Cordless Impact Drivers

These lightweight powerhouses are better at driving screws than cordless driver/drills; here's why and which one to buy.

BY GARY M. KATZ

ONLINE CONNECTION

See a video of this tool in use on our Web site at www.finehomebuilding.com.

This is not a drill

An impact driver behaves just like a driver/drill until the torque needed to drive the fastener exceeds the torque of the motor. At this point, the large compression spring 1 causes the hammer gear 2 to strike the anvil gear 3, adding rotational force 4 to drive the fastener. Feathering the trigger governs the speed and frequency of the impacts.

A while back, I visited my cousin's job site to see how the finish carpenters were installing huge plaster crown molding 30 ft. in the air. As I walked through the door, the racket of hammer drills echoed through the cavernous remodel, sounding like an indoor shooting range on a Sunday afternoon.

I reached for my earplugs, and it dawned on me: The din was different. These guys were driving 6-in. drywall screws with little screw shooters I'd never seen before. My cousin came down from the scaffold with one of those tools swinging from a hook on his belt.

"You've never used an impact driver?" he said incredulously, handing me the cordless tool. "Try it. You'll never go back to a regular driver/drill." He was right. Now I use a cordless drill only for drilling holes. But he was wrong to hand me that tool. I still have his impact driver.

What's an impact driver?

These lightweight, pint-size tools are designed for driving screws—lots of screws—and lag bolts, too. And although an impact driver sounds like a hammer drill, the percussive force is much different. With a hammer drill, the percussive force is delivered directly toward the tip of the tool, in line with the drill bit, much the same as a hammer striking a nail.

Impact drivers, on the other hand, deliver their force rotationally, or perpendicular to the bit. So rather than hammering a fastener directly into the material as the drill rotates, the force of an impact driver is directed toward turning the fastener (photo facing page).

Unlike a cordless drill, an impact driver has no three-jaw chuck or clutch. Instead, the front of the tool sports a simple spring-loaded quick-change chuck (photos left, p. 103), which holds ¼-in. hexagonal bits and bit holders securely in place (no more slipping bits as with a standard drill chuck). But behind the quick changer, hidden in a well-lubricated housing, is the real magic of an impact driver.

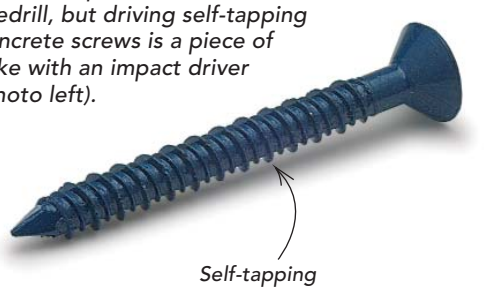
Inside the head and attached to the back of the quick changer is a two-lugged gear aptly named the anvil. A driving gear with two matching lugs (the hammer) strikes the lugs of the anvil. A large compression spring behind the hammer initiates the impact operation only when the torque required to turn the screw exceeds the torque of the tool's motor, at which point the hammer is released and begins to strike the anvil.

In simpler terms, an impact driver runs just like any other drill until you need more torque to drive a screw. Then the hammer hits the anvil and delivers up to an average of 3000 impacts per minute, increasing the torque from 250 in.-lb. (the same as a standard 12v driver/drill) to an average of 700 in.-lb. That's a lot of torque for a screwdriver. One caution: Although you may never strip the head of a screw with an impact driver, you can easily shear off a screw or even snap the driver bit (sidebar p. 105).

The learning curve

Snapping off screw heads is part of the learning curve with an impact driver, and that curve can be steep for screws that secure hardware as well as for drywall screws. Pilot holes are a must for all hardware screws, and even then users must feather, or back off,

Leave the driving to the driver. *Driving screws overhead requires less leverage with an impact driver because the driver applies a rotational force to the screw (photo above). You have to predrill, but driving self-tapping concrete screws is a piece of cake with an impact driver (photo left).*



Self-tapping concrete screw

DEWALT (800) 433-9258, www.dewalt.com

For those folks new to impact drivers, DeWalt's two models with their adjustable-torque dials might be just the ticket. Most of my crew, however, found the dial unnecessary. Although the 9.6v model weighs just as much as other 12v models, it drives less than half as many screws, and it won't stand up on its battery. I found that the reverse switches were the most difficult to operate of all the tools tested.

This heavier duty 12v DeWalt model stands unsteadily on its battery, but it still doesn't outperform the lighter competition. The motor and transmission are similar to the 9.6v model, but the increased voltage adds more torque. Both DeWalt drivers have thick handles and feel no different than a standard driver/drill.

DEWALT DW977K 12V	
Speed	0-2000 rpm
Impacts/minute	0-2600
Torque	850 in.-lb.
Battery	1 NiCd
Weight	4 lb.
1⅝-in. screws/charge	215
Cost	$250

DEWALT DW967K 9.6V	
Speed	0-2000 rpm
Impacts/minute	0-2600
Torque	625 in.-lb.
Battery	1 NiCd
Weight	3.7 lb.
1⅝-in. screws/charge	145
Cost	$200

HITACHI (800) 829-4752, www.hitachi.com/powertools

These drivers were the favorite among the intermittent users on my crew due to their ergonomic combination of slender handles and feather weight. The motor on the 9.6v delivered nearly three times more torque than any 12v driver/drill on the market, and the 12v model was nearly 3½ times more powerful. With its smaller flat-bottom battery, the 9.6v Hitachi is less steady than the Makita (occasionally taking a nose dive), but I barely noticed it hanging from my tool belt. Even with the larger battery, though, Hitachi's 12v impact driver was not very stable. Still, the 12v model seemed to run neck and neck with the Makita tools as the most popular of the group.

HITACHI WH12DH 12V	
Speed	0-2200 rpm
Impacts/minute	0-3000
Torque	868 in.-lb.
Battery	1 NiCd
Weight	3.7 lb.
1⅝-in. screws/charge	260
Cost	$270

HITACHI WH8DHS 9.6V	
Speed	0-2200 rpm
Impacts/minute	0-2800
Torque	781 in.-lb.
Battery	1 NiCd
Weight	3.5 lb.
1⅝-in. screws/charge	180
Cost	$250

the trigger as the screw begins to seat against the piece of hardware.

Tightening a hinge screw a little too much can snap off the screw head. The same result occurs when driving screws into hard materials such as medium-density fiberboard (MDF) or dense hardwoods. Overtightening a strike screw or latch screw can bend the hardware and draw it too deep into the mortise. Unlike a driver/drill, you can't feel the torque with an impact driver. The trick to these tools is learning how to feather the trigger while watching the bit so that the screw turns exactly the amount needed.

When it comes to driving drywall screws, there's no better tool than an impact driver. As a test, I drove one 3-in. coarse-thread drywall screw into the edge of an old 2x4 until the head was buried to the maximum depth of the driver bit. Then I backed out the screw and drove it into a new hole. I buried that same screw into the tough old 2x4 six times before its Phillips head started to wear out. This feat is possible because with the action of an impact driver, the bit rarely jumps out and never strips the head of a screw.

The bad news about impact drivers is that they're loud. But because I always wear ear protection, a little more racket is worth a lot more driving power.

Use an impact driver for any screw

I let several door hangers on my crew test impact drivers. We found that impact drivers are superb for running handfuls of screws. Because most impact drivers weigh only half as much as a driver/drill, they're easier on the arm. And when they're hanging from your tool belt, they're much easier on the back. We also found that 12v impact drivers are more than sufficient for our work, compared with the heavy, clunky 14v and 18v driver/drills we're used to.

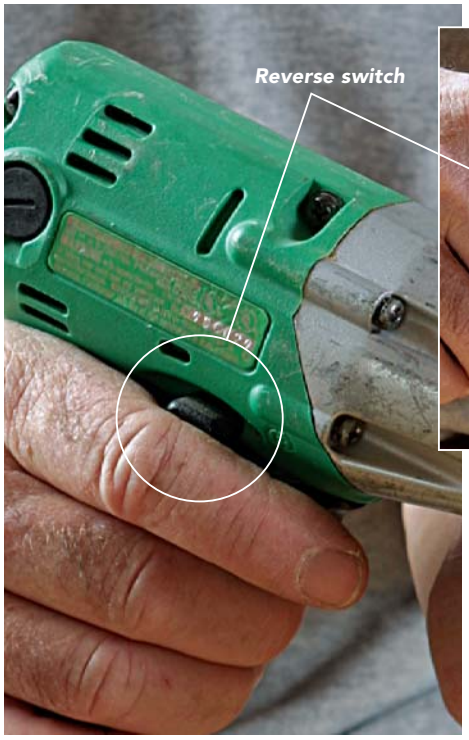
The light weight of an impact driver is deceptive. When driving screws, these tools require far less force because the hammer and anvil do all the work instead of your shoulder and arm. Installing fasteners overhead always required a ladder and extra height for leverage, but not so with an impact driver (top photo, p. 101). I've driven hinge screws in 8-ft. jambs standing on just a stepstool.

These compact tools can be put to other good uses as well. I'd never been able to drive Tapcon screws (hardened screws designed to tap into pilot holes drilled in concrete; 800-982-7178; www.itwbrands.com) reliably un-

IMPACT-DRIVER FEATURES

Quick-change artist. *Instead of a standard drill chuck, impact drivers use a quick-change bit system. A sleeve slides either in (photo above) or out (photo below) to accept a ¼-in. hex bit that won't slip.*

Adjustable torque saves screws. *DeWalt has the only impact driver with a switch that limits the torque the tool applies. Less torque means less chance of breaking fasteners.*



Reverse is a knuckle away *For most impact drivers, reversing tool direction is a simple matter of rotating the knuckle of your trigger finger up to the switch (photo left). DeWalt's driver (photo above) is the only one that requires moving your whole finger to work the reverse switch.*

til now (bottom photo, p. 101). With an impact driver, every screw seats firmly and securely.

For installing decking screws in materials from redwood to Trex, impact drivers are a must. I start by squeezing the trigger and running the screw in fast until it's just about home; then I feather the trigger and let the hammer clack against the anvil in single blows until each screw is perfectly, uniformly flush.

Because of the tools' size, they're perfect for driving screws in tight places. One contractor thanked me in writing after I let him borrow an impact driver to drive screws into rock-hard lumber in a 1920s Arts and Crafts remodel. I've also loaned these tools to cabinet installers, framers, tile installers, electricians, plumbers and HVAC contractors. The feedback has always been the same: After getting over the initial learning curve of using the tool, they're all smiles.

For jobs such as driving trim-head screws into baseboard and casing, securing plumbing straps and electrical boxes, fastening backerboard and running lags in ledgers, impact drivers are a revolutionary improvement. For certain jobs, such as driving screws in pocket holes or securing solid-brass screws, though, I still use a standard driver/drill to minimize the risk of stripping or shearing off the screw.

Your wrist will thank you

I had heard rumors that the vibration from impact drivers is hard on the hands. But because the impact operation transfers all the torque from my wrist to the head of the tool, I discovered that an impact driver is easier on my arthritic paws than either my electric screw shooter or any of my cordless driver/drills.

Several of the impact drivers in this review (the models by Makita and Hitachi) sport slender ergonomic handles that fit even my small hand, and the soft, friction-free grips of Makita's BTD models make them even more user-friendly.

All the impact drivers were variable speed and reversible. The reverse switches on every model except the DeWalt could be activated by the knuckle of the trigger finger without taking the finger off the trigger (photos bottom right). The DeWalt models were the only ones to come with adjustable torque (photo top right), but I found this feature less

MAKITA (800) 462-5482, www.makitausa.com

Slender and lightweight, Makita's 6914D drove the most screws on a single charge of any 12v tool. When it took a dive off a 25-ft. scaffold, and we had to replace only the handle ($37). The motor on this little gem is three times more powerful than a standard driver/drill. Makita's impact drivers are all angled, which distributes more of the weight toward the rear of the tool and improves tool balance both during use and while standing.

When it comes to impact drivers, Makita's 14v BTD model seems geared more for lug nuts than for #8 screws. Although it's no heavier than the 14v driver/drill that I used to carry (4 lb.), I've already grown accustomed to the lighter-weight 12v models and can't go back. If I were in the decking business instead of the finish-carpentry business, though, I'd opt for this model. Although the rpm and impacts/minute are nearly the same as the BTD120, its 12v cousin, the torque is much greater at 1150 in.-lb. With its larger, flatter battery, this tool is stable while standing up.

The BTD series is the latest addition to Makita's cordless-tool chest, and there are some big differences in design. The 120 looks bigger than the 6914D, but it's actually smaller and even weighs a little less. A nonslip rubber-backed handle improves the grip, and the battery has a larger flat surface on the bottom, which makes the driver more stable in a standing position. The battery and charger are enhanced with a built-in fan and a microprocessing chip that controls the rate and duration of the charge. Sadly, the BTD kit included only one battery.

MAKITA BTD150 14V

Speed	0-2300 rpm
Impacts/minute	0-3000
Torque	1150 in.-lb.
Battery	1 NiCd
Weight	4 lb.
1⅝-in. screws/charge	280
Cost	$389

MAKITA BTD120 12V

Speed	0-2300 rpm
Impacts/minute	0-3000
Torque	887 in.-lb.
Battery	1 NiCd
Weight	3.3 lb.
1⅝-in. screws/charge	145
Cost	$319

MAKITA 6914D 12V

Speed	0-2200 rpm
Impacts/minute	0-3000
Torque	870 in.-lb.
Battery	2 NiCd
Weight	3.7 lb.
1⅝-in. screws/charge	260
Cost	$289

MAKITA BTD120 12V

MAKITA 6914D 12V

necessary once I'd mastered the trigger-feathering technique.

Not only are impact drivers easier on the user, but they're easier on batteries as well. Because of the additional impact torque, the demand on the motor is far less than that of a standard driver/drill, meaning less drain on the battery, which in turn results in much longer run times than standard driver/drills. Increased run time means fewer recharges and prolonged battery life. With all these advantages, I wasn't surprised to hear from one manufacturer that in Japan, impact drivers outsell driver/drills by nearly 20%.

No special accessories needed

Every tool in this review came equipped with a ¼-in. hex-drive collar designed for standard ¼-in. bit holders or for Phillips, square-drive and slot-head tips, as well as hex-head nut drivers and sockets. The collars are spring-loaded, so bits or bit holders are well secured and never spin in loose jaws, again a real blessing.

Many accessory bits are available for hex-head shafts, from drill bits to mini-grinding wheels; however, I found that drill bits, especially paddle (spade) bits, were easier to run in my standard driver/drill; the impact driver seemed slower and offered no appreciable advantage for driving drill bits.

Putting impact drivers to the test

I had no difficulty dreaming up an objective testing scenario for these tools. In the past six months, my crew installed hundreds of metal door jambs fastened with thousands of self-tapping screws into metal studs. We also drove similar numbers of regular drywall screws into wood studs.

More than once, we counted the number of screws each tool drove with a freshly charged battery (with the exception of the Makita BTD models, which arrived too late to be tested as extensively as the rest of the pack). We stopped driving screws as soon as the tool showed signs of considerable power loss.

Without exception, the Makita and Hitachi tools drove the most screws, around 260 for the 12v models and 180 for the 9.6v models. DeWalt's 12v drove 220, while its 9.6v model drove fewer than 150. The Panasonic 9.6v came in close behind, with about 100 screws, and the Milwaukee 12v finished last with fewer than 100 screws.

The Makita and Hitachi drivers received the most "testing" from my crew. These tools seemed to be the ones they reached for first.

These bits bit the dust. *The extra torque of an impact driver can be tough on bits. If the steel of a bit is too soft, it can wear out (left). If the steel is too hard, the wings can break off (right).*

Don't buy cheap bits

A power screwdriver is only as good as the driver bit (photos left). After a while, any driver bit can wear out or break. Those of us who drive a lot of screws know that all driver bits are not created equal, and the extra torque of an impact driver only accentuates the differences. Many bits just aren't made to withstand this torque. Bit durability depends on the hardness of the steel in the bit. But increased bit hardness is good only up to a point. The perfect bit should be hardened enough for longer wear yet not hardened to brittleness.

My advice is to avoid generic bits at the lumber-store check-out counter and to buy good brand-name bits such as DeWalt or Makita. Apex (937-222-7871; www.cooperindustries.com) is my first choice in bits. Apex bits seem to last longer, and their bit design (especially the squat #2 style) fits most drywall and finish screws better than any other bit I've used. Apex's ACR bits have ribs machined in the wing faces of the bit that help to grip the screw.

—*G. M. K.*

The Panasonic and Milwaukee drivers spent the least time out of their cases.

Katz's pick of the litter

The adjustable-torque setting on the DeWalt tools proved enticing for a few users, but the weight and run time of these tools made them less popular among more experienced hands. Without question, the most popular tools were the Hitachis and Makitas. Some tradespeople preferred the 9.6v models because they were nearly weightless yet still drove more screws than a heavier 14v driver/drill. For driving countless numbers of larger screws, the 12v tools were picked up first.

Although I've only recently received the latest BTD models from Makita and they haven't been tested nearly as much as the others, I am confident they will be equal to the task. The Makita battery slides in perpendicular to the handle, making battery changes much easier. With their angled motor and improved balance, these tools felt the best in my hands. In addition, they're supported by new battery-saving chargers. The 14v model provides more power and torque, but it comes with a larger price tag and extra weight. So I find myself reaching for the 12v BTD 120 instead. □

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MILWAUKEE (800) 414-6527, www.mil-electric-tool.com

MILWAUKEE 9057-6 12V	
Speed	0-1500 rpm
Impacts/minute	0-2200
Torque	600 in.-lb.
Battery	2 NiCd
Weight	4 lb.
1⅝-in. screws/charge	95
Cost	$260

The heaviest tool tested and still brand new in its huge red case even after three months of testing, the Milwaukee was a disappointment for everyone on the crew. This tool has the slowest motor and the least amount of torque of any 12v tool, though its impacts per minute are nearly the same. Even an additional battery doesn't tip the scale in favor of this model. The 9057-6 comes as a ⅜-in. square drive with a ¼-in. hex-head adapter.

PANASONIC (800) 338-0552, www.panasonic.com

PANASONIC EY6588CQ 9.6V	
Speed	0-2200 rpm
Impacts/minute	0-3300
Torque	650 in.-lb.
Battery	1 NiCd
Weight	3 lb.
1⅝-in. screws/charge	100
Cost	$280

Although capable of delivering power, the Panasonic was the lightest tool tested. It was also a lightweight in the quantity of screws it drove, averaging only 100 1⅝-in. drywall screws on a freshly charged battery. Even so, its torque always made the job seem easy. This tool was one that stayed clean after three months of testing because it just wasn't chosen by the crew that often. No case was included with the tool, but the kit included a 15-minute fast charger.