



An Extended Guide · No. 1446

Sizing the Station and the Panels Together

Enough battery to last,
enough panel to refill it

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✓ The best news first — this one is safe indoors

Here is the best news about a solar generator, and the reason it earns a place in your home: despite the word 'generator,' it has no engine. At its heart is a big rechargeable battery in a case — a power station — and the panels simply refill it from the sun. It burns no fuel, so it gives off no exhaust and no carbon monoxide — the invisible, deadly gas that makes a gas generator a strictly outdoors-only machine. That means the power station part is safe to use right inside your home, in any room, with the windows closed — beside your chair, on the nightstand, next to a medical device. (The panels sit outside in the sun; the station stays indoors where it is dry.) A few simple habits keep it that way: charge it with the gear it came with, give it a little air while it works (don't bury it under a blanket or shut it in a tight cabinet), keep it away from water and from baking heat, and never use one that is cracked, soaked, or swollen. And here is a comfort worth keeping in mind as we size one: because it runs safely indoors, you are sizing it for the quiet essentials you keep beside you — not for a whole house of heavy machines.

Let's size it to your home, not to a number on a box

Picking the right size sounds like it should involve a lot of math. It doesn't. This guide walks you through it the plain way — starting with what you actually want to keep running, and working out from there, with no numbers to memorize.

I'm Bill, and I run Bill's Home Tech here in Portage County, Ohio. In 30-plus years of helping folks with the gear in their homes, I've watched a lot of people either overbuy a giant unit they never draw on or grab a little one that leaves them short. Both mistakes come from starting with a number instead of starting with their own list. We'll do it the other way around.

There are really just two things to size, and they work as a pair: the station — the battery part — and the panels that refill it. Match those two to each other and to your home, and you'll have exactly what you need without paying for what you don't. Let's take it one calm step at a time.

★ Nothing to sell you

I don't sell solar generators or panels and I earn no commission, so there's no reason for me to talk you into a bigger one than you need. If you'd like a second set of eyes before you spend a dollar, call or text me at (330) 200-8042 — the conversation's free.

The whole guide, on one page

If you remember only these things, you already know how to size a solar generator without overbuying or coming up short.

- ❑ Start with a list, not a number: walk the house and write down what you truly want running in an outage.
- ❑ Size two things together — the station (how much it runs and for how long) and the panels (how fast they refill it).
- ❑ Leave headroom for start-up: motors like a fridge briefly pull several times their running power just to get going.
- ❑ Match the panels to the station's solar input; too little means slow refills, and too much voltage can damage it.
- ❑ Aim at your list plus a sensible cushion — a battery far bigger than you need only costs more and weighs more.
- ❑ Know the hard edge: a 240-volt well pump or central air is beyond any portable unit; that stays a gas generator's job.

✓ One line to hold onto

Size the battery to your must-run list plus a cushion, size the panels to refill that battery in the sun you actually get, and make sure the panels fit the station's input.

Start with your list, not with a number

The single best thing you can do before you shop is the one thing most people skip: decide what you actually need to keep running.

Take a slow walk through your home and picture the power being out. What would you truly want still working? For most folks it's a short, sensible list — a lamp or two, the phones, the internet box, maybe a medical device, and a way to keep the fridge cold in turns. Write it on a piece of paper. That list, not any number on a box, is what decides your size.

Be honest with yourself about wants versus needs. It's tempting to add everything, but each thing you add asks for a bigger, heavier, costlier unit. The essentials that keep you safe, warm, fed, and connected are what matter most; the nice-to-haves can wait for the power to come back on.

★ Send me your list

That little must-run list really is the whole ballgame. Jot down what you'd want running, snap a photo, and text it to me at (330) 200-8042. I'll help you turn it into a rough size to shop for — no guessing, no overbuying.

The two things you're sizing

A solar generator is a team of two parts, and each one has its own job to size. Keep them straight and the whole thing gets simple.

The station — how much, and how long

The station is the battery in the box. It has two numbers worth knowing: its watts, which decide how much you can run at the same time, and its watt-hours, which decide how long it lasts before it needs a refill. Your list tells you both — how much runs at once, and how long you need it to hold out.

The panels — how fast it refills

The panels are the sun-catchers. Their job is to pour power back into the station during the day. Size them so they can refill the battery in the sun you actually get — enough that a long outage doesn't slowly drain you dry. We keep the deep dive in our watts-and-watt-hours guide; here we just need the plain idea.

✓ Battery for the load, panels for the refill

Think of it this way: the station is sized to what you run and for how long; the panels are sized to put that power back. Two jobs, sized as a pair.

Sizing the station: the two numbers

You'll see two kinds of numbers on any station. You don't need the math — just the plain idea behind each one, and how your list points to them.

Watts — how much at once

Watts are about the moment. Add up what you'd have running at the same time — a couple of lamps, the phones charging, the internet box, a medical device — and you want a station whose watts comfortably cover that total, with room to spare. Try to draw more than its watts and it simply won't run that much at once.

Watt-hours — how long it lasts

Watt-hours are about time — how long the battery keeps those things going before it needs a refill. A bigger number lasts longer. The gentler your draw and the shorter your outage, the less you need; a long outage on a quiet load asks for more.

✓ Watts for 'at once,' watt-hours for 'how long'

Picture a water tank: watts are how fast it can pour, watt-hours are how much water is in the tank. Our watts-and-watt-hours guide walks through both in plain English — come here for sizing, go there for the depth.

Reading an appliance nameplate

To build your list, it helps to know how much each thing draws — and the answer is usually hiding in plain sight on the item itself.

Most appliances have a little label or a stamped plate, often on the back or the bottom, that tells you what they draw. Sometimes it's given straight as watts. When it isn't, you'll usually see volts and amps instead — and as a rough rule, watts are about volts times amps. That's the whole trick; you're just reading what the maker already printed.

Jot the watts next to each item on your must-run list. Add up the ones you'd run at the same time, and that running total is what your station's watts need to cover — plus the surge headroom, coming up next, for anything with a motor. You don't have to be precise to the last watt; a sensible total with a cushion is plenty.

✓ The number's already on the label

You rarely have to guess. Check the plate on the back or the bottom, note the watts (or the volts times amps), and let your own list do the sizing for you.

Leave room for the start-up surge

Here's one wrinkle that trips people up, explained simply — and it's the reason you want a little extra watt headroom.

Anything with a motor — a fridge, a fan, a furnace blower, a pump — needs a big gulp of power for the first instant it kicks on, several times what it uses once it's running. That brief spike is called the surge, or the start-up draw. It lasts only a moment, but the station has to be able to deliver it or it will trip.

So when your list includes anything with a motor, don't size right up to the edge of the station's watts. Leave a good bit of headroom above your running total, so a surge doesn't overwhelm the unit and shut it down. Things that just make heat or light — lamps, a phone charger, a heating pad — don't surge like that; it's the motors to watch.

! Motors ask for a jolt to start

If you plan to run a fridge or anything with a motor, pick a station with watts well above your everyday total. A unit sized too tightly may handle the running load just fine yet trip the instant the motor kicks on.

Sizing the panels to refill it

Once you know the battery you need, the panels have a clear job: put back what you take out, in the sunlight you actually get.

The rough idea is simple. Over a day, you draw a certain amount out of the battery. The panels need to be able to pour a similar amount back in during the sunny hours, or you'll slowly fall behind day after day. More panel refills faster; too little leaves the battery creeping downward on a long outage.

But real panels give less than the number printed on them — sun angle, clouds, heat, and shade all take a bite — so plan for a good bit less than the label promises, and lean toward a little more panel rather than a little less. Where you aim and place them matters a great deal too; our panel-setup guide covers angle and placement, so I won't repeat it here.

✓ Refill what you spend

Aim for enough panel to put back roughly what you use in a day, in the sun your spot really gets. On a long outage, that's the difference between keeping up and slowly running down.

Match the panels to the station's input

This is the one part of sizing where a mistake can cost you the whole unit, so it's worth a careful minute.

Every station has a solar input — the port the panels plug into — and that input is built to accept only up to a certain voltage, and only so much power. Too little panel just means slow refills, which is merely disappointing. Too much voltage into that input, though, can damage the station outright.

The safe path is easy: use the panels the maker offers for that station, or check that any panels you're eyeing stay within the input's limits before you buy. The figures you need are printed right on the station and the panels. If matching them up makes your head swim, that's exactly the kind of thing to hand to me before you spend anything.

! Never feed the input more voltage than it accepts

A station's solar input takes only up to a set voltage. Panels wired for more can ruin the unit in an instant. Stay within the printed limits — when in doubt, use the maker's own panels or check compatibility first. This is the one sizing mistake that can cost you the whole machine.

Two kinds of homes, two sets of needs

How much to buy depends a great deal on where you live and how long your power tends to stay out. A short town outage and a long country one ask for very different sizes.

If you live in town or the suburbs

In town, in the suburbs, or in an apartment, outages tend to be short and the power is usually back within hours. Your water keeps flowing from the city main no matter what, so you're really just keeping food, light, and connection going — which means you can size modestly and still be well covered.

- A modest station easily carries phones, the internet, a lamp, and a medical device through a typical short outage.
- You may need little or no panel — a wall charge before the storm often holds you over just fine.
- Being indoor-safe and quiet matters more here than raw size does.
- If you want panels at all, a small one to stretch the rare long outage is usually plenty.

If you are out in the country on a well

Out in the country, outages run longer and the stakes are higher, because when the power quits your well pump quits too. That points you toward more battery and more panel — and toward one honest limit.

- A longer outage means more watt-hours, so the battery lasts across days, not just hours.
- It also means more panel, so the sun can refill the battery day after day while the grid stays down.
- Size for the quiet indoor essentials — lights, phones, the internet, a medical device — across the long haul.
- Be honest about the well pump: a 240-volt pump stays a gas generator's job, no matter how big the portable unit.

★ Not sure how big to go?

Tell me your setup — city water or a well, and how long your outages usually run — and I'll help you land on a size that fits without overbuying. Call (330) 200-8042.

Right-sizing: enough, but not too much

There's a real cost to guessing wrong in either direction, so let's aim for the comfortable middle.

Buy too small and you'll be rationing power or watching the battery die before the lights come back — the very thing you bought it to avoid. That's the worse mistake of the two, and it's why a sensible cushion matters.

But bigger isn't automatically better. A station far larger than your list is heavier to lift and move, costs a good deal more, and gives you nothing extra if you never draw on all that capacity. The sweet spot is your must-run list, plus enough cushion to cover a surge and a longer-than-usual outage — and then you stop.

✓ Aim at your list, then add a cushion

Size to what you'll really run, add a little headroom for surges and long nights, and resist the urge to go bigger 'just in case.' The right size is the one that fits your list, not the biggest one on the shelf.

How the length of your outage changes it

The same list needs a bigger setup if the power stays out for days instead of hours. Time is a big part of sizing.

For a short outage — the kind most towns see — a modest battery carries your essentials through, and you may not even unfold a panel. You're just bridging a few hours until the grid comes back.

For a long outage — more common out in the country — two things grow. You need more watt-hours, so the battery holds out across days, and you need more panel, so the sun can refill it each day while the grid stays down. Without the panels, even a big battery eventually runs flat on a multi-day outage; with them, the sun keeps topping you back up.

✓ Short outage, less; long outage, both

A short outage leans on the battery alone. A long one leans on battery and panel together — the battery to last, the panel to refill it day after day.

How your own sunlight changes the panel size

Two homes with the very same battery can need different amounts of panel, simply because one gets more sun than the other.

A bright, open yard with hours of direct midday sun refills a station quickly, so you may need less panel. A shady lot, a spot hemmed in by trees or buildings, or the short, weak days of winter all mean the panels gather less — so you need more panel to put back the same power, or you lean harder on the wall charge.

So when you size the panels, size them for the sun you honestly get where you live, not for a perfect day in a brochure. If your spot is shady, or you're planning for winter outages, count on more panel than a sunny summer yard would need. How you angle and place the panels matters a great deal too, and our panel-setup guide covers that side of it.

✓ Less sun means more panel

The shadier your spot and the shorter your days, the more panel it takes to keep up — or the more you'll lean on a wall charge. Size for your real sunlight, not a best case.

When to add an expansion battery instead

You don't always have to buy a bigger unit to get more time. Many stations can grow, and that changes how you size from the start.

Some stations accept an add-on battery that plugs in to hold more power — more watt-hours — without changing how much you can run at once. That's handy in two ways. You can start with a size that fits today and add a battery later if your needs grow, or you can keep a single unit light enough to carry while still having the option of more runtime when you want it.

So if you're torn between two sizes, it's worth checking whether the smaller one can take an expansion battery down the road. That can be the smarter, lighter, and cheaper path than buying the biggest unit up front. Our expandability guide goes through which setups can grow and how, so you can plan ahead.

✓ Grow it later instead of overbuying now

If a station can take an add-on battery, you can buy for today and expand when life asks for more — often a wiser move than paying for capacity you may never use. See the expandability guide for the details.

When the job needs a gas generator instead

Sizing includes knowing what no portable unit can do, however large you buy. Here's the honest edge.

A portable solar generator is built for the essentials, not for the heaviest loads in a house. A 240-volt well pump, central air conditioning, an electric water heater, or an electric range asks for far more power than a portable battery can deliver — and no amount of extra panel or a bigger battery changes that. These run on 240-volt circuits, not the ordinary household outlets a portable unit provides.

For a well pump especially, that stays a gas generator's job. Plenty of country homes keep both: a gas generator for the pump and the heavy work, and a quiet solar generator sized for the indoor essentials — lights, phones, the internet, a medical device — especially overnight, when running a gas unit is least pleasant.

! Don't size a portable unit for a well pump

No portable solar generator, at any size, will run a 240-volt well pump or central air. If your plan must include those, size a gas generator for them and let the solar unit handle the quiet indoor essentials.

A simple sizing method, start to finish

Here's the whole process in order. Follow these steps and you'll arrive at the right size without a single formula.

- ❑ Walk the house and write your must-run list — what you truly want going in an outage.
- ❑ Note each item's watts from its label (or its volts times amps), and add up what runs at the same time.
- ❑ Pick a station whose watts clear that total, with headroom for any motor's start-up surge.
- ❑ Choose enough watt-hours for how long your outages run — more for a long rural one, less for a short town one.
- ❑ Match the panels to the station's solar input, and size them to refill it in the sun you really get.
- ❑ Ask whether an add-on battery later beats buying the biggest unit now — and leave the 240-volt loads to a gas generator.

★ Want me to check your math?

Do the walk-through, jot your list, and send it my way at (330) 200-8042. I'll sanity-check the size before you buy, so you don't come up short or pay for more than you'll ever use.

Common sizing mistakes

A handful of avoidable slip-ups account for most sizing regrets. Now you'll see them coming.

- **Starting with a number.** Picking a size off a shelf before you know your list leads to overbuying or coming up short.
- **Forgetting the surge.** Sizing right to the edge, then having the station trip the moment the fridge motor kicks on.
- **Too little panel.** A big battery with a small panel refills slowly and falls behind on a long outage.
- **Too much voltage.** Panels beyond the input's limit can damage the station — the costliest mistake of all.
- **Buying the biggest 'just in case.'** Paying for, and lugging around, capacity you'll never actually draw on.

! The one that costs real money

Feeding the solar input more voltage than it accepts can ruin the station. Match the panels to the input, or use the maker's own — that single check protects the whole investment.

Questions worth asking before you buy

Whether you're talking to a salesperson or to me, these plain questions get you to the right size for your home.

Q: What do I actually need to keep running at once?

Start here, always. Your running total — the things going at the same time — sets the watts you need, and a motor in the mix means you'll want extra headroom on top of that.

Q: How long do my outages usually last?

That sets the watt-hours. A few hours in town asks for far less than days in the country. Size the battery to your longest realistic outage, not your average one.

Q: Do these panels fit this station's input?

The panels must stay within the station's solar input limits. Too much voltage can damage it, so use the maker's panels or check compatibility before you buy.

Q: Can I add a battery later if I need more?

If a station takes an add-on battery, you can start smaller and grow later — often smarter than buying the biggest one now. It's well worth asking before you choose.

✓ There's no silly question

If a salesperson makes you feel rushed or foolish for asking, that's a reason to walk away, not to buy. A plain question deserves a plain, respectful answer.

A simple sizing checklist

Keep this handy as you shop. Check each box and you'll avoid the usual sizing mix-ups.

- ☐ I've written my must-run list and noted roughly what each item draws.
- ☐ I've added up what runs at once, with headroom for any motor's start-up surge.
- ☐ I've picked watt-hours to match how long my outages really last.
- ☐ The panels I'm looking at fit the station's solar input and its voltage limit.
- ☐ I've sized the panels for the sun my spot actually gets.
- ☐ I've thought about an add-on battery, and left 240-volt loads to a gas generator.

★ One last look before you spend

Send me your finished list and the unit you're considering at (330) 200-8042, and I'll give it a friendly once-over. Better to check now than to wish you'd sized it differently later.

Where to go from here

Now that you can size the pair with confidence, the rest of this series fills in each piece, one calm topic at a time.

If the two numbers still feel fuzzy, our watts-and-watt-hours guide slows them right down. When you're ready to shop, the choosing-a-kit guide helps you pick a good one, and the expandability guide shows which stations can grow later. For the solar side, the sun-and-weather guide sets honest expectations, and the panel-setup guide covers aiming and placement.

There's no need to read them all at once, or in order. Pick the question that's on your mind today, and come back to the others when you need them. Every one is written the same plain way, with nothing to memorize.

✓ One question at a time

You don't have to become an expert to size this well. Get your list right, match the panels to the input, and lean on the guides — or on me — for the rest whenever you're ready.

Common Questions

The sizing questions I hear most from folks getting ready to buy, answered plainly.

Q: How do I know what size I need?

Start with a list of what you'd run in an outage, not with a number on a box. Add up what runs at once for the watts, and think about how long your outages last for the watt-hours. That list does the sizing for you.

Q: Why do I need extra watts if my things don't use that much?

Because motors — a fridge, a fan, a pump — gulp several times their running power for the instant they start. That surge is brief, but the station has to handle it, so you leave headroom above your everyday total.

Q: How much panel should I get?

Enough to put back roughly what you use in a day, in the sun your spot really gets, without going past the station's input limit. A shady lot or a long outage calls for more; a short town outage may need little or none.

Q: Is a bigger unit always better?

No. A station far bigger than your list just costs more and weighs more for no benefit. Aim at your must-run list plus a sensible cushion, and stop there — or pick one that can take an add-on battery later.

Q: Can I size one big enough to run my well pump?

No — a 240-volt well pump is beyond any portable unit, no matter how large. That stays a gas generator's job. Many rural homes keep both: gas for the pump, solar for the quiet indoor essentials.

★ Still have a question?

That's what I'm here for, and there's never a silly one. Call or text me at (330) 200-8042 and I'll give you a straight, friendly answer.

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 solar generator 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 licensed electrical work myself — for anything that needs to be wired into your home, 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

Two Things to Size

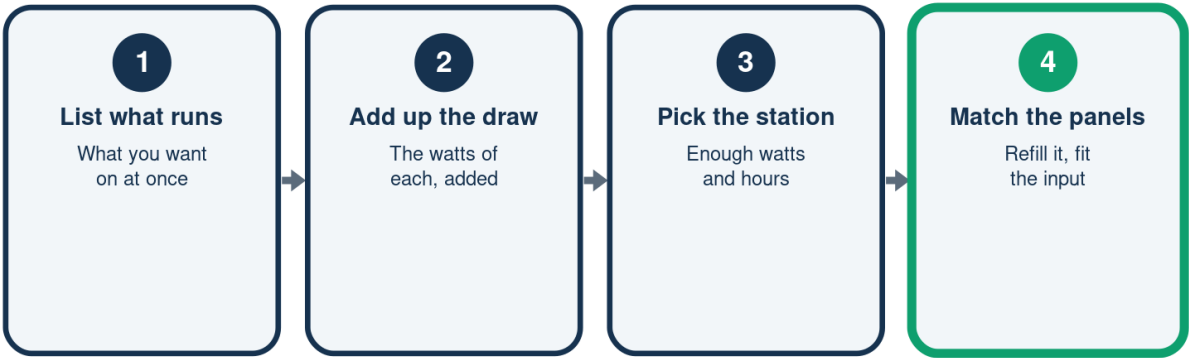
The battery, and the panels that refill it

	The station	The panels
What it decides	Run and runtime	Refill speed
Too small means	You run short	Slow refills
Too big means	Heavy and costly	Wasted or risky
Match it to	Your must-runs	The solar input

Size the battery to your list; size the panels to refill it.

Sizing in Four Steps

From your list to the right kit



Your list decides everything that follows.

Roughly How Much You Need

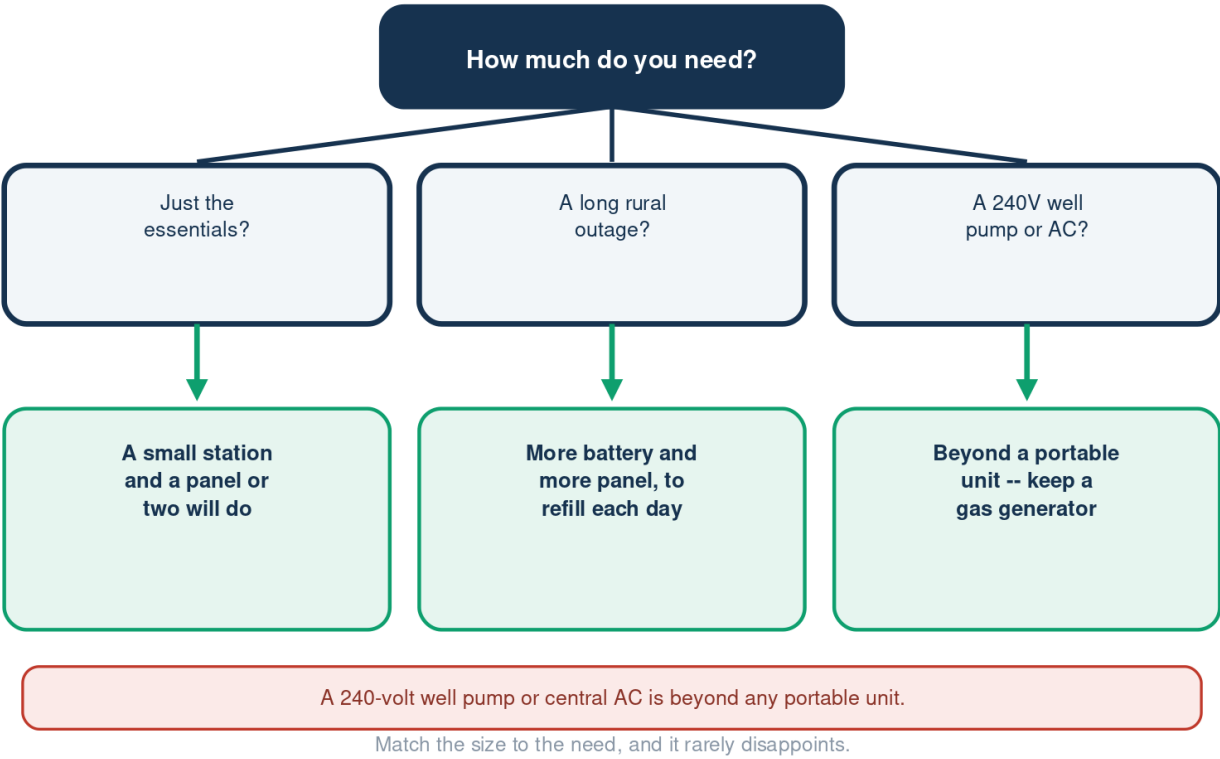
Bigger needs take more -- to a point

	What you cover	Roughly what it takes
Just essentials	Phones, a lamp	A small station
Add some comfort	Fridge in turns	A midsize station
A long outage	Essentials, days	More of both
A 240V well pump	Water from a well	A gas generator

A portable unit shines up to a point; a well pump needs gas.

How Big Should It Be?

Let your needs point to a size





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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.

— *Bill*



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