil for the ignition capacitor and a pulser coil to generate a trigger pulse for ignition timing.

b. CDI Unit - The "black box" of the system. This solid state, encapsulated unit contains the electronic control circuitry, including the ignition capacitor, silicon controlled rectifier (SCR), charging current rectifiers, and automatic spark advance circuit components.

c. Ignition Coil - A "Step-up" transformer which increases the voltage from the ignition capacitor to the high voltage used to "fire" the spark plug.

SPECIFICATIONS

Model		DT360A
Magneto - Model		F0T-02171
C.D.I. - Model		F8T-00171
Ignition Coil - Model		F6T-40191
Magneto	Turning Direction (Facing Toward the Engine) Outside Dia. x Length (mm) Moment of Inertia of Rotor (kg-cm²) Weight (kg)	Left 130 x 49 4.6 2.3
Unit	Length x Width x Height (mm) Weight (kg)	62 x 48 x 33 0.22
Coil	Length x Width x Height (mm) Weight (kg)	66 x 57.5 x 40 0.45
Performance	Spark Length Measured by Tester (mm/rpm)	7/300 10/10,000

Flywheel Magneto (DT250A)

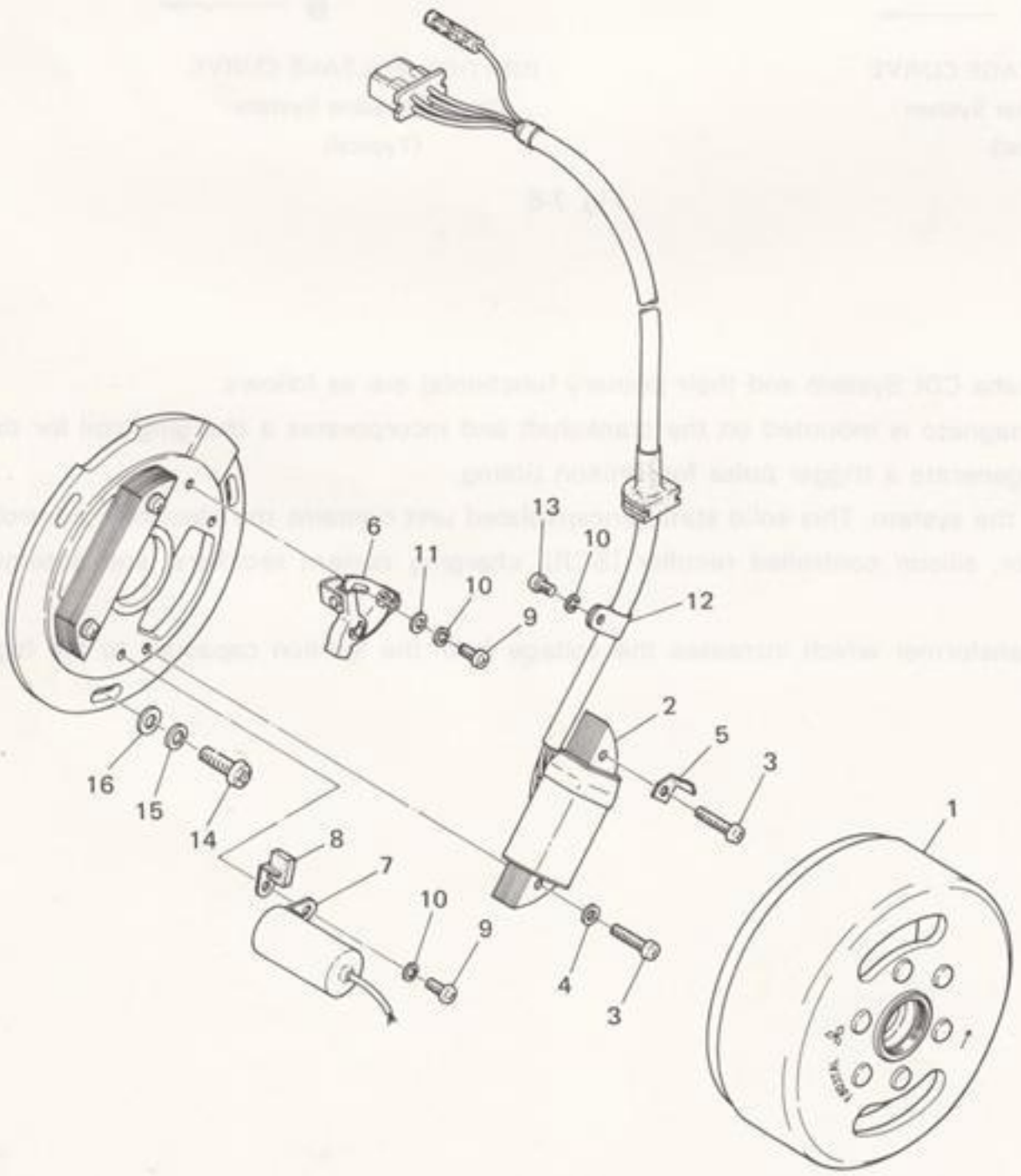
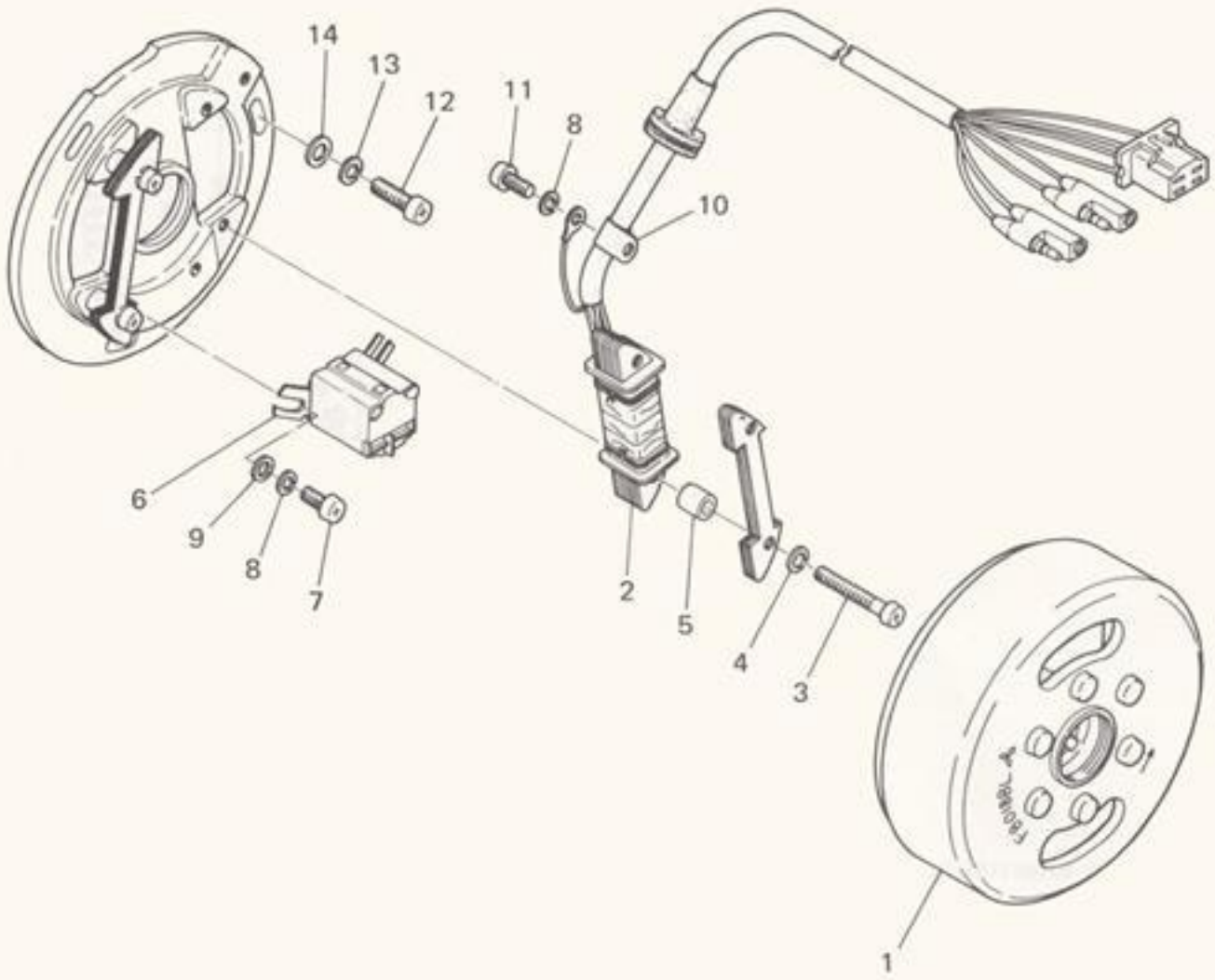


Fig. 7-7

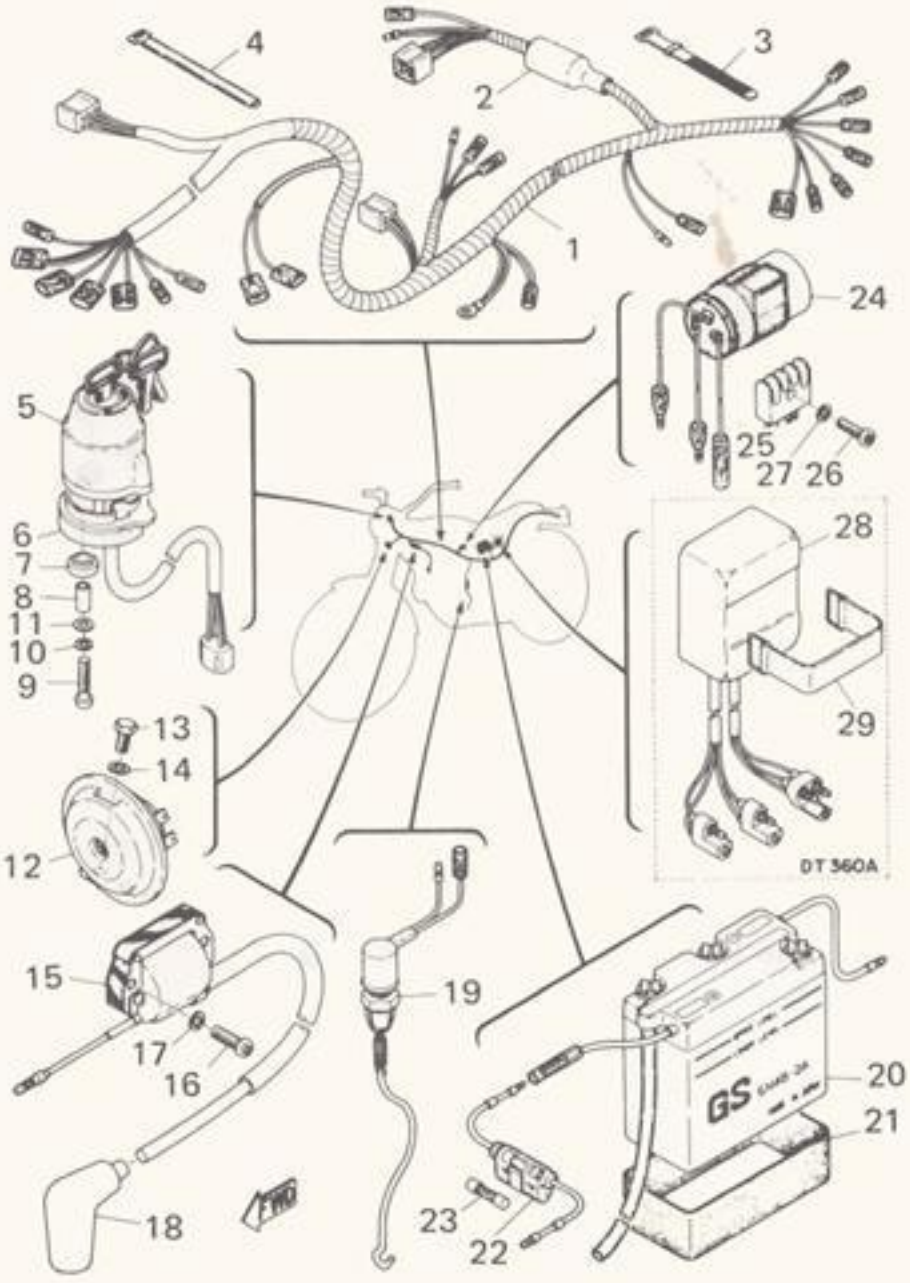
C.D.I. Magneto (DT360A)



1. Flywheel ass'y
2. Charge coil
3. Panhead screw
4. Spring washer
5. Spacer
6. Pulser coil
7. Panhead screw
8. Spring washer
9. Plain washer
10. Lead clamp
11. Screw
12. Panhead screw
13. Spring washer
14. Plain washer

Fig. 7-8

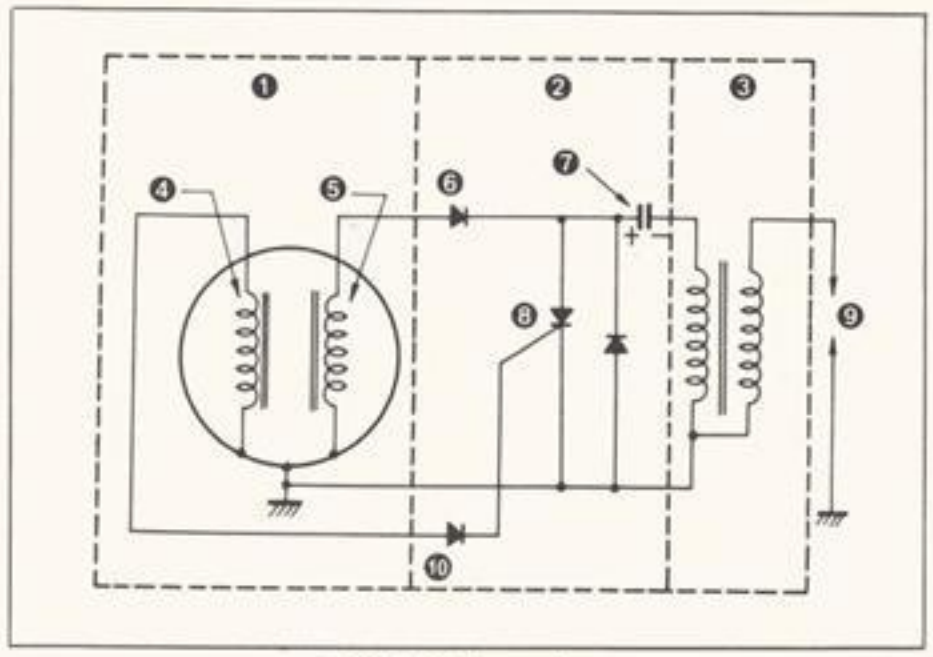
Electrical



1. Wire harness ass'y
2. Connector cover
3. Switch cord band
4. Band
5. Main switch ass'y
6. Main switch damper
7. Main switch damper 2
8. Main switch collar
9. Plain washer
10. Spring washer
11. Panhead screw
12. Horn
13. Bolt
14. Spring washer
15. Ignition coil ass'y
16. Panhead screw
17. Spring washer
18. Plug cap ass'y
19. Stop switch ass'y
20. Battery ass'y
21. Battery band
22. Fuse holder ass'y
23. Fuse (6V-10A)
24. Flasher relay ass'y
25. Rectifier ass'y
26. Panhead screw
27. Spring washer
28. C.D.I. Unit ass'y (DT360A)
29. Battery fitting band (DT360A)

Fig. 7-9

2. Description of Operation

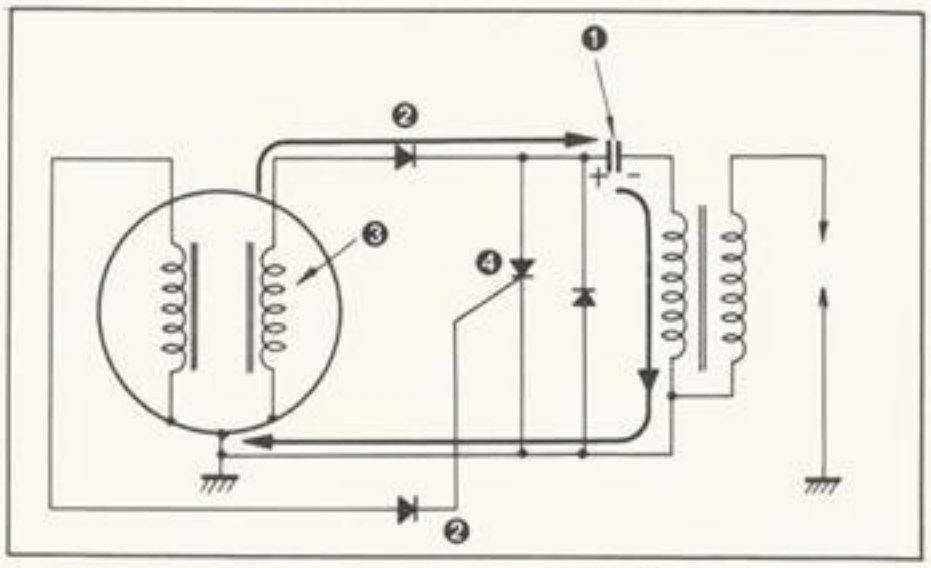


C.D.I. Schematic

1. Magneto
2. C.D.I. Unit
3. Ignition coil
4. Pulser coil
5. Charging coil
6. Diode
7. Condenser
8. Thyristor
9. Spark plug
10. Diode

Fig. 7-10

a. As the magneto turns it induces an alternating current (AC) in the charge coil. This AC current is rectified to a direct current (DC) by the diode in the CDI unit and charges the Ignition Capacitor to approximately 350 volts.
The Thyristor (Silicon Control Rectifier) prevents the discharge of the ignition capacitor until it receives a positive (+) trigger pulse from the Pulse Coil. See Figure 2.



Ignition Capacitor Charging

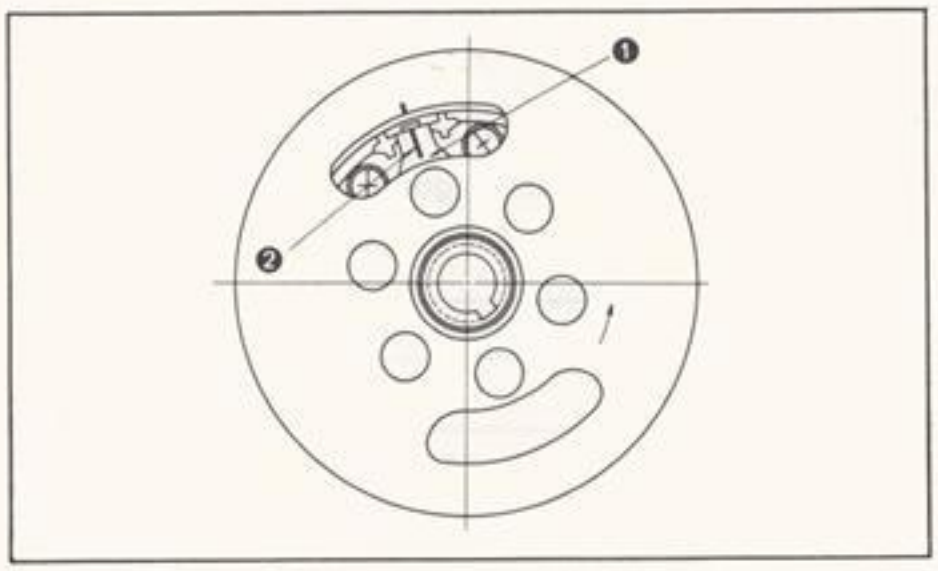
1. Condenser
2. Diode
3. Charge coil
4. Thyristor

Fig. 7-11

b. When the mark on the rotor aligns with the mark on the pulse coil (See Figure 7-10), a trigger pulse is sent to the thyristor gate. This pulse allows the thyristor to conduct and the current stored in the ignition capacitor will quickly flow through the primary winding of the ignition coil. This induces a high voltage in the ignition coil secondary winding which causes a spark to jump across the electrodes of the spark plug.

c. Automatic Spark Advance System. The output voltage of the pulse coil will increase as engine speed increases. This causes the Thyristor to conduct earlier, resulting in an advanced spark.

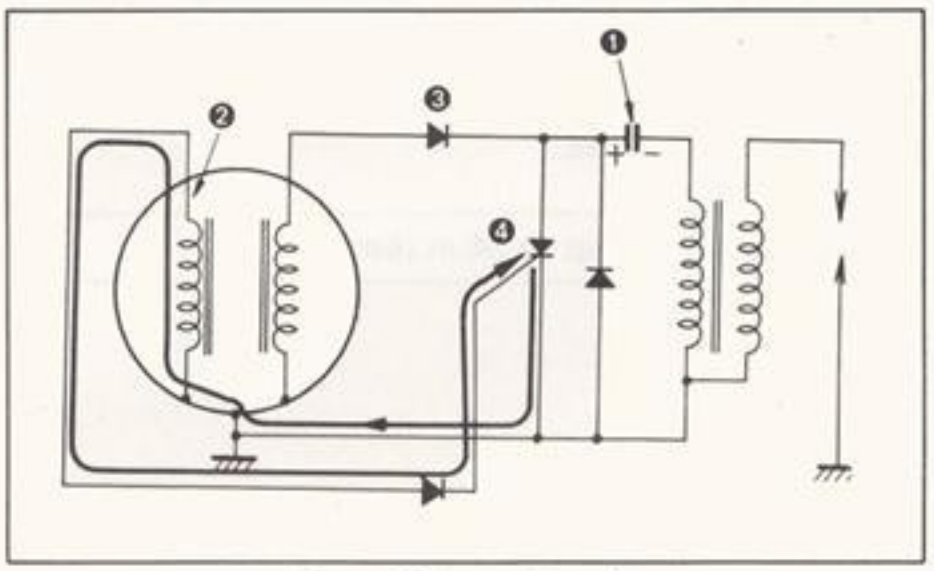
Magneto



Timing Marks Aligned

1. Pulser coil
2. Timing Marks

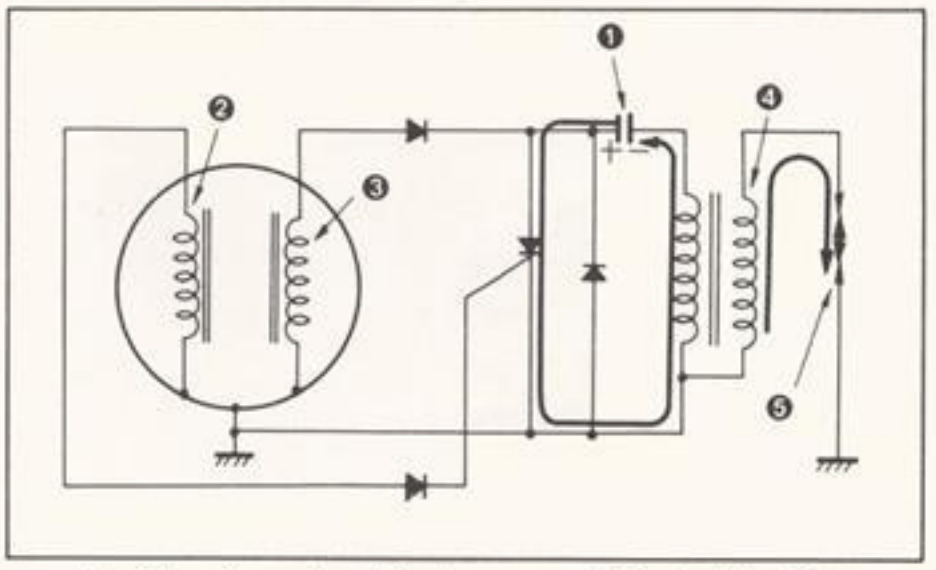
Fig. 7-12



Trigger Pulse to Thyristor

1. Condenser
2. Pulser coil
3. Diode
4. Thyristor

Fig. 7-13



Ignition Capacitor Discharges and Spark Plug Fires

1. Ignition capacitor
2. Pulse coil
3. Charge coil
4. Ignition coil
5. Spark plug

Fig. 7-14

3. Troubleshooting

Caution:
Avoid using an improper tester (insulation resistance testers or other testers with a battery of large capacity).
The use of a large capacity tester may ruin the C.D.I. unit.

a. Checking the Magneto Charge Coil and Pulser.
The resistance of the magneto ignition coil windings is as specified below. To locate the cause of trouble (broken coil, short-circuit, etc.), measure the resistance across each lead as shown in chart.

DT360A	
Charge Coil Ω x100 scale	Pulser
Brown-Black Approx. 12.5Ω ± 10%	White/Red-White/Green Approx. 90Ω ± 10%

b. Ignition Coil

1) Coil spark gap test

a) Remove fuel tank and disconnect ignition coil from wire harness and spark plug.

b) Connect electrotester as shown.

c) Connect fully charged 6V. Battery to tester.

d) Turn on spark gap switch and increase gap until misfire occurs.

Minimum spark gap: 0.24 in. (6mm)

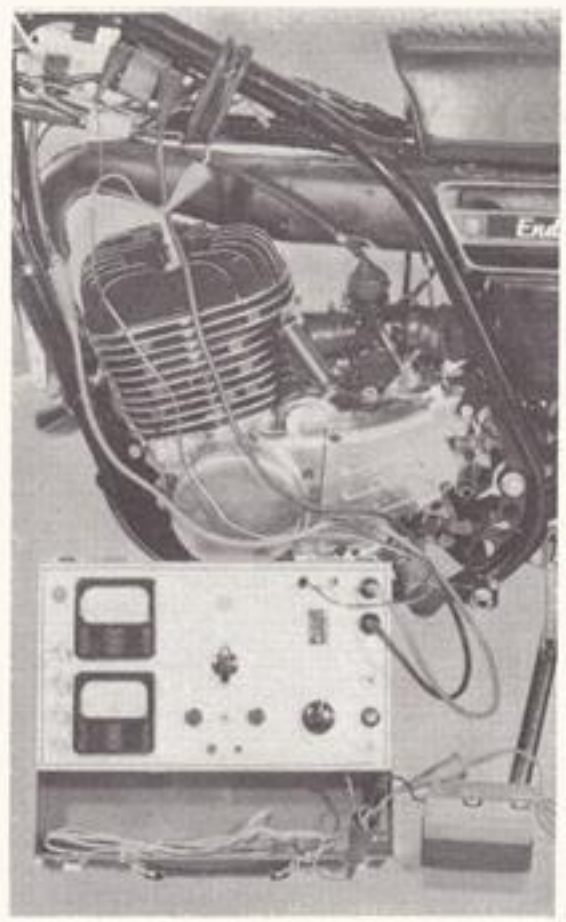
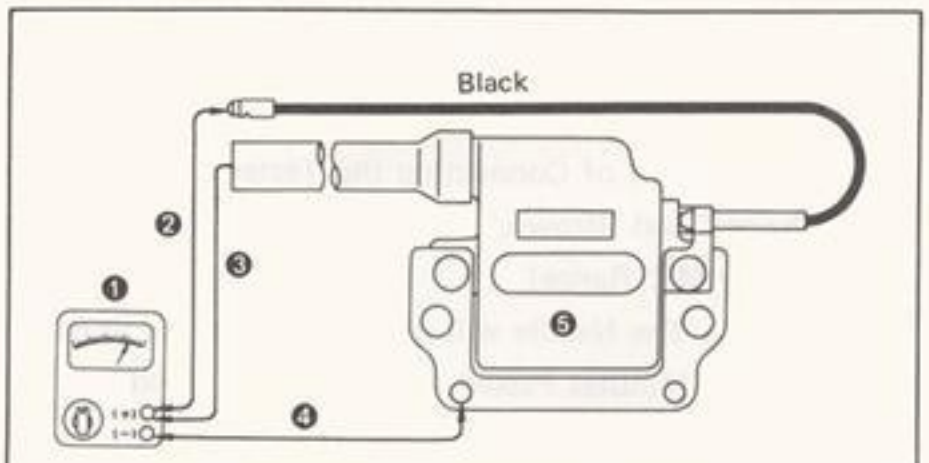


Fig. 7-15

2) Direct Current Resistance Testing

Use a Pocket Tester or equivalent ohmmeter to determine resistance and continuity of primary and secondary coil windings.



1. Pocket-tester
2. Primary coil resistance value
3. Secondary coil resistance value
4. Ground
5. Ignition coil

Fig. 7-16

	Model DT360A	Temperature
Primary Coil Resistance (Use (Ω x 1) Scale)	0.61Ω ±10%	20°C or 68°F
Secondary Coil Resistance (Use (Ω x 100) Scale)	6.0kΩ ±20%	20°C or 68°F

c. Checking the C.D.I. unit (F8700171)

See if the C.D.I. unit is correct or not with using a tester that measures a resistance between each of terminals.

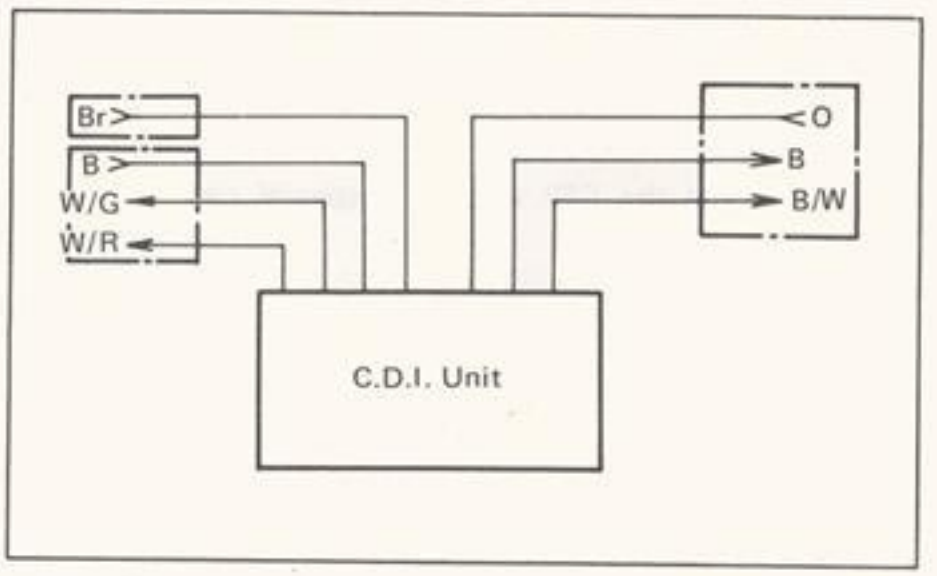


Fig. 7-17

Measuring Points	Normal
To Connect the Tester's ⊕ and ⊖ with 'Brown' and 'Black' Respectively, (Tester PKΩ Range)	Resistance Small (50 ~ 80Ω)
To Connect the Tester's ⊕ and ⊖ with 'Black' and 'Brown,' Respectively.	Resistance Infinity
The Moment of Connecting the Tester's ⊕ and ⊖ with 'Orange' and 'Brown,' Respectively. (Tester MΩ Range) Note: The Needle will not Deflect Unless Several Minutes Passed Away at the Second Check-up.	Needle Deflects at a Moment
To Connect the Tester's ⊕ and ⊖ with 'Brown' and 'Orange,' Respectively.	Resistance Infinity
To Connect the Tester's ⊕ and ⊖ with 'White/Red' and 'White/Green,' Respectively. (Tester 10 kΩ Range)	Resistance Small (100 ~ 300Ω)
To Connect the Tester's ⊕ and ⊖ with 'White/Green' and 'White/Red,' Respectively. (Tester 10 kΩ Range)	Resistance Large (600 ~ 1 kΩ)

4. Wiring Connections

a. The wiring between the magneto, CDI unit, and ignition coil uses couplers to prevent any wrong connection. When connecting the ground circuit and the ignition coil, particular care should be taken. If these are connected wrong, the CDI unit will become inoperative.

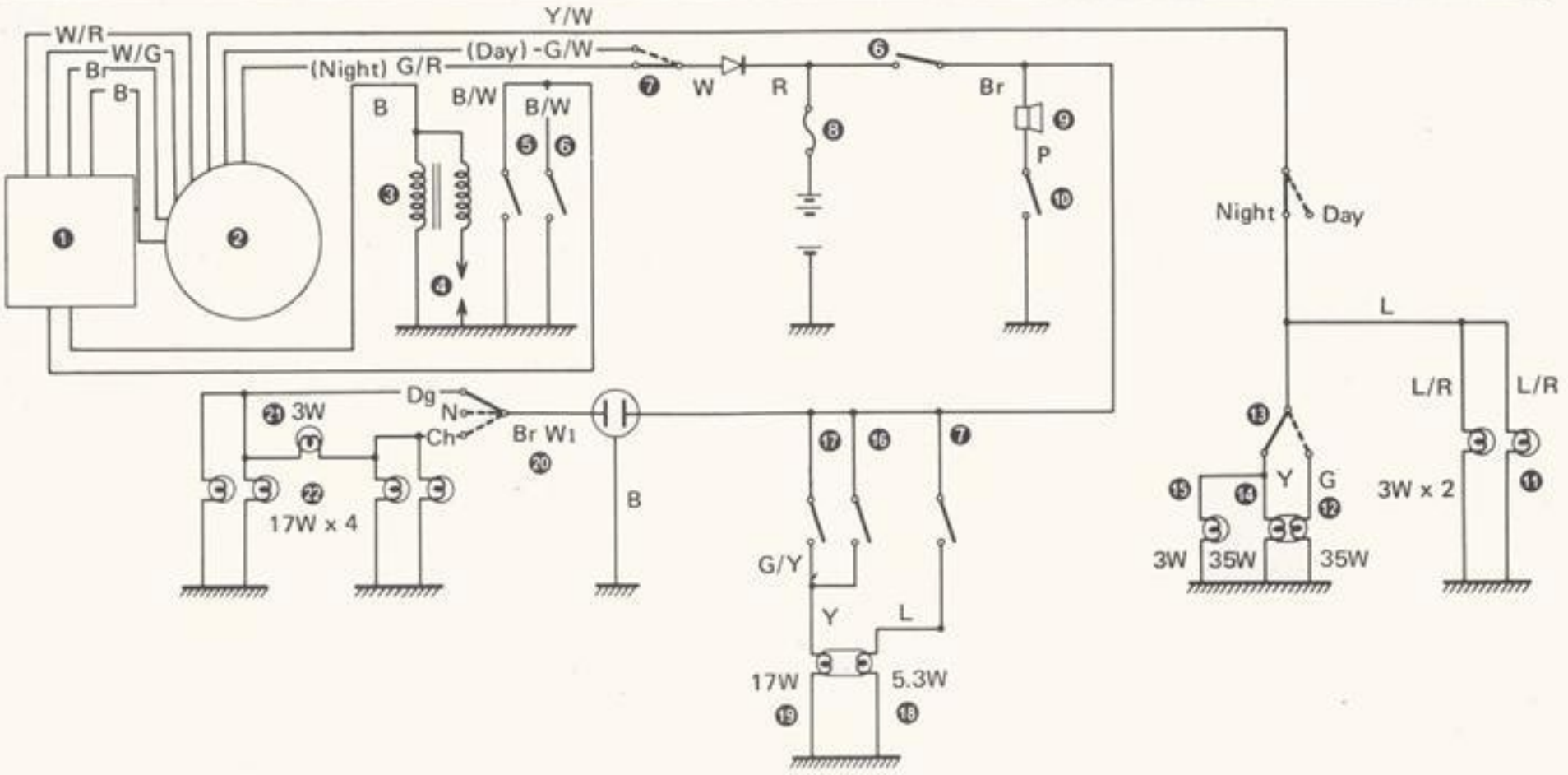
b. Wiring Notes.

1) Connection must be done accurately.
Special care is required for connection of the ground circuit and ignition coil.

2) The CDI unit and ignition coil should be installed in the specified positions. If position is to be changed, a dry and airy place should be selected.
Keep free from mud and water.

3) To remove the rotor, be sure to use the rotor puller (an accessary tool). Avoid using a hammer, or the rotor may be damaged.

4) Handle the CDI unit with special care. If you should drop it, the incorporated electronic components will be damaged.



1. C.D.I. Unit
2. F.W.M.
3. Ignition coil
4. Spark plug
5. Kill switch
6. Main switch
7. Lighting switch
8. Fuse
9. Horn
10. Horn button
11. Meter lamp
12. Low beam
13. Dimmer switch
14. High beam
15. High beam indicator
16. Rear stop switch
17. Front stop switch
18. Tail lamp
19. Stop lamp
20. Flasher relay
21. Flasher indicator
22. Flasher lamp

Fig. 7-18

CHAPTER 8. CHASSIS

8-1. Special Tools

A. Vernier Caliper
P/N 90890 - 03005

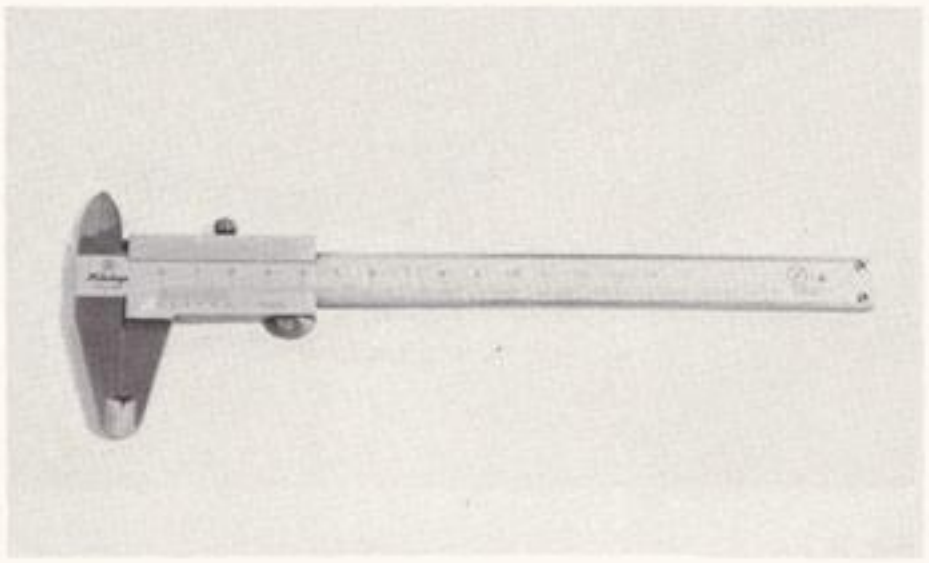


Fig. 8-1

B. Torque Wrench
P/N 90890 - 05006

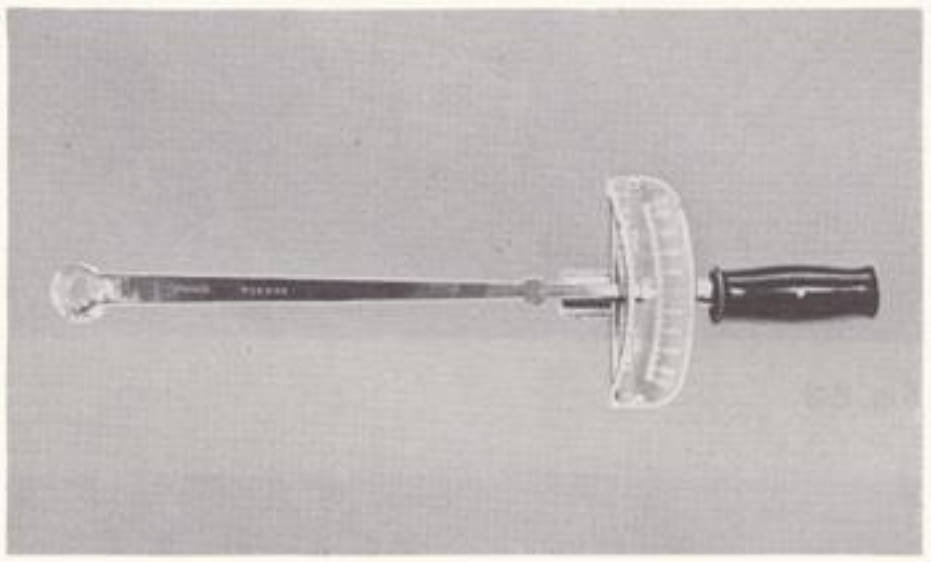


Fig. 8-2

C. Tire Pressure Gauge

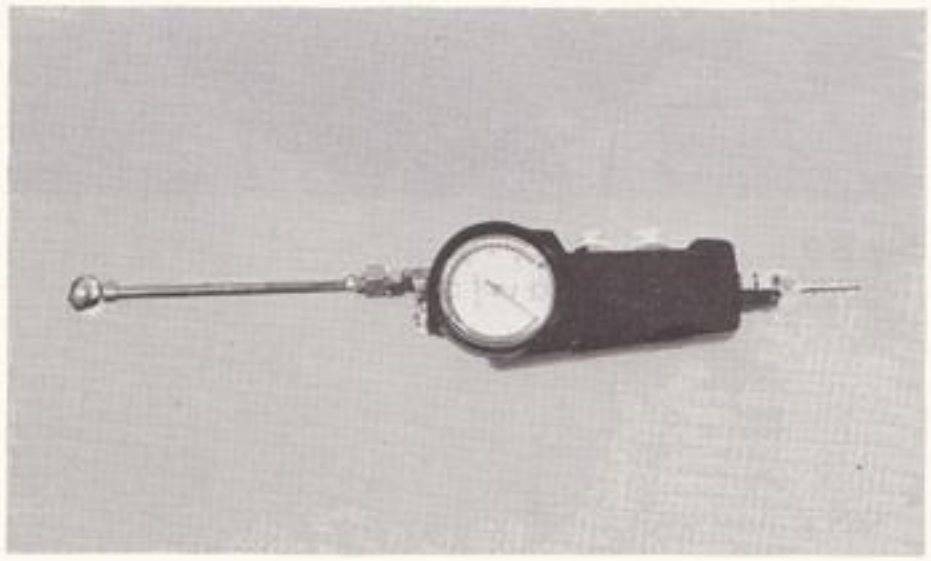


Fig. 8-3

D. Steering Nut Wrench
P/N 90890 - 01050

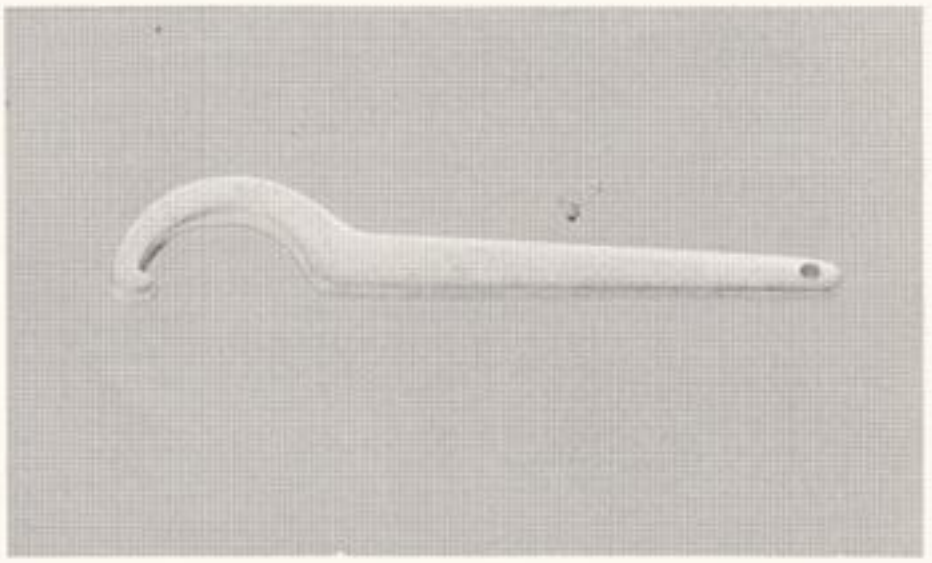


Fig. 8-4

E. Fluid Measuring Cup (CC)

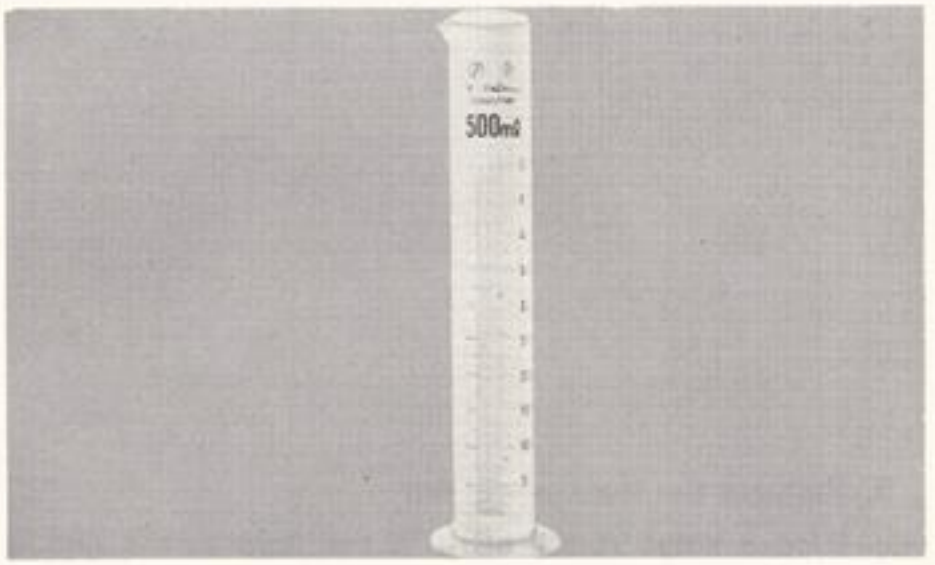


Fig. 8-5

F. Grease Gun (hand pump type)

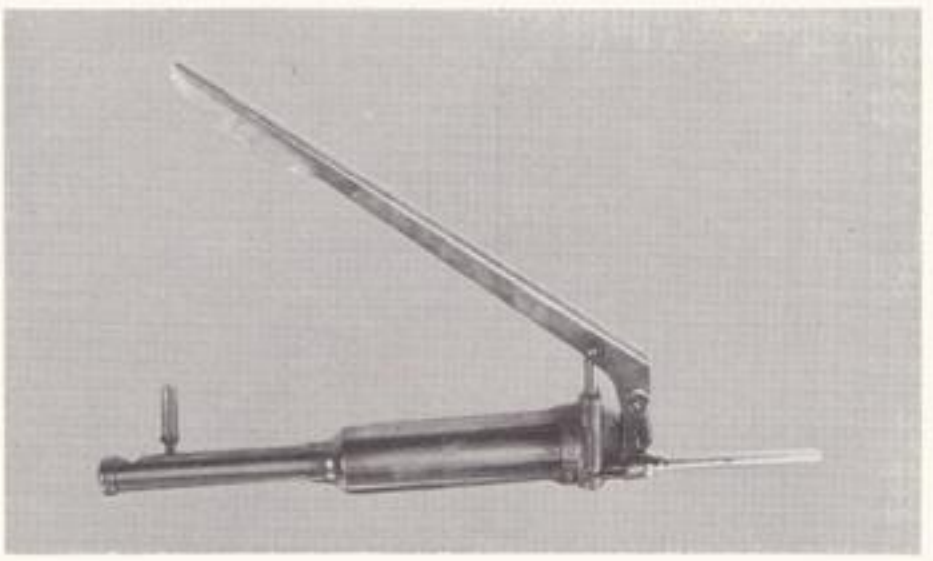


Fig. 8-6

8-2 Front Wheel

A. Removal

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

2. Disconnect the speedometer cable from the front wheel backing plate.

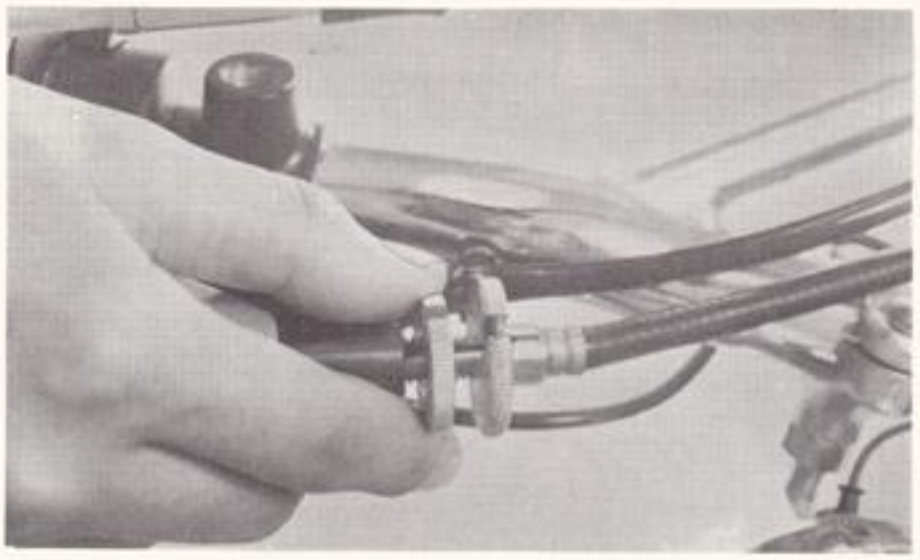


Fig. 8-7

3. Remove cotter pin from front wheel nut.

4. Loosen the two axle cap nuts, at the bottom of the right hand fork leg.

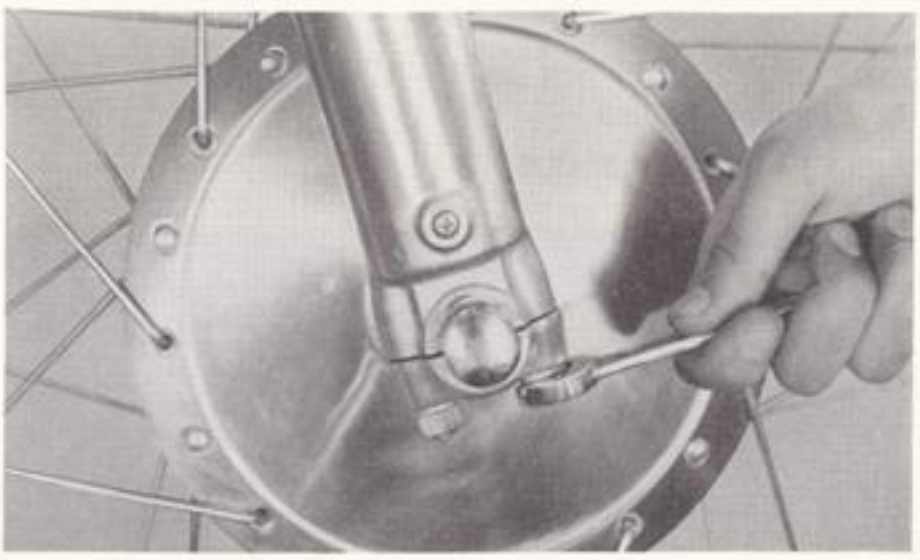


Fig. 8-8

5. Remove the front wheel nut.
   (Use a small round shaft in the hole at the end of the axle to keep axle from turning).

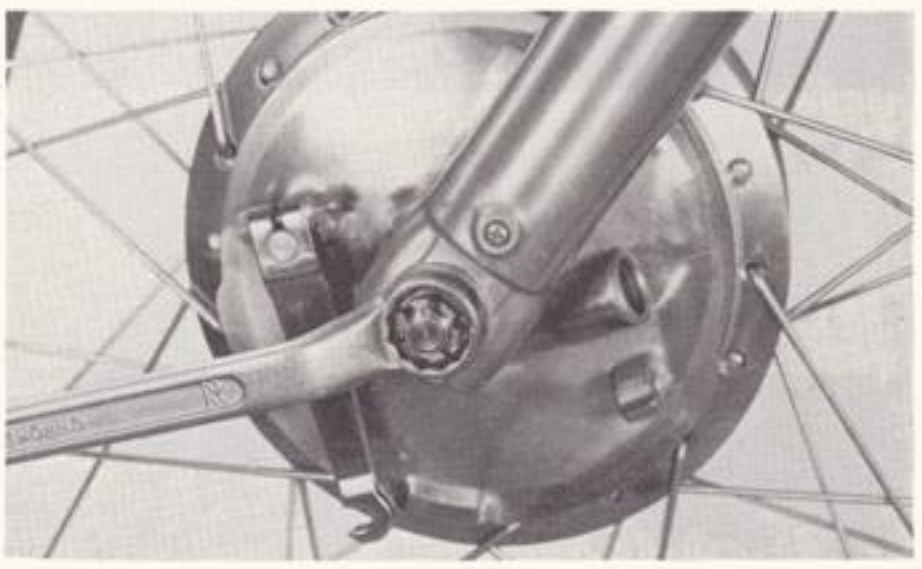


Fig. 8-9

6. Remove the front wheel axle by simultaneously twisting and pulling out on the axle. Then remove the wheel assembly.
   (Raise the front of the machine by placing a support under the engine).

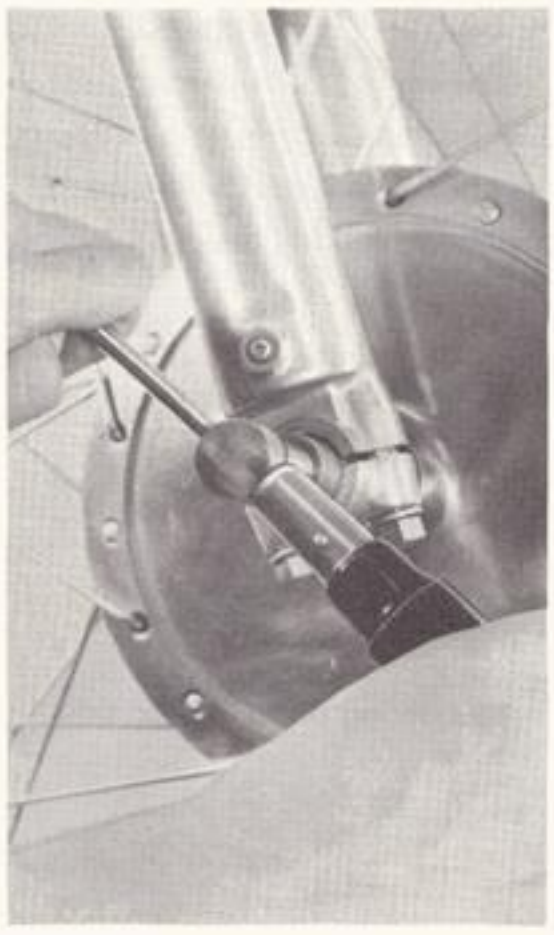


Fig. 8-10

B. Front Axle

Remove any corrosion from the axle with emery cloth. Then place it on a surface plate and check for bending. If bent, straighten or replace.

C. Checking Brake Shoe Wear

Measure the outside diameter at the brake shoe with slide calipers.
If it measures less than specified, replace.

Front brake shoe diameter:	6 in. (150mm)
Replacement limit:	5.8 in. (145mm)

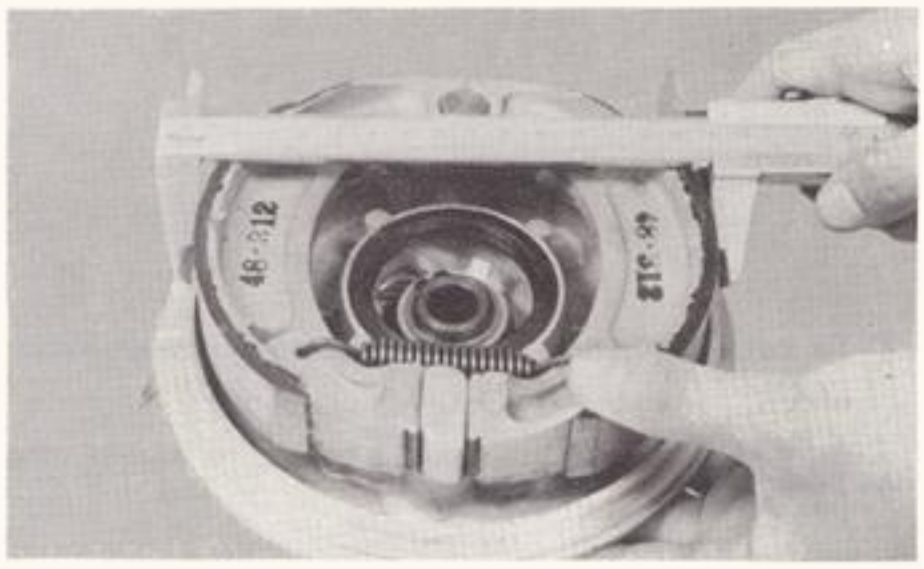


Fig. 8-11

D. Brake Drum

Oil or scratches on the inner surface of the brake durm will impair braking performance or result in abnormal noises.
Remove oil by wiping with a rag soaked in lacquer thinner or solvent.
Remove scratches by lightly and evenly rebbing with emery cloth.

E. Replacing Wheel Bearings

If the bearings allow play in the wheel or if it does not turn smoothly, replace the bearing as follow:

1. First clean the outside of the wheel hub.

2. Insert the bent end of the special tool 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.)

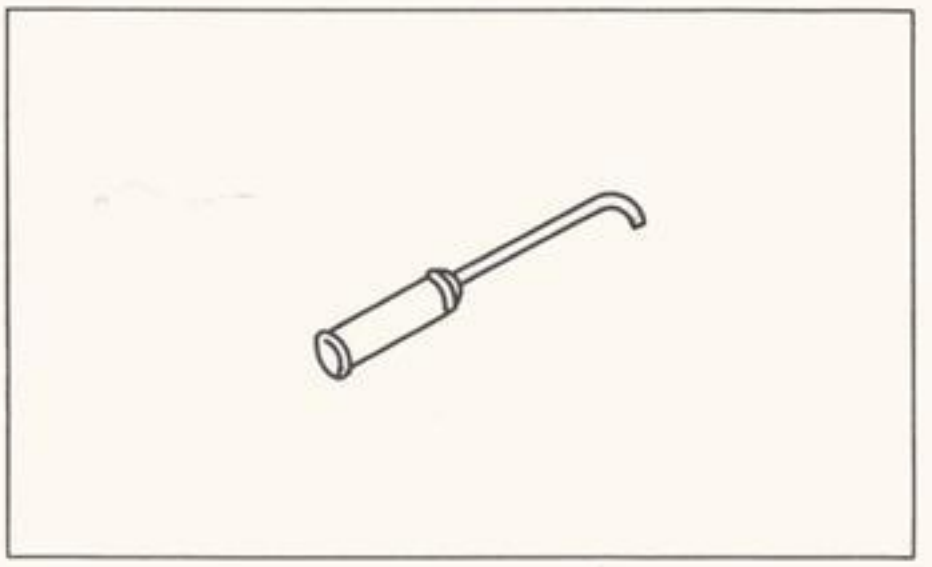


Fig. 8-12

3. Push out the bearing on the other side.

Fig. 8-13

4. To install the wheel bearing, reverse the above sequence.
   Be sure to grease the bearing before installation and use the bearing fitting tool.

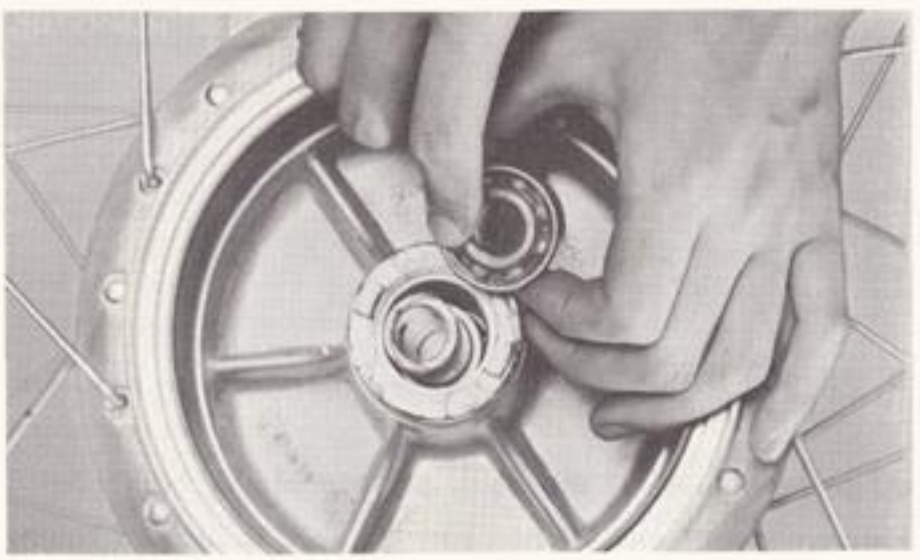


Fig. 3-14

5. If the tooth surface of the helical speedometer drive gear is excessively worn, replace it.

6. Check the lips of the seals for damage or warpage. Replace if necessary.

F. Installing Front Wheel

Caution:

1. After replacing wheel and axle, tighten axle nut FIRST and install a new cotter pin.

Axle nut torque: 862 - 1,042 in.-lbs (10 - 12 kg-m)

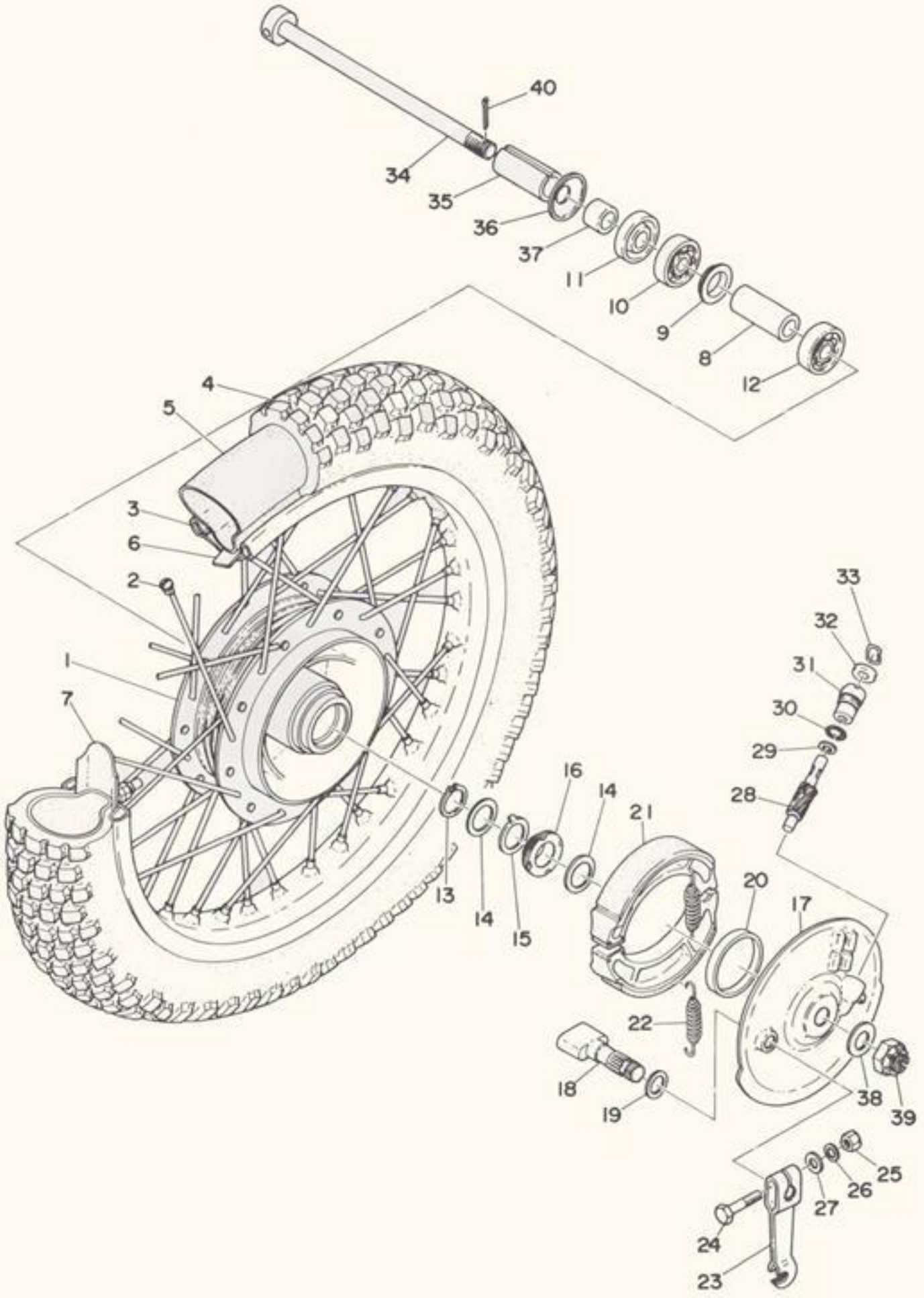
Fig. 8-15

2. THEN tighten the axle pinch cap nuts.

Cap nut torque: 174 in.-lbs (2.0kg-m)

Fig. 8-16

Front wheel



1. Front hub
2. Spoke set
3. Front rim (1.60A-21)
4. Front tire (3.00–21–4PR)
5. Front tube (3.00-21)
6. Rim band (3.00-21)
7. Bead spacer
8. Bearing spacer
9. Spacer flange
10. Bearing (B6202)
11. Oil seal (SD-20-35-7)
12. Bearing (6002Z)
13. Circlip (S-22)
14. Thrust washer 2 (22.5-19-1)
15. Meter clutch
16. Drive gear
17. Brake shoe plate
18. Camshaft
19. Camshaft shim (12.2-22-0.5)
20. Oil seal (SDD-50-62-7)
21. Brake shoe comp.
22. Brake shoe return spring
23. Camshaft lever
24. Bolt
25. Nut
26. Spring washer
27. Plainwasher
28. Meter gear
29. Thrust washer 1 (7-12-0.8)
30. O-ring (2.4-13.8)
31. Bushing
32. Oil seal (SO-7-14-4)
33. Stop ring
34. Wheel shaft
35. Collar
36. Dust hub cover
37. Wheel shaft collar
38. Plain washer
39. Plain washer
39. Shaft nut
40. Cotter pin

Fig. 8-17

8-3. Rear Wheel

The rear wheel is 18-in. size, and the rear tire is Trials Universal. A single leading-shoe type brake is used. A labyrinth seal between the wheel hub and the brake plate is provided to prevent water and dust leakage.

A. Removal

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

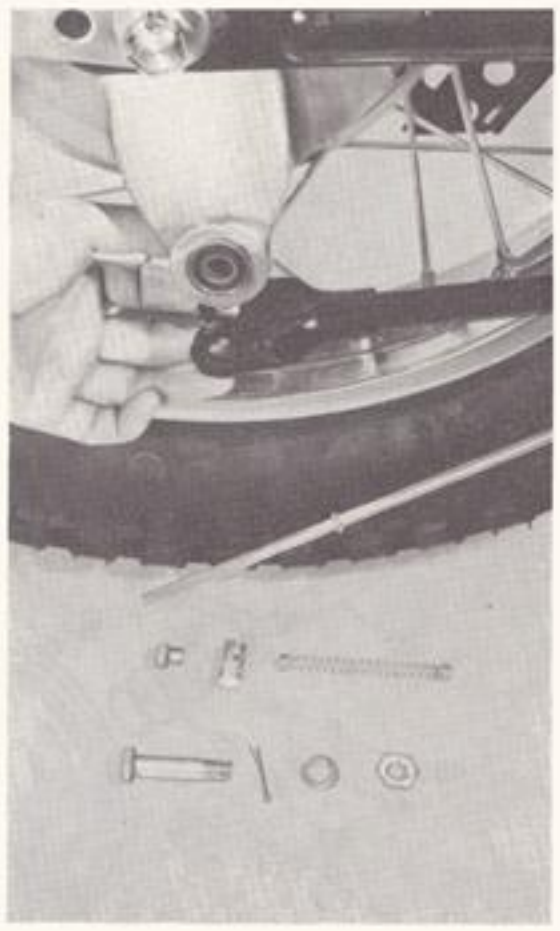


Fig. 8-18

2. Remove cotter pin from rear wheal shaft nut.

3. Remove the rear wheel shaft nut.

4. Pull out the rear wheel shaft by simultaneously twisting and pulling out.

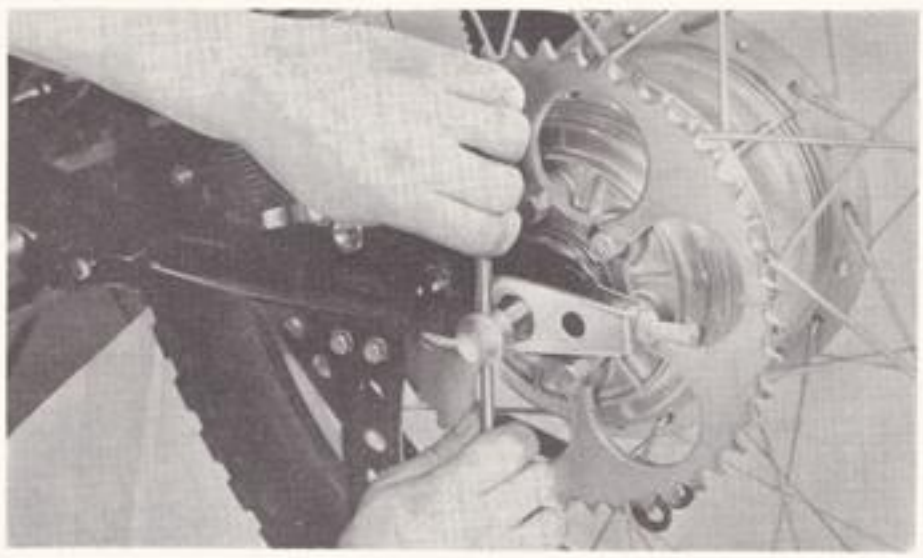


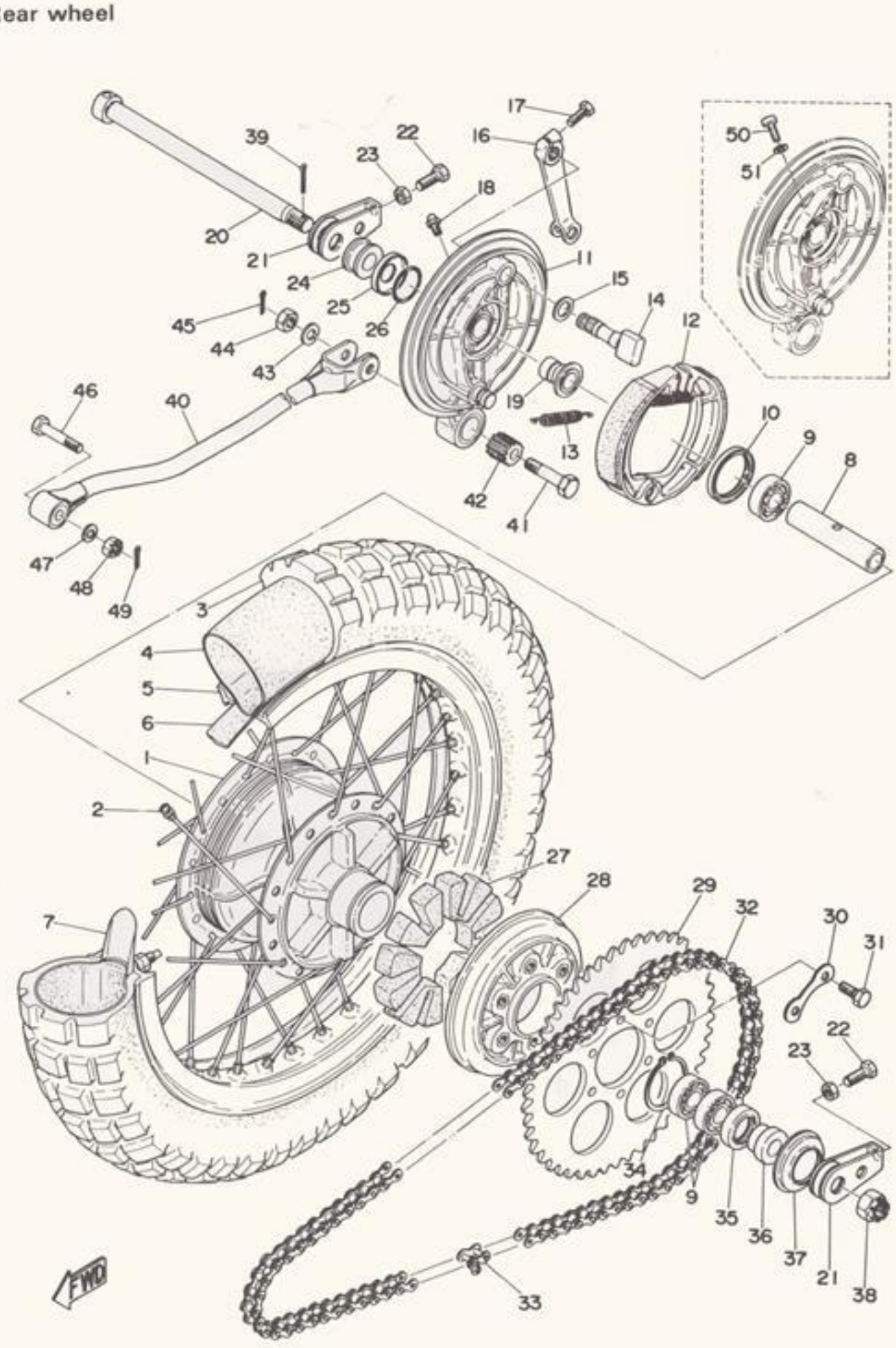
Fig. 8-19

5. Remove the rear brake shoe plate.

6. Lean the machine to the left and remove the rear wheel assembly.

Fig. 8-20

Rear wheel



1. Rear hub
2. Spoke set
3. Rear tire (4.00–18–4PR)
4. Rear tube (4.00-18)
5. Rear rim (1.85B-18)
6. Rim band (4.00-18)
7. Bead spacer
8. Bearings, spacer
9. Bearing (6203)
10. Oil seal (SO-46-56-4)
11. Brake shoe plate
12. Brake shoe comp.
13. Return spring
14. Camshaft
15. Camshaft shim
16. Camshaft lever
17. Bolt
18. Grease nipple
19. Shaft bushing
20. Wheel shaft
21. Chain puller
22. Chain puller bolt
23. Nut
24. Wheel shaft collar
25. Plate dust cover
26. O-ring (2.4-31)
27. Clutch damper
28. Hub clutch
29. Sprocket wheel, gear
30. Lock washer
31. Fitting bolt
32. Chain (DK520D-102L)
33. Chain joint
34. Circlip
35. Oil seal (DD25-40-9)
36. Shaft collar
37. Dust cover
38. Shaft nut
39. Cotter pin
40. Tension bar
41. Tension bar bolt
42. Bushing
43. Spring washer
44. Nut
45. Cotter pin
46. Tension bar bolt
47. Spring washer
48. Slotted nut
49. Cotter pin
50. Pan head screw
51. Spring washer

Fig. 8-21

B. Checking Brake Shoe Wear

1. Measure the outside diameter at the brake shoe with slide calipers.
   If it measures less than specified, replace.

Rear brake shoe diameter:	5.9 in. (150mm)
Replacement limit:	5.7 in. (145mm)

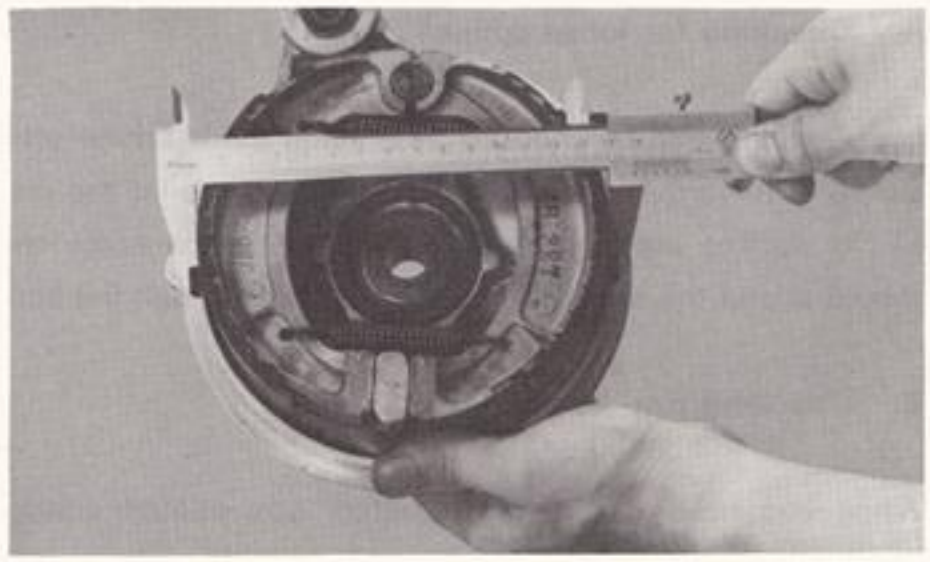


Fig. 8-22

2. Remove any glazed areas from brake shoes using coarse sand paper or file.

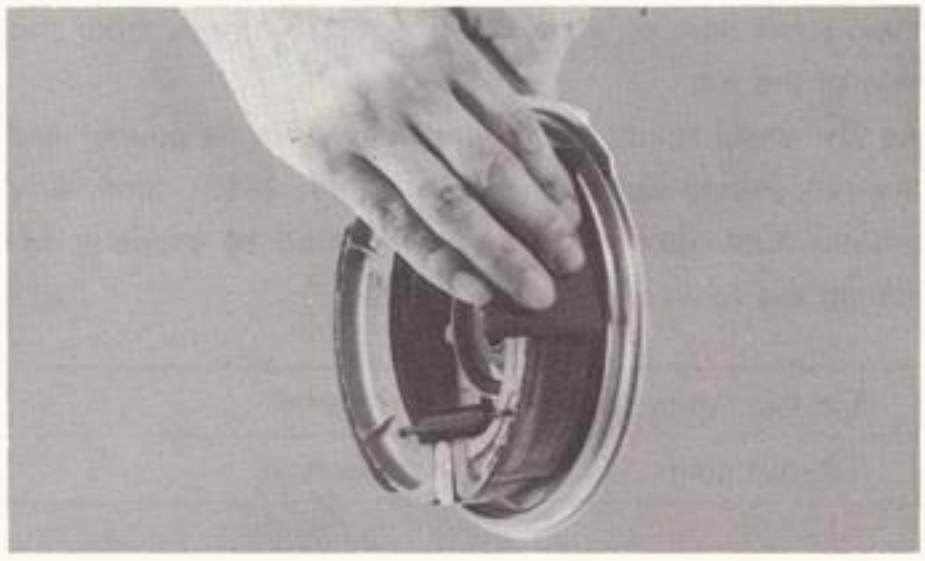


Fig. 8-23

C. Brake Drum

Oil or scratches on the inner surface or the brake drum will impair braking performance or result in abnormal noises. Remove oil by wiping with a rag soaked in lacquer thinner or solvent. Remove scratches by lightly and evenly rubbing with emery cloth.

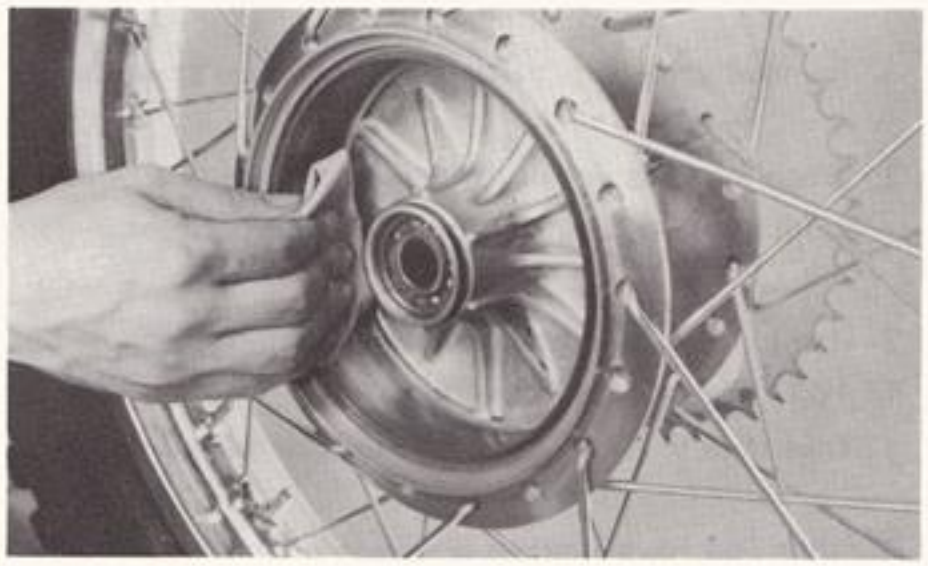


Fig. 8-24

D. Replacing Wheel Bearings

See front wheel section, paragraph 6-1,A,4.

8-4 Rims and Spokes (Front and Rear Wheels)

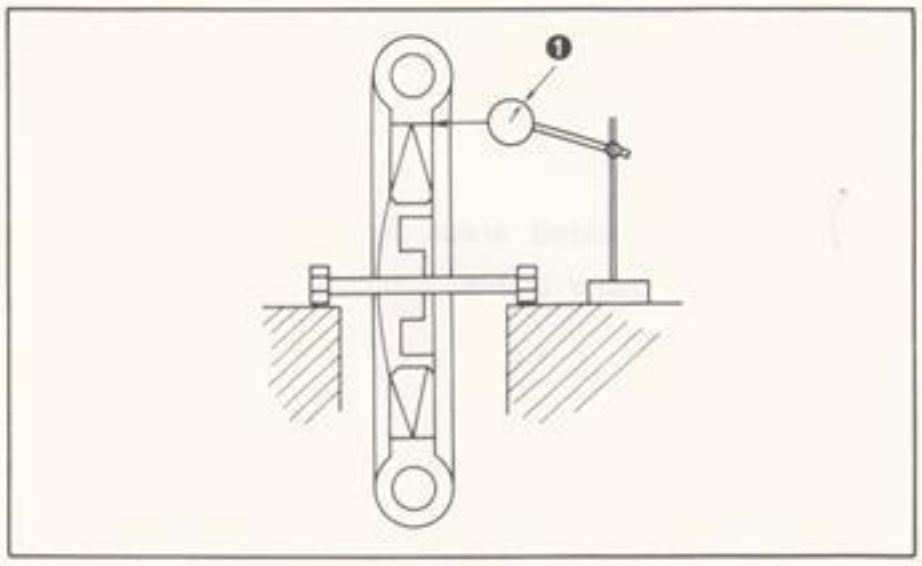
A. Checking for loose spokes

Loose spokes can be checked by bracing the machine off the ground so that the wheel can spin free.
Slowly revolve the wheel and at the same time let the metal shaft of a fairly heavy screwdriver bounce off each spoke. If all the spokes are tightened approximately the same then the sound given off by the screwdriver hitting the spokes should sound the same. If one spoke makes a dull flat sound, then check it for looseness.

B. Checking rim "run-out"

While you have the wheel elevated, you should check that it does not have too much run-out.
"run-out" is the amount the wheel deviates from a straight line as it spins. Spin the wheel, and solidly anchor some sort of a pointer about 1/8" away from the side of the rim.
As the wheel spins, the distance between the pointer and the rim should not change more than 1/16" total. Any greater fluctuation should be eliminated by properly adjusting the spokes.

Run-out limits: 0.08 in. (2mm) lateral
Run-out limits: 0.08 in. (2mm) vertical



1. Dial gauge

Fig. 8-25

8-5. Tires and Tubes

A. Removal

1. Remove valve cap, valve core, and valve stem lock nut.

2. When all air is out of tube, separate tire bead from rim.
   (both sides) by stepping on tire with your foot.

3. Use two tire removal irons (with rounded edges) and begin to work the tire bead over the edge of the rim, starting 180° opposite the tube stem.
   Take care to avoid pinching the tube as you do this.

4. After you have worked one side of the tire completely off the rim, then you can slip the tube out. Be very careful not to damage the stem while pushing it back out of the rim hole.

Note:

If you are changing the tire itself, then finish the removal by working the tire off the same rim edge just previously mentioned.

B. Installing Tire and Tube

Reinstalling the tire and tube can be accomplished by reversing the disassembly procedure. The only difference in procedure would be right after the tube has been installed, but before the tire has been completely slipped onto the rim, inflate the tube. This removes any creases that might exist. Release the air and continue with reassembly.Also, right after the tire has been completely slipped onto the rim, check to make sure that the stem comes out of the hole in the rim at a right angle to the rim.

Tire Pressure	Front	13 lbs/in^2 (0.9kg/cm^2)	Normal Riding
	Rear	16 lbs/in^2 (1.1kg/cm^2)	

8-6. Drive Chain and Sprockets

Note:

Please refer to Maintenance Intervals and Lubrication Intervals charts for additional information.

A. Drive Sprocket

With the left crankcase cover removed, proceed as follows:

1. Using a blunt chisel, flatten the drive sprocket lock washer tab.

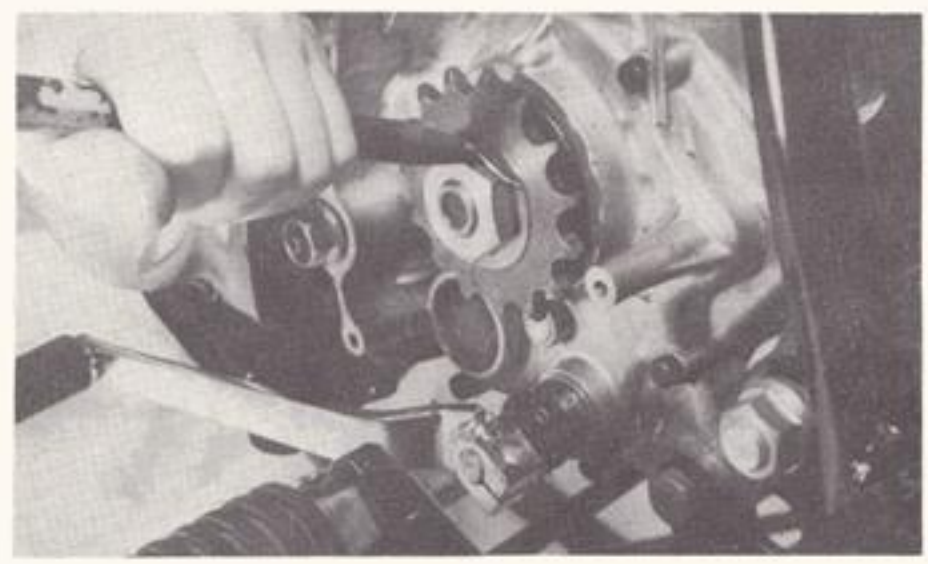
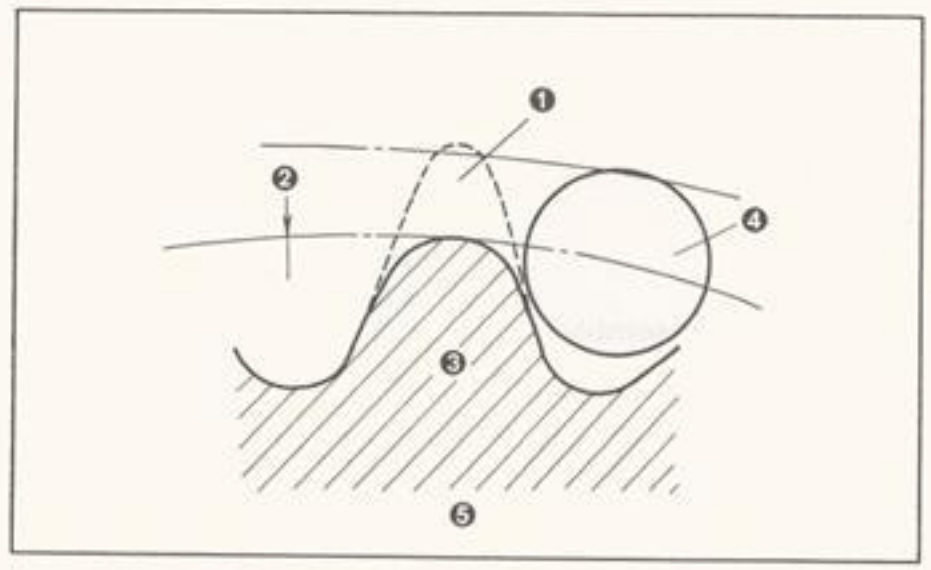


Fig. 8-26

2. With the drive chain in place, transmission in gear, firmly apply the rear brake. Remove the sprocker securing nut. Remove the sprocket.

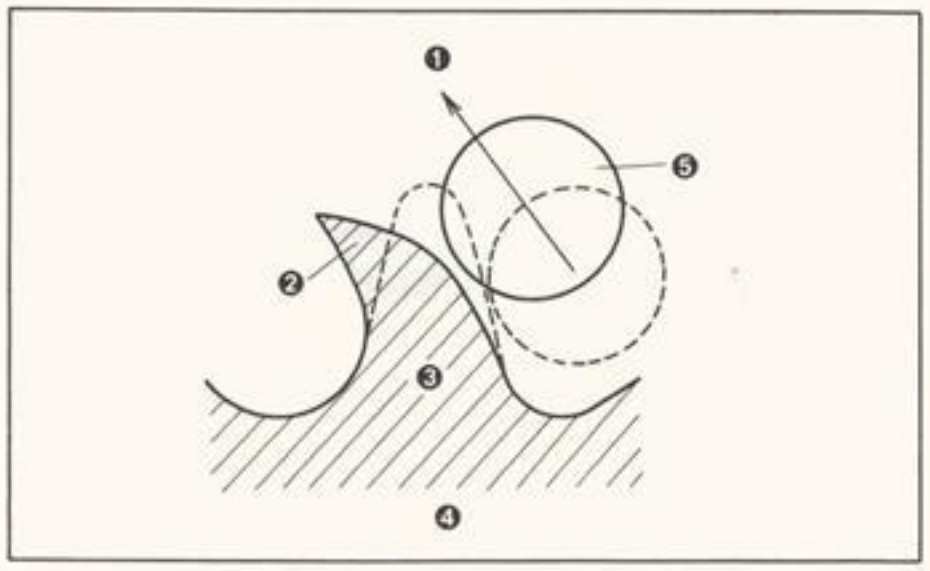
3. Check sprocket wear. Replace if wear decreases tooth height to a point approaching the roller center line.



1. Correct 2. Replace 3. Tooth 4. Roller 5. Sprocket

Fig. 8-27

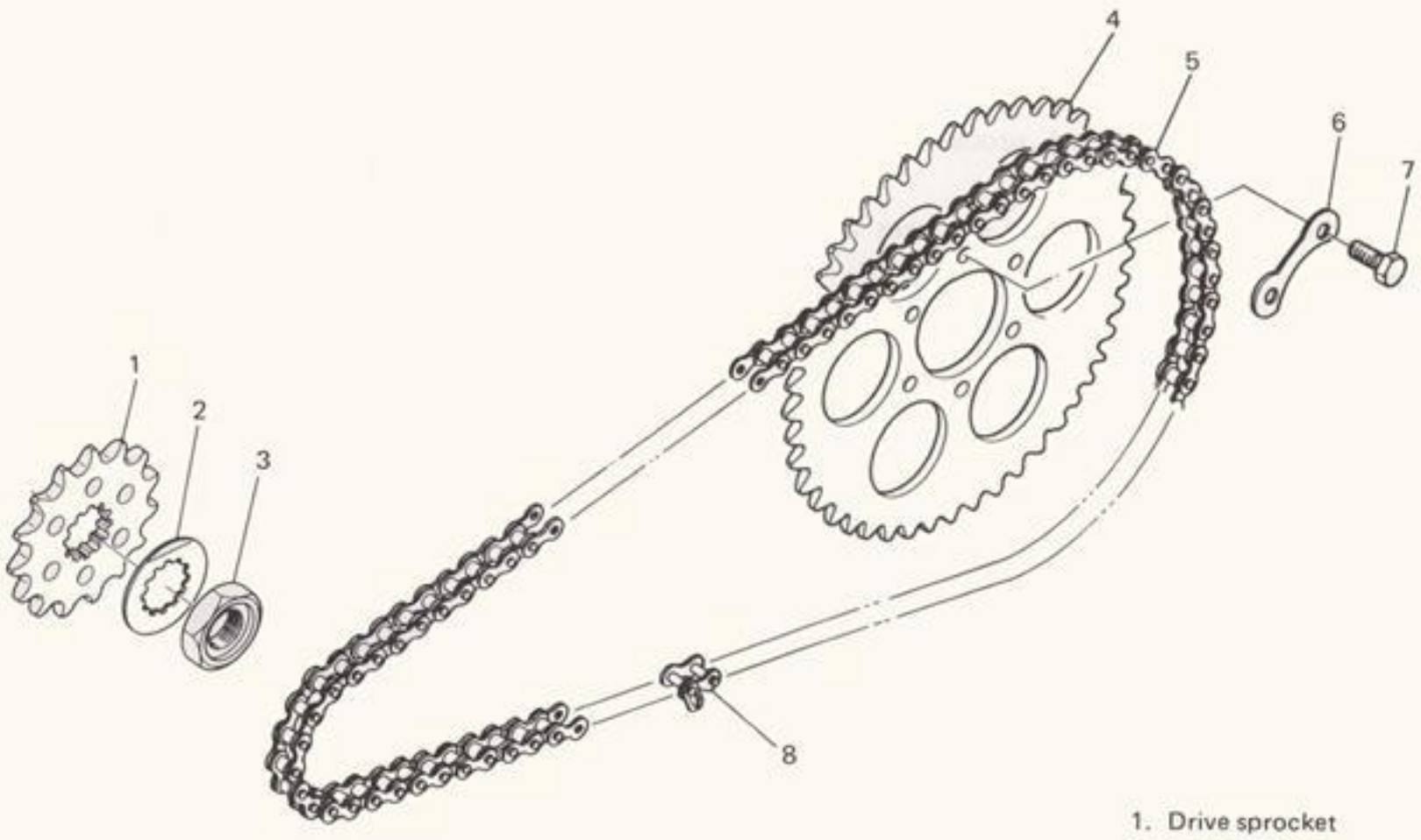
4. Replace if tooth wear shows a pattern such as that in the illustration, or as precaution and common sense dictate.



1. Slip off 2. Replace 3. Tooth 4. Sprocket 5. Roller

Fig. 8-28

Drive Chain and Sprockets



1. Drive sprocket
2. Lock washer
3. Lock nut
4. Gear sprocket wheel
5. Chain
6. Lock washer
7. Fitting bolt
8. Chain joint

Fig. 8-29

5. During reassembly, make sure the lock washer splines are properly seated on the drive shaft splines. Tighten securing nut thoroughly to specified torque value. Bend lock washer tab fully against securing nut flats.

Drive Sprocket Securing Nut Torque:	608 - 781 in.-lbs (7.0 - 9.0kg-m)

B. Driven Sprocket

With the rear wheel removed, proceed as follows:

1. Using a blunt chisel, flatten the securing bolt lock washer tabs.
   Remove the securing bolts (6). Remove the lock washers and sprocket.

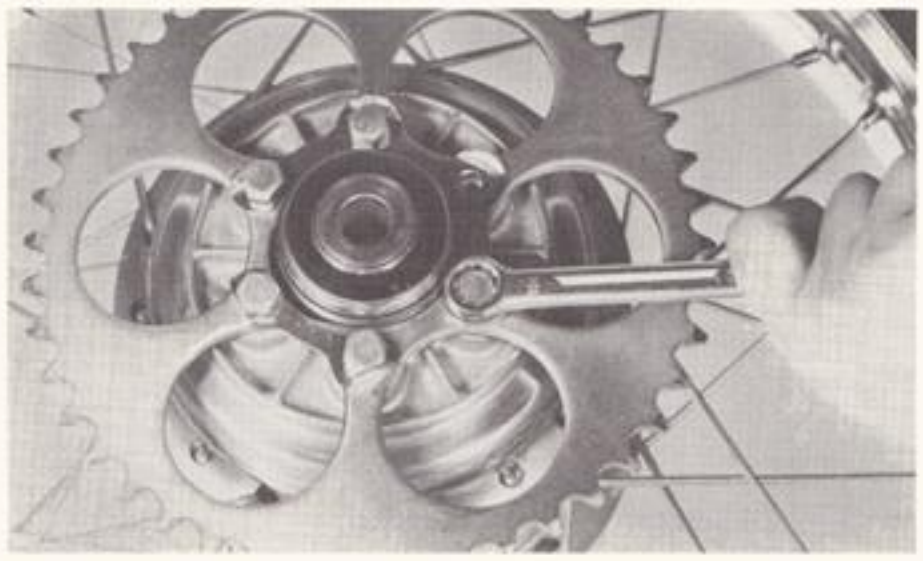


Fig. 8-30

2. Check sprocket wear per procedures for the drive sprocket.

3. Check the sprocket to see that it runs true. Do not heat and hammer to straighten. Use a press. If severely bent, replace.

4. During reassembly, make sure that sprocket and sprocket seat are clean. Tighten the securing bolts in a cross-hatch pattern.
   Bend the tabs of the lock washers fully against the securing bolt flats.

Driven Sprocket Securing Bolt Torque:
174 - 226 in.-lbs (2.0 - 2.6kg-m)

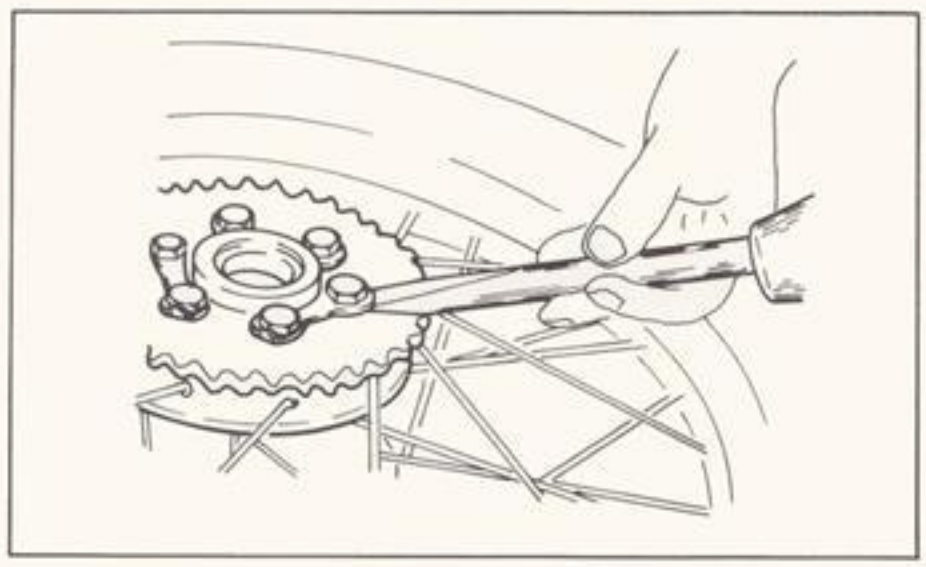


Fig. 8-31

C. Chain

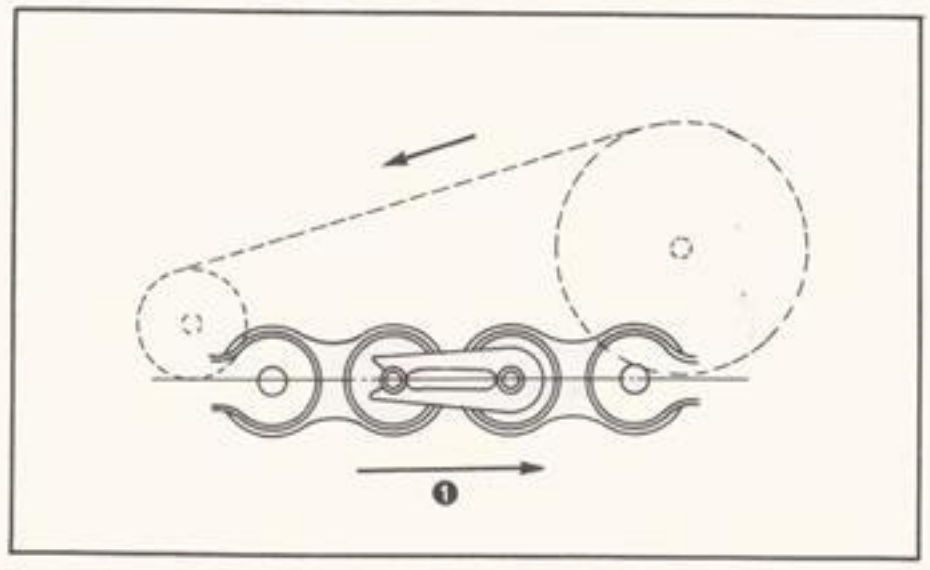
Note:

Please refer to Maintenance and Lubrication Intervals charts for additional information.

1. Using a blunt-nosed pliers, remove the master link clip and side plate. Remove the chain.

Fig. 8-32

2. During reassembly, the master link clip must be installed with rounded end facing the direction of travel.

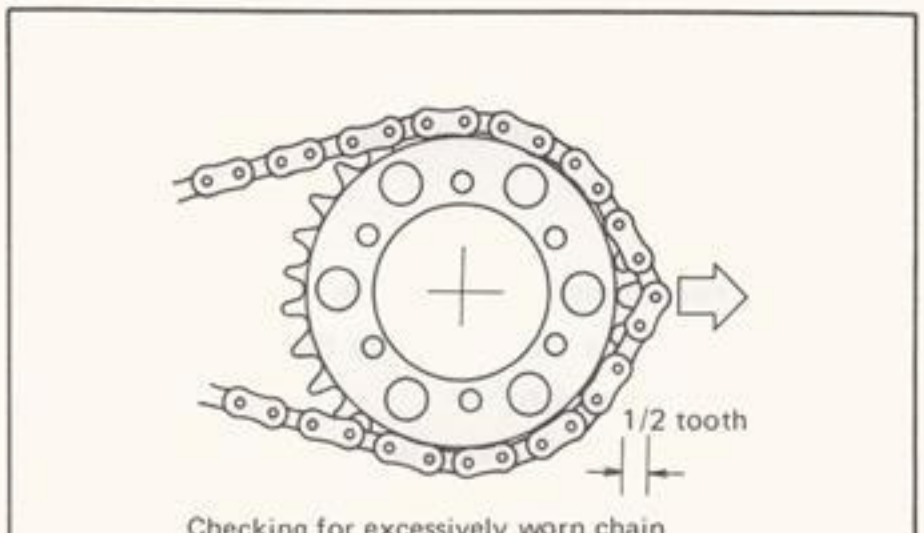


1. Turning direction

Fig. 8-33

D. Inspection

1. With the chain installed on the machine, excessive wear may be roughly determined by attempting to pull the chain away from the rear sprocket. If the chain will lift away more than one-half the length of the sprocket teeth, remove and inspect.
   If any portion of the chain shows signs of damage, or if either sprocket shows signs of excessive wear, remove and inspect.



Checking for excessively worn chain

Fig. 8-34

2. Check the chain for stiffness. Hold as illustrated. If stiff, soak in solvent solution, clean with medium bristle brush, dry with high pressure air. Oil chain thoroughly and attempt to work out kinks. If still stiff, replace.

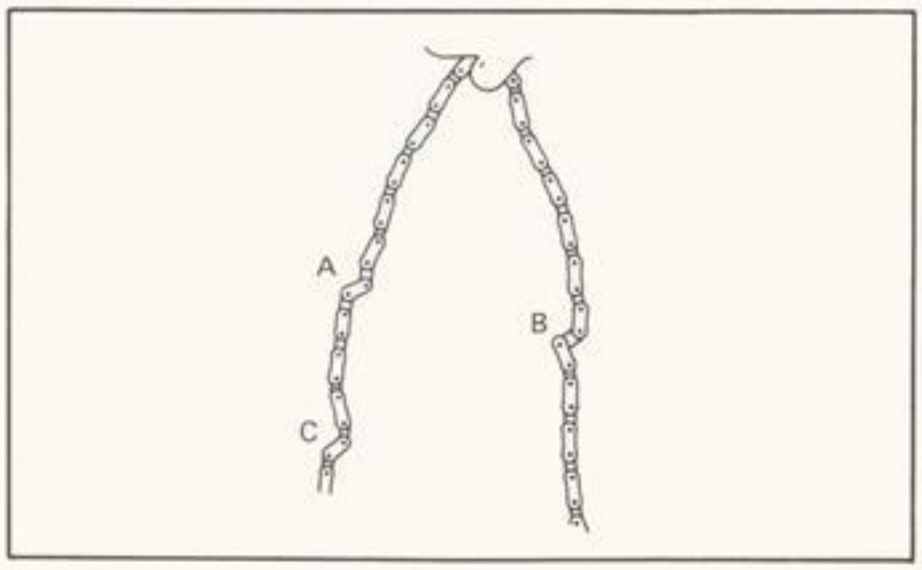


Fig. 8-35

3. Check the side plates for visible wear. Check to see if excessive play exists in pins and rollers. Check for damaged rollers. Replace as required.

E. Maintenance

The chain should be lubricated per the recommendations given in the Maintenance and Lubrication Intervals charts. More often if possible. Preferable after every use. See "Chassis and Suspension, Swing Arm", for additional information regarding chain guide and oiler.

1. Wipe off dirt with shop rag. If accumulation is severe, use soft bristle brush, then rag.

2. Apply lubricant between roller and side plates on both inside and outside of chain. Don't skip a portion as this will cause uneven wear.
   Apply thoroughly. Wipe off excess.

Note:

Chain and lubricant should be at room temperature to assure penetration of lubricant into rollers.

Choice of lubricant is determined by use and terrain. SAE 20wt. or 30wt. may be used, but several specialty types by accessory manufacturers offer more penetration, corrosion resistance and shear strength for roller protection.
In certain areas, semi-drying lubricants are preferrable. These will resist picking up sand particles, dust, etc. Consult your Authorized Yamaha Dealer.

3. Periodically, remove the chain. Wipe and/or brush excess dirt off. Blow off with high pressure air.

4. Soak chain in solvent, brushing off remaining dirt. Dry with high pressure air. Lubricate thoroughly while off machine. Work each roller thoroughly to make sure lubricant penetrates. Wipe off excess. Re-install.

8-7. Front Forks

A. General - The front forks

The front forks utilize chrome plated tubular steel fork logs (inner tubes) and tubular alminum sliders (outer tubes). The bearing surface is the entire inside surface of the aluminum outer tube.

B. Front Fork Oil Change

1. With the front wheel removed or raised off the floor with a suitable frame stand, loosen pinch bolt at the top of each inner fork tube.

Fig. 8-36

2. Remove cap bolts on inner fork tubes.

3. Remove drain screw from each outer tube with open container under each drain hole.

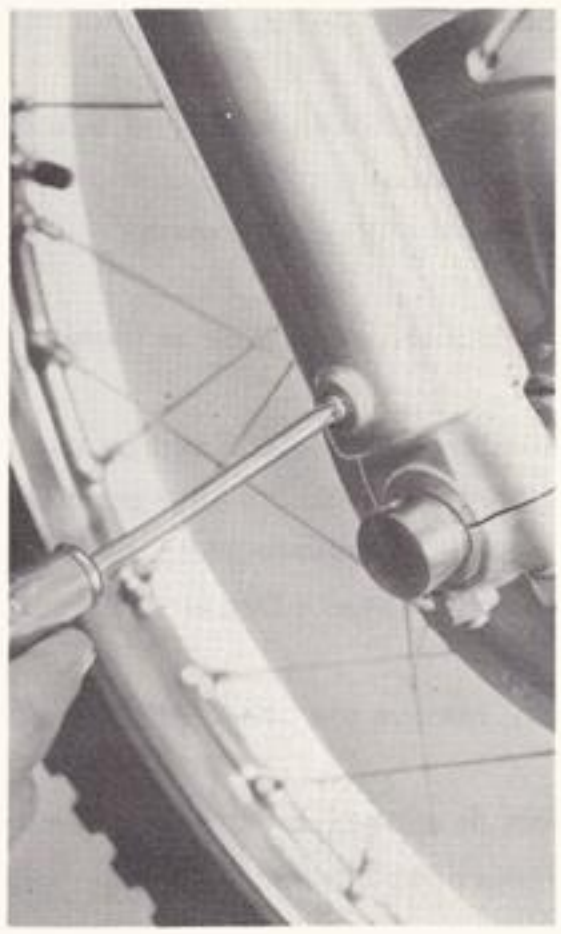


Fig. 8-37

4. After most of oil has drained, slowly raise and lower outer tubes to pump out remaining oil.

5. Replace drain screws.

Note:

Check gaskets, replace if damaged.

6. Pour specified amount of oil into the inner tube through the upper end opening. Use 10W/30 "SE" motor oil.

Note:

Specialty type fork oils of quality manufacture may be used.

Front fork oil capacity: 5.9oz (175cc) per side

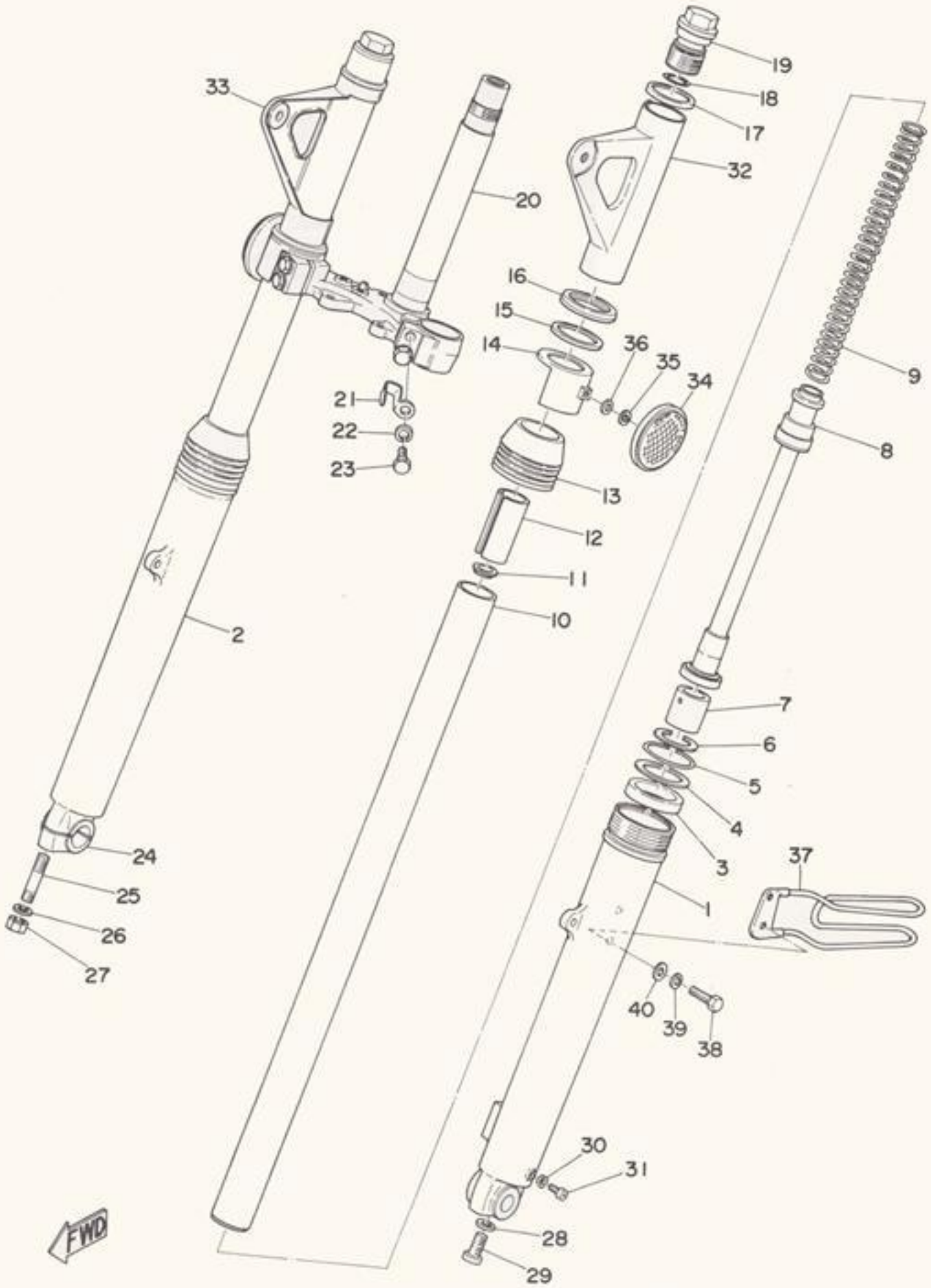
Fig. 8-38

Notes:

Select the weight oil that suits local conditions and your preference (lighter for less damping; heavier for more damping).

7. After filling, slowly pump the outer tubes up and down to distribute the oil.

Front Fork



1. Outer tube, left
2. Outer tube, right
3. Oil seal
4. Oil seal washer
5. Oil seal clip
6. Circlip (R-28)
7. Piston
8. Cylinder comp.
9. Fork spring
10. Inner tube
11. Spring shaft, upper
12. Spacer
13. Dust seal
14. Outer cover
15. Packing
16. Cover guide, under
17. Cover guide, upper
18. Packing (O-ring)
19. Cap bolt
20. Under bracket comp.
21. Under bracket comp.
21. Wire holder
22. Spring washer
23. Under bracket bolt
24. Axle holder
25. Axle holder bolt
26. Spring washer
27. Nut
28. Packing
29. Bolt
30. Drain plug gasket
31. Drain plug
32. Upper cover, left
33. Upper cover, right
34. Reflector
35. Spring washer
36. Plain washer
37. Wire holder
38. Bolt
39. Spring washer
40. Plain washer

Fig. 8-39

8. Inspect O-ring on fork cap bolts and replace if damaged.

Fig. 8-40

9. Replace fork cap bolts and torque to specification.

Fork cap torque:	862 in.-lbs (10kg-m)

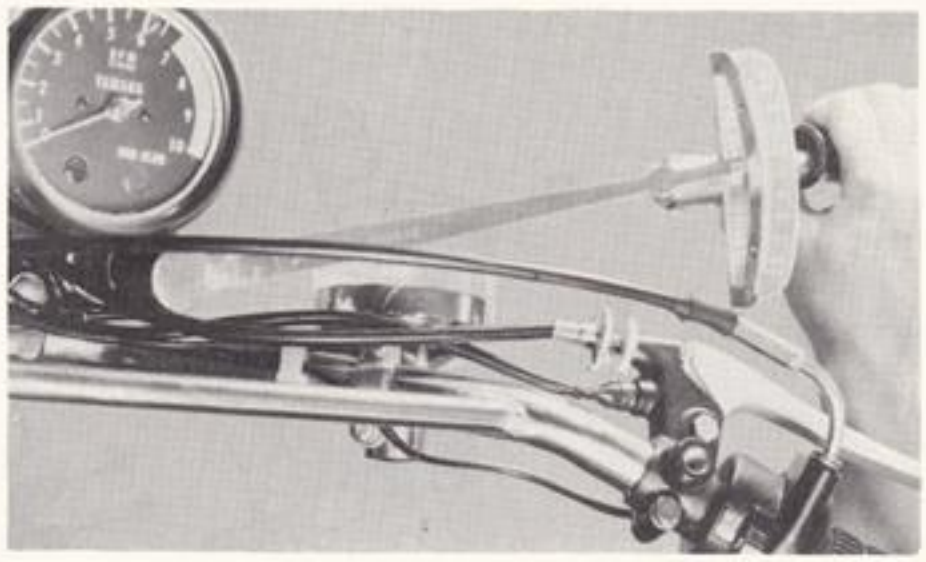


Fig. 8-41

10. Tighten pinch bolts at fork crown and torque to specification.

Fork tube pinch bolt torque:
69 - 104 in.-lbs (0.8 - 1.2kg-m)

Fig. 8-42

C. Front Fork Disassembly

1. With the front wheel and speedometer removed and the various pinch bolts loosened, the fork legs can be removed from the upper and lower brackets.

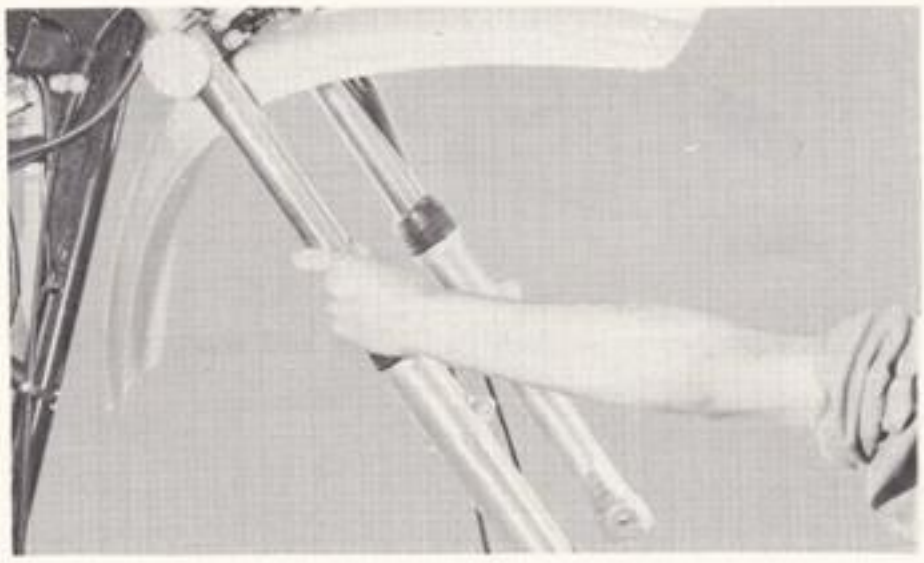


Fig. 8-43

2. Drain the oil from both fork tubes.

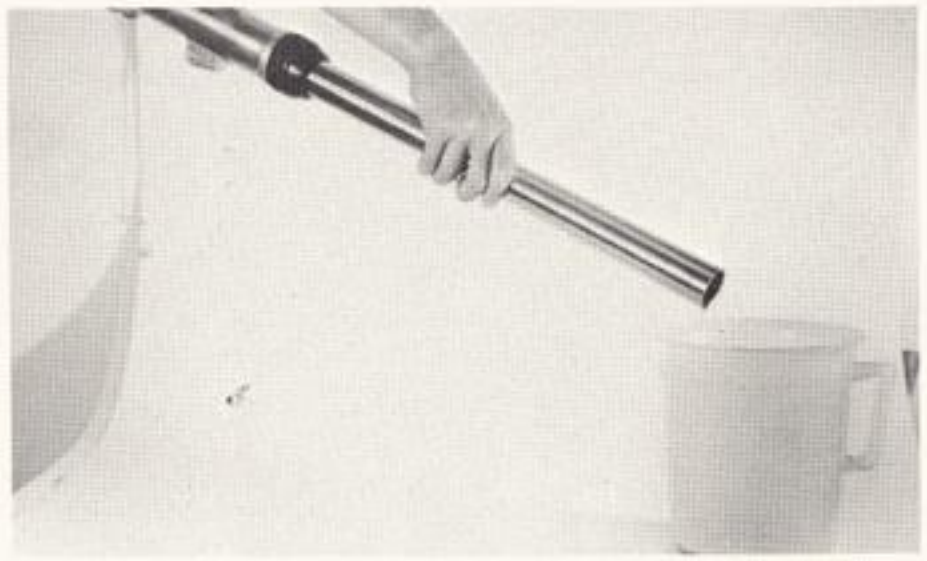


Fig. 8-44

3. Remove the special bolt (arrow marked) from bottom of outer tubes.

Fig. 8-45

4. Remove inner tube, damper assembly from outer tube.

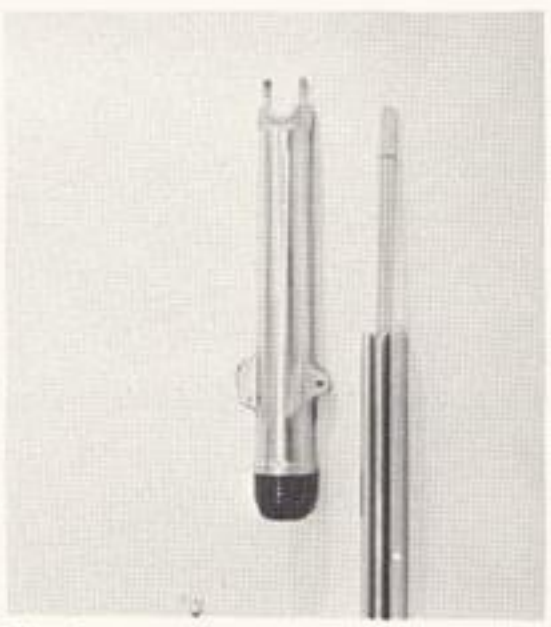


Fig. 8-46

5. Remove clip from bottom of inner tube and pull out damper assembly. Inspect and replace if damaged.

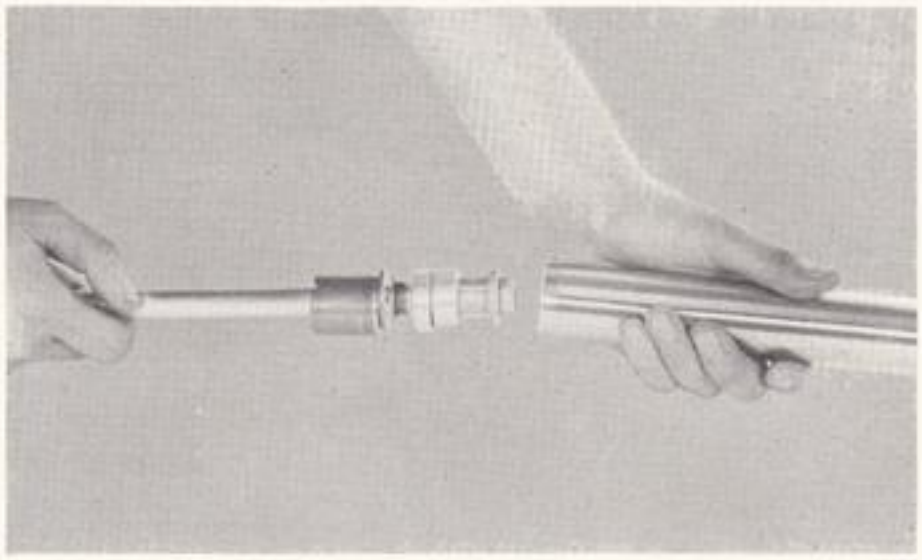


Fig. 8-47

6. To replace fork seal, remove wire clip, felt ring and cover washer from outer tube.

Fig. 8-48

7. Carefully pry out old seal without damaging fork tube.

Fig. 8-49

8. Insert new seal "open" side down using large socket and soft hammer.

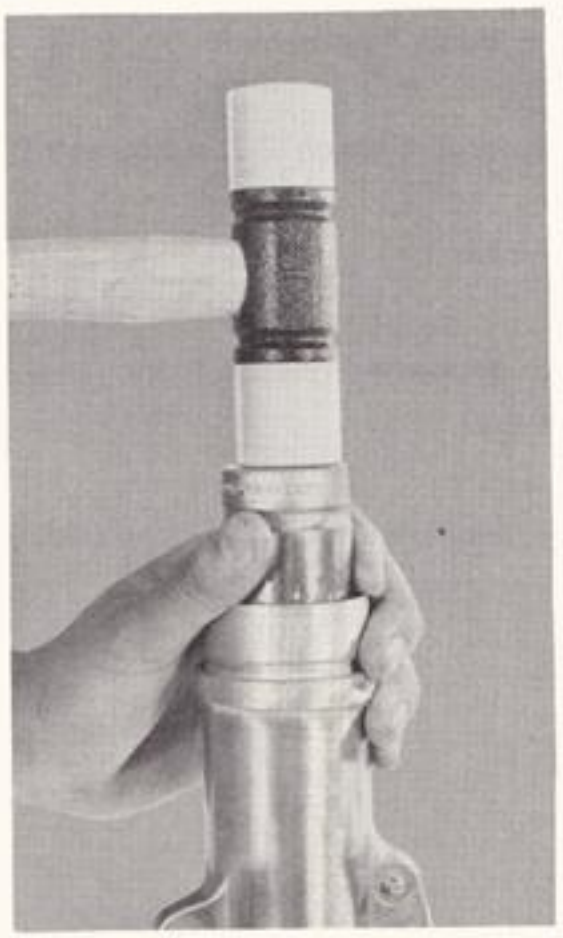


Fig. 8-50

D. Checking

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

E. Assembling

1. When assembling the front fork, reverse the order of disassembly.

2. Installing the front fork on the frame.

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

Fig. 8-51

b. Pour specified amount of oil into the inner tube through the upper end opening. Use 10W/30 "SE" motor oil.

Note:

Specialty type fork oils of quality manufacture may be used.

Fork oil capacity: 5.9oz (175cc) per side

8-8. Steering Head

The steering head pivot is supported by two sets of uncaged ball and race bearing assemblies.

A. Steering Head Adjustment

Refer to Chapter 2, Section 2-2, paragraph D for steering head adjustment procedure.

B. Disassembly

The front end should be raised off the ground with a support under the engine and the front wheel should be removed (see Section 8-2).

1. Remove headlight from head lamp body.

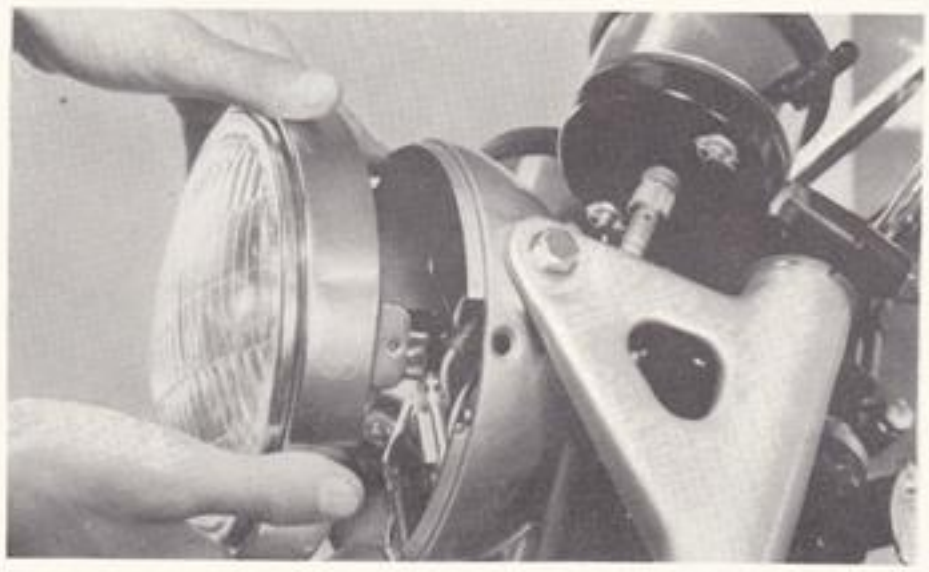


Fig. 8-52

2. Disconnect electrical wires between head lamp body and main wiring harness from frame.

Note:

Removal of fuel tank may aid in disconnecting wiring.

3. Disconnect any electrical wires between handlebar harness in head lamp body.

4. Disconnect clutch and throttle cables at handlebars.

5. Disconnect tachometer cables at instruments.

6. Remove handlebars and put aside.

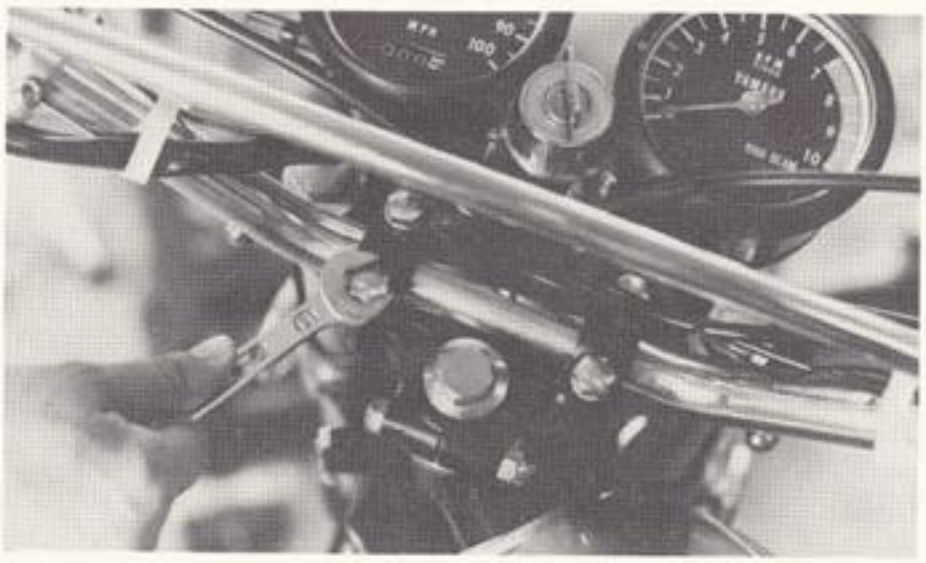


Fig. 8-53

7. Loosen upper fork tube pinch bolts (in upper fork bracket).

Note:

At this pint, removal of the fork tube assemblies is optional. If front fork disassembly is to be done, remove the tubes at this time (see Section 8-7). If not, leave the tubes installed in the lower fork bracket.

8. Loosen stem pinch bolt.

Fig. 8-54

9. Remove stem bolt and crown washer.

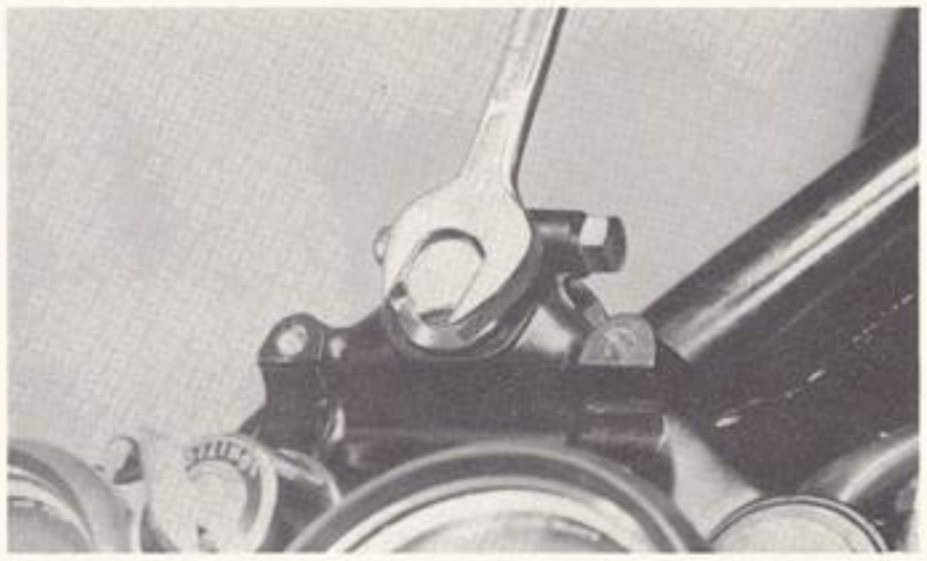


Fig. 8-55

Steering Head

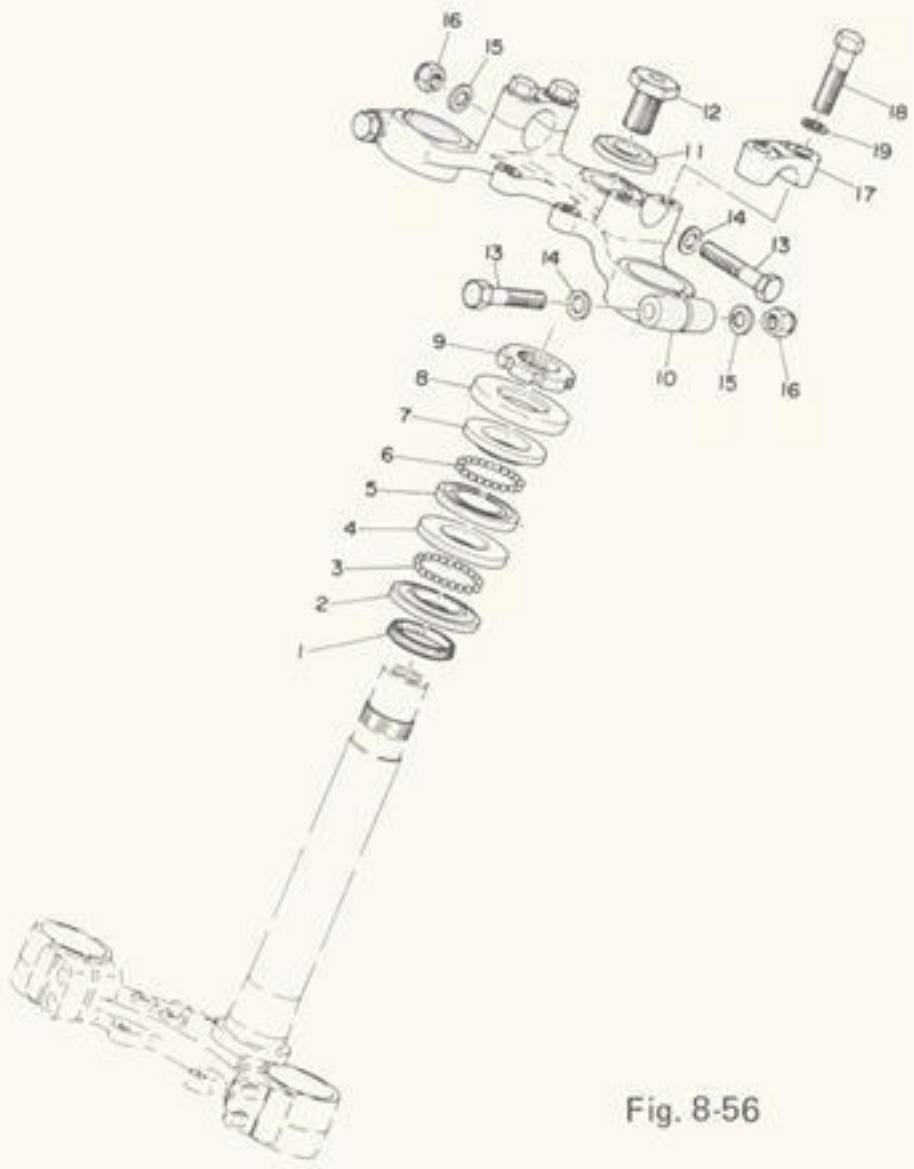


Fig. 8-56

1. Dust seal
2. Ball race 1
3. Ball (1/4 inch)
4. Ball race 2
5. Ball race 2
6. Ball (3/16 inch)
7. Ball race 1
8. Ball race cover
9. Fitting nut
10. Handle crown
11. Crown washer
12. Steering fitting bolt
13. Bolt
14. Pedal link washer
15. Spring washer
16. Crown nut
17. Handle upper holder
18. Bolt
19. Spring washer

10. Remove handle crown (upper bracket) and instruments, at the same time and put aside.

Fig. 8-57

11. Lift off the headlight body and its stays as an assembly.

12. Remove steering ring nut with steering nut wrench.

Caution:

Support under bracket with a suitable stand to hold the bracket up into the headstock so that the loose bearings will not fall out.

Fig. 8-58

13. While still supporting the under bracket, carefully lift off the upper bearing cover.

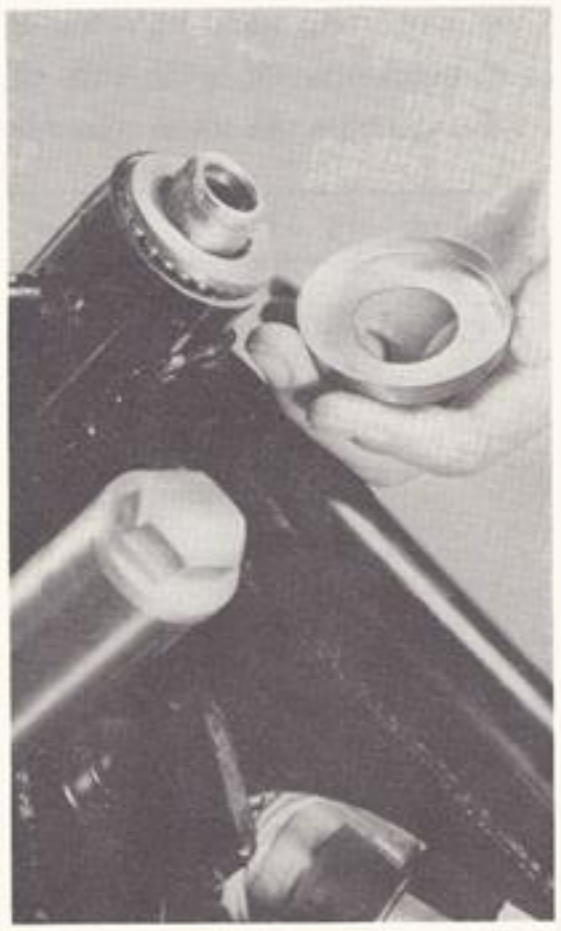


Fig. 8-59

14. Lift off the top bearing race and remove all of the ball bearings from the upper bearing assembly.

Ball quantity/Size: 22 / 3/16"

Fig. 8-60

15. Remove the supporting stand from the under bracket and remove bracket while being very careful not to lose any bearings from the lower assembly.

Ball quantity/Size: 19 / 1/4"

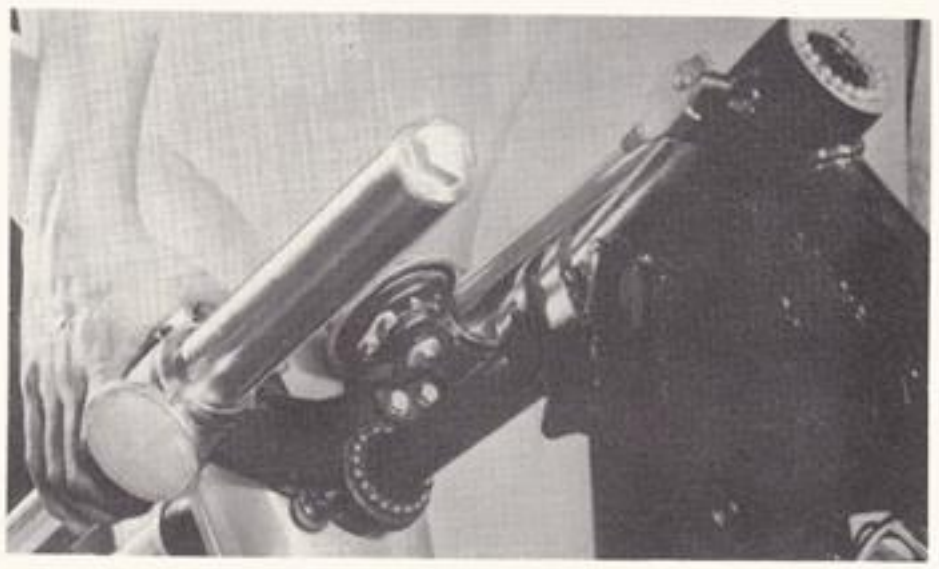


Fig. 8-61

16. To remove press fit races from steering head tap out from back side with long punch. Tap lightly to avoid cracking the race.

Fig. 8-62

C. Inspection

1. Examine all the balls for pits or partial flatness. If any one is found defective, the entire set (including both races) should be replaced. If either race is pitted, shows rust spots, or is damaged in any way, replace both races and all balls.

2. Examine dust seal under lowest race and replace if worn.

D. Reassembling

1. If pressed-in races have been removed, tap in new races using a special tool.

Fig. 8-63

2. Grease the lower ball race of the bottom assembly and arrange the balls around it. Then apply more grease.

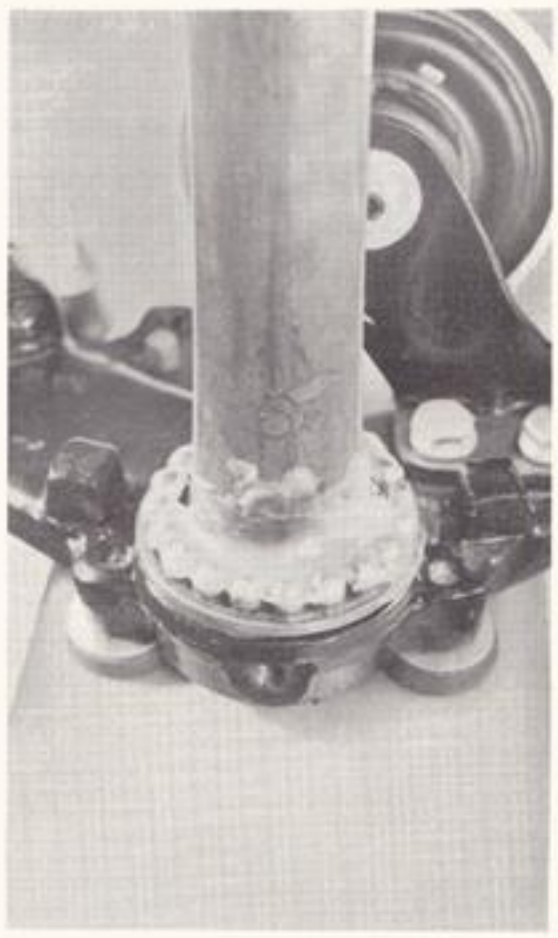


Fig. 8-64

3. Grease the lower ball race of the upper assembly and arrange the balls around it. Then apply more grease and set the top race into place.
   See lubrication chart for lubricant type.

Fig. 8-65

4. Carefully slip the underbracket stem up into the steering head.
   Hold the top bearing assembly in place so the stem does not knock any balls out of position.

Fig. 8-66

5. Set the upper bearing cover on and thread on the ring nut.
   Tighten the ring nut so that all free play is taken up, but so the bracket can still pivot freely from lock to lock. Recheck for free play after the entire fork unit has been installed. (See Section 2-3 for adjustment procedure.)

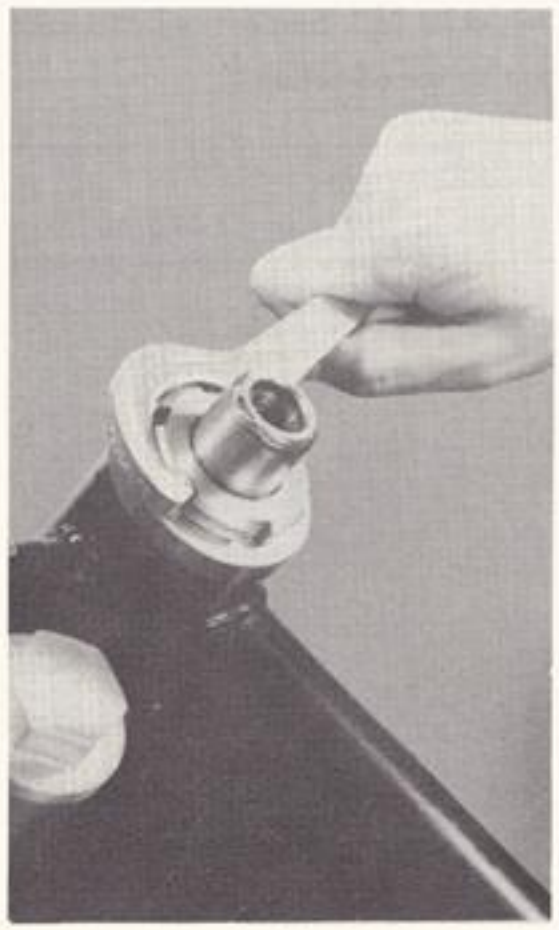


Fig. 8-67

6. Install the fork tubes into the underbracket if they were previously removed.

7. Replace the headlight body and stays onto the fork tubes with all rubber and steel spacing washers properly in place.

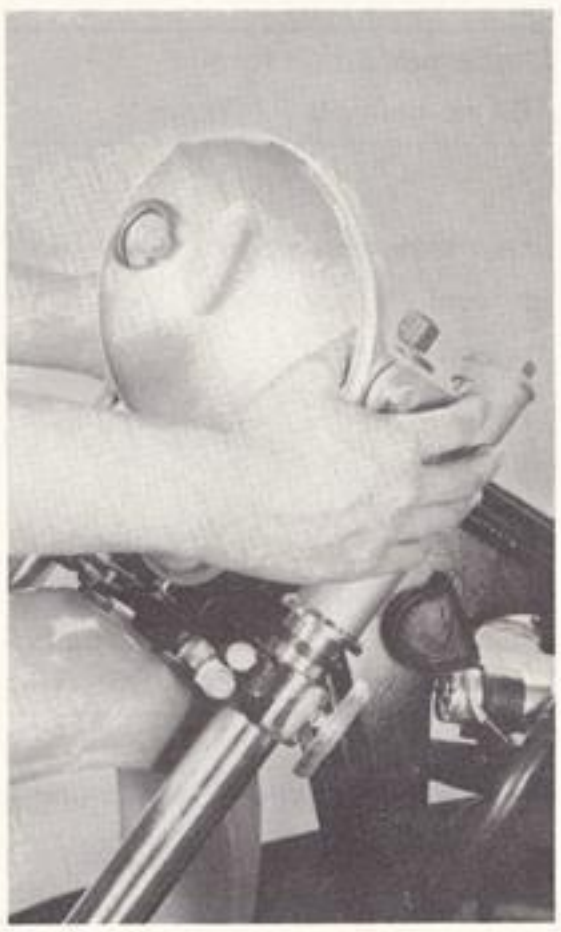


Fig. 8-68

8. Install the upper fork bracket, tighten stem pinch bolt and torque to specification.

Stem pinch bolt torque:
*139 - 208 in.-lbs (1.6 - 2.4kg-m)

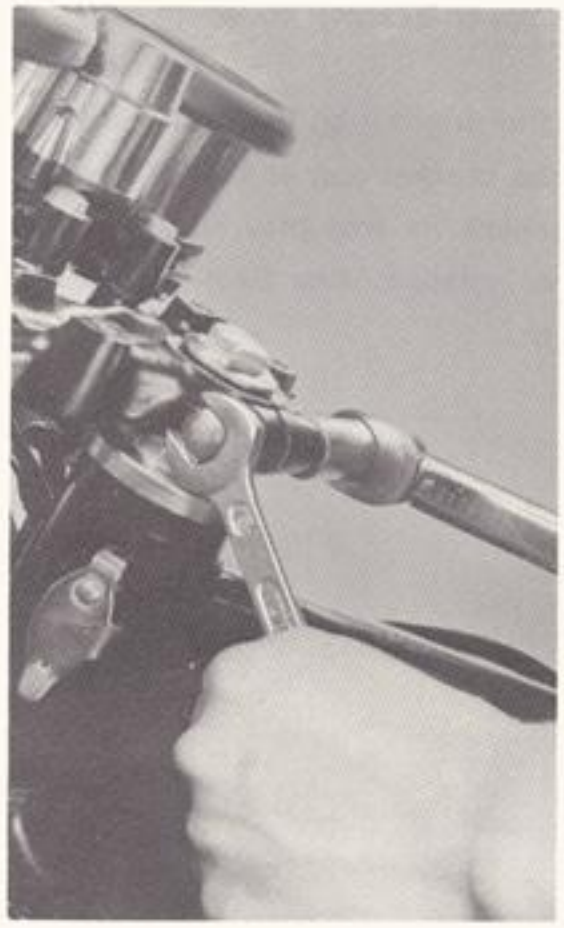


Fig. 8-69

9. Tighten upper fork pinch bolts and torque to specification.

Upper fork tube pinch bolt torque:
69 - 104 in.-lbs (0.8 - 1.2kg-m)

Note:

Make certain that tops of fork tubes are adjusted to the same level. If necessary, loosen underbracket pinch bolts and adjust.

Fig. 8-70

10. Install handlebars and torque to specification.

Handlebar mounting bolt torque: 96 - 156 in.-lbs (1.1 - 1.8kg-m)

11. Reconnect all electrical wiring and check operation.

12. Install headlight and check operation.

13. Install front wheel.

14. Reconnect speedometer and tachometer cables.

15. Reconnect clutch, front brake and throttle cables and check operation.

8-9. Rear Shock Absorbers

Shock Absorber Oil Change

1. Remove the shock absorber from the machine, and the cap from reservoir.

Fig. 8-71

2. Pour oil out of reservoir. Pump the shock absorber shaft to remove all oil from the damping cylinder.

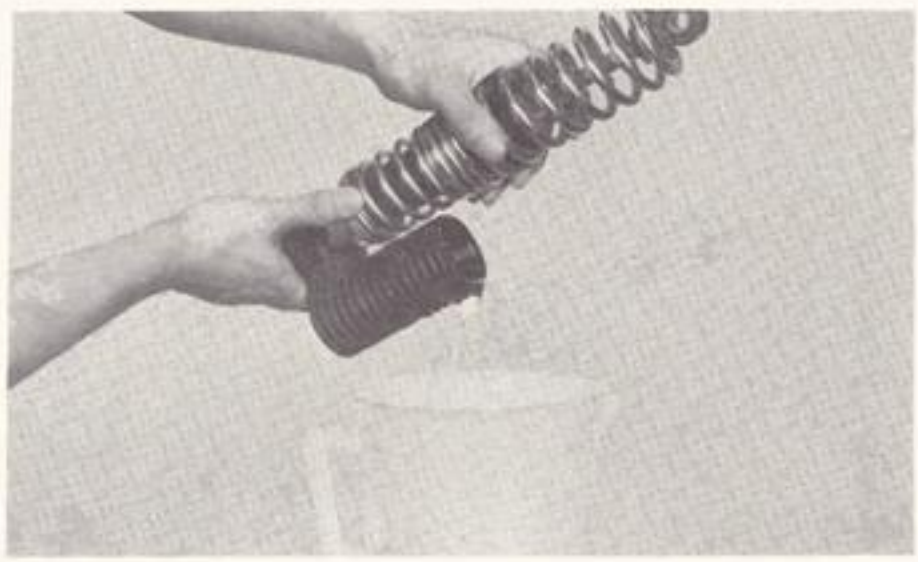


Fig. 8-72

3. Wash the entire unit in mild solvent and pump out all solvent afterward.

4. Measure the correct amount of Yamaha Shock Oil or another specialty shock oil and refill the unit. As you pour the oil in, slowly pump the damper to distribute the oil and eliminate any air bubbles.

Shock oil capacity:	6.1oz (181cc)

Note:

Choose the weight oil that will suit rider preference and local conditions.

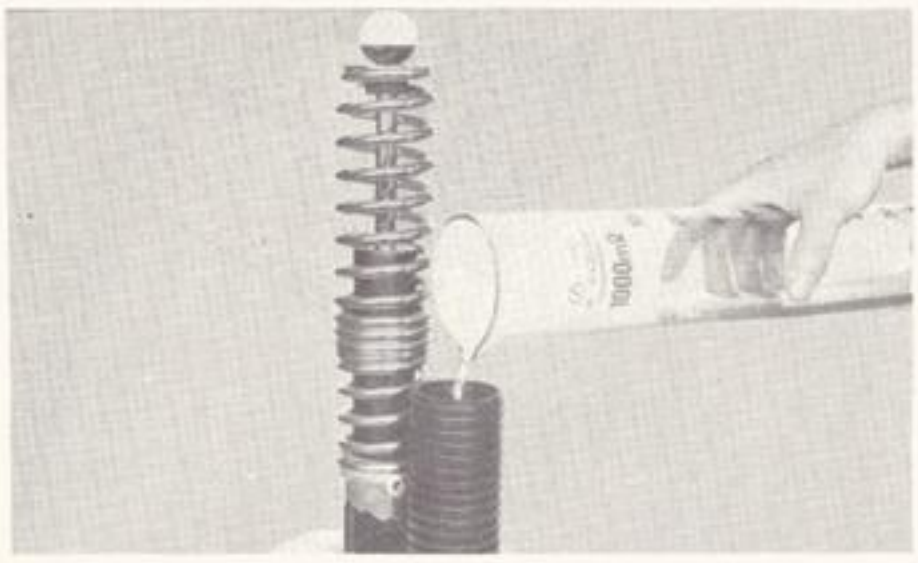


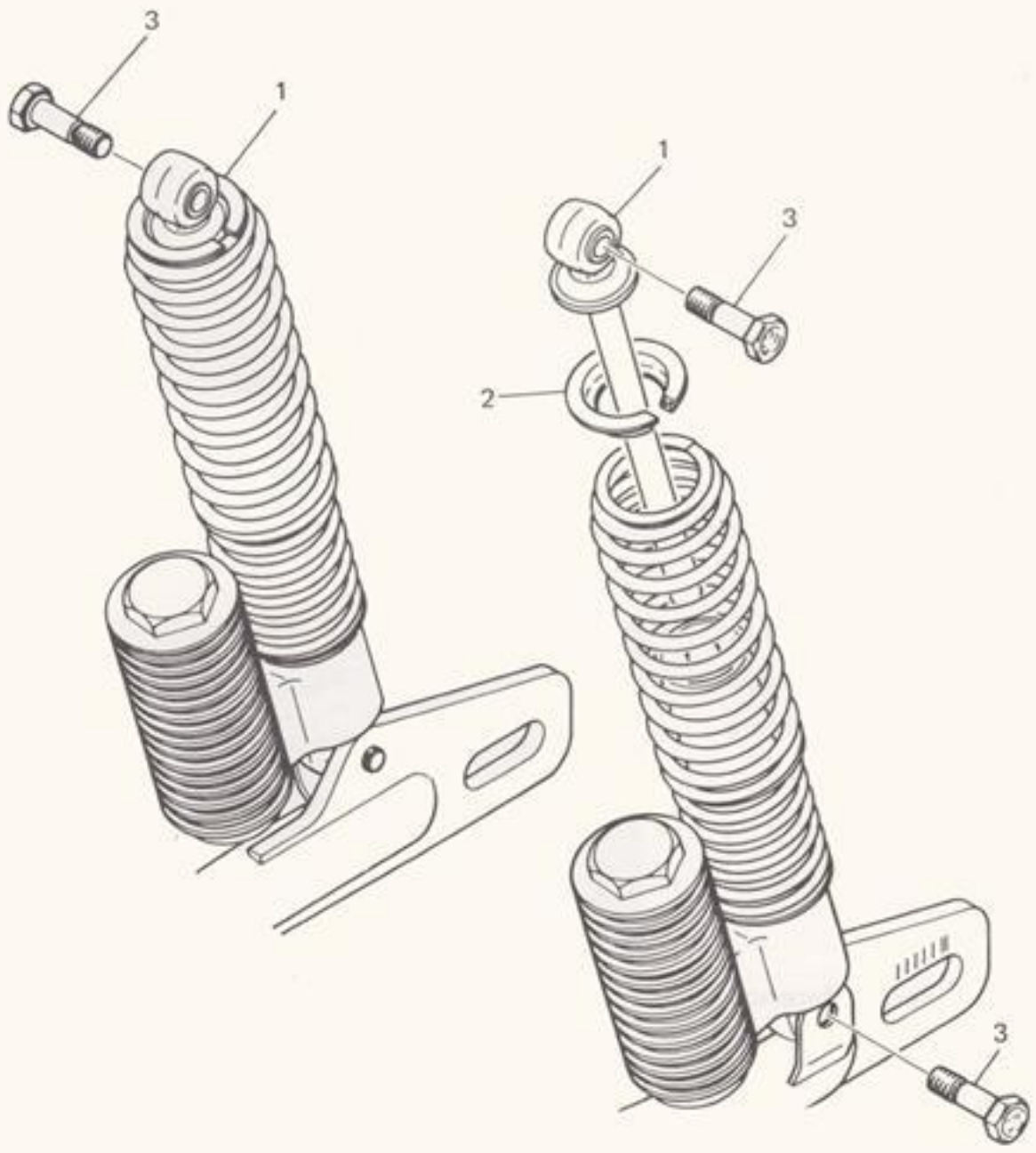
Fig. 8-73

5. Replace reservoir cap and springs and re-install the shock absorber.

Reservoir cap torque:
434 - 520 in.-lbs (5.0 - 6.0kg-m)

Fig. 8-74

Rear shock absorber



1. Rear cushion ass'y
2. Spring seat upper
3. Rear cushion bolt

Fig. 8-75

8-10. Swing Arm

A. Swing Arm Inspection

1. With rear wheel and shock absorbers removed, grasp the ends of the arm and move from right to left to check for freeplay.

Swing arm freeplay:	0.04in. (1.0mm)

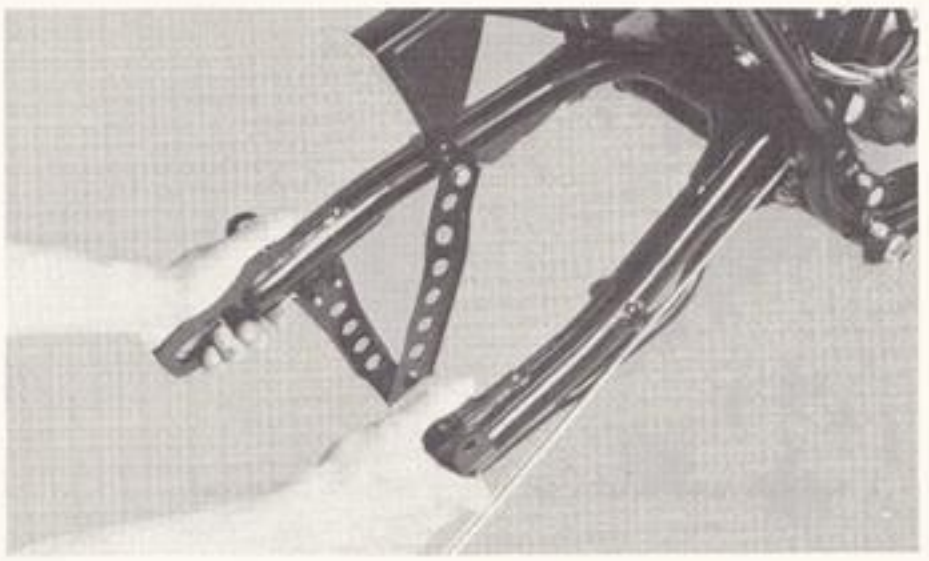


Fig. 8-76

2. If freeplay is excessive, remove swing arm and replace swing arm bushings.

B. Swing Arm Lubrication

1. Apply grease to zerk fitting on top of pivot with low pressure hand operated gun. Apply until fresh grease appears at both ends of pivot shaft.

Recommended lubricant:	90wt, smooth lube grease

2. Wipe off excessive grease.

C. Swing Arm Removal

1. Remove nut on swing arm pivot bolt and tap out bolt with a long aluminum or brass rod.

Note:

Carefully remove the arm while noting the location of spacing washers and shims.

Pivot bolt torque:	862 - 955 in.-lbs (10 - 11kg-m)

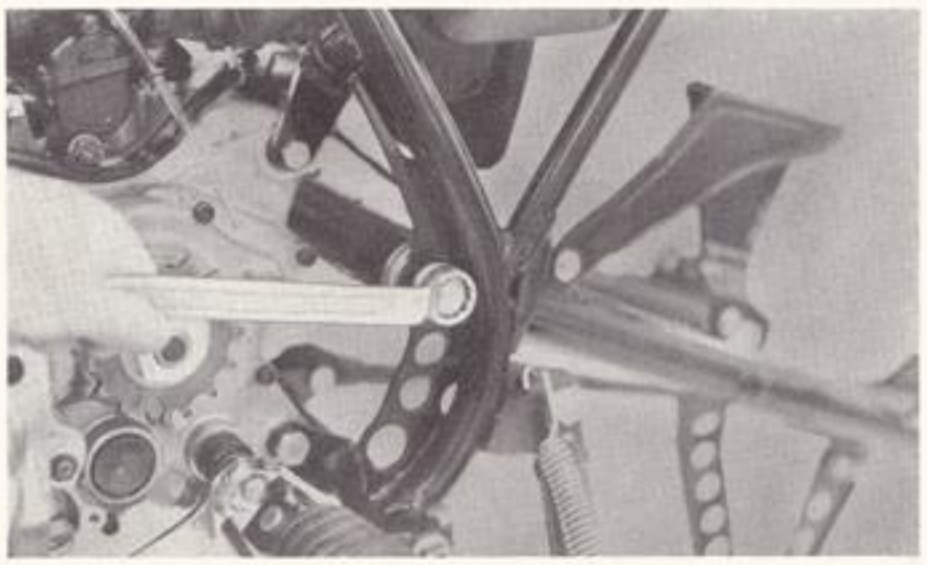


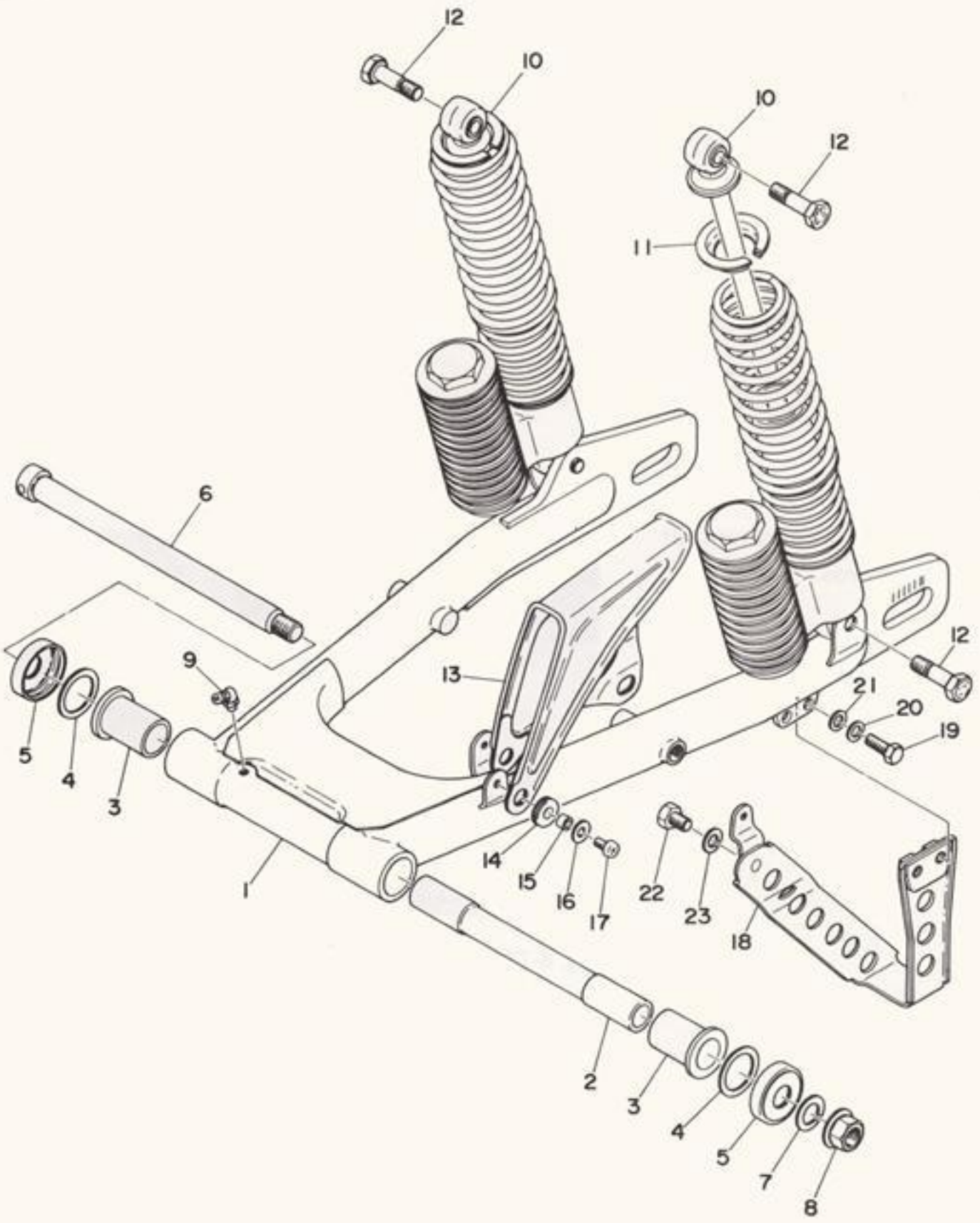
Fig. 8-77

2. Tap out old bushing from each side of pivot using the long rod.

Fig. 8-78

3. Install new bushings using a soft hammer.

Rear Arm



1. Rear arm comp.
2. Bushing 2
3. Bushing 1
4. Shim
5. Thrust cover
6. Pivot shaft
7. Spring washer
8. Pivot nut
9. Grease nipple
10. Rear cushion ass'y
11. Spring upper seat
12. Rear cushion bolt
13. Chain case
14. Grommet
15. Chain case spacer
16. Chain case washer
17. Pan head screw
18. Chain guard
19. Bolt
20. Spring washer
21. Plain washer
22. Bolt
23. Spring washer

Fig. 8-79

8-11. Cables and Fittings

A. Cable Maintenance

Note:

See Maintenance and Lubrication Intervals Charts for additional information.

Cable maintenance is primarily concerned with preventing deterioration through rust and weathering; and providing for proper lubrication to allow the cable to move freely within its housing.

Cable removal is straight-forward and uncomplicated. Removal will not be discussed within this section. For details, see the individual maintenance section for which the cable is an integral part.

Cable routing is of paramount importance, however. For details of cable routing, see the cable routing diagrams at the end of this manual.

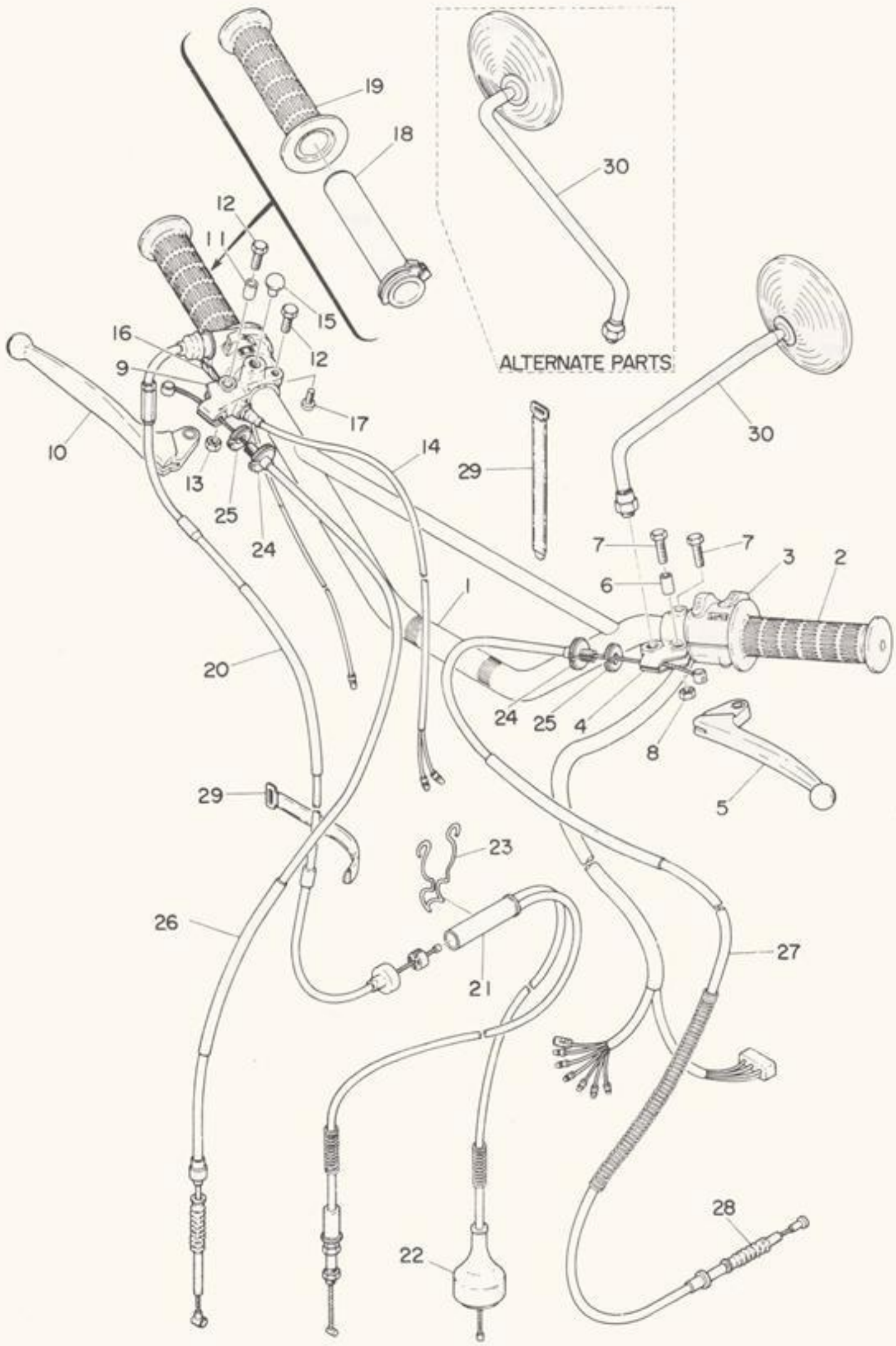
1. Remove the cable.
2. Check for free movement of cable within its housing. If movement is obstructed, check for fraying of the cable strands. If fraying is evident, replace the cable assembly.
3. To lubricate cable, hold in vertical position. Apply lubricant to uppermost end of cable. Leave in vertical position until lubricant appears at bottom end. Allow excess to drain and re-install.

Note:

Choice of lubricant depends upon conditions and preference. However, a semidrying, graphite-base lubricant will probably perform most adequately under most conditions.

Under certain conditions, a water displacing lubricant is more suitable.

Handle. Wire



1. Handle
2. Grip, left
3. Handle switch 4
4. Lever holder, left
5. Lever, left
6. Lever collar
7. Bolt
8. Nut
9. Lever holder, right
10. Lever, right
11. Lever collar
12. Bolt
13. Nut
14. Front stop switch ass'y
15. Blind plug
16. Handle switch 1
17. Pan head screw
18. Guide tube
19. Grip, right
20. Throttle wire 1
21. Throttle wire 2
22. Rubber cap
23. Holder
24. Adjusting bolt
25. Wire adjusting nut
26. Front brake wire
27. Clutch wire
28. Wire boot
29. Band
30. Back mirror ass'y, left
    Back mirror ass'y, right

Fig. 8-80

B. Throttle Maintenance

1. Loosen clamp which holds rubber dust cover and slide cover away from aluminum throttle housing. (Spray light lubricant on cable and housing and cover will slide easier).

Fig. 8-81

2. Remove two philips head screws from throttle housing assembly and separate two halves of housing.

3. Disconnect cable end from throttle grip assembly and remove grip assembly.

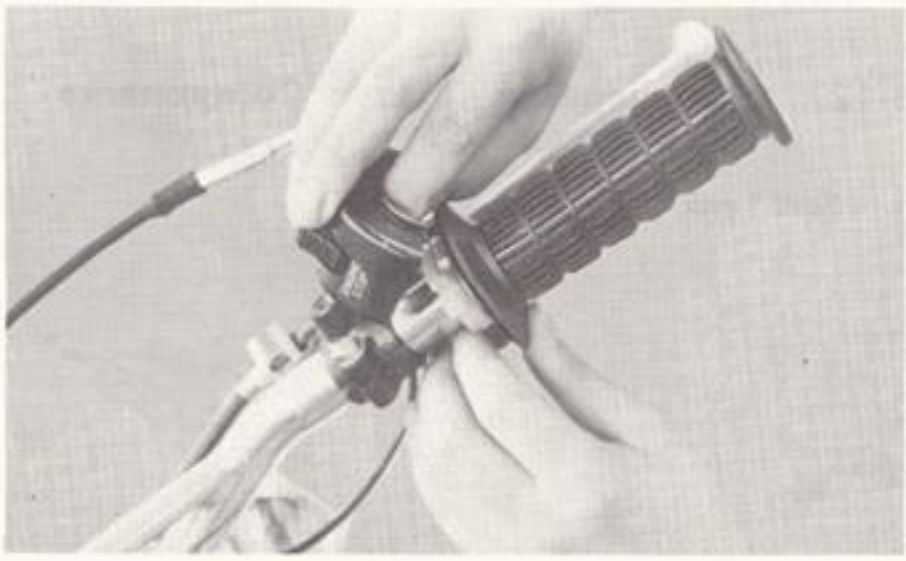


Fig. 8-82

4. Wash all parts in mild solvent and check contact surfaces for burrs or other damage. (Also clean and inspect right-hand end of handlebars.)

5. Lubricate contact surfaces with light coat of lithium soap base grase and reassemble.

Note:

Tighten housing screws evenly to maintain an even gap between the two halves.

6. Check for smooth throttle operation and quick spring return when released and make certain that housing does not rotate on handlebar.

C. Cable Junction Maintenance

The throttle cable cylinder (junction point for Autolube control cable) must be periodically maintained also.

1. Remove throttle cable number one from handlebar housing.

2. Remove throttle cable number two from carburetor mixing chamber top.

3. Remove Autolube pump cable from pump pulley. Remove cable adjustor.

4. Remove seat and fuel tank.

5. Remove cable/cylinder assembly complete.

6. Remove cylinder cap, throttle cable two and Autolube pump cable.

7. Wash assembly thoroughly in solvent.

8. Lubricate all associated cables.

9. Apply a thin coating of lubricant to cylinder walls.

Note:

A small amount of lithium soap base grease may be used in lieu of cable lubricant. However, if machine is to be used in extreme cold, this should be avoided.

10. Reassemble all cables. Make sure cylinder is sealed from damage due to weather and riding conditions. Re-install. See cable routing diagrams for correct installation position. See Mechanical Adjustments Chapter for correct cable adjustment.

8-12. Miscellaneous Chassis Components

A. Fuel Tank

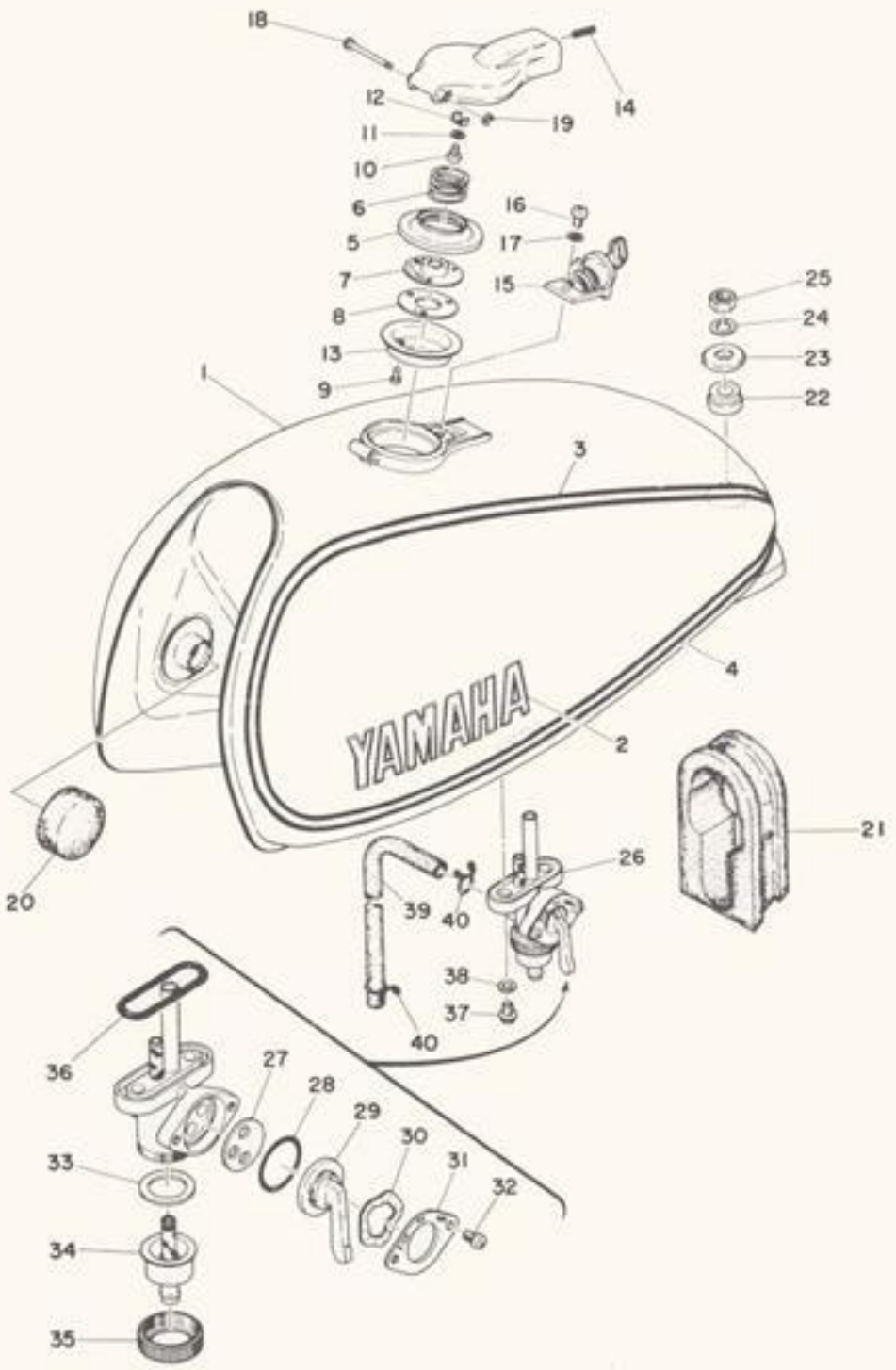
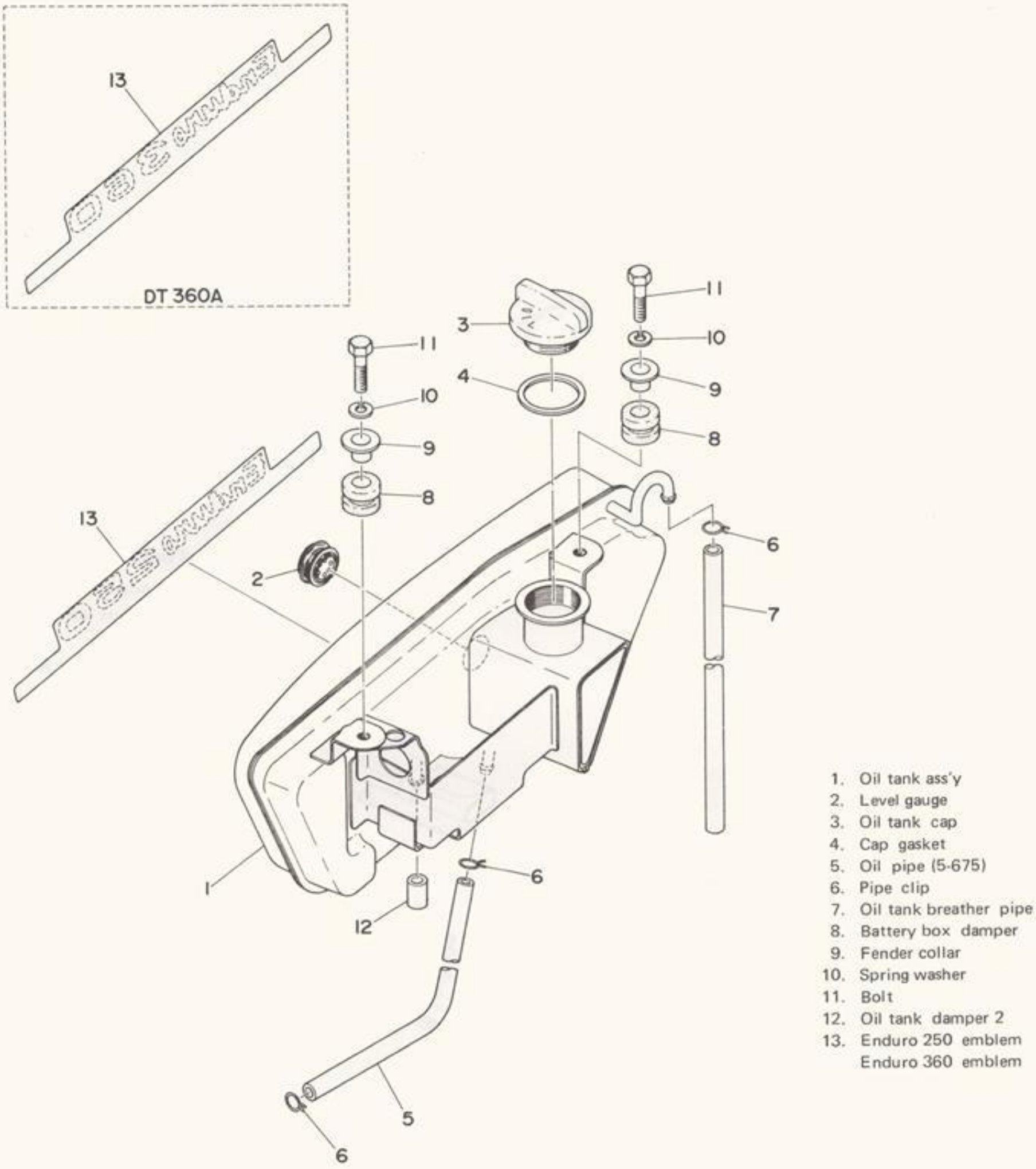


Fig. 8-83

1. Fuel tank comp.
2. Fuel tank emblem
3. Fuel tank graphic, upper left
   Fuel tank graphic, upper right
4. Fuel tank graphic, under left
   Fuel tank graphic, under right
5. Cap packing
6. Cap spring
7. Gasket
8. Gasket
9. Pan head screw
10. Pan head screw
11. Spring washer
12. Plate stopper
13. Plate gasket 1
14. Spring pin
15. Key comp.
16. Pan head screw
17. Spring washer
18. Pin 1
19. Circlip (E-2)
20. Locating damper 1
21. Locating damper
22. Fuel tank damper
23. Special washer
24. Spring washer
25. Nut
26. Fuel cock ass'y
27. Valve
28. O-ring
29. Cock lever
30. Wave washer
31. Lever fitting plate
32. Pan head screw
33. Filter gasket
34. Filter cup
35. Ring nut
36. O- ring
37. Cock connecting bolt
38. Protector washer (6.2-12-1.5)
39. Fuel pipe (7-200)
40. Pipe clip

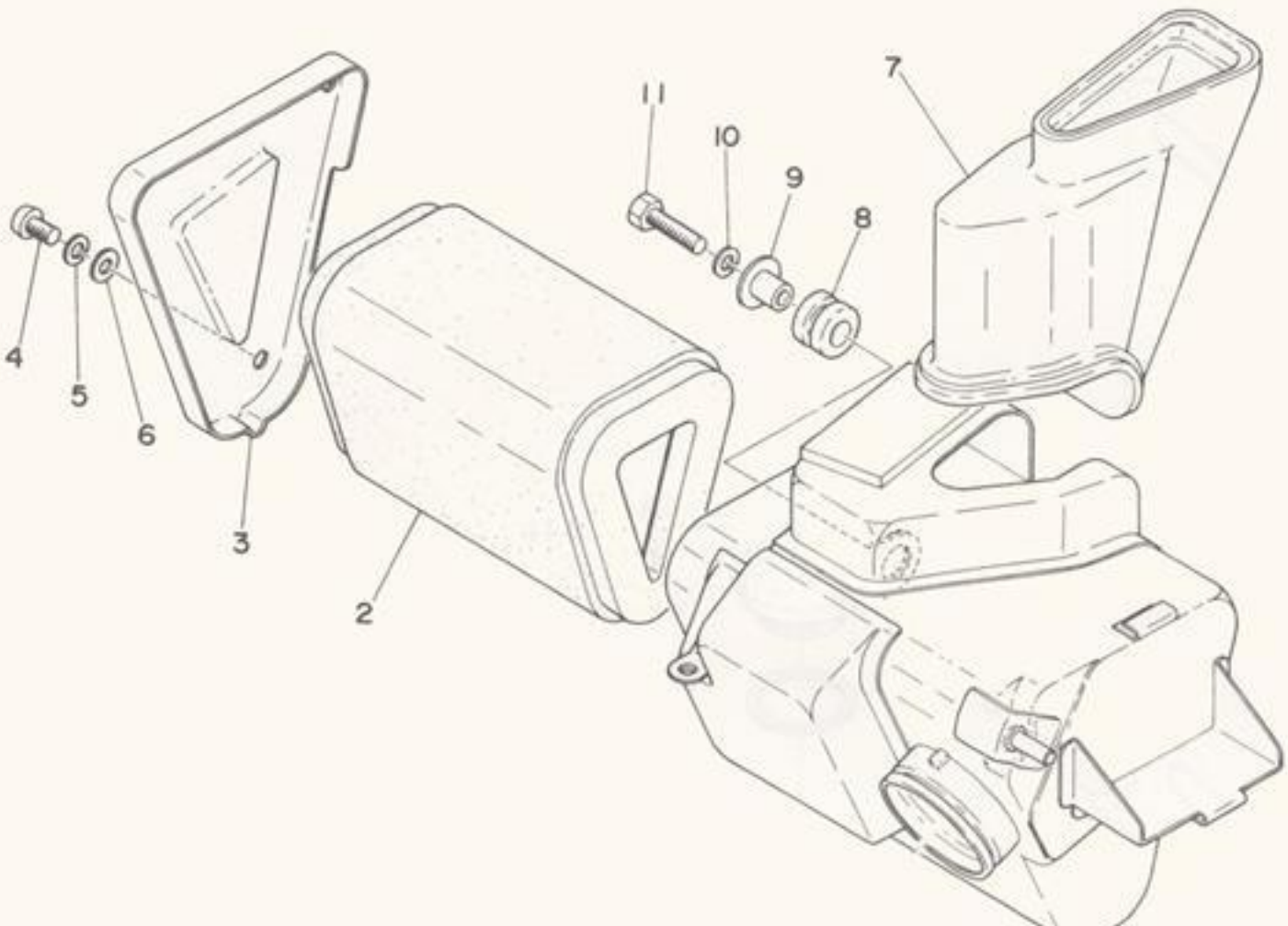
B. Oil Tnak



1. Oil tank ass'y
2. Level gauge
3. Oil tank cap
4. Cap gasket
5. Oil pipe (5-675)
6. Pipe clip
7. Oil tank breather pipe
8. Battery box damper
9. Fender collar
10. Spring washer
11. Bolt
12. Oil tank damper 2
13. Enduro 250 emblem
    Enduro 360 emblem

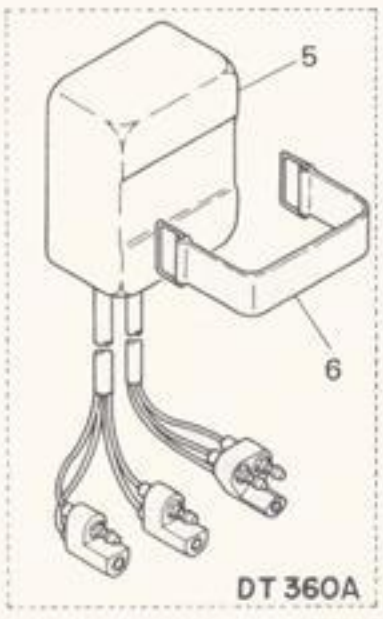
Fig. 8-84

C. Air Cleaner, Tool Box, Battery Box



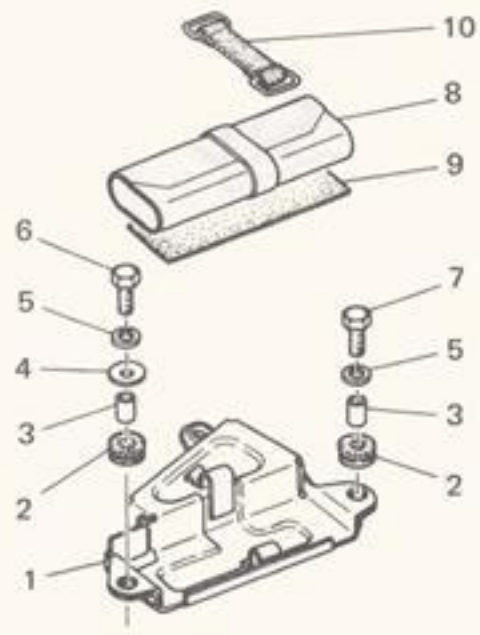
(Air Cleaner)

1. Air cleaner case
2. Air cleaner element
3. Case cap
4. Pan head screw
5. Spring washer
6. Washer
7. Duct
8. Battery box, damper 1
9. Fender collar
10. Spring washer
11. Bolt



(Tool Box)

1. Tool box comp.
2. Battery box damper 1
3. Fender collar
4. Leg shield washer (6.5-20-1.6)
5. Spring washer
6. Bolt
7. Bolt
8. Tool ass'y
9. Tool damper
10. Tool band

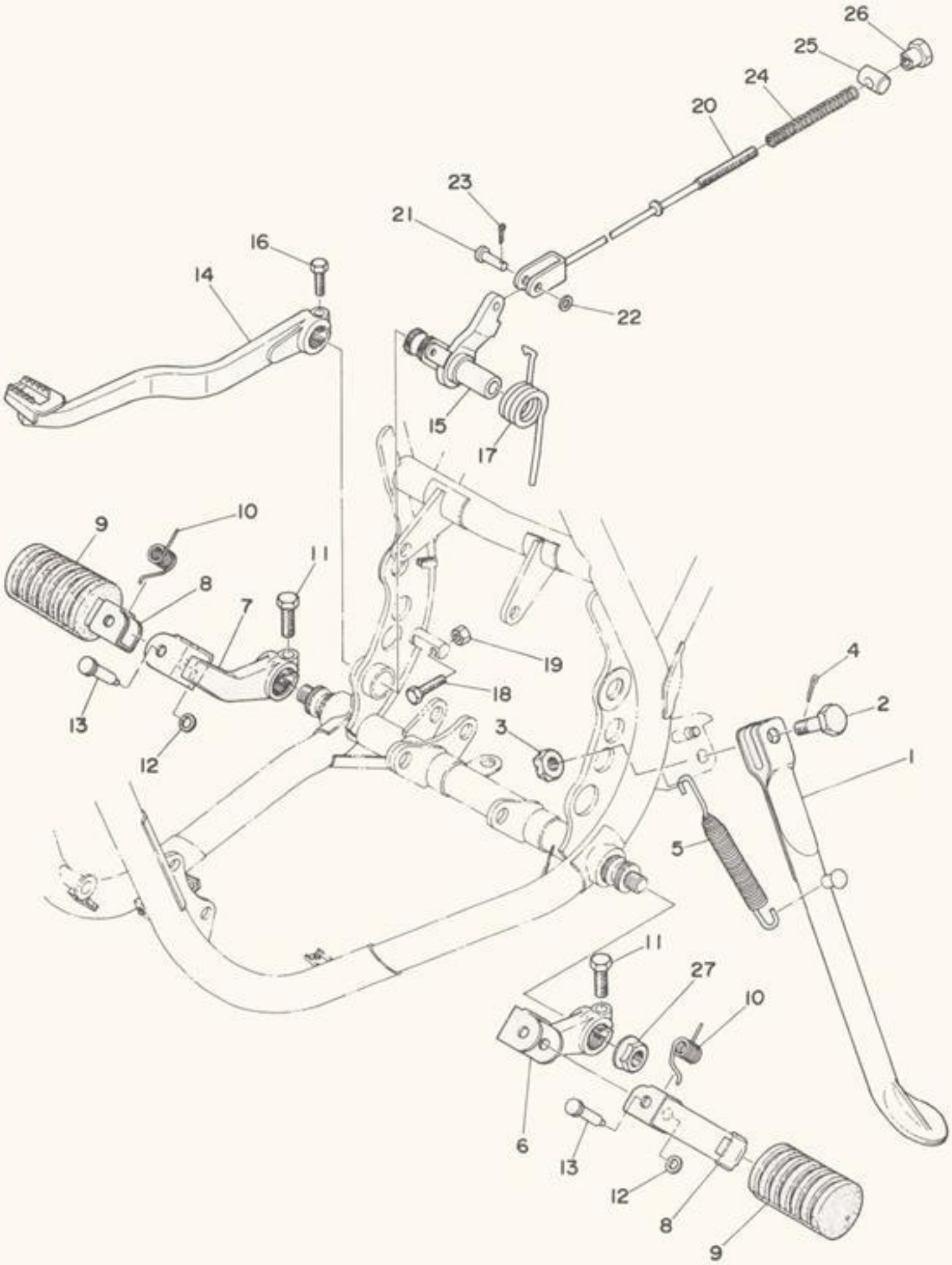


(Battery Box)

1. Battery ass'y
2. Battery band
3. Fuse holder ass'y
4. Fuse (6V-10A)
5. C.D.I. Unit ass'y
6. Unit fitting band

Fig. 8-85

D. Footpeg - Brake



1. Side stand
2. Side stand bolt
3. Slotted nut
4. Cotter pin
5. Spring
6. Footrest bracket, left
7. Footrest bracket, right
8. Footrest
9. Footrest cover
10. Return spring
11. Bolt
12. Special washer
13. Clevis pin
14. Brake pedal
15. Brake shaft
16. Bolt
17. Return spring
18. Bolt
19. Nut
20. Brake rod
21. Link joint pin
22. Plain washer
23. Cotter pin
24. Rod spring
25. Clevis pin
26. Adjusting nut
27. Footrest nut

Fig. 8-86

8-13. Frame Dimensions

Unit: mm

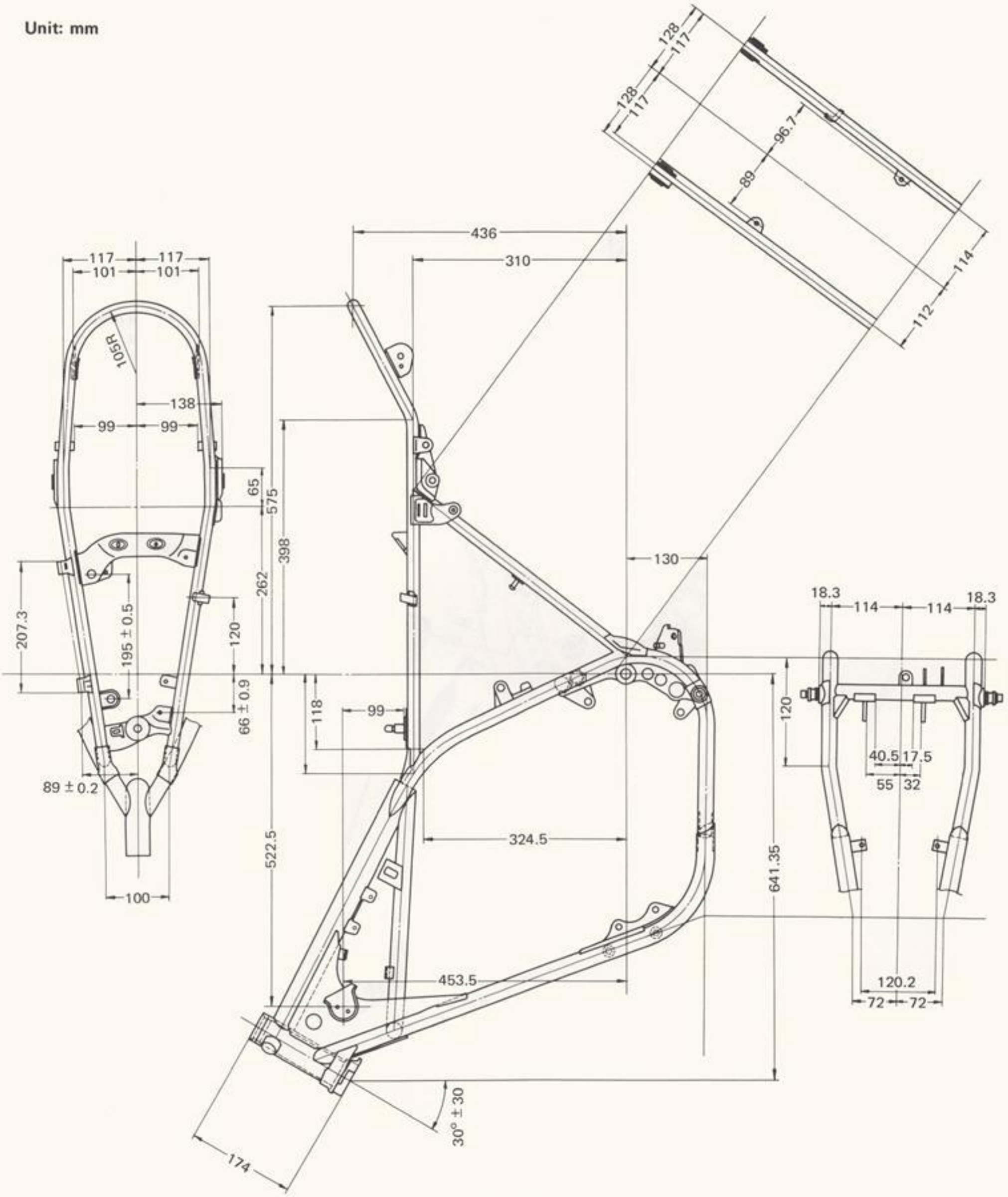


Fig. 8-87

CHAPTER 9. APPENDICES

9-1. Troubleshooting Guide

The following guide is not complete in itself. If a problem is found within an individual component mentioned within the chart, refer to the section or chapter involved for inspection procedures.

No Start or Difficult to Start

Ignition System	
Possible Cause	Remedy
No Spark.	1. Check Ignition Main Switch. 2. Check Ignition Kill Button. 3. Check Point Assembly, DT250A. 4. Check Condenser, DT250A 5. Check Wiring, Magneto Coil 6. Check Coil. 7. Check High Tension Lead. 8. Check Spark Plug. 9. Check Ignition Timing.
Weak or Intermittent Spark.	1. Use Electro Tester, Spark Gap Test. 2. Check Spark Plug. 3. Check High Tension Lead. 4. Check Ignition Assembly.
Air/Fuel Systems	
Possible Cause	Remedy
No Fuel.	1. Check Fuel Tank. 2. Check Petcock. 3. Remove Main Jet, Check Fuel Flow
Intermittent or Poor Fuel Flow.	1. Clean Fuel Tank, Check Cap Vent. 2. Clean Petcock. 3. Remove Carburetor, Service.
Bad Fuel.	1. Flush Fuel System, Complete. 2. Add Fresh Fuel, Proper Grade.
Blocked Air Intake or Malfunction.	1. Clean and Lube Filter. 2. Check Reed Valve Assembly.
Engine/Exhaust Systems	
Possible Cause	Remedy
Incorrect Compression Pressure.	1. If Reading too High, Check for Excessive Carbon. 2. If Reading too Low, Check: a. Cylinder Head Gasket. b. Cylinder base gasket. c. Piston, Rings, Cylinder.
Poor Bottom End Compression.	1. Check Crankcase Seals L. & R.

Possible Cause	Remedy
Blocked Exhaust System.	1. Check Muffler/Spark Arrester. 2. Check Exhaust Port Carbon Formation. 3. Check Exhaust Pipe for Internal Damage.

Poor Idle and/or Low Speed Performance

Ignition System	
Possible Cause	Remedy
Spark Plug Fouled or Incorrect Gap.	1. Clean and Gap, or Replace if Necessary.
Contact Points Bad (DT250A)	1. Clean and Gap, or Replace if Necessary.
Incorrect Ignition Timing.	1. Reset Timing.
Weak Spark.	1. Check Ignition Coil and Condenser.
Air/Fuel Systems	
Possible Cause	Remedy
Tank Cap Vent Plugged.	1. Clean or Repair as Necessary.
Fuel Petcock Plugged.	1. Clean or Repair as Necessary.
Carburetor Slow Speed System Inoperative.	1. Clean or Repair as Necessary.
Air/Fuel Systems	
Possible Cause	Remedy
Pilot Screw Out of Adjustment or Plugged.	1. Clean or Repair as Necessary.
Carburetor Float Level Incorrect.	1. Clean or Repair as Necessary.
Starter Lever on.	1. Clean or Repair as Necessary.
Air Leak.	1. Clean or Repair as Necessary.
Carburetor Not Level.	1. Clean or Repair as Necessary.
Engine/Exhaust Systems (See "No Start").	

Poor Mid-Range and High Speed Performance

Ignition Systems	
Possible Cause	Remedy
Spark Plug Incorrect.	1. Clean and Gap or Change Plug if Necessary.
Advance Defective (DT360A).	1. Check for Correct "Retard" to "Full Advance" Position.
Ignition Timing Incorrect.	1. Reset.
Points Set too Close (DT250A).	1. Regap.
Air/Fuel Systems	
Possible Cause	Remedy
Dirty Air Filter Element.	1. Clean.
Carburetor Float Level Incorrect.	1. Measure and Change if Required.

Possible Cause	Remedy
Incorrect Main Jet Size.	1. Remove Jet and Check Size.
Incorrect Jet Needle Notch.	1. Check Position of Clip in Needle.
Cracked or Leaking Reeds.	1. Remove.
Carburetor Not Level.	1. Level.

9-2. Conversion Tables

Metric to Inch System

	Known	Multiplier (Rounded Off)	Result
Torque	kg-m	7.235	ft-lbs
	kg-m	86.82	in.-lbs
	kg-cm	.0724	ft-lbs
	kg-cm	.8682	in.-lbs
Weight	kg	2,205	lb
	g	.03527	oz
Flow/ Distance	Km/ℓ	2.352	mpg
	Km/hr	0.6214	mph
	Km	0.6214	mi
	m	3.281	ft
	m	1.094	yd
	cm	0.3937	in.
	mm	0.03937	in.
Volume/ Capacity	cc (cm^3)	0.03381	oz (U.S. liq.)
	cc (cm^3)	0.06102	cu in.
	ℓ (Liter)	2.1134	pt (U.S. liq.)
	ℓ (Liter)	1.057	qt (U.S. liq.)
	ℓ (Liter)	0.2642	gal (U.S. liq.)
Misc.	kg/mm	56.007	lb/in.
	kg/cm^2	14.2234	psi ($lb/in.^2$)
	Centigrade (°C)	5/9 (°F-32)	Fahrenheit (°F)

Inch to Metric System

	Known	Multiplier (Rounded Off)	Result
Torque	ft-lbs	0.13826	kg-m
	in.-lbs	0.01152	kg-m
	ft-lbs	13.825	kg-m
	in.-lbs	1.1518	kg-m
Weight	lb	0.4536	kg
	oz	28.35	g
Flow/ Distance	mpg	0.4252	Km/ℓ
	mph	1.609	Km/hr
	mi	1.609	Km
	ft	0.3048	m
	yd	0.9144	m
	in.	2.54	cm
	in.	25.4	mm
Volume/ Capacity	oz (U.S. liq.)	29.57	cc (cm^3)
	cu in.	16.387	cc (cm^3)
	pt (U.S. liq.)	0.4732	ℓ (Liter)
	qt (U.S. liq.)	0.9463	ℓ (Liter)
	gal (U.S. liq.)	3.7853	ℓ (Liter)
Misc.	lb/in.	0.017855	kg/mm
	psi ($lb/in.^2$)	0.07031	kg/cm^2
	Fahrenheit (°F)	9/5(°C+32)	Centigrade(°C)

Definition of Terms:

m-kg = Meter Kilograms: Usually torque.
g = Gram(s).
kg = Kilogram(s): 1,000 grams.
km = Kilometer(s).
l = Liter(s).
km/l = Kilometer(s) Per Liter: Mileage.
cc = Cubic Centimeter(s) (cm^3): Volume or Capacity.
kg/mm = Kilogram(s) Per Millimeter: Usually Spring Compression Rate.
kg/cm^2 = Kilogram(s) Per Square Centimeter: Pressure.

Millimeters to Inches

	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
0		0.0039	0.0079	0.0118	0.0157	0.0197	0.0236	0.2760	0.0315	0.0354
1	0.0394	0.0433	0.0472	0.0512	0.0551	0.0591	0.0630	0.0669	0.0709	0.0748
2	0.7890	0.0827	0.0866	0.0906	0.0945	0.0984	0.1024	0.1063	0.1102	0.1142
3	0.1181	0.1200	0.1260	0.1299	0.1339	0.1378	0.1417	0.1457	0.1496	0.1535
4	0.1575	0.1614	0.1654	0.1693	0.1732	0.1772	0.1811	0.1850	0.1890	0.1929
5	0.1969	0.2000	0.2047	0.2087	0.2126	0.2165	0.2205	0.2244	0.2283	0.2323
6	0.2362	0.2402	0.2441	0.2480	0.2520	0.2559	0.2598	0.2638	0.2677	0.2717
7	0.2756	0.2795	0.2835	0.2874	0.2913	0.2953	0.2992	0.3031	0.3071	0.3110
8	0.3150	0.3189	0.3228	0.3268	0.3307	0.3346	0.3386	0.3425	0.3465	0.3504
9	0.3543	0.3583	0.3622	0.3661	0.3701	0.3740	0.3780	0.3819	0.3858	0.3898
10	0.3937	0.3976	0.4016	0.4055	0.4094	0.4134	0.4173	0.4213	0.4252	0.4291

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

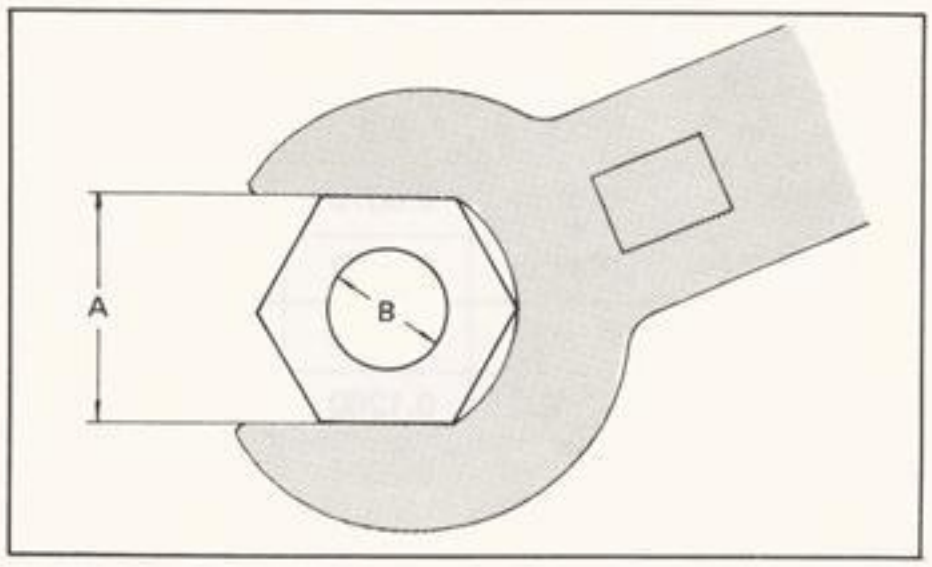
	0	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0		0.254	0.508	0.762	1.016	1.270	1.524	1.778	2.032	2.286
0.1	2.540	2.794	3.048	3.302	3.556	3.810	4.064	4.318	4.572	4.826
0.2	5.080	5.334	5.588	5.842	6.096	6.350	6.604	6.858	7.112	7.366
0.3	7.620	7.874	8.128	8.382	8.636	8.890	9.144	9.398	9.652	9.906
0.4	10.160	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

9-3. Torque Specifications

The list at right covers those stud/bolt sizes with standard I.S.O. pitch threads. Torque specifications for components with thread pitches other than standard are given within the applicable chapter.

Torque specifications call for dry, clean threads. Components such as the cylinder or cylinder head should be at room temperature prior to torquing. A cylinder head or any other item with several fasteners should be torqued down in a cross-hatch pattern in successive stages until torque specification is reached. The method is similar to installing an automobile wheel and will avoid warping the component.



A (Nut)	B (Bolt)	Torque Specification		
		kg-m	ft-lbs	in.-lbs
10mm	6mm	1.0	7.0	85
13mm	8mm	2.0	15	175
14mm	8mm	2.0	15	175
17mm	10mm	3.5 - 4.0	25 - 30	300 - 350
19mm	12mm	4.0 - 4.5	30 - 35	350 - 400
22mm	14mm	4.5 - 5.0	30 - 35	400 - 400
26mm	17mm	6.0 - 7.0	40 - 50	500 - 600
27mm	18mm	6.0 - 7.0	40 - 50	500 - 600
30mm	20mm	7.0 - 8.0	50 - 60	600 - 700
Spark Plug		2.5 - 3.0	20 - 22	230 - 250

Engine and Frame Parts

Section Parts to Tightened	Size		Tightening Torque
Engine			
Cylinder Head	M8	P1.25	2.1 – 2.5 kg-m
Cylinder	M10	P1.25	4.2 – 4.5 kg-m
Magneto	M12	P1.25	7.0 – 7.5 kg-m
Spark Plug	M14	P1.25	2.5 – 3.0 kg-m
Blind Plug	M14	P1.25	2.5 – 3.0 kg-m
Decompression	M22	P1.25	2.5 – 3.0 kg-m
Banjo Bolt	M6	P1.0	0.4 – 0.5 kg-m
Reed Valve	M3	P0.6	0.07 – 0.09 kg-m
Change Adjusting Screw	M8	P1.25	1.8 – 2.2 kg-m
" " "	M6	P1.0	0.7 – 1.1 kg-m
Ratchet Wheel Guide	M6	P1.0	0.75 – 1.2 kg-m
Drive Sprocket	M18	P1.0	7.0 – 9.0 kg-m
Clutch	M18	P1.0	7.0 – 8.0 kg-m
Primary Drive Gear	M18	P1.0	7.0 – 9.0 kg-m
Drain Plug	M14	P1.25	2.0 – 2.5 kg-m
Change Lever	M6	P1.0	0.7 – 1.1 kg-m
Kick Crank	M8	P1.25	1.8 – 2.9 kg-m
Stopper Screw Cam Shift	M14	P1.5	2.0 – 2.5 kg-m
Frame			
Engine Mount	M10	P1.25	4.5 – 5.5 kg-m
" "	M8	P1.25	2.5 – 2.9 kg-m
Pivot Shaft	M14	P1.25	10.0 – 11.0 kg-m
Rear Cushion	M10	P1.25	2.0 – 2.6 kg-m
Handle Upper Holder	M8	P1.25	1.1 – 1.8 kg-m
Handle Crown	M8	P1.25	1.1 – 1.8 kg-m
Front Wheel	M14	P1.25	10.0 – 12.0 kg-m
Brake Lever F.R	M6	P1.0	0.7 – 1.1 kg-m
Spoke F.R	Nipple		0.3 kg-m
Bead Spacer F.R	M8	P1.25	0.79 – 1.25 kg-m
Rear Wheel	M16	P1.5	10.0 – 12.0 kg-m
Tension Bar F.R	M8	P1.25	0.79 – 1.25 kg-m
Sprocket Wheel Gear	M10	P1.25	2.0 – 2.6 kg-m
Side Stand	M10	P1.25	4.0 – 4.8 kg-m
Foot Rest	M10	P1.25	1.7 – 2.1 kg-m
Front Fork Under Bracket	M8	P1.25	7.9 – 1.25 kg-m

9-4. Consumer Information

1974 MODEL DT250A

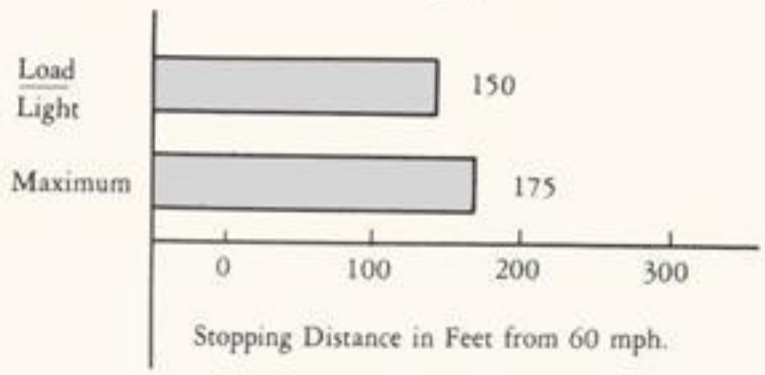
Notice

The information presented represents results obtainable by skilled drivers under controlled road and vehicle conditions, and the information may not be correct under other conditions.

STOPPING DISTANCE

This figure indicates braking performance that can be met or exceeded by the vehicles to which it applies, without locking the wheels, under different conditions of loading and with partial failures of the braking system.

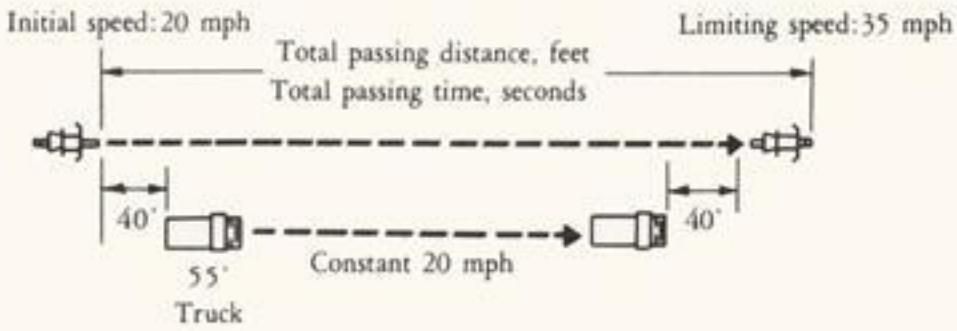
A. Fully Operational Service Brake



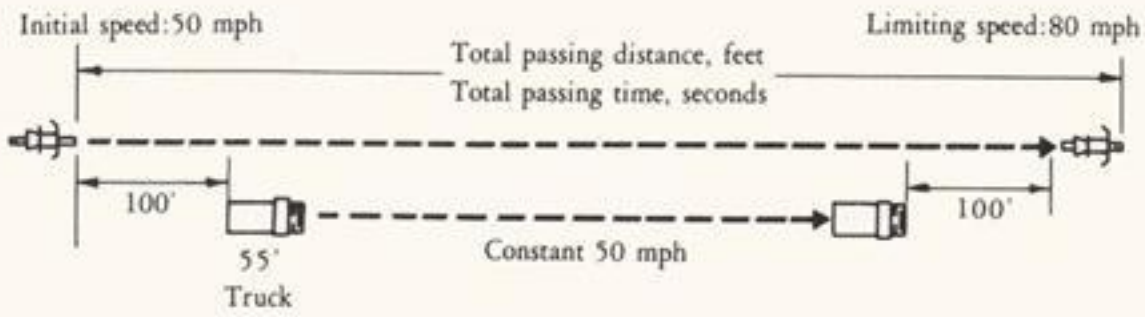
ACCELERATION AND PASSING ABILITY

This figure indicates passing times and distances that can be met or exceeded by the vehicles to which it applies, in the situations diagrammed below. The low-speed pass assumes an initial speed of 20 mph and a limiting speed of 35 mph. The high-speed pass assumes an initial speed of 50 mph and a limiting speed of 80 mph.

LOW SPEED PASS



HIGH SPEED PASS



SUMMARY

Low-speed pass ..... 360 feet; 7.4 seconds.
High-speed pass ..... 1,300 feet; 14.1 seconds.

1974 MODEL DT360A

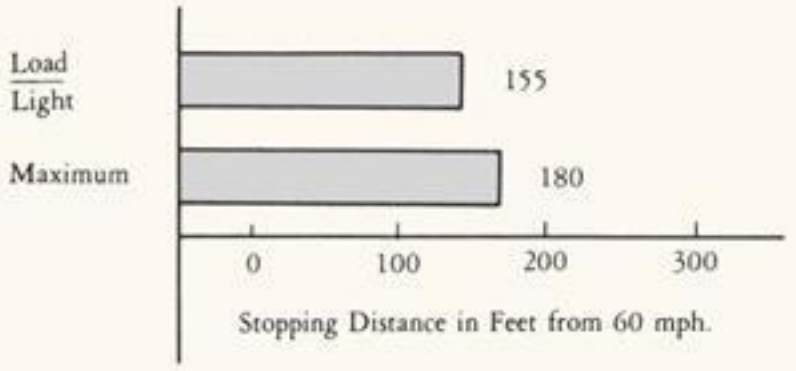
Notice

The information presented represents results obtainable by skilled drivers under controlled road and vehicle conditions, and the information may not be correct under other conditions.

STOPPING DISTANCE

This figure indicates braking performance that can be met or exceeded by the vehicles to which it applies, without locking the wheels, under different conditions of loading and with partial failures of the braking system.

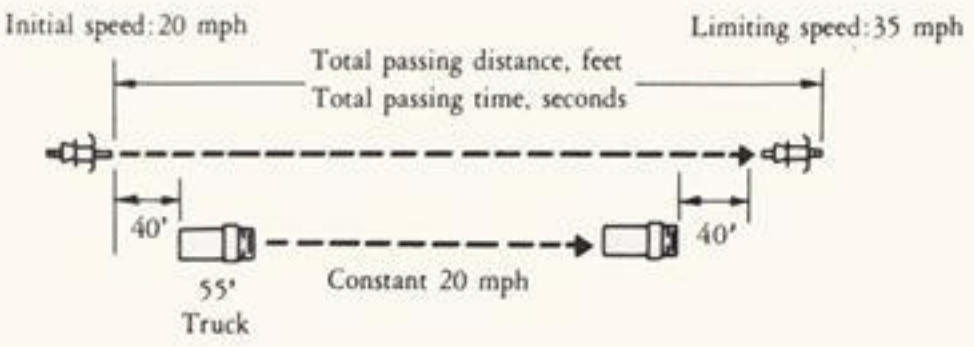
A. Fully Operational Service Brake



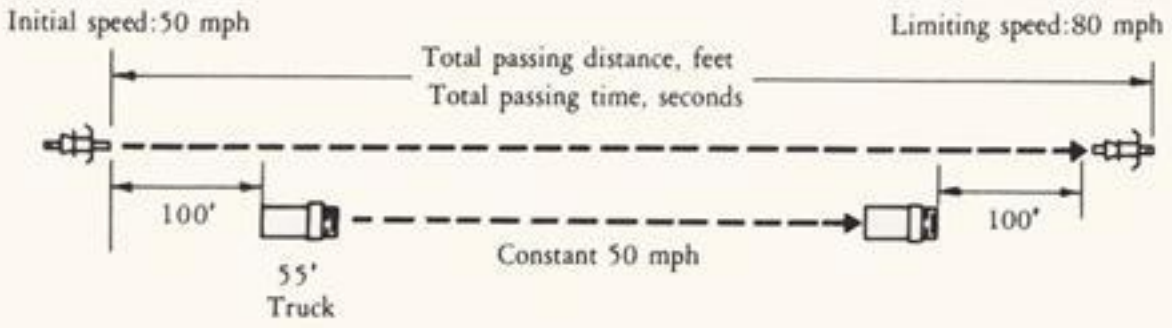
ACCELERATION AND PASSING ABILITY

This figure indicates passing times and distances that can be met or exceeded by the vehicles to which it applies, in the situations diagrammed below. The low-speed pass assumes an initial speed of 20 mph and a limiting speed of 35 mph. The high-speed pass assumes an initial speed of 50 mph and a limiting speed of 80 mph.

LOW SPEED PASS



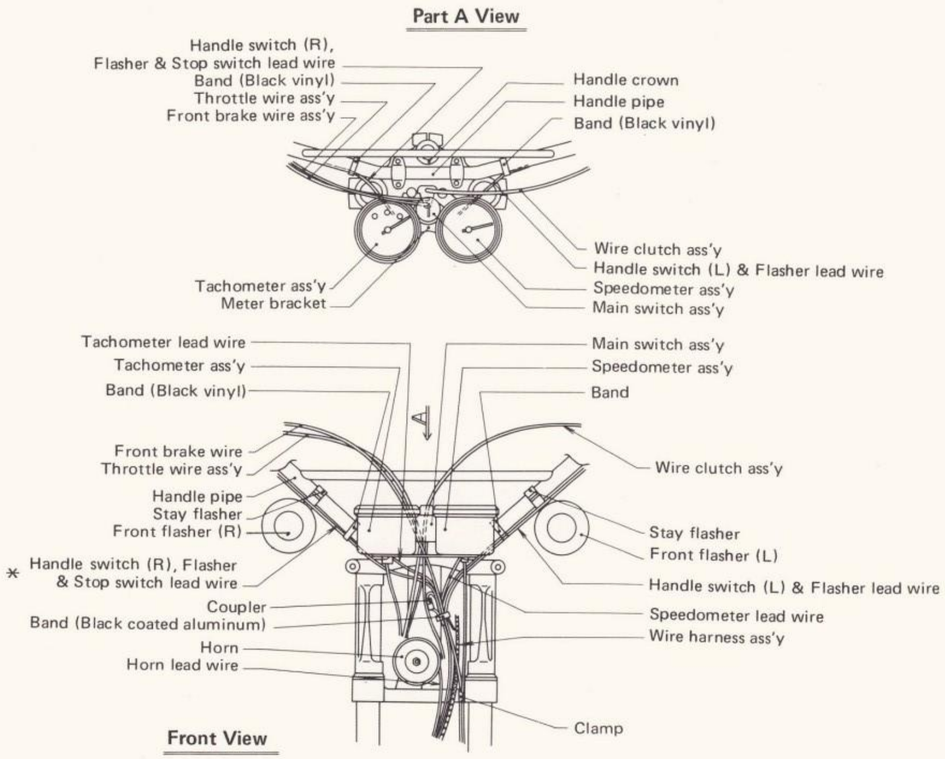
HIGH SPEED PASS

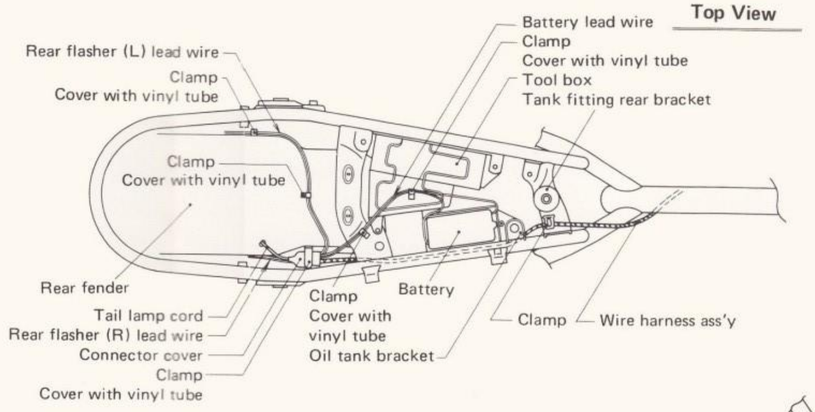


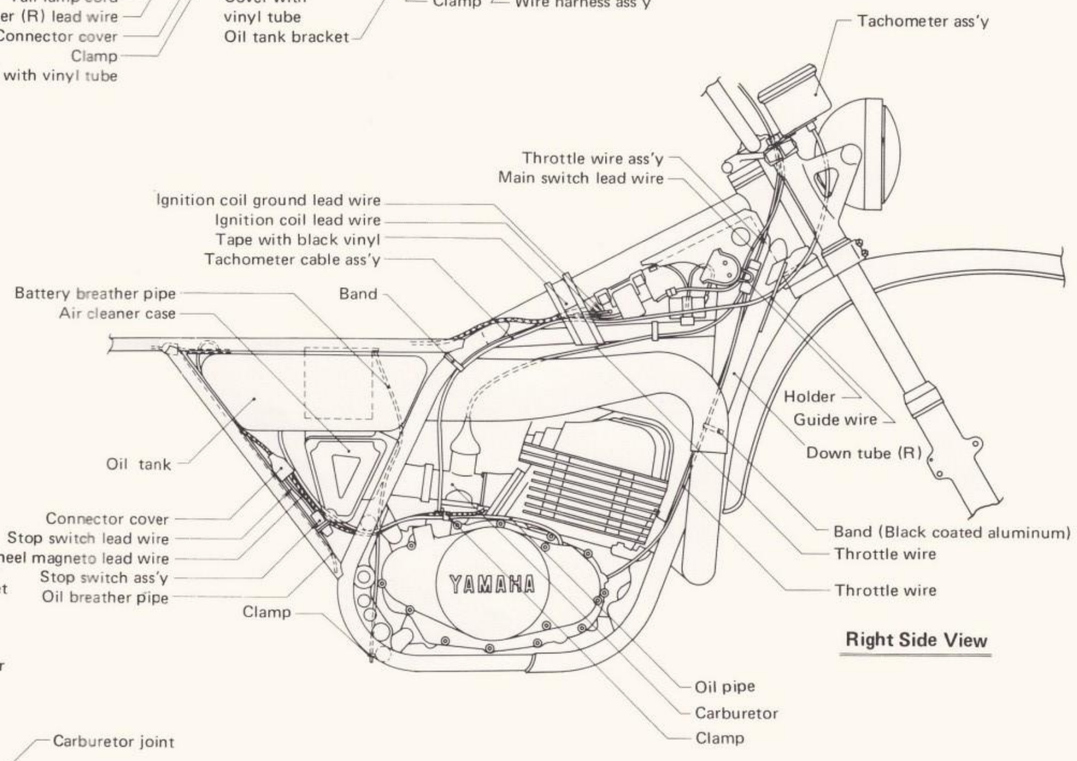
SUMMARY

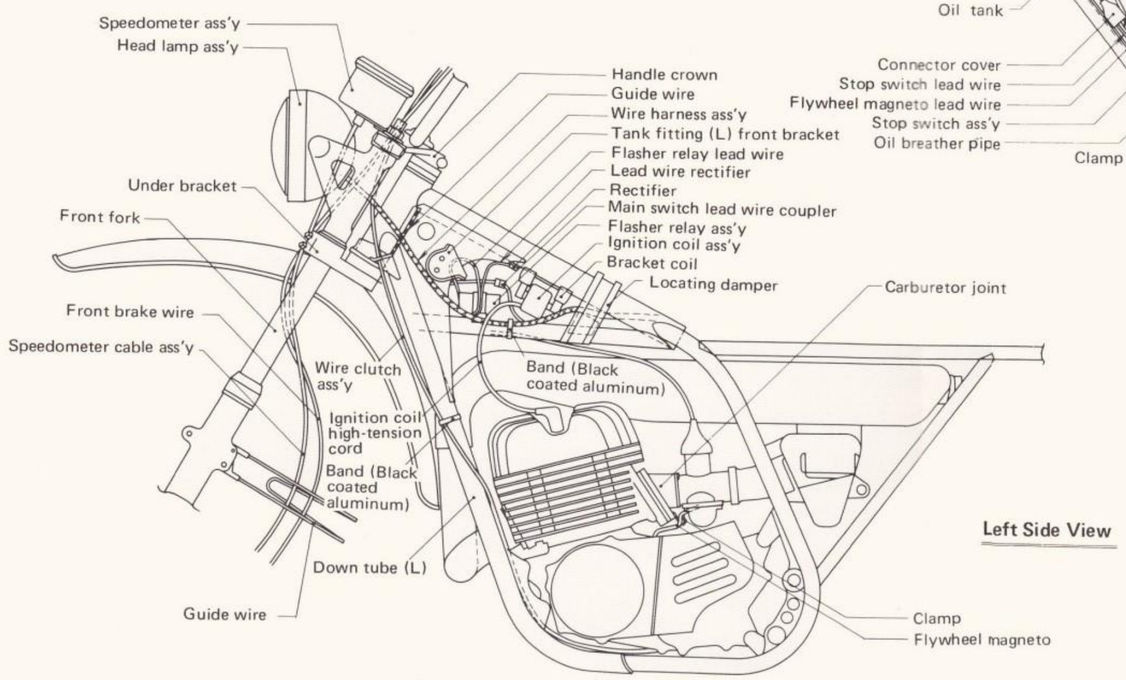
Low-speed pass ..... 355 feet; 7.3 seconds.
High-speed pass ..... 1,180 feet; 12.6 seconds.

CABLE ROUTING DIAGRAMS









* **Note:**
Connect the stop switch lead wire to the harness of lead wire in the head lamp body.

Fig. 1-4

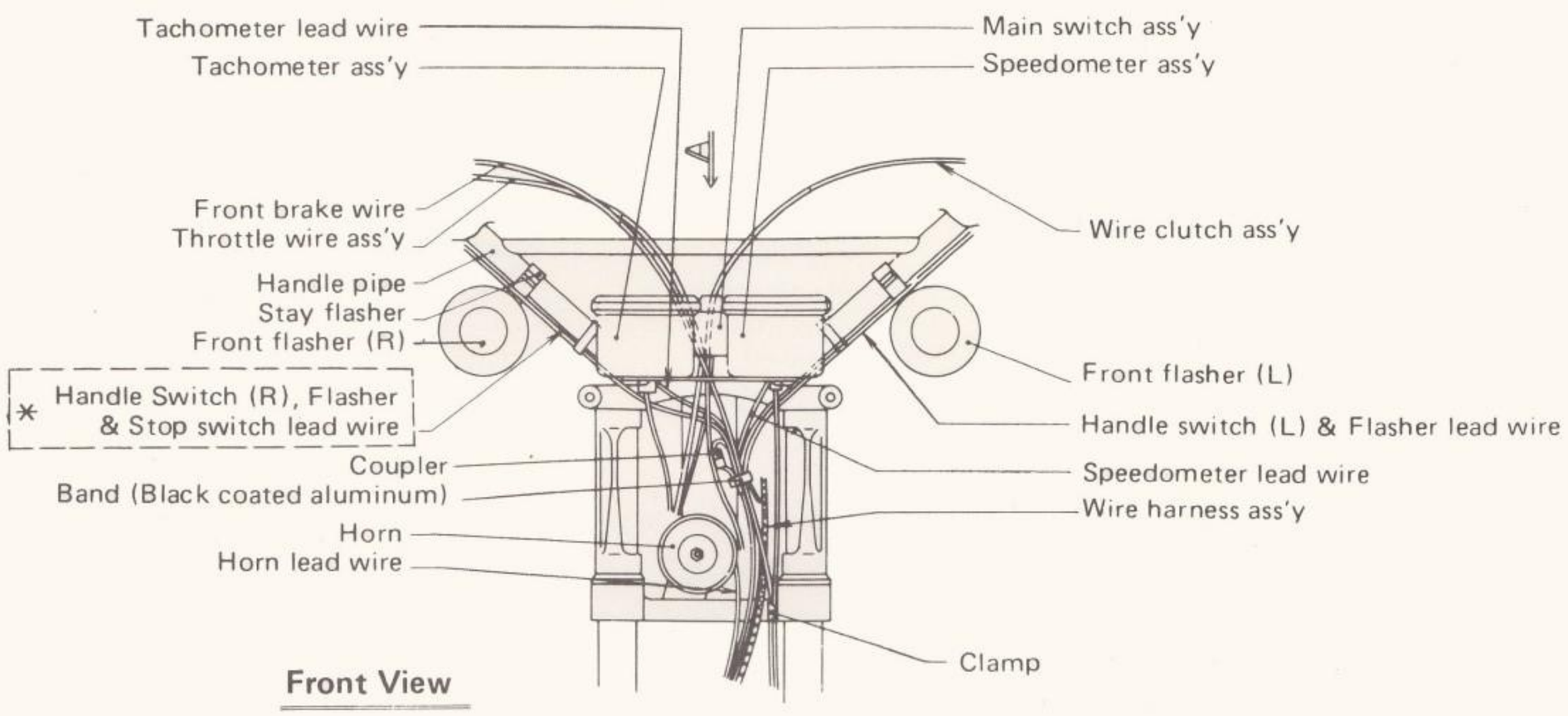
(350.5) Overall length: 85.8 (2179.1) (414.0)

ERRATA

DT250A/360A Assembly Manual

Referring to "Cable Routing Diagrams", it is requested to make corrections as follows:

INCORRECT

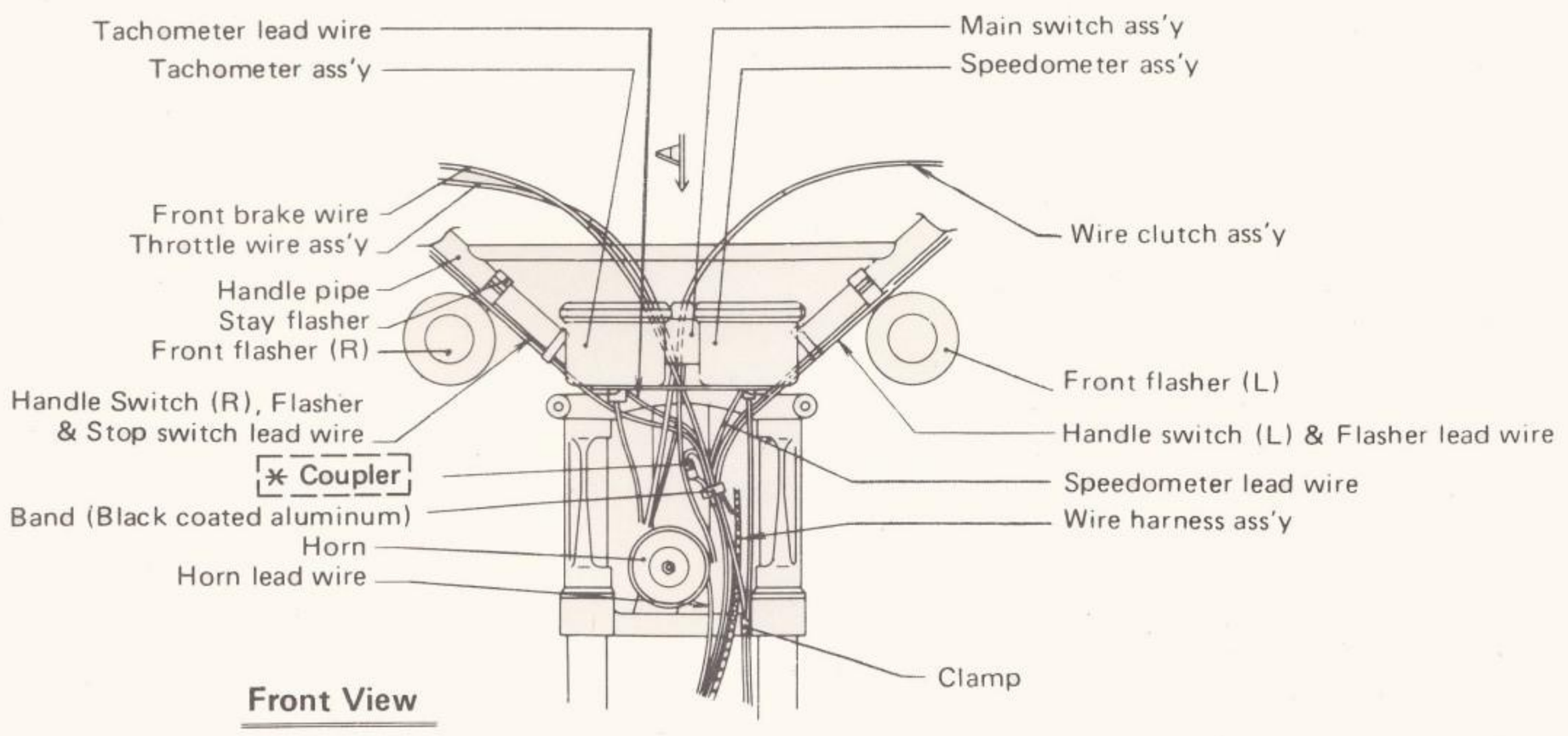


Front View

Note:

Connect the stop switch lead wire to the harness of lead wire in the head lamp body.

CORRECT



Front View

*** Note:**

Insert the coupler of the lead wire (coming from the left handle switch) in the head lamp body.

ERRATA

Referring to "DT250A/360A Service Manual", it is requested to make corrections as follows:

Page	Line	Incorrect		Correct	
3	5 9	Dimensions: Overall Length Wheelbase	DT250A 46.46 in. (1,180 mm) DT360A 56.1 in. (1,925 mm)	Dimensions: Overall Length Wheelbase	DT250A 85.8 in. (2,180 mm) DT360A 56.1 in. (1,425 mm)
7	38	Bushing Spacer I.D.	DT360A $25^{+0}_{-0.001}$ mm	Bushing Spacer I.D.	DT360A $25^{+0}_{-0.01}$ mm
8	5	Primary-Drive, Gear "Lash" No.	DT250A 0.2 to 0.6	Primary-Drive, Gear "Lash" No.	DT250A 02 to 06
9	12	Air Jet	DT250A 25φ	Air Jet	DT250A 2.5φ
17	5	Ignition Timing Specifications DT250A Timing (B.T.D.C.) 0.13 ± 0.006 in. (3.2 ± 0.95 mm)		Ignition Timing Specifications DT250A Timing (B.T.D.C.) 0.13 ± 0.006 in. (3.2 ± 0.15 mm)	
18	25	Spark Plug Gap 0.20 - 0.24 in.-lbs. (0.5 - 0.6 mm)		Spark Plug Gap 0.020 - 0.024 in. (0.5 - 0.6 mm)	
46	9 ~ 10	Tightening Torque Bolt Size / Torque 10 mm: 391 ~ 478 in. (4.5 ~ 5.5 kg-m) 8 mm: 217 ~ 252 in. (2.5 ~ 2.9 kg-m)		Tightening Torque Bolt Size / Torque 10 mm: 391 ~ 478 in.-lbs. (4.5 ~ 5.5 kg-m) 8 mm: 217 ~ 252 in.-lbs. (2.5 ~ 2.9 kg-m)	
47	8	3-4 A. Note: 4/1		3-4 A. Note: 1/4	

INCORRECT

Page	Line		Nominal	Maximum
71	22 ~ 24	Clutch Housing Bushing I.D.	$1.32^{+0.003}_{-0.006}$ in. $\left(33^{+0.007}_{-0.014}\text{ mm}\right)$	1.32 in. (33.02 mm)
		Bushing Spacer O.D.	$1.32^{-0.0010}_{-0.0016}$ in. $\left(33^{-0.025}_{-0.041}\text{ mm}\right)$	1.32 in. (32.95 mm)
		Bushing/Spacer Clearance	0.008 ~ 0.0016 in. (0.020 ~ 0.040 mm)	0.024 in. (0.060 mm)

CORRECT

Page	Line		Nominal	Maximum
71	22 ~ 24	Clutch Housing Bushing I.D.	$1.299^{+0.0003}_{-0.0006}$ in. $\left(33^{+0.007}_{-0.014}\text{ mm}\right)$	1.300 in. (33.020 mm)
		Bushing Spacer O.D.	$1.299^{-0.0010}_{-0.0016}$ in. $\left(33^{-0.025}_{-0.041}\text{ mm}\right)$	1.300 in. (32.950 mm)
		Bushing/Spacer Clearance	0.0008 ~ 0.0016 in. (0.020 ~ 0.040 mm)	0.0024 in. (0.060 mm)

INCORRECT

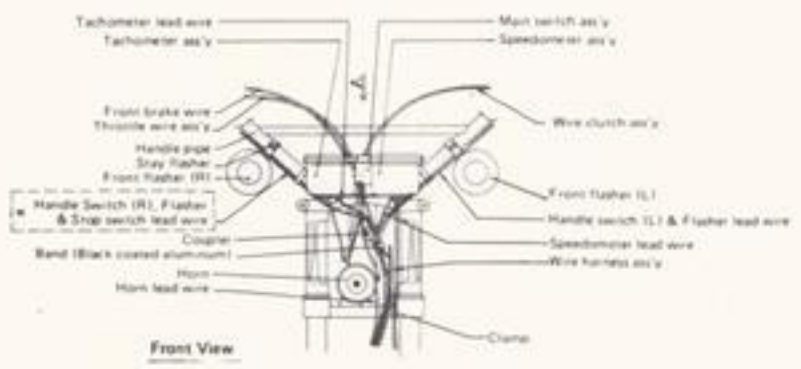
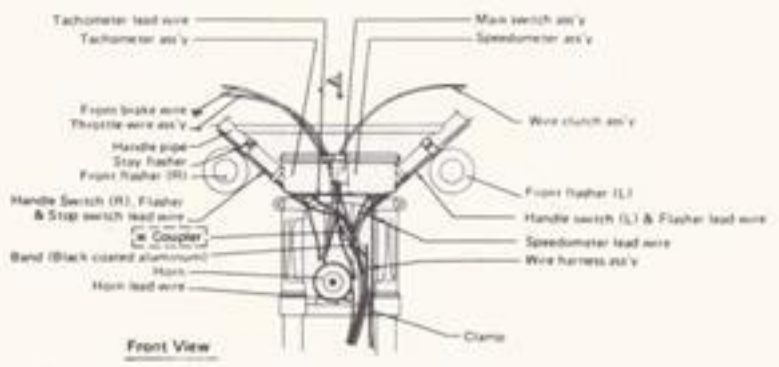
Page	Line		Nominal	Maximum
71	28 ~ 30	Main Shaft O.D.	$1.00^{-0.0008}_{-0.0016}$ in. $\left(25^{-0.020}_{-0.041}\text{ mm}\right)$	0.998 in. (24.95 mm)
		Bushing Spacer I.D.	$1.00^{+0}_{-0.0004}$ in. $\left(25^{+0}_{-0.010}\text{ mm}\right)$	1.000 in. (25.02 mm)
		Shaft/Spacer Clearance	0.0008 ~ 0.0020 in. (0.020 ~ 0.051 mm)	0.024 in. (0.060 mm)

CORRECT

Page	Line		Nominal	Maximum
71	28 ~ 30	Main Shaft O.D.	$0.984^{-0.0008}_{-0.0016}$ in. $\left(25^{-0.020}_{-0.041}\text{ mm}\right)$	0.982 in. (24.950 mm)
		Bushing Spacer I.D.	$0.984^{+0}_{-0.0004}$ in. $\left(25^{+0}_{-0.010}\text{ mm}\right)$	0.985 in. (25.020 mm)
		Shaft/Spacer Clearance	0.0008 ~ 0.0020 in. (0.020 ~ 0.051 mm)	0.0024 in. (0.060 mm)

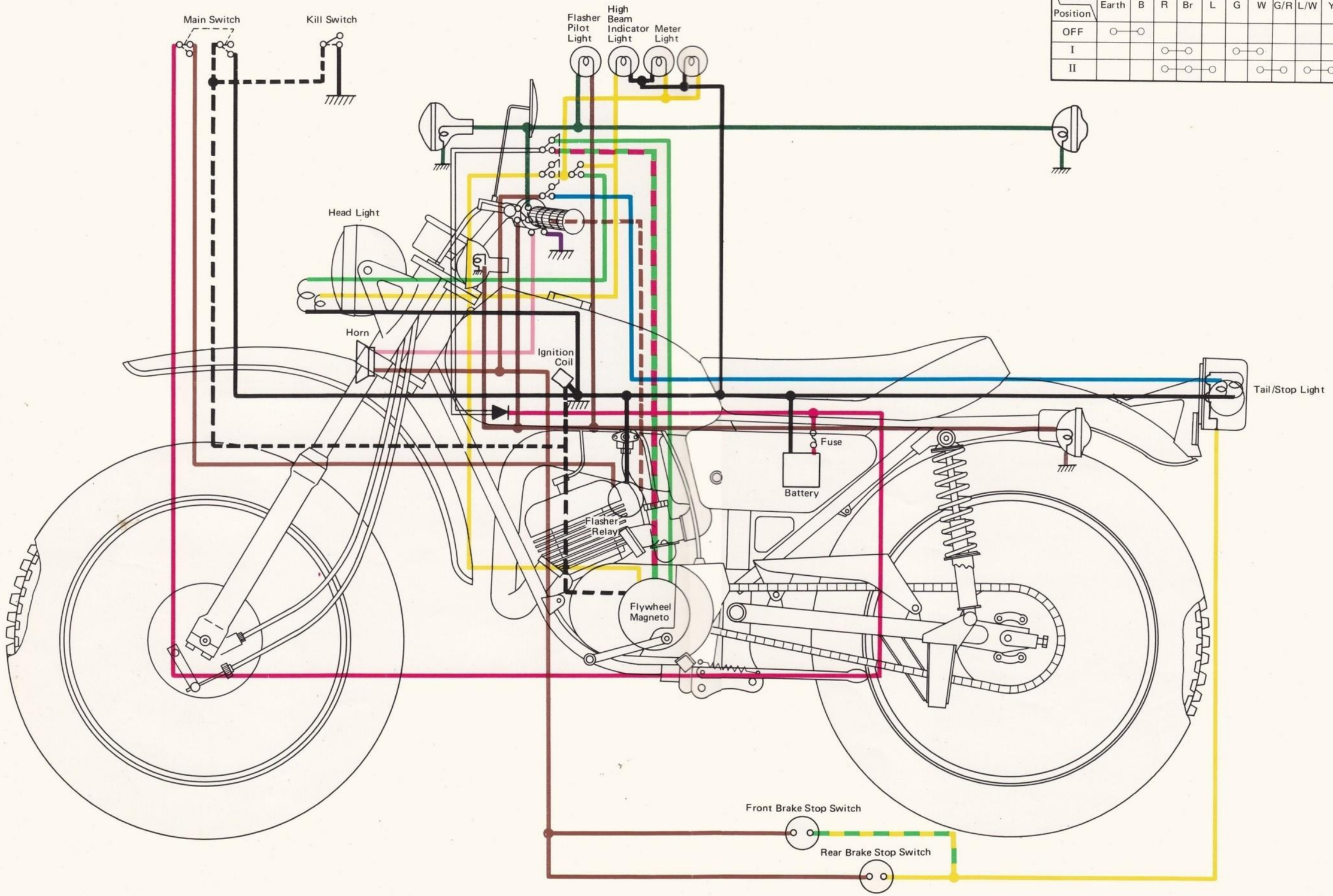
Page	Line	INCORRECT	CORRECT
81	14 ~ 15	Kick Axle to Kick Gear Clearance Minimum / Maximum Axle O.D.: 0.998 in. (24.947 mm) / 0.996 in. (24.900 mm) Gear I.D.: 1.000 in. (25.000 mm) / 1.061 in. (25.021 mm) Clearance: 0.0008 in. (0.020 mm) / 0.003 in. (0.074 mm)	Kick Axle to Kick Gear Clearance Minimum / Maximum Axle O.D.: 0.982 in. (24.947 mm) / 0.980 in. (24.980 mm) Gear I.D.: 0.984 in. (25.000 mm) / 0.985 in. (25.021 mm) Clearance: 0.0008 in. (0.020 mm) / 0.003 in. (0.074 mm)
94	32 ~ 33	Flywheel Width 'F $64^{+0.020}_{-0.050}$ $64^{+0.020}_{-0.050}$	Flywheel Width F $(64^{+0}_{-0.050})$ $(64^{+0}_{-0.050})$
105	17	Float Level | F.L. | 0.692 ± 0.10 in. (17.3 ± 2.5 mm) | 0.692 ± 0.10 in. (17.3 ± 2.5 mm)	Float Level | F.L. | 0.681 ± 0.10 in. (17.3 ± 2.5 mm) | 0.681 ± 0.10 in. (17.3 ± 2.5 mm)
107	25	Float level: 0.692 ± 0.10 in. (17.3 ± 2.5 mm)	Float level: 0.681 ± 0.10 in. (17.3 ± 2.5 mm)
110	18	Torque: 0.32 in.-lbs (8.0 kg-cm)	Torque: 6.95 in.-lbs (8.0 kg-cm)

Page	Line	INCORRECT	CORRECT
120	14	R.P.M. / Amperage (Daytime / Nighttime) 2,000 r.p.m.: 1.8 ± 0.5A / 0.7 ± 0.5A 8,000 r.p.m.: 2.7 ± 0.5A (DT250A) 3.0 ± 0.5A (DT360A) / 1.5 ± 0.5A (DT250A) 1.3 ± 0.5A (DT360A)	R.P.M. / Amperage (Daytime / Nighttime) 2,000 r.p.m.: 1.8 ± 0.5A / 0.7 ± 0.3A 8,000 r.p.m.: 2.7 ± 0.5A (DT250A) 3.0 ± 0.5A (DT360A) / 1.5 ± 0.5A (DT250A) 1.3 ± 0.5A (DT360A)

INCORRECT	CORRECT
	
* **Note:** Connect the stop switch lead wire to the harness of lead wire in the head lamp body.	* **Note:** Insert the coupler of the lead wire (coming from the left handle switch) in the head lamp body.

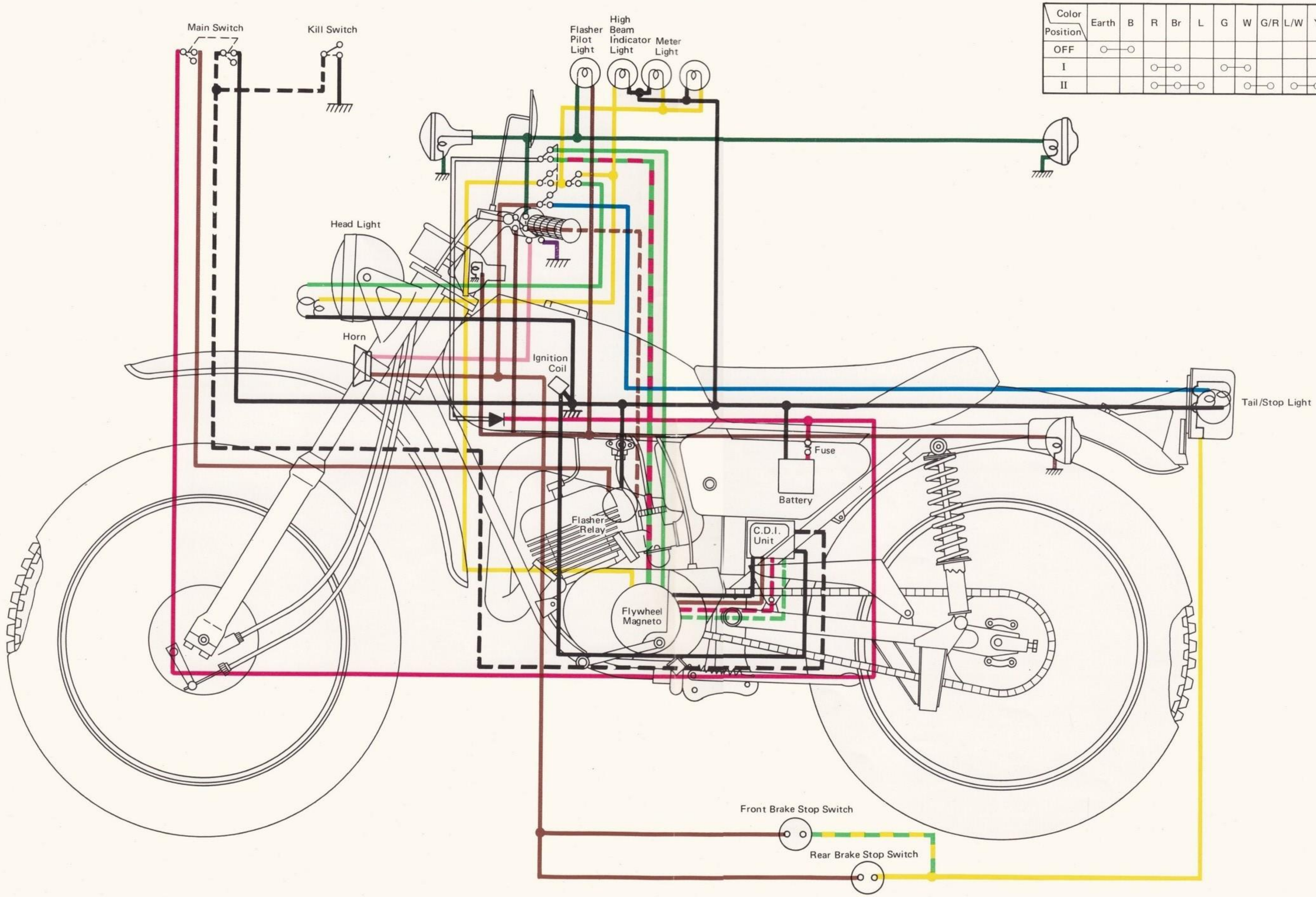
DT250A WIRING DIAGRAM

Color / Position	Earth	B	R	Br	L	G	W	G/R	L/W	Y
OFF	○—○									
I			○—○			○—○				
II			○—○	○—○			○—○		○—○	



DT360A WIRING DIAGRAM

Color / Position	Earth	B	R	Br	L	G	W	G/R	L/W	Y
OFF	○—○									
I			○—○			○—○				
II			○—○	○—○			○—○		○—○	



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