



An Extended Guide · No. 1395

Sizing a Home Battery: Capacity vs Runtime

How big, how long — the
honest way to think about it

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! Read this first — this is a licensed electrician's job

A whole-home battery ties into your home's main electrical panel, and that makes the installation real electrical work — a job for a licensed electrician, done with a permit, and often with your utility's approval before it is switched on. It is not a do-it-yourself project. The happy news, and one of a battery's real advantages, is that once it is installed it runs silently and gives off no exhaust and no carbon monoxide, so unlike a generator it is safe indoors or in the garage. But the battery still stores a great deal of energy, so leave the wiring, the mounting, and any service to the pros, and follow the installer's and maker's instructions. I help you plan it and line up a trustworthy licensed electrician — I do not do the wiring myself. No honest size can be set from a page like this one — it comes from a licensed installer's load calculation, and the finished system still ties into your main panel as permitted electrical work.

How big, and how long? Let's be honest about it

'How big a battery do I need, and how long will it last?' is the most natural question in the world — and the one where you deserve honesty over a snappy number. This guide gives you the honest way to think about it, in plain English.

I'm Bill, and I run Bill's Home Tech here in Portage County, Ohio. In 30-plus years of helping folks with home gear, I've learned that a confident wrong number does more harm than a patient 'it depends.' So I won't guess a size for you — but I will make sure you understand exactly what drives it.

I don't sell batteries and earn no commission, so there's no reason for me to nudge you bigger. We'll cover three plain ideas — how much a battery stores, how much it delivers at once, and how long it lasts — and why the real number always comes from a proper load calculation.

★ There's nothing to sell you here

If you'd like help understanding a sizing quote before you spend a dollar, call or text me at (330) 200-8042. I'll talk it through honestly — free, and with no sales pitch.

The whole guide, on one page

If you remember only these things, you already understand how to think about sizing a home battery honestly.

- ❑ Three plain ideas: capacity is how much it stores, power output is how much it can deliver at once, runtime is how long it lasts.
- ❑ Runtime isn't a fixed number on a box — it depends entirely on what you're running. Light loads stretch it; heavy loads drain it fast.
- ❑ No one can responsibly name your size without a proper load calculation of your actual home and needs.
- ❑ The single most useful thing you can do is write your must-run list — it's what a good installer sizes from.
- ❑ Multiple units can be 'stacked' to add both capacity and output when one isn't enough.
- ❑ You can set a backup reserve, so some charge is always held back for an outage even if you use the battery day to day.

✓ The one-sentence version

Capacity and power output are set by the equipment; runtime is set by your loads — so the honest size comes from a load calculation, never from a number I could toss out here.

Three words worth knowing

Almost all the confusion about sizing clears up once these three plain ideas sit apart in your mind.

People blur them together, and that's where the trouble starts. Let's give each its own plain meaning, with a simple picture, and then spend a page on each one.

The idea	In plain words
Capacity	How much energy it stores
Power output	How much it delivers at once
Runtime	How long it lasts, given your loads

✓ **A reservoir, a pipe, and the weather**

Capacity is the size of a reservoir. Power output is how wide the pipe out of it is. Runtime is how long the water lasts — which depends on how fast you're drawing it. Hold that picture and the rest falls into place.

Capacity: how much it stores

Start with the one folks think of first — the size of the reservoir of energy the battery holds.

Capacity is simply how much energy a battery can hold when it's full. A bigger capacity means a larger reservoir to draw from, so, all else equal, it can keep things running longer before it needs recharging. It's the figure people most want a number for — and the one that means the least on its own.

Why the least on its own? Because a reservoir tells you nothing until you know how fast you're emptying it. A big capacity feeding heavy loads can run dry faster than a modest capacity feeding gentle ones. Capacity only becomes useful once it's paired with your actual loads.

✓ Bigger capacity isn't automatically better

Past what your loads and your goals call for, extra capacity mostly costs money and sits idle. The right capacity is the one matched to your list — not the biggest one on offer.

Power output: how much at once

This is the one folks forget, and it's often the one that actually trips a system up. Let's give it its due.

Power output is how much the battery and inverter can deliver at any single moment — how wide the pipe is, in our picture. A battery can hold a great deal of energy overall and still be unable to push out enough at once to run several big things together. Capacity and output are two different measures, and you need enough of both.

Output matters most for the big motors — a well pump, an air conditioner, sometimes a large sump pump — because they demand a sudden surge the instant they start, far above what they draw while running. If the output can't meet that surge, the appliance may not start at all, no matter how full the battery is.

✓ A full reservoir with a narrow pipe

Imagine a huge reservoir but a garden hose out of it. Plenty stored, but not enough flowing at once to do a big job. That's why output is sized right alongside capacity — never assumed.

Runtime: how long it lasts

Here's the one everyone really wants — and the one that can't honestly be a single number. Let me explain why, gently.

Runtime is how long the battery keeps your home going, and it depends entirely on what you're asking it to run. The very same battery might carry a fridge and some lights for a good long stretch, then empty far sooner if you switch on heavy loads. Runtime isn't a property of the battery alone — it's the battery meeting your loads.

That's why a runtime figure printed on a box is close to meaningless for your home. It assumes some particular load that almost certainly isn't yours. Ask instead, 'how long under my must-run list?' — a question only a load calculation can truly answer.

! Runtime is not a fixed spec

Be gently suspicious of any flat promise like 'it runs your home for a set time.' Runtime swings with your loads, the weather, and whether solar is refilling it. A single guaranteed number is a red flag, not a reassurance.

Why I won't quote you a size

This is the page where honest advice means declining to guess — and I'd rather be honest than impressive.

The right size for your battery depends on what you want to back up, how heavy those loads are, how long you'd like them to last, whether you have solar, and the particular quirks of your home's wiring. Change any one of those and the answer changes. There's simply no honest one-size number, and anyone who blurts one out is guessing.

Those questions are exactly what a proper load calculation is for. A licensed installer studies your real loads and goals and works out the capacity and output your plan needs. That's a world away from a figure pulled off a chart — and you deserve the real thing, not a hopeful estimate.

✓ What I can do instead of guessing

I'll help you build the must-run list a good load calc starts from, understand the quotes you get, and ask the right questions — so you can compare installers fairly and choose with confidence.

The most useful step: your must-run list

If you do just one thing before talking to any installer, do this. It's worth more than any number I could give you.

Write down what you'd truly want running in an outage — the real must-haves, not everything you own. That short list is precisely what a proper load calculation is built on. Bring it to every quote, and you'll get answers tied to your actual needs instead of a catalog's biggest system.

- **Keeping food:** the refrigerator, and a freezer if you depend on one.
- **Staying safe in the weather:** your furnace's controls and blower, or a way through real heat or cold.
- **Health and light:** any medical device, and enough lighting to move around without a fall.
- **Staying reachable:** the internet and a way to charge a phone and call for help.
- **Water on a well:** the pump — a heavy load, but no power means no water at all.

★ I'll help you build it

Not sure what belongs on your list? That's exactly the sort of thing I sit down and sort out with folks, in plain words and at your pace. Call (330) 200-8042 and we'll build it together.

The starting surge that catches folks out

Here's where power output and heavy motors collide — and why a battery that seems big enough sometimes isn't.

Big motors don't sip power evenly. When a well pump or an air conditioner first kicks on, it demands a brief jolt of power well above what it uses once it's running — often several times its running draw. That surge lasts only a moment, but the battery and inverter have to be able to meet it, or the motor simply won't start.

This is why a battery alone may not restart a big 240-volt well pump without enough output to swing that surge. Sometimes the fix is more output or stacked units; sometimes it's a soft-starter that eases a motor on more gently. Which one suits your home is a question for the installer, tied to your actual equipment.

! A big motor can outmatch a battery's output

Never assume a battery will start your well pump or central AC just because its stored capacity looks ample. The starting surge is a separate hurdle. Have the installer confirm the output can meet it — in writing, not as a hopeful maybe.

Two kinds of homes, two sets of needs

Sizing looks very different for a close-in home running gentle loads through short outages than for a rural home whose well pump dominates the whole calculation.

If you live in town or the suburbs

In town or the suburbs, sizing is often more forgiving. City water keeps flowing, the loads you'd want backed up tend to be gentle, and a modest system sized to a short must-run list frequently does the job.

- Gentle loads — fridge, lights, internet, furnace controls — are kind to both capacity and output, so a modest system stretches nicely.
- Shorter in-town outages mean runtime doesn't have to reach as far, which keeps the sizing sensible.
- City water takes the heaviest, surgiest load — a well pump — right out of the equation.
- Even so, the honest number still comes from a load calculation, not from a rule of thumb.

If you are out in the country on a well

Out in the country, the well pump takes over the sizing conversation. It's a heavy 240-volt load with a big starting surge, and losing it means losing water entirely — so both capacity and output have to answer to it.

- The well pump's starting surge often sets the output your system needs, and it can drain capacity quickly — squarely a job for a load calc.
- Meeting that surge may call for more output, stacked units, or a soft-starter — the installer's call, not a guess from a chart.
- Because rural outages run long and the pump is thirsty, many country homes pair a battery with a generator for endurance.
- Store drinking water regardless — when the well is down, stored water is your bridge until the pump can run again.

★ On a well? The pump drives the size

If you're on a well, that pump shapes the whole sizing conversation. Tell me about your setup and what you'd want running, and I'll help you know what to ask the installer. Call (330) 200-8042.

Stacking units to add more

When one battery isn't enough, you're not stuck. Here's the plain idea behind adding more.

Many home battery systems are built to be 'stacked' — you add more than one unit, and together they hold more energy and can deliver more at once. It's how a system grows to meet a bigger must-run list, a whole-home plan, or a hungry well pump that a single unit couldn't start.

Stacking adds both capacity and output, which is exactly why it can solve a stubborn surge problem as well as a runtime one. How many units, and whether stacking or a different approach is the right answer, is part of the load calculation. Our stacking guide goes deeper if you'd like the fuller picture.

✓ Room to grow is worth asking about

Even if you start with one unit, ask whether the system can be stacked later. A setup that leaves room to grow lets you start sensibly now and add capacity if your needs change — far easier than starting over.

Setting a backup reserve

Here's a friendly setting that quietly protects you — worth knowing about, and easy to manage.

If you use your battery day to day — storing cheaper power to use later, say — you don't want it fully drained the moment an outage strikes. A backup reserve is a portion of the charge the system always holds back, untouched by everyday use, so there's power waiting when the grid quits. You set it in the app.

How much to reserve is a gentle balance: hold back more and you're readier for a surprise outage but do less everyday shifting; hold back less and it's the other way around. There's no single right answer — it's about your outages and how you use the battery. It's also easy to adjust as you learn what suits you.

★ I'll help you set the reserve

Picking and setting a backup reserve is exactly the kind of app task I help folks with on a visit — I'll show you the one screen and set it where it suits your home. Call (330) 200-8042.

How capacity and runtime relate

This is the knot at the center of every sizing question. Untangle it and the rest is easy.

Capacity is fixed by the equipment; runtime is not. Take one battery of a given capacity and it will last very different lengths of time depending on what it's feeding. Run gentle loads and its runtime stretches; pile on heavy ones and the same battery empties far sooner. Runtime is capacity divided by how hard you're pulling.

Same battery, different day	What happens to runtime
Fridge, lights, internet	Stretches a good while
Add the furnace blower	Shortens somewhat
Add central AC or a range	Drains much faster
Sun refilling it by day	Extends, if you have solar

✓ **This is why 'it depends' is the honest answer**

The same battery is a long-lasting cushion or a quick sprint depending entirely on your loads. That's not a dodge — it's the truth, and it's exactly what a load calculation pins down for your home.

Sizing follows how much you back up

How big a battery you need can't be separated from how much of your home you're keeping alive. The two are joined at the hip.

The more of your home you want running, and the heavier the loads on your list, the more capacity and output it takes. Backing up a few gentle essential circuits calls for far less than keeping the whole home going with its big appliances. So your coverage choice largely sets your size — and your size largely sets your cost.

That's why sizing and coverage are best thought about together. If you haven't yet decided between essential-loads and whole-home backup, our whole-home vs essential-loads guide walks through that choice, and it feeds straight into the load calculation that sizes your battery.

✓ **Decide coverage, and size follows**

Settle what you want running, and the sizing conversation gets far simpler. The must-run list you build is the same list that answers both questions at once.

How solar changes the runtime math

If you have or want solar, it changes runtime in an important way. Let's be clear-eyed about how.

Without solar, a battery is a fixed reservoir: once it's drained during an outage, it can't refill until the grid returns. Runtime is simply whatever the stored charge gives you. That's a perfectly good way to own a battery — it just means the reservoir doesn't top itself up mid-outage.

Add solar, and during daylight the panels can refill the battery even while the grid is down, stretching runtime — sometimes a great deal — for as long as the sun cooperates. But it does nothing at night and less on heavy-cloud days, so solar extends runtime rather than guaranteeing it. How much depends on your panels, your weather, and your loads.

✓ Solar stretches runtime, on the sun's terms

Think of solar as a helper that refills the reservoir when the sun's out, not a promise of endless power. A qualified installer can explain what solar would realistically add for your home — no guarantees from a brochure.

Not too big, not too small

Right-sizing is a Goldilocks problem, and both ends cost you something. Here's how to think about the balance.

Undersize a battery and it disappoints — it runs down sooner than you hoped, or can't start a load you needed. Oversize it and you've spent good money on capacity and output that mostly sit idle. Neither is a disaster, but both are avoidable, and the middle is where the value lives.

The way you find that middle isn't a rule of thumb — it's the load calculation, working from your must-run list, your heavy loads, your outages, and whether solar is in the picture. That's how a good installer lands on 'enough, with a little sensible headroom,' rather than too little or too much.

✓ Aim for 'enough,' with a little headroom

The goal isn't the biggest battery or the cheapest — it's the one that covers your real needs with a modest cushion. A trustworthy installer sizes to your list, not to the top of the catalog.

A few sizing myths, cleared up

Some very common beliefs about sizing just aren't so. Let's clear the air gently.

- **'The box says it runs a home for a set time, so that's what I'll get.'** Not for your home — runtime depends on your loads, not a one-size figure on a label.
- **'Bigger is always better.'** Only up to your needs. Past that, extra capacity and output mostly cost money and sit idle.
- **'Plenty of stored energy means it'll start anything.'** No — starting a big motor is about output and surge, a separate hurdle from how much is stored.
- **'A salesperson can size it over the phone.'** A real size comes from a load calculation of your actual home, not a quick guess from a chart.

✓ When a number arrives too easily, ask how

If someone names your size before studying your loads, ask what it's based on. 'A proper load calculation' is the answer you want to hear — from them, or from me.

Questions worth asking about sizing

Whether you're talking to a salesperson or to me, these keep the sizing conversation honest.

Q: How long will this last under my actual must-run list?

Press for an answer tied to your real loads, not a best-case number off a label. It should be clear what runs, and what happens as the charge gets low.

Q: Is the output enough to start my heavy loads?

Ask specifically about the well pump or AC surge. Stored capacity isn't the same as the power to start a big motor — they should confirm the output can meet it.

Q: Can I add capacity later by stacking?

If growing later matters, ask now. A system built to stack lets you start sensibly and expand if your needs change, instead of starting over.

Q: What did you base this size on?

The answer should be a load calculation of your home and loads. If it's a rule of thumb or a phone guess, slow down — that's not a real size.

✓ There's no silly question

This touches money, comfort, and safety at once. Ask until you're sure — a good salesperson, or I, should welcome every single one.

What a good load calculation looks like

So you know it when you see it, here's the honest shape of the process that sizes your battery well.

A good installer doesn't reach for a chart. They walk your home with your must-run list, look at what each load actually draws and which big motors have a starting surge, and factor in how long you'd want things to last and whether solar will help refill the battery. Then they recommend a capacity and output — often with a little sensible headroom.

That careful study is the difference between a size you can trust and a number someone hoped was close. It takes a bit of time, and it's worth every minute. When a quote is built on it, you can compare installers fairly and buy with real confidence.

✓ A load calc is a good sign, not a delay

If an installer wants to study your home before naming a size, that's exactly what you want. The one who skips it to give you a fast number is the one to be wary of.

What I do, and what I leave to the pros

Worth saying plainly, because it's the honest shape of how I help with sizing.

- **What I help with:** building your must-run list, explaining capacity, output, and runtime in plain words, reading sizing quotes with you, and lining up a licensed installer I trust.
- **What only a licensed pro does:** the load calculation, sizing the capacity and output, and the licensed electrical work to install it under a permit.
- **What I never do:** name your size or price myself — those come from a pro who has studied your home, not from a guess, and you deserve the real thing.

★ Call before you commit to a size

The best time to reach me is while you're still comparing sizing quotes. A little plain guidance up front saves a lot of second-guessing later. Reach me at (330) 200-8042.

Common Questions

The questions I hear most from folks trying to size a home battery, answered plainly.

Q: How long will a home battery last in an outage?

It depends entirely on what you're running. The same battery lasts a good while on gentle loads and empties fast on heavy ones. There's no honest single number — a load calculation answers it for your home.

Q: What's the difference between capacity and power output?

Capacity is how much energy the battery stores overall; power output is how much it can deliver at once. You need enough of both — a big reservoir still needs a wide enough pipe to do a big job.

Q: How big a battery do I need?

I honestly can't say without a load calculation, and neither can anyone who hasn't studied your home. It depends on your must-run list, your heavy loads, your outages, and whether you have solar.

Q: Can I add more capacity later?

Often yes — many systems can be stacked, adding both capacity and output. If that matters to you, ask before you buy so the installer chooses equipment that leaves room to grow.

Q: Will a battery start my well pump?

Only if the output can meet the pump's big starting surge — a separate hurdle from how much is stored. It may take more output, stacked units, or a soft-starter. Have the installer confirm it, in writing.

Q: What is a backup reserve?

It's a portion of charge the system always holds back for outages, even if you use the battery day to day. You set it in the app, and it's easy to adjust as you learn what suits your home.

★ Still sizing it up? That's what I'm here for

Getting the size right before you spend is exactly the kind of thing I love to help with. Call or text me at (330) 200-8042 and let's talk it through, no pressure.

You don't have to do this alone

You just have to remember that a friendly, patient person is one call away.

I hope this guide made sizing a home battery honestly feel a little less daunting and a lot more doable. Keep it in a drawer with your other home papers, come back to a page whenever you need it, and don't worry about memorizing anything.

When you'd rather have a hand, that's exactly what I do. I come to your home, work at your pace, and never make you feel rushed or silly for asking. A first visit is a flat \$99, and for the parts that don't need me on-site I can often help right on your screen for \$49. Every visit comes with a 30-day, come-back-free guarantee. I don't do the licensed electrical work myself — for that I'll help you line up a trustworthy local pro.

★ Bill's Home Tech — real help, close to home

Call or text me at (330) 200-8042, or visit BillsHomeTech.com. Serving Atwater and all of Portage County. 30+ years of patient, plain-English tech help — and if you're ever not 100% happy with a visit, I'll make it right or refund it. That's a promise. — Bill

Capacity, Power, and Runtime

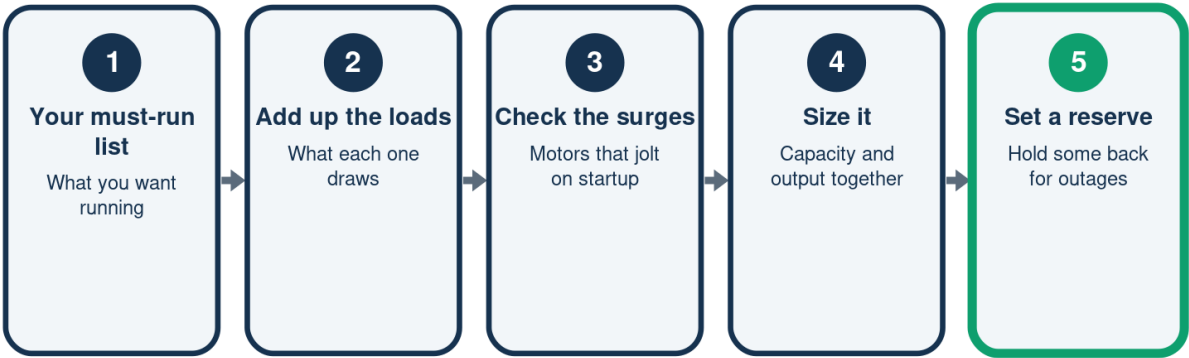
Three plain ideas, no numbers needed

	Capacity	Power output	Runtime
In plain words	Energy stored	Power at once	Time it lasts
Think of it as	Reservoir size	Pipe width	Depends on use
Mostly set by	The battery	Battery+inverter	Your loads
Honest figure?	Load calc	Load calc	Load calc

No responsible number comes from anywhere but a proper load calc.

How a Load Calc Works

The honest path from your needs to a size



A licensed installer does this — it is not a guess from a chart.

Same Battery, Different Runtime

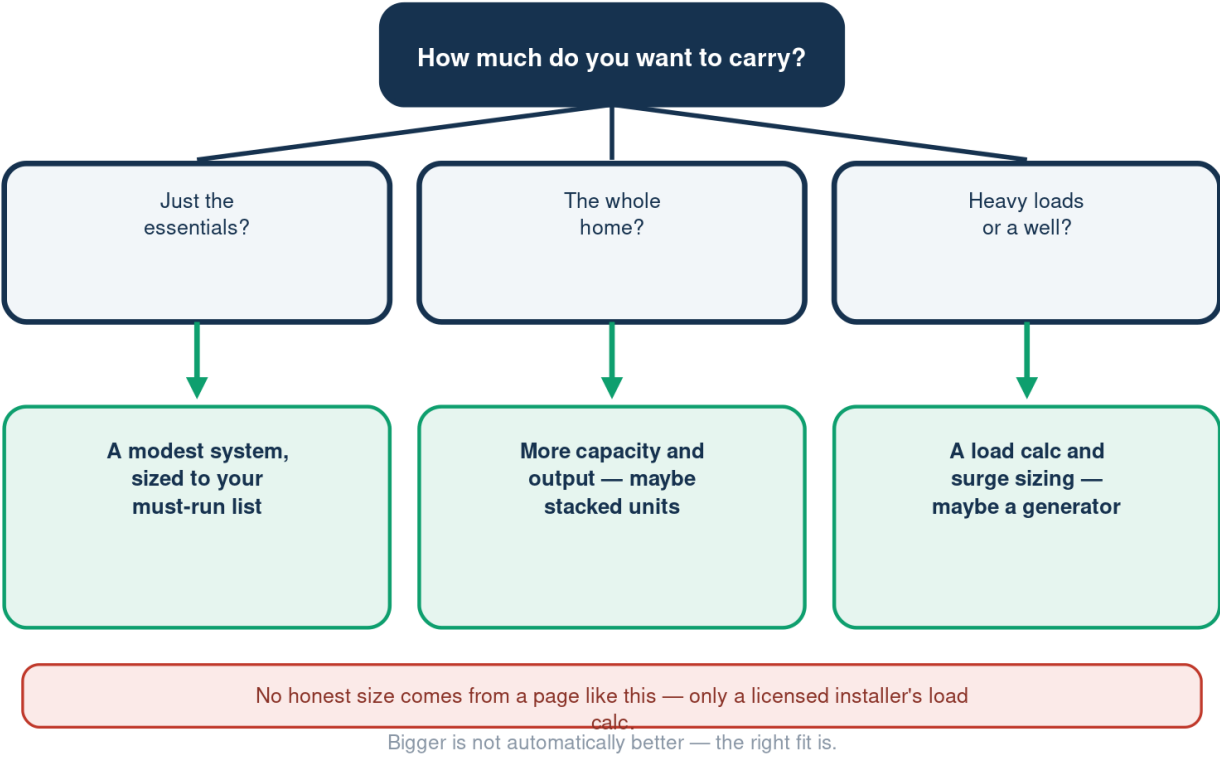
The very same battery, two very different days

	Light loads	Heavy loads
What's running	Fridge, lights, wifi	AC, range, well pump
Draw on it	Gentle	Hungry
Runtime	Stretches long	Drains fast
Recharge need	Later	Sooner

Runtime is not a fixed number — your loads set it.

How Should You Size It?

Let your loads, not a chart, set the size





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You just have to remember you can call.
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A Note From Bill

A quick note from Bill.

I write these guides to make home tech a little less frustrating, and I do my best to keep every step accurate and up to date. Still, every home, device, and setup is a bit different, so I can't promise a guide will match yours exactly or fix your particular problem. These guides are for general information only — they're not professional, legal, or financial advice, and they don't replace your device's own manual or the manufacturer's instructions. Please go slow, use your own good judgment, and use everything here at your own risk. If a step involves electrical wiring, a gas appliance, a water heater, plumbing, or climbing a ladder — or if anything just doesn't feel safe — please stop and call a licensed professional (or give me a call at 330-200-8042). Bill's Home Tech and Bill Davis can't be responsible for any damage, data loss, or injury that comes from using these guides. Thanks for reading, and stay safe out there.

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