Hand Tool

A hand tool is any tool that is powered by hand rather than a motor. Categories of hand tools include wrenches, pliers, cutters, files, striking tools, struck or hammered tools, screwdrivers, vises, clamps, snips, saws, drills and knives.

What Tools Do

Push things in
- Pull things out
- Turn things
- Keep things from turning
- Measure things
- Shape things
- Anything we need done easier, faster, or more accurately

Objectives

- List safety rules for hand tools
- Select the right tool for a given job
- Maintain and store tools properly
- Use hand tools safely
- Identify common automotive hand tools

Tool Rules

- Purchase quality tools
- Keep tools organized
- Keep tools clean
- Use the right tool for the job.

Tech Tip

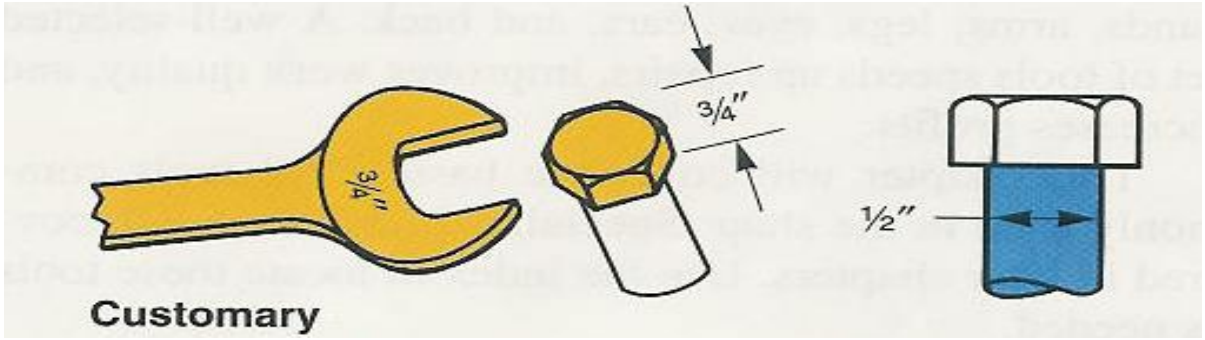
- The time spent maintaining your tools and toolbox is time well spent. Well organized tools will save time on each job and help you get more work done. Unorganized or poorly maintained tools will hurt your on –the-job performance

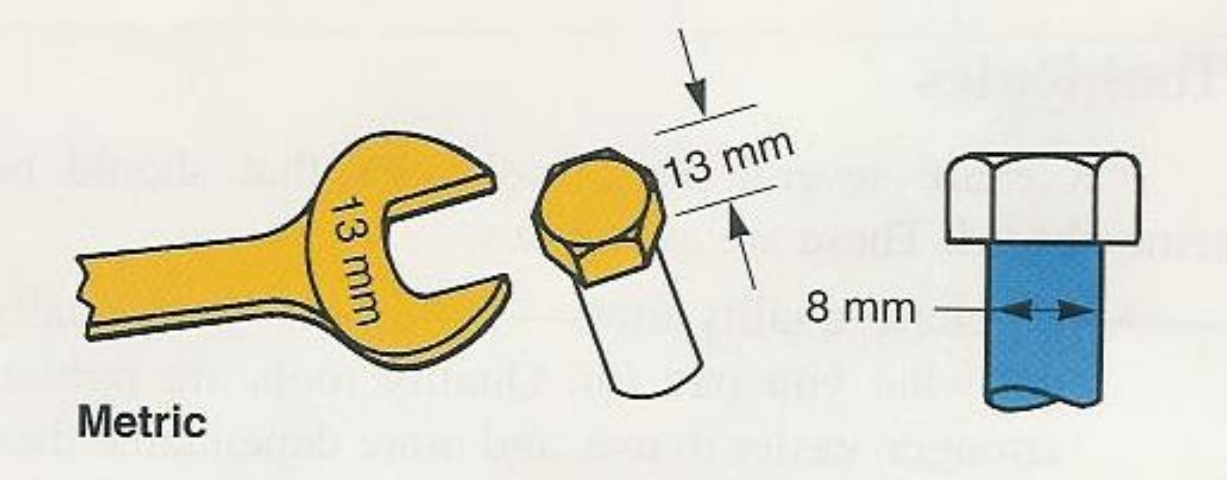
Tool Box Organization

- Related tools are normally kept in the same toolbox drawer.
- The **lower roll-around cabinet** holds the bulky, heavy tools.
- Commonly used tools are normally placed in the **upper tool chest**
- The small **carrying (tote) tray** is for holding frequently used tools.

Wrench Sizes

Customary tool sizes are given in fractions of an inch. The measurement is the width of the jaw opening. As shown here, these sizes are not the same as bolt sizes





Metric wrench sizes are given in **millimeters**. The measurement is the wide of the jaw opening. The wrench size is not the same as the bolt size.

SPANNER

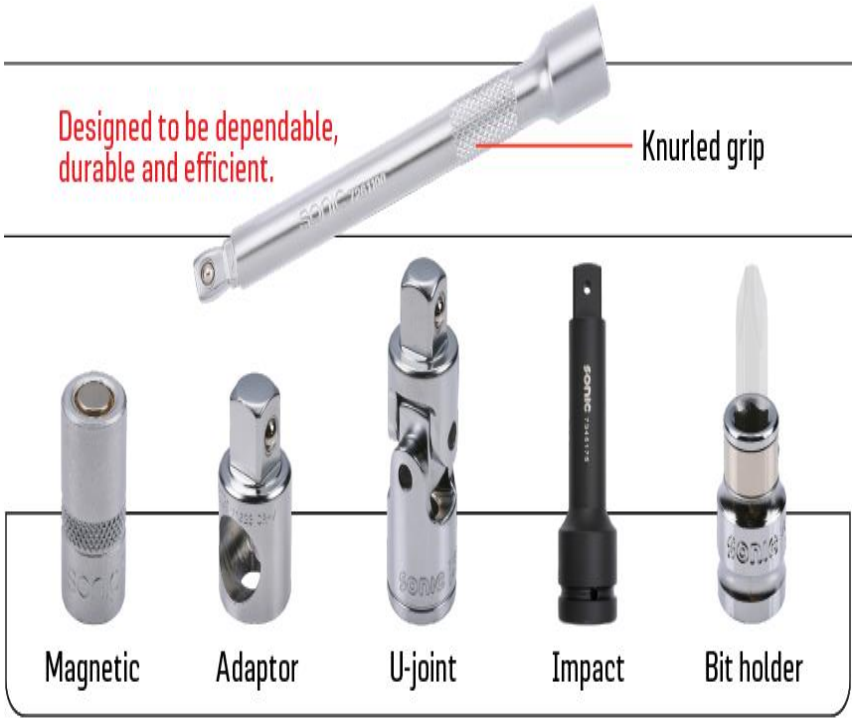
A.Open-End Wrenches- An open-end wrench has an open jaw on both ends. Each end is a different size and set at an angle.

B.Box-end Wrenches- Box-end wrenches are completely closed on both ends. They fully surround and grip the head of the bolt or nut.

C.Combination Wrenches- A combination wrench has a box-end jaw on one end and an open end on the other. Both ends are usually the same size.

D.Line Wrenches- A line wrench, also called a tubing wrench or flare nut wrench, is a box-end wrench with a small opening or split in the jaw. The opening allows the wrench to be slipped over fuel lines, brake lines or power steering line and onto the fitting nut.

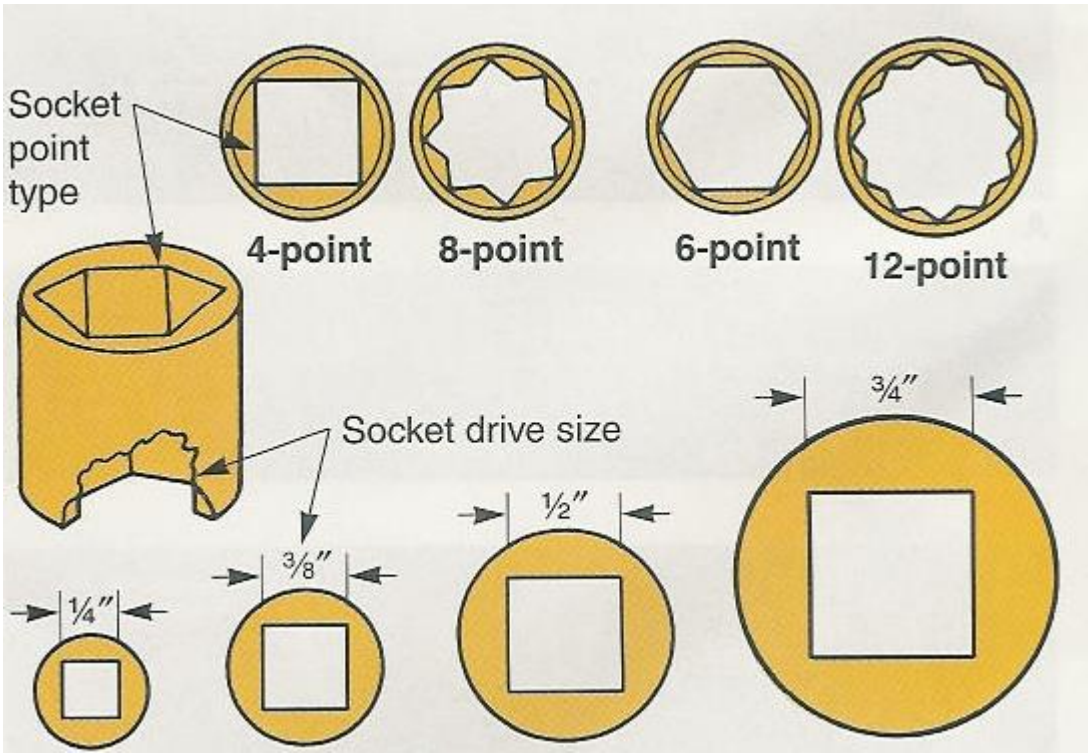
Extensions



- **Extensions** are used between a socket and its handle.
- They allow the handle to be placed farther from the work piece, giving you room to swing the handle and turn the fastener.
- A **universal joint** is a swivel that lets the socket wrench reach around obstructions.
- It is used between the socket and drive handle, with or without and extension

Socket Drive Size

A socket's **drive size** is the size of the square opening for the handle



Wrenches

- ***Wrenches*** are used to install and remove nuts and bolts.
- ***Wrench size*** is determined by measuring across the wrench jaws.
- ***Wrenches*** come in both conventional ***(inch)*** and metric (***millimeter***) sizes.
- The size is stamped on the side of the wrench.
- **Wrench Rules**
- Always select the right size wrench. It must fit the bolt head snugly. A loose fitting wrench will round-off the corners of the bolt head.
- Never hammer on a standard wrench to break loose a bolt. Use a longer wrench with more leverage or a special ***slug wrench***. A slug wrench is designed to be used with a hammer.
- When possible, pull on the wrench. Then, if the wrench slips, you are less likely to hurt your hand. When you must push, use the palm of your hand and keep your fingers open.
- Never use a steel bar or pipe to increase the length of a wrench for leverage. Excess force can bend or break the wrench.

Screwdrivers

- **Screwdrivers** are used to remove or install screws. They come in many shapes and sizes.
- A **Standard screwdriver** has a single blade that fits into a slot in the screw head.
- A **Phillips** screwdriver has two crossing blades that fit into a star-shaped scre slot.
- A **Reed and Prince** screwdriver is similar to a Phillips, but has a slightly different tip shape.
- **Torx** and **clutch head** are special types of screwdrivers

Pliers

- Pliers are used to grip, cut,crimp, hold, and been various parts. Different pliers are helpful for different situations.

A. Combination pliers, or **slip joint pliers**, are the most common pliers used. The slip joint allows the jaws to be adjusted to grasp different size parts.

B. Rib Joint pliers or **Channel lock pliers**, or water pump pliers open extra wide for holding very large objects.

C. Needle nose pliers are excellent for handling extremely small parts or reaching into highly restricted areas.

D. Diagonal cutting pliers are the most commonly used cutting pliers. The jaw shape allows cutting flush with a surface

E. Locking pliers, or **vise grips**, clamp onto and hold a part.

F. Snap ring pliers have sharp pointed tips for installing and removing special clips called snap rings.

Hammers

A **ball peen hammer** is the most common type of hammer used in automotive work. It has a flat face for general striking. It also has around end for shaping metal parts, such as sheet metal or river heads.

A **sledge hammer** has a very large head. It is usually the heaviest hammer and produces powerful blows. A sledge hammer is sometimes used to free frozen parts.

The **brass** or **lead hammer** has a soft, heavy head and is useful when scarring the surface of a part must be avoided. The relatively soft head deforms to protect the part surface from damage.

A **plastic** or **rawhide hammer** is light and has a soft head. It is used where light blows are needed to prevent part breakage or damage to surfaces on small; and delicate parts.

A **rubber mallet** has a head made of solid rubber. It will rebound, or bounce, upon striking and is not effective on solid metal parts. It is recommended on sheet metal or plastic parts, such as garnish molding and wheel covers.

A **dead blow hammer** has a plastic-coated, metal face and is filled with small metal balls called lead shot. The extra weight prevents a rebound of the hammer when striking. The plastic coating avoids surface damage.

Files

Files are used to remove a small amount of material from a work face surface. Files can be used in Wood working, metal working and with plastics to create clean edges, remove burs and other imperfections, smooth sharp edges and remove excess material in small amounts.

Files come in numerous sizes and roughness to work with different materials.

Clamps

A vice is a device used for work holding, or holding a part in place while working with it. The vice in this picture is a table vice. It is bolted to a work table for general use. A vice is a very useful, common tool that can be used for a variety of projects. In the next few slides, we touch on a few different types of vices and clamping methods.

Summary

- It is almost impossible to do even the simplest auto repair without using some type of tool.
- Professional auto technicians invest thousands of dollars in tools. A well selected set of tools will speed up repairs, improve work quality, and increase profits.
- Purchase quality tools. Quality tools are lighter, stronger, easier to use, and more dependable than off-brand bargain tools.
- Keep tools organized. There should be a place for every tool and every tool should be in its place.
- Use the right tool for the job. A good technician will know when, where, and why a particular tool will work better than another.
- A toolbox stores and protects a technician's tools when not in use.
- A six-point wrench is the strongest wrench configuration.
- A socket is a cylinder-shaped, box-end tools for removing or installing bolts and nuts.