**Screwdriver**

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| Screwdriver | |
| IMG_256  A slotted or "flat-blade" screwdriver | |
| Other names | Turnscrew |
| Classification | [Hand tool](https://en.wikipedia.org/wiki/Hand_tool" \o "Hand tool) |
| Types | See shape chart below |
| Related | [Hex key](https://en.wikipedia.org/wiki/Hex_key" \o "Hex key) [Wrench](https://en.wikipedia.org/wiki/Wrench" \o "Wrench) |

A screwdriver is a tool, manual or powered, for turning (driving or removing) screws. A typical simple screwdriver has a handle and a shaft, and a tip that the user inserts into the screw head to turn it. The shaft is usually made of tough steel to resist bending or twisting. The tip may be hardened to resist wear, treated with a dark tip coating for improved visual contrast between tip and screw—or ridged or treated for additional 'grip'. Handle are typically wood, metal, or plastic[1] and usually hexagonal, square, or oval in cross-section to improve grip and prevent the tool from rolling when set down. Some manual screwdrivers have interchangeable tips that fit into a socket on the end of the shaft and are held in mechanically or magnetically. These often have a hollow handle that contains various types and sizes of tips, and a reversible ratchet action that allows multiple full turns without repositioning the tip or the user's hand.

A screwdriver is classified by its tip, which is shaped to fit the driving surfaces—slots, grooves, recesses, etc.—on the corresponding screw head. Proper use requires that the screwdriver's tip engage the head of a screw of the same size and type designation as the screwdriver tip. Screwdriver tips are available in a wide variety of types and sizes (List of screw drives). The two most common are the simple 'blade'-type for slotted screws, and Phillips.

A wide variety of power screwdrivers range from a simple 'stick'-type with batteries, a motor, and a tip holder all inline, to powerful "pistol" type VSR (variable-speed reversible) Cordless drills that also function as screwdrivers. This is particularly useful as drilling a pilot hole before driving a screw is a common operation. Special combination drill-driver bits and adapters let an operator rapidly alternate between the two. Variations include impact drivers, which provide two types of 'hammering' force for improved performance in certain situations, and "right-angle" drivers for use in tight spaces. Many options and enhancements, such as built-in bubble levels, high/low gear selection, magnetic screw holders, adjustable-torque clutches, keyless chucks, 'gyroscopic' control, etc., are available.

**Drive types.**

Screwdrivers come in a large range of sizes to accommodate various screws—from tiny jeweler's screwdrivers up. A screwdriver that is not the right size and type for the screw may damage the screw in the process of tightening it. This is less important for PoziDriv and SupaDriv, which are designed specifically to tolerate some size mismatch.

Some screwdriver tips are magnetic, so that the screw (unless non-magnetic) remains attached to the screwdriver without requiring external force. This is particularly useful in small screws, which are otherwise difficult to handle. Many screwdriver designs have a handle with detachable tip (the part of the screwdriver that engages the screw), called bits as with drill bits. This provides a set of one handle and several bits that can drive a variety of screw sizes and types.

Many modern electrical appliances, if they contain screws, use screws with heads other than the typical slotted or Phillips styles. Torx is one such pattern that has become widespread. The main cause of this trend is manufacturing efficiency: Torx screwdriver tips do not slip out of the fastener as easily as would a Phillips or slotted driver. (Slotted screws are rarely used in mass-produced devices, since the driver is not inherently centered on the fastener.) Non-typical fasteners are commonplace in consumer devices for their ability to make disassembly more difficult, which is seen as a benefit for manufacturers but is considered a disadvantage by users than if more-common head types were used. However, Torx and other drivers have become widely available to the consumer due to their increasing use in the industry. Specialized patterns of security screws are also used, such as the Line Head (LH) style by OSG System Products, Japan, as used in many Nintendo consoles, though drivers for the more common security heads are, again, readily available.

**Blade types**

The tool used to drive a slotted screw head is called a common blade, flat-blade, slot-head, straight, flat, flat-tip,[5] or "flat-head"[6] screwdriver. This last usage can be confusing, because the term flat-head also describes a screw with a flat top, designed to install in a countersunk hole. Furthermore, the term implies that a screwdriver has a "head"; it does not. Such a flat-headed screw may have a slotted, cross, square recessed, or combination head. Prior to the development of the newer bit types the flat-blade was referred to as the "Common-Blade". This was simply because it was the most common one.

Among slotted screwdrivers, variations at the blade or bit end involve the profile of the blade as viewed face-on (from the side of the tool). The more common type is sometimes referred to as keystone, where the blade profile is slightly flared before tapering off at the end, which provides extra stiffness to the workface and makes it capable of withstanding more torque. To maximize access in space-restricted applications, the cabinet variant screwdriver blade sides are straight and parallel, reaching the end of the blade at a right angle. This design is also frequently used in jeweler's screwdrivers.

Many textbooks and vocational schools instruct mechanics to grind down the tip of the blade, which, due to the taper, increases its thickness and consequently allows more precise engagement with the slot in the screw. This approach creates a set of graduated slotted screwdrivers that fit a particular screw for a tighter engagement and reduce screw head deformation. However, many better-quality screwdriver blades are already induction-hardened (surface heat-treated), and tip grinding after manufacture compromises their durability. Thus, it is best to select a tip made to fit precisely to begin with, and avoid weakening the factory heat-treatment.

Frearson vs Phillips.svg

Phillips screwdrivers come in several standard sizes, ranging from tiny "jeweler's" to those used for automobile frame assembly—or #00 to #3 respectively. This size number is usually stamped onto the shank (shaft) or handle for identification. Each bit size fits a range of screw sizes, more or less well. Each Phillips screwdriver size also has a related shank diameter. The driver has a 57° point and tapered, unsharp (rounded) flutes. By far the most commonly found size around the household, automobile, and office is the #2, —which fits computers, printers and photocopiers, light switches, carburetors, furniture, household appliances, door hinges, and so forth. The second most commonly seen household Phillips screw is the #1, which fits calculators, cameras, smaller toys, and cell phone sized devices. The #1 and smaller bits come to a blunt point, but the #2 and above have no point, but rather a nearly squared-off tip, making each size incompatible with the other. A "#2 x 6 Phillips screwdriver" designation as commonly seen in tool catalogs describes a Number Two bit with a six-inch-long shank.

The rounded, tapered slots of the Phillips head were deliberately designed for the screwdriver to "cam out" (pop out) of the screw head recess under high torque on high-speed factory assembly lines. This prevents stripping damage to the screw threads, at the expense of possible damage to the recess in the screw head. Modern torque-limiting power driver tools for professional use eliminate overtorquing damage much more reliably. Market inertia and ignorance of the design's historical intent have led to widespread misapplication of Phillips head fasteners in applications where cam-out is not desirable. Some Phillips head screwdrivers have been manufactured with hardened "anti-cam-out" (ACO) grooves in an attempt to defeat this designed-in behavior.[8] See torx head screw.

Robertson, also known as a square,[9] or Scrulox[10] screw drive has a square-shaped socket in the screw head and a square protrusion on the tool. Both the tool and the socket have a taper, which makes inserting the tool easier, and also tends to help keep the screw on the tool tip without the user needing to hold it there. (The taper's earliest reason for being was to make the manufacture of the screws practical using cold forming of the heads,[11] but its other advantages helped popularize the drive.) Robertson screws are commonplace in Canada, though they have been used elsewhere and have become much more common in other countries in recent decades. Robertson screwdrivers are easy to use one-handed, because the tapered socket tends to retain the screw, even if it is shaken. They also allow for the use of angled screw drivers and trim head screws. The socket-headed Robertson screws are self-centering, reduce cam out, stop a power tool when set, and can be removed if painted-over or old and rusty. In industry, they speed up production and reduce product damage. One of their first major industrial uses was the Ford Motor Company's Model A & Model T production. Henry Ford found them highly reliable and saved considerable production time, but when he couldn't secure licensing for them in the United States, limited their production use to his Canadian division. Robertson-head screwdrivers are available in a standard range of tip-sizes, from 1.77mm to 4.85mm.

Reed and Prince, also called Frearson, is another historic cross-head screw configuration. The cross in the screw head is sharper and less rounded than a Phillips, and the bit has 45° flukes and a sharper, pointed end. Also, the Phillips screw slot is not as deep as the Reed and Prince slot. In theory, different size R&P screws fit any R&P bit size.

Pozidriv and the related Supadriv are widely used in Europe and most of the Far East. While Pozidriv screws have cross heads like Phillips and are sometimes thought effectively the same, the Pozidriv design allows higher torque application than Phillips. It is often claimed that they can apply more torque than any of the other commonly used cross-head screwdriver systems, due to a complex fluting (mating) configuration.

Japanese Industrial Standard (JIS) cross-head screwdrivers are still another standard, often inaccurately referred to as Japanese Phillips. Compatible screw heads are usually identifiable by a single depressed dot or an "X" to one side of the cross slot. This is a screw standard throughout the Asia market and Japanese imports. The driver has a 57° point with a flat tip.