

Mr.V's Quick Reference Sheet

2.13.26

What's the Big Deal about "Brushed" or "Brushless" Motors in our cordless tools?

THE SHORT ANSWER IS PHYSICS...

The "big deal" is that "standard" (brushed) motors use physical contact to operate, which creates friction, heat, and wear, while **brushless motors use electronics for a more efficient, powerful, and durable tool**. This fundamental design difference results in significant performance advantages for brushless tools.

Key Differences:

Aspect	Brushed Motor	Brushless Motor
Commutation	Mechanical (carbon brushes and a commutator make physical contact).	Electronic (sensors and a circuit board control the current sequence).
Efficiency	Lower (around 75-80% due to friction and heat loss).	Higher (around 85-90%, less energy wasted).
Maintenance	Requires frequent brush replacement as they wear down over time.	Virtually maintenance-free; no brushes to replace.
Lifespan	Shorter due to mechanical wear.	Significantly longer (can be 10,000+ hours vs. 1,000-3,000 for brushed).
Power/Torque	Good for basic jobs but lower power-to-weight ratio.	Higher power density and more torque, with power output adjusted as needed.
Heat/Noise	Runs hotter and is noisier due to friction and arcing.	Runs cooler and quieter with less vibration and sparking.
Cost	Lower initial upfront cost.	Higher initial cost due to complex electronics.

Summary of Benefits

1. **Longer Battery Life:** Brushless motors are more energy-efficient, extending the run time of cordless tools by as much as 50% on the same battery charge.
2. **More Power and Speed:** By eliminating friction, more of the battery's energy is converted into rotational force, allowing for more compact tools with greater performance.
3. **Increased Durability:** The lack of wearing components (brushes) means the motors last much longer and are more reliable, especially for heavy-duty or professional use.
4. **Smarter Operation:** The electronic controllers in brushless motors can adjust power, speed, and torque based on the load, offering better control and protecting the tool from overload.

The choice between the two generally **depends on usage**: brushed motors are cost-effective for light, occasional DIY tasks, while the efficiency and longevity of brushless motors make them a better long-term investment for regular or demanding projects.

IMPORTANT NOTE - When comparing TOOL prices, make sure the 'Brand AND Model#' match up PERFECTLY. Tool brands can build multiple versions with different price points for the same type of tool. This means we must be good detectives if we want the best value for our hard earned dollars. One way to determine best value is by calculating the **AVERAGE TOOL COST (ATC)** if they are to buy tools in a **COMBO-KIT**. I have provided the ATC for the two different Options of cordless tools in the Part.1 Kit list below for our evaluation.

Mr.V's Pro Tip when deciding What Kind of Tool to Buy - "Figure out How you are going to use the Tool, then buy the Best Quality Tool you can afford...If you can, find more budget and buy the Best. Your project experience and quality of work will thank you"

Option.A - Standard Motor TOOL SET:

Best for a Home DIYer using the tool for less than 4 hours per week - Small, light, occasional DIY tasks.

- **Ryobi / PCL1200K2** - 18 Volt Combo Kit: [**\$139** as of 2.13.26]
 1. Drill/Driver,
 2. Hammer Driver,
 3. Two 1.5 Ah Batteries
 4. Charger. (set of 4)
- **ATC: \$34.75**



Option.B - Brushless Motor TOOL SET:

Best for a Home DIYer and/or Trade Pro's using the tool for 8 hours or more per week - Small & Large, lite to heavy projects - better long-term investment.

- **Makita / CX203SYB** - 18V LXT® Lithium-Ion Sub-Compact Brushless Cordless Kit: [**\$179** as of 2.13.26]
 5. Drill/Driver,
 6. Hammer Driver,
 7. Two 1.5 Ah Batteries
 8. Charger. (set of 4)
- **ATC: \$44.75** [22% more]

