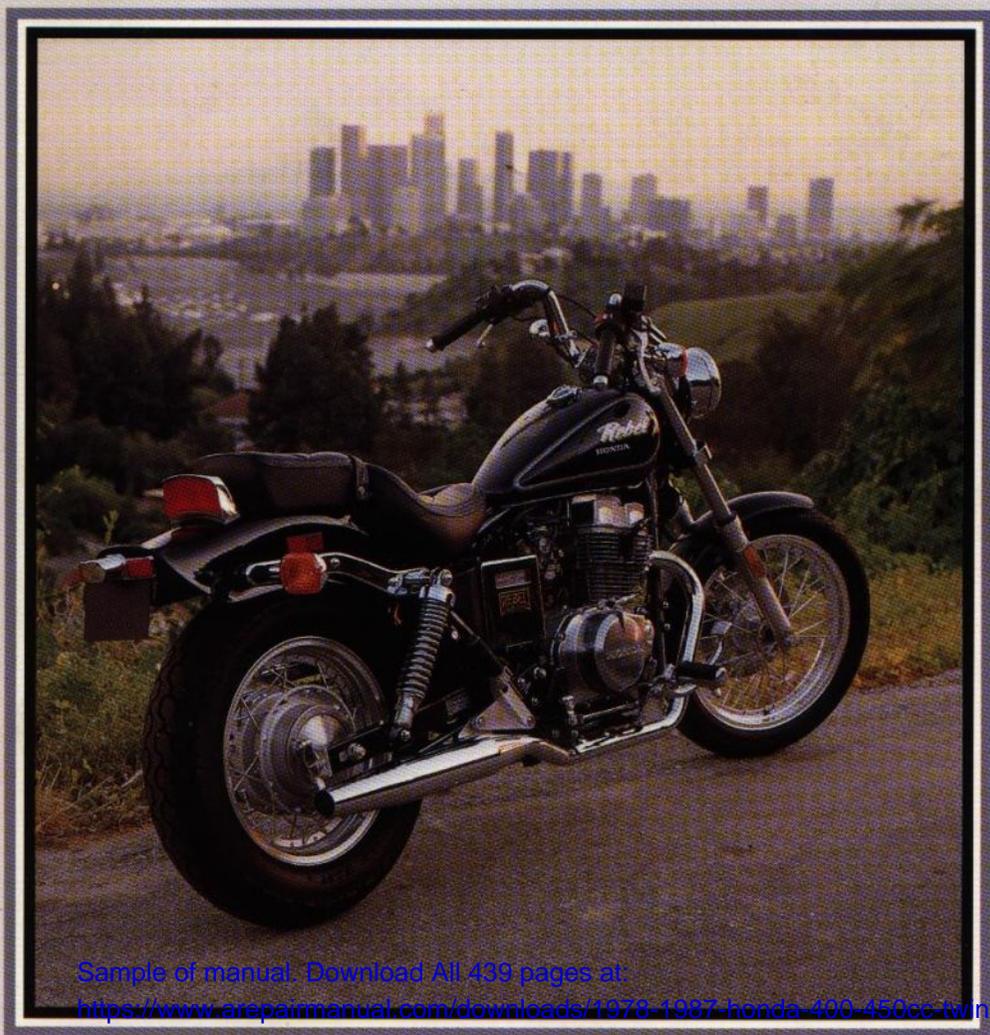


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CHAPTER ONE

GENERAL INFORMATION

MANUAL ORGANIZATION

This chapter provides general information and discusses equipment and tools useful both for preventive maintenance and troubleshooting.

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 the Honda running well. Chapter Three also includes recommended tune-up procedures, eliminating the need to constantly consult chapters on the various assemblies.

Subsequent chapters describe specific systems such as the engine, clutch, transmission (manual and automatic), fuel, exhaust, suspension and brakes. Each chapter provides disassembly, repair and assembly procedures in simple step-by-step form. If a repair is impractical for a home mechanic, it is so indicated. It is usually faster and less expensive to take such repairs to a dealer or competent repair shop. Specifications concerning a particular system are included at the end of the appropriate chapter.

Some of the procedures in this manual specify special tools. In most cases, the tool is illustrated

Professional mechanics can work the gears and never sustain a serious injury. If you observe a lack of common sense and safety, you can enjoy many hours servicing your own machine. If you ignore these rules you can hurt yourself or damage the bike.

Never use gasoline as a cleaning solvent. Gasoline is highly flammable and can be absorbed by the skin. If you are working in a confined space, use proper ventilation. Avoid breathing in fumes. Use proper safety procedures when working with tools.

either in actual use or alone. Well equipped mechanics may find they can substitute similar tools already on hand or can fabricate their own. All dimensions and capacities are expressed in English units familiar to U.S. mechanics as well as in metric units. Refer to **Table I** for Metric to U.S. conversions.

Tables 1-4 are at the end of this chapter.

NOTES, CAUTIONS AND WARNINGS

The terms **NOTE**, **CAUTION** and **WARNING** have specific meanings in this manual. A **NOTE** provides additional information to make a step or procedure easier or clearer. Disregarding a **NOTE** could cause inconvenience, but would not cause equipment damage or personal injury.

A **CAUTION** emphasizes areas where equipment damage could result. Disregarding a **CAUTION** could cause permanent mechanical damage; however, personal injury is unlikely.

A **WARNING** emphasizes areas where personal injury or even death could result from negligence. Mechanical damage may also occur. **WARNINGS** are to be taken *seriously*. In some cases, serious injury or death has resulted from disregarding similar warnings.

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4 QUICK REFERENCE DATA

TIRE PRESSURES *

Model	Up to 206 lbs. (90 kg)		Up to vehicle load limit	
	psi	kg/cm ²	psi	kg/cm ²
CB400T, CB400A				
Front	24	1.75	24	1.75
Rear	32	2.25	36	2.50
1979-1980 CM400T, 1979-1980 CM400A, CM400E				
Front	24	1.75	24	1.75
Rear	28	2.0	36	2.50
1981 CM400A				
Front	28	2.0	28	2.0
Rear	28	2.0	36	2.50
1981 CM400E				
Front	24	1.75	28	2.0
Rear	28	2.0	36	2.50
1981 CB400T, 1981 CM400C, CM400T				
Front	28	2.0	28	2.0
Rear	28	2.0	36	2.50
CM450A, CM450C, CM450T				
Front	28	2.0	28	2.0
Rear	28	2.0	36	2.50
CM450E				
Front	24	1.75	28	2.0
Rear	24	1.75	36	2.50
CB450SC				
Front	28	2.0	28	2.0
Rear	28	2.0	36	2.50
Rebel 450				
Front	28	2.0	28	2.0
Rear	28	2.0	28	2.0

* Tire inflation pressure for factory equipped tires. Aftermarket tire inflation pressure may vary according to tire manufacturer's instructions.

REPLACEMENT BULBS

Item	Number
Headlight	
Rebel 450	12V 60/55W
All other models	12V 50/35W
Tail/brakelight	SAE 1157
Directional	
Front	
1978-1983	SAE 1034
1985-on	SAE 1073
Rear	SAE 1073
Instrument lights	SAE 57
Running light (models so equipped)	SAE 1034

MAINTENANCE AND TUNE-UP TORQUE SPECIFICATIONS

Item	N-m	ft.-lb.
Oil filter cover bolt	29-31	21-22
Oil drain bolt		
1978-1984	25-35	18-25
1985-on	32-38	23-27
Fork cap bolt	15-30	11-22
1982-1985 air-assist models and Rebel 450	15-30	11-22
1986 CM450SC	16-20	12-14
Fork bridge bolts		
Upper (1982-on)	9-13	7-9
Lower (1982-on)	18-25	13-18
Front fork interconnecting air hose (1982-on)		
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Air hose-to-fork cap bolt	4-7	3-5
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Handlebar holder bolts	18-25	13-18
Rear axle nut		
Rebel 450	80-100	58-72
CB450SC	90-100	65-72
All other models	68-100	50-72
Fuel strainer cup (models so equipped)	3-5	2-4
Balancer chain		
8 mm adjust nut	20-24	15-18
Adjuster plate		
8 mm nut	20-24	15-18
10 mm nut	30-35	22-25
Cylinder head bolts	30-35	22-25

TUNE-UP SPECIFICATIONS

Valve clearance	
Intake	0.08-0.12 mm (0.003-0.005 in.)
Exhaust	0.12-0.16 mm (0.005-0.006 in.)
Compression pressure	
1979-1985	1,172-1,368 kPa (171-199 psi)
1986 CB450SC	1,000-1,400 kPa (145-205 psi)
Rebel 450	1,019-1,215 kPa (157-185 psi)
Spark plug type	
Standard heat range	
1978-1981	ND X24ES-U or NGK D8EA
1982	ND X24ESR-U or NGK DR8ES-L
1983-on	ND X24EPR-U9 NGK DPR8EA-9
Spark plug gap	
1978-1981	0.6-0.7 mm (0.024-0.028 in.)
1982-on	0.8-0.9 mm (0.032-0.036 in.)
Idle speed	
Manual transmission	1,200 ± 100 rpm
Automatic transmission	1,250 ± 100 rpm

ENGINE OIL CAPACITY

Engine size	Oil drain		Rebuild	
	U.S. qt.	Liter	U.S. qt.	Liter
Manual transmission	2.	2.5	3.2	3.0
Automatic transmission	2.6	2.5	3.5	3.3

FRONT FORK OIL CAPACITY *

Model	cc	fl. oz.
CB400T	175	5.9
CM400A, CM400C, CM400T, CB450T	172	5.8
CM400E	135	4.6
CM450A, CM450C	105	6.9
CB450SC	185	2.26
Rebel 450	114	4.5
See Chapter Nine, Table 3 for 1981-on		
* Capacity for each fork leg.		

DRIVE CHAIN REPLACEMENT NUMBERS

Model	Number
CB400T, CB400A, CB450T, CM400E	DID 50DS-100L or RK 50KS-100L
CM400A, CM400C, CM400T	DID 50DS-102L or RK 50KS-102L
CB450SC	DID 50H1-106LE or Takasago 520-106LE
Rebel 450	DID 525V or RK525 MO-21

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400-450 TWINS • 1978-1987

Introduction

This detailed comprehensive manual covers the Honda 400-450 series twins from 1978-1987. The expert text gives complete information on maintenance, tune-up, repair and overhaul. Hundreds of photos and drawings guide you through every step. Where differences occur among the models, they are clearly identified. The book includes all you will need to know to keep your Honda running right.

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 you in mind. All chapters are thumb tabbed. Important items are extensively indexed at the rear of the book. All procedures, tables, photos, etc., in this manual are for the reader who may be working on the bike for the first time or using this manual for the first time. All the most frequently used specifications and capacities are summarized in the *Quick Reference Data* pages at the front of the book.

Keep the book handy in your tool box. It will help you better understand how your bike runs, lower your repair costs and generally improve your satisfaction with the bike.

Throughout this manual keep in mind 2 conventions. "Front" refers to the front of the bike. The front of any component, such as the engine, is the end which faces toward the front of the bike. The "left-" and "right-hand" sides refer to the position of the parts as viewed by a rider sitting on the seat facing forward. For example, the throttle control is on the right-hand side and the clutch lever is on the left-hand side. These rules are simple, but even experienced mechanics occasionally become disoriented.

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 hours servicing your own machine. If you ignore these rules you can hurt yourself or damage the bike.

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. If welding or brazing is required on the machine, remove the fuel tank to a safe distance, at least 50 feet away.
4. Use the proper sized wrenches to avoid damage to nuts and injury to yourself.
5. When loosening a tight or stuck nut, think about what would happen if the wrench should slip. Be careful; protect yourself accordingly.
6. Keep your work area clean and uncluttered.
7. Wear safety goggles during all operations involving drilling, grinding or the use of a cold chisel.
8. Never use worn tools.
9. Keep a fire extinguisher handy and be sure it is rated for gasoline and electrical fires.

SERVICE HINTS

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.

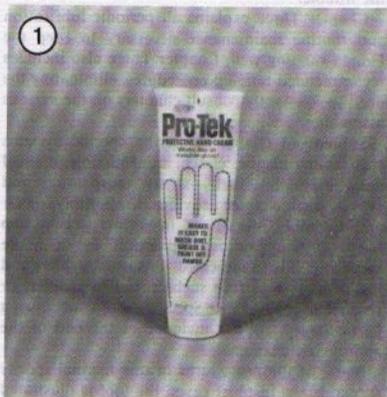
Take your time and do the job right. Do not forget that a newly rebuilt engine must be broken in the same as a new one. Keep the rpm within the limits given in your owner's manual when you get back on the road.

1. There are many items available that can be used on your hands before and after working on your bike. A little preparation before getting "all greased up" will help when cleaning up later. Before starting out, work Vaseline, soap or a product such as Invisible Glove (Figure 1) onto your forearms, into your hands and under your fingernails and cuticles. This will make cleanup a lot easier. For cleanup, use a waterless hand soap such as Sta-Lube and then finish up with powdered Boraxo and a fingernail brush.
2. Repairs go much faster and easier if the bike is clean before you begin work. There are special cleaners, such as Gunk or Bel-Ray Degreaser (Figure 2) for washing the engine and related parts. Just spray or brush on the cleaning solution, let it 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.

3. Special tools are required for some repair procedures. These may be purchased from a dealer or motorcycle shop, rented from a tool rental dealer or fabricated by a mechanic or machinist—often at a considerable savings.
4. Much of the labor charged for by mechanics is to remove and disassemble other parts to reach the defective unit. It is usually possible to perform the



preliminary operations yourself and then take the defective unit in to the dealer for repair.

5. Once you have decided to tackle the job yourself, read the entire section *completely* while looking at the actual parts before starting the job. Making sure you have identified the proper one. Study the illustrations and text until you have a good idea of what is involved in completing the job satisfactorily. If special tools or replacement parts are required, make arrangements to get them before you start. It is frustrating and time-consuming to get partly into a job and then be unable to complete it.

6. 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.

7. Whenever servicing the engine or transmission, or when removing a suspension component, the bike should be secured in a safe manner. If the bike is to be parked on the sidestand or center stand, check the stand to make sure it is secure and not damaged. Block the front and rear wheels if they remain on the ground. A small hydraulic jack and a block of wood can be used to raise the chassis. If the transmission is not going to be worked on and the drive chain is connected to the rear wheel, shift the transmission into first gear.

8. Disconnect the negative battery cable when working on or near the electrical, clutch, or starter systems and before disconnecting any electrical wires. On most batteries, the negative terminal will be marked with a minus (-) sign and the positive terminal with a plus (+) sign.

9. 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, such as a bearing in a case, there is usually a tool designed to separate them. Never use a screwdriver to pry parts with machined surfaces such as crankcase halves. You will mar the surfaces and end up with leaks.

10. Make diagrams or take a Polaroid picture wherever similar-appearing parts are found. For instance, crankcase bolts are often not the same length. You may think you can remember where everything came from, but mistakes are costly. There is also the possibility you may be sidetracked and not return to work for days or even weeks, in which interval carefully laid out parts may have become disturbed.

11. 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. Seal and label them with masking tape.

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

13. Protect finished surfaces from physical damage or corrosion. Keep gasoline and hydraulic brake fluid off plastic parts and painted and plated surfaces.

14. Frozen or very tight bolts and screws can often be loosened by soaking with penetrating oil, such as WD-40 or Liquid Wrench, 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.

15. 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.

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

17. Wiring connections and brake components should be kept clean and free of grease and oil.

18. When assembling 2 parts, start all fasteners, then tighten evenly.

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

20. Whenever a rotating part butts against a stationary part, look for a shim or washer.

21. Use new gaskets if there is any doubt about the condition of the old ones. A thin coat of oil on gaskets may help them seal effectively.

22. 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 and brake components.



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

24. Carbon can be removed from the head, the piston crown and the exhaust port with a dull screwdriver. Do *not* scratch machined surfaces. Wipe off the surface with a clean cloth when finished.

25. The 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 *after* the float has been removed.

26. A baby bottle makes a good measuring device for adding oil to the front forks. Get one that is graduated in fluid ounces and cubic centimeters. After it has been used for this purpose, do *not* let a small child drink out of it as there will always be an oil residue in it.

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

SPECIAL TIPS

Because of the extreme demands placed on a bike, several points should be kept in mind when performing service and repair. The following items are general suggestions that may improve the overall life of the machine and help avoid costly failures.

1. Use a locking compound such as Loctite Lock N' Seal No. 242 (blue Loctite) on all bolts and nuts, even if they are secured with lockwashers. This type of Loctite does not harden completely and allows easy removal of the bolt or nut. A screw or bolt lost from an engine cover or bearing retainer could easily cause serious and expensive damage before its loss is noticed. Make sure the threads are clean and free of grease and oil. Clean with contact cleaner before applying the Loctite. When applying Loctite, use a small amount. If too much is used, it can work its way down the threads and stick parts together not meant to be stuck. Keep a tube of Loctite in your tool box. When used properly it is cheap insurance.

2. Use a hammer-driven impact tool to remove and install all bolts, particularly engine cover

screws. These tools help prevent the rounding off of bolt heads and ensure a tight installation.

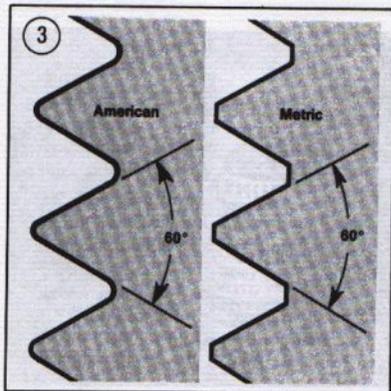
3. When replacing missing or broken fasteners (bolts, nuts and screws), especially on the engine or frame components, always use Honda replacement parts. They are specially hardened for each application. The wrong 50-cent bolt could easily cause serious and expensive damage, not to mention rider injury.

4. When installing gaskets in the engine, always use Honda replacement gaskets *without* sealer, unless designated. These gaskets are designed to swell when they come in contact with oil. Gasket sealer will prevent the gaskets from swelling as intended, which can result in oil leaks. These Honda gaskets are cut from material of the precise thickness needed. Installation of a too thick or too thin gasket in a critical area could cause engine damage.

TORQUE SPECIFICATIONS

Torque specifications throughout this manual are given in Newton-meters (Nm) and foot-pounds (ft.-lb.). Newton-meters have been adopted in place of meter-kilograms (mkg) in accordance with the International Modernized Metric System. Tool manufacturers offer torque wrenches calibrated in both Newton-meters and foot-pounds.

Existing torque wrenches calibrated in meter-kilograms can be used by performing a simple conversion. All you have to do is move the decimal point one place to the right; for example, 4.7 mkg = 47 Nm. This conversion is accurate



enough for mechanical work even though the exact mathematical conversion is $3.5 \text{ mkg} = 34.3 \text{ N}\cdot\text{m}$.

Refer to **Table 2** for standard torque specifications for various size screws, bolts and nuts that may not be listed in the respective chapters. To use the table, first determine the size of the bolt or nut. Use a vernier caliper and measure across the flats of the nut and across the threads for a bolt.

FASTENERS

The materials and designs of the various fasteners used on your Honda are not arrived at by chance or accident. Fastener design determines the type of tool required to work the fastener. Fastener material is carefully selected to decrease the possibility of physical failure.

Threads

Nuts, bolts and screws are manufactured in a wide range of thread patterns. To join a nut and bolt, the diameter of the bolt and the diameter of the hole in the nuts must be the same. It is just as important that the threads on both be properly matched.

The best way to tell if the threads on 2 fasteners are matched is to turn the nut on the bolt (or the bolt into the threaded hole in the piece of equipment), with your fingers only. Be sure both pieces are clean. If much force is required, check the thread condition on each fastener. If the thread condition is good but the fastener jams, the threads are not compatible. A thread pitch gauge can also be used to determine pitch. Honda motorcycles are manufactured with metric standard fasteners. The threads are cut differently than those of American fasteners (**Figure 3**).

Most threads are cut so that the fastener must be turned *clockwise* to tighten it. These are called right-hand threads. Some fasteners have left-hand threads; they must be turned *counterclockwise* to be tightened. Left-hand threads are used in locations where normal rotation of the equipment would tend to loosen a right-hand threaded fastener. When left-hand threads are used in this manual they are identified in the text.

Machine Screws

There are many different types of machine screws. **Figure 4** shows a number of screw heads requiring different types of turning tools. Heads are also designed to protrude above the metal (round or hex) or to be slight recessed in the metal (flat). See **Figure 5**.

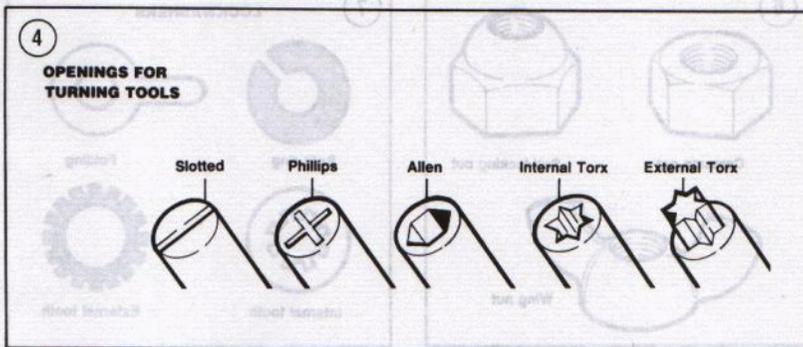
Bolts

Commonly called bolts, the technical name for these fasteners is cap screws. Metric bolts are described by the diameter and pitch (or the distance between each thread). For example an $\text{M}8 \times 1.25$ bolt is one that has a diameter of 8 millimeters and a distance of 1.25 millimeters between each thread. The measurement across 2 flats on the head of the bolt indicates the proper wrench size to be used. Use a vernier caliper and measure across the threads to determine the bolt diameter.

Nuts

Nuts are manufactured in a variety of type and sizes. Most are hexagonal (6-sided) and fit on bolts, screws and studs with the same diameter and pitch.

Figure 6 shows several types of nuts. The common nut is generally used with a lockwasher.



Self-locking nuts have a nylon insert which prevents the nut from loosening; no lockwasher is required. Wing nuts are designed for fast removal by hand. Wing nuts are used for convenience in non-critical locations.

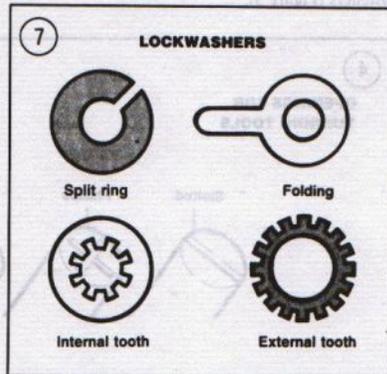
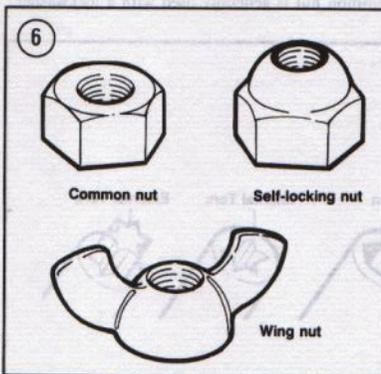
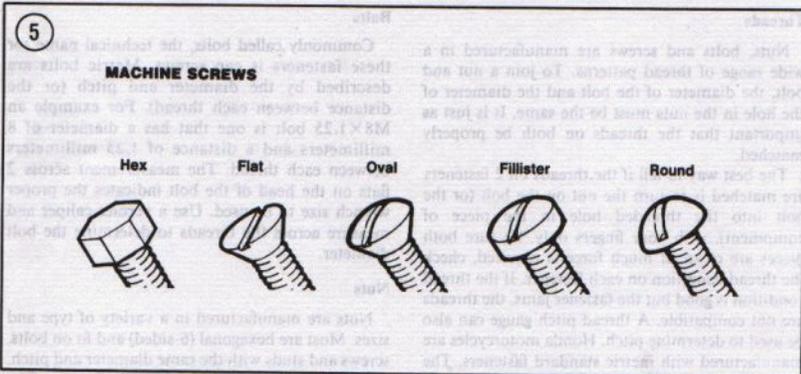
To indicate the size of a nut, manufacturers specify the diameter of the opening and the threads per inch. This is similar to bolt specifications, but without the length dimension. The measurement across 2 flats on the nut indicates the proper wrench size to be used.

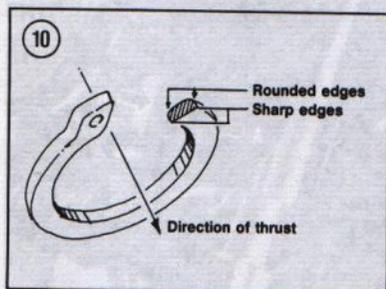
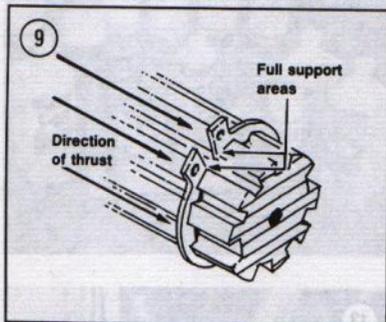
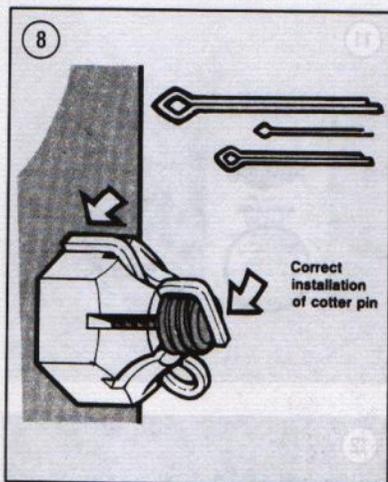
Self-Locking Fasteners

Several types of bolts, screws and nuts incorporate a system that develops interference between the bolt, screw nut or tapped hole threads. Interference is

achieved in various ways: by distorting threads, coating threads with dry adhesive or nylon, distorting the top of an all-metal nut, using a nylon insert in the center or at the top of a nut, etc.

Self-locking fasteners offer greater holding strength and better vibration resistance. Some self-locking fasteners can be reused if in good condition. Others, like the nylon insert nut, form an initial locking condition when the nut is first installed; the nylon forms closely to the bolt thread pattern, thus reducing any tendency for the nut to loosen. When the nut is removed, its locking efficiency is greatly reduced. For greatest safety it is recommended that you install new self-locking fasteners whenever they are removed.





Washers

There are 2 basic types of washers: flat washers and lockwashers. Flat washers are simple discs with a hole to fit a screw or bolt. Lockwashers are designed to prevent a fastener from working loose due to vibration, expansion and contraction. Figure 7 shows several types of washers. Washers are also used in the following functions:

- As spacers.
 - To prevent galling or damage of the equipment by the fastener.
 - To help distribute fastener load during torquing.
 - As fluid seals (copper or laminated washers).
- Note that flat washers are often used between a fastener to provide a smooth bearing surface. This allows the fastener to be turned easily with a tool.

Cotter Pins

Cotter pins (Figure 8) are used to secure special kinds of fasteners. The threaded stud must have a hole in it; the nut or nut lock piece has castellations around which the cotter pin ends wrap. Cotter pins should not be reused after removal as the ends may break and the cotter pin could then fall out.

Snap Rings

Snap rings can be internal or external design. They are used to retain items on shafts (external type) or within tubes (internal type). In some applications, snap rings of varying thickness are used to control the end play of parts assemblies. These are often called selective snap rings. Snap rings should be replaced during installation, as removal weakens and deforms them.

Two basic types of snap rings are available: machined and stamped snap rings. Machined snap rings (Figure 9) can be installed in either direction (shaft or housing) because both faces are machined, thus creating two sharp edges. Stamped snap rings (Figure 10) are manufactured with one sharp edge and one rounded edge. When installing stamped snap rings in a thrust situation (transmission shafts, fork tubes, etc.), the sharp edge must face away from the part producing the thrust. When installing snap rings, observe the following:

- Compress or expand the snap rings only enough to install or remove them.
- After the snap ring is installed, make sure it is completely seated in its groove.

LUBRICANTS

Periodic lubrication ensures long life for any type of equipment. The *type* of lubricant used is just as important as the lubrication service itself. The following paragraphs describe the types of lubricants most often used on motorcycle equipment. Be sure to follow the motorcycle manufacturer's recommendations for lubricant types.

Generally, all liquid lubricants are called "oil." They may be mineral-based (including petroleum bases), natural-based (vegetable and animal bases), synthetic-based or emulsions (mixtures). "Grease" is an oil to which a thickening base has been added so that the end product is semi-solid. Grease is often classified by the type of thickener added; lithium soap is commonly used.

Engine Oil

Oil for motorcycle and automotive engines is classified by the American Petroleum Institute (API) and the Society of Automotive Engineers (SAE) in several categories. Oil containers display these classifications on the top of the can or on the bottle label (Figure 11).

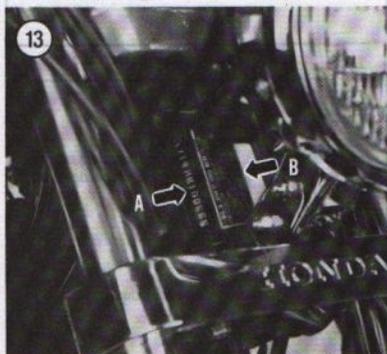
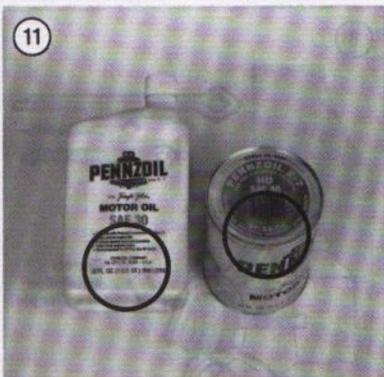
API oil classification is indicated by letters; oils for gasoline engines are identified by an "S." The engines covered in this manual require SE or SF classified oil.

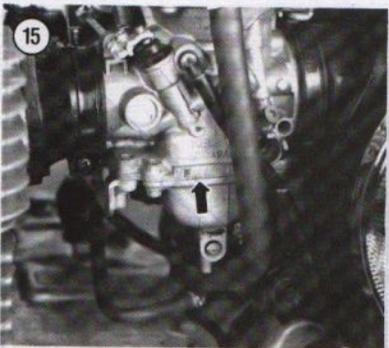
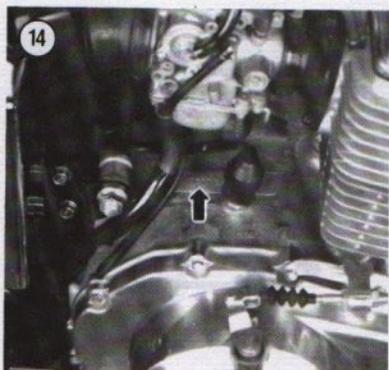
Viscosity is an indication of the oil's thickness. The SAE uses numbers to indicate viscosity; thin oils have low numbers while thick oils have high numbers. A "W" after the number indicates that the viscosity testing was done at low temperature to simulate cold-weather operation. Engine oils fall into the 5W-30 and 20W-50 range.

Multi-grade oils (for example 10W-40) have a constant viscosity. This allows the oil to perform efficiently across a wide range of engine operating conditions. The lower the number; the better the engine will start in cold climates. Higher numbers are usually recommended for engine running in hot weather conditions.

Grease

Greases are graded by the National Lubricating Grease Institute (NLGI). Greases are graded by number, according to the consistency of the grease; these range from No. 000 to No. 6, with No. 6 being the most solid. A typical multipurpose grease is NLGI No. 2. For specific applications, equipment manufacturers may require grease with an additive such as molybdenum disulfide (MoS²).





EXPENDABLE SUPPLIES

Certain expendable supplies are required during maintenance and repair work. These include grease, oil, gasket cement, wiping rags and cleaning solvent. Ask your dealer for the special locking compounds, silicone lubricants and other products (Figure 12) which make vehicle maintenance simpler and easier. Cleaning solvent or kerosene is available at some service stations or hardware stores.

PARTS REPLACEMENT

Honda makes frequent changes during a model year—some minor, some relatively major. When you order parts from the dealer or other parts distributor, always order by engine and frame number. Write the numbers down and carry them with you. Compare new parts to old before purchasing them. If they are not alike, have the parts manager explain the difference to you.

SERIAL NUMBERS

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

The frame serial number is stamped on the right-hand side of the steering head (A, Figure 13). The vehicle identification number (VIN) is on the left-hand side of the steering head (B, Figure 13).

The engine serial number is located on the top right-hand surface of the crankcase (Figure 14). The carburetor identification number is located on the carburetor body above the float bowl (Figure 15). On models so equipped, the color label is attached either to the air filter air box or on the storage compartment under the seat (Figure 16). When ordering color-coded parts always specify the color indicated on this label.

BASIC HAND TOOLS

A number of tools are required to maintain a bike in top riding condition. You may already have some of these tools for home or car repairs. There are also tools made especially for bike repairs; these you will have to purchase. In any case, a wide variety of quality tools will make bike repairs easier and more effective.

Top quality tools are essential; they are also more economical in the long run. If you are now starting to build your tool collection, stay away from the "advertised specials" featured at some parts houses, discount stores and chain drug stores. These are usually a poor grade tool that can be sold cheaply and that is exactly what they are—*cheap*.

They are usually made of inferior material and are thick, heavy and clumsy. Their rough finish makes them difficult to clean and they usually don't last very long.

Quality tools are made of alloy steel and are heat treated for greater strength. They are lighter and better balanced than cheap ones. Their surface is smooth, making them a pleasure to work with and easy to clean. The initial cost of good quality tools may be more, but it is cheaper in the long run.

Don't try to buy everything in all sizes in the beginning; do it a little at a time until you have the necessary tools. The Stanley line, available from most hardware stores, is a good all-around line of tools and will last you a lifetime if you take care of them.

Keep your tools clean and in a tool box. Keep them organized with the sockets and related drives together and the open-end and box wrenches together, etc. After using a tool, wipe off dirt and grease with a clean cloth and place the tool in its correct place. Doing this will save a lot of time you would have spent trying to find a socket buried in a bunch of clutch parts.

The following tools are required to perform virtually any repair job on a bike. Each tool is described and the recommended size given for starting a tool collection. Table 3 includes the tools that should be on hand for simple home repairs and/or major overhaul as shown in Figure 17. Additional tools and some duplicates may be added as you become more familiar with the bike. Almost all motorcycles and bikes (with the exception of the U.S. built Harley and some English bikes) use metric size bolts and nuts. If you are starting your collection now, buy metric sizes.

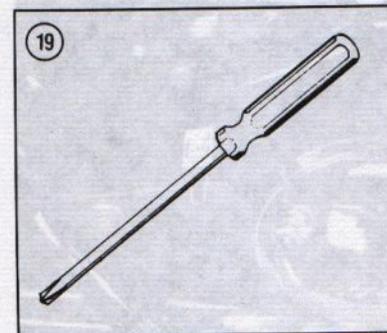
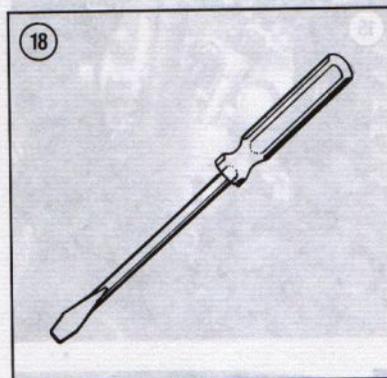
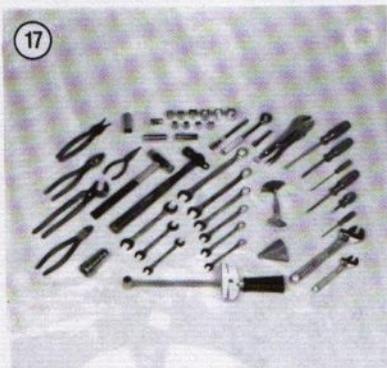
Screwdrivers

The screwdriver is a very basic tool, but if used improperly it will do more damage than good. The slot on a screw has a definite dimension and shape. A screwdriver must be selected to conform with that shape. Use a small screwdriver for small screws and a large one for large screws or the screw head will be damaged.

Two basic types of screwdriver are required to repair the bike—common (flat blade) screwdrivers (Figure 18) and Phillips screwdrivers (Figure 19).

Screwdrivers are available in sets which often include an assortment of common and Phillips blades. If you buy them individually, buy at least the following:

- Common screwdriver—5/16×6 in. blade.
- Common screwdriver—3/8×12 in. blade.
- Phillips screwdriver—size 2 tip, 6 in. blade.



Use screwdrivers only for driving screws. Never use a screwdriver for prying or chiseling. Do not try to remove a Phillips or Allen head screw with a common screwdriver; you can damage the head so that the proper tool will be unable to remove it.

Keep screwdrivers in the proper condition and they will last longer and perform better. Always keep the tip of a common screwdriver in good condition. **Figure 20** shows how to grind the tip to the proper shape if it becomes damaged. Note the symmetrical sides of the tip.

Pliers

Pliers come in a wide range of types and sizes. Pliers are useful for cutting, bending and crimping. They should never be used to cut hardened objects or to turn bolts or nuts. **Figure 21** shows several pliers useful in bike repairs.

Each type of pliers has a specialized function. Gas pliers are general purpose pliers and are used mainly for holding things and for bending. Vise Grips are used as pliers or to hold objects very tight like a vise. Needle-nose pliers are used to hold or bend small objects. Channel lock pliers can be adjusted to hold various sizes of objects; the jaws remain parallel to grip around objects such as pipe

or tubing. There are many more types of pliers. The ones described here are most suitable for bike repairs.

Box and Open-end Wrenches

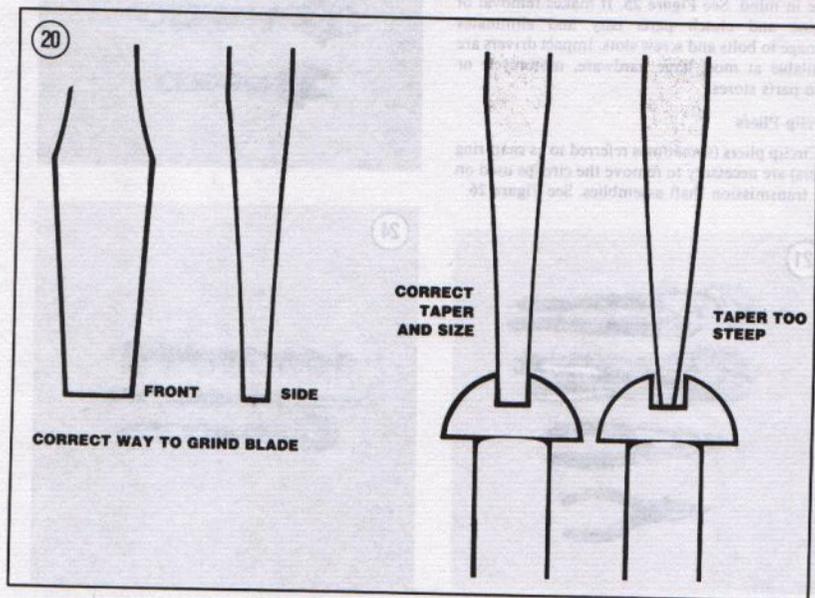
Box and open-end wrenches are available in sets or separately in a variety of sizes. The size number stamped near the end refers to the distance between 2 parallel flats on the hex head bolt or nut.

Box wrenches are usually superior to open-end wrenches. Open-end wrenches grip the nut on only 2 flats. Unless it fits well, it may slip and round off the points on the nut. The box wrench grips all 6 flats. Both 6-point and 12-point openings on box wrenches are available. The 6-point gives superior holding power; the 12-point allows a shorter swing.

Combination wrenches (**Figure 22**) which are open on one side and boxed on the other are also available. Both ends are the same size.

Adjustable (Crescent) Wrenches

An adjustable wrench (also called crescent wrench) can be adjusted to fit nearly any nut or bolt head. See **Figure 23**. However, it can loosen and slip, causing damage to the nut and injury to



your knuckles. Use an adjustable wrench only when other wrenches are not available.

Adjustable wrenches come in sizes ranging from 4-18 in. overall. A 6 or 8 in. wrench is recommended as an all-purpose wrench.

Socket Wrenches

This type is undoubtedly the fastest, safest and most convenient to use. See **Figure 24**. Sockets which attach to a ratchet handle are available with 6-point or 12-point openings and 1/4, 3/8, 1/2 and 3/4 in. drives. The drive size indicates the size of the square hole which mates with the ratchet handle.

Torque Wrench

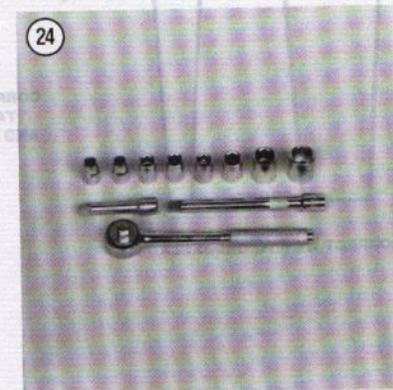
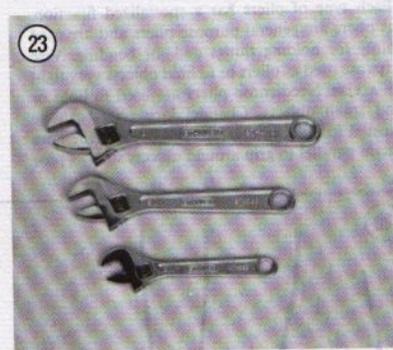
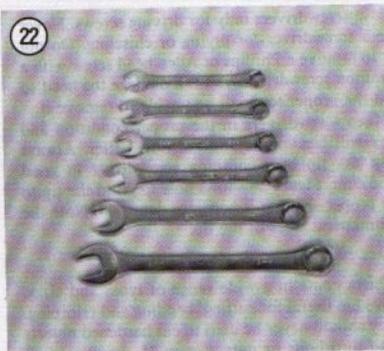
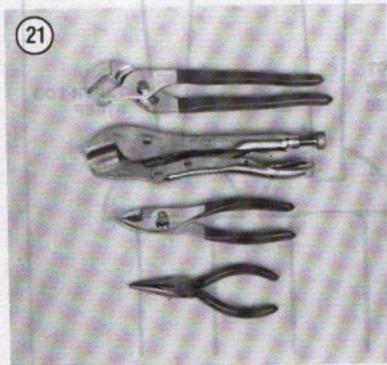
A torque wrench is used with a socket to measure how tightly a nut or bolt is installed. They come in a wide price range and with either 3/8 or 1/2 in. square drive. The drive size indicates the size of the square drive which mates with the socket. Purchase one that measures 0-140 N·m (0-100 ft.-lb.).

Impact Driver

This tool might have been designed with the bike in mind. See **Figure 25**. It makes removal of engine and clutch parts easy and eliminates damage to bolts and screw slots. Impact drivers are available at most large hardware, motorcycle or auto parts stores.

Circlip Pliers

Circlip pliers (sometimes referred to as snap-ring pliers) are necessary to remove the circlips used on the transmission shaft assemblies. See **Figure 26**.



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**Hammers**

The correct hammer is necessary for bike repairs. Use only a hammer with a face (or head) of rubber or plastic or the soft-faced type that is filled with buck shot. These are sometimes necessary in engine tear-downs. *Never* use a metal-faced hammer on the bike as severe damage will result in most cases. You can always produce the same amount of force with a soft-faced hammer.

Ignition Gauge

This tool (Figure 27) has both flat and wire measuring gauges and is used to measure spark plug gap. This device is available at most auto or motorcycle supply stores.

Other Special Tools

A few other special tools may be required for major service. These are described in the appropriate chapters and are available either from a Honda dealer or other manufacturers as indicated.

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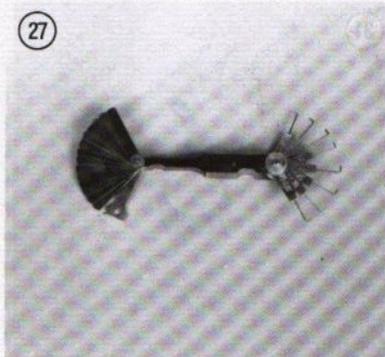
**TUNE-UP AND TROUBLESHOOTING TOOLS****Multimeter or Volt-ohm Meter**

This instrument (Figure 28) is invaluable for electrical system troubleshooting and service. A few of its functions may be duplicated by homemade test equipment, but for the serious mechanic it is a must. Its uses are described in the applicable sections of the book.

Strobe Timing Light

This instrument is necessary for tuning. By flashing a light at the precise instant the spark plug fires, the position of the timing mark can be seen. Marks on the alternator flywheel line up with the

27



28



stationary mark on the crankcase while the engine is running.

Suitable lights range from inexpensive neon bulb types to powerful xenon strobe lights (Figure 29). 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. Both types work on the bike; use according to the manufacturer's instructions.

Portable Tachometer

A portable tachometer is necessary for tuning (Figure 30). Ignition timing and carburetor adjustments must be performed at the specified engine speed. The best instrument for this purpose is one with a low range of 0-1,000 or 0-2,000 rpm and a high range of 0-4,000 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.

Compression Gauge

A compression gauge (Figure 31) measures the engine compression. The results, when properly interpreted, can indicate general ring and valve condition. They are available from motorcycle or auto supply stores and mail order outlets.

MECHANIC'S TIPS

Removing Frozen Nuts and Screws

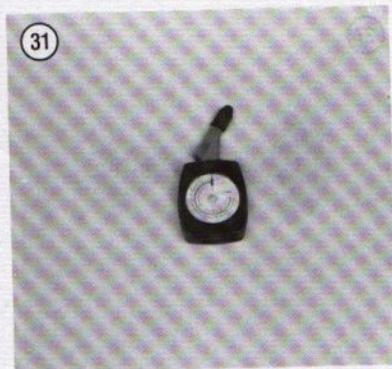
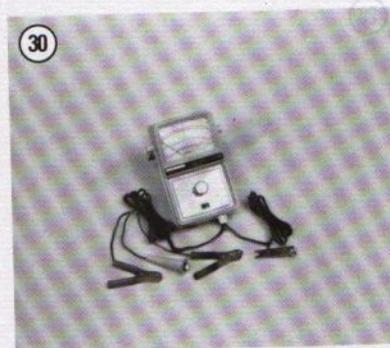
When a fastener rusts and cannot be removed, several methods may be used to loosen it. First, apply penetrating oil such as Liquid Wrench or WD-40 (available at any hardware or auto supply store).

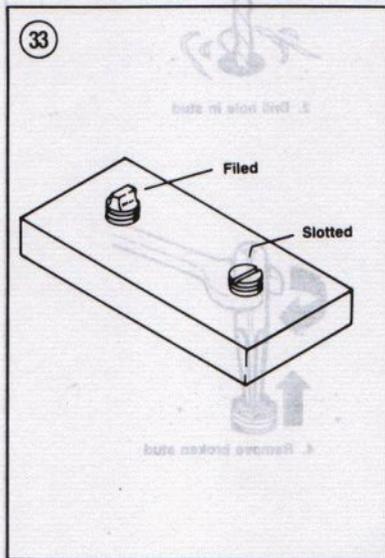
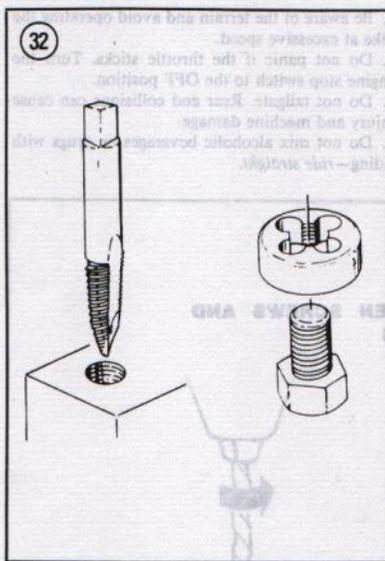
Apply it liberally and let it penetrate for 10-15 minutes. Rap the fastener several times with a small hammer; do not hit it hard enough to cause damage. Reapply the penetrating oil if necessary.

For frozen screws, apply penetrating oil as described, then insert a screwdriver in the slot and rap the top of the screwdriver with a hammer. This loosens the rust so the screw can be removed in the normal way. If the screw head is too chewed up to use a screwdriver, grip the head with Vise Grips and twist the screw out.

Remedying Stripped Threads

Occasionally, threads are stripped though carelessness or impact damage. Often the threads can be cleaned up with a tap (for internal threads on nuts) or die (for external threads on bolts). See Figure 32.





Removing Broken Screws or Bolts

When the head breaks off a screw or bolt, several methods are available for removing the remaining portion.

If a large portion of the remainder projects out, try gripping it with Vise Grips. If the projecting portion is too small, file it to fit a wrench or cut a slot in it to fit a screwdriver. See Figure 33.

If the head breaks off flush, use a screw extractor. To do this, centerpunch the remaining portion of the screw or bolt. Drill a small hole in the screw and tap the extractor into the hole. Back the screw out with a wrench on the extractor. See Figure 34.

RIDING SAFETY

General Tips

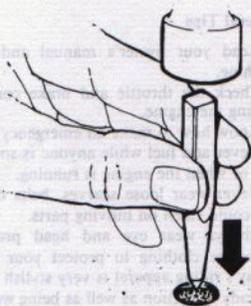
1. Read your owner's manual and know your machine.
2. Check the throttle and brake controls before starting the engine.
3. Know how to make an emergency stop.
4. Never add fuel while anyone is smoking in the area or when the engine is running.
5. Never wear loose scarves, belts or boot laces that could catch on moving parts.
6. Always wear eye and head protection and protective clothing to protect your *entire* body. Today's riding apparel is very stylish and you will be ready for action as well as being well protected.
7. Riding in the winter months requires a good set of clothes to keep your body dry and warm, otherwise your entire trip may be miserable. If you dress properly, moisture will evaporate from your body. If you become too hot and if your clothes trap the moisture, you will become cold. Even mild temperatures can be very uncomfortable and dangerous when combined with a strong wind or traveling at high speed. See Table 4 for wind chill factors. Always dress according to what the wind chill factor is, not the ambient temperature.
8. Never allow anyone to operate the bike without proper instruction. This is for their bodily protection and to keep your machine from damage or destruction.
9. Use the "buddy system" for long trips, just in case you have a problem or run out of gas.
10. Never attempt to repair your machine with the engine running except when necessary for certain tune-up procedures.
11. Check all of the machine components and hardware frequently, especially the wheels and the steering.

1. Avoid dangerous terrain.
2. Do not ride the bike on or near railroad tracks. The bike engine and exhaust noise can drown out the sound of an approaching train.
3. Keep the headlight, turn signal lights and taillight free of dirt and never ride at night without the headlight on.
4. Always steer with both hands.

5. Be aware of the terrain and avoid operating the bike at excessive speed.
6. Do not panic if the throttle sticks. Turn the engine stop switch to the OFF position.
7. Do not tailgate. Rear end collisions can cause injury and machine damage.
8. Do not mix alcoholic beverages or drugs with riding—ride straight.

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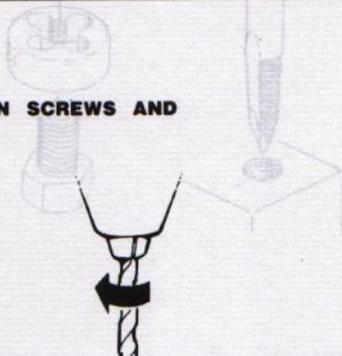
REMOVING BROKEN SCREWS AND BOLTS



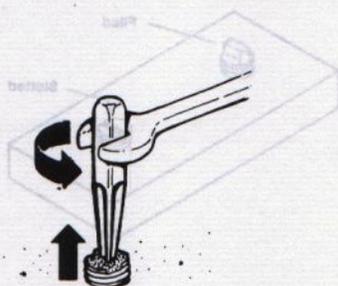
1. Center punch broken stud



3. Tap in screw extractor



2. Drill hole in stud



4. Remove broken stud

Table 1 DECIMAL EQUIVALENTS

Fractions	Decimal in.	Metric mm	Fractions	Decimal in.	Metric mm
1/64	0.015625	0.39688	33/64	0.515625	13.09687
1/32	0.03125	0.79375	17/32	0.53125	13.49375
3/64	0.046875	1.19062	35/64	0.546875	13.89062
1/16	0.0625	1.58750	9/16	0.5625	14.28750
5/64	0.078125	1.98437	37/64	0.578125	14.68437
3/32	0.09375	2.38125	19/32	0.59375	15.08125
7/64	0.109375	2.77812	39/64	0.609375	15.47812
1/8	0.125	3.17500	5/8	0.625	15.87500
9/64	0.140625	3.57187	41/64	0.640625	16.27187
5/32	0.15625	3.96875	21/32	0.65625	16.66875
11/64	0.171875	4.36562	43/64	0.671875	17.06562
3/16	0.1875	4.76250	11/16	0.6875	17.46250
13/64	0.203125	5.15937	45/64	0.703125	17.85937
7/32	0.21875	5.55625	23/32	0.71875	18.25625
15/64	0.234375	5.95312	47/64	0.734375	18.65312
1/4	0.250	6.35000	3/4	0.750	19.05000
17/64	0.265625	6.74687	49/64	0.765625	19.44687
9/32	0.28125	7.14375	25/32	0.78125	19.84375
19/64	0.296875	7.54062	51/64	0.796875	20.24062
5/16	0.3125	7.93750	13/16	0.8125	20.63750
21/64	0.328125	8.33437	53/64	0.828125	21.03437
11/32	0.34375	8.73125	27/32	0.84375	21.43125
23/64	0.359375	9.12812	55/64	0.859375	21.82812
3/8	0.375	9.52500	7/8	0.875	22.22500
25/64	0.390625	9.92187	57/64	0.890625	22.62187
13/32	0.40625	10.31875	29/32	0.90625	23.01875
27/64	0.421875	10.71562	59/64	0.921875	23.41562
7/16	0.4375	11.11250	15/16	0.9375	23.81250
29/64	0.453125	11.50937	61/64	0.953125	24.20937
15/32	0.46875	11.90625	31/32	0.96875	24.60625
31/64	0.484375	12.30312	63/64	0.984375	25.00312
1/2	0.500	12.70000	1	1.000	25.40000

Table 2 STANDARD TORQUE SPECIFICATIONS

Item	N-m	Ft.-lb.
5 mm bolt and nut	4.5-6	3-4
6 mm bolt and nut	8-12	6-9
8 mm bolt and nut	18-25	13-18
10 mm bolt and nut	30-40	22-29
12 mm bolt and nut	50-60	36-43
5 mm screw	3.5-5	2-4
6 mm screw and 6 mm bolt with 8 mm head	7-11	5-8
6 mm flange bolt and nut	10-14	7-10
8 mm flange bolt and nut	24-30	17-22
10 mm flange bolt and nut	35-45	25-33