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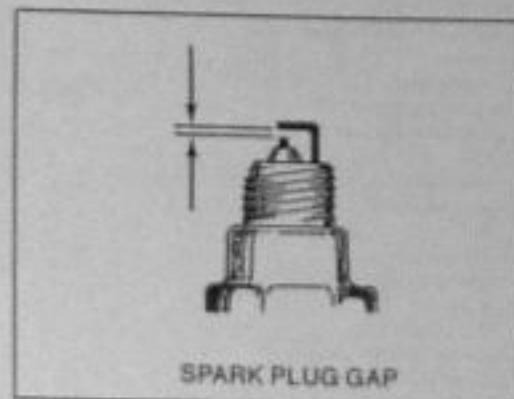
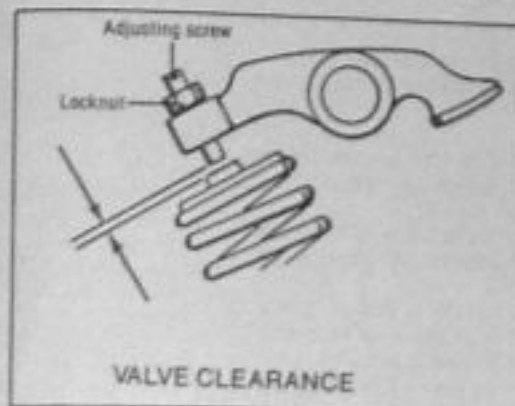
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QUICK REFERENCE DATA



FREE PLAY ADJUSTMENTS

Item	mm	in.
Clutch lever	10-20	3/8-3/4
Front brake lever		
XL200R, TLR200	10-20	3/8-3/4
All other models	20-30	3/4-1 1/4
Rear brake pedal		
XL200R, XR200R	15-20	5/8-3/4
All other models	20-30	3/4-1 1/4
Throttle grip	2-6	1/8-1/4
Starter decompressor	1-2	0.04-0.10
Drive chain slack		
XL125S, XL185S, XL200R	30-40	1 1/4-1 5/8
(lower chain run)		
XR185, XR200	21	1 1/4
XR200R (upper chain run)	35-45	1 3/8-1 3/4
TLR200 (lower chain run)	25-35	1-1 3/8

TUNE-UP SPECIFICATIONS

Valve clearance	
Intake	
All models	0.05 mm (0.002 in.)
Exhaust	
XL125S, XL185S,	
XL200R, TLR200	0.05 mm (0.002 in.)
XR185, XR200, XR200R	0.06 mm (0.003 in.)
Compression pressure	
(at sea level)	
XL125S, XL200R, TLR200	178 ± 21 psi (12.5 ± 1.5 kg/cm ²)
XL185S	192 ± 21 psi (13.5 ± 1.5 kg/cm ²)
XR185, XR200, XR200R	195 psi (14.0 kg/cm ²)
Spark plug type (1979-1981)	
Standard heat range	
U.S.	ND X24ES-U or NGK D8EA
Canadian	ND X24ESR-U or NGK DR8ES-L
Cold weather*	
U.S.	ND X22ES-U or NGK D7EA
Canadian	ND X22ESR-U or NGK DR7ES

(continued)

TUNE-UP SPECIFICATIONS (continued)

Spark plug type (1979-1981) (continued)		
Extended high speed riding		ND X27ES-U or NGK D9EA
U.S.		ND X27ESR-U or NGK DR8ES
Canadian		
Spark plug type (1982-on)		
Standard heat range		ND X24ESR-U or NGK DR8ES-L
U.S.		ND X24ESR-U or NGK DR8ES-L
Canadian		
Cold weather*		
U.S.		ND X22ESR-U or NGK DR7ES
Canadian		ND X22ESR-U or NGK DR7ES
Extended high speed riding		
U.S.		ND X27ESR-U or NGK DR9ES
Canadian		ND X27ESR-U or NGK DR8ES
Spark plug gap (all years)		0.6-0.7 mm (0.024-0.028 in.)
Ignition timing @ idle		Timing mark "T" or "F"
XL125S, XR200R (1986-on)		1,400 ± 100 rpm
All other models		1,300 ± 100 rpm
Ignition timing advance		
Advance starts all models		Advance timing marks "II"
Full advance		1,950 ± 150 rpm
XL125S, XL185S		3,350 ± 150 rpm
All other models		3,150 ± 150 rpm
Idle speed		
XL125S, XR200R (1986-on)		1,400 ± 100 rpm
All other models		1,300 ± 100 rpm

*Cold weather climate—below 41° F (5° C).

FRAME TORQUE SPECIFICATIONS

Item	ft.-lb	N-m
Front axle nut		
XL125S, XL185S, XR185, XR200	40-50	29-36
XL200R	60-80	43-58
Front axle (XR200R, TLR200)	60-80	43-58
Front axle clamp nuts (XR200R)	10-14	7-10
Handlebar holder bolts		
XL125S, XL185S, XR185,		
XR200, XL200R, TLR200	20-25	14-18
XR200R	18-30	13-22
Front bridge bolts		
Upper (except TLR200)	9-13	7-9
Upper (TLR200)	20-25	14-18
Lower		
XL125S, XL185S, XR185		
XR200, XL200R	20-25	14-18
XR200R	18-30	13-22
TLR200	30-40	22-29
Steering stem nut		
XL125S, XL185S, XR185, XR200	60-90	43-65
XR200R, XL200R, TLR200	80-120	58-87
Fork cap bolt	15-30	11-22
Rear axle nut		
XL125S, XL185S, XR185, XR200	60-80	43-58
XR200R	80-110	58-80
Rear swing arm pivot bolt/nut		
XL125S, XL185S, XR185, XR200	35-50	25-36
XR200R	80-100	58-72

(continued)

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FRAME TORQUE SPECIFICATIONS (continued)

Item	ft.-lb	N-m
Shock Absorbers		
Upper bolt/nut (XR200R)		
1981-1983	60-75	43-54
1986-1987	40-50	29-36
Lower bolt/nut (XR200R)		
1981-1983	38-48	27-35
1986-1987	40-50	29-36
Upper bolt (TLR200)	10-14	7-10
Lower bolt (TLR200)	10-14	7-10
Upper bolt/nut (all others)	30-40	22-29
Lower bolt/nut (all others)	30-40	22-29
Pro-Link Linkage (XR200R)		
Shock arm to swing arm pivot bolt		
1981-1983	90-120	65-87
1986-1987	90-120	65-87
Shock link to frame pivot bolt		
1981-1983	60-75	43-54
1986-1987	40-50	29-36
Shock arm to shock link pivot bolt		
1981-1983	60-75	43-54
1986-1987	40-50	43-54
Brake torque link bolt (front and rear)		
XL125S, XL185S, XR185, XR200	18-25	13-18
XR200R	8-12	6-9
Driven sprocket nuts		
Except XR200R 1986-1987	55-65	40-47
XR200R 1986-1987	34-40	25-29

FLUIDS

Fuel capacity (total)		
XL125S (exc. 1985)	1.8 U.S. gal. (7.0 liters, 1.5 imp. gal.)	
XL125S (1985)	2.4 U.S. gal. (9.0 liters, 2.0 imp. gal.)	
XL185S	1.8 U.S. gal. (7.0 liters, 1.5 imp. gal.)	
XR185, XR200	1.8 U.S. gal. (7.0 liters, 1.5 imp. gal.)	
XR200R (1981-1983)	2.0 U.S. gal. (7.5 liters, 1.6 imp. gal.)	
XR200R (1986-on)	2.4 U.S. gal. (9.0 liters, 2.0 imp. gal.)	
XL200R	2.1 U.S. gal. (8.0 liters, 1.8 imp. gal.)	
TLR200	1.7 U.S. gal. (6.5 liters, 1.4 imp. gal.)	
Fuel reserve	0.4 U.S. gal. (1.5 liters, 0.3 imp. gal.)	
Oil capacity		
At oil change	0.98 U.S. gal. (0.9 liters, 0.82 imp. gal.)	
At overhaul	1.2 U.S. gal. (1.1 liters, 1.0 imp. gal.)	
Fork oil capacity*		
XL125S, XL185S	1979-1984	155 cc (5.24 oz.)
XL125S	1981-1982	160 cc (5.41 oz.)
XL125S	1985	172.5 cc (5.83 oz.)
XL185S	1981	160 cc (5.41 oz.)
XL185S	1982-on	165 cc (5.8 oz.)
XR185	1979	170 cc (5.75 oz.)
XR200	1980-1981	170 cc (5.75 oz.)**
XR200	1982-on	165 cc (5.8 oz.)**
XR200R	1981	271 cc (9.16 oz.)**
XR200R	1982-1983	320 cc (11.0 oz.)**
XR200R	1986-on	350 cc (11.8 oz.)**
XL200R	1983-1984	260 cc (8.9 oz.)
TLR200	1986-on	207 cc (7.0 oz.)

*Capacity for each fork leg.

**Standard capacity. Quantity can be varied to suit rider.

XI

ENGINE TORQUE SPECIFICATIONS

Item	N-m	ft.-lb.
Cylinder head cover		
8 mm cap nuts	18-20	13-14
XL125S, XL185S	20-22	14-16
XR185, XR200	28-30	20-22
XR200R, XL200R, TLR200	8-12	6-9
Cam sprocket bolts	8-12	6-9
Pulse rotor bolt		
Alternator rotor bolt	18-20	13-14
XL125S, XL185S	18-20	13-14
XR185, XR200	45-55	33-40
XR200R	55-65	40-47
TLR200		

REPLACEMENT BULBS

Item	Volts/watts	CP	SAE No.
Headlight			
XL125S (1979-1984), XL185S	6V 35/36.5	—	—
XR185, XR200	6V 25/25W	—	—
XR200R (1981-1983)	6V 25W	—	—
XR200R (1986-on)	12V 35W	—	—
TLR200, XL125S (1985)	12V 35/35W	—	—
Tailight/brakelight			
XL125S (1979-1984), XL185S	6V 5.3/25w	3/32	—
TLR200, XL125S (1985)	12V 8/27W	3/32	1157
Tailight			
XR185, XR200	6V 3W	2	55
XR200R (1981-1983)	6V 3W	2	55
XR200R (1986-on)	12V 3.4W	—	—
Turn Signal			
XL125S (1979-1984), XL185S	6V 18W	21	1129
TLR200, XL125S (1985)	12V 23/23W	32/32	1073
Speedometer			
6 volt models	6V 3W	2	55
12 volt models	12V 3.4W	2	—
Neutral indicator			
6 volt models	6V 3W	2	55
12 volt models	12V 3.4W	2	—
Turn signal indicator			
6 volt models	6V 1.7W	1	51
12 volt models	12V 3.4W	2	—
High beam indicator			
6 volt models	6V 1.7W	1	51
12 volt models	12V 1.7W	1	—

INTRODUCTION

CLYMER®

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XL/XR/TLR125-200 • 1979-1987

When you open the front cover of the Clymer repair manual, you are greeted by a warm, friendly, and helpful voice. It's the voice of the Clymer repair manual, which is designed to help you get the most out of your Honda motorcycle. The Clymer repair manual is a complete guide to the maintenance and repair of your Honda motorcycle. It contains all the information you need to keep your Honda motorcycle in top condition. The Clymer repair manual is a must-have for every Honda motorcycle owner.

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8 mm cap nuts		
XL125S, XL185S	18-20	13-14
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Pulse rotor bolt	8-12	6-9
Alternator rotor bolt		
XL125S, XL185S	18-20	13-14
XR185, XR200	18-20	13-14
XR200R	45-55	33-40
TLR200	55-65	40-47

REPLACEMENT BULBS

Item	Volts/watts	CP	SAE No.
Headlight			
XL125S (1979-1984), XL185S	6V 35/36.5	—	—
XR185, XR200	6V 25/25W	—	—
XR200R (1981-1983)	6V 25W	—	—
XR200R (1986-on)	12V 35W	—	—
TLR200, XL125S (1985)	12V 35/35W	—	—
Tailight/brakelight			
XL125S (1979-1984), XL185S	6V 5.3/25w	3/32	—
TLR200, XL125S (1985)	12V 8/27W	3/32	1157
Tailight			
XR185, XR200	6V 3W	2	55
XR200R (1981-1983)	6V 3W	2	55
XR200R (1986-on)	12V 3.4W	—	—
Turn Signal			
XL125S (1979-1984), XL185S	6V 18W	21	1129
TLR200, XL125S (1985)	12V 23/23W	32/32	1073
Speedometer			
6 volt models	6V 3W	2	55
12 volt models	12V 3.4W	2	—
Neutral indicator			
6 volt models	6V 3W	2	55
12 volt models	12V 3.4W	2	—
Turn signal indicator			
6 volt models	6V 1.7W	1	51
12 volt models	12V 3.4W	2	—
High beam indicator			
6 volt models	6V 1.7W	1	51
12 volt models	12V 1.7W	1	—

INTRODUCTION

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XL/XR/TLR125-200 • 1979-1987

This manual is a reference guide for the repair and maintenance of Honda motorcycles. It contains complete instructions and specifications for the repair and maintenance of the engine, transmission, chassis, and electrical system. It is designed to be used by a trained technician or a knowledgeable amateur.

A shop manual is a reference guide for the repair and maintenance of Honda motorcycles. It contains complete instructions and specifications for the repair and maintenance of the engine, transmission, chassis, and electrical system. It is designed to be used by a trained technician or a knowledgeable amateur.

From the book store, it will help you to keep your Honda motorcycle in the best of health and running smoothly.

INTRODUCTION

This detailed, comprehensive manual covers all 1979-1987 Honda XL/XR/TLR 125-200 singles. The expert text gives complete information on maintenance, repair and overhaul. Hundreds of photos and drawings guide you through every step. The book includes all you need to know to keep your Honda running right.

Where repairs are practical for the owner/mechanic, complete procedures are given. Equally important, difficult jobs are pointed out. Such operations are usually more economically performed by a dealer or independent garage.

A shop manual is a reference. You want to be able to find information fast. As in all Clymer books, this one is designed with this in mind. All chapters are thumb tabbed. Important items are indexed at the rear of the book. Finally, all the most frequently used specifications and capacities are summarized on the *Quick Reference* pages at the front of the book.

Keep the book handy. It will help you to better understand your Honda, lower repair and maintenance costs, and generally improve your satisfaction with your bike.

CHAPTER ONE

GENERAL INFORMATION

The troubleshooting, maintenance, tune-up, and step-by-step repair procedures in this book are written specifically for the owner and home mechanic. The text is accompanied by helpful photos and diagrams to make the job as clear and correct as possible.

Troubleshooting, maintenance, tune-up, and repair are not difficult if you know what to do and what tools and equipment to use. Anyone of average intelligence, with some mechanical ability, and not afraid to get their hands dirty can perform most of the procedures in this book.

In some cases, a repair job may require tools or skills not reasonably expected of the home mechanic. These procedures are noted in each chapter and it is recommended that you take the job to your dealer, a competent mechanic, or a machine shop.

MANUAL ORGANIZATION

This chapter provides general information, safety and service hints. Also included are lists of recommended shop and emergency tools as well as a brief description of troubleshooting and tune-up equipment.

Chapter Two provides methods and suggestions for quick and accurate diagnosis and

repair of problems. Troubleshooting procedures discuss typical symptoms and logical methods to pinpoint the trouble.

Chapter Three explains all periodic lubrication and routine maintenance necessary to keep your motorcycle running well. Chapter Three also includes recommended tune-up procedures, eliminating the need to constantly consult chapters on the various subassemblies.

Subsequent chapters cover specific systems such as the engine, transmission, and electrical system. Each of these chapters provides disassembly, inspection, repair, and assembly procedures in a simple step-by-step format. If a repair is impractical for the home mechanic it is indicated. In these cases it is usually faster and less expensive to have the repairs made by a dealer or competent repair shop. Essential specifications are included in the appropriate chapters.

When special tools are required to perform a task included in this manual, the tools are illustrated. It may be possible to borrow or rent these tools. The inventive mechanic may also be able to find a suitable substitute in his tool box, or to fabricate one.

The terms **NOTE**, **CAUTION**, and **WARNING** have specific meanings in this manual. A **NOTE** provides additional or explanatory information. A

CAUTION is used to emphasize areas where equipment damage could result if proper precautions are not taken. A WARNING is used to stress those areas where personal injury or death could result from negligence, in addition to possible mechanical damage.

SERVICE HINTS

Time, effort, and frustration will be saved and possible injury will be prevented if you observe the following practices.

Most of the service procedures covered are straightforward and can be performed by anyone reasonably handy with tools. It is suggested, however, that you consider your own capabilities carefully before attempting any operation involving major disassembly of the engine.

Some operations, for example, require the use of a press. It would be wiser to have these performed by a shop equipped for such work, rather than to try to do the job yourself with makeshift equipment. Other procedures require precision measurements. Unless you have the skills and equipment required, it would be better to have a qualified repair shop make the measurements for you.

Repairs go much faster and easier if the parts that will be worked on are clean before you begin. There are special cleaners for washing the engine and related parts. Brush or spray on the cleaning solution, let stand, then rinse it away with a garden hose. Clean all oily or greasy parts with cleaning solvent as you remove them.

WARNING

Never use gasoline as a cleaning agent. It presents an extreme fire hazard. Be sure to work in a well-ventilated area when using cleaning solvent. Keep a fire extinguisher, rated for gasoline fires, handy in any case.

Much of the labor charge for repairs made by dealers is for the removal and disassembly of other parts to reach the defective unit. It is frequently possible to perform the preliminary operations yourself and then take the defective unit in to the dealer for repair, at considerable savings.

Once you have decided to tackle the job yourself, make sure you locate the appropriate section in this manual, and read it entirely. Study the illustrations and text until you have a good idea of what is involved in completing the job satisfactorily. If special tools are required, make arrangements to get them before you start. Also, purchase any known defective parts prior to starting on the procedure. It is frustrating and time-consuming to get partially into a job and then be unable to complete it.

Simple wiring checks can be easily made at home, but knowledge of electronics is almost a necessity for performing tests with complicated electronic testing gear.

During disassembly of parts keep a few general cautions in mind. Force is rarely needed to get things apart. If parts are a tight fit, like a bearing in a case, there is usually a tool designed to separate them. Never use a screwdriver to pry apart parts with machined surfaces such as cylinder head or crankcase halves. You will mar the surfaces and end up with leaks.

Make diagrams wherever similar-appearing parts are found. You may think you can remember where everything came from — but mistakes are costly. There is also the possibility you may get sidetracked and not return to work for days or even weeks — in which interval, carefully laid out parts may have become disturbed.

Tag all similar internal parts for location, and mark all mating parts for position. Record number and thickness of any shims as they are removed. Small parts such as bolts can be identified by placing them in plastic sandwich bags that are sealed and labeled with masking tape.

Wiring should be tagged with masking tape and marked as each wire is removed. Again, do not rely on memory alone.

Disconnect battery ground cable before working near electrical connections and before disconnecting wires. Never run the engine with the battery disconnected; the alternator could be seriously damaged.

Protect finished surfaces from physical damage or corrosion. Keep gasoline and brake fluid off painted surfaces.

GENERAL INFORMATION

Frozen or very tight bolts and screws can often be loosened by soaking with penetrating oil like Liquid Wrench or WD-40, then sharply striking the bolt head a few times with a hammer and punch (or screwdriver for screws). Avoid heat unless absolutely necessary, since it may melt, warp, or remove the temper from many parts.

Avoid flames or sparks when working near a charging battery or flammable liquids, such as gasoline.

No parts, except those assembled with a press fit, require unusual force during assembly. If a part is hard to remove or install, find out why before proceeding.

Cover all openings after removing parts to keep dirt, small tools, etc., from falling in.

When assembling two parts, start all fasteners, then tighten evenly.

Wiring connections and brake shoes, drums, pads, and discs and contact surfaces in dry clutches should be kept clean and free of grease and oil.

When assembling parts, be sure all shims and washers are replaced exactly as they came out.

Whenever a rotating part butts against a stationary part, look for a shim or washer. Use new gaskets if there is any doubt about the condition of old ones. Generally, you should apply gasket cement to one mating surface only, so the parts may be easily disassembled in the future. A thin coat of oil on gaskets helps them seal effectively.

Heavy grease can be used to hold small parts in place if they tend to fall out during assembly. However, keep grease and oil away from electrical, clutch, and brake components.

High spots may be sanded off a piston with sandpaper, but emery cloth and oil do a much more professional job.

Carburetors are best cleaned by disassembling them and soaking the parts in a commercial carburetor cleaner. Never soak gaskets and rubber parts in these cleaners. Never use wire to clean out jets and air passages; they are easily damaged. Use compressed air to blow out the carburetor, but only if the float has been removed first.

Take your time and do the job right. Do not forget that a newly rebuilt engine must be

broken in the same as a new one. Refer to your owner's manual for the proper break-in procedures.

SAFETY FIRST

Professional mechanics can work for years and never sustain a serious injury. If you observe a few rules of common sense and safety, you can enjoy many safe hours servicing your motorcycle. You could hurt yourself or damage the motorcycle if you ignore these rules.

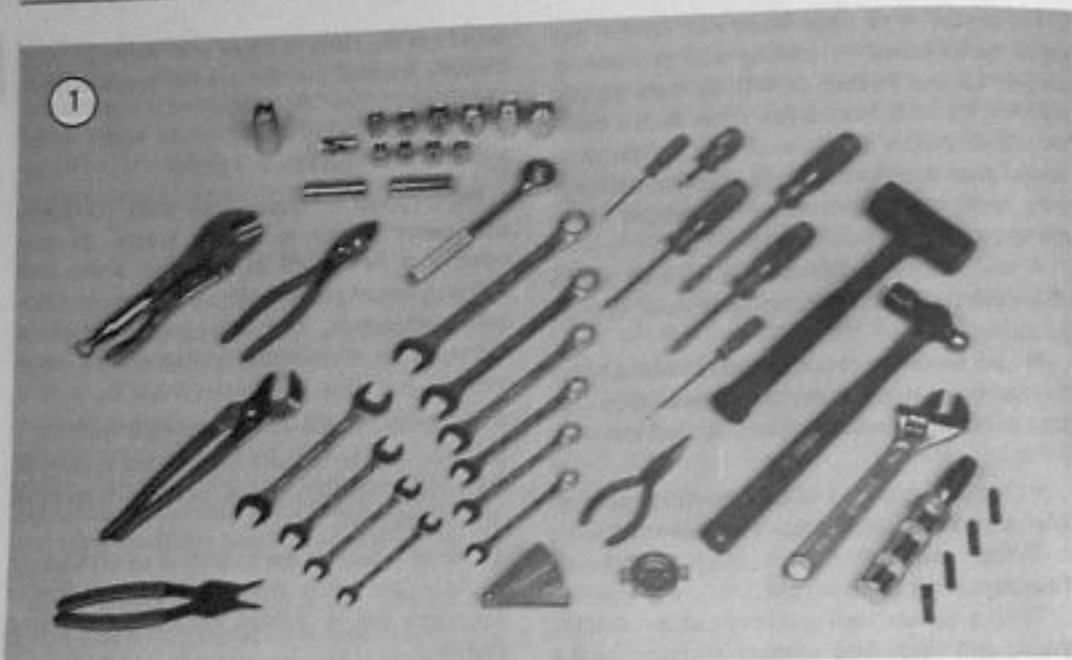
1. Never use gasoline as a cleaning solvent.
2. Never smoke or use a torch in the vicinity of flammable liquids such as cleaning solvent in open containers.
3. Never smoke or use a torch in an area where batteries are being charged. Highly explosive hydrogen gas is formed during the charging process.
4. Use the proper sized wrenches to avoid damage to nuts and injury to yourself.
5. When loosening a tight or stuck nut, be guided by what would happen if the wrench should slip. Protect yourself accordingly.
6. Keep your work area clean and uncluttered.
7. Wear safety goggles during all operations involving drilling, grinding, or use of a cold chisel.
8. Never use worn tools.
9. Keep a fire extinguisher handy and be sure it is rated for gasoline (Class B) and electrical (Class C) fires.

EXPENDABLE SUPPLIES

Certain expendable supplies are necessary. These include grease, oil, gasket cement, wiping rags, cleaning solvent, and distilled water. Also, special locking compounds, silicone lubricants, and engine and carburetor cleaners may be useful. Cleaning solvent is available at most service stations and distilled water for the battery is available at supermarkets.

SHOP TOOLS

For complete servicing and repair you will need an assortment of ordinary hand tools (Figure 1).



As a minimum, these include:

- a. Combination wrenches
- b. Sockets
- c. Plastic mallet
- d. Small hammer
- e. Impact driver
- f. Snap ring pliers
- g. Gas pliers
- h. Phillips screwdrivers
- i. Slot (common) screwdrivers
- j. Feeler gauges
- k. Spark plug gauge
- l. Spark plug wrench

Special tools required are shown in the chapters covering the particular repair in which they are used.

Engine tune-up and troubleshooting procedures require other special tools and equipment. These are described in detail in the following sections.

EMERGENCY TOOL KITS

Highway

A small emergency tool kit kept on the bike is handy for road emergencies which otherwise

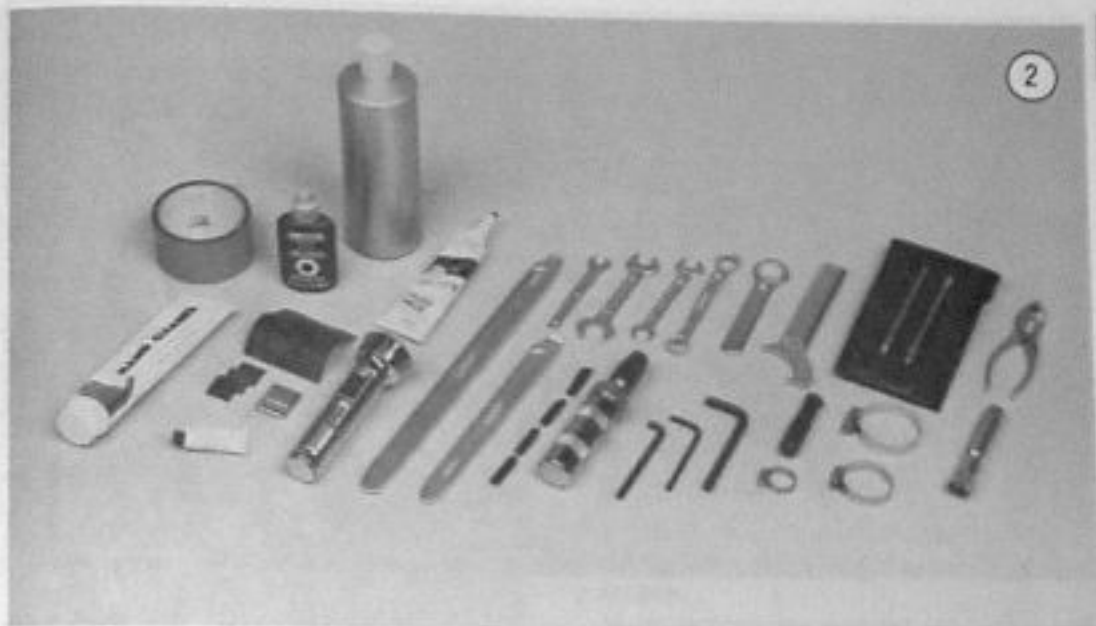
could leave you stranded. The tools and spares listed below and shown in **Figure 2** will let you handle most roadside repairs.

- a. Motorcycle tool kit (original equipment)
- b. Impact driver
- c. Silver waterproof sealing tape (duct tape)
- d. Hose-clamps (3 sizes)
- e. Silicone sealer
- f. Lock 'N' Seal
- g. Flashlight
- h. Tire patch kit
- i. Tire irons
- j. Plastic pint bottle (for oil)
- k. Waterless hand cleaner
- l. Rags for clean up

Off-Road

A few simple tools and aids carried on the motorcycle can mean the difference between walking or riding back to camp or to where repairs can be made. See **Figure 3**.

A few essential spare parts carried in your truck or van can prevent a day or weekend of trail riding from being spoiled. See **Figure 4**.



On the Motorcycle

- a. Motorcycle tool kit (original equipment)
- b. Drive chain master link
- c. Tow line
- d. Spark plug
- e. Spark plug wrench
- f. Shifter lever
- g. Clutch/brake lever
- h. Silver waterproof sealing tape (duct tape)
- i. Loctite

In the Truck

- a. Control cables (throttle, clutch, brake)
- b. Silicone sealer
- c. Tire patch kit
- d. Tire irons
- e. Tire pump
- f. Impact driver
- g. Oil

WARNING

Tools and spares should be carried on the motorcycle — not in clothing where a simple fall could result in serious injury from a sharp tool.

TROUBLESHOOTING AND TUNE-UP EQUIPMENT

Voltmeter, Ohmmeter, and Ammeter

For testing the ignition or electrical system, a good voltmeter is required. For motorcycle use, an instrument covering 0-20 volts is satisfactory. One which also has a 0-2 volt scale is necessary for testing relays, points, or individual contacts where voltage drops are much smaller. Accuracy should be $\pm \frac{1}{2}$ volt.

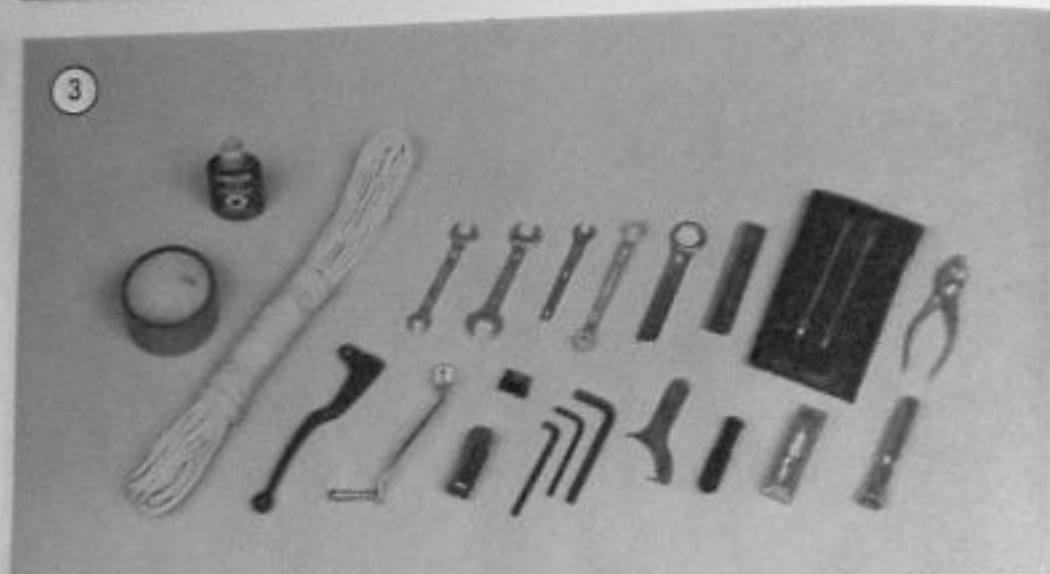
An ohmmeter measures electrical resistance. This instrument is useful for checking continuity (open and short circuits), and testing fuses and lights.

The ammeter measures electrical current. Ammeters for motorcycle use should cover 0-50 amperes and 0-250 amperes. These are useful for checking battery charging and starting current.

Several inexpensive vom's (volt-ohm-milli-ammeter) combine all three instruments into one which fits easily in any tool box. See **Figure 5**. However, the ammeter ranges are usually too small for motorcycle work.

Hydrometer

The hydrometer gives a useful indication of battery condition and charge by measuring the



specific gravity of the electrolyte in each cell. See Figure 6. Complete details on use and interpretation of readings are provided in the electrical chapter.

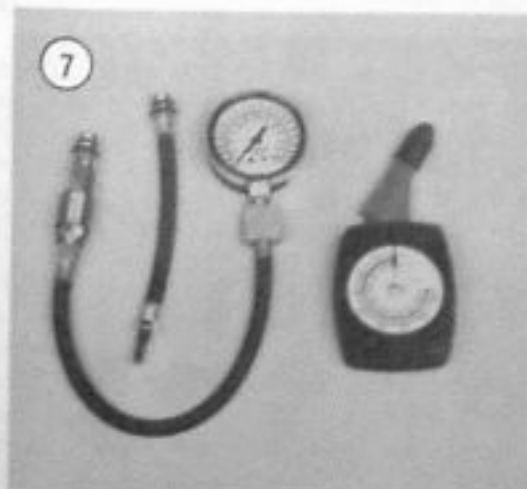
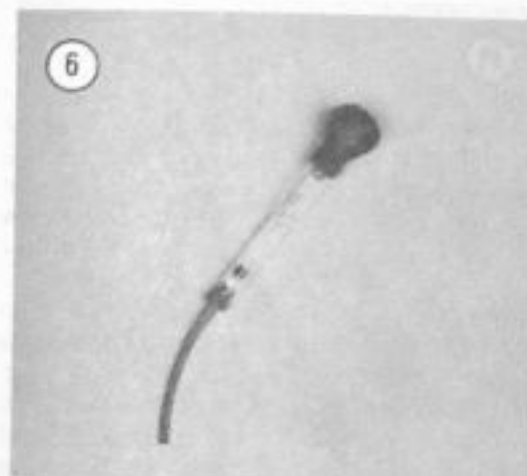
Compression Tester

The compression tester measures the compression pressure built up in each cylinder. The results, when properly interpreted, can indicate

general cylinder, ring, and valve condition. See Figure 7. Extension lines are available for hard-to-reach cylinders.

Dwell Meter (Contact Breaker Point Ignition Only)

A dwell meter measures the distance in degrees of cam rotation that the breaker points remain closed while the engine is running. Since



this angle is determined by breaker point gap, dwell angle is an accurate indication of breaker point gap.

Many tachometers intended for tuning and testing incorporate a dwell meter as well. See Figure 8. Follow the manufacturer's instructions to measure dwell.

Tachometer

A tachometer is necessary for tuning. See Figure 8. Ignition timing and carburetor adjustments must be performed at the specified idle speed. The best instrument for this purpose is one with a low range of 0-1,000 or 0-2,000 rpm for setting idle, and a high range of 0-4,000 or more for setting ignition timing at 3,000 rpm. Extended range (0-6,000 or 0-8,000 rpm) instruments lack accuracy at lower speeds. The instrument should be capable of detecting changes of 25 rpm on the low range.

NOTE: The motorcycle's tachometer is not accurate enough for correct idle adjustment.

Strobe Timing Light

This instrument is necessary for tuning, as it permits very accurate ignition timing. The light flashes at precisely the same instant that No. 1 cylinder fires, at which time the timing marks on the engine should align. Refer to Chapter Three for exact location of the timing marks for your engine.

Suitable lights range from inexpensive neon bulb types to powerful xenon strobe lights. See **Figure 9**. Neon timing lights are difficult to see and must be used in dimly lit areas. Xenon strobe timing lights can be used outside in bright sunlight.

Tune-up Kits

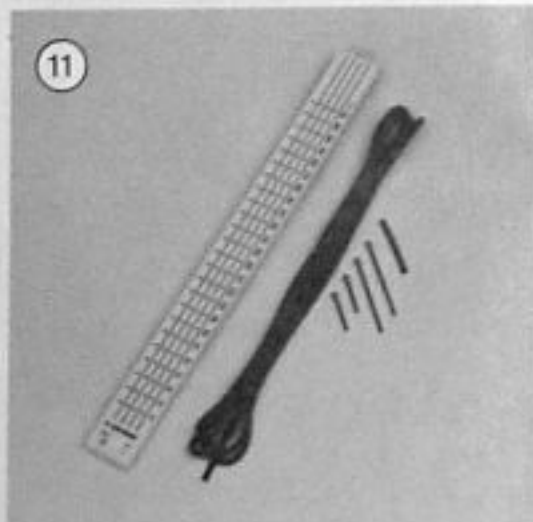
Many manufacturers offer kits that combine several useful instruments. Some come in a convenient carry case and are usually less expensive than purchasing one instrument at a time. **Figure 10** shows one of the kits that is available. The prices vary with the number of instruments included in the kit.

Manometer (Carburetor Synchronizer)

A manometer is essential for accurately synchronizing carburetors on multi-cylinder engines. The instrument detects intake pressure differences between carburetors and permits them to be adjusted equally. A suitable manometer costs about \$50 and comes with detailed instructions for use. See **Figure 11**.

Fire Extinguisher

A fire extinguisher is a necessity when working on a vehicle. It should be rated for both *Class B* (flammable liquids — gasoline, oil, paint, etc.) and *Class C* (electrical — wiring, etc.) type fires. It should always be kept within reach. See **Figure 12**.



CHAPTER TWO

TROUBLESHOOTING

Troubleshooting motorcycle problems is relatively simple. To be effective and efficient, however, it must be done in a logical step-by-step manner. If it is not, a great deal of time may be wasted, good parts may be replaced unnecessarily, and the true problem may never be uncovered.

Always begin by defining the symptoms as closely as possible. Then, analyze the symptoms carefully so that you can make an intelligent guess at the probable cause. Next, test the probable cause and attempt to verify it; if it's not at fault, analyze the symptoms once again, this time eliminating the first probable cause. Continue on in this manner, a step at a time, until the problem is solved.

At first, this approach may seem to be time consuming, but you will soon discover that it's not nearly so wasteful as a hit-or-miss method that may never solve the problem. And just as important, the methodical approach to troubleshooting ensures that only those parts that are defective will be replaced.

The troubleshooting procedures in this chapter analyze typical symptoms and show logical methods for isolating and correcting trouble. They are not, however, the only methods; there may be several approaches to a given problem, but all good troubleshooting methods have one thing in common — a logical, systematic approach.

ENGINE

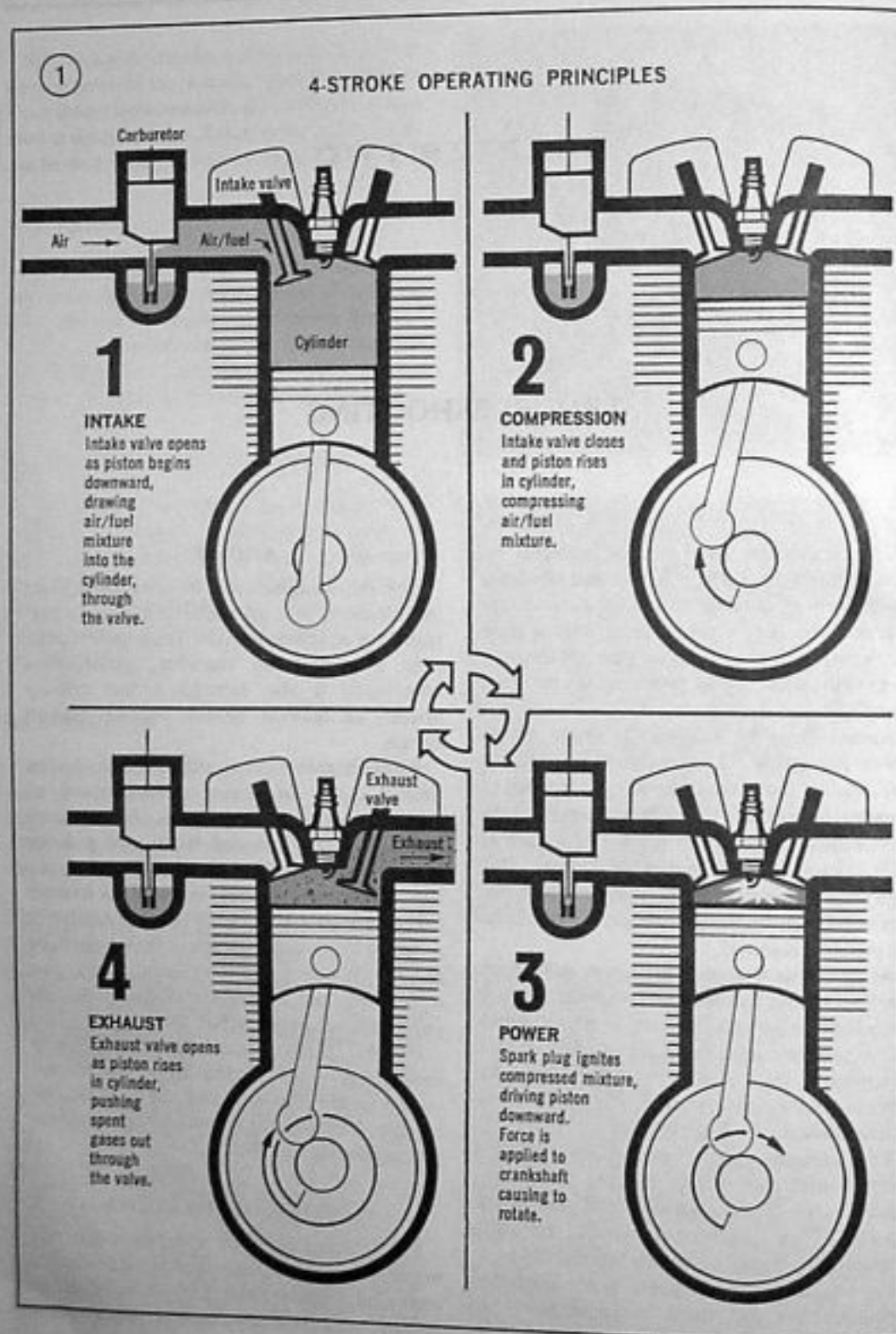
The entire engine must be considered when trouble arises that is experienced as poor performance or failure to start. The engine is more than a combustion chamber, piston, and crankshaft; it also includes a fuel delivery system, an ignition system, and an exhaust system.

Before beginning to troubleshoot any engine problems, it's important to understand an engine's operating requirements. First, it must have a correctly metered mixture of gasoline and air (**Figure 1**). Second, it must have an airtight combustion chamber in which the mixture can be compressed. And finally, it requires a precisely timed spark to ignite the compressed mixture. If one or more is missing, the engine won't run, and if just one is deficient, the engine will run poorly at best.

Of the three requirements, the precisely timed spark — provided by the ignition system — is most likely to be the culprit, with gas/air mixture (carburetion) second, and poor compression the least likely.

STARTING DIFFICULTIES

Hard starting is probably the most common motorcycle ailment, with a wide range of problems likely. Before delving into a reluctant or non-starter, first determine what has changed



since the motorcycle last started easily. For instance, was the weather dry then and is it wet now? Has the motorcycle been sitting in the garage for a long time? Has it been ridden many miles since it was last fueled?

Has starting become increasingly more difficult? This alone could indicate a number of things that may be wrong but is usually associated with normal wear of ignition and engine components.

While it's not always possible to diagnose trouble simply from a change of conditions, this information can be helpful and at some future time may uncover a recurring problem.

Fuel Delivery

Although it is the second most likely cause of trouble, fuel delivery should be checked first simply because it is the easiest.

First, check the tank to make sure there is fuel in it. Then, disconnect the fuel hose at the carburetor, open the valve and check for flow (Figure 2). If fuel does not flow freely make sure the tank vent is clear. Next, check for blockage in the line or valve. Remove the valve and clean it as described in the fuel system chapter.

If fuel flows from the hose, reconnect it and remove the float bowl from the carburetor, open the valve and check for flow through the float needle valve. If it does not flow freely when the float is extended and then shut off when the flow is gently raised, clean the carburetor as described in the fuel system chapter.

When fuel delivery is satisfactory, go on to the ignition system.

Ignition

Remove the spark plug from the cylinder and check its condition. The appearance of the plug is a good indication of what's happening in the combustion chamber; for instance, if the plug is wet with gas, it's likely that engine is flooded. Compare the spark plug to Figure 3. Make certain the spark plug heat range is correct. A "cold" plug makes starting difficult.

After checking the spark plug, reconnect it to the high-tension lead and lay it on the cylinder head so it makes good contact (Figure 4). Then,

with the ignition switched on, crank the engine several times and watch for a spark across the plug electrodes. A fat, blue spark should be visible. If there is no spark, or if the spark is weak, substitute a good plug for the old one and check again. If the spark has improved, the old plug is faulty. If there was no change, keep looking.

Make sure the ignition switch is not shorted to ground. Remove the spark plug cap from the end of the high-tension lead and hold the exposed end of the lead about $\frac{1}{4}$ inch from the cylinder head. Crank the engine and watch for a spark arcing from the lead to the head. If it's satisfactory, the connection between the lead and the cap was faulty. If the spark hasn't improved, check the coil wire connections.

If the spark is still weak, remove the ignition cover and remove any dirt or moisture from the points or sensor. Check the point or air gap against the specifications in the *Quick Reference Data* at the beginning of the book.

If spark is still not satisfactory, a more serious problem exists than can be corrected with simple adjustments. Refer to the electrical system chapter for detailed information for correcting major ignition problems.

Compression

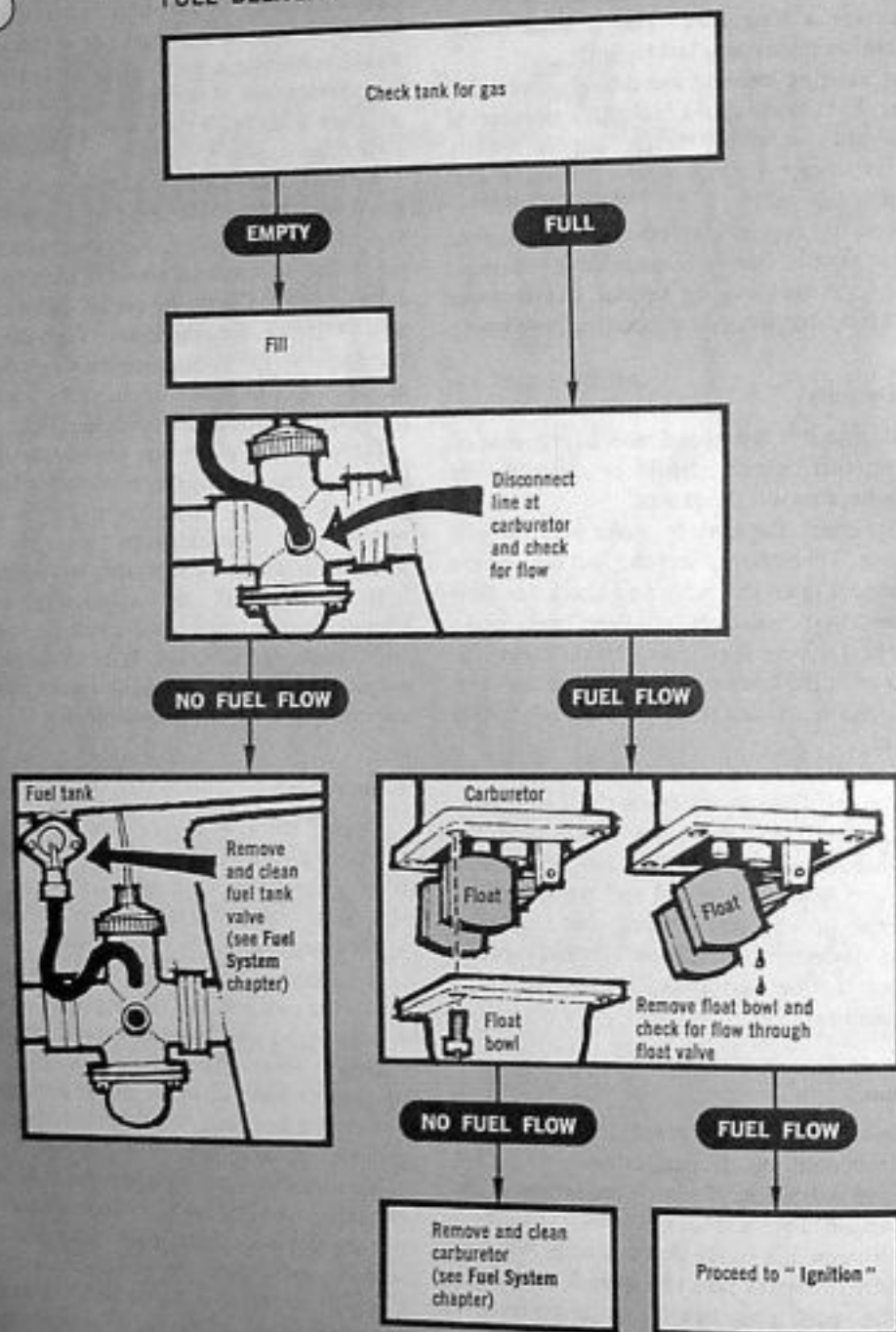
Compression — or the lack of it — is the least likely cause of starting trouble. However, if compression is unsatisfactory, more than a simple adjustment is required to correct it (see the engine chapter).

An accurate compression check reveals a lot about the condition of the engine. To perform this test you need a compression gauge (see Chapter One). The engine should be at operating temperature for a fully accurate test, but even a cold test will reveal if the starting problem is compression.

Remove the spark plug and screw in a compression gauge (Figure 5). With assistance, hold the throttle wide open and crank the engine several times, until the gauge ceases to rise. Normal compression should be 130-160 psi, but a reading as low as 100 psi is usually sufficient for the engine to start. If the reading is much lower than normal, remove the gauge and pour about a tablespoon of oil into the cylinder.

2

FUEL DELIVERY



NOTE: If fuel flow is adequate and spark is present (see Ignition which follows), increase fuel ratio with idle screw.

3

NORMAL

- Appearance—Firing tip has deposits of light gray to light tan.
- Can be cleaned, regapped and reused.

CARBON FOULED

- Appearance—Dull, dry black with fluffy carbon deposits on the insulator tip, electrode and exposed shell.
- Caused by—Fuel/air mixture too rich, plug heat range too cold, weak ignition system, dirty air cleaner, faulty automatic choke or excessive idling.
- Can be cleaned, regapped and reused.

OIL FOULED

- Appearance—Wet black deposits on insulator and exposed shell.
- Caused by—Excessive oil entering the combustion chamber through worn rings, pistons, valve guides or bearings.
- Replace with new plugs (use a hotter plug if engine is not repaired).

LEAD FOULED

- Appearance—Yellow insulator deposits (may sometimes be dark gray, black or tan in color) on the insulator tip.
- Caused by—Highly leaded gasoline.
- Replace with new plugs.

LEAD FOULED

- Appearance—Yellow glazed deposits indicating melted lead deposits due to hard acceleration.
- Caused by—Highly leaded gasoline.
- Replace with new plugs.



OIL AND LEAD FOULED

- Appearance—Glazed yellow deposits with a slight brownish tint on the insulator tip and ground electrode.
- Replace with new plugs.

FUEL ADDITIVE RESIDUE

- Appearance—Brown colored hardened ash deposits on the insulator tip and ground electrode.
- Caused by—Fuel and/or oil additives.
- Replace with new plugs.

WORN

- Appearance—Severely worn or eroded electrodes.
- Caused by—Normal wear or unusual oil and/or fuel additives.
- Replace with new plugs.

PREIGNITION

- Appearance—Melted ground electrode.
- Caused by—Overadvanced ignition timing, insensitive ignition advance mechanism, too low of a fuel octane rating, lean fuel/air mixture or carbon deposits in combustion chamber.

PREIGNITION

- Appearance—Melted center electrode.
- Caused by—Abnormal combustion due to overadvanced ignition timing or incorrect advance, too low of a fuel octane rating, lean fuel/air mixture, or carbon deposits in combustion chamber.
- Correct engine problem and replace with new plugs.

INCORRECT HEAT RANGE

- Appearance—Melted center electrode and white blistered insulator tip.
- Caused by—Incorrect plug heat range selection.
- Replace with new plugs.

4

IGNITION:

Turn switches on. Remove spark plug and check for spark outside cylinder

SPARK

NO SPARK

Check with good plug

SPARK

NO SPARK

Check high tension lead

SPARK

NO SPARK

Check coil connections

SPARK

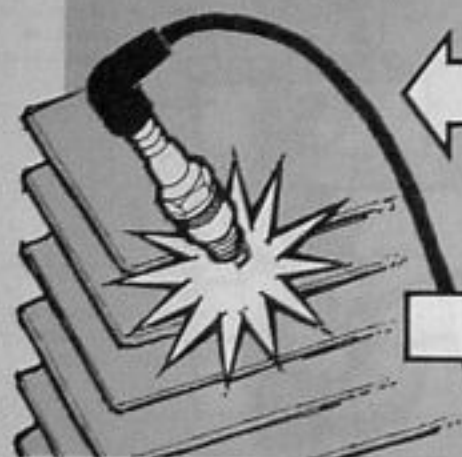
NO SPARK

Check point or air gap

SPARK

NO SPARK

Refer to electrical chapter for correction



5

COMPRESSION:

Check head bolt torque

Check compression (dry test)

OK

Low

Check compression (wet test)

Refer to engine chapter for correction

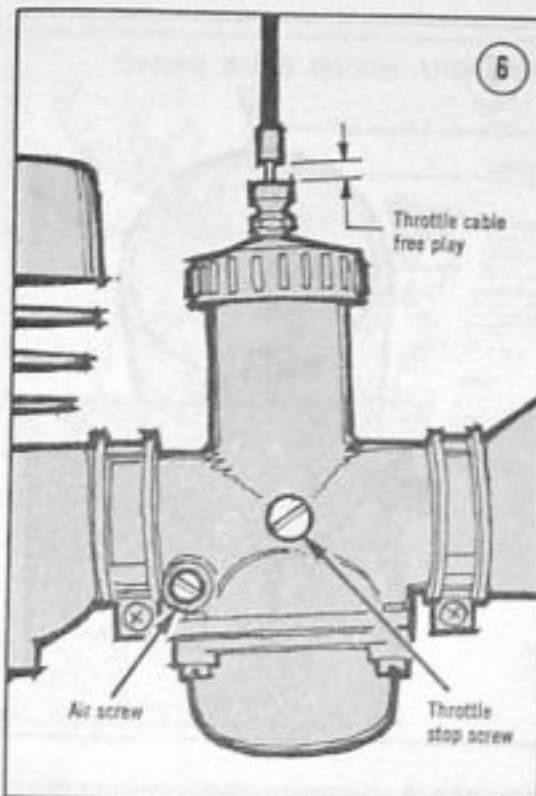


6

Throttle cable free play

Air screw

Throttle stop screw



Crank the engine several times to distribute the oil and test the compression once again. If it is now significantly higher, the rings and bore are worn. If the compression did not change, the valves are not seating correctly. Adjust the valves and check again. If the compression is still low, refer to the engine chapter.

NOTE: Low compression indicates a developing problem. The condition causing it should be corrected as soon as possible.

POOR PERFORMANCE

Poor engine performance can be caused by any of a number of things related to carburetion, ignition, and the condition of the sliding and rotating components in the engine. In addition, components such as brakes, clutch, and transmission can cause problems that seem to be related to engine performance, even when the engine is in top running condition.

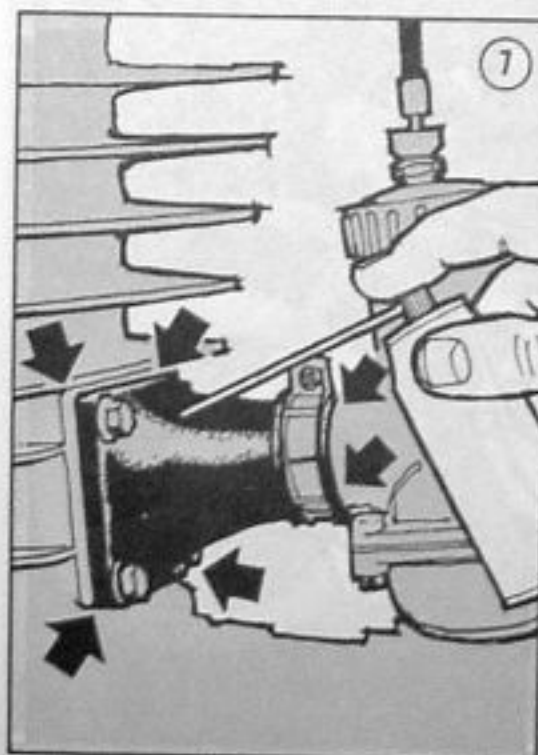
Poor Idling

Idling that is erratic, too high, or too low is most often caused by incorrect adjustment of the carburetor idle circuit. Also, a dirty air filter or an obstructed fuel tank vent can affect idle speed. Incorrect ignition timing or worn or faulty ignition components are also good possibilities.

First, make sure the air filter is clean and correctly installed. Then, adjust the throttle cable free play, the throttle stop screw, and the idle mixture air screw (Figure 6) as described in the routine maintenance chapter.

If idling is still poor, check the carburetor and manifold mounts for leaks; with the engine warmed up and running, spray WD-40 or a similar light lube around the flanges and joints of the carburetor and manifold (Figure 7). Listen for changes in engine speed. If a leak is present, the idle speed will drop as the lube "plugs" the leak and then pick up again as it is drawn into the engine. Tighten the nuts and clamps and test again. If a leak persists, check for a damaged gasket or a pinhole in the manifold. Minor leaks in manifold hoses can be repaired with silicone sealer, but if cracks or holes are extensive, the manifold should be replaced.

7



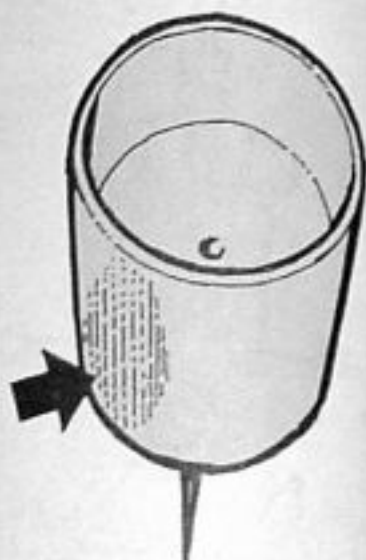
A worn throttle slide may cause erratic running and idling, but this is likely only after many thousands of miles of use. To check, remove the carburetor top and feel for back and forth movement of the slide in the bore; it should be barely perceptible. Inspect the slide for large worn areas and replace it if it is less than perfect (Figure 8).

If the fuel system is satisfactory, check ignition timing and breaker point gap (air gap in electronic ignition). Check the condition of the system components as well. Ignition-caused idling problems such as erratic running can be the fault of marginal components. See the electrical system chapter for appropriate tests.

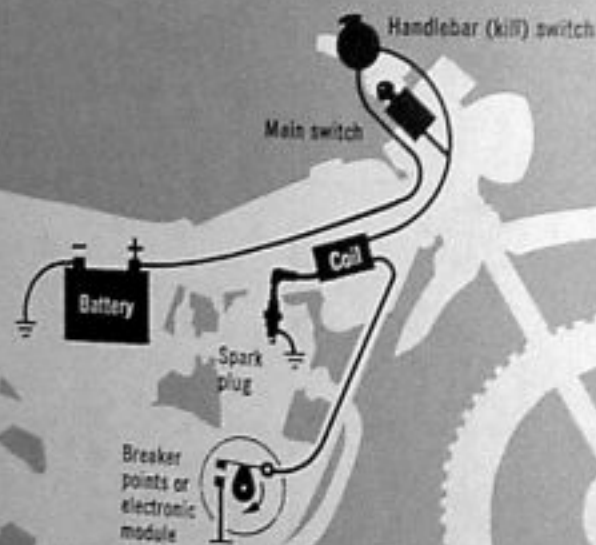
Rough Running or Misfiring

Misfiring (see Figure 9) is usually caused by an ignition problem. First, check all ignition connections (Figure 10). They should be clean, dry, and tight. Don't forget the kill switch; a loose connection can create an intermittent short.

8



10



ENGINE RUNS ROUGH AND MISFIRES



ENGINE MISSES—ALL SPEEDS

9

- + Check ignition wire connections.
- + Inspect the insulation on the spark plug high-tension lead for cracking and deterioration.
- + Inspect the spark plug for correct heat range and condition.
- + Check the point gap and the spring tension on the contact breaker or check electronic module on models with electronic ignition.

ENGINE MISSES AT LOW SPEED

- + Check ignition system (above).
- + Clean carburetor—pay particular attention to low-speed jet and circuit.

ENGINE MISSES AT MID-RANGE

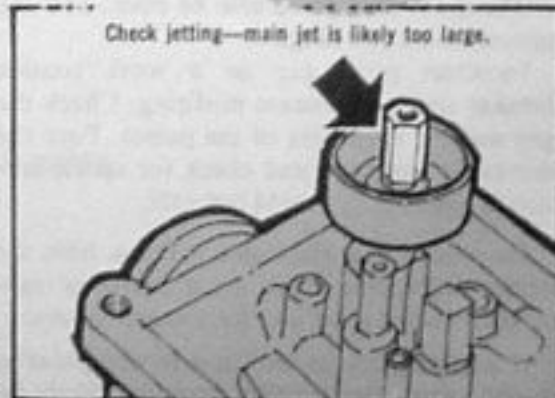
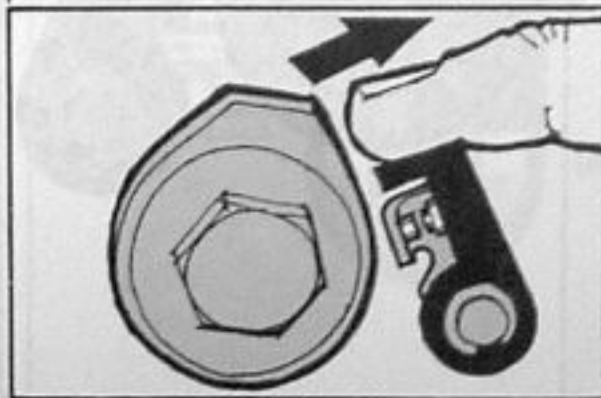
- + Check ignition system (above).
- + Clean carburetor.
- + Check position and condition of slide needle.

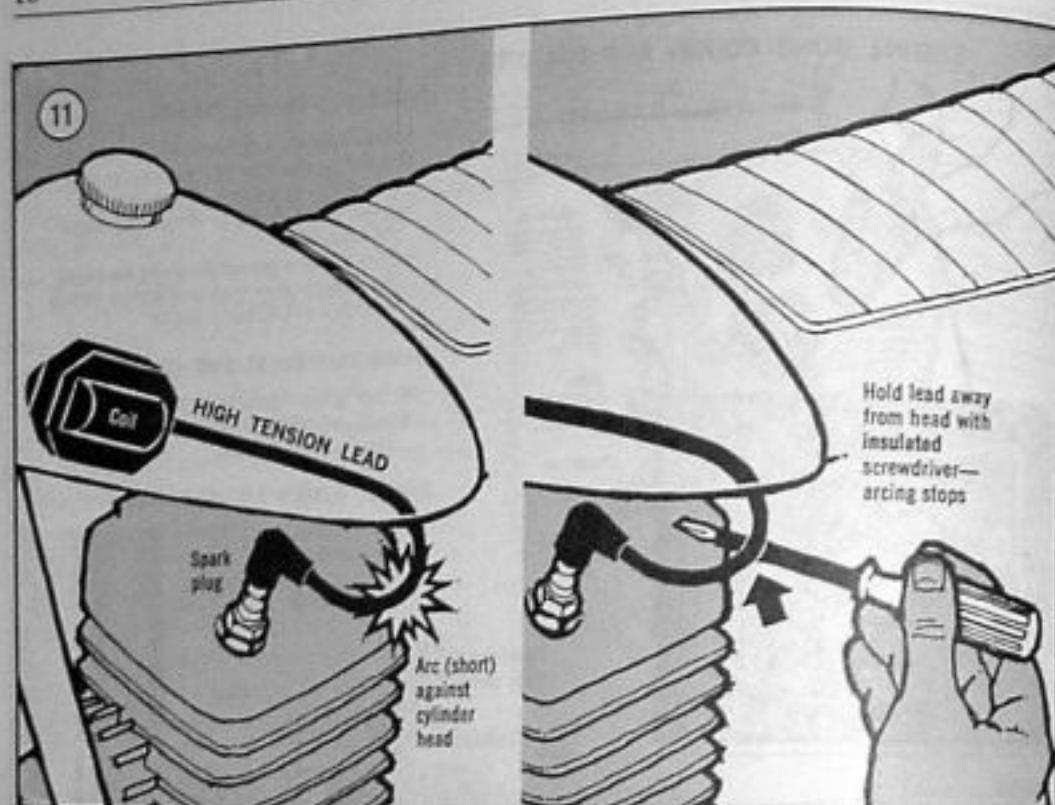


ENGINE MISSES AT HIGH SPEED

- Check ignition system (above).
- Clean carburetor.

- Check jetting—main jet is likely too large.





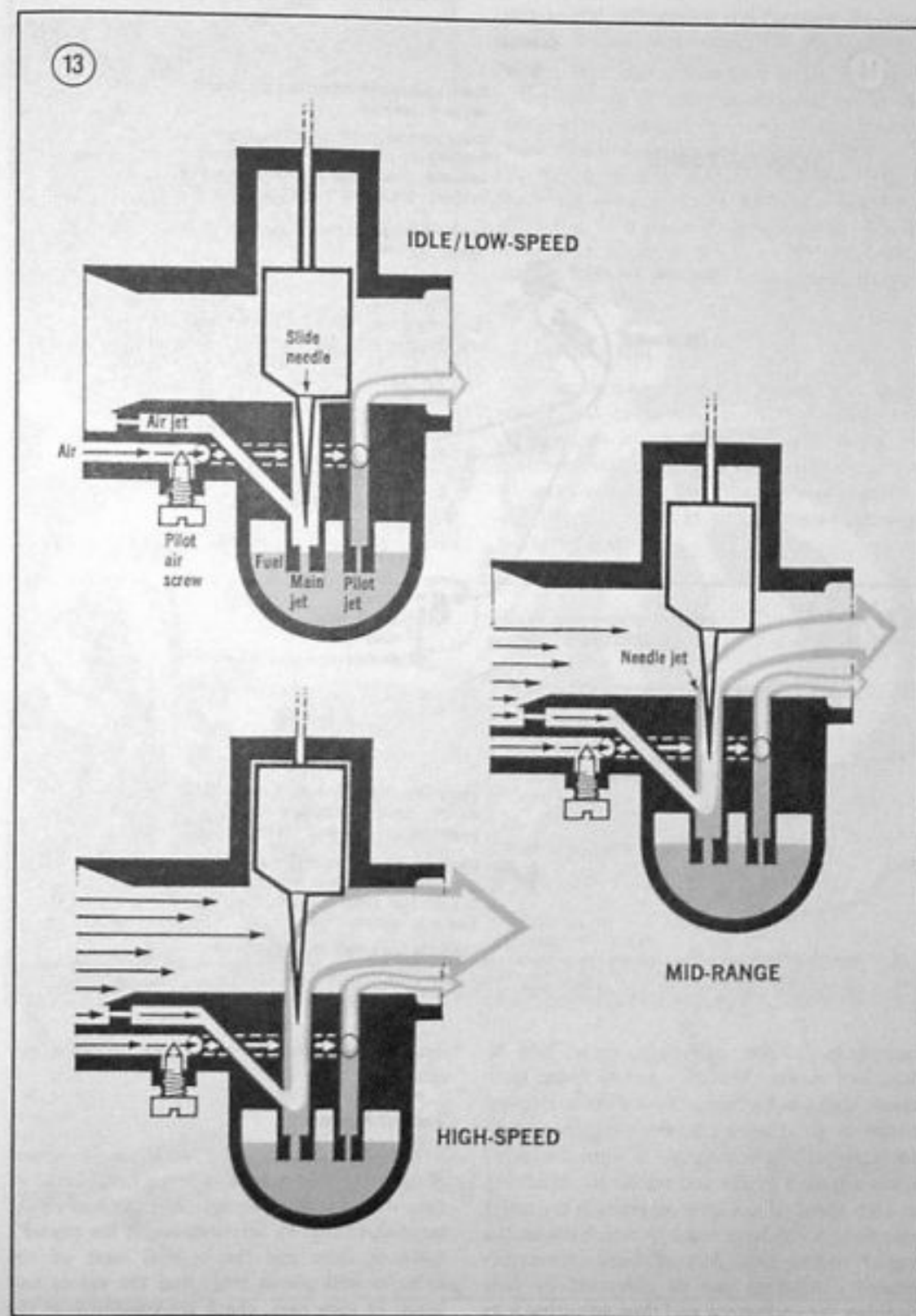
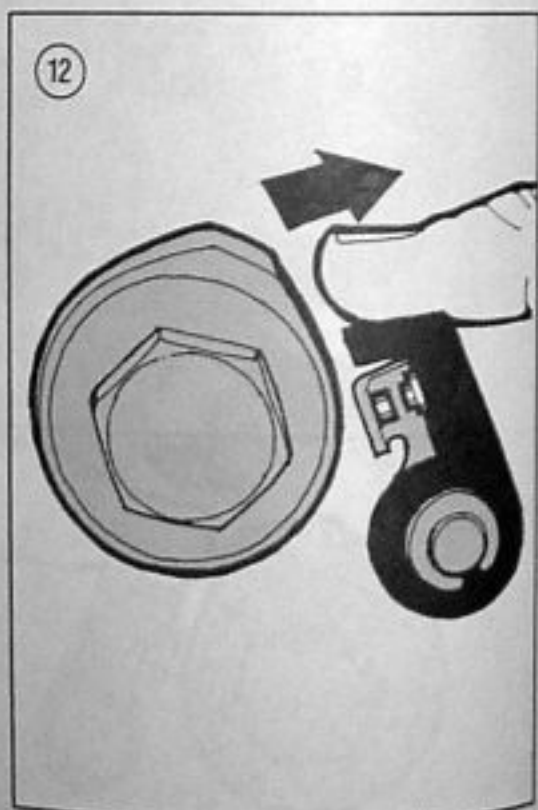
Check the insulation on the high-tension spark plug lead. If it is cracked or deteriorated it will allow the spark to short to ground when the engine is revved. This is easily seen at night. If arcing occurs, hold the affected area of the wire away from the metal to which it is arcing, using an insulated screwdriver (Figure 11), and see if the misfiring ceases. If it does, replace the high-tension lead. Also check the connection of the spark plug cap to the lead. If it is poor, the spark will break down at this point when the engine speed is increased.

The spark plug could also be poor. Test the system with a new plug.

Incorrect point gap or a weak contact breaker spring can cause misfiring. Check the gap and the alignment of the points. Push the moveable arm back and check for spring tension (Figure 12). It should feel stiff.

On models with electronic ignition, have the electronic module tested by a dealer or substitute a known good unit for a suspected one.

If misfiring occurs only at a certain point in engine speed, the problem may very likely be



14

LOSS OF POWER

Gradual

Check ignition and carburetion and tune engine if necessary.

Check compression. If compression rises following wet test, ring and cylinder wear is indicated. If compression remains low during wet test, valve and seat wear are indicated.

Check brake adjustment and condition; they may be dragging.

Check wheel bearings for dirt, dryness, and wear that may create drag.

Handlebar (kill) switch

Main switch

Coil

Battery

Breaker points or electronic module

Sudden

Check compression (above). If power loss is sudden, damage to rings, piston, and bore or valves and seats are more likely than wear.

Check the ignition system for a failed component, poor contact, or change in timing or point gap. Check electronic module on electronic ignition.

Check the fuel system for an obstruction.

carburetion. Poor performance at idle is described earlier. Misfiring at low speed (just above idle) can be caused by a dirty low-speed circuit or jet (Figure 13). Poor midrange performance is attributable to a worn or incorrectly adjusted needle and needle jet. Misfiring at high speed (if not ignition related) is usually caused by a too-large main jet which causes the engine to run rich. Any of these carburetor-related conditions can be corrected by first cleaning the carburetor and then adjusting it as

described in the tune-up and maintenance chapter.

Loss of Power

First determine how the power loss developed (Figure 14). Did it decline over a long period of time or did it drop abruptly? A gradual loss is normal, caused by deterioration of the engine's state of tune and the normal wear of the cylinder and piston rings and the valves and seats. In such case, check the condition of the

15



ignition and carburetion and measure the compression as described earlier.

A sudden power loss may be caused by a failed ignition component, obstruction in the fuel system, damaged valve or seat, or a broken piston ring or damaged piston (Figure 15).

If the engine is in good shape and tune, check the brake adjustment. If the brakes are dragging, they will consume considerable power. Also check the wheel bearings. If they are dry, extremely dirty, or badly worn they can create considerable drag.

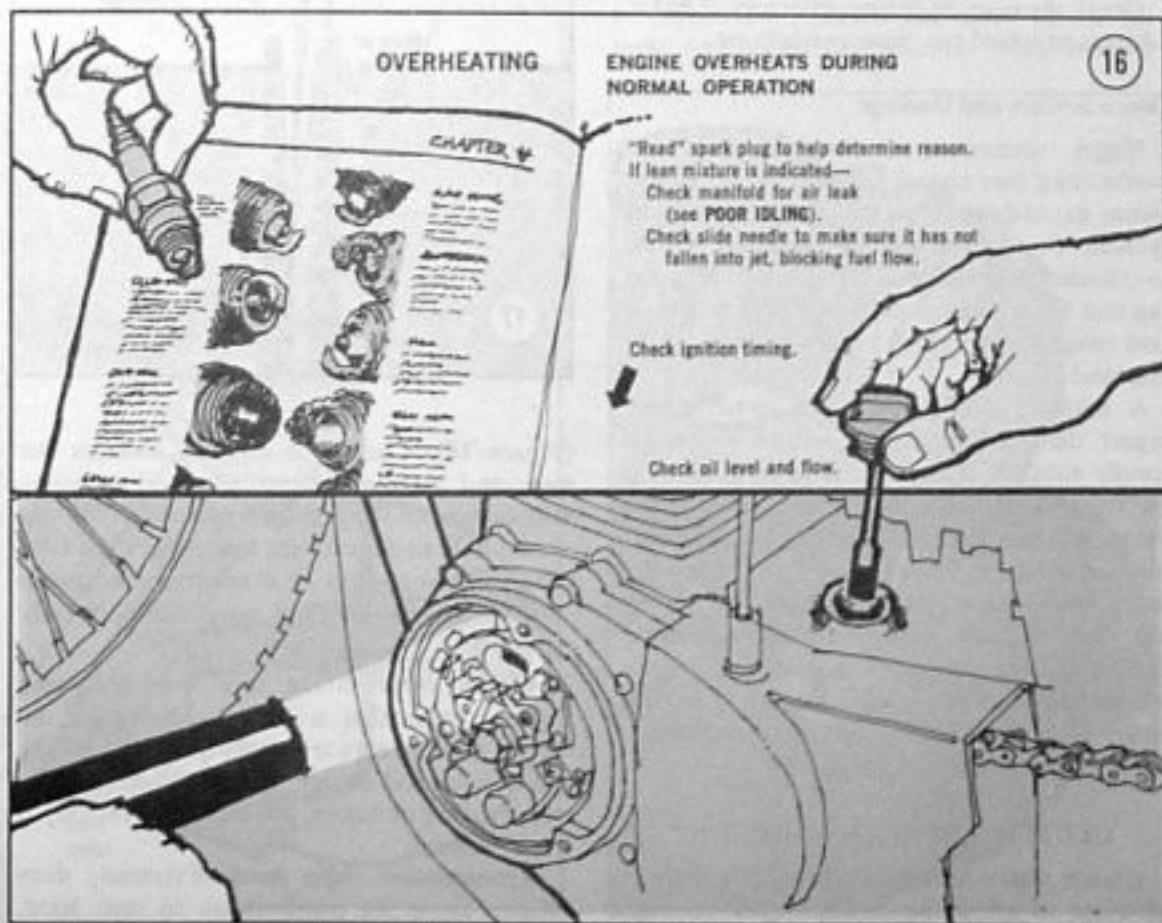
Engine Runs Hot

A modern motorcycle engine, in good mechanical condition, correctly tuned, and operated as it was intended, will rarely experience overheating problems. However, out-of-spec conditions can create severe overheating that may result in serious engine damage. Refer to Figure 16.

OVERHEATING

ENGINE OVERHEATS DURING NORMAL OPERATION

16



Overheating is difficult to detect unless it is extreme, in which case it will usually be apparent as excessive heat radiating from the engine, accompanied by the smell of hot oil and sharp, snapping noises when the engine is first shut off and begins to cool.

Unless the motorcycle is operated under sustained high load or is allowed to idle for long periods of time, overheating is usually the result of an internal problem. Most often it's caused by a too-lean fuel mixture.

Remove the spark plug and compare it to **Figure 3**. If a too-lean condition is indicated, check for leaks in the intake manifold (see *Poor Idling*). The carburetor jetting may be incorrect but this is unlikely if the overheating problem has just developed (unless, of course, the engine was jetted for high altitude and is now being run near sea level). Check the slide needle in the carburetor to make sure it hasn't come loose and is restricting the flow of gas through the main jet and needle jet (**Figure 17**).

Check the ignition timing; extremes of either advance or retard can cause overheating.

Piston Seizure and Damage

Piston seizure is a common result of overheating (see above) because an aluminum piston expands at a greater rate than a steel cylinder. Seizure can also be caused by piston-to-cylinder clearance that is too small; ring end gap that is too small; insufficient oil; spark plug heat range too hot; and broken piston ring or ring land.

A major piston seizure can cause severe engine damage. A minor seizure — which usually subsides after the engine has cooled a few minutes — rarely does more than scuff the piston skirt the first time it occurs. Fortunately, this condition can be corrected by dressing the piston with crocus cloth, refitting the piston and rings to the bore with recommended clearances, and checking the timing to ensure overheating does not occur. Regard that first seizure as a warning and correct the problem before continuing to run the engine.

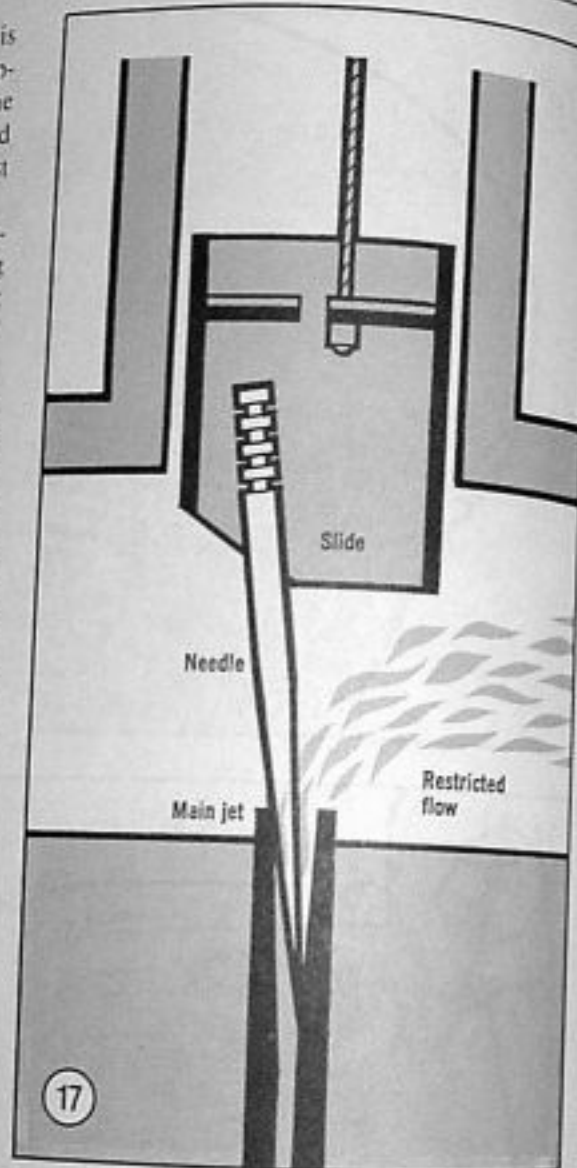
CLUTCH AND TRANSMISSION

1. *Clutch slips*—Make sure lever free play is sufficient to allow the clutch to fully engage

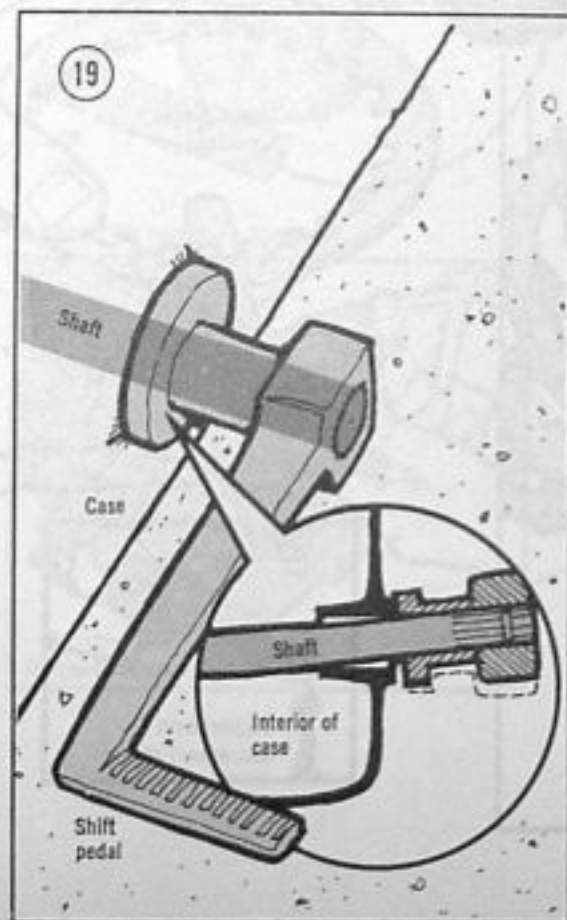
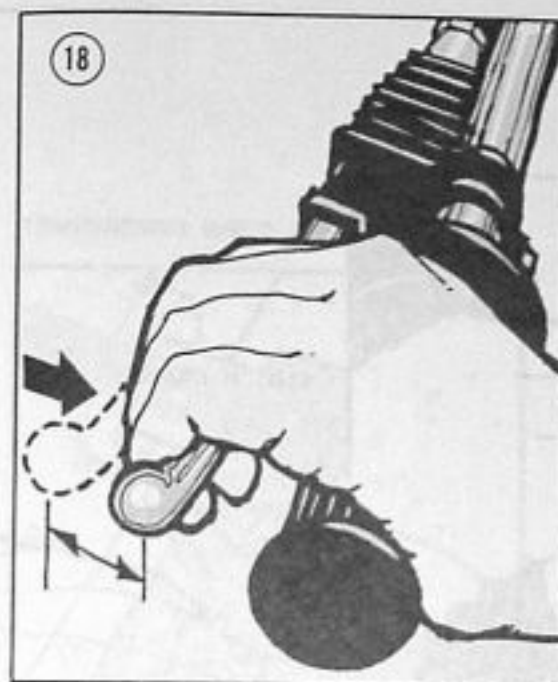
(**Figure 18**). Check the contact surfaces for wear and glazing. Transmission oil additives also can cause slippage in wet clutches. If slip occurs only under extreme load, check the condition of the springs or diaphragm and make sure the clutch bolts are snug and uniformly tightened.

2. *Clutch drags*—Make sure lever free play isn't so great that it fails to disengage the clutch. Check for warped plates or disc. If the transmission oil (in wet clutch systems) is extremely dirty or heavy, it may inhibit the clutch from releasing.

3. *Transmission shifts hard*—Extremely dirty oil can cause the transmission to shift hard.



TROUBLESHOOTING



Check the selector shaft for bending (**Figure 19**). Inspect the shifter and gears for wear and damage.

4. *Transmission slips out of gear*—This can be caused by worn engagement dogs or a worn or damaged shifter (**Figure 20**). The overshift travel on the selector may be misadjusted.

5. *Transmission is noisy*—Noises usually indicate the absence of lubrication or wear and damage to gears, bearings, or shims. It's a good idea to disassemble the transmission and carefully inspect it when noise first occurs.

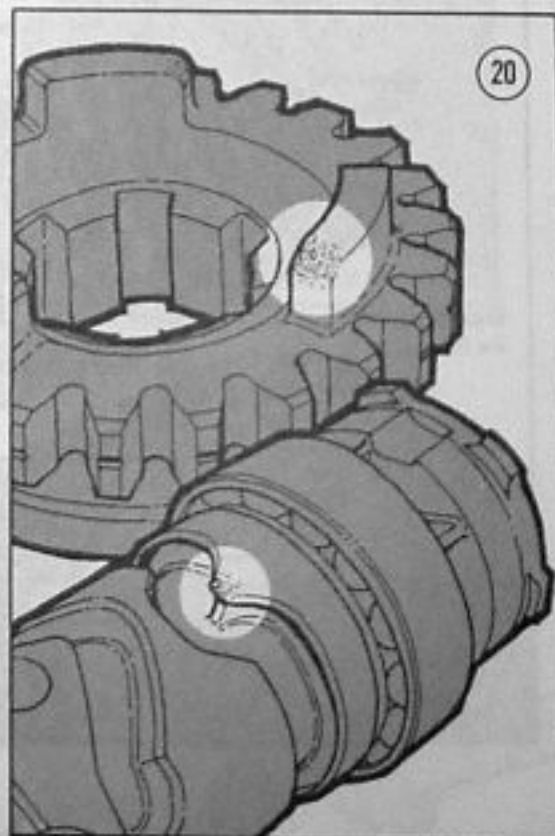
DRIVE TRAIN

Drive train problems (outlined in **Figure 21**) arise from normal wear and incorrect maintenance.

CHASSIS

Chassis problems are outlined in **Figure 22**.

1. *Motorcycle pulls to one side*—Check for loose suspension components, axles, steering



21

DRIVE SYSTEM

CLUTCH SLIPS

Adjust free play →

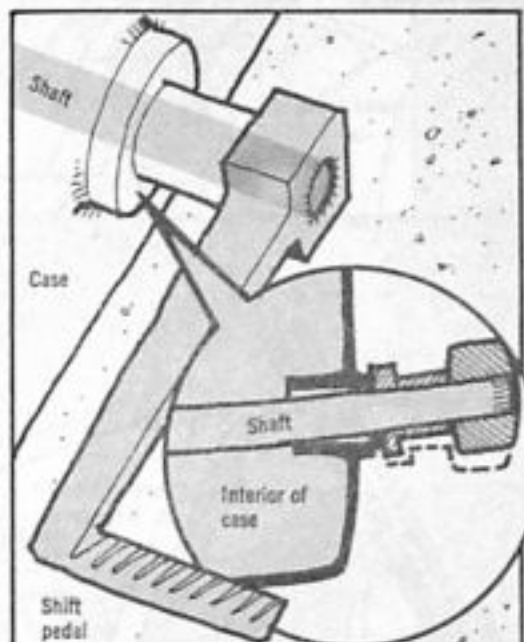
Inspect plates
for wear and
glazingInspect springs
for tension

CLUTCH DRAGS

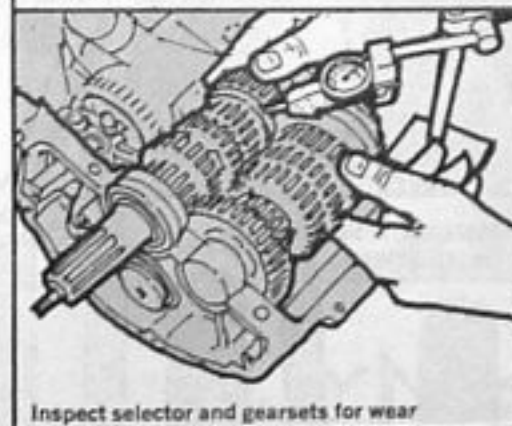
Adjust free play ←

Check plates
for warpageReplace oil if
extremely dirty

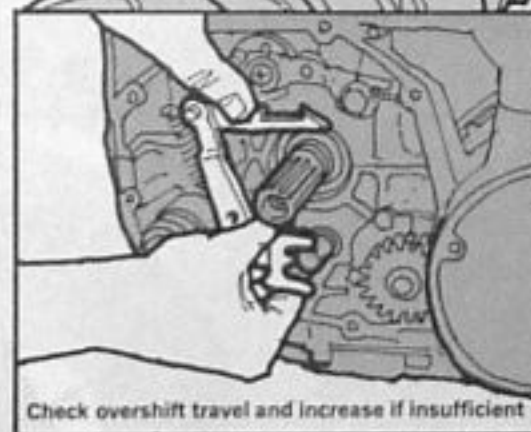
TRANSMISSION SHIFTS HARD



Check for bent selector shaft



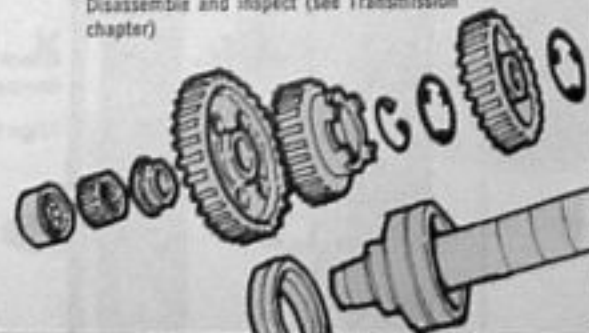
TRANSMISSION SLIPS OUT OF GEAR

Inspect
for worn dogs
and damaged
shifter.

TRANSMISSION IS NOISY

Check oil level

Disassemble and inspect (see Transmission chapter)

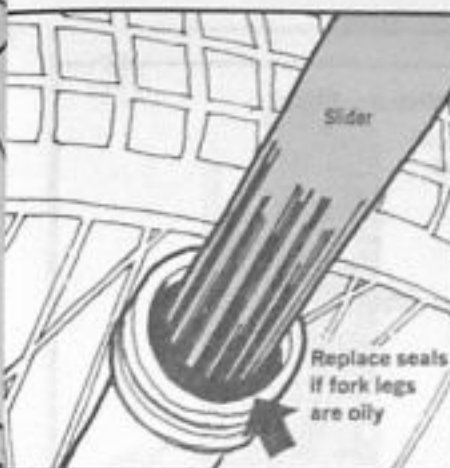
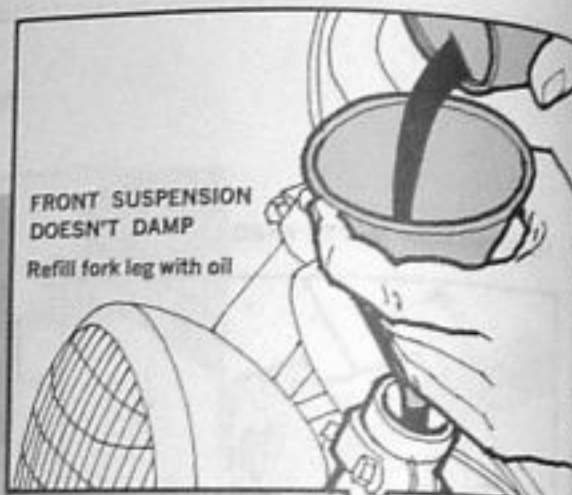


22

SUSPENSION AND HANDLING

FRONT SUSPENSION
DOESN'T DAMP

Refill fork leg with oil



SUSPENSION AND HANDLING CONTINUED

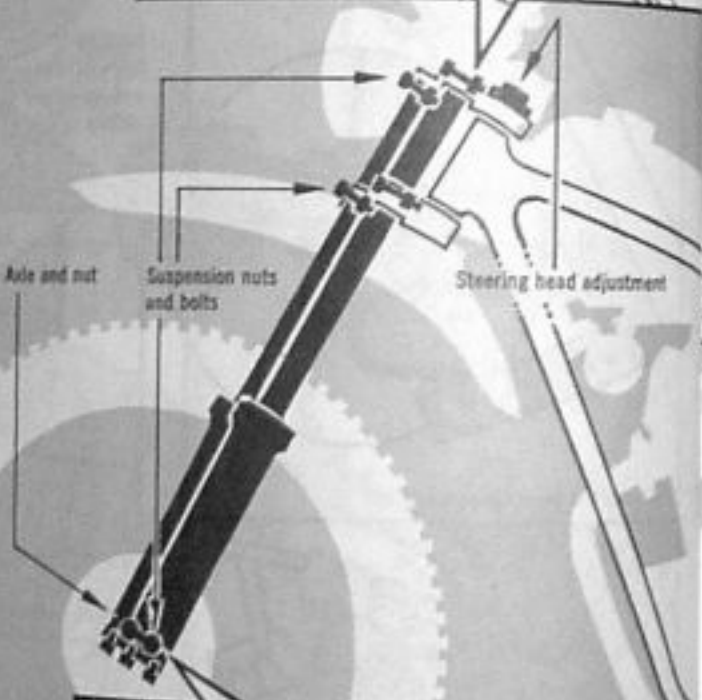
MOTORCYCLE PULLS
TO ONE SIDE

Check:

Axle and nut

Suspension nuts
and bolts

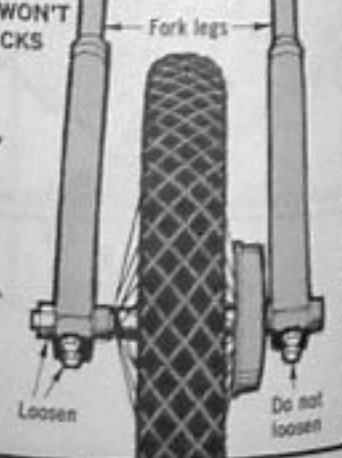
Steering head adjustment



FRONT SUSPENSION WON'T
COMPRESS OR IT STICKS

Check for dented or
damaged slider

Align fork sliders



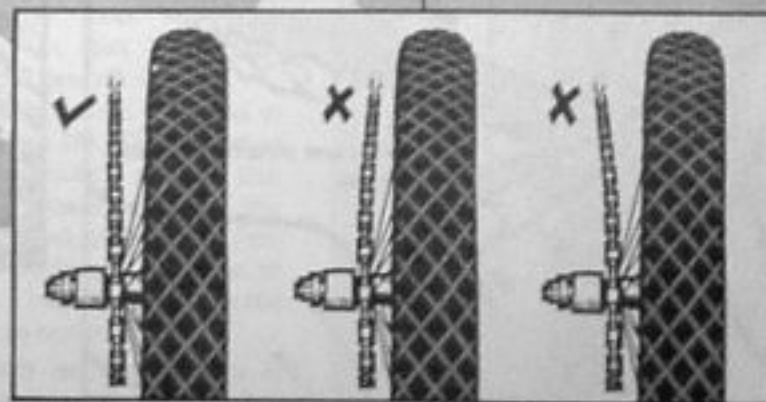
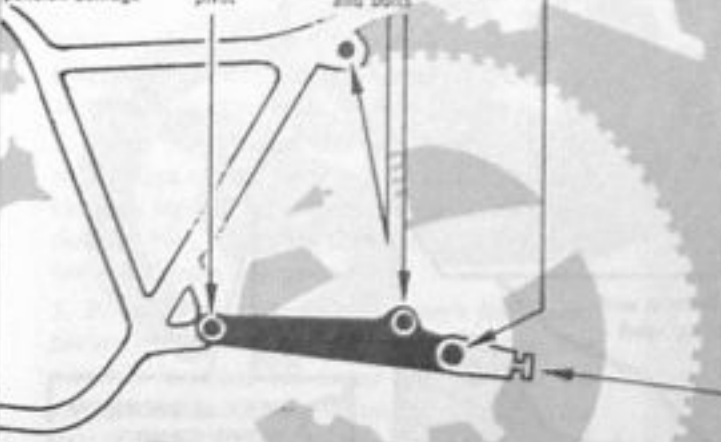
Frame and
suspension damage

Swing arm
pivot

Suspension nuts
and bolts

Axle and nut

Wheel alignment



SUSPENSION AND HANDLING CONTINUED

STEERING IS TIGHT
OR NOTCHY

Inspect, lubricate, and
adjust steering head

REAR SUSPENSION STICKS

Replace shock
with bent rod

Impact

STEERING IS SLOPPY

Inspect, lubricate, and
adjust steering head

Swing arm

Check swing arm pivot for condition
and tightness

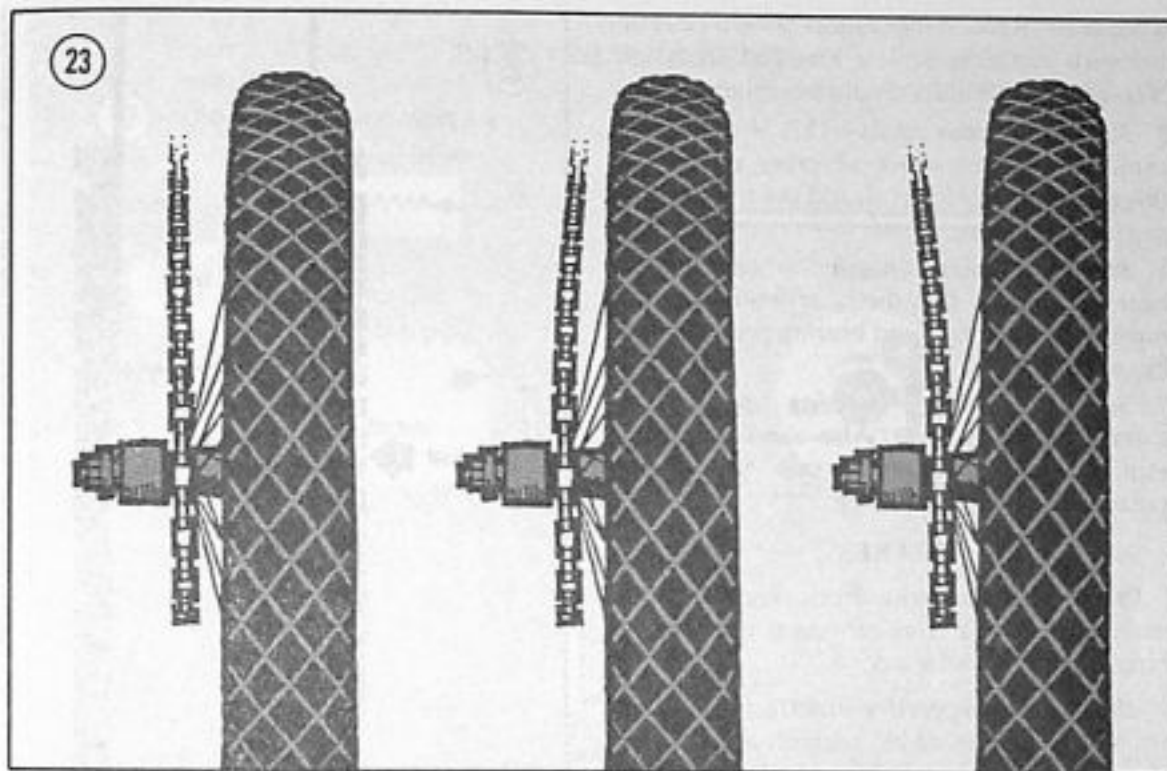
REAR SUSPENSION
WON'T DAMP

Check for oil

Rebuild or replace
rear shocks

TROUBLESHOOTING

23



head, swing arm pivot. Check wheel alignment (Figure 23). Check for damage to the frame and suspension components.

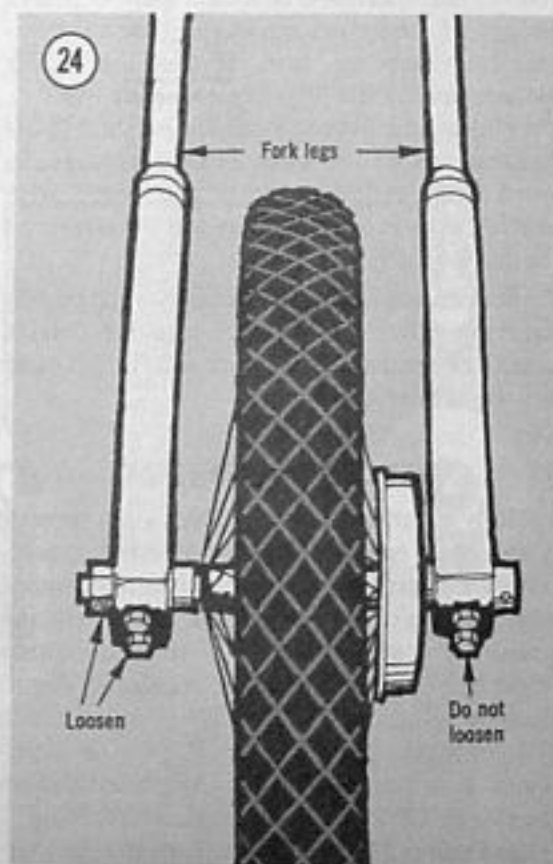
2. *Front suspension doesn't damp*—This is most often caused by a lack of damping oil in the fork legs. If the upper fork tubes are exceptionally oily, it's likely that the seals are worn out and should be replaced.

3. *Front suspension sticks or won't fully compress*—Misalignment of the forks when the wheel is installed can cause this. Loosen the axle nut and the pinch bolt on the nut end of the axle (Figure 24). Lock the front wheel with the brake and compress the front suspension several times to align the fork legs. Then, tighten the pinch bolt and then the axle nut.

The trouble may also be caused by a bent or dented fork slider (Figure 25). The distortion required to lock up a fork tube is so slight that it is often impossible to visually detect. If this type of damage is suspected, remove the fork leg and remove the spring from it. Attempt to operate the fork leg. If it still binds, replace the slider; it's not practical to repair it.

4. *Rear suspension does not damp*—This is usually caused by damping oil leaking past

24



worn seals. Rebuildable shocks should be refitted with complete service kits and fresh oil. Non-rebuildable units should be replaced.

5. **Rear suspension sticks**—This is commonly caused by a bent shock absorber piston rod (Figure 26). Replace the shock; the rod can't be satisfactorily straightened.

6. **Steering is tight or "notchy"**—Steering head bearings may be dry, dirty, or worn. Adjustment of the steering head bearing pre-load may be too tight.

7. **Steering is sloppy**—Steering head adjustment may be too loose. Also check the swing arm pivot; looseness or extreme wear at this point translate to the steering.

BRAKES

Brake problems arise from wear, lack of maintenance, and from sustained or repeated exposure to dirt and water.

1. **Brakes are ineffective**—Ineffective brakes are most likely caused by incorrect adjustment. If adjustment will not correct the problem, remove the wheels and check for worn or glazed linings. If the linings are worn beyond the service limit, replace them. If they are simply glazed, rough them up with light sandpaper.

In hydraulic brake systems, low fluid levels can cause a loss of braking effectiveness, as can worn brake cylinder pistons and bores. Also check the pads to see if they are worn beyond the service limit.

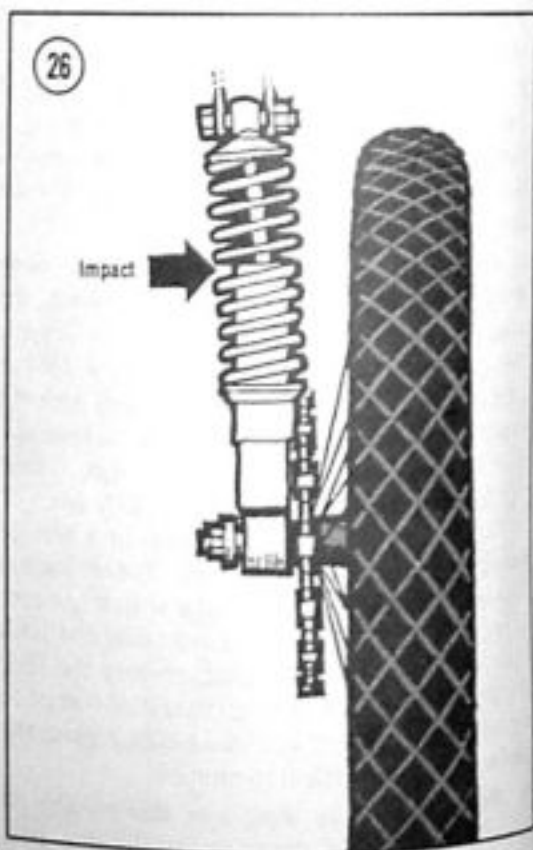
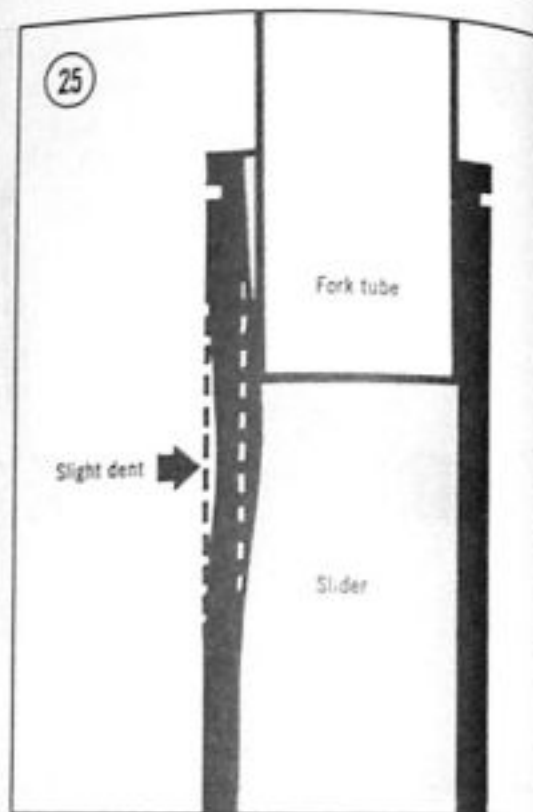
2. **Brakes lock or drag**—This may be caused by incorrect adjustment. Check also for foreign matter embedded in the lining and for dirty and dry wheel bearings.

ELECTRICAL SYSTEM

Many electrical system problems can be easily solved by ensuring that the affected connections are clean, dry, and tight. In battery equipped motorcycles, a neglected battery is the source of a great number of difficulties that could be prevented by simple, regular service to the battery.

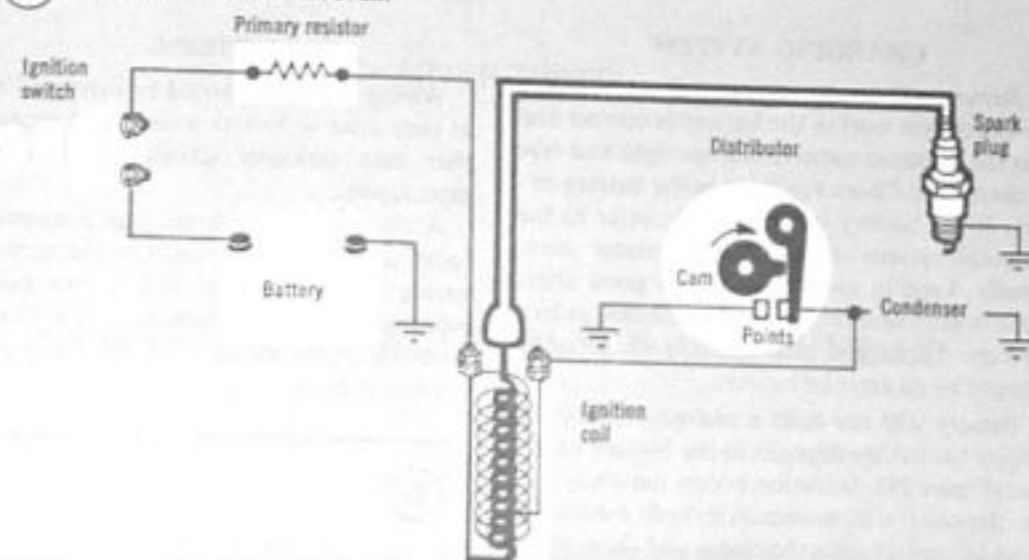
A multimeter, like the volt/ohm/milliammeter described in Chapter One, is invaluable for efficient electrical system troubleshooting.

See Figures 27 and 28 for schematics showing

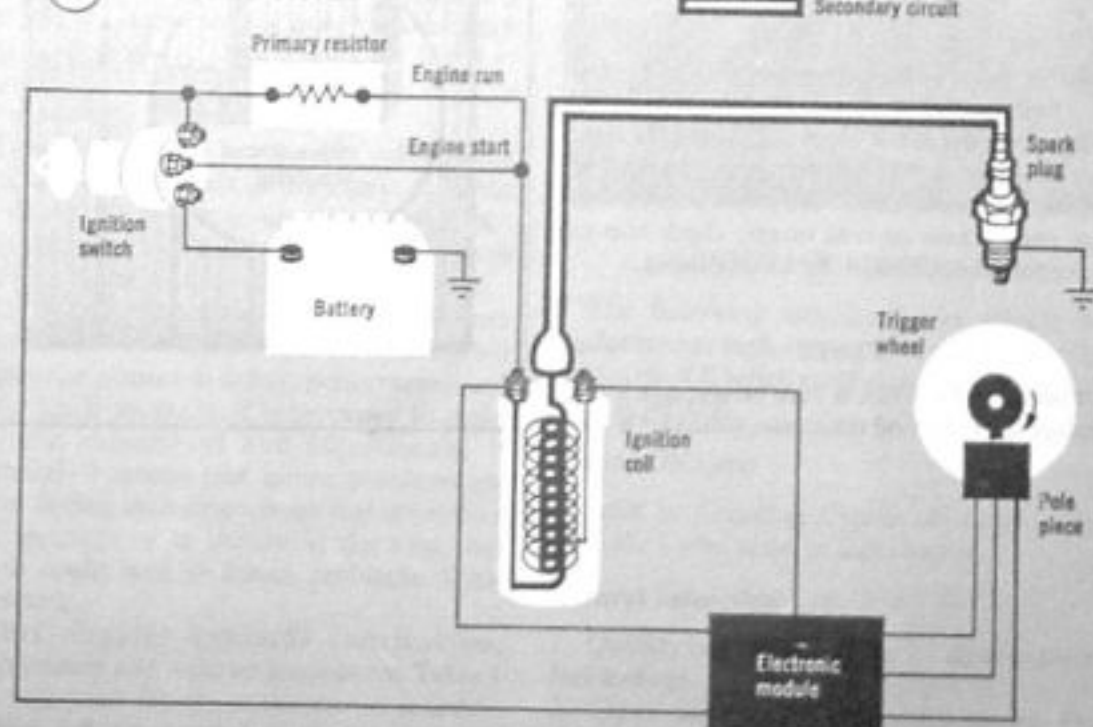


BASIC IGNITION CIRCUITS

27 CONTACT BREAKER SYSTEM



28 ELECTRONIC SYSTEM



simplified conventional and electronic ignition systems. Typical and most common electrical troubles are also described.

CHARGING SYSTEM

1. **Battery will not accept a charge**—Make sure the electrolyte level in the battery is correct and that the terminal connections are tight and free of corrosion. Check for fuses in the battery circuit. If the battery is satisfactory, refer to the electrical system chapter for alternator tests. Finally, keep in mind that even a good alternator is not capable of restoring the charge to a severely discharged battery; it must first be charged by an external source.

2. **Battery will not hold a charge**—Check the battery for sulfate deposits in the bottom of the case (Figure 29). Sulfation occurs naturally and the deposits will accumulate and eventually come in contact with the plates and short them out. Sulfation can be greatly retarded by keeping the battery well charged at all times. Test the battery to assess its condition.

If the battery is satisfactory, look for excessive draw, such as a short.

LIGHTING

Bulbs burn out frequently—All bulbs will eventually burn out, but if the bulb in one particular light burns out frequently check the light assembly for looseness that may permit excessive vibration; check for loose connections that could cause current surges; check also to make sure the bulb is of the correct rating.

FUSES

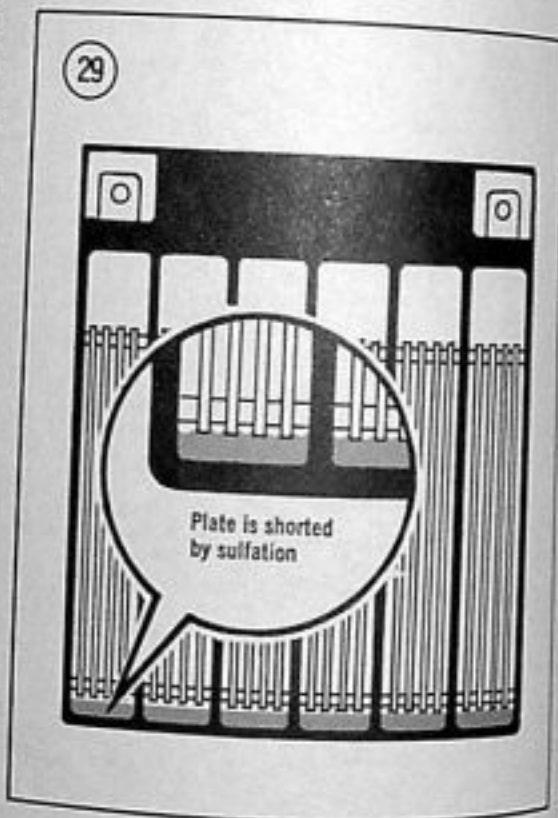
Fuse blows—When a fuse blows, don't just replace it; try to find the cause. Consider a fuse

a warning device as well as a safety device. And never replace a fuse with one of greater amperage rating. It probably won't melt before the insulation on the wiring does.

WIRING

Wiring problems should be corrected as soon as they arise — before a short can cause a fire that may seriously damage or destroy the motorcycle.

A circuit tester of some type is essential for locating shorts and opens. Use the appropriate wiring diagram at the end of the book for reference. If a wire must be replaced make a notation on the wiring diagram of any changes in color coding.



CHAPTER THREE

LUBRICATION, MAINTENANCE AND TUNE-UP

A motorcycle, even in normal use, is subjected to tremendous heat, stress and vibration. When neglected, any bike becomes unreliable and actually dangerous to ride. To keep the bike properly maintained, look into the tune-up tools and parts and check out the different lubricants, motor oil, fork oil, locking compounds and greases (Figure 1). Also check engine degreasers, like Gunk or Bel-Ray Degreaser, for cleaning your engine prior to working on it.

The more you get involved in your Honda the more you will want to work on it. Start out by doing simple tune-up, lubrication and maintenance. Tackle the more involved jobs as you become more acquainted with the bike.

The Honda singles covered in this book are some of the most reliable bikes available, but to gain the utmost in safety, performance and useful life from them, it is necessary to make periodic inspections and adjustments. It frequently happens that minor problems are found during such inspections that are simple and inexpensive to correct at the time, but which could lead to major problems if not corrected.

This chapter explains lubrication, maintenance and tune-up procedures. Table 1 is a suggested factory maintenance schedule (Tables 1-8 are located at the end of this chapter).



ROUTINE CHECKS

The following simple checks should be performed at each stop at a service station for gas or, on XR series models, whenever the fuel tank is refilled.

Engine Oil Level

Refer to *Checking Engine Oil Level* under *Periodic Lubrication* in this chapter.

General Inspection

1. Quickly inspect the engine for signs of oil or fuel leakage.
2. Check the tires for embedded stones. Pry them out with your ignition key.
3. Make sure all lights work.

NOTE

On XL series, at least check the brake light. It can burn out any time. Motorists cannot stop as quickly as you and need all the warning you can give.

Tire Pressure

Tire pressure must be checked with the tires cold. Correct tire pressure depends a lot on the load you are carrying. See Table 2.

Battery (XL/TLR Series)

Remove the right-hand side cover and check the battery electrolyte level. The level must be between the upper and lower level marks on the case (Figure 2).

For complete details see *Battery Removal/Installation and Electrolyte Level Check* in this chapter.

Due to evaporation, check the level more frequently in hot weather.

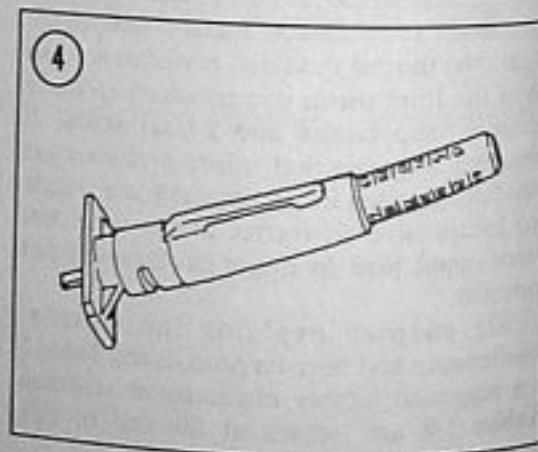
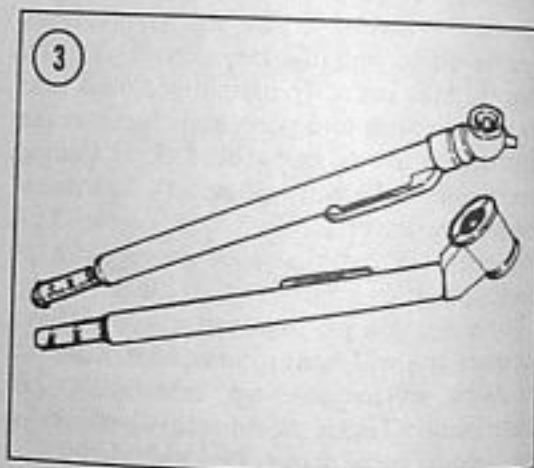
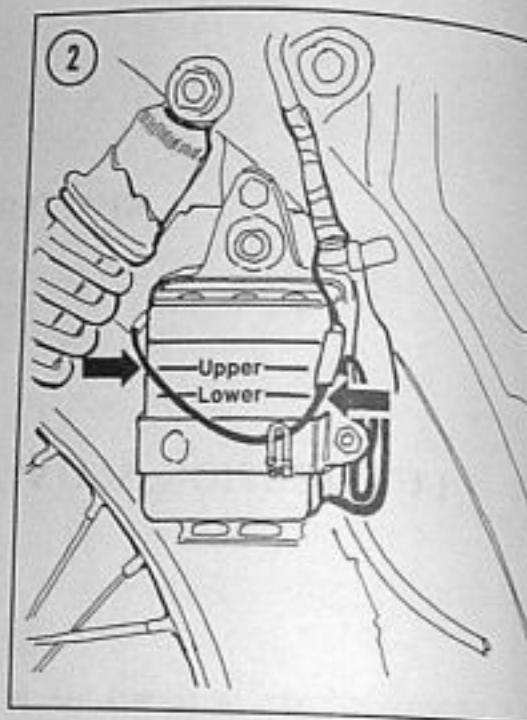
Lights and Horn (XL/TLR Series)

With the engine running, check the following.

1. Pull the front brake lever on and check that the brake light comes on.
2. Push the rear brake pedal down and check that the brake light comes on soon after you have begun depressing the pedal.
3. Move the headlight dimmer switch up and down between the HI and LO positions and check to see that both headlight elements are working.
4. Turn the turn signal switch to the left and right positions and check that all 4 turn signals are working.
5. Push the horn button and make sure that the horn blows loudly.
6. During these tests, if the rear brake pedal traveled too far before the brake light came on, adjust the rear brake light switch as described under *Rear Brake Light Switch Adjustment (XL Series)* in Chapter Seven. If the horn or any of the lights failed to operate properly, refer to Chapter Seven.

Lights (XR Series)

With the engine running, check the following.



1. Check to see that both the headlight and taillight are working.
2. Make sure that the engine kill switch works properly.
3. During these tests, if either the headlight, taillight or engine kill switch failed to operate properly, refer to Chapter Seven.

PRE-CHECKS

The following checks should be performed prior to the first ride of the day.

1. Inspect all fuel lines and fittings for wetness.
2. Make sure the fuel tank is full of fresh gasoline.
3. Make sure the engine oil level is correct.
4. Check the operation of the clutch and adjust the free play in the cable if necessary.
5. Check the throttle and the brake lever. Make sure they operate properly with no binding.
6. Make sure the engine kill switch works properly.
7. Check the wheel spokes and rim locks for tightness; adjust if necessary.
8. Inspect the condition of the front and rear suspension; make sure it has a good solid feel with no looseness.
9. Check the condition of the drive chain for wear and correct tension.
10. Check tire pressure. Refer to Table 2.
11. Check the exhaust system for damage.
12. Check the tightness of all fasteners, especially engine mounting hardware.

SERVICE INTERVALS

The services and intervals shown in Table 1 are recommended by the factory. Strict adherence to these recommendations will ensure long service from your Honda. However, if the bike is run in an area of high humidity the lubrication services must be done more frequently to prevent possible rust damage.

For convenience when maintaining your motorcycle, most of the services shown in Table 1 are described in this chapter. However, some procedures which require more than minor disassembly or adjustment are covered elsewhere in the appropriate chapter.

TIRES AND WHEELS**Tire Pressure**

Tire pressure should be checked and adjusted to maintain the smoothness of the tire, good traction and handling and to get the maximum life out of the tire. A simple, accurate gauge (Figure 3) can be purchased for a few dollars and should be carried in your motorcycle tool kit. The appropriate tire pressures are shown in Table 2.

Tire Inspection

The tires take a lot of punishment, so inspect them periodically for excessive wear, cuts, abrasions, etc. If you find a nail or other object in the tire, mark its location with a light crayon prior to removing it. This will help locate the hole for repair. Refer to Chapter Eight for tire changing and repair information.

Check local traffic regulations concerning minimum tread depth. Measure the tread depth at the center of the tire tread using a tread depth gauge (Figure 4) or small ruler. Honda recommends tire replacement when the front or rear tread depth is 8 mm (1/8 in.) or less. Replace the tire(s) at this point.

Wheel Spoke Tension

Tap each spoke with a wrench. The higher the pitch of sound it makes, the tighter the spoke. The lower the sound frequency, the looser the spoke. A "ping" is good; a "klunk" says the spoke is too loose.

If one or more spokes are loose, tighten them as described under *Wheels* in Chapter Eight.

Rim Inspection

Frequently inspect the condition of the wheel rims. If a rim has been damaged it might have been enough to knock it out of alignment. Improper wheel alignment can cause severe vibration and result in an unsafe riding condition.

CRANKCASE BREATHER HOSE (U.S. MODELS ONLY)

Inspect the condition of the breather hoses for cracks and deterioration and make sure that the hose clamps are tight (Figure 5).

BATTERY (XL/TLR SERIES)

Removal/Installation and Electrolyte Level Check

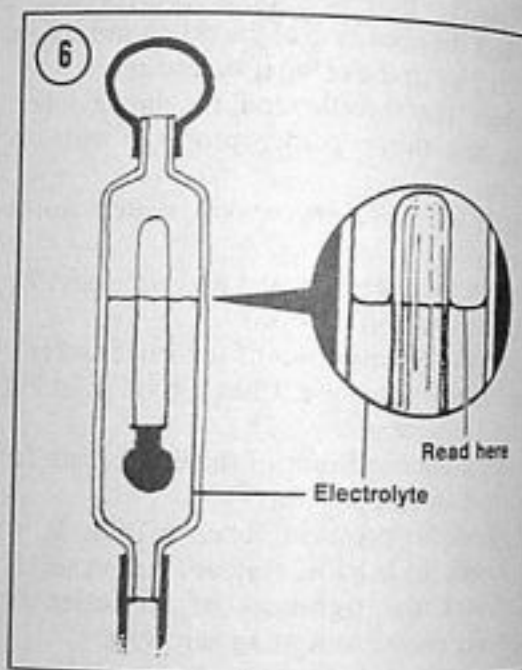
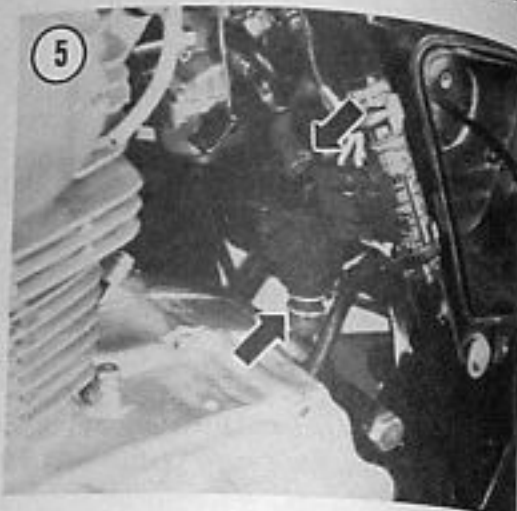
The battery is the heart of the electrical system. It should be checked and serviced as indicated in Table 1. The majority of electrical system troubles can be attributed to neglect of this vital component.

The electrolyte level may be checked with the battery installed by removing the left-hand side panel. The electrolyte level should be maintained between the 2 marks on the battery case (Figure 2). If the electrolyte level is low, it's a good idea to remove the battery from the bike so it can be thoroughly serviced and checked.

1. Remove the right-hand side cover.
2. Disconnect the battery negative (-) and positive (+) leads at the wiring harness. There are no battery terminals; the electrical leads come directly out of the battery.
3. Remove the nut securing the battery holder and hinge the holder open.
4. Disconnect the battery vent tube from the battery and leave it routed through the bike's frame.
5. Slide the battery out of the frame.
6. Wipe off any of the highly corrosive residue that may have dripped from the battery during removal.

CAUTION

Be careful not to spill battery electrolyte on painted or polished surfaces. The liquid is highly corrosive and will damage the finish. If it is spilled, wash it off immediately with soapy water and thoroughly rinse with clean water.



9. After the battery has been refilled, recharged or replaced, install it by reversing these removal steps.

CAUTION

If the breather tube was moved during battery removal be sure to route the breather tube so that any residue from it will not drain onto any part of the bike's frame. The tube must be free of bends or twists as any restriction may pressurize the battery and damage it.

Testing

Hydrometer testing is the best way to check battery condition. Use a hydrometer with

LUBRICATION, MAINTENANCE AND TUNE-UP

numbered graduations from 1.100 to 1.300 rather than one with color-coded bands. To use the hydrometer, squeeze the rubber ball, insert the tip into the cell and release the pressure on the ball. Draw enough electrolyte to float the weighted float inside the hydrometer. Note the number in line with the surface of the electrolyte; this is the specific gravity for this cell. Squeeze the rubber ball again and return the electrolyte to the cell from which it came.

The specific gravity of the electrolyte in each battery cell is an excellent indication of that cell's condition. A fully charged cell will read 1.260-1.280, while a cell in good condition reads from 1.230-1.250 and anything below 1.140 is discharged.

Specific gravity varies with temperature. For each 10° the electrolyte temperature exceeds 80° F (27° C), add 0.004 to readings indicated on the hydrometer. Subtract 0.004 for each 10° below 80° F (27° C). If the cells test in the poor range, the battery requires recharging. The hydrometer is useful for checking the progress of the charging operation. Table 3 shows approximate state of charge.

Charging

WARNING

During the charging process, highly explosive hydrogen gas is released from the battery. The battery should be charged only in a well-ventilated area and away from any open flames (including pilot lights on home gas appliances). Do not allow any smoking in the area. Never check the charge of the battery by arcing across the electrical connections; the resulting spark can ignite the hydrogen gas.

CAUTION

Always remove the battery from the bike before connecting the battery charger. Never recharge a battery in the bike's frame due to the corrosive mist that is emitted during the charging process. If this mist settles on the bike's frame it will corrode the surface.

1. Connect the positive (+) charger lead to the positive (+) battery lead and the negative (-) charger lead to the negative (-) battery lead.

2. Remove all vent caps from the battery, set the charger at 6 volts or twelve volts depending on model and switch the charger on. If the output of the charger is variable, it is best to select a low setting, somewhere between 1/2 and 2 amps.

CAUTION

The electrolyte level must be maintained at the upper level during the charging cycle, check and refill as necessary.

3. After the battery has been charged for about 8 hours, turn the charger off, disconnect the leads and check the specific gravity. It should be within the limits specified in Table 3. If it is, and remains stable for 1 hour, the battery is considered charged.
4. Clean the battery case and battery compartment in the bike's frame and reinstall the battery in the bike, reversing the removal steps.

CAUTION

Route the breather tube so that it does not drain onto any part of the bike's frame. The tube must be free of bends or twists as any restriction may pressurize the battery and damage it.

New Battery Installation

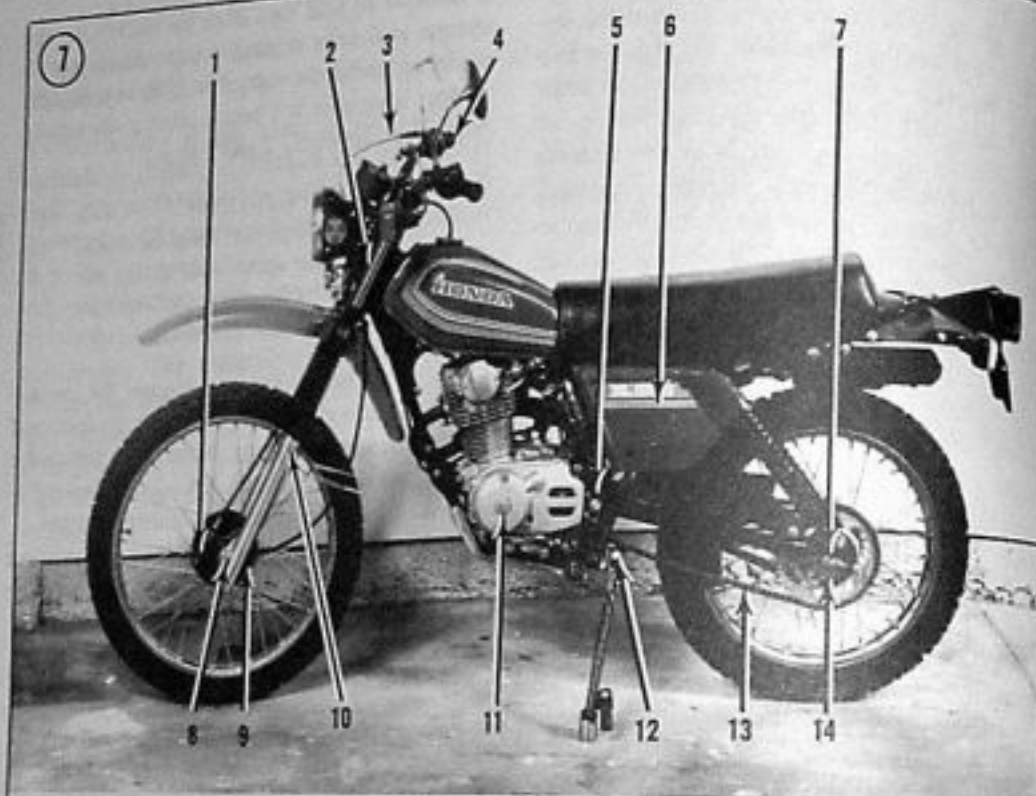
When replacing the old battery with a new one, be sure to charge it completely (specific gravity 1.260-1.280) before installing it in the bike. Failure to do so, or using the battery with a low electrolyte level, will permanently damage the new battery.

PERIODIC LUBRICATION

Refer to Figure 7 for major lubrication points.

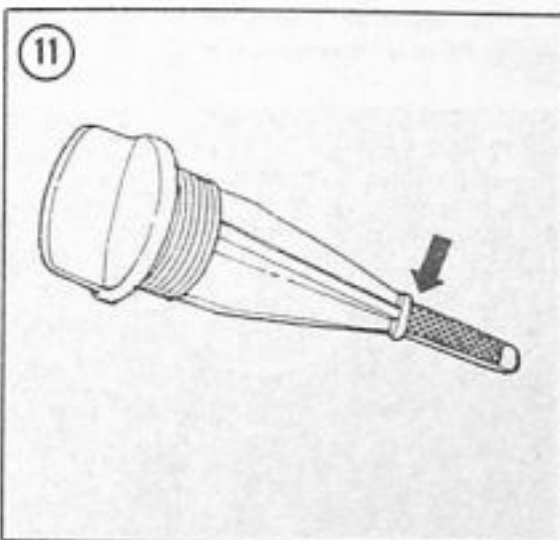
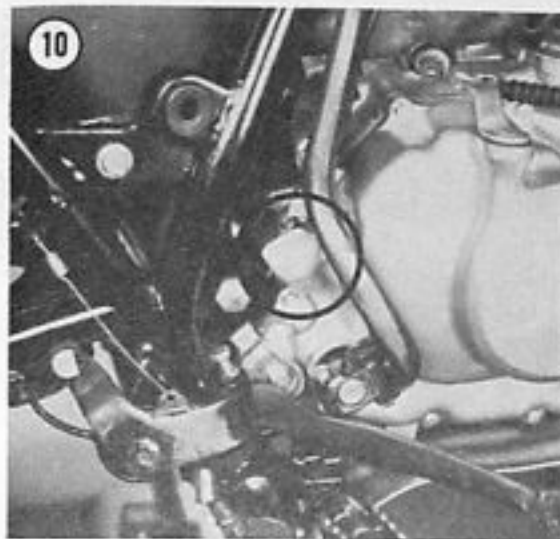
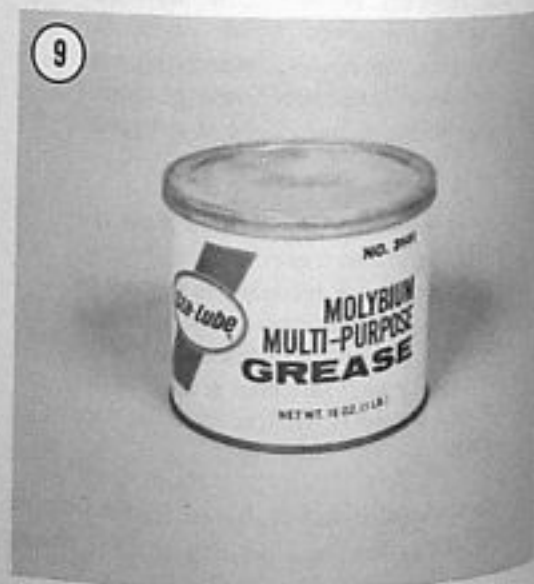
Oil

Oil is classified according to its viscosity, which is an indication of how thick it is. The Society of Automotive Engineers (SAE) system distinguishes oil viscosity by numbers called "weights." Thick (heavy) oils have higher viscosity numbers than thin (light) oils. For example, a 5 weight (SAE 5) oil is a light oil while a 90 weight (SAE 90) oil is relatively heavy. The viscosity of the oil has nothing to do with its lubricating properties.



LUBRICATION POINTS

- | | |
|---|---------------------------|
| 1. Front brake cam | 8. Front wheel bearings |
| 2. Steering head bearings | 9. Speedometer drive gear |
| 3. Control cables | 10. Front forks |
| 4. Throttle grip, clutch and brake pivots | 11. Engine oil |
| 5. Swing arm bushings or bearings | 12. Sidestand pivot point |
| 6. Air cleaner | 13. Drive chain |
| 7. Rear brake cam | 14. Rear wheel bearings |



Cleaning Solvent

A number of solvents can be used to remove old dirt, grease and oil. Kerosene is readily available and comparatively inexpensive. Another inexpensive solvent similar to kerosene is ordinary diesel fuel. Both of these solvents have a very high flash point (they have to be very hot in order to ignite and catch fire) and can be used safely in any adequately ventilated area away from open flames (this includes pilot lights on home water heaters and clothes driers that are sometimes located in the garage).

WARNING

Never use gasoline. Gasoline is extremely volatile and contains tremendously destructive potential energy. The slightest spark from metal parts accidentally hitting, or a tool slipping, could cause a fatal explosion.

Checking Engine Oil Level

Engine oil level is checked with the dipstick/oil filler cap, located on the rear right-hand side of the engine behind the clutch mechanism cover (Figure 10).

1. Start the engine and let it warm up approximately 2-3 minutes. Shut off the engine and let the oil settle.
2. Place the bike on a level surface and place a block of wood under the sidestand to maintain the bike in an upright position. Be careful that the bike does not fall over in this position.
3. Unscrew the dipstick/oil filler cap and wipe it clean. Reinsert it onto the threads in the hole; do not screw it in. Remove it and check the oil level. The bike must be level for a correct reading.
4. The level should be between the 2 lines, not above the upper one (Figure 11). If necessary, add the recommended type oil to correct the level. Install the dipstick/oil filler cap and tighten it securely.

Changing Engine Oil and Cleaning Oil Filter Screen

Regular oil changes will contribute more to engine longevity than any other maintenance operation performed. The factory-

Grease

A good quality grease (preferably waterproof) should be used (Figure 8). Water does not wash grease off parts as easily as it washes off oil. In addition, grease maintains its lubricating qualities better than oil on long and strenuous rides. Some components require the use of a lithium based molybdenum disulfide grease (NGLI No. 2 with MoS₂ additive); refer to Figure 9. This is a special type of grease, suggested by the Honda factory, and should be used where specified throughout this book.

In a pinch, though, the wrong lubricant is better than none at all. Correct the situation as soon as possible.

recommended oil change interval and the interval for cleaning the oil filter screen and rotor are shown in Table 1.

These intervals assume that the bike is operated in moderate climates. If it is operated under dusty conditions, the oil will get dirty more quickly and should be changed more frequently than recommended.

Use only a high quality detergent motor oil with an API classification of SE or SF. The classification is stamped or printed on top of the can (Figure 12). Try to use the same brand of oil at each oil change. Refer to Figure 13 for correct oil weight to use under anticipated ambient temperatures (not engine oil temperature).

CAUTION

Do not add any friction reducing additives to the oil as they will cause clutch slippage. Also, do not use an engine oil with graphite added.

- e. 1 quart of oil (oil change) or 2 quarts of oil (after engine disassembly)

There are a number of ways to discard the old oil safely. The easiest way is to pour it from the drain pan into a half-gallon plastic bleach or milk bottle. Tighten the cap and place it in your household trash.

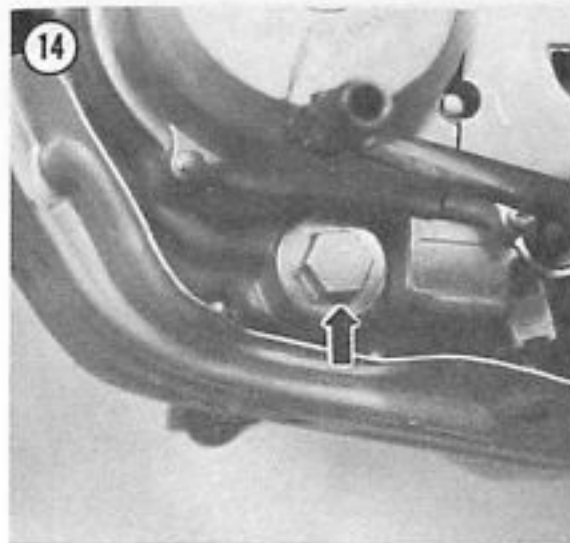
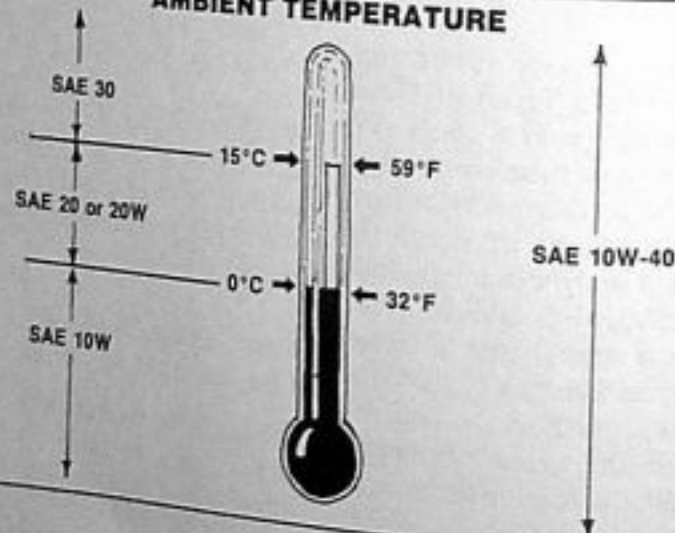
NOTE

Never dispose of motor oil in the trash, on the ground, or down a storm drain. Many service stations accept used motor oil and waste haulers provide curbside used motor oil collection. Do not combine other fluids with motor oil to be recycled. To locate a recycler, contact the American Petroleum Institute (API) at www.recycleoil.org.



13

AMBIENT TEMPERATURE



1. Place the bike on the sidestand.
2. Start the engine and let it reach operating temperature.
3. Shut the engine off and place a drain pan under the engine drain plug.

NOTE

In the following step use the 24 mm wrench provided in the owner's tool kit.

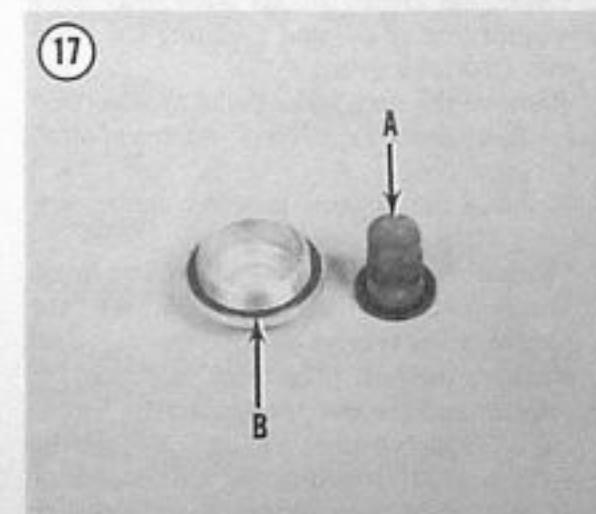
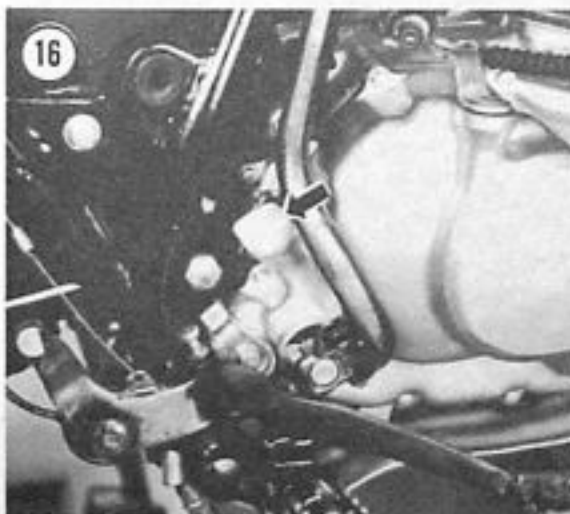
4. Remove the 24 mm drain plug (Figure 14). Remove the spring and oil filter screen (Figure 15). Remove the dipstick/oil filler cap (Figure 16); this will speed up the flow of oil.
5. Let it drain for at least 15-20 minutes. During this time, turn the engine over a couple of times with the kickstarter to drain any remaining oil.



CAUTION

Do not let the engine start and run without oil in the crankcase. Make sure the ignition switch is in the OFF position.

6. Clean the oil filter screen, spring and plug in solvent and thoroughly dry with compressed air. Inspect the condition of the filter screen (A, Figure 17) for holes or defects; replace as necessary. Thoroughly clean out the drain plug area in the crankcase with a shop rag and solvent.
7. Inspect the condition of the O-ring seal (B, Figure 17) on the drain plug. Replace it if its condition is in doubt.



8. Install the filter screen, spring (Figure 18) and drain plug. Tighten the drain plug to 10-20 N·m (7-14 ft.-lb.).
9. Clean the oil filter rotor as described under *Oil Filter Rotor Cleaning* in this chapter prior to refilling the crankcase with new engine oil.
10. Insert a funnel into the oil fill hole and fill the engine with the correct weight and quantity oil.

NOTE

The capacity is approximately 0.95 U.S. qt. (0.90 liters, 0.8 Imp. qt.) for oil and filter change. If the engine has been disassembled the capacity is approximately 1.2 U.S. qt. (1.1 liters, 1.0 Imp. qt.).

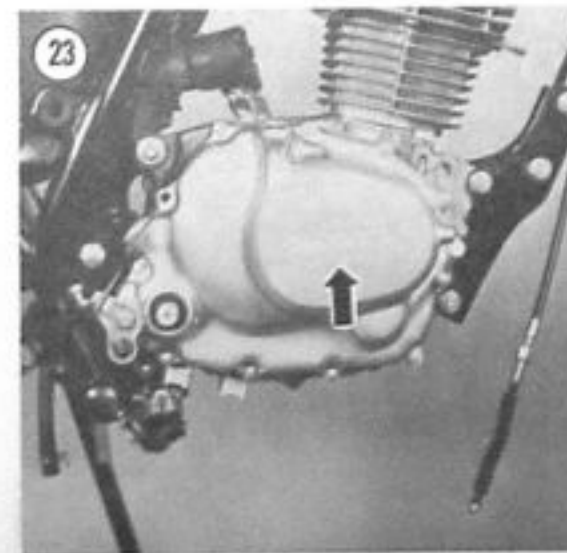
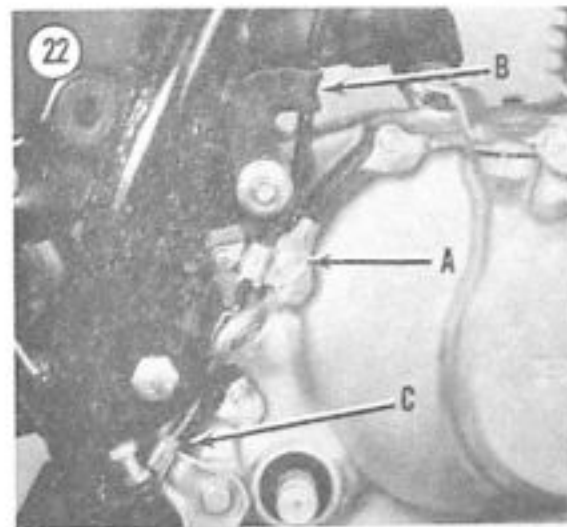
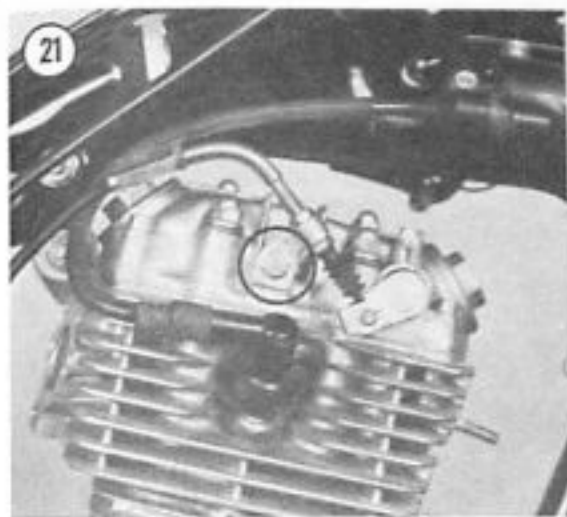
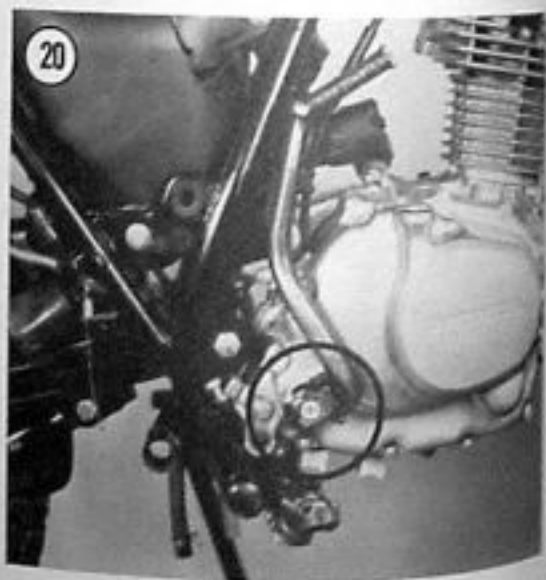
11. Screw in the dipstick/oil filler cap securely.
12. Start the engine, let it run at moderate speed and check for leaks.
13. Turn the engine off and check for correct oil level; adjust as necessary.

Oil Filter Rotor Cleaning

The factory-recommended intervals for cleaning the oil filter rotor are shown in Table 1.

These intervals assume that the bike is operated in moderate climates. If it is operated under dusty conditions, the oil will get dirty more quickly and the rotor should be cleaned more frequently than recommended.

1. Drain the engine oil as described under *Changing Engine Oil and Cleaning Oil Filter Screen* in this chapter.
2. Remove the rear brake pedal as described under *Rear Brake Pedal Removal/Installation* in Chapter Ten.
3. Remove the exhaust pipe protector from the exhaust pipe.
4. Slacken the clutch cable at the hand lever.
5. Disconnect the clutch cable at the crankcase cover (Figure 19).
6. Remove the bolt (Figure 20) securing the kickstarter and remove the kickstarter lever.
7. On all models except XL125S, remove the bolt (Figure 21) securing the decompressor cable bracket to the cylinder head. Remove



the bolt (A, Figure 22) securing the decompressor cable bracket to the right-hand crankcase cover. Remove the cable from the clip (B, Figure 22) and remove the cable end from the decompressor lever on the crankcase cover (C, Figure 22).

8. Move an oil drain pan under the right-hand crankcase cover (residual oil will drain out when this cover is removed). Remove the bolts securing the right-hand crankcase cover (Figure 23) and remove the cover, gasket and 2 locating dowels.

9. Remove the screws (Figure 24) securing the oil filter rotor cover and remove the cover.

10. Clean the inside of the rotor in solvent and, if necessary, scrape out any oil sludge with a broad-tipped dull screwdriver.

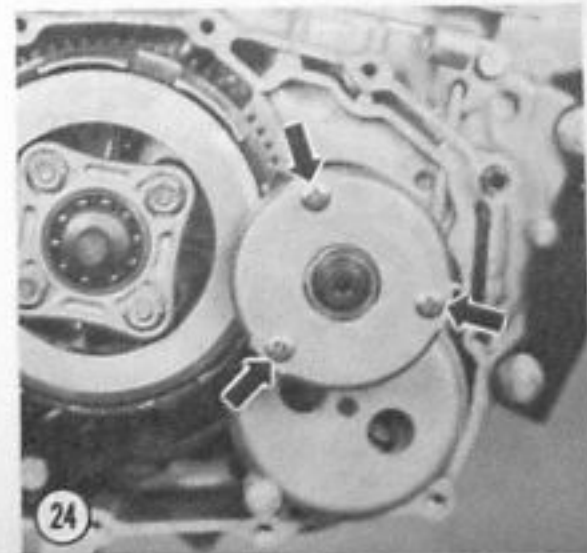
11. Install the oil filter rotor cover and install the screws (Figure 24). Tighten the screws securely.

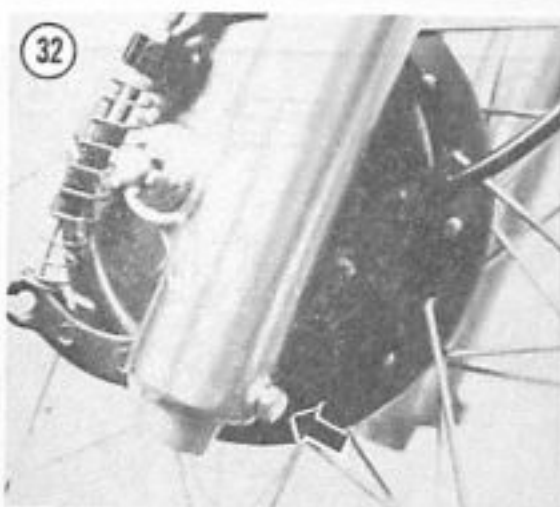
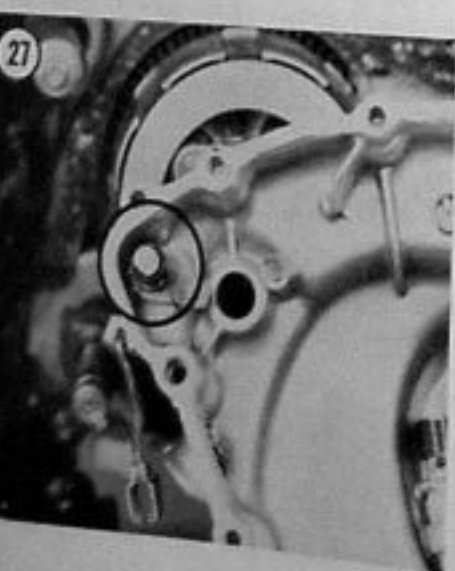
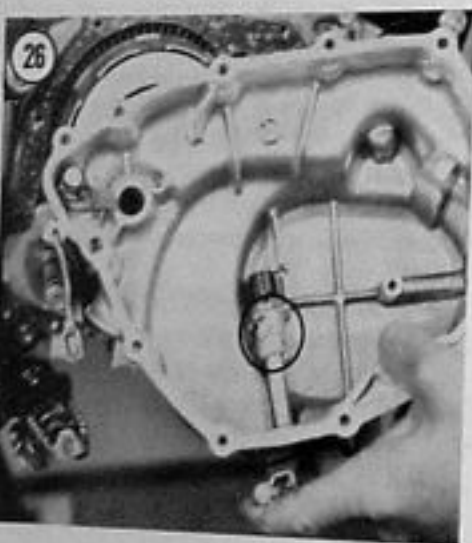
12. Install the dowel pins (A, Figure 25) and the gasket (B, Figure 25).

13. Hold the clutch actuating lever in the released position so the recess in the actuator (Figure 26) will mesh properly with the clutch lifter.

14. On all models except XL125S, make sure the decompressor release cam follower and spring are in position in the right-hand crankcase cover (Figure 27).

15. Install the right-hand crankcase cover. Push it all the way into place. On all models except XL125S, if the crankcase cover will not





decompressor cable clip onto the crankcase cover and install the bolt (A, Figure 22). Tighten the bolt securely.

17. Install the kickstarter lever and tighten the bolt securely.

18. Connect the clutch cable to the lever on the crankcase cover (Figure 19).

19. Install the exhaust pipe protector.

20. Install the rear brake pedal as described under *Rear Brake Pedal Removal/Installation* in Chapter Ten.

21. Refill the engine with the recommended type and quantity oil; refer to *Changing Engine Oil and Cleaning Oil Filter Screen* in this chapter.

22. Adjust the clutch as described under *Clutch Adjustment* in this chapter.

23. On all models except XL125S, adjust the starter decompressor as described under *Starter Decompressor Adjustment* in this chapter.

Front Fork Oil Change

There is no factory-recommended fork oil change interval but it's good practice to change the oil every 6,000 miles (10,000 km) or when it becomes contaminated.

Some models are equipped with air-assist front forks. Service is basically the same as for the non-air-assist type fork. Where differences occur in this procedure they are identified.

1. On models with air-assist front forks, unscrew the dust cap (Figure 28) and bleed off all air pressure by depressing the valve stem (Figure 29).

NOTE

Release air pressure gradually. If it is released too fast, oil will spurt out with the air. Protect your eyes and clothing accordingly.

2. Place a milk crate or wood block(s) under the engine to support the bike securely.

3. Unscrew the fork cap bolt (Figure 30) or fork cap/air valve assembly (Figure 31). Unscrew the fork cap bolt (or fork cap/air valve assembly) slowly as it is under spring pressure from the fork spring.

4. Place a drain pan under the drain screw (Figure 32 or Figure 33) and remove the drain

go all the way in, wiggle the decompressor release lever and the clutch release lever and push the cover the rest of the way on. Install the screws and tighten securely in a crisscross pattern.

CAUTION

Do not install any of the crankcase cover screws until the crankcase cover is snug up against the crankcase surface. Do not try to force the cover into place with screw pressure. If the cover will not fit up against the crankcase, remove the crankcase cover and repeat Step 15.

16. On all models except XL125S, insert the decompressor release cable into the lever in the crankcase cover (C, Figure 22) and fit the cable into the clip (B, Figure 22). Install the

screw. Allow the oil to drain for at least 5 minutes. Never reuse the oil.

CAUTION

Do not allow the fork oil to come in contact with any of the brake components.

5. Inspect the condition of the gasket on the drain screw; replace it if necessary. Install the drain screw.
6. Repeat for the other fork.
7. Refill each fork leg with the specified quantity of DEXRON ATF (automatic transmission fluid) or fork oil. Refer to Table 4 for specified quantity.

NOTE

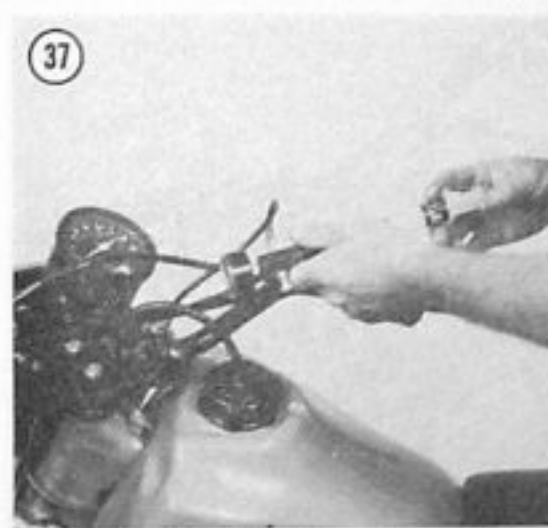
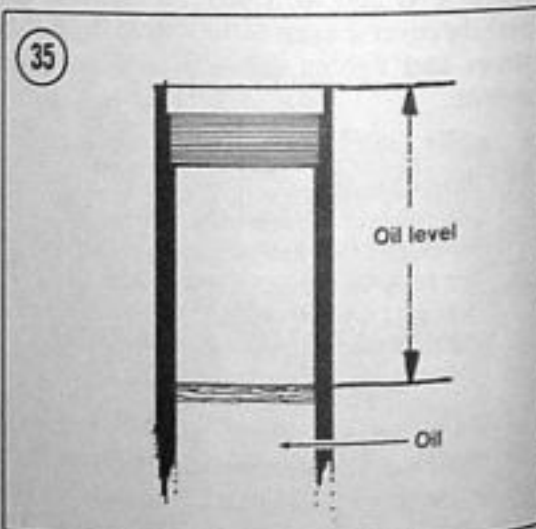
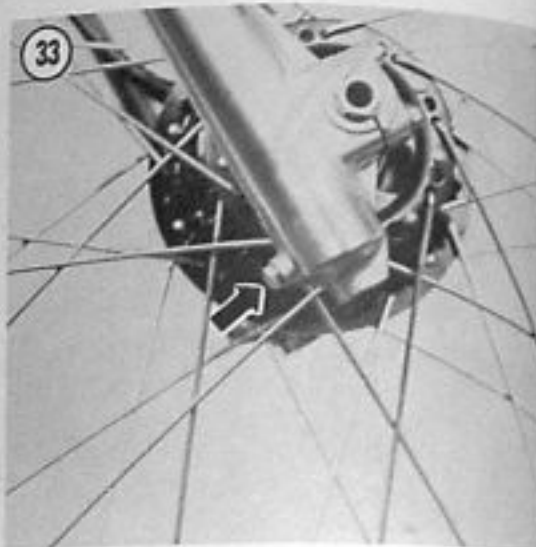
In order to measure the correct amount of fluid, use a plastic baby bottle. These have measurements in fluid ounces (oz.) and cubic centimeters (cc) on the side (Figure 34).

8. After filling each fork tube, slowly pump the fork tubes several times to expel air from the upper and lower fork chambers and to distribute the oil.

9. On XR200 (since 1982) and XR200R models, withdraw the fork spring from each fork tube. Apply the front brake and push down on the handlebar. Hold the handlebar in this position with the forks totally compressed. Have an assistant measure the distance from the top of the fork tube to the top of the fork oil (Figure 35). Different fork damping characteristics can be produced by varying the amount of fork oil in the fork tube (using the standard air inflation pressure). Refer to the dimensions shown in Table 5.

10. Install the fork springs.

11. Inspect the condition of the O-ring seal (Figure 36) on the fork cap bolt; replace if necessary. Install the fork top cap while pushing down on the spring. Start the fork cap bolt slowly; don't cross thread it. Tighten fork cap bolt to 15-30 N·m (11-22 ft.-lb.).



12. On models with air-assist forks, inflate forks on all except XL200R and TL200R to 4.3-7.2 psi (0.3-0.5 kg/cm²). On XL200R and TLR200, inflate forks to 0-5.6 psi (0-0.4 kg/cm²). Do not use compressed air; use only a small hand-operated air pump such as the S & W Mini-pump (Figure 37) or equivalent.

WARNING

Never use any type of compressed gas as an explosion may be lethal. Never heat the fork assembly with a torch or place it near an open flame or extreme heat as this will also result in an explosion. Never exceed the maximum air pressure of 14.2 psi (1.0 kg/cm²).

13. Road test the bike and check for leaks.

Drive Chain Lubrication

Oil the drive chain every 300 miles (500 km) or sooner if it becomes dry. A properly maintained chain will provide maximum service life and reliability.

1. Place a milk crate or wood block(s) under the engine to support the bike securely.
2. Shift the transmission to NEUTRAL.
3. Oil the bottom run of the chain with a commercial chain lubricant (Figure 38). Concentrate on getting the lubricant down between the side plates, pins, bushings and rollers of each chain link.

CAUTION

On XR200R models, the drive chain is an O-ring type. Do not use engine oil as a lubricant as it will damage the O-rings. Use a chain lubricant specifically formulated for use with this type of chain or the specified gear oil.

4. Rotate the wheel to bring the unoled portion of the chain within reach. Continue until all of the chain is lubricated.

Control Cables

Every 4,000 miles (6,400 km) the control cables should be lubricated. They should also be inspected at this time for fraying and the cable sheath should be checked for chafing. The cables are relatively inexpensive and should be replaced when found to be faulty.

The control cables can be lubricated either with oil or with any of the popular cable lubricants and a cable lubricator. The first method requires more time and the complete lubrication of the entire cable is less certain.

Examine the exposed end of the inner cable. If it is dirty or the cable feels gritty when moved up and down in its housing, spray it with a lubricant/solvent such as LPS-25 or WD-40. Let this solvent drain out, then proceed with the following steps.

Oil method

1. Disconnect the cables from the front brake lever (Figure 39), the clutch lever (Figure 40) and the throttle grip assembly (Figure 41). On XR200R models, oil the rear brake cable also.

NOTE

On the throttle cable it is necessary to remove the screws that clamp the housing together to gain access to the cable end.

2. Make a cone of stiff paper and tape it to the end of the cable sheath (Figure 42).
3. Hold the cable upright and pour a small amount of light oil (SAE 10W/30) into the cone. Work the cable in and out of the sheath for several minutes to help the oil work its way down to the end of the cable.

NOTE

To avoid a mess, place a shop cloth at the end of the cable to catch the oil as it runs out.

4. Remove the cone, reconnect the cable and adjust the cable(s) as described in this chapter.

Lubricator method

1. Disconnect the cables from the front brake lever (Figure 39), the clutch lever (Figure 40) and the throttle grip assembly (Figure 41). On XR200R models, oil the rear brake cable also.

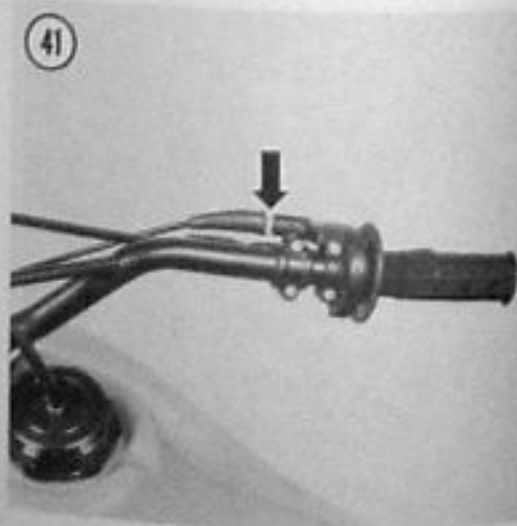
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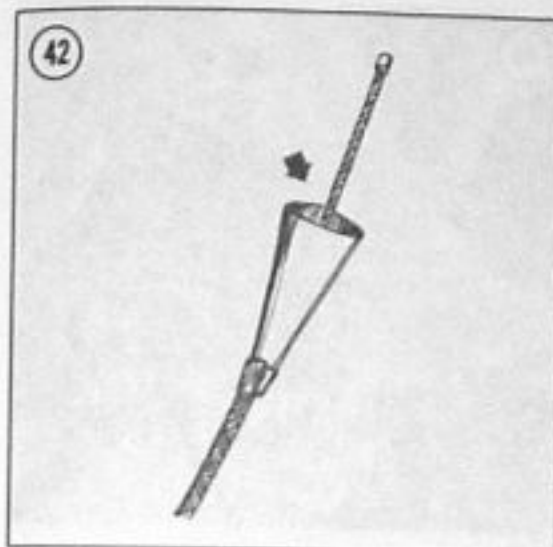
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41



42



43



44



NOTE

On the throttle cable it is necessary to remove the screws that clamp the housing together to gain access to the cable end.

2. Attach a lubricator following the manufacturer's instructions.
3. Insert the nozzle of the lubricant can in the lubricator (Figure 43), press the button on the can and hold it down until the lubricant begins to flow out of the other end of the cable.

NOTE

Place a shop cloth at the end of the cable(s) to catch all excess lubricant that will flow out.

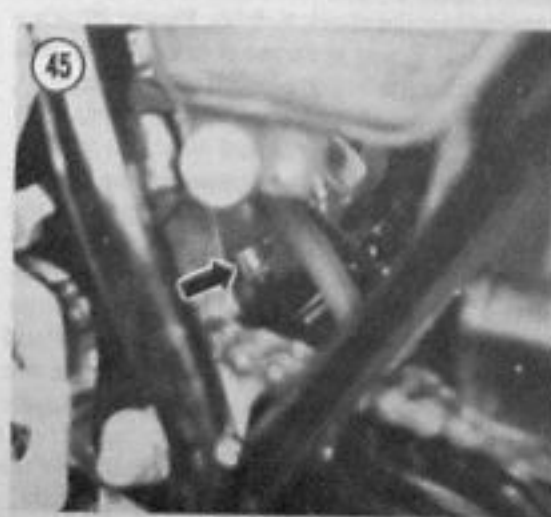
4. Remove the lubricator, reconnect the cable(s) and adjust the cable(s) as described in this chapter.

Swing Arm Bushing Lubrication

Lubricate the swing arm bushings every 1,000 miles (1,600 km). Apply with a small hand-held grease gun (Figure 44). On dual-shock models, use a good grade multipurpose grease. On Pro-link models, use molybdenum disulfide grease (NGLI No. 2 with MoS₂ additive).

1. Wipe the grease fitting clean of all road dirt and grease residue. Refer to Figure 45 for dual-shock models or Figure 46 for Pro-Link models. Force the grease into the fitting until the grease runs out of both ends of the swing arm.

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NOTE

Figure 46 is shown with the engine removed for clarity. It is not necessary to remove it for this procedure.

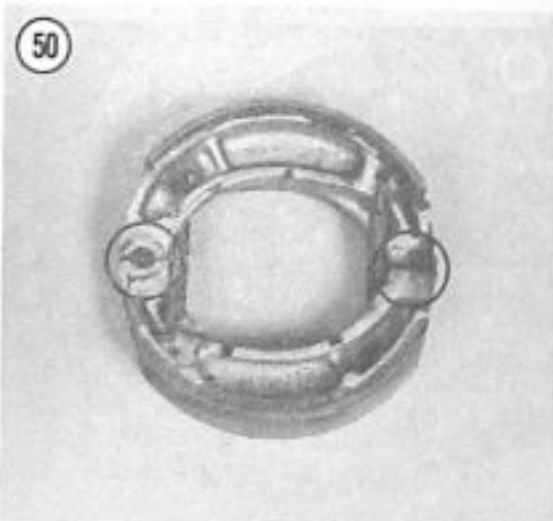
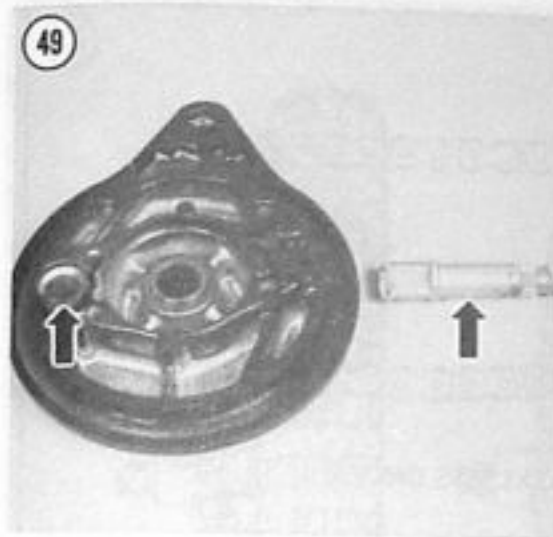
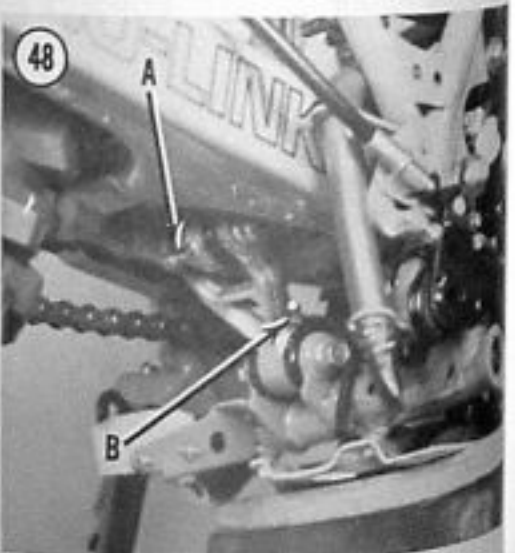
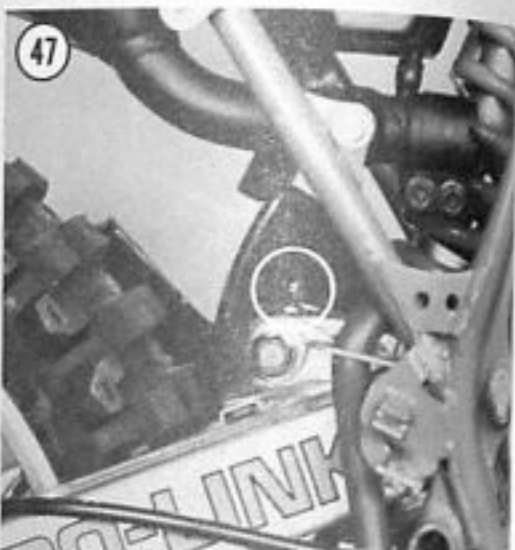
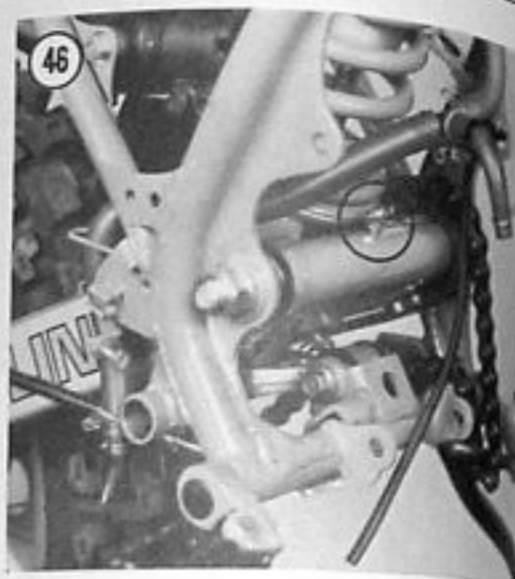
2. Clean off excess grease.
3. If the grease will not run out of the ends of the swing arm, unscrew the grease fitting from the swing arm. Clean it out with solvent; make sure the ball check valve is free. Reinstall the fitting or replace with a new one.
4. Apply the grease gun again. If grease still does not run out of both ends of the swing arm, remove the swing arm as described under *Swing Arm Removal/Installation (Dual-shock Models)* or *Swing Arm Removal/Installation (Pro-Link Models)* in Chapter Nine. Disassemble the swing arm and thoroughly clean and regrease.

Pro-Link Suspension Lubrication

Lubricate the Pro-Link suspension every 1,000 miles (1,600 km). Apply with a small hand-held grease gun (Figure 44). Use molybdenum disulfide grease (NGLI No. 2 with MoS₂ additive).

1. Wipe the grease fittings clean of all road dirt and grease residue. Force the grease into the fitting until the grease runs out past the dust seals on each of the links. There is one fitting where the shock arm is attached to the swing arm (Figure 47) and one where the shock arm is attached to the shock link (A, Figure 48). One additional fitting is on the shock link where it attaches to the lower portion of the frame (B, Figure 48).

2. Clean off excess grease.
3. If the grease will not run out of the ends of the joints, unscrew the grease fitting from the arm or link. Clean it out with solvent; make sure the ball check valve is free. Reinstall the fitting or replace with a new one.
4. Apply the grease gun again. If grease still does not run out of both ends, remove the suspension components as described under *Pro-Link Assembly Removal/Inspection/Installation* in Chapter Nine. Disassemble the assembly and thoroughly clean and regrease.



Brake Cam Lubrication

Lubricate the front and rear brake cam every 12,000 miles (19,200 km), every 2 years or whenever the wheel is removed.

1. Remove the wheel as described under *Front Wheel Removal/Installation* in Chapter Eight or *Rear Wheel Removal/Installation* in Chapter Nine.
2. Remove the brake panel assembly from the wheel hub.
3. Remove the brake shoes from the backing plate by pulling upon the center of each shoe.

NOTE

Place a clean shop rag on the linings to protect them from oil and grease during removal.

4. Wipe away old grease from the camshaft and pivot pins on the backing plate. Also clean the pivot hole and camshaft contact area of each shoe. Be careful not to get any grease on the linings.
5. Sparingly apply a high-temperature grease to all pivot and rubbing surfaces of the backing plate and the camshaft (Figure 49), to the brake shoe pivot points (Figure 50) and to the spring ends.
6. Reassemble the brake assembly.
7. Reinstall the brake panel assembly into the wheel hub and reinstall the wheel.
8. On rear wheels, adjust the drive chain and rear brake as described in this chapter.

Speedometer Cable Lubrication

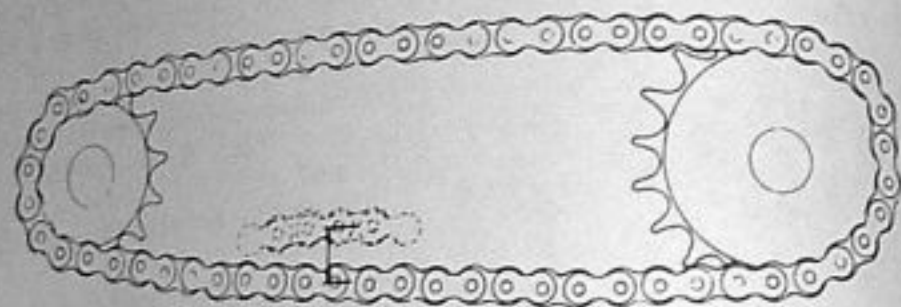
Lubricate the cable every year or whenever needle operation is erratic.

1. Unscrew the retaining collar and remove the cable from the instrument (Figure 51).
2. Pull the cable from the cable sheath.
3. If the grease on the cable is contaminated, thoroughly clean off all old grease.
4. Thoroughly coat the cable with a good grade multipurpose grease and reinstall into the sheath.
5. Make sure the cable is correctly seated into the drive unit.

Miscellaneous Lubrication Points

Lubricate the clutch lever, front brake lever, sidestand pivot point and footpeg pivot points. Use 10W/30 motor oil.

52



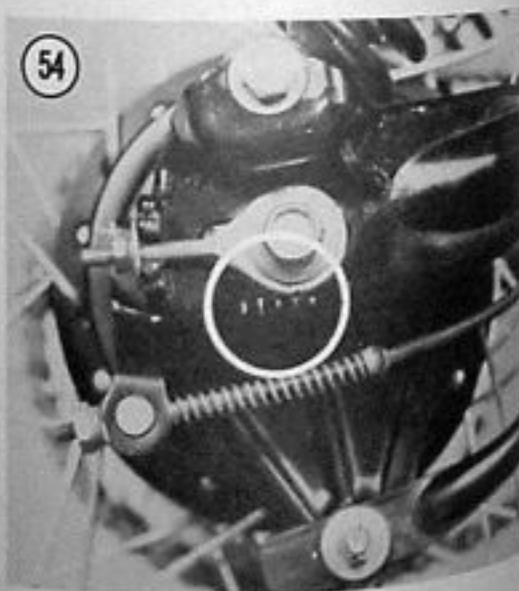
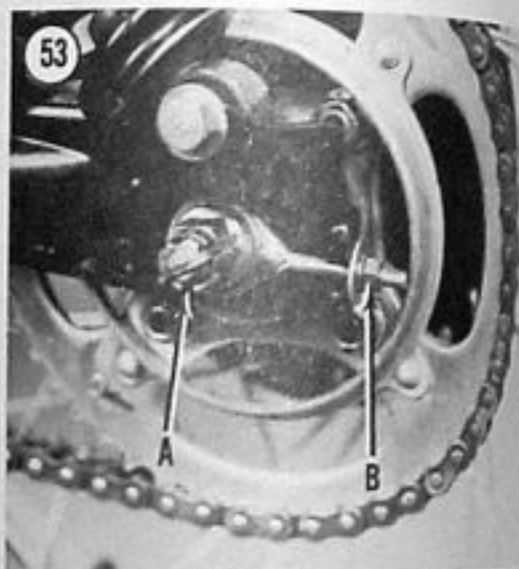
MODELS XL125S AND XL185S ONLY

PERIODIC MAINTENANCE

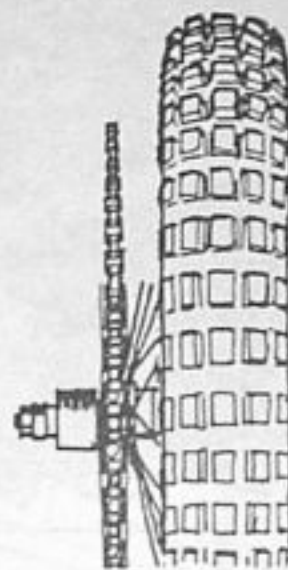
Drive Chain Adjustment
(XL125S and XL185S)

The drive chain should be checked and adjusted every 300 miles (500 km). The correct amount of chain free play, pushed up midway between the sprockets on the lower chain run, is 30-40 mm (1 1/4-1 5/8 in.). See Figure 52. If adjustment is necessary perform the following.

1. Place a milk crate or wood block(s) under the engine to support the bike securely with the rear wheel off of the ground.
2. Shift the transmission into NEUTRAL.
3. Remove the cotter pin and loosen the axle nut (A, Figure 53).
4. Turn the axle adjuster nut (B, Figure 53) in or out as required, in equal amounts. Be sure that the marks (Figure 54) on both adjusters align with the same marks on each side of the swing arm. The correct amount of chain free play, pushed up midway between the sprockets on the lower chain run, is 30-40 mm (1 1/4-1 5/8 in.). See Figure 52.
5. Rotate the rear wheel to move the chain to another position and recheck the adjustment; chains rarely wear or stretch evenly and, as a result, the free play will not remain constant over the entire chain. If the chain cannot be adjusted within these limits, it is excessively worn and stretched and should be replaced. Always replace both sprockets when replacing



55



A



B



C

the drive chain; never install a new chain over worn sprockets. Replacement chain is as follows:

- a. XL125S—DID 428GM by 124 links or RK 428 HS by 124 links
- b. XL185S—DID 428DSM by 120 links or RK 428 FD by 120 links

WARNING

Excessive free play can result in chain breakage which could cause a serious accident.

6. Sight along the top of the drive chain from the rear sprocket to see that it is correctly aligned. It should leave the top of the rear sprocket in a straight line (A, Figure 55). If it is cocked to one side or the other (B and C, Figure 55) the wheel is incorrectly aligned and must be corrected. Refer to Step 4.

7. Tighten the rear axle nut to 60-80 N·m (43-58 ft.-lb.). Install a new cotter pin and bend the ends over completely.

NOTE

Always install a new cotter pin; never reuse an old one.

8. After the drive chain has been adjusted to the correct amount of free play, drill a small hole in the drive chain guard (Figure 56) directly above the top surface of the chain. This can be used as a reference point for future checking.

9. After the drive chain has been adjusted, the rear brake pedal free play must be adjusted as described under *Rear Brake Pedal Adjustment* in this chapter.

Drive Chain Adjustment
(XR185 and XR200)

The drive chain should be checked and adjusted every 300 miles (500 km).

On XR185 models, chain free play is correct when the top surface of the lower run of the chain, adjacent to the tensioner, is 31 mm (1 1/4 in.) from the bottom surface of the swing arm (Figure 57). Adjust the chain before the free play is decreased to the service limit of 21 mm (7/8 in.).

On XR200 models, the correct amount of chain free play is when the top surface of the lower run of the chain, adjacent to the

tensioner, is aligned with the upper edge of the lower rivet on the chain guard (Figure 58). Adjust the chain before it reaches the upper edge of the top rivet.

If adjustment is necessary on either model, perform the following.

1. Place a milk crate or wood block(s) under the engine to support the bike securely with the rear wheel off the ground.

2. Shift the transmission into NEUTRAL.

3. Inspect the drive chain tensioner for wear. If it is worn to the wear line, replace the tensioner prior to adjusting the drive chain.

4. Remove the cotter pin and loosen the axle nut (A, Figure 53).

5. Turn the axle adjuster nut (B, Figure 53) in or out as required, in equal amounts. Be sure that the marks (Figure 54) on both adjusters align with the same marks on each side of the swing arm. The correct amount of chain free play is described at the beginning of this procedure.

6. Rotate the rear wheel to move the chain to another position and recheck the adjustment; chains rarely wear or stretch evenly and, as a result, the free play will not remain constant over the entire chain. If the chain cannot be adjusted within these limits, it is excessively worn and stretched and should be replaced. Always replace both sprockets when replacing the drive chain; never install a new chain over worn sprockets. Replacement chain is as follows:

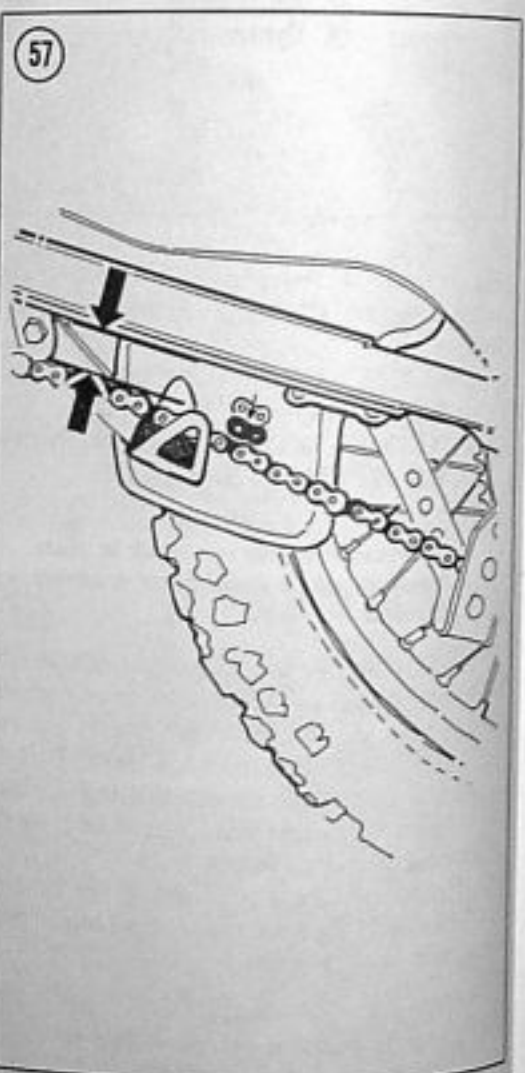
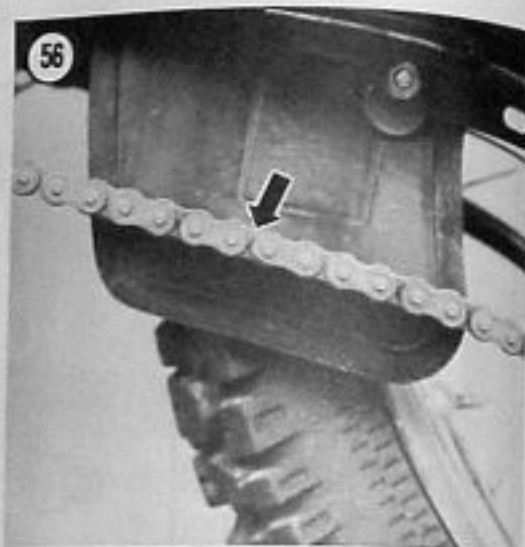
- a. XR185—DS 428 by 125 links
- b. XR200—DS 520 by 102 links

WARNING

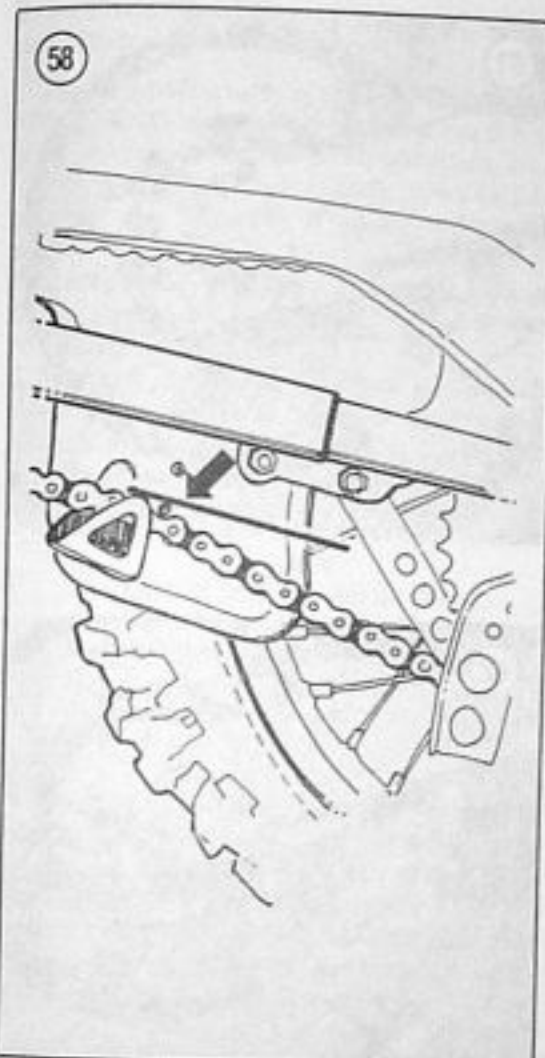
Excessive free play can result in chain breakage which could cause a serious accident.

7. Sight along the top of the drive chain from the rear sprocket to see that it is correctly aligned. It should leave the top of the rear sprocket in a straight line (A, Figure 55). If it is cocked to one side or the other (B and C, Figure 55) the wheel is incorrectly aligned and must be corrected. Refer to Step 5.

8. Tighten the rear axle nut to 60-80 N·m (43-58 ft.-lb.). Install a new cotter pin and bend the ends over completely.



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NOTE
Always install a new cotter pin; never reuse an old one.

9. After the drive chain has been adjusted, the rear brake pedal free play must be adjusted as described under *Rear Brake Pedal Adjustment* in this chapter.

Drive Chain Adjustment (XL200R, XR200R, TLR200)

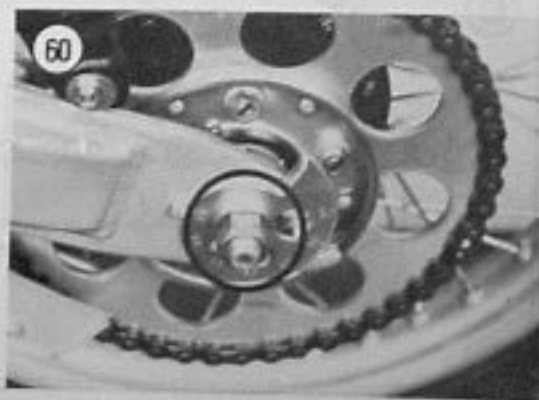
Check and adjust the drive chain every 300 miles (500 km).

On the XL200R and TLR200, push the chain up at a point midway between the sprockets on the lower chain run; see Figure 57. Correct free play is 30-40 mm (1 1/4-1 5/8 in.) for the XL200R and 25-35 mm (1-1 3/8 in.) for the TLR200.

On the XR200R, push the chain up at a point midway between the sprockets on the upper chain run; correct free play is 35-45 mm (1 3/8-1 3/4 in.). See Figure 59.

On the TLR200, if the drive chain wears against the muffler, this can be adjusted as well. See *Modification to Prevent TLR200 Chain Contact* in Chapter Six.

1. Place the bike on the side stand.
2. Shift the transmission into NEUTRAL.
3. Loosen the axle nut (Figure 60).
4. Turn both axle snail adjusters (Figure 61) equal amounts to increase or decrease chain tension. Make sure that the same snail adjuster mark aligns with the stopper pin on both sides of the swing arm (Figure 62).
5. Rotate the rear wheel to move the chain to another position and recheck the adjustment; chains rarely wear or stretch evenly so that



free play may not be constant over the entire chain. If the chain cannot be adjusted within limits, it should be replaced. Replacement chain numbers are:

- a. XL200R—DS 520 by 104 links.
- b. XR200R—DS 520 by 106 links.
- c. TLR200—DS520 by 96 links.

Replace both sprockets at the same time; do not install a new chain over worn sprockets.

WARNING

Excessive free play can result in chain breakage which could lead to a serious accident.

WARNING

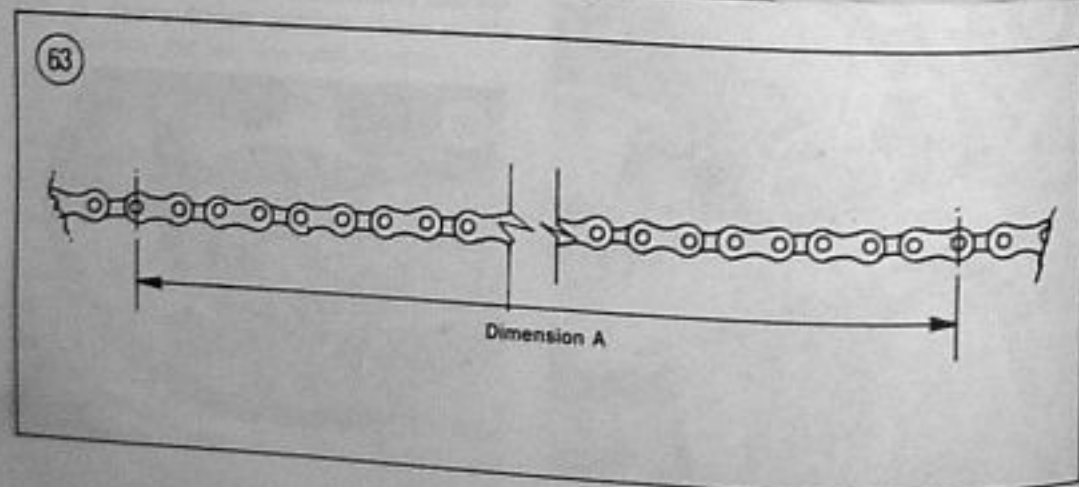
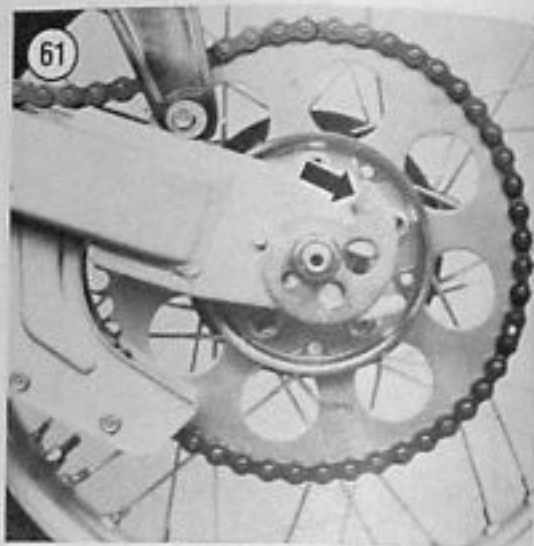
Replace the drive chain if the red zone on the left-hand snail adjuster label aligns with the center of the stopper pin after the chain has been properly adjusted.

6. Sight along the chain from the rear sprocket to see that it is correctly aligned. The chain should leave the rear sprocket in a straight line (A, Figure 55). If it is cocked to one side or the other (B or C, Figure 55) the rear wheel is incorrectly aligned and must be corrected. Refer to Step 4.

7. Tighten the rear axle nut to 80-110 N·m (58-80 ft.-lb.).

8. After the drive chain has been adjusted to the correct amount of free play, drill a small hole in the drive chain guard (B, Figure 59) directly above the top of the chain to use as a reference point in the future.

9. Readjust the rear brake pedal free play as described under *Rear Brake Pedal Adjustment* in this chapter.



Drive Chain Cleaning, Inspection and Lubrication

There is no factory-recommended mileage interval for cleaning the drive chain but it is a good practice to remove, thoroughly clean and lubricate the chain every 2,000 miles (3,200 km) or more frequently if ridden in dusty or muddy terrain.

1. Remove the drive chain as described under *Drive Chain Removal/Installation* in Chapter Nine.
2. Immerse the chain in a pan of cleaning solvent and allow it to soak for about a half hour. Move it around and flex it during this period so that dirt between the pins and rollers may work its way out.

CAUTION

The XR200R (1983-on) has an O-ring type chain. Do not use a steam cleaner, high-pressure washer or any solvent that may damage the rubber O-rings. Non-flammable, non-petroleum solvents are usually safe.

3. On O-ring chains, carefully scrub the rollers and side plates with a medium soft brush and rinse away loosened grit. Chains without O-rings may be vigorously scrubbed with a stiff brush without damage. Rinse the chain a few times to wash out remaining dirt, then hang it up to dry thoroughly.

4. After cleaning the chain, examine it carefully for wear or damage. If necessary, replace the chain.

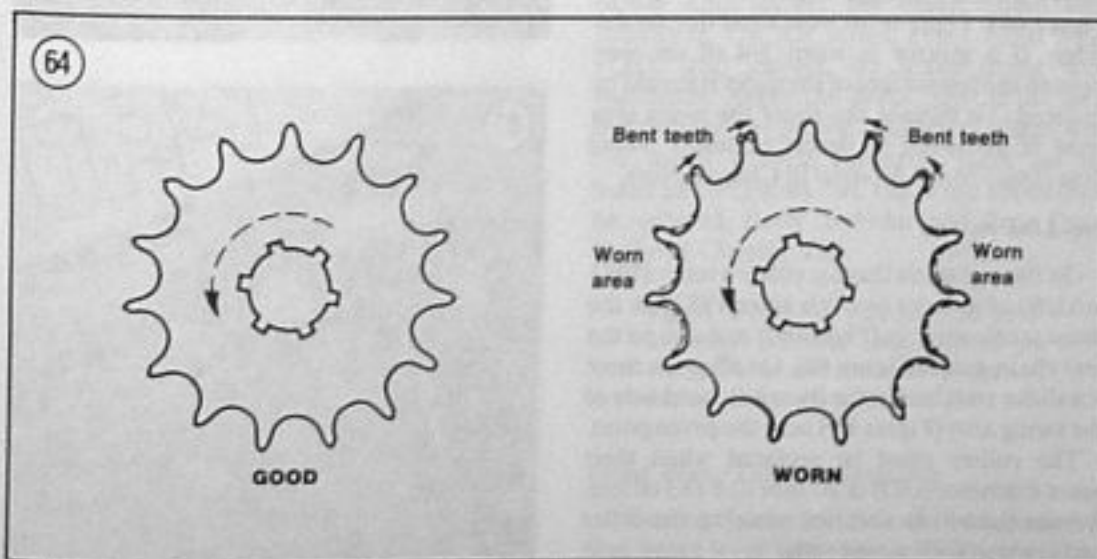
5. Lay the chain alongside a ruler and pull the chain taut. Measure the distance between the specified number of pins indicated in Table 6 and compare to dimension A in Figure 63. If the chain has stretched to the service limit, it must be replaced. Replacement chain numbers are as follows:

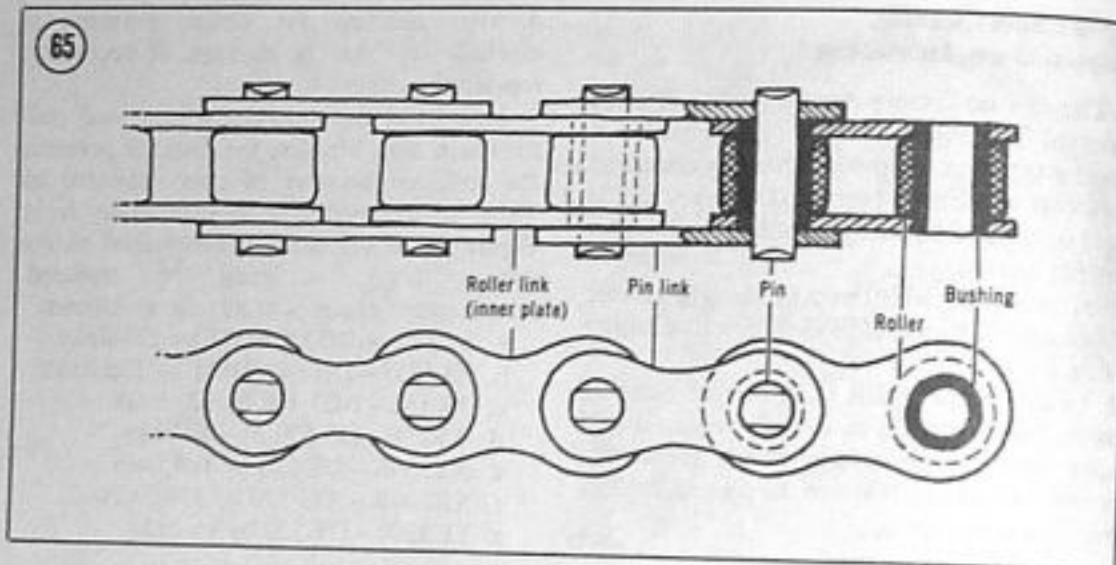
- a. XL125S—DID 428GM by 124 links.
- b. XL185S—DID 428DSM by 120 links.
- c. XR185—DID 428 by 125 links.
- d. XR200—DS 520 by 102 links.
- e. XL200R—DS 520 by 104 links.
- f. XR200R—DS 520 by 106 links.
- g. TLR200—DS 520 by 96 links.

CAUTION

Always check both sprockets (Figure 64) every time the drive chain is removed. If any wear is visible on the teeth, replace the sprocket. Never install a new chain over worn sprockets or a worn chain over new sprockets.

6. Check the inner faces of the inner plates (Figure 65). They should be lightly polished on both sides. If they show considerable wear on both sides, the sprockets are not aligned. Adjust alignment as described in *Drive Chain Adjustment*, for the appropriate model, in this chapter.



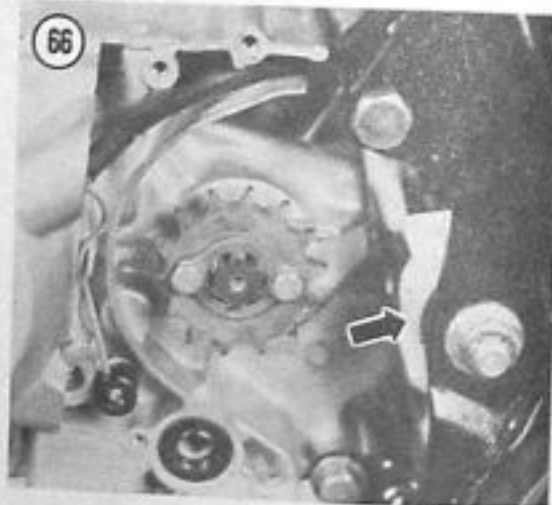


7. Lubricate the chain with a good grade of chain lubricant carefully following the manufacturer's instructions.
8. Reinstall the chain as described under *Drive Chain Removal/Installation* in Chapter Nine.
9. Adjust chain free play as described under *Drive Chain Adjustment*, for the appropriate model, in this chapter.

Drive Chain Tensioners and Sliders

Dual-shock models

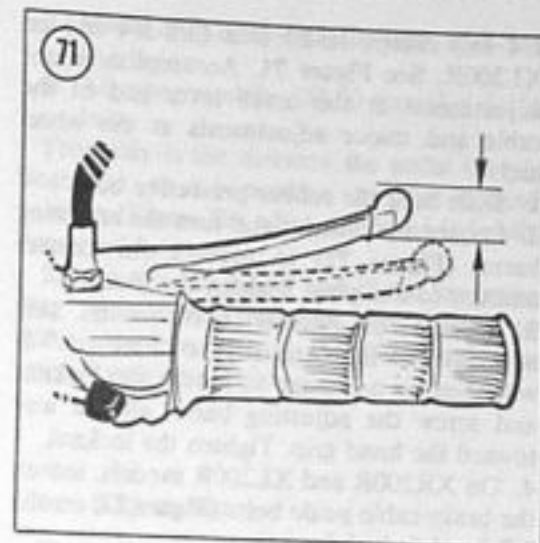
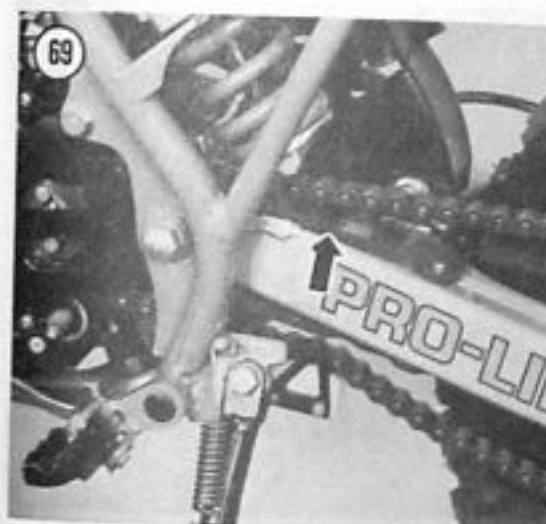
There is only one slider on these models. It is located on the left-hand side of the swing arm (Figure 66). There is no wear limit line on the slider. If a groove is worn 3/4 of the way through the top surface of the slider it should be replaced. To replace the slider the swing arm must be removed as described under *Swing Arm (Dual-shock Models)* in Chapter Nine.



Pro-Link models

On these models there is either a roller (1981 models) or a slider (models since 1982) on the chain tensioner arm (Figure 67) and also on the rear chain guide (Figure 68). On all years there is a slider attached to the front left-hand side of the swing arm (Figure 69) near the pivot point.

The rollers must be replaced when their outer diameter (OD) is 20 mm (0.8 in.) or less. Remove the bolt and nut securing the roller and replace with a new roller.



The slider(s) must be replaced when worn as follows:

- a. Front tensioner—15 mm (0.6 in.)
- b. Rear chain guide—17 mm (0.7 in.)

Remove the bolts and nuts securing the slider(s) and replace with a new slider(s).

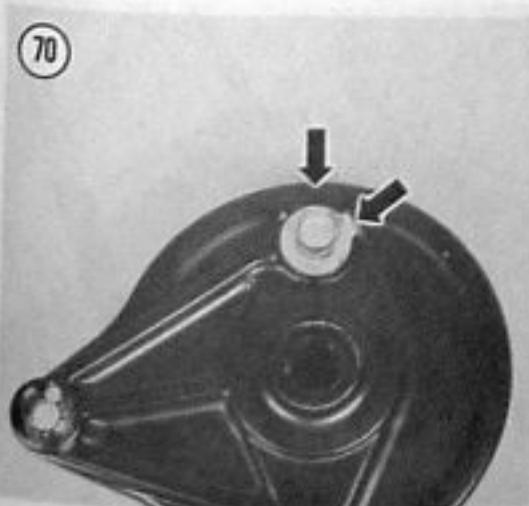
Check the slider attached to the swing arm. If a groove is worn more than 3/4 of the way through the slider it must be replaced. Remove the screws securing the slider to the swing arm and replace with a new one.

Brake Lining Inspection

On XL and TLR series, every 4,000 miles (6,400 km) inspect the brake lining wear indicators. On XR series, every 1,000 miles (1,600 km) inspect the brake lining wear indicators. Apply the brake fully; if the wear indicator arrow on the brake arm aligns with the raised triangle reference mark on the brake panel (Figure 70), the brake shoes must be replaced. Refer to *Front and Rear Drum Brake* in Chapter Ten.

NOTE

Figure 70 is shown with the brake panel assembly partially disassembled for clarity. It is not necessary to remove any components to see the wear indicators.



Front Brake Level Adjustment

The front brake cable should be adjusted so that brake lever free play is 20-30 mm (3/4-1

1/4 in.) except 10-20 mm (3/8-3/4 in.) on XL200R. See Figure 71. Accomplish minor adjustments at the brake lever end of the cable and major adjustments at the wheel end.

1. Slide back the rubber protective boot.
2. Loosen the locknut and turn the adjusting barrel (Figure 72) to achieve the correct amount of free play. Tighten the locknut.
3. Because of normal brake wear, this adjustment will eventually be "used up." It will then be necessary to loosen the locknut and screw the adjusting barrel all the way toward the hand grip. Tighten the locknut.
4. On XR200R and XL200R models, loosen the brake cable guide bolts (Figure 73) on the left-hand fork slider.
5. At the brake panel, loosen the locknut (A, Figure 74) and turn the adjuster nut (B, Figure 74) until the brake lever can be used once again for the minor adjustment. Tighten the locknut.
6. On XR200R and XL200R models, tighten the brake cable guide bolts securely on the fork slider.
7. At the hand lever, loosen the locknut and turn the adjusting barrel (Figure 72) to achieve the correct amount of free play. Tighten the locknut.
8. Slide the rubber protective boot back into place.

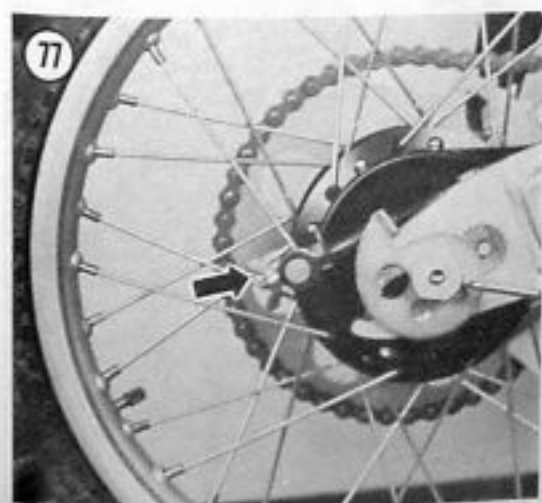
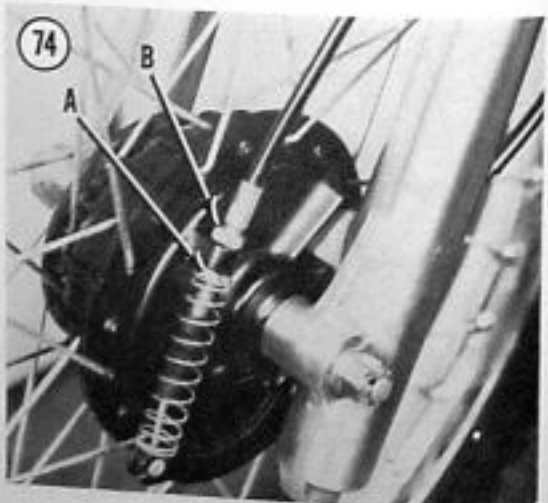
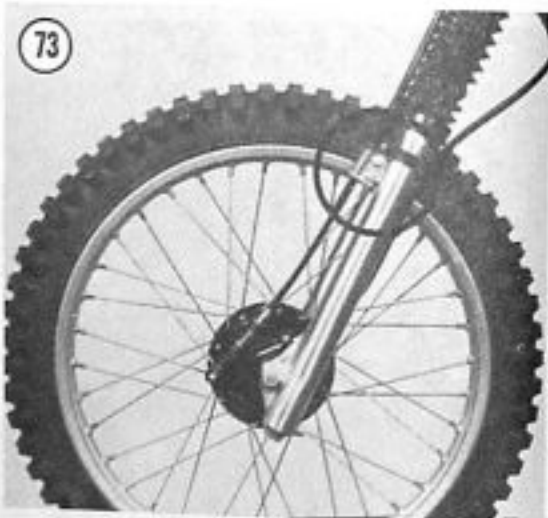
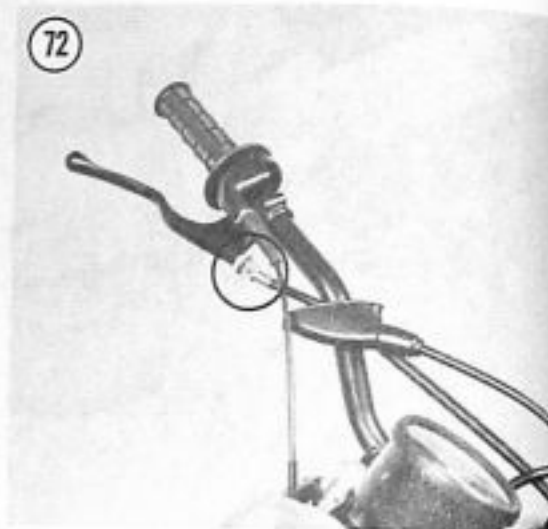
Rear Brake Pedal Height Adjustment

The rear brake pedal should be adjusted to your own personal preference.

1. Place the bike on the sidestand.
2. Check that the brake pedal is in the at-rest position.
3. To change height position, loosen the locknut and turn the adjuster. Refer to Figure 75 or Figure 76.
4. Tighten the locknut and adjust the brake pedal free play as described in this chapter.

Rear Brake Pedal Free Play Adjustment

Adjust the brake pedal to the desired height as described earlier. Turn the adjustment nut on the end of the brake rod, or the cable on XR200R models (Figure 77), until the pedal has the following amount of free play:



- a. Model XR200R—15-20 mm (5/8-3/4 in.)
- b. All other models—20-30 mm (3/4-1 1/4 in.)

Free play is the distance the pedal travels from the at-rest position to the applied position (Figure 78) when the pedal is lightly depressed by hand.

Rotate the rear wheel and check for brake drag. Also operate the pedal several times to make sure it returns to the at-rest position immediately after release.

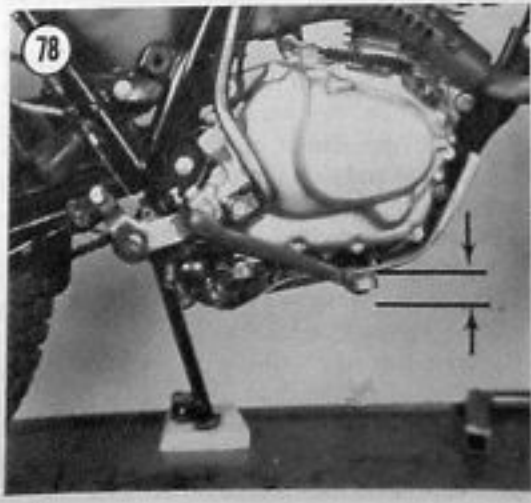
Clutch Adjustment

The clutch free play adjustment should be checked at the intervals shown in Table 1.

Clutch adjustment is limited to clutch lever free play. The cable adjustment takes up slack caused by cable stretching. There is no provision for adjusting the clutch mechanism.

If the proper amount of free play cannot be achieved by using this adjustment procedure, the cable has stretched to the point that it needs to be replaced. Refer to *Clutch Cable Replacement* in Chapter Five.

1. Slide back the rubber protective boot.
2. Loosen the locknut on the hand lever and screw in the adjuster barrel (Figure 79) until 10-20 mm (3/8-3/4 in.) of free play is obtained at the tip of the lever (Figure 80). Tighten the locknut.



NOTE

If the proper amount of free play cannot be achieved at the hand lever, additional adjustment can be made close to the clutch actuating lever on the right-hand side of the engine.

3. At the hand lever, loosen the locknut and turn the adjuster barrel all the way in toward the hand lever. Tighten the locknut.
4. On the right-hand side of the engine, loosen the locknut and turn the adjuster barrel (Figure 81) until the correct amount of lever free play is obtained. Tighten the locknut.
5. If necessary, repeat Step 2 for fine adjustment.
6. After adjustment is completed, check that the locknuts are tight on both the hand lever and at the right-hand side of the engine.
7. Test ride the bike and make sure the clutch is operating correctly.

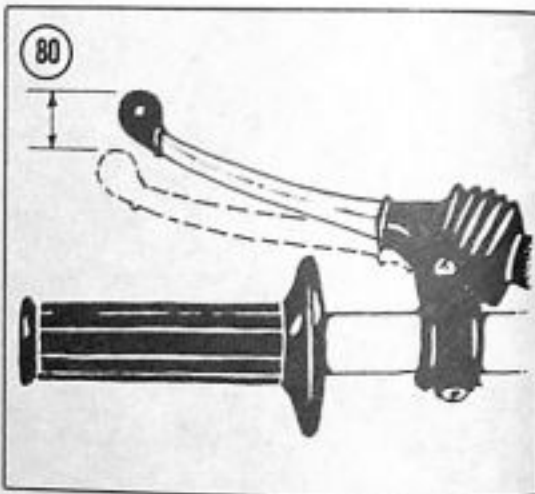
Throttle Adjustment and Operation

The throttle grip should have 2-6 mm (1/8-1/4 in.) of rotational free play. If adjustment is necessary, slide back the rubber boot, loosen the locknut (Figure 82) and turn the adjuster at the throttle grip in or out to achieve proper free play rotation. Tighten the locknut.

If the proper amount of free play cannot be produced by the adjuster at the throttle grip there is an additional adjustment point at the top of the carburetor. Remove the seat and the fuel tank as described under *Fuel Tank Removal/Installation* in Chapter Six. Loosen the locknut and turn the adjuster (Figure 83) to achieve the proper amount of free play. Tighten the locknut.

Check the throttle cable from grip to carburetor. Make sure it is not kinked or chafed. Replace as necessary.

Make sure the throttle grip rotates freely from a fully closed to fully open position. Check with the handlebar at center, at full right and at full left. If necessary, remove the throttle grip and apply a lithium base grease to it.

**Starter Decompressor Adjustment**

This procedure pertains to all models except the XL125S which is not equipped with a starter decompressor.

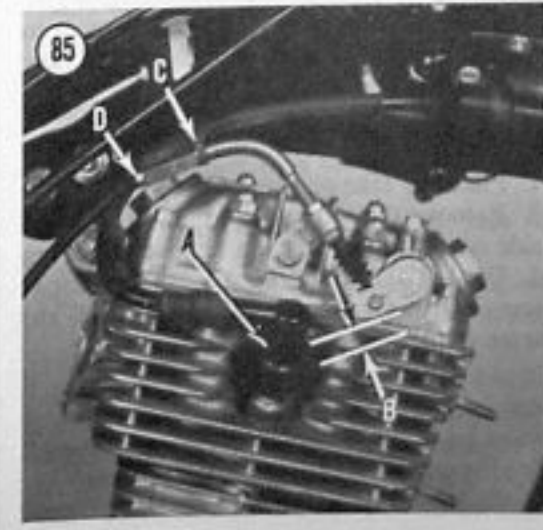
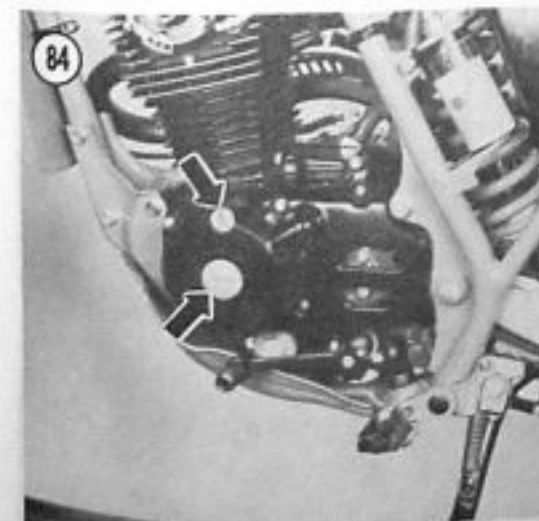
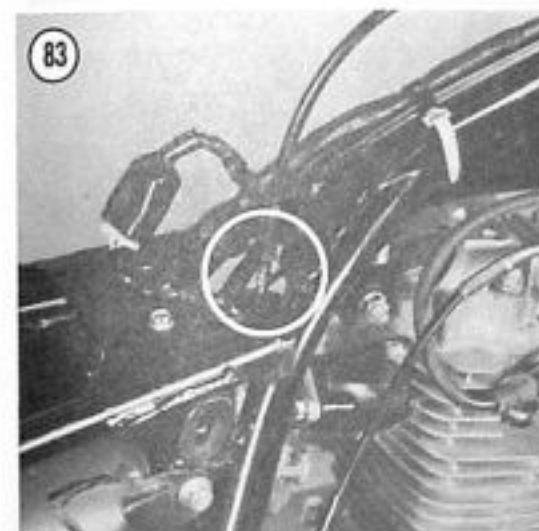
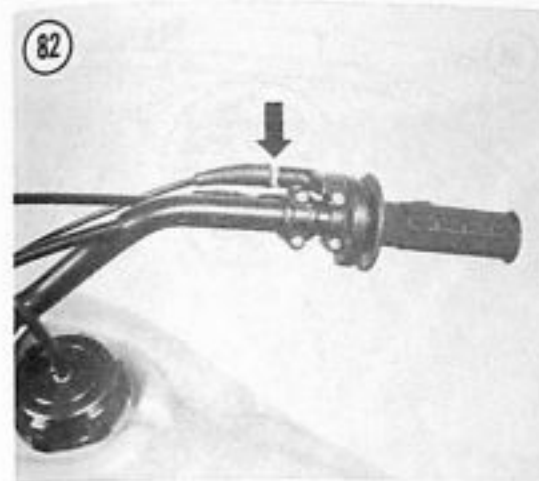
NOTE

Valve clearance must be correctly adjusted prior to adjusting the decompressor. Refer to *Valve Clearance Adjustment* under *Tune-up* in this chapter.

1. Place the bike on the sidestand.
2. Remove the fuel tank as described under *Fuel Tank Removal/Installation* in Chapter Six.
3. Remove the 2 inspection hole covers (Figure 84) on the left-hand crankcase cover.
4. Remove the spark plug (A, Figure 85). This will make it easier to rotate the engine by hand.
5. Rotate the crankshaft with the nut on the alternator rotor. Turn the nut counterclockwise until the piston is at top dead center (TDC) on the compression stroke.

NOTE

A piston at TDC on its compression stroke will have both of its rocker arms loose, indicating that both the exhaust and the intake valves are closed. Remove the valve adjustment covers and make this test.



6. Make sure the "T" mark on the alternator rotor aligns with the fixed notch in the case (Figure 86).

7. Measure the free play at the tip of the valve lifter lever (B, Figure 85). The correct amount of free play is 1-2 mm (0.04-0.10 in.).

8. To adjust the free play, loosen the locknut (C, Figure 85) and turn the adjusting nut (D, Figure 85) until the correct amount of free play is achieved. Tighten the locknut.

CAUTION

If the free play is not adjusted correctly it will result in hard starting (excessive free play) or cause erratic engine idle and a burned exhaust valve (insufficient free play).

9. Install the valve adjusting covers, the spark plug, the 2 inspection hole covers and the fuel tank.

Air Cleaner

The air cleaner element should be removed and cleaned at the intervals shown in Table 1.

The air cleaner removes dust and abrasive particles from the air before the air enters the carburetor and engine. Without the air cleaner, very fine particles could enter into the engine and cause rapid wear of the piston rings, cylinder and bearings. They also might clog small passages in the carburetor. Never run the bike without the air cleaner element installed.

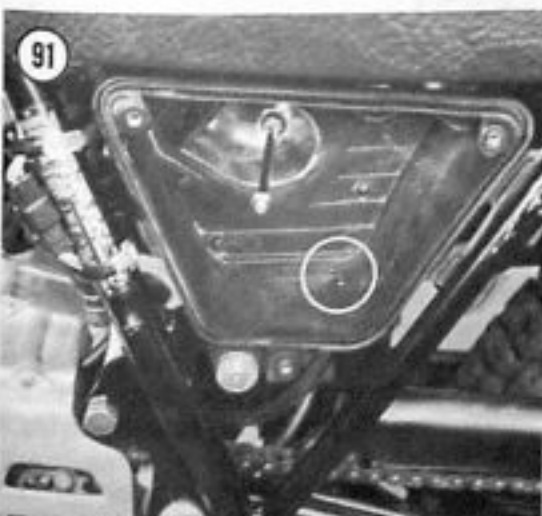
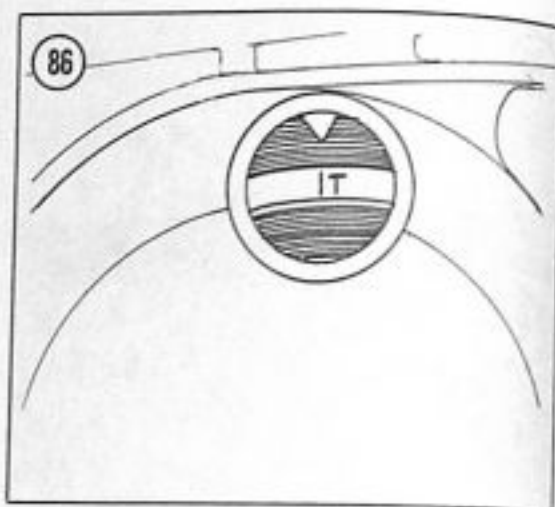
Proper air cleaner servicing can do more to ensure long service from your engine than any other single item.

Servicing

1. Place the bike on the side-stand.
2. Remove the screws securing the left-hand side cover (Figure 87) and remove the cover.
3. On XR200R models, remove the screws securing the air cleaner cover (Figure 88) and remove the cover.

NOTE

On all other models the side cover is fitted with a sealing gasket enabling the side cover to also act as the air cleaner cover.



4A. On XR200R models, remove the wing nut (A, Figure 89) securing the holder bar. Hinge the holder bar up (B, Figure 89) and pull the air cleaner element and holder (C, Figure 89) out of the air box.

4B. On all other models, remove the wing nut (A, Figure 90) and pull the element and holder (B, Figure 90) out of the air box.

5. Remove the air cleaner element from the holder.

6. Wipe out the interior of the air box with a shop rag and cleaning solvent. Remove any foreign matter that may have passed through a broken element. Make sure the drain hole is open (Figure 91).

7. Clean the element gently in cleaning solvent until all dirt is removed. Thoroughly dry in a clean shop cloth until all solvent residue is removed. Let it dry for about one hour.

NOTE

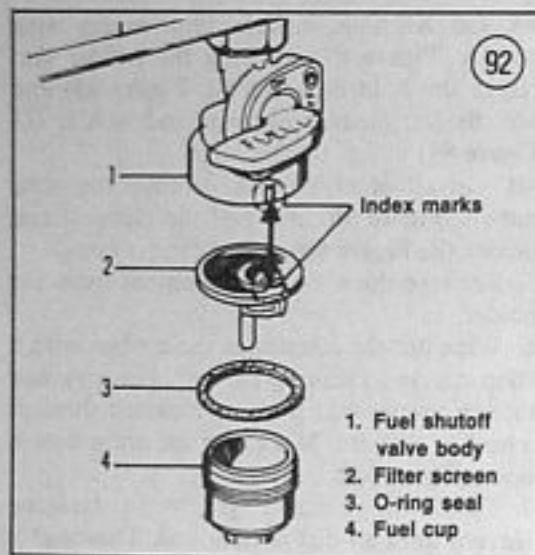
Inspect the element; if it is torn or broken in any area it should be replaced. Do not run with a damaged element as it may allow dirt to enter the engine.

8. Pour a small amount of SAE 80 or SAE 90 gear oil or foam air filter oil onto the element and work it into the porous foam material. Do not oversaturate the element as too much oil will restrict air flow. The element will be discolored by the oil and should have an even color indicating that the oil is distributed evenly. If the foam air filter oil was used let the element dry for another hour prior to installation. If installed too soon, the chemical carrier in the special foam air filter oil will be drawn into the engine and may cause damage.

9. Install the air cleaner element onto the element holder.

10. Apply a light coat of multipurpose grease to the inside sealing edge of the element where it seats against the air box.

11. Install the air cleaner element and holder into the air box. On XR200R models, make sure that the "UP" mark is facing up toward the top. On all other models, make sure that the "TOP" mark is facing up toward the top.



Make sure that the air cleaner element is properly seated against the air box.

CAUTION

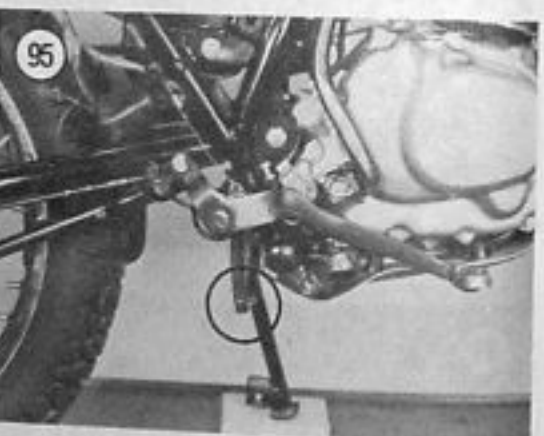
An improperly seated air cleaner element will allow dirt and grit to enter the carburetor and engine, causing expensive engine damage.

12. On XR200R models, hinge down the holder bar.
13. On all models, install the wing nut and tighten securely.
14. On all models except the XR200R, inspect the sealing gasket on the side cover, replace if necessary. Apply a light coat of multipurpose grease to the sealing edge of the gasket on the side cover. This will provide a good airtight seal between the element and the side cover. Install the element into the air box. Make sure it seats properly against the air box.

CAUTION

An improperly installed air cleaner element will allow dirt and grit to enter the carburetor and engine, causing expensive engine damage.

15. On XR200R models, install the air cleaner cover and tighten the screws securely.
16. On all models, install the side cover. On all models except XR200R, make sure the side cover is properly seated against the air box.



Fuel Strainer (XL185S)

Refer to Figure 92 for this procedure.

1. Turn the fuel shutoff valve to the OFF position.
2. Unscrew the fuel cup, O-ring seal and filter screen from the bottom of the fuel shutoff valve. Properly dispose of fuel remaining in the fuel cup.
3. Clean the filter screen with a medium soft toothbrush and blow out with compressed air.

Replace the filter screen if it is broken in any area.

4. Wash the fuel cup in kerosene to remove any residue or foreign matter. Thoroughly dry with compressed air.
5. Align the index marks on the filter screen and the fuel shutoff valve body.
6. Install the O-ring and screw onto the fuel cup.
7. Hand-tighten the fuel cup and then tighten to a final torque of 3-5 N·m (2-4 ft.-lb.). Do not over-tighten the fuel cup as it may be damaged.
8. Turn the fuel shutoff valve to the ON position and check for leaks.

Fuel Shutoff Valve and Filter Removal/Installation

The integral fuel filter in the fuel shutoff valve removes particles in the fuel which might otherwise enter the carburetor. This could cause the float needle to stay in the open position or clog one of the jets.

1. Turn the fuel shutoff valve to the OFF position (A, Figure 93) and remove the fuel line from the valve (B, Figure 93).

NOTE

The fuel tank can either be removed or left in place; drain all fuel from it in either case.

2. Install a longer piece of clean fuel line to the valve and place the loose end into a clean, sealable metal container. If the fuel is kept clean, it can be reused.
3. Turn the fuel shutoff valve to the RES position and open the fuel filler cap. This will speed up the flow of fuel. Drain the tank completely.
- 4A. On models with a metal fuel tank, unscrew the locknut (Figure 94) securing the fuel shutoff valve to the fuel tank and remove the valve.
- 4B. On models with a plastic fuel tank, remove the screws (C, Figure 93) securing the fuel shutoff valve to the fuel tank and remove the valve.
5. After removing the valve, insert a corner of a clean shop rag into the opening in the tank to stop the dribbling of fuel onto the engine and frame.

6. Remove the fuel filter from the shutoff valve. Clean it with a medium soft toothbrush and blow out with compressed air. Replace if it is defective.
7. Install by reversing these removal steps. Do not forget to install the gasket between the valve and the tank. Check for fuel leakage after installation is completed.

Fuel Line Inspection

Inspect the condition of the fuel line from the fuel tank to the carburetor (B, Figure 93). If it is cracked or starting to deteriorate it must be replaced. Make sure the small hose clamps are in place and holding securely.

WARNING

A damaged or deteriorated fuel line presents a very dangerous fire hazard to both the rider and the bike if fuel should spill onto a hot engine or exhaust pipe.

Crankcase Breather (U.S. Models Only)

To clean out the breather system, remove the drain plug (Figure 95) and drain out all residue from the hose line at the intervals shown in Table 1.

NOTE

This operation should be performed more often if a considerable amount of riding is done at full throttle or in the rain.

Install the cap; make sure the clamp is tight.

Refer to Chapter Six for more complete details on the breather system.

Spark Arrester Cleaning

The spark arrester should be cleaned at the intervals shown in Table 1.

NOTE

On the XL series, the spark arrester is installed on U.S. models only.

WARNING

To avoid burning your hands, do not perform this cleaning operation with the exhaust system hot. Work in a well-ventilated area (outside of your garage) that is free of any fire hazards. Be sure to protect your eyes with safety glasses or goggles.

1A. On 1979 XL125S and XL185S models, remove the screw securing the spark arrester and withdraw the spark arrester from the end of the muffler.

1B. On all other models, remove the screws (Figure 96) securing the muffler lid and remove the muffler lid and the gasket.

2A. On all models except the 1979 XL125S and XL185S, block the opening of the muffler with shop cloths.

2B. On 1979 XL125S and XL185S models, leave the end of the muffler open.

3. Start the engine and rev it up about 20 times to blow out accumulated carbon in the tail section of the muffler. Continue until carbon stops coming out of the muffler opening.

4. Turn the engine off, remove the shop cloths and let the muffler cool off.

5. Inspect the gasket on the muffler lid (if so equipped). If it is damaged or deteriorated, replace it prior to installing the muffler lid.

6A. On 1979 XL125S and XL185S models, install the spark arrester.

6B. On all other models install the muffler lid and gasket and tighten the screws securely.

NOTE

On XR200R models, do not remove the 2 screws from the end of the spark arrester. These 2 mounting screws must be installed at all times for the spark arrester to function properly.

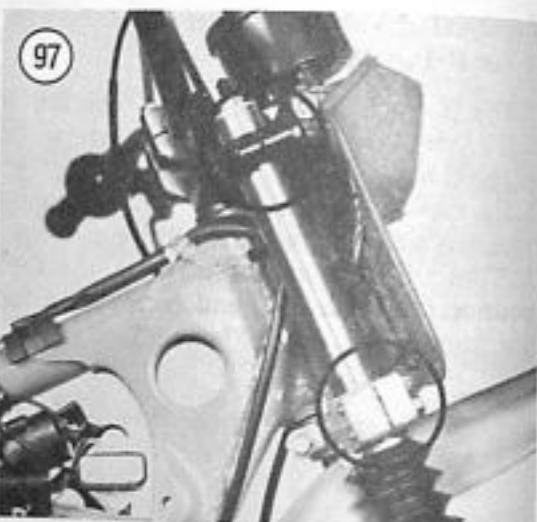
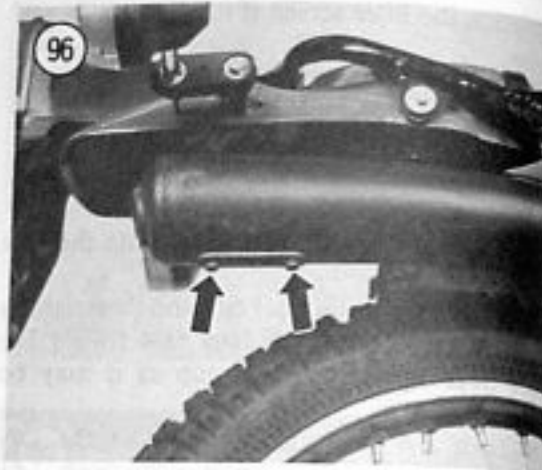
Wheel Bearings

There is no factory-recommended mileage interval for cleaning and repacking the wheel bearings. They should be serviced whenever they are removed from the wheel hub or whenever there is the likelihood of water contamination. The service procedures are covered in Chapter Eight and Chapter Nine.

Steering Head Adjustment Check

The steering head is fitted with loose ball bearings. It should be checked every 8,000 miles (12,800 km) on XL series models or every 1,000 miles (1,600 km) on XR series models.

Place a milk crate or wood block(s) so that the front wheel is off the ground. Hold onto the



front fork tubes and gently rock the fork assembly back and forth. If you can feel looseness refer to *Steering Head Adjustment* in Chapter Eight.



be removed and trued. Refer to *Spoke Adjustment* in Chapter Eight.

Front Suspension Check

1. Apply the front brake and pump the forks up and down as vigorously as possible. Check for smooth operation and check for any oil leaks.

2. Make sure the upper and lower fork bridge bolts (Figure 97) are tight.

3. Check the tightness of the handlebar holder bolts (Figure 98) securing the handlebar.

4A. On XR200R models, check that the 4 nuts securing the front axle holder are tight (Figure 99).

4B. On all other models, make sure the front axle nut is tight and that the cotter pin is in place.

CAUTION

If any of the previously mentioned bolts and nuts are loose, refer to Chapter Eight for correct procedures and torque specifications.

Rear Suspension Check

1. Place a milk crate or wood block(s) under the engine to support it securely with the rear wheel off the ground.

2. Push hard on the rear wheel (sideways) to check for side play in the rear swing arm bushings.

3A. On dual-shock models, check the tightness of the upper and lower shock absorber mounting bolts and nuts (Figure 100).

3B. On Pro-Link models, make sure all shock absorber and linkage bolts and nuts are tight. Refer to Figure 101, Figure 102 and Figure 103.

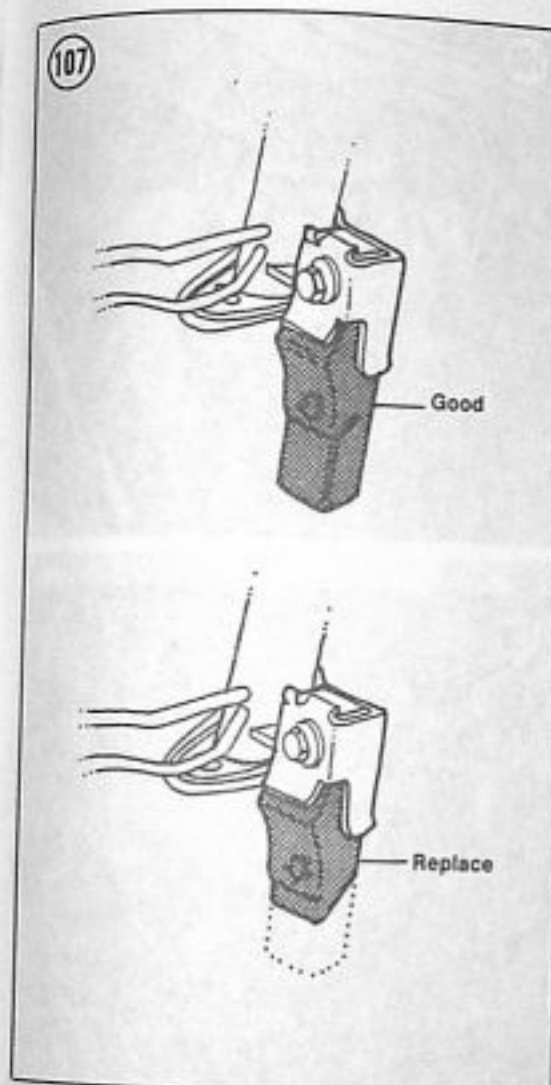
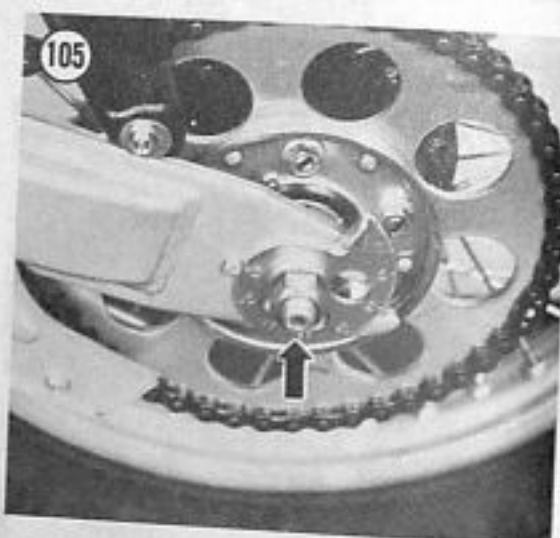
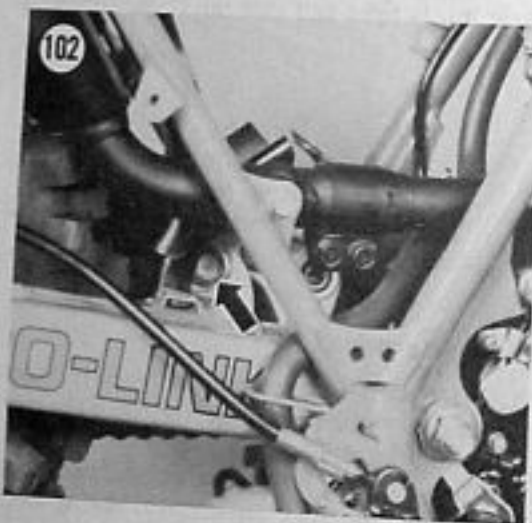
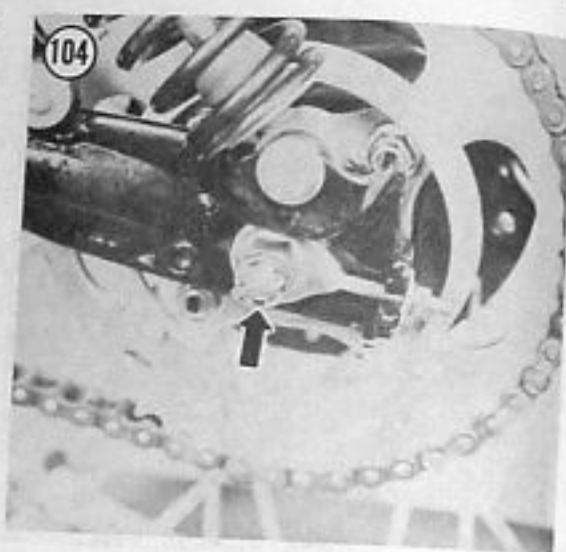
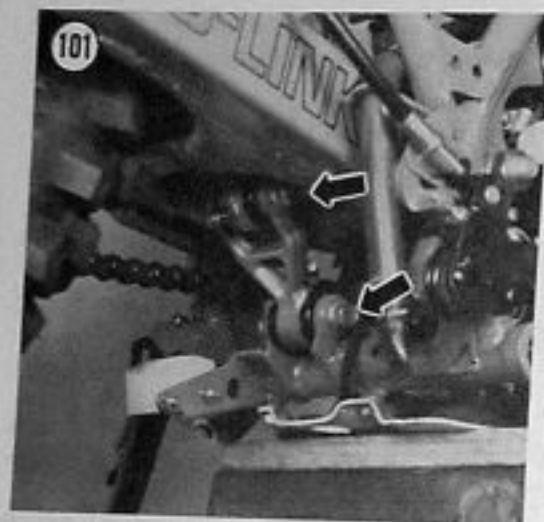
4A. On dual-shock models, make sure the rear axle nut is tight and the cotter pin is in place (Figure 104).

4B. On Pro-Link models, make sure the self-locking rear axle nut is tight (Figure 105). There is no cotter pin on these models.

5. Check the tightness of the rear brake torque arm bolts (Figure 106). Make sure the cotter pin is in place.

Wheel Hubs, Rims and Spokes

Check wheel hubs and rims for bends and other signs of damage. Check both wheels for broken or bent spokes. Replace damaged or broken spokes as described under *Wheels* in Chapter Eight. Pluck each spoke with your finger like a guitar string or tap each one lightly with a small hammer. All spokes should emit the same sound. A spoke that is too tight will have a higher pitch than the others; one that is too loose will have a lower pitch. If only one or two spokes are slightly out of adjustment, adjust them with a spoke wrench made for this purpose. If more are affected, the wheel should



**Sidestand Rubber
(XL Models)**

The rubber tip on the sidestand kicks the sidestand up if you should forget. If it wears down to the molded line (Figure 107) it will no longer be effective and must be replaced. Remove the bolt and replace the rubber tip with a new one.

ENGINE TUNE-UP

A complete tune-up should be performed at the intervals shown in Table 1.

On XL and TLR series models, more frequent tune-ups may be required if the bike is ridden primarily in stop-and-go traffic. On XR series models, if you are racing the bike it is wise to tune up the bike prior to each race.

The number of definitions of the term "tune-up" is probably equal to the number of people defining it. For the purposes of this book, a tune-up is general adjustment and maintenance to ensure peak engine performance.

Table 7 summarizes tune-up specifications.

The spark plug should be routinely replaced at every other tune-up or if the electrodes show signs of erosion. Have new parts on hand before you begin.

Because different systems in an engine interact, the procedures should be done in the following order.

- Clean or replace the air cleaner element
- Adjust valve clearances
- Adjust camshaft chain tension
- Run a compression test
- Check or replace spark plug
- Check and adjust the ignition timing
- Adjust the carburetor idle speed

To perform a tune-up on your Honda, you will need the following tools and equipment:

- 18 mm spark plug wrench
- Socket wrench and assorted sockets
- Flat feeler gauge
- Special tool for adjusting the valve clearance (Honda Valve Adjusting Wrench part No. 07908-3230000)

CAUTION

If any of the previously mentioned bolts and nuts are loose, refer to Chapter Nine for correct procedures and torque specifications.

Nuts, Bolts and Other Fasteners

Constant vibration can loosen many of the fasteners on the motorcycle. Check the tightness of all fasteners, especially those on:

- Engine mounting hardware
- Engine crankcase covers
- Handlebar and front forks
- Gearshift lever
- Kickstarter lever
- Brake pedal and lever
- Exhaust system

- c. Spark plug wire feeler gauge and gapper tool
- f. Compression gauge
- g. Ignition timing light
- h. Portable tachometer

Valve Clearance Adjustment

Valve clearance adjustment must be made with the engine cool, at room temperature (below 95° F/35° C). The correct intake valve clearance is shown in Table 6.

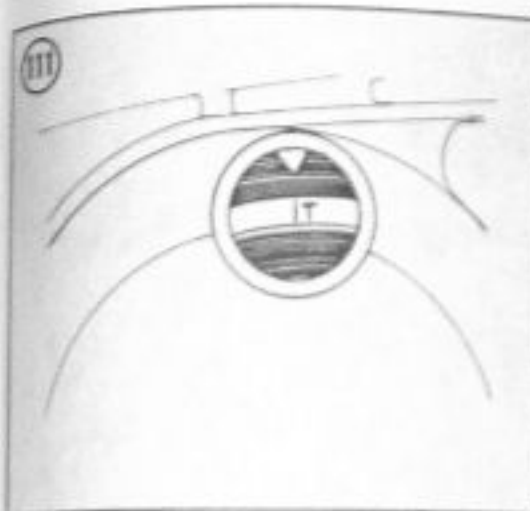
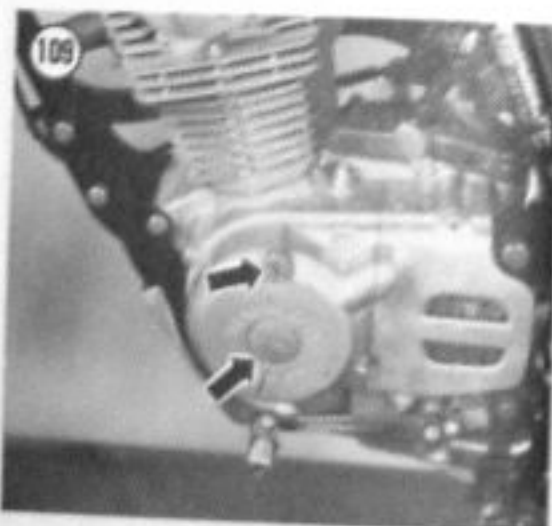
The exhaust valve is located at the front of the engine and the intake valve is at the rear of the engine.

1. Place the bike on the sidestand.
2. Remove the seat and the fuel tank (A, Figure 108) as described under *Fuel Tank Removal/Installation* in Chapter Six.
3. Use the 24 mm wrench furnished in the owner's tool kit and remove both valve adjustment covers (B, Figure 108).
4. Disconnect the spark plug lead (C, Figure 108).
5. Remove the 2 inspection hole covers (Figure 109) located on the left-hand crankcase cover.
6. Remove the spark plug (A, Figure 110)—this will make it easier to rotate the engine.
7. Rotate the crankshaft with the nut on the alternator rotor. Turn it *counterclockwise* until the piston is at top dead center (TDC) on the compression stroke.

NOTE

A piston at TDC on its compression stroke will have free play in both of its rocker arms, indicating that both the intake and exhaust valves are closed.

8. Make sure the "T" mark on the alternator rotor aligns with the fixed notch in the crankcase (Figure 111).
9. If the engine timing mark is aligned with the "T" mark, but both rocker arms are not loose, rotate the engine an additional 360° (one full turn) until both valves have free play.



10. Check the clearance of both the intake and exhaust valves by inserting a flat feeler gauge between the rocker arm pad and the camshaft lobe (B, Figure 110). When the clearance is correct, there will be a slight resistance on the feeler gauge when it is inserted and withdrawn.

NOTE

The following steps require the use of a special tool, Honda Valve Adjusting Wrench part No. 07908-321000.

11. To correct the clearance, use the valve adjusting wrench (Figure 112) and back off the locknut. Screw the adjuster in or out so there is a slight resistance felt on the feeler gauge. Hold the adjuster to prevent it from turning further and tighten the locknut securely. Then recheck the clearance to make sure the adjuster did not slip when the locknut was tightened. Readjust if necessary.
12. Rotate the engine 360° and repeat Step No. 10 to make sure the adjustment is correct. If the clearance is still not correct, repeat Step No. 11 until it is correct.
13. Inspect the condition of the rubber gasket on each valve adjusting cover. Replace if they are starting to deteriorate or harden; replace as a set even if only one is bad. Install both covers and tighten securely.
14. Install the spark plug and attach the spark plug lead.
15. On all models except the XL125S, adjust the starter decompressor as described under *Starter Decompressor Adjustment* in this chapter.
16. Install both inspection caps, the fuel tank and the seat.

Air Cleaner Element

The air cleaner element should be cleaned or replaced prior to doing other tune-up procedures. Refer to *Air Cleaner Servicing* in this chapter.

Camshaft Chain Tensioner Adjustment

In time the camshaft chain and guide will wear and develop slack. This will cause engine noise and if neglected too long will cause

engine damage. The chain tension should be adjusted at the intervals listed or whenever it becomes noisy.

1. Place the bike on the sidestand.
2. Start the engine and let it reach normal operating temperature. Shut off the engine.
3. Connect a portable tachometer following the manufacturer's instructions.
4. Remove the rubber cap covering the adjuster bolt assembly. It is located just behind the cylinder on the upper left-hand side of the crankcase.
5. Restart the engine and let it idle at the engine speed specified in Table 6.
6. Loosen the upper adjuster bolt (Figure 113). The tensioner will automatically adjust to the correct tension. Retighten the adjuster bolt to 15-22 N·m (11-16 ft.-lb.).

NOTE

Do not loosen the lower 6 mm bolt as engine oil will squirt out.

7. Turn the engine off and disconnect the portable tachometer.
8. Install the rubber boot.

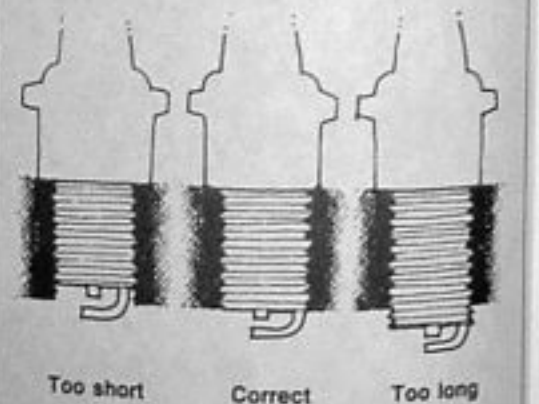
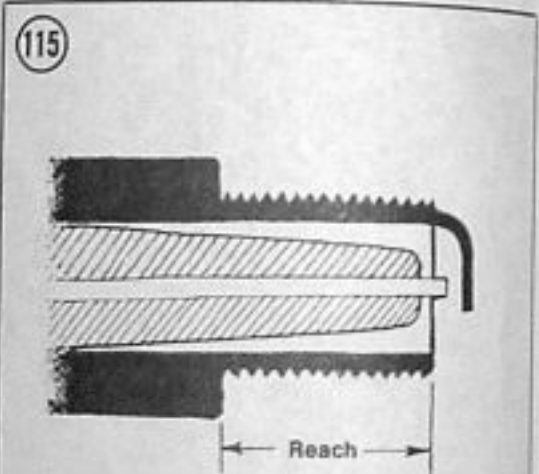
Compression Test

A compression test should be performed at the mileage intervals shown in Table 1.

Record the results and compare them with the test readings at the next test interval. A running record will show trends in deterioration so that corrective action can be taken before complete failure occurs to a given set of parts.

The results, when properly interpreted, can indicate general cylinder, piston ring and valve condition.

1. Place the bike on the sidestand.
2. Start the engine and let it reach normal operating temperature. Shut the engine off.
3. Fully open the throttle lever and raise the choke lever or knob all the way up to the completely open position.



spark plug hole onto the top of the piston. Turn the engine over once to distribute the oil, then take another compression reading. If the compression increases significantly, the valves are good but the piston rings are defective. If compression does not increase, the valves require servicing (providing the starter decompressor lever is adjusted correctly). A valve could be hanging open or burned or a piece of carbon could be on a valve seat.

Install the spark plug and connect the spark plug lead.

Correct Spark Plug Heat Range

Spark plugs are available in various heat ranges, hotter or colder than the plugs originally installed at the factory.

Select a plug of the heat range designed for the loads and conditions under which the bike will be run. Use of incorrect heat ranges can cause a seized piston, scored cylinder wall or damaged piston crown.

In general, use a hot plug for low speeds and low temperatures. Use a cold plug for high speeds, high engine loads and high temperatures. The plug should operate hot enough to burn off unwanted deposits, but not so hot that it is damaged or causes preignition. A spark plug of the correct heat range will show a light tan color on the portion of the insulator within the cylinder after the plug has been in service.

The reach (length) of a plug is also important. A longer than normal plug could interfere with the piston, causing permanent and severe damage; refer to Figure 115. Refer to Table 7 for recommended spark plug heat ranges.

Spark Plug Removal/Cleaning

1. Grasp the spark plug lead (Figure 116) as near the plug as possible and pull it off the plug.

4. Disconnect the spark plug wire and remove the spark plug.

5. Connect a compression gauge to the cylinder following the manufacturer's instructions (Figure 114).

6. Operate the kickstarter several times and check the readings.

CAUTION

Do not turn the engine over more than absolutely necessary. When the spark plug lead is disconnected the electronic ignition will produce the highest voltage possible and the ignition coil may overheat and be damaged.

7. Remove the compression gauge and record the reading. See Table 7 for correct readings.

If the reading is higher than normal, there may be a buildup of carbon deposits in the combustion chamber or on the piston crown.

If a low reading is obtained, it can be caused by one or more of the following faulty items:

- a. A leaking cylinder head gasket
- b. Incorrect valve clearance
- c. Valve leakage (burned valve face)
- d. Worn or broken piston ring
- e. Misadjusted starter decompressor lever free play (except on XL125S models)

If the head gasket is okay, perform a "wet" test to determine which other component is faulty. Pour about one teaspoon of engine oil through the

- If it is stuck to the plug, twist it slightly to break it loose.
2. Blow away any dirt that has accumulated in the spark plug well.

CAUTION

The dirt could fall into the cylinder when the plug is removed, causing serious engine damage.

3. Remove the spark plug with an 18 mm spark plug wrench.

NOTE

If the plug is difficult to remove, apply penetrating oil, like WD-40 or Liquid Wrench (Figure 117), around the base of the plug and let it soak in about 10-20 minutes.

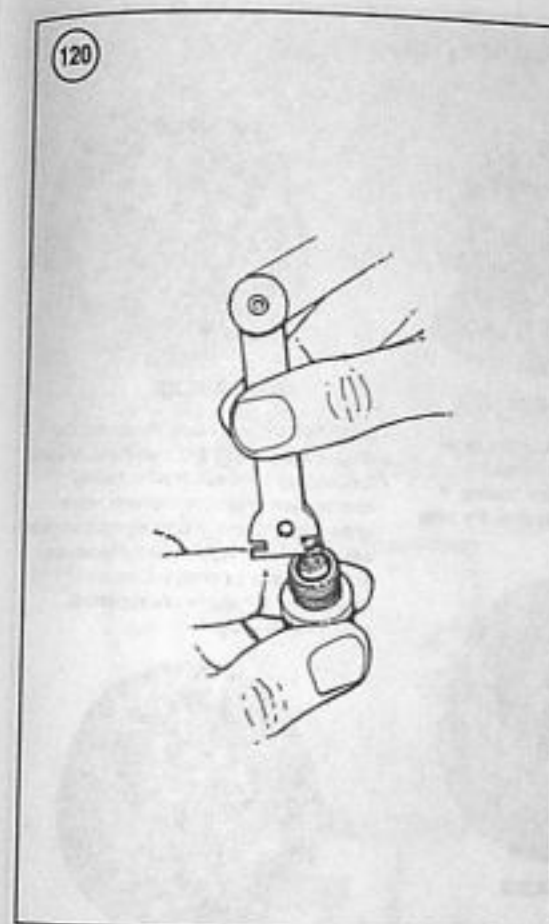
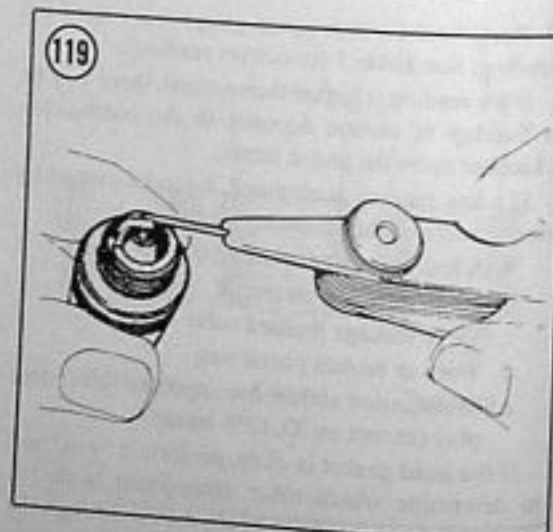
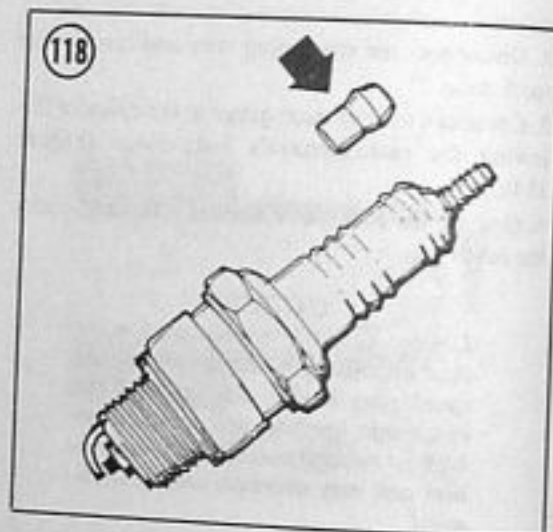


4. Inspect the plug carefully. Look for a broken center porcelain, excessively eroded electrodes and excessive carbon or oil fouling. If any of these problems are present, replace the plug. If deposits are light, the plug may be cleaned in solvent with a wire brush or cleaned in a special spark plug sandblast cleaner. Regap the plug as explained in this chapter.

Gapping and Installing the Plug

A spark plug should be carefully gapped to ensure a reliable, consistent spark. You must use a special spark plug gapping tool and a round feeler gauge.

1. Remove the new spark plug from its box. Do not screw on the small piece that is loose in the box (Figure 118); it is not used.
2. Insert a feeler gauge between the center and side electrode of each plug (Figure 119). The correct gap is 0.6-0.7 mm (0.024-0.028 in.). If the gap is correct, you will feel a slight drag as you pull the gauge through. If there is no drag or the gauge won't pass through, bend the side electrode with a gapping tool (Figure 120) to set the proper gap.
3. Put a small drop of oil on the threads of the spark plug.
4. Screw the spark plug in by hand until it seats. Very little effort is required. If force is necessary, you have the plug cross-threaded; unscrew it and try again.



5. Use a spark plug wrench and tighten the plug an additional 1/4 to 1/2 turn after the gasket has made contact with the head. If you are installing an old, regapped plug and reusing the old gasket, only tighten an additional 1/4 turn.

NOTE

Do not overtighten. This will only squash the gasket and destroy its sealing ability.

6. Install the spark plug lead; make sure it is on tight.

Reading Spark Plugs

Much information about engine and spark plug performance can be determined by careful examination of the spark plug. This information is more valid after performing the following steps.

1. Ride the bike a short distance at full throttle in any gear.

2. Turn the ignition switch to the OFF position before closing the throttle and simultaneously shift to NEUTRAL; coast and brake to a stop.
3. Remove the spark plug and examine it. Compare it to Figure 121.

If the insulator is white or burned, the plug is too hot and should be replaced with a colder one.

A too-cold plug will have sooty or oily deposits ranging in color from dark brown to black. Replace with a hotter plug and check for too-rich carburetion or evidence of oil blowby at the piston rings.

If the plug has a light tan or gray colored deposit and no abnormal gap wear or electrode erosion is evident, the plug and the engine are running properly.

If the plug exhibits a black insulator tip, a damp and oily film over the firing end and a carbon layer over the entire nose it is oil fouled. An oil-fouled plug can be cleaned, but it is better to replace it.

Ignition Timing

All models are equipped with a capacitor discharge ignition system (CDI). This system uses no breaker points, but timing does have to be checked as the base plate may move and alter timing.

Incorrect ignition timing can cause a drastic loss of engine performance and efficiency. It may also cause overheating.

Before starting on this procedure, check all electrical connections related to the ignition system. Make sure all connections are tight and free from corrosion and that all ground connections are clean and tight.

1. Place the bike on the sidestand.
2. Start the engine and let it reach normal operating temperature. Turn the engine off.
3. Remove the timing mark hole cap (Figure 122).
4. Connect a portable tachometer (Figure 123) following the manufacturer's instructions.
5. Connect a timing light (Figure 124) following the manufacturer's instructions.
6. Restart the engine and let it idle at the rpm's specified in Table 7.

SPARK PLUG CONDITION

121



NORMAL

- Identified by light tan or gray deposits on the firing tip.
- Can be cleaned.



GAP BRIDGED

- Identified by deposit buildup closing gap between electrodes.
- Caused by oil or carbon fouling. If deposits are not excessive, the plug can be cleaned.



OIL FOULED

- Identified by wet black deposits on the insulator shell bore and electrodes.
- Caused by excessive oil entering combustion chamber through worn rings and pistons, excessive clearance between valve guides and stems, or worn or loose bearings. Can be cleaned. If engine is not repaired, use a hotter plug.



CARBON FOULED

- Identified by black, dry, fluffy carbon deposits on insulator tips, exposed shell surfaces and electrodes.
- Caused by too cold a plug, weak ignition, dirty air cleaner, too rich a fuel mixture, or excessive idling. Can be cleaned.



LEAD FOULED

- Identified by dark gray, black, yellow, or tan deposits or a fused glazed coating on the insulator tip.
- Caused by highly leaded gasoline. Can be cleaned.



WORN

- Identified by severely eroded or worn electrodes.
- Caused by normal wear. Should be replaced.



FUSED SPOT DEPOSIT

- Identified by melted or spotty deposits resembling bubbles or blisters.
- Caused by sudden acceleration. Can be cleaned.



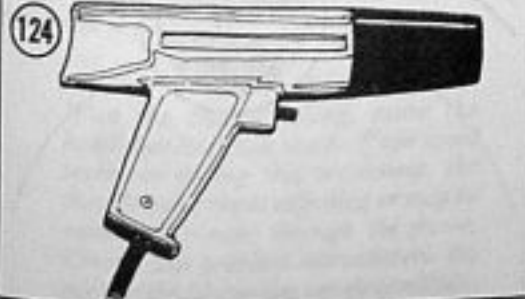
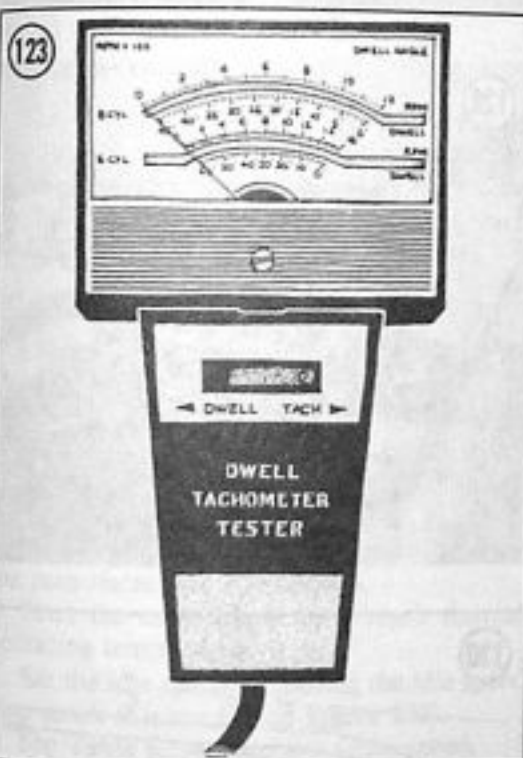
OVERHEATING

- Identified by a white or light gray insulator with small black or gray brown spots and with bluish-burnt appearance of electrodes.
- Caused by engine overheating, wrong type of fuel, loose spark plugs, too hot a plug, or incorrect ignition timing. Replace the plug.



PREIGNITION

- Identified by melted electrodes and possibly blistered insulator. Metallic deposits on insulator indicate engine damage.
- Caused by wrong type of fuel, incorrect ignition timing or advance, too hot a plug, burned valves, or engine overheating. Replace the plug.



7. Adjust the idle speed if necessary as described under *Carburetor Idle Speed Adjustment* in this chapter.

8. Shine the timing light at the timing window and pull the trigger (Figure 125). The timing is correct if the "F" mark aligns with the fixed index mark (Figure 126).

9. If timing is incorrect, stop the engine and continue with this procedure.

10. Remove the pulse generator cover and gasket (Figure 127).

11. Loosen the screws securing the base plate (A, Figure 128). Rotate the base plate clockwise to advance the timing or counterclockwise to retard the timing. Tighten the screws, restart the engine and recheck the timing. Repeat this step until timing is correct. Be sure to tighten the screws securely.

NOTE

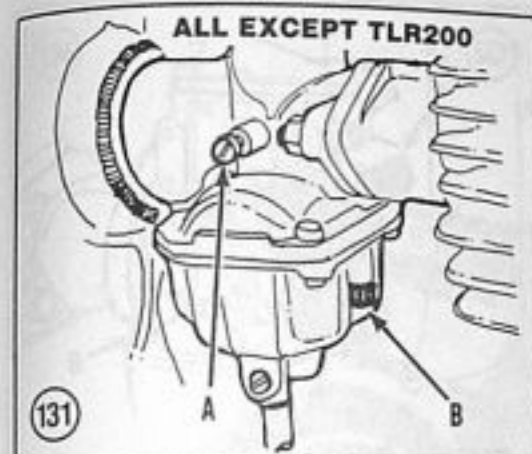
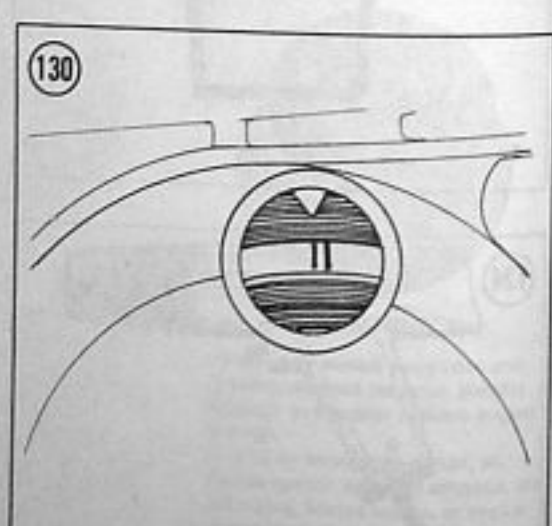
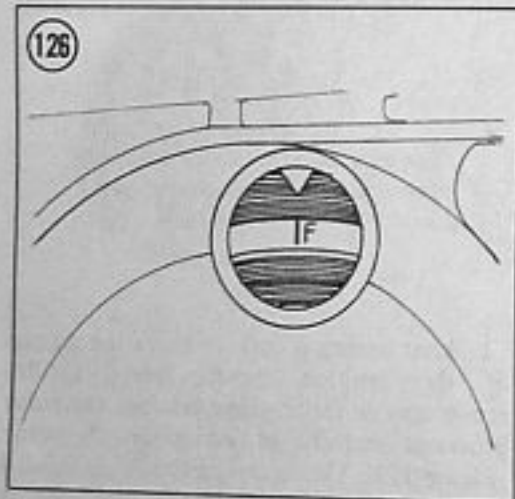
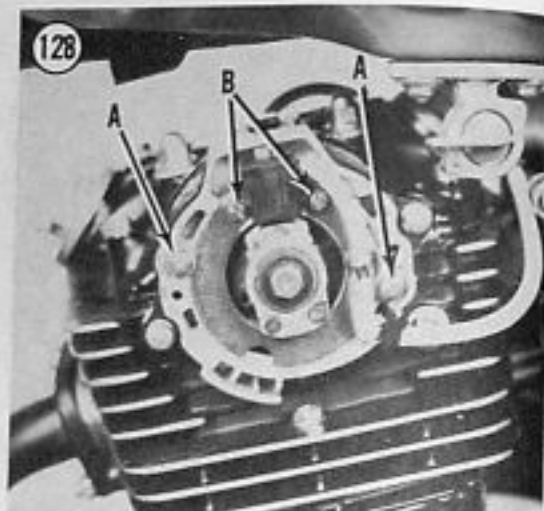
If correct timing cannot be achieved, inspect and test all ignition components as described in Chapter Seven.

12. After timing is correct, check the air gap of the ignition pulse. Insert a flat non-magnetic feeler gauge between the pulse generator and the projection on the rotor (Figure 129). The clearance should be 0.3-0.4 mm (0.012-0.016 in.). If the clearance is incorrect, loosen either or both screws (B, Figure 128) and carefully move the pulse generator to achieve the correct clearance.

13. Also check the ignition advance alignment. Restart the engine and increase engine speed to 1,950 rpm. Ignition advance begins at 1,950 rpm for all models. At this engine speed the ignition advance marks should just begin to align with the fixed index mark (Figure 130). Full ignition advance is achieved at the engine speed specified in Table 7.

If idle speed and timing are correct but full advance is incorrect, refer to *Ignition Advance Mechanism Inspection* in Chapter Seven.

14. Disconnect the timing light and portable tachometer.



15. Install the pulse generator cover and gasket and the timing mark hole cap.

Carburetor Idle Mixture

The idle mixture (pilot screw) is preset at the factory and *is not to be reset*. Do not adjust the pilot screw unless the carburetor has been overhauled. If so, refer to *Idle Speed and Mixture Adjustment* in Chapter Six.

Idle Speed Adjustment

Before making this adjustment, the air cleaner must be clean and the engine must have adequate compression; see *Compression Test* in this chapter. Otherwise, this procedure cannot be done properly.

1. Place the bike on the sidestand.
2. Connect a portable tachometer following the manufacturer's instructions.
3. Start the engine and let it reach normal operating temperature.
4. Set the idle speed by turning the idle speed stop screw (Figure 131 or Figure 132).
5. See Table 6 for the correct idle speed.
6. Open and close the throttle a couple of times; check for variation in idle speed. Readjust if necessary.

WARNING

With the engine idling, move the handlebar from side to side. If idle speed increases during this movement, the throttle cable needs adjusting or may be incorrectly routed through the frame. Correct this problem immediately. Do not ride the bike in this unsafe condition.

7. Turn the engine off and disconnect the portable tachometer.

STORAGE

Several months of inactivity can cause serious problems and a general deterioration of the bike's condition. This is especially true in areas of weather extremes. During the winter months it is advisable to specially prepare the bike for lay-up.

Selecting a Storage Area

Most owners store their vehicle in their home garage. If you do not have a home garage, facilities suitable for long-term storage are readily available for rent or lease in most areas. In selecting a building, consider the following points.

1. The storage area must be dry. Heating is not necessary, but the building should be well-insulated to minimize extreme temperature variations.
2. Buildings with large window areas should be avoided or such windows should be masked if direct sunlight can fall on the bike. This is also a good security measure.
3. Buildings in industrial areas, where factories are liable to emit corrosive fumes, are not desirable nor are facilities near bodies of salt water.
4. The area should be selected to minimize the possibility of loss from fire, theft or vandalism. The area should be fully insured, perhaps with a package covering fire, theft, vandalism, weather and liability. The advice of your insurance agent should be sought in these matters. The building should be fireproof and items such as the security of doors and windows, alarm facility and proximity of police should be considered.

Preparing Bike for Storage

Careful preparation will minimize deterioration and make it easier to restore the bike to service later. Use the following procedure.

1. Wash everything completely. Make certain to remove all dirt from all the hard to reach parts like the cooling fins on the head and

cylinder. Completely dry all parts of the vehicle to remove all moisture. Wax all painted and polished surfaces, including any chromed areas.

2. Run the engine for about 20-30 minutes to warm up the oil in the engine. Drain the oil, regardless of the time since the last oil change. Fill the engine with the normal quantity and type of oil.

3. Drain all gasoline from the fuel tank, the interconnecting hose and the carburetors. Leave the fuel shutoff valve in the RES position. As an alternative, a fuel preservative may be added to the fuel. This preservative is available from many motorcycle shops and marine equipment suppliers.

4. Lubricate the drive chain and control cables; refer to specific procedures in this chapter.

5. Remove the spark plug and pour about one teaspoon of SAE 10W/30 motor oil into the cylinder. Turn the engine over a few revolutions by hand to distribute the oil and then install the spark plug.

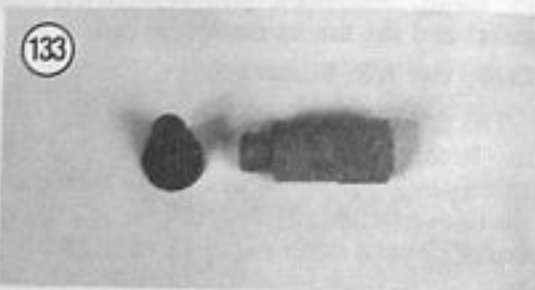
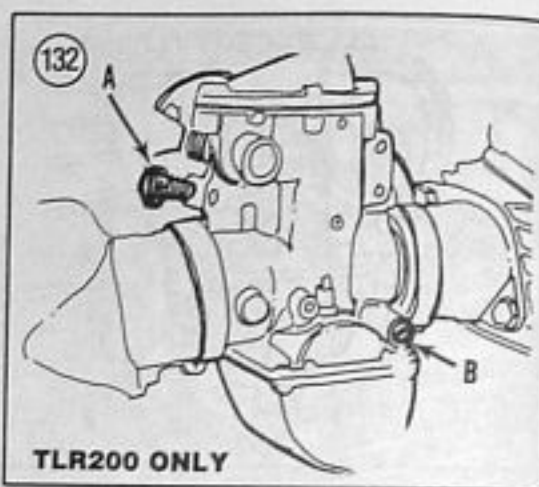
6. On XL series models, remove the battery from the frame. If there is evidence of acid spillage in the battery box, neutralize it with a baking soda solution, wash clean and repaint the damaged area. Store the battery in a warm area and recharge it every 2 weeks.

7. One additional safeguard for winter or prolonged storage is the Engine Protection Dispenser (Figure 133) that screws into the spark plug hole. It dispenses a vapor into the cylinder, crankcase, carburetor and muffler which works against rust and acid damage. It is rated to be good for up to 2 years and is available from the Brookstone Company, 127 Voss Farm Road, Peterborough, New Hampshire 03458. The catalog number is P-3304, "Engine Protection Dispenser."

8. Tape or tie a plastic bag over the end of the muffler to prevent the entry of moisture.

9. Check the tire pressure, inflate to the correct pressure and move the bike to the storage area. Place it securely on a milk crate or wood blocks with both 4 wheels off the ground.

10. Cover the bike with a tarp, blanket or heavy plastic drop cloth. Place this cover mainly as a dust cover—do not wrap it tightly especially if it is plastic, as it may trap



moisture. Leave room for air to circulate around the vehicle.

Inspection During Storage

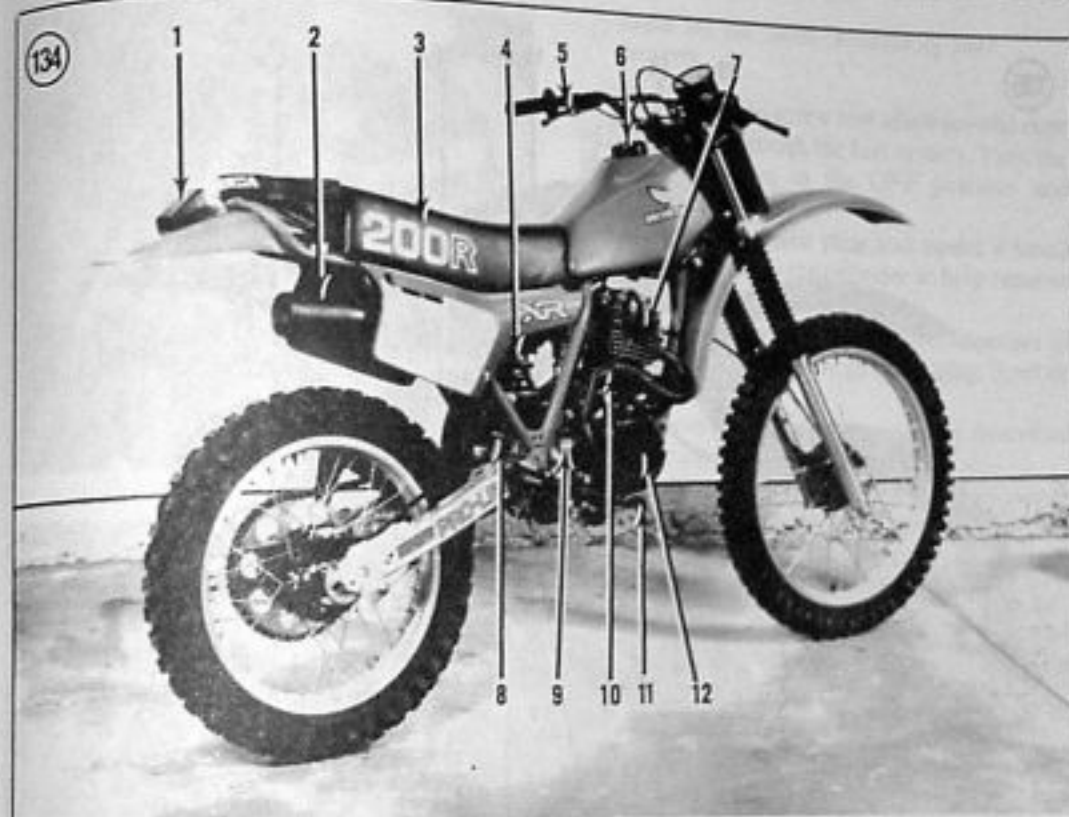
Try to inspect the bike weekly while in storage. Any deterioration should be corrected as soon as possible. For example, if corrosion of bright metal parts is observed, cover them with a light coat of grease or silicone spray after a thorough polishing.

Turn the engine over a couple of times—don't start it; use the kickstarter with the ignition switch in the OFF position.

Restoring the Bike to Service

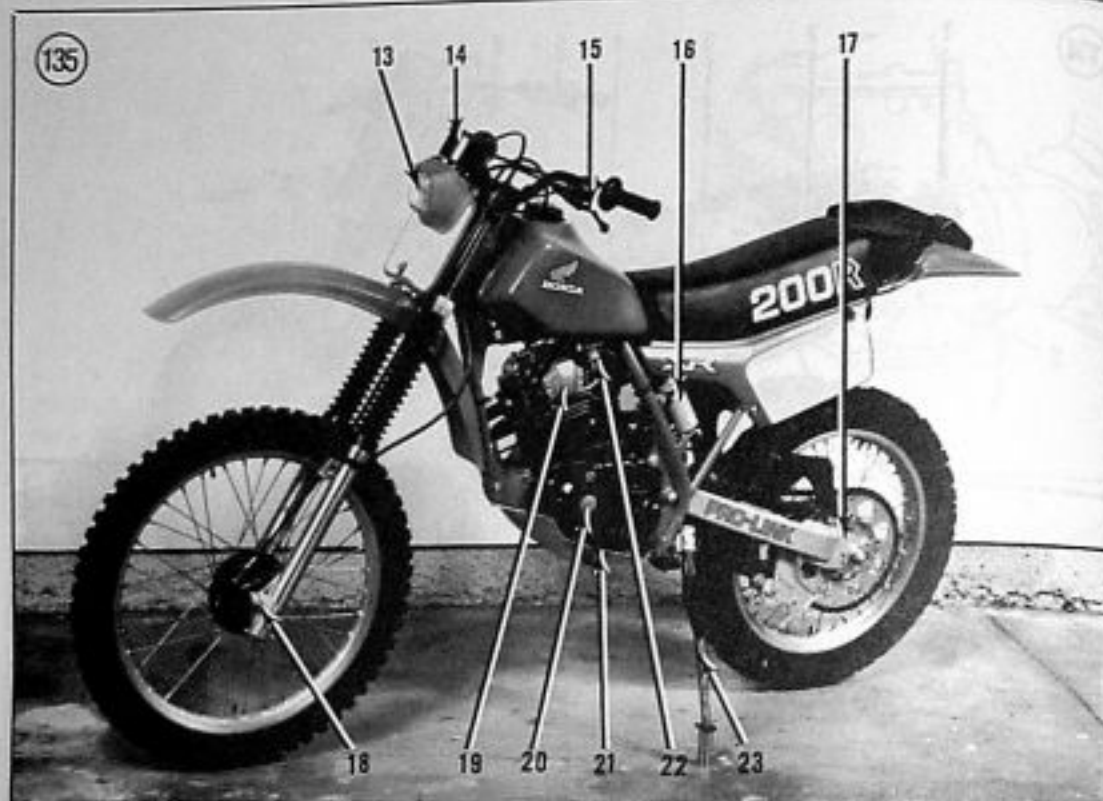
A bike that has been properly prepared and stored in a suitable area requires only light maintenance to restore it to service. It is advisable, however, to perform a tune-up.

1. Before removing the bike from the storage area, reinflate the tires to the correct pressures. Air loss during storage may have nearly flattened the tires and moving the bike can cause damage to tires and rims.



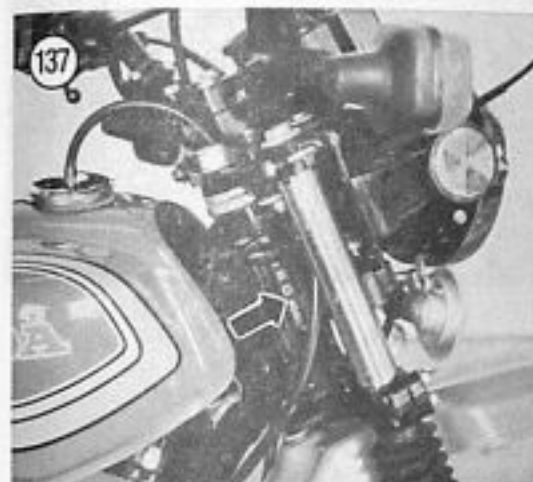
MAJOR CONTROLS AND COMPONENTS

- | | |
|---|--|
| 1. Taillight (XR series),
tail/brake light (XL series) | 7. Spark plug |
| 2. Muffler and spark arrestor | 8. Shock absorber adjustment (Pro-Link models) |
| 3. Seat | 9. Engine oil fill cap |
| 4. Battery (XL series) | 10. Kickstarter |
| 5. Clutch lever | 11. Rear brake pedal |
| 6. Fuel filler cap, vent tube and fuel tank | 12. Clutch |



MAJOR CONTROLS AND COMPONENTS

- | | |
|--|-------------------------|
| 13. Headlight | 19. Ignition pulse unit |
| 14. Speedometer and trip meter | 20. Alternator |
| 15. Clutch lever | 21. Shift lever |
| 16. Remote reservoir (Pro-Link shock absorber) | 22. Fuel shutoff valve |
| 17. Drive chain adjusters | 23. Side stand |
| 18. Speedometer drive unit | |



drain on the floor. Dispose of fuel properly.

4. Open the drain screw and allow several cups of fuel to pass through the fuel system. Turn the fuel shutoff valve to the OFF position and close the drain screws.
5. Remove the spark plug and squirt a small amount of fuel into the cylinder to help remove the oil coating.
6. Remove the engine protection dispenser (if installed) and install a fresh spark plug. Start up the engine.
7. Perform the standard tune-up as described in this chapter.
8. Check the operation of the ignition switch and the headlight and taillight switch. Oxidation of the switch contacts during storage may make them inoperative.
9. On XL series models, install the battery after it has been fully charged.
10. Clean and test ride the bike.

WARNING

If any type of preservative (Armor All or equivalent) has been applied to the tire treads, be sure the tires are well "scrubbed-in" prior to any fast riding or cornering on a hard surface. If not, they will slip right out from under you.

GENERAL SPECIFICATIONS

General information and specifications are listed in Table 7. Refer to Figure 134 and Figure 135 for the location of all major controls.

SERIAL NUMBERS

You must know the model serial numbers and VIN number for registration purposes and sometimes when ordering replacement parts.

The frame serial number is stamped on the left-hand side of the steering head (Figure 136). The vehicle identification number (VIN) is on the right-hand side of the steering head (Figure 137). The engine serial number is located on the bottom, left-hand side of the crankcase below the gearshift lever (Figure 138). The carburetor identification number is located on the right-hand side of the carburetor body as shown in Figure 139.

WARNING
During the next step, place a metal container under the carburetor to catch all fuel or it will create a real fire danger if allowed to drain onto the bike and the floor. Dispose of the fuel properly.

2. When the bike is brought to the work area, drain the fuel tank if fuel preservative was used. Turn the fuel shutoff valve to the OFF position and refill the fuel tank with fresh gasoline.
3. Turn the fuel shutoff valve to the RES position and check for leaks in the fuel system.

WARNING
For the next step, place a metal container under the drain outlet on the float bowl to catch the expelled fuel—this presents a real fire danger if allowed to

PARTS REPLACEMENT

Honda makes frequent changes during a model year, some minor and some relatively major. When you order parts from a dealer or other parts distributor, always order by engine or chassis number. Write the numbers down

and carry them with you. Compare new parts to old parts before purchasing them. If they are not alike, have the parts manager explain the difference to you. This is especially true with electrical components as few dealers or parts houses will allow you to return them for an exchange or refund.

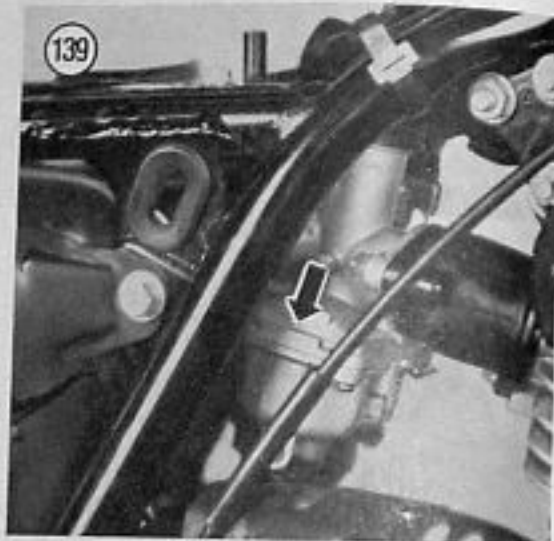
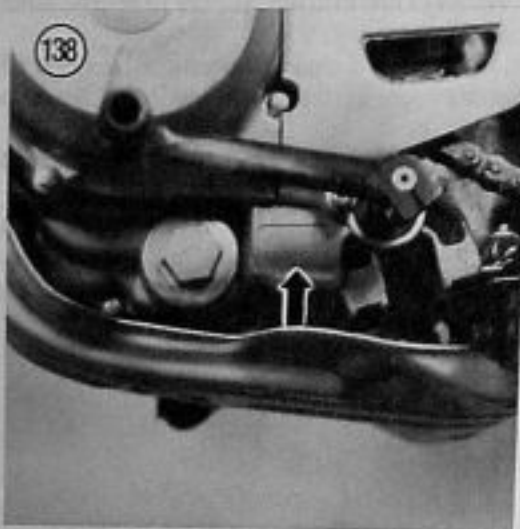


Table 1 MAINTENANCE SCHEDULE*

Every 300 miles (500 km) or as needed (all models)	<ul style="list-style-type: none"> Lubricate and adjust the drive chain
Every 600 miles (1,000 km) or 6 months (all models)	<ul style="list-style-type: none"> Check engine oil level Check battery specific gravity and electrolyte level (XL/TLR) Lubricate rear brake pedal and shift lever Lubricate side stand pivot point Inspect front steering for looseness Check wheel bearings for smooth operation Check wheel spoke condition Check wheel runout Check and adjust clutch lever free play
Every 1,000 miles (1,600 km)—XR series models	
Every 1,250 miles (2,000 km)—XL125S models	
Every 2,000 miles (3,200 km)—XL185S, TLR200 models	<ul style="list-style-type: none"> Change engine oil and clean oil filter screen
Every 1,000 miles (1,600 km)—XR series models	
Every 2,500 miles (4,000 km)—XL125S models	
Every 4,000 miles (6,400 km)—XL185S, TLR200 models	<ul style="list-style-type: none"> Clean and inspect air cleaner element Complete engine tune-up: <ul style="list-style-type: none"> Check and adjust valve clearance Adjust the cam chain tension Check and adjust ignition timing Check and adjust the carburetor Inspect spark plug; regap if necessary Check and adjust starter decompressor free play (all models except XL125S) Check and adjust clutch free play Check and adjust throttle operation and free play Adjust rear brake pedal height and free play Clean fuel shutoff valve and filter Check and adjust the headlight aim (except XR models after 1981) Inspect brake shoes for wear Inspect crankcase breather hoses for cracks or loose hose clamps—drain out all residue Inspect fuel line for chafed, cracked or swollen ends Check engine mounting bolts for tightness Check all suspension components Inspect all drive chain, rollers tensioners and sliders (XR series models only) Lubricate control cables
Every 1,000 miles (1,600 km)—XR series models	
Every 5,000 miles (8,000 km)—XL125S models	
Every 8,000 miles (12,800 km)—XL185S, TLR200 models	<ul style="list-style-type: none"> Remove and clean oil filter rotor
Every 2,000 miles (3,200 km)—XR series models	
Every 3,000 miles (4,830 km)—XL125S models	
Every 6,000 miles (10,000 km)—XL185S, TLR200 models	<ul style="list-style-type: none"> Change front fork oil Inspect wheel bearings

(continued)

Table 1 MAINTENANCE SCHEDULE* (continued)

Every 2,000 miles (3,200 km)—XR series models
Every 6,000 miles (9,600 km)—XL125S models
Every 8,000 miles (12,800 km)—XL185S, TLR200 models
• Dismantle and clean the carburetor
• Replace the spark plug
• Run a compression test
• Inspect and repack the steering head bearings
• Lubricate the speedometer drive cables

* This maintenance schedule should be considered as a guide to general maintenance and lubrication intervals. Harder than normal use and exposure to mud, water, sand, high humidity, etc. will naturally dictate more frequent attention to most maintenance items.

Table 2 TIRE INFLATION PRESSURE

Tire size	Air pressure
Front tire	
2.75×21-4PR	21.3 psi (1.5 kg/cm ²)
2.75×21-6PR	14.2 psi (1.0 kg/cm ²)
3.00×21-6PR	14.2 psi (1.0 kg/cm ²)
Rear tire	
3.50×18-4PR	14.2 psi (1.0 kg/cm ²)
4.00×18-4PR	21.0 psi (1.5 kg/cm ²)
4.10×18-4PR	21.3 psi (1.5 kg/cm ²)
4.10×18-6PR	14.2 psi (1.0 kg/cm ²)

Table 3 BATTERY STATE OF CHARGE

Specific gravity	State of charge
1.110-1.130	Discharged
1.140-1.160	Almost discharged
1.170-1.190	One-quarter charged
1.200-1.220	One-half charged
1.230-1.250	Three-quarters charged
1.260-1.280	Fully charged

Table 4 FRONT FORK OIL CAPACITY*

Model	Year	Capacity
XL125S, XL185S	1979-1984	155 cc (5.24 oz.)
XL125S	1981-1982	160 cc (5.41 oz.)
XL125S	1985	172.5 cc (5.83 oz.)
XL185S	1981	160 cc (5.41 oz.)
XL185S	1982-on	165 cc (5.6 oz.)
XR185	1979	170 cc (5.75 oz.)
XR200	1980-1981	170 cc (5.75 oz.)**
XR200	1982-on	165 cc (5.6 oz.)**
XR200R	1981	271 cc (9.16 oz.)**
XR200R	1982-1983	320 cc (11.0 oz.)**
XR200R	1986-on	350 cc (11.8 oz.)**
XL200R	1983-1984	260 cc (8.9 oz.)
TLR200	1986-on	207 cc (7.0 oz.)

*Capacity for each fork leg.

**Standard capacity. Quantity can be varied to suit rider.

Table 5 FORK DAMPING ADJUSTMENT (XR MODELS)

Model and ride quality	Oil level*
Model XR200 (1982-on)	
Standard ride	173.5 mm (6.83 in.)
Slightly stiffer	149.0 mm (5.87 in.)
Slightly softer	175.5 mm (6.93 in.)
Model XR200R (1981)	
Standard ride	162.5 mm (6.40 in.)
Slightly stiffer	127.0 mm (5.00 in.)
Slightly softer	164.0 mm (6.50 in.)
Model XR200R (1982-1983)	
Standard ride	145.0 mm (5.75 in.)
Slightly stiffer	135.0 mm (5.25 in.)
Slightly softer	175.0 mm (7.00 in.)
Model XR200R (1986-on)	
Standard ride	150.0 mm (5.90 in.)
Slightly stiffer	140.0 mm (5.50 in.)
Slightly softer	170.0 mm (6.70 in.)

*Measured from top of fork tube. See text, Front Fork Oil Change.

Table 6 DRIVE CHAIN LENGTH

Model	Dimension A (pins)	Standard	Service limit
XL125S, XL185S	41	508 mm (20.0 in.)	518 mm (20.4 in.)
XR185	125	1,588 mm (62.5 in.)	1,619 mm (63.7 in.)
XR200	101	1,603 mm (63.1 in.)	1,635 mm (64.4 in.)
XR200R (1981-1983)	107	1,667 mm (65.6 in.)	1,700 mm (66.9 in.)
XR200R (1986-on)	107	1,699 mm (66.9 in.)	1,716 mm (67.6 in.)
XL200R	***		
TLR200	41	635 mm (24.9 in.)	648 mm (25.5 in.)

Table 7 TUNE-UP SPECIFICATIONS

Valve clearance	
Intake	0.05 mm (0.002 in.)
Exhaust	
XL125S, XL185S, XL200R, TLR200	0.05 mm (0.002 in.)
XR185, XR200, XR200R	0.08 mm (0.003 in.)
Compression pressure (at sea level)	
XL125S, XL200R, TLR200	178 ± 21 psi (12.5 ± 1.5 kg/cm ²)
XL185S	192 ± 21 psi (13.5 ± 1.5 kg/cm ²)
XR185, XR200, XR200R	199 psi (14.0 kg/cm ²)
Spark plug type (1979-1981)	
Standard heat range	
U.S.	ND X24ES-U or NGK D8EA
Canadian	ND X24ESR-U or NGK DR8ES-L
Cold weather*	
U.S.	ND X22ES-U or NGK D7EA
Canadian	ND X22ESR-U or NGK DR7ES
Extended high speed riding	
U.S.	ND X27ES-U or NGK D9EA
Canadian	ND X27ESR-U or NGK DR8ES
Spark plug type (1982-on)	
Standard heat range	
U.S.	ND X24ESR-U or NGK DR8ES-L
Canadian	ND X24ESR-U or NGK DR8ES-L
Cold weather*	
U.S.	ND X22ESR-U or NGK DR7ES
Canadian	ND X22ESR-U or NGK DR7ES
Extended high speed riding	
U.S.	ND X27ESR-U or NGK DR8ES
Canadian	ND X27ESR-U or NGK DR8ES
Spark plug gap (all years)	0.6-0.7 mm (0.024-0.028 in.)
Ignition timing @ idle	
XL125S, XR200R (1986-on)	Timing mark "T" or "F"
All other models	1,400 ± 100 rpm
Ignition timing advance	1,300 ± 100 rpm
Advance starts all models	Advance timing marks "II"
Full advance	1,950 ± 150 rpm
XL125S, XL185S	
All other models	3,350 ± 150 rpm
Idle speed	3,150 ± 150 rpm
XL125S, XR200R (1986-on)	
All other models	1,400 ± 100 rpm
	1,300 ± 100 rpm

*Cold weather climate—below 41° F (5° C).

Table 8 GENERAL SPECIFICATIONS

Engine type	Air cooled, single cylinder, SOHC, 4-stroke			
Bore and Stroke				
XL125S	56.5×49.5 mm (2.22×1.95 in.)			
XL185S, XR185	63.0×57.8 mm (2.48×2.28 in.)			
XR200, XR200R, TLR200	65.5×57.8 mm (2.58×2.28 in.)			
Displacement				
XL125S, (except 1985)	124 cc (7.57 cu. in.)			
XL125S (1985), XL185S, XR185	180 cc (10.98 cu. in.)			
XR200, XR200R, XL200R, TLR200	195 cc (11.90 cu. in.)			
Compression ratio				
XL125S	9.4 to 1			
XL185S, XL200R	9.2 to 1			
XR185, XR200, XR200R	10.0 to 1			
TLR200	8.2 to 1			
Carburetion	Single Keihin			
Ignition	Capacitor discharge ignition (CDI)			
Lubrication	Wet-sump, filter screen, oil pump			
Clutch	Wet, multi-disc (5)			
Transmission (5-speed)	XL125S	XL185S	XL200R	
1st	2.769	2.769	3.333	
2nd	1.722	1.722	2.769	
3rd	1.273	1.272	1.722	
4th	1.000	1.000	1.000	
5th	0.815	0.777	0.777	
Final reduction	4.000	3.571	3.461	
Transmission (6-speed)	XL125S	XR185, XR200	XR200R	TLR200
1st	3.083	3.083	2.769	2.769
2nd	1.941	1.941	1.941	2.063
3rd	1.400	1.450	1.450	1.500
4th	1.130	1.130	1.130	1.130
5th	0.923	0.923	0.923	0.923
6th	0.785	0.785	0.785	0.786
Final reduction	4.000	3.866	3.846	3.866
Battery				
XL125 (exc. 1985), XL185	6 volt, 4 amp-hour			
XL125S (1985), XL200R, TLR200	12 volt, 3 amp-hour			
Alternator				
XL125S	113W/5,000 rpm			
XL185S	108W/5,000 rpm			
XR185, XR200	45W/5,000 rpm			
XR200R (1981-1983)	50W/5,000 rpm			
XR200R (1986-on)	108W/5,000 rpm			
XL200R	196W/5,000 rpm			
TLR200	156W/5,000 rpm			

(continued)

Table 8 GENERAL SPECIFICATIONS (continued)

Wheelbase	1,315 mm (51.8 in.)
XL125S	1,310 mm (51.6 in.)
XL185S	1,325 mm (52.2 in.)
XR185, XR200	1,355 mm (53.3 in.)
XR200R (1981-1983)	1,360 mm (53.5 in.)
XR200R (1986-on)	1,373 mm (54.1 in.)
XL200R	1,305 mm (50.9 in.)
TLR200	
Steering head angle	62° 10'
XL125S, XL185S	61° 30'
XR185, XR200	61° 20'
XR200R (1981-1983)	64°
XR200R (1986-on)	61° 30'
XL200R	63° 30'
TLR200	
Trail	
XL125S, XL185S, XL200R	122 mm (4.8 in.)
XR185, XR200	125 mm (4.9 in.)
XR200R (1981-1983)	125 mm (4.9 in.)
XR200R (1986-on)	100 mm (3.9 in.)
TLR200	86 mm (3.4 in.)
Front suspension travel	
XL125S, XL185S, XL200R	200 mm (7.9 in.)
XR185, XR200	216 mm (8.5 in.)
XR200R (1981-1983)	249 mm (9.8 in.)
XR200R (1986-on)	254 mm (10.0 in.)
TLR200	160 mm (6.3 in.)
Rear suspension travel	
XL125S, XL185S, XL200R	165 mm (6.5 in.)
XR185, XR200	191 mm (7.5 in.)
XR200R (1981-1983)	247 mm (9.7 in.)
XR200R (1986-on)	245 mm (9.6 in.)
TLR200	150 mm (5.9 in.)
Ground clearance	
XL125S, XL185S	265 mm (10.4 in.)
XR185, XR200	285 mm (11.2 in.)
XL200R	273 mm (10.7 in.)
XR200R (1981-1983)	340 mm (13.4 in.)
XR200R (1986-on)	305 mm (12.0 in.)
TLR200	300 mm (11.8 in.)
Weight (dry)	
XL125S	
XL185S	229.3 lb. (104 kg.)
XR185, XR200	232.6 lb. (105.5 kg.)
XR200R (1981-1983)	216.0 lb. (98 kg.)
XR200R (1986-on)	222.7 lb. (101 kg.)
XL200R	216.0 lb. (98 kg.)
TLR200	234 lb. (106 kg.)
	209 lb. (95 kg.)

(continued)

Table 8 GENERAL SPECIFICATIONS (continued)

Fuel capacity (total)	
XL 125S (exc. 1985)	1.8 U.S. gal. (7.0 liters, 1.5 imp. gal.)
XL 125S (1985)	2.4 U.S. gal. (9.0 liters, 2.0 imp. gal.)
XL 185S	1.8 U.S. gal. (7.0 liters, 1.5 imp. gal.)
XR185, XR200	1.8 U.S. gal. (7.0 liters, 1.5 imp. gal.)
XR200R (1981-1983)	2.0 U.S. gal. (7.5 liters, 1.6 imp. gal.)
XR200R (1986-on)	2.4 U.S. gal. (9.0 liters, 2.0 imp. gal.)
XL200R	2.1 U.S. gal. (8.0 liters, 1.8 imp. gal.)
TLR200	1.7 U.S. gal. (6.5 liters, 1.4 imp. gal.)
Fuel reserve	0.4 U.S. gal. (1.5 liters, 0.3 imp. gal.)
Oil capacity	
At oil change	0.98 U.S. qt. (0.9 liters, 0.82 imp. gal.)
At overhaul	1.2 U.S. qt. (1.1 liters, 1.0 imp. gal.)

CHAPTER FOUR

ENGINE

All models covered in this book are equipped with an air-cooled, 4-stroke, single cylinder engine with a single overhead camshaft. The crankshaft is supported by 2 main ball bearings. The camshaft is chain-driven from the timing sprocket on the left-hand side of the crankshaft and operates rocker arms that are individually adjustable.

Engine lubrication is by wet sump with the oil pump located on the right-hand side of the engine adjacent to the clutch. The oil pump delivers oil under pressure throughout the engine and is gear driven off of the crankshaft.

The engine used in the various models is the same basic unit with different compression ratios and different bore and stroke dimensions to achieve varying displacements.

This chapter contains information for removal, inspection, service and reassembly of the engine. Table 1 provides complete specifications for the engine and Table 2 lists all of the engine torque specifications. Table 1 and Table 2 are located at the end of this chapter.

Although the clutch and transmission are located within the engine they are covered in Chapter Five to simplify this material.

Prior to removing the engine or any major assembly, clean the entire engine and frame



with a good grade commercial degreaser like Gunk or Bel-Ray Degreaser (Figure 1). It is easier to work on a clean engine and you will do a better job. Make certain that you have all the necessary tools available, especially any special tool(s), and purchase replacement parts prior to disassembly. Also make sure you have a clean place to work.

It is a good idea to identify and mark parts as they are removed to help during assembly and installation. Clean all parts thoroughly upon

ENGINE

removal, then place them in trays or boxes with their associated mounting hardware. Do not rely on memory alone as it may be days or weeks before you complete the job.

Throughout the text there is frequent mention of the right-hand and left-hand side of the engine. This refers to the engine as it sits in the bike's frame, not as it sits on your workbench. The right- and left-hand refers to a rider sitting on the seat facing forward.

ENGINE PRINCIPLES

Figure 2 explains how the engine works. This will be helpful when troubleshooting or repairing the engine.

ENGINE COOLING

Cooling is provided by air passing over the cooling fins on the engine cylinder head and cylinder. It is very important to keep these fins free from buildup of dirt, oil, grease and other foreign matter. Brush out the fins with a whisk broom or small stiff paint brush.

CAUTION

Remember, these fins are thin in order to dissipate heat and may be damaged if struck too hard.

SERVICING ENGINE IN FRAME

The engine must be removed from the frame to remove the cylinder head, cylinder and piston. The crankcase studs are too long to allow the removal of the cylinder head with the engine in the frame.

The following components can be serviced while the engine is mounted in the frame (the bike's frame is a great holding fixture for breaking loose stubborn bolts and nuts):

- Carburetor
- Alternator
- Clutch assembly
- External shift mechanism

ENGINE

Removal/Installation

- Drain the engine oil as described under *Changing Engine Oil* in Chapter Three.
- Remove the side covers and the seat.

3. Remove the fuel tank as described under *Fuel Tank Removal/Installation* in Chapter Six.

4. Remove the exhaust system as described under *Exhaust System Removal/Installation* in Chapter Six.

5. Remove the carburetor as described under *Carburetor Removal/Installation* in Chapter Six.

6. Remove the bolts securing the skid plate (Figure 3) and remove the skid plate.

7. Disconnect the spark plug lead and tie it up out of the way. Disconnect the engine breather hose (if so equipped) from the crankcase.

8. Remove the alternator as described under *Alternator Removal/Installation* in Chapter Seven.

9. Remove the drive chain master link and remove the bolts securing the drive sprocket. Remove the drive sprocket.

10. Remove the clutch assembly as described under *Clutch Removal/Disassembly* in Chapter Five.

11. Remove the ignition advance mechanism as described in this chapter.

12. Tie the bike down or support it vertically as the sidestand will be removed in the next step.

13. Remove the bolts securing the foot peg/sidestand assembly and remove the assembly.

14. Take a final look all over the engine to make sure everything has been disconnected.

15. Remove the upper engine hanger bolts and nuts (A, Figure 4) and remove the hanger plates.

16. Place a suitable size hydraulic jack, with a piece of wood to protect the crankcase, under the engine. Apply a *small amount* of jack pressure up on the engine.

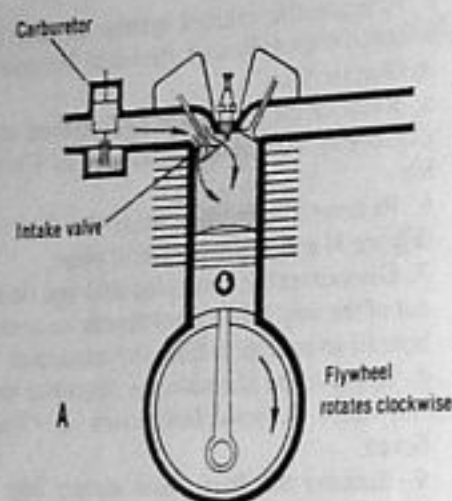
17. Remove the bolts and nuts (B, Figure 4) securing the front engine hanger bolts and remove the engine hanger.

18. Remove the upper rear through bolt (C, Figure 4) from the right-hand side. Don't lose the spacer on the left-hand side and the clip on the right-hand side.

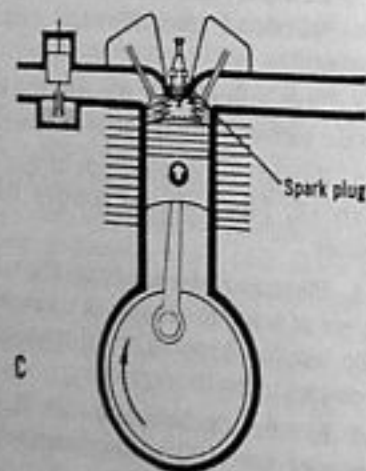
19. Remove the lower rear through bolt (D, Figure 4) from the right-hand side.

4-STROKE OPERATING PRINCIPLES

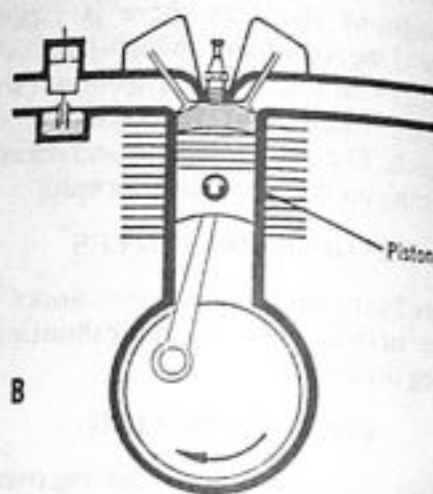
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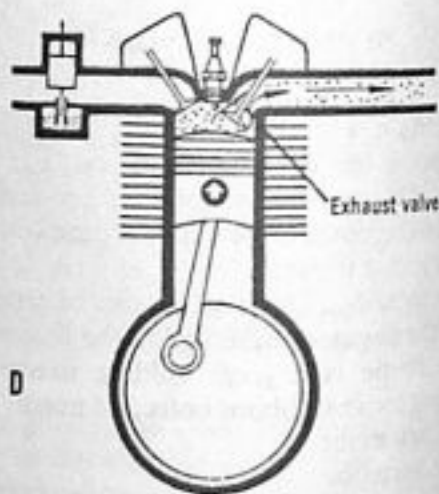
As the piston travels downward, the exhaust valve is closed and the intake valve opens, allowing the new fuel/air mixture from the carburetor to be drawn into the cylinder. When the piston reaches the bottom of its travel (BDC), the intake valve closes and remains closed for the next revolution and a half of the crankshaft.



As the piston almost reaches the top of its travel, the spark plug fires, igniting the compressed fuel/air mixture. The piston continues to top dead center (TDC) and is pushed downward by the expanding gases.



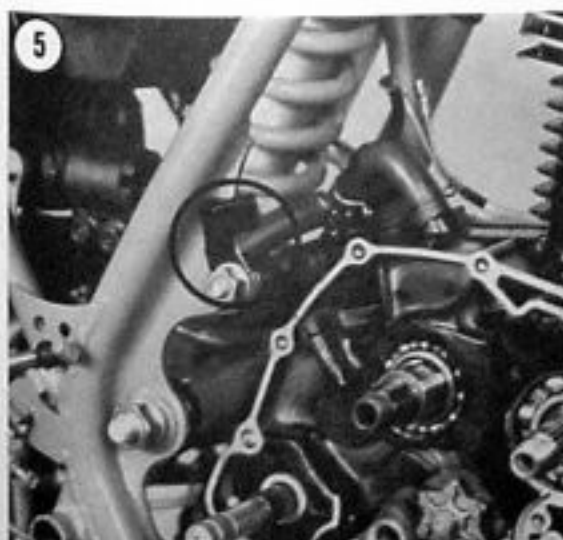
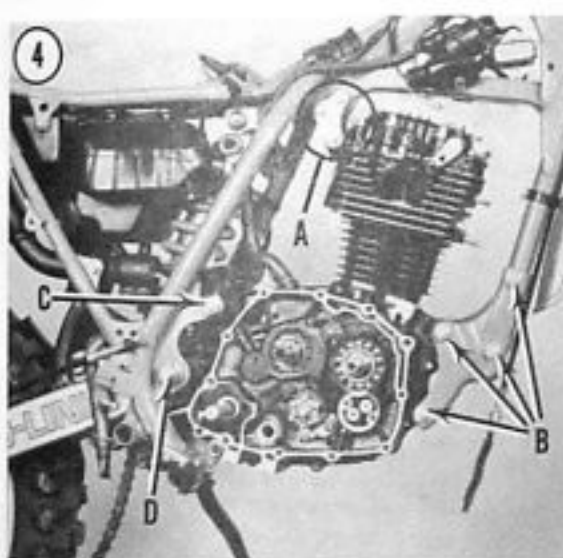
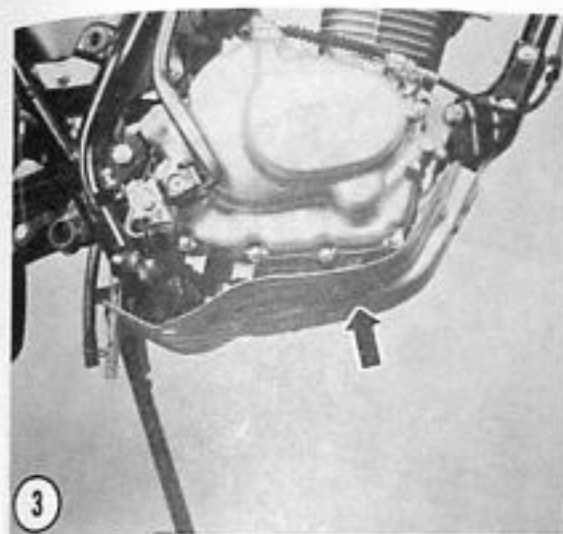
While the crankshaft continues to rotate, the piston moves upward, compressing the fuel/air mixture.



When the piston almost reaches BDC, the exhaust valve opens and remains open until the piston is near TDC. The upward travel of the piston causes the exhaust gases to be pushed out of the cylinder. After the piston has reached TDC, the exhaust valve closes and the cycle starts all over again.

WARNING

The following steps require the aid of a helper to safely remove the engine assembly from the frame.



20. Pull the engine up and slightly forward. Remove the engine from either side. Take it to a workbench for further disassembly.

21. Install by reversing these removal steps, noting the following.

22. Be sure to install the spacer on the left-hand side of the upper rear through bolt. Also install the clip (Figure 5) for the decompressor cable (except XL125S) on the right-hand side of the same bolt.

23. Tighten both of the rear 10 mm through bolts (Figure 6) to the following torque specifications:

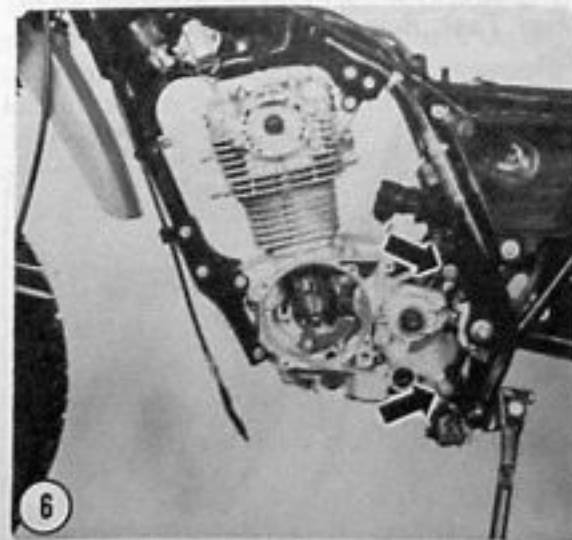
- a. XL125S, XL185S, XR185, XR200—30-40 N·m (22-29 ft.-lb.)
- b. XR200R, TLR200—45-65 N·m (33-43 ft.-lb.)

24. Tighten the front engine hanger 8 mm bolts (Figure 7) to the following torque specifications:

- a. XL125S, XL185S, XR185, XR200—27-33 N·m (20-24 ft.-lb.)
- b. XR200R, TLR200—31-37 N·m (22-27 ft.-lb.)

25. Tighten the upper engine hanger 8 mm bolts (Figure 8) to the following torque specifications:

- a. XL125S, XL185S—18-23 N·m (13-16 ft.-lb.)



- b. XR185, XR200—27-33 N·m (20-24 ft.-lb.)
- c. XR200R, TLR200—31-37 N·m (22-27 ft.-lb.)

- 26. Fill the engine with the recommended type and quantity oil; refer to Chapter Three.
- 27. Adjust the clutch, drive chain and rear brake pedal as described in Chapter Three.
- 28. Start the engine and check for leaks.

CYLINDER HEAD COVER AND CAMSHAFT

The cylinder head cover carries the rocker arm assemblies. The cover also carries the decompressor lever assembly (except on the XL125S which is not equipped with one).

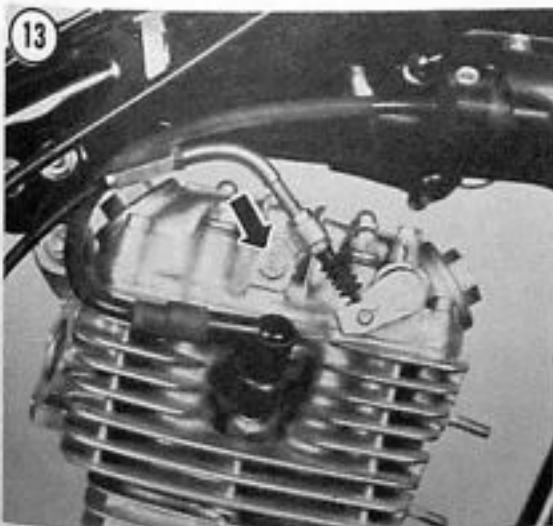
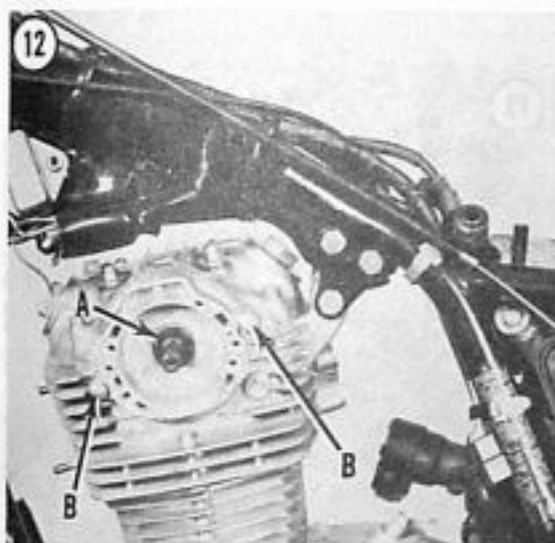
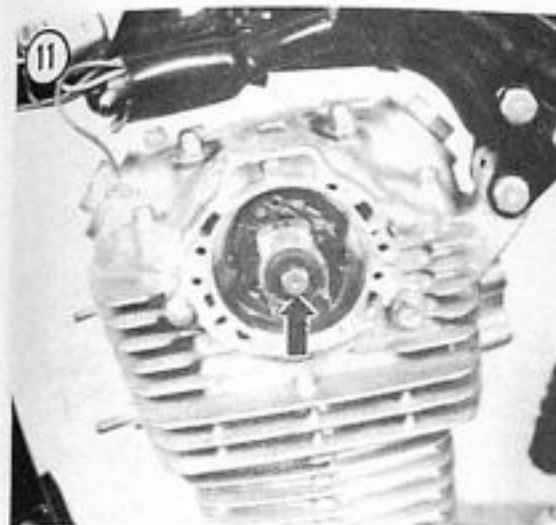
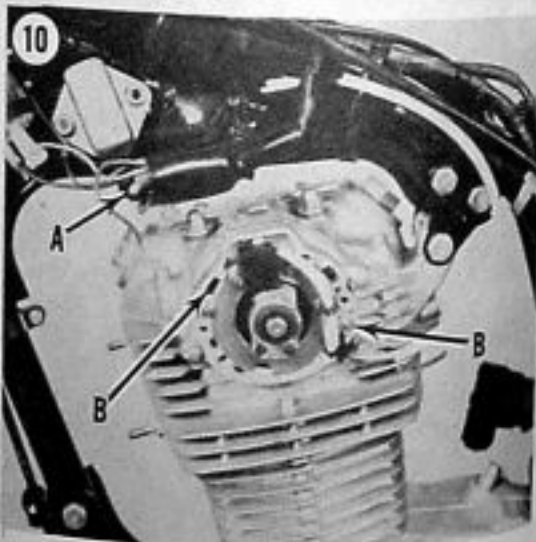
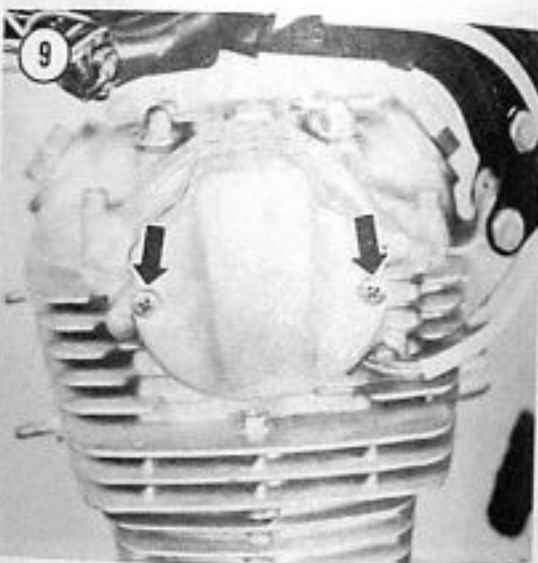
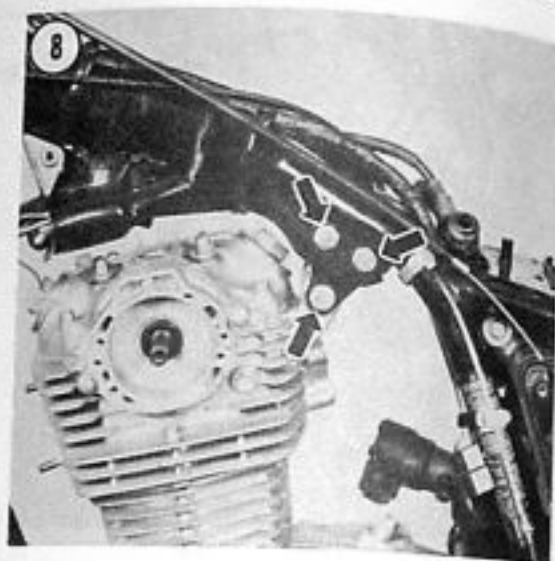
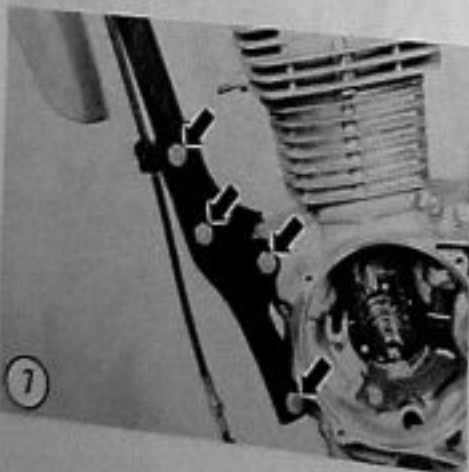
The cam is held in place between the cylinder head cover and the cylinder head and is driven by a chain off of the timing sprocket on the crankshaft. The cam can be removed with the engine in the frame, but it is easier to do with the engine removed.

Cylinder Head Cover and Camshaft Removal

CAUTION

To prevent any warpage and damage, remove the cylinder head cover and cam only when the engine is at room temperature.

- 1. Place a milk crate or wood block(s) under the engine to support the bike securely.
- 2. Remove the side covers and the seat.
- 3. Remove the fuel tank as described under Fuel Tank Removal/Installation in Chapter Six.

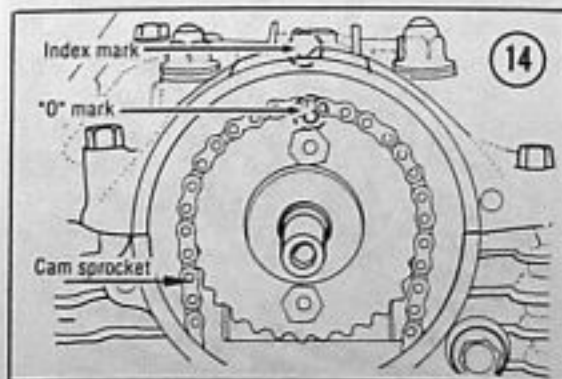


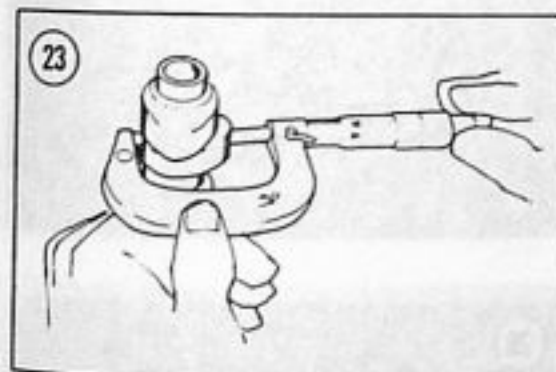
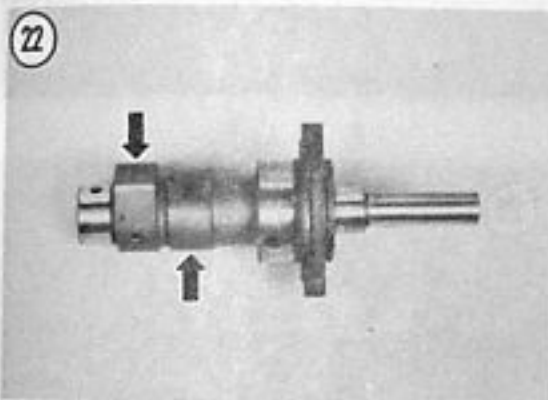
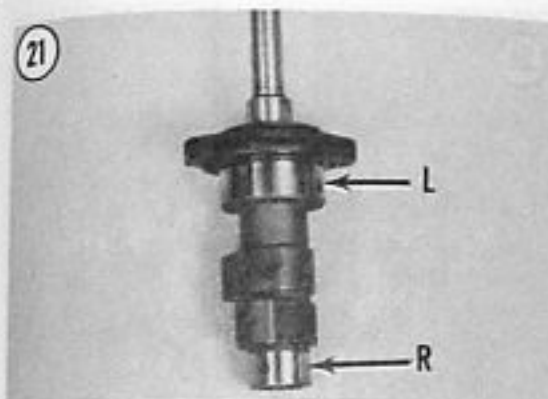
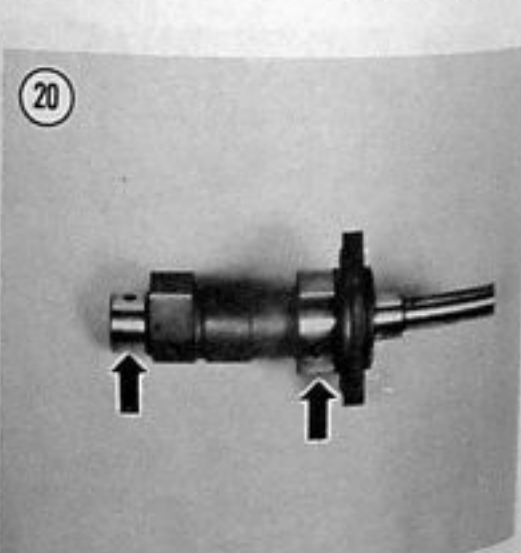
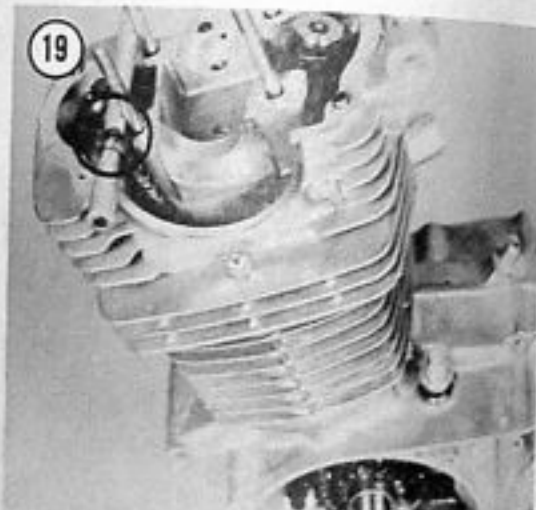
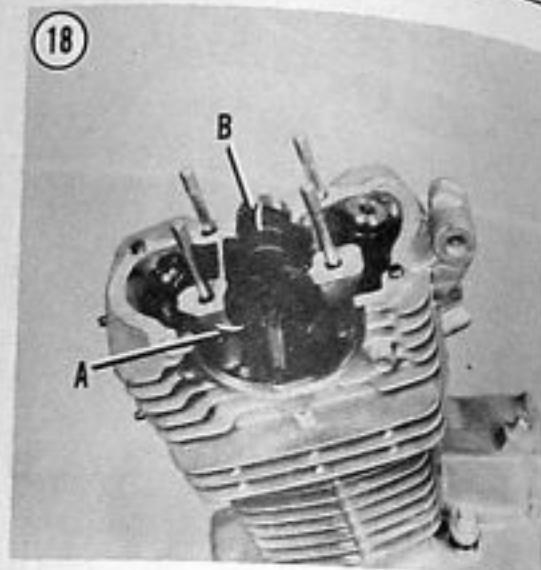
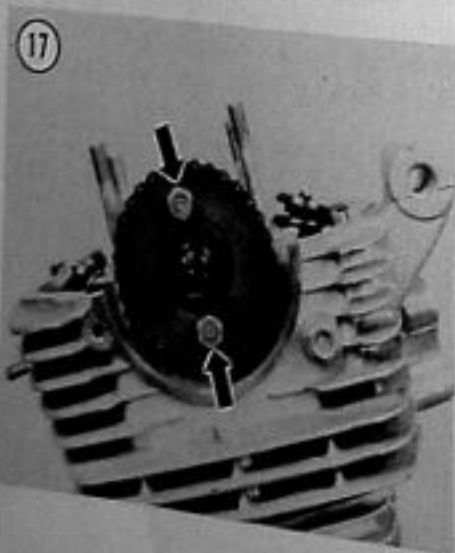
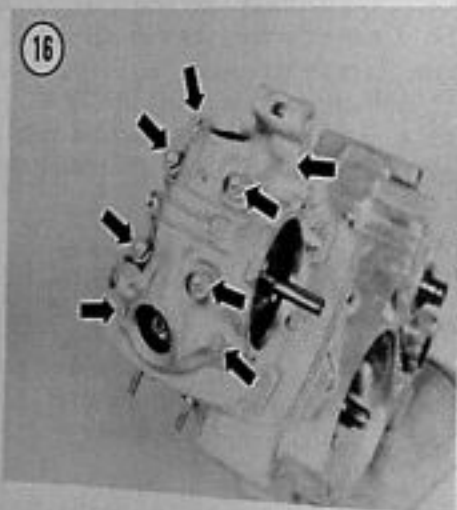
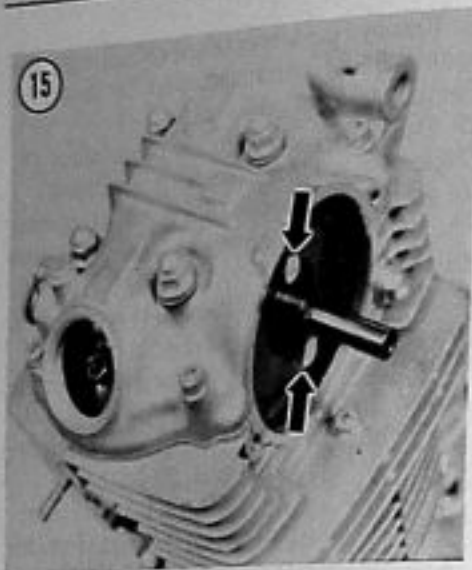
- 4. Remove the screws (Figure 9) securing the ignition pulse cover and remove the cover and the gasket.
- 5. Disconnect the electrical connections (A, Figure 10) to the ignition pulse generator.
- 6. Remove the screws (B, Figure 10) securing the pulse generator assembly and remove the assembly.
- 7. Remove the bolt (Figure 11) securing the pulse rotor and remove the pulse rotor.
- 8. Remove the dowel pin (A, Figure 12) on the camshaft.
- 9. Remove the bolts (B, Figure 12) securing the pulse base and remove the pulse base.
- 10. Remove the bolt (Figure 13) securing the starter decompressor cable bracket to the cylinder head cover. Remove the cable end from the decompressor lever and separate the assembly from the cylinder head cover.
- 11. Remove the spark plug (this will make it easier to rotate the engine).
- 12. Shift the transmission into NEUTRAL.
- 13. Remove the engine as described under Engine Removal/Installation in this chapter.

NOTE

The following steps are shown with the engine removed from the frame. As previously mentioned the cam can be removed with the engine either in or out of the frame. It is a lot easier to remove the cam with the engine out so that the cylinder head cover can also be removed.

- 14. Temporarily install the magneto rotor and rotate the engine until the "O" mark on the camshaft sprocket aligns with the V-groove index mark on the cylinder head (Figure 14).





15. Loosen both cam sprocket bolts (Figure 15).
16. Remove the 6 mm Allen bolts and 8 mm cap nuts (Figure 16) securing the cylinder head cover. Remove the cylinder head cover and gasket. Don't lose the locating dowels.
17. Remove the cam sprocket bolts (Figure 17).
18. Pull the cam chain and cam sprocket off of the cam shoulder and let them rest on the portion of the cam where the ignition pulse generator is normally attached.

19. Remove the cam sprocket from the cam chain. Rest the cam chain on the cam (A, Figure 18). Remove the cam (B, Figure 18) from the cylinder head.

20. Loop a piece of wire through the cam chain and tie it to an external part of the engine or insert a long drift or similar tool in the chain loop and rest this tool on the cylinder head (Figure 19). This will prevent the chain from falling into the crankcase.

CAUTION

If the crankshaft must be rotated while the camshaft is removed, pull up on the cam chain and keep it taut while rotating the crankshaft. Make certain that the chain is positioned onto the crankshaft timing sprocket. If this is not done, the chain may become kinked and may damage both the chain and the timing sprocket on the crankshaft.

21. Remove the cam bushing from the camshaft.

Camshaft Inspection

1. Check the cam bearing journals for wear and scoring (Figure 20).
2. Measure both the left-hand (L) and right-hand (R) bearing journals with a micrometer (Figure 21). Compare to dimensions given in Table 1. If worn to the service limit the cam must be replaced.

NOTE

The left-hand bearing journal is the larger of the two.

3. Check the cam lobes for wear (Figure 22). The lobes should show no signs of scoring and the edges should be square. Slight damage may be removed with a silicone carbide oilstone. Use No. 100-120 grit stone initially, then polish with a No. 280-320 grit stone.
4. Even though the cam lobe surface appears to be satisfactory, with no visible signs of wear, the cam lobes must be measured with a micrometer as shown in Figure 23. Compare to dimensions given in Table 1.

NOTE

The right-hand cam lobe is the exhaust and the left-hand is the intake.

5. Check the cam bearing surface in the cylinder head (A, Figure 24) and cylinder head cover (Figure 25). (This applies only to the left-hand bearing as the right-hand bearing rides in a separate bushing.) The surfaces should not be scored or excessively worn. Replace either part if wear is evident.
6. Inspect the condition of the cam sprocket for wear; replace if necessary.
7. Measure the inside diameter of the cam bushing with an inside micrometer. Compare to dimensions given in Table 1. Also make sure that the locating pin is secure in the bushing. If the pin is loose, replace the bushing.
8. Install the cylinder head cover and install the 8 mm cap nuts and washers. Tighten the nuts to the torque specifications in Table 2. Install the Allen bolts and tighten securely.
9. Measure the inside diameter of the left-hand bearing surface with an inside micrometer. Compare with dimensions given in Table 1. If it is not within specifications, replace the cylinder head and cover as a set.
10. Remove the cap nuts and washers and remove the cylinder head cover.

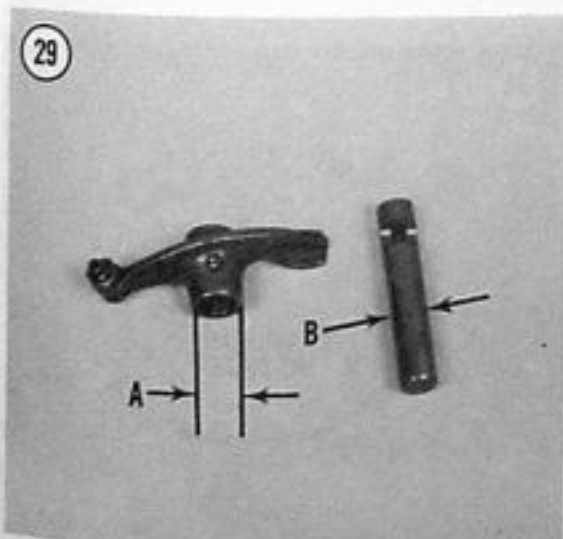
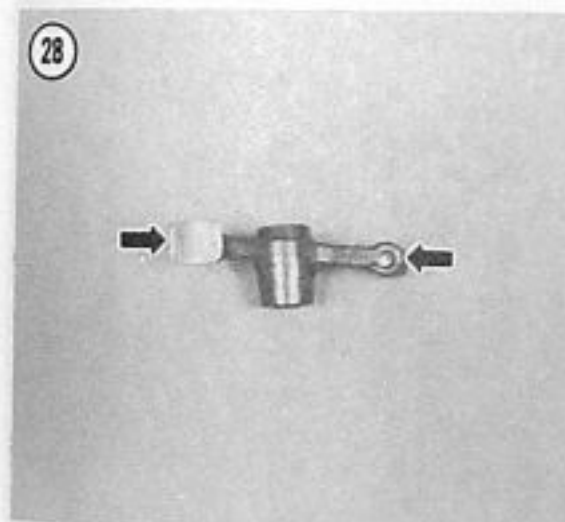
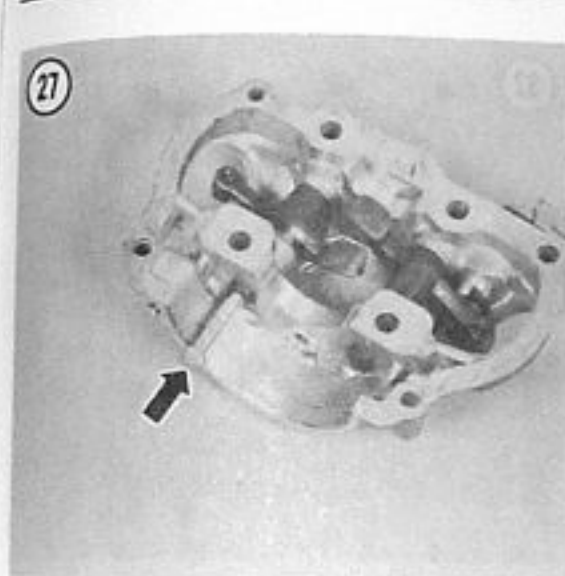
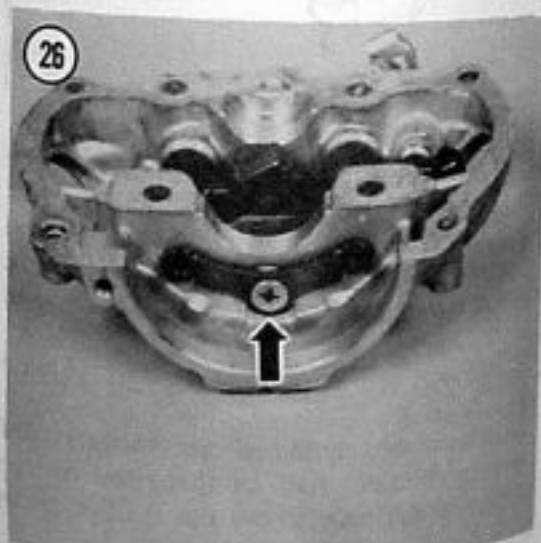
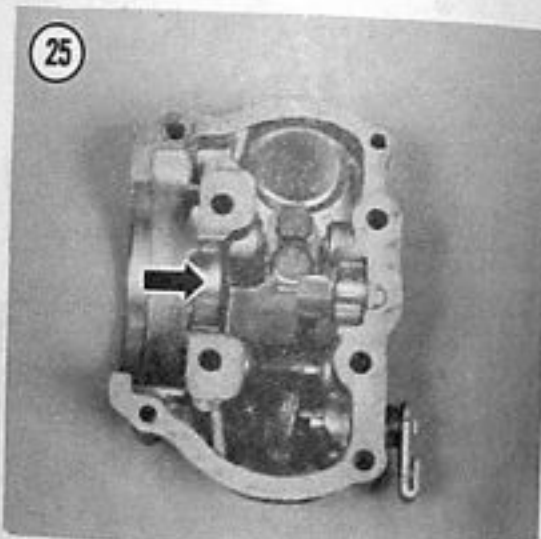
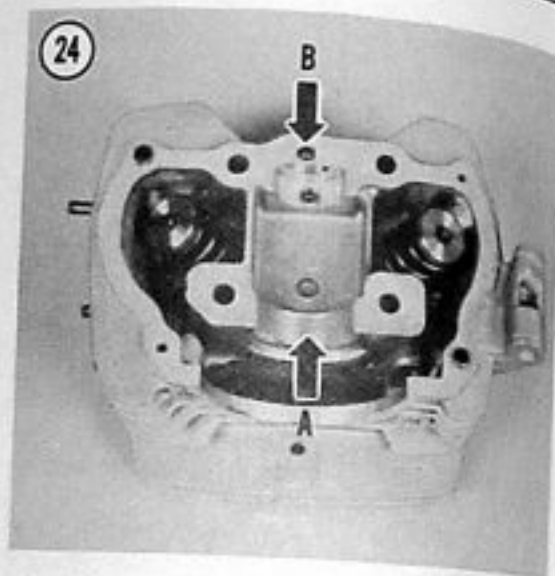
Cylinder Head Cover Disassembly/Inspection/Assembly

It is recommended that one rocker arm assembly be disassembled, inspected and then assembled to avoid the intermixing of parts. This is especially true on a well run-in engine as the different sets of parts have taken a set and wear pattern.

NOTE

Both rocker arms look the same but they are different and have different part numbers. If you remove both rocker arm assemblies at the same time, mark them in sets with "I" (intake—rear set) or "E" (exhaust—front set) so they will be reinstalled in the correct location in the cylinder head cover.

1. Remove the screw securing the rocker arm shaft set plate (Figure 26) and remove the set plate.



2. Screw in a 6 mm bolt (Figure 27) and withdraw the rocker arm shaft.
3. Remove the rocker arm.
4. Wash all parts in cleaning solvent and thoroughly dry.
5. Inspect the condition of the rocker arm pad (Figure 28) where it rides on the cam lobe and where the adjuster rides on the valve stem. If the pad is scratched or unevenly worn, inspect the condition of the cam lobe for scoring, chipping or flat spots. Replace the rocker arm if defective.
6. Measure the inside diameter of the rocker arm bore (A, Figure 29) with an inside micrometer and check against dimensions in Table 1. Replace if worn to the service limit or greater.
7. Inspect the rocker arm shaft for signs of wear or scoring. Measure the outside diameter (B, Figure 29) with a micrometer and check against dimensions in Table 1. Replace if worn to the service limit or less.
8. Inspect the cam bearing surface for excessive wear. If worn excessively, the cylinder head cover must be replaced.
9. Coat the rocker arm shaft and rocker arm bore with assembly oil (Figure 30).
10. Install the rocker arm shaft with the threaded hole facing out. Partially insert the rocker arm shaft into the cover (Figure 31) and position the rocker arm into the cylinder head cover.



11. Make sure the locking relief in the rocker arm shaft (Figure 32) is aligned with the hole in the cylinder head to allow the crankcase stud to pass by it upon installation.

12. The notch on the end of the rocker arm shaft (Figure 33) must be facing toward the other rocker arm shaft to accept the set plate.

13. Repeat Steps 2-12 for the other rocker arm assembly.

14. To remove the decompressor lever, remove the guide bolt and washer above the lever and withdraw the decompressor lever, spring and thrust washer.

15. Install the spring and thrust washer onto the decompressor lever and insert it into the cylinder head cover. Position the spring and install the guide bolt and washer. Tighten the guide bolt securely.

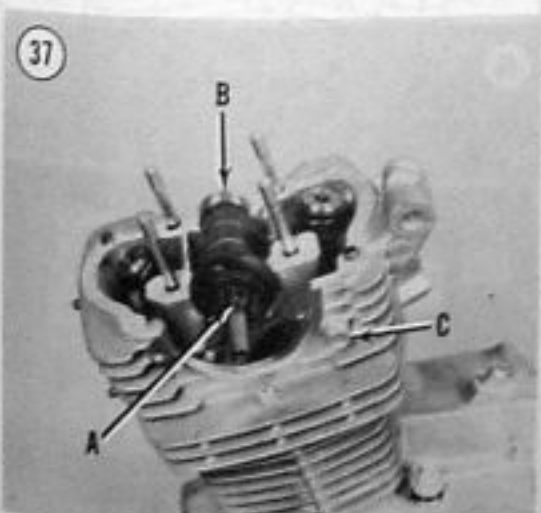
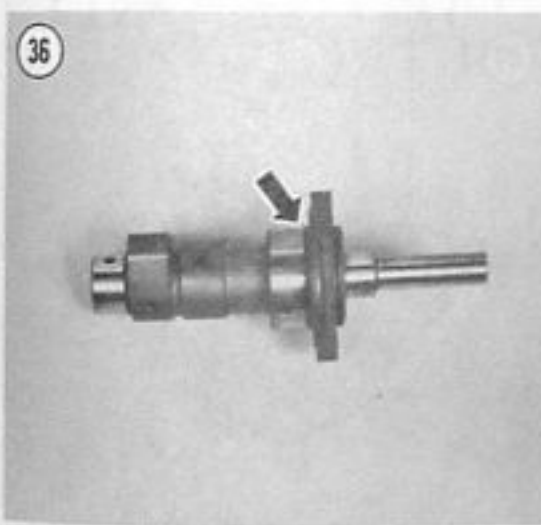
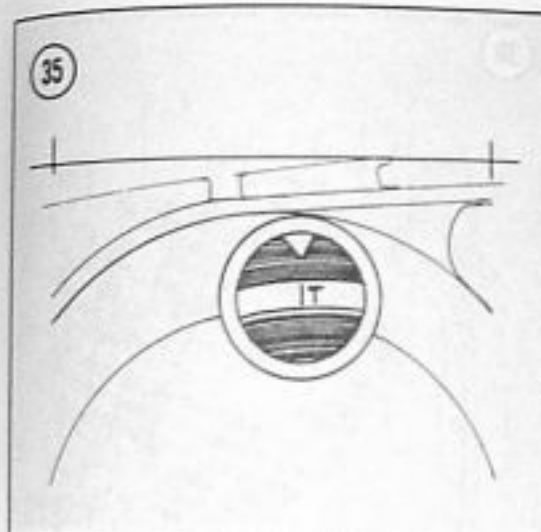
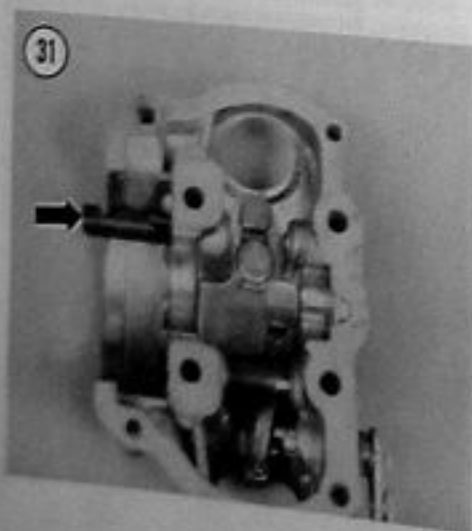
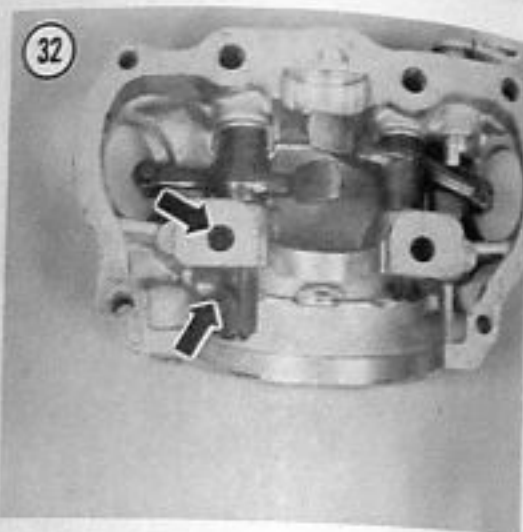
Cylinder Head Cover and Camshaft Installation

1. Lubricate all cam lobes and bearing journals with molybdenum disulfide grease (Figure 34). Also coat the bearing surfaces in the cylinder head and cylinder head cover.

CAUTION

When rotating the crankshaft, keep the cam chain taut and engaged with the timing sprocket on the crankshaft.

2. The piston must be at top dead center (TDC) during the following steps for correct valve timing.



3. Hold the cam drive chain up and taut while rotating the crankshaft to avoid damage to the chain and/or the crankcase. Temporarily install the alternator rotor (if removed) and rotate the crankshaft *counterclockwise* until the "T" timing mark is pointing straight up at the cam. Temporarily install the alternator cover, remove the timing hole cap and make sure the "T" mark aligns with the stationary pointer (Figure 35).

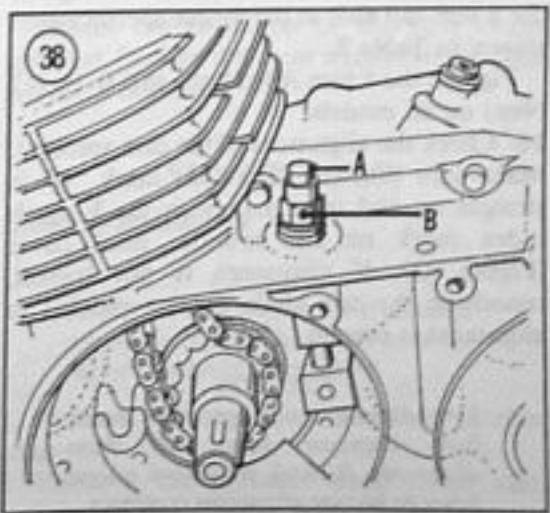
4. Install the cam bushing into the cylinder head. Make sure the locating pin is aligned with the hole in the cylinder head.

5. Make sure the large thrust washer (Figure 36) is installed on the cam's large bearing journal, up against the sprocket mounting flange.

6. Install the cam through the cam chain (A, Figure 37) and into position in the cylinder head (B, Figure 37).

7. Fill the oil pocket with fresh engine oil so the cam lobes will be covered for the initial engine start up.

8. On the cylinder head, loosen the cam chain tensioner bolt (C, Figure 37). On the crankcase, remove the adjusting bolt and washer (A, Figure 38) on the cam chain tensioner. Loosen the lower bolt (B, Figure 38). To gain the maximum amount of chain slack, insert a narrow punch into the hole in the tensioner and push down on the tensioner assembly, then tighten the adjusting bolt and reinstall the bolt and washer. Tighten the cam chain tensioner bolt (C, Figure 37).



9. Install and position the cam sprocket onto the cam with the alignment mark "O" up at the 12 o'clock position.

10. Make sure the cam chain is meshed properly with the drive sprocket on the crankshaft.

11. Pull the cam chain up and onto the cam sprocket. Check that the alignment mark "O" is still at the top (Figure 39). Pull the cam chain and sprocket up and into place onto the sprocket shoulder of the camshaft.

12. Make sure the locating dowels (Figure 40) are in place in the cylinder head.

13. Loosen all valve adjusters fully. This relieves strain on the rocker arms and cylinder head cover during installation.

14. Apply a light coat of gasket sealer to the sealing surface of the cylinder head cover. Cover only the flat sealing surface. Do not apply the sealer too close to the edge of the right-hand bearing surface as it will restrict oil flow.

NOTE

Use Gasgacinch Gasket Sealer, 4-Three Bond (Figure 41) or equivalent. When selecting an equivalent, avoid thick or hard setting materials.

15. Preload the decompressor lever and install the cylinder head cover. Install the washers onto the crankcase studs followed by the cap nuts. Install the Allen bolts and tighten the cap nuts and Allen bolts in the torque pattern shown in Figure 42. Tighten the 8 mm cap nuts to the torque specifications shown in Table 2.

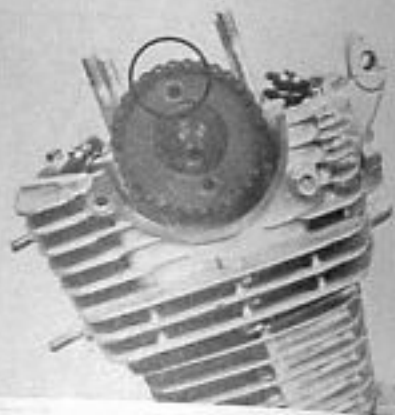
Tighten the 6 mm Allen bolts to 9 ft.-lb. (12 Nm) on all models.

16. Check the alignment of the cam sprocket. Make sure that the alignment mark "O" is straight up and is aligned with the V-notch index mark on the cylinder head cover (Figure 43). If alignment is not correct, reposition the cam chain on the sprocket so alignment is correct.

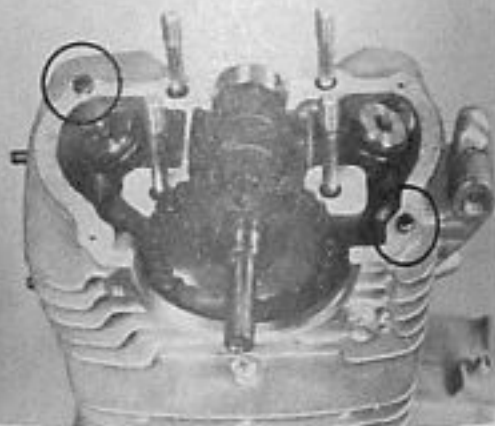
CAUTION

Very expensive damage could result from improper cam and chain alignment. Recheck your work several times to be sure alignment is correct.

39



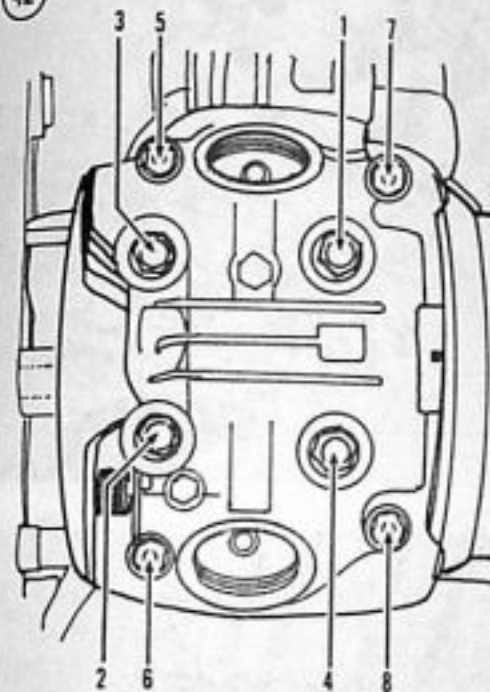
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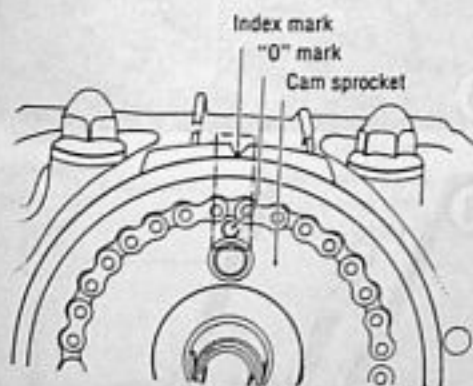
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43



CAUTION

Very expensive damage could result from improper cam and chain alignment. Recheck your work several times to be sure alignment is correct.

17. When alignment is correct install the cam sprocket bolts and tighten to 8-12 N·m (6-9 ft.-lb.).

18. Make one final check to make sure alignment is correct. The "T" timing mark must be aligned with the stationary pointer (Figure 35) and the alignment mark on the sprocket must align with the V-notch in the cylinder head cover (Figure 43).

19. After the engine has been installed in the frame, adjust the valves and cam chain tension as described in Chapter Three.

CAMSHAFT CHAIN

Replacement

To remove the cam chain, perform steps 1-6 of *Crankcase Disassembly* in this chapter. The crankcase halves do not have to be separated. To install the chain, perform steps 12-17 of *Crankcase Assembly*.

Inspection

Refer to *Camshaft Chain and Tensioner Inspection* in this chapter.

Camshaft Chain Tensioner Adjustment

After the cam chain has been replaced, adjust the chain as described under *Camshaft Chain Tensioner Adjustment* in Chapter Three.

Camshaft Chain Sprocket

Inspect the condition of the cam chain sprocket. Replace if it shows signs of wear or has any teeth missing.

CYLINDER HEAD

Removal/Installation

CAUTION

To prevent any warpage and damage, remove the cylinder head only when the engine is at room temperature.

1. Remove the engine as described in this chapter.
2. Remove the cylinder head cover and camshaft as described in this chapter.

3. Remove the cylinder head bolts and washers, one on each side of the head in line with the camshaft (A, Figure 44).
4. Remove the bolt (B, Figure 44) securing the cam chain tensioner to the cylinder head.
5. Loosen the head by tapping around the perimeter with a rubber or plastic mallet. If necessary, gently pry the head loose with a broad-tipped screwdriver.

CAUTION

Remember, the cooling fins are fragile and may be damaged if tapped or pried on too hard. Never use a metal hammer.

6. Untie the wire securing the cam chain and retie it to the cylinder head.
7. Remove the cylinder head by pulling it straight up and off the crankcase studs and cylinder. Pull the cam chain and wire through the opening in the cylinder head and retie the cam chain to the engine.
8. Remove the cylinder head gasket and discard it.

NOTE

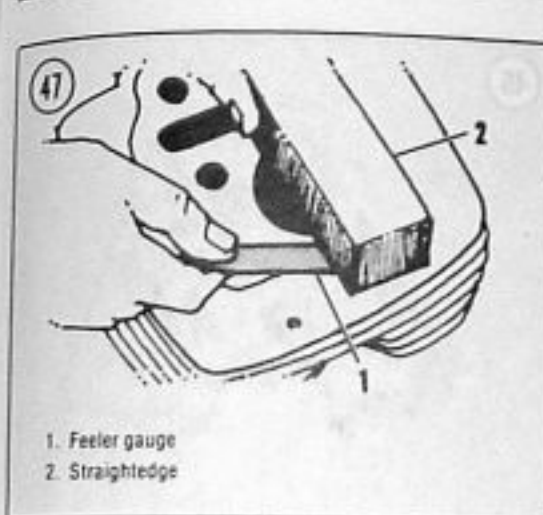
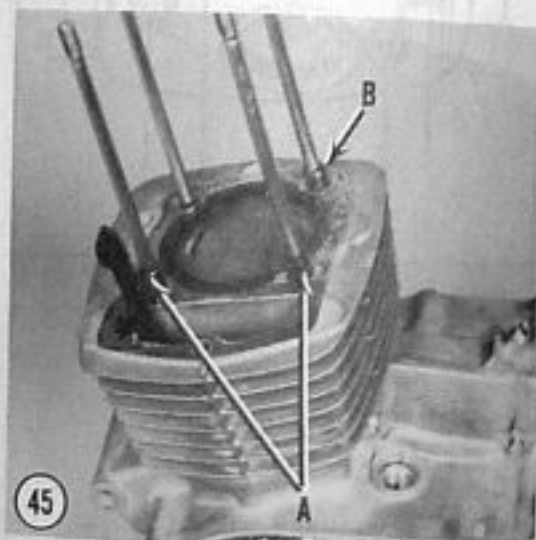
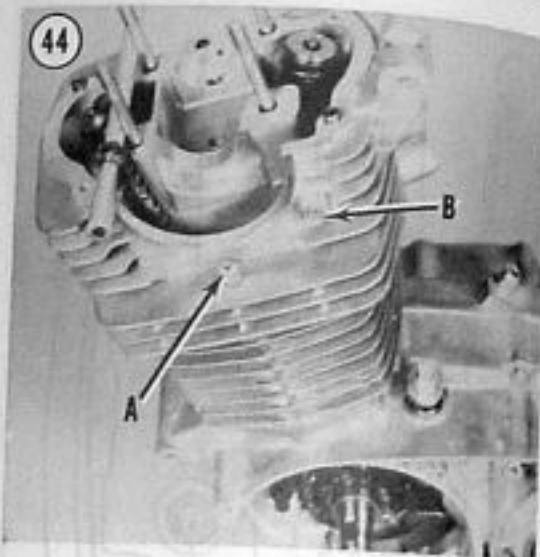
Don't lose the 3 locating dowels. Discard the small O-ring.

9. Place a clean shop cloth into the cam chain opening in the cylinder block to prevent the entry of foreign matter.
10. Install by reversing these removal steps, noting the following.
11. Clean the mating surfaces of the head and cylinder block of any gasket material.
12. Carefully pry out the rubber oil plug (B, Figure 24), clean the opening, and install a new rubber oil plug.
13. Install 2 locating dowels (A, Figure 45) on the left-hand crankcase studs. On the right-hand rear stud, install a locating dowel and a new O-ring (B, Figure 45).

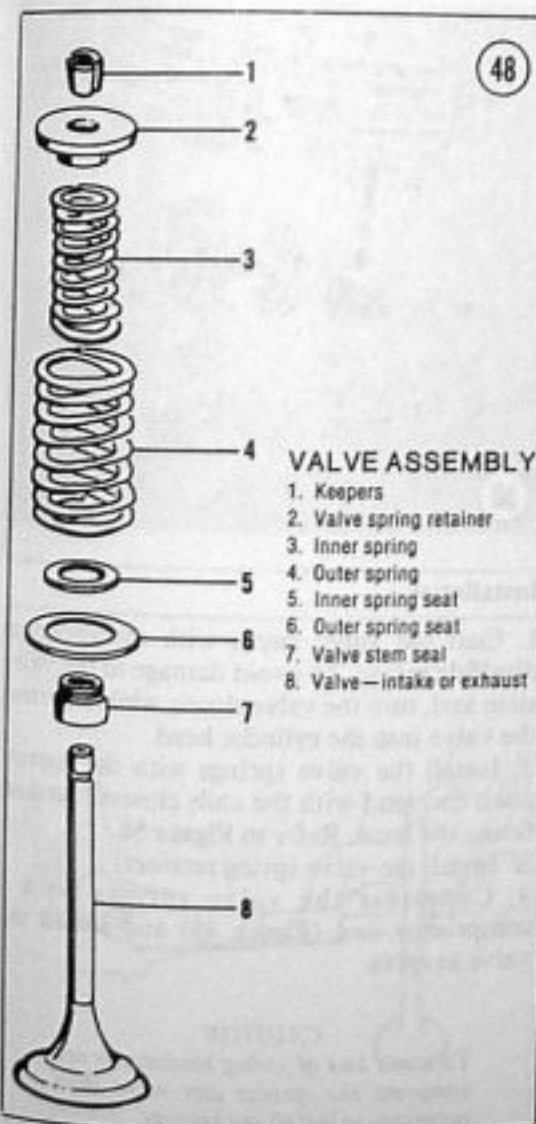
NOTE

Figure 45 is shown with the cam chain tensioner removed for clarity. It should be in place at this time.

14. Install the cylinder head with a new head gasket (Figure 46), and secure it with the washers and bolts. Tighten the bolts securely.
15. Correctly position the upper end of the cam chain tensioner and install the bolt and washer. Tighten the bolt securely.



1. Feeler gauge
2. Straightedge

**VALVE ASSEMBLY**

1. Keepers
2. Valve spring retainer
3. Inner spring
4. Outer spring
5. Inner spring seat
6. Outer spring seat
7. Valve stem seal
8. Valve—intake or exhaust

Inspection

1. Remove all traces of gasket material from the cylinder head mating surfaces.
2. Without removing the valves, remove all carbon deposits from the combustion chambers and valve ports with a wire brush. A blunt screwdriver or chisel may be used if care is taken not to damage the head, valves and spark plug threads.
3. After the carbon is removed from the combustion chambers and the valve intake and exhaust ports, clean the entire head in cleaning solvent. Blow dry with compressed air.
4. Clean away all carbon from the piston crown. Do not remove the carbon ridge at the top of the cylinder bore.
5. Check for cracks in the combustion chamber and exhaust ports. A cracked head must be replaced.
6. After the head has been thoroughly cleaned, place a straightedge across the cylinder head/cylinder gasket surface (Figure 47) at several points. Measure the warp by inserting a flat feeler gauge between the straightedge and the cylinder head at each location. There should be no warpage; if a small amount is present, it can be resurfaced by a dealer or qualified machine shop.
7. Check the cylinder head cover mating surface using the procedure in Step 6. There should be no warpage.
8. Check the condition of the valves and valve guides as described under *Valve and Valve Components* in this chapter.

VALVES AND VALVE COMPONENTS**Removal**

Refer to Figure 48 for this procedure.

1. Remove the cylinder head as described in this chapter.
2. Compress the valve springs with a valve compressor tool (Figure 49). Remove the valve keepers and release the compression. Remove the valve compressor tool.

CAUTION

To avoid loss of spring tension, do not compress the springs any more than necessary to remove the keepers.

3. Remove the valve spring retainer and valve springs (Figure 50).

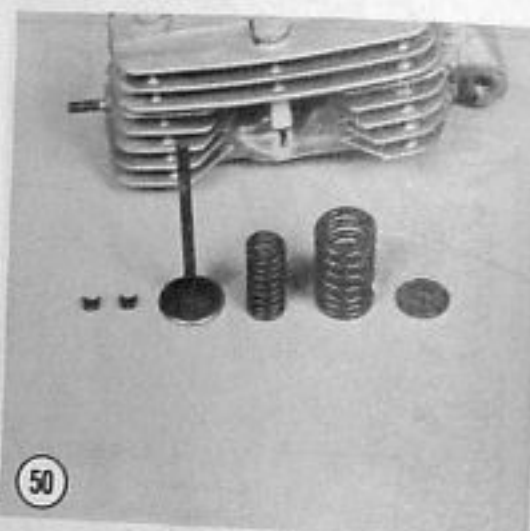
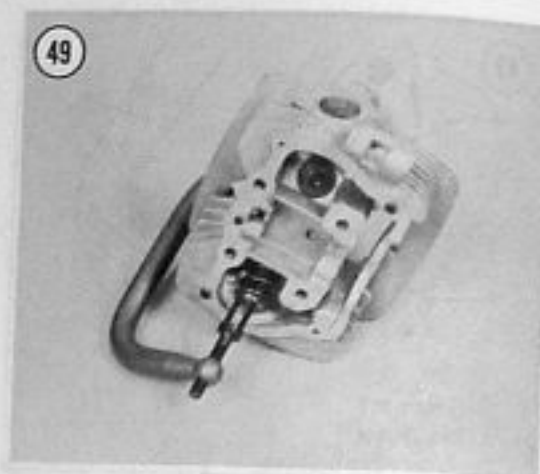
NOTE

The inner and outer valve seats and valve stem seal will stay in the cylinder head.

4. Prior to removing the valve, remove any burrs from the valve stem (Figure 51). Otherwise the valve guide will be damaged.
5. Mark all parts as they are disassembled so that they will be installed in their same locations.

Inspection

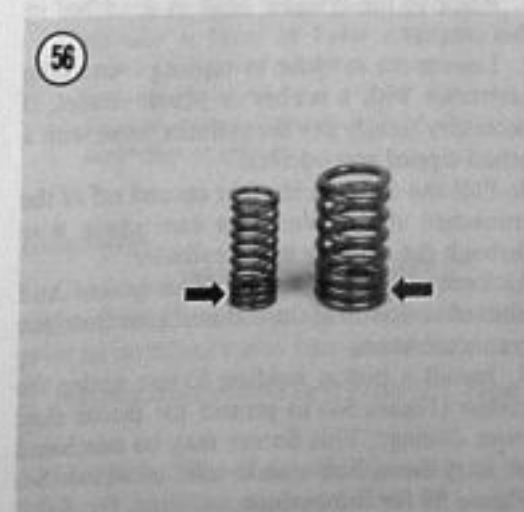
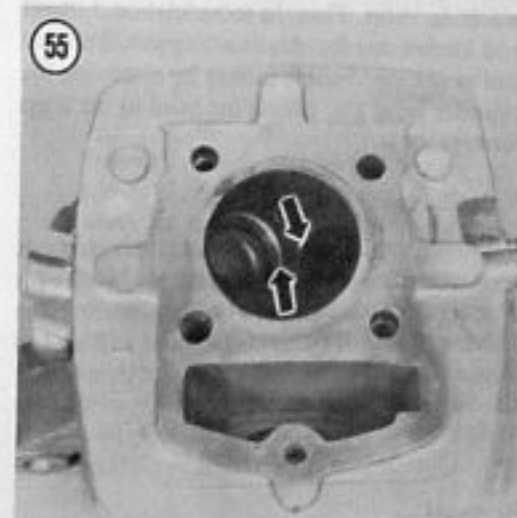
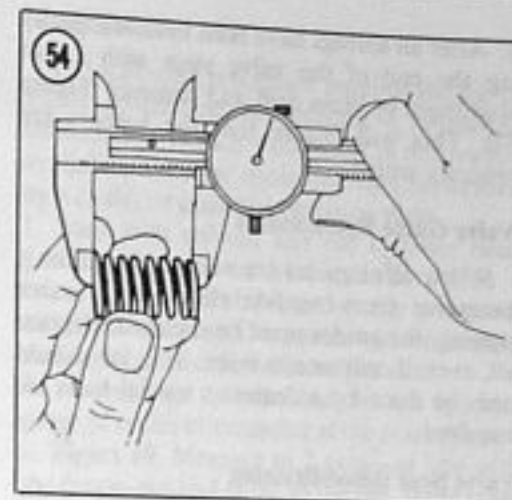
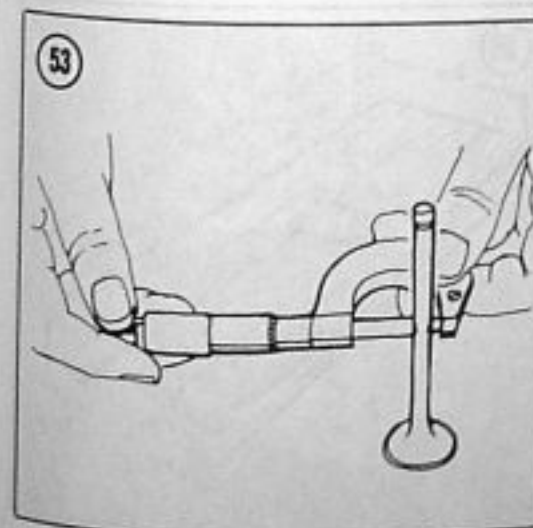
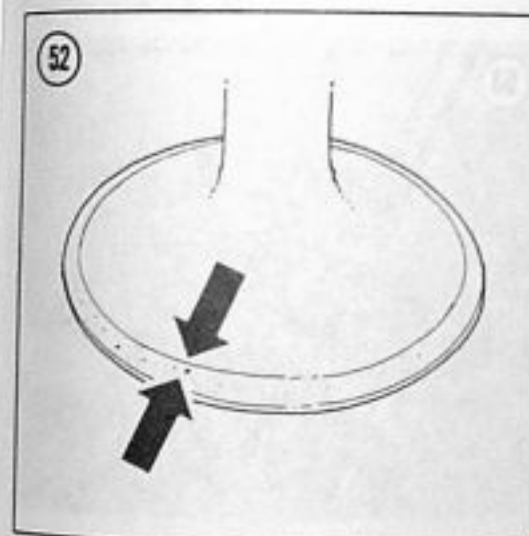
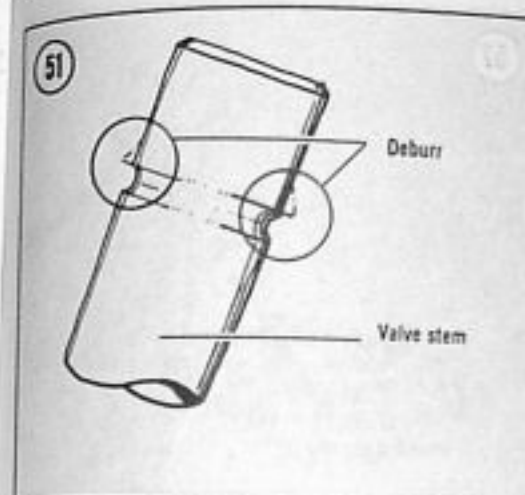
1. Clean valves with a wire brush and solvent.
2. Inspect the contact surface of each valve for burning or pitting (Figure 52). Unevenness of the contact surface is an indication that the valve is not serviceable. The valve contact surface *cannot* be ground and the valve must be replaced if this area is damaged.
3. Measure the valve stem for wear (Figure 53). Compare with specifications given in Table 1.
4. Remove all carbon and varnish from the valve guide with a stiff spiral wire brush.
5. This step assumes that the valve stem is within specifications. Insert each valve in its guide. Hold the valve with the head just slightly off the valve seat and rock it sideways. If it rocks more than slightly, the guide is probably worn and should be replaced. As a final check, take the head to a dealer and have the valve guides measured.
6. Measure the valve spring free length with a vernier caliper (Figure 54). All should be within the length specified in Table 1 with no signs of bends or distortion. Replace defective springs in pairs (inner and outer).
7. Check the valve spring retainer and valve keepers. If they are in good condition they may be reused; replace as necessary.
8. Inspect the valve seats (Figure 55). If worn or burned, they must be reconditioned. This should be performed by a dealer or qualified machine shop.

**Installation**

1. Coat the valve stems with molybdenum disulfide grease. To avoid damage to the valve stem seal, turn the valve slowly while inserting the valve into the cylinder head.
2. Install the valve springs with the narrow pitch end (end with the coils closest together) facing the head. Refer to Figure 56.
3. Install the valve spring retainer.
4. Compress the valve springs with a compressor tool (Figure 49) and install the valve keepers.

CAUTION

To avoid loss of spring tension, do not compress the springs any more than necessary to install the keepers.



5. After all springs have been installed, gently tap the end of the valve stem with a soft aluminum or brass drift and hammer (Figure 57). This will ensure that the keepers are properly seated.

Valve Guide Replacement

When valve guides are worn so that there is excessive stem-to-guide clearance or valve tipping, the guides must be replaced. Replace all, even if only one is worn. This job should only be done by a dealer as special tools are required.

Valve Seat Reconditioning

This job is best left to a dealer or qualified machine shop. They have special equipment and knowledge for this exacting job. You can still save considerable money by removing the cylinder head and taking the head to the shop for repairs.

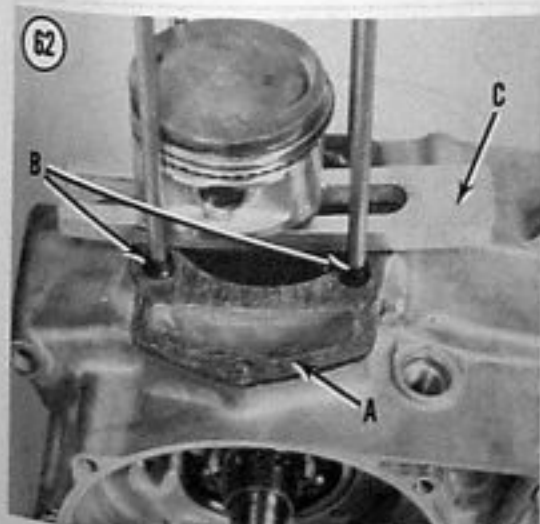
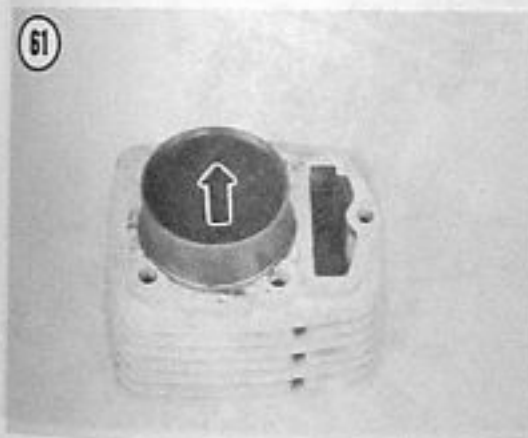
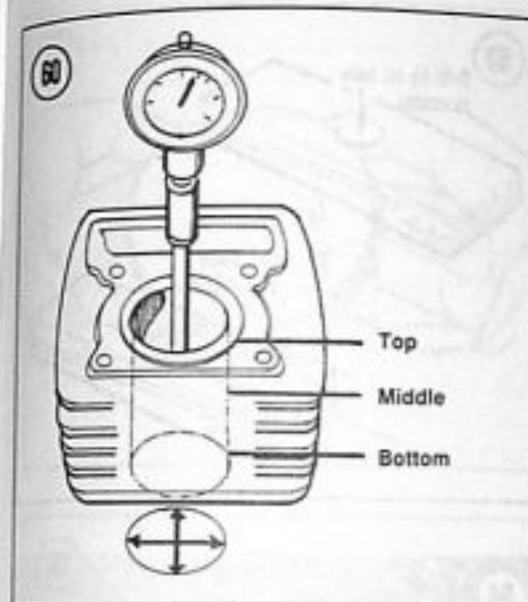
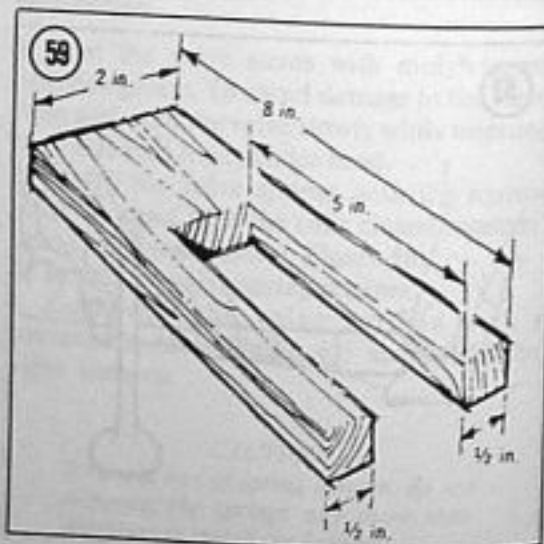
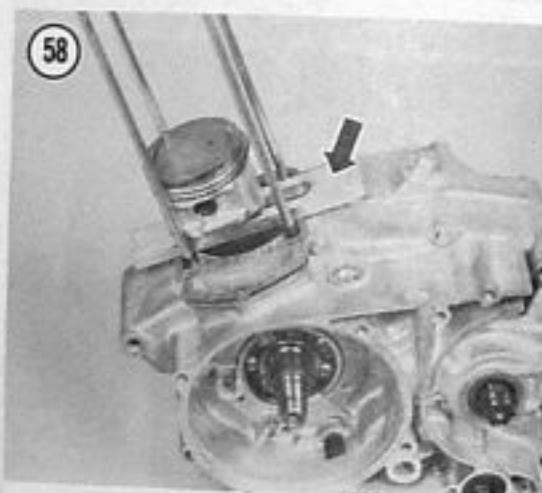
Valve Lapping or Grinding

Valve lapping or grinding the valves is not recommended as the valve face is coated with a special material. Lapping or grinding the valve will remove this surface and will lead to almost instant valve failure. *Do not lap or grind the valves.*

CYLINDER

Removal

1. Remove the cylinder head as described in this chapter.
2. Loosen the cylinder by tapping around the perimeter with a rubber or plastic mallet. If necessary, gently pry the cylinder loose with a broad-tipped screwdriver.
3. Pull the cylinder straight up and off of the crankcase studs. Work the cam chain wire through the opening in the cylinder.
4. Remove the cylinder base gasket and discard it. Remove the 2 dowel pins from the crankcase studs.
5. Install a piston holding fixture under the piston (Figure 58) to protect the piston skirt from damage. This fixture may be purchased or may be a homemade unit of wood. See Figure 59 for dimensions.



Inspection

The following procedure requires the use of highly specialized and expensive measuring instruments. If such equipment is not readily available, have the measurements performed by a dealer or qualified machine shop.

1. Soak with solvent any old cylinder head gasket material on the cylinder. Use a broad-tipped dull chisel and gently scrape off all gasket residue. Do not gouge the sealing surface as oil and air leaks will result.
2. Measure the cylinder bore with a cylinder gauge or inside micrometer at the points shown in Figure 60. Measure in 2 axes—in line with the piston-pin and at 90° to the pin. If the taper or out-of-round is 0.10 mm (0.004 in.) or greater, the cylinder must be rebored to the next oversize and a new piston installed.

NOTE

The new piston should be obtained before the cylinder is rebored so that the piston can be measured; slight manufacturing tolerances must be taken into account to determine the actual size and working clearance. Piston-to-cylinder wear limit is 0.10 mm (0.004 in.).

3. Check the cylinder wall (Figure 61) for scratches; if evident, the cylinder should be rebored.

NOTE

The maximum wear limit on the cylinder is listed in Table 1. If the cylinder is worn to this limit, it must be replaced. Never rebores a cylinder if the finished rebores diameter will be this dimension or greater.

Installation

1. Check that the top surface of the crankcase and the bottom surface of the cylinder are clean prior to installing a new base gasket.
2. Install a new cylinder base gasket (A, Figure 62).
3. Install the 2 dowel pins (B, Figure 62) on the left-hand crankcase studs.

4. Install a piston holding fixture under the piston (C, Figure 62). This can be a purchased unit or home made (Figure 63).

5. Make sure the end gaps of the piston rings are *not* lined up with each other—they must be staggered. Lightly oil the piston rings and the inside of the cylinder bores with assembly oil.

6. Untie the cam chain wire and tie it to the cylinder.

7. Install the cylinder (Figure 64) and slide it down onto the crankcase studs.

8. Carefully feed the cam chain and wire up through the opening in the cylinder and tie it to the engine.

9. Start the cylinder down over the piston. Compress each piston ring as it enters the cylinder either with your fingers or by using aircraft type hose clamps (Figure 65) of the appropriate size.

10. Slide the cylinder down until it bottoms on the piston holding fixture.

11. Remove the piston holding fixture and slide the cylinder down into place on the crankcase.

12. Install the cylinder head as described in this chapter.

13. Adjust the valves, the cam chain tensioner and the ignition timing as described in *Tune-Up* in Chapter Three.

14. Follow the *Break-in Procedure* in this chapter if the cylinder was rebored or honed or a new piston or piston rings were installed.

PISTON, PISTON PIN AND PISTON RINGS

The piston is made of an aluminum alloy. The piston pin is made of steel and is a precision fit. The piston pin is held in place by a clip at each end.

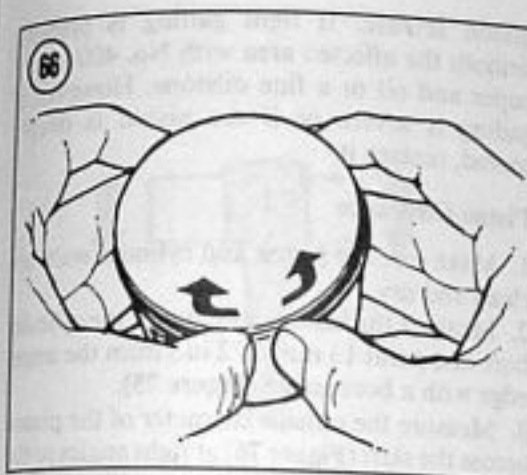
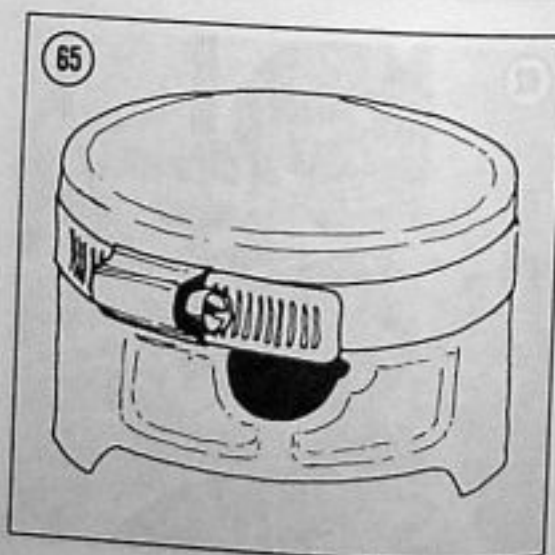
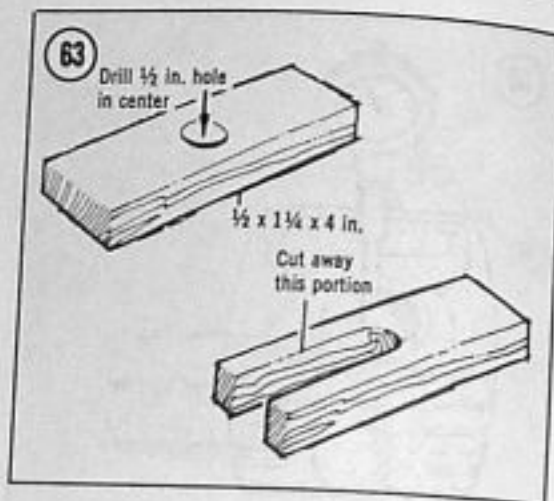
Piston Removal

1. Remove the cylinder head and cylinder as described in this chapter.

WARNING

The edges of all piston rings are very sharp. Be careful when handling them to avoid cut fingers.

2. Remove the top ring with a ring expander tool or by spreading the ends with your thumbs



just enough to slide the ring up over the piston (Figure 66). Repeat for the remaining rings.

3. Before removing the piston, hold the rod tightly and rock the piston as shown in Figure 67. Any rocking motion (do not confuse with the normal sliding motion) indicates wear on the piston pin, piston pin bore or rod small-end bore (more likely a combination of both).

NOTE

Wrap a clean shop cloth under the piston so that the piston pin clip will not fall into the crankcase.

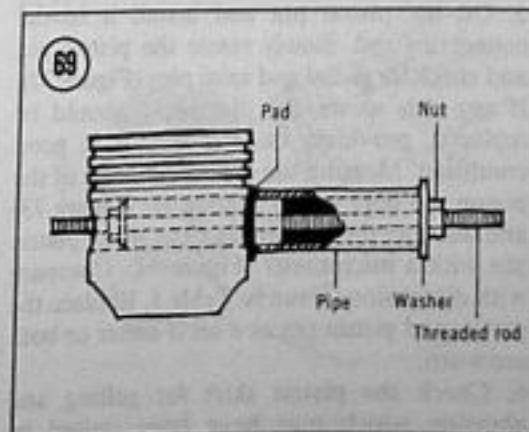
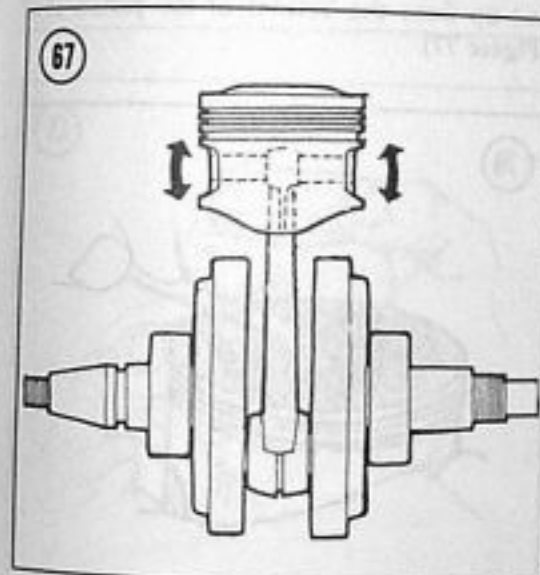
4. Remove the clips from each side of the piston pin bore (Figure 68) with a small screwdriver or scribe. Hold your thumb over one edge of the clip when removing it to prevent the clip from springing out.

5. Use a proper size wooden dowel or socket extension and push out the piston pin.

CAUTION

Be careful when removing the pin to avoid damaging the connecting rod. If it is necessary to gently tap the pin to remove it, be sure that the piston is properly supported so that lateral shock is not transmitted to the lower connecting rod bearing.

6. If the piston pin is difficult to remove, heat the piston and pin with a butane torch. The pin will probably push right out. Heat the piston to only about 140° F (60° C), i.e., until it is too warm to touch, but not excessively hot. If the pin is still difficult to push out, use a homemade tool as shown in Figure 69.



NOTE

A special tool, the universal piston pin extractor, is available from British Marketing, P.O. Box 219, San Juan Capistrano, California 92693.

7. Lift the piston off the connecting rod.
8. If the piston is going to be left off for some time, place a piece of foam insulation tube over the end of the rod to protect it.

Inspection

1. Carefully clean the carbon from the piston crown with a chemical remover or with a soft scraper (Figure 70). Do not remove or damage the carbon ridge around the circumference of the piston above the top ring (Figure 71). If the piston, rings and cylinder are found to be dimensionally correct and can be reused, removal of the carbon ring from the top of the piston or the carbon ridge from the top of the cylinder will promote excessive oil consumption.

CAUTION

Do not wire brush the piston skirts.

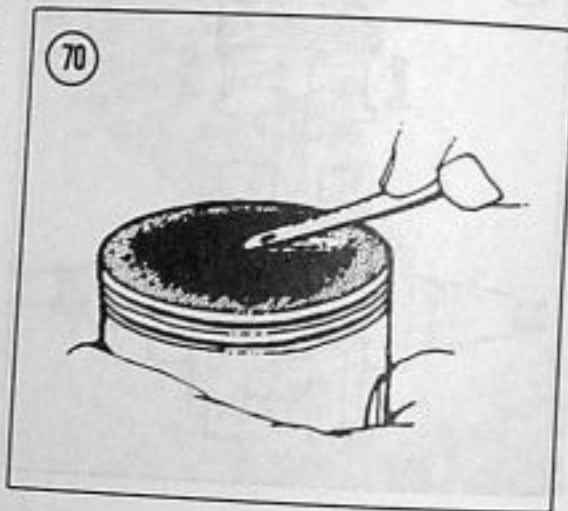
2. Examine each ring groove for burrs, dented edges and wide wear. Pay particular attention to the top compression ring groove as it usually wears more than the others.
3. Measure piston-to-cylinder clearance as described under *Piston Clearance* in this chapter.
4. If damage or wear indicates piston replacement, select a new piston as described under *Piston Clearance* in this chapter.
5. Oil the piston pin and install it in the connecting rod. Slowly rotate the piston pin and check for radial and axial play (Figure 72). If any play exists, the piston pin should be replaced, providing the rod bore is in good condition. Measure the inside diameter of the piston pin bore with a snap gauge (Figure 73) and measure the outside diameter of the piston pin with a micrometer (Figure 74). Compare with dimensions given in Table 1. Replace the piston and piston pin as a set if either or both are worn.
6. Check the piston skirt for galling and abrasion which may have been caused by

piston seizure. If light galling is present, smooth the affected area with No. 400 emery paper and oil or a fine oilstone. However, if galling is severe or if the piston is deeply scored, replace it.

Piston Clearance

1. Make sure the piston and cylinder walls are clean and dry.
2. Measure the inside diameter of the cylinder bore at a point 13 mm (1/2 in.) from the upper edge with a bore gauge (Figure 75).
3. Measure the outside diameter of the piston across the skirt (Figure 76) at right angles to the piston pin. Measure at a distance 10 mm (0.40 in.) up from the bottom of the piston skirt (Figure 77).

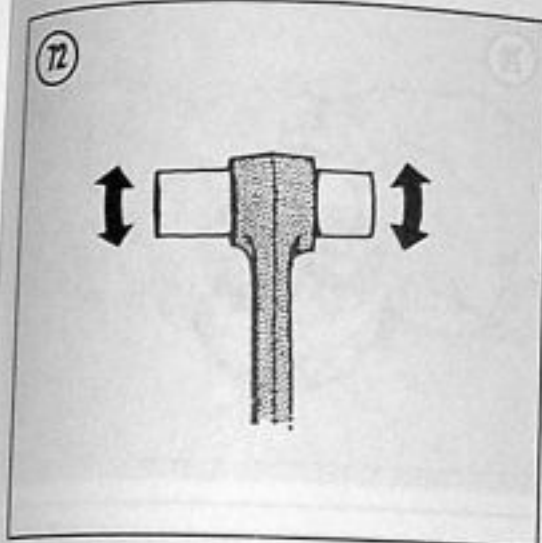
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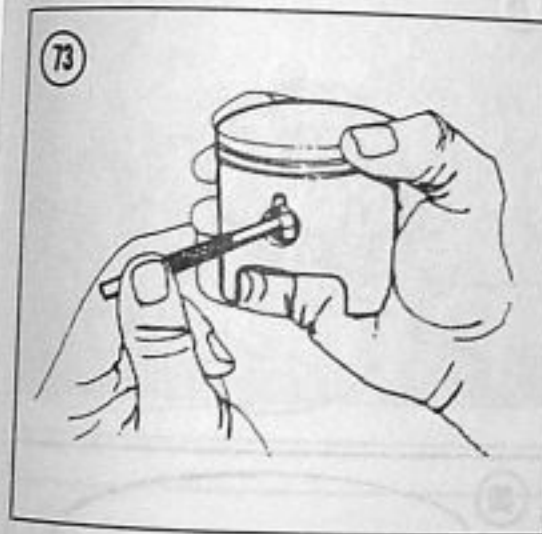
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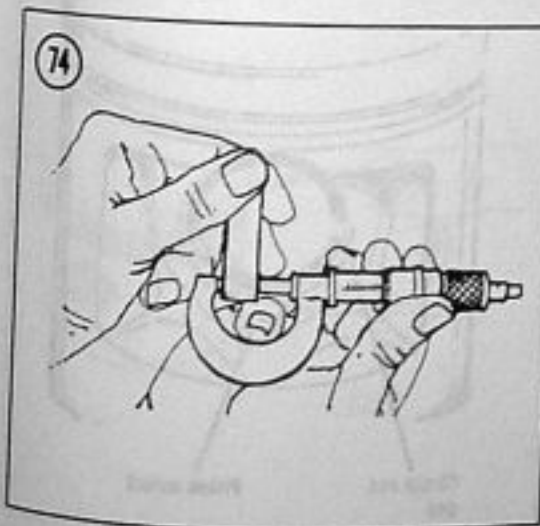
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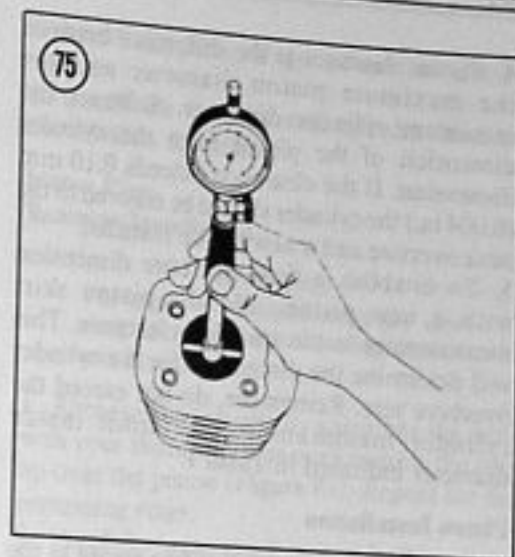
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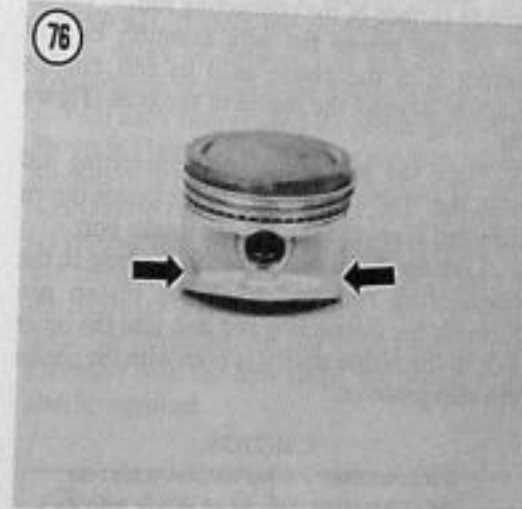
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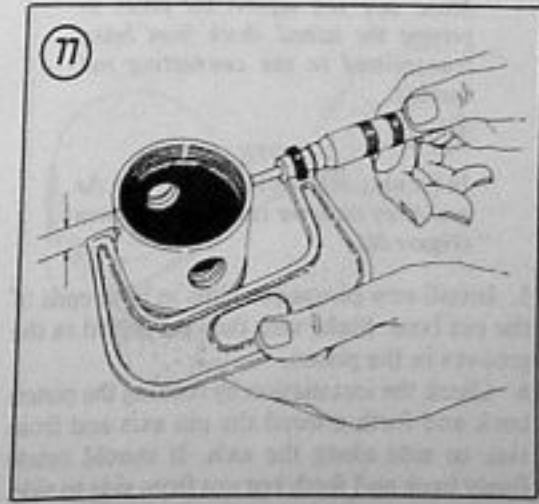
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4. Piston clearance is the difference between the maximum piston diameter and the minimum cylinder diameter. Subtract the dimension of the piston from the cylinder dimension. If the clearance exceeds 0.10 mm (0.004 in.) the cylinder should be rebored to the next oversize and a new piston installed.

5. To establish a final overbore dimension with a new piston, add the piston skirt measurement to the specified clearance. This will determine the dimension for the cylinder overbore size. Remember, do not exceed the cylinder maximum service limit inside diameter indicated in Table 1.

Piston Installation

1. Apply molybdenum disulfide grease to the inside surface of the connecting rod.
2. Oil the piston pin with assembly oil and install it in the piston until its end extends slightly beyond the inside of the boss (Figure 78).
3. Place the piston over the connecting rod with the "IN" (Figure 79) on the piston crown directed rearward toward the intake port.
4. Line up the piston pin with the hole in the connecting rod and push the piston pin through the connecting rod and into the other side of the piston until it is even with the piston pin clip grooves.

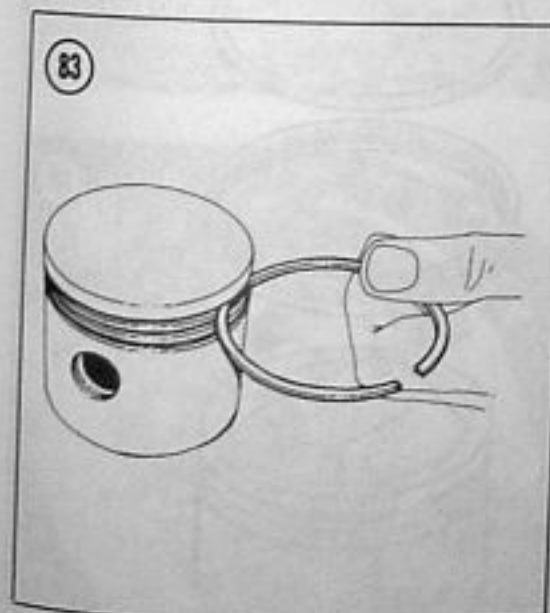
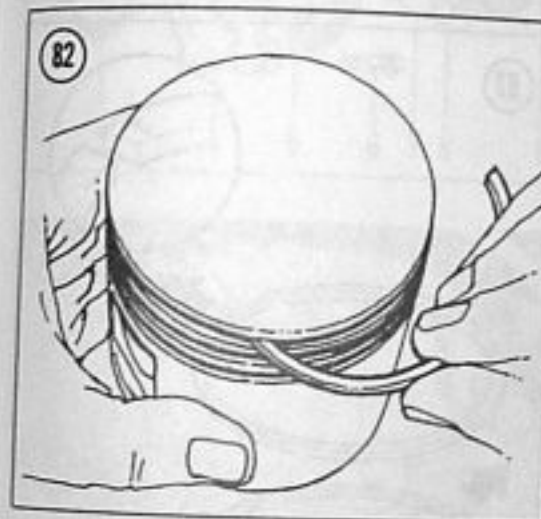
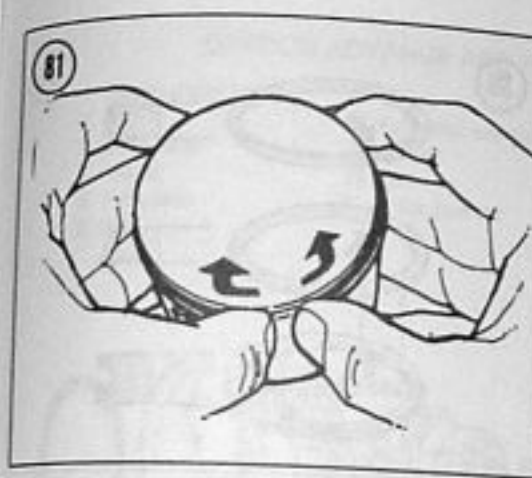
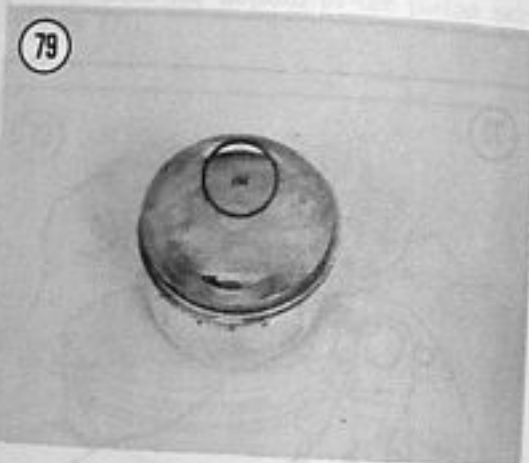
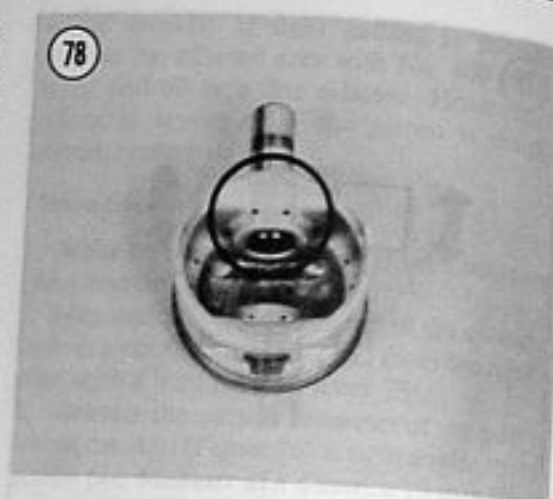
CAUTION

If it is necessary to tap the piston pin into the connecting rod, do so gently with a block of wood or a soft-faced hammer. Make sure you support the piston to prevent the lateral shock from being transmitted to the connecting rod bearing.

NOTE

In the next step, install the clips with the gap away from the cutout in the piston (Figure 80).

5. Install new piston pin clips in both ends of the pin boss. Make sure they are seated in the grooves in the piston.
6. Check the installation by rocking the piston back and forth around the pin axis and from side to side along the axis. It should rotate freely back and forth but not from side to side.



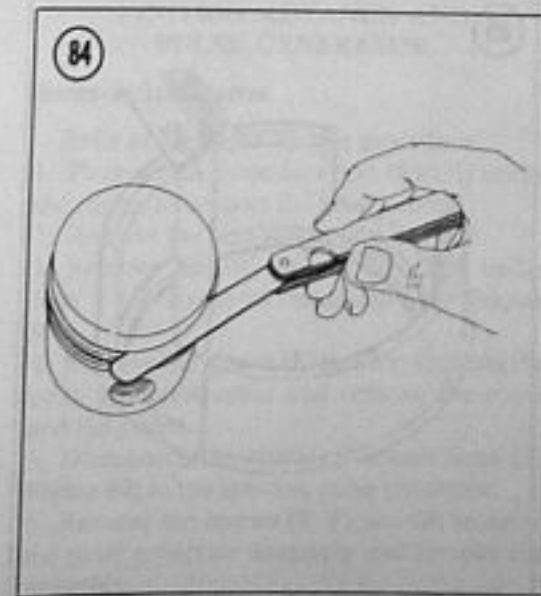
7. Install the piston rings as described in this chapter.
8. Install the cylinder and cylinder head as described in this chapter.

Piston Ring Removal/Installation

WARNING

The edges of all piston rings are very sharp. Be careful when handling them to avoid cut fingers.

1. Remove the top ring by spreading the ends with your thumbs just enough to slide the ring up over the piston (Figure 81). Repeat for the remaining rings.
2. Carefully remove all carbon buildup from the ring grooves with a broken piston ring (Figure 82). Inspect the grooves carefully for burrs, nicks or broken and cracked lands. Recondition or replace the piston if necessary.
3. Roll each ring around its piston groove as shown in Figure 83 to check for binding. Minor binding may be cleaned up with a fine-cut file.
4. Measure the side clearance of each ring in its groove with a flat feeler gauge (Figure 84) and compare to dimensions given in Table 1. If the clearance is greater than specified, the rings must be replaced. If the clearance is still excessive with the new rings, the piston must also be replaced.



5. Measure each ring for wear as shown in Figure 85. Place each ring, one at a time, into the cylinder and push it in about 20 mm (3/4 in.) with the crown of the piston to ensure that the ring is square in the cylinder bore. Measure the gap with a flat feeler gauge and compare to dimensions in Table 1. If the gap is greater than specified, the rings should be replaced. When installing new rings, measure their end gap in the same manner as for old ones. If the gap is less than specified, carefully file the ends with a fine-cut file until the gap is correct.

6. Install the piston rings in the order shown in Figure 86.

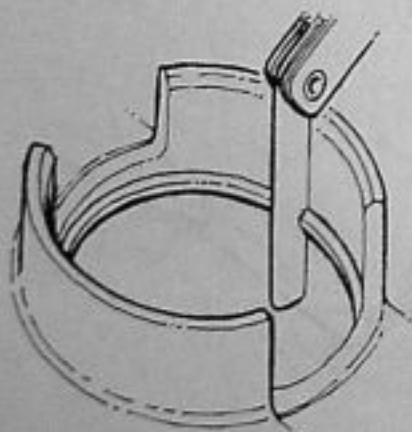
NOTE

Install all rings with their markings facing up.

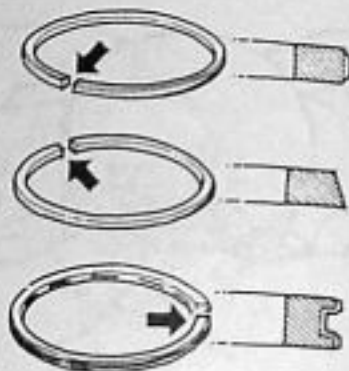
7. Install the piston rings—first the bottom one, then the middle one, then the top—by carefully spreading the ends of the ring with your thumbs and slipping the ring over the top of the piston. Remember that the marks on the piston rings are toward the top of the piston.

8. Make sure the rings are seated completely in their grooves all the way around the piston and that the ends are distributed around the piston as shown in Figure 87. The important thing is that the ring gaps are not aligned with each other when installed.

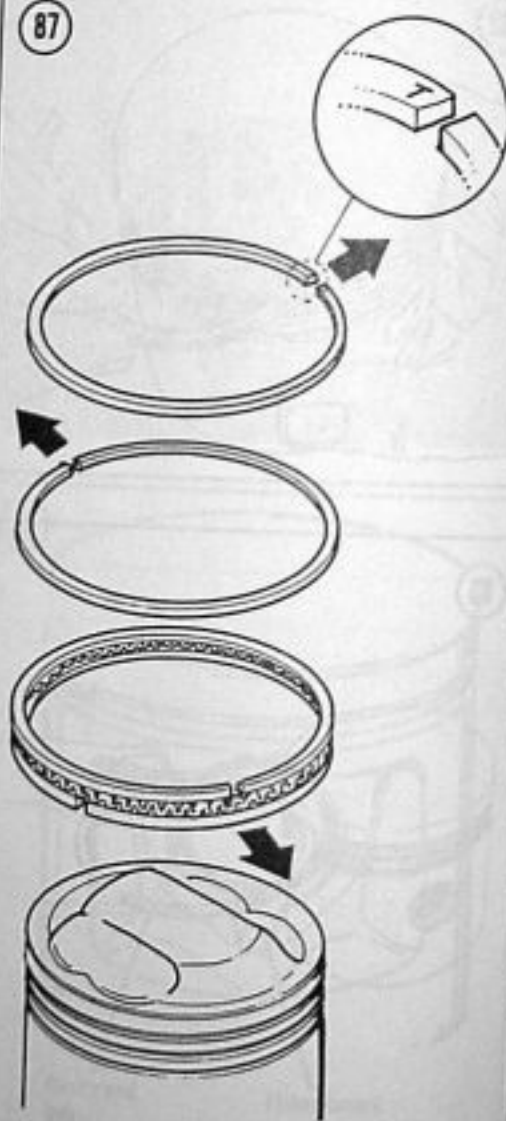
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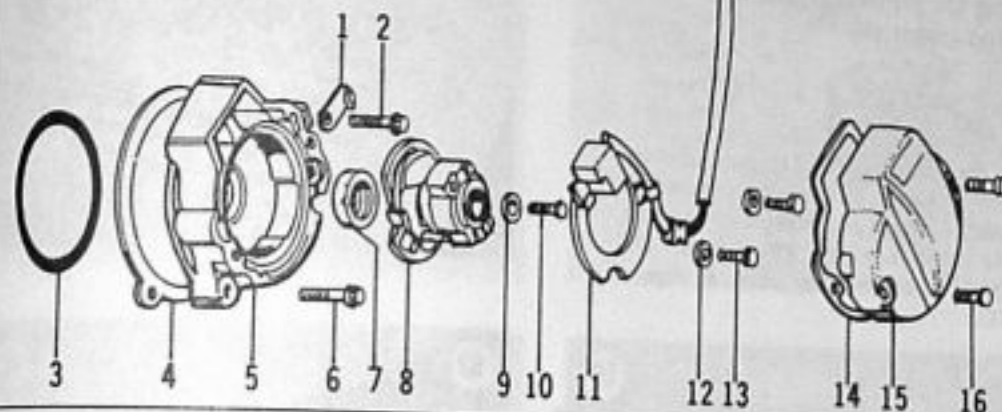


IGNITION ADVANCE AND PULSE GENERATOR ASSEMBLY

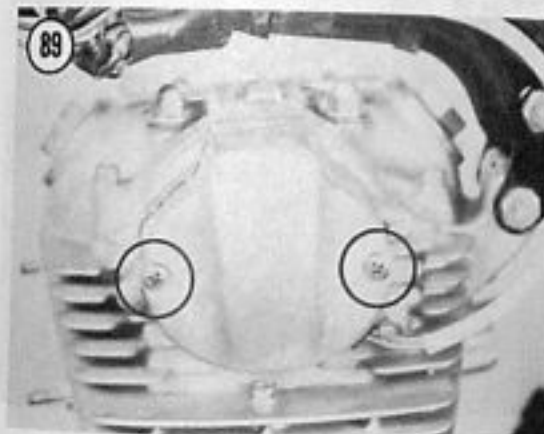
1. Electrical wire clip
2. Bolt
3. O-ring seal
4. Gasket
5. Pulse base
6. Bolt

7. Oil seal
8. Pulse rotor and ignition advance mechanism
9. Washer
10. Bolt
11. Pulse generator

12. Washer
13. Screw
14. Gasket
15. Pulse generator cover
16. Screw



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9. If new rings were installed, measure the side clearance of each ring in its groove with a flat feeler gauge (Figure 84) and compare to dimensions given in Table 1.

10. Follow the *Break-in Procedure* in this chapter if a new piston or piston rings have been installed or the cylinder was rebored or honed.

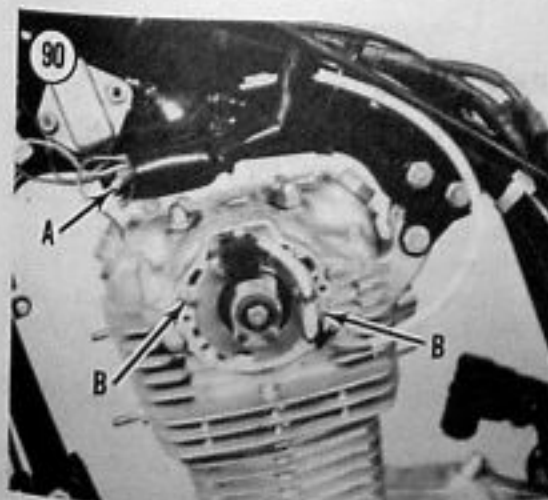
IGNITION ADVANCE AND PULSE GENERATOR

Removal/Installation

Refer to Figure 88 for this procedure.

1. Place a milk crate or wood block(s) under the engine to support the bike securely.
2. Remove the side covers and the seat.
3. Remove the fuel tank as described under *Fuel Tank Removal/Installation* in Chapter Six.
4. Remove the screws (Figure 89) securing the pulse generator cover and remove the cover and the gasket.
5. Disconnect the electrical connections (A, Figure 90) to the ignition pulse generator.
6. Remove the screws (B, Figure 90) securing the pulse generator assembly and remove the assembly.

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7. Remove the bolt (Figure 91) securing the pulse rotor and ignition advance mechanism and remove the assembly.

8. Don't lose the dowel pin (A, Figure 92) on the camshaft.

9. If necessary, remove the bolts (B, Figure 92) securing the pulse base and remove the pulse base and gasket.

NOTE

If the pulse rotor and ignition advance components have been separated, assemble by aligning the punch mark on the rotor (A, Figure 93) with the "O" mark on the backing plate (B, Figure 93).

10. If removed, inspect the O-ring and the gasket (Figure 94) on the back of the pulse base. Also inspect the oil seal (Figure 95) in the pulse base. Replace all 3 if any need replacing.

11. If removed, install the pulse base, O-ring and gasket.

12. Make sure the dowel pin is in place on the camshaft.

13. When installing the pulse rotor and ignition advance unit, index the notch on the backside of the advance unit with the pin in the end of the camshaft (Figure 96).

14. Install the bolt securing the pulse generator and ignition advance mechanism (Figure 91) and tighten to 12 N·m (9 ft.-lb.).

15. Install the pulse generator assembly and tighten the screws (B, Figure 90).

16. Install the pulse generator cover and gasket (Figure 89).

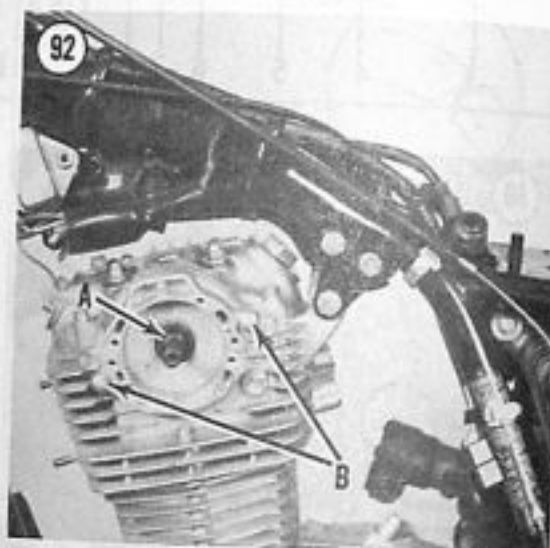
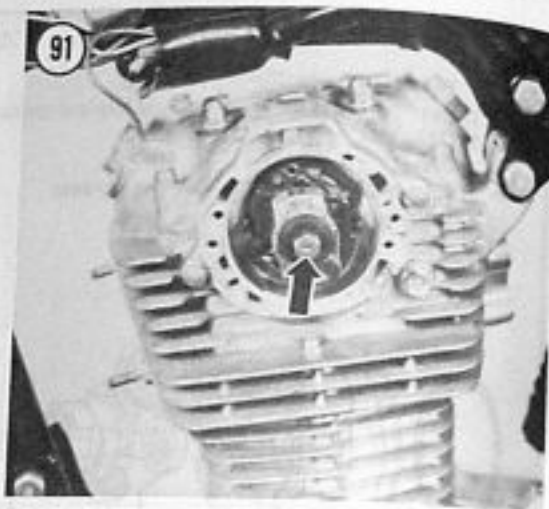
17. Connect the electrical connections (A, Figure 90) to the ignition pulse generator.

18. Install the fuel tank, seat and side covers.

19. Adjust the ignition timing as described under Ignition Timing in Chapter Three.

Testing/Inspection

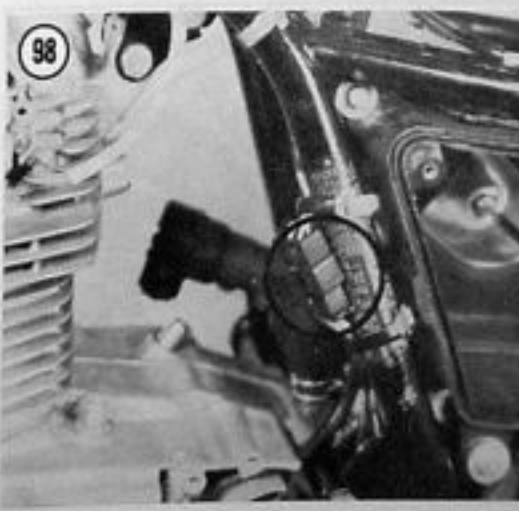
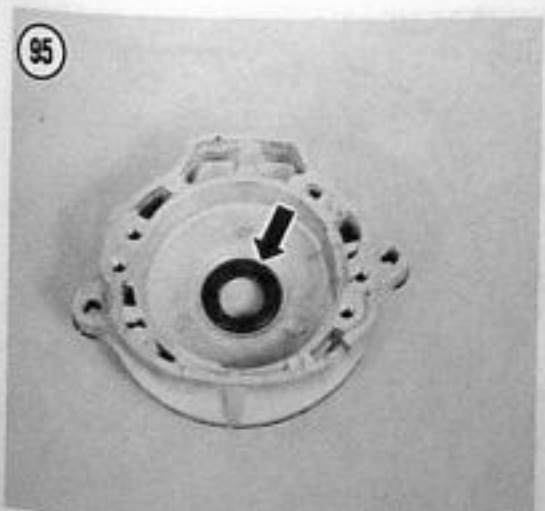
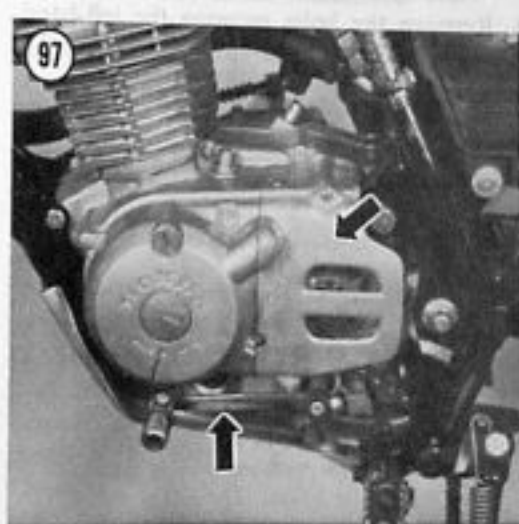
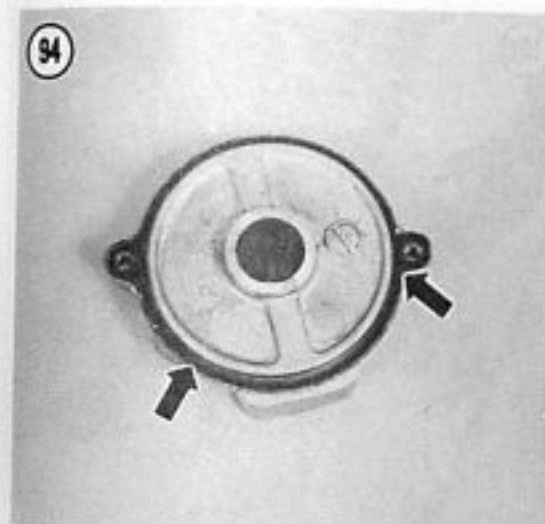
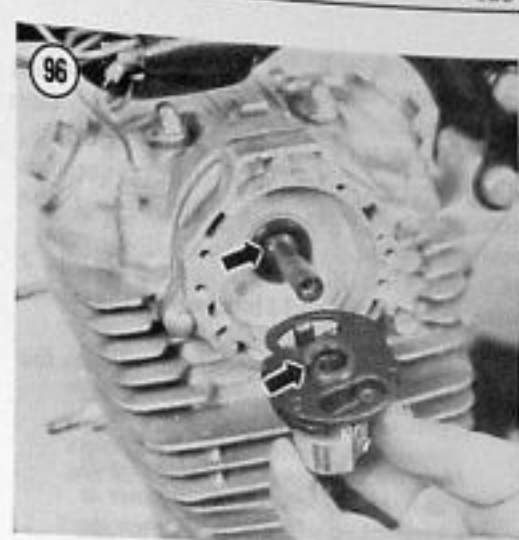
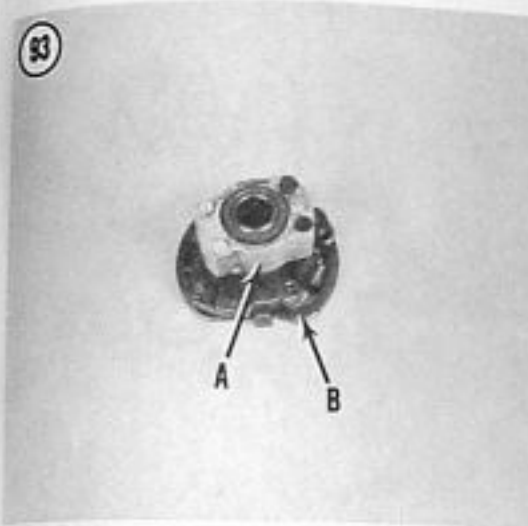
For inspection of the ignition advance unit and test procedures for the ignition pulse, refer to Ignition Advance Inspection and Ignition Pulse Testing in Chapter Seven.



ALTERNATOR

Rotor Removal/Installation

1. Place a milk crate or wood block(s) under the engine to support the bike securely.
2. Drain the engine oil as described under Changing Engine Oil in Chapter Three.
3. Remove the left-hand side cover.
4. Remove the fuel tank as described under Fuel Tank Removal/Installation in Chapter Six.
5. Remove the gearshift lever and drive sprocket cover (Figure 97).
- 6A. On XL and TLR series, disconnect the alternator electrical connection (Figure 98).



containing 5 wires (one black/red, one pink, one yellow, one white/yellow and one light green/red).

6B. On XR185 and XR200 models, disconnect the alternator electrical connection containing 2 wires (one black/red and one white/yellow).

6C. On XR200R models, disconnect the 2 wires (1 black/red and 1 blue) within the rubber boot (Figure 99).

7. On XL series, disconnect the wire to the neutral switch (Figure 100).

NOTE

Move the oil drain pan (used in Step 2) under the left-hand crankcase cover as additional oil will drain out when the cover is removed.

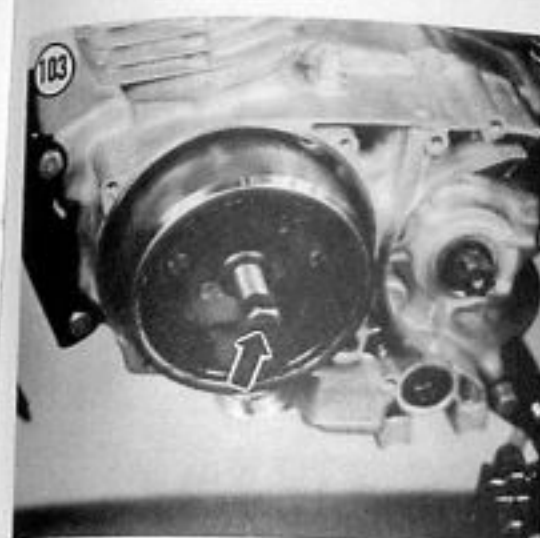
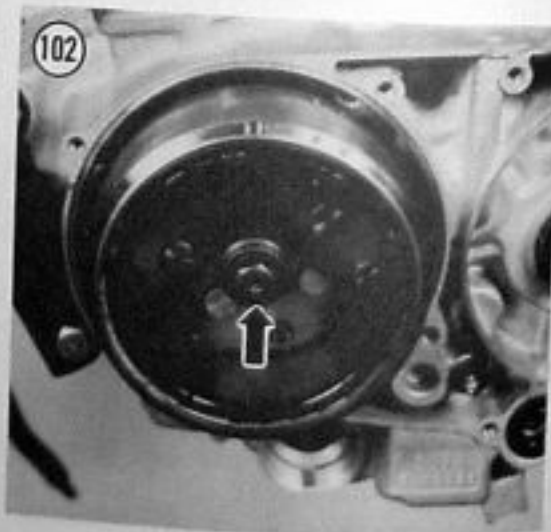
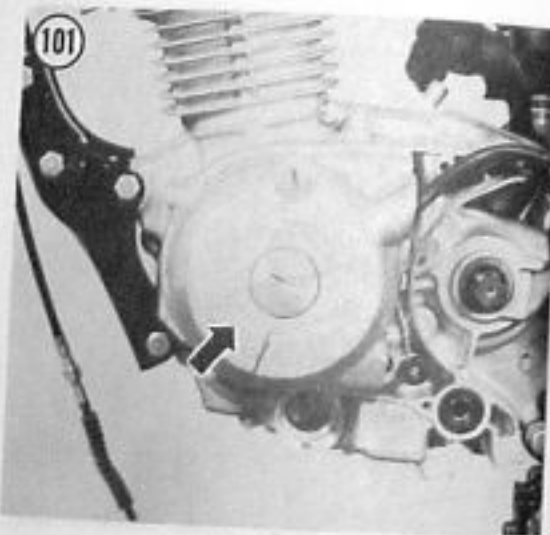
8. Remove the bolts securing the left-hand crankcase cover (Figure 101) and remove the cover.

9. Remove the bolt and washer securing the alternator rotor (Figure 102).

10. Screw in a flywheel puller (Figure 103) until it stops. Use the Honda flywheel puller (part No. 07733-0010000) or equivalent.

CAUTION

Don't try to remove the rotor without a puller; any attempt to do so will ultimately lead to some form of damage to the engine and/or rotor. Many aftermarket types of pullers are available from most motorcycle dealers or mail order houses. The cost of one of these pullers is about \$10 and it makes an excellent addition to any mechanic's tool box. If you can't buy or borrow one, have a dealer remove the rotor.



11. Hold the rotor with a strap wrench (Figure 104) and gradually tighten the puller until the rotor disengages from the crankshaft.

NOTE

If the rotor is difficult to remove, strike the puller with a hammer a few times. This will usually break it loose. Do not hit the rotor.

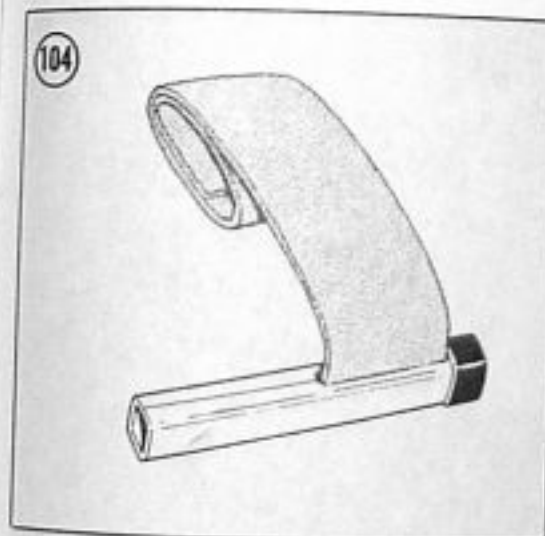
CAUTION

If normal rotor removal attempts fail, do not force the puller as the threads may be stripped out of the rotor causing expensive damage. Take it to a dealer and have them remove it.

12. Remove the rotor and puller. Don't lose the Woodruff key on the crankshaft.

CAUTION

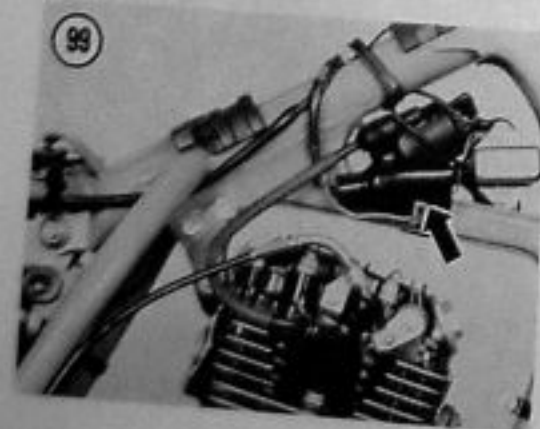
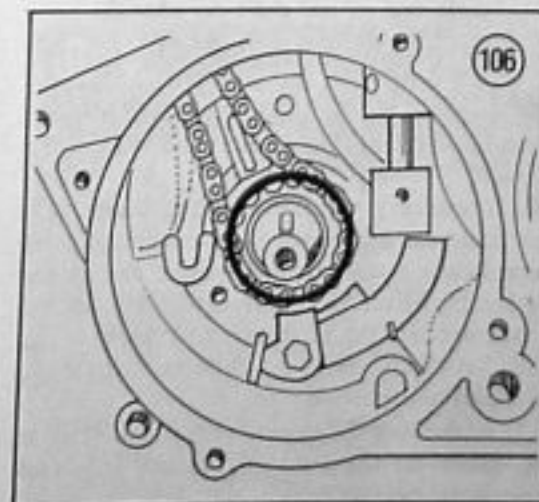
Carefully inspect the inside of the rotor (Figure 105) for small bolts, washers or other metal "trash" that may have been picked up by the magnets. These small metal bits can cause severe damage to the stator plate components.



13. Install by reversing these removal steps, noting the following.

14. Make sure the Woodruff key (Figure 106) is in place on the crankshaft and align the keyway in the rotor with the key when installing the rotor.

15. Be sure to install the washer prior to installing the rotor bolt. Install the rotor bolt.



16. To keep the rotor from turning, hold it with the same tool setup used in Step 11; refer to **Figure 107**.

17. Tighten the rotor bolt to the torque specifications shown in **Table 2**.

18. Make sure the large O-ring (**Figure 108**) is in place on the backside of the left-hand crankcase cover.

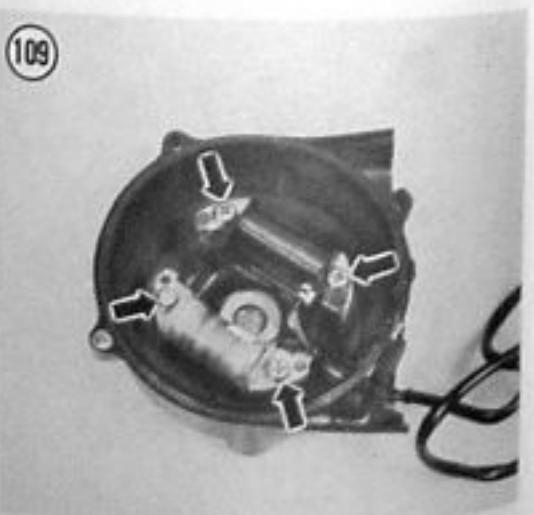
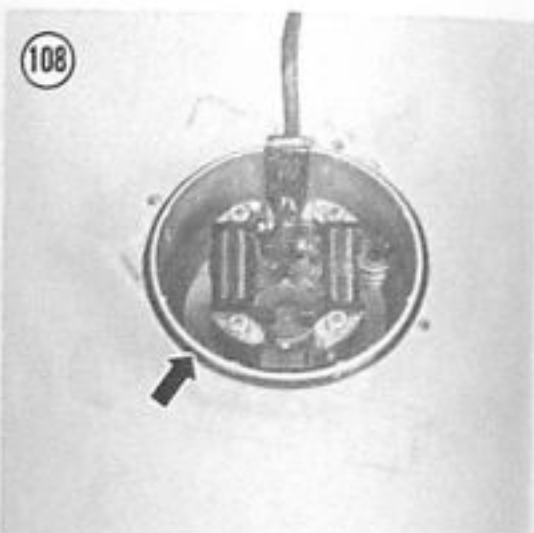
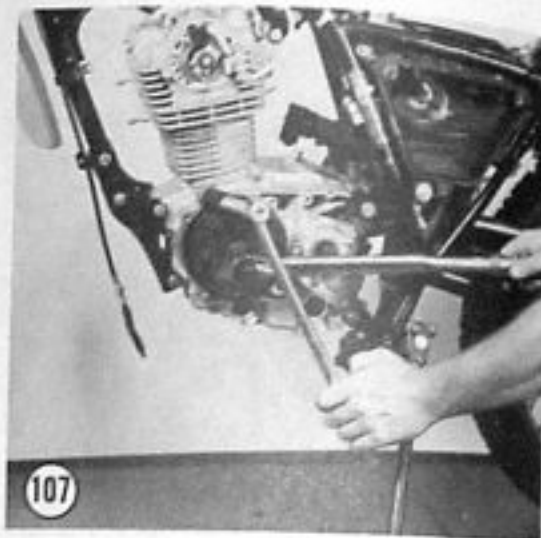
19. Fill the engine with the recommended type and quantity oil as described under *Changing Engine Oil* in Chapter Three.

Stator Assembly Removal/Installation

1. Place a milk crate or wood block(s) under the engine to support the bike securely.
2. Drain the engine oil as described under *Changing Engine Oil* in Chapter Three.
3. Remove the left-hand side cover.
4. Remove the fuel tank as described under *Fuel Tank Removal/Installation* in Chapter Six.
5. Remove the gearshift lever and drive spocket cover (**Figure 97**).
6. Disconnect the alternator electrical connection (**Figure 98**).
7. On XL series, disconnect the wire to the neutral switch (**Figure 100**).

NOTE

Move the oil drain pan (used in Step 2) under the left-hand crankcase cover as additional oil will drain out when the cover is removed.



8. Remove the bolts securing the left-hand crankcase cover (**Figure 101**) and remove the cover.

9. If necessary, remove the screws (**Figure 109**) securing the stator assembly to the left-hand crankcase housing and remove the stator assembly. Pull the grommet and electrical harness out of the left-hand crankcase housing.

10. Install by reversing these removal steps, noting the following.

11. Make sure the large O-ring (**Figure 108**) is in place on the backside of the left-hand crankcase cover.

12. Fill the engine with the recommended type and quantity of oil as described under *Changing Engine Oil* in Chapter Three.

Alternator Component Testing

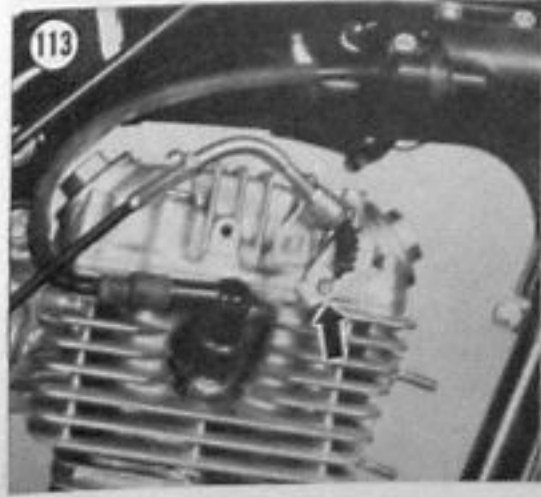
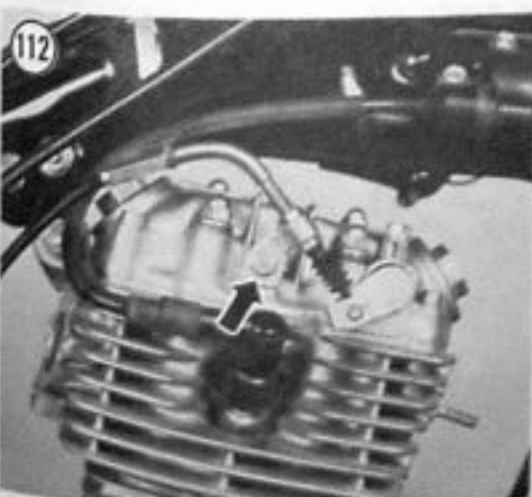
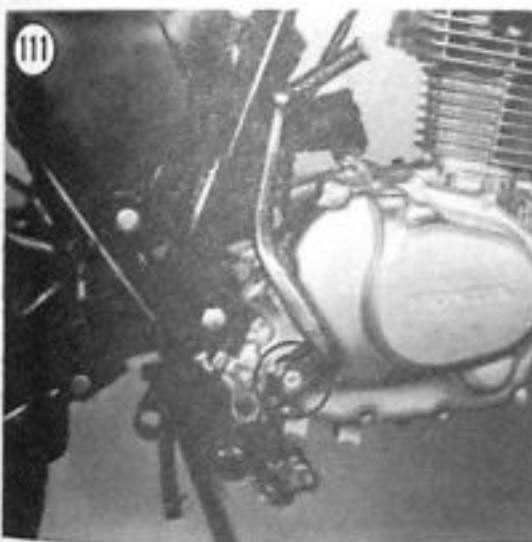
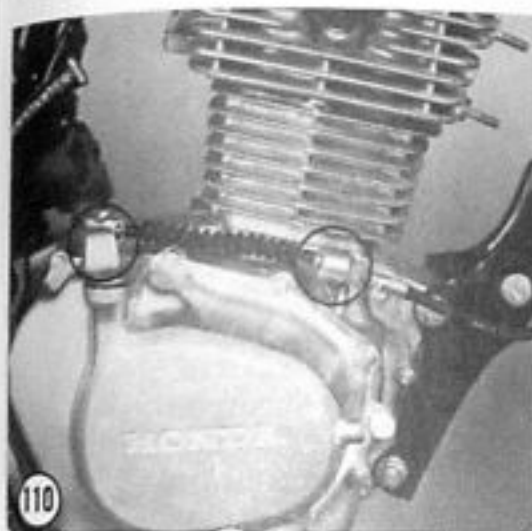
For test procedures for the alternator rotor and stator assembly, refer to *Alternator Rotor Testing* and *Alternator Stator Testing* in Chapter Seven.

OIL PUMP

The oil pump is located on the right-hand side of the engine forward of the clutch assembly. The oil pump can be removed with the engine in the frame.

Removal

1. Drain the engine oil as described under *Changing Engine Oil* in Chapter Three.
2. Remove the rear brake pedal as described under *Rear Brake Pedal Removal/Installation* in Chapter Ten.
3. Remove the exhaust pipe protector from the exhaust pipe.
4. Slacken the clutch cable at the hand lever.
5. Disconnect the clutch cable at the crankcase cover (**Figure 110**).
6. Remove the bolt (**Figure 111**) securing the kickstarter and remove the kickstarter lever.
7. On all models except the XL125S, remove the bolt (**Figure 112**) securing the decompressor cable bracket to the cylinder head cover. Disconnect the cable top end from the decompressor actuating lever (**Figure 113**).

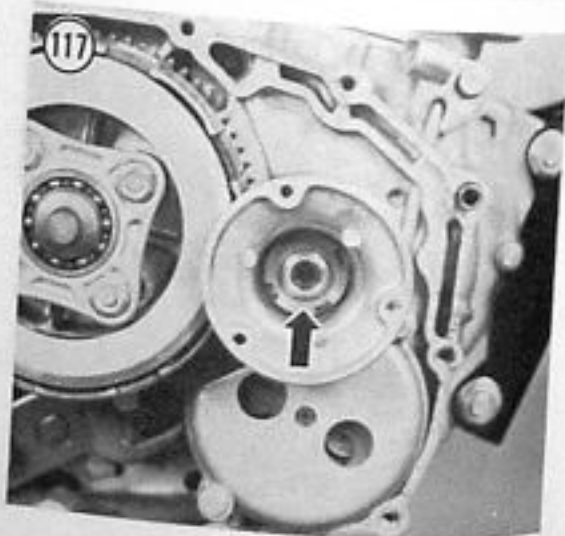
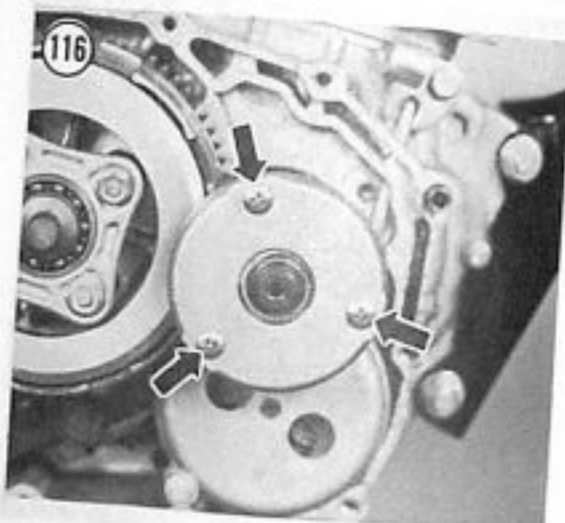
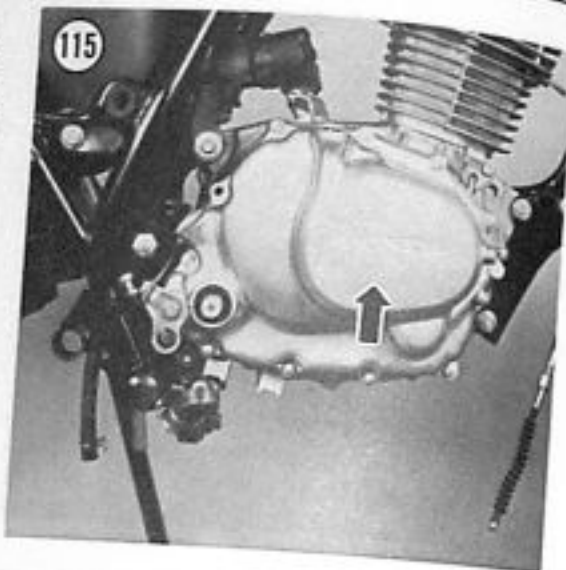
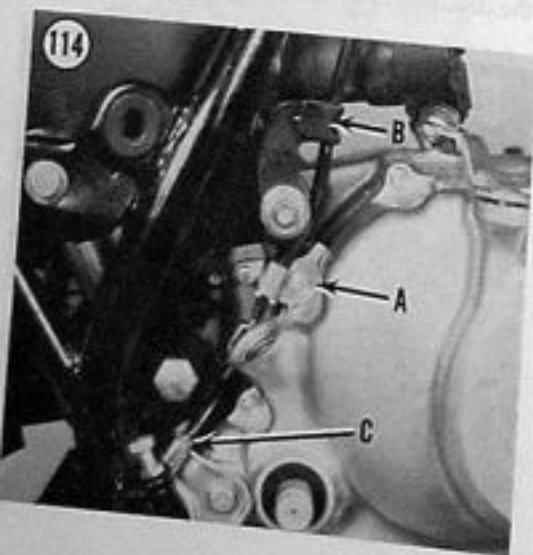


8. Remove the bolt (A, Figure 114) securing the decompressor cable bracket to the right-hand crankcase cover. Remove the cable from the clip (B, Figure 114) and remove the cable end from the decompressor lever on the crankcase cover (C, Figure 114).
9. Remove the bolts securing the right-hand crankcase cover (Figure 115) and remove the cover, gasket and 2 locating dowels.
10. Remove the screws (Figure 116) securing the oil filter rotor cover and remove the cover.
11. Place a copper washer (or copper penny) into mesh with the primary drive gear behind the oil filter rotor and the clutch outer housing. This will keep the oil rotor from turning during the next step.
12. Remove the nut and lockwasher (Figure 117) securing the oil rotor housing in place. Remove the housing.

NOTE

Oil rotor nut removal requires a special tool available from a Honda dealer (Locknut Wrench 20 x 24 part No. 07716-0020100).

13. Remove the bolts (Figure 118) securing the oil pump gear cover and remove the cover.
14. Remove the oil pump drive gear (Figure 119).
15. Remove the screws (Figure 120) securing the oil pump body assembly and remove the assembly.

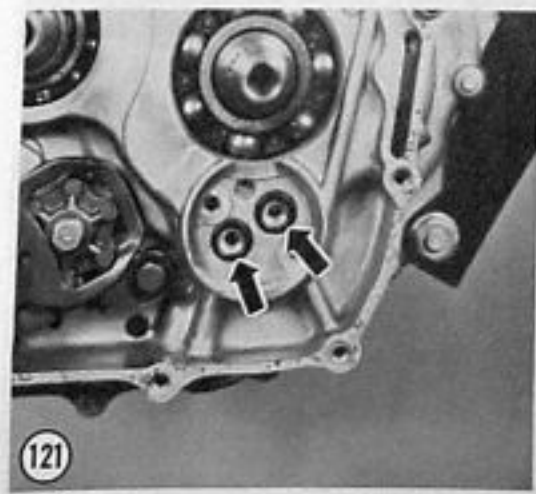
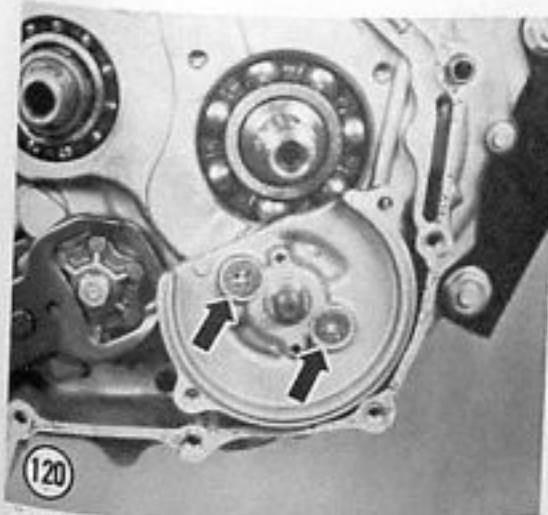
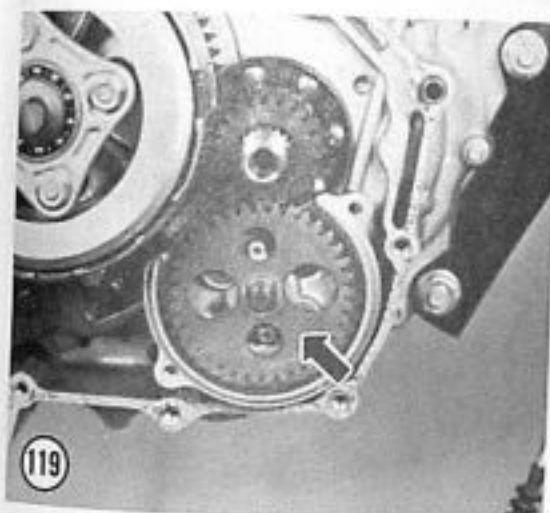
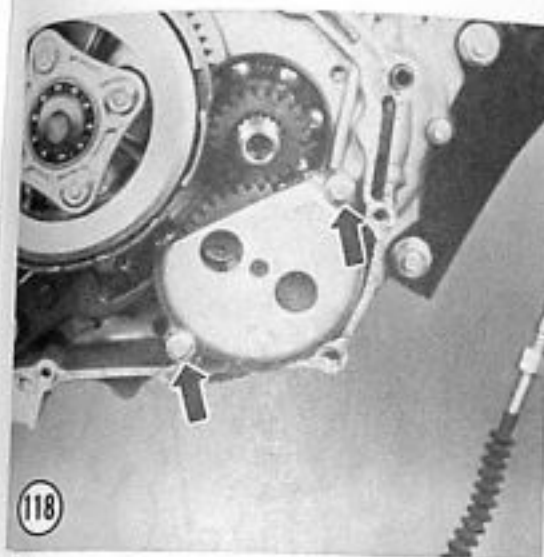


16. Don't lose the O-ring seals (Figure 121) in the crankcase recesses.

Disassembly/Inspection/Assembly

Refer to Figure 122 for this procedure.

1. Inspect the pump body for cracks.
2. Remove the gear shaft (Figure 123).
3. Remove the Phillips screws (Figure 124) securing the pump cover to the body and remove the cover.
4. Remove the inner and outer rotors. Inspect both parts for scratches and abrasions. Replace both parts if evidence of this is found.
5. If damaged, remove the gasket (Figure 125).
6. Clean all parts in solvent and thoroughly dry. Coat all parts with fresh engine oil prior to assembly.
7. Inspect the condition of the teeth on the drive gear. Replace the drive gear if the teeth are damaged or any are missing.
8. Install the inner and outer rotor into the pump body.
9. Measure the clearance between the inner rotor tip and the outer rotor as shown in Figure 126. If the clearance is 0.2 mm (0.008 in.) or greater, replace the worn part.
10. Measure the clearance between the outer rotor and the oil pump body with a flat feeler gauge (Figure 127). If the clearance is 0.40 mm (0.016 in.) or greater, replace the worn part.
11. Install a new gasket if the old one was removed.
12. Install the cover and screws and tighten the screws securely.



8. Remove the bolt (A, Figure 114) securing the decompressor cable bracket to the right-hand crankcase cover. Remove the cable from the clip (B, Figure 114) and remove the cable end from the decompressor lever on the crankcase cover (C, Figure 114).

9. Remove the bolts securing the right-hand crankcase cover (Figure 115) and remove the cover, gasket and 2 locating dowels.

10. Remove the screws (Figure 116) securing the oil filter rotor cover and remove the cover.

11. Place a copper washer (or copper penny) into mesh with the primary drive gear behind the oil filter rotor and the clutch outer housing. This will keep the oil rotor from turning during the next step.

12. Remove the nut and lockwasher (Figure 117) securing the oil rotor housing in place. Remove the housing.

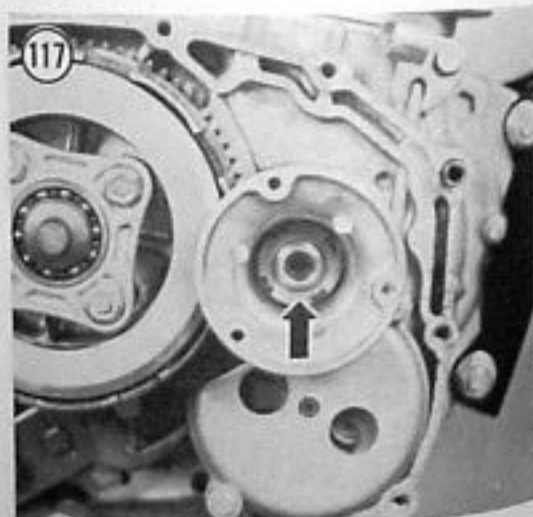
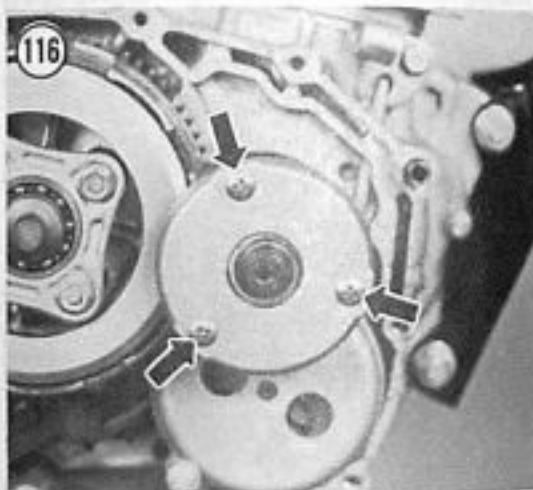
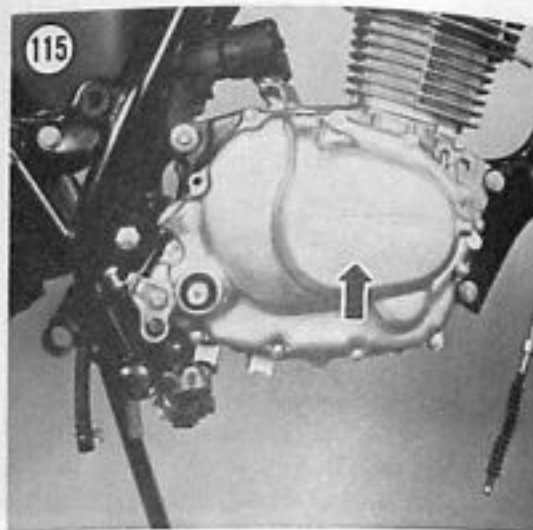
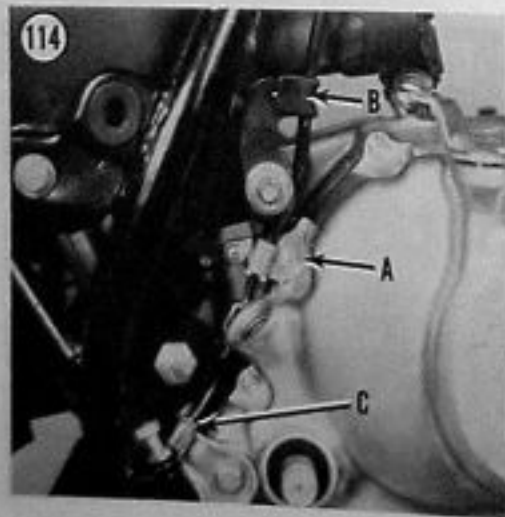
NOTE

Oil rotor nut removal requires a special tool available from a Honda dealer (Locknut Wrench 20 x 24 part No. 07716-0020100).

13. Remove the bolts (Figure 118) securing the oil pump gear cover and remove the cover.

14. Remove the oil pump drive gear (Figure 119).

15. Remove the screws (Figure 120) securing the oil pump body assembly and remove the assembly.

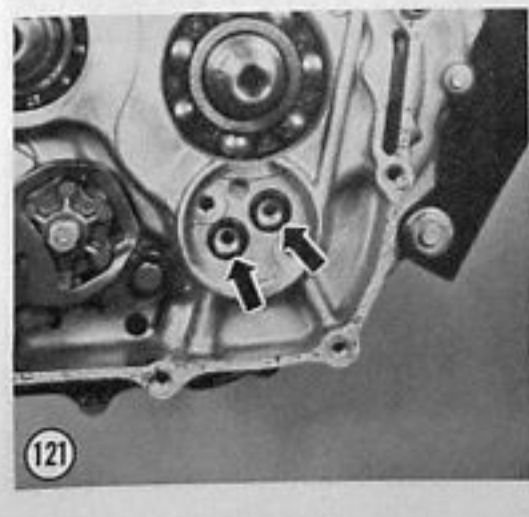
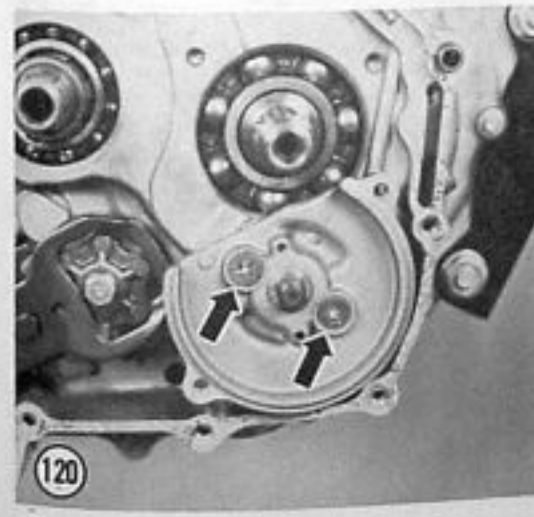
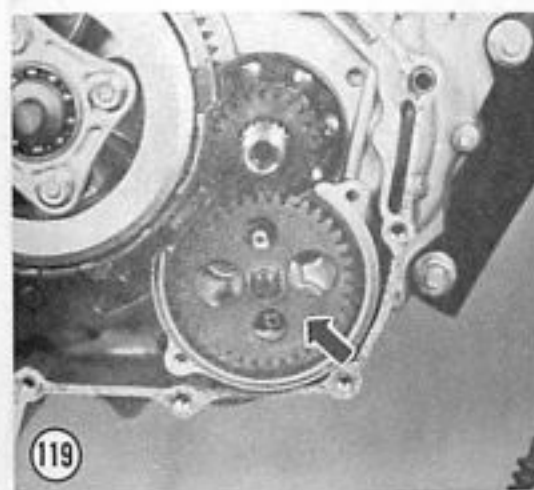
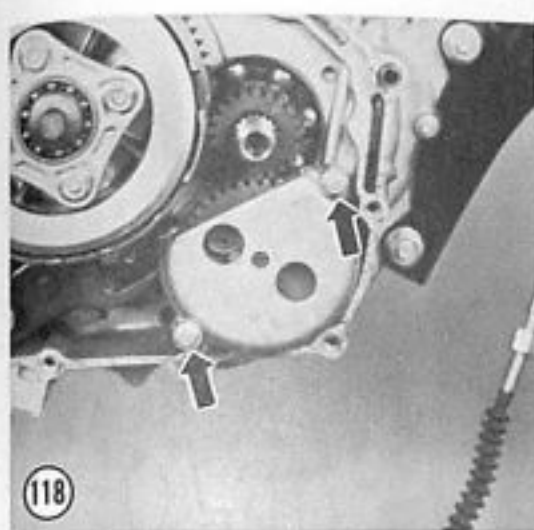


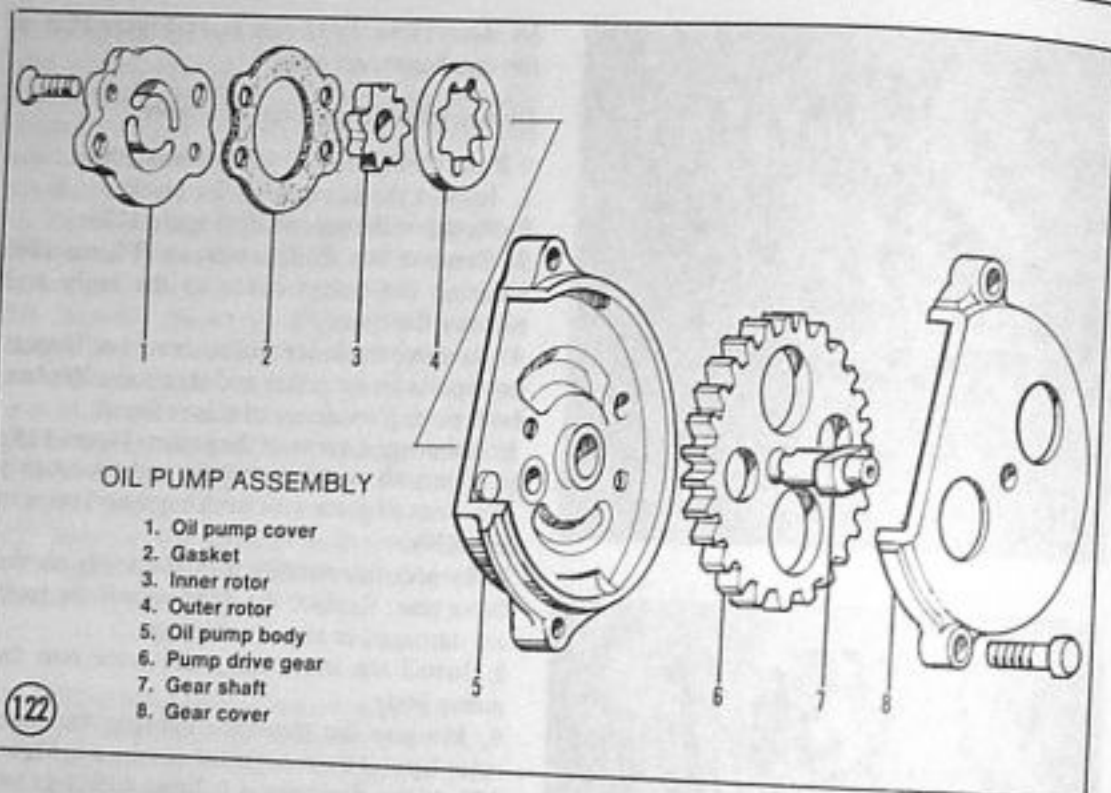
16. Don't lose the O-ring seals (Figure 121) in the crankcase recesses.

Disassembly/Inspection/Assembly

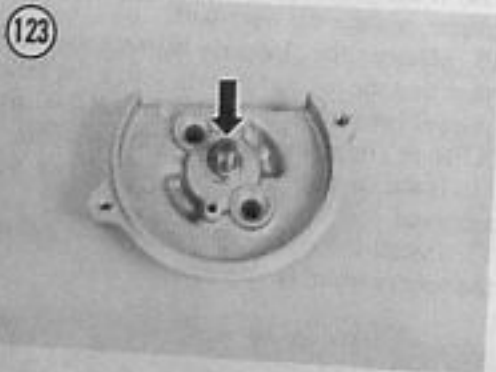
Refer to Figure 122 for this procedure.

1. Inspect the pump body for cracks.
2. Remove the gear shaft (Figure 123).
3. Remove the Phillips screws (Figure 124) securing the pump cover to the body and remove the cover.
4. Remove the inner and outer rotors. Inspect both parts for scratches and abrasions. Replace both parts if evidence of this is found.
5. If damaged, remove the gasket (Figure 125).
6. Clean all parts in solvent and thoroughly dry. Coat all parts with fresh engine oil prior to assembly.
7. Inspect the condition of the teeth on the drive gear. Replace the drive gear if the teeth are damaged or any are missing.
8. Install the inner and outer rotor into the pump body.
9. Measure the clearance between the inner rotor tip and the outer rotor as shown in Figure 126. If the clearance is 0.2 mm (0.008 in.) or greater, replace the worn part.
10. Measure the clearance between the outer rotor and the oil pump body with a flat feeler gauge (Figure 127). If the clearance is 0.40 mm (0.016 in.) or greater, replace the worn part.
11. Install a new gasket if the old one was removed.
12. Install the cover and screws and tighten the screws securely.

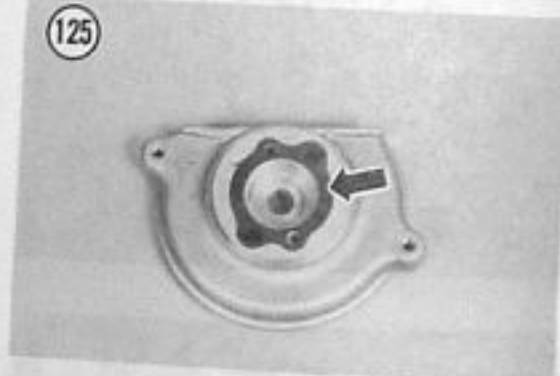




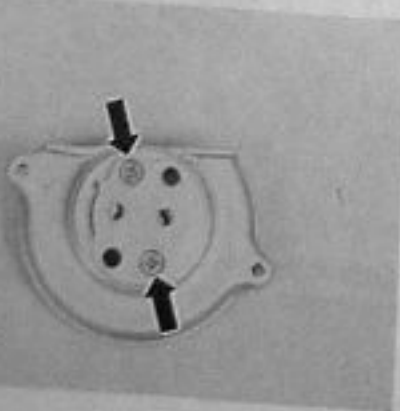
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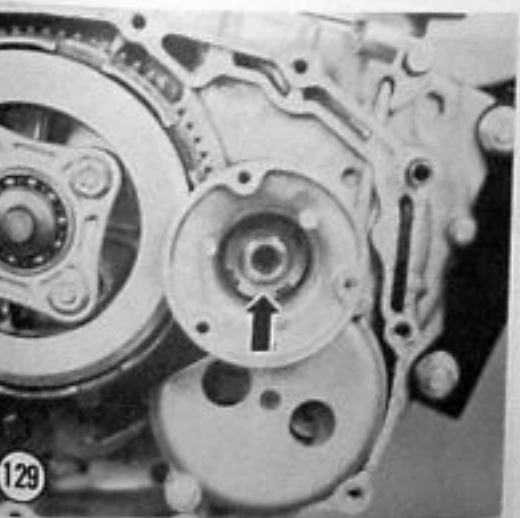
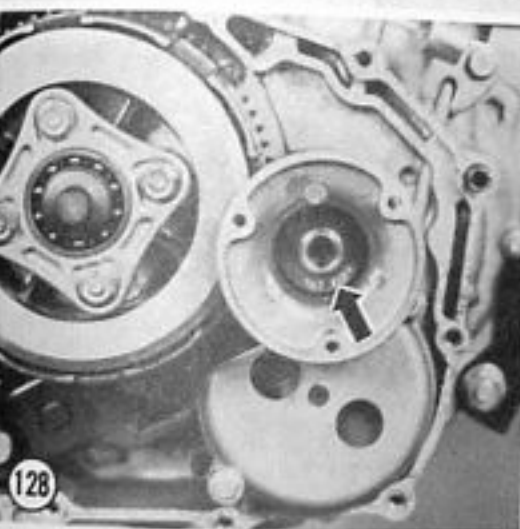
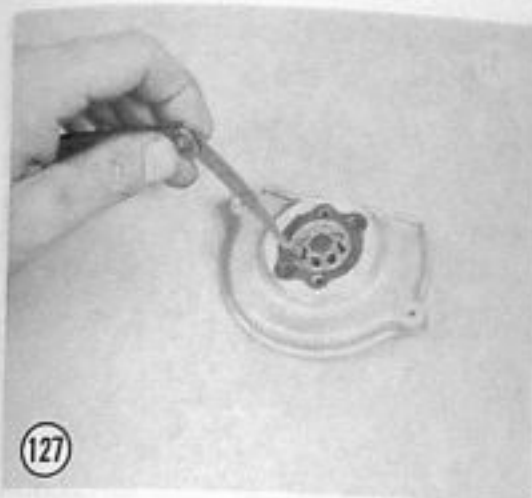
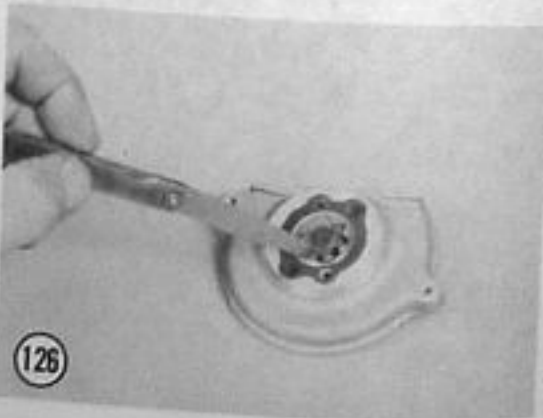
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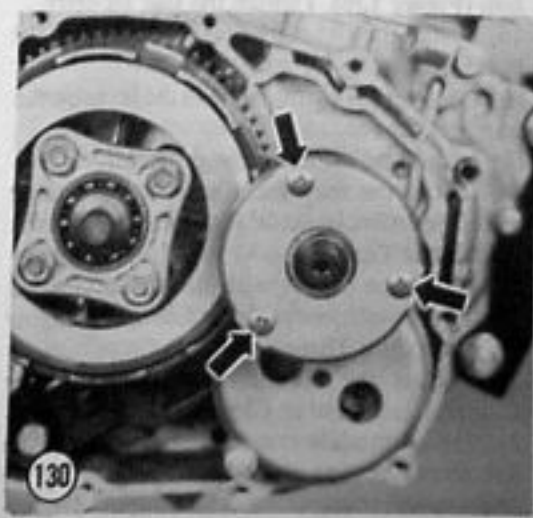
126



13. Install the oil pump gear shaft (Figure 123).

Installation

1. Install the O-ring seals (Figure 121) into the recesses in the crankcase.
2. Install the oil pump body assembly (Figure 120) and tighten the bolts securely.
3. Install the oil pump drive gear (Figure 119).
4. Install the oil pump gear cover and screws (Figure 118).
5. Install the oil rotor housing. Install the lockwasher with the "OUTSIDE" mark facing toward the outside (Figure 128).
6. Install the locknut (Figure 129) and tighten to 40-50 N·m (29-36 ft.-lb.). Use the same tool setup as used in Removal Step 11 and Step 12.
7. Install the oil filter rotor cover and install the screws (Figure 130). Tighten the screws securely.
8. Install the dowel pins (A, Figure 131) and the gasket (B, Figure 131).
9. Pull the clutch actuator lever on the crankcase cover so the recess in the actuator (Figure 132) will mesh properly with the clutch lifter.
10. On all models except XL125S, make sure the decompression release cam follower and spring are in position in the right-hand crankcase cover as shown in Figure 133.



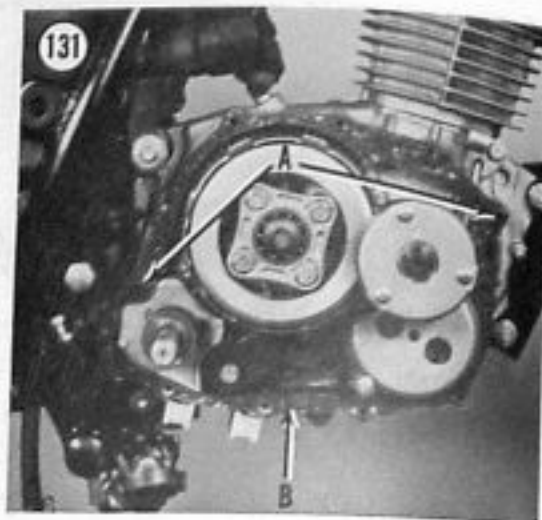
11. Install the right-hand crankcase cover. Push it all the way into place. On models except the XL125S, if the crankcase cover will not go all the way in, wiggle the decompressor release lever and the clutch release lever and push the cover the rest of the way on. Install the screws and tighten securely in a crisscross pattern.

CAUTION

Do not install any of the crankcase cover screws until the crankcase cover is snug up against the crankcase surface. Do not try to force the cover into place with screw pressure. If the cover will not fit up against the crankcase, remove the crankcase cover and repeat Step 11.

NOTE

Steps 12-14 do not apply to the XL125S.



12. Insert the decompressor release cable into the lever in the crankcase cover (C, Figure 134) and fit the cable into the clip (B, Figure 134). Install the decompressor cable clip onto the crankcase cover and install the bolt (A, Figure 134).

13. Hook the top end of the decompressor cable into the actuating arm on the cylinder head cover (Figure 135).

14. Move the decompressor cable bracket into position on the cylinder head and install the bolt (Figure 136). Tighten the bolt securely.

15. Install the kickstarter lever and tighten the bolt securely.

16. Connect the clutch cable to the lever on the crankcase cover.

17. Install the exhaust pipe protector.

18. Install the rear brake pedal as described under *Rear Brake Pedal Removal/Installation* in Chapter Ten.

19. Refill the engine with the recommended type and quantity oil; refer to *Changing Engine Oil* in Chapter Three.

20. Adjust the clutch as described under *Clutch Adjustment* in Chapter Three.

21. On all models except XL125S, adjust the decompressor as described under *Starter Decompressor Adjustment* in Chapter Three.

CRANKCASE AND CRANKSHAFT

Disassembly of the crankcase—splitting the cases—and removal of the crankshaft assembly require that the engine be removed from the frame.

The crankcase is made in 2 halves of precision diecast aluminum alloy and is of the "thin-walled" type. To avoid damage, do not hammer or pry on any of the interior or exterior projected walls. These areas are easily damaged. The cases are assembled with a gasket between the 2 halves and dowel pins align the halves when they are bolted together.

The crankshaft assembly is made up of 2 full-circle flywheels pressed together on a hollow crankpin. The connecting rod big-end bearing on the crankpin is a needle bearing assembly. The crankshaft assembly is supported in 2 ball bearings in the crankcase. Service to the crankshaft assembly is limited to removal and replacement.

The procedure which follows is presented as a complete, step-by-step, major lower end rebuild that should be followed if an engine is to be completely reconditioned. However, if you're replacing a part that you know is defective, the disassembly should be carried out only until the failed part is accessible; there is no need to disassemble the engine beyond that point so long as you know the remaining components are in good condition and that they were not affected by the failed part.

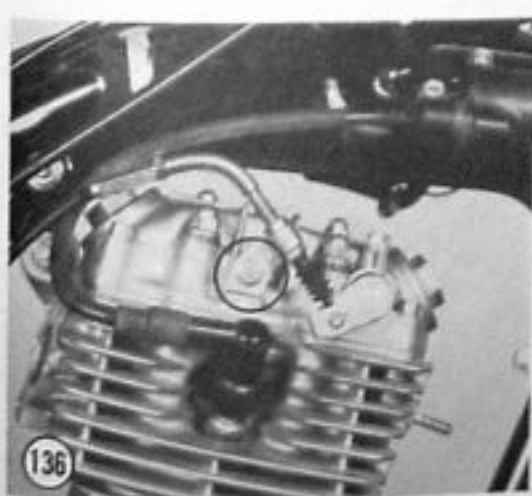
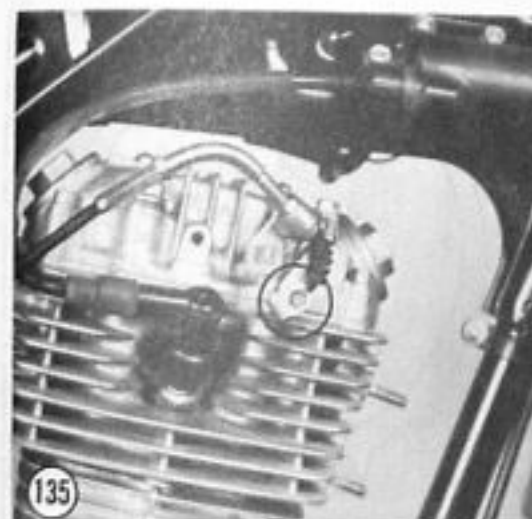
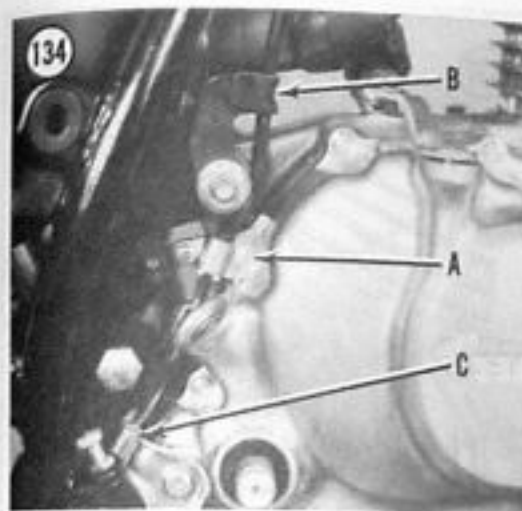
Crankcase Disassembly

1. Remove the engine as described in this chapter.

2. Remove the cam drive chain adjusting bolt and washer (A, Figure 137) and the bolt assembly (B, Figure 137).

3. Remove all exterior engine assemblies as described in this chapter and other related chapters:

- Cylinder head cover
- Cylinder head
- Cylinder
- Piston
- Alternator
- Clutch
- External shift mechanism



4. Remove the bolt (A, Figure 138) securing the cam chain tensioner arm and remove the tensioner arm and spring (B, Figure 138).
5. Remove the cam chain tensioner assembly. Turn the crankcase assembly over and catch the tensioner assembly lock collars located within the adjusting bolt assembly cavity.
6. Remove the cam chain.
7. On the left-hand crankcase side, remove the bolts securing the crankcase halves together (Figure 139). To prevent warpage, loosen them in a crisscross pattern.

NOTE

Set the engine on wood blocks or fabricate a holding fixture of 2 X 4 inch wood as shown in Figure 140.

8. Turn the crankcase over and remove the only bolt (Figure 141) on the right-hand side. Don't lose the clip located under the bolt.

CAUTION

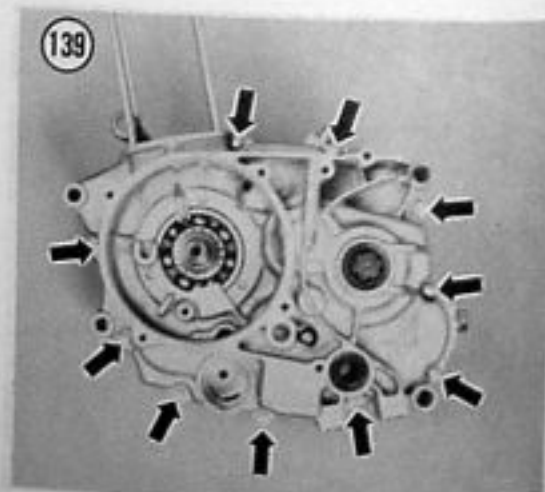
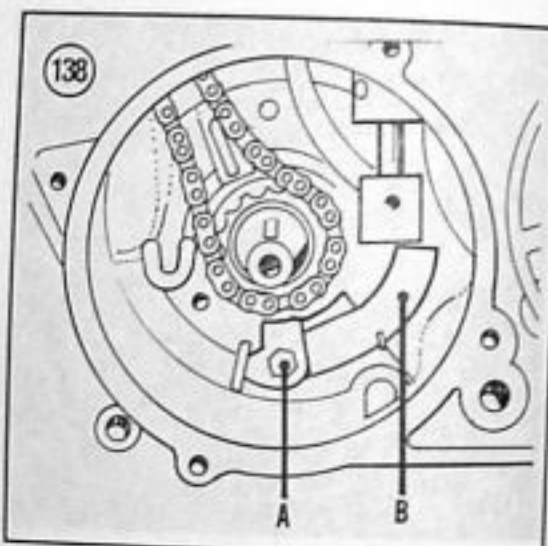
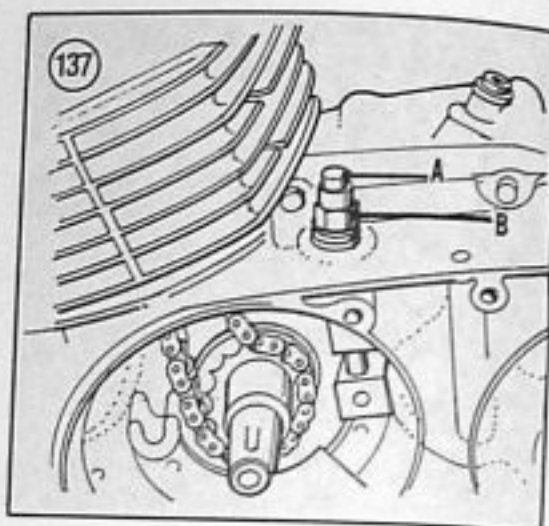
Perform the next step directly over and close to the workbench as the crankcase halves may separate easily. Do not hammer on the crankcase halves or they will be damaged.

9. Hold onto the right-hand crankcase and studs and tap on the right-hand end of the crankshaft and transmission shafts with a plastic or rubber mallet until the crankshaft and crankcase separate.
10. If the crankcase and crankshaft will not separate using this method, check to make sure that all screws are removed. If you still have a problem, take the crankcase assembly to a dealer and have them separate it.

NOTE

Never pry between case halves. Doing so may result in oil leaks, requiring replacement of the case halves.

11. Don't lose the 2 locating dowels if they came out of the case. They do not have to be removed from the case if they are secure.
12. Lift up and carefully remove the transmission, shift drum and shift fork shaft assemblies.
13. Carefully remove the crankshaft assembly from the crankcase half.



14. Inspect the crankcase halves and crankshaft as described in this chapter.

Crankcase Assembly

1. Apply assembly oil to the inner race of all bearings in both crankcase halves.

NOTE

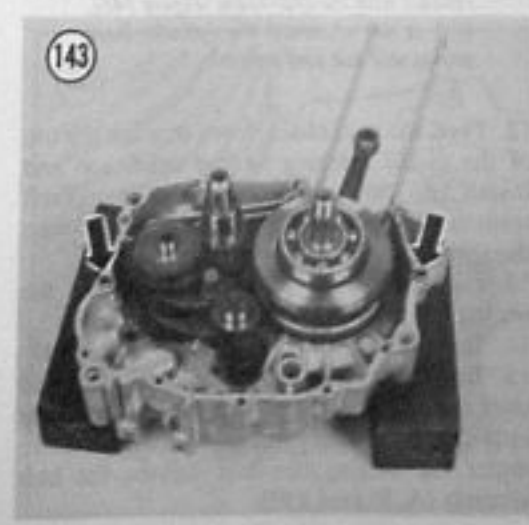
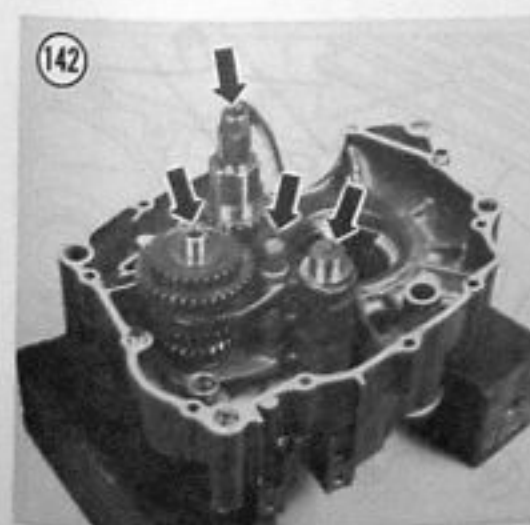
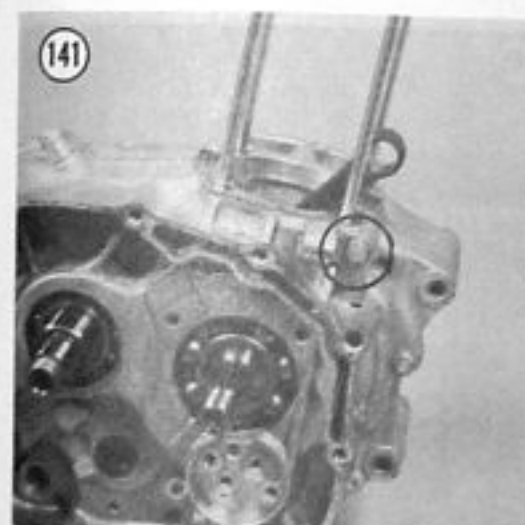
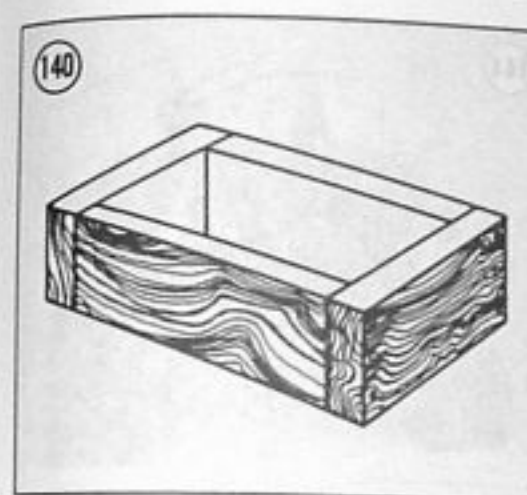
Set the crankcase half assembly on wood blocks or the wood holding fixture shown in the disassembly procedure.

2. Install the transmission assemblies, shift shafts and shift drum in the left-hand crankcase half and lightly oil all shaft ends (Figure 142). Refer to Chapter Five for the correct procedure.
3. Install the crankshaft.

NOTE

Make sure the mating surfaces are clean and free of all old gasket material. Make sure you get a leak-free seal.

4. Install the 2 locating dowels (Figure 143) if they were removed.
5. Install a new crankcase gasket (Figure 144).
6. Set the upper crankcase half over the one on the blocks. Push it down squarely into place until it reaches the crankshaft bearing. There is usually about 1/2 inch left to go.
7. Lightly tap the case halves together with a plastic or rubber mallet until they seat.



CAUTION

Crankcase halves should fit together without force. If the crankcase halves do not fit together completely, do not attempt to pull them together with the crankcase screws. Separate the crankcase halves and investigate the cause of the interference. If the transmission shafts were disassembled, recheck to make sure that a gear is not installed backwards. Do not risk damage by trying to force the cases together.

8. Into the left-hand crankcase, install all of the 50 mm crankcase screws (Figure 139) and tighten only finger-tight.

9. Securely tighten the screws in 2 stages in a crisscross pattern until they are firmly hand-tight.

10. Turn the crankcase over and install the one 55 mm crankcase screw and clip on the right-hand side (Figure 141). Tighten this screw firmly hand-tight also.

11. After the crankcase halves are completely assembled, rotate the crankshaft and transmission shafts to make sure there is no binding. If any is present, disassemble the crankcase and correct the problem.

NOTE

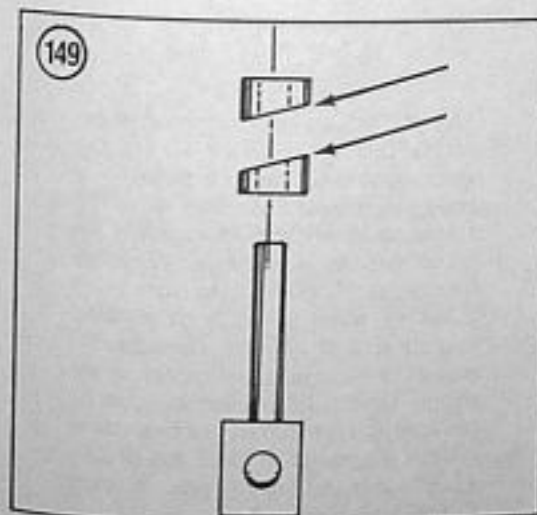
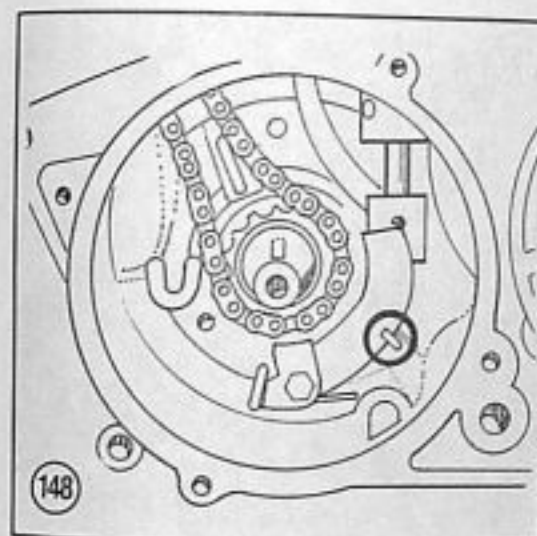
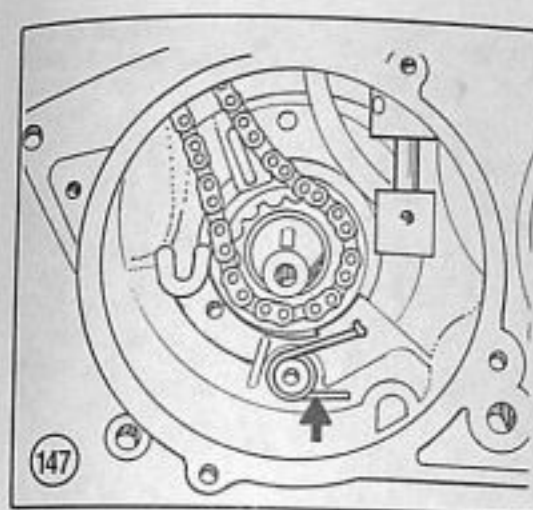
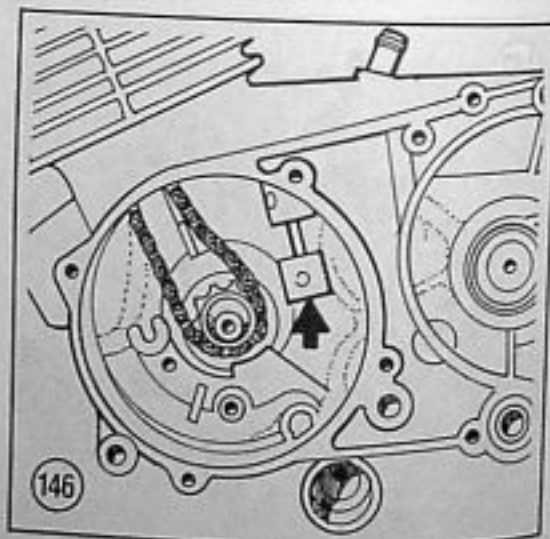
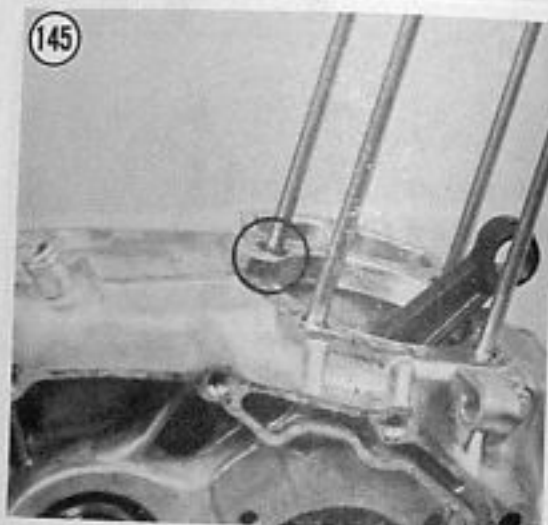
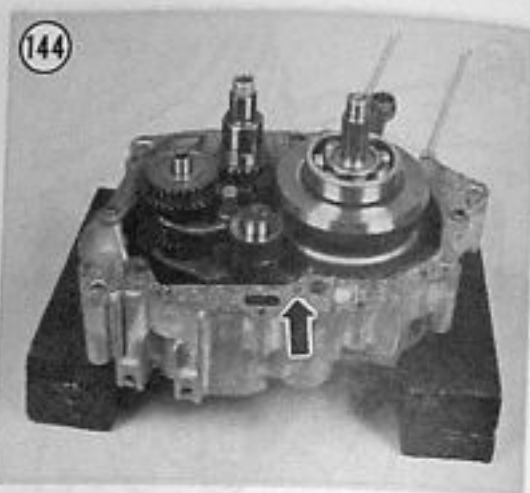
After a new crankcase gasket is installed, it must be trimmed. Carefully trim off all excess crankcase gasket material where the cylinder base gasket comes in contact with the crankcase (Figure 145). If it is not trimmed the cylinder base gasket will not seal properly.

12. Feed the cam chain down through the top of the chain opening in the crankcase and install the cam chain onto the crankshaft sprocket. Make sure it is correctly engaged with the sprocket.

13. Install the cam chain tensioner and the setting bar assembly (Figure 146).

14. Install the spring as shown in Figure 147.

15. Install the cam chain tensioner arm and start the bolt. Position the spring up onto the arm (Figure 148). Push the arm into place under the setting bar and tighten the bolt securely (A, Figure 138).



16. Install the cam chain tensioner lock collars. First install one with the flat end in first then install one with the angled end in first.

NOTE

The 2 angled surfaces of the lock collars must face each other; refer to Figure 149.

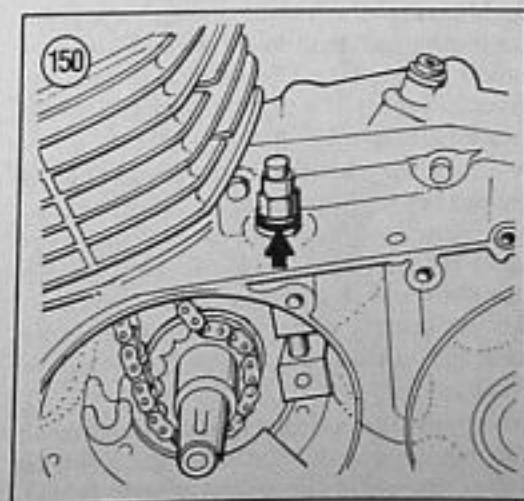
17. Install the cam drive chain adjusting bolt assembly. Don't forget to install the O-ring seal (Figure 150) on the adjusting bolt.

18. Install all exterior engine assemblies as described in this chapter and other related chapters:

- External shift mechanism
- Clutch
- Alternator
- Piston
- Cylinder
- Cylinder head
- Cylinder head cover

Crankcase and Crankshaft Inspection

1. Clean both crankcase halves inside and out with cleaning solvent. Thoroughly dry with compressed air and wipe off with a clean shop cloth. Be sure to remove all traces of old gasket material from all mating surfaces.



2. Check the transmission and shift drum bearings (Figure 151 and Figure 152) for roughness, pitting, galling and play by rotating them slowly by hand. If any roughness or play can be felt in the bearing it must be replaced.

3. Carefully inspect the cases for cracks and fractures, especially in the lower areas (Figure 153); they are vulnerable to rock damage. Also check the areas around the stiffening ribs, bearing bosses and threaded holes. If any are found, have them repaired by a shop specializing in the repair of precision aluminum castings or replace them.

4. Make sure the oil control orifice (A, Figure 154) in the right-hand case half is clean and free of dirt. Clean it out with a small piece of wire if necessary and blow out with compressed air.

5. Make sure the crankcase studs (B, Figure 154) are tight in each case half. Retighten if necessary.

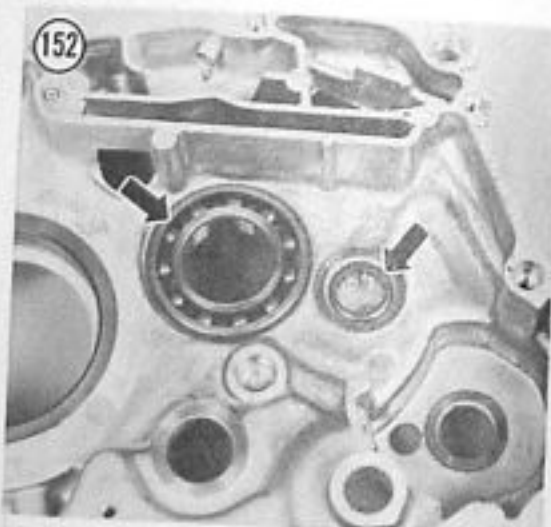
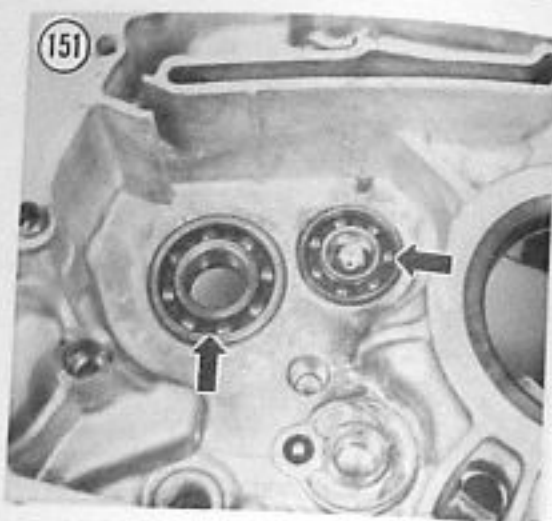
6. Check the crankshaft main bearings (Figure 155) for roughness, pitting, galling and play by rotating them slowly by hand. If any roughness or play can be felt in the bearing it must be replaced. This must be entrusted to a dealer as special tools are required. The cam chain sprocket and oil pump drive gear must also be removed and realigned properly upon installation.

7. Inspect the cam chain sprocket (A, Figure 156) and the primary drive gear spline (B, Figure 156) for wear or missing teeth or spline damage. If either is damaged, replacement should be entrusted to a dealer.

8. Measure the inside diameter of the connecting rod small end (Figure 157) with an inside micrometer. Compare to dimensions given in Table 1. If worn to the service limit the crankshaft assembly must be replaced.

9. Check the condition of the connecting rod big end bearing by grasping the rod in one hand and lifting up on it. With the heel of your other hand, rap sharply on the top of the rod. A sharp metallic sound, such as a click, is an indication that the bearing or crankpin or both are worn and the crankshaft assembly should be replaced.

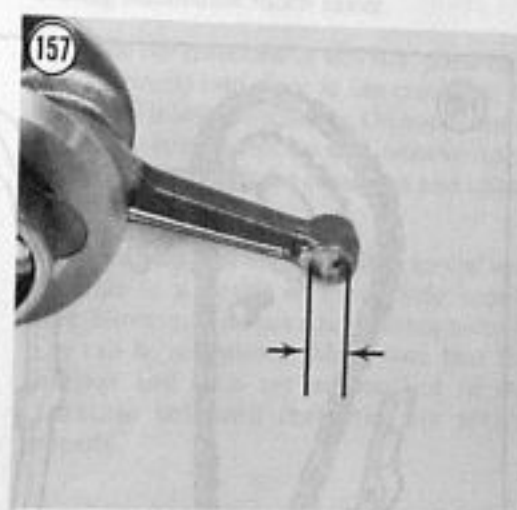
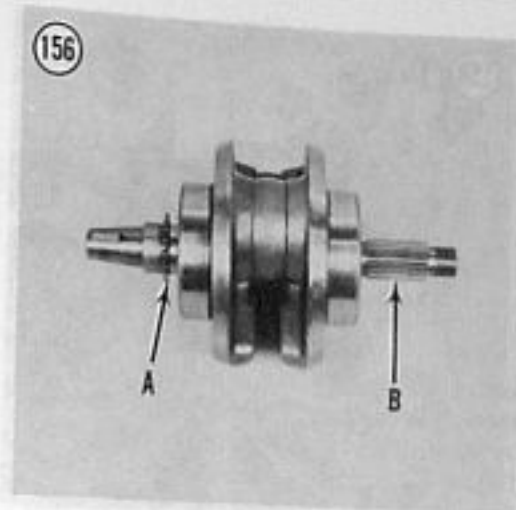
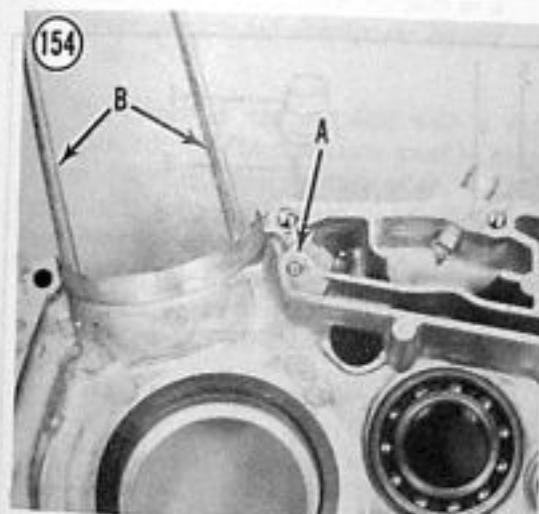
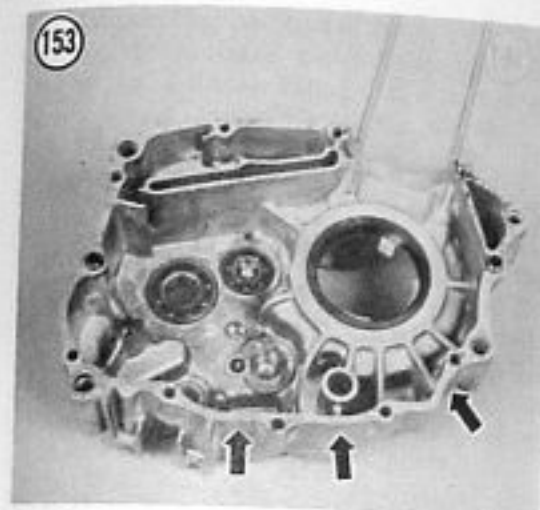
10. Check the connecting rod to crankshaft side clearance with a flat feeler gauge (Figure 158). Compare to dimensions given in Table 1.

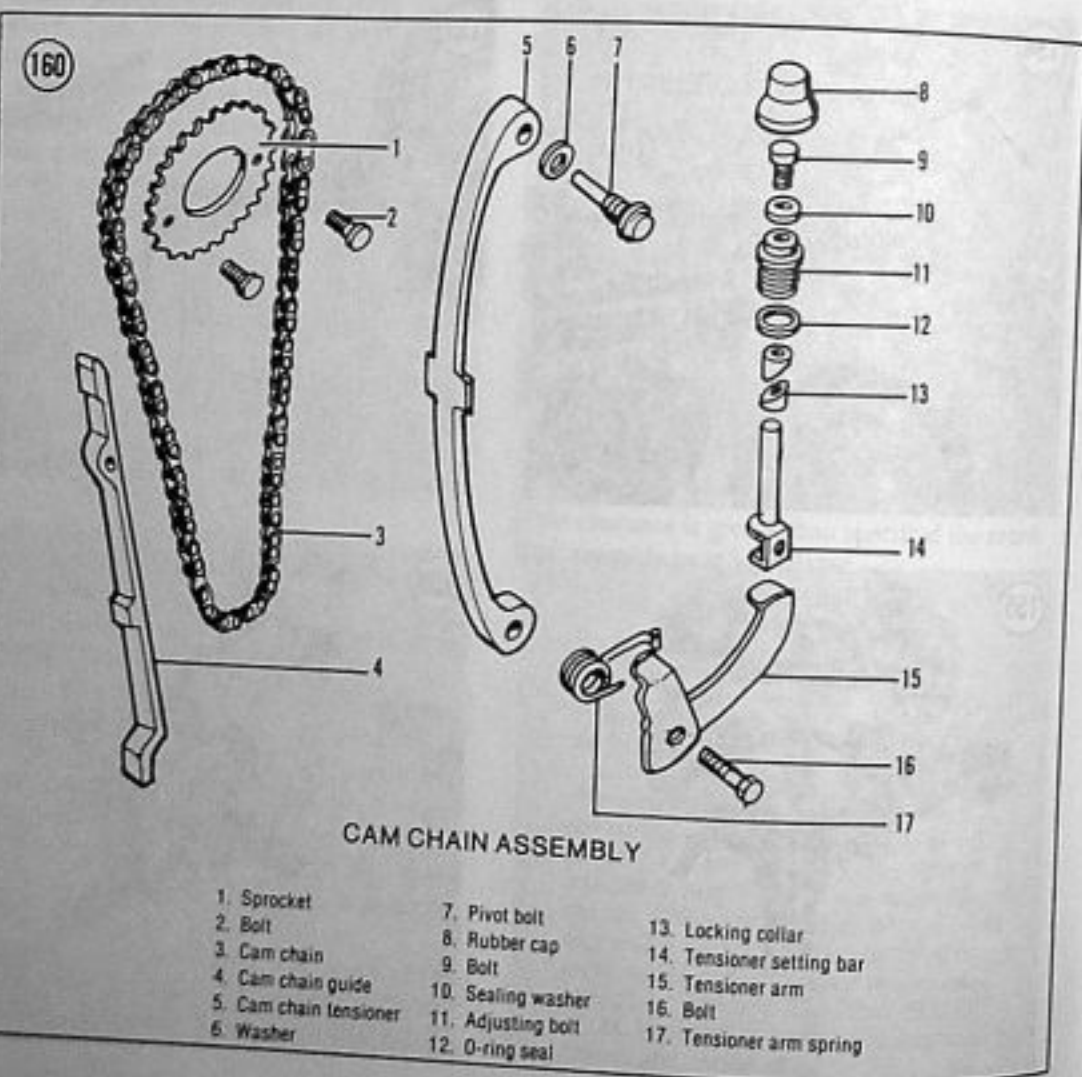
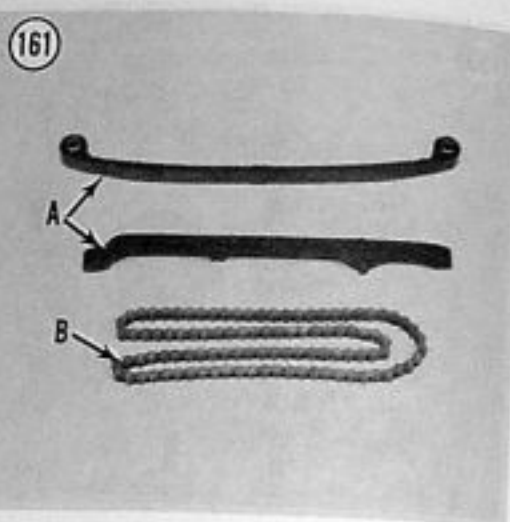
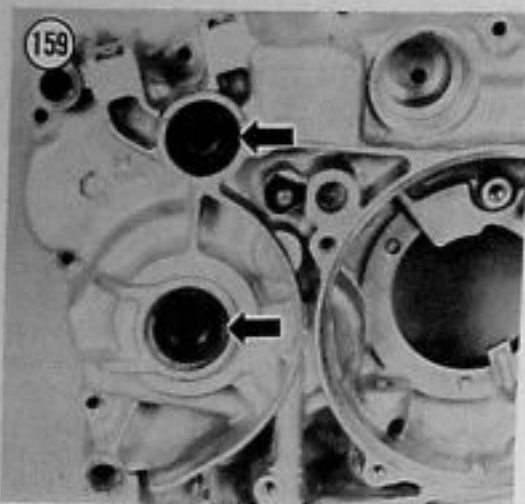


If the clearance is greater than specified the crankshaft assembly must be replaced.

NOTE

Other inspections of the crankshaft assembly involve accurate measuring equipment and should be entrusted to a dealer or competent machining shop. The crankshaft assembly operates under severe stress and dimensional tolerances are critical. These dimensions are given in Table 1. If any are off by the slightest amount it may cause a considerable amount of damage or destruction of the engine. The crankshaft assembly must be replaced as a unit as it cannot be serviced without the aid of a 10-12 ton (9,000-11,000 kilogram) capacity press, holding fixtures and crankshaft jig.





11. Inspect the condition of the oil seals. They should be replaced every other time the crankcase is disassembled. Refer to *Bearing and Oil Seal Replacement* in this chapter.

Bearing and Oil Seal Replacement

1. Pry out the oil seals (Figure 159) with a small screwdriver, taking care not to damage the crankcase bore. If the seals are old and difficult to remove, heat the cases as described in Step 2 and use an awl to punch a small hole in the steel backing of the seal. Install a small sheet metal screw part way into the seal and pull the seal out with a pair of pliers.

CAUTION

Do not install the screw too deep or it may contact and damage the bearing behind it.

2. The bearings are installed with a slight interference fit. The crankcase must be heated in an oven to a temperature of about 212° F (100° C). An easy way to check the proper temperature is to drop tiny drops of water on the case; if they sizzle and evaporate immediately, the temperature is correct. Heat only one case at a time.

CAUTION

Do not heat the cases with a torch (propane or acetylene); never bring a flame into contact with the bearing or case. The direct heat will destroy the case hardening of the bearing and will likely cause warpage of the case.

3. Remove the case from the oven and hold onto the 2 crankcase studs with a kitchen pot holder, heavy gloves or heavy shop cloths—it is hot.

4. Remove the oil seals if not already removed (see Step 1).

5. Hold the crankcase with the bearing side down and tap it squarely on a piece of soft wood. Continue to tap until the bearing(s) fall out. Repeat for the other half.

CAUTION

Be sure to tap the crankcase squarely on the piece of wood. Avoid damaging the sealing surface of the crankcase.

6. If the bearings are difficult to remove, they can be gently tapped out with a socket or piece of pipe the same size as the bearing outer race.

NOTE

If the bearings or seals are difficult to remove or install, don't take a chance on expensive damage. Have the work performed by a dealer or competent machine shop.

7. While heating up the crankcase halves, place the new bearings in a freezer if possible. Chilling them will slightly reduce their overall diameter while the hot crankcase is slightly larger due to heat expansion. This will make bearing installation much easier.

8. While the crankcase is still hot, press each new bearing(s) into place in the crankcase by hand until it seats completely. Do not hammer it in. If the bearing will not seat, remove it and cool it again. Reheat the crankcase and install the bearing again.

9. Oil seals are best installed with a special tool available at a dealer or motorcycle supply store. However, a proper size socket or piece of pipe can be substituted. Make sure that the bearings and seals are not cocked in the crankcase hole and that they are seated properly.

CAMSHAFT CHAIN AND TENSIONER

Inspection

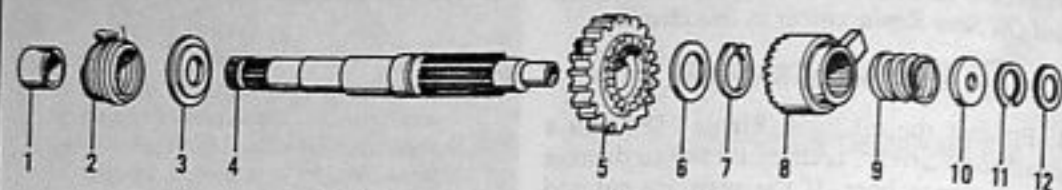
Refer to Figure 160 for this procedure.

Inspect the surface of the chain guide and chain tensioner (A, Figure 161). If either is worn or disintegrating it must be replaced. This may indicate a worn cam chain or improper chain adjustment.

Check all the components of the tensioner assembly; if any part is defective, replace the assembly.

Inspect the cam drive chain (B, Figure 161) for wear and damage. If the chain needs replacing, also check the drive sprocket on the crankshaft and the cam sprocket. They also may be defective.

KICKSTARTER ASSEMBLY



1. Collar
2. Return spring
3. Guide plate
4. Kickstarter shaft
5. Kickstarter gear
6. Thrust washer
7. 20 mm circlip
8. Kickstarter ratchet
9. Ratchet spring
10. Spring seat
11. 18 mm circlip
12. Thrust washer

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KICKSTARTER

Removal

Refer to Figure 162 for this procedure.

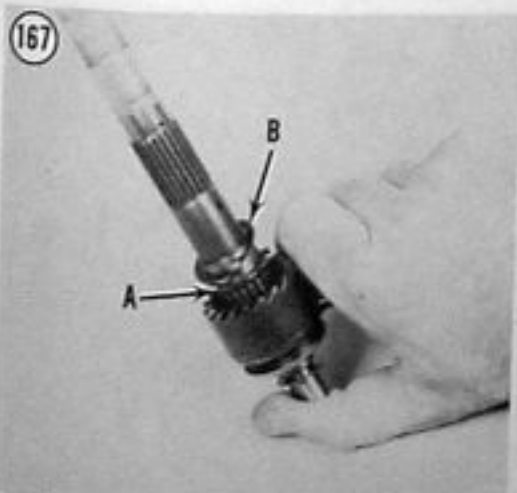
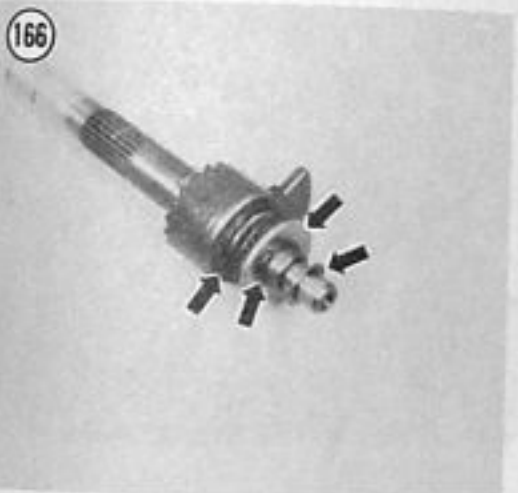
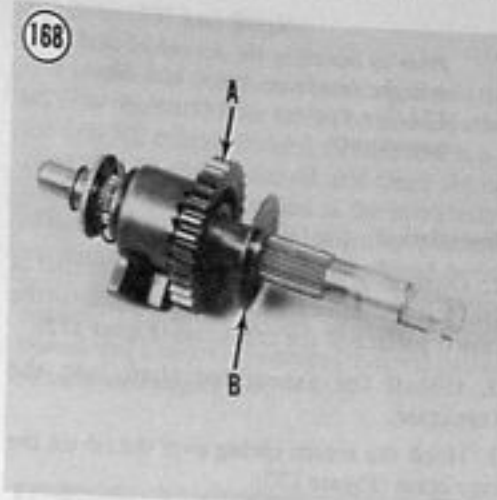
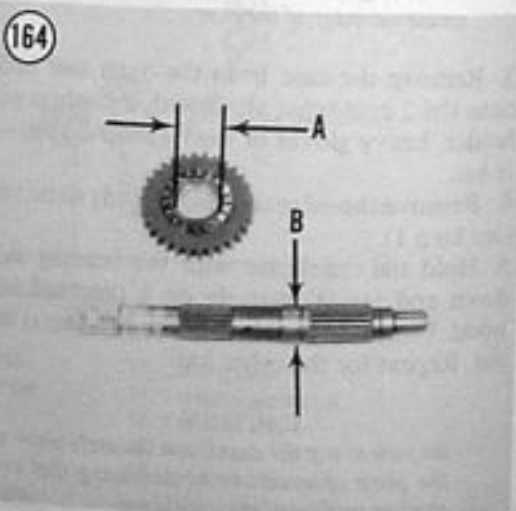
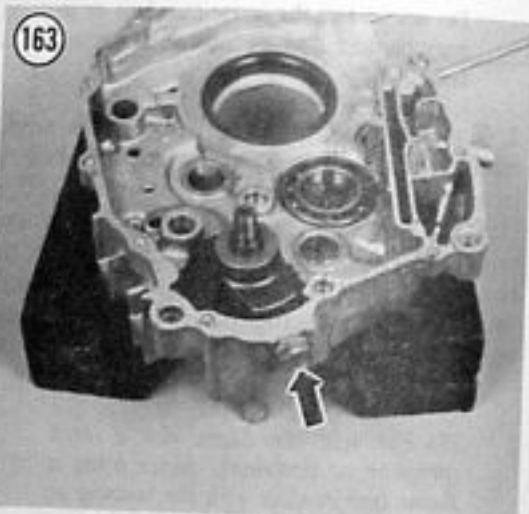
1. Remove the engine from the frame as described in this chapter.
2. Remove the kickstarter cam and spring from the kickstarter shaft.
3. Perform Steps 2-11 of *Crankcase Disassembly* in this chapter.
4. Loosen the stopper bolt (Figure 163).
5. Unhook the return spring from the rib on the crankcase and withdraw the kickstarter shaft assembly from the crankcase half.

NOTE

On models so equipped, do not lose the thin thrust washer that is against the inside surface of the crankcase.

Disassembly/Inspection/Assembly

1. Clean the assembled shaft in solvent and dry with compressed air.
2. Remove the collar, return spring, guide plate, kickstarter gear and thrust washer.
3. From the other end of the shaft, remove the thrust washer and circlip.
4. Slide off the spring seat, ratchet spring and starter ratchet.
5. Measure the inside diameter of the kickstarter gear (A, Figure 164). If the dimension is 20.05 mm (0.789 in.) or greater the gear must be replaced.



6. Measure the outside diameter of the kickstarter shaft where the kickstarter gear rides (B, Figure 164). If the dimension is 19.90 mm (0.783 in.) or less the shaft must be replaced.

7. Check for chipped, broken or missing teeth on the gears. Replace as necessary.

8. Make sure the ratchet gear operates smoothly on the shaft.

9. Check all parts for uneven wear; replace any that are questionable.

10. Apply assembly oil to all sliding surfaces of all parts prior to assembly.

11. Install the starter ratchet onto the shaft. The punch marks on both parts must align (Figure 165).

12. Install the ratchet spring, spring seat, 18 mm circlip and thrust washer (Figure 166).

13. Compress the starter ratchet onto the ratchet spring and install the 20 mm circlip (A, Figure 167) from the other side.

14. Install the thrust washer (B, Figure 167).

15. Slide the kickstarter gear onto the other end of the shaft (A, Figure 168).

16. Install the guide plate with the inner raised section on first toward the kickstarter gear (B, Figure 168).

17. Install the return spring and place the hook into the hole in the shaft (A, Figure 169). Slide on the collar (B, Figure 169).

18. Push the collar into place within the return spring (Figure 170).

NOTE

Prior to installing the assembled shaft into the crankcase, check with Figure 171 for correct placement of all components.

Installation

1. On models so equipped, apply a light coat of grease to the shim and install the shim onto the raised surface of the crankcase (Figure 172).
2. Install the assembled shaft into the crankcase.
3. Hook the return spring over the rib on the crankcase (Figure 173).
4. Rotate the kickstarter shaft assembly until the starter ratchet boss aligns with the flat on the screw boss in the crankcase (Figure 174).
5. Tighten the stopper bolt securely.
6. Assemble the crankcase as described under *Crankcase Assembly* in this chapter.
7. Install the spring and kickstarter cam. Align the punch marks on both parts (Figure 175).

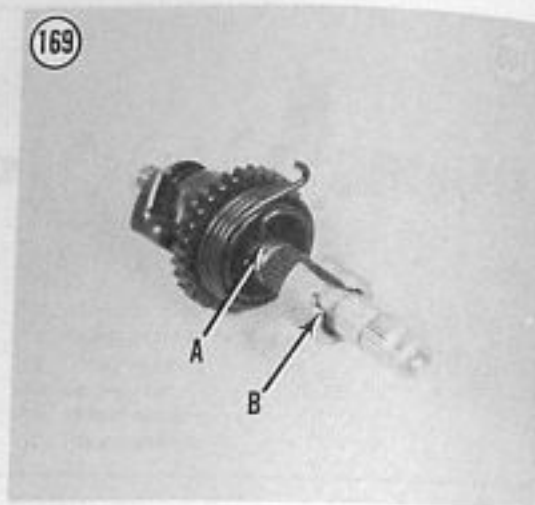
BREAK-IN PROCEDURE

If the rings were replaced, a new piston installed, the cylinder rebored or honed or major lower end work performed, the engine should be broken in just as though it were new. The performance and service life of the engine depends greatly on a careful and sensible break-in.

For the first 100 miles (805 km), no more than one-third throttle should be used and speed should be varied as much as possible within the one-third throttle limit. Prolonged steady running at one speed, no matter how moderate, is to be avoided as well as hard acceleration.

Following the 500 Mile (805 km) Service described in this chapter, more throttle should not be used until the motorcycle has covered at least 1,000 miles (1,601 km) and then it should be limited to short bursts of speed until 1,500 miles (2,414 km) have been logged.

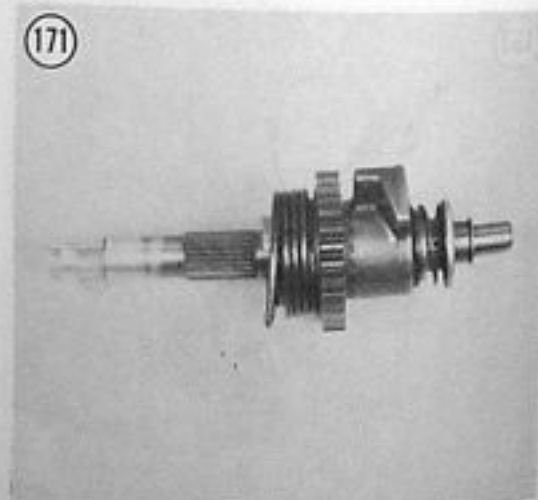
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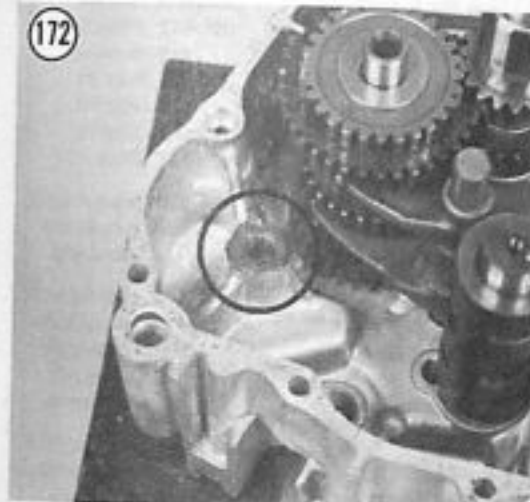


The mono-grade oils recommended for break-in and normal use provide a better bedding pattern for rings and cylinder than do multi-grade oils. As a result, piston ring and cylinder bore life are greatly increased. During this period, oil consumption will be higher than normal. It is therefore important to frequently check and correct oil level. At no time, during the break-in or later, should the oil level be allowed to drop below the bottom line on the dipstick; if the oil level is low, the oil will become overheated resulting in insufficient lubrication and increased wear.

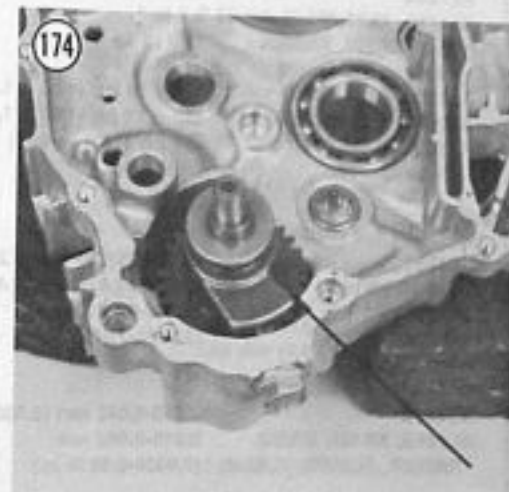
500 Mile (805 km) Service

It is essential that the oil be changed and the oil filter rotor and filter screen be cleaned after the first 500 miles (805 km). In addition, it is a good idea to change the oil and clean the oil filter rotor and filter screen at the completion of the break-in (about 1,500 miles/2,414 km) to ensure that all of the particles produced during break-in are removed from the lubrication system. The small added expense may be considered a smart investment that will pay off in increased engine life.

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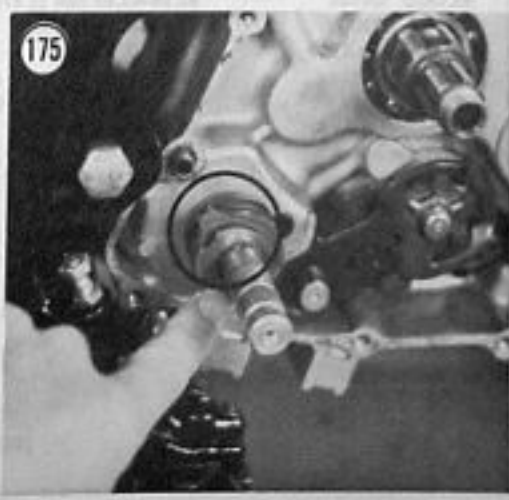


Table 1 ENGINE SPECIFICATIONS

Item	Specifications	Wear limit
General type	4-stroke, air-cooled, SOHC	
Number of cylinders	1	
Bore and stroke		
XL125S	56.5×49.5 mm (2.22×1.95 in.)	
XL185S, XR185	63.0×57.8 mm (2.48×2.28 in.)	
XR200, XR200R, XLR200R, TLR200	65.5×57.8 mm (2.58×2.28 in.)	
Displacement		
XL125S	124 cc (7.57 cu. in.)	
XL185S, XR185	180 cc (10.98 cu. in.)	
XR200, XR200R, XLR200R, TLR200	195 cc (11.90 cu. in.)	
Compression ratio		
TLR200	8.2 to 1	
XL125S	9.4 to 1	
XL185S, XL200R	9.2 to 1	
XR185, XR200, XR200R	10.0 to 1	
Compression pressure		
XL125S	178 ± 21 psi (12.5 ± 1.5 kg/cm ²)	
XL185S, XL200R, TLR200	192 ± 21 psi (13.5 ± 1.5 kg/cm ²)	
XR185, XR200, XR200R	199 psi (14.0 kg/cm ²)	
Lubrication	Wet sump	
Cylinder		
Bore		
XL125S	56.500-56.510 mm (2.2244-2.2248 in.)	56.60 mm (2.228 in.)
XL185S, XR185	63.000-63.010 mm (2.4803-2.4807 in.)	63.10 mm (2.484 in.)
XR200, XR200R, XL200R, TLR200	65.500-65.510 mm (2.5787-2.5791 in.)	65.60 mm (2.583 in.)
Out of round	—	0.10 mm (0.004 in.)
Piston/cylinder clearance		
XL125S	0.010-0.040 mm (0.0004-0.0016 in.)	0.1 mm (0.004 in.)
XL185S, XR185, XR200, XR200R, XL200R, TLR200	0.015-0.045 mm (0.0006-0.0018 in.)	0.1 mm (0.004 in.)
Piston		
Diameter		
XL125S	56.470-56.490 mm (2.2232-2.2401 in.)	56.40 mm (2.220 in.)
XL185S, XR185	62.95-62.98 mm (2.478-2.479 in.)	62.90 mm (2.476 in.)
XR200, XR200R, XL200R, TLR200	65.465-65.485 mm (2.577-2.578 in.)	65.40 mm (2.575 in.)
Clearance in bore	—	0.10 mm (0.004 in.)
Piston pin bore (all models)	15.002-15.008 mm (0.5906-0.5909 in.)	15.04 mm (0.592 in.)
Piston pin outer diameter	14.994-15.000 mm (0.5903-0.5906 in.)	14.96 mm (0.589 in.)
Piston to pin clearance	0.002-0.014 mm (0.0001-0.0006 in.)	0.02 mm (0.001 in.)

(continued)

Table 1 ENGINE SPECIFICATIONS (continued)

Item	Specifications	Wear limit
Piston rings		
Number of rings		
Compression	2	
Oil control	1	
Ring end gap		
Top and second		
XL125S	1.15-0.35 mm (0.006-0.014 in.)	0.5 mm (0.02 in.)
XL185S, XR185, XR200R, XL200R, TLR200	0.20-0.40 mm (0.008-0.016 in.)	0.5 mm (0.02 in.)
Oil (side rail)		
All models	0.2-0.9 mm (0.01-0.04 in.)	—
Ring side clearance		
Top ring		
XL125S, XL185, XR185	0.015-0.050 mm (0.0006-0.0020 in.)	0.09 mm (0.004 in.)
XR200, XR200R, XL200R, TLR200	0.010-0.045 mm (0.0004-0.0018 in.)	0.09 mm (0.004 in.)
Second ring		
XL125S, XL185, XR185	0.015-0.045 mm (0.0006-0.0018 in.)	0.09 mm (0.004 in.)
XR200, XR200R, XL200R, TLR200	0.015-0.045 mm (0.0006-0.0018 in.)	0.09 mm (0.004 in.)
Connecting rod		
Small end inner diameter	15.010-15.028 mm (0.5909-0.5917 in.)	15.06 mm (0.593 in.)
Crankshaft		
Runout	—	0.05 mm (0.002 in.)
Connecting rod big end side clearance	0.05-0.30 mm (0.002-0.012 in.)	0.80 mm (0.032 in.)
Kickstarter		
Shaft outer diameter	19.959-19.980 mm (0.7858-0.7866 in.)	19.90 mm (0.783 in.)
Gear inner diameter	20.000-20.021 mm (0.7874-0.7882 in.)	20.05 mm (0.789 in.)
Valve timing		
XL125S (except 1985), XL185S		
Intake valve		
Opens	10° (BTDC) @ 1 mm lift	
Closes	40° (ABDC) @ 1 mm lift	
Exhaust valve		
Opens	40° (BBDC) @ 1 mm lift	
Closes	10° (ATDC) @ 1 mm lift	
XL125S (1985)		
Intake valve		
Opens	5° (BTDC) @ 1 mm lift	
Closes	35° (ABDC) @ 1 mm lift	
Exhaust valve		
Opens	30° (BBDC) @ 1 mm lift	
Closes	5° (ATDC) @ 1 mm lift	

(continued)

Table 1 ENGINE SPECIFICATIONS (continued)

Item	Specifications	Wear limit
XR185, XR200, XR200R		
Intake valve		
Opens	15° (BTDC) @ 1 mm lift	
Closes	45° (ABDC) @ 1 mm lift	
Exhaust valve		
Opens	45° (BBDC) @ 1 mm lift	
Closes	15° (ATDC) @ 1 mm lift	
TLR200		
Intake valve		
Opens	0° (BTDC) @ 1 mm lift	
Closes	30° (ABDC) @ 1 mm lift	
Exhaust valve		
Opens	30° (BBDC) @ 1 mm lift	
Closes	0° (ATDC) @ 1 mm lift	
Camshaft (XL125S 1985)		
Cam lobe height		
Intake	31.783 (1.2513)	30.70 mm (1.210 in.)
Exhaust	31.386 (1.2357)	30.40 mm (1.20 in.)
Camshaft (TLR200)		
Cam lobe height		
Intake	31.059-31.219 mm (1.2228-1.2229 in.)	30.94 mm (1.218 in.)
Exhaust	30.657-30.817 mm (1.2070-1.2133 in.)	30.53 mm (1.202 in.)
Camshaft (all others)		
Cam lobe height		
Intake	31.675-31.875 mm (1.2470-1.2459 in.)	31.55 mm (1.242 in.)
Exhaust	31.279-31.479 mm (1.2315-1.2393 in.)	31.25 mm (1.230 in.)
Cam journal OD		
Right-hand end	19.967-19.980 mm (0.7861-0.7866 in.)	19.90 mm (0.784 in.)
Left-hand end	33.959-33.975 mm (1.3370-1.3376 in.)	33.90 mm (1.335 in.)
Cam bushing inner diameter	20.005-20.026 mm (0.7876-0.7884 in.)	20.05 mm (0.789 in.)
Cam bearing surface in cylinder head	34.000-34.025 mm (1.3386-1.3396 in.)	34.05 mm (1.341 in.)
Valves		
Valve stem outer diameter		
Intake	5.450-5.465 mm (0.2146-0.2152 in.)	5.40 mm (0.213 in.)
Exhaust	5.430-5.445 mm (0.2138-0.2144 in.)	5.40 mm (0.213 in.)
Valve guide inner diameter		
Intake	5.475-5.485 mm (0.2156-0.2159 in.)	5.50 mm (0.217 in.)
Exhaust	5.475-5.485 mm (0.2156-0.2159 in.)	5.50 mm (0.217 in.)
Stem to guide clearance		
Intake	0.010-0.035 mm (0.0004-0.0014 in.)	0.12 mm (0.005 in.)
Exhaust	0.030-0.055 mm (0.0012-0.0022 in.)	0.14 mm (0.006 in.)
Valve seat width		
Intake and exhaust	1.2 mm (0.047 in.)	1.5 mm (0.059 in.)
Valve face width		
Intake and exhaust	1.7 mm (0.067 in.)	2.0 mm (0.08 in.)
Valve spring free length		
Inner	39.4 mm (1.55 in.)	35.5 mm (1.40 in.)
Outer	45.5 mm (1.79 in.)	41.0 mm (1.61 in.)

(continued)

Table 1 ENGINE SPECIFICATIONS (continued)

Item	Specifications	Wear limit
Rocker arm assembly		
Rocker arm bore ID	12.000-12.018 mm (0.4724-0.4730 in.)	12.05 mm (0.474 in.)
Rocker arm shaft OD	11.995-11.997 mm (0.4715-0.4722 in.)	11.93 mm (0.470 in.)
Rocker arm to shaft clearance	0.005-0.041 mm (0.0002-0.0016 in.)	0.08 mm (0.003 in.)
Cylinder head warpage	—	0.004 in. (0.10 mm)
Oil Pump		
Inner to outer rotor tip clearance	—	0.20 mm (0.008 in.)
Outer rotor to body clearance	—	0.40 mm (0.016 in.)
End clearance	—	0.25 mm (0.010 in.)

Table 2 ENGINE TORQUE SPECIFICATIONS

Item	N-m	ft.-lb.
Cylinder head cover		
8 mm cap nuts		
XL125S, XL185S	18-20	13-14
XR185, XR200	20-22	14-16
XR200R, XL200R, TLR200	28-30	20-22
Cam sprocket bolts	8-12	6-9
Pulse rotor bolt	8-12	6-9
Alternator rotor bolt		
XL125S, XL185S	18-20	13-14
XR185, XR200	18-20	13-14
XR200R	45-55	33-40
TLR200	55-65	40-47

CHAPTER FIVE

CLUTCH AND TRANSMISSION

CLUTCH OPERATION

The clutch is a wet multi-plate type which operates immersed in the engine oil. It is mounted on the right-hand end of the transmission main shaft. The inner clutch hub is splined to the main shaft and the outer clutch housing can rotate freely on the main shaft. The outer clutch housing is geared to the crankshaft.

The clutch release mechanism is mounted within the right-hand crankcase cover and is operated by the clutch cable and hand lever mounted on the handlebar.

The clutch assembly is the same on all models except that the XL125S does not have the decompression lever mechanism mounted within the right-hand crankcase cover.

Refer to Table 1 for all clutch specifications and Table 2 for shift fork and shift shaft specifications. Honda does not provide specifications for the transmission components. Table 1 and Table 2 are at the end of this chapter.

CLUTCH

Removal/Disassembly

Refer to Figure 1 for this procedure.

The clutch assembly can be removed with

the engine in the frame. In the following procedure the skid plate, foot peg assembly and the exhaust system are shown removed. It is not necessary to remove them for this procedure.

1. Drain the engine oil as described under *Changing Engine Oil* in Chapter Three.
2. Remove the rear brake pedal as described under *Rear Brake Pedal Removal/Installation* in Chapter Ten.
3. Remove the exhaust pipe protector from the exhaust pipe.
4. Slacken the clutch cable at the hand lever.
5. Disconnect the clutch cable at the crankcase cover (Figure 2).
6. Remove the bolt (Figure 3) securing the kickstarter and remove the kickstarter lever.

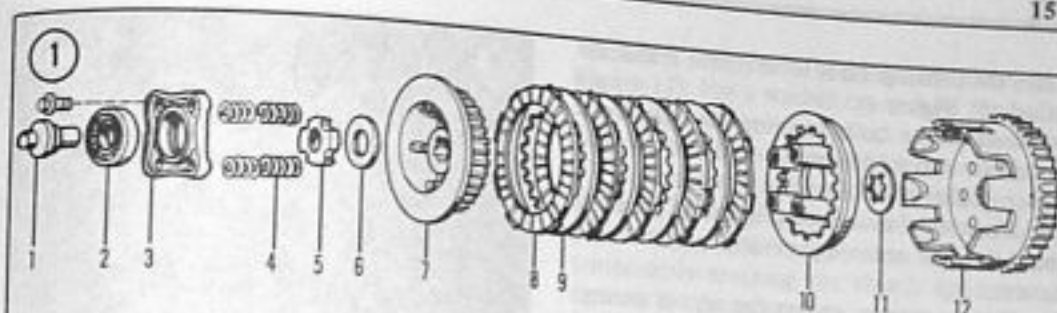
NOTE

Step 7 and Step 8 do not apply to the XL125S.

7. Remove the bolt (Figure 4) securing the decompressor cable bracket to the cylinder head cover. Disconnect the top end of the decompressor cable from the actuation lever on the cylinder head cover (Figure 5).
8. Remove the bolt (A, Figure 6) securing the decompressor cable bracket to the right-hand crankcase cover. Remove the cable from the clip (B, Figure 6) and remove the cable end

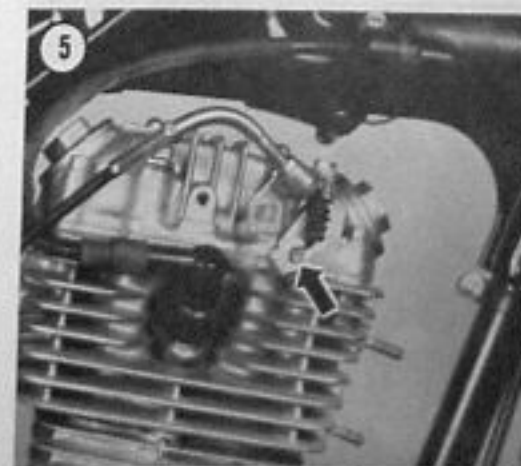
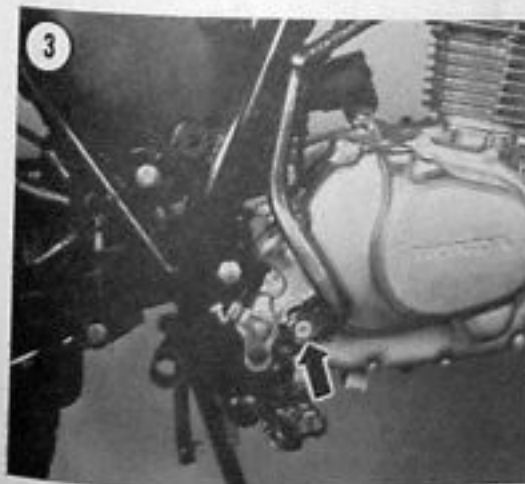
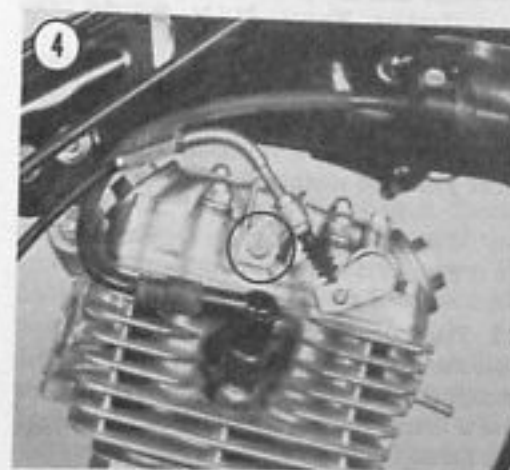
CLUTCH AND TRANSMISSION

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CLUTCH ASSEMBLY

- | | |
|------------------------|------------------------------|
| 1. Clutch lifter | 7. Clutch center |
| 2. Bearing | 8. Clutch friction discs (5) |
| 3. Clutch lifter plate | 9. Clutch plates (4) |
| 4. Clutch springs | 10. Pressure plate |
| 5. Locknut | 11. Splined washer |
| 6. Lockwasher | 12. Clutch outer housing |



from the decompressor lever on the crankcase cover (C, Figure 6).

9. Remove the bolts securing the right-hand crankcase cover (Figure 7) and remove the cover, gasket and 2 locating dowels.

10. Remove the screws (Figure 8) securing the oil filter rotor cover and remove the cover.

11. Place a copper washer (or copper penny) into mesh with the primary drive gear behind the oil filter rotor and the clutch outer housing. This will keep the oil rotor from turning during the next step.

12. Remove the nut and lockwasher (Figure 9) securing the oil rotor housing in place. Remove the housing.

NOTE

Oil rotor nut removal requires a special tool available from a Honda dealer (Locknut Wrench 20x24 part No. 07716-0020100).

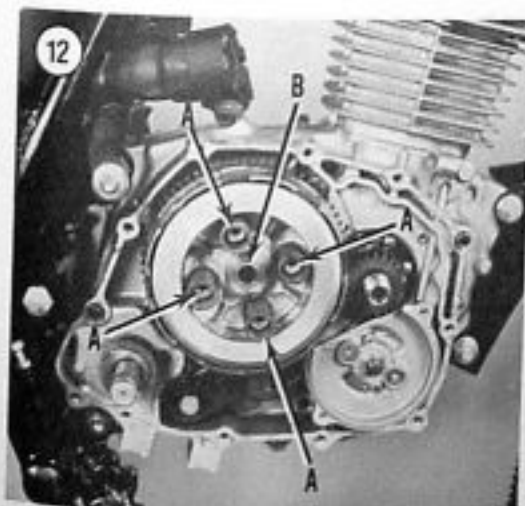
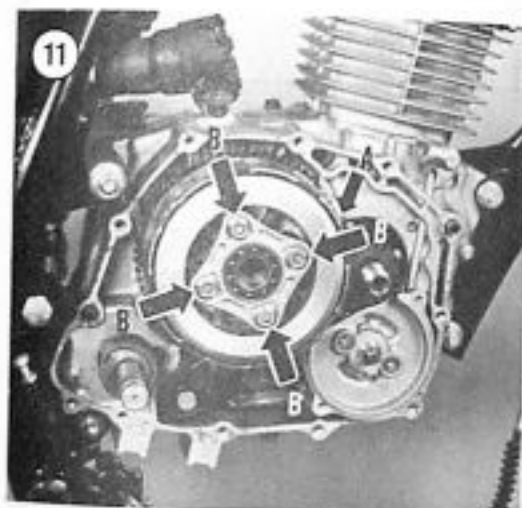
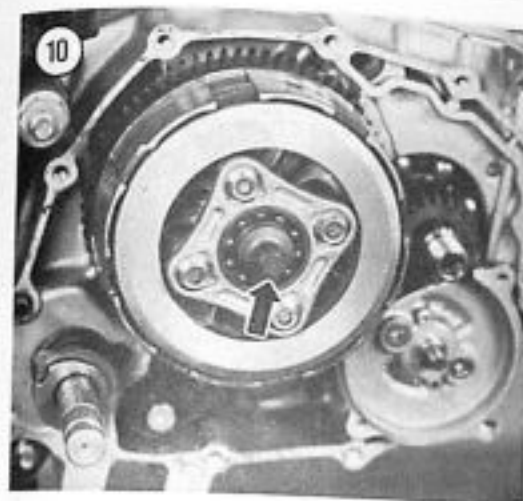
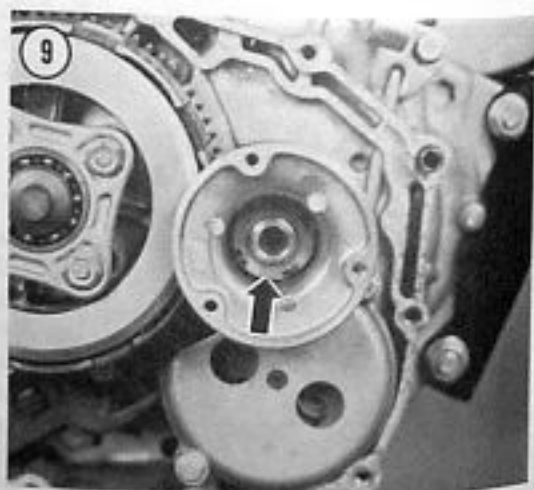
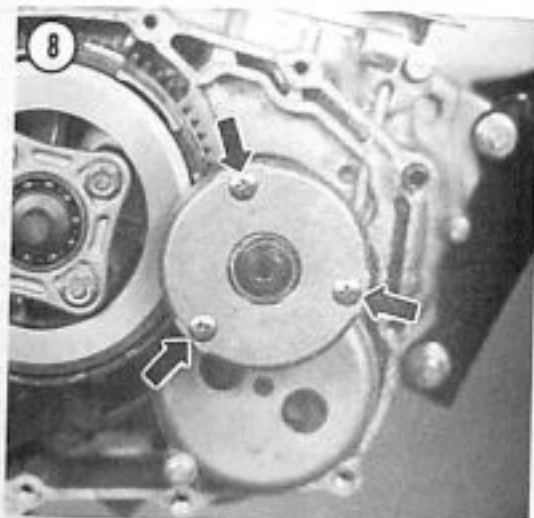
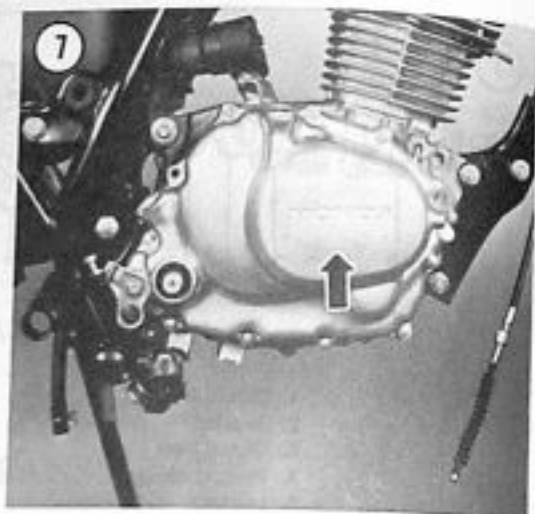
13. Remove the clutch lifter (Figure 10).

14. Using a crisscross pattern, remove the clutch bolts (Figure 11) securing the clutch lifter plate and remove the lifter plate.

NOTE

The following 2 steps are necessary to hold the clutch outer housing so that the retaining nut can be removed.

15. Place a copper washer (or copper penny) into mesh with the primary drive gear and the clutch outer housing (A, Figure 11). Do not use a hard steel washer which could damage the gears.



16. Leave the clutch springs in place (A, Figure 12). Put a washer on each of the bolts removed in the previous step, install them in the clutch outer housing, and tighten them.

17. Remove the nut and lockwasher (B, Figure 12) securing the clutch assembly in place. Remove the copper washer, the bolts temporarily securing the clutch springs and remove the housing.

NOTE

Clutch nut removal requires the same wrench as oil rotor nut removal (Locknut Wrench 20 x 24 part No. 07716-0020100).

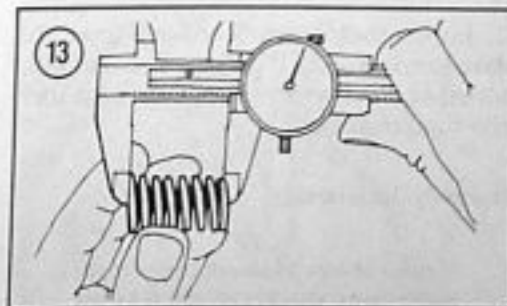
18. Remove the clutch nut and lockwasher.

19. Remove the clutch center, plates, discs and pressure plate.

20. Remove the splined washer and the clutch outer housing.

Inspection

1. Clean all parts in a petroleum based solvent such as kerosene and thoroughly dry with compressed air.
2. Measure the free length of each clutch spring as shown in Figure 13. If any of the springs are worn to the service limit shown in Table 1, they should be replaced. Replace all springs as a set.
3. Measure the thickness of each friction disc at several places around the disc as shown in Figure 14. Replace any disc that is worn to the service limit shown in Table 1. For optimum performance, replace all discs as a set even if only a few need replacement.
4. Check the clutch plates for warpage on a surface plate such as a piece of plate glass (Figure 15). Replace any that are warped 0.20



mm (0.008 in.) or more. For optimum performance, replace all plates as a set even if only a few need replacement.

5. Inspect the condition of the grooves and studs in the pressure plate (A, Figure 16). If either show signs of wear or galling the pressure plate should be replaced.

6. Inspect the condition of the inner splines and outer grooves in the clutch center (B, Figure 16); if damaged the clutch center should be replaced.

7. Inspect the condition of the teeth on the clutch outer housing (Figure 17). Remove any small nicks on the gear teeth with an oilstone. If damage is severe the clutch housing should be replaced.

8. Inspect the condition of the splines in the center of the clutch outer housing (Figure 18). Remove any small nicks on the splines with an oilstone. If damage is severe the clutch housing should be replaced.

9. Inspect the condition of the slots in the clutch outer housing (Figure 19) for cracks, nicks or galling where it comes in contact with the friction disc tabs. If any severe damage is evident, the clutch housing must be replaced.

10. Inspect the condition of the lifter guide bearing (Figure 20). Make sure it rotates smoothly with no signs of wear or damage. Replace as necessary.

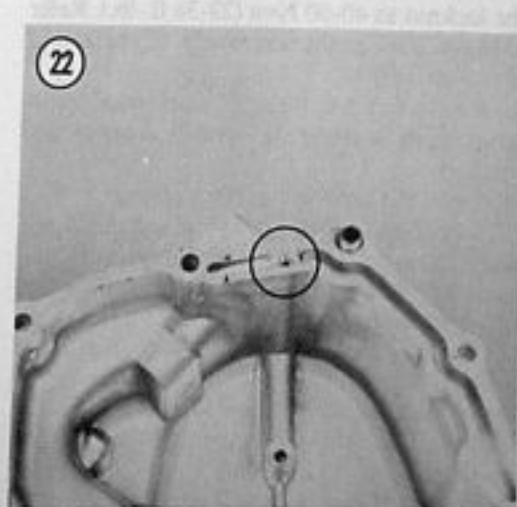
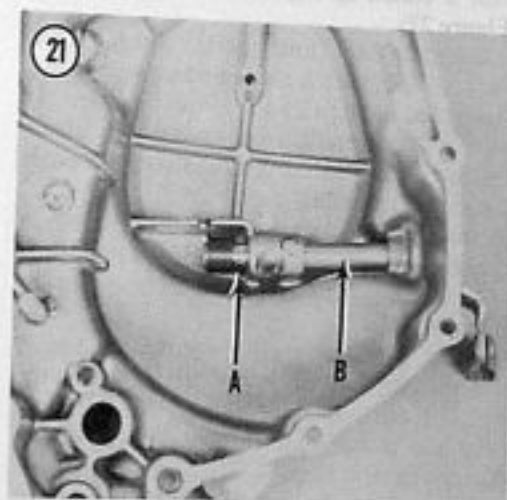
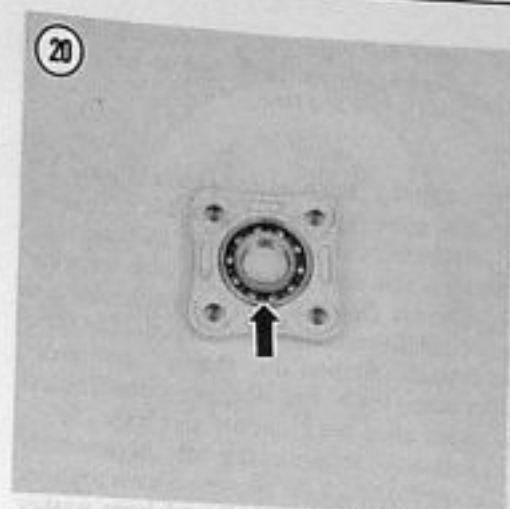
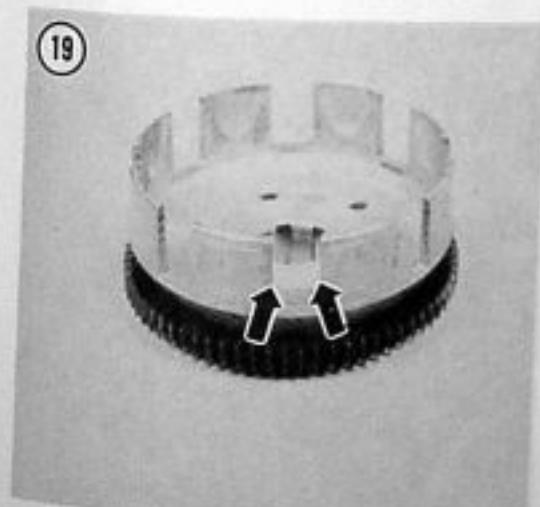
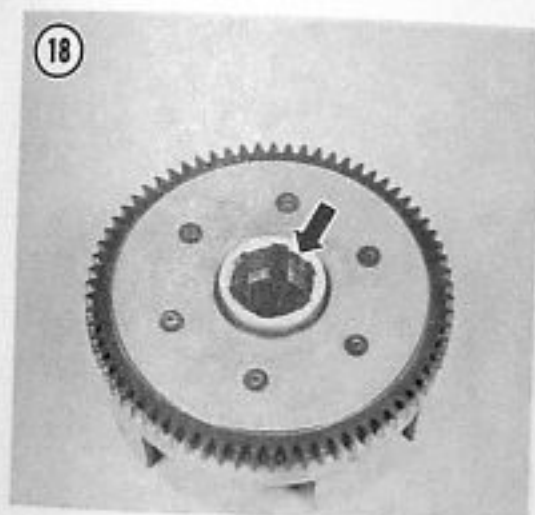
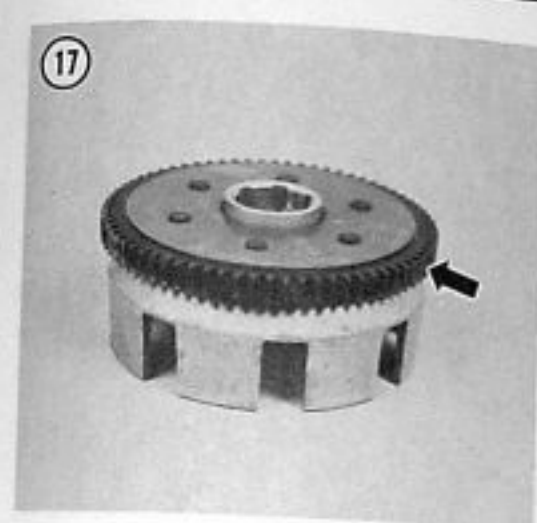
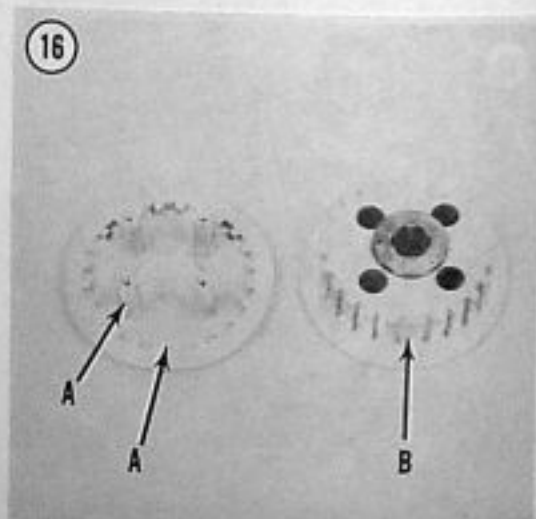
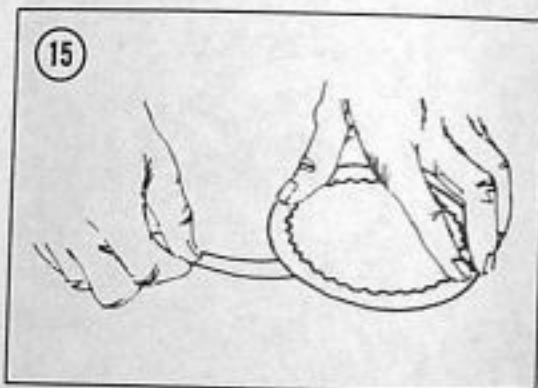
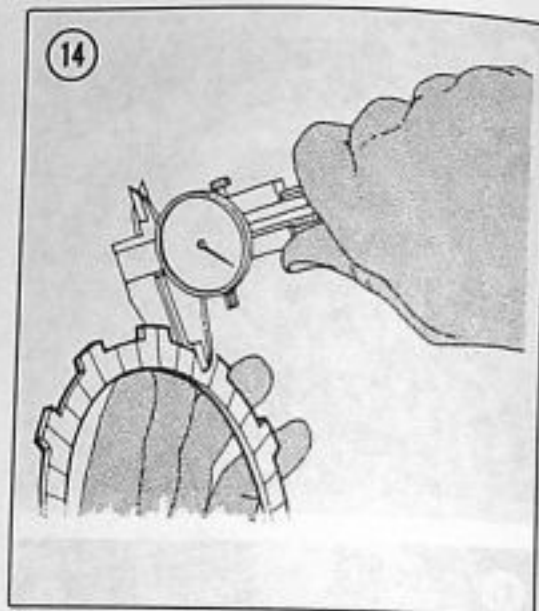
11. Check the movement of the clutch lifter mechanism in the right-hand crankcase cover. If the arm binds or the return spring is weak or broken, it must be replaced. To remove the mechanism, remove the spring pin (A, Figure 21) and return spring. Withdraw the arm (B, Figure 21) from the cover. Check the condition of the lifter arm oil seal in the cover. Replace if necessary. Reinstall the lifter arm and small spring as shown in Figure 21. Install the spring pin.

12. Inspect the oil control orifice (Figure 22). Make sure it is open. If clogged, clean out with solvent or blow out any dirt or foreign matter with compressed air.

Assembly/Installation

NOTE

If either or both friction discs and clutch plates have been replaced with new ones,



apply new engine oil to all surfaces to avoid having the clutch lock up when used for the first time.

1. Install the clutch outer housing (Figure 23) and the splined washer (Figure 24).

2. Assemble the clutch center, friction discs, clutch plates and the pressure plate on your workbench. Onto the clutch center install first a friction disc and then a clutch plate. Continue to install a friction disc then a clutch plate, alternating them until all are installed. The last item installed is a friction disc (Figure 25).

3. Install the pressure plate onto this assembly (Figure 26) and hold all components together with a clutch spring, bolt and large washer (Figure 27).

4. Slide on the clutch parts (clutch center, friction discs, clutch plates and pressure plate) assembled in Steps 2 and 3. Push the assembly on slowly, carefully aligning the tabs of the friction discs with the slots in the clutch outer housing (Figure 28).

5. Install the lockwasher with the dished side facing toward the outside. The word "OUTSIDE" stamped on it must face outward (Figure 29).

6. Place a copper washer (or copper penny) into mesh with the primary drive gear and the clutch outer housing (A, Figure 30). This will keep the clutch outer housing from turning during the next step.

7. Install the locknut (B, Figure 30) and tighten the locknut to 40-50 N·m (29-36 ft.-lb.). Refer to Figure 31. Use the same tool setup as used in Removal Step 17.

8. Remove the bolt(s) and washer(s) temporarily holding the clutch components together.

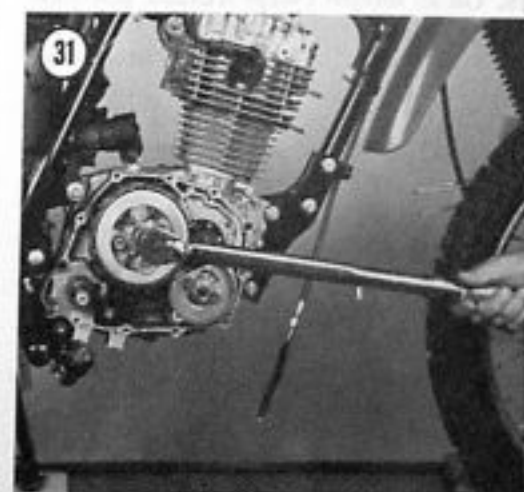
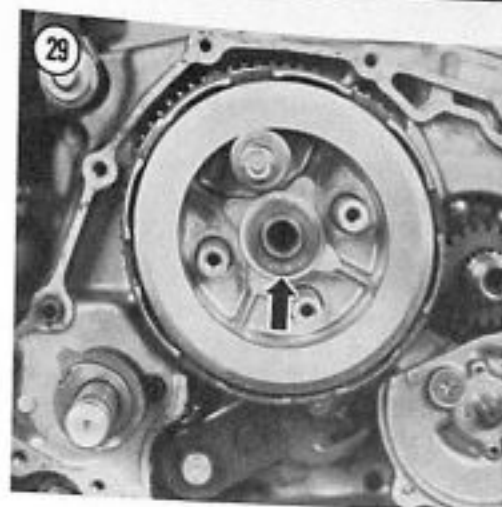
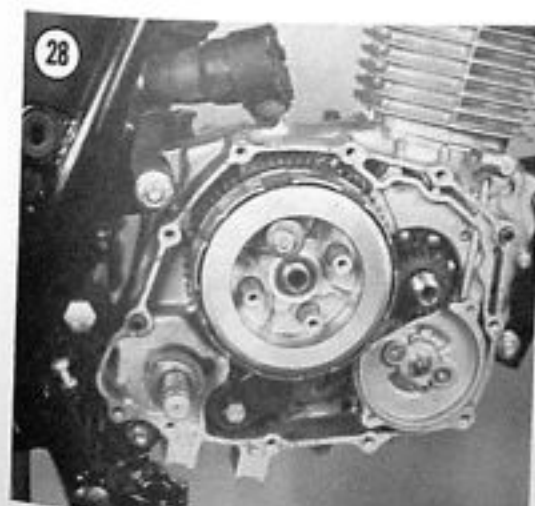
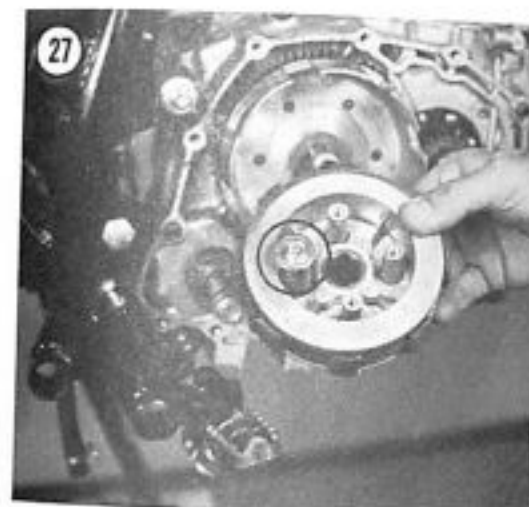
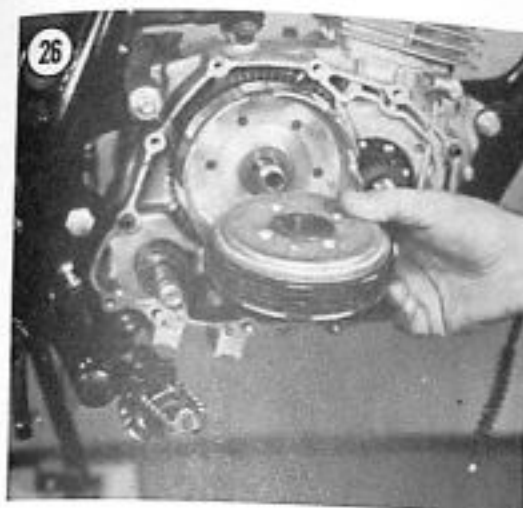
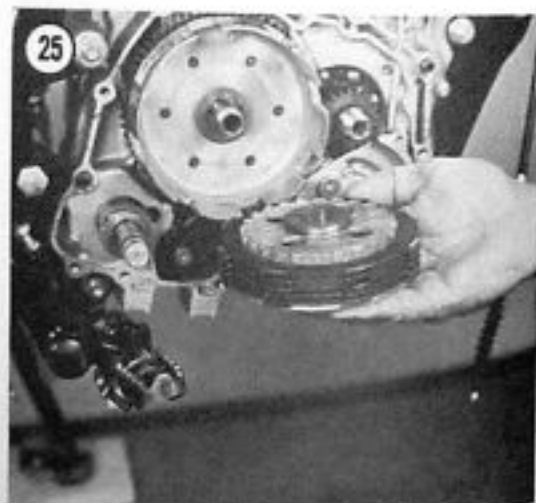
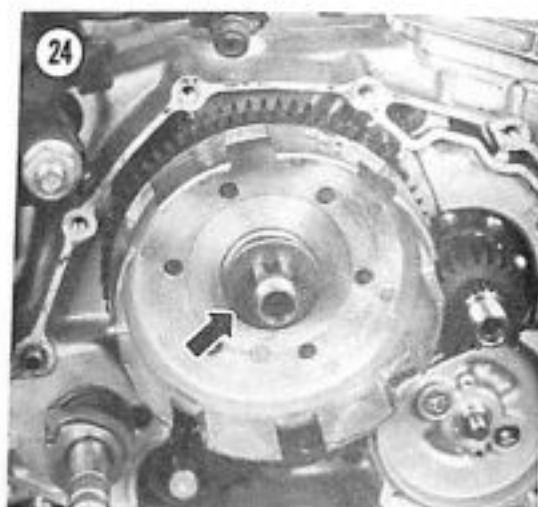
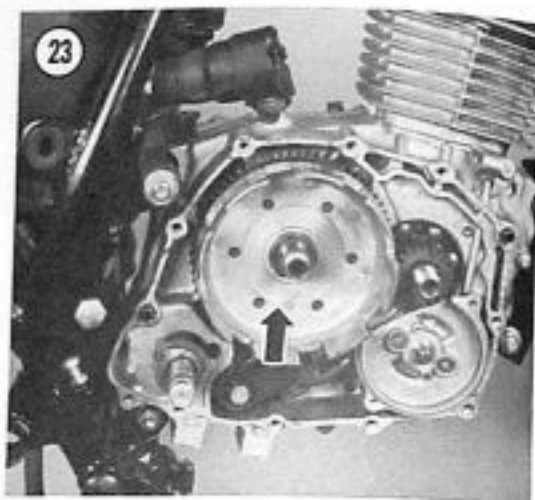
9. Install the remaining clutch springs.

10. Install the clutch lifter plate and the clutch bolts (Figure 32). Tighten the bolts securely in a crisscross pattern in 2 or 3 stages.

11. Install the clutch lifter (Figure 33).

12. Install the oil rotor housing. Install the lockwasher with the "OUTSIDE" mark facing toward the outside (Figure 34).

13. Install the locknut (Figure 35) and tighten to 40-50 N·m (29-36 ft.-lb.). Use the same tool setup as used in Removal Step 11 and Step 12.



14. Install the oil filter rotor cover and install the screws. Tighten the screws securely.
15. Install the dowel pins (A, Figure 36) and the gasket (B, Figure 36).

16. Hold the clutch actuating lever in the released position so the recess in the actuator (Figure 37) will mesh properly with the clutch lifter.

17. On all models except XL125S, make sure the decompressor release cam follower and spring are in position in the right-hand crankcase cover (Figure 38).

18. Install the right-hand crankcase cover. Push it all the way into place. On all models except XL125S, if the crankcase cover will not go all the way in, wiggle the decompressor release lever and the clutch release lever and push the cover the rest of the way on. Install the screws and tighten securely in a crisscross pattern.

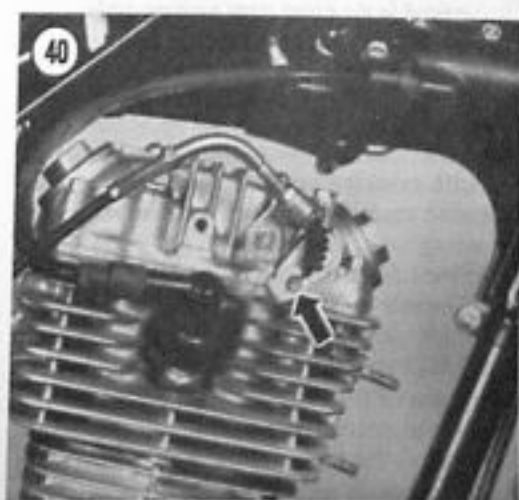
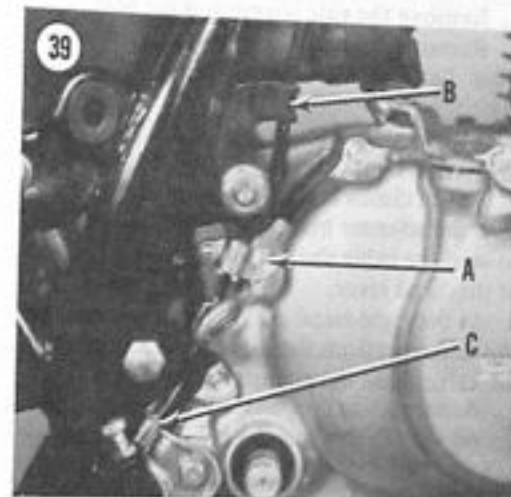
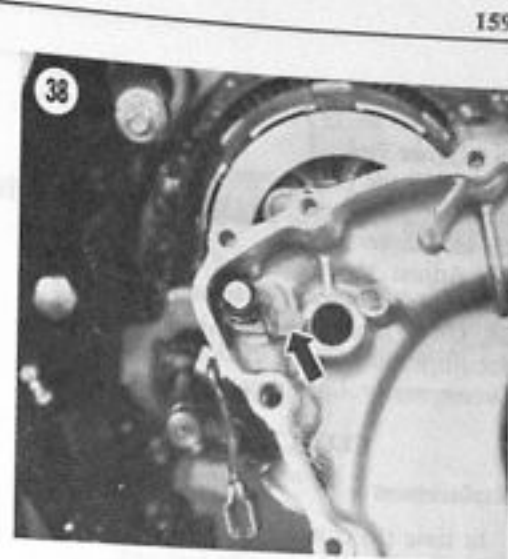
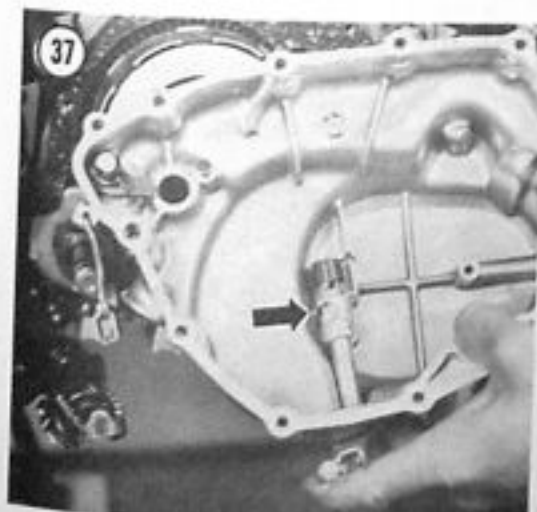
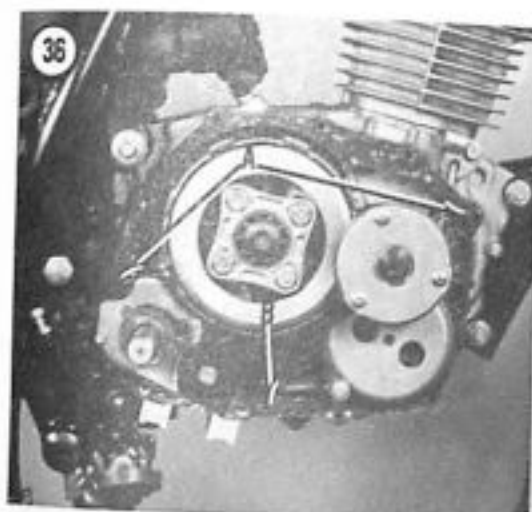
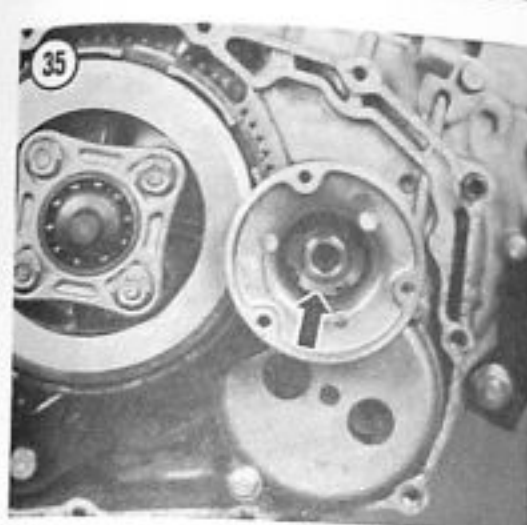
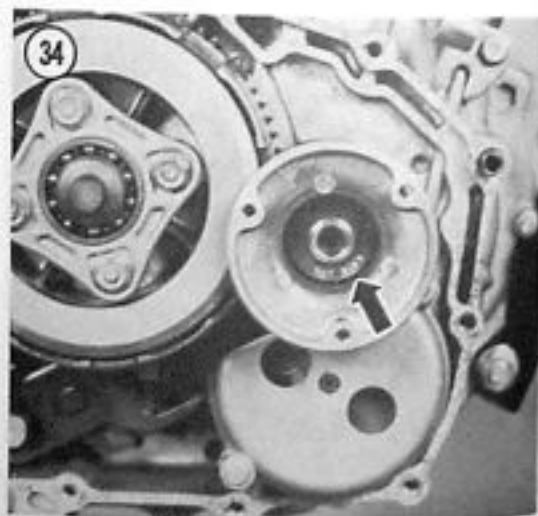
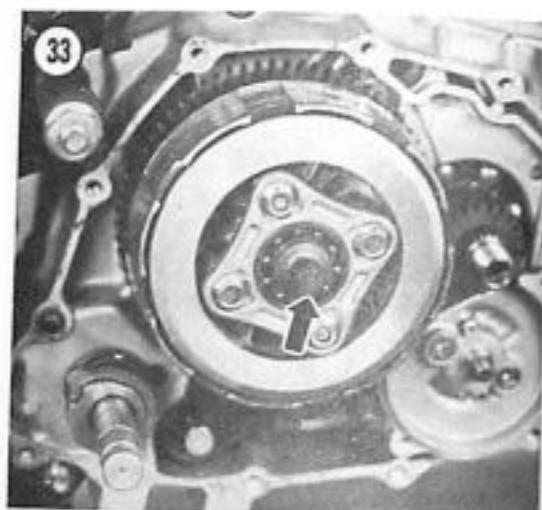
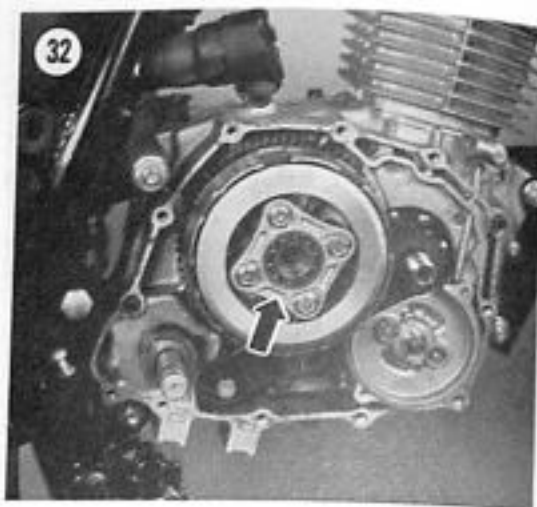
CAUTION

Do not install any of the crankcase cover screws until the crankcase cover is snug up against the crankcase surface. Do not try to force the cover into place with screw pressure. If the cover will not fit up against the crankcase, remove the crankcase cover and repeat Step 18.

NOTE

Steps 19-21 do not apply to the XL125S.

19. On all models except XL125S, insert the decompressor release cable into the lever in the crankcase cover (C, Figure 39) and fit the cable into the clip (B, Figure 39). Install the decompressor cable clip onto the crankcase cover and install the bolt (A, Figure 39).
20. Insert the top end of the decompressor cable into the actuator lever on the cylinder head cover (Figure 40).
21. Move the decompressor cable bracket into position on the cylinder head and install the bolt (Figure 41). Tighten the bolt securely.
22. Install the kickstarter lever and tighten the bolt securely.
23. Connect the clutch cable to the lever on the crankcase cover (Figure 42).
24. Install the exhaust pipe protector.



25. Install the rear brake pedal as described under *Rear Brake Pedal Removal/Installation* in Chapter Ten.

26. Refill the engine with the recommended type and quantity oil; refer to *Changing Engine Oil* in Chapter Three.

27. Adjust the clutch as described under *Clutch Adjustment* in Chapter Three.

28. On all models except XL125S, adjust the decompressor as described under *Starter Decompressor Adjustment* in Chapter Three.

CLUTCH CABLE

Replacement

In time the clutch cable will stretch to the point that it will have to be replaced.

1. Remove the side covers and the seat.

2. Remove the fuel tank as described under *Fuel Tank Removal/Installation* in Chapter Six.

3. At the clutch lever, pull back the rubber protective boot covering the cable adjuster.

4. At the clutch lever, loosen the locknut and turn the adjuster barrel (Figure 43) all the way toward the cable sheath. Slip the cable end out of the hand lever.

5. At the right-hand crankcase cover, remove the cable end from the clutch lever and remove the cable from the clamps on the frame.

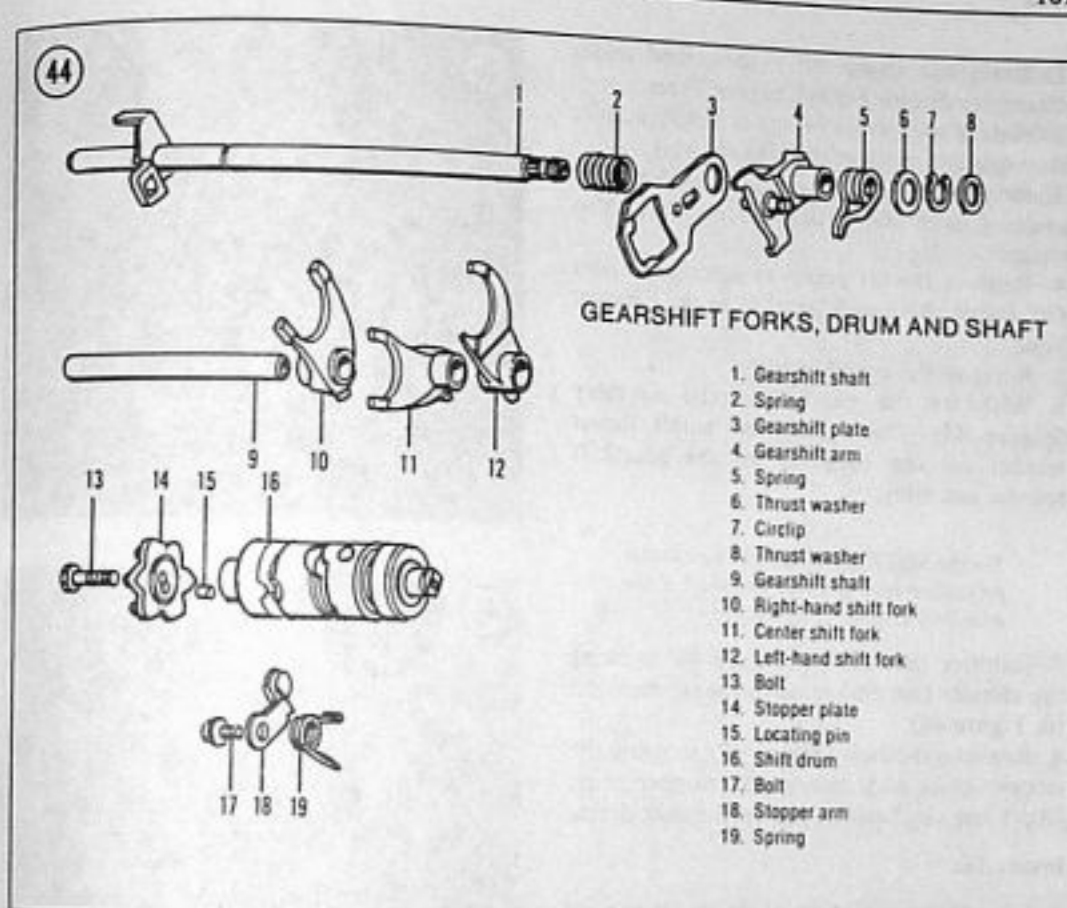
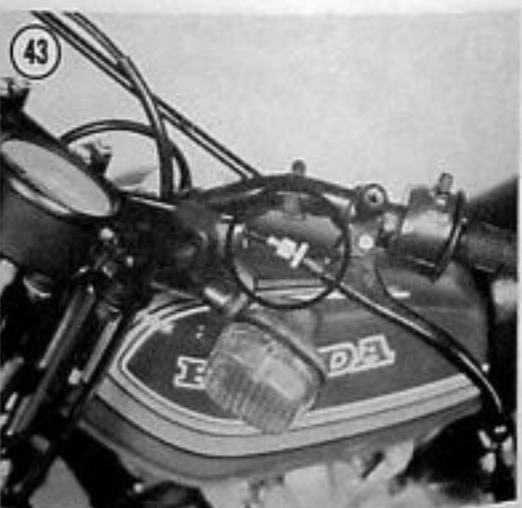
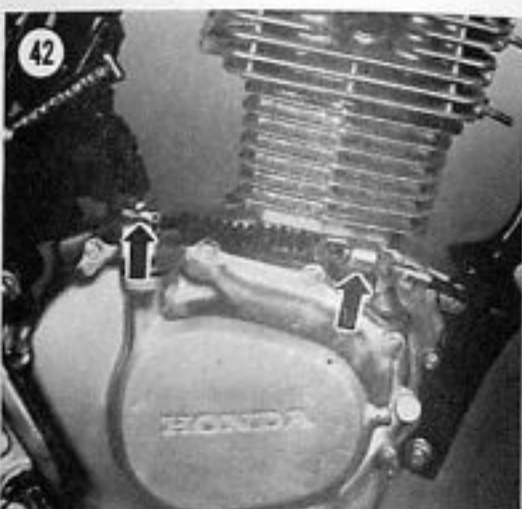
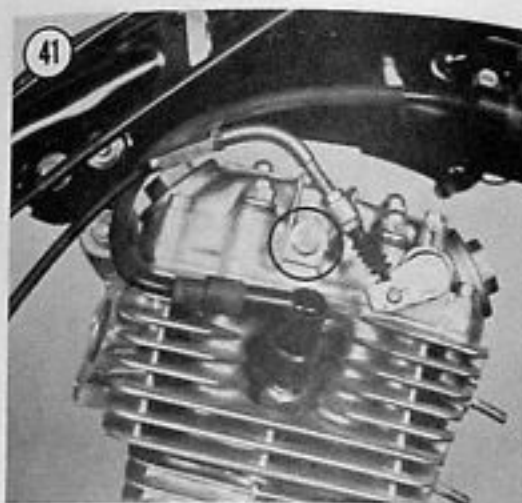
NOTE

The piece of string attached in the next step will be used to pull the new clutch cable back through the frame so it will be routed in the exact same position as the old one.

6. Tie a piece of heavy string or cord (approximately 6-8 ft./1.8-2.4 m long) to the clutch mechanism end of the cable. Wrap this end with masking or duct tape. Do not use an excessive amount of tape. Tie the other end of the string to the foot peg.

7. At the handlebar end of the cable, carefully pull the cable (and attached string) out through the frame and from behind the steering head area. Make sure the attached string follows the same path of the cable through the frame and behind the steering head area.

8. Remove the tape and untie the string from the old cable.



9. Lubricate the new cable as described under *Control Cables* in Chapter Three.

10. Tie the string to the clutch mechanism end of the new clutch cable and wrap it with tape.

11. Carefully pull the string back through the frame routing the new cable through the same path as the old cable.

12. Remove the tape and untie the string from the cable and the footpeg. Attach the new cable to the clutch lever and the clutch mechanism.

13. Install all components which were removed.

14. Adjust the clutch cable as described under *Clutch Adjustment* in Chapter Three.

EXTERNAL SHIFT MECHANISM

The external shift mechanism is located on the same side of the crankcase as the clutch assembly and can be removed with the engine in the frame. To remove the shift drum and shift forks it is necessary to remove the engine

and split the crankcase. This procedure is covered under *Shift Drum and Shift Forks* in this chapter.

NOTE

The gearshift lever is subject to a lot of abuse. If the bike has been in a hard spill, the gearshift lever may have been hit and the shift shaft bent. It is very hard to straighten the shaft without subjecting the crankcase to abnormal stress where the shaft enters the case. If the shaft is bent enough to prevent it from being withdrawn from the crankcase, there is little recourse but to cut the shaft off with a hacksaw very close to the crankcase. It is much cheaper in the long run to replace the shaft than risk damaging a very expensive crankcase.

Removal

Refer to Figure 44 for this procedure.

1. Drain the engine oil as described under *Changing Engine Oil* in Chapter Three.
2. Place a milk crate or wood block(s) under the engine to support the bike securely.
3. Remove the clutch assembly as described under *Clutch Removal/Disassembly* in this chapter.
4. Remove the oil pump as described under *Oil Pump Removal/Installation* in Chapter Four.
5. Remove the gearshift lever.
6. Withdraw the gearshift spindle assembly (Figure 45). Don't lose the small thrust washer on the backside of the gearshift spindle assembly.

NOTE

See the NOTE in the introduction to this procedure regarding a bent shaft if the assembly is difficult to remove.

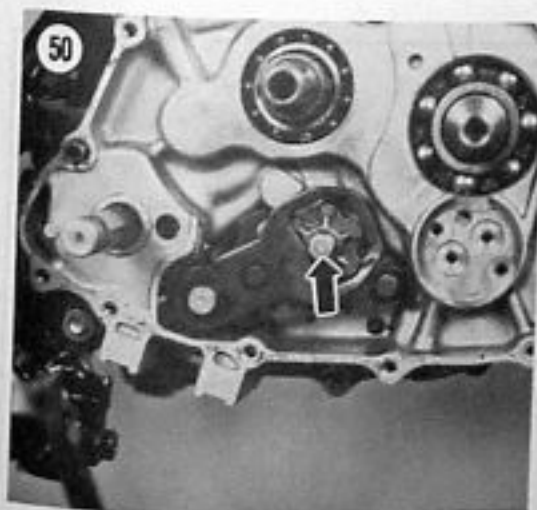
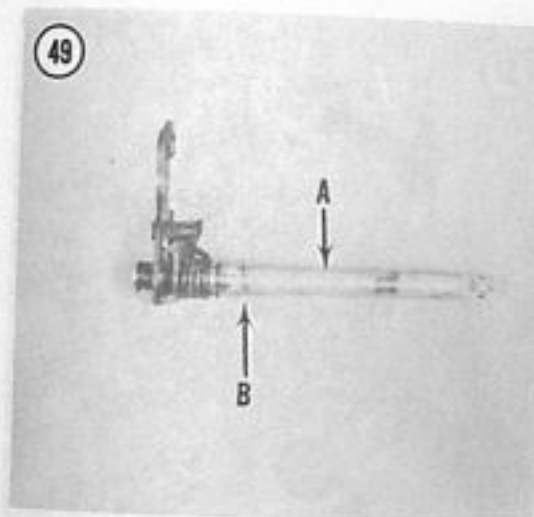
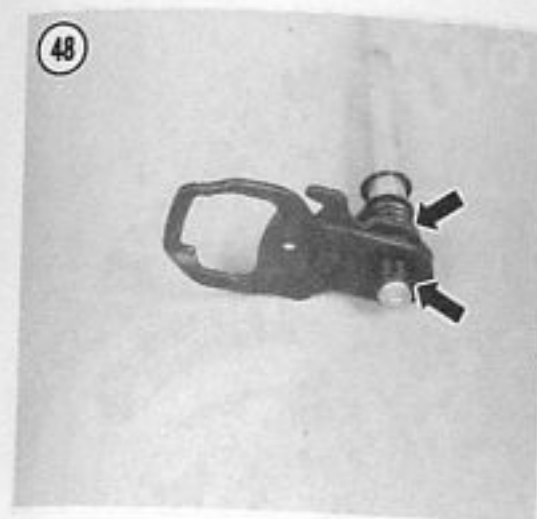
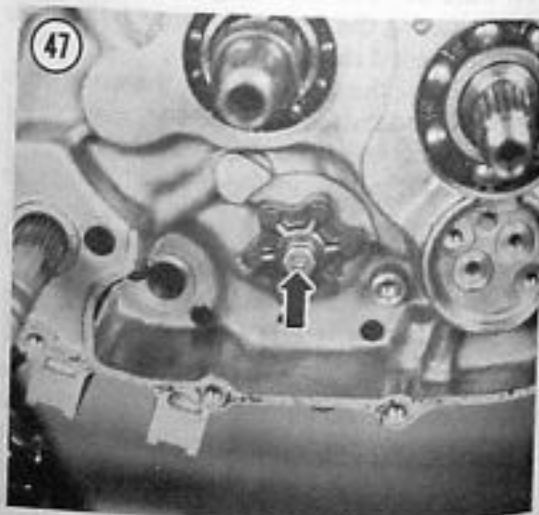
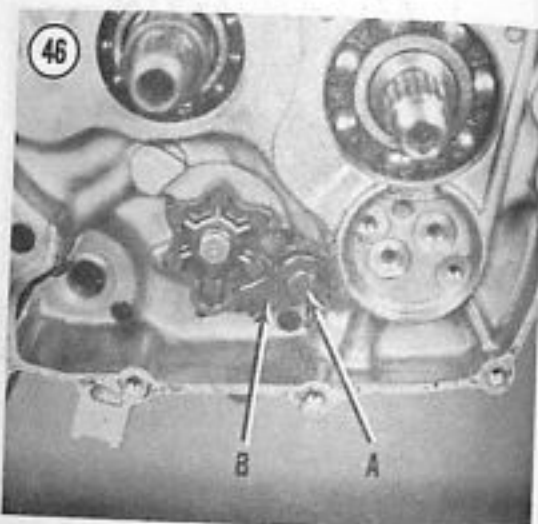
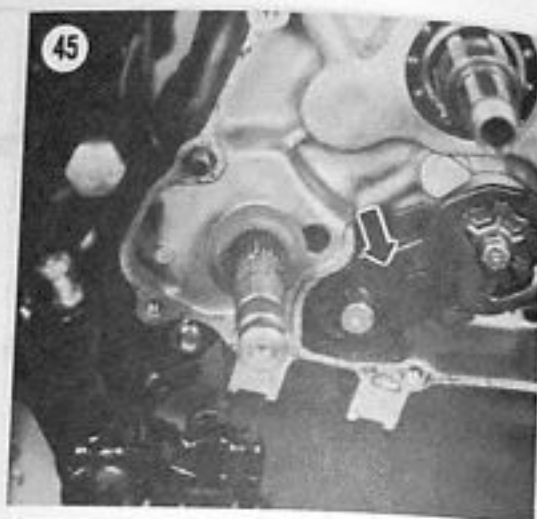
7. Remove the bolt (A, Figure 46) securing the stopper arm and remove the stopper arm (B, Figure 46).
8. Remove the bolt (Figure 47) securing the stopper plate and remove the stopper plate. Don't lose the locating pin on the shift drum.

Inspection

1. Inspect the condition of the return springs on the gearshift spindle assembly (Figure 48). If broken or weak they must be replaced.
2. Inspect the gearshift lever assembly shaft (A, Figure 49) for bending, wear or other damage; replace if necessary.
3. Inspect the condition of the ramps on the stopper plate. They must be smooth and free of burrs or cracks. Replace if necessary.

Installation

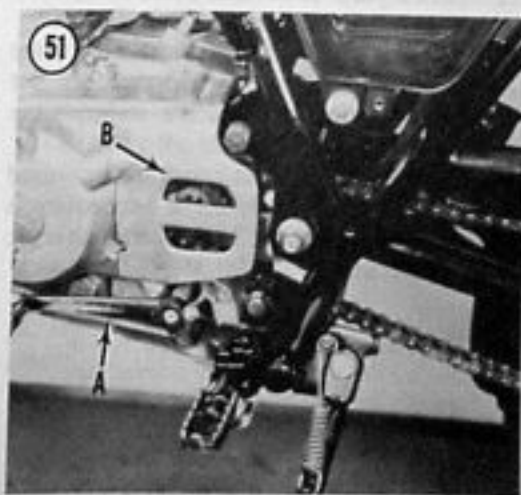
1. Make sure the locating pin is installed in the shift drum. Align this pin with the hole in the backside of the stopper plate. Install the stopper plate and tighten the bolt securely (Figure 47).
2. Install the spring, stopper arm (B, Figure 46) and bolt (A, Figure 46). Tighten the bolt only finger-tight at this time.
3. Locate the stopper arm onto the stopper plate and tighten the stopper arm bolt securely.
4. Make sure the small thrust washer (B, Figure 49) is in place on the gearshift spindle.



5. Install the gearshift spindle assembly. Make sure the gearshift spindle assembly is correctly positioned onto the stopper plate (Figure 50).
6. Install the oil pump as described under *Oil Pump Removal/Installation* in Chapter Four.
7. Install the clutch assembly as described under *Clutch Assembly/Installation* in this chapter.
8. Install the gearshift lever.
9. Refill the engine with the correct type and quantity oil. Refer to *Changing Engine Oil* in Chapter Three.
10. Adjust the clutch as described under *Clutch Adjustment* in Chapter Three.

DRIVE SPROCKET**Removal/Installation**

1. Shift the transmission into any gear. Push the bike forward until the master link is visible on the driven sprocket.
2. Place a milk crate or wood block(s) under the engine to support the bike securely.
3. Remove the bolt securing the shift lever (A, Figure 51) and remove the shift lever.
4. Remove the screws securing the drive sprocket cover (B, Figure 51) and remove the cover.
5. Have an assistant hold the rear brake on while you loosen the bolts securing the drive sprocket and drive sprocket holding plate.



6. Remove the drive chain master link clip (Figure 52) and remove the drive chain.
7. Remove the bolts (Figure 53) securing the drive sprocket and drive sprocket holding plate. Rotate the holding plate in either direction to disengage it from the splines on the shaft; slide off the holding plate and drive sprocket.
8. Install by reversing these removal steps, noting the following.
9. Install a new drive chain master link so that the closed end of the clip is facing the direction of chain travel (Figure 54).
10. Adjust the drive chain as described under *Drive Chain Adjustment* in Chapter Three.



Inspection

Inspect the condition of the teeth on the drive sprocket. If the teeth are visibly worn (Figure 55), replace the sprocket with a new one.

If the sprocket requires replacement, the drive chain is probably worn also.

TRANSMISSION AND INTERNAL SHIFT MECHANISM

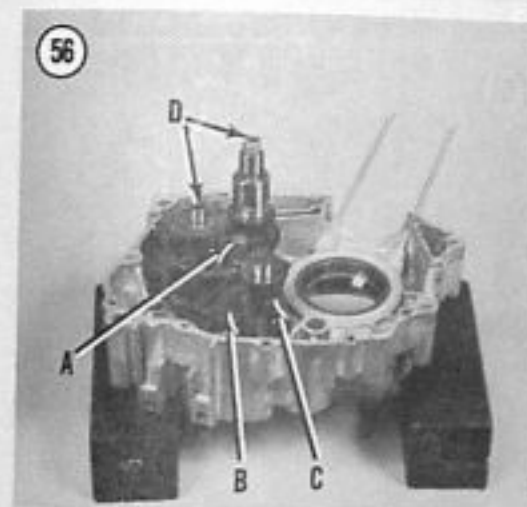
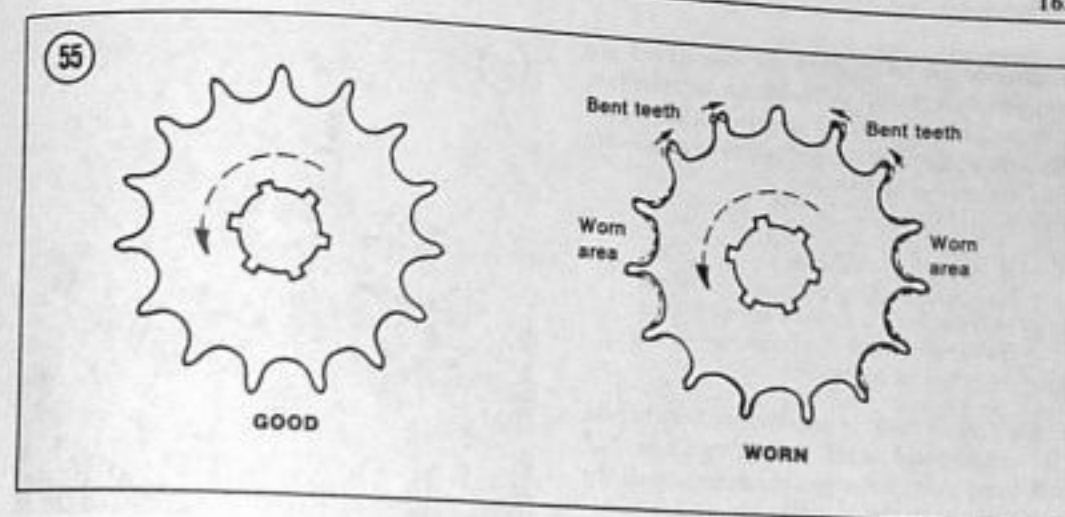
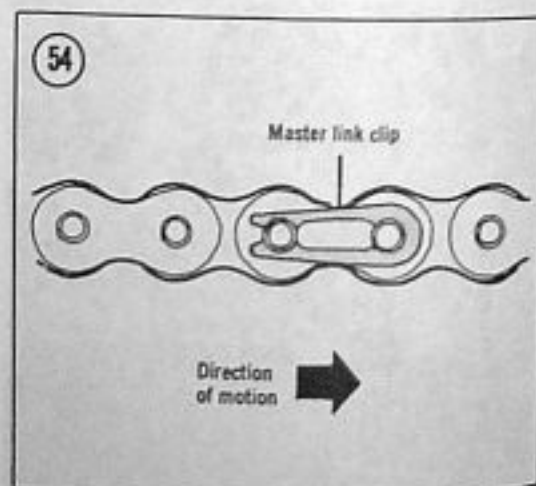
To gain access to the transmission and internal shift mechanism it is necessary to remove the engine and split the crankcase. Once the crankcase has been split removal of the transmission and shift drum and forks is a simple task of pulling the assemblies up and out of the crankcase. Installation is more complicated and is covered more completely than the removal sequence.

Refer to Table 2 for specifications for the internal shift mechanism. Honda does not provide specifications for the transmission components.

There are 2 different transmissions used among the various models. The 5-speed unit is used only on the XL185S; all other models use the 6-speed unit.

NOTE

If disassembling a used, well run-in engine for the first time by yourself, pay particular attention to any additional shims that may have been added by a previous owner. These may have been added to take up the tolerance of worn

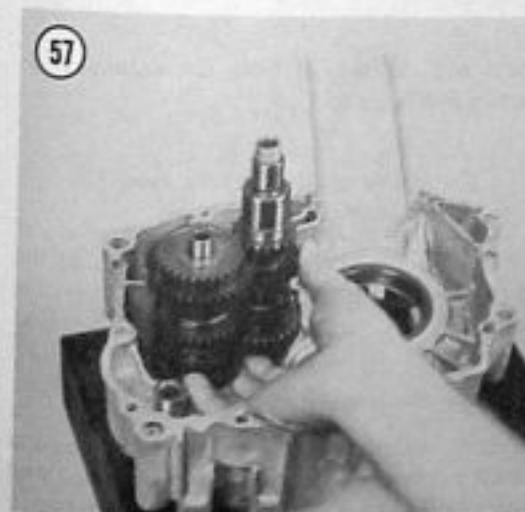


components and must be reinstalled in the same position since the shims have developed a wear pattern. If new parts are going to be installed these shims may be eliminated. This is something you will have to determine upon reassembly.

5-SPEED TRANSMISSION AND INTERNAL SHIFT MECHANISM

Removal/Installation

1. Remove the engine and split the crankcase as described under *Crankcase Disassembly* in Chapter Four.
2. Remove the crankshaft assembly from the crankcase.
3. Pull the shift fork shaft (A, Figure 56) out of the crankcase.
4. Pivot the shift forks (B, Figure 56) away from the shift drum to allow shift drum removal.
5. Remove the shift drum (C, Figure 56).
6. Remove the shift forks and remove both transmission assemblies (D, Figure 56).
7. Disassemble and inspect the shift forks and transmission assemblies as described in this chapter.
8. Install the 2 transmission assemblies by meshing them together in their proper relationship to each other. Install them in the left-hand crankcase. Hold the thrust washer and collar in place, with your fingers, on the countershaft (Figure 57). Make sure it is still



positioned correctly after the assemblies are completely installed. After both assemblies are installed, tap on the end of both shafts (Figure 58) with a plastic or rubber mallet to make sure they are completely seated.

NOTE

If the thrust washer on the end of the countershaft does not seat correctly it will hold the transmission shaft up a little and prevent the crankcase halves from seating completely.

9. Each shift fork is marked with either an "R" (right-hand side), "C" (center) or "L" (left-hand side); refer to Figure 59. Install the shift forks with these marks facing down.

10. Install the shift forks in this sequence—L, C then R. Engage the shift forks into the grooves in the gears (Figure 60) but do not insert the shift fork shaft.

11. Coat all bearings and sliding surfaces of the shift drum with assembly oil (Figure 61) and install the shift drum (Figure 62). Rotate the shift drum to the neutral position by aligning the neutral switch rotor with the neutral switch in the crankcase (Figure 63). This will make it easier to insert the shift fork pin followers into the shift drum.

12. Pivot each shift fork into mesh with the shift drum.

13. Install the shift fork shaft (A, Figure 64). Make sure all 3 cam pin followers are in mesh with the shift drum grooves.

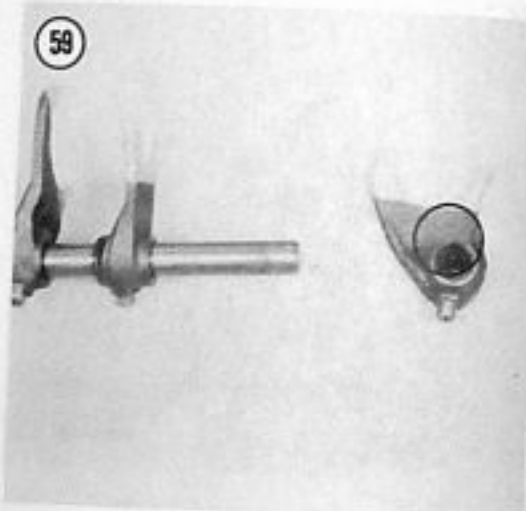
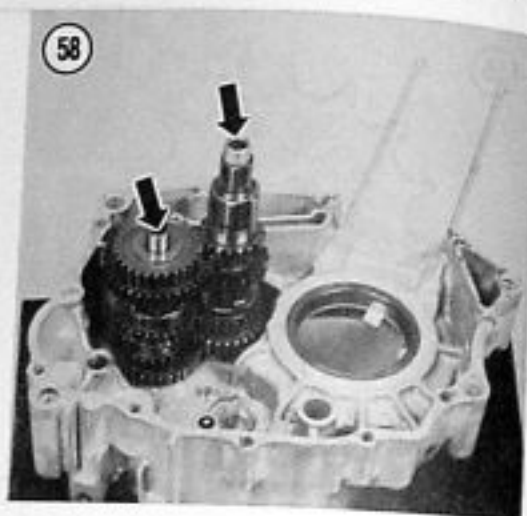
14. Spin the transmission shafts and shift through the gears using the shift drum. Make sure you can shift into all gears. This is the time to find that something may be installed incorrectly—not after the crankcase is completely assembled.

NOTE

This procedure is best done with the aid of a helper as the assemblies are loose and won't spin very easily. Have the helper spin the transmission shaft while you turn the shift drum through all the gears.

15. Make sure that the thrust washer (B, Figure 64) is installed on the countershaft.

16. On models so equipped, apply a light coat of multipurpose grease to the kickstarter shaft



shim and position it onto the crankcase as shown in Figure 65.

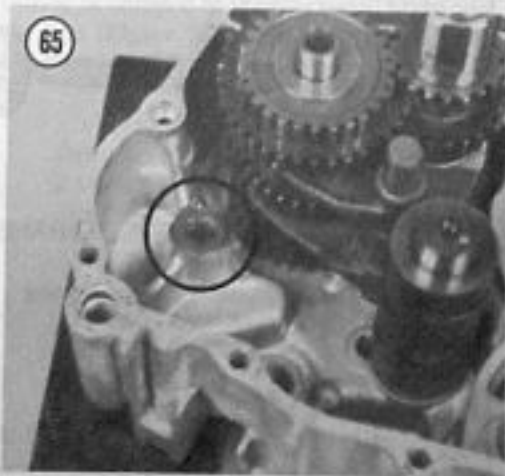
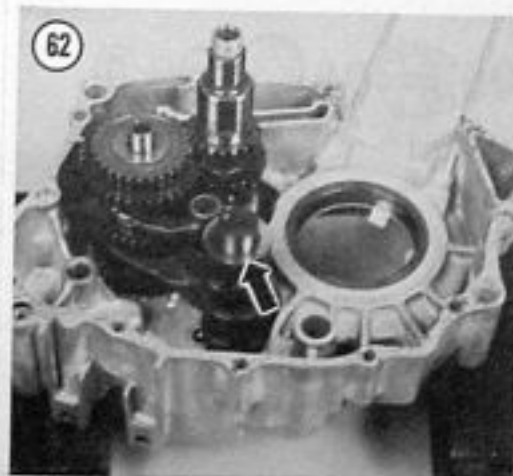
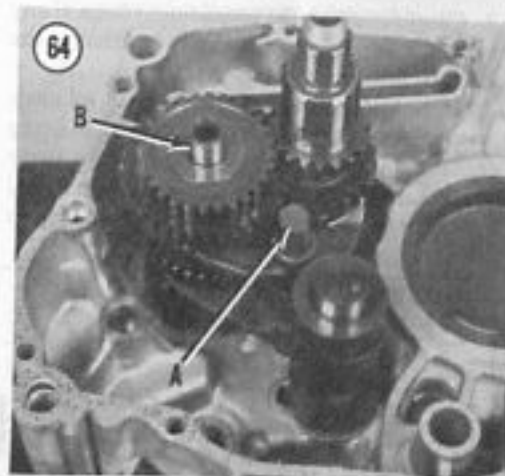
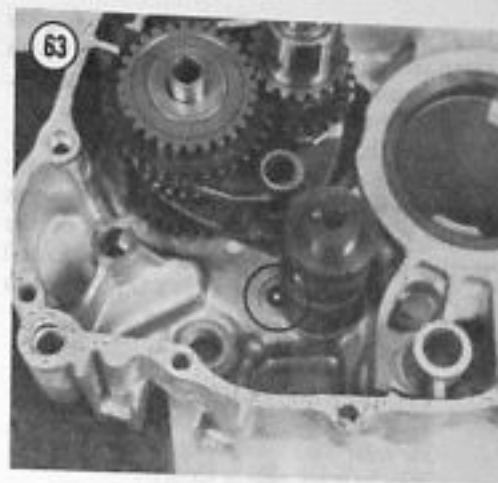
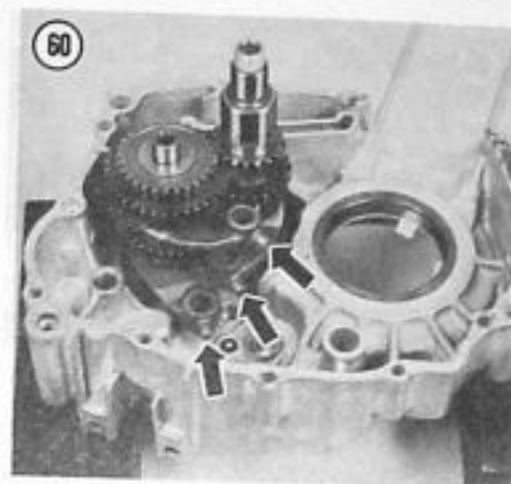
NOTE

The kickstarter assembly is mounted in the right-hand crankcase half.

17. Install the crankshaft and assemble the crankcase as described under *Crankcase Assembly* in Chapter Four.

Preliminary Inspection

Prior to disassembling the transmission shaft assemblies they should be cleaned and inspected. Place the assembled shaft into a



large can or plastic bucket and thoroughly clean with solvent and a stiff brush. Dry with compressed air or let it sit on rags to drip dry. Repeat for the other shaft assembly.

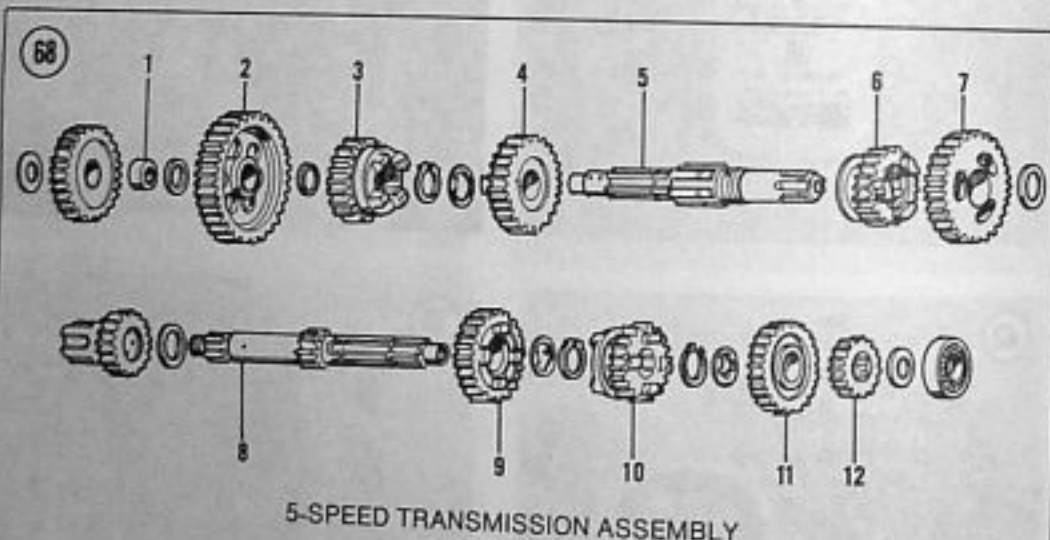
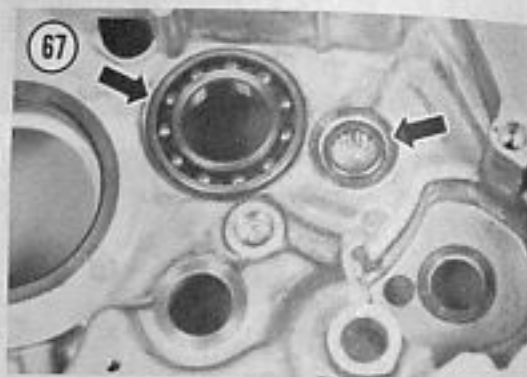
1. After they have been cleaned, visually inspect the components of the assemblies for excessive wear. Any burrs, pitting or roughness on the teeth of a gear will cause wear on the mating gear. Minor roughness can be cleaned up with an oilstone but there's little point in attempting to remove deep scars.

NOTE

Defective gears should be replaced. It's a good idea to replace the mating gear on the other shaft even though it may not show as much wear or damage.

2. Carefully check the engagement dogs. If any are chipped, worn, rounded or missing, the affected gear must be replaced.

3. If possible, check the runout of each transmission shaft. Mount the shaft being checked in a lathe, on V-blocks or on some other suitable centering device. Place a dial indicator so that its plunger contacts a constant



5-SPEED TRANSMISSION ASSEMBLY

1. Kickstarter idle gear bushing
2. Countershaft 1st gear
3. Countershaft 5th gear
4. Countershaft 3rd gear
5. Countershaft 4th gear

6. Countershaft 2nd gear
7. Countershaft 2nd gear
8. Main shaft (including 1st gear)
9. Main shaft 5th gear
10. Main shaft 3rd gear
11. Main shaft 4th gear
12. Main shaft 2nd gear

CLUTCH AND TRANSMISSION

surface nearest the center of the shaft. Rotate the shaft and record the extremes of the dial readings. The shaft should be replaced if the runout exceeds 0.04 mm (0.0016 in.).

4. Rotate the transmission bearings in the crankcases by hand. Refer to Figure 66 and Figure 67. Check for roughness, noise and radial play. Any bearing that is suspect should be replaced. Refer to *Bearing and Oil Seal Replacement* in Chapter Four.

5. If the transmission shafts are satisfactory and are not going to be disassembled, apply engine oil to all components and reinstall them in the crankcase as described under 5-Speed

Transmission and Internal Shift Mechanism (XL185S) Removal/Installation in this chapter.

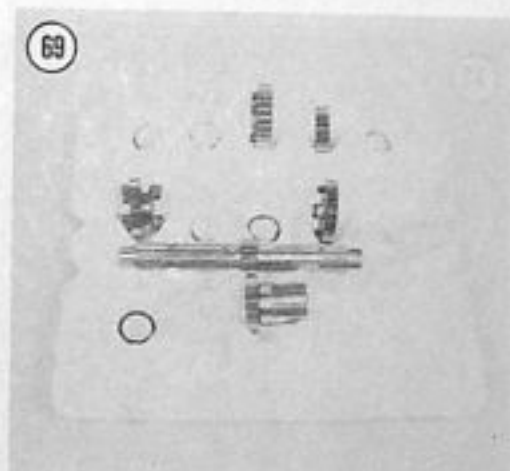
Main Shaft

Disassembly/Inspection/Assembly

Refer to Figure 68 for this procedure.

NOTE

A helpful "tool" that should be used for transmission disassembly is a large egg flat (the type that restaurants get their eggs in). As you remove a part from the shaft set it in one of the depressions in the same position from which it was removed (Figure 69). This is an easy way to remember the correct relationship of all parts.



1. If not cleaned in the *Preliminary Inspection* sequence, place the assembled shaft into a large can or plastic bucket and thoroughly clean with solvent and a stiff brush. Dry with compressed air or let it sit on rags to drip dry.
2. Slide off the thrust washer, the 2nd gear and the 4th gear.
3. Slide off the splined washer and remove the circlip.
4. Slide off the 3rd gear.
5. Remove the circlip and splined washer.
6. Slide off the 5th gear.
7. From the other end of the shaft, slide off the kickstarter gear and thrust washer.
8. Check each gear for excessive wear, burrs, pitting or chipped or missing teeth. Make sure the lugs (Figure 70) on the gears are in good condition.



NOTE

Defective gears should be replaced. It is a good idea to replace the mating gear on the countershaft even though it may not show as much wear or damage.

NOTE

The 1st gear is part of the shaft, therefore, if the gear is defective the shaft must be replaced.

9. Make sure that all gears slide smoothly on the main shaft splines.

NOTE

It is a good idea to replace all circlips every other time the transmission is disassembled to ensure proper gear alignment.

10. Install the thrust washer and the kickstarter gear (Figure 71).
11. Slide on the 5th gear and install the splined washer and circlip (Figure 72).
12. Slide on the 3rd gear and install the circlip and splined washer (Figure 73).
13. Slide on the 4th gear (Figure 74), the 2nd gear and the thrust washer (Figure 75).
14. After assembly is complete refer to Figure 76 for the correct placement of all gears. Make sure all circlips are seated correctly in the main shaft grooves.

Countershaft Disassembly/Inspection/Assembly

Refer to Figure 68 for this procedure.

NOTE

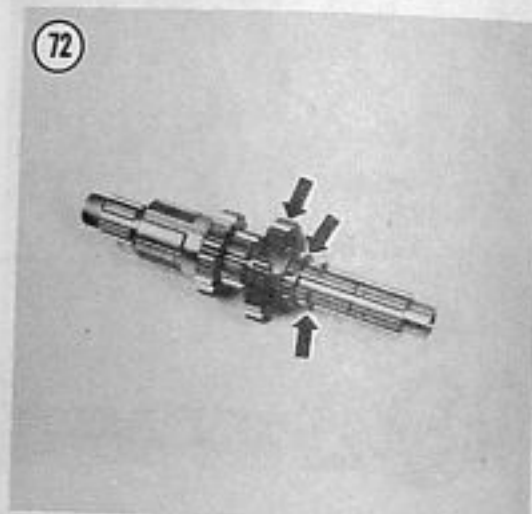
Use the same large egg flat (used on the main shaft disassembly) during the countershaft disassembly (Figure 77). This is an easy way to remember the correct relationship of all parts.

1. If not cleaned in the Preliminary Inspection sequence, place the assembled shaft into a large can or plastic bucket and thoroughly clean with solvent and a stiff brush. Dry with compressed air or let it sit on rags to drip dry.
2. Remove the thrust washer, kickstarter idle gear and, on models since 1980, remove the kickstarter idle gear bushing.
3. Slide off the thrust washer and the 1st gear.
4. Slide off the thrust washer and the 5th gear.
5. Remove the circlip and thrust washer and slide off the 3rd gear.
6. From the other end of the shaft, remove the thrust washer and slide off the 2nd and the 4th gears.
7. Check each gear for excessive wear, burrs, pitting or chipped or missing teeth. Make sure the lugs (Figure 78) on the gears are in good condition.

71



72

**NOTE**

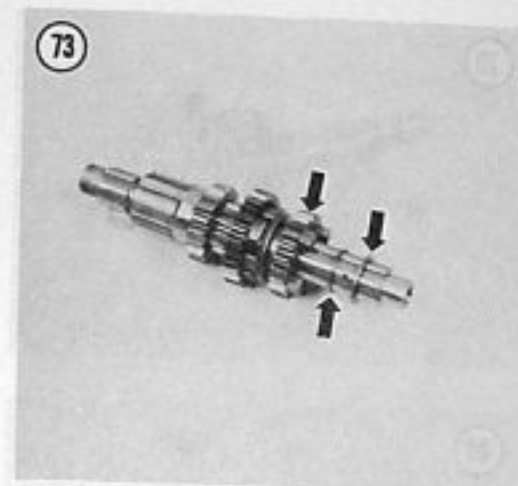
Defective gears should be replaced. It is a good idea to replace the mating gear on the main shaft even though it may not show as much wear or damage.

8. Make sure that all gears slide smoothly on the countershaft splines.

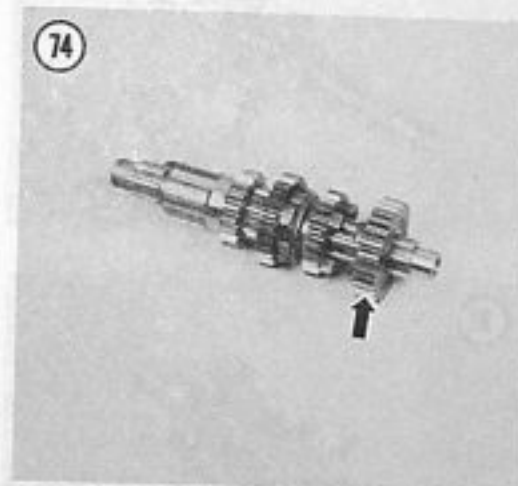
NOTE

It is a good idea to replace the circlip every other time the transmission is disassembled to ensure proper gear alignment.

73



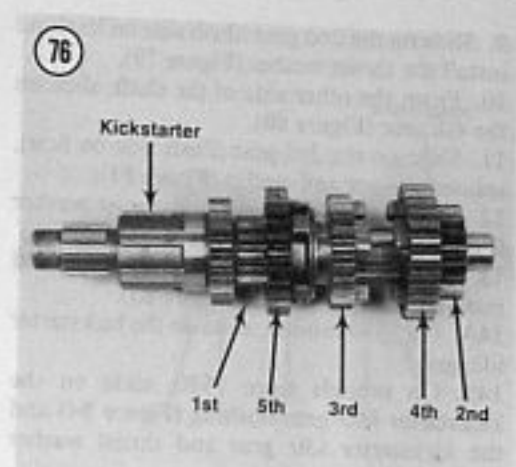
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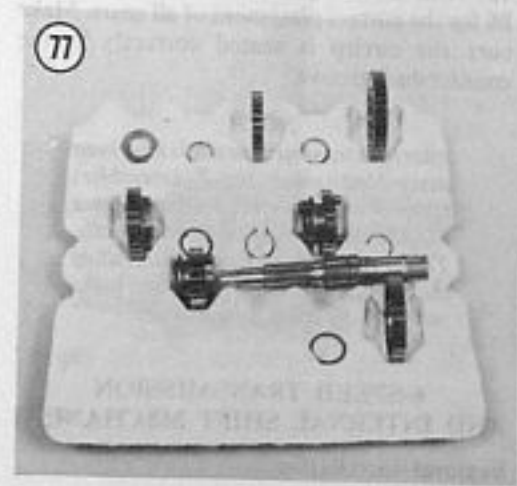
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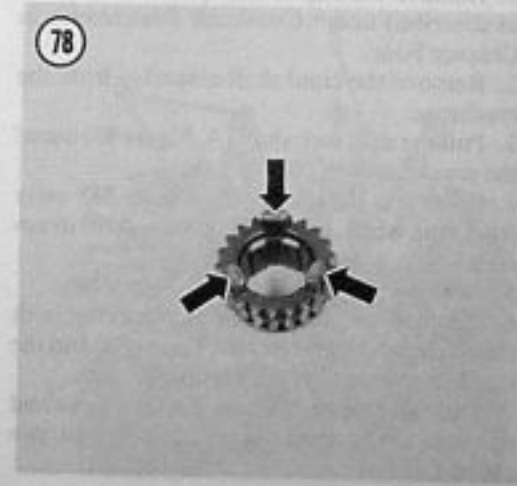
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77



78



9. Slide on the 2nd gear (flush side on last) and install the thrust washer (Figure 79).
10. From the other side of the shaft, slide on the 4th gear (Figure 80).
11. Slide on the 3rd gear (flush side on first), splined washer and circlip (Figure 81).
12. Slide on the 5th gear and thrust washer (Figure 82).
13. Slide on the 1st gear (flush side on last) and install the thrust washer (Figure 83).
- 14A. On 1979 models, slide on the kickstarter idle gear.
- 14B. On models since 1980, slide on the kickstarter idle gear bushing (Figure 84) and the kickstarter idle gear and thrust washer (Figure 85).
15. After assembly is complete refer to Figure 86 for the correct placement of all gears. Make sure the circlip is seated correctly in the countershaft groove.

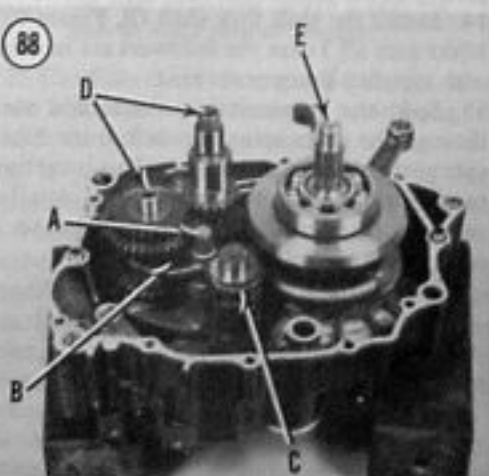
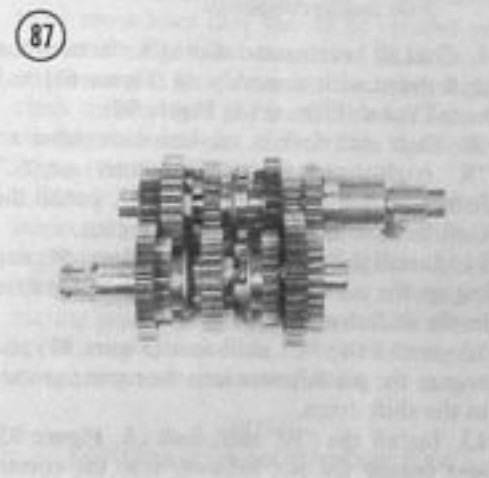
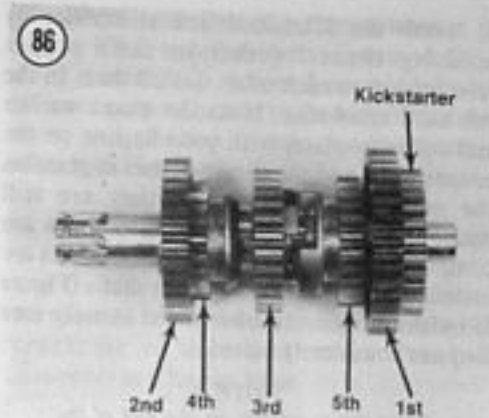
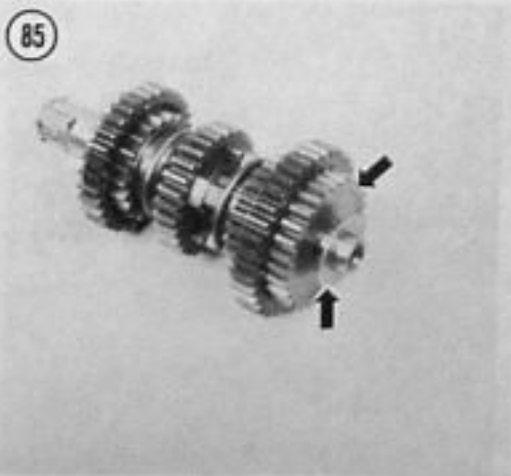
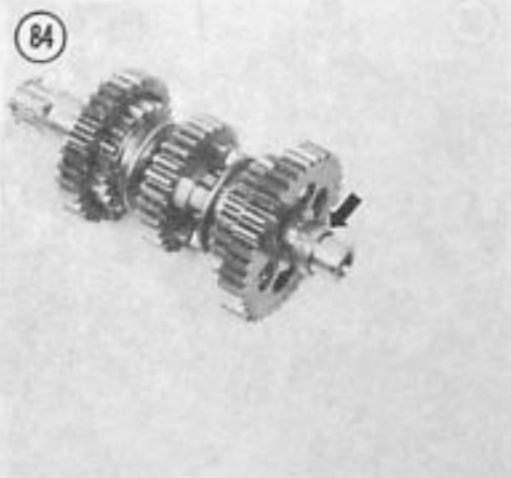
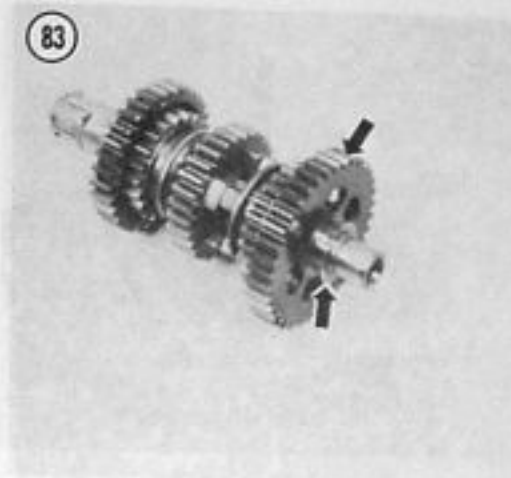
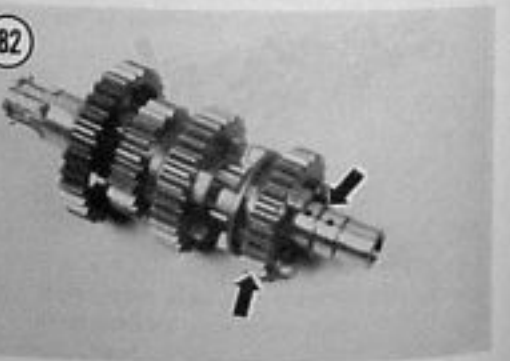
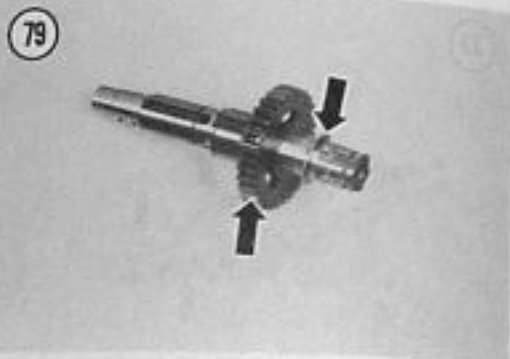
NOTE

After both transmission shafts have been assembled, mesh the 2 assemblies together in the correct position (Figure 87). Check that all gears meet correctly. This is your last check prior to installing the assemblies into the crankcase; make sure they are correctly assembled.

6-SPEED TRANSMISSION AND INTERNAL SHIFT MECHANISM

Removal/Installation

1. Remove the engine and split the crankcase as described under *Crankcase Disassembly* in Chapter Four.
2. Remove the crankshaft assembly from the crankcase.
3. Pull the shift fork shaft (A, Figure 88) out of the crankcase.
4. Pivot the shift forks (B, Figure 88) away from the shift drum to allow shift drum removal.
5. Remove the shift drum (C, Figure 88).
6. Remove the shift forks and remove both transmission assemblies (D, Figure 88) and the crankshaft assembly (E, Figure 88).
7. Disassemble and inspect the shift forks and transmission assemblies as described in this chapter.



8. Install the 2 transmission assemblies by meshing them together in their proper relationship to each other. Install them in the left-hand crankcase. Hold the thrust washer and collar in place, with your fingers, on the countershaft and the thrust washer in place on the main shaft. Make sure they are still positioned correctly after the assemblies are completely installed. After both assemblies are installed, tap on the end of both shafts (Figure 89) with a plastic or rubber mallet to make sure they are completely seated.

NOTE

If the thrust washer on the end of the countershaft does not seat correctly it will hold the transmission shaft up a little and prevent the crankcase halves from seating completely.

9. Coat all bearing and sliding surfaces of the shift drum with assembly oil (Figure 61) and install the shift drum (A, Figure 90).

10. Each shift fork is marked with either an "R" (right-hand side), "C" (center) or "L" (left-hand side); refer to Figure 91. Install the shift forks with these marks facing up.

11. Install the "L" shift fork (B, Figure 90) and engage the pin follower into the correct groove in the shift drum.

12. Install the "C" shift fork (Figure 92) and engage the pin follower into the correct groove in the shift drum.

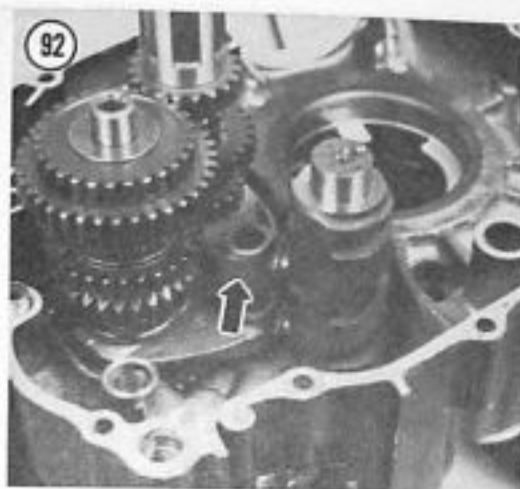
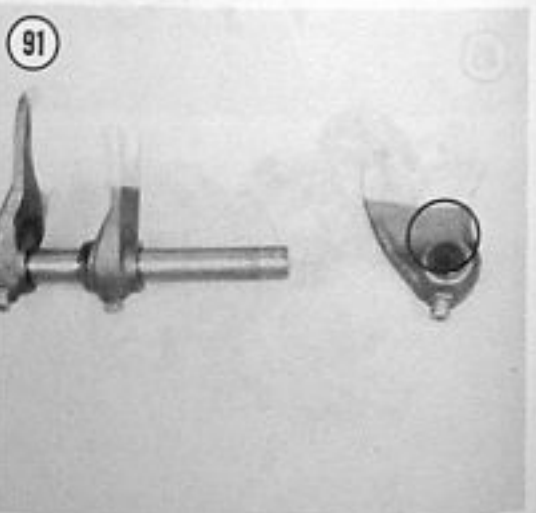
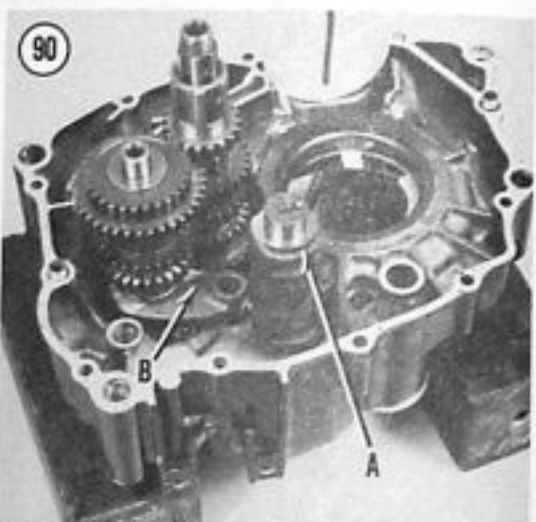
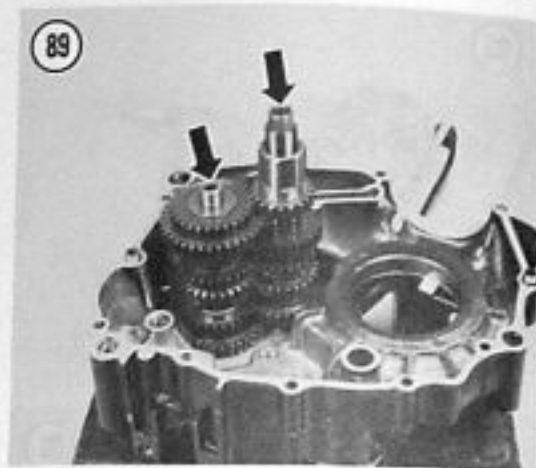
13. Install the "R" shift fork (A, Figure 93) and engage the pin follower into the correct groove in the shift drum.

14. Install the shift fork shaft (B, Figure 93). Make sure all 3 cam pin followers are in mesh with the shift drum grooves.

15. Spin the transmission shafts and shift through the gears using the shift drum. Make sure you can shift into all gears. This is the time to find that something may be installed incorrectly—not after the crankcase is completely assembled.

NOTE

This procedure is best done with the aid of a helper as the assemblies are loose and won't spin very easily. Have the helper spin the transmission shaft while you turn the shift drum through all the gears.



NOTE

The kickstarter assembly is mounted in the right-hand crankcase half.

18. Install the crankshaft and assemble the crankcase as described under *Crankcase Assembly* in Chapter Four.

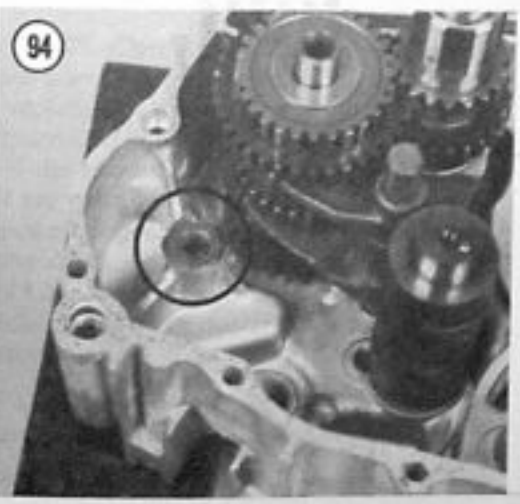
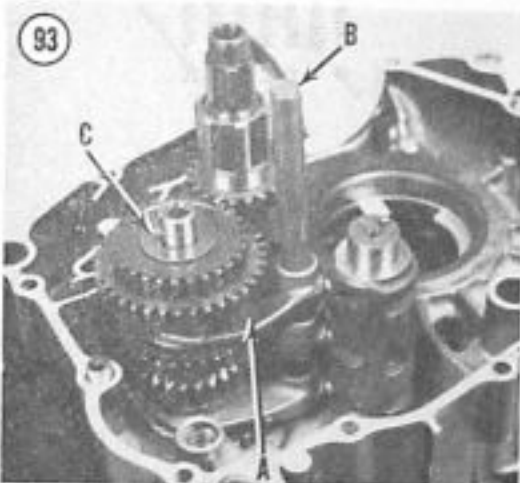
Preliminary Inspection

Prior to disassembling the transmission shaft assemblies they should be cleaned and inspected. Place the assembled shaft into a large can or plastic bucket and thoroughly clean with solvent and a stiff brush. Dry with compressed air or let it sit on rags to drip dry. Repeat for the other shaft assembly.

1. After they have been cleaned, visually inspect the components of the assemblies for excessive wear. Any burrs, pitting or roughness on the teeth of a gear will cause wear on the mating gear. Minor roughness can be cleaned up with an oilstone but there's little point in attempting to remove deep scars.

NOTE

Defective gears should be replaced. It's a good idea to replace the mating gear on the other shaft even though it may not show as much wear or damage.



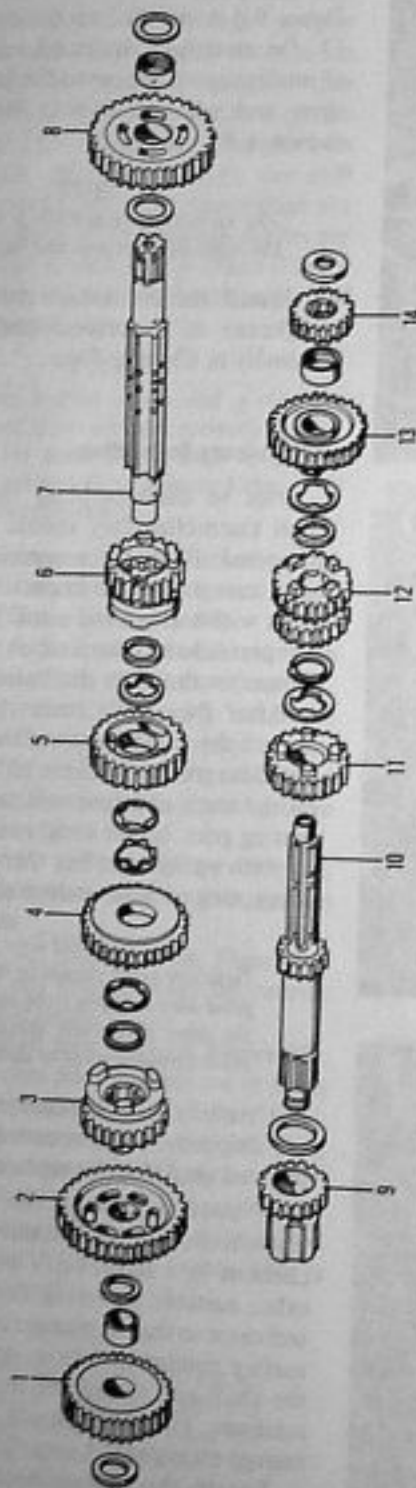
2. Carefully check the engagement dogs. If any are chipped, worn, rounded or missing, the affected gear must be replaced.

3. If possible, check the runout of each transmission shaft. Mount the shaft being checked in a lathe, on V-blocks or on some other suitable centering device. Place a dial indicator so that its plunger contacts a constant surface nearest the center of the shaft. Rotate the shaft and record the extremes of the dial readings. The shaft should be replaced if the runout exceeds 0.04 mm (0.0016 in.).

4. Rotate the transmission bearings in the crankcases by hand. Refer to Figure 66 and

6-SPEED TRANSMISSION ASSEMBLY

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1. Kickstarter idle gear
2. Countershaft 1st gear
3. Countershaft 5th gear
4. Countershaft 3rd gear
5. Countershaft 4th gear
6. Countershaft 6th gear
7. Countershaft

8. Countershaft 2nd gear
9. Kickstarter drive gear
10. Main shaft (including 1st gear)
11. Main shaft 5th gear
12. Main shaft 3rd/4th combination gear
13. Main shaft 6th gear
14. Main shaft 2nd gear

CLUTCH AND TRANSMISSION

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NOTE

A helpful "tool" that should be used for transmission disassembly is a large egg flat (the type that restaurants get their eggs in). As you remove a part from the shaft set it in one of the depressions in the same position from which it was removed (Figure 96). This is an easy way to remember the correct relationship of all parts.

97



1. If not cleaned in the Preliminary Inspection sequence, place the assembled shaft into a large can or plastic bucket and thoroughly clean with solvent and a stiff brush. Dry with compressed air or let it sit on rags to drip dry.
2. Slide off the splined or thrust washer, the 2nd gear, the 6th gear and 6th gear bushing. On XL125S models there is no bushing.
3. Slide off the splined washer and remove the circlip.
4. Slide off the 3rd/4th combination gear.
5. Remove the circlip and splined washer.
6. Slide off the 5th gear.
7. From the other end of the shaft, slide off the kickstarter gear and thrust washer.
8. Check each gear for excessive wear, burrs, pitting or chipped or missing teeth. Make sure the lugs (Figure 97) on the gears are in good condition.

NOTE

Defective gears should be replaced. It is a good idea to replace the mating gear on the countershaft even though it may not show as much wear or damage.

NOTE

The 1st gear is part of the shaft, therefore, if the gear is defective the shaft must be replaced.

9. Make sure that all gears slide smoothly on the main shaft splines.

NOTE

It is a good idea to replace all circlips every other time the transmission is disassembled to ensure proper gear alignment.

Figure 67. Check for roughness, noise and radial play. Any bearing that is suspect should be replaced. Refer to *Bearing and Oil Seal Replacement* in Chapter Four.

5. If the transmission shafts are satisfactory and are not going to be disassembled; apply engine oil to all components and reinstall them in the crankcase as described under *6-Speed Transmission and Internal Shift Mechanism—Removal/Installation* in this chapter.

Main Shaft

Disassembly/Inspection/Assembly

Refer to Figure 95 for this procedure.

10. Install the thrust washer and the kickstarter gear (Figure 98).

11. Slide on the 5th gear and install the splined washer and circlip (Figure 99).

12. Position the 3rd/4th combination gear with the smaller 3rd gear going on first. Slide on the 3rd/4th combination gear and install the circlip (Figure 100).

13. Install the splined washer (A, Figure 101).

14A. On XL125S, install the 6th gear.

14B. On all other models, align the oil hole in the 6th gear bushing with the oil hole in the transmission shaft and slide the bushing into place (B, Figure 101). Slide on the 6th gear (Figure 102).

15. Slide on the 2nd gear and the thrust washer (Figure 103).

NOTE

On XL125S models, the last washer to be installed is a splined washer and not a thrust washer.

16. After assembly is complete refer to Figure 104 for the correct placement of all gears. Make sure all circlips are seated correctly in the main shaft grooves.

Countershaft

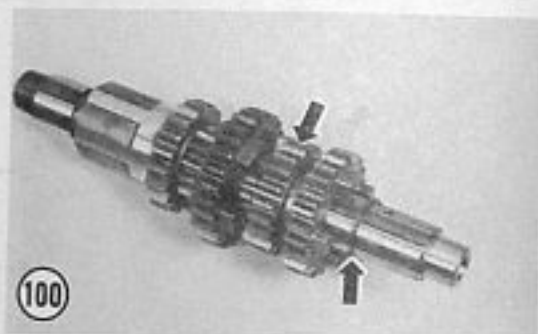
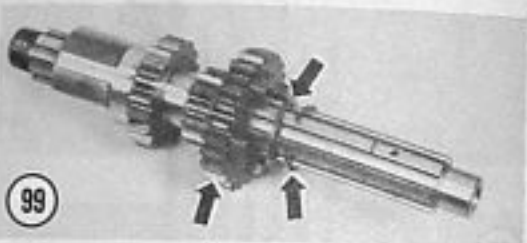
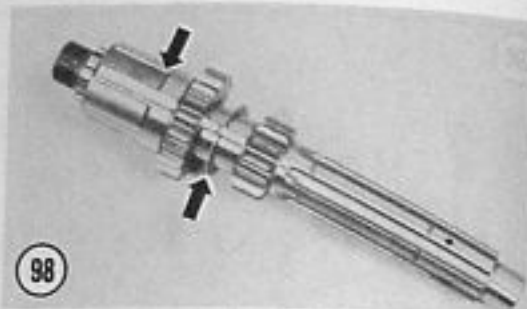
Disassembly/Inspection/Assembly

Refer to Figure 95 for this procedure.

NOTE

Use the same large egg flat (used on the main shaft disassembly) during the countershaft disassembly (Figure 105). This is an easy way to remember the correct relationship of all parts.

1. If not cleaned in the Preliminary Inspection sequence, place the assembled shaft into a large can or plastic bucket and thoroughly clean with solvent and a stiff brush. Dry with compressed air or let it sit on rags to drip dry.
2. Slide off the thrust washer, 2nd gear, the 2nd bushing and the thrust washer.
3. Slide off the thrust washer and the kickstarter idle gear.
4. Slide off the thrust washer and the 1st gear.
5. Slide off the 5th gear.
6. Remove the circlip and splined washer and slide off the 3rd gear.



7. Slide off the splined lockwasher. Rotate the splined washer in either direction to disengage the tangs from the raised splines on the transmission shaft. Slide off the splined washer.

8. Slide off the 4th gear.

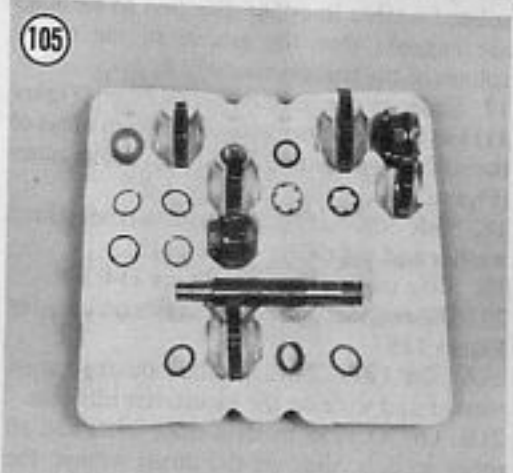
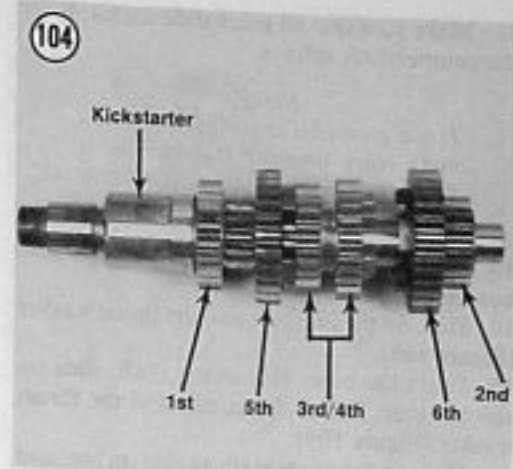
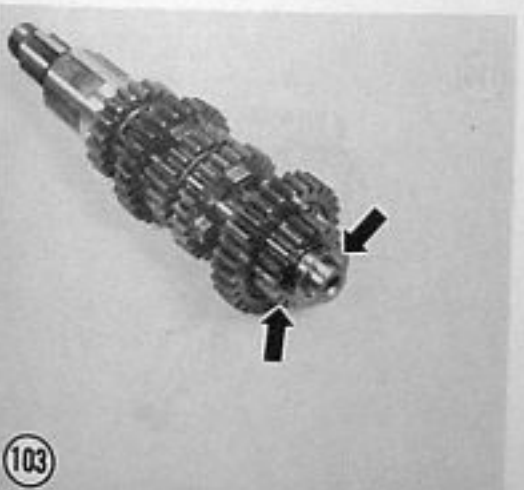
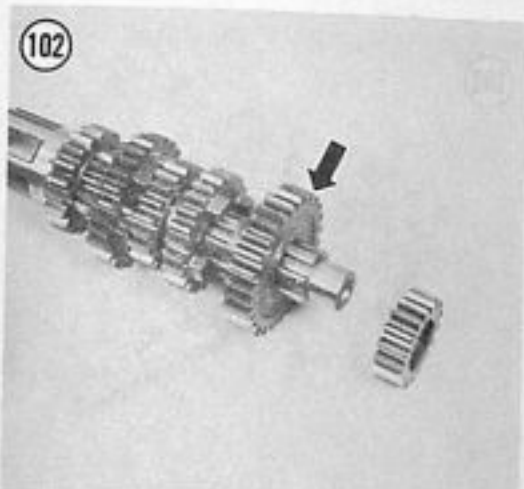
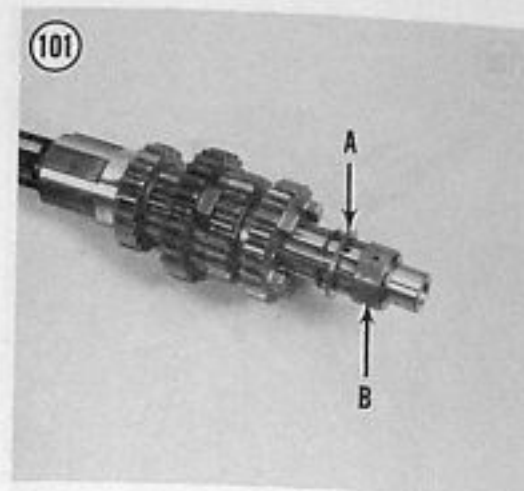
9. Slide off the splined washer and remove the circlip.

10. Slide off the 6th gear.

11. Check each gear for excessive wear, burrs, pitting or chipped or missing teeth. Make sure the lugs (Figure 106) on the gears are in good condition.

NOTE

Defective gears should be replaced. It is a good idea to replace the mating gear on the main shaft even though it may not show as much wear or damage.



12. Make sure that all gears slide smoothly on the countershaft splines.

NOTE

It is a good idea to replace the circlips every other time the transmission is disassembled to ensure proper gear alignment.

13. Slide on the thrust washer and the 2nd gear bushing (Figure 107).

14. Slide on the 2nd gear and the thrust washer (Figure 108).

15. From the other side of the shaft, slide on the 6th gear. Install the circlip and the thrust washer (Figure 109).

16. Slide on the 4th gear (flush side on last) and the splined washer (Figure 110). Rotate the splined washer in either direction so its tangs are engaged into the groove in the raised splines of the transmission shaft.

17. Slide on the splined lockwasher (Figure 111) so that the tangs go into the open areas of the splined washer and lock the washer in place (Figure 112).

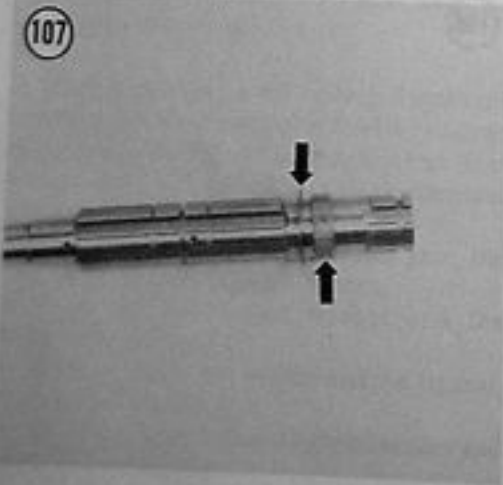
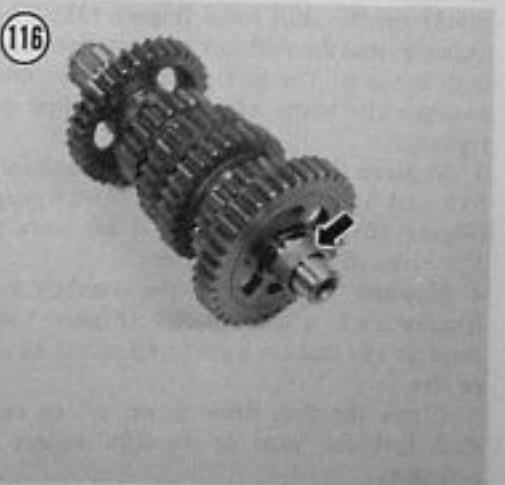
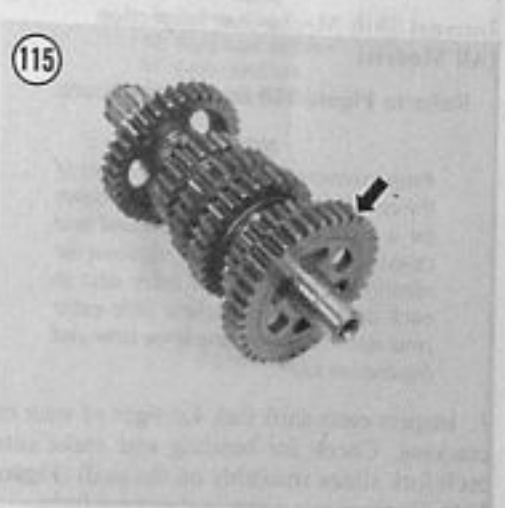
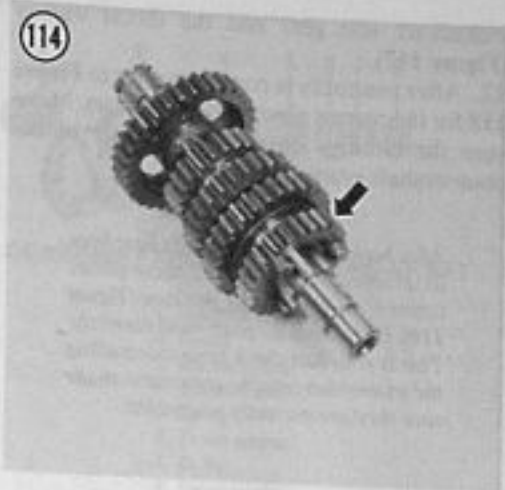
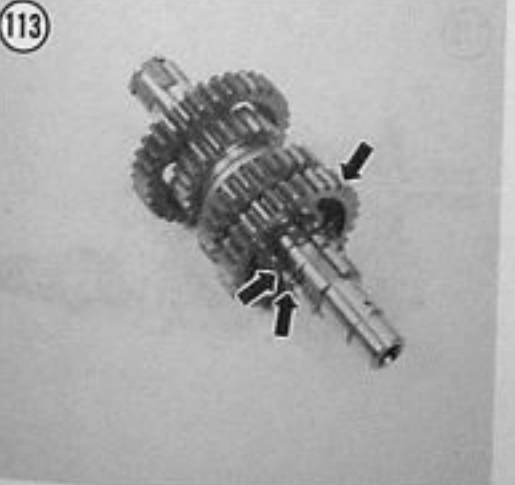
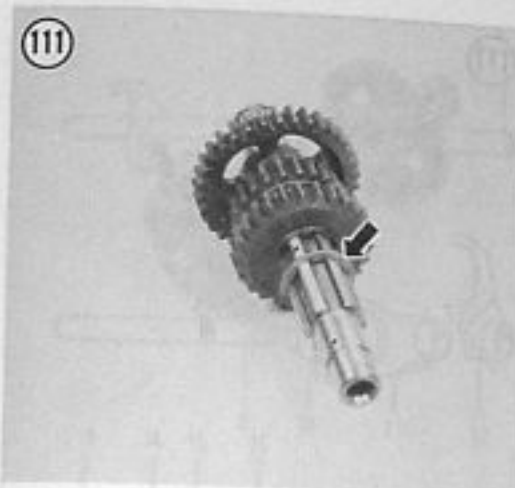
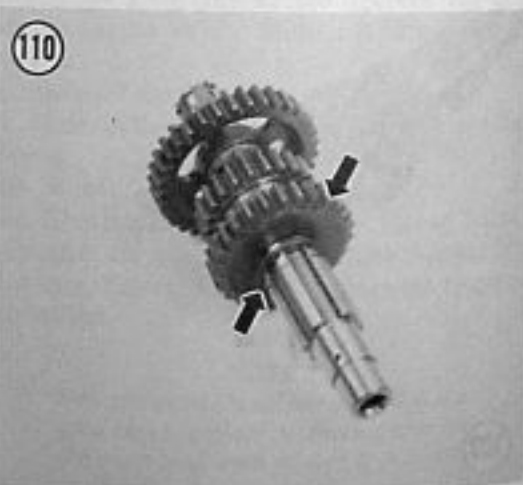
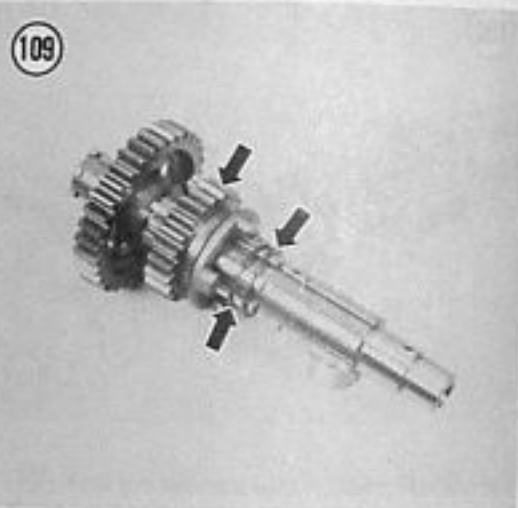
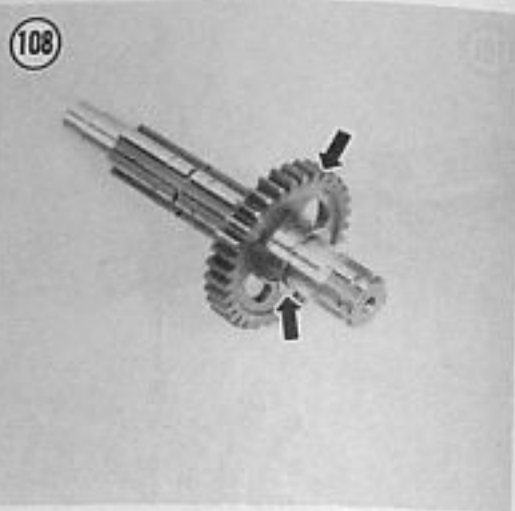
18. Slide on the 3rd gear and install the splined washer and the circlip (Figure 113).

19. Slide on the 5th gear (Figure 114).

20. Slide on the 1st gear (flush side on last); see Figure 115.

- 21A. On 1979 XL125S, slide on the thrust washer and slide on the kickstarter idle gear.

- 21B. On XL125S models since 1980 and all other models, slide on the thrust washer, the kickstarter idle gear bushing (Figure 116), the



kickstarter idle gear and the thrust washer (Figure 117).

22. After assembly is complete refer to Figure 118 for the correct placement of all gears. Make sure the circlips are seated correctly in the countershaft groove.

NOTE

After both transmission shafts have been assembled, mesh the 2 assemblies together in the correct position (Figure 119). Check that all gears meet correctly. This is your last check prior to installing the assemblies into the crankcase; make sure they are correctly assembled.

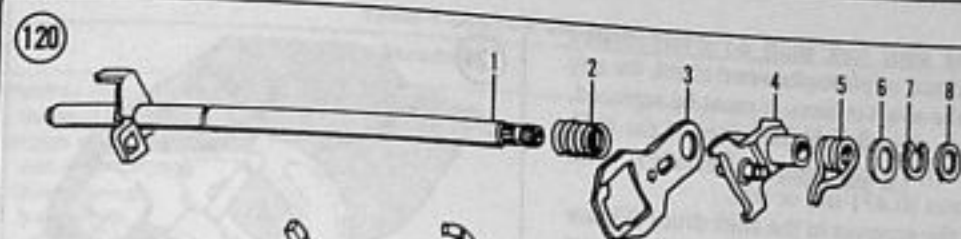
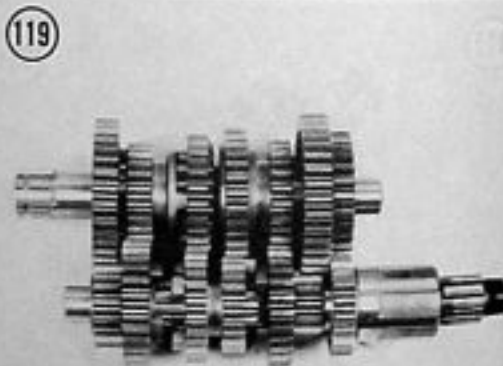
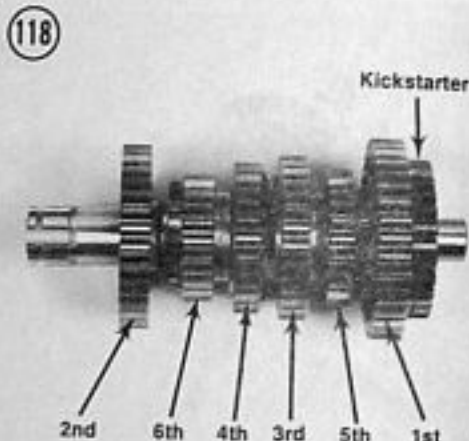
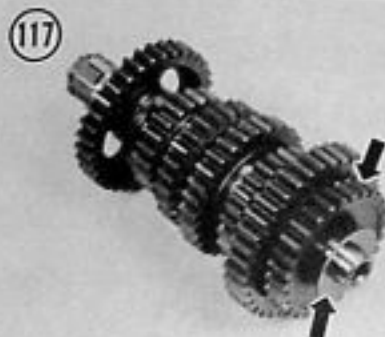
Internal Shift Mechanism Inspection (All Models)

Refer to Figure 120 for this procedure.

NOTE

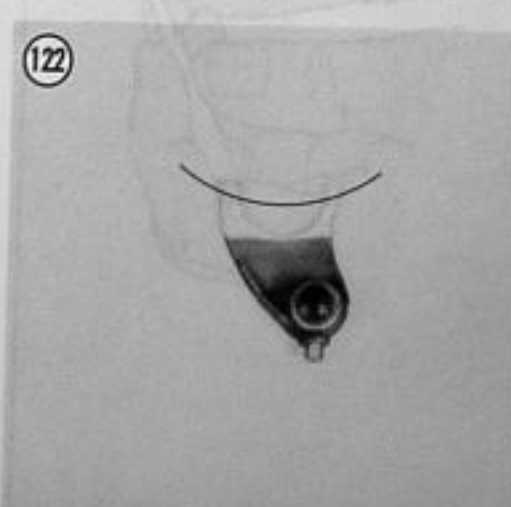
Prior to removal or disassembly of any of the components, lay the assembly down on a piece of paper or cardboard and carefully trace around it. Write down the identifying numbers and letter next to each item. This will take a little extra time now but it may save some time and frustration later.

1. Inspect each shift fork for signs of wear or cracking. Check for bending and make sure each fork slides smoothly on the shaft (Figure 121). Replace any worn or damaged forks.
2. Check for any arc-shaped wear or burned marks on the shift forks (Figure 122). This indicates that the shift fork has come in contact with the gear. The fork fingers have become excessively worn and the fork must be replaced.
3. Measure the inside diameter of each shift fork with an inside micrometer or snap gauge (Figure 123). Replace any that are worn to 12.05 mm (0.474 in.) or greater.
4. Measure the width of the gearshift fork fingers with a micrometer (Figure 124). Replace any that are worn to 4.5 mm (0.18 in.) or less.
5. Check the shift drum dowel pin on each shift fork for wear or damage; replace as necessary.



GEARSHIFT FORKS, DRUM AND SHAFT

1. Gearshift shaft
2. Spring
3. Gearshift plate
4. Gearshift arm
5. Spring
6. Thrust washer
7. Circlip
8. Thrust washer
9. Gearshift shaft
10. Right-hand shift fork
11. Center shift fork
12. Left-hand shift fork
13. Bolt
14. Stopper plate
15. Locating pin
16. Shift drum
17. Bolt
18. Stopper arm
19. Spring



6. Roll the shift fork shaft on a flat surface such as a piece of plate glass and check for any bends. If the shaft is bent, it must be replaced.
7. Measure the outside diameter of the shift fork shaft with a micrometer. Replace if worn to 11.96 mm (0.471 in.) or less.
8. Check the grooves in the shift drum (Figure 125) for wear or roughness. If any of the groove profiles have excessive wear or damage, replace the shift drum.
9. Inspect the neutral switch rotor (A, Figure 126) on the end of the shift drum. If damaged, remove it and install a new one. Make sure the locating tang on the rotor is installed into the hole in the shift drum (B, Figure 126).
10. Apply a light coat of oil to the shift fork shaft and the inside bores of the shift forks prior to installation.

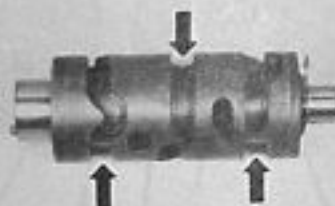
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CLUTCH AND TRANSMISSION

Table 1 CLUTCH SPECIFICATIONS

Item	Standard	Wear limit
Friction disc thickness	2.9-3.0 mm (0.11-0.12 in.)	2.6 mm (0.10 in.)
Clutch plate and disc warpage	—	0.20 mm (0.008 in.)
Clutch springs free length		
XL125S	33.2 mm (1.31 in.)	30.0 mm (1.18 in.)
XL185S, XR185	35.5 mm (1.40 in.)	32.5 mm (1.28 in.)
XR200, XR200R, XLR200R	37.9 mm (1.49 in.)	34.7 mm (1.37 in.)
TLR200	35.1 mm (1.382 in.)	31.6 mm (1.24 in.)

Table 2 SHIFT FORK AND SHAFT SPECIFICATIONS

Item	Specifications	Wear limit
Shift fork ID (all)	12.000-12.018 mm (0.4724-0.4731 in.)	12.05 mm (0.474 in.)
Shift fork finger thickness (all)	4.93-5.00 mm (0.1941-0.1969 in.)	4.50 mm (0.177 in.)
Shift fork shaft OD	11.976-11.994 mm (0.4715-0.4722 in.)	11.96 mm (0.471 in.)

CHAPTER SIX

FUEL AND EXHAUST SYSTEMS

The fuel system consists of the fuel tank, the shutoff valve, a single Keihin carburetor and the air cleaner.

The exhaust system consists of an exhaust pipe, muffler and a spark arrester.

This chapter includes service procedures for all parts of the fuel system and exhaust system. Tables 1-4 are at the end of this chapter.

AIR CLEANER

The air cleaner must be cleaned frequently. Refer to Chapter Three for specific procedures and service intervals.

CARBURETOR OPERATION

For proper operation a gasoline engine must be supplied with fuel and air mixed in proper proportions by weight. A mixture in which there is an excess of fuel is said to be rich. A lean mixture is one which contains insufficient fuel. A properly adjusted carburetor supplies the proper mixture to the engine under all operating conditions.

The carburetor consists of several major systems. A float and float valve mechanism maintain a constant fuel level in the float bowl. The pilot system supplies fuel at low speeds. The main fuel system supplies fuel at medium and high speeds. A starter (choke) system supplies the very rich mixture needed to start a cold engine.

CARBURETOR SERVICE

Major carburetor service (removal and cleaning) should be performed at the intervals indicated in Table 1 in Chapter Three or when poor engine performance, hesitation and little or no response to mixture adjustment is observed. Alterations in jet size, throttle slide cutaway and (on XR models only) changes in jet needle position should be attempted only if you're experienced in this type of "tuning" work; a bad guess could result in costly engine damage or, at least, poor performance. If, after servicing the carburetor and making the



FUEL AND EXHAUST SYSTEMS

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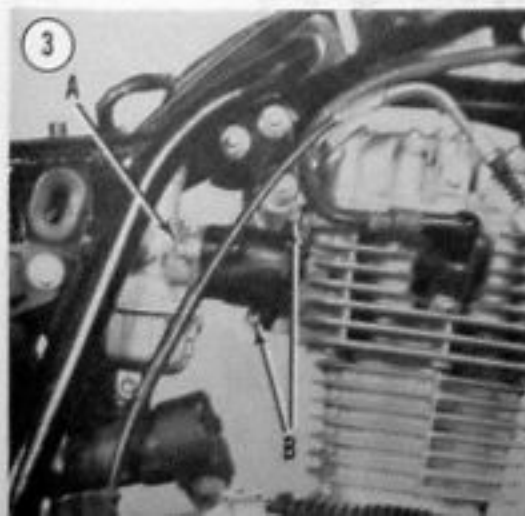
adjustments described in this chapter, the bike does not perform correctly (and assuming that other factors affecting performance are correct, such as ignition timing and condition, etc.), the vehicle should be checked by a dealer or a qualified performance tuning specialist.

Carburetor specifications are covered in Table 1 at the end of this chapter.

Carburetor

Removal/Installation

1. Place a milk crate or wood block(s) under the engine to support it securely.
2. Remove both side covers and seat (Figure 1).



3. Turn the fuel shutoff valve (Figure 2) to the OFF position and remove the fuel line to the carburetor.

4. Remove the fuel tank as described in this chapter.

5. Place a metal container under the drain tube and open the drain screw on the carburetor. Drain out all fuel from the float bowl.

NOTE

Prior to removing the top cap, thoroughly clean the area around it so no dirt will fall into the carburetor.

6. Unscrew the carburetor top cap and pull the throttle valve assembly up and out of the carburetor.

NOTE

If the top cap and throttle valve assembly are not going to be removed from the throttle cable for cleaning, wrap them in a clean shop cloth or place them in a plastic bag to help keep them clean.

7. Loosen the clamping screw on the rubber boot going to the air cleaner assembly. Slide the clamp off and away from the carburetor.

8. Either remove the nuts (A, Figure 3) securing the carburetor to the rubber intake tube or remove the bolts (B, Figure 3) securing the rubber intake tube to the cylinder head.

9. Note the routing of the carburetor overflow and vent tubes through the frame, then carefully pull all of them free. Leave them attached to the carburetor.

10. Carefully work the carburetor free from the rubber boot and remove it.

11. Take the carburetor to a workbench for disassembly and cleaning.

12. To remove the throttle valve from the throttle cable, depress the throttle spring away from the throttle valve. Push the throttle cable end down and out along the groove in the side of the throttle valve (Figure 4) and remove the throttle valve and needle jet assembly.

13. Install by reversing these removal steps, noting the following. When installing the throttle valve into the carburetor, position the groove in the throttle slide toward the idle speed adjust screw side of the carburetor.

Disassembly/Cleaning/ Inspection/Assembly (except TLR200)

Refer to Figure 5 for this procedure and to Table 1 for carburetor specifications.

1. Remove the drain tube.
2. Remove the screws (Figure 6) securing the float bowl and remove the float bowl.
3. Remove the main jet holder (Figure 7).
4. Remove the main jet (Figure 8 or Figure 9).
5. Remove the needle jet holder (Figure 10) and needle jet.

NOTE

Turn the carburetor over and catch the needle jet as it falls out into your hand.

6. Remove the float pivot pin (Figure 11) and remove the float.

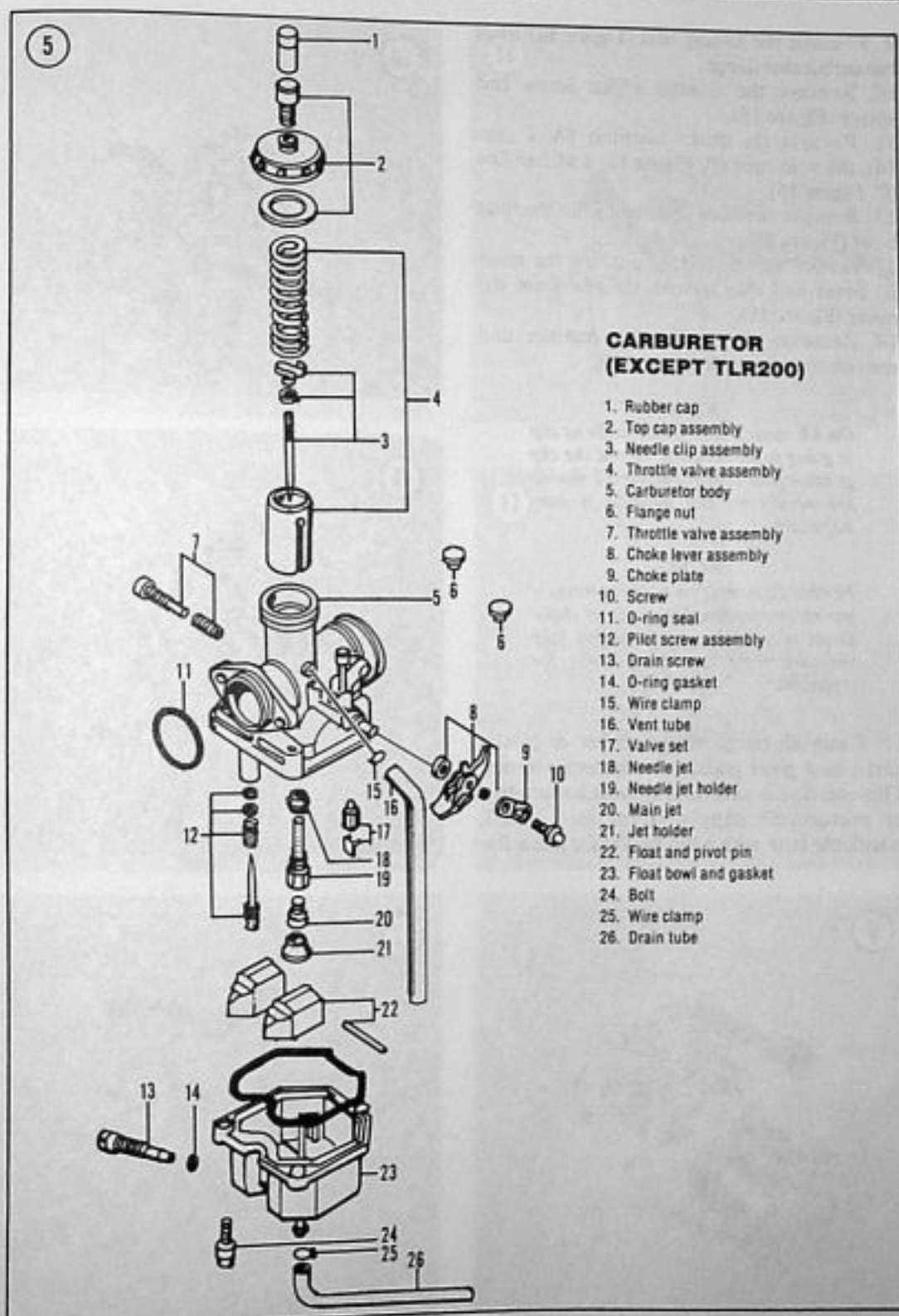
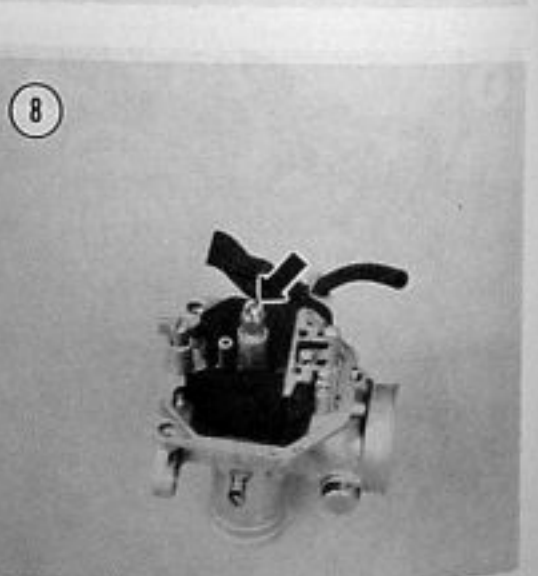
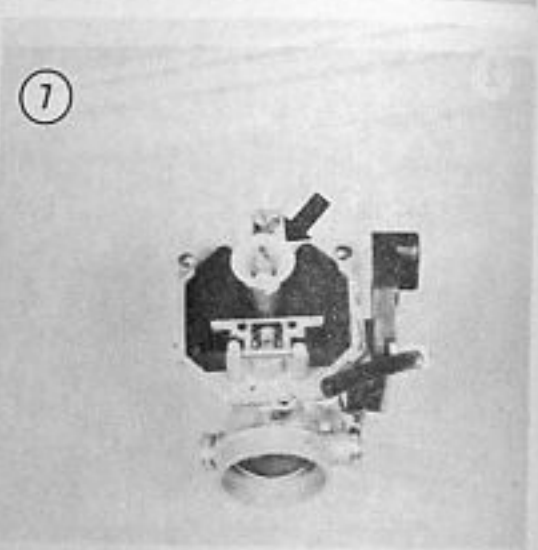
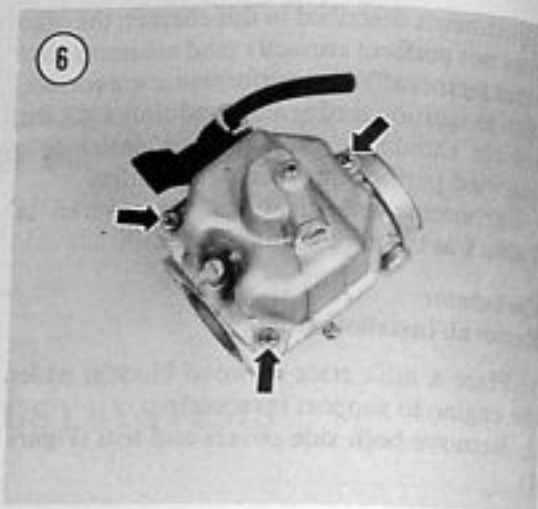
NOTE

Prior to removing the pilot screw, carefully screw it in until it *lightly* seats. Count and record the number of turns so it can be installed in the same position.

7. Unscrew the pilot screw (A, Figure 12) and remove the spring, washer and O-ring seal.
8. If necessary, remove the float valve assembly (B, Figure 12).

NOTE

The slow jet (C, Figure 12) is pressed into place on some models but on other models it may be removed (Figure 13).



CARBURETOR (EXCEPT TLR200)

1. Rubber cap
2. Top cap assembly
3. Needle clip assembly
4. Throttle valve assembly
5. Carburetor body
6. Flange nut
7. Throttle valve assembly
8. Choke lever assembly
9. Choke plate
10. Screw
11. O-ring seal
12. Pilot screw assembly
13. Drain screw
14. O-ring gasket
15. Wire clamp
16. Vent tube
17. Valve set
18. Needle jet
19. Needle jet holder
20. Main jet
21. Jet holder
22. Float and pivot pin
23. Float bowl and gasket
24. Bolt
25. Wire clamp
26. Drain tube

9. Remove the O-ring seal (Figure 14) from the carburetor flange.
10. Remove the throttle adjust screw and spring (Figure 15).
11. Remove the choke assembly (A, Figure 16), the vent tube (B, Figure 16) and fuel line (C, Figure 16).
12. Remove the float bowl seal from the float bowl (Figure 17).
13. On XR series models, unscrew the main jet cover and also remove the seal from the cover (Figure 18).
14. Remove the needle clip retainer and remove the jet needle (Figure 19).

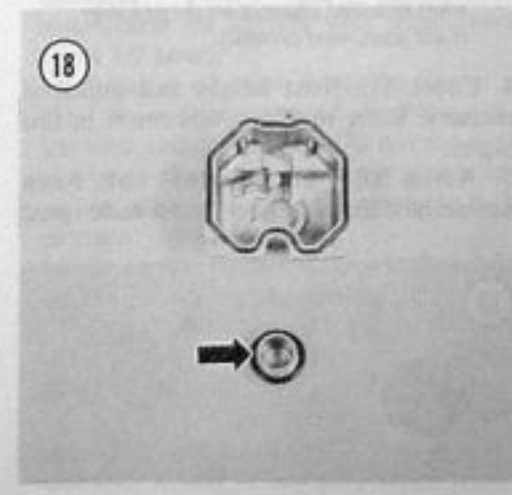
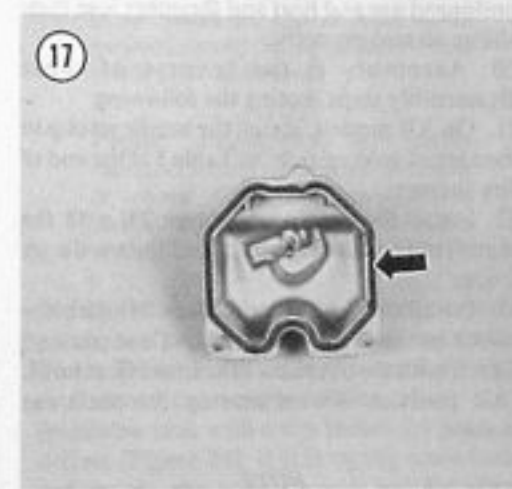
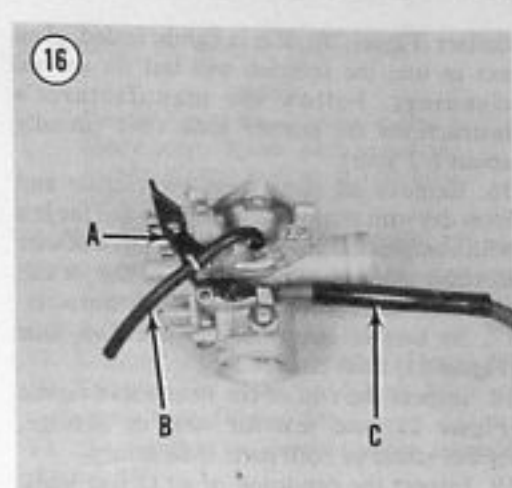
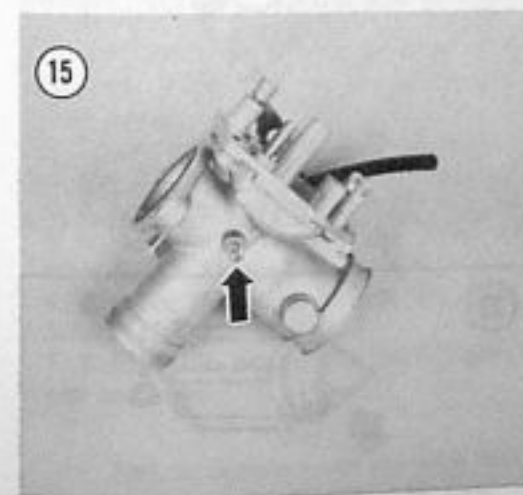
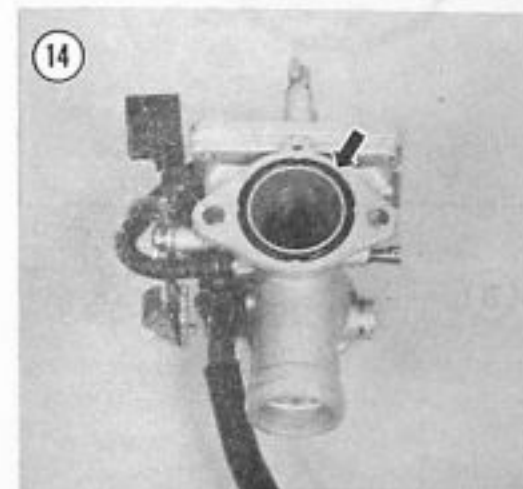
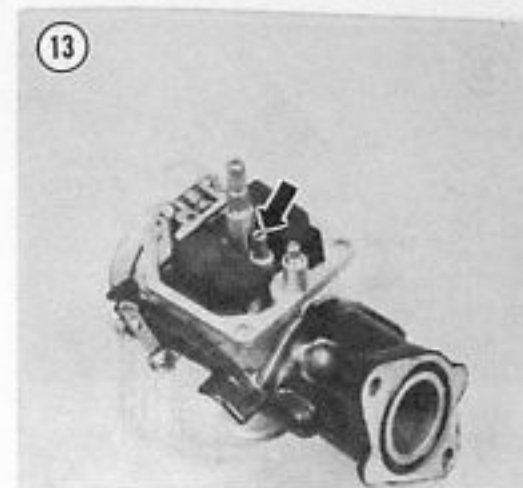
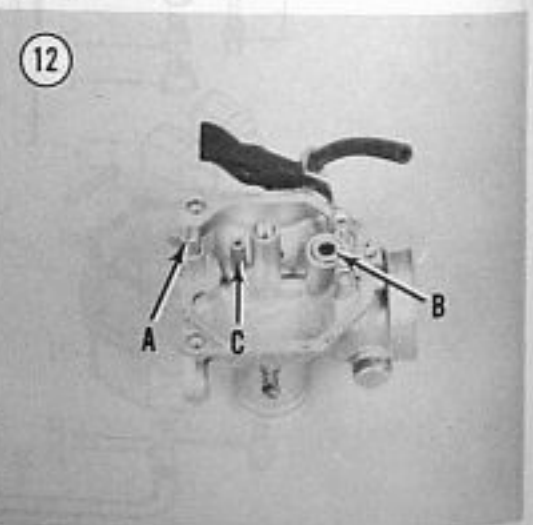
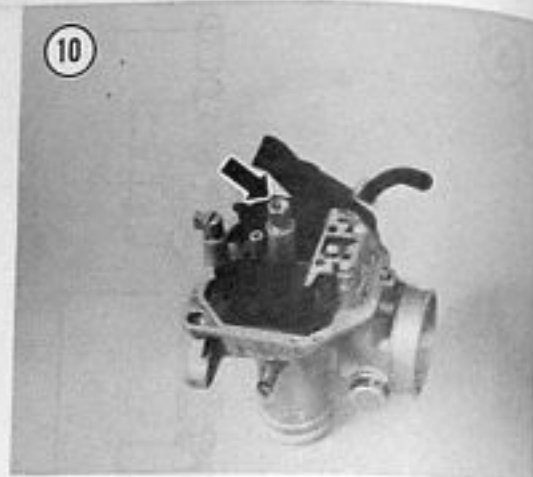
NOTE

On XR models only, if the needle jet clip is going to be removed, record the clip position prior to removal. On XL models the needle jet clip position is non-adjustable.

NOTE

Further disassembly is neither necessary nor recommended. If throttle or choke shafts or butterflies are damaged, take the carburetor body to a dealer for replacement.

15. Clean all parts, except rubber or plastic parts, in a good grade of carburetor cleaner. This solution is available at most automotive or motorcycle supply stores in a small, resealable tank with a dip basket for just a few



dollars (Figure 20). If it is tightly sealed when not in use, the solution will last for several cleanings. Follow the manufacturer's instructions for correct soak time (usually about 1/2 hour).

16. Remove all parts from the cleaner and blow dry with compressed air. Blow out the jets with compressed air. Do not use a piece of wire to clean them as minor gouges in the jet can alter flow rate and upset the fuel/air mixture.

17. Be sure to clean out the overflow tube (Figure 21) from both ends.

18. Inspect the end of the float valve needle (Figure 22) and seat for wear or damage; replace either or both parts if necessary.

19. Inspect the condition of all O-ring seals. O-ring seals tend to become hardened after prolonged use and heat and therefore lose their ability to seal properly.

20. Assembly is the reverse of these disassembly steps, noting the following.

21. On XR models, install the needle jet clip in the correct groove; refer to Table 1 at the end of this chapter.

22. Install the needle jet (Figure 23) with the chamfered end facing up toward the needle jet holder.

23. Install the jet holder (Figure 24) with the cutout notch facing toward the float pin and align it with the overflow tube in the float bowl. This position varies among the different models.

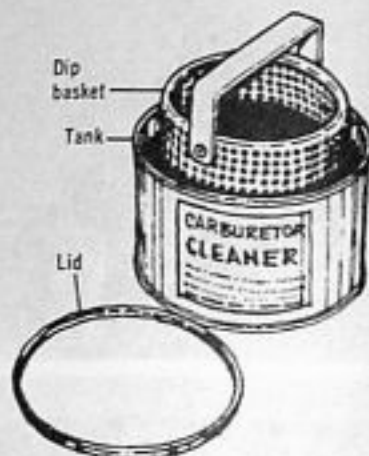
NOTE

If the float bowl will not seat completely when installed, chances are the jet holder is not positioned correctly.

24. Check the float height and adjust if necessary. Refer to *Float Adjustment* in this chapter.

25. After the carburetor has been disassembled the pilot screw and the idle speed

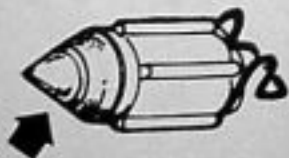
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23



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8. Remove the slow jet (Figure 31).

NOTE

Carefully screw the air screw in until it lightly seats. Count and record the number of turns so it can be installed in the same position.

9. Unscrew the air screw (A, Figure 32) and remove the spring washer and the O-ring seal.

10. Remove the throttle adjust screw and spring (B, Figure 32).

11. Remove the choke assembly (Figure 33).

12. Remove the float bowl seal from the carburetor body (Figure 34).

13. Disassemble the throttle valve assembly (Figure 35).

NOTE

If the needle jet clip is going to be removed, record the clip position on the needle prior to removal.

NOTE

Further disassembly is neither necessary nor recommended. If throttle or choke shafts or butterflies are damaged, take the carburetor body to a dealer for replacement.

should be adjusted. Refer to *Pilot Screw Adjustment* and *Idle Speed Adjustment* in this chapter.

Disassembly/Assembly (TLR200)

Refer to Figure 25 for the following procedure.

1. Remove the drain tube.
2. Slide off the clip (Figure 26) or remove the screws securing the float bowl and remove the float bowl.
3. Remove the float pin and remove the float (Figure 27).
4. Remove the float valve (A, Figure 28).
5. If necessary, remove the float valve assembly (B, Figure 28).
6. Remove the main jet and the main jet holder (Figure 29).
7. Remove the needle jet holder (Figure 30) and needle jet.

NOTE

Turn the carburetor over and catch the needle jet as it falls out into your hand.

14. Clean all parts, except rubber or plastic parts, in a good grade of carburetor cleaner. This solution is available at most automotive or motorcycle supply stores in a small, resealable tank with a dip basket for just a few dollars (Figure 20). If it is tightly sealed when not in use, the solution will last for several cleanings. Follow the manufacturer's instructions for correct soak time (usually about 1/2 hour).

15. Remove all parts from the cleaner and blow dry with compressed air. Blow out the jets with compressed air. Do not use a piece of wire to clean them as minor gouges in the jet can alter flow rate and upset the fuel/air mixture.

16. Be sure to clean out the overflow tube in the float bowl from both ends.

17. Inspect the end of the float valve needle (Figure 36) and seat for wear or damage; replace either or both parts if necessary.

18. Inspect O-rings which tend to become hardened after prolonged use and heat and lose their ability to seal properly.

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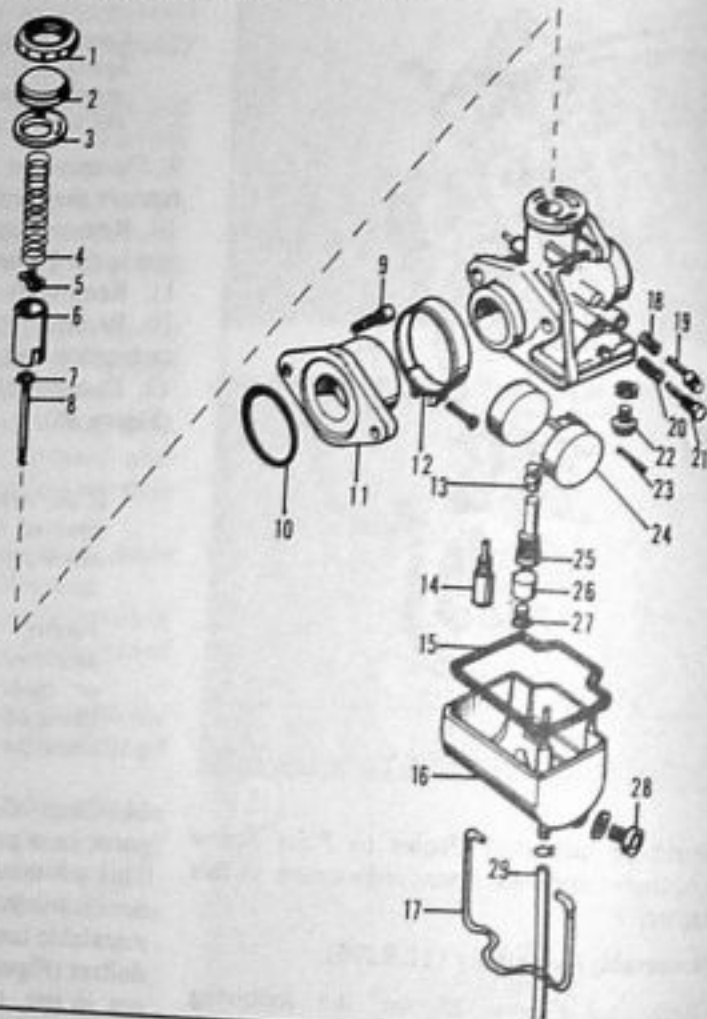
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CARBURETOR ASSEMBLY TLR200

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1. Cap
2. Lid
3. Gasket
4. Spring
5. Needle clip plate
6. Throttle valve
7. Needle clip
8. Jet needle
9. Bolt
10. O-ring
11. Inlet tube
12. Clamping band
13. Needle jet
14. Slow jet
15. Gasket
16. Float bowl
17. Float bowl clip
18. Spring
19. Air screw
20. Spring
21. Throttle adjust screw
22. Float valve
23. Float pivot pin
24. Float assembly
25. Needle jet holder
26. Main jet holder
27. Main jet
28. Drain screw
29. Drain tube



19. Assembly is the reverse of these steps, noting the following.

20. Install the needle jet clip in the correct groove; refer to Table 1 at the end of this chapter.

21. Check the float height and adjust if necessary. See *Float Adjustment* in this chapter.

22. Adjust idle speed and mixture as described under *Carburetor Adjustments*.

CARBURETOR ADJUSTMENTS

Float Adjustment

The carburetor assembly has to be removed and partially disassembled for this adjustment.

1. Remove the carburetor as described earlier in this chapter.
2. Remove the float bowl from the main body.
3. Hold the carburetor so that the float arm is just touching the float needle, not pushing it down. Use a float level gauge, vernier caliper or small ruler (Figure 37) and measure the distance from the carburetor body to the float. The correct height is listed in Table 1.

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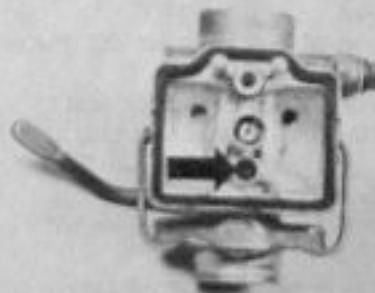
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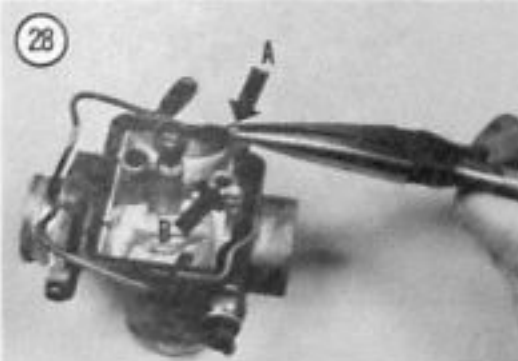
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29



4. Adjust by carefully bending the tang on the float arm. See Figure 38. If the float level is set too high, the result will be a rich fuel-air mixture. If it is set too low, the mixture will be too lean.

NOTE

Both float chambers must be at the same height.

5. Reassemble and install the carburetor.

Needle Jet Adjustment

The position of the needle jet can be adjusted to affect the fuel mixture for medium throttle openings.

the top of the carburetor must be removed for this adjustment. It is not necessary to remove the carburetor but the fuel tank must be removed.

1. Place wood blocks under the engine to support it securely.
2. Remove the side covers and seat.
3. Turn the fuel shutoff valve to the OFF position, and remove the fuel line to the carburetor.
4. Remove the fuel tank as described in this chapter.
5. Clean away any dirt around the top cap of the carburetor to prevent dirt from falling into the carburetor body.
6. Unscrew the carburetor top cap and pull the throttle valve assembly up and out of the carburetor.
7. Depress the throttle valve spring and remove the throttle cable from the throttle valve (Figure 39).
8. Record the position of the needle clip retainer, then remove the retainer and the jet needle.
9. Raising the needle (lowering the clip) will enrich the mixture in the mid-range, while lowering the needle (raising the clip) will lean the mixture. Refer to Figure 40. Table 1 shows standard clip positions for all models.
10. Reassemble and install the top cap. When installing the throttle valve into the carburetor, position the groove in the throttle slide toward the idle speed adjust screw side of the carburetor.

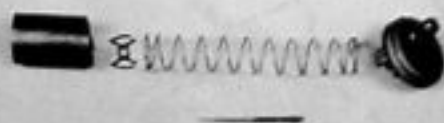
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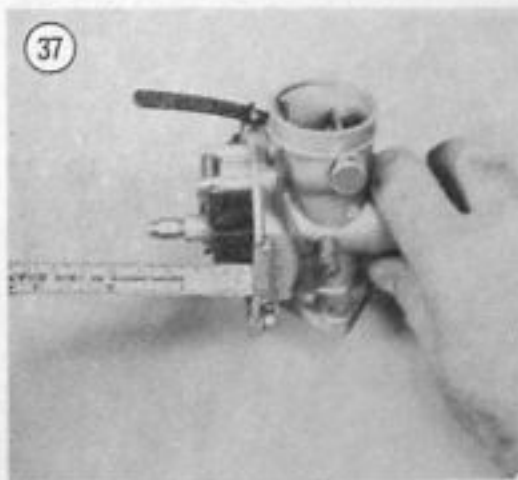
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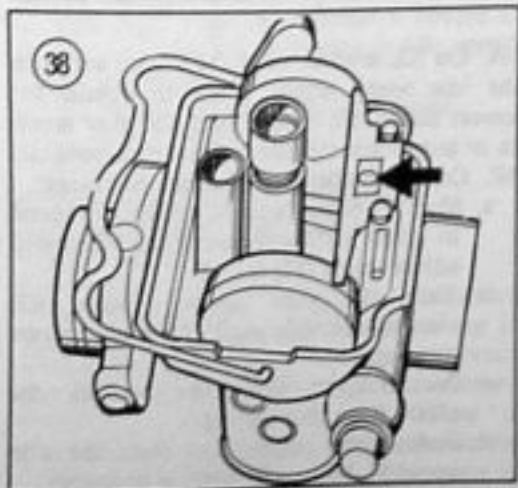
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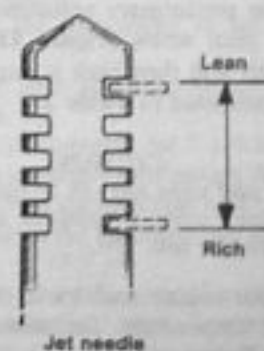
Choke Adjustment (XL Models)

1. Remove the side covers, seat and fuel tank.
2. Operate the choke knob (Figure 41) and check for smooth operation of the cable and choke mechanism.
3. Pull the knob all the way up to the closed position.
4. At the carburetor, pull up on the choke lever to make sure it is at the end of its travel thus closing the choke valve. If you can move the choke lever an additional amount it must be adjusted.

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5. To adjust, loosen the cable clamping screw (A, Figure 42) and move the cable sheath up until the choke lever (B, Figure 42) is fully closed. Hold the choke lever in this position and tighten the cable clamping screw securely.
6. Push the choke knob all the way down to the fully open position.
7. At the carburetor assembly, check that the choke lever is fully open by checking for free play between the cable and the choke lever. The cable should move slightly as there should be no tension on it.
8. If proper adjustment cannot be achieved using this procedure the cable has stretched and must be replaced. Refer to *Choke Cable Removal/Installation* in this chapter.
9. The choke knob should remain in whatever position it is placed from fully closed to fully open. If it does not, pull up on the rubber cover and turn the adjuster. Look down onto the knob and turn it either clockwise to increase resistance or counterclockwise to decrease resistance.
10. Reinstall the fuel tank, seat and side covers.

Idle Speed and Mixture Adjustment (All XR and 1980 XL Models)

NOTE

The pilot jet is pre-set at the factory and adjustment is not necessary unless the carburetor has been overhauled or someone has misadjusted it.

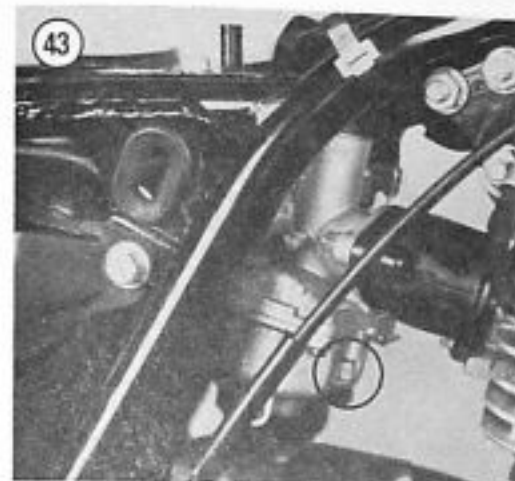
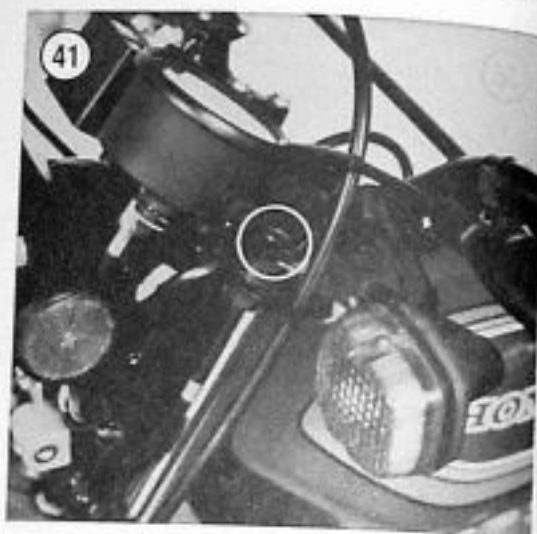
1. Place a milk crate or wood block(s) under the engine to support the bike securely.
2. For the preliminary adjustment, carefully turn the pilot screw (Figure 43) in until it seats *lightly* and then back it out the number of turns indicated in Table 2.

CAUTION

The pilot screw seat can be damaged if the pilot screw is tightened too hard against the seat.

3. Start the engine and let it reach normal operating temperature. Ten minutes at idle is usually sufficient.
4. Turn the engine off and connect a portable tachometer following the manufacturer's instructions.

- 5A. On XL models, start the engine and turn the idle speed adjust screw to obtain the lowest stable idle speed. Turn the pilot screw in or out to achieve the highest rpm possible.
- 5B. On XR models perform the following:
 - a. Start the engine and adjust the idle speed to $1,300 \pm 100$ rpm using the idle speed adjust screw (Figure 44).
 - b. Turn the pilot screw (Figure 43) clockwise slowly until the engine stops running.
 - c. Back out the pilot screw one full turn (360°) from this setting.
 - d. Restart the engine and reset the idle speed ($1,300 \pm 100$ rpm) if necessary.



6. Open and close the throttle a couple of times and check for variations in idle speed. Readjust if necessary.
7. Disconnect the portable tachometer.

Idle Speed and Mixture Adjustment (XL Models Since 1980, U.S. and Canada Only)

To comply with U.S. and Canadian emission control standards, a limiter cap is attached to the pilot screw. This is to prevent the owner from readjusting the factory setting. The limiter cap will allow a maximum of $7/8$ of a turn of the pilot screw to a leaner mixture only. The pilot screw is

preset at the factory and should not be reset unless the carburetor has been overhauled.

CAUTION

Do not try to remove the limiter cap from the pilot screw as it is bonded in place. It will break off and damage the pilot screw if removal is attempted.

The air cleaner must be cleaned before starting this procedure or the results will be inaccurate.

1. For the preliminary adjustment, carefully turn the pilot screw in until it *lightly seats* and then back it out the following number of turns:

- a. Model XL125S: $1 \frac{5}{8}$ turns
- b. Model XL185S: 2 turns

2. Start the engine and let it reach normal operating temperature. Stop-and-go riding for approximately 10 minutes is sufficient.
3. Turn the engine off and connect a portable tachometer following the manufacturer's instructions.
4. Start the engine and turn the idle speed adjust screw (Figure 44) in or out to achieve the following idle speed:
 - a. Model XL125S— $1,400 \pm 100$ rpm on U.S. models and $1,300 \pm 100$ rpm on Canadian models.
 - b. Model XL185S— $1,300 \pm 100$ rpm.

5. Turn the pilot screw in or out to obtain the highest idle speed.
6. Readjust the idle speed to the specified rpm.
7. Turn the pilot screw *in* slowly until the engine stops.
8. Turn the pilot screw *out* $1 \frac{1}{4}$ turns from the position in Step 7 and restart the engine.
9. Turn the idle speed adjust screw in or out again to achieve the specified idle speed; refer to Step 4.
10. Perform this step only if a new limiter cap is to be installed. Apply Loctite No. 601, or equivalent, to the limiter cap and install it on the pilot screw. Make sure the pilot screw does not move while installing the limiter cap. Position the limiter cap against the stop

on the float bowl (Figure 45) so that the pilot screw can only turn clockwise, not counterclockwise.

WARNING

With the engine idling, move the handlebar from side to side. If idle speed increases during this movement, the throttle cable needs adjustment or it may be incorrectly routed through the frame. Correct this problem immediately. Do not ride the bike in this unsafe condition.

11. Turn the engine off and disconnect the portable tachometer.

12. After this adjustment is completed, test ride the bike. Throttle response from idle should be rapid and without any hesitation.

Idle Speed and Mixture Adjustment (TLR200)

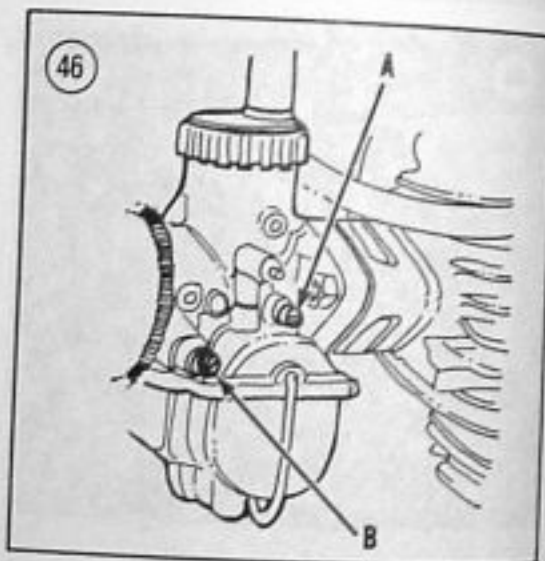
Clean the air cleaner element as described in Chapter Three before attempting this procedure.

1. Place wood blocks under the engine to support it securely.
2. Start the engine and warm it to normal operating temperature. A few minutes of riding will accomplish this.
3. Shut off the engine.
4. Connect a portable tachometer following the manufacturer's instructions. Restart the engine.
5. Turn the idle adjust screw (A, Figure 46) in or out to achieve the specified idle. See Table 1.
6. Turn the pilot air screw (B, Figure 46) in or out to achieve the highest engine rpm.
7. Repeat Steps 4 and 5 until specified idle is reached.
8. From this point, turn the pilot air screw in or out 1/8 to 1/4 turn to achieve smoothest idle.
9. Open and close the throttle a couple of times and check for variations in idle speed. Readjust if necessary.
10. Turn the engine off and disconnect the portable tachometer.

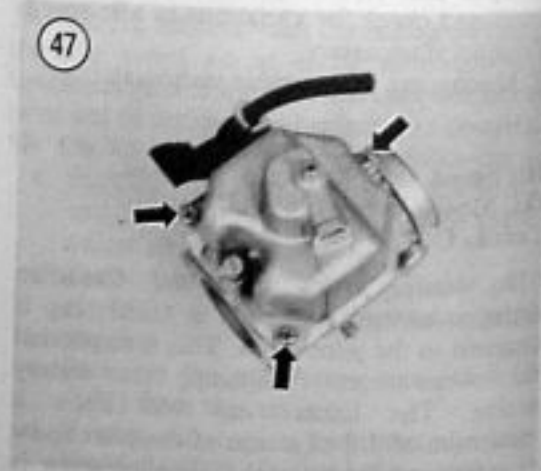
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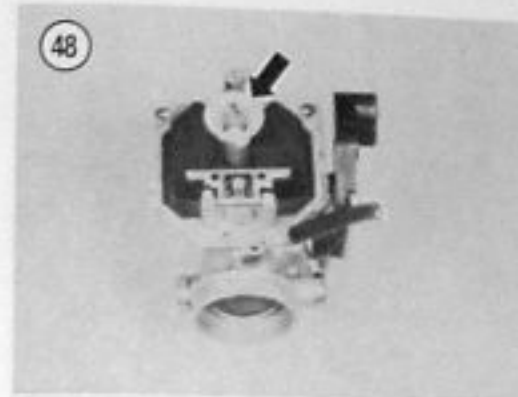


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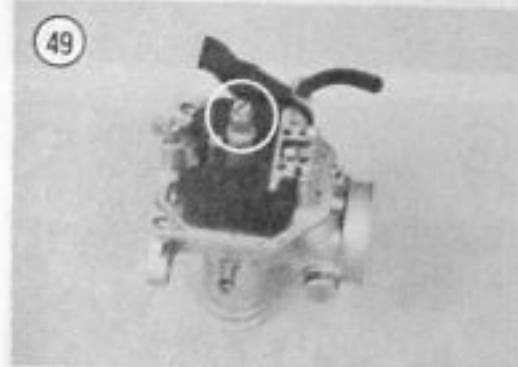


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2. Remove the screws (Figure 47) securing the float bowl and remove the float bowl.
3. Remove the main jet holder (Figure 48).
4. Remove the main jet (Figure 49) and replace it with the factory recommended high altitude size. Refer to Table 3.
5. Install the float bowl.
6. Reinstall the carburetor as described in this chapter.
7. Be sure to route the drain tube correctly.
8. Start the engine and adjust the idle speed as described under *Idle Speed Adjustment* in this chapter.
9. Test ride the bike and perform a spark plug test; refer to *Reading Spark Plugs* in Chapter Three.

High-altitude and Temperature Adjustment (XR200R)

High-altitude and temperature adjustment consists of a main jet size change, a different location of the clip on the jet needle and a different pilot screw setting.

If the bike is going to be ridden for any sustained period at high elevation (above 5,000 ft./1,500 m), the main jet should be changed to a one-step smaller jet. Never change the jet by more than one size at a time without test riding the bike and running a spark plug test. Refer to *Reading Spark Plugs* in Chapter Three.

CAUTION

If the carburetor has been adjusted for high-altitude operation (smaller jet and different needle jet clip location and pilot jet setting), it must be changed back to standard settings when ridden at altitudes below 5,000 ft. (1,500 m). Engine overheating and piston seizure will occur if the engine runs too lean with the smaller jet, changed needle jet clip location and different pilot screw setting.

High-altitude Adjustment (Main Jet Replacement) (All Models Except XR200R and TLR200)

If the bike is going to be ridden for any sustained period at high elevation (above 5,000 ft./1,500 m), the main jet should be changed to a one-step smaller jet. Never change the jet by more than one size at a time without test riding the bike and running a spark plug test. Refer to *Reading Spark Plugs* in Chapter Three.

CAUTION

If the carburetor has been adjusted for high-altitude operation (smaller jet installed), it must be changed back to standard settings when ridden at altitudes below 5,000 ft. (1,500 m). Engine overheating and piston seizure will occur if the engine runs too lean with the smaller jet installed.

1. Remove the carburetor as described in this chapter.

2. Remove both side covers and the seat.
3. Turn the fuel shutoff valve to the OFF position and remove the fuel line to the carburetor.
4. Remove the fuel tank as described in this chapter.

WARNING

During the next step, place a metal container under the main jet cover to catch the fuel that will flow out. Do not let it drain out onto the engine or the bike's frame as it presents a real fire danger. Do not perform this procedure with a hot engine. Dispose of the fuel properly; wipe up any that may have spilled on the bike and on the floor.

NOTE

Figures 50-52 are shown with the carburetor assembly removed and partially disassembled for clarity. It is not necessary to remove the carburetor for this procedure, but it is a lot easier.

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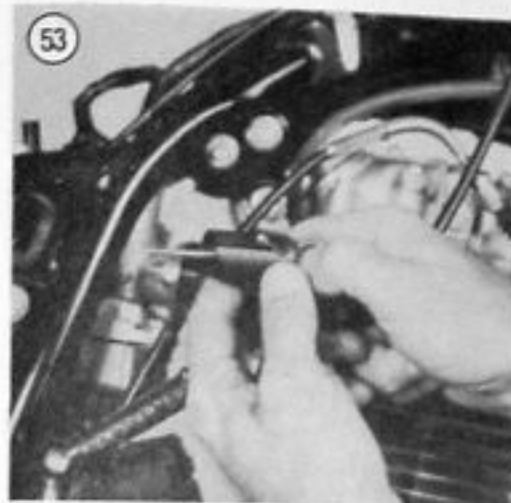


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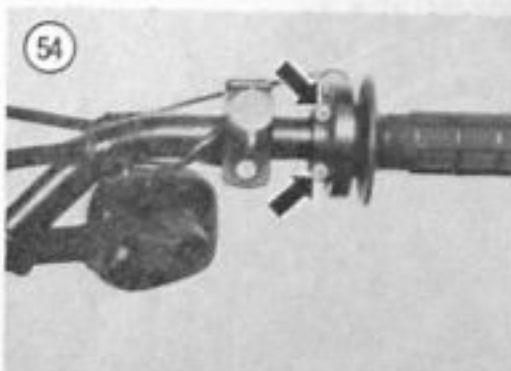


4. Remove the main jet cover (Figure 50) from the float bowl.
5. Remove the main jet (Figure 51) and replace it with the factory recommended size as indicated in Table 4.
6. Make sure the main jet cover gasket (Figure 52) is in place and in good condition. Install the main jet cover.
7. Unscrew the carburetor top cap.
8. At the carburetor top cap assembly, depress the throttle valve spring and remove the throttle cable from the throttle valve (Figure 53).
9. Remove the needle clip retainer and remove the jet needle.
10. Remove the clip from the jet needle. The standard position is in the 4th groove from the top.
11. Reposition the clip according to the factory information listed in Table 4.
12. Reassemble the throttle valve assembly and install it into the carburetor.
13. Increase the pilot screw opening according to the factory information listed in Table 4.
14. Start the engine and adjust the idle speed as described under *Idle Speed Adjustment* in this chapter.
15. Test ride the bike and perform a spark plug test; refer to *Reading Spark Plugs* in Chapter Three.

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3. Remove the fuel tank as described in this chapter.

NOTE

Prior to removing the top cap, thoroughly clean the area around it so no dirt will fall into the carburetor.

4. Unscrew the carburetor top cap and pull the throttle valve assembly up and out of the carburetor.
5. Depress the throttle valve spring and remove the throttle cable from the throttle valve.

NOTE

Place a clean shop rag over the top of the carburetor to keep any foreign matter from falling into the throttle slide area.

6. Remove the screws (Figure 54) securing the throttle cover and separate the 2 halves of the throttle lever assembly. Remove the assembly from the handlebar (A, Figure 55).
7. Remove the throttle cable end from the throttle lever.

NOTE

The piece of string attached in the next step will be used to pull the new throttle cable back through the frame so it will be routed in the exact same position as the old one.

High Altitude Adjustment (TLR200)

The carburetor must be readjusted when the bike is operated continuously above 6,500 ft. (2,000 m).

1. Warm the engine to normal operating temperature. Five or ten minutes of normal riding should accomplish this.
2. Turn the air screw (B, Figure 46) counterclockwise 1/4 turn.
3. Adjust idle speed to $1,300 \pm 100$ rpm.
4. Return settings to normal when operating below 5,000 feet (1,500 m).

THROTTLE CABLE**Removal**

1. Place a milk crate or wood block(s) under the engine to support the bike securely.
2. Remove the side covers and the seat.

8. Tie a piece of heavy string or cord (approximately 6-8 ft./1.8-2.4 m long) to the carburetor end of the throttle cable. Wrap this end with masking or duct tape. Do not use an excessive amount of tape as it will be pulled through the frame loop during removal. Tie the other end of the string to the frame.

9. At the throttle lever end of the cable, carefully pull the cable (and attached string) out through the frame loop (B, Figure 55) and on XL models from behind the headlight housing. Make sure the attached string follows the same path of the cable through the frame and behind the headlight.

10. Remove the tape and untie the string from the old cable.

Installation

1. Lubricate the new cable as described under *Control Cables* in Chapter Three.

2. Tie the string (used during *Removal*) to the new throttle cable and wrap it with tape.
3. Carefully pull the string back through the frame routing the new cable through the same path as the old cable.
4. Remove the tape and untie the string from the cable and the frame.
5. Reverse Steps 1-7 of *Removal*, noting the following.
6. Apply grease to the sliding surface of the throttle grip and install it onto the handlebar. Align the punch mark on the handlebar with the slit in the throttle cover and tighten the forward screw first.
7. Operate the throttle grip and make sure the carburetor throttle linkage is operating correctly and with no binding. If operation is incorrect or there is binding carefully check that the cable is attached correctly and there are no tight bends in the cable.
8. Adjust the throttle cable as described under *Throttle Operation/Adjustment* in Chapter Three.
9. Test ride the bike and make sure the throttle is operating correctly.

CHOKE CABLE (XL125S AND XL185S)

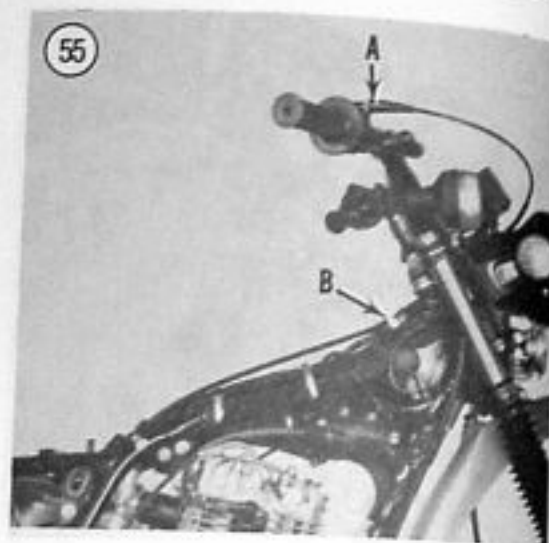
Removal/Installation

1. Place a milk crate or wood block(s) under the engine to support the bike securely.
2. Remove the side covers and the seat.
3. Turn the fuel shutoff valve to the OFF position and remove the fuel line to the carburetor.
4. Remove the fuel tank as described in this chapter.
5. Loosen the choke cable clamp screw (A, Figure 56) and remove the cable end from the choke lever (B, Figure 56).

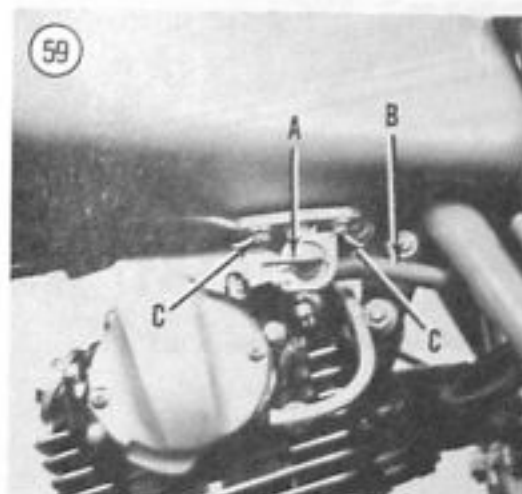
NOTE

The piece of string attached in the next step will be used to pull the new choke cable back through the frame so it will be routed in the same position as the old cable.

6. Tie a piece of heavy string or cord (approximately 6-8 ft./1.8-2.4 m long) to the carburetor end of the choke cable. Wrap this end with masking or duct tape. Do not use an



FUEL AND EXHAUST SYSTEMS



excessive amount of tape as it will be pulled through the frame loop during removal. Tie the other end of the string to the frame or air box.

7. Completely unscrew the locknut (Figure 57) securing the choke knob assembly to the bracket.

8. At the choke knob end of the cable, carefully pull the cable (and attached string) out through the frame loop (Figure 58) and through the fork area. Make sure the attached string follows the same path that the cable does through the frame and behind the fork area.

9. Remove the tape and untie the string from the old cable.
10. Lubricate the new cable as described under *Control Cables* in Chapter Three.

NOTE

Make sure the locknut is positioned on the string so it will be located below the mounting bracket when the cable is installed.

11. Tie the string to the new choke cable and wrap it with tape.
12. Carefully pull the string back through the frame routing the new cable through the same path as the old cable.
13. Remove the tape and untie the string from the cable and the frame.
14. Screw the locknut onto the choke cable knob assembly and tighten securely.
15. Attach the choke cable to the carburetor choke lever as shown in Figure 56.
16. Operate the choke knob and make sure the carburetor choke linkage is operating correctly and with no binding. If operation is incorrect or there is binding carefully check that the cable is attached correctly and there are no tight bends in the cable.
17. Adjust the choke cable as described under *Choke Adjustment (XL Models)* in this chapter.
18. Install the fuel tank, side covers and the seat.

FUEL SHUTOFF VALVE

Removal/Cleaning/Installation

The integral fuel filter in the fuel shutoff valve removes particles in the fuel which might otherwise enter into the carburetor. This could cause the float needle to stay in the open position or clog one of the jets.

1. Turn the fuel shutoff valve to the OFF position (A, Figure 59) and remove the fuel line from the valve (B, Figure 59).

NOTE

The fuel tank can either be removed or left in place and drained of all fuel.

2. Install a longer piece of clean fuel line to the valve and place the loose end into a clean, sealable metal container. If the fuel is kept clean, it can be reused.

3. Turn the fuel shutoff valve to the RES position and open the fuel filler cap. This will speed up the flow of fuel. Drain the tank completely.

4A. On metal fuel tanks, unscrew the locknut (Figure 60) securing the fuel shutoff valve to the fuel tank and remove the valve.

4B. On plastic fuel tanks, remove the screws and washers (C, Figure 59) securing the fuel shutoff valve to the fuel tank and remove the valve.

5. After removing the valve, insert a corner of a clean shop rag into the opening in the tank to stop the dribbling of fuel onto the engine and frame.

6. Remove the fuel filter screen from the shutoff valve (B, Figure 60). Clean it with a medium soft toothbrush and blow out with compressed air. Replace the filter if it is defective.

7. Install by reversing these removal steps. Do not forget to install the gasket (C, Figure 60) between the valve and the tank. Check for fuel leakage after installation is completed.

FUEL STRAINER (XL125S AND XL185S SINCE 1982)

Cleaning

1. Turn the fuel shutoff valve to the OFF position (Figure 61).

2. Remove the fuel cup, O-ring seal and the filter screen (Figure 62) from the bottom of the fuel shutoff valve. Properly dispose of fuel remaining in fuel cup.

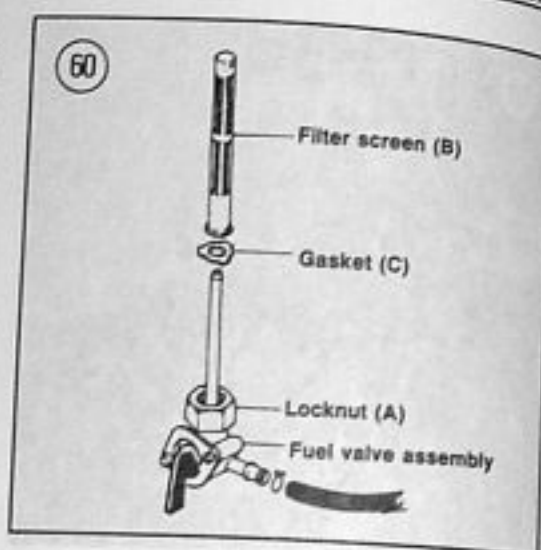
3. Clean the filter screen with a medium soft toothbrush and blow out with compressed air. Replace the filter screen if it is broken in any area.

4. Wash the fuel cup in kerosene to remove any residue or foreign matter. Thoroughly dry with compressed air.

5. Align the index marks on the filter screen and the fuel shutoff valve body.

6. Install a new O-ring seal and screw on the fuel cup.

7. Hand-tighten the fuel cup and then tighten to a final torque of 3-5 N·m (2-4 ft.-lb.). Do not overtighten the fuel cup as it may be damaged.



8. Turn the fuel shutoff valve to the ON position and check for fuel leaks.

FUEL TANK

Removal/Installation

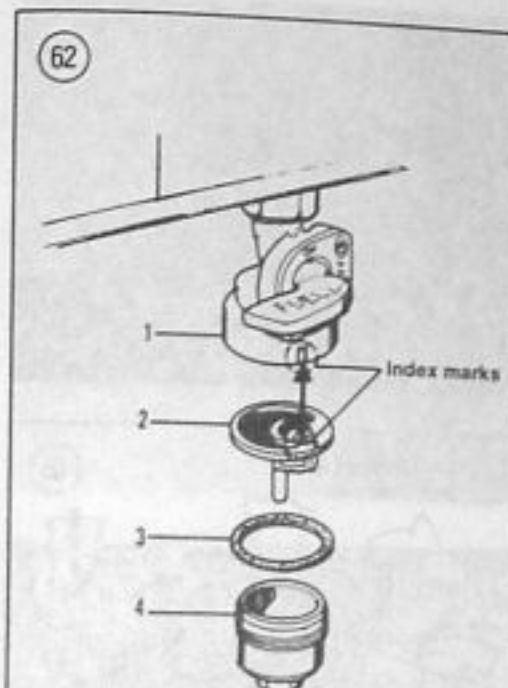
1. Place a milk crate or wood block(s) under the engine to support the bike securely.

2. Turn the fuel shutoff valve to the OFF position and remove the fuel line to the carburetor.

3. Remove the side covers and the seat.

4A. On plastic fuel tanks, unhook the rubber strap (A, Figure 63) securing the rear of the fuel tank. Remove the bolt and spacer on each side of the front of the fuel tank (B,

FUEL AND EXHAUST SYSTEMS



FUEL STRAINER XL125S, XL185S (1982-ON)

1. Fuel shutoff valve body
2. Filter screen
3. O-ring seal
4. Fuel cup



Figure 63). Pull the fuel fill cap vent tube (C, Figure 63) free from the steering head area. Pull the tank up and toward the rear and remove the tank.

4B. On metal fuel tanks, remove the bolt (A, Figure 64) securing the rear of the fuel tank. Pull the fuel fill cap vent tube (B, Figure 64) free from the steering head area. Pull the tank up and toward the rear and remove the tank.

5. Inspect the condition of the rubber cushions on the frame where the fuel tank is held in place. Replace as a set if either is damaged or starting to deteriorate.

6. Install by reversing these removal steps.

FUEL TANK REPAIR (METAL TANKS ONLY)

Sealing (Pin-hole Size)

A pin-hole size leak can be sealed with the use of a product called Theroxite Gas Tank Sealer Stick or equivalent. Follow the manufacturer's instructions.

Sealing (Small Hole Size)

This procedure requires the use of a non-petroleum, non-flammable solvent.

If you feel unqualified to do it, take the tank to a dealer and have them seal the tank for you.

WARNING

Before attempting any service on the fuel tank be sure to have a fire extinguisher rated for gasoline or chemical fires within reach. Do not smoke or allow anyone to smoke or work where there are any open flames (i.e. water heater or clothes drier gas pilot). The work area must be well-ventilated.

1. Remove the fuel tank as described in this chapter.

2. Mark the spot on the tank where the leak is visible with a grease pencil.

3. Remove the fuel filler cap and turn the fuel shutoff valve to the RES position. Use compressed air and direct the air nozzle into the fuel filler neck; blow the interior of the tank dry.

4. Turn the fuel shutoff valve to the OFF position and pour about 1 quart (1 liter) of

non-petroleum based solvent into the tank; install the fuel filler cap and shake the tank vigorously 1 or 2 minutes. This is to remove all fuel residue.

5. Drain the non-petroleum based solution into a safe storable container. This solution may be re-used. Let the tank air out overnight before using the sealant.

6. Remove the fuel shutoff valve from the tank. If necessary, plug the tank opening with a cork and/or tape it closed with duct tape. Thoroughly clean the surrounding area with ignition contact cleaner so the tape will hold securely.

7. Again blow the tank interior completely dry with compressed air.

8. The following step is best done out of doors as the fumes are very strong and flammable. Pour a sealant into the tank (a silicone rubber base sealer like Pro-Tech, Kreem Super Sealer or equivalent). These are available at most motorcycle supply stores.

CAUTION

Do not spill the sealant onto the painted surface of the tank as it will destroy the finish.

9. Position the tank so that the point of the leak is at the lowest part of the tank. This will allow the sealant to accumulate at the point of the leak.

10. Let the tank sit in this position for at least 48 hours.

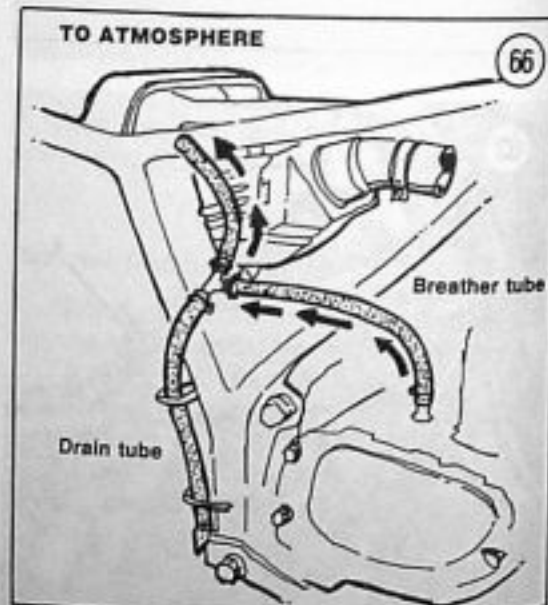
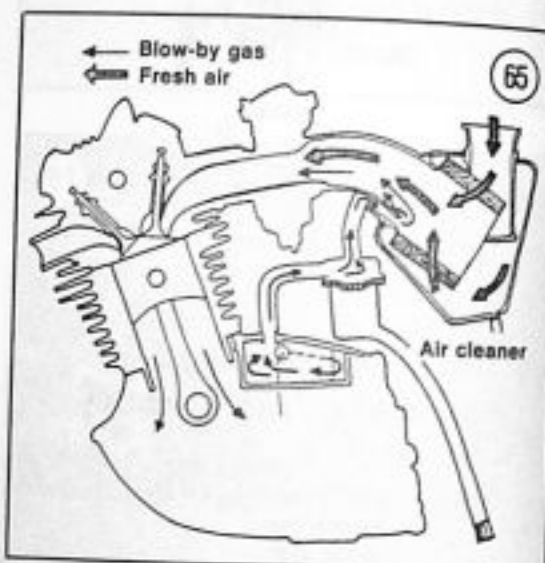
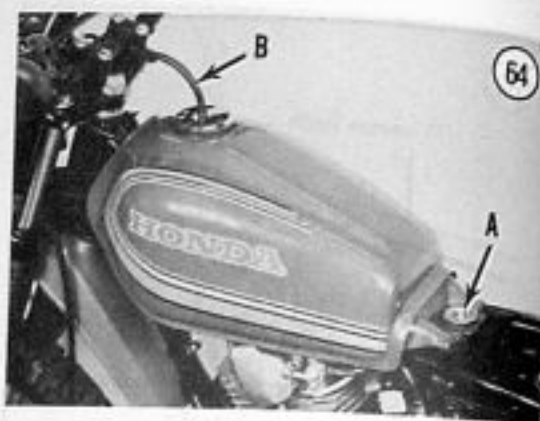
11. After the sealant has dried, install the fuel shutoff valve, turn it to the OFF position and refill the tank with fuel.

12. After the tank has been filled, let it sit for at least 2 hours and recheck the leak area.

13. Install the tank.

Emergency Repair—Metal Fuel Tank Only

If the fuel tank develops a small pin-hole size leak during a weekend outing, it can be "patched" temporarily with a product like Duro Liquid Steel or equivalent. This is available at most hardware or automotive supply stores. The tank can be patched while a small amount of fuel is dripping from the tank.



FUEL FILTER

Most models are fitted with a small fuel filter screen in the shutoff valve. See Chapter Three for cleaning. In addition, some models have a replaceable inline fuel filter similar to those found on many automobiles. An inline filter is a good idea on any motorcycle. Simply cut the flexible fuel line between the fuel tank and the carburetor and install a replacement filter such as the AC No. GF453.

EVAPORATIVE EMISSION CONTROL SYSTEM (CALIFORNIA ONLY)

On some street-legal models, fuel vapor from the fuel tank is routed into a charcoal canister when the engine is stopped. When the engine is started these vapors are drawn into the air cleaner, through the carburetor and into the engine to be burned. Make sure that all vacuum hoses are correctly routed and attached. Inspect the hoses and replace if necessary. If the canister is damaged in any way it must be replaced.

CRANKCASE BREATHER SYSTEM (U.S. MODELS ONLY)

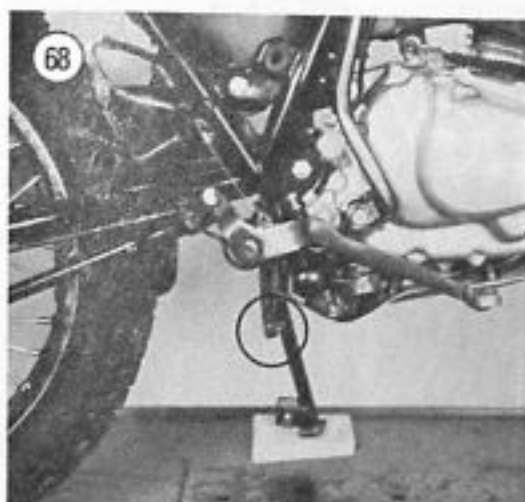
In order to comply with air pollution standards, the bike is equipped with a crankcase breather system. The system shown in Figure 65 is used on the XL and TLR series that can be run on the street as well as in the dirt. It draws blowby gases from the crankcase and recirculates them into the fuel/air mixture and then into the engine to be burned.

The system used on the XR series of dirt bikes differs in that the gases are not routed into the air box nor are they burned in the engine. They are routed as shown in Figure 66 and are vented to enter the atmosphere under the seat.

Inspection

Make sure all hose clamps (Figure 67) are tight and check all hoses for deterioration. Replace as necessary. Check that hoses are not clogged or crimped.

Remove the plug (Figure 68) from the drain hose and clean out all residue. This cleaning



1. Wipe the area around the leak clean of dirt and oil.
2. Apply a small, thin amount of Liquid Steel with a flat tool such as a putty knife or broad-tipped screwdriver.
3. Let this patch dry for approximately one hour.
4. Reapply 3-4 times or until the leakage is stopped.

NOTE

As soon as possible, seal or have the tank patched permanently; this method is only recommended for a quick type repair.

procedure is needed more frequently if a considerable amount of riding is done at full throttle or in the rain.

NOTE

Be sure to install the plug and clamps.

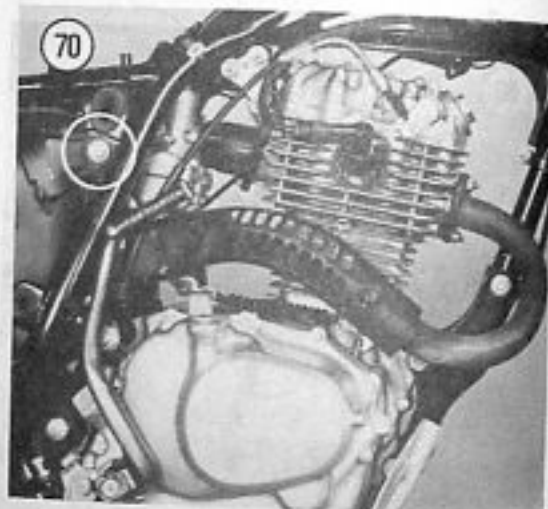
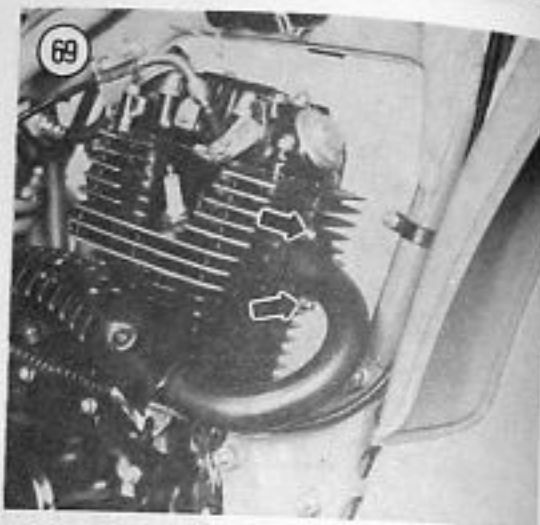
EXHAUST SYSTEM

The exhaust system is a vital performance component and frequently, because of its design, it is a vulnerable piece of equipment. Check the exhaust system for deep dents and fractures and repair them or replace parts immediately. Check the muffler frame mounting flanges for fractures and loose bolts. Check the cylinder head mounting flange for tightness. A loose exhaust pipe connection will not only rob the engine of power, it could also damage the piston and cylinder.

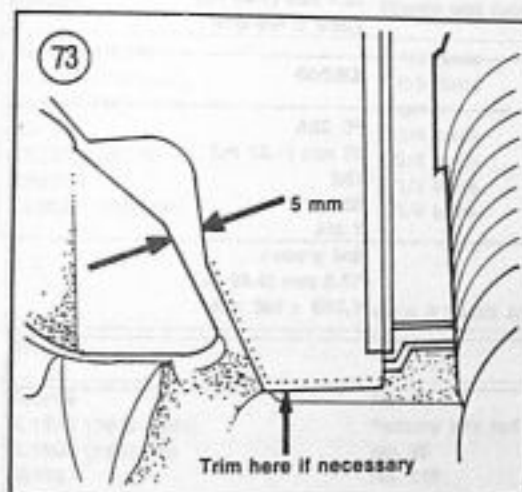
The exhaust system consists of an exhaust pipe, muffler and spark arrestor.

Removal/Installation

1. Place a milk crate or wood block(s) under the engine to support the bike securely.
2. Turn the fuel shutoff valve to the OFF position and remove the fuel line to the carburetor.
3. Remove the side covers and the seat.
4. Remove the fuel tank as described in this chapter.
5. Remove the nuts (Figure 69) securing the exhaust pipe to the cylinder head.
6. Remove the bolts and washers securing the front of the muffler to the frame (Figure 70).
7. Remove either the air cleaner air box or the rear wheel in order to remove the assembly from the frame.
- 8A. On XL series models, remove the bolt and washer securing the rear of the muffler to the frame (Figure 71).
- 8B. On XR and TLR Series models, remove the bolts (Figure 72) securing the front and rear of the muffler to the frame.
9. Withdraw the exhaust system out through the rear and remove it.
10. Don't lose the 2 collars at the exhaust port when the exhaust pipe is removed from the cylinder head.



FUEL AND EXHAUST SYSTEMS



nuts and tighten securely. Make sure the collars are correctly seated into the cylinder head.

NOTE

By tightening the cylinder head nuts first you will minimize the chances of an exhaust leak at the cylinder head.

17. Tighten the muffler bolts securely.
18. Install the fuel tank, the seat and side covers.
19. After installation is complete, start the engine and make sure there are no exhaust leaks.

Carbon Removal

The spark arrestor should be cleaned at specified intervals. Refer to *Spark Arrestor Cleaning* in Chapter Three for the specified time interval and the complete procedure.

Modification to Prevent TLR200 Chain Contact

On some 1986 TLR200's the chain may wear against the muffler. This can be fixed with the following procedure.

1. Have someone sit on the bike to compress the suspension.
2. Measure clearance between the welded seam of the muffler and the chain. If clearance is less than 6 mm, the muffler should be repositioned.
3. Remove the lower left side mounting bolt. See Figure 72.
4. Purchase a new mounting bolt. The original is 6×12 mm; use a 6×16 mm bolt.
5. Install two 6 mm flat washers between the muffler and the frame and install the new mounting bolt.
6. Remeasure the muffler to chain clearance. It should be 6-10 mm. Do not exceed 10 mm or there will not be sufficient clearance between the muffler and the air box.
7. Measure the muffler to air box clearance. See Figure 73. It should be at least 5 mm. If clearance is insufficient, up to 8 mm can be trimmed from the air box.
8. To trim the air box, remove the rear wheel (see Chapter Nine) and carefully trim the edge of the air box with a sharp knife. Do not remove more than 8 mm.
11. Inspect the condition of the gaskets at all joints; replace as necessary.
12. Make sure the cylinder head exhaust port gasket is in place.
13. Install the exhaust system into the frame.
14. Install the exhaust pipe assembly into position and install one cylinder head nut only finger-tight until the muffler bolts and washers are installed.
15. Install the muffler attachment bolts and washers; do not tighten at this time. Make sure the head pipe inlet is correctly seated in the exhaust port.
16. Remove the one cylinder head nut. Install the 2 collars into place and slide the exhaust pipe flange into position. Install the 2

Table 1 CARBURETOR SPECIFICATIONS

Item	XL125S (1979)	XL125S (1980-on)
Model No.	PD 14A	PD 13A (Canada PD21A)
Venturi diameter	24 mm (0.98 in.)	24 mm (0.98 in.)
Main jet No.	100	100 (Canada 98)
Slow air jet	NA	38
Initial pilot screw opening	1 1/2	1 5/8
Needle jet clip position	Non-adjustable	Non-adjustable
Float level	12.5 mm (0.49 in.)	12.5 mm (0.49 in.)
Idle speed	1,400 ± 100 rpm	1,400 ± 100 rpm
Item	XL185S (1979)	XL185S (1980-on)
Model No.	PD 14B	PD 13A
Venturi diameter	24 mm (0.98 in.)	24 mm (0.98 in.)
Main jet No.	100	102
Slow air jet	NA	35
Initial pilot screw opening	2	2
Needle jet clip position	Non-adjustable	Non-adjustable
Float level	12.5 mm (0.49 in.)	12.5 mm (0.49 in.)
Idle speed	1,300 ± 100 rpm	1,300 ± 100 rpm
Item	XR185	XR200
Model No.	PD 31A	PD 32A
Venturi diameter	24 mm (0.98 in.)	26 mm (1.02 in.)
Main jet No.	115	102
Slow air jet	NA	35
Initial pilot screw opening	2 1/4	1 3/4
Needle jet clip position	4th groove	3rd groove
Float level	12.5 mm (0.49 in.)	12.5 mm (0.49 in.)
Idle speed	1,300 ± 100 rpm	1,300 ± 100 rpm
Item	XL125S (1985)	
Model No.	13A60, 13F10 (CA)	
Venturi diameter	24 mm (0.94 in.)	
Main jet No.	102	
Slow air jet	38	
Initial pilot screw opening	2 3/8	
Needle jet clip position	3rd groove	
Float level	12.5 mm (0.49 in.)	
Idle speed	1,400 ± 100 rpm	
Item	XR200R (1986-1987)	XR200R (1981-1983)
Model No.	PD97A	PD28A
Venturi diameter	26 mm (1.02 in.)	26 mm (1.02 in.)
Main jet No.	110	138
Slow air jet	38	NA
Initial pilot screw opening	1 1/8	2 1/2
Needle jet clip position	3rd groove	3rd groove
Float level	12.5 mm (0.49 in.)	12.5 mm (1.02 in.)
Idle speed	1,400 ± 100 rpm	1,300 ± 100 rpm

(continued)

Table 1 CARBURETOR SPECIFICATIONS (continued)

Item	XL200R	TLR200
Model No.	PD61A	P07A/P08A
Venturi diameter	26 mm (1.02 in.)	22 mm (0.87 in.)
Main jet No.	100	92
Slow air jet	NA	38
Initial pilot screw opening	1 1/4	1 3/4
Needle jet clip position	3rd groove	3rd groove
Float level	14.0 mm (0.55 in.)	24 mm (0.94 in.)
Idle speed	—	1,300 ± 100 rpm
NA—Does not apply to this model.		

Table 2 PILOT SCREW INITIAL SETTING

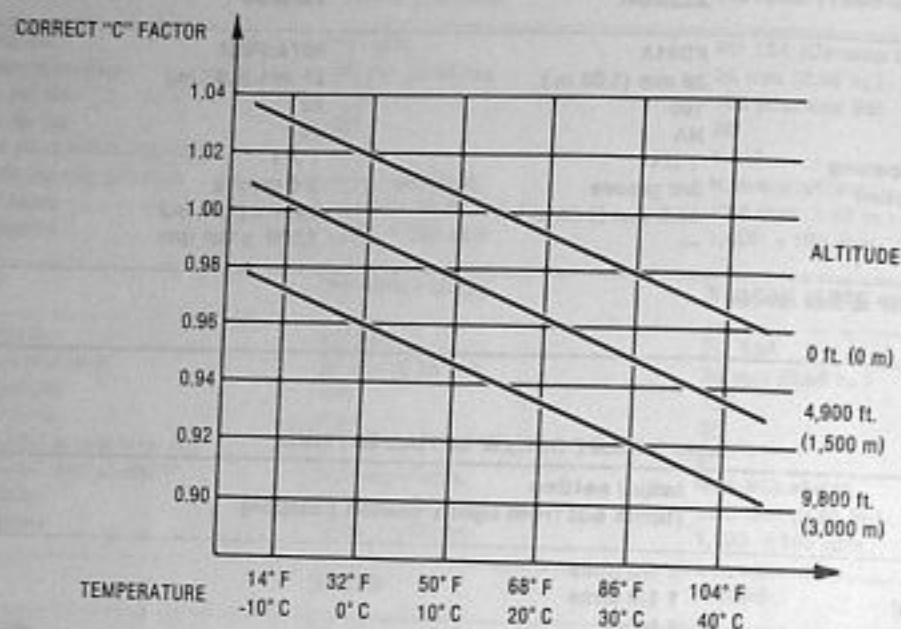
Model	Initial setting (turns out from lightly seated position)
XL125S (1979)	1 1/2 turns
XL125S (1980-on)	1 5/8 turns
XL185S (1979-on)	2 turns
XR185	2 1/4 turns
XR200, TLR200	1 3/4 turns
XR200R	2 1/2 turns
XL200R (1986-on)	1 1/8 turns

Table 3 HIGH ALTITUDE JET SIZE

Model	Jet size
XL125S	No. 95
XL185S (1979-1981)	Factory jets not available
XL185S (1982-on)	No. 98
XR185	No. 110
XR200	No. 110
XR200R	See Table 4
XL200R	No. 95
TLR200	No. 92

Table 4 is on the following page.

Table 4 TEMPERATURE AND ALTITUDE SETTINGS



Use the information in this table to determine what carburetor adjustments are necessary for proper engine operation in various areas.

The chart in the table is divided in 2 directions:

Horizontal—for various ambient temperatures

Vertical (right-hand side)—various altitudes

Vertical (left-hand side)—for the "C" factor

Determine the approximate altitude and surrounding air temperature of the area where you are going to ride. Locate these 2 factors on the chart. Where these 2 factors intersect (vertical and horizontal), closest to one of the angled lines, will establish the "C" factor. Use this established "C" factor for the following steps:

To Determine Main Jet Size

Multiply the standard main jet number (No. 138) by the "C" factor. Use the main jet number closest to the number in the answer.

EXAMPLE

Main jet number times the "C" factor—i.e.
 $(138 \times 0.96 = 132.48)$ —use main jet number 132.

To Determine the Pilot Screw Setting and Jet Needle Clip Position

If the determined "C" factor is above 0.95 (left-hand side of the chart) no adjustment is necessary to the pilot screw or clip position change on the jet needle for proper engine operation.

If the determined "C" factor is 0.95 (left-hand side of the chart) or anywhere below, turn the pilot screw out by 1/2 turn and raise the clip on the jet needle by one groove.

EXAMPLE

Pilot screw opening (+) plus 1/2 turn—i.e.
 $(2 \frac{1}{2} + 1/2 \text{ turn} = 3)$. Turn the pilot screw out 3 turns from the *lightly seated position*.

EXAMPLE

Jet needle clip standard position minus 1 position—i.e.
 $(4 - 1 = 3)$. Move the jet needle clip to the No. 3 position on the jet needle.

Optional Honda Factory Main Jet Numbers

No. 122

No. 125

No. 128

No. 130

No. 132

No. 135

No. 140

No. 142

CHAPTER SEVEN

ELECTRICAL SYSTEMS

This chapter contains operating principles and service and test procedures for all electrical and ignition components. The electrical systems vary. The XL and TLR200 are equipped with components approved for street-legal operation. These components include a battery, a solid-state rectifier (voltage regulator/rectifier on models since 1982), a headlight, a taillight/brakelight, front and rear directional signals and a horn.

The XR models are equipped only with a headlight and taillight (no battery) and are designed for offroad use only. Starting with the 1981 model, the XR200 is not equipped with a headlight or taillight. Where differences occur between models, they are identified.

The electrical system includes the following systems:

- Charging system (XL, TLR series)
- Ignition system
- Lighting system
- Directional signals (XL, TLR series)
- Horn (XL, TLR series)

Tables 1-5 are at the end of this chapter.

CHARGING SYSTEM (XL MODELS)

The charging system consists of the battery, alternator and a solid state rectifier (Figure 1)

on 1979-1981 models. A voltage regulator/rectifier is added to the system on models since 1982 (Figure 2).

Alternating current is generated by the alternator and is rectified to direct current by the rectifier. On models so equipped, the voltage regulator maintains the voltage to the battery and additional electrical load (lights, ignition, etc.) at a constant voltage regardless of variations in engine speed and load.

Charging System Output Test

Whenever a charging system trouble is suspected, make sure the battery is fully charged and in good condition before going any further. Clean and test the battery as described under *Battery Testing* in Chapter Three.

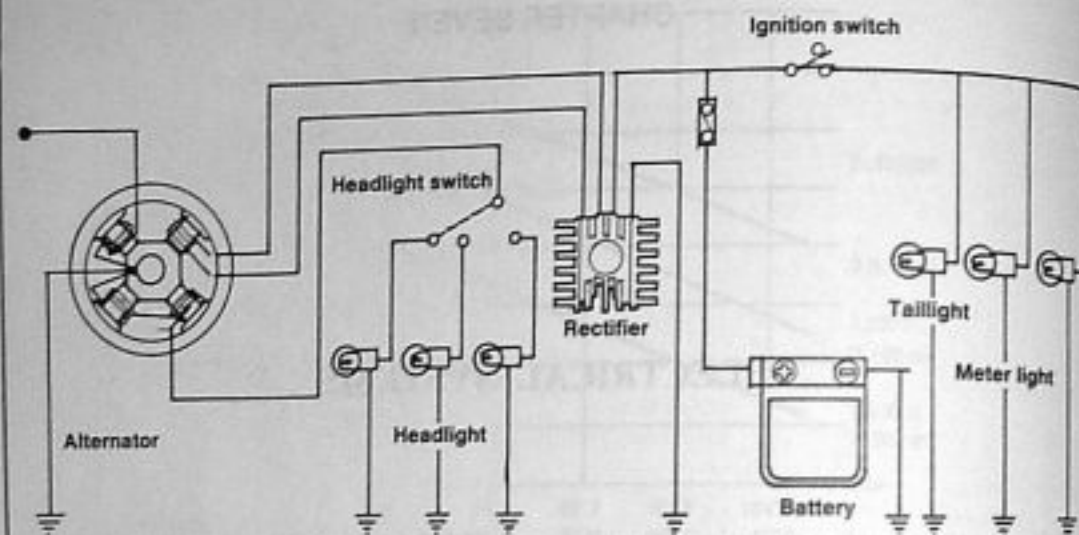
Prior to starting the test, start the bike and let it reach normal operating temperature; shut off the engine.

To test the charging system, disconnect the battery wires. Connect a 0-15 DC voltmeter and 0-10 DC ammeter into the circuit as shown in Figure 3.

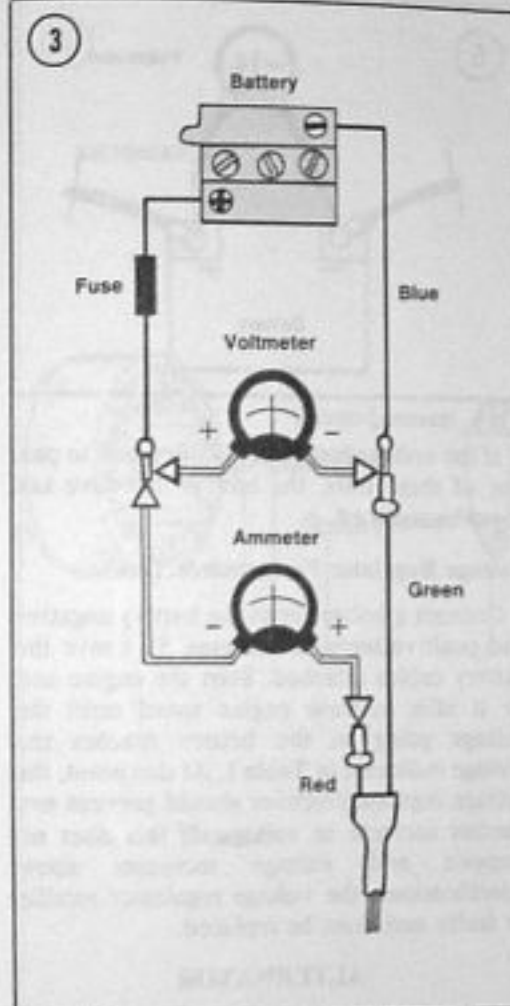
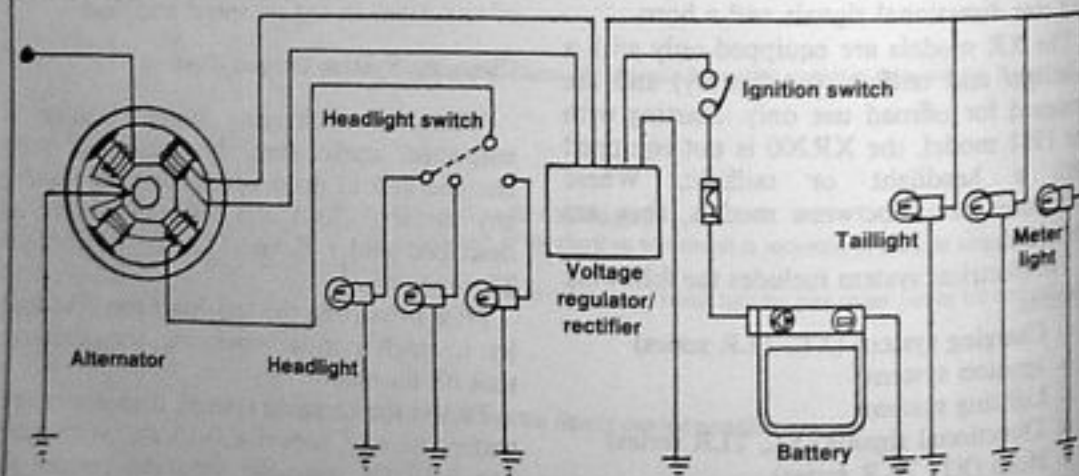
NOTE

During the test, if the needle of the ammeter reads in the opposite direction on the scale, reverse the polarity of the test leads.

CHARGING SYSTEM (XL SERIES 1979-1981)



CHARGING SYSTEM (XL and TLR200 SERIES 1982-ON)



Start the engine and let it idle. Check the output at the different engine speeds described in Table 1.

If the charging current is considerably lower than specified, check the alternator and/or the rectifier (or voltage regulator/rectifier). Less likely is the possibility that the voltage is too high; in that case the voltage rectifier (or voltage regulator/rectifier) is probably at fault.

Test the separate charging system components as described under the appropriate headings in this chapter.

After the test is completed, reconnect the battery leads.

BATTERY

For complete battery information, refer to *Battery* in Chapter Three.

RECTIFIER (XL SERIES, 1979-1981)

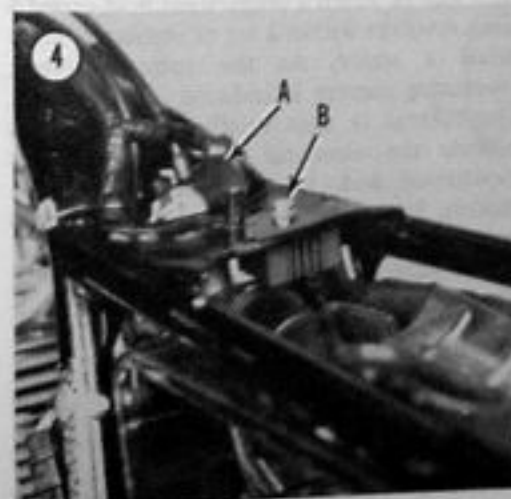
Removal/Installation

1. Remove the seat and both side covers.
2. Remove the fuel tank as described under *Fuel Tank Removal/Installation* in Chapter Six.
3. Disconnect the battery negative lead.
4. Disconnect the electrical connector (A, Figure 4) from the rectifier.
5. Remove the bolt (B, Figure 4) securing the rectifier to the rear fender and remove the rectifier.
6. Install by reversing these removal steps. Make sure all electrical connections are tight.

Testing

Make the following test using an ohmmeter with a positive ground. If a negative ground ohmmeter is used reverse the test leads in the following test.

1. Disconnect the electrical connector (A, Figure 4) coming from the rectifier. This connector contains 4 wires (one green, one pink, one yellow and one red/white).
2. Connect the ohmmeter positive lead to the red/white wire and the negative lead to the pink wire, then the yellow wire and then to the green wire. All 3 readings should show continuity.



3. Reverse the ohmmeter leads and repeat Step 4. This time all the readings should show no continuity.
4. Connect the ohmmeter positive lead to the pink wire and the negative lead to the green wire and then to the yellow wire. There should be continuity.
5. Reverse the ohmmeter leads and repeat Step 6. This time there should be no continuity.
6. Connect the ohmmeter positive lead to the yellow wire and the negative lead to the green wire. There should be continuity.
7. Reverse the ohmmeter leads and repeat Step 6. This time there should be no continuity.
8. If the rectifier fails to pass any of these tests the unit is defective and must be replaced.

VOLTAGE REGULATOR/RECTIFIER (XL SERIES, 1982-ON)

Removal/Installation

1. Remove the seat and both side covers.
2. Remove the fuel tank as described under *Fuel Tank Removal/Installation* in Chapter Six.
3. Disconnect the battery negative lead.
4. Disconnect the electrical connectors. Remove the bolts securing the voltage regulator/rectifier in place to the rear fender.
5. Remove the voltage regulator/rectifier and the electrical connector and 2 wires.
6. Install by reversing these removal steps. Make sure all electrical connections are tight.

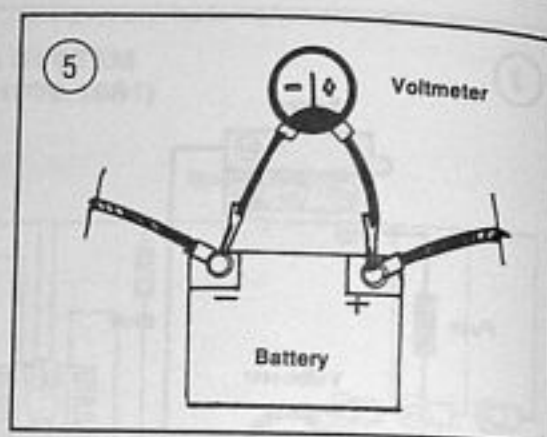
Testing

To test the voltage regulator/rectifier, disconnect the 5-pole electrical connector from the harness.

NOTE

Testing must be made with a quality ohmmeter or the test readings may be false.

Refer to Table 2 for ohmmeter positive (+) and negative (-) test lead placement, wire color code and specified resistance values.



If the voltage regulator/rectifier fails to pass any of these tests, the unit is defective and must be replaced.

Voltage Regulator Performance Test

Connect a voltmeter to the battery negative and positive terminals (Figure 5). Leave the battery cables attached. Start the engine and let it idle; increase engine speed until the voltage going to the battery reaches the voltage indicated in Table 1. At this point, the voltage regulator/rectifier should prevent any further increase in voltage. If this does not happen and voltage increases above specifications, the voltage regulator/rectifier is faulty and must be replaced.

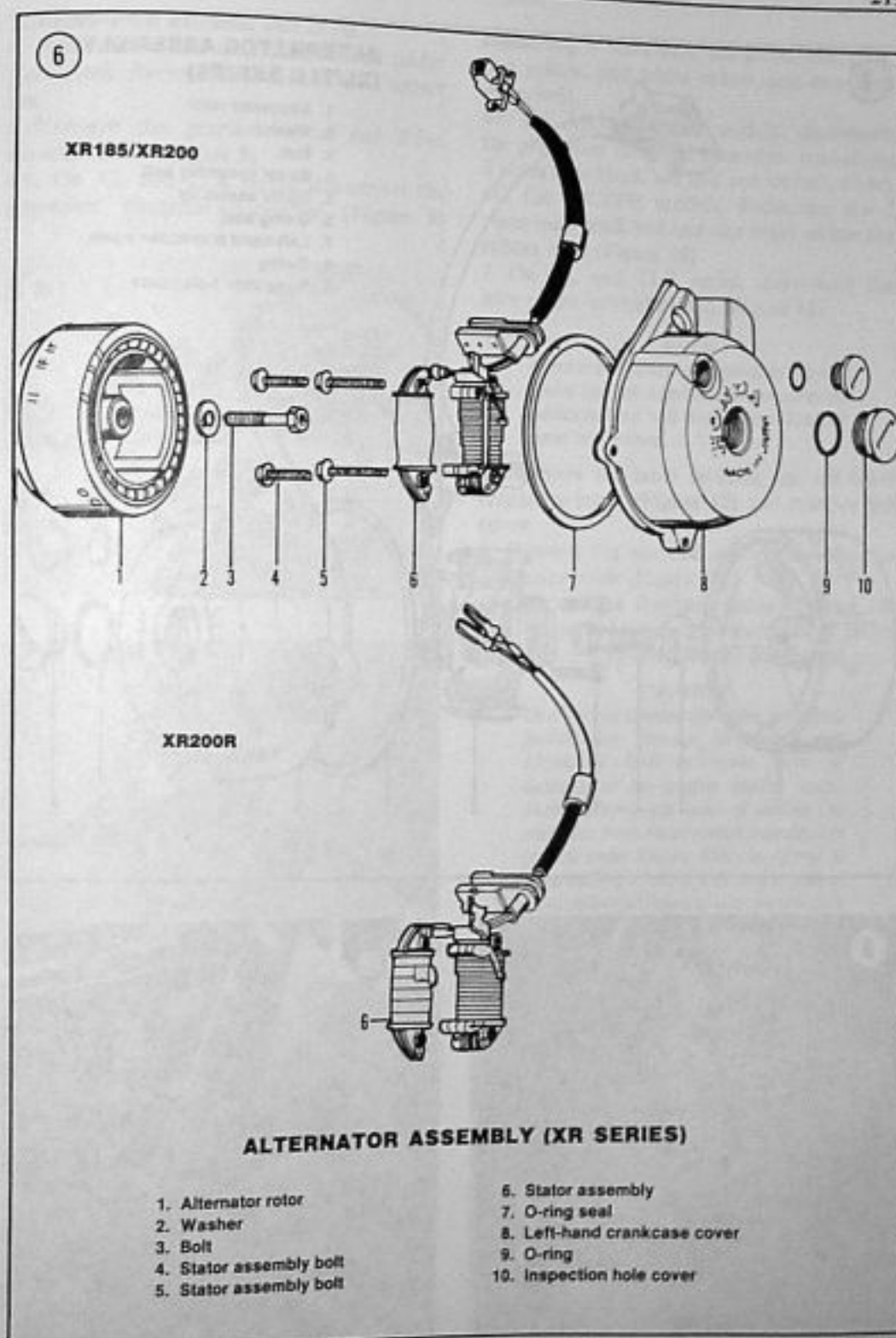
ALTERNATOR

The alternator is a form of electrical generator in which a magnetized field called a rotor revolves within a set of stationary coils called a stator. As the rotor revolves, alternating current is induced in the stator. The current is then rectified and used to operate the electrical accessories on the motorcycle and, on XL and TLR series models, for charging the battery. The rotor is permanently magnetized.

The alternator components are shown in Figure 6 and Figure 7.

Rotor Removal/Installation

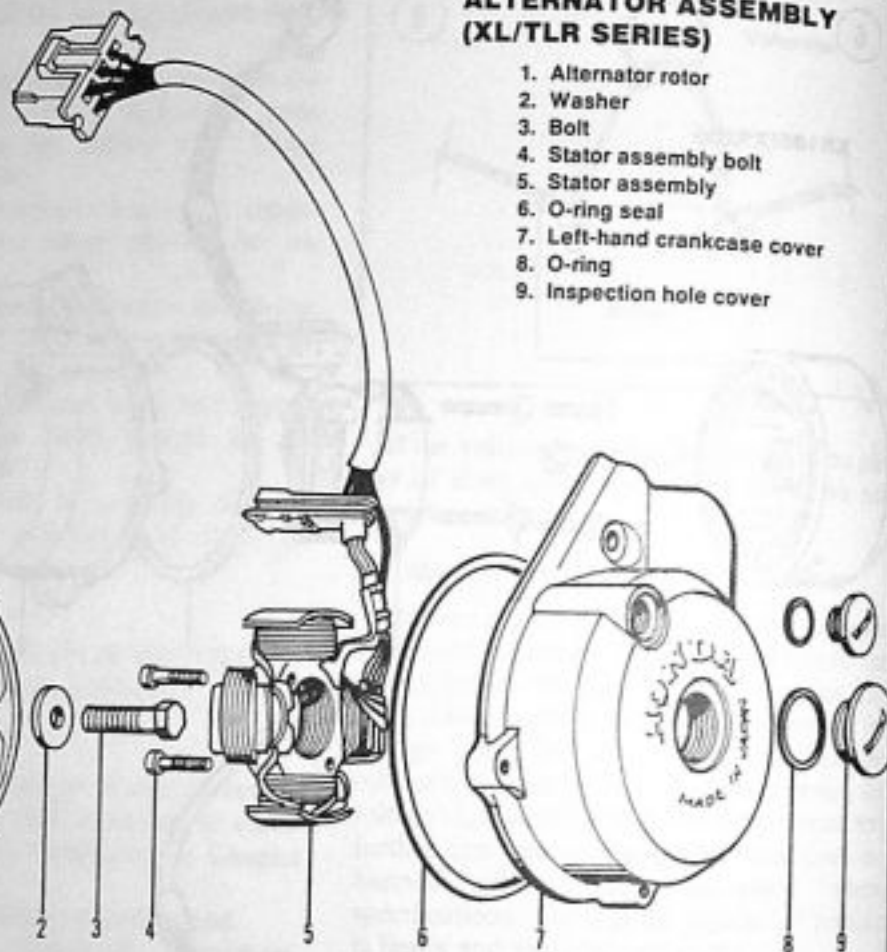
1. Place a milk crate or wood block(s) under the engine to support the bike securely.
2. Drain the engine oil as described under *Changing Engine Oil* in Chapter Three.



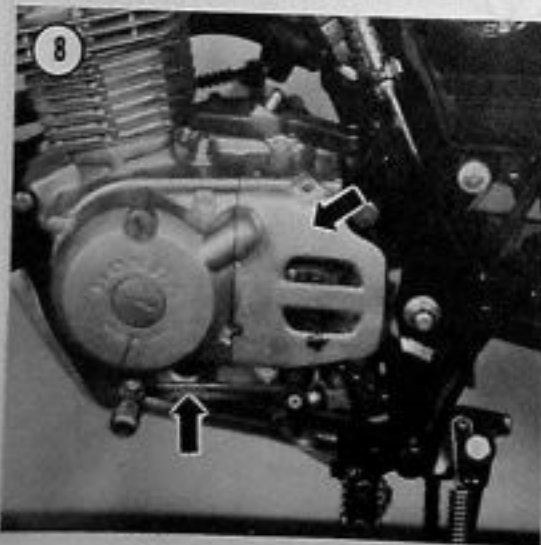
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ALTERNATOR ASSEMBLY (XL/TLR SERIES)

1. Alternator rotor
2. Washer
3. Bolt
4. Stator assembly bolt
5. Stator assembly
6. O-ring seal
7. Left-hand crankcase cover
8. O-ring
9. Inspection hole cover



8



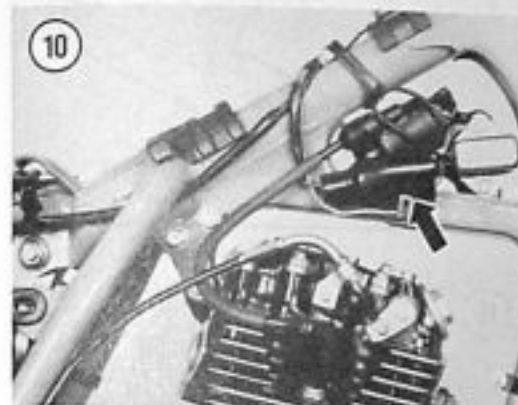
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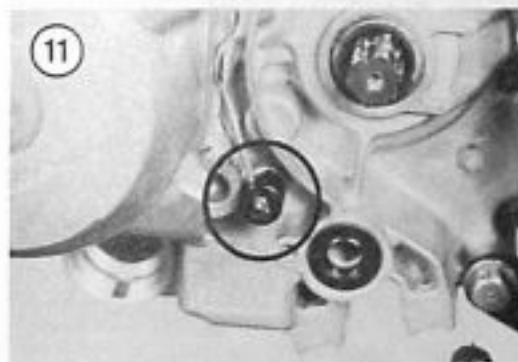
ELECTRICAL SYSTEMS

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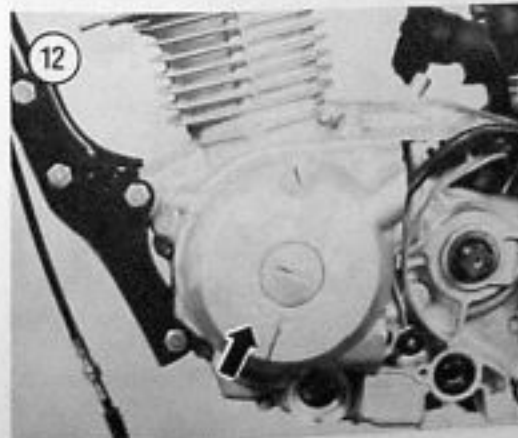
3. Remove the left-hand side cover.
4. Remove the fuel tank as described under *Fuel Tank Removal/Installation* in Chapter Six.
5. Remove the gearshift lever and drive sprocket cover (Figure 8).
- 6A. On XL and TLR series, disconnect the alternator electrical connector (Figure 9)



10



11



12

containing 5 wires (one black/red, one pink, one yellow, one white/yellow and one light green/red).

6B. On XR185-XR200 models, disconnect the alternator electrical connector containing 2 wires (one black/red and one white/yellow).

6C. On XR200R models, disconnect the 2 wires (one black/red and one blue) within the rubber boot (Figure 10).

7. On XL and TLR series, disconnect the wire to the neutral switch (Figure 11).

NOTE

Move the oil drain pan (used in Step 2) under the left-hand crankcase cover as additional oil will drain out when the cover is removed.

8. Remove the bolts securing the left-hand crankcase cover (Figure 12) and remove the cover.

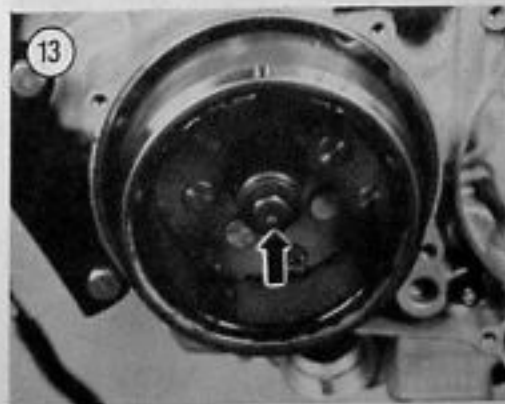
9. Remove the nut and washer securing the alternator rotor (Figure 13).

10. Screw in a flywheel puller (Figure 14) until it stops. Use the Honda flywheel puller (part No. 07733-0010000) or equivalent.

CAUTION

Don't try to remove the rotor without a puller; any attempt to do so will ultimately lead to some form of damage to the engine and/or rotor. Many aftermarket types of pullers are available from most motorcycle dealers or mail order houses. The cost of one of these pullers is about \$10 and it makes an excellent addition to any mechanic's tool box. If you can't buy or borrow one, have a dealer remove the rotor.

13



11. Hold the rotor with a strap wrench (Figure 15) and gradually tighten the puller until the rotor disengages from the crankshaft.

NOTE

If the rotor is difficult to remove, strike the puller with a hammer a few times. This will usually break it loose. Do not hit the rotor.

CAUTION

If normal rotor removal attempts fail, do not force the puller as the threads may be stripped out of the rotor causing expensive damage. Take it to a dealer and have them remove it.

12. Remove the rotor and puller. Don't lose the Woodruff key on the crankshaft.

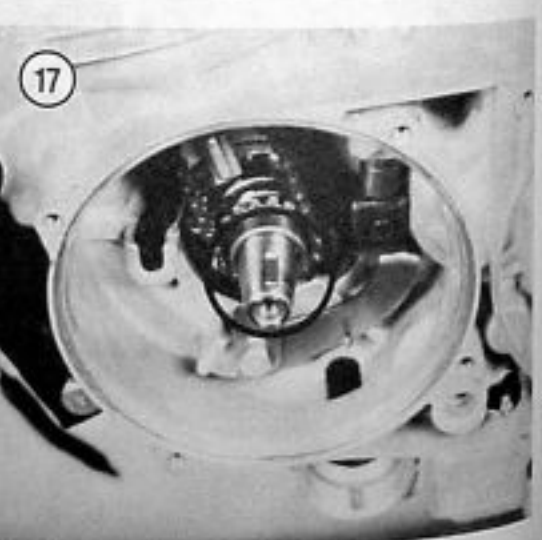
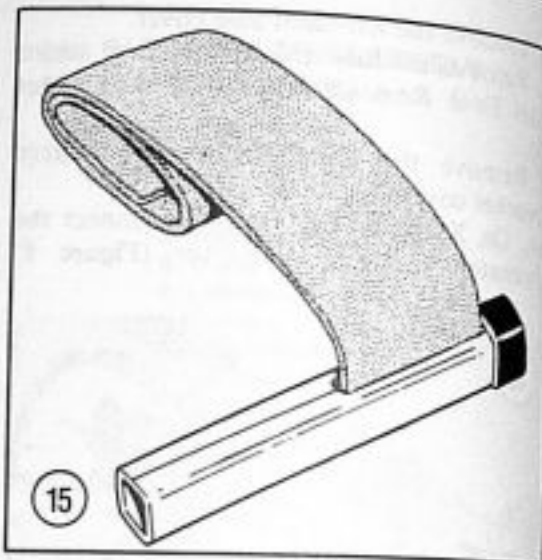
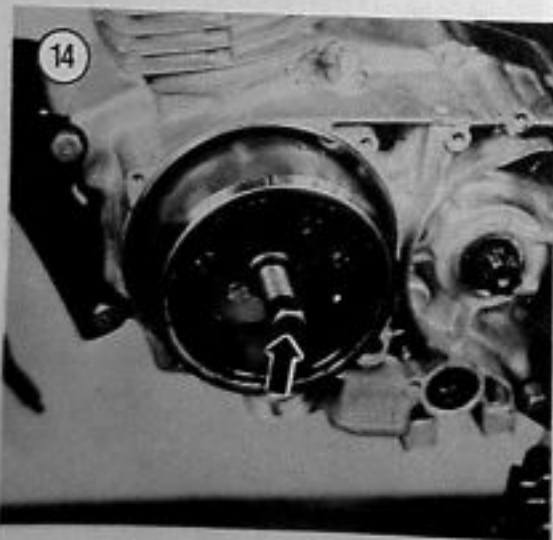
CAUTION

Carefully inspect the inside of the rotor (Figure 16) for small bolts, washers or other metal "trash" that may have been picked up by the magnets. These small metal bits can cause severe damage to the magneto stator plate components.

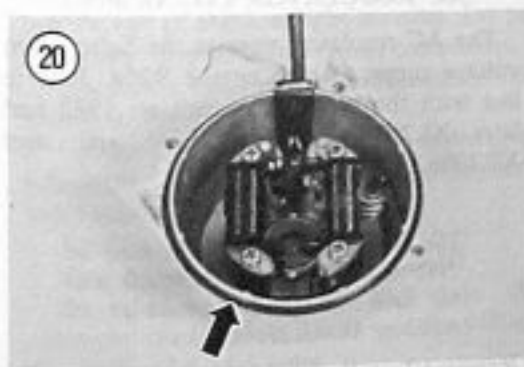
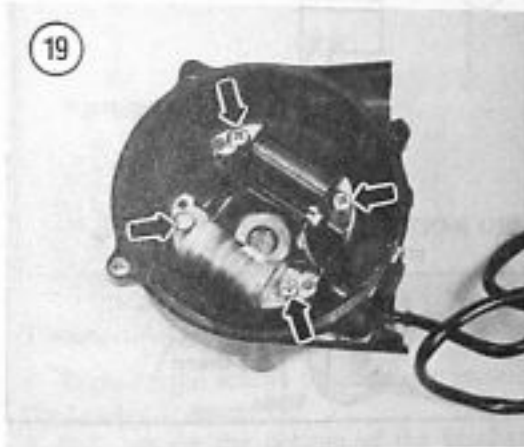
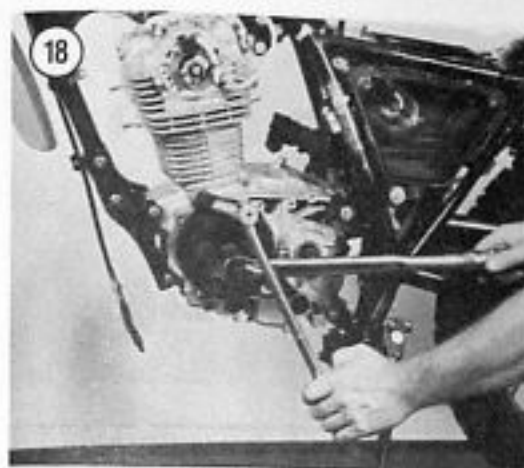
13. Install by reversing these removal steps, noting the following.

14. Make sure the Woodruff key (Figure 17) is in place on the crankshaft and align the keyway in the rotor with the key when installing the rotor.

15. Be sure to install the washer prior to installing the rotor nut. Install the rotor nut.



ELECTRICAL SYSTEMS



16. To keep the rotor from turning, hold it with the same tool setup used in Step 11; refer to Figure 18.

17. Tighten the rotor nut to the following torque specifications:

- a. XL125S, XL185S and XR200: 40-46 N·m (29-33 ft.-lb.)

- b. XR185: 40-50 N·m (29-36 ft.-lb.)
- c. XR200R: 45-55 N·m (33-40 ft.-lb.)
- d. TLR200: 55-65 N·m (40-47 ft.-lb.)

18. Fill the engine with the recommended type and quantity of oil as described under Changing Engine Oil in Chapter Three.

Alternator Rotor Testing

The rotor is permanently magnetized and cannot be tested except by replacement with a rotor known to be good. A rotor can lose magnetism from old age or a sharp blow. If defective, the rotor must be replaced; it cannot be remagnetized.

Stator Assembly Removal/Installation

1. Place a milk crate or wood block(s) under the engine to support the bike securely.
2. Drain the engine oil as described under Changing Engine Oil in Chapter Three.
3. Remove the left-hand side cover.
4. Remove the fuel tank as described under Fuel Tank Removal/Installation in Chapter Six.
5. Remove the gearshift lever and drive spocket cover (Figure 8).
6. Disconnect the alternator electrical connector (Figure 9).
7. On XL and TLR series, disconnect the wire to the neutral switch (Figure 11).

NOTE

Move the oil drain pan (used in Step 2) under the left-hand crankcase cover as additional oil will drain out when the cover is removed.

8. Remove the bolts securing the left-hand crankcase cover (Figure 12) and remove the cover.

9. If necessary, remove the screws (Figure 19) securing the stator assembly to the left-hand crankcase housing and remove the stator assembly. Pull the grommet and electrical harness out of the left-hand crankcase housing.

10. Install by reversing these removal steps, noting the following.

11. Make sure the large O-ring (Figure 20) is in place on the backside of the left-hand crankcase cover.

12. Fill the engine with the recommended type and quantity of oil as described under *Changing Engine Oil* in Chapter Three.

Stator Coil Testing

It is not necessary to remove the stator assembly to perform the following tests. It is shown removed in the following procedures for clarity.

In order to get accurate resistance measurements the stator assembly and coil must be warm (minimum temperature is 68° F/20° C). If necessary, start the engine and let it warm up to normal operating temperature.

Both coils resistance check (XL/TLR series)

Use an ohmmeter set at $R \times 1$ and check for continuity between the white/yellow terminal and ground (Figure 21). The specified resistance is 0.47 ohms.

Also check between the yellow and the pink wire; the specified resistance is 0.58 ohms.

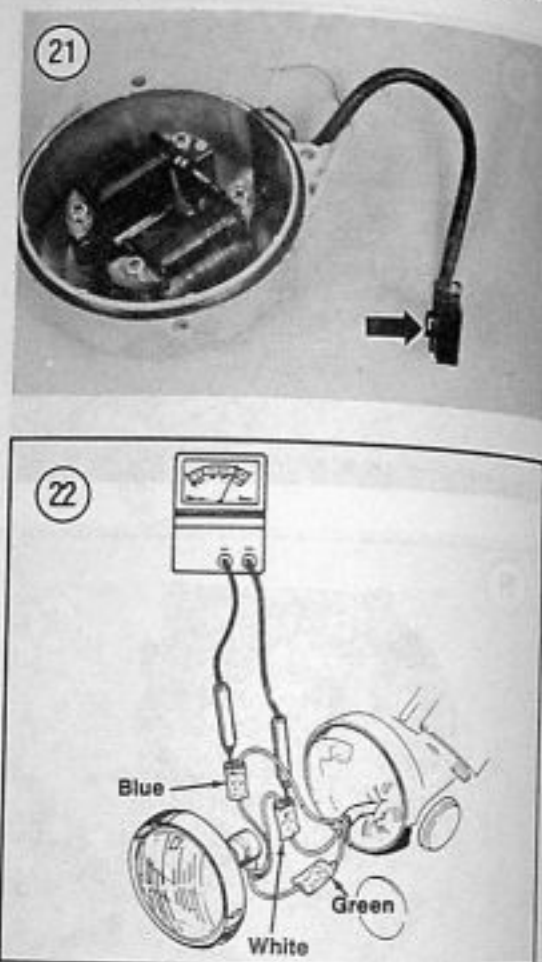
If either of these resistance values is not met one of the coils is bad and the stator assembly must be replaced (the individual coil cannot be replaced).

Lighting coil continuity check (XR series)

Use an ohmmeter set at $R \times 1$ and check for continuity between the white/yellow wire and to ground. If there is continuity (low resistance) the coil is good. If there is no continuity (infinite resistance) the coil is bad and the stator assembly must be replaced (the individual coil cannot be replaced).

Exciter coil resistance check (XR series)

Use an ohmmeter set at $R \times 10$ and check resistance between the black/red wire and ground. If there is continuity (specified resistance of 245 ohms for models XR185 and XR200 or 200-500 ohms for model XR200R) the coil is good. If there is no continuity or the resistance is less than specified, the coil is bad and the stator assembly must be replaced (the individual coil cannot be replaced).



AC REGULATOR (XL/XR200R)

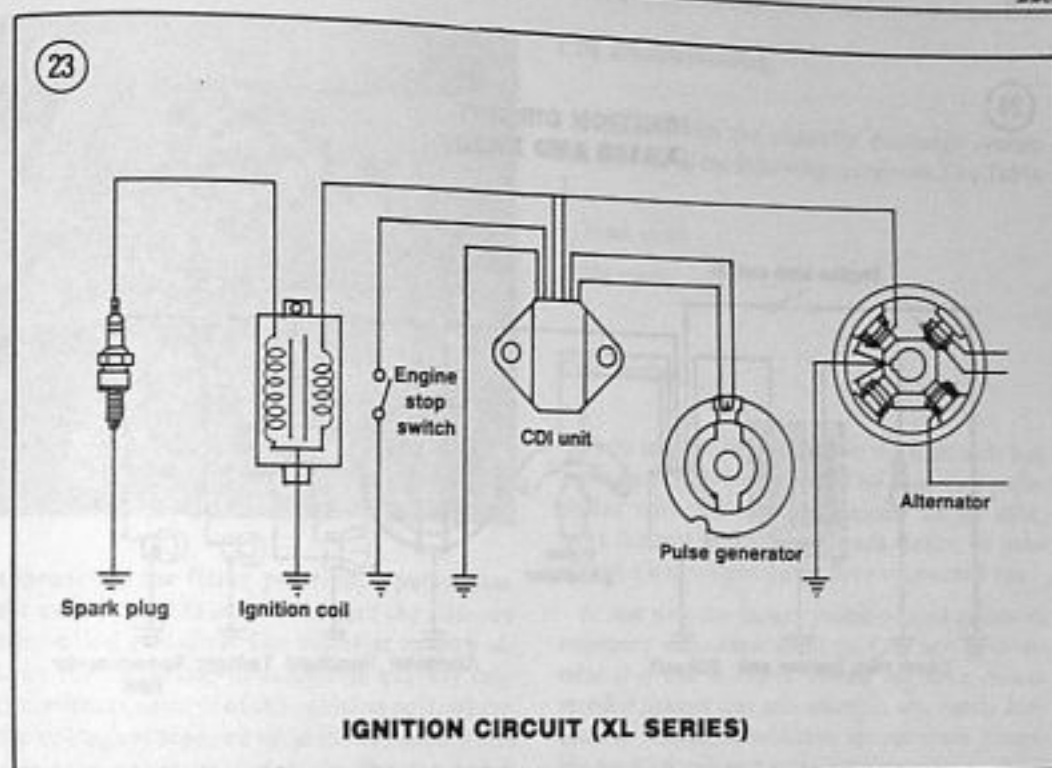
The AC regulator protects the lights from voltage surges at high engine RPM. It is in line with the headlight circuit on 1982 and later XL200R's and on 1986 and later XR200R's.

NOTE

The AC regulator was retrofitted on 1985 models. If your motorcycle does not have one, Honda provides an AC regulator kit.

Removal/Installation

1. Remove the fuel tank as described in Chapter Six.
2. Disconnect the white and green leads from the AC regulator.
3. Remove the bolt securing the regulator to the frame and remove the unit.
4. Installation is the reverse of these steps.



IGNITION CIRCUIT (XL SERIES)

Testing

1. Remove the screws on each side securing the headlight assembly.
2. Pull out on the bottom of the headlight assembly and disengage it from the locating tab on top of the headlight housing. Do not disconnect any of the electrical connectors.
3. Connect a voltmeter set to measure AC as shown in Figure 22.
4. Connect an electronic tachometer following the tachometer manufacturer's instructions.
5. Start the engine and let it idle.
6. Switch the headlight dimmer to HL.
7. Increase engine speed and note the voltmeter readings. At 5,000 rpm the voltage should be 13.5-14.5 volts.
8. If the voltage reading is correct, the AC regulator is operating correctly. If the voltage is incorrect, proceed to Step 9.
9. Disconnect the tachometer and voltmeter.
10. Remove the fuel tank as described in Chapter Six.
11. Disconnect the white and green leads going to the AC regulator.

12. Use an ohmmeter set at $R \times 10$ and perform the following test on the wires coming from the unit:

- a. Connect the positive lead to the white wire and the negative lead to the green wire. The specified resistance is 10-190 ohms.
- b. Connect the positive lead to the green wire and the negative lead to the white wire. The specified resistance is 10-190 ohms.

13. If the readings in Step 12 are much greater or less than specified, the unit is faulty and must be replaced.

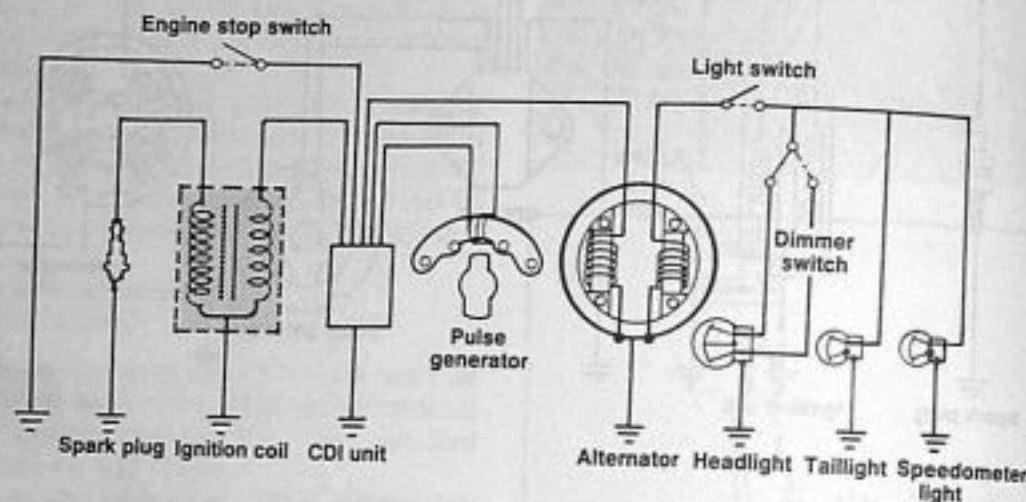
CAPACITOR DISCHARGE IGNITION

All models are equipped with a capacitor discharge ignition (CDI) system which is a solid-state system that uses no breaker points. Refer to Figure 23, Figure 24 or Figure 25 for the ignition circuit of the various models.

Alternating current from the alternator is rectified to direct current and is used to charge the capacitor. As the piston

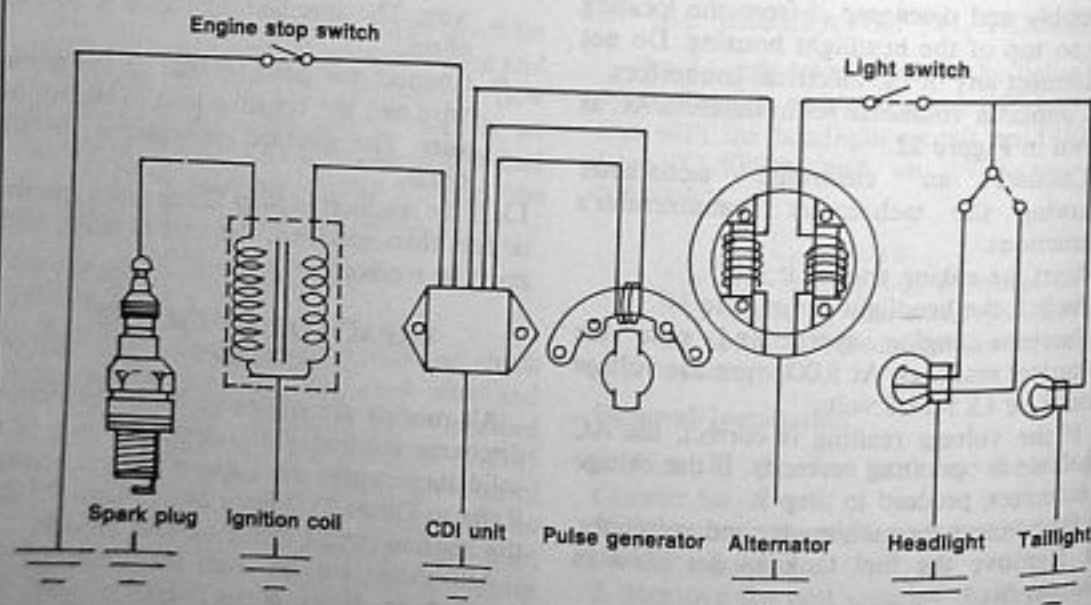
24

IGNITION CIRCUIT (XR185 AND XR200)



25

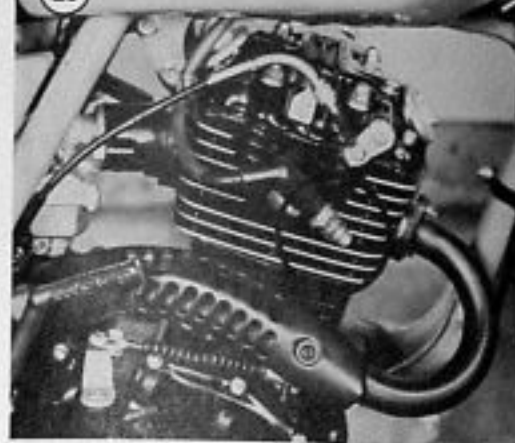
IGNITION CIRCUIT (XR200R)



ELECTRICAL SYSTEMS

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approaches the firing position, a pulse from the exciter coil is used to trigger the silicone controlled rectifier. The rectifier in turn allows the capacitor to discharge quickly into the primary circuit of the ignition coil, where the voltage is stepped up in the secondary circuit to a value sufficient to fire the spark plug.

CDI Precautions

Certain measures must be taken to protect the capacitor discharge system. Damage to the semiconductors in the system may occur if the following precautions are not observed.

1. Never disconnect any of the electrical connections while the engine is running.
2. Keep all connections between the various units clean and tight. Be sure that the wiring connectors are pushed together firmly to help keep out moisture.
3. Do not substitute another type of ignition coil.
4. The CDI unit is mounted within a rubber vibration isolator. Always be sure that the isolator is in place when installing the unit.
5. On XL and TLR series models, never connect the battery backwards. If the battery polarity is wrong, damage will occur to the rectifier (or voltage regulator/rectifier), the alternator and the spark unit.

CDI Troubleshooting

Problems with the capacitor discharge system fall into one of the following categories. See Table 3.

1. Weak spark
2. No spark

CDI Testing

Tests may be performed on the CDI unit but a good one may be damaged by someone unfamiliar with the test equipment. To be safe, have the test made by a Honda dealer or substitute a known good unit for a suspected one.

At one time the factory recommended extensive resistance measurements of the CDI unit to determine if it was defective. Honda has since recommended against that procedure; it was rarely conclusive. Instead, Honda now recommends removing the CDI unit and using an ohmmeter to check the circuits to which the CDI connects. If they check out, then the CDI must be defective. If you have the proper equipment, use the following procedure.

1. Disconnect the spark plug wire from the spark plug.
2. Remove the spark plug from the cylinder head.
3. Connect the spark plug wire to a known good spark plug.
4. Hold the base of the spark plug against a good ground such as the cylinder head. See Figure 26.

WARNING

Do not hold the spark plug wire unless you use a pair of insulated pliers. The high voltage generated could produce a serious or possibly fatal shock.

5. Kick the engine over as strongly as possible. The crankshaft must turn fast enough to produce a spark.
6. If there is a fat blue spark, the CDI unit is good.
7. If the spark is weak or there is no spark, test the CDI unit as described in the following steps.

NOTE

The following steps apply only to those models listed in Table 4. If your model is not listed, then you must go to the dealer for testing.

8. Install a good spark plug in the cylinder head, and connect the spark plug wire.
9. Disconnect the electrical connectors from the CDI unit.

NOTE

Use a quality digital multimeter available from Honda (Part No. KS-AHM-32-003). Any Radio Shack digital multimeter is a suitable equivalent. Install fresh batteries before the test.

NOTE

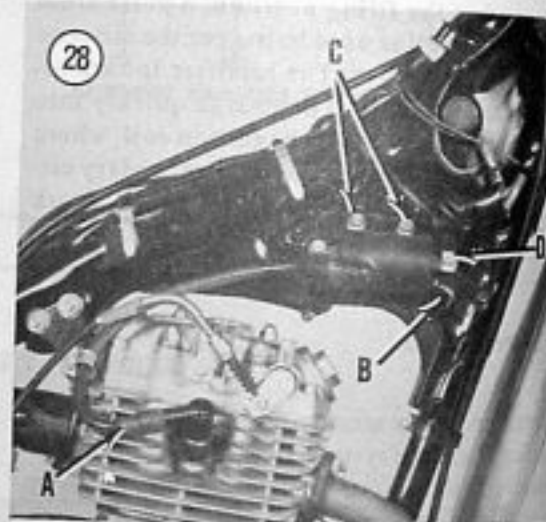
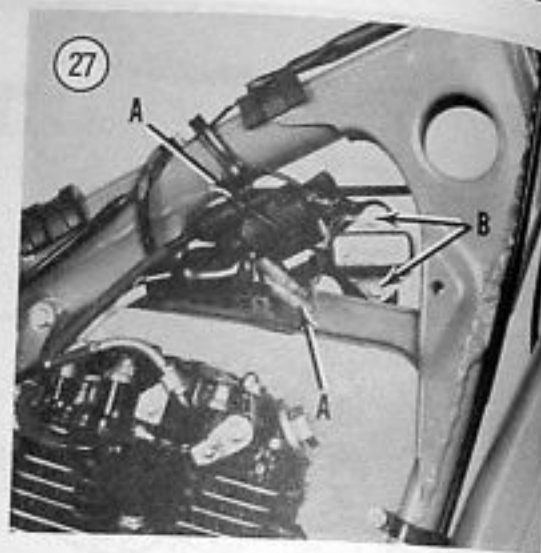
All measurements are made at the CDI connector on the wiring harness.

10. Measure the resistance of the exciter coil, the pulse generator, the ignition coil primary and the ignition coil secondary. See wiring diagram for your specific bike at the back of the book for wire colors. Compare readings to Table 4. If any of them differ appreciably, test the related component as described elsewhere in this chapter.

11. If the components listed in the table are okay, then check for open or shorted wires or poor connections in the wiring harness.
12. If everything else checks out okay, then the CDI is probably defective.

Replacement

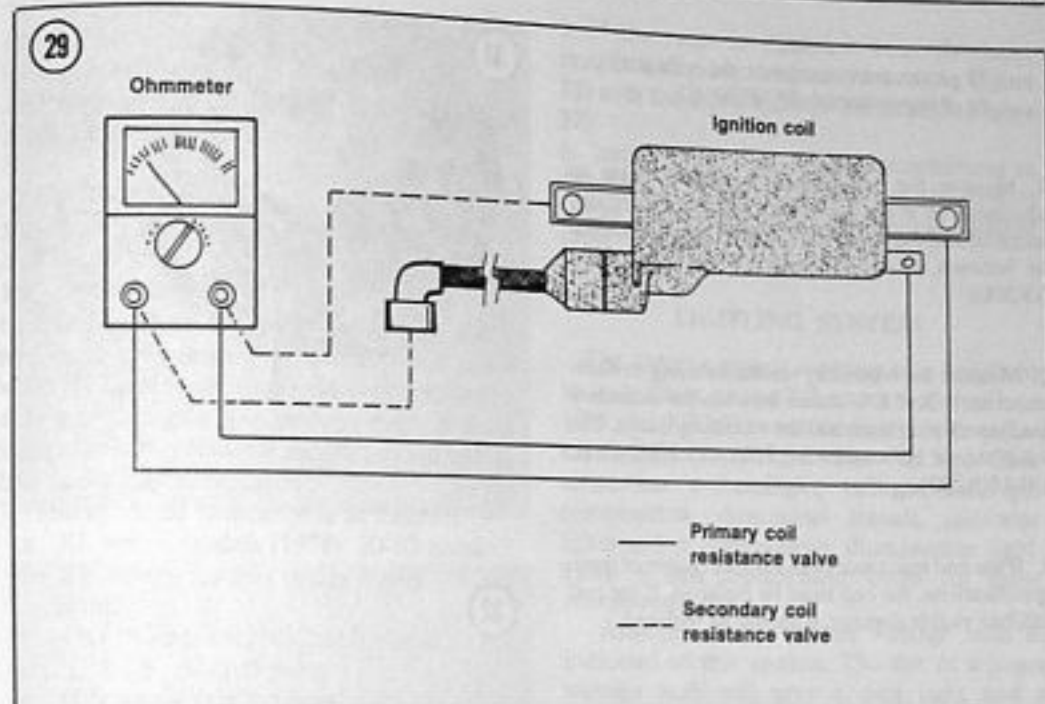
1. Remove the side covers and the seat.
2. Remove the fuel tank as described under *Fuel Tank Removal/Installation* in Chapter Six.
3. Disconnect the 4 electrical wires going from the CDI unit to the electrical harness and the one wire going to the ignition coil (A, Figure 27).
4. Remove the bolts (B, Figure 27) securing the CDI unit to the mounting bracket.
5. Install a new CDI unit and attach the electrical wires to it. Make sure all electrical connections are tight.
6. Reinstall the fuel tank, seat and side covers.

**SPARK PLUG**

The spark plug recommended by the factory is usually the most suitable for your machine. If riding conditions are mild, it may be advisable to go to a plug one step hotter than normal. Unusually severe riding conditions may require a slightly colder plug. See Chapter Three for details.

IGNITION COIL**Removal/Installation**

1. Place a milk crate or wood block(s) under the engine to support the bike securely.
2. Remove the side covers and the seat.

ELECTRICAL SYSTEMS

3. Remove the fuel tank as described under *Fuel Tank Removal/Installation* in Chapter Six.
4. On XL and TLR series models, disconnect the battery negative lead.
5. Disconnect the high voltage lead from the spark plug (A, Figure 28).
6. Disconnect the electrical wire (B, Figure 28) from the CDI unit to the ignition coil.
7. Remove the screws (C, Figure 28) securing the ignition coil to the frame and remove the coil.
8. Install by reversing these removal steps, noting the following.
9. Be sure to attach the ground wire to the front mounting screw (D, Figure 28).
10. Make sure all electrical connections are tight and free of corrosion.

Testing

The ignition coil is a form of transformer which develops the high voltage required to jump the spark plug gap. The only maintenance required is that of keeping the electrical connections clean and tight and occasionally checking to see that the coil is mounted securely.

If the condition of the coil is doubtful, there are several checks which may be made.

First, as a quick check of coil condition, disconnect the high voltage lead from the spark plug. Remove the spark plug from the cylinder head. Connect a new or known good spark plug to the high voltage lead and place the spark plug base on a good ground like the engine cylinder head (Figure 26). Position the spark plug so you can see the electrode.

WARNING

If it is necessary to hold the high voltage lead, do so with an insulated pair of pliers. The high voltage generated by the CDI could produce serious or fatal shocks.

Turn the engine over with the kickstarter. If a fat blue spark occurs, the coil is in good condition; if not, proceed as follows. Make sure that you are using a known good spark plug for this test. If the spark plug used is defective the test results will be incorrect.

Reinstall the spark plug in the cylinder head.

Refer to Figure 29 for this procedure. Disconnect all ignition coil wires before testing.

NOTE

To get accurate resistance, the coil must be at approximately 68° F (20° C).

1. Measure the coil primary resistance using an ohmmeter set at $R \times 1$. Measure between the primary terminal and the mounting flange. The value should be between 0.2-0.8 ohms (0.16-0.20 ohms, 1984 XR200).

2. Measure the secondary resistance using an ohmmeter set at $R \times 1$. Measure between the secondary lead (spark plug lead) and the mounting flange. The value should be between 8-15 ohms (3.7-4.5 ohms, 1984 XR200).

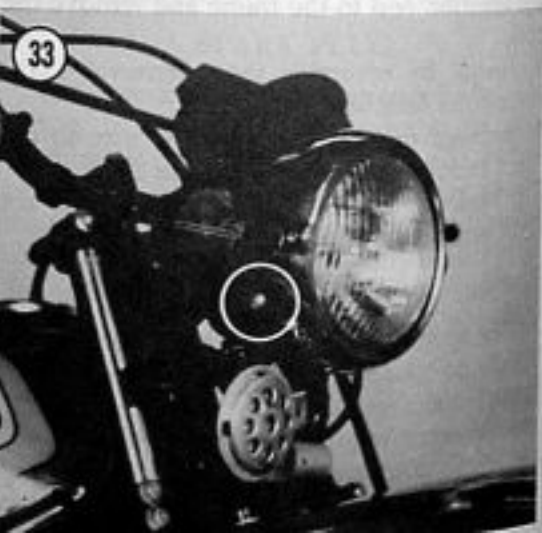
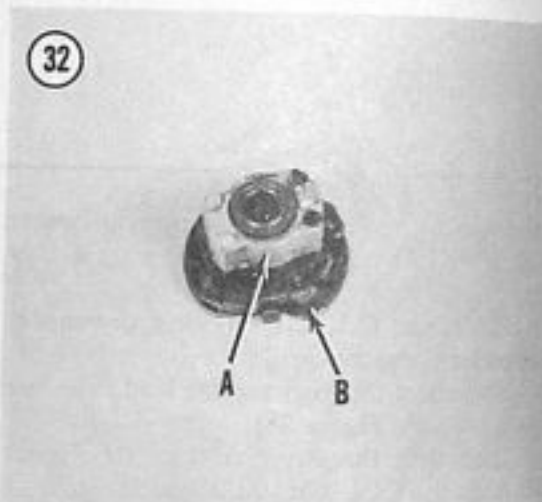
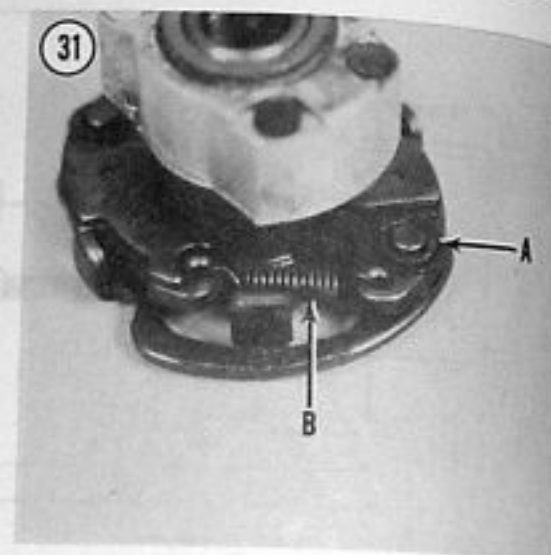
3. If the coil resistance does not meet either of these specifications, the coil must be replaced. If the coil exhibits visible damage, it should be replaced.

IGNITION PULSE GENERATOR

Inspection

NOTE

To get accurate resistance measurements the unit must be at approximately 68° F (20° C).



ELECTRICAL SYSTEMS

1. Place a milk crate or wood block(s) under the engine to support the bike securely.
2. Remove the side covers and the seat.
3. Remove the fuel tank as described under *Fuel Tank Removal/Installation* in Chapter Six.
4. On XL and TLR series models, disconnect the battery negative lead.
5. Disconnect the electrical connections from the ignition pulse generator (Figure 30).
6. Use an ohmmeter set at $R \times 1$ and check resistance between the blue/yellow and green wires. If there is continuity as specified in the next step the pulse generator is good. If there is no continuity (infinite resistance) the unit is bad and must be replaced.
7. The specified resistance is as follows:
 - a. XL series models (1979): 20-60 ohms
 - b. XL series models (since 1980): 30-200 ohms
 - c. XR185 and XR200: 20-60 ohms
 - d. XR200R: 30-200 ohms
 - e. TLR200: 400-500 ohms

IGNITION ADVANCE MECHANISM (PULSE ROTOR)

The ignition advance mechanism advances the ignition (fires the spark plug sooner) as engine speed increases. If it does not advance properly and smoothly, the ignition will be incorrect at high engine rpm. It must be inspected periodically to make certain it operates freely.

Inspection

1. Remove the ignition advance mechanism as described under *Ignition Advance Mechanism (Pulse Rotor) Removal/Installation* in Chapter Four.
2. Inspect the rotor pivot points (A, Figure 31) of each weight. The rotor must pivot freely to maintain proper ignition advance. Apply lightweight grease to the pivot pins.
3. Inspect the rotor return springs (B, Figure 31). Make sure they are taut and completely return the rotor to its fully retarded position.
4. If the unit fails either of these inspections it must be replaced.

5. If the rotor is removed from the base, install it, aligning the punch mark (A, Figure 32) with the index mark in the base (B, Figure 32).

6. Install the ignition advance mechanism as described under *Ignition Advance Mechanism (Pulse Rotor) Removal/Installation* in Chapter Four.

LIGHTING SYSTEM

The lighting system consists of a headlight and a taillight on the XR series models. Since 1981, the XR200 is not equipped with either a headlight or taillight. The XL and TLR series has a headlight, taillight/brakelight combination, directional signals, indicator lights and a speedometer illumination light. Table 5 lists replacement bulbs for these components.

Always use the correct wattage bulb as indicated in this section. The use of a larger wattage bulb will give a dim light and a smaller wattage bulb will burn out prematurely.

Headlight Replacement (XL/TLR Series)

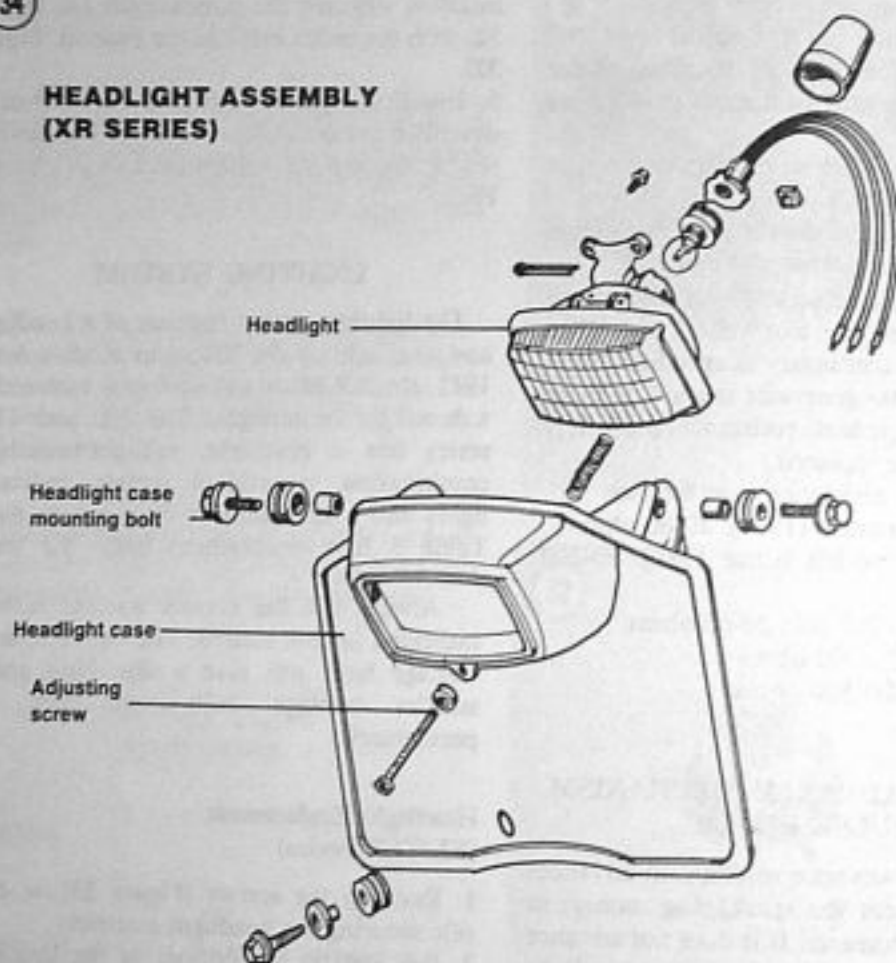
1. Remove the screws (Figure 33) on each side securing the headlight assembly.
2. Pull out on the bottom of the headlight assembly and disengage it from the locating tab on top of the headlight housing.
3. Disconnect the electrical connector from the headlight unit.
4. Remove the horizontal adjust screw and the 2 headlight retaining screws. Remove the sealed beam unit. Assemble by reversing this sequence; make sure to install the sealed beam unit with the "TOP" mark facing up.
5. Install by reversing these removal steps.
6. Adjust the headlight as described under *Headlight Adjustment (XL Series)* in this chapter.

Headlight Replacement (XR Series)

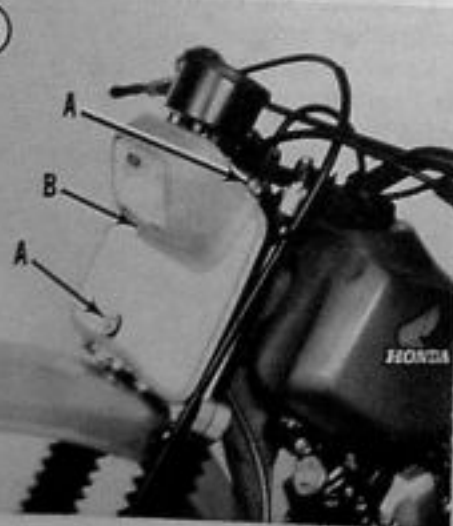
- Refer to Figure 34 for this procedure.
1. Remove the bolts (A, Figure 35) securing the headlight holder.

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HEADLIGHT ASSEMBLY (XR SERIES)



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headlight assembly. Loosen the mounting bolt (B, Figure 36) on each side and position the headlight correctly. Retighten the bolts and reinstall the reflex reflectors.

Headlight Adjustment (XR Series)

Adjustment is limited to the vertical. Adjust to your personal preference. Turn the adjust screw (B, Figure 35) at the base of the headlight holder. There are as yet no regulations on headlight adjustment for off-road use.

Taillight/Brakelight Replacement (XL/TLR Series)

1. Remove the screws securing the lens (Figure 37) and remove the lens.
2. Wash the inside and outside of the lens with a mild detergent and wipe dry. Wipe off the reflective base surrounding the bulbs with a soft cloth.
3. Inspect the condition of the lens gasket and replace if it is damaged or deteriorated.
4. Replace the bulb(s) and install the lens; do not overtighten the screws as the lens may crack.



Taillight Replacement (XR185 and XR200)

1. Remove the side covers and the seat.
2. Remove the screws securing the lens and remove the lens.
3. Wash the inside and outside of the lens with a mild detergent and wipe dry. Wipe off the reflective base surrounding the bulb with a soft cloth.
4. Replace the bulb and install the lens; do not overtighten the screws as the lens may crack.

Taillight Replacement (XR200R)

1. Remove the bolts from the underside of the rear fender. Partially pull the lens assembly (Figure 38) up and off of the fender.
2. On the underside of the backing plate, remove the screws securing the lens to the backing plate and remove the lens.
3. Wash the inside and outside of the lens with a mild detergent and wipe dry. Wipe off the reflective base surrounding the bulb with a soft cloth.

2. Pivot the holder down and disconnect the electrical socket and connector from the backside of the lens unit.
3. Remove the bulb from the backside of the lens unit and replace with a new bulb.
4. Install by reversing these removal steps.
5. Adjust the headlight as described under *Headlight Adjustment (XR Series)* in this chapter.

Headlight Adjustment (XL/TLR Series)

Adjust the headlight horizontally and vertically according to Department of Motor Vehicle regulations in your area.

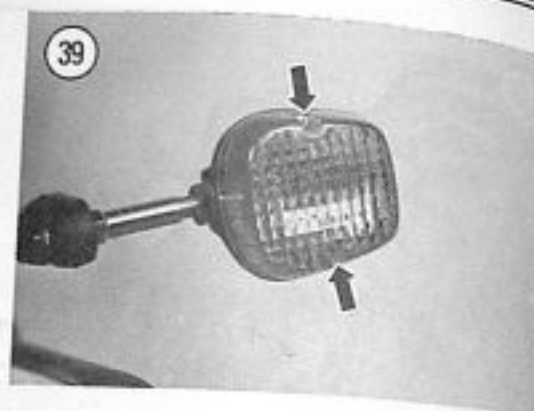
To adjust the headlight horizontally, turn the screw (A, Figure 36) on the right-hand side of the headlight trim bezel. Screwing in turns the light toward the right-hand side of the rider and loosening the screw directs the light to the left-hand side of the rider.

To adjust the headlight vertically, remove the side reflex reflector on each side of the

4. Replace the bulb and install the lens; do not overtighten the screws as the lens may crack.
5. Position the light assembly onto the fender and install the bolts securing the assembly to the rear fender.

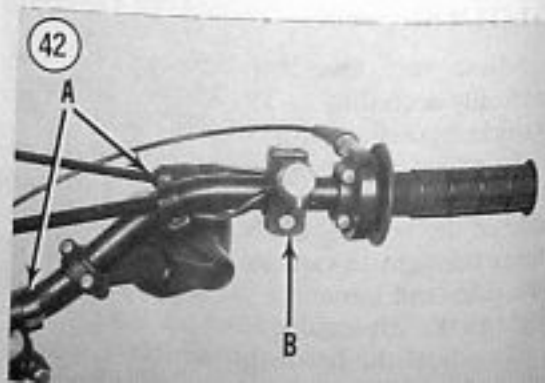
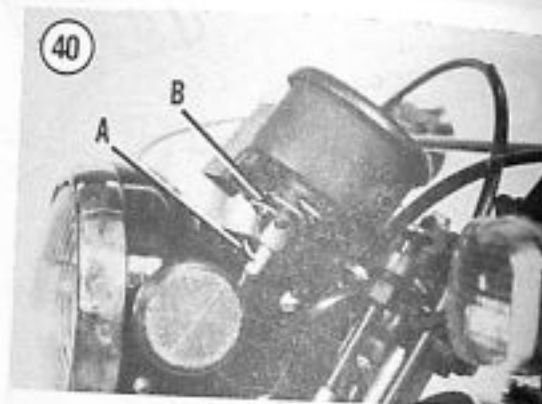
Directional Signal Light Replacement (XL/TLR Series)

1. Remove the screws securing the lens (Figure 39) and remove the lens.
2. Wash the inside and outside of the lens with a mild detergent and wipe dry.
3. Inspect the condition of the lens gasket and replace if it is damaged or deteriorated.
4. Replace the bulb and install the lens; do not overtighten the screws as the lens may crack.



Speedometer Illumination Light Replacement (XL/TLR Series)

1. Disconnect the speedometer drive cable (A, Figure 40).
- 2A. On 1979 models, unscrew the acorn nuts, washers and rubber dampers securing the instrument cluster.
- 2B. On models since 1980, unscrew the acorn nuts, washers and rubber damper (B, Figure 40) securing the speedometer housing.



NOTE

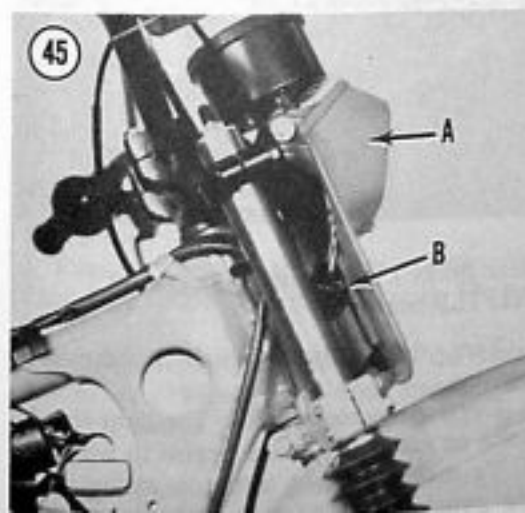
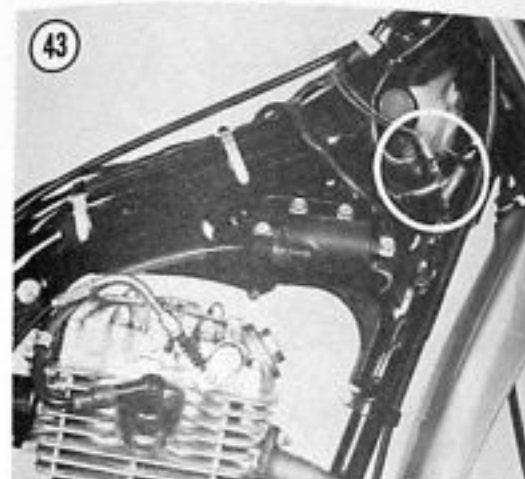
In the next step do not pull up too hard on the cluster or housing; there is very little slack in the electrical wires—they are very short.

3. Carefully pull the cluster or housing up and off of the mounting bracket. Carefully pull the socket/bulb assembly out of the backside of the speedometer housing.
4. Replace the defective bulb(s).
5. Install by reversing these removal steps. Be sure to install all rubber dampers.

Indicator Light Replacement (1979 XL125 and XL185)

1. Disconnect the speedometer drive cable.
2. Unscrew the acorn nuts, washers and rubber dampers securing the instrument cluster.

ELECTRICAL SYSTEMS



NOTE

In the next step do not pull up too hard on the cluster or housing as there is very little slack in the electrical wires—they are very short.

3. Carefully pull the cluster up and off of the mounting bracket.
4. Remove the screws securing the upper panel and lift the panel out of the housing.
5. Replace the defective bulb(s).
6. Install by reversing these removal steps. Be sure to install all rubber dampers.

Indicator Light Replacement (XL Series Since 1980 and TLR200)

From the underside of the indicator light assembly, pull out the bulb socket assemblies (Figure 41).

Replace the defective bulb(s) and reinstall the socket assemblies into the indicator light assembly.

SWITCHES

Engine Kill Switch

Removal/Installation (Except XR200R)

1. Remove the seat.
2. Remove the fuel tank as described under *Fuel Tank Removal/Installation* in Chapter Six.
3. Remove the right-hand rear view mirror.
4. Unhook the plastic straps (A, Figure 42) securing the electrical wires to the handlebar.
5. Disconnect from the wiring harness the electrical wires (one green and one black/white) going to the engine kill switch (Figure 43).
6. Remove the screw (B, Figure 42) securing the kill switch to the front brake lever assembly.
7. Remove the kill switch and electrical wires from the frame.
8. Install a new switch assembly by reversing these removal steps.

Engine Kill Switch

Removal/Installation (XR200R)

1. Unhook the plastic straps (A, Figure 44) securing the electrical wires to the handlebar.
2. Remove the bolts securing the headlight case (A, Figure 45) and pivot the case down and out of the way.

3. Disconnect from the wiring harness the electrical wires (one black and one black/white) going to the engine kill switch (B, Figure 45).

4. Remove the screw (B, Figure 44) securing the kill switch to the handlebar.

5. Remove the engine kill switch and electrical wires from the frame.

6. Install a new switch assembly by reversing these removal steps.

Front Brake Light Switch Removal/Installation (XL/TLR Series)

1. Remove the seat.

2. Remove the fuel tank as described under *Fuel Tank Removal/Installation* in Chapter Six.

3. Pull back the rubber protective boot on the brake lever.

4. Pull the small rubber boot (A, Figure 46) away from the switch.

5. Unhook the plastic straps (B, Figure 46) securing the electrical wires to the handlebar.

6. Disconnect from the wiring harness the electrical wires (one black and one green/yellow) going to the front brake light switch (Figure 47).

7. Carefully remove the switch assembly from the brake lever.

8. Remove the brake switch and electrical wires from the frame.

9. Install a new switch assembly by reversing these removal steps.

Rear Brake Light Switch Removal/Installation (XL/TLR Series)

1. Remove the right-hand side cover.

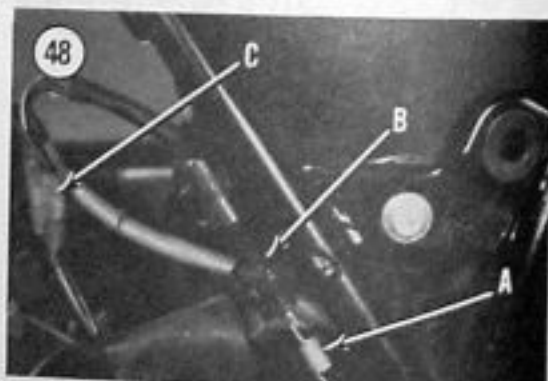
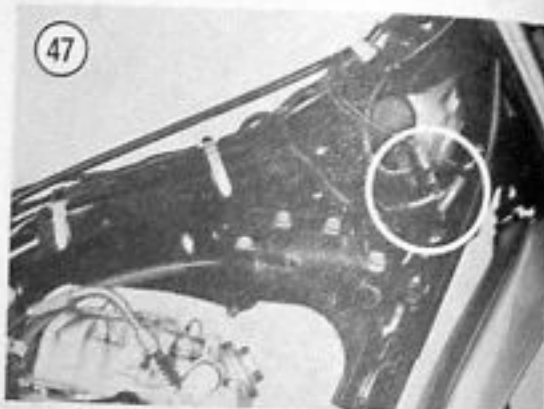
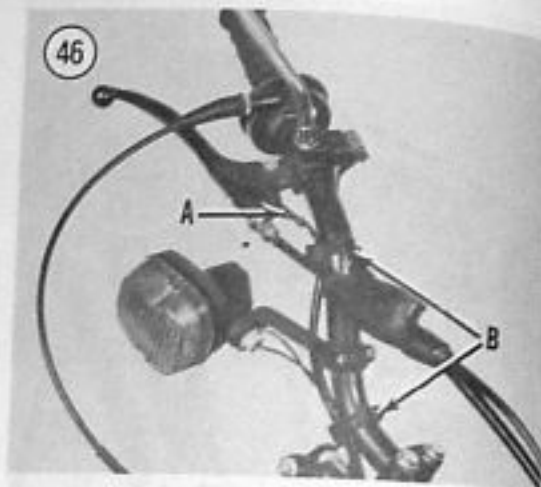
2. Unhook the switch spring from the brake arm (A, Figure 48).

3. Unscrew the switch housing and adjust nut (B, Figure 48) from the frame bracket.

4. Disconnect the electrical connectors (C, Figure 48) from the wiring harness.

5. Install a new switch by reversing these removal steps, noting the following.

6. Adjust as described under *Rear Brake Light Switch Adjustment (XL Series)* in this chapter.

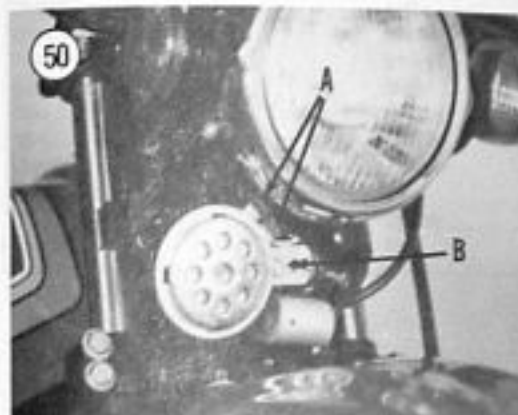
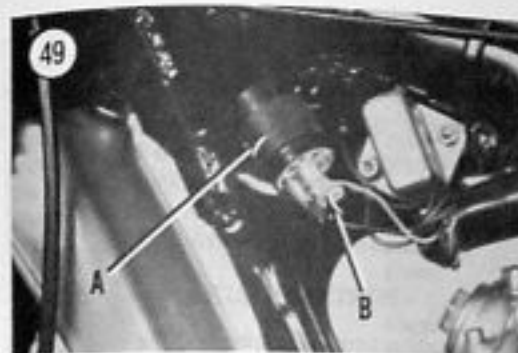


Rear Brake Light Switch Adjustment (XL/TLR Series)

1. Turn the ignition switch to the ON position.

2. Depress the brake pedal. The light should come on just as the brake begins to work.

3. To make the light come on earlier, hold the switch body and turn the adjusting nut



Horn Removal/Installation (XL/TLR Series)

1. Disconnect the electrical connections (A, Figure 50) from the horn.

2. Remove the screw and washer (B, Figure 50) securing the horn to the frame and remove the horn.

3. Install by reversing these removal steps.

Horn Testing (XL Series)

Remove the horn as described under *Horn Removal/Installation (XL Series)* in this chapter. Connect a 6-volt battery to the horn. If the horn is good, it will sound. If not, replace it.

Instrument Cluster Removal/Installation (1979 XL Series)

NOTE

Only the 1979 model has an instrument cluster. Models since 1980 have a separate speedometer and a small indicator panel.

clockwise as viewed from the top. Turn counterclockwise to delay the light from coming on. Refer to B, Figure 48.

NOTE

Some riders prefer the light to come on a little early. This way, they can tap the pedal without braking to warn drivers who are following too closely.

ELECTRICAL COMPONENTS

Turn Signal Relay Removal/Installation (XL/TLR Series)

1. Remove the seat.

2. Remove the fuel tank as described under *Fuel Tank Removal/Installation* in Chapter Six.

3. Pull the turn signal relay out of the rubber mount (A, Figure 49) and transfer the electrical wires (B, Figure 49) to the new relay.

4. Install the relay in the rubber mount.

5. Install the fuel tank and seat.

1. Disconnect the speedometer drive cable.

2. Unscrew the acorn nuts, washers and rubber dampers securing the instrument cluster.

3. Remove the headlight as described under *Headlight Replacement (XL Series)* in this chapter.

4. Within the headlight housing, disconnect the electrical connections going to the instrument cluster. This consists of the red colored connector containing 6 wires (one black, one light green/red, one orange, one light blue, one green and one blue) and 2 separate wires (one green and one brown/white).

5. Carefully pull the electrical wires out through the back of the headlight housing and pull the cluster up and off the mounting bracket.

6. Install by reversing these removal steps. Be sure to install all rubber dampers.

Fuse (XL Series)

There is only one fuse on the XL series models (the XR series is not equipped with a

fuse). It is the 10 amp main fuse located under the right-hand side cover.

The fuse is on a fuse holder attached to the battery hold-down strap.

NOTE

Always carry a spare fuse.

Whenever a fuse blows, find out the reason for the failure before replacing the fuse. Usually the trouble is a short circuit in the wiring. This may be caused by

worn-through insulation or a disconnected wire shorted to ground.

CAUTION

Never substitute aluminum foil or wire for a fuse. Never use a higher amperage fuse than specified. An overload could cause a fire and complete loss of the motorcycle.

WIRING DIAGRAMS

Wiring diagrams are located at the end of this book.

ELECTRICAL SYSTEMS

Table 2 VOLTAGE REGULATOR/RECTIFIER TEST POINTS (XL200R)

Test Probe Positive (+)	Negative (-)	Value (ohms)
Yellow	pink	infinity
Yellow	green	1-20
Yellow	red	infinity
Yellow	black	1-50
Pink	yellow	infinity
Pink	green	1-20
Pink	red	infinity
Pink	black	1-50
Green	yellow	infinity
Green	pink	infinity
Green	red	infinity
Green	black	0.2-10
Red	yellow	1-20
Red	pink	1-20
Red	green	3-100
Red	black	3-100
Black	yellow	infinity
Black	pink	infinity
Black	green	0.2-20
Black	red	infinity

Table 3 CDI TROUBLESHOOTING

Symptoms	Probable cause
Weak spark	Poor connections (clean and retighten) High voltage leak (replace defective wire) Defective coil (replace ignition coil)
No spark	Wiring broken (replace wire) Defective ignition (replace coil) Defective pulser coil in magneto (replace coil)

Table 4 CDI CIRCUIT TESTING

Model	Year	Exciter	Pulser	Ignition coil with Cap	Pri.	Sec.
XL200R	1983	50-200	30-200	0.2-0.4	3.6K-4.4K	7.3K-11K
XL200R	1984	50-200	30-200	0.1-0.3	3.7K-4.5K	7.4K-11K
XR200R	1984-1985	50-200	460-580	0.1-0.3	3.7K-4.5K	7.4K-11K
XR200R	1986-on	50-200	30-200	0.1-0.3	3.7K-4.5K	7.4K-11K
TLR200	1986-on	100-300	400-500	0.1-0.3	3.7K-4.5K	7.4K-11K

Table 1 CHARGING CURRENT *

Model	3,000 rpm	4,000 rpm	8,000 rpm
XL125S	—	—	—
XL185S	—	1.2 A/8.0 V	3.4 A/9.0 V
XL200R /TLR200	2.0 A/17.5 V	1.2 A/7.0 V	4.0 A/8.9 V
		—	4.5 A/18.5 V

* Headlight ON and high beam

Table 5 REPLACEMENT BULBS

Item	Volts/watts	CP*	SAE No.
Headlight			
XL125S (1979-1984), XL185S	6V 35/38.5	—	—
XR185, XR200	6V 25/25W	—	—
XR200R (1981-1983)	6V 25W	—	—
XR200R (1986-on)	12V 35W	—	—
TLR200, XL125S (1985)	12V 35/35W	—	—
Taillight/brakelight			
XL125S (1979-1984), XL185S	6V 5.3/25w	3/32	—
TLR200, XL125S (1985)	12V 8/27W	3/32	1157
Taillight			
XR185, XR200	6V 3W	2	55
XR200R (1981-1983)	6V 3W	2	55
XR200R (1986-on)	12V 3.4W	—	—
Turn Signal			
XL125S (1979-1984), XL185S	6V 18W	21	1129
TLR200, XL125S (1985)	12V 23/23W	32/32	1073
Speedometer			
6 volt models	6V 3W	2	55
12 volt models	12V 3.4W	2	—
Neutral indicator			
6 volt models	6V 3W	2	55
12 volt models	12V 3.4W	2	—
Turn signal indicator			
6 volt models	6V 1.7W	1	51
12 volt models	12V 3.4W	2	—
High beam indicator			
6 volt models	6V 1.7W	1	51
12 volt models	12V 1.7W	1	—

* CP=Candle power.

CHAPTER EIGHT

FRONT SUSPENSION AND STEERING

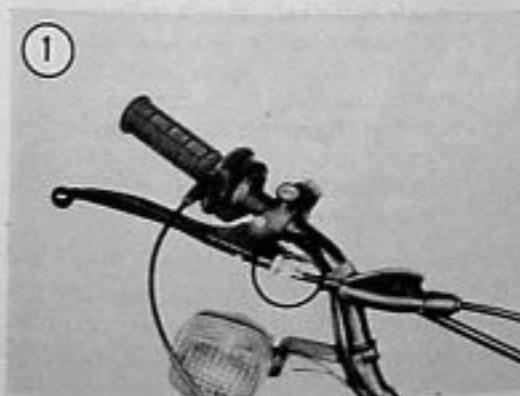
This chapter describes repair and maintenance of the front wheel, forks and steering components.

Refer to Table 1 for torque specifications for the front suspension. Tables 1-4 are located at the end of this chapter.

FRONT WHEEL

Removal (Except XR200R/XL200R)

1. Place a milk crate or wood block(s) under the engine to support it securely with the front wheel off the ground.
2. Slacken the brake cable at the hand lever (Figure 1).
3. Unscrew the speedometer cable set screw (Figure 2). Pull the speedometer cable free from the hub (A, Figure 3).



4. Remove the cotter pin and remove the axle nut (B, Figure 3).

5. At the brake panel, loosen the locknut (A, Figure 4) and remove the cable end from the brake arm (B, Figure 4). Remove the brake cable from the bracket on the brake panel (C, Figure 4).

6. Withdraw the axle (Figure 5) from the right-hand fork leg.

7. Pull the wheel down and forward. This allows the brake panel to disengage from the boss on the left-hand fork slider. Remove the wheel.

Installation (Except XR200R/XL200R)

1. Make sure the axle bearing surfaces of the fork sliders are free from burrs and nicks.
2. Clean the axle in solvent and thoroughly dry. Make sure all surfaces that the axle comes in contact with are clean and free from road dirt and old grease prior to installation.
3. Position the wheel into place, carefully inserting the groove in the brake panel into the groove in the raised boss in the left-hand fork slider (Figure 6). This is necessary for proper brake operation.
4. Install the axle from the right-hand side and install the nut. Tighten the nut to 40-50 N·m (29-36 ft.-lb.).

5. Install a new cotter pin and bend the ends over completely.
6. Slowly rotate the wheel and install the speedometer cable into the speedometer housing. Install and tighten the cable set screw.
7. After the wheel is completely installed, rotate it several times and apply the brakes a couple of times to make sure that the wheel rotates freely and that the brake is operating correctly.
8. Adjust the front brake as described under *Front Brake Lever Adjustment* in Chapter Three.

Removal (XR200R/XL200R)

1. Place a milk crate or wood block(s) under the engine to support it securely with the front wheel off the ground.
2. Slacken the brake cable at the hand lever (Figure 7).
3. Unscrew the speedometer cable set screw (A, Figure 8). Pull the speedometer cable free from the hub.
4. At the brake panel, loosen the locknut (B, Figure 8) and remove the cable end from the brake arm (C, Figure 8). Remove the brake cable from the bracket on the brake panel (D, Figure 8).
5. Remove the axle holder nuts (A, Figure 9) and remove the axle holder.
6. Unscrew the axle (B, Figure 9) from the left-hand fork leg.
7. Pull the wheel down and forward. This allows the the brake panel to disengage from the boss on the left-hand fork slider. Remove the wheel.

Installation (XR200R/XL200R)

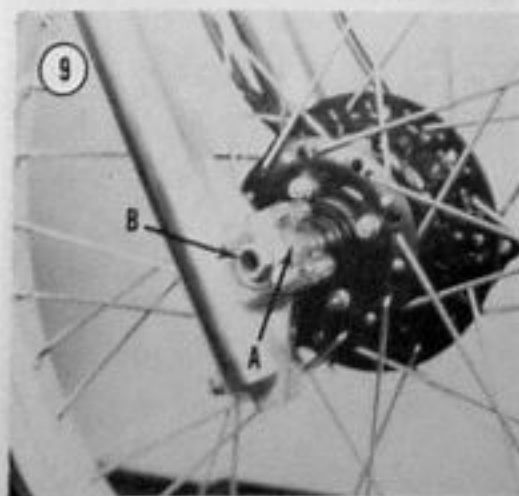
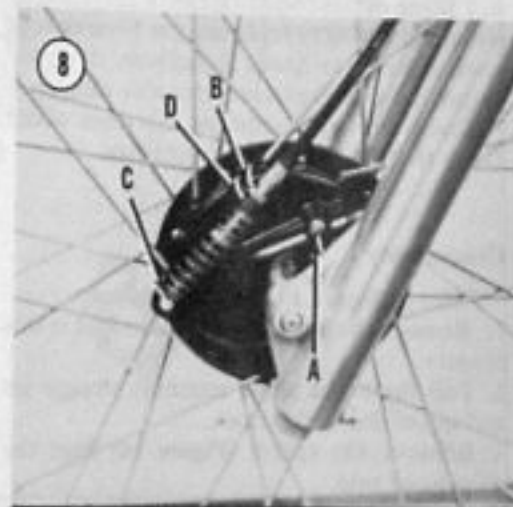
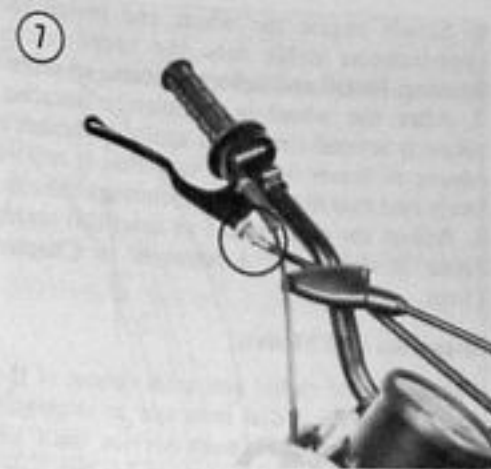
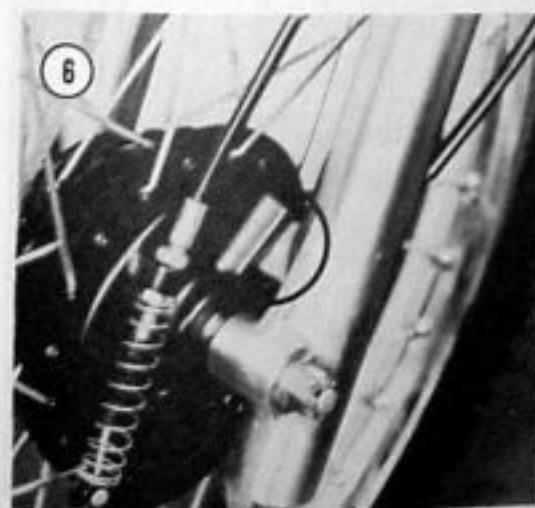
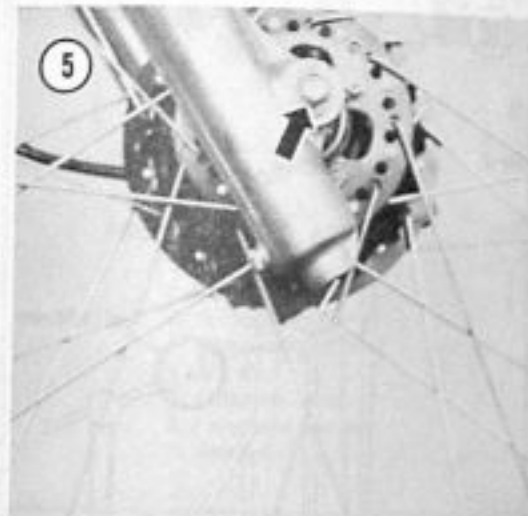
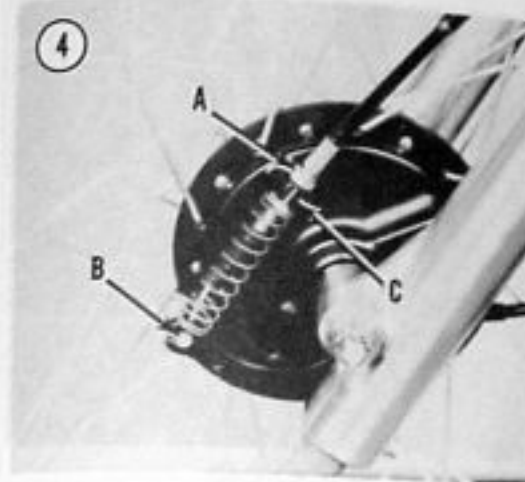
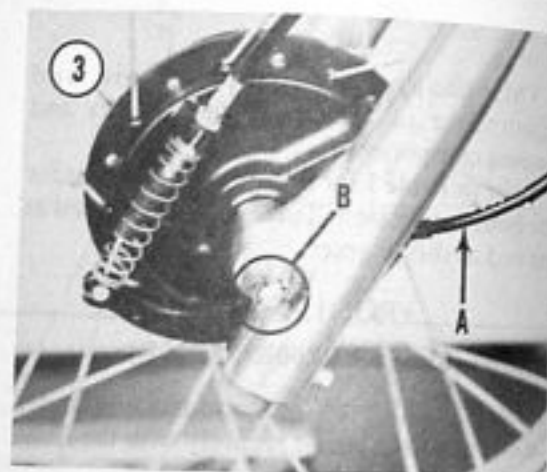
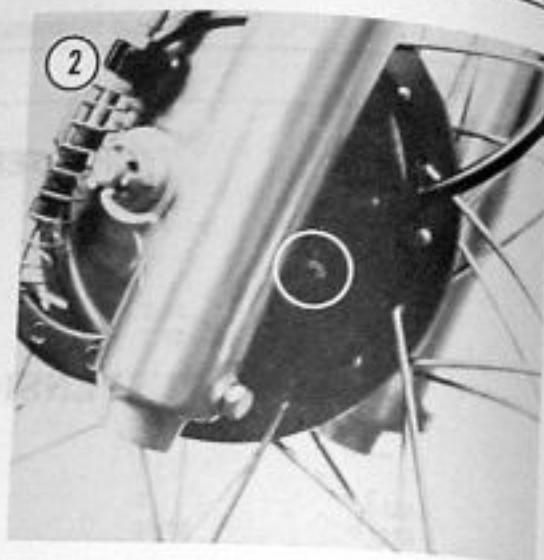
1. Make sure the axle bearing surfaces of the fork sliders and axle holder are free from burrs and nicks.
2. Clean the axle in solvent and thoroughly dry. Make sure all surfaces that the axle comes in contact with are clean and free from road dirt and old grease prior to installation.
3. Position the wheel in place, carefully inserting the groove in the brake panel into the groove in the left-hand fork slider. This is necessary for proper brake operation.

4. Install the axle from the right-hand side through the wheel hub. Screw it into the left-hand slider and tighten to 50-80 N·m (36-58 ft.-lb.).

NOTE

The axle holder nuts must be tightened in the manner and to the torque value described in Step 5. After installation is complete, there will be a slight gap at the bottom (Figure 10) with no gap at the top. If done incorrectly, the studs may fail, resulting in loss of control of the bike when riding.

5. Install the axle holder with the "UP" and arrow marks (Figure 11) facing upward. Install the nuts. Tighten the upper nuts first, then the lower nuts to 10-14 N·m (7-10 ft.-lb.).



6. Slowly rotate the wheel and install the speedometer cable into the speedometer housing. Install and tighten the cable set screw.
7. After the wheel is completely installed, rotate it several times and apply the brakes a couple of times to make sure that it rotates freely and that the brake is operating correctly.
8. Adjust the front brake as described under *Front Brake Lever Adjustment* in Chapter Three.

Inspection (All Models)

Measure the radial and axial runout of the wheel rim with a dial indicator as shown in Figure 12. The maximum service limit for both radial and axial runout is 2.0 mm (0.08 in.). Some of this condition can be corrected by either tightening or replacing any loose or bent spokes. Refer to *Spoke Adjustment* or *Spoke Inspection and Replacement* in this chapter.

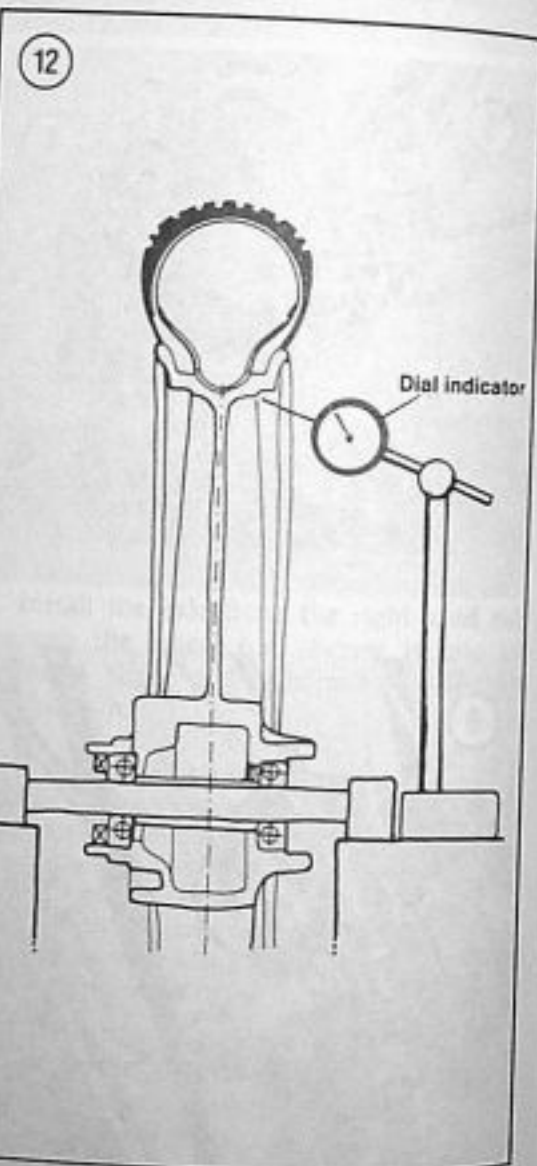
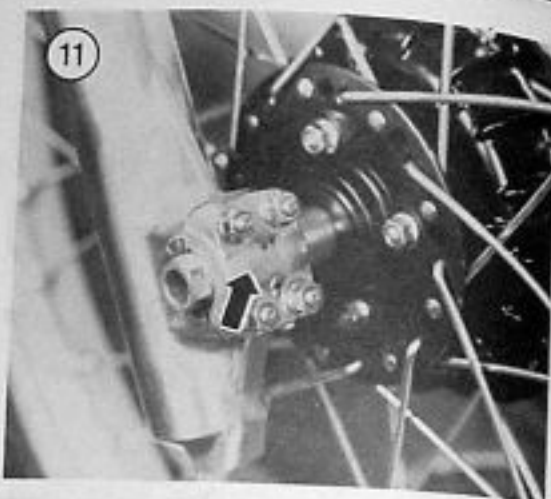
Check the axle runout as described under *Front Hub Inspection* in this chapter.

FRONT HUB

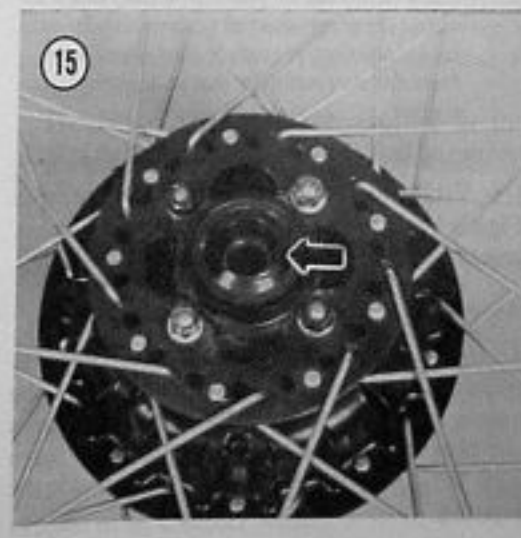
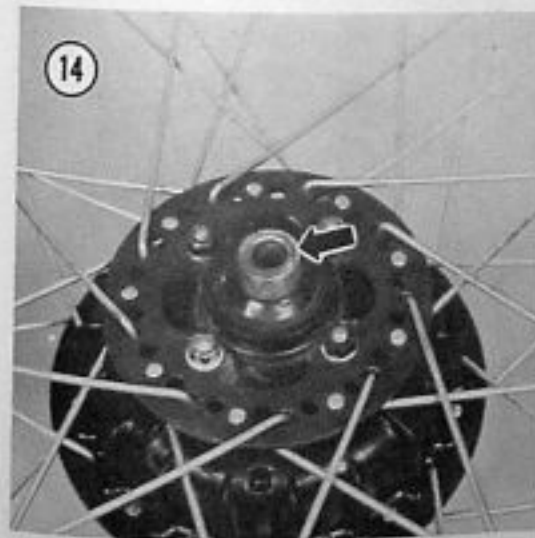
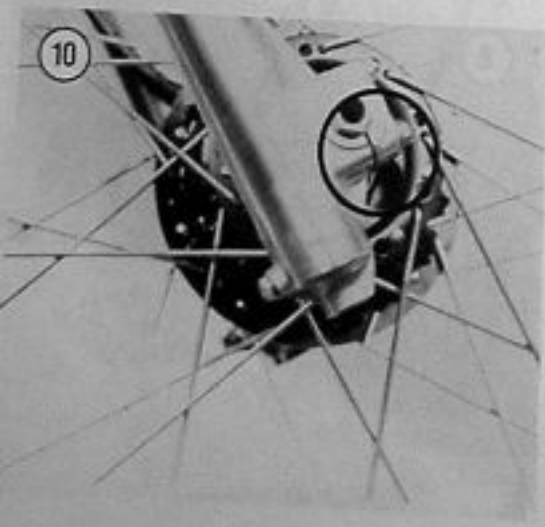
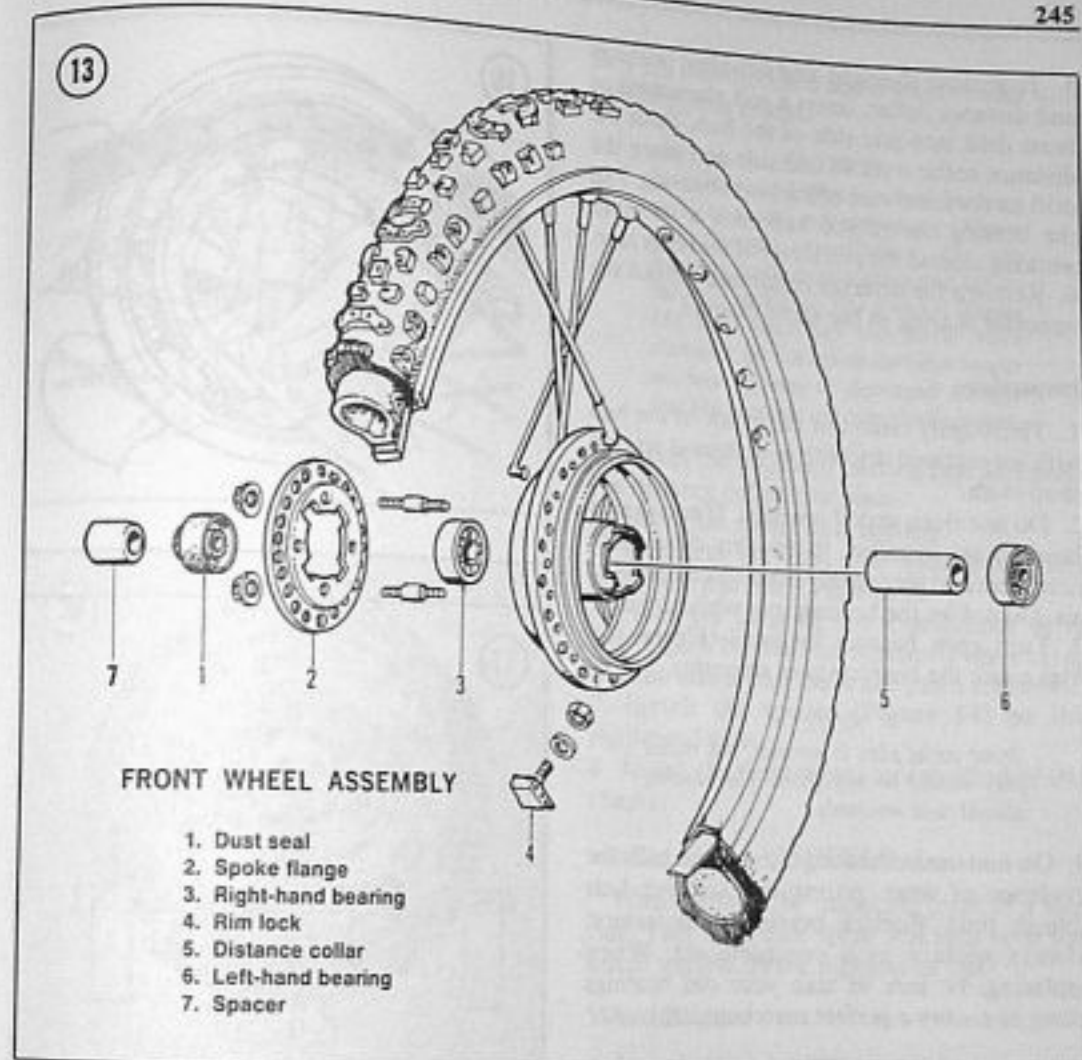
Disassembly

Refer to Figure 13 for this procedure.

1. Remove the front wheel as described in this chapter.
2. Pull the brake panel assembly straight up and out of the brake drum.
3. Remove the spacer (Figure 14) from the right-hand side.
4. Remove the dust seal (Figure 15) from the right-hand side.



FRONT SUSPENSION AND STEERING



5. To remove the right- and left-hand bearings and distance collar, insert a soft aluminum or brass drift into one side of the hub. Push the distance collar over to one side and place the drift on the inner race of the lower bearing. Tap the bearing out of the hub with a hammer working around the perimeter of the inner race.
6. Remove the distance collar and tap out the opposite bearing in the same manner.

Inspection

1. Thoroughly clean out the inside of the hub with solvent and dry with compressed air or a shop cloth.
2. Do not clean sealed bearings. If non-sealed bearings are installed, thoroughly clean them in solvent and thoroughly dry with compressed air. Do not let the bearing spin while drying.
3. Turn each bearing by hand (Figure 16). Make sure the bearings turn smoothly.

NOTE

Some axial play is normal, but radial play should be negligible. The bearing should turn smoothly.

4. On non-sealed bearings, check the balls for evidence of wear, pitting or excessive heat (bluish tint). Replace bearings if necessary; always replace as a complete set. When replacing, be sure to take your old bearings along to ensure a perfect match.

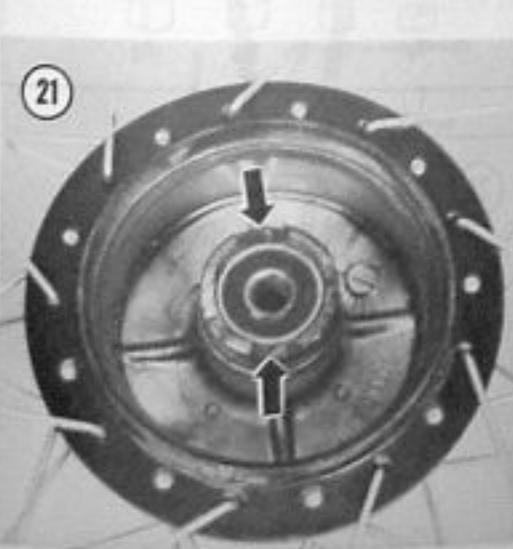
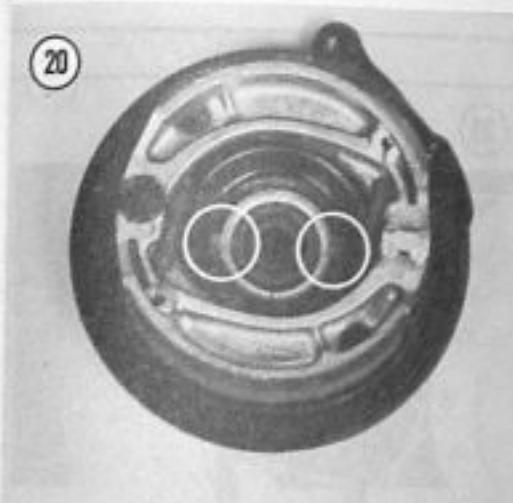
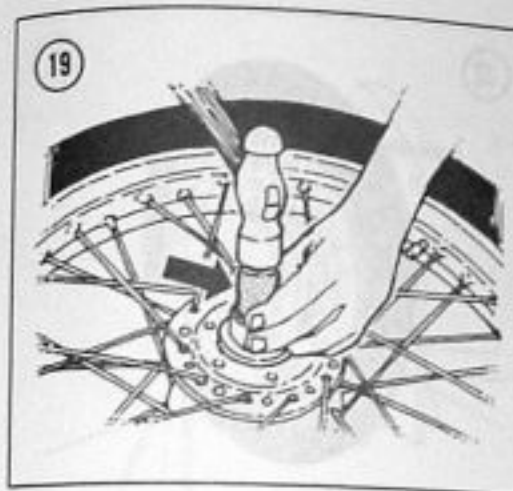
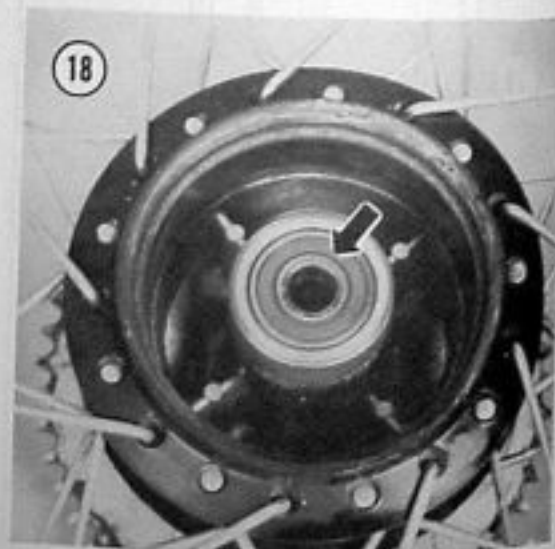
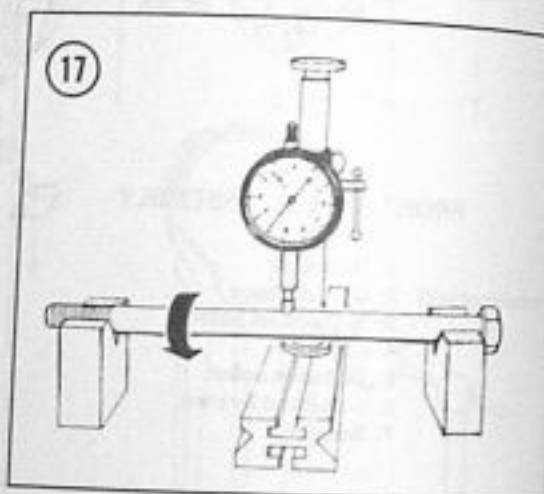
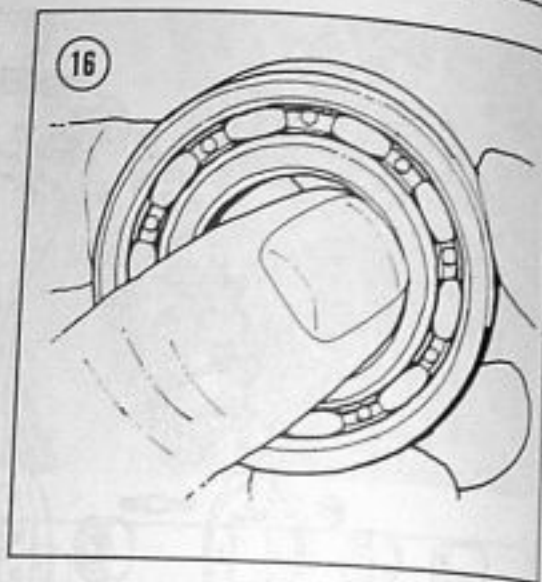
NOTE

Fully sealed bearings are available from many bearing specialty shops. Fully sealed bearings provide better protection from dirt and moisture that may get into the hub.

5. Check the axle for wear and straightness. Use V-blocks and a dial indicator as shown in Figure 17. If the runout is 0.2 mm (0.008 in.) or greater, the axle should be replaced.

Assembly

1. On non-sealed bearings, pack the bearings with a good quality bearing grease. Work the grease in between the balls thoroughly. Turn the bearing by hand a couple of times to make sure the grease is distributed evenly inside the bearing.



2. Pack the wheel hub and distance collar with multipurpose grease.

CAUTION

Install the stock Honda wheel bearings with the sealed side facing out (Figure 18). During installation, tap the bearings squarely into place and tap on the outer race only. Use a socket (Figure 19) that matches the outer race diameter. Do not tap on the inner race or the bearing may be damaged. Be sure that the bearings are completely seated.

3. Install the left-hand bearing first and press the distance collar into place.
4. Install the right-hand bearing.
5. Lubricate the dust seal with grease and install the dust seal (Figure 15).
6. Align the tangs of the speedometer drive dog (Figure 20) with the notches (Figure 21) in the hub and install the brake panel assembly.
7. Install the spacer (Figure 14) on the right-hand side.
8. Install the front wheel as described in this chapter.

WHEELS

Wheels should be inspected prior to a long ride. This little time spent will help keep you out of trouble on the highway or trail.

Wheel Balance

An unbalanced wheel is unsafe. Depending on the degree of unbalance and the speed of the bike, the rider may experience anything from a mild vibration to a violent shimmy and loss of control.

The balance weights are applied to the spokes on the light side of the wheel to correct the condition.

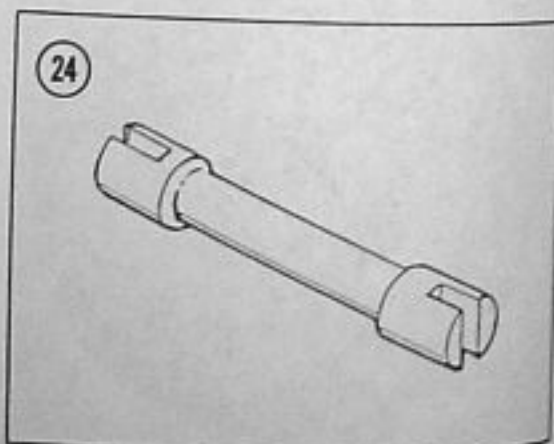
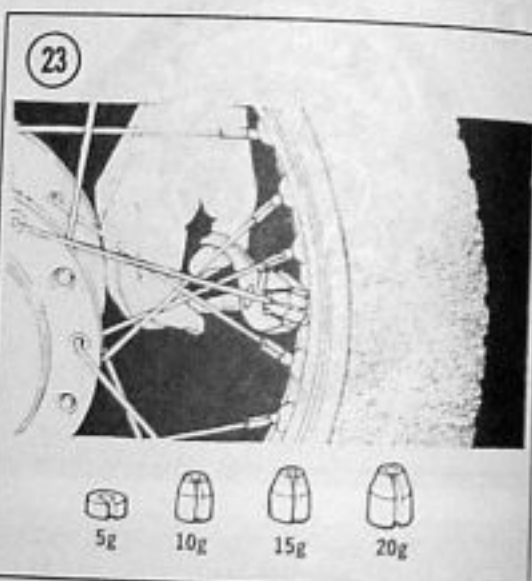
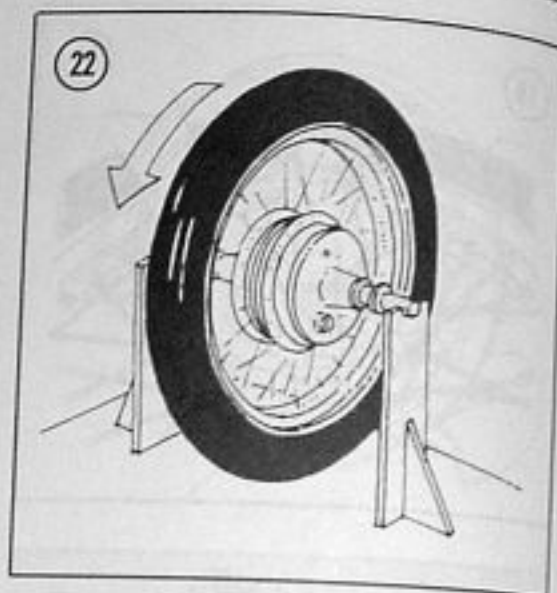
NOTE

Be sure to balance the rear wheel with the driven sprocket assembly attached as it will affect the balance.

Before you attempt to balance the wheel, check to be sure that the wheel bearings are in good condition and properly lubricated. The wheel must rotate freely.

1. Remove the wheel as described in this chapter or in Chapter Nine.

2. Mount the wheel on a fixture such as the one shown in Figure 22 so it can rotate freely.
3. Give the wheel a spin and let it coast to a stop. Mark the tire at the lowest point.
4. Spin the wheel several more times. If the wheel keeps coming to rest at the same point, it is out of balance.
5. Attach a weight to the upper (or light) side of the wheel on the spoke (Figure 23). Weights come in 4 sizes: 5, 10, 15 and 20 grams. Crimp the weights onto the spoke with ordinary gas pliers.
6. Experiment with different weights until the wheel comes to rest at a different position each time it is spun. When this happens, consider the wheel balanced. Tighten the weights so they won't be thrown off.



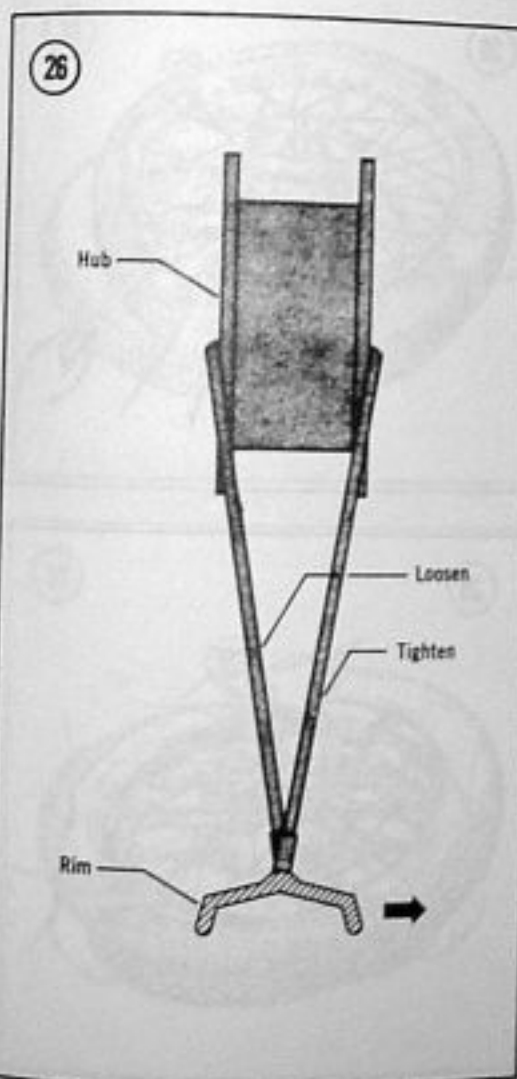
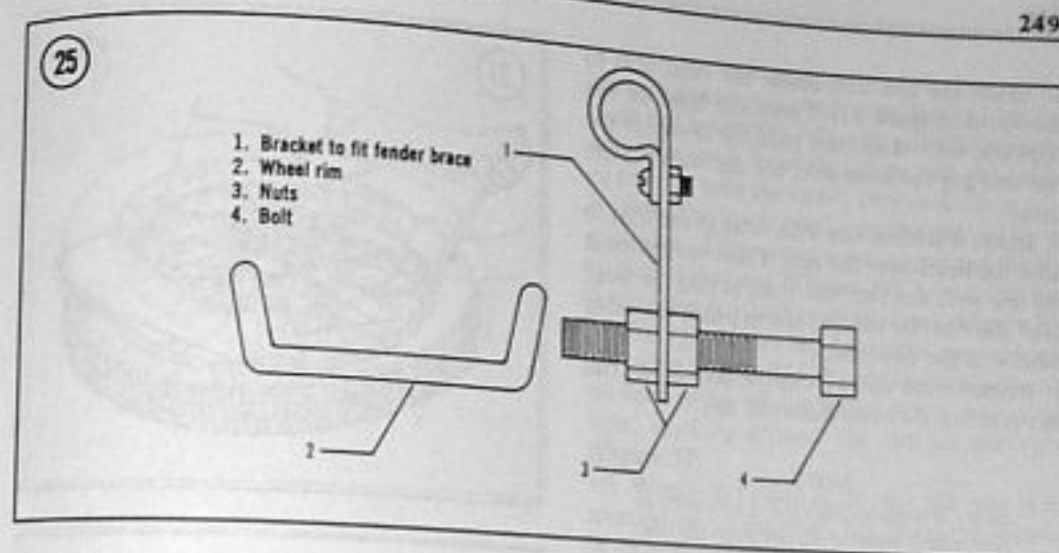
Spoke Inspection and Replacement

Spokes loosen with use and should be checked periodically. The "tuning fork" method for checking spoke tightness is simple and works well. Tap each spoke with a spoke wrench (Figure 24) or the shank of a screwdriver and listen for a tone. A tightened spoke will emit a clear, ringing tone and a loose spoke will sound flat. All the spokes in a correctly tightened wheel will emit tones of similar pitch but not necessarily the same precise tone.

Bent or stripped spokes should be replaced as soon as they are detected, as they can destroy an expensive hub. Unscrew the nipple from the spoke and depress the nipple into the rim far enough to free the end of the spoke; take care not to push the nipple all the way in. Remove the damaged spoke from the hub and use it to match a new spoke of identical length. If necessary, trim the new spoke to match the original and dress the end of the thread with a thread die. Install the new spoke in the hub and screw on the nipple; tighten it until the spoke's tone is similar to the tone of the other spokes in the wheel. Periodically check the new spoke; it will stretch and must be retightened several times before it takes a final set.

Spoke Adjustment

If all spokes appear loose, tighten all on one side of the hub, then tighten all on the other



side. One-half to one turn should be sufficient; do not overtighten.

After tightening the spokes, check rim runout to be sure you haven't pulled the rim out of shape.

One way to check rim runout is to mount a dial indicator on the front fork or swing arm, so that it bears against the rim.

If you don't have a dial indicator, improvise one as shown in Figure 25. Adjust the position of the bolt until it just clears the rim. Rotate the rim and note whether the clearance increases or decreases. Mark the tire with chalk or light crayon at areas that produce significantly large or small clearance. Clearance must not change by more than 2.0 mm (0.08 in.).

To pull the rim out, tighten spokes which terminate on the same side of the hub and loosen spokes which terminate on the opposite side of the hub (Figure 26). In most cases, only a slight amount of adjustment is necessary to true a rim. After adjustment, rotate the rim and make sure another area has not been pulled out of true. Continue adjustment and checking until runout is less than 2.0 mm (0.08 in.).

TIRE CHANGING

Removal

1. Remove the valve core and deflate the tire.
2. Press the entire bead on both sides of the tire into the center of the rim.
3. Lubricate the beads with soapy water.

4. Insert the tire iron under the bead next to the valve (Figure 27). Force the bead on the opposite side of the tire into the center of the rim and pry the bead over the rim with the tire iron.

5. Insert a second tire iron next to the first to hold the bead over the rim. Then work around the tire with the first tire iron, prying the bead over the rim. Be careful not to pinch the inner tube with the tire irons.

6. Remove the valve from the hole in the rim and remove the tube from the tire.

NOTE

Step 7 is required only if it is necessary to completely remove the tire from the rim, such as for tire replacement.

7. Stand the tire upright. Insert the tire iron between the second bead and the side of the rim that the first bead was pried over (Figure 28). Force the bead on the opposite side from the tire iron into the center of the rim. Pry the second bead off of the rim, working around the wheel with 2 tire irons as with the first bead. Remove the tire from the rim.

Installation

1. Carefully check the tire for any damage, especially inside.

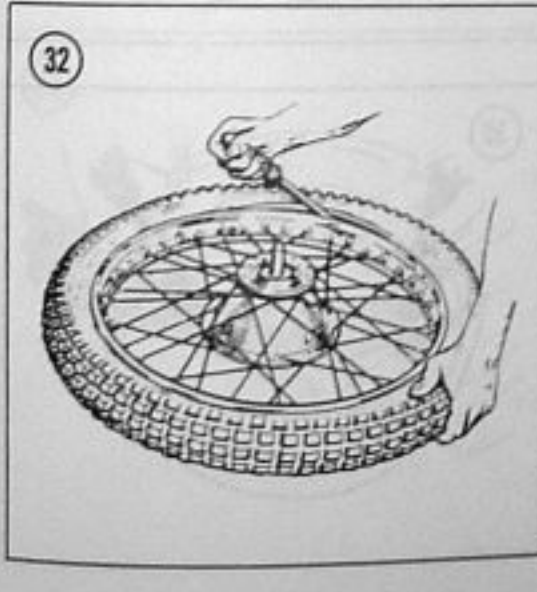
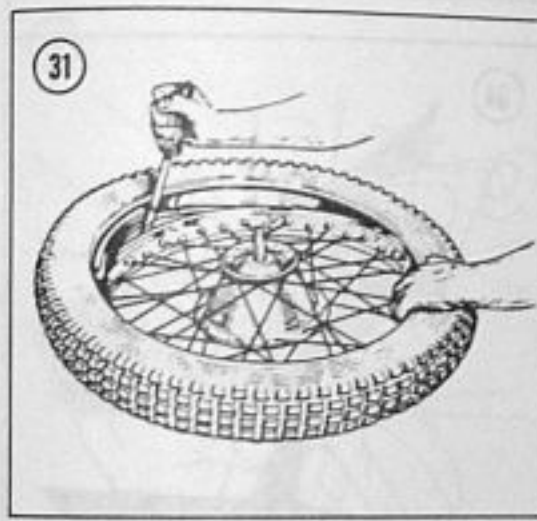
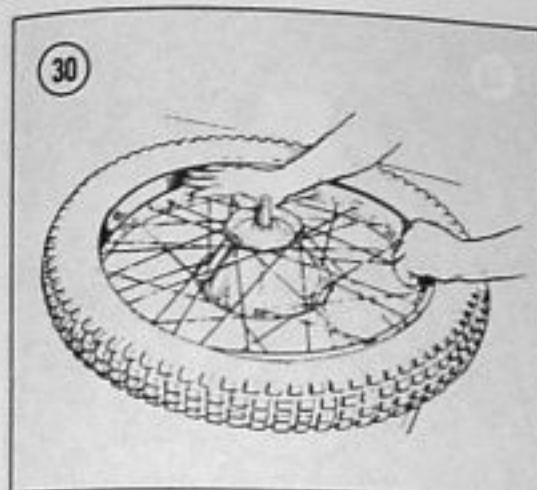
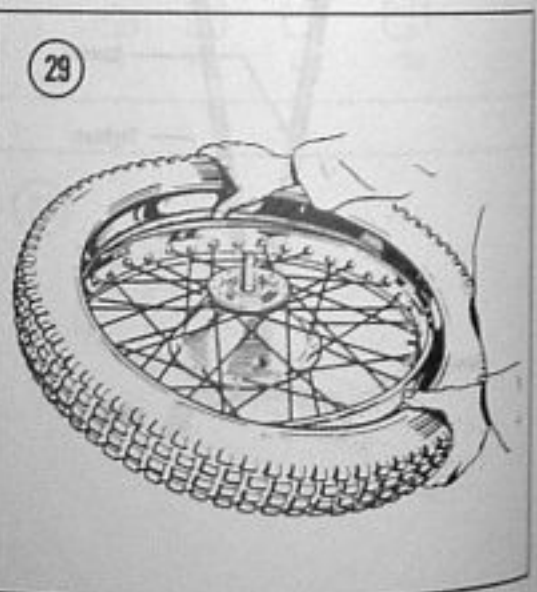
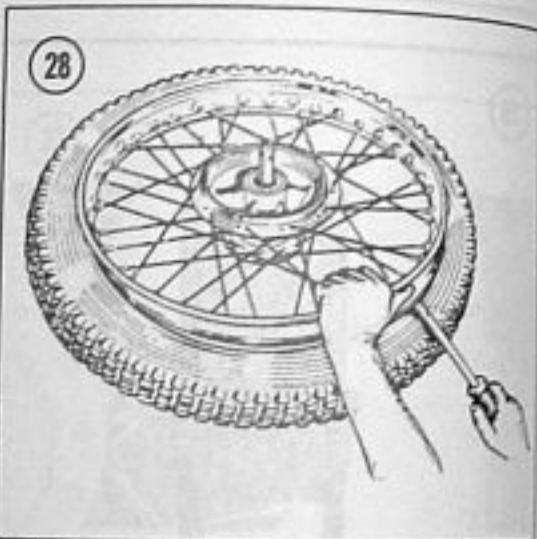
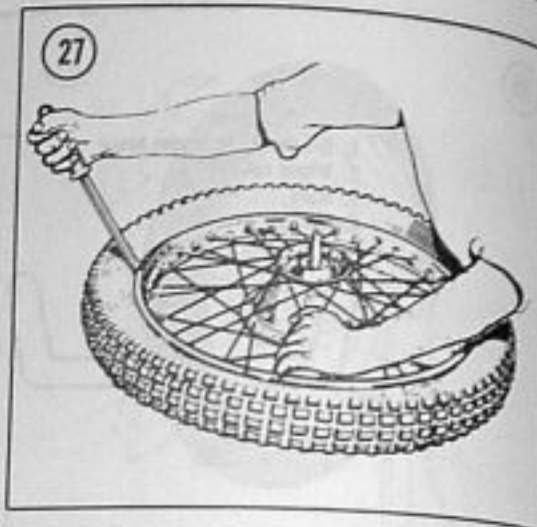
2. A new tire may have balancing rubbers inside. These are not patches and should not be disturbed. A colored spot near the bead indicates a lighter point on the tire. This should be placed next to the valve.

3. Check that the spoke ends do not protrude through the nipples into the center of the rim where they can puncture the tube. File off any protruding spoke ends. Be sure the rim rubber tape is in place with the rough side toward the rim.

4. Install the valve stem core and tighten securely.

5. Inflate the tube just enough to round it out. Too much air will make it difficult to install it in the tire and too little will increase the chances of pinching the tube with the tire irons. Install the tube into the tire.

6. Lubricate the tire beads and rim with soapy water.



7. Pull the tube partly out of the tire at the valve. Squeeze the beads together to hold the tube and insert the valve into the hole in the rim. The lower bead should go into the center of the rim with the upper bead outside it.

8. Press the lower bead into the rim center on each side of the valve, working around the tire in both directions (Figure 29). Use a tire iron for the last few inches of the bead (Figure 30).

9. Press the upper bead into the rim opposite the valve (Figure 31). Pry the bead into the rim on both sides of the initial point with a tire iron, working around the rim to the valve (Figure 32).

10. Wiggle the valve to be sure the tube is not trapped under the bead. Set the valve squarely in its hole before screwing on the valve nut to hold it against the rim.

11. Check the bead on both sides of the tire for even fit around the rim.

12. Inflate the tire slowly to seat the beads in the rim. It may be necessary to bounce the tire to complete the seating. Inflate to the required pressure; refer to Table 2. Balance the wheel as described in this chapter.

TIRE REPAIRS

Every rider will eventually experience trouble with a tire or tube. Repairs and replacement are fairly simple and every rider should know the techniques.

Patching a motorcycle tube is only a temporary fix. The tire flexes too much and the patch could rub right off. However, a patched tire will get you far enough to buy a new tube.

NOTE

A can of a pressurized tire sealant (Figure 33) can be carried in your tool box or tow vehicle. It may be able to seal the hole. This is only a temporary fix.

Tire Repair Kits

Tire repair kits can be purchased from motorcycle dealers and some auto supply stores. When buying, specify that the kit you want is for motorcycles.

There are 2 types of tire repair kits:

- Hot patch
- Cold patch

Hot patches are stronger because they actually vulcanize to the tube, becoming part of it. However, they are far too bulky to carry for roadside repairs and the strength is unnecessary for a temporary repair.

Cold patches are not vulcanized to the tube; they are simply glued to it. Though not as strong as hot patches, cold patches are still very durable. Cold patch kits are less bulky than hot and more easily applied under adverse conditions. A cold patch kit contains everything necessary and tucks easily into your emergency tool kit.

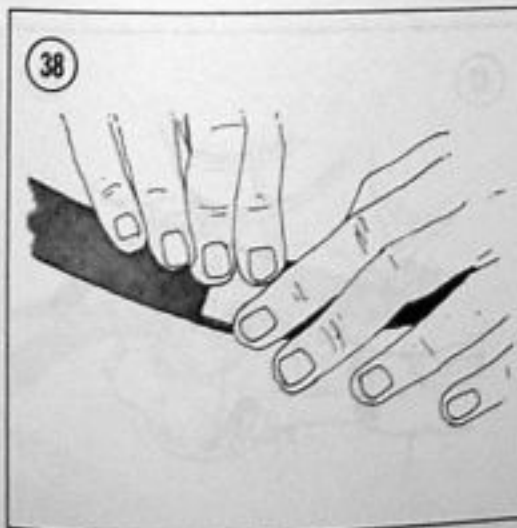
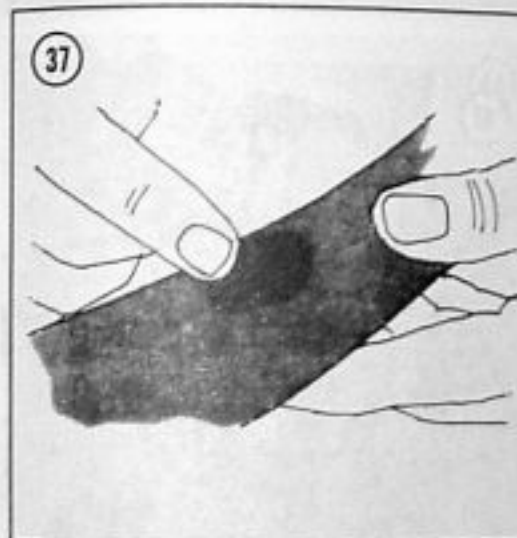
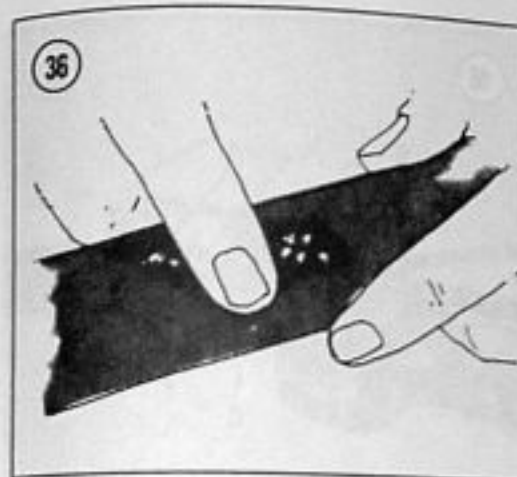
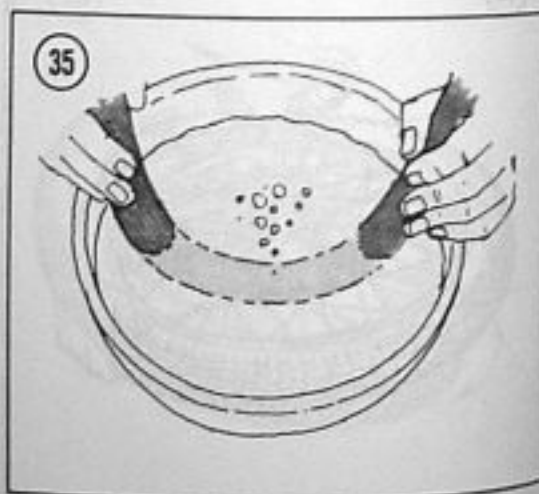
Tube Inspection

1. Remove the inner tube as described under *Tire Changing* in this chapter.
2. Install the valve core into the valve stem (Figure 34) and inflate the tube slightly. Do not overinflate.
3. Immerse the tube in water a section at a time (Figure 35). Look carefully for bubbles indicating a hole. Mark each hole and continue checking until you are certain that all holes are discovered and marked. Also make sure that the valve core is not leaking; tighten it if necessary.

NOTE

If you do not have enough water to immerse sections of the tube, try running your hand over the tube slowly and very close to the surface. If your hand is damp, it works even better. If you suspect a hole anywhere, apply some saliva to the area to verify it (Figure 36).

4. Apply a cold patch using the techniques described under *Cold Patch Repair* in this chapter.
5. Dust the patch area with talcum powder to prevent it from sticking to the tire.
6. Carefully check the inside of the tire casing for small rocks or sand which may have damaged the tube. If the inside of the tire is split, apply a patch to the area to prevent it from pinching and damaging the tube again.
7. Check the inside of the rim. Make sure the rim band is in place, with no spoke ends protruding which could puncture the tube.
8. Deflate the tube prior to installation in the tire.



Cold Patch Repairs

1. Remove the tube from the tire as described under *Tire Changing* in this chapter.
2. Roughen an area around the hole slightly larger than the patch, using a cap from the tire repair kit or a pocket knife. Do not scrape too vigorously or you may cause additional damage.
3. Apply a small quantity of special cement to the puncture and spread it evenly with your finger (Figure 37).
4. Allow the cement to dry until tacky—usually 30 seconds or so is sufficient.
5. Remove the backing from the patch.

CAUTION

Do not touch the newly exposed rubber with your fingers or the patch will not stick firmly.

6. Center the patch over the hole. Hold the patch firmly in place for about 30 seconds to allow the cement to set (Figure 38).
7. Dust the patched area with talcum powder to prevent sticking.
8. Install the tube as described in this chapter.

HANDLEBAR

Removal/Installation (Except XR200R)

1. Remove the rear view mirrors (A, Figure 39).



2. Remove the screws securing the left-hand handlebar switch assembly (B, Figure 39).

3. Remove the electrical wire plastic band and remove the electrical wires from the left-hand side of the handlebar.

4. Slacken the clutch cable (C, Figure 39) and disconnect the cable from the clutch hand lever.

5. Loosen the clutch bracket bolt (D, Figure 39) and slide off the clutch lever assembly.

6. Remove the screws (A, Figure 40) securing the throttle assembly. Slide off the assembly and carefully lay the throttle assembly and cable over the fender or back over the fuel tank. Be careful that the cable does not get crimped or damaged.

7. Remove the electrical wire plastic band (B, Figure 40) and remove the electrical wires from the right-hand side of the handlebar.

8. Remove the screw (C, Figure 40) securing the engine stop switch and slide off the switch and brake lever assembly.

9. Remove the bolts (Figure 41) securing the handlebar upper holders and remove the holders and the handlebar.

10. To maintain a good grip on the handlebar and to prevent it from slipping down, clean the knurled section of the handlebar with a wire brush. It should be kept rough so it will be held securely by the holders. The upper and lower holders should also be kept clean and free of any metal that may have been gouged loose by handlebar slippage.

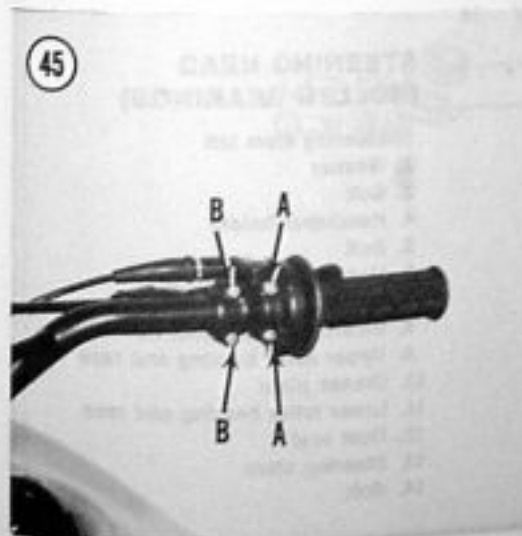
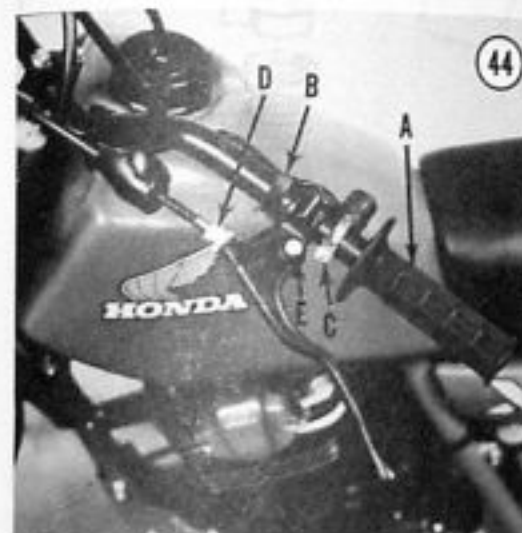
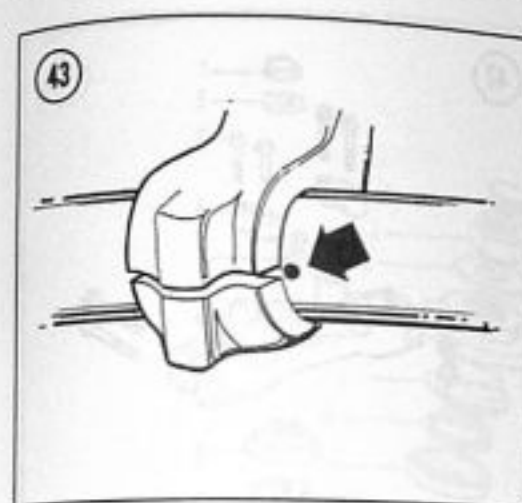
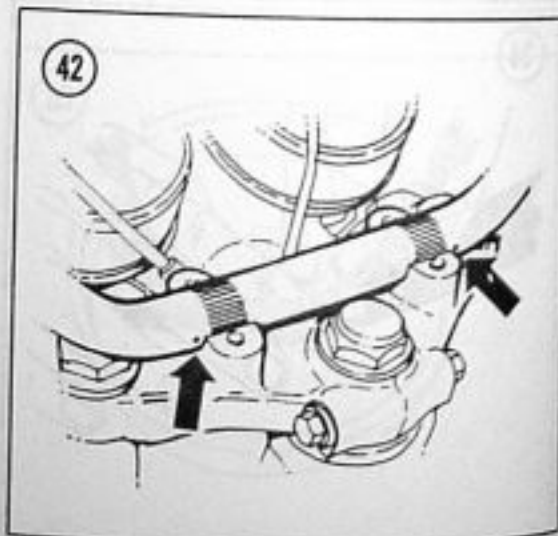
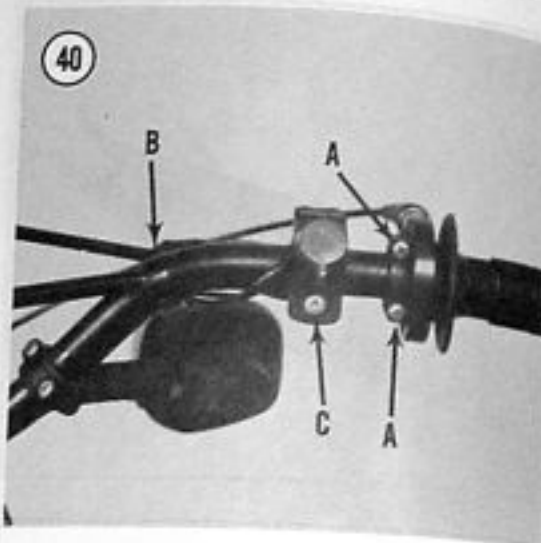
11. Install by reversing these removal steps, noting the following.

12. Position the handlebar in the lower holders on the fork bridge so the punch mark on the handlebar is aligned with the top surface of the upper holders (Figure 42).

13. Install the handlebar and handlebar upper holders. Install the holders with the punch mark toward the front.

14. Install the bolts. Tighten the front bolts first, then the rear to 20-25 N·m (14-18 ft.-lb.). After installation is complete, recheck the alignment of the punch mark.

15. When installing all assemblies, align the punch mark on the handlebar with the slit on the mounting bracket (Figure 43).



16. Adjust the clutch and throttle operation as described under *Clutch Adjustment* and *Throttle Operation/Adjustment* in Chapter Three.

Removal/Installation (XR200R)

1. Slide off the left-hand grip if necessary (A, Figure 44).

2. Remove the electrical wire plastic band (B, Figure 44).

3. Remove the screw securing the engine stop switch assembly (C, Figure 44) and remove the assembly and the electrical wires.

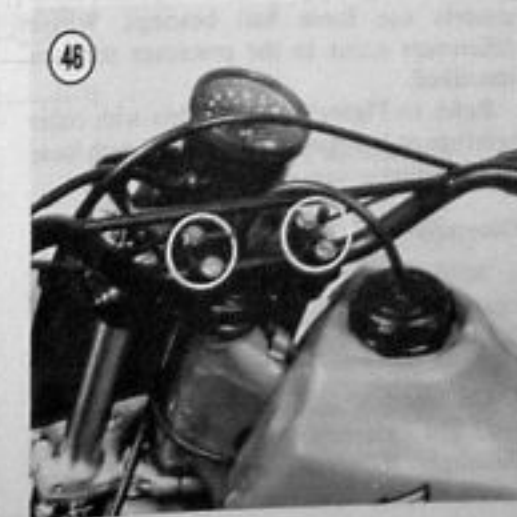
4. Slacken the clutch cable (D, Figure 44) and disconnect the cable from the clutch hand lever.

5. Remove the screws securing the clutch lever assembly (E, Figure 44) and remove the clutch lever assembly.

6. Remove the screws (A, Figure 45) securing the throttle assembly. Slide off the assembly and carefully lay the throttle assembly and cable over the fender or back over the fuel tank. Be careful that the cable does not get crimped or damaged.

7. Remove the screws (B, Figure 45) securing the front brake lever assembly and remove the assembly.

8. Remove the bolts (Figure 46) securing the handlebar upper holders and remove the holders and the handlebar.



9. To maintain a good grip on the handlebar and to prevent it from slipping down, clean the knurled section of the handlebar with a wire brush. It should be kept rough so it will be held securely by the holders. The upper and lower holders should also be kept clean and free of any metal that may have been gouged loose by handlebar slippage.

10. Install by reversing these removal steps, noting the following.

11. Position the handlebar in the lower holders on the fork bridge so the punch mark on the handlebar is aligned with the top surface of the upper holders (Figure 42).

12. Install the handlebar and handlebar upper holders. Install the holders with the punch mark toward the front.

13. Install the bolts. Tighten the front bolts first, then the rear to 18-30 N·m (13-22 ft.-lb.). After installation is complete, recheck the alignment of the punch mark.

14. When installing all assemblies, align the punch mark on the handlebar with the slit on the mounting bracket (Figure 43).

15. Adjust the clutch and throttle operation as described under *Clutch Adjustment* and *Throttle Operation/Adjustment* in Chapter Three.

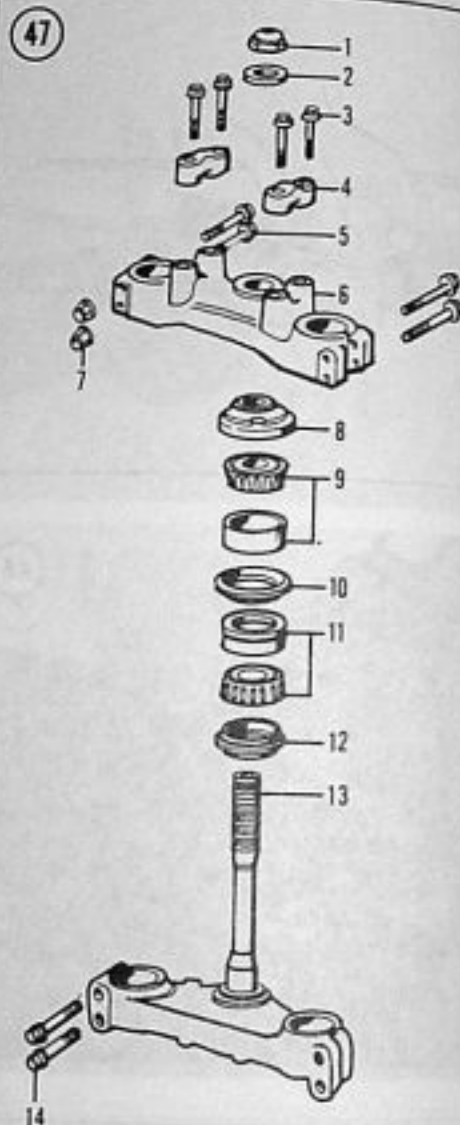
STEERING HEAD

There are 2 different type steering head assemblies used among the various models. Some models are equipped with assembled roller bearings (upper and lower) while other models use loose ball bearings. Where differences occur in the procedure they are identified.

Refer to Figure 47 for models with roller bearings or to Figure 48 for models with loose ball bearings.

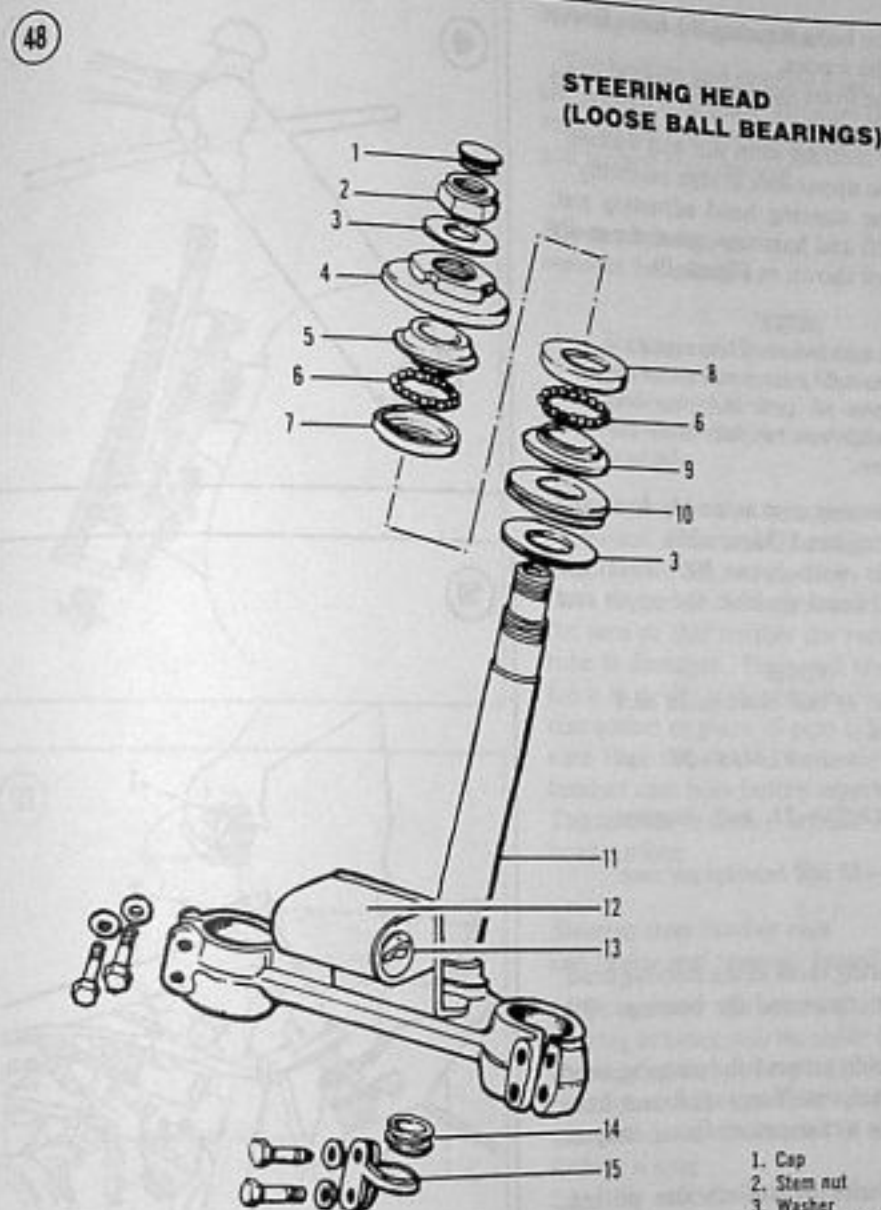
Disassembly

1. Remove the front wheel as described in this chapter.
2. Remove the handlebar as described in this chapter.
3. On models so equipped, remove the headlight assembly as described under *Headlight Removal/Installation* in Chapter Seven.



**STEERING HEAD
(ROLLER BEARINGS)**

1. Steering stem nut
2. Washer
3. Bolt
4. Handlebar holder
5. Bolt
6. Upper fork bridge
7. Nut
8. Steering head adjust nut
9. Upper roller bearing and race
10. Grease plate
11. Lower roller bearing and race
12. Dust seal
13. Steering stem
14. Bolt



1. Cap
2. Stem nut
3. Washer
4. Steering head adjusting nut
5. Upper race—top bearing
6. Ball bearings
7. Lower race—top bearing
8. Upper race—bottom bearing
9. Lower race—bottom bearing
10. Dust seal
11. Steering stem
12. Steering lock holder
13. Steering lock tumbler
14. Grommet
15. Brake cable guide

4. Remove the bolts securing the front fender and remove the fender.
5. Remove the front forks as described in this chapter.
6. Loosen the steering stem nut and washer.
7. Remove the upper fork bridge assembly.
8. Remove the steering head adjusting nut. Use a large drift and hammer or use the easily improvised tool shown in **Figure 49**.

NOTE

On models with loose ball bearings, have an assistant hold a large pan under the steering stem to catch the loose ball bearings while you carefully lower the steering stem.

9. Lower the steering stem assembly down and out of the steering head (**Figure 50**).
10. On models with loose ball bearings, remove the ball bearings from the upper and lower race.

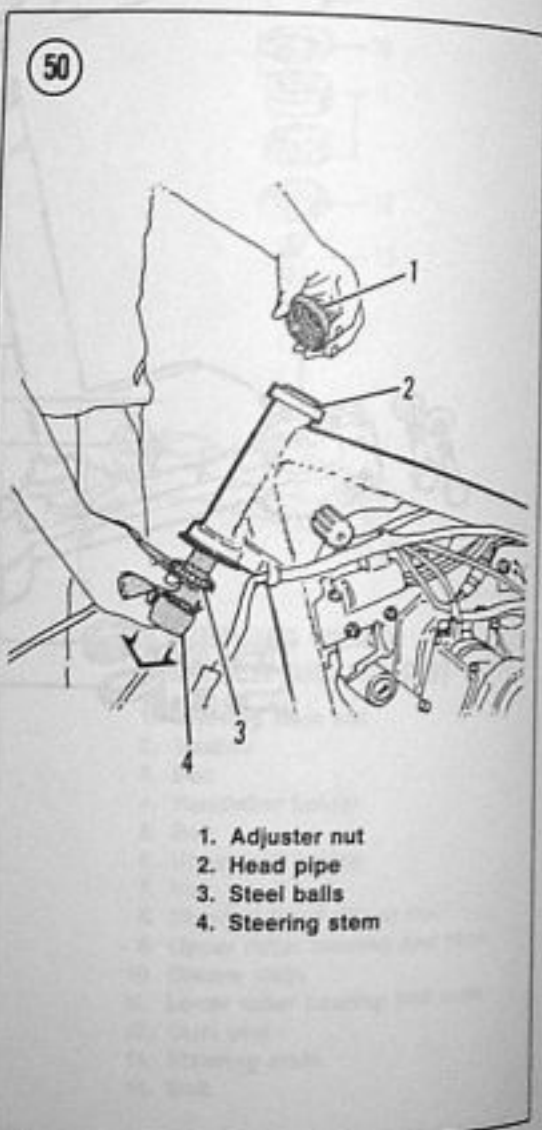
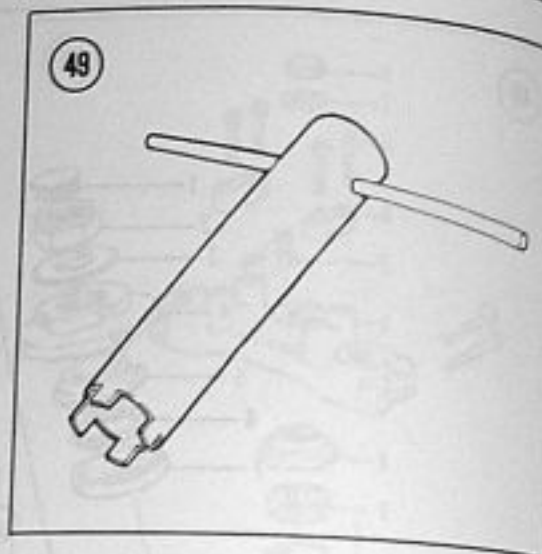
NOTE

The number of ball bearings in each model varies:

- a. XL125S and XL185S—20 ball bearings per race.
- b. XR185/XR200—21 ball bearings per race.
- c. TLR200—18 ball bearings per race.

Inspection

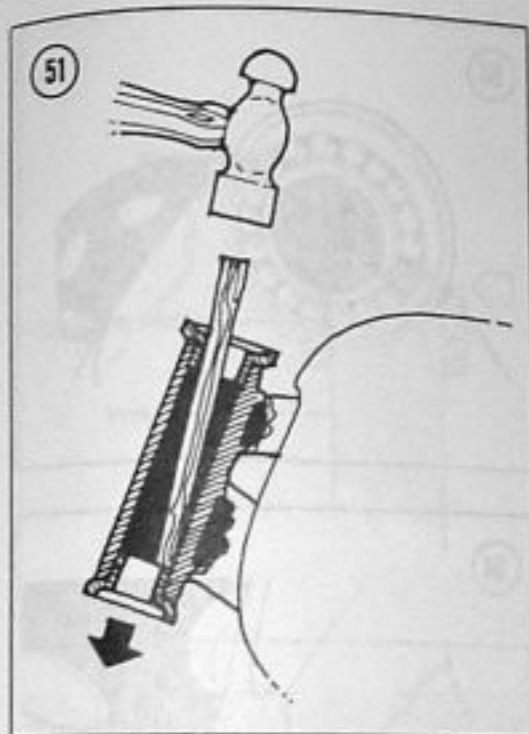
1. Clean the bearing races in the steering head, the steering stem races and the bearings with solvent.
2. Check the welds around the steering head for cracks and fractures. If any are found, have them repaired by a competent frame shop or welding service.
3. Check the balls or rollers for pitting, scratches or discoloration indicating wear or corrosion. Replace them in sets if any are bad.
4. Check the races for pitting, galling and corrosion. If any of these conditions exist, replace the races as described under **Steering Head Bearing Races** in this chapter.
5. Check the steering stem for cracks and check its race for damage or wear. If this race or any race is damaged, the bearings should be replaced as a complete bearing set. Take the old races and bearings to your dealer to ensure accurate replacement.

**Steering Head Bearing Races**

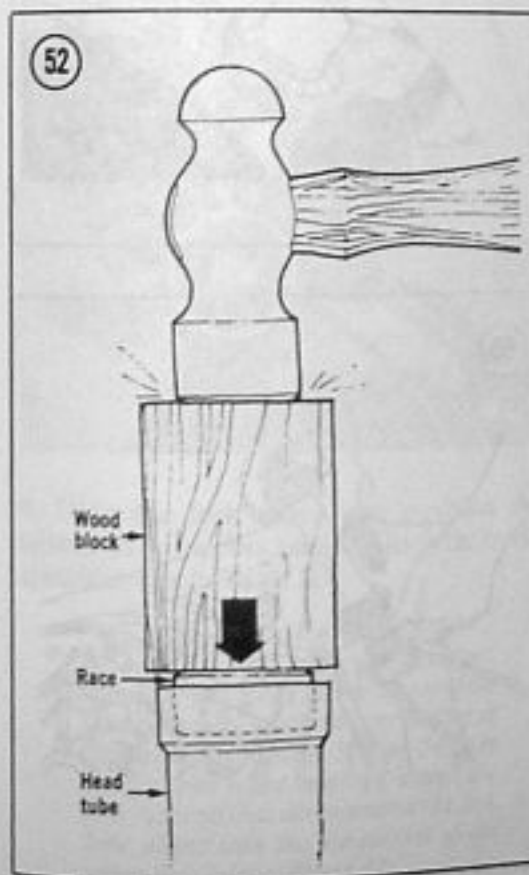
The headset and steering stem bearing races are pressed into place. Because they are easily bent, do not remove them unless they are worn and require replacement.

Headset bearing race removal/installation**NOTE**

The upper and lower bearings and races are not the same size. The lower one is the larger of the two. Be sure that you install them at the proper ends of the head tube.



To remove the headset race, insert a hardwood stick or soft punch into the head tube (**Figure 51**) and carefully tap the race out from the inside. After it is started, tap around the race so that neither the race nor the head tube is damaged. To install the headset race, tap it in slowly with a block of wood, a suitable size socket or piece of pipe (**Figure 52**). Make sure that the race is squarely seated in the headset race bore before tapping it into place. Tap the race in until it is flush with the steering head surface.

**Steering stem bearing race and grease seal removal/installation**

1. To remove the steering stem race (lower bearing or inner race on roller bearing models) try twisting and pulling it up by hand. If it will not come off, carefully pry it up with a screwdriver; work around in a circle, prying a little at a time.
- 2A. On models with loose ball bearings, remove the lower bearing race, dust seal and dust seal washer.
- 2B. On models with roller bearings, remove the lower bearing and internal race and dust seal.
- 3A. On models with loose ball bearings, install the dust seal washer and race. Slide the lower race over the steering stem with the bearing surface pointing up.
- 3B. On models with roller bearings, install the dust seal and lower roller bearing and internal race.

4. Tap the race or roller bearing down with a piece of hardwood; work around in a circle so the race (or bearing) will not be bent. Make sure it is seated squarely and is all the way down.

Steering Head Assembly

Refer to Figure 47 for models with roller bearings or Figure 48 for models with loose ball bearings.

1. Make sure the steering head and stem races are properly seated.

NOTE

The number of ball bearings in each model varies:

- a. XL125S and XL185S—20 ball bearings per race.
- b. XR185/XR200—21 ball bearings per race.
- c. TLR200—18 ball bearings per race.

2. On models with loose ball bearings, apply a coat of cold grease to the upper bearing race cone and fit the ball bearings around it (Figure 53).
3. On models with loose ball bearings, apply a coat of cold grease to the lower bearing race cone and fit the ball bearings around it (Figure 54).
4. On models with roller bearings, install the upper roller bearing assembly into the steering head.
5. Install the steering stem into the head tube and hold it firmly in place.
6. On models with loose ball bearings, install the upper bearing race.
7. Install the steering stem adjusting nut and tighten it until it is snug against the upper race, then back it off 1/8 turn.

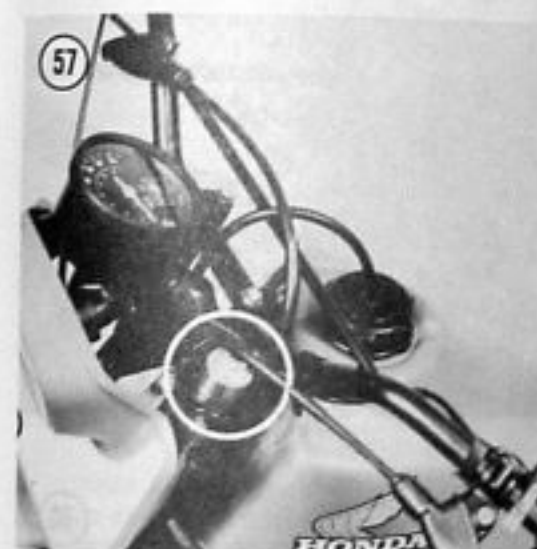
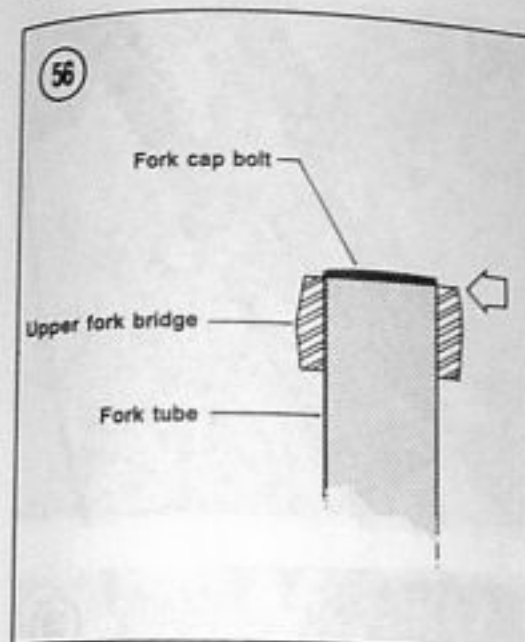
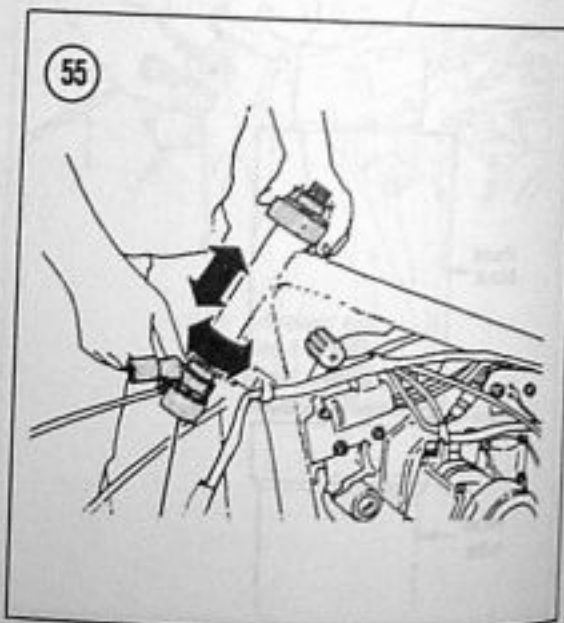
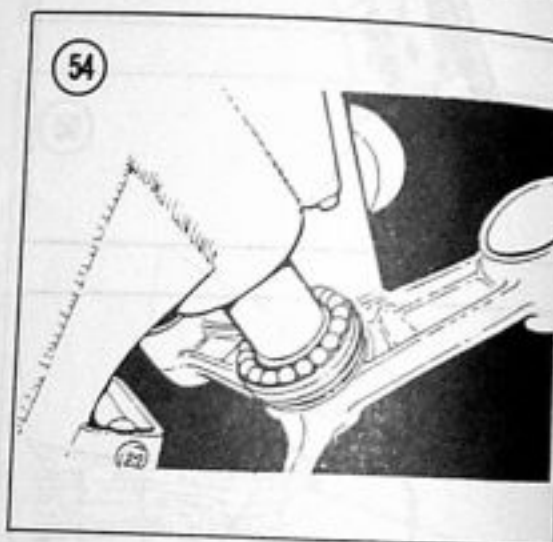
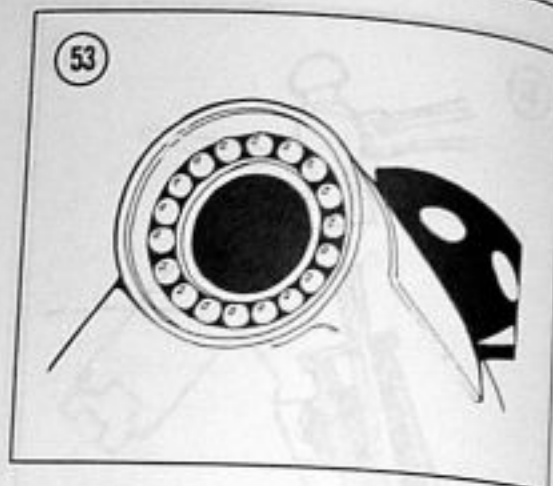
NOTE

The adjusting nut should be just tight enough to remove both horizontal and vertical play (Figure 55), yet loose enough so that the assembly will turn to both lock positions under its own weight after an assist.

8. Install the upper fork bridge, washer and steering stem nut finger-tight.

NOTE

Steps 9-11 must be performed in this order to assure proper upper and lower fork bridge to fork alignment.



9. Slide the fork tubes into position and tighten the lower fork bridge bolts to the torque specifications in Table 1.

NOTE

On models with loose ball bearings, install the fork tubes so that the top of the fork tube aligns with the top surface of the upper fork bridge (Figure 56). On models with roller bearings, install the fork tubes so that the groove on the fork tube aligns with the top surface of the upper fork bridge (Figure 57).

10. Tighten the steering stem nut to the torque specifications in Table 1.
11. Tighten the upper fork bridge bolts to the torque specifications in Table 1.
12. On models so equipped, install the headlight assembly as described under Headlight Removal/Installation in Chapter Seven.
13. Install the handlebar as described in this chapter.
14. Install the front wheel as described in this chapter.
15. After a few hours of riding, the bearings have had a chance to seat; readjust the free play in the steering stem with the steering stem adjusting nut. Refer to Step 7.

Steering Stem Adjustment

If play develops in the steering system, it may only require adjustment. However, don't take a chance on it. Disassemble the stem and look for possible damage. Then reassemble and adjust as described in Step 7 of the Steering Head Assembly procedure.

FRONT FORK

The front suspension uses a spring-controlled, hydraulically damped, telescopic fork. Removal and installation are basically the same on all models and where differences occur they are identified.

The air assist fork used on the XR200R/XL200R is different from those used on all other models and the service procedure is covered separately. All other models are serviced basically the same way. Since 1981 they have air assist.

Before suspecting major trouble, drain the front fork oil and refill with the proper type and quantity; refer to Front Fork Oil Change in Chapter Three. If you still have trouble, such as poor damping, a tendency to bottom or top out or leakage around the rubber seals, follow the service procedures in this chapter.

To simplify fork service and to prevent the mixing of parts, the legs should be removed, serviced and installed individually.

Removal/Installation (All Models)

1. Remove the front wheel as described in this chapter.

2. Disconnect the speedometer and brake cables from the wire brackets on the fork slider (Figure 58).

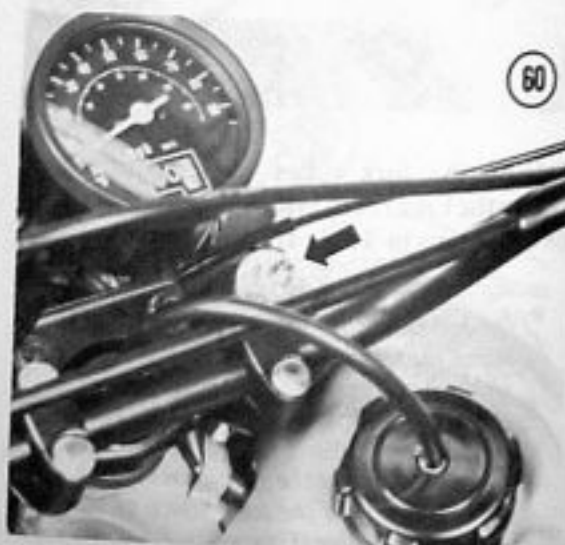
3. On models with air assist, remove the air valve cap (Figure 59) and bleed off all air pressure by depressing the valve stem (Figure 60). Repeat for both fork assemblies.

WARNING

Always bleed off all air pressure; failure to do so may cause personal injury when disassembling the fork assembly.

NOTE

Release the air pressure gradually. If released too fast, fork oil will spurt out with the air. Protect your eyes and clothing accordingly.



4. Remove the bolts securing the front fender and remove the fender (A, Figure 61).

5. Loosen the upper and lower fork bridge bolts (B, Figure 61).

6. On models with rubber boots (C, Figure 61), loosen the upper clamping band and slide the boot down onto the slider.

7. Remove the fork tube. It may be necessary to slightly rotate the fork tube while pulling it down and out.

8. Install by reversing these removal steps, noting the following.

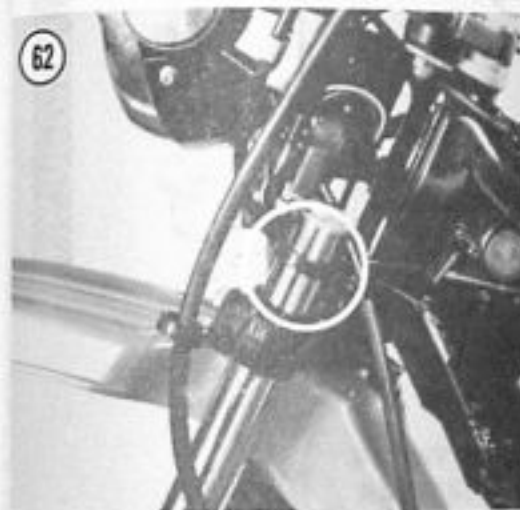
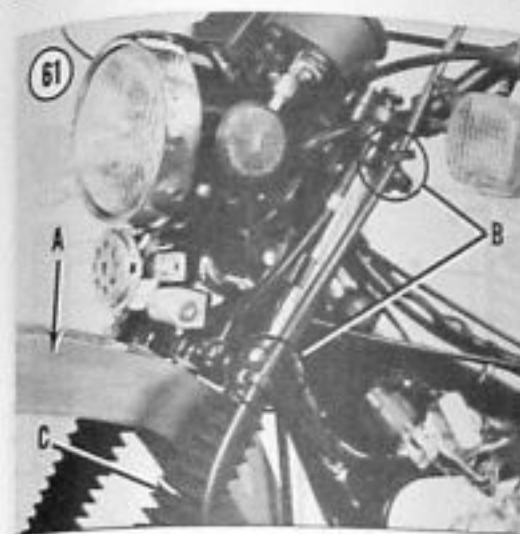
9. Be sure to install any clamps (Figure 62) onto the fork tube during installation.

10A. On XR200R and TLR200 models, install the fork tubes so that the groove on the fork tube aligns with the top surface of the upper fork bridge (Figure 57).

10B. On all other models, install the fork tubes so that the top of the fork tube aligns with the top surface of the upper fork bridge (Figure 56).

11. Tighten the bolts to the torques specified in Table 1.

12. On models with air-assist forks, inflate forks to 4.3-7.2 psi (0.3-0.5 kg/cm²), except XL200R and TLR200 to 0-5.6 psi (0-0.4 kg/cm²). Do not use compressed air; use only a small hand-operated air pump such as the S & W Mini-pump or equivalent.



WARNING

Never use any type of compressed gas as an explosion may be lethal. Never heat the fork assembly with a torch or place it near an open flame or extreme heat as this will also result in an explosion.

CAUTION

Never exceed an air pressure of 14 psi (1.0 kg/cm²) as damage may occur to internal components of the fork assembly.

Disassembly (Except XR200R/XL200R)

Refer to Figures 63-66 during the disassembly and assembly procedures.

Minor variations exist among the different models and years. Pay particular attention to the location and positioning of spacers, washers and springs to make sure they are assembled in the correct location.

1. On models so equipped, slide the rubber boot off of the fork tube.
2. Clamp the slider in a vise with soft jaws (Figure 67).
3. Remove the Allen head screw and gasket from the bottom of the slider.

NOTE

This screw has been secured with Loctite and is often very difficult to remove because the damper rod will turn inside the slider. It sometimes can be removed with an air impact driver. If you are unable to remove it, take the fork tubes to a dealer and have them remove the screws.

4. Hold the upper fork tube in a vise with soft jaws and remove the top bolt.

WARNING

Be careful when removing the top bolt as the spring(s) is under pressure.

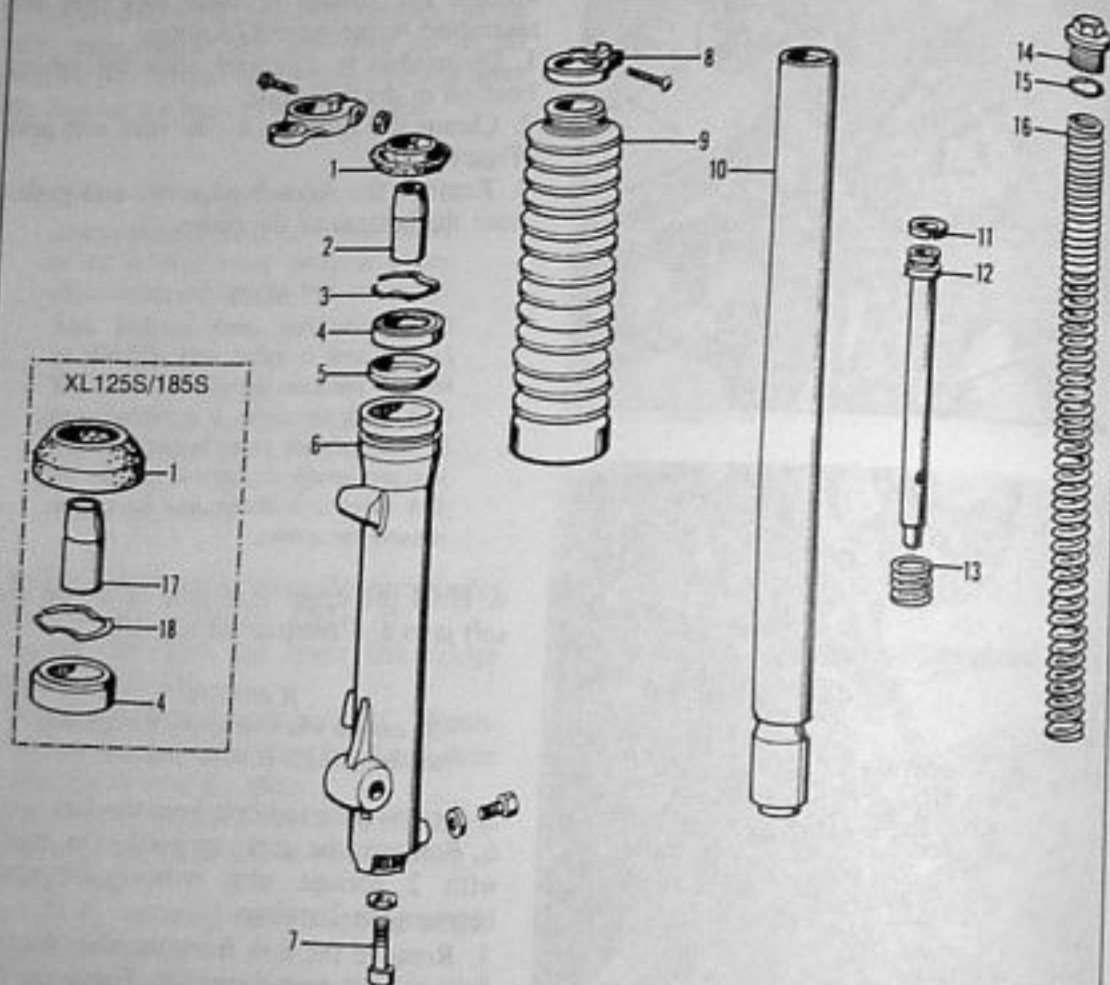
5. Remove the top bolt from the fork.
6. Remove the fork spring(s). On models with 2 springs, also remove the spacer between the 2 springs.
7. Remove the fork from the vise, pour the fork oil out and discard it. Pump the fork several times by hand to expel most of the remaining oil.
8. Pull the fork tube out of the slider.
9. Remove the oil lock piece, the damper rod and rebound spring.
10. If oil has been leaking from the top of the slider, remove the dust seal, circlip, oil seal and, on models so equipped, the oil seal backup ring.

NOTE

Models XL125S, XL185S (1979-1980) and XR185 (1979) are equipped with a set ring in place of the circlip.

11. It may be necessary to slightly heat the area on the slider around the oil seal prior to

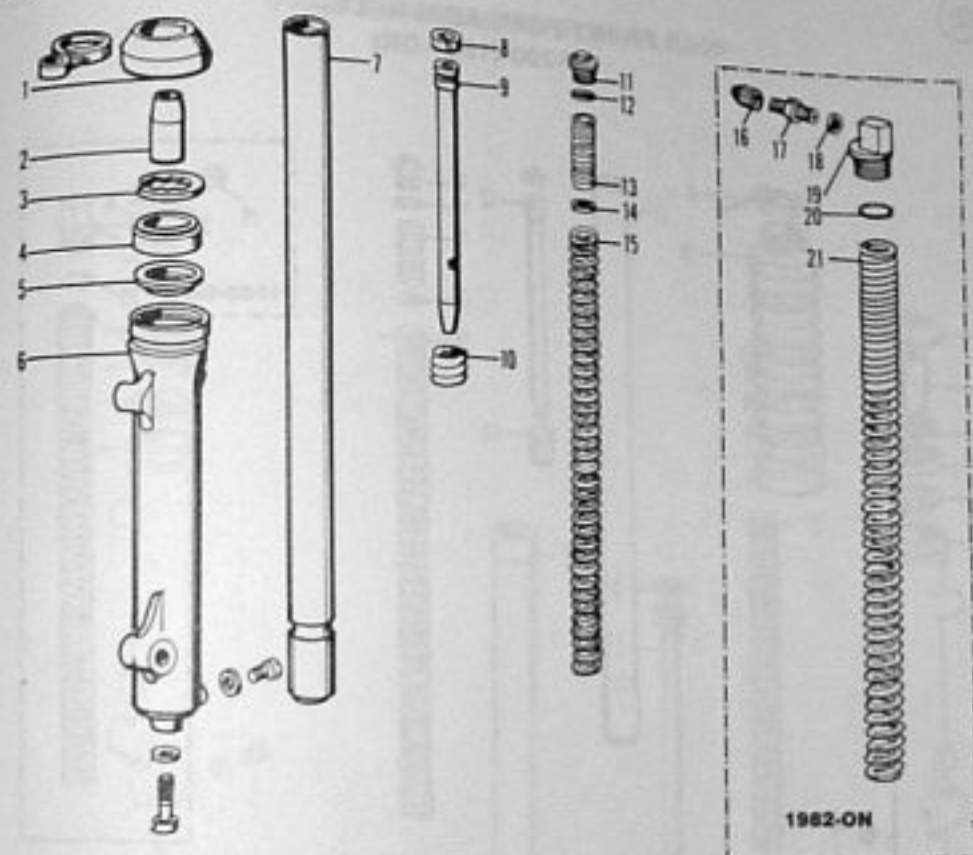
63



**FRONT FORK ASSEMBLY—
XL125S, XL185S (1979-1980),
XR185 (1979)**

- | | |
|-----------------------------|--------------------|
| 1. Dust seal | 10. Fork tube |
| 2. Oil lock piece | 11. Piston ring |
| 3. Snap ring | 12. Damper rod |
| 4. Oil seal | 13. Rebound spring |
| 5. Oil seal (XR185 only) | 14. Top cap bolt |
| 6. Fork slider | 15. O-ring seal |
| 7. Allen bolt and washer | 16. Fork spring |
| 8. Boot clamp (XR185 only) | 17. Oil lock piece |
| 9. Rubber boot (XR185 only) | 18. Snap ring |

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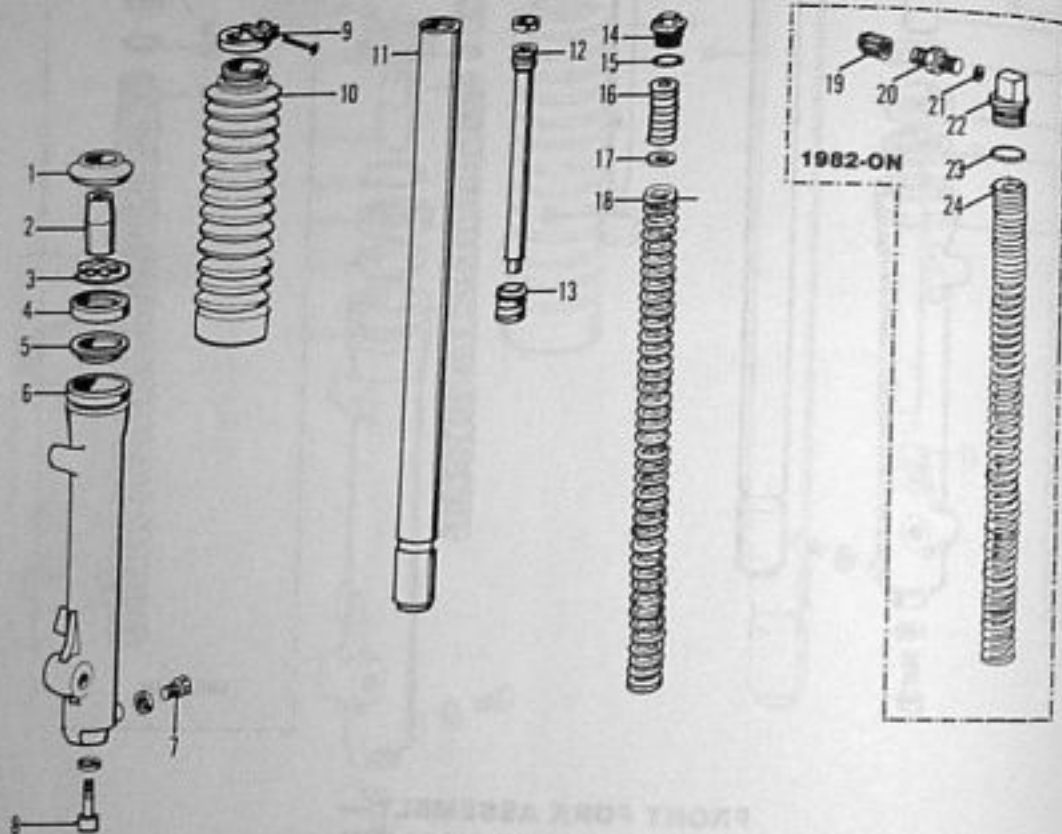


**FRONT FORK ASSEMBLY—
XL125S, XL185S (1981-ON)**

- | | | |
|-------------------|-------------------------|--------------------------------------|
| 1. Dust seal | 8. Piston ring | 15. Fork spring (long) |
| 2. Oil lock piece | 9. Damper rod | 16. Air cap |
| 3. Snap ring | 10. Rebound spring | 17. Air valve |
| 4. Oil seal | 11. Top cap bolt | 18. O-ring seal |
| 5. Backup ring | 12. O-ring seal | 19. Fork cap bolt/air valve assembly |
| 6. Fork slider | 13. Fork spring (short) | 20. O-ring seal |
| 7. Fork tube | 14. Spring seat | 21. Fork spring |

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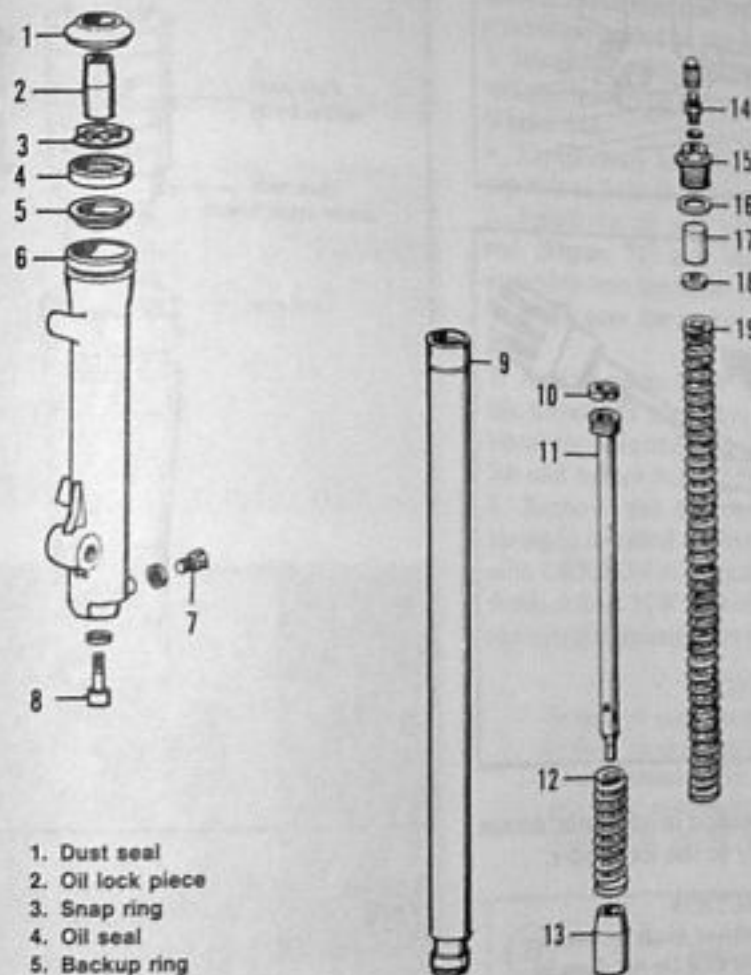
FRONT FORK ASSEMBLY— XR200 (1981-ON)



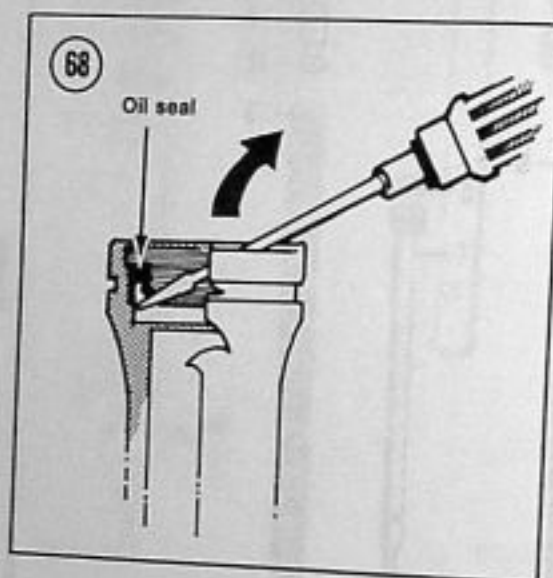
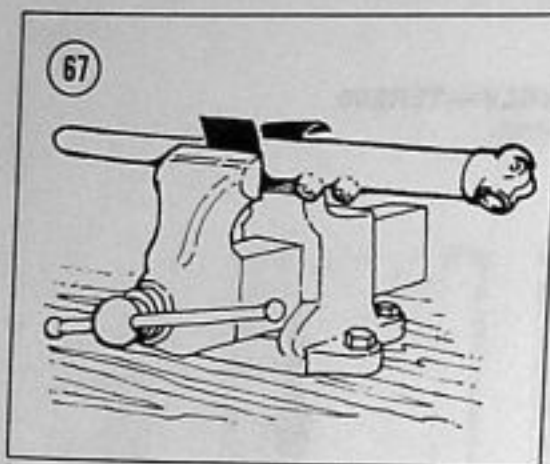
- | | |
|--------------------------|--------------------------------------|
| 1. Dust seal | 13. Rebound spring |
| 2. Oil lock piece | 14. Top cap bolt |
| 3. Snap ring | 15. O-ring seal |
| 4. Oil seal | 16. Fork spring (short) |
| 5. Backup ring | 17. Spring seat |
| 6. Fork slider | 18. Fork spring (long) |
| 7. Oil drain screw | 19. Air cap |
| 8. Allen bolt and washer | 20. Air valve |
| 9. Rubber boot clamp | 21. O-ring seal |
| 10. Rubber boot | 22. Fork cap bolt/air valve assembly |
| 11. Fork tube | 23. O-ring seal |
| 12. Damper rod | 24. Fork spring |

66

FRONT FORK ASSEMBLY—TLR200



- | |
|--------------------------------|
| 1. Dust seal |
| 2. Oil lock piece |
| 3. Snap ring |
| 4. Oil seal |
| 5. Backup ring |
| 6. Fork slider |
| 7. Oil drain screw |
| 8. Allen bolt and washer |
| 9. Fork tube |
| 10. Piston ring |
| 11. Damper rod |
| 12. Rebound spring |
| 13. Oil lock piece |
| 14. Air valve assembly |
| 15. Top cap bolt |
| 16. O-ring seal |
| 17. Collar (1982-on only) |
| 18. Spring seat (1982-on only) |
| 19. Fork spring |



removal. Use a rag soaked in hot water, do not apply a flame directly to the fork slider.

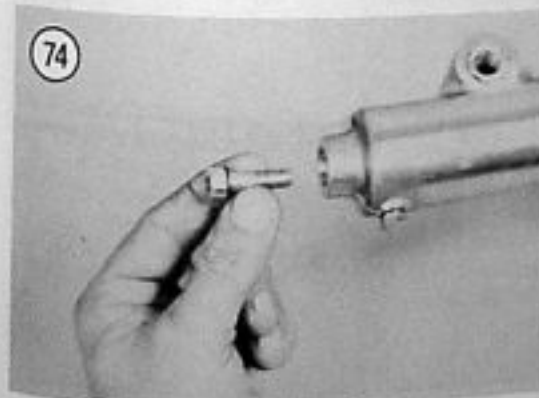
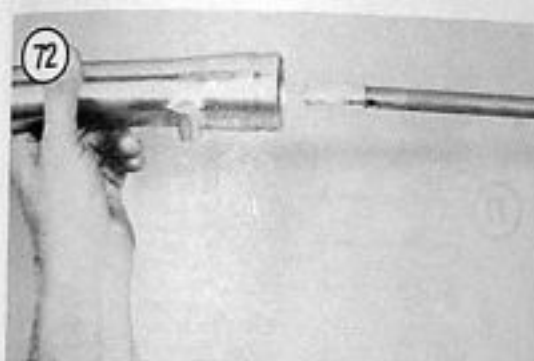
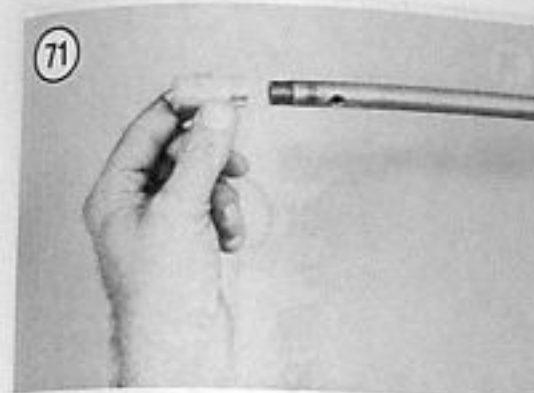
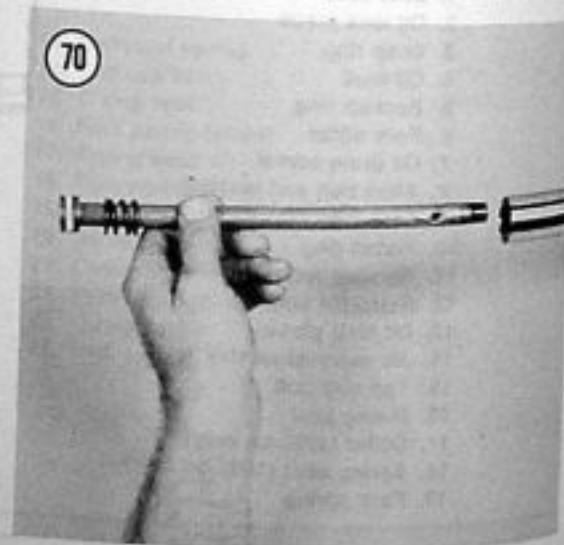
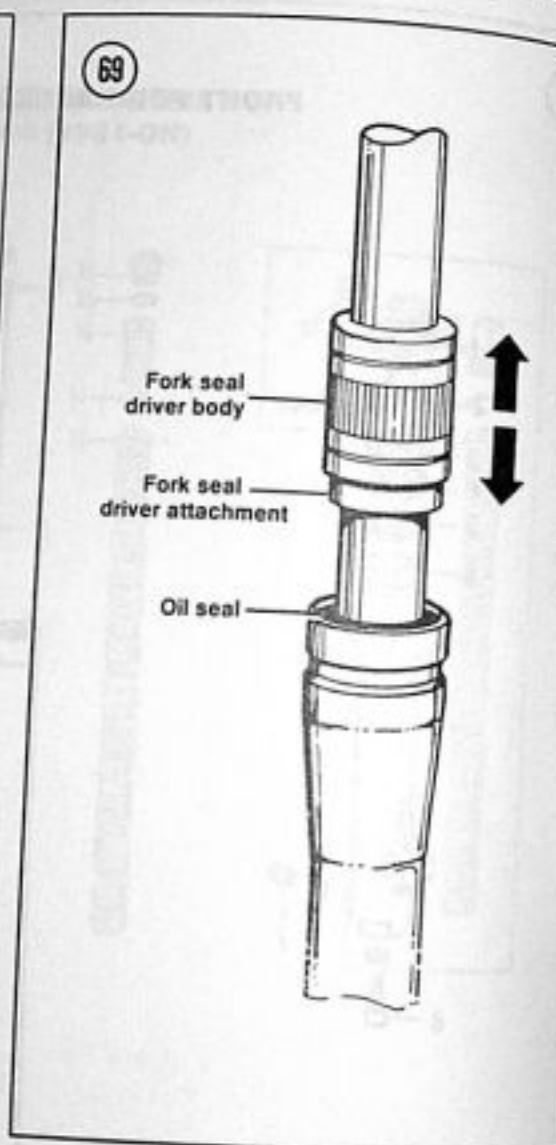
CAUTION

Use a dull screwdriver blade to remove the oil seal (Figure 68). Do not damage the outer edge or inner surface of the slider.

12. Inspect the components as described under *Inspection (All Models)* in this chapter.

Disassembly (Except XR200R/XL200R)

1. Coat all parts with fresh ATF (automatic transmission fluid) or fork oil prior to installation. If removed, install a new backup ring and (on models so equipped) a new oil seal. Drive the seal into the slider (Figure 69) with



Honda special tool Fork Seal Driver Body (part No. 07747-0010100) and Fork Seal Driver Attachment (part No. 07747-0010300) or suitable size socket. Drive the oil seal in until the groove in the slider can be seen above the top surface of the oil seal.

2. Install the circlip (or set ring, depending on model). Make sure that the circlip or set ring is completely seated in the groove in the slider.

3. Install the rebound spring onto the damper rod and insert this assembly into the fork tube (Figure 70).

4. Temporarily install the fork spring(s) and top bolt to hold the damper rod in place.

5. Install the oil lock piece onto the damper rod (Figure 71) and install the upper fork assembly into the slider (Figure 72).

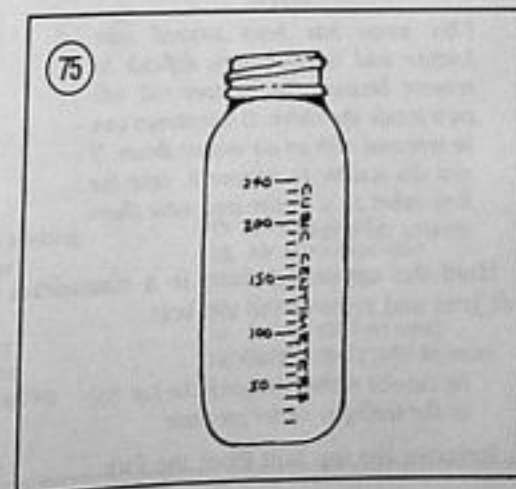
6. Make sure the gasket is on the Allen head screw.

7. Apply Loctite Lock N' Seal (Figure 73) to the threads of the Allen head screw prior to installation. Install it in the fork slider (Figure 74) and tighten to 8-12 N·m (6-9 ft.-lb.).

8. Remove the top bolt and remove the spring(s) installed in Step 4. Fill the fork tube with DEXRON ATF (automatic transmission fluid) or SAE 10W fork oil. Refer to Table 3 for the specific quantity for each fork leg.

NOTE

In order to measure the correct amount of fluid, use a plastic baby bottle. These have graduations in fluid ounces (oz.) and cubic centimeters (cc) on the side (Figure 75). Many fork oil containers



have a semi-transparent strip (Figure 76) on the side of the bottle to aid in measuring.

9A. On models with a single spring, install the spring with the closer wound coils toward the handlebar.

9B. On models with 2 springs, install the long spring, the spring spacer and the short spring.

10. Inspect the condition of the O-ring seal on the top bolt (Figure 77); replace if necessary.

11. Install the top bolt (Figure 78) and tighten as follows:

- Non-air-assist models: 15-30 N•m (11-22 ft.-lb.)
- Air-assist models: 15-35 N•m (11-25 ft.-lb.)

12. On models so equipped, install the rubber boot and snap it into position on the fork slider.

13. Repeat for the other fork assembly.

14. Install the fork assemblies as described under *Front Fork Removal/Installation (All Models)* in this chapter.

Disassembly

(XR200R/XL200R)

Refer to Figure 79 or Figure 80 during the disassembly and assembly procedures.

- Remove the rubber boot from the slider.
- Clamp the slider in a vise with soft jaws (Figure 67).
- Remove the Allen head screw and gasket from the bottom of the slider.

NOTE

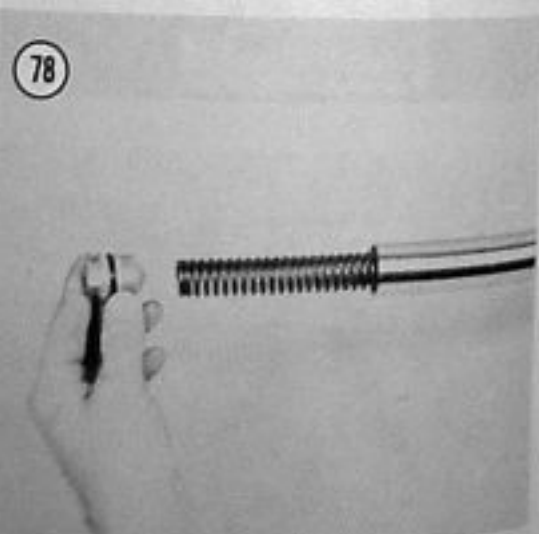
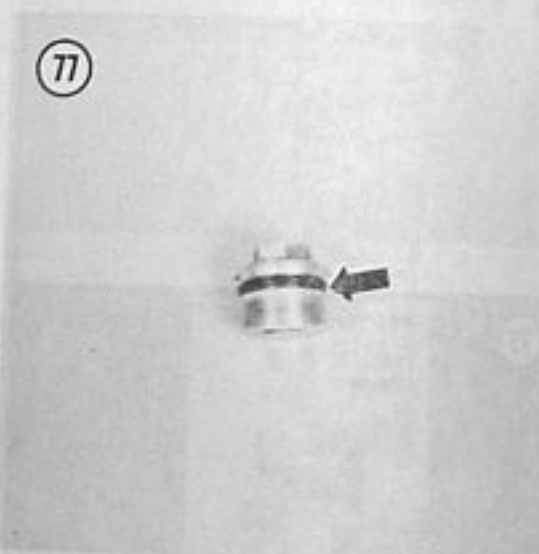
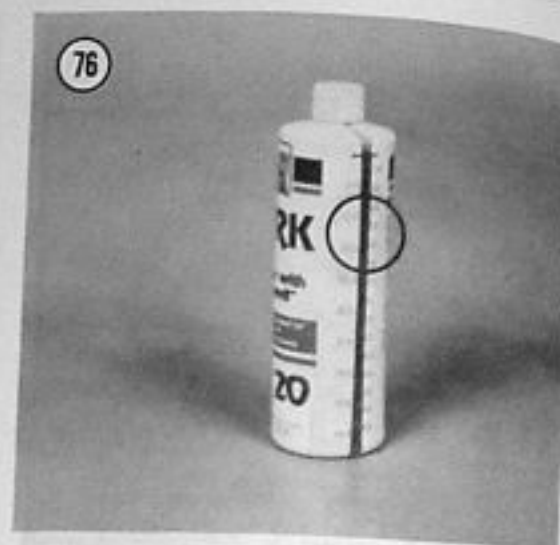
This screw has been secured with Loctite and is often very difficult to remove because the damper rod will turn inside the slider. It sometimes can be removed with an air impact driver. If you are unable to remove it, take the fork tubes to a dealer and have them remove the screws.

- Hold the upper fork tube in a vise with soft jaws and remove the top bolt.

WARNING

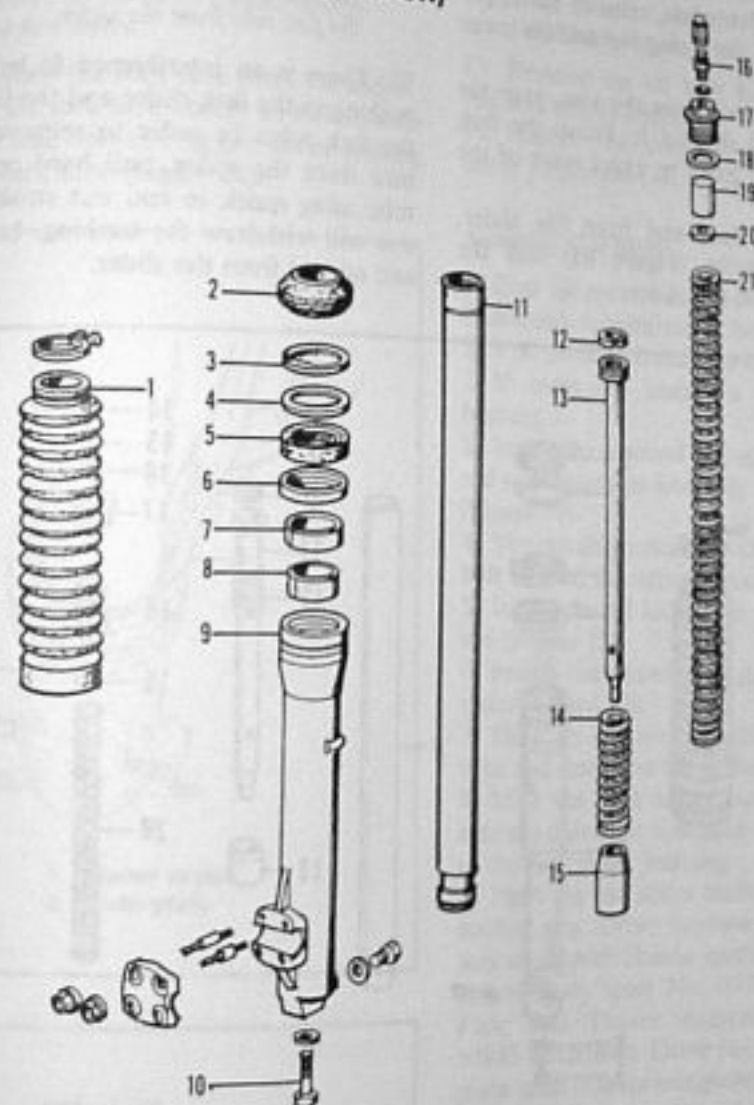
Be careful when removing the top bolt as the spring is under pressure.

- Remove the top bolt from the fork.



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FRONT FORK ASSEMBLY— XR200R (1980-ON)



- | | | |
|------------------------|---------------------------|--------------------------------|
| 1. Rubber boot | 8. Fork tube bushing | 15. Oil lock piece |
| 2. Dust seal | 9. Fork slider | 16. Air valve assembly |
| 3. Circlip | 10. Allen bolt and washer | 17. Top cap bolt |
| 4. Backup plate | 11. Fork tube | 18. O-ring seal |
| 5. Oil seal | 12. Piston ring | 19. Collar (1982-on only) |
| 6. Backup ring | 13. Damper rod | 20. Spring seat (1982-on only) |
| 7. Fork slider bushing | 14. Rebound spring | 21. Fork spring |

6A. On XR200R models since 1982, remove the collar and spring seat. Remove the fork spring.

6B. On XL200R models, remove the upper short spring "A," the spring seat and the lower long spring "B."

7. Remove the fork from the vise, pour the fork oil out and discard it. Pump the fork several times by hand to expel most of the remaining oil.

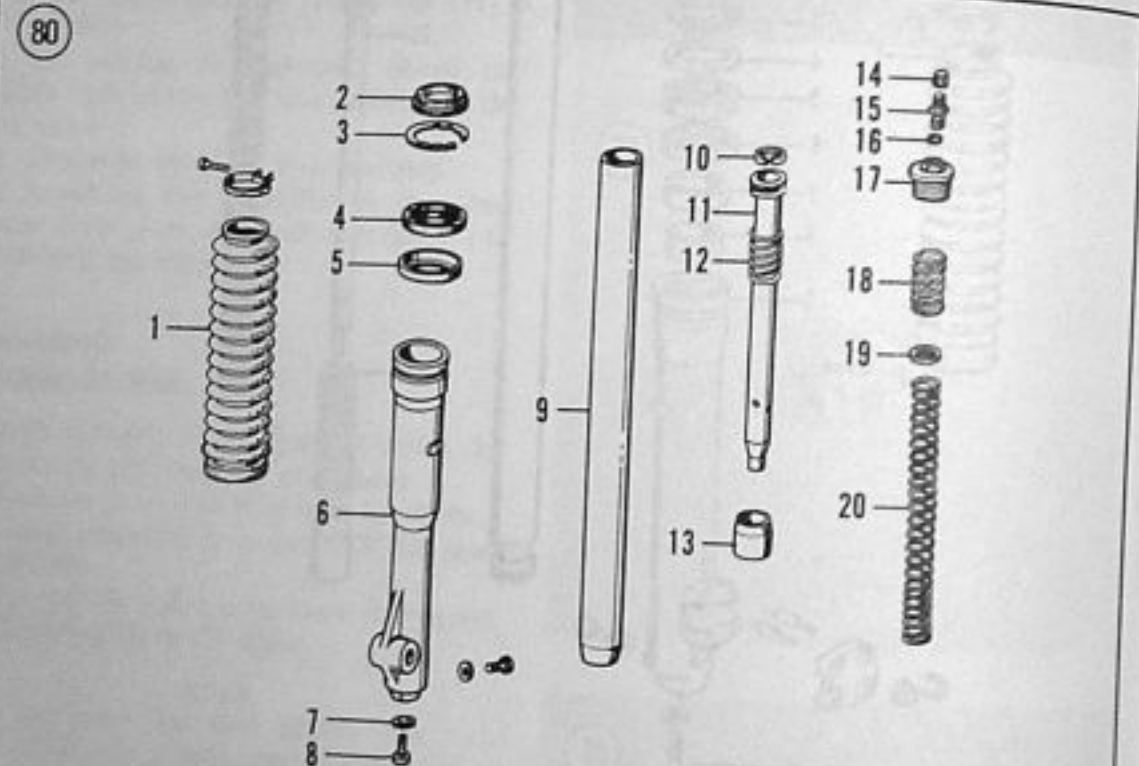
8. Remove the dust seal from the slider. Remove the circlip (Figure 81) and the backup plate from the slider.

9. Install the fork slider in a vise with soft jaws.

NOTE

On this model force is needed to remove the fork tube from the slider.

10. There is an interference fit between the bushing in the fork slider and the bushing on the fork tube. In order to remove the fork tube from the slider, pull hard on the fork tube using quick in and out strokes. Doing this will withdraw the bushing, backup ring and oil seal from the slider.



FRONT FORK (XL200R)

- | | |
|-----------------|----------------------|
| 1. Rubber boot | 11. Damper rod |
| 2. Dust seal | 12. Rebound spring |
| 3. Circlip | 13. Oil lock piece |
| 4. Oil seal | 14. Cap |
| 5. Backup ring | 15. Air valve |
| 6. Fork slider | 16. O-ring |
| 7. Washer | 17. Top cap bolt |
| 8. Allen bolt | 18. Short spring "A" |
| 9. Fork tube | 19. Spring seat |
| 10. Piston ring | 20. Long spring "B" |

NOTE

It may be necessary to slightly heat the area on the slider around the oil seal prior to removal. Use a rag soaked in hot water; do not apply a flame directly to the fork slider.

11. Withdraw the fork tube from the slider.
12. Turn the fork tube upside down and slide off the oil seal, backup ring and slider bushing from the fork tube (Figure 82).

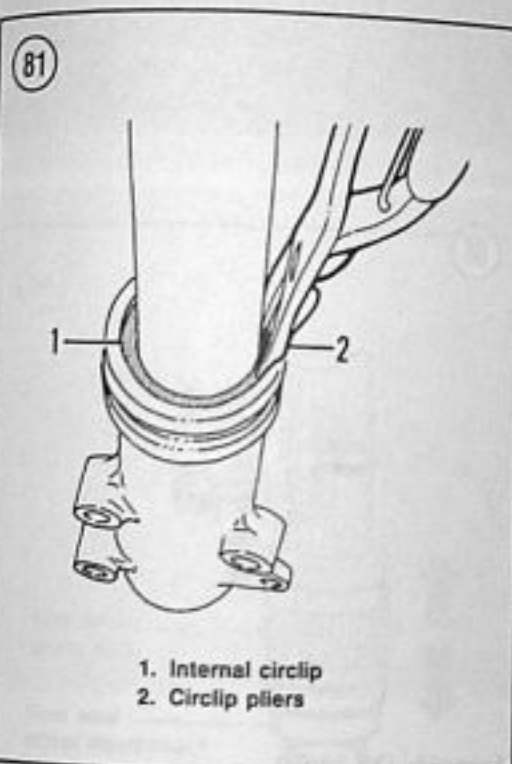
NOTE

Do not remove the fork tube bushing unless it is going to be replaced. Inspect it as described under Inspection (All Models) in this chapter.

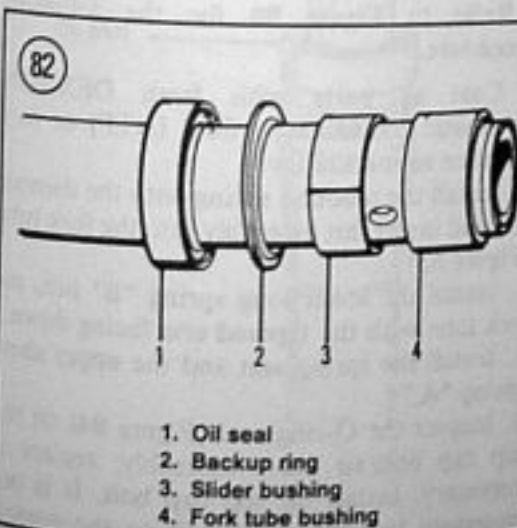
13. Remove the oil lock piece, the damper rod and rebound spring.
14. Inspect the components as described under Inspection (All Models) in this chapter.

Assembly (XR200R)

1. Coat all parts with fresh DEXRON ATF (automatic transmission fluid) or SAE 10W fork oil prior to installation.
2. If removed, install a new fork tube bushing.
3. Install the rebound spring onto the damper rod and insert this assembly into the fork tube (Figure 70).
4. Temporarily install the fork spring and top bolt to hold the damper rod in place.
5. Install the oil lock piece onto the damper rod (Figure 71).
6. Install the upper fork assembly into the slider (Figure 72).
7. Slide the fork slider bushing down the fork tube and rest it on the slider.
8. Slide the fork slider backup ring (flange side up) down the fork tube and rest it on top of the fork slider bushing.
9. Place the old slider bushing on top of the backup ring. Drive the new bushing into the fork slider with Honda special tools Fork Seal Driver Body (part No. 07747-0010100) and Fork Seal Driver Attachment (part No. 07947-KA20200). Drive the new bushing into place until it seats completely in the recess in the slider. Remove the old slider bushing.
10. Install the backup ring.
11. To prevent damage to the inside of the new fork seal during installation, wrap the groove in the top of the fork tube with clear tape (something smooth and non-abrasive—do not use duct or masking tape).
12. Coat the new seal with ATF (automatic transmission fluid). Position the seal with the marking facing upward and slide it down onto the fork tube. Drive the seal into the slider (Figure 69) with Honda special tools Fork



1. Internal circlip
2. Circlip pliers



1. Oil seal
2. Backup ring
3. Slider bushing
4. Fork tube bushing

Seal Driver Body (part No. 07747-0010100) and Fork Seal Driver Attachment (part No. 07747-0010300). Drive the oil seal in until the groove in the slider can be seen above the top surface of the oil seal. Remove the tape from the top of the fork tube.

NOTE

If the seal must be driven further down, remove the special tools and insert the backup plate on top of the seal. Repeat Step 12 until the seal is correctly seated.

13. Install the backup plate and circlip. Make sure the circlip is completely seated in the groove in the fork slider.

14. Install the dust seal.

15. Make sure the gasket is on the Allen head screw.

16. Apply Loctite Lock N' Seal (Figure 73) to the threads of the Allen head screw prior to installation. Install it in the fork slider (Figure 74) and tighten to 15-25 N·m (11-18 ft.-lb.).

17. Remove the top bolt and remove the spring installed in Step 4. Fill the fork tube with DEXRON ATF (automatic transmission fluid) or SAE 10W fork oil. Refer to Table 3 for the specific quantity for each fork leg.

NOTE

In order to measure the correct amount of fluid, use a plastic baby bottle. These have graduations in fluid ounces (oz.) and cubic centimeters (cc) on the side (Figure 75). Many fork oil containers have a semi-transparent strip (Figure 76) on the side of the bottle to aid in measuring.

18. Install the spring into the fork tube. Either end can be installed first as the spring is not progressively wound.

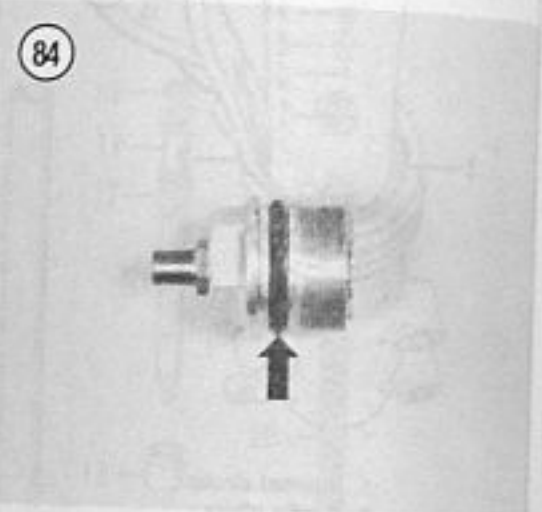
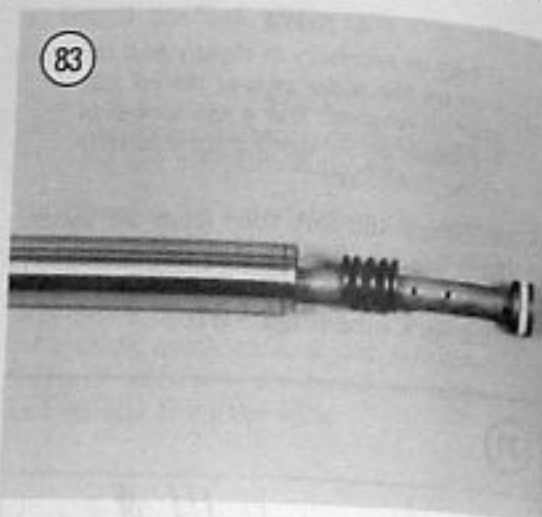
19. Inspect the condition of the O-ring seal on the top bolt (Figure 77); replace if necessary.

20. Install the top bolt and tighten to 15-30 N·m (11-22 ft.-lb.).

21. Install the rubber boot and snap it into place on the fork slider.

22. Repeat for the other fork assembly.

23. Install the fork assemblies as described under Front Fork Removal/Installation (All Models) in this chapter.



Assembly (XL200R)

Refer to Figure 80 for the following procedure.

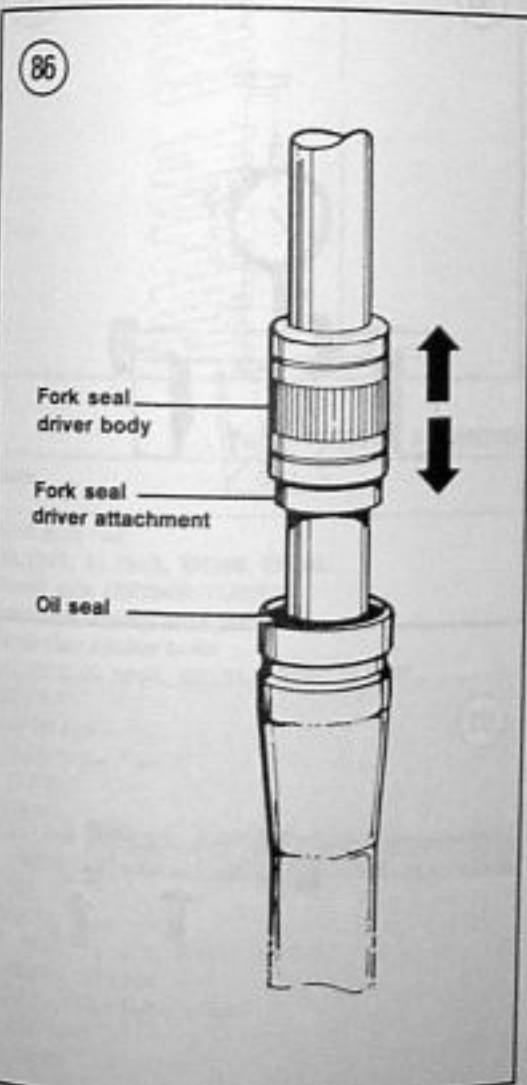
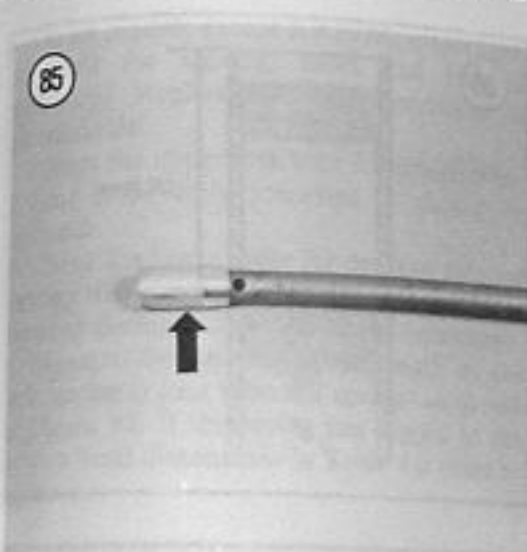
1. Coat all parts with fresh DEXRON automatic transmission fluid (ATF) or fork oil prior to installation.

2. Install the rebound spring onto the damper rod and insert this assembly into the fork tube (Figure 83).

3. Install the lower long spring "B" into the fork tube with the tapered end facing down.

4. Install the spring seat and the upper short spring "A."

5. Inspect the O-ring seal (Figure 84) on the top cap bolt/air valve assembly; replace if necessary. Install the top cap bolt. It is not necessary to tighten the bolt to the correct



torque specification at this time as it will be removed to add fork oil later.

6. Install the oil lock piece onto the damper rod (Figure 85).

7. Install the upper fork assembly into the slider.

8. If removed, slide a new fork tube backup ring with the flange side up onto the fork tube and into the slider.

9. If removed, install a new oil seal as follows:

a. Coat the new oil seal with ATF.

b. Position the oil seal with the seal markings facing up.

c. Slide the fork tube oil seal into the slider.

d. Drive the oil seal into place (Figure 86) with Honda special tool Fork Seal Driver (part No. 07947-3330000).

e. Drive the oil seal in until the groove in the slider can be seen above the top surface of the oil seal.

10. Install the circlip, make sure the circlip is completely seated in the groove in the fork slider.

11. Install the dust seal.

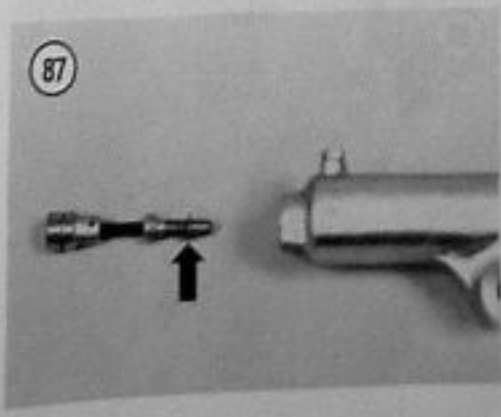
12. Make sure the gasket is on the Allen head screw (Figure 87).

13. Apply Loctite Lock N'Seal to the threads of the Allen head screw and install it in the fork slider (Figure 88). Tighten the screw to 15-25 N·m (11-18 ft.-lb.).

14. Install the rubber boot and snap it into place on the fork slider.

15. Remove the top cap/air valve assembly from the fork.

16. Remove the upper short spring "A," the spring seat and the lower long spring "B."



17. Fill the fork with 259-264 cc (8.8-8.9 oz.) of DEXRON ATF or 10W fork oil.

18. Hold the fork assembly vertical and compress the fork all the way.

19. Measure the oil level from the top of the fork tube. The level should be 145 mm (5.7 in.); refer to Figure 89.

20. Install the lower long spring "B" into the fork tube with the tapered end facing down.

21. Install the spring seat and the upper short spring "A."

22. Clamp the fork tube in a vise with soft jaws and tighten the fork cap; boltair valve assembly to 15-30 N·m (11-22 ft.-lb.).

23. Slide on the rubber boot with the "INSIDE" mark facing in toward the wheel. Position the top of the rubber boot 226.4-226.7 mm (8.91-8.92 in.) from the top surface of the fork tube. Tighten the clamp securely.

24. Repeat for the other fork assembly.

25. Install the fork assemblies as described in this chapter.

Inspection (All Models)

1. Thoroughly clean all parts in solvent and dry them. Check the fork tube for signs of wear or scratches.

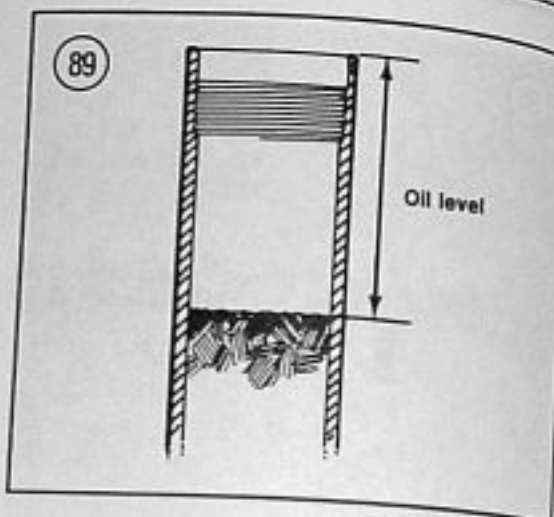
2. Check the damper rod for straightness. Figure 90 shows one method. The rod should be replaced if the runout is 0.2 mm (0.008 in.) or greater.

3. Carefully check the damper rod and piston ring (Figure 91) for wear or damage.

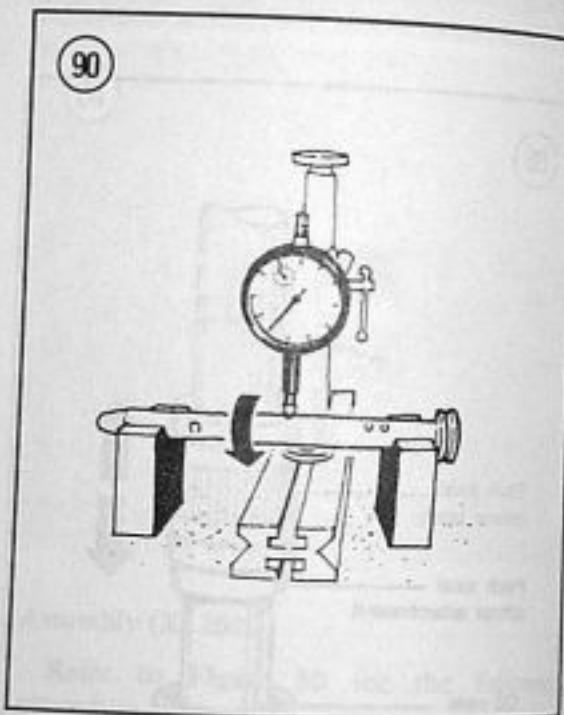
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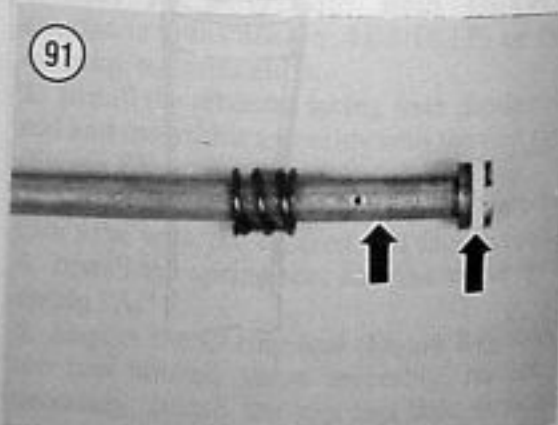
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90



91



FRONT SUSPENSION AND STEERING

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4. On all models except XR200R, inspect the oil seals for scoring, nicks and loss of resiliency. Replace if their condition is questionable.

5. Check the upper fork tube for straightness. If bent or severely scratched, it should be replaced.

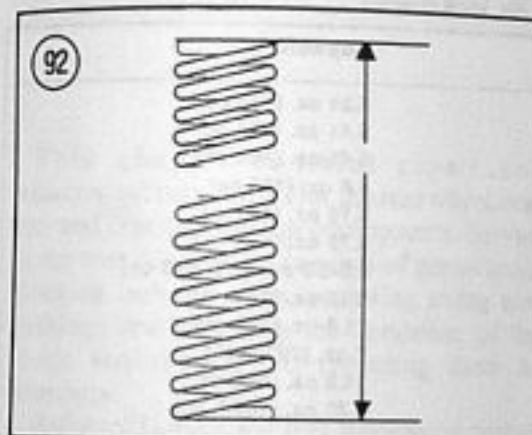
6. Check the lower slider for dents or exterior damage that may cause the upper fork tube to hang up during riding. Replace if necessary.

7. Measure the uncompressed length of the fork spring(s) (not rebound spring) as shown in Figure 92. If the spring has sagged to the service limit dimensions in Table 4 it must be replaced.

8. On XR200R models, inspect the slider and fork tube bushings. If either is scratched or scored they must be replaced. If the Teflon coating is worn off so that the copper base material is showing on approximately 3/4 of the total surface, the bushing must be replaced. Also check for distortion on the check points of the backup ring; replace as necessary. Refer to Figure 93.

9. Any parts that are worn or damaged should be replaced. Simply cleaning and reinstalling unserviceable components will not improve performance of the front suspension.

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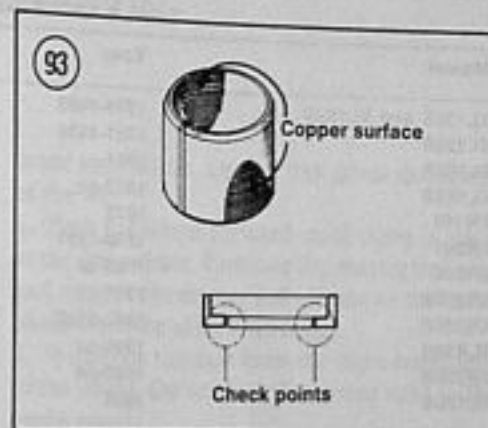


Table 1 FRONT SUSPENSION TORQUE SPECIFICATIONS

Item	N·m	ft.-lb.
Front axle nut		
XL125S, XL185S, XR185, XR200	40-50	29-36
Front axle (XR200R/TLR200)	60-80	43-58
Front axle clamp nuts (XR200R)	10-14	7-10
Handlebar holder bolts		
XL125S, XL185S, XR185, XR200, TLR200	20-25	14-18
XR200R	18-30	13-22
Fork bridge bolts		
Upper (exc. TLR200)	9-13	7-9
TLR200	20-25	14-18
Lower		
XL125S, XL185S, XR185, XR200	20-25	14-18
XR200R	18-30	13-22
TLR200	30-40	22-29
Steering stem nut		
XL125S, XL185S, XR185, XR200	60-90	43-65
XR200R, TLR200	80-120	58-87
Fork cap bolt (all models)		
1979-1981	15-30	11-22
1982-on	15-35	11-25

Table 2 TIRE INFLATION PRESSURE

Tire size	Air pressure
Front tire	
2.75×21-4PR	21.3 psi (1.5 kg/cm ²)
2.75×21-6PR	14.2 psi (1.0 kg/cm ²)
3.00×21-6PR	14.2 psi (1.0 kg/cm ²)
Rear tire	
3.50×18-4PR	14.2 psi (1.0 kg/cm ²)
4.00×18-4PR	21.0 psi (1.5 kg/cm ²)
4.10×18-4PR	21.3 psi (1.5 kg/cm ²)
4.10×18-6PR	14.2 psi (1.0 kg/cm ²)

Table 3 FRONT FORK OIL CAPACITY*

Model	Year	Capacity
XL125S and XL185S	1979-1980	5.24 oz. (155 cc)
XL125S	1981-1984	5.41 oz. (160 cc)
XL185S	1981	5.41 oz. (160 cc)
XL185S	1982-on	5.6 oz. (165 cc)
XR185	1979	5.75 oz. (170 cc)
XR200	1980-1981	5.75 oz. (170 cc)
XR200	1982-on	5.6-5.7 oz. (165-170 cc)
XR200R	1981	9.16 oz. (271 cc)**
XR200R	1982-1983	11.0 oz. (320 cc)**
TLR200	1986-on	7 oz. (207 cc)**
XR200R	1986-on	11.8 oz. (350 cc)
XL125S	1985	5.83 oz. (132.5 cc)

*Capacity for each fork leg.
 **Standard capacity for this model. Quantity can vary with rider personal preference.

Table 4 FRONT FORK SPRING FREE LENGTH

Model	Standard length	Service limit
XL125S, XL185S		
1979	568.5 mm (22.23 in.)	557.1 mm (21.93 in.)
1980-1981		
Spring "A"	68.8 mm (2.71 in.)	67.4 mm (2.65 in.)
Spring "B"	497.4 mm (20.65 in.)	487.5 mm (19.19 in.)
1982-on		
XR185	565.5 mm (22.26 in.)	554.2 mm (21.80 in.)
XR200	568.5 mm (22.38 in.)	560.2 mm (22.06 in.)
XR200R	565.5 mm (22.26 in.)	542.9 mm (21.37 in.)
XL200R	575.1 mm (22.64 in.)	563.6 mm (21.19 in.)
Spring "A"	63.3 mm (2.49 in.)	62.0 mm (2.4 in.)
Spring "B"	539.8 mm (21.25 in.)	529 mm (20.8 in.)

CHAPTER NINE

REAR SUSPENSION

This chapter contains repair and replacement procedures for the rear wheel, rear hub and rear suspension components. Service to the rear suspension consists of periodically checking bolt tightness, replacing swing arm bushings and checking the condition of the shock absorber(s) and replacing them as necessary.

Refer to Table 1 for rear suspension torque specifications. Table 1 is at the end of the chapter.

REAR WHEEL

Removal/Installation
(Dual-shock Models)

1. Place a milk crate or wood block(s) under the engine to support the bike securely so that the rear wheel is off the ground.
2. Remove the cotter pin and axle nut (A, Figure 1). Discard the old cotter pin.
3. Loosen the drive chain adjuster locknuts (B, Figure 1) on each side of the wheel.
4. Unscrew the rear brake adjust nut completely from the brake rod (A, Figure 2). Depress the brake pedal and withdraw the brake rod from the brake lever. Pivot the rod out of the way and reinstall the adjust nut to avoid misplacing it.
5. Remove the cotter pin then remove the nut and washer (B, Figure 2) securing the rear

brake torque link. Let the link pivot down out of the way.

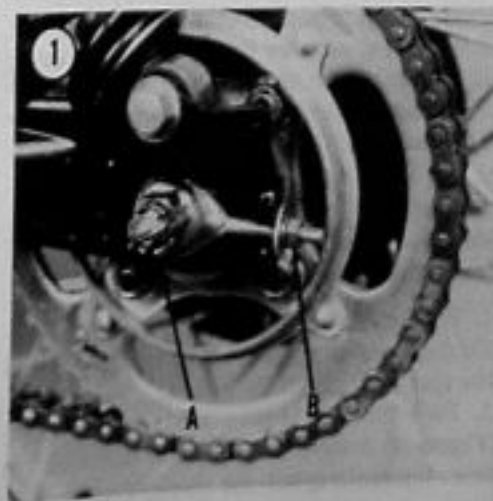
6. Push the wheel forward until there is slack in the drive chain. Remove the master link clip and remove the master link. Remove the drive chain from the driven sprocket.

7. Withdraw the axle from the right-hand side of the wheel. Do not lose the spacer next to the brake panel.

8. Pull the wheel to the rear and remove it.

9. Install by reversing these removal steps; note the following.

10. Inspect wheel components as described under *Inspection (All Models)* in this chapter.



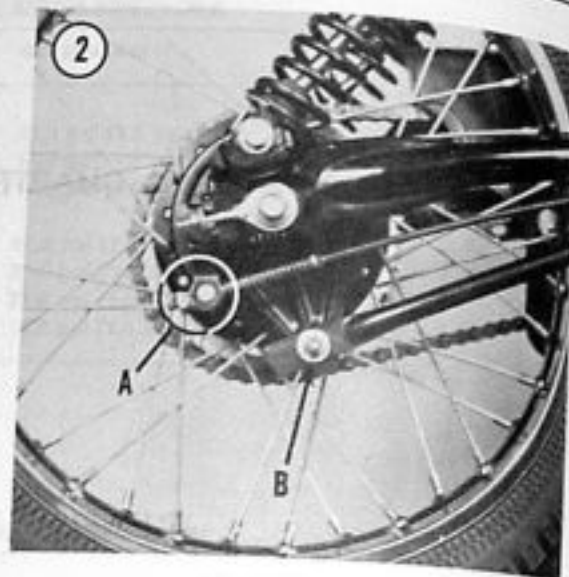
11. Be sure to install the axle spacer on the brake panel side of the wheel.

CAUTION

The rear wheel spacer should be periodically replaced. Frequent tightening of the rear axle nut causes the spacer to compress slightly. A compressed spacer alters swing arm to rear wheel clearance.

NOTE

Make sure the axle adjusters are in place prior to installing the axle.



12. Install the axle from the right-hand side and install the axle nut finger-tight.
13. Make sure the drive chain adjuster stoppers are in place on the swing arm.
14. Install a new drive chain master link clip with the closed end facing in the direction of chain travel (Figure 3).
15. Adjust the drive chain tension as described in Chapter Three.
16. Tighten the axle nut and brake torque link nut to the torque values in Table 1.

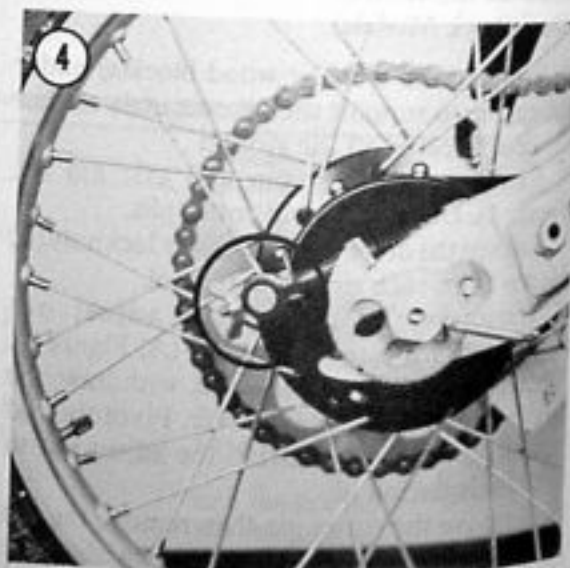
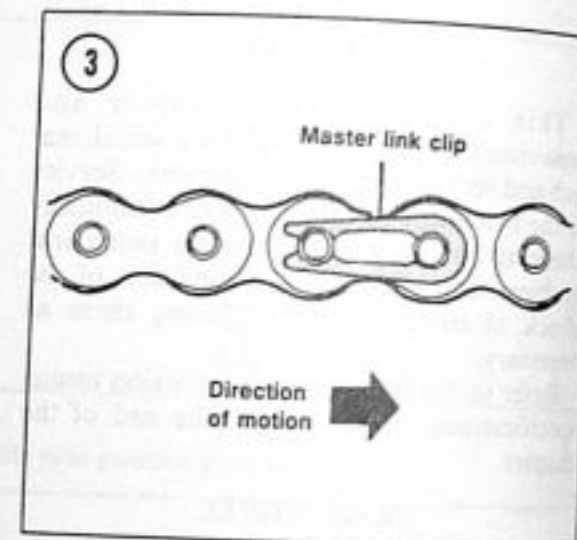
NOTE

Install a new cotter pin on the axle nut and torque link nut; never reuse an old one as it may break and fall off. Bend the ends over completely.

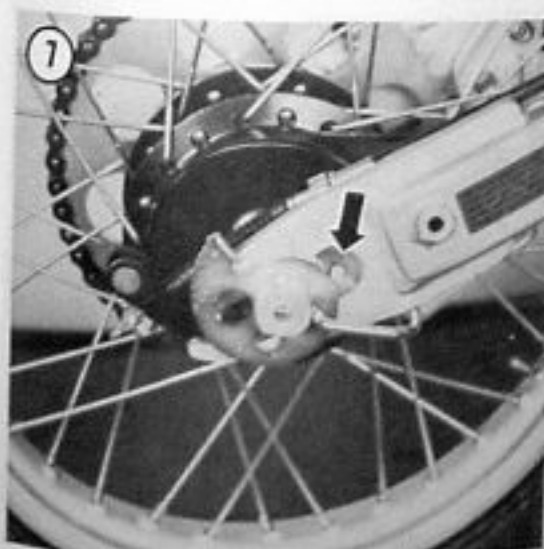
17. After the wheel is completely installed, rotate it several times to make sure it rotates smoothly. Apply the brake several times to make sure it operates correctly.
18. Adjust the rear brake as described under *Rear Brake Pedal Adjustment* in Chapter Three.

Removal/Installation (Pro-Link Models)

1. Place a milk crate or wood block(s) under the engine to support the bike securely so that the rear wheel is off the ground.
2. Pull the rear brake cable holder plate (Figure 4) toward the rear and disconnect it from the brake arm.



REAR SUSPENSION



3. Loosen the rear axle nut (Figure 5).
4. Rotate both drive chain snail adjusters toward the front so the wheel can be moved forward for maximum chain slack.
5. Move the wheel forward and position the notch in the snail adjusters onto the stopper pin on the swing arm.
6. Rotate the rear wheel to derail the drive chain (Figure 6).
7. On the right-hand side, pull the stopper plate (Figure 7) off of the stopper pin on the swing arm.
8. Slide the wheel and axle assembly to the rear and remove it.
9. Install by reversing these removal steps, note the following.
10. Inspect wheel components as described under *Inspection (All Models)* in this chapter.
11. Make sure the groove in the brake panel is properly meshed with the tang on the swing arm. This is necessary for proper brake operation.
12. Adjust the drive chain tension as described in Chapter Three.
13. Tighten the axle nut to the torque values in Table 1.
14. After the wheel is completely installed, rotate it several times to make sure it rotates smoothly. Apply the brake several times to make sure it operates correctly.
15. Adjust the rear brake as described under *Rear Brake Pedal Adjustment* in Chapter Three.

Inspection (All Models)

Measure the radial and axial runout of the wheel rim with a dial indicator as shown in Figure 8. The maximum radial and axial runout is 2.0 mm (0.08 in.). If the runout exceeds this dimension, check the condition of the wheel bearings. Some of this condition can be corrected as described under *Spoke Inspection and Replacement* in Chapter Eight.

Check axle runout as described under *Rear Hub Inspection* in this chapter.

REAR HUB**Disassembly (Dual-shock Models)**

Refer to Figure 9 for this procedure.

1. Remove the rear wheel as described in this chapter.
2. Pull the rear brake panel straight up and out of the brake drum.
3. Remove the dust cover from the left-hand side of the wheel.
4. Remove the circlip (A, Figure 10) and remove the driven sprocket assembly.

NOTE

If the driven sprocket assembly is difficult to remove, tap on the backside of the sprocket (from the opposite side of the wheel through the spokes) with the wooden handle of a hammer. Tap evenly around the perimeter of the sprocket until the assembly is free.

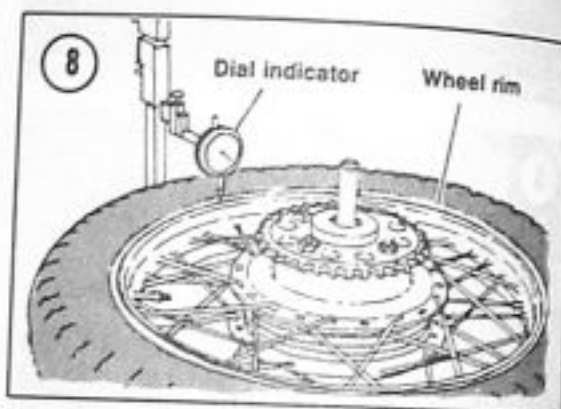
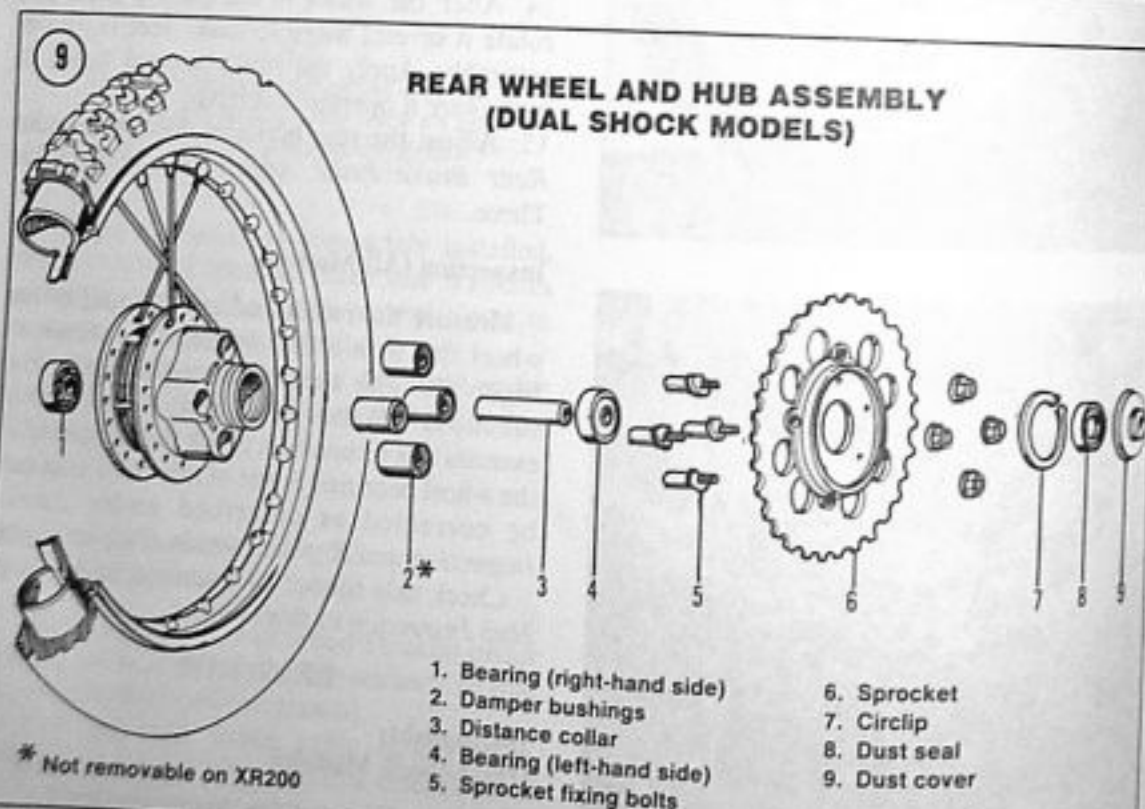
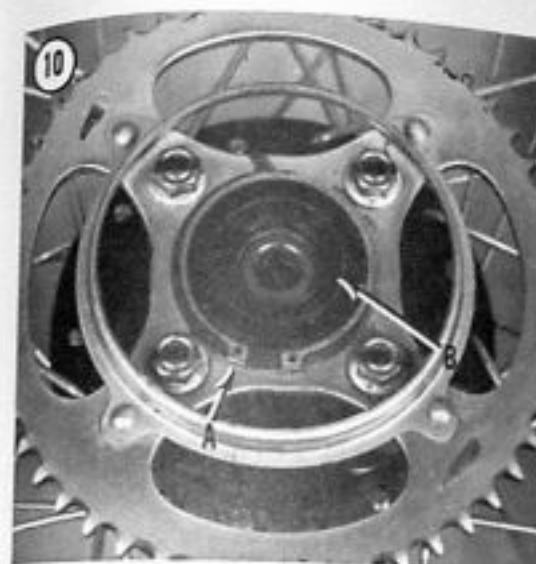
5. Remove the dust seal from the left-hand side (B, Figure 10).
6. To remove the hub right- and left-hand bearings and distance collar, insert a soft aluminum or brass drift into one side of the hub. Push the distance collar over to one side and place the drift on the inner race of the lower bearing. Tap the bearing out of the hub

with a hammer, working around the perimeter of the inner race.

7. Remove the distance collar and tap out the opposite bearing.

**Assembly
(Dual-shock Models)**

1. On non-sealed bearings, pack the bearings with a good quality bearing grease (Figure 11). Work the grease in between the balls thoroughly. Turn the bearing by hand a couple of times to make sure the grease is distributed evenly inside the bearing.


**REAR WHEEL AND HUB ASSEMBLY
(DUAL SHOCK MODELS)**

REAR SUSPENSION


2. Blow any dirt or foreign matter out of the hub prior to installing the bearings.
3. Pack the wheel hub with multipurpose grease.
4. Install the right-hand bearing into the hub.

CAUTION

Install stock Honda bearings with the sealed side facing out (Figure 12). Tap the bearings squarely into place and tap on the outer race only. Use a socket (Figure 13) that matches the outer race diameter. Do not tap on the inner race or the bearing might be damaged. Be sure that the bearings are completely seated.

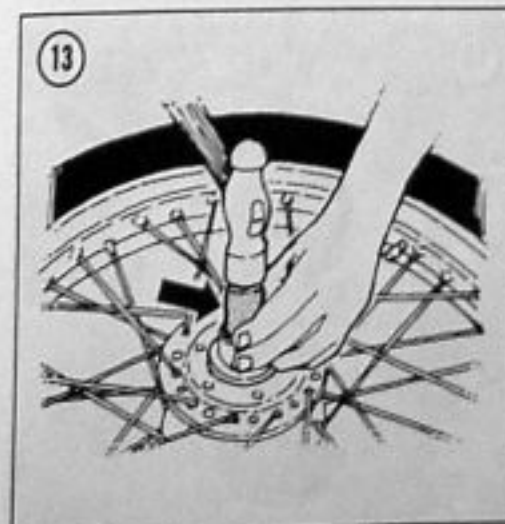
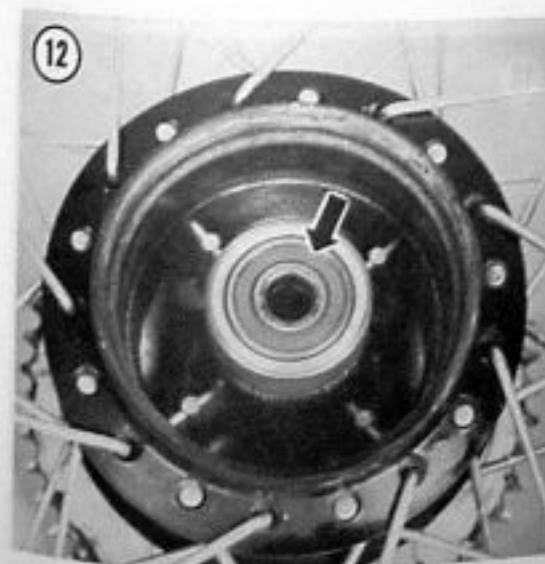


5. Press the distance collar into the hub from the left-hand side.
6. Install the left-hand bearing into the hub.
7. Install the driven sprocket assembly and install the circlip.
8. Lubricate the new oil seal with fresh multipurpose grease and tap it gently into place.
9. Install the rear wheel as described in this chapter.

**Disassembly
(Pro-Link Models, 1981-1983)**

Refer to Figure 14 for this procedure.

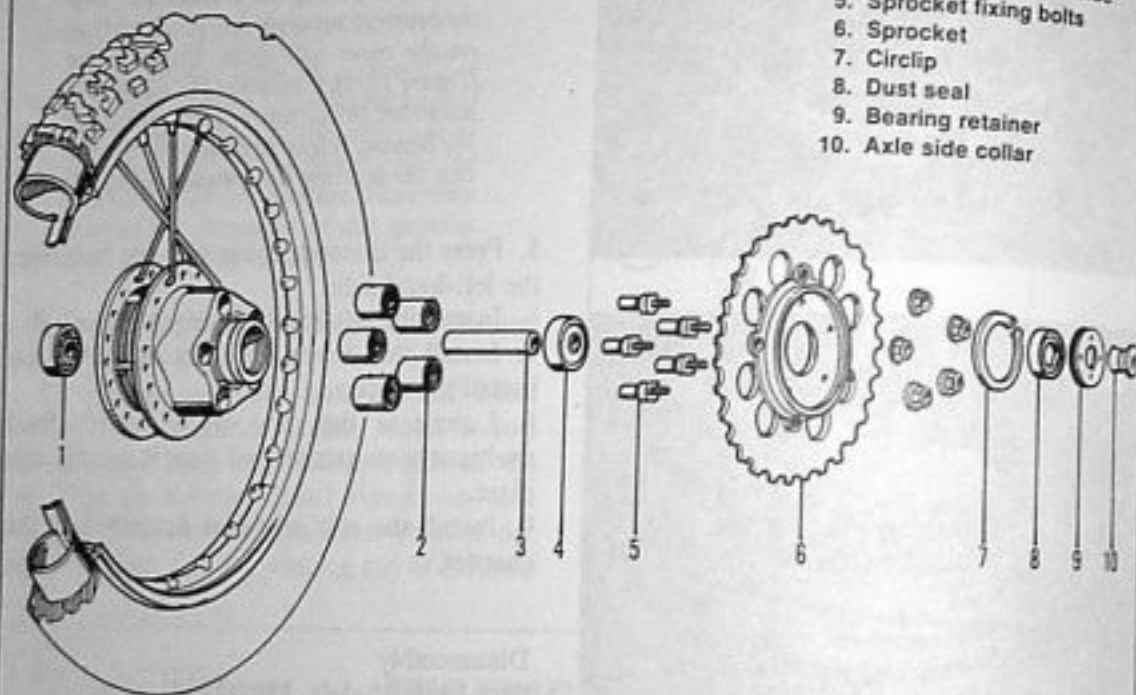
1. Remove the rear wheel as described in this chapter.



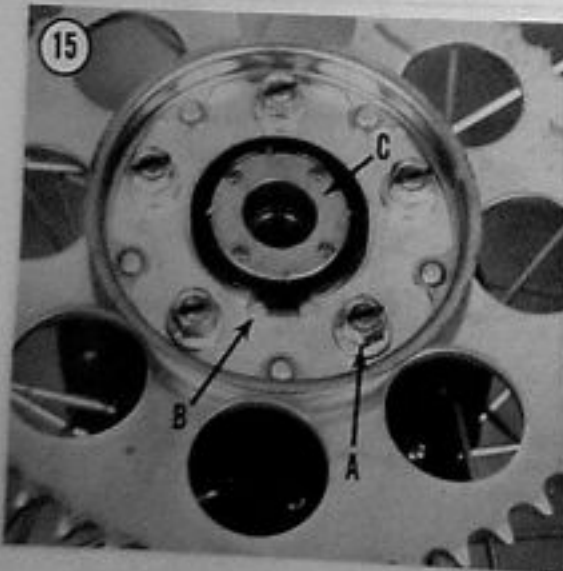
14

REAR WHEEL AND HUB ASSEMBLY (PRO-LINK MODELS, 1981-1983)

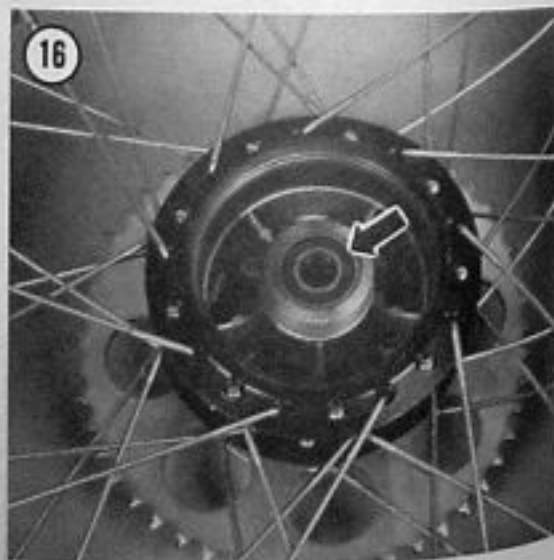
1. Bearing—right-hand side
2. Damper bushings
3. Distance collar
4. Bearing—left-hand side
5. Sprocket fixing bolts
6. Sprocket
7. Circlip
8. Dust seal
9. Bearing retainer
10. Axle side collar



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REAR SUSPENSION

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2. Remove the axle nut, drive chain adjuster and side collar from the left-hand side. Withdraw the axle, drive chain adjuster, stopper plate and brake assembly from the right-hand side.
3. Remove the nuts (A, Figure 15) securing the driven sprocket assembly.
4. Remove the circlip (B, Figure 15) and remove the driven sprocket assembly.

NOTE

If the driven sprocket assembly is difficult to remove, tap on the backside of the sprocket (from the opposite side of the wheel through the spokes) with the wooden handle of a hammer. Tap evenly around the perimeter of the sprocket until the assembly is free.

5. Use a small drift and hammer or special tool (Honda part No. 07710-0010100 and 07710-0010401) and unscrew the bearing retainer (C, Figure 15) from the hub.
6. Remove the dust seal from the hub.
7. To remove the hub right- and left-hand bearings (Figure 16) and distance collar, insert a soft aluminum or brass drift into one side of the hub. Push the distance collar over to one side and place the drift on the inner race of the lower bearing. Tap the bearing out of the hub with a hammer, working around the perimeter of the inner race.
8. Remove the distance collar and tap out the opposite bearing.
9. Inspect wheel components as described under *Inspection (All Models)*.

Disassembly (Pro-Link Models 1986-on)

Refer to Figure 17 for this procedure.

1. Remove the rear wheel as described in this chapter.
2. Pull the brake assembly straight up and out of the brake drum.
3. Remove the axle spacer (Figure 18).
4. Use a small drift and hammer or special tool (Honda Part No. 07710-0010100 and 07710-0010401) and unscrew the bearing retainer (Figure 19).
5. Remove the dust seal.

6. Remove the right-hand (Figure 20) and left-hand bearings and distance collar. Tap the bearings out with a soft aluminum or brass drift.
7. Inspect wheel components as described under *Inspection (All Models)*.

Inspection (All Models)

1. Thoroughly clean out the inside of the hub with solvent and dry with compressed air or a shop cloth.

NOTE

Avoid getting any greasy solvent residue on the brake drum during this procedure. If this happens, clean it off with a clean shop cloth and lacquer thinner.

2. Do not clean sealed bearings. If non-sealed bearings are installed, clean them in solvent and thoroughly dry with compressed air. Do not let the bearing spin while drying.
3. On all models except XR200R (1986-on), turn each bearing by hand (Figure 21). Make sure that the bearings turn smoothly.

CAUTION

Honda recommends against reinstalling old bearings on XR200R (1986-on). Replace them with new ones.

4. On non-sealed bearings, check the balls (on the non-sealed side) for evidence of wear, pitting or excessive heat (bluish tint). Replace the bearing if necessary; always replace as a complete set. When replacing, be sure to take your bearings along to ensure a perfect matchup.

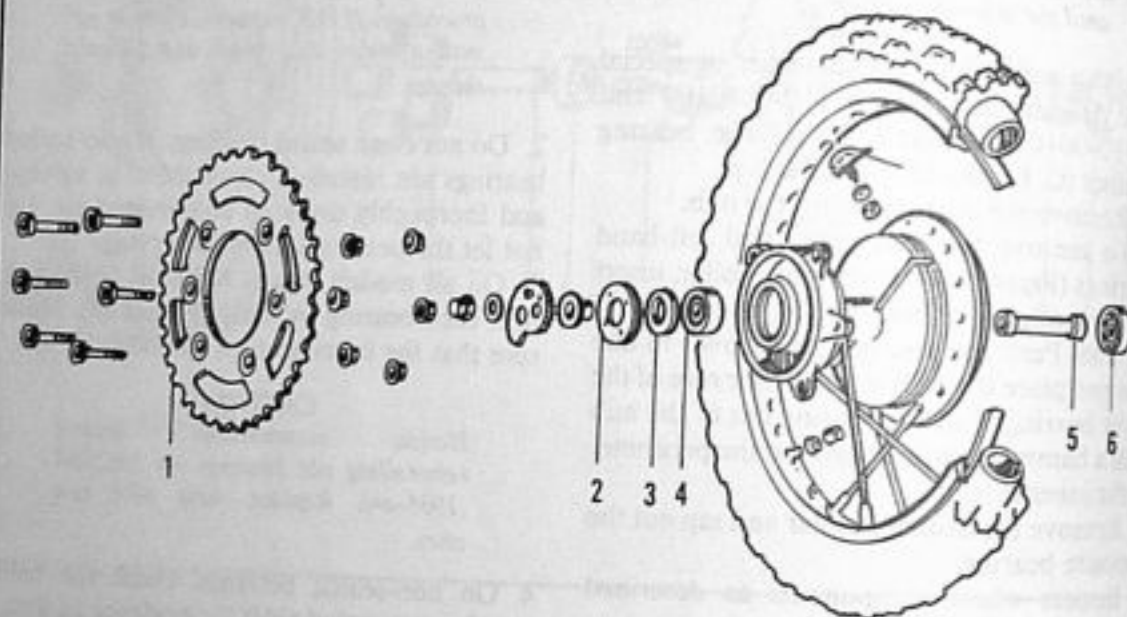
NOTE

Fully sealed bearings are available from many bearing specialty shops. Fully sealed bearings provide better protection from dirt and moisture that may get into the hub.

5. Check the axle for wear and straightness. Use V-blocks and a dial indicator as shown in Figure 22. If the runout is 0.2 mm (0.008 in.) or greater, the axle should be replaced.

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REAR WHEEL AND HUB ASSEMBLY (1986-ON)

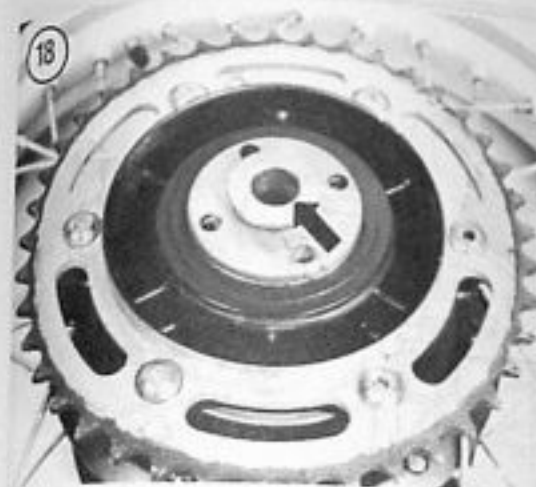


1. Sprocket
2. Bearing retainer
3. Dust seal
4. Bearing
5. Spacer
6. Bearing

REAR SUSPENSION

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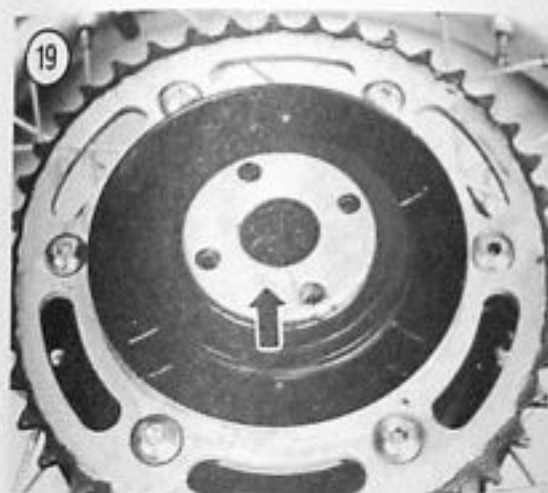
Assembly (Pro-Link Models 1981-1983)

1. On non-sealed bearings, pack the bearings with a good quality bearing grease (Figure 23). Work the grease in between the balls thoroughly. Turn the bearing by hand a couple of times to make sure the grease is distributed evenly inside the bearing.
2. Blow any dirt or foreign matter out of the hub prior to installing the bearings.
3. Pack the wheel hub bearing cavities with multipurpose grease.
4. Install the right-hand bearing.

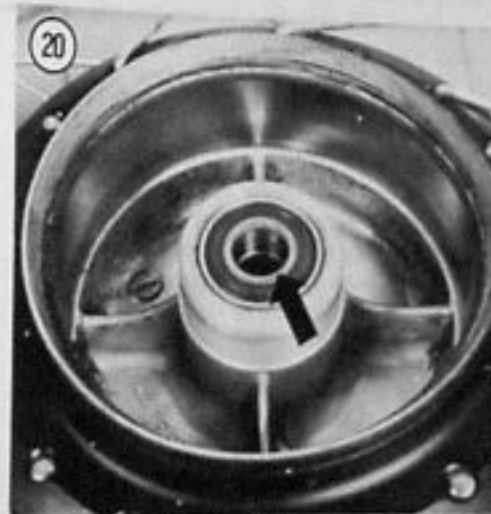
CAUTION

Do not reinstall old bearings. Replace them with new ones.

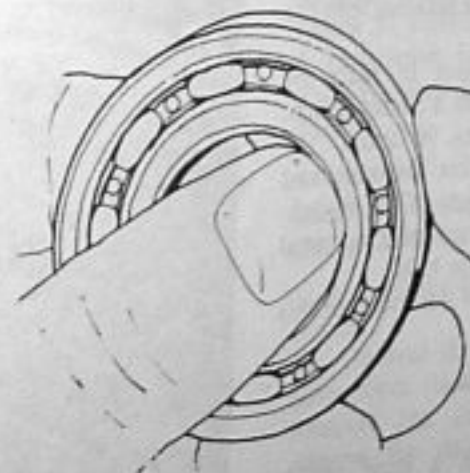
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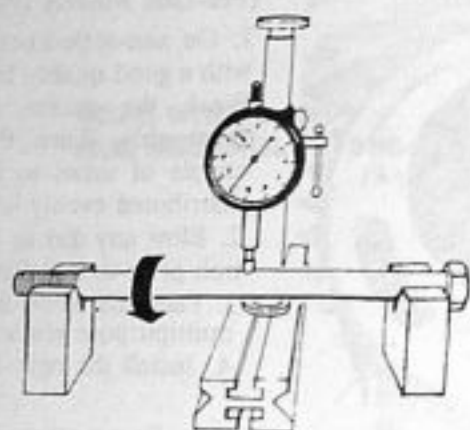
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21



22

**NOTE**

Install both bearings with the sealed side facing toward the outside (Figure 24). Tap the bearing squarely into place and tap only on the outer race. Use a socket (Figure 25) that matches the outer race diameter. Do not tap on the inner race or the bearing will be damaged. Be sure to tap the bearings until they seat completely.

23



24

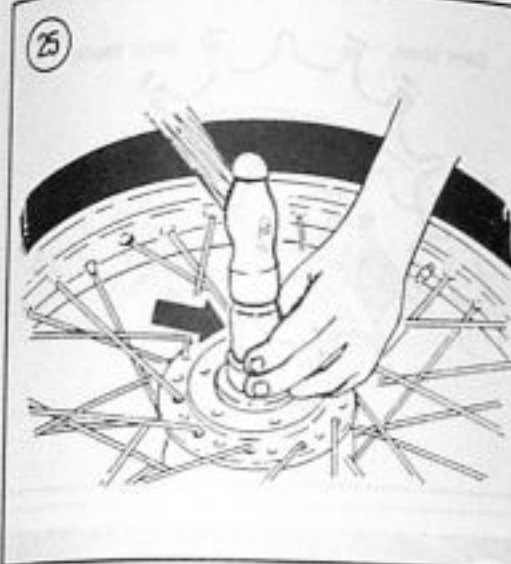


5. Install the distance collar from the left-hand side and install the left-hand bearing.
6. Apply a light coat of multipurpose grease to the dust seal and install the seal.
7. Make sure that the bearing retainer threads are in good condition; replace the retainer if necessary. Screw the bearing retainer into the hub.
8. Lock the bearing retainer in place by staking it (D, Figure 26) with a center punch. Stake the retainer at 4 places, 90° apart.
9. Install the driven sprocket assembly and tighten the nuts to 55-65 N·m (40-47 ft.-lb.).
10. Install the circlip. Make sure it is seated correctly in the groove in the hub.
11. Install the rear wheel as described in this chapter.

Assembly (Pro-Link Models, 1986-on)

1. Pack the bearings with a good quality bearing grease (Figure 11). Work the grease in

25



and tap only on the outer race. Use a socket (Figure 25) that matches the outer race diameter. Do not tap on the inner race or the bearing will be damaged. Be sure to tap the bearings until they seat completely.

4. Install the distance collar from the left-hand side and install the left-hand bearing.
5. Apply a light coat of multi-purpose grease to the dust seal and install the seal.
6. Make sure that the bearing retainer threads are in good condition; replace the retainer if necessary. Screw the bearing retainer into the hub.
7. Lock the bearing retainer in place by staking it (D, Figure 26) with a center punch. Stake the retainer at 4 places, 90° apart.
8. Install the brake assembly into the hub.
9. Install the rear wheel as described in this chapter.

DRIVEN SPROCKET ASSEMBLY

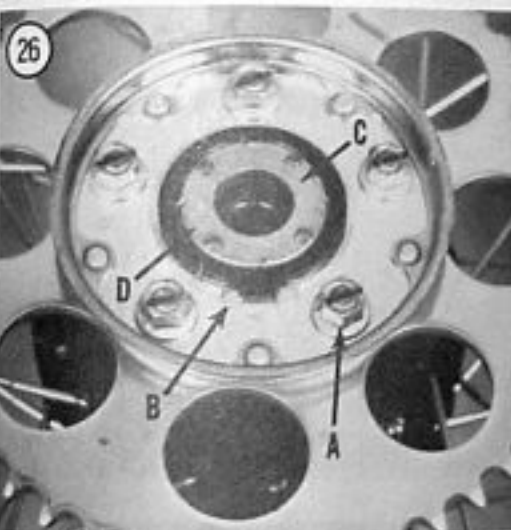
All models except the XR200R from 1986-on have a driven sprocket assembly separate from the wheel hub itself.

Removal/Installation (XR200R 1986-on)

1. Remove the rear wheel as described in this chapter.
2. Remove Allen bolts, washers and nuts securing the driven sprocket to the wheel hub.
3. Inspect the condition of the teeth on the sprocket. If they are visibly worn as shown in Figure 27, replace the sprocket.
4. Installation is the reverse of these steps. Tighten Allen bolts to torque specified in Table 1.

Removal/Installation (except XR200R 1986-on)

1. Remove the rear wheel as described in this chapter.
- 2A. On dual-shock models, remove the dust cover from the left-hand side of the wheel. Remove the circlip (A, Figure 28) and remove the driven sprocket assembly (B, Figure 28).



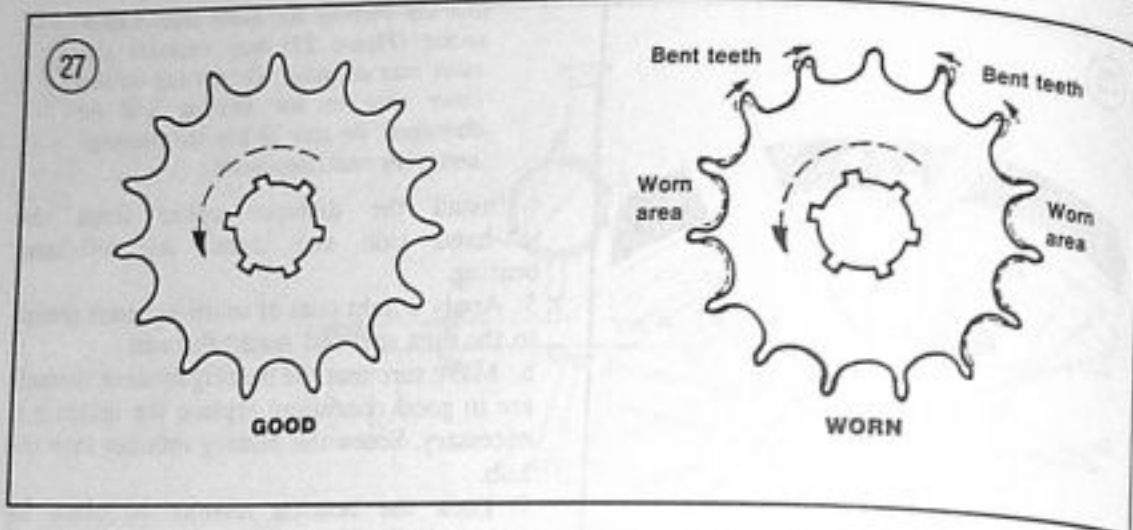
- between the balls thoroughly. Turn the bearing by hand a couple of times to make sure the grease is distributed evenly inside the bearing.
2. Blow any dirt or foreign matter out of the hub prior to installing the bearings.
3. Install the right-hand bearing.

CAUTION

Do not reinstall old bearings. Replace them with new ones.

NOTE

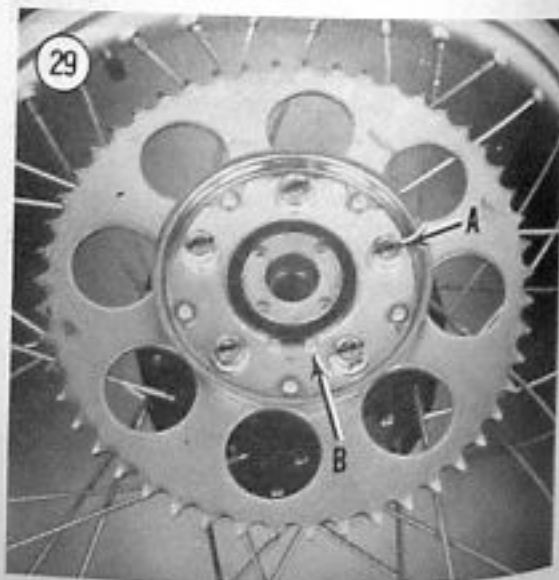
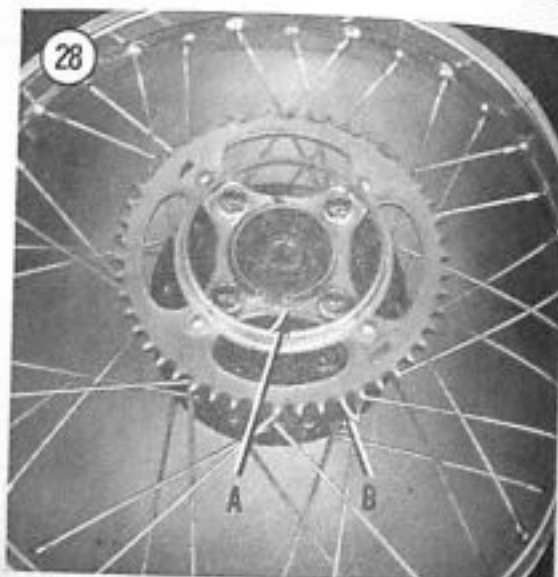
Install both bearings with the sealed side facing toward the outside (Figure 24). Tap the bearing squarely into place



2B. On Pro-Link models, remove the nuts (A, Figure 29) securing the driven sprocket assembly. Remove the circlip (B, Figure 29) and remove the driven sprocket assembly.

NOTE

In Steps 2A and 2B, if the driven sprocket is difficult to remove, tap on the backside of the sprocket (from the opposite side of the wheel through the spokes) with the wooden handle of a hammer. Tap evenly around the perimeter of the sprocket until the assembly is free.

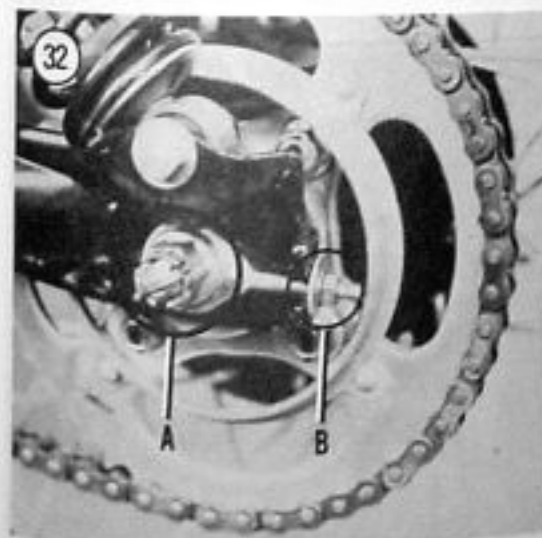
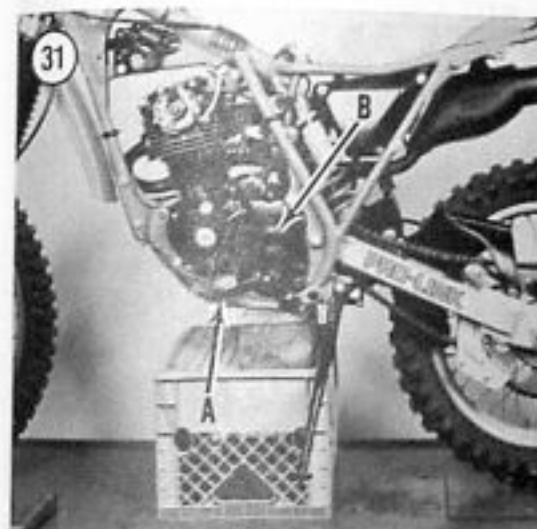
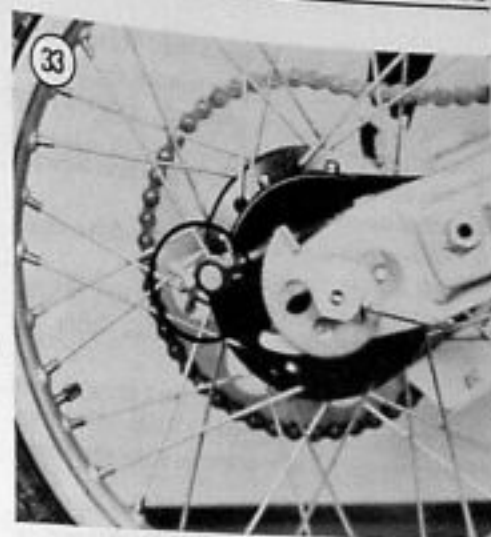
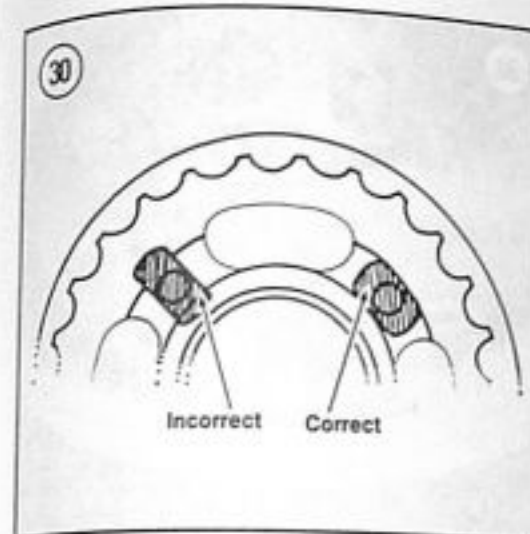


Inspection

1. Inspect the condition of the rubber dampers for signs of damage or deterioration. Replace as a complete set even though only one may require replacement.

NOTE

On XR200 models, the rubber dampers are not removable as on all other models. They must be removed with a 32 mm hole cutter. This operation should be entrusted to a Honda dealer.



2. Inspect the condition of the teeth on the sprocket. If they are visibly worn as shown in Figure 27, replace the sprocket.

3. On XL125S, XL185S, XR185 and XR200, if the fixing bolts were removed, install them correctly into the groove in the backside of the sprocket. Refer to Figure 30. Tighten the nuts to 55-65 N·m (40-47 ft.-lb.).

4. If the sprocket requires replacement, the drive chain is probably worn also and may need replacement. Refer to *Drive Chain Removal/Installation* in this chapter.

DRIVE CHAIN

Removal/Installation (All Except XL200R)

1. Place a milk crate or wood block(s) under the engine to support the bike securely so that the rear wheel is off the ground.
2. Remove the gearshift pedal (A, Figure 31).
3. Remove the bolts securing the left-hand crankcase cover (B, Figure 31) and remove it.
- 4A. On dual-shock models, remove the cotter pin and axle nut (A, Figure 32). Discard the old cotter pin. Loosen the drive chain adjuster locknuts (B, Figure 32) on each side of the wheel.
- 4B. On Pro-Link models, pull the rear brake cable holder plate (Figure 33) toward the rear and disconnect it from the brake arm. Loosen

the rear axle nut (Figure 34). Rotate both drive chain snail adjusters toward the front so the wheel can be moved forward for maximum chain slack.

5. On all models, push the rear wheel forward for maximum chain slack.

6. Rotate the rear wheel until the drive chain master link is visible.

7. Remove the clip on the master link (Figure 35) and remove the master link from the chain.

8. Remove the drive chain and inspect it as described under *Drive Chain Cleaning, Inspection and Lubrication* in Chapter Three.

NOTE

Drive chain replacement information is included in the procedure in Chapter Three.

9. Install by reversing these removal steps, noting the following.

10. Install a new drive chain master link clip with the closed end facing in the direction of chain travel (Figure 36).

11. Adjust the drive chain tension as described in Chapter Three.

12. Tighten the axle nut to the torque values in Table 1.

NOTE

On dual-shock models, install a new cotter pin on the axle nut; never reuse an old one as it may break and fall off. Bend the ends over completely.

13. After the wheel is completely installed, rotate it several times to make sure it rotates smoothly. Apply the brake several times to make sure it operates correctly.

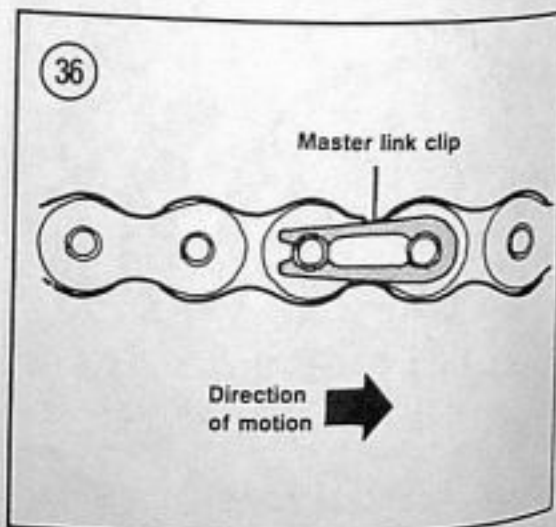
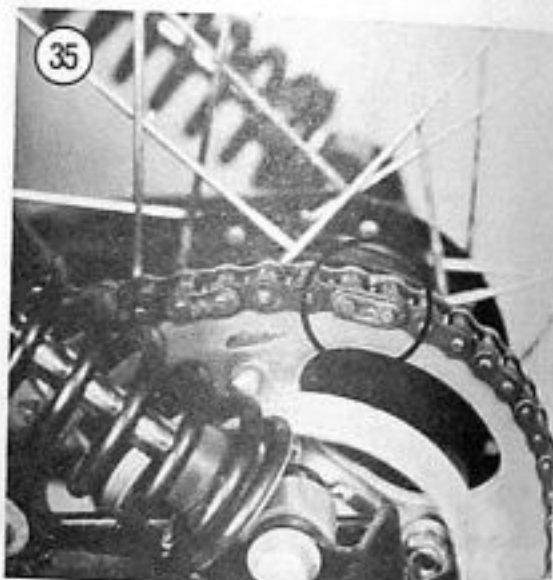
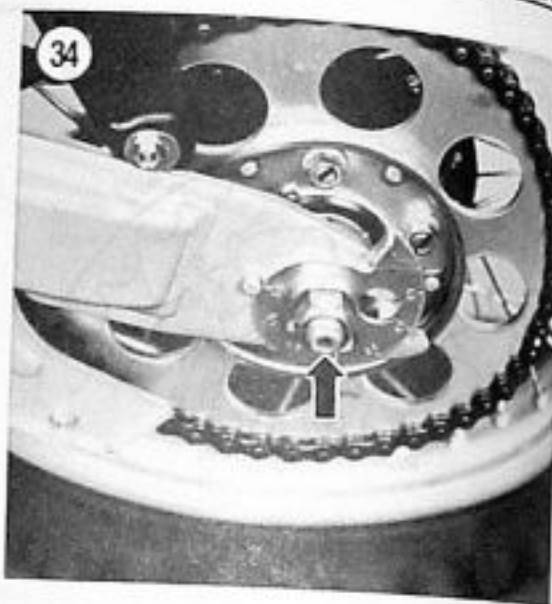
14. Adjust the rear brake as described under *Rear Brake Pedal Adjustment* in Chapter Three.

Removal/Installation (XL200R)

WARNING

The drive chain is manufactured as a continuous closed loop with no master link. Attempting to break it will weaken it and result in a potentially dangerous failure.

1. Place wood block(s) under the frame to support the bike securely with the rear wheel off the ground.



REAR SUSPENSION

2. Remove the gearshift pedal (A, Figure 31).

3. Remove the bolts securing the left-hand rear crankcase cover (B, Figure 31) and remove the cover.

4. Remove the rear wheel as described in this chapter.

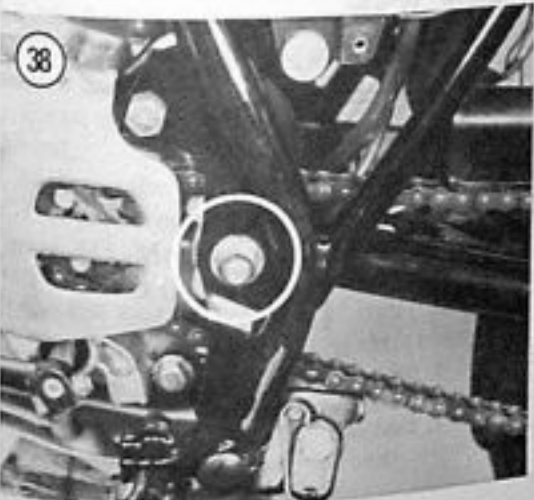
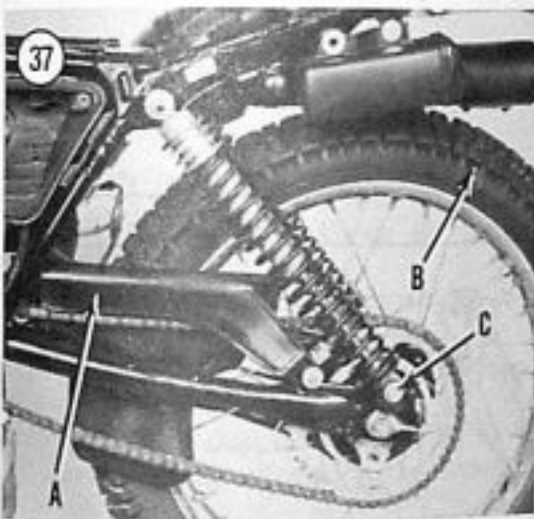
5. Remove the swing arm as described in this chapter.

6. Remove the drive chain from the drive sprocket.

7. Install by reversing this procedure.

Lubrication and Adjustment

For lubrication and adjustment of the drive chain, refer to *Drive Chain Lubrication and Drive Chain Adjustment* in Chapter Three.



WHEEL BALANCING

Balance the rear wheel in the same manner as the front wheel. See *Wheel Balancing* in Chapter Eight.

TIRE CHANGING AND TIRE REPAIRS

Service the rear tire in the same manner as the front tire. See *Tire Changing or Tire Repairs* in Chapter Eight.

SWING ARM (DUAL-SHOCK MODELS)

In time, the bushings or pivot collar will wear beyond the service limits and will have to be replaced. The condition of the bushings can greatly affect handling performance and if worn parts are not replaced they can produce erratic and dangerous handling. Common symptoms are wheel hop, pulling to one side during acceleration and pulling to the other side during braking.

Removal

1. Place a milk crate or wood block(s) under the engine to support the bike securely with the rear wheel off of the ground.

2. Remove both side covers and the seat.

3. Remove the drive chain guard (A, Figure 37).

4. Remove the rear wheel (B, Figure 37) as described in this chapter.

5. Remove the chain guide on models so equipped.

6. Remove the lower mounting bolt (C, Figure 37) on both shock absorbers. Pivot the shock absorber up and out of the way.

NOTE

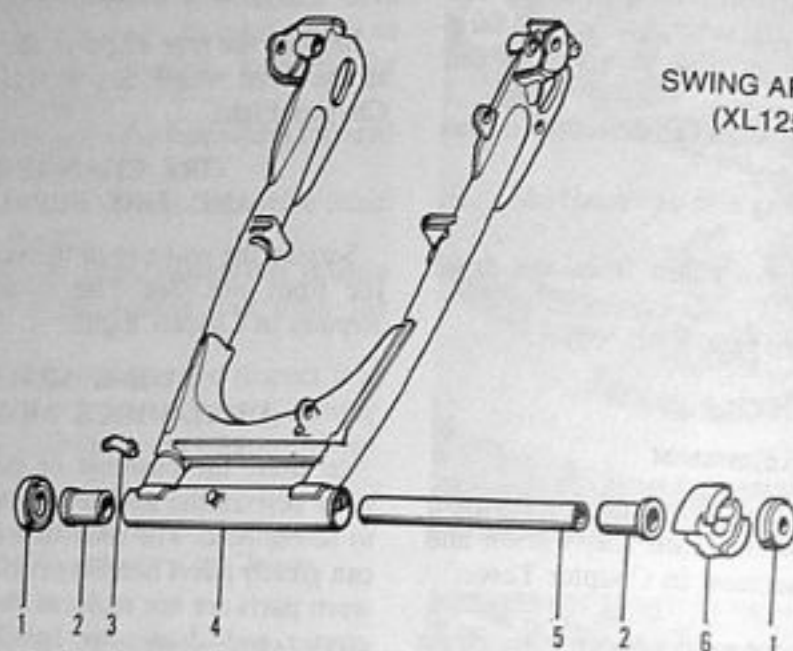
It is not necessary to completely remove the shock absorbers.

7. Grasp the rear end of the swing arm and try to move it from side to side in a horizontal arc. There should be no noticeable side play. If play is evident and the pivot bolt is tightened correctly, the bushings or pivot collar should be replaced.

8. Remove the self-locking nut (Figure 38) and withdraw the pivot bolt from the right-hand side.

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SWING ARM ASSEMBLY (XL125S, XL185S)

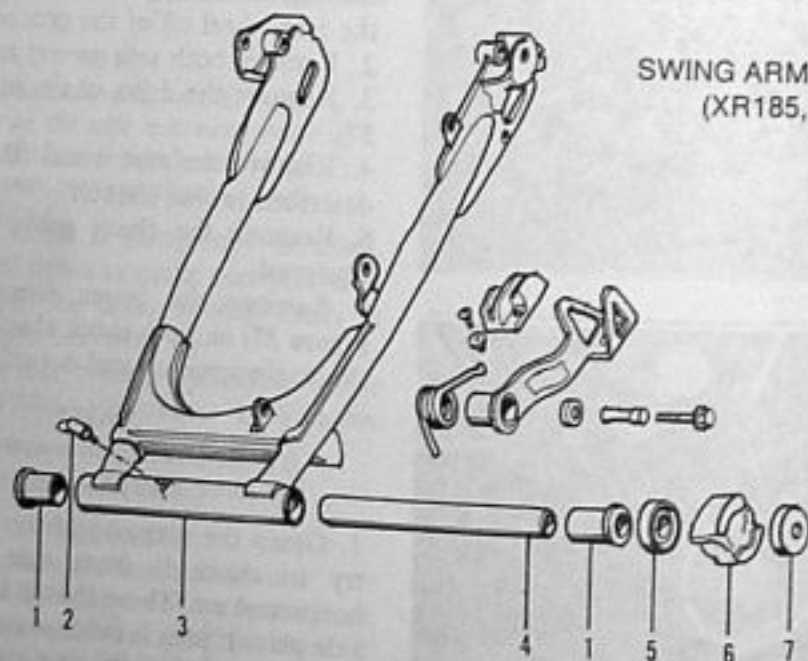


1. Dust seal
2. Bushing
3. Grease fitting

4. Swing arm assembly
5. Pivot collar
6. Drive chain slider

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SWING ARM ASSEMBLY (XR185, XR200)

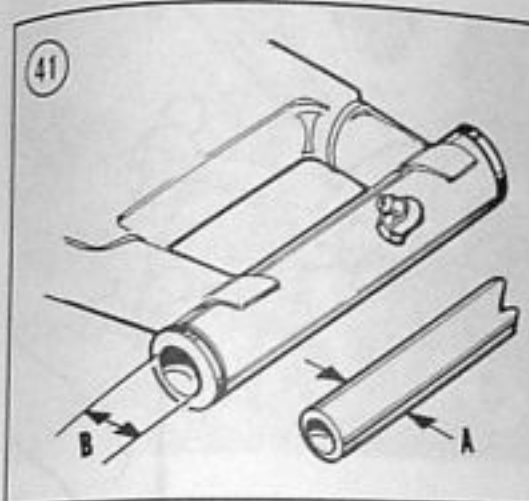


1. Bushing
2. Grease fitting
3. Swing arm assembly
4. Pivot collar

5. Grease seal
6. Drive chain slider
7. Dust seal

REAR SUSPENSION

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9. Pull back on the swing arm, free it from the drive chain and remove the swing arm from the frame.

NOTE

Don't lose the dust seal caps on each side of the pivot points; they will usually fall off when the swing arm is removed.

Disassembly/Inspection/Assembly

Refer to Figure 39 or Figure 40 for this procedure.

1. Remove the swing arm as described in this chapter.
2. Remove the rear brake torque link from the swing arm.
3. Remove both dust seal caps if they have not already fallen off during the removal sequence.
4. Remove the drive chain slider from the left-hand side of the swing arm.
5. Withdraw the pivot collar, clean it in solvent and dry it.
6. Clean the bushings and the pivot collar in solvent.
7. Measure the outside diameter of both ends of the pivot collar with a micrometer (A, Figure 41). Measure the inside diameter of both bushings (B, Figure 41). If the difference between A and B exceeds 0.80 mm (0.031 in.) at either end, replace the pivot collar and both bushings.

NOTE

Always replace both bushings even though only one may be worn.

8. If the bushings need replacing, refer to *Bushing Replacement* in this chapter.
9. Prior to installing the pivot collar, coat it thoroughly with multipurpose grease. Insert the pivot collar and install the drive chain slider on the left-hand side. Install both dust seal caps.
10. Install the brake torque link arm onto the swing arm.

Installation

1. Place the dust seal caps on each end of the pivot points on the swing arm.
2. Position the swing arm into the mounting area. Align the holes in the swing arm with the holes in the frame. To help align the holes, insert a drift in from the left-hand side.
3. Apply a light coat of grease to the pivot bolt. After all holes are aligned, insert the pivot bolt from the right-hand side and install the self-locking nut. Tighten the self-locking nut as specified in Table 1.
4. Pivot the shock absorbers down into position and install the shock absorber lower mounting bolts. Tighten the bolts as specified in Table 1.
5. Install the drive chain guard.
6. Install the rear wheel as described in this chapter.
7. Install the seat and side covers.
8. Grease the pivot shaft as described under *Swing Arm Bushing Lubrication* in Chapter Three.

Bushing Replacement

1. Remove the swing arm as described in this chapter.
2. Secure the swing arm in a vise with soft jaws.
3. Carefully tap out the bushings. Use a suitable size drift or socket and extension and carefully drive them out from the opposite end (Figure 42).

CAUTION

Do not remove the bushings just for inspection as they are usually damaged during removal.

4. Repeat for the other end.

5. Wash all parts, including the inside of the swing arm pivot area, in solvent and thoroughly dry.

6. Apply a light coat of waterproof grease to all parts prior to installation.

7. Install the new bushing. Tap new bushing into place slowly and squarely with a block of wood and hammer (Figure 43). Make sure that it is not cocked and that it is completely seated.

CAUTION

Never reinstall a bushing that has been removed. Removal slightly damages it so that it is no longer true to alignment. If installed, it will damage the pivot collar and create an unsafe riding condition.

8. Repeat Step 7 for the other side.

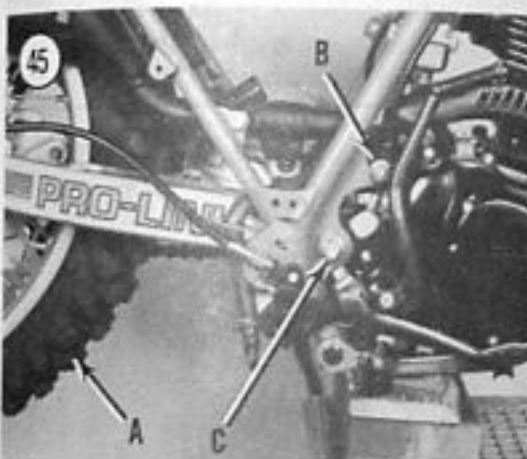
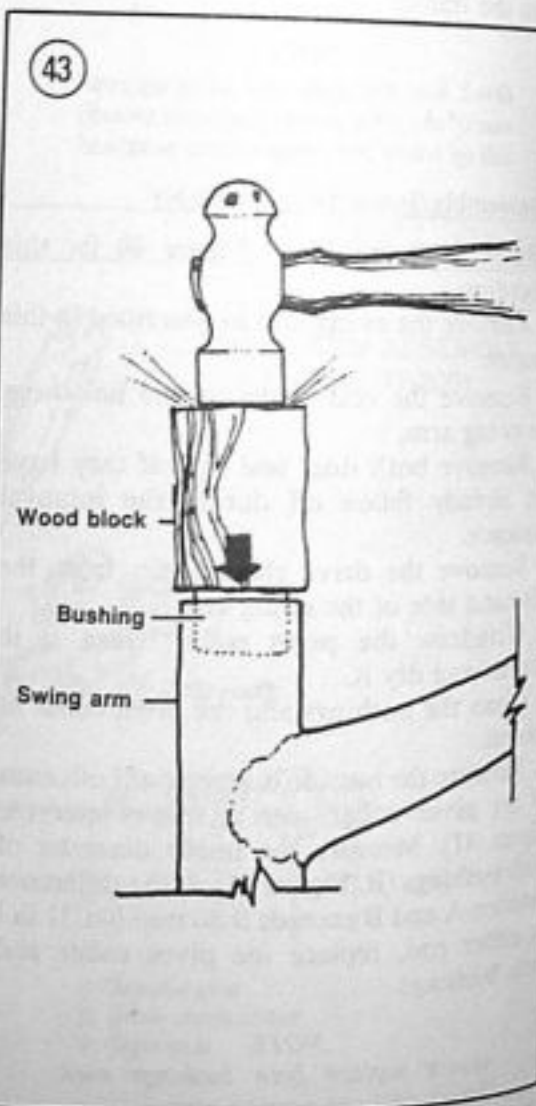
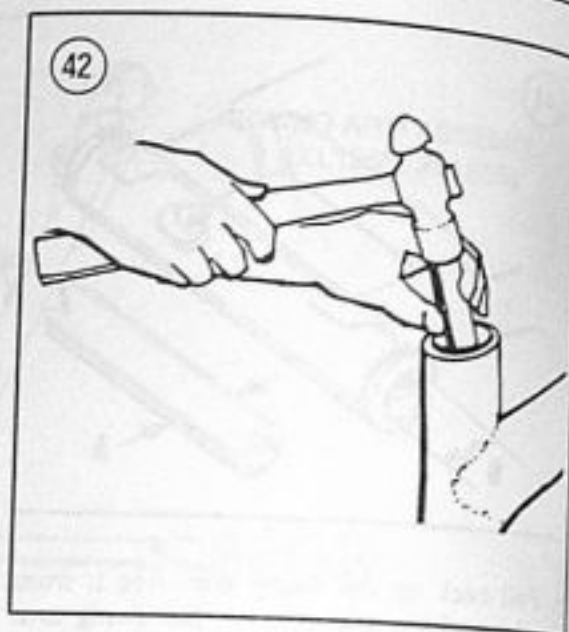
9. Install the rear swing arm as described in this chapter.

SWING ARM (PRO-LINK MODELS)

In time, the needle bearings or the pivot collar will wear beyond the service limits and will have to be replaced. The condition of the needle bearings can greatly affect handling performance and if worn parts are not replaced they can produce erratic and dangerous handling. Common symptoms are wheel hop, pulling to one side during acceleration and pulling to the other side during braking.

Removal

1. Place a milk crate or wood block(s) under the engine to support the bike securely with the rear wheel off of the ground.
2. Remove both side covers and the seat.
3. Remove the fuel tank as described under *Fuel Tank Removal/Installation* in Chapter Six.
4. Remove the air cleaner case.
5. Remove the shock absorber unit as described under *Shock Absorber Removal (Pro-Link Models)* in this chapter.
6. Grasp the rear end of the swing arm and try to move it from side to side in a horizontal arc. There should be no noticeable



side play. If play is evident, and the pivot bolt is tightened correctly, the bushings or pivot collar should be replaced.

7. Remove the bolt and nut (Figure 44) securing the shock arm to the shock link.

8. Remove the rear wheel (A, Figure 45) as described in this chapter.

9. Loosen the upper 10 mm engine mounting bolt (B, Figure 45).

10. Remove the self-locking nut (C, Figure 45) and withdraw the pivot bolt from the left-hand side.

11. Pull back on the swing arm, free it from the drive chain and remove the swing arm from the frame.

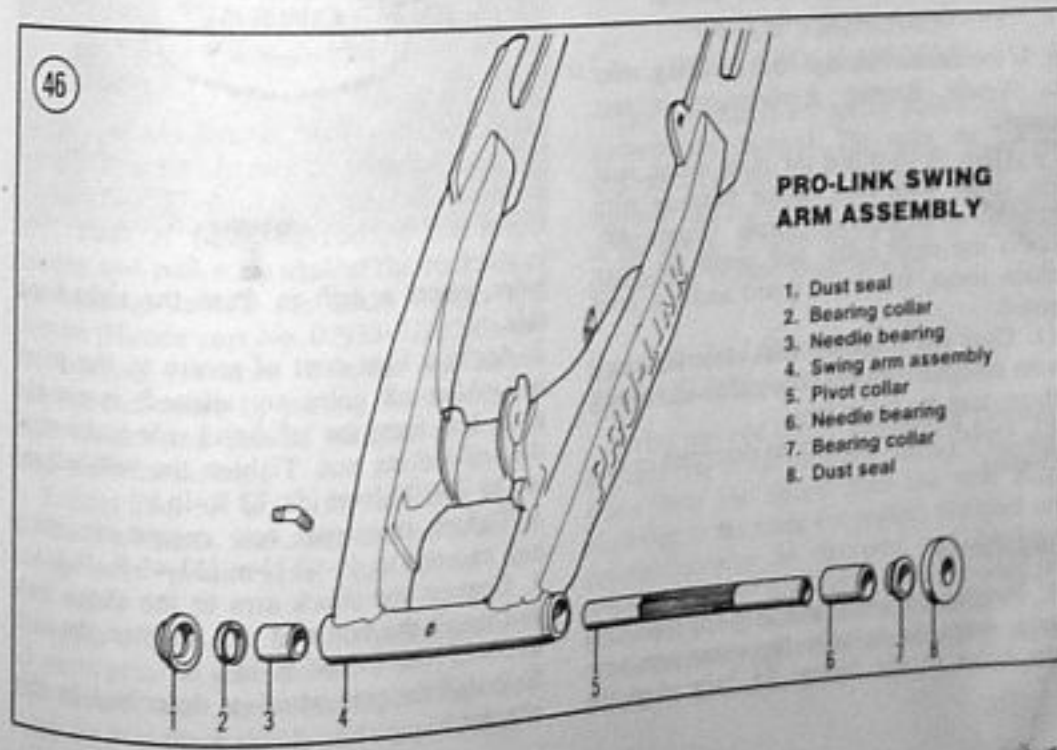
NOTE

Don't lose the dust seal caps on each side of the pivot points; they will usually fall off when the swing arm is removed.

Disassembly/Inspection/Assembly

Refer to Figure 46 for this procedure.

1. Remove the swing arm as described in this chapter.
2. Remove the chain guard and the mud guard from the swing arm.
3. Remove the drive chain slider from the left-hand side of the swing arm.



4. If necessary, remove the bolt and nut securing the shock arm from the swing arm. It does not have to be removed for this procedure.

5. Remove both dust seal caps if they have not already fallen off during the removal sequence.

6. Withdraw the pivot collar, clean in solvent and dry it.

7. Measure the outside diameter of the collar with a micrometer at both ends (Figure 47). If the diameter is 19.915 mm (0.7841 in.) or less at either end, the pivot collar must be replaced.

NOTE

If the pivot collar is replaced, the needle bearings at each end must be replaced at the same time.

8. Wipe off any excess grease from the needle bearings at each end of the swing arm. The needle bearings wear very slowly and wear is very difficult to measure. Turn each bearing with your fingers; make sure they rotate smoothly. Check the rollers for evidence of wear, pitting or color change (bluish tint) indicating heat from lack of lubrication.

NOTE

Always replace both needle bearings even though only one may be worn.

9. If the needle bearings need replacing, refer to *Needle Bearing Replacement* in this chapter.

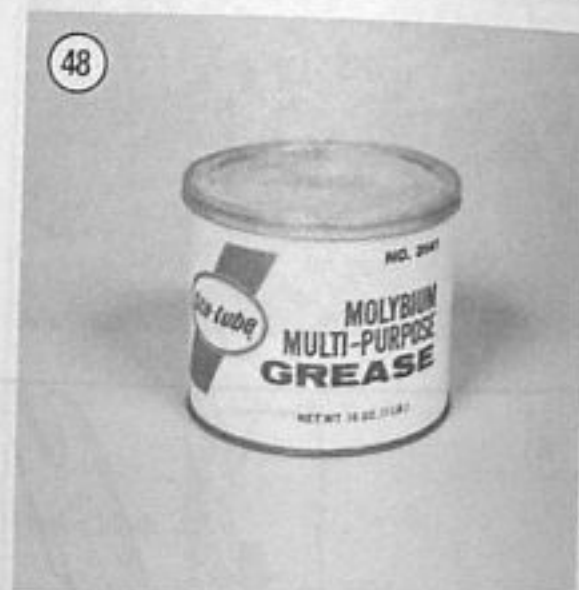
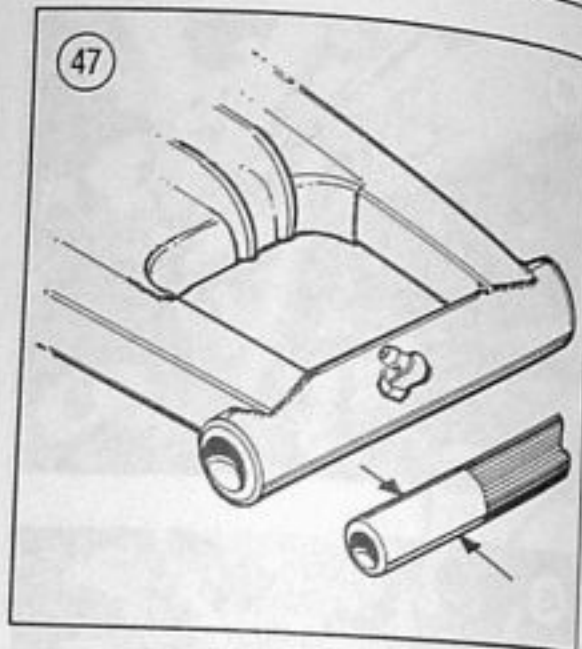
10. Prior to installing the pivot collar, coat the collar and both needle bearings with molybdenum disulfide grease (Figure 48). Insert the pivot collar and install the drive chain slider, the chain guard and the mud guard.

11. Coat the inside of both dust seal caps with molybdenum disulfide grease and install them onto the swing arm.

12. Install the swing arm as described in this chapter.

Installation

1. Position the swing arm into the mounting area. Align the holes in the swing arm with the holes in the frame. To help align the



holes, insert a drift in from the right-hand side.

2. Apply a light coat of grease to the pivot bolt. After all holes are aligned, insert the pivot bolt from the left-hand side and install the self-locking nut. Tighten the self-locking nut to 70-100 N·m (51-72 ft.-lb.).

3. Tighten the upper rear engine mounting bolt and nut to 45-60 N·m (33-43 ft.-lb.).

4. Connect the shock arm to the shock link and install the bolt and nut. Tighten the bolt to 60-75 N·m (43-54 ft.-lb.).

5. Install the rear wheel as described in this chapter.

REAR SUSPENSION

6. Install the shock absorber as described in this chapter.

7. Install the air cleaner case.

8. Install the fuel tank, the seat and the side covers.

9. Lubricate swing arm pivot bolt and shock linkage as described under *Swing Arm Bushing Lubrication* in Chapter Three.

Needle Bearing Replacement

The swing arm is equipped with needle bearings at each end. The bearing will be damaged when removed, so don't remove it unless absolutely necessary.

The bearing can be removed either with a long drift and hammer or with the use of special tools that are available from a Honda dealer.

1. Remove the swing arm as described in this chapter.

2. Secure the swing arm in a vise with soft jaws.

3A. Carefully tap out the needle bearing and collar. Use a suitable size drift or socket and extension and carefully drive them out from the opposite end (Figure 42).

CAUTION

Do not remove the bearings just for inspection as they are damaged during removal and new bearings must be installed.

3B. If special tools are being used, install the Needle Bearing Remover (Honda part No. 07936-3710600) into one side of the swing arm. Push it past the end of the needle bearing and pull it up against the backside of the bearing. Install the Slide Weight and Handle (Honda part No. 07936-3710200) into the bearing remover. Remove the needle bearing and collar by pulling it out with the slide weight and handle (similar to a body shop slide hammer).

4. Repeat Step 3A or 3B for the other end.

5. Wash all parts, including the inside of the swing arm pivot area, in solvent and thoroughly dry.

6. Apply a light coat of waterproof grease to all parts prior to installation.

7A. Install the new bearings. Tap new bearings into place slowly and squarely with a

block of wood and hammer (Figure 43). Tap the bearing in until it is slightly below the surface of the swing arm. Make sure that the bearings are not cocked and that they are completely seated. Set the collar in place and install it in the same manner until completely seated against the swing arm surface.

7B. If special tools are being used, install the new bearings. Tap new bearings into place slowly and squarely with Swing Arm Bearing Installer (Honda part No. 07946-KA50000) and a hammer. Tap the bearing in until it is slightly below the surface of the swing arm. Make sure that the bearings are not cocked and that they are completely seated. Set the collar in place and install it in the same manner until completely seated against the swing arm surface.

CAUTION

Never reinstall a bearing that has been removed. Removal slightly damages it so that it is no longer true to alignment. If installed, it will damage the pivot collar and create an unsafe riding condition.

8. Repeat Step 7A or 7B for the other side.
9. Install the rear swing arm as described in this chapter.

SHOCK ABSORBERS (DUAL-SHOCK MODELS)

The rear shocks are spring controlled and hydraulically damped. The units are sealed and cannot be serviced. Service is limited to removal and replacement of the damper unit or the spring. If either shock fails to dampen adequately, replace them as a set.

Spring Pre-load Adjustment Models XL125S and XL185S

Spring pre-load can be adjusted by rotating the cam ring at the top of the spring. Looking down onto the shock, turn the cam ring clockwise to decrease (or soften) pre-load or counterclockwise to increase (or harden) pre-load. Use the spanner wrench provided in the owner's tool kit for this adjustment.

The cam ring must be indexed on the same detent on both shocks.

Models XR185 and XR200

Spring pre-load can be adjusted by pushing down on the spring and spring adjuster. Remove the set ring from the groove in the shock absorber unit and change it to a different location in the grooves in the top of the shock.

Spring pre-load will be softest if the set ring is located in the top groove of the shock. Pre-load will be hardest if set in the bottom groove of the shock.

The set ring must be set into the same groove on both shocks.

Removal/Installation

Removal and installation of the rear shocks are easier if they are done separately. The remaining unit will support the rear of the bike and maintain the correct relationship between the top and bottom mounts.

1. Place a milk crate or wood block(s) under the engine to support the bike securely with the rear wheel off the ground.
2. Remove both side covers (Figure 49).
3. Adjust both shocks to the softest setting.
4. Remove the upper and lower mounting bolts. See Figure 50.
5. Pivot the lower end of the shock to the rear and pull the chock off the upper stud.
6. Installation is the reverse of these steps, noting the following.
7. Be sure to install a washer behind the bolt on TLR200 models, and behind the bolt and nut on all other models.
8. Tighten the nut and mounting bolt as specified in Table 1.
9. Repeat Steps 4-8 for the other shock.
10. Adjust the shocks as described in this chapter.

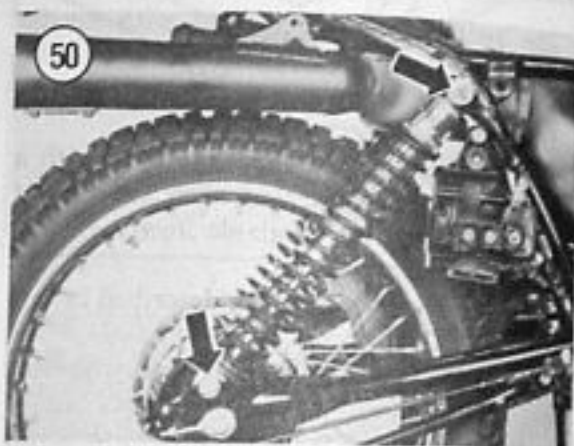
Disassembly/Inspection/Assembly

Refer to Figure 51 or Figure 52 for this procedure.

WARNING

Without the proper tool, this procedure can be dangerous. The spring can fly loose, causing injury. For a small bench fee, a dealer can do the job for you.

1. Install the spring compression tool as shown in Figure 53. This special tool is available from a Honda dealer. It is the Shock



Absorber Compressor (Honda part No. 07959-3290001).

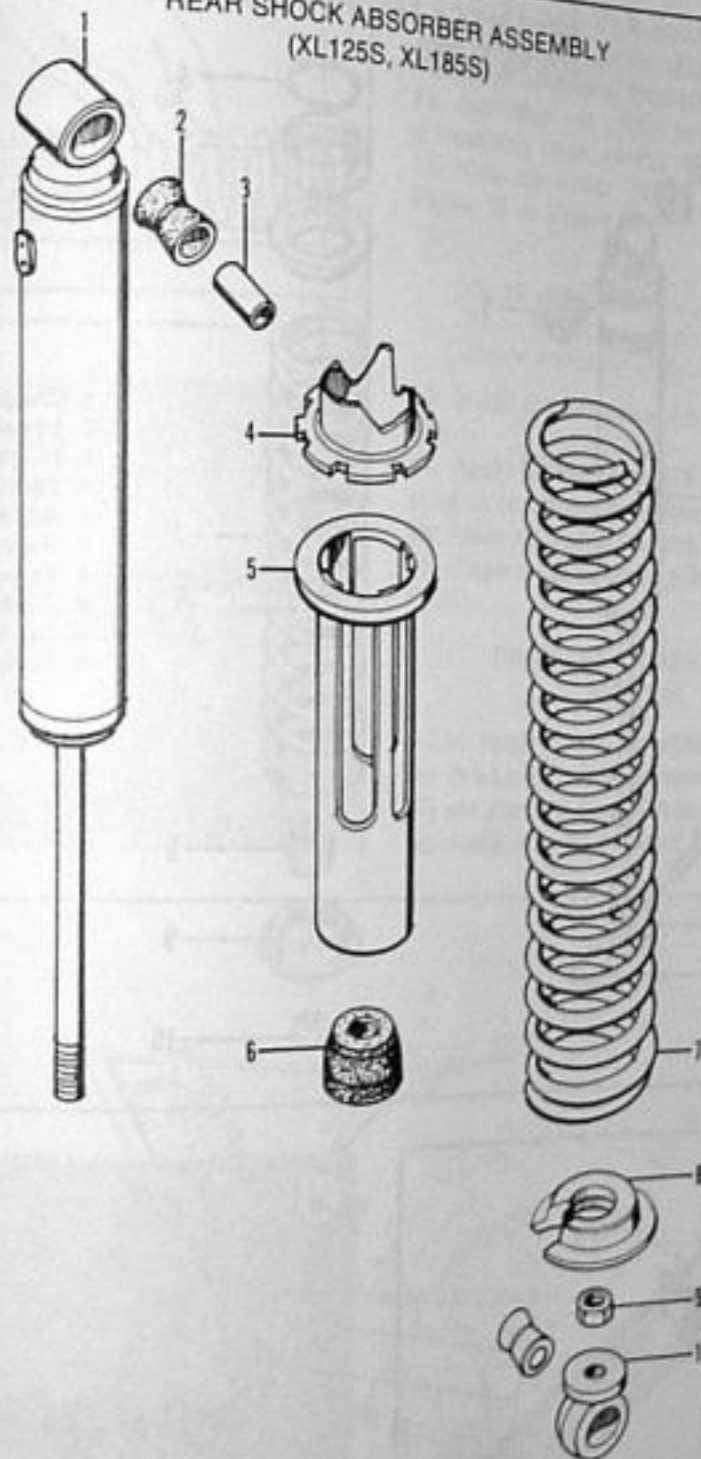
2. Compress the spring just enough to remove the spring seat. Remove the spring seat.
3. Release the spring tension and remove the shock from the compression tool.
4. Slide off the spring.
5. Clamp the lower mount in a vise equipped with soft jaws.
6. Loosen the locknut (A, Figure 54) and unscrew the lower mount (B, Figure 54).
7. Measure the spring free length (Figure 55). The springs must be replaced if one has sagged to the following service limit:
 - a. XL series: 296.1 mm (11.66 in.) or less
 - b. XR series: 339.6 mm (13.37 in.) or less
 - c. TLR series: 307.5 mm (12.11 in.)
8. Check the damper unit for leakage and make sure the damper rod is straight.

NOTE

The damper unit cannot be rebuilt; it must be replaced as a unit.

9. Inspect the rubber stopper (C, Figure 54). If it is damaged or deteriorated it must be replaced.

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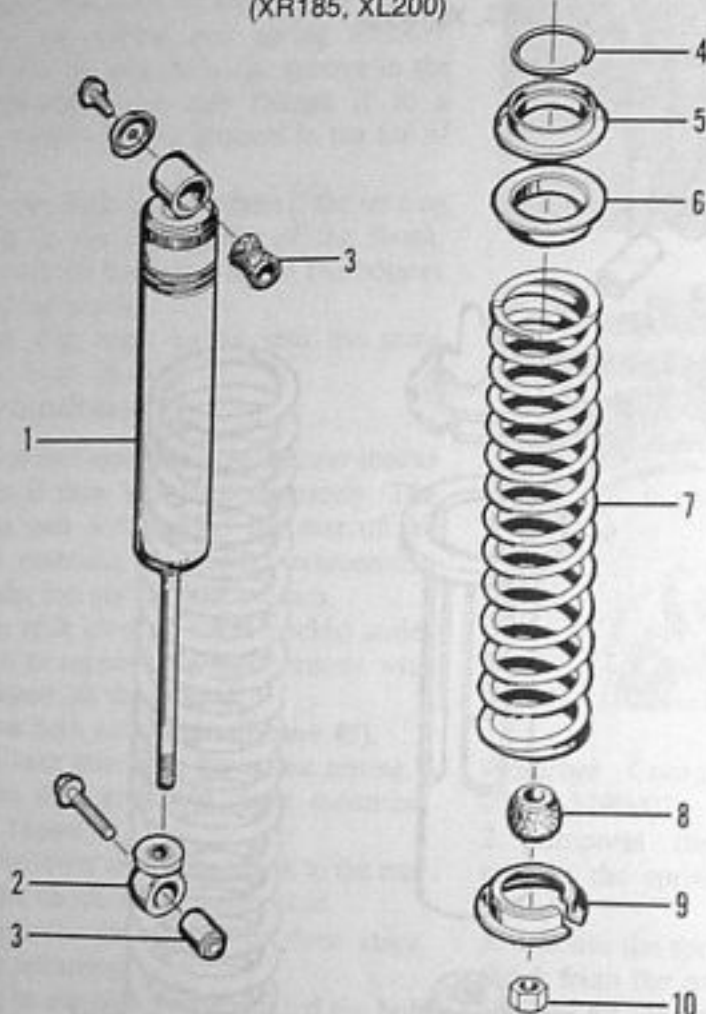
REAR SHOCK ABSORBER ASSEMBLY
(XL125S, XL185S)

1. Damper unit
2. Rubber bushing
3. Bushing
4. Spring pre-load adjuster
5. Spring guide

6. Rubber stopper
7. Spring
8. Lower spring seat
9. Locknut
10. Lower joint

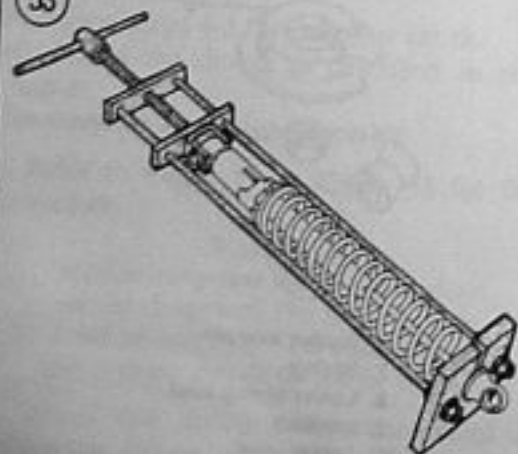
REAR SHOCK ABSORBER ASSEMBLY (XR185, XL200)

52

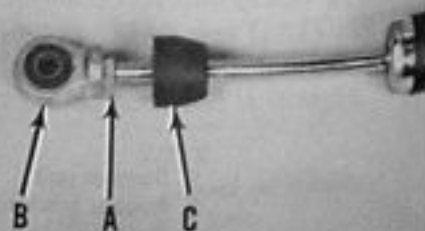


1. Damper unit
2. Lower joint
3. Bushing
4. Set ring
5. Adjusting collar
6. Upper spring seat
7. Spring
8. Rubber stopper
9. Lower spring seat
10. Locknut

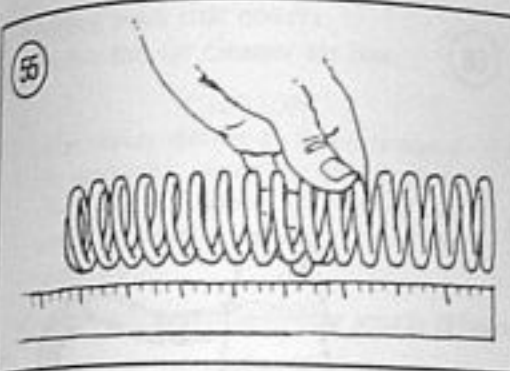
53



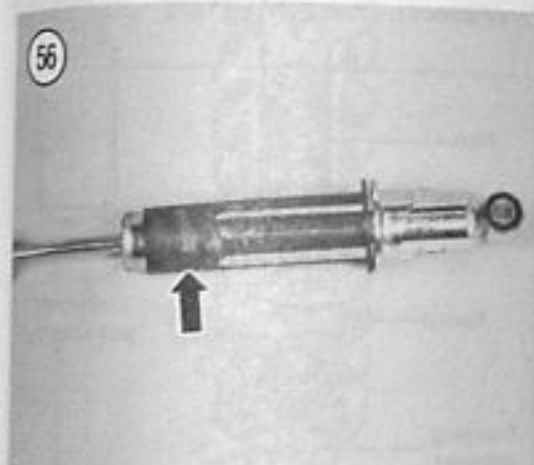
54



55



56



10. On XL and TLR series models, make sure the spring guide (Figure 56) is not cracked or damaged. Replace if necessary.
11. Assembly is the reverse of these disassembly steps, noting the following.
12. Note the order of the parts shown in Figure 51 or Figure 52.

NOTE

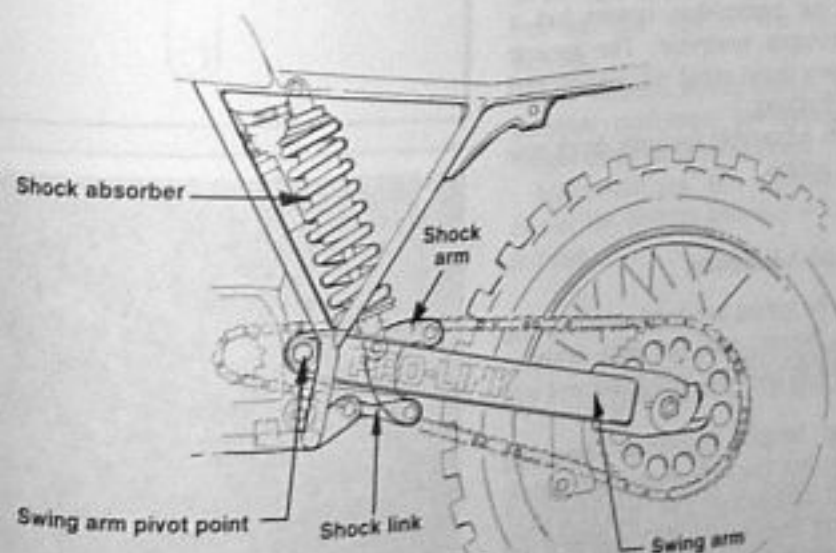
On XR series models, be sure to install the spring with the closer wound coil toward the bottom of the shock.

13. Install the locknut and screw it on all the way.
14. Apply Loctite Lock N' Seal to the threads prior to installing the lower joint. Screw on the lower joint until it stops.
15. Tighten the locknut to 30-40 N·m (22-29 ft.-lb.).

PRO-LINK SUSPENSION SYSTEM

The single shock absorber and linkage of the Pro-Link rear suspension system (Figure 57) are attached to the swing arm just aft of the swing arm pivot point and to the lower

57



rear portion of the frame. All of these items are located forward of the rear wheel.

The shock link and shock arm working together with the matched spring rate and damping rates of the shock absorber achieve a "progressive rising rate" rear suspension. This system provides the rider with the best of two worlds—greater rider comfort and better transfer of power to the ground.

As the rear suspension is moved upward by bumps, the shock absorber is compressed by the movement of the shock arm. The shock arm and shock link are attached to the swing arm and to the lower portion of the frame.

As rear suspension travel increases, the portion of the shock arm, where the shock absorber is attached, rises above the swing arm thus increasing shock absorber travel (compression). This provides a progressive rise rate in which the shock eventually moves at a faster rate than the wheel. At about half way through the wheel travel the shock begins to move at a faster rate than it did in the beginning.

SHOCK ABSORBER (PRO-LINK MODELS)

The single shock absorber (Figure 58) used in the Pro-Link suspension system has a remote oil/nitrogen reservoir. The remote reservoir allows more rapid oil cooling and help prevent frothing.

The shock is adjustable for both shock rate and damping action.

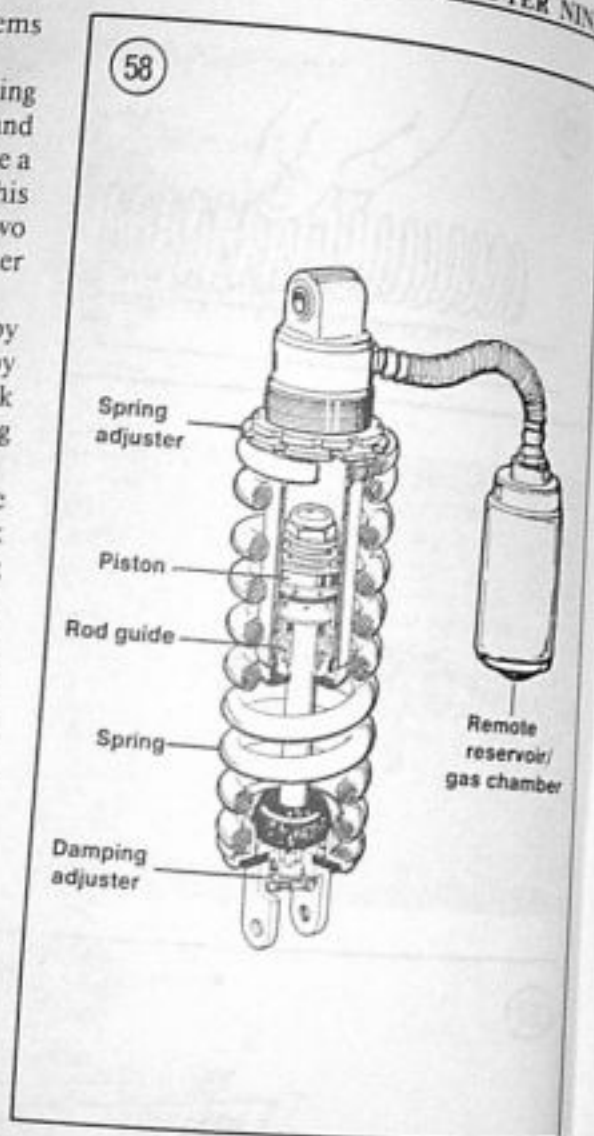
Spring Pre-load Adjustment

There must be spring pre-load on the spring at all times. Never ride the bike without spring pre-load as possible loss of control will result.

The spring length (pre-load) must be maintained within the following dimensions:

- Standard dimension: 198 mm (7.8 in.)
- Minimum dimension: 193 mm (7.6 in.)
- Maximum dimension: 203 mm (8.0 in.)

1. Place a milk crate or wood block(s) under the engine to support the bike securely with the rear wheel off of the ground.



REAR SUSPENSION

2. Remove both side covers.
3. Remove the air cleaner air box.

CAUTION

After the air cleaner air box is removed the carburetor throat is exposed. Close the choke (A, Figure 59) to keep dirt and foreign matter from entering the carburetor.

4. Measure the existing spring length (Figure 60).
5. To adjust, loosen the locknut and turn the adjuster (B, Figure 59) in the desired

direction. Tightening the adjuster increases spring pre-load and loosening it decreases pre-load.

NOTE

Special tools are required for the locknut and the adjuster. These are the optional pin spanners, Honda part No. 89201-KA4-810 and part No. 89202-KA4-810.

6. One complete turn (360°) of the adjuster moves the spring 1.5 mm (0.006 in.).

NOTE

Remember, the spring length (pre-load) must be maintained between the minimum dimension of 193 mm (7.6 in.) and the maximum dimension of 203 mm (8.0 in.).

7. After the desired spring length is achieved, tighten the locknut securely.
8. Install the air cleaner air box and the side covers.

Rebound Damping Adjustment

Rebound damping can be adjusted to 4 different settings. The adjuster knob is located at the base of the shock absorber (Figure 61) between the legs of the lower mounting bracket.

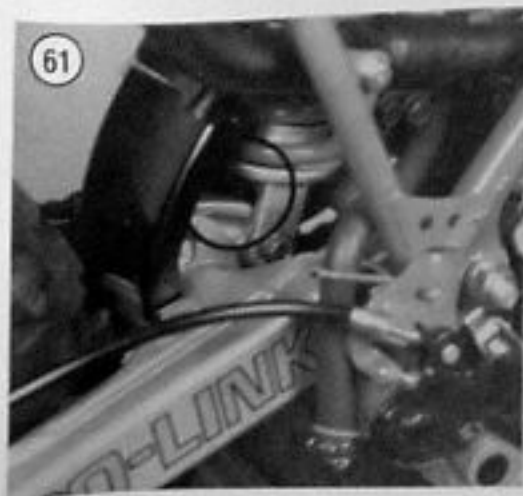
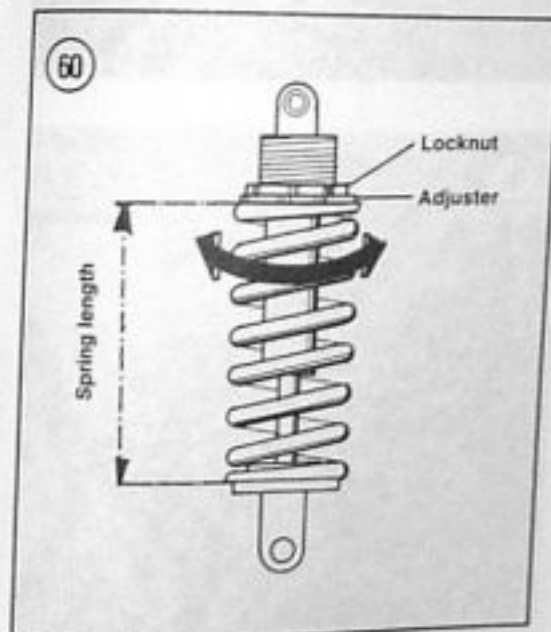
The rebound setting should be adjusted to personal preference to accommodate rider weight and riding conditions.

Make sure that the adjuster is located in one of the detents and not in between any 2 settings.

SHOCK ABSORBER (PRO-LINK MODELS)

Removal

1. Place a milk crate or wood block(s) under the engine to support the bike securely with the rear wheel off of the ground.
2. Remove both side covers and the seat.
3. Remove the fuel tank as described under Fuel Tank Removal/Installation in Chapter Six.



4. Remove the top bolts (Figure 62) and the bolt on the right-hand side securing the air cleaner air box to the frame (Figure 63). Loosen the clamping band on the portion going to the carburetor and remove the air box from the left-hand side.

5. Remove the bolt (Figure 64) securing the remote reservoir to the frame.

WARNING

Do not attempt to disconnect the reservoir hose from the shock absorber body. The compressed nitrogen within the shock absorber body and remote reservoir is pressurized to 285 psi (20 kg/cm²).

6. Remove the shock absorber upper mounting bolt and nut (Figure 65).

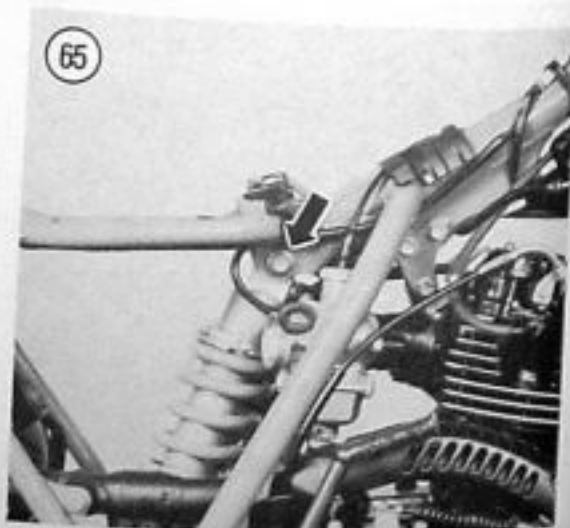
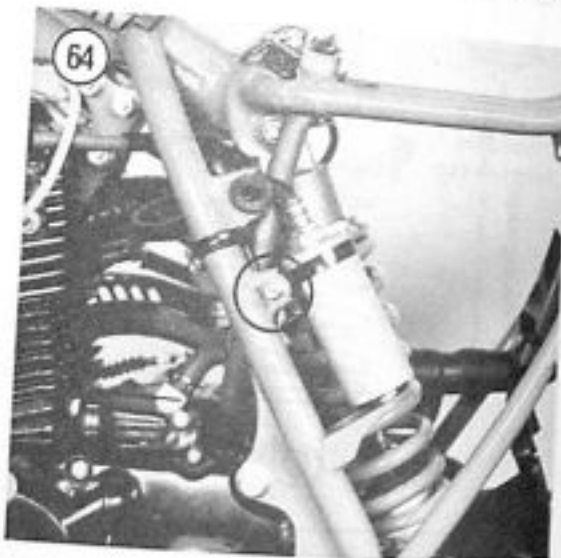
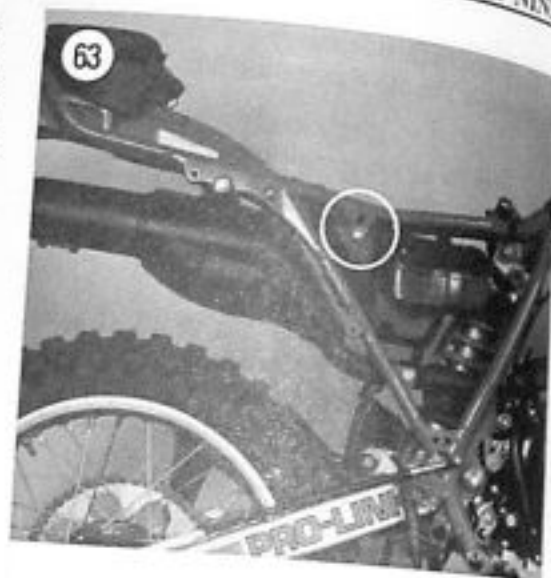
7. Loosen the lower mounting bolt (Figure 66). There is no nut as the bolt is screwed into the other side of the shock absorber lower mounting bracket.

8. Move the upper portion of the shock absorber toward the rear (Figure 67).

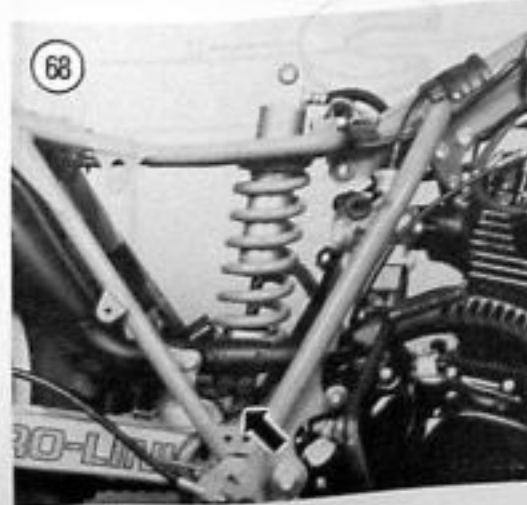
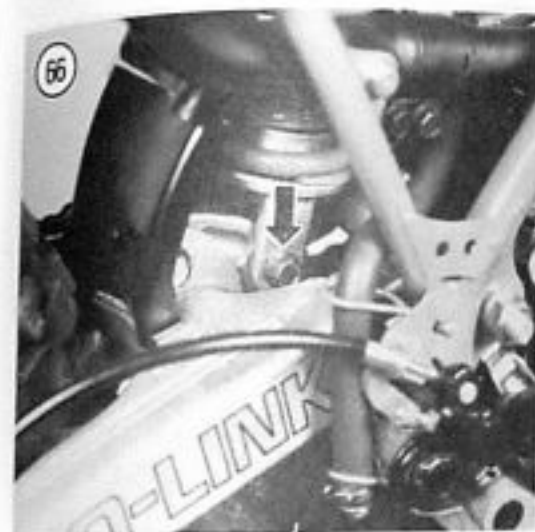
NOTE

The next step requires the aid of a helper. While raising the rear wheel, make sure the upper portion of the shock absorber clears the air box mounting brackets on the frame.

9. Raise the rear wheel up as far as possible and have a helper install blocks of wood under the wheel.



REAR SUSPENSION



10. Remove the shock absorber lower mounting bolt (Figure 68) and remove the shock absorber out through the top of the frame.

11. Keep the rear wheel in the raised position (Figure 69).

Disassembly/Inspection/Assembly

Refer to Figure 70 for this procedure.

Service by the home mechanic is limited to removal and installation of the spring. Under no circumstances should you attempt to disconnect the reservoir hose or disassemble the shock absorber unit or reservoir due to the high internal pressure of the nitrogen.

If you are satisfied with the existing spring pre-load setting and want to maintain it, measure the spring length (Figure 60) prior to disassembly.

1. Hold the shock absorber upside down and secure the upper mounting portion of the shock (A, Figure 71) in a vise with soft jaws. Be careful not to kink or damage the hose.
2. Use the optional special tools and loosen the locknut and the spring adjuster all the way (B, Figure 71).

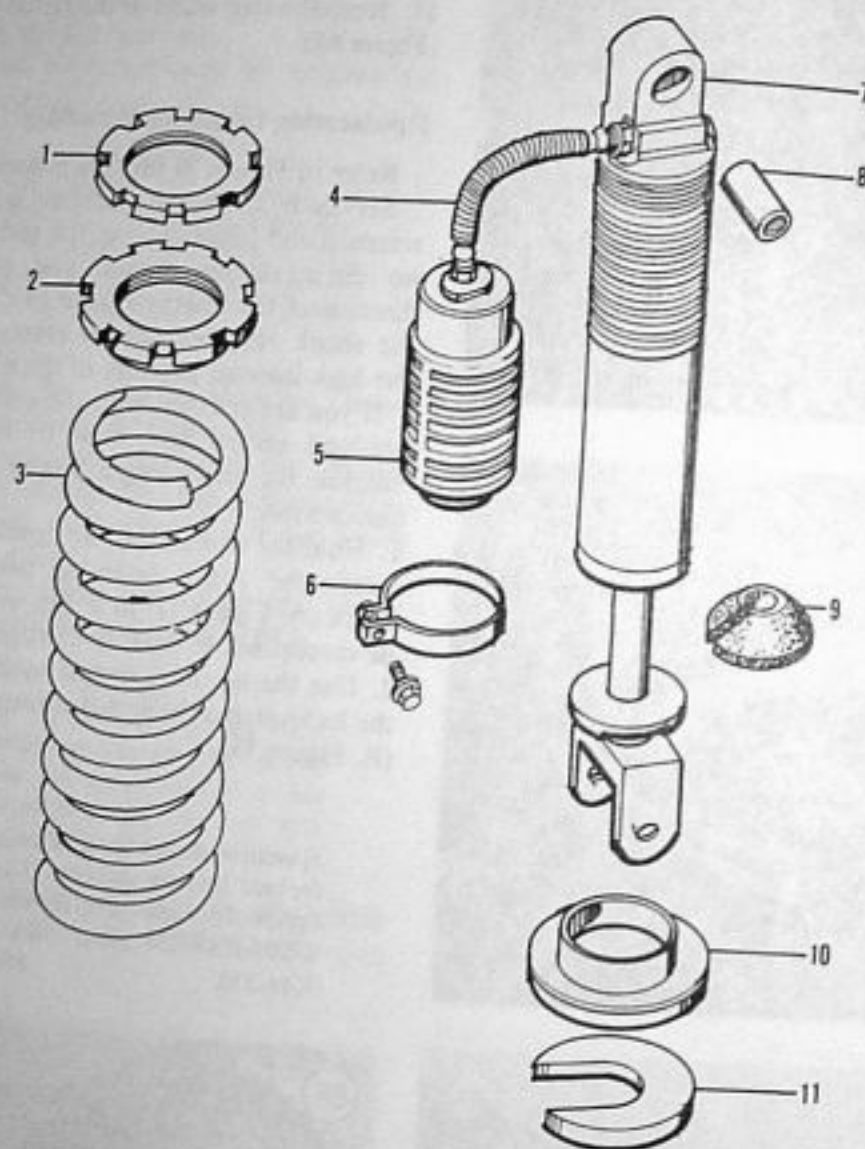
NOTE

Special tools are required to loosen the locknut and the adjuster. These are 2 optional pin spanners, Honda part No. 89201-KA4-810 and No. 89202-KA4-810.



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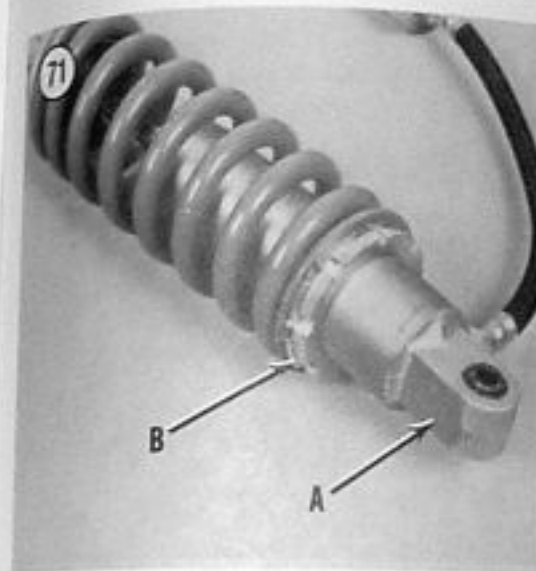
REAR SHOCK ABSORBER ASSEMBLY (PRO-LINK)



1. Adjuster locknut
2. Spring adjuster
3. Spring
4. Hose
5. Reservoir
6. Reservoir clamp band
7. Damper unit assembly
8. Bushing
9. Rubber stopper
10. Spring seat
11. Spring stopper

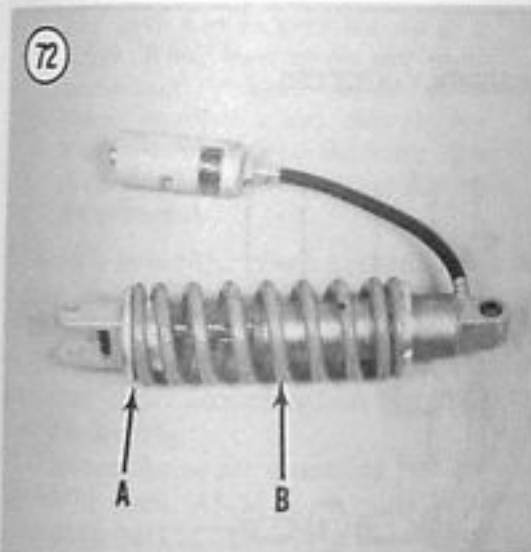
REAR SUSPENSION

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3. Remove the shock absorber assembly from the vise.
4. From the lower portion of the shock absorber assembly, slide out the spring stopper (A, Figure 72) and remove the spring seat. Slide off the spring (B, Figure 72).
5. Measure the free length of the spring (Figure 73). The standard free length is 207 mm (8.15 in.). Replace the spring if it has sagged to 202.9 mm (7.99 in.) or less.
6. Inspect the condition of the upper mounting bushing (Figure 74); replace if necessary.
7. Check the damper unit for dents, oil leakage or other damage. Make sure the damper rod is straight.

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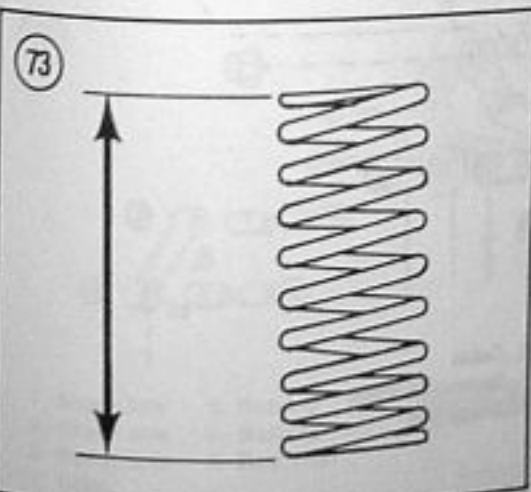
NOTE

The damper unit cannot be rebuilt; it must be replaced as a unit.

WARNING

The shock absorber body and remote reservoir contain highly compressed nitrogen gas (284 psi/20 kg/cm²). Do not tamper with or attempt to open the damper unit or disconnect the reservoir hose from either unit. Do not place it near an open flame or other extreme heat. Do not dispose of the damper assembly yourself. Take it to a dealer where it can be deactivated and disposed of properly. Never attempt to remove the valve core from the base of the reservoir.

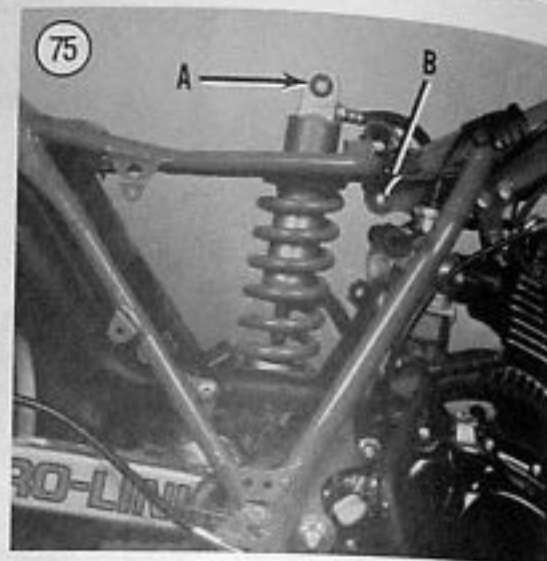
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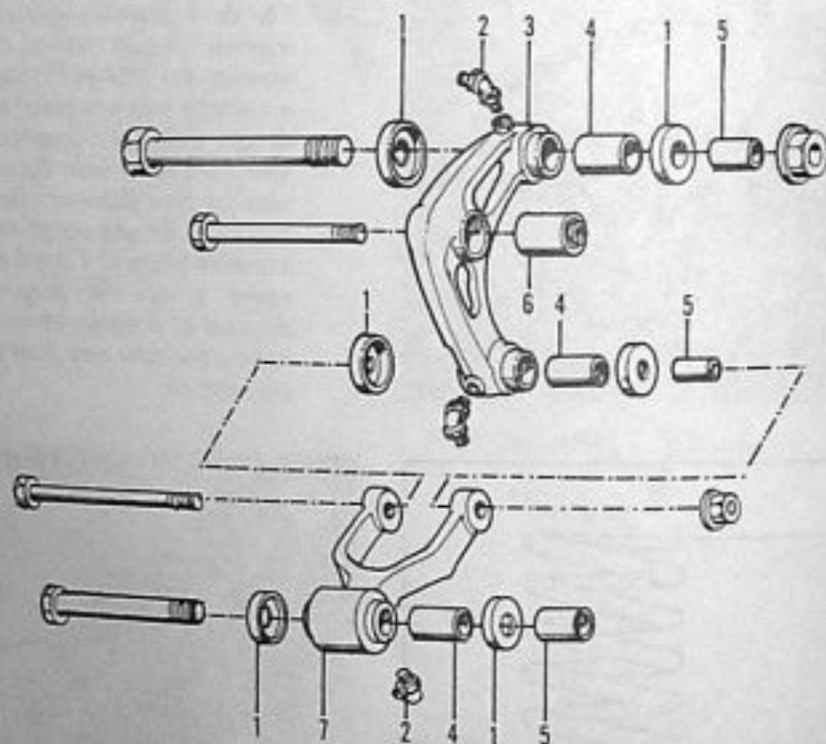


8. Install the spring, the spring seat (flange side toward the spring) and the spring stopper.
9. Hold the shock absorber upside down and secure the upper mounting portion of the shock in a vise with soft jaws. Be careful not to kink or damage the hose.
10. Screw on the adjuster and locknut by hand until they contact the spring.
11. Use the optional special tools and tighten the adjuster to the standard spring length or to the length measured prior to disassembly. The standard spring length is 198 mm (7.8 in.). Refer to Figure 60.
12. Tighten the locknut securely.
13. Remove the shock absorber assembly from the vise.



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PRO-LINK PIVOT ARM ASSEMBLY (XR200R)



- | | |
|-------------------|-------------------|
| 1. Dust seal | 5. Collar |
| 2. Grease fitting | 6. Damper bushing |
| 3. Shock arm | 7. Shock link |
| 4. Bushing | |

REAR SUSPENSION

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Installation

1. The rear wheel must be in the same raised position as it was in Step 11 of Removal. Refer to Figure 69.
2. Position the shock absorber assembly in the frame with the remote reservoir hose toward the front. This will position the threaded side of the lower mount to the left-hand side.
3. Install the shock absorber lower mounting bolt (Figure 68) from the right-hand side. Do not tighten at this time.
4. Apply a coat of molybdenum disulfide grease to the upper mounting bushing (A, Figure 75) and the mounting yoke (B, Figure 75) on the frame.

NOTE

The next step requires the aid of a helper. While lowering the rear wheel, make sure the upper portion of the shock absorber clears the air box mounting brackets on the frame. Also make sure the remote reservoir does not get damaged.

5. Slowly lower the rear wheel and move the upper mount into position in the frame (Figure 67).
6. From the right-hand side, install the shock absorber upper mounting bolt and install the nut (Figure 65).
7. Tighten the upper mounting bolt and nut to 60-75 N·m (43-54 ft.-lb.) and the lower mounting bolt to 38-48 N·m (27-35 ft.-lb.).

WARNING

All bolts and nuts used on the Pro-Link suspension must be replaced with parts of the same type. Do not use a replacement part of lesser quality or substitute design, as this may affect the performance of the system or result in failure of the part which will lead to loss of control of the bike. Torque values listed in Table 1 must be used during installation to ensure proper retention of these parts.

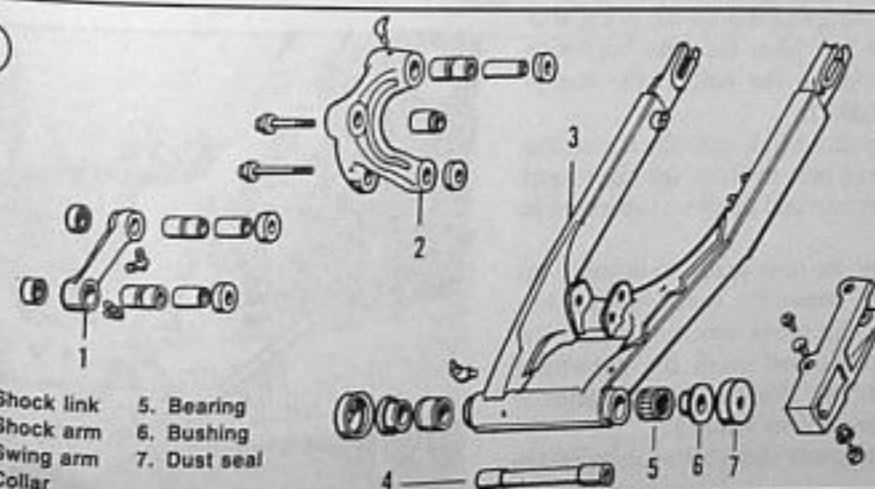
8. Position the remote reservoir in the frame and install the bolt (Figure 64) securing the remote reservoir to the frame. Tighten the bolt securely.
9. Remove the milk crate or wood block(s) from under the engine. Push down on the rear of the bike and make sure the rear suspension is operating properly.
10. Rest the bike on the sidestand.
11. From the left-hand side, install the air cleaner air box into the frame. Install the top bolts (Figure 62) and the bolt on the right-hand side (Figure 63). Make sure the clamping band on the portion going to the carburetor is tight.
12. Install the fuel tank, seat and both side covers.

PIVOT ARM ASSEMBLY

Removal/Inspection/Installation

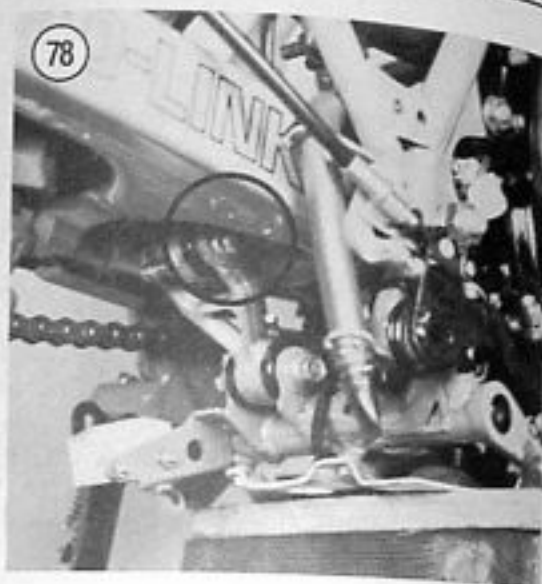
Refer to Figure 76 or 77 for this procedure.

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- | | |
|---------------|--------------|
| 1. Shock link | 5. Bearing |
| 2. Shock arm | 6. Bushing |
| 3. Swing arm | 7. Dust seal |
| 4. Collar | |

1. Remove the shock absorber as described in this chapter.
2. Remove the shock arm pivot bolt (Figure 78).
3. From the lower portion of the frame, remove the bolt and nut securing the shock link to the frame (Figure 79).
4. Remove the bolt (Figure 80) securing the shock arm to the swing arm.
5. Remove the pivot arm assembly.
6. Inspect both arms for cracks or damage; replace as necessary.
7. Remove the dust seals at all pivot points and push out the bushings.
8. Clean all parts in solvent and thoroughly dry with compressed air.
9. Inspect the condition of the bushings and the area in both arms where the bushings ride. The low-maintenance sintered metal bushings should last for a long time but should be inspected periodically for wear. There are no factory specifications for dimensions for the bushings nor for the bushing receptacles in the arms.
10. Inspect the condition of the dust seals. Replace all of them as a set if any are worn or starting to deteriorate. If the dust seals are in poor condition they will allow dirt to enter into the pivot areas and cause the bushings to wear.
11. Coat all surfaces of the pivot receptacles, the bushings and the inside of the dust seals with molybdenum disulfide grease. Insert the bushings into the shock link and shock arm and install the dust seals.
12. Install the shock arm onto the swing arm and install the bolt from the right-hand side (Figure 80). Tighten the bolt to the torque specified in Table 1.
13. Install the shock link onto the frame and install the pivot bolt in from the right-hand side. Install the nut and tighten as specified in Table 1.
14. Make sure the dust seals are installed on the shock arm. Move the shock link up into position with the shock arm and install the shock arm pivot bolt from the right-hand side. Install the nut (Figure 78) and tighten to the torque specified in Table 1.
15. Install the shock absorber as described in this chapter.



REAR SUSPENSION

Table 1 REAR SUSPENSION TORQUE SPECIFICATIONS

Item	N-m	ft.-lb.
Rear axle nut		
XL125S (1979-1984)	60-80	43-58
XL125S (1985)	80-100	58-72
XL185S, XR185, XR200	60-80	43-58
XR200R	80-110	58-80
Rear swing arm pivot bolt/nut		
XL125S (1979-1984)	35-50	25-36
XL125S (1985)	60-80	43-58
XL185S, XR185, XR200	35-50	25-36
XR200R	80-100	58-72
Shock absorbers		
Upper bolt/nut (XR200R)		
1981-1983	60-75	43-54
1986-1987		40-50
29-36		
Lower bolt/nut (XR200R)		
1981-1983	38-48	27-35
1986-1987	40-50	29-36
Upper bolt (TLR200)	10-14	7-10
Lower bolt (TLR200)	10-14	7-10
Upper bolt/nut (all others)	30-40	22-29
Lower bolt/nut (all others)	30-40	22-29
Pro-Link linkage (XR200R)		
Shock arm to swing arm pivot bolt		
1981-1983	90-120	65-87
1986-1987	90-120	65-87
Shock link to frame pivot bolt		
1981-1983	60-75	43-54
1986-1987	40-50	29-36
Shock arm to shock link pivot bolt		
1981-1983	60-75	43-54
1986-1987	40-50	43-54
Brake torque link bolt (front and rear)		
XL125S, XL185S, XR185, XR200	18-25	13-18
XR200R	8-12	6-9
Driven sprocket nuts/bolts		
XL125S (1985)	60-70	43-51
XR200R 1986-1987	34-40	25-29
All others	55-65	40-47

CHAPTER TEN

BRAKES

Both the front and the rear brake are drum type. Figure 1 illustrates the major components of the brake assembly. Activating the brake hand lever or foot pedal pulls the cable or rod which in turn rotates the camshaft. This forces the brake shoes out into contact with the brake drum.

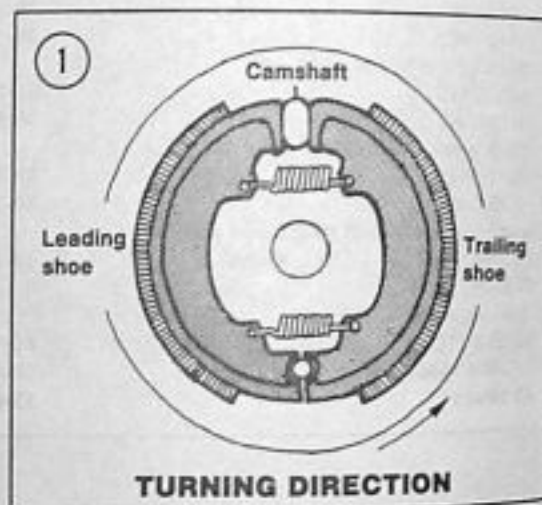
Lever and pedal free play must be maintained on both brakes to minimize brake drag and premature brake wear and to maximize braking effectiveness. Refer to *Front Brake Lever Adjustment* and *Rear Brake Pedal Free Play* in Chapter Three for complete adjustment procedures.

The front brake cable on all models and the rear brake cable on XR200R models must be inspected and replaced periodically as they stretch with use until they can no longer be properly adjusted.

Brake specifications are in Table 1, located at the end of this chapter.

FRONT AND REAR BRAKE

The front and rear brake assemblies are almost identical and both are covered in the same procedures. Where differences occur they are identified.



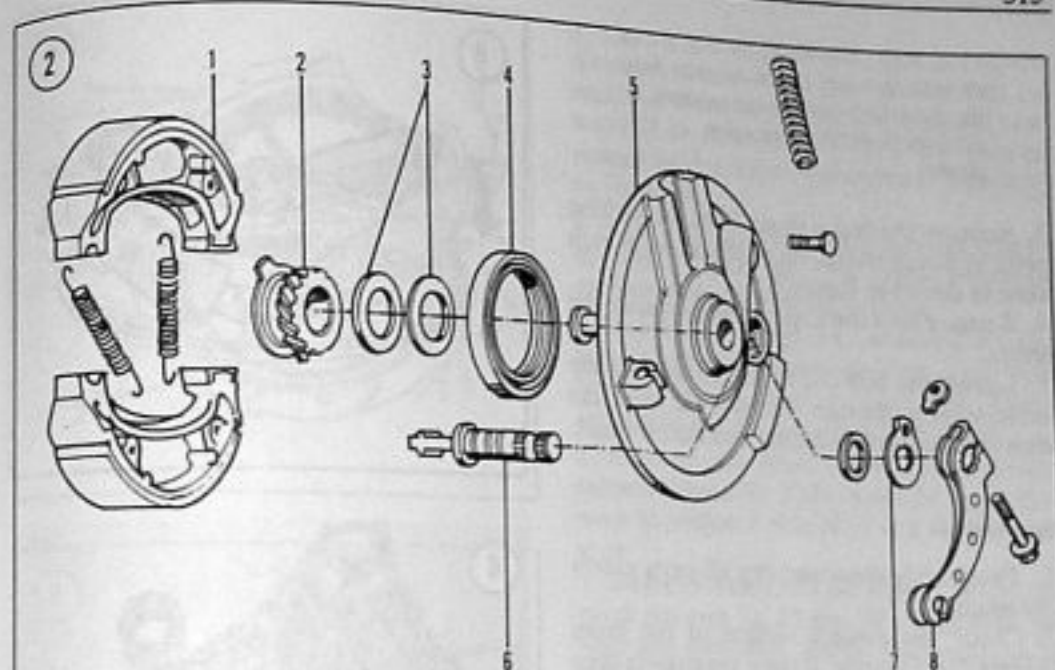
Disassembly

Refer to Figure 2 for the front brake and Figure 3 for the rear brake.

1. Remove the front or rear wheel as described in Chapter Eight or in Chapter Nine.
2. Pull the brake assembly (Figure 4) straight up and out of the brake drum.

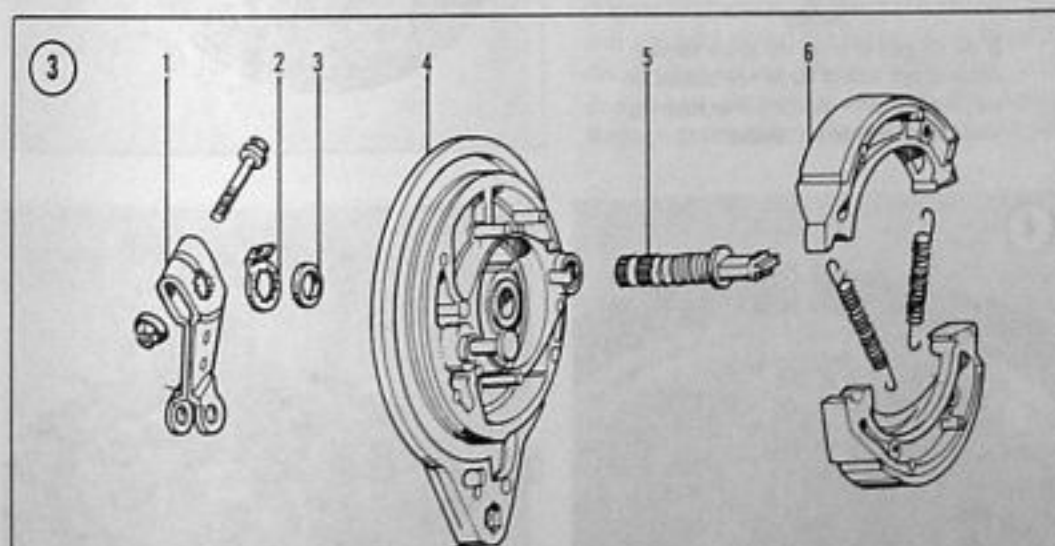
NOTE

Place a clean shop rag on the linings to protect them from oil and grease during removal.



FRONT BRAKE ASSEMBLY

- | | |
|--------------------------------|--------------------------------|
| 1. Brake shoes | 5. Brake backing plate |
| 2. Speedometer gear | 6. Brake camshaft |
| 3. Thrust washers (XR185 only) | 7. Brake lining wear indicator |
| 4. Dust seal | 8. Brake arm |



REAR BRAKE ASSEMBLY

- | | |
|--------------------------------|------------------------|
| 1. Brake arm | 4. Brake backing plate |
| 2. Brake lining wear indicator | 5. Brake camshaft |
| 3. Dust seal | 6. Brake shoes |

NOTE

Prior to removing the brake shoes from the backing plate, measure them as described under **Inspection** in this chapter.

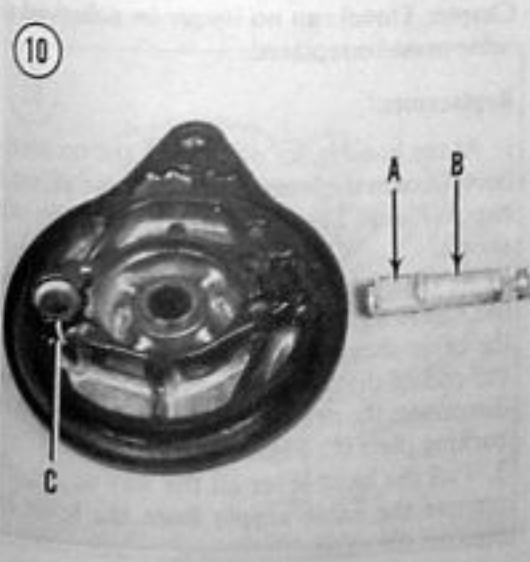
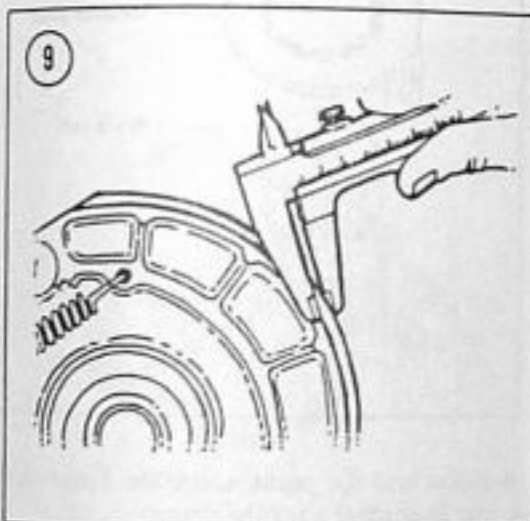
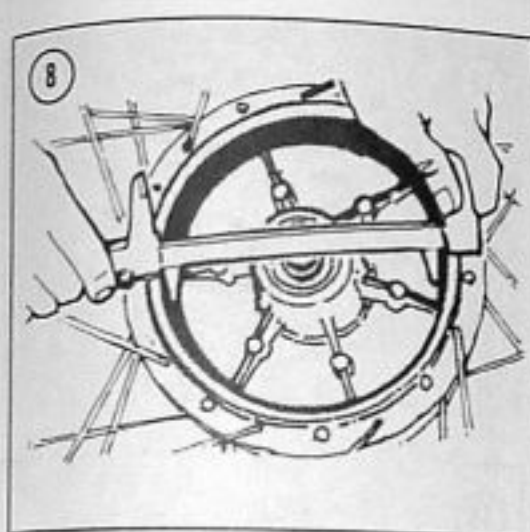
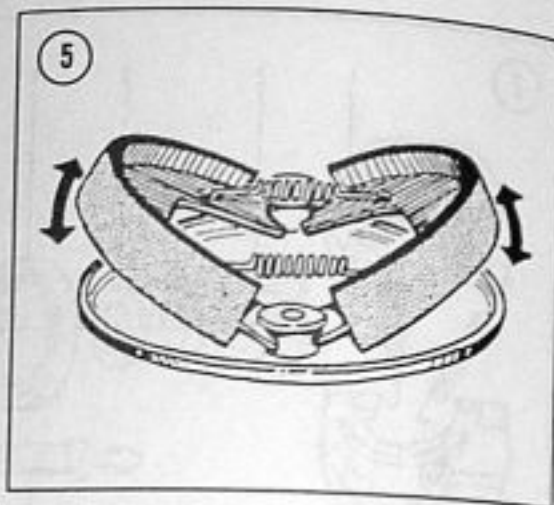
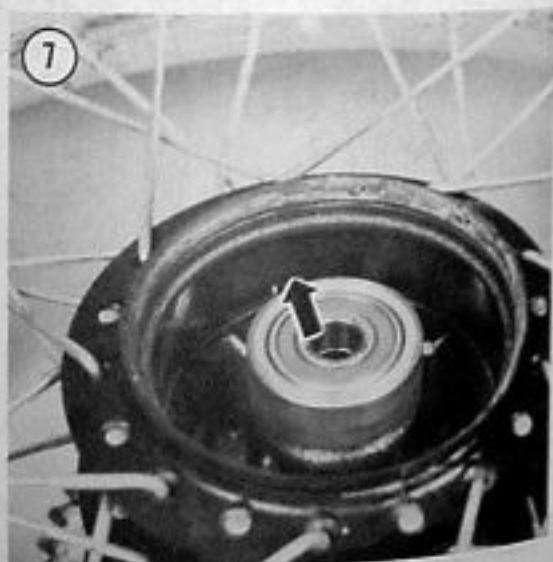
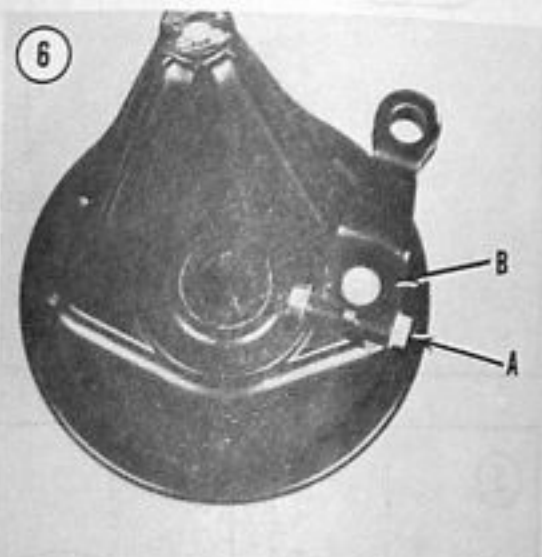
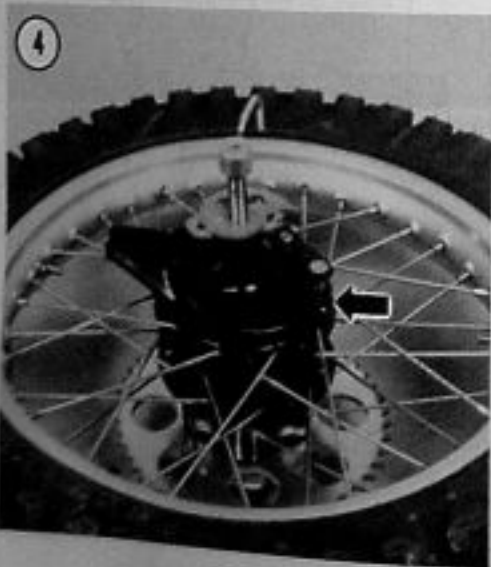
3. Remove the brake shoes from the backing plate by firmly pulling up on the center of each shoe as shown in Figure 5.
4. Remove the return springs and separate the shoes.
5. Loosen the bolt (A, Figure 6) securing the brake lever to the cam. Remove the lever, the dust seal, the wear indicator and the camshaft.

Inspection

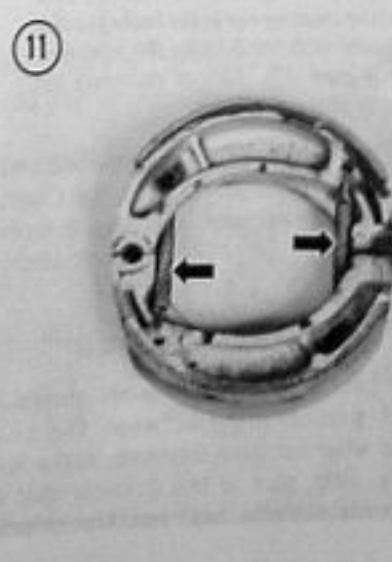
1. Thoroughly clean and dry all parts except the linings.
2. Check the contact surface of the drum (Figure 7) for scoring. If there are grooves deep enough to snag a fingernail, the drum should be reground and new shoes fitted. This type of wear can be avoided to a great extent if the brakes are disassembled and thoroughly cleaned after riding the bike in water, mud or deep sand.

NOTE

If oil or grease is on the drum surface, clean it off with a clean rag soaked in lacquer thinner—do not use any solvent that may leave an oil residue.



3. Use vernier calipers and check the inside diameter of the drum for out-of-round or excessive wear (Figure 8). The standard new brake drum ID is 110 mm (4.33 in.). Turn or replace the drum if it is worn to 111 mm (4.37 in.) or greater.
4. If the drum is turned, the linings will have to be replaced and the new linings arced to conform to the new drum contour.
5. Inspect the linings for imbedded foreign material. Dirt can be removed with a stiff wire brush. Check for traces of oil or grease. If they are contaminated, they must be replaced.
6. Measure the brake linings with vernier calipers (Figure 9). They should be replaced if worn to within 2 mm (0.08 in.) of the metal shoe.
7. Inspect the cam lobe (A, Figure 10) and the pivot pin area (B, Figure 10) of the shaft for wear and corrosion. Minor roughness can be removed with fine emery cloth.
8. Inspect the bearing surface for the camshaft in the backing plate (C, Figure 10). If it is worn or damaged, the backing plate must be replaced. The camshaft should also be replaced at the same time.
9. Inspect the brake shoe return springs (Figure 11) for wear. If they are stretched, they will not fully retract the brake shoes from the drum, resulting in a power-robbing drag on the drums and premature wear of the linings. Replace as necessary; always replace as a pair.



Assembly

1. Assemble the brakes by reversing the disassembly steps, noting the following.
2. Grease the shaft, cam and pivot post with a light coat of molybdenum disulfide grease (Figure 12); avoid getting any grease on the brake plate where the linings come in contact with it.
3. Install the cam into the backing plate from the backside. From the outside of the backing plate install the dust seal. Align the wear indicator to the cam as shown in Figure 13 and push it all the way down to the backing plate (Figure 14).
4. When installing the brake lever onto the brake camshaft, be sure to align the punch marks on the two parts (B, Figure 6).
5. Hold the brake shoes in a "V" formation with the return springs attached and snap them in place on the brake backing plate. Make sure they are firmly seated on it (Figure 15).

NOTE

If new linings are being installed, file off the leading edge of each shoe a little (Figure 16) so that the brake will not grab when applied.

6. Install the brake panel assembly into the brake drum.
7. Install the front or rear wheel as described in Chapter Eight or in Chapter Nine.

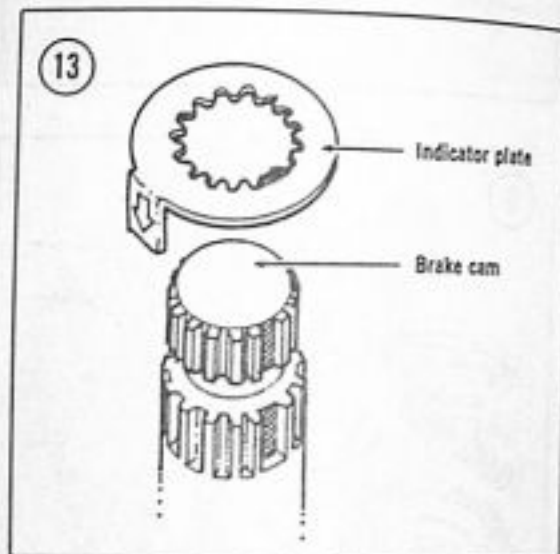
NOTE

When installing the front wheel, be sure that the locating slot in the brake panel is engaged with the boss on the front fork leg (Figure 17). This is necessary for proper brake operation.

8. Adjust the front brake as described under Front Brake Lever Adjustment in Chapter Three. Adjust the rear brake as described under Rear Brake Pedal Adjustment in Chapter Three.

FRONT BRAKE CABLE

Front brake cable adjustment should be checked periodically because the cable stretches with use and increases brake lever free play. Free play is the distance that the brake lever travels between the released

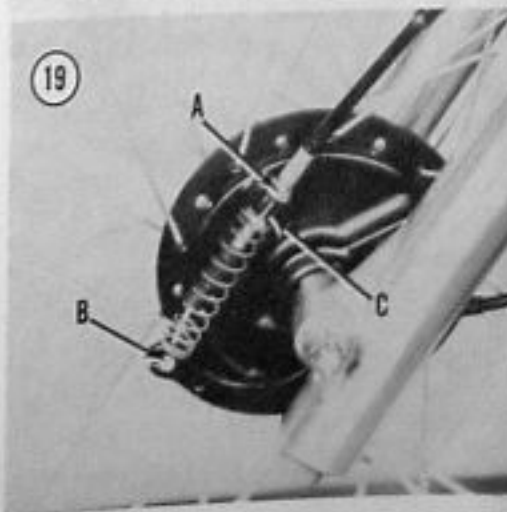
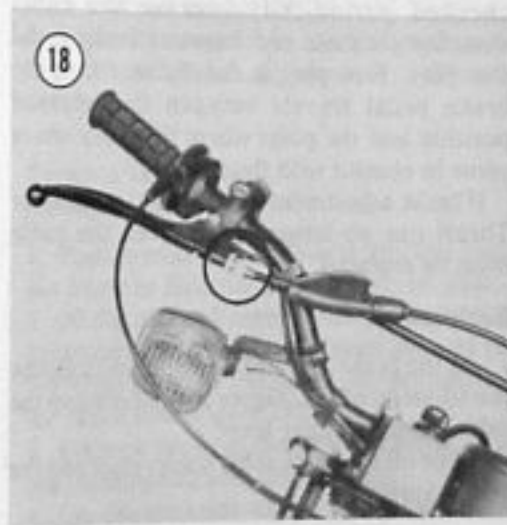
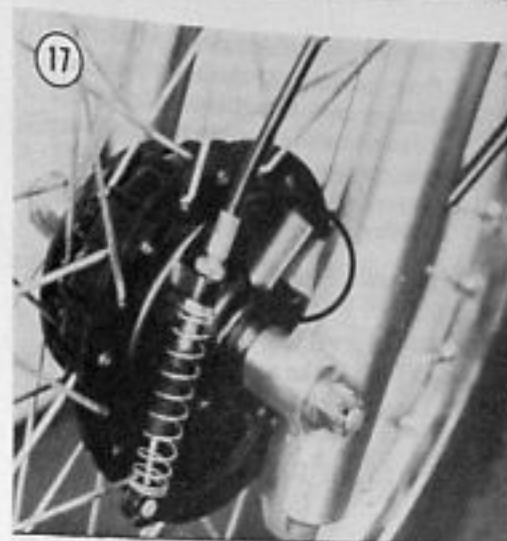
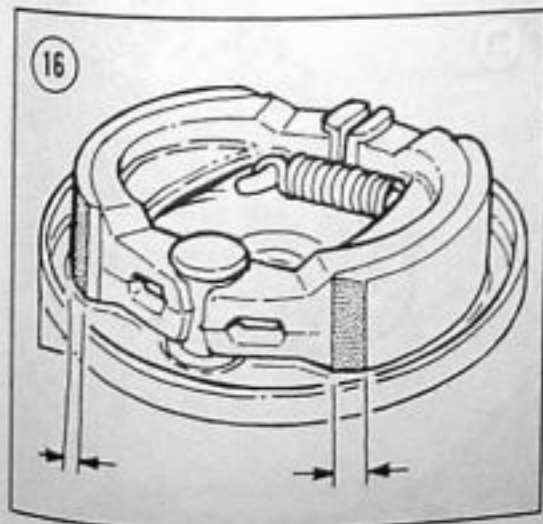
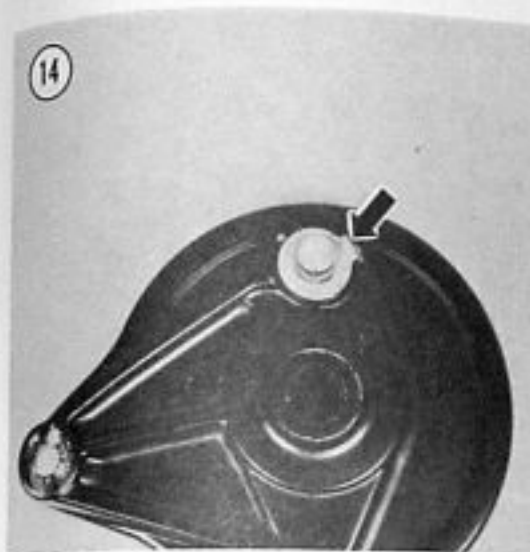


position and the point where the brake shoes come in contact with the drum.

If the brake adjustment (as described in Chapter Three) can no longer be achieved the cable must be replaced.

Replacement

1. At the hand lever, slide back the protective boot. Loosen the locknut and turn the adjusting barrel (Figure 18) all the way toward the cable sheath.
2. At the brake assembly, loosen the locknut (A, Figure 19) and screw it all the way toward the cable sheath. Unhook the cable end from the end of the brake lever (B, Figure 19) and disconnect the cable from the receptacle on the backing plate (C, Figure 19).
3. Pull the hand lever all the way to the grip, remove the cable nipple from the lever and remove the cable.



NOTE

Prior to removing the cable, make a drawing (or take a Polaroid picture) of the cable routing through the frame. It is very easy to forget once it has been removed. Replace it exactly as it was, avoiding any sharp turns.

4. Withdraw the cable from the holders on the front fork.
5. Install by reversing these removal steps.
6. Adjust the brake as described under *Front Brake Lever Adjustment* in Chapter Three.

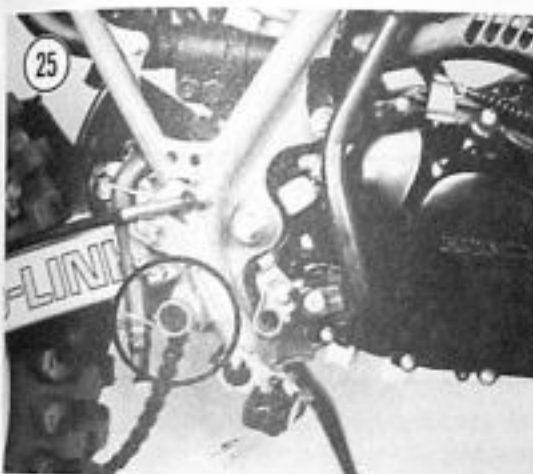
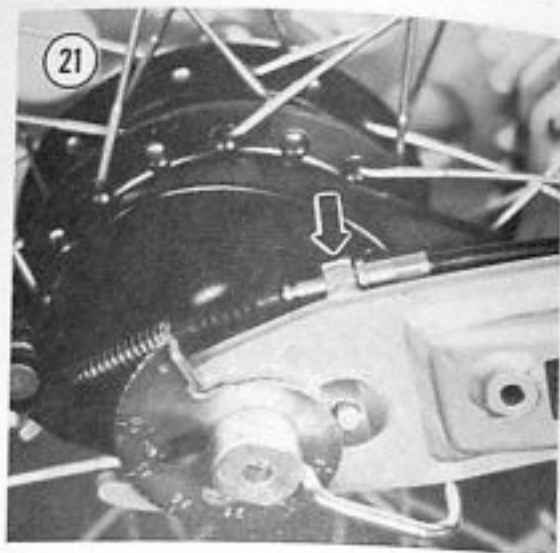
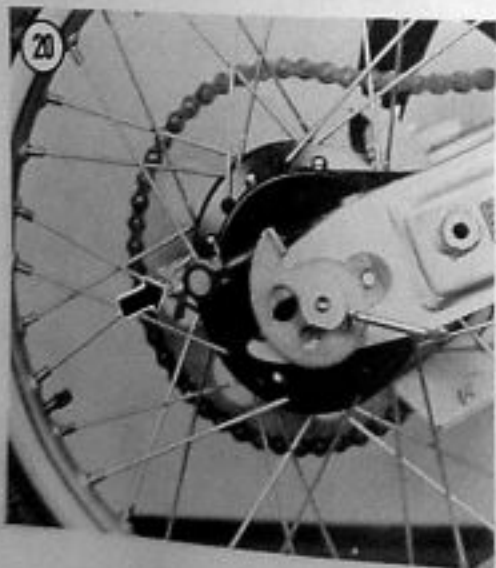
REAR BRAKE CABLE (XR200R)

Rear brake cable adjustment should be checked periodically because the cable stretches with use and increases brake pedal free play. Free play is the distance that the brake pedal travels between the released position and the point where the brake shoes come in contact with the drum.

If brake adjustment (as described in Chapter Three) can no longer be achieved the cable must be replaced.

Replacement

1. At the brake assembly, completely unscrew the adjustment nut (Figure 20) and remove the cable from the brake lever.
2. Slide off the brake cable holder plate and the return spring.

**NOTE**

Keep the brake cable holder plate and the adjustment nut as they are not furnished with a new replacement cable.

3. Remove the cable from the receptacle on the rear swing arm (Figure 21).
4. Unhook the front end of the cable from the rear brake pedal arm (Figure 22).
5. Install by reversing these removal steps.
6. Adjust the brake as described under *Rear Brake Pedal Adjustment* in Chapter Three.

REAR BRAKE PEDAL ASSEMBLY

Removal/Installation (Dual-shock Models)

1. Place a milk crate or wood block(s) under the frame to hold the bike securely in place.

2. Completely unscrew the adjustment screw (Figure 23) from the brake arm.
3. Unhook the rear brake light switch spring (Figure 24).
4. From the backside of the brake pedal, remove the spring clip and unscrew the nut from the brake pivot shaft.
5. Pull the brake pedal assembly out of the frame and remove it along with the brake rod.
6. Install by reversing these removal steps, noting the following.
7. Apply grease to the brake arm pivot shaft and to the shaft receptacle in the frame prior to installing the brake pedal assembly onto the frame. Be sure that the return spring is properly attached.
8. Make sure that the spring clip is correctly in place so it will not fall off.
9. Adjust the rear brake as described under *Rear Brake Pedal Adjustment* in Chapter Three.

Removal/Installation (Pro-Link Models)

1. Place a milk crate or wood block(s) under the frame to hold the bike securely in place.
2. At the brake assembly, pull forward on the brake cable holder plate (Figure 20) and pull the brake cable up and out of the receptacle on the brake arm (Figure 21).
3. Unhook the front end of the cable from the rear brake pedal arm (Figure 22).
4. On the backside of the brake pedal arm, remove the cotter pin and washer.
5. Partially pull the brake pedal out of the frame and unhook the return spring from the pedal.
6. Withdraw the brake pedal from the frame and remove it and the return spring.
7. Install by reversing these removal steps, noting the following.
8. Apply grease to the brake pedal pivot shaft and to the shaft receptacle in the frame (Figure 25). Be sure that the return spring is properly attached.
9. Install a new cotter pin and bend the ends over completely.
10. Adjust the rear brake as described under *Rear Brake Pedal Adjustment* in Chapter Three.

Removal/Installation (XL200R)

1. Place wood block(s) under the frame to hold the bike securely in place.
2. Completely unscrew the adjusting nut from the brake rod.
3. Remove the brake arm joint from the brake lever.
4. Depress the brake pedal and remove the brake rod. Leave the spring on the brake rod.
5. Reinstall the brake arm joint and adjusting nut onto the brake rod to avoid misplacing them.
6. Disconnect the return spring from the brake pedal inner arm.

7. Remove the clamping bolt on the inner arm.
8. Slide the inner arm off the brake pedal pivot shaft.
9. Withdraw the brake pedal/pivot shaft assembly from the frame.
10. Install by reversing this procedure, noting the following:
 - a. Apply a coat of multipurpose grease to the pivot shaft prior to installing the brake pedal/pivot shaft assembly onto the bike's frame.
 - b. Adjust the rear brake as described in Chapter Three.

Table 1 BRAKE SPECIFICATIONS

Item	Specifications	Wear Limit
Brake drum inner diameter—front and rear	110 mm (4.33 in.)	111 mm (4.37 in.)
Brake lining thickness—front and rear	4.0 mm (0.16 in.)	2.0 mm (0.08 in.)

CHAPTER ELEVEN

FRAME AND REPAINTING

The frame does not require routine maintenance. However, it should be inspected immediately after any accident or spill.

This chapter describes procedures for completely stripping the frame. In addition, recommendations are provided for repainting the stripped frame.

This chapter also includes procedures for the kickstand and the footpegs.

KICKSTAND (SIDE STAND)**Removal/Installation**

1. Place a milk crate or wood block(s) under the frame to support the bike securely.



2. Raise the kickstand and disconnect the return spring (A, Figure 1) from the pin on the frame with Vise Grips.

3. From under the frame, remove the bolt and nut (B, Figure 1) and remove the kickstand from the frame.

4. Install by reversing these removal steps. Apply a light coat of multipurpose grease to the pivot surfaces of the frame tab and the kickstand yoke prior to installation.

FOOTPEGS**Replacement**

Remove the cotter pin (Figure 2) securing the footpeg to the bracket on the frame. Remove the pivot pin and footpeg.

Make sure the spring is in good condition and not broken. Replace as necessary.

Lubricate the pivot point and pivot pin prior to installation. Install a new cotter pin and bend the ends over completely.

FRAME

The frame does not require routine maintenance. However, it should be inspected immediately after any accident or spill.

Component Removal/Installation

1. Remove the seat, side cover panels and fuel tank.
2. Remove the engine as described in Chapter Four.
3. Remove the front wheel, steering and front forks as described in Chapter Eight.
4. Remove the rear wheel, fender, shock absorber(s) and rear swing arm as described in Chapter Nine.
5. On XL models, remove the battery.
6. On all models, remove the wiring harness.
7. Remove the kickstand and footpegs as described in this chapter.
8. Remove the steering head races from the steering head tube as described in Chapter Eight.
9. Inspect the frame for bends, cracks or other damage, especially around welded joints and areas that are rusted.
10. Assemble by reversing these removal steps.

Stripping and Painting

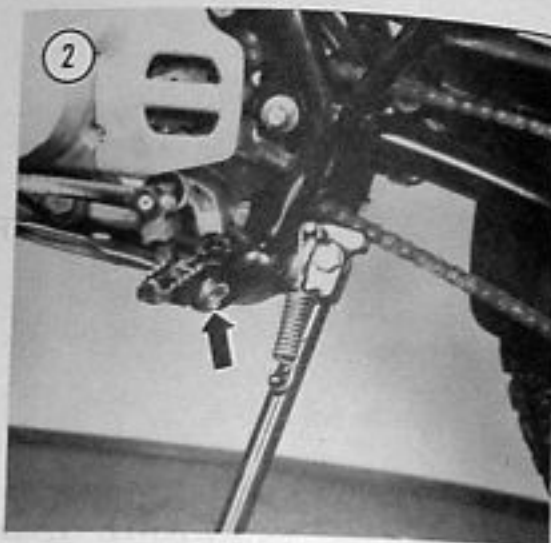
Remove all components from the frame. Thoroughly strip off all old paint. The best way is to have it sandblasted down to bare metal. If this is not possible, you can use a liquid paint remover and steel wool and a fine, hard wire brush.

CAUTION

The fenders, side covers, drive chain guard, air box, fuel tank (on XR200R models) and the instrument cluster are molded plastic (Figure 3). If you wish to change the color of these parts, consult an automotive paint supplier for the proper procedure. Do not use any liquid paint remover on these components as it will damage the surface. The color is an integral part of some of these components and cannot be removed.

When the frame is down to bare metal, have it inspected for hairline and internal cracks. Magnaflux is the most common and complete process.

Make sure that the primer is compatible with the type of paint you are going to use for the finish color. Spray on one or two coats of primer as smoothly as possible. Let it dry



thoroughly and use a fine grade of wet sandpaper (400-600 grit) to remove any flaws. Carefully wipe the surface clean and then spray a couple of coats of the final color. Use either lacquer or enamel base paint and follow the manufacturer's instructions.

NOTE

If you are racing the XR series bike it will be subject to a lot of mud and moisture in competition. You may want to consider a rust preventive formula paint. This may help to extend the life of the frame.

A shop specializing in painting will probably do the best job. However, you can do a surprisingly good job with a good grade of

spray paint. Spend a few extra dollars and get a good grade of paint as it will make a difference in how well it looks and how long it will stand up. It's a good idea to shake the can and make sure the ball inside the can is loose when you purchase the can of paint. Shake the can as long as is stated on the can. Then immerse the can upright in a pot or bucket of warm water (not hot—not over 120° F).

WARNING

Higher temperatures could cause the can to burst. Do not place the can in direct contact with any flame or heat source.

Leave the can in the water for several minutes. When thoroughly warmed, shake the can again and spray the frame. Be sure to get

into all the crevices where there may be rust problems. Several light mist coats are better than one heavy coat. Spray painting is best done in temperatures of 70-80° F (21-26° C); any temperature above or below this will give you problems.

After the final coat has dried completely, at least 48 hours, any overspray or orange peel may be removed with a light application of Dupont rubbing compound (red color) and finished with Dupont polishing compound (white color). Be careful not to rub too hard or you will go through the finish.

Finish off with a couple coats of good wax prior to reassembling all the components.

It's a good idea to keep the frame touched up with fresh paint if any minor rust spots or scratches appear.

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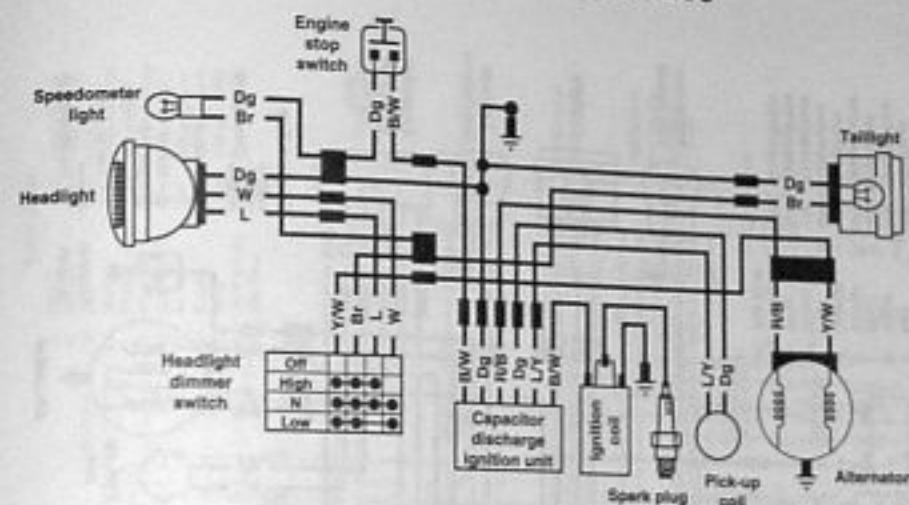
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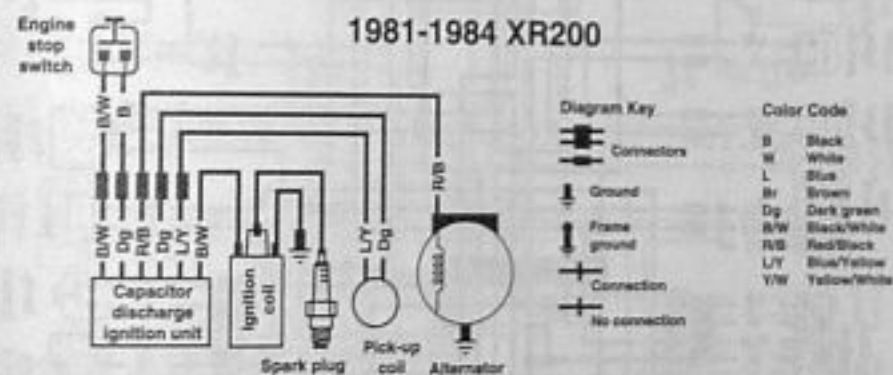
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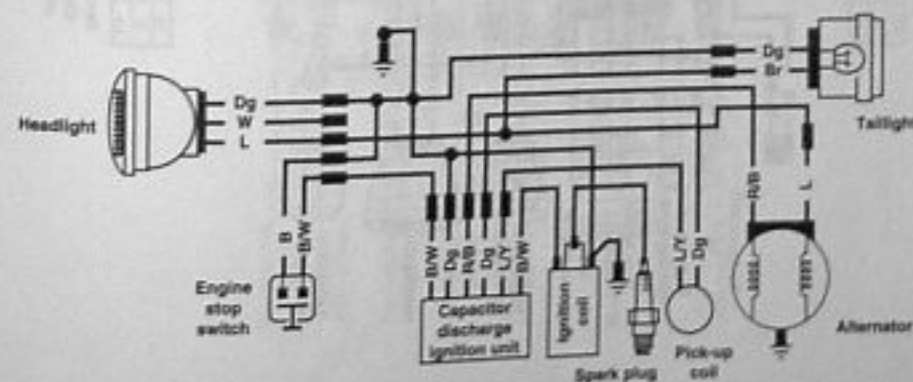
1979 XR185 & 1980 XR200



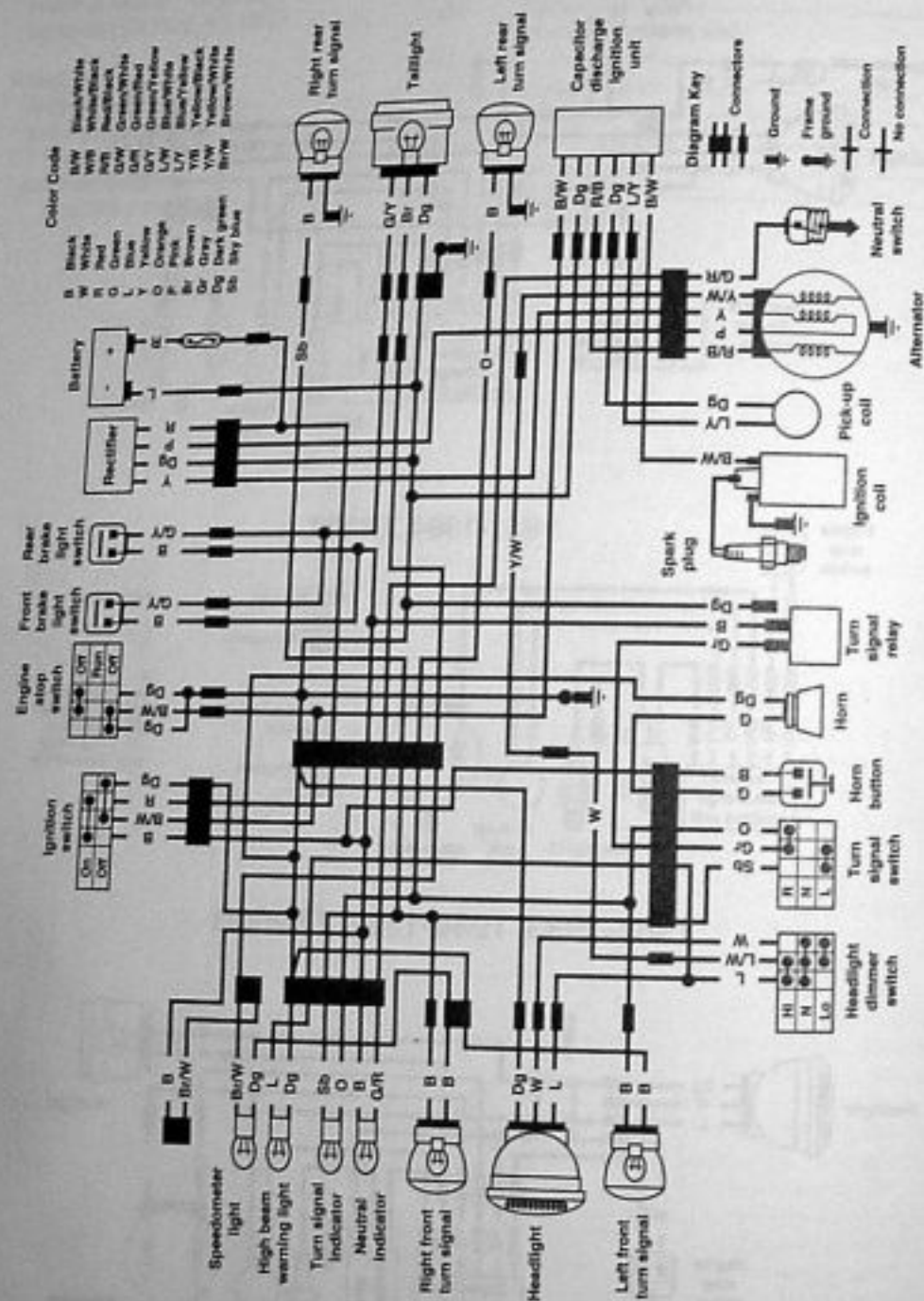
1981-1984 XR200



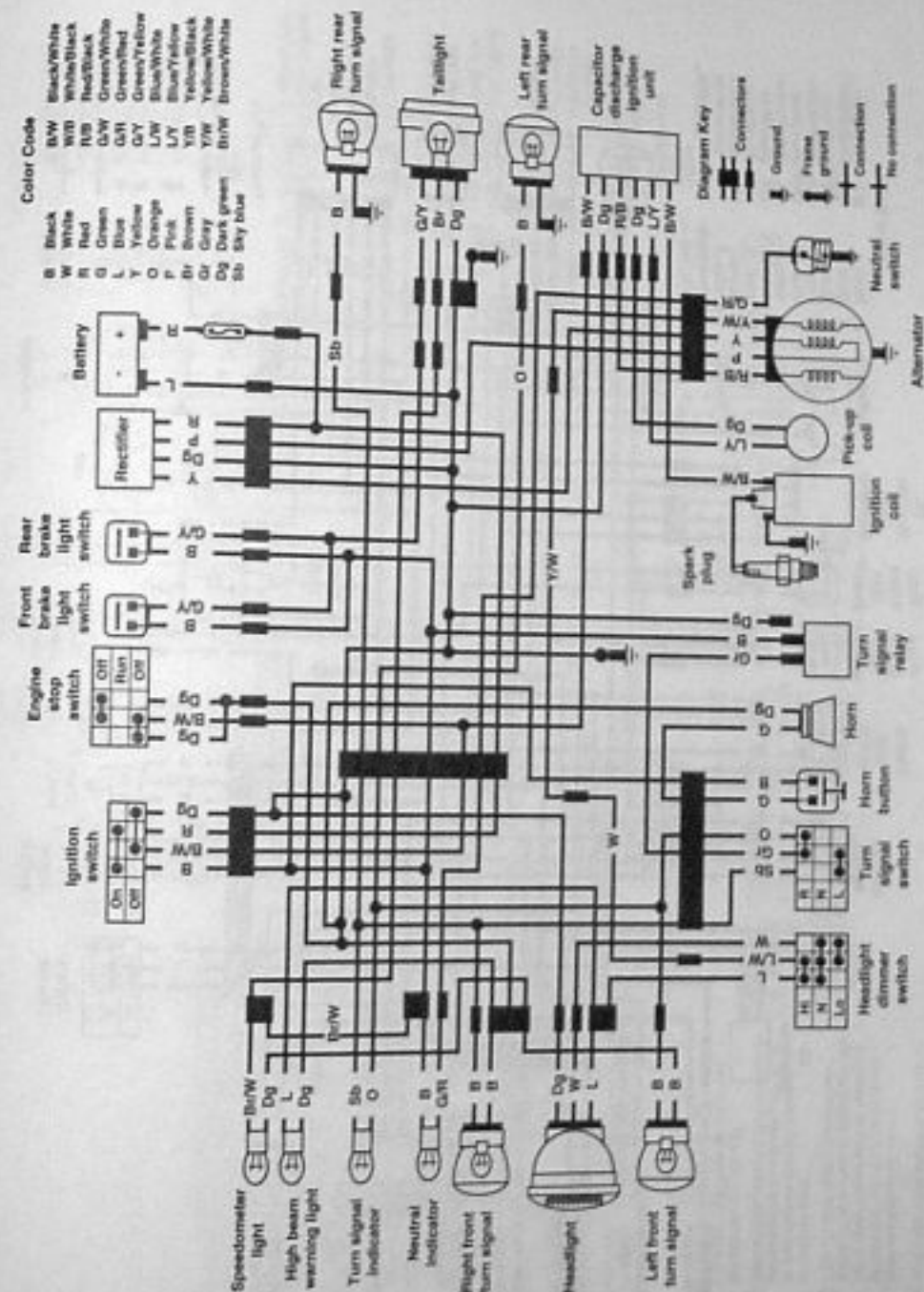
1981-1983, 1986-1987 XR200R



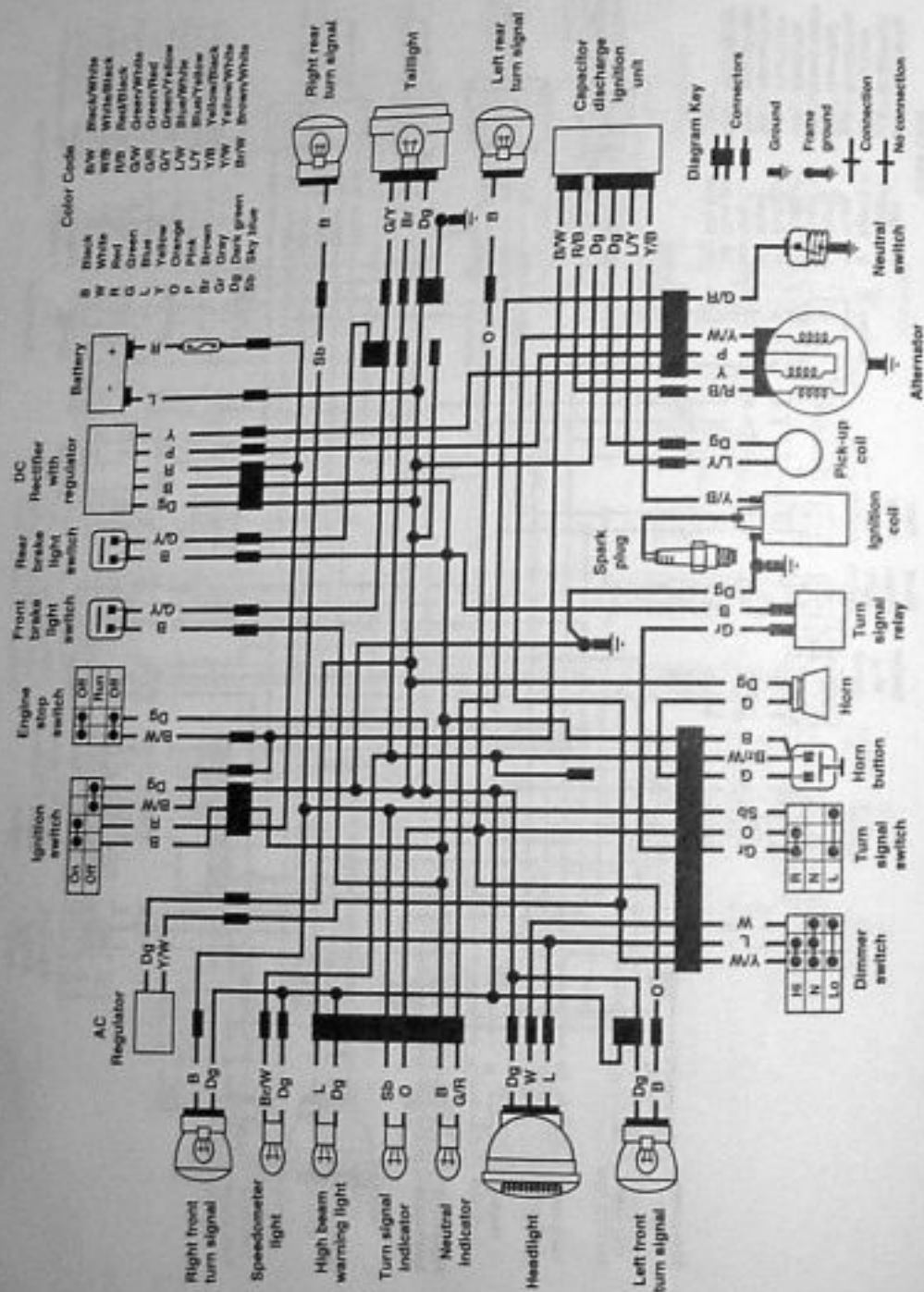
1979 XL125 & XL185S



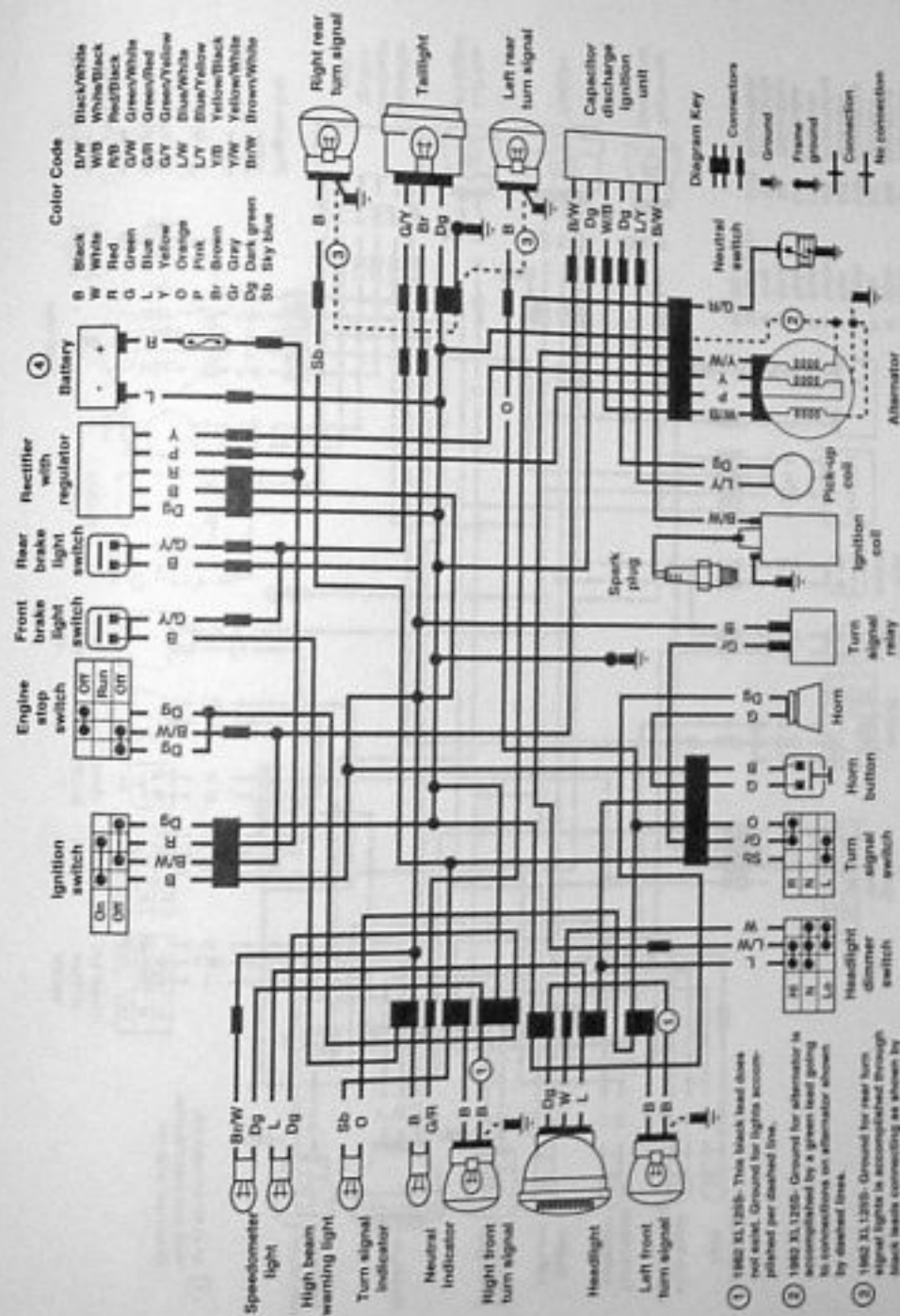
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1983 XL200R & 1986-1987 TLR200



1982, 1984-1985 XL125S & 1982 XL185S



1980-1981 XL125S & 1981 XL185S

