



An Extended Guide · No. 1697

The Startup Surge, and How Soft Starters Help

Why the pump starts hard
— and how to soften it

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! Read this first — carbon monoxide is the real danger

A running generator's exhaust contains carbon monoxide — an invisible, odorless gas that can kill in minutes. Never run a generator indoors, in a garage, in a shed, or on a porch, not even with the door open and a fan going. Run it outside only, well away from the house — the safety agencies say at least 20 feet — with the exhaust pointed away from every window, door, and vent. Put battery-backup carbon-monoxide alarms on each floor and outside the bedrooms. If an alarm sounds, or anyone feels dizzy, sick, or sleepy, get everyone into fresh air first and ask questions later. Most folks reading this are trying to start a well pump on a generator — and the instant a generator is running, its exhaust is the danger that comes before the pump, the surge, or anything else on these pages.

The hardest moment is the very first second

A well pump doesn't ease into its work — it slams on. For a second or two at startup it asks for far more power than it needs the rest of the time, and that brief demand often decides whether your backup can run it at all. This guide is about that surge, and about a real tool that can soften it: a soft starter.

I'm Bill, and I run Bill's Home Tech here in Portage County, Ohio. Out on a well, the most common sticking point I hear is 'my generator seems big enough, so why won't it start the pump?' Nine times out of ten the answer is that first-second surge — and once you understand it, the rest of backing up a well starts to make sense.

We'll go slow. First, why any motor surges, and why a well pump surges especially hard. Then what happens when your power source can't keep up. Then the soft starter — what it is, how it helps, and, just as importantly, what it can't do. I'll point you to our other guides for the math and the wiring, and keep this one on the surge itself.

★ Bring me your questions about the surge

If your generator won't start your pump, or you're wondering whether a soft starter would help, that's a great thing to talk through before you spend a dime. Call or text me at (330) 200-8042 and we'll think it through together.

The whole idea, in under a minute

If you remember only these things, you already understand what most people get wrong about running a well pump on backup power.

- ❑ Every electric motor needs a brief jolt of extra power to start — far more than it uses once it's running.
- ❑ A well pump surges especially hard, often around three times its running power, for just a second or two.
- ❑ If your power source can't deliver that surge, the motor may hum, strain, heat up, or refuse to start.
- ❑ Repeated failed starts are the real danger — over time they can damage the pump motor you rely on.
- ❑ A soft starter is a real device that ramps the motor up gently instead of all at once, cutting the surge a lot.
- ❑ That can be enough to let a smaller generator or power station start a pump it otherwise couldn't.
- ❑ It is not a cure-all: it lowers the surge, not the running load, and it must be matched to your pump and installed by a licensed pro.

✓ Where the real numbers live

This page is the concept. For the actual sizing math — adding your running load, the pump's surge, and a safe cushion — see our sizing guide, which walks through it step by step.

Running power and starting power are two different numbers

Before we talk about softening the surge, it helps to be crystal clear on what the surge even is. Every motor has two power numbers, not one.

The first is its running power — the steady amount it draws once it's up and spinning, doing its everyday job. The second is its starting power — the much bigger gulp it needs for the first instant, to get from a dead stop up to speed. For a well pump, that starting number is often around three times the running number, though only for a second or two before it settles.

Your backup source has to cover that higher starting number, not just the running one. A generator or battery that looks big enough on paper for the running load can still fail at the surge. That gap is the whole reason this guide — and soft starters — exist.

✓ The math has its own guide

I'm keeping the numbers general here on purpose. When you're ready to actually add up your running load, your pump's surge, and a safe cushion, our sizing guide is the place to do it.

Why a well pump surges harder than most

All motors surge to start. A well pump surges more than most, and there's a plain physical reason for it.

Picture what the pump is asked to do the instant it switches on. It has to start lifting a tall column of water — from deep in the ground all the way up to your house — and push it against the pressure already sitting in your tank and pipes. That standing water has real weight, and it isn't moving yet. Getting it moving from a dead stop takes a hard, sudden shove.

Once the water is flowing and the motor is up to speed, the job gets much easier and the draw settles down. But that first shove — overcoming the weight and the pressure all at once — is why the pump's starting surge is usually the single biggest number on a rural backup list.

★ This is the number that decides everything

When someone tells me their generator won't start the pump, I don't start with the generator — I start with this surge. It's almost always the piece that's been underestimated.

What happens when the power can't keep up

Asking a pump for a surge your generator or battery can't deliver isn't a harmless mismatch. It's hard on the motor.

When the surge falls short, the pump can't get up to speed cleanly. You might hear it hum or groan instead of starting. The motor strains against a load it can't overcome, and straining pulls even more current, which makes it heat up. Sometimes it simply refuses to start at all. None of that is the pump 'trying its best' — it's a motor being stressed.

- **Humming or buzzing** instead of a clean start — the motor is stuck between off and running.
- **Heat and strain** as it pulls hard against a load it can't move — wear it was never built for.
- **Refusing to start**, or tripping a breaker, when the surge simply isn't there.
- **Repeated failed starts**, the real danger — each one stresses the motor, and over time that can damage the pump.

! Don't keep trying to force it

If your pump hums, strains, or won't start on your backup power, stop — don't stand there flipping it on and off hoping it catches. Repeated failed starts can cook the motor. It's a sign the power source or the surge is the problem, and that's what needs fixing.

Enter the soft starter

So far this has all been a problem. Here's a tool that can help with it: the soft starter.

A soft starter is a small electronic device that wires into the pump's circuit and changes how the motor starts. Instead of hitting the motor with full power all at once — the hard slam that causes the big surge — it feeds the power in gradually over a second or two, easing the motor up to speed.

Think of it like the difference between flooring the gas pedal from a dead stop and easing into it smoothly. You reach the same speed either way, but the gentle way asks a lot less of everything at the start. That gentler start is what shrinks the surge your backup has to cover.

✓ It's a real, established tool

Soft starters aren't a gimmick or a workaround. They're a well-understood piece of equipment that pump and electrical pros install all the time. The trick is knowing what they do and don't do — which is the rest of this guide.

How a soft starter helps your backup

Here's why any of this matters for a generator or a power station: a smaller surge is easier to supply.

Remember that your backup source has to cover the pump's starting surge, and that surge is usually the biggest number in the whole plan. If a soft starter cuts that surge down substantially, the peak your generator or power station has to hit comes down right along with it.

In practical terms, that can mean a generator that couldn't quite start your pump before now can — or that a somewhat smaller, lighter, quieter unit becomes enough. It can even open the door to a power station or battery starting certain pumps that would otherwise be out of reach. It doesn't make the pump need less power to run; it makes the pump easier to start.

★ This is where it earns its keep

The soft starter's whole value, for backup, is shrinking that one big surge number. If the surge is what's standing between you and starting your pump, this is the tool worth asking a pro about.

The honest limits — what it doesn't do

A soft starter is genuinely useful, which is exactly why it's worth being honest about its limits. It is not magic.

The most important thing to understand: a soft starter lowers the starting surge, but it does nothing about the pump's steady running load. Once the pump is up and running, it draws what it draws. So if your power source is too small to even run the pump steadily — not just start it — a soft starter won't fix that.

- **It shrinks the surge, not the running load.** The pump still needs its full running power every second it's on.
- **It has to be matched to your pump.** A soft starter is chosen for a specific motor — the wrong one helps little or causes new trouble.
- **It won't rescue a truly undersized source.** If the gap between your generator and your pump is large, a soft starter can't bridge it alone.

! A small nudge, not a rescue

If your generator is close to starting your pump, a soft starter may be exactly the nudge that gets you there. If it's badly undersized, the honest answer is a bigger power source, not a soft starter.

Who installs one, and where it goes

A soft starter isn't something you buy off a shelf and plug in yourself. It's wired into your pump's electrical controls, and that's licensed-pro work.

The device is installed into the pump's control circuit — the wiring and box that tell the pump when to run — usually near the pressure tank or the pump's controls. That's 240-volt territory, tied straight into your home's electrical system, so it's a job for a licensed electrician or your well and pump professional, not a weekend project.

Just as important, the right soft starter has to be matched to your particular pump before anyone installs anything. A good pro confirms your pump is a suitable candidate, picks the correct device for it, and sets it up properly. Skipping that step is how people end up with a part that doesn't help or, worse, causes new problems.

! This is not a self-install

Please don't try to wire a soft starter into your pump yourself. It lives in the same 240-volt controls that run the pump, and getting it wrong is both dangerous and hard on the equipment. I help you decide whether it's worth doing; a licensed pro does the wiring.

Two kinds of homes, two sets of needs

The surge is a fact of life for any electric motor — but whether a well pump's surge matters to you depends entirely on where your water comes from.

If you live in town or the suburbs

If you're on city water, you don't have a well pump to start, so the biggest, hardest surge on a rural backup list simply isn't on yours. The idea of a starting surge still applies to other motors you might run — a furnace blower, a fridge, an air conditioner — but none of those asks for anything like a well pump's first-second demand.

- You still have surges to think about — a furnace blower or air conditioner starts hard too — just nothing on a well pump's scale.
- A soft starter is occasionally used on a big central air conditioner, but that's a different conversation from well-pump backup.
- For most in-town homes, sizing around the fridge, furnace, and lights is enough — see our sizing guide.
- Not sure whether you're on city water or a private well? A water bill or a neighbor can tell you quickly.

If you are out in the country on a well

Out on a well, the pump's starting surge is very likely the single biggest number in your whole backup plan — the one that decides how large a generator you need. That's exactly the situation where softening the surge can change the answer, letting a smaller or more affordable setup do the job.

- The well pump's surge usually sets the size class of generator you have to shop for.
- If a soft starter shrinks that surge, it can shrink the generator you need right along with it.
- It never removes the pump's running load, so there's still a floor your power source has to clear — our sizing guide shows how to find it.
- Whether a soft starter is worth it depends on how close your current or planned power source already is.

★ On a well and staring at the surge?

This is one of my favorite rural puzzles to help with — figuring out whether a soft starter, a bigger generator, or a bit of both is the smart move for your pump. Call or text me at (330) 200-8042 and let's work it out.

Soft starter, or just a bigger generator?

There are two honest ways to beat a pump's surge: lower the surge, or bring more power. Both are valid, and they have different trade-offs.

The bigger-generator path solves the surge by brute force — you get a unit with enough headroom to cover the pump's full first-second demand. It's simple, it's proven, and it needs no changes to your pump. The downsides are that a bigger generator costs more, weighs more, takes more room, and often burns more fuel.

The soft-starter path solves the surge at the pump instead — you shrink the demand so a smaller generator can meet it. The upside is a lighter, quieter, often cheaper generator might do. The downsides are the added device, the pro install, and the fact that it must be matched to your pump and only helps if the gap is small enough to bridge.

✓ Sometimes the answer is a little of both

There's no single right answer. For some homes a slightly bigger generator is simplest; for others a soft starter is the cheaper path; for a few, a modest generator plus a soft starter together is the sweet spot. It depends on your pump and your budget.

A soft starter is not the same as a variable-speed pump

This one trips people up, so let's be clear: if you already have a newer variable-speed pump, you may not need a soft starter at all.

Some modern wells use a constant-pressure, variable-speed pump. These have a built-in drive — often called a VFD — that already starts the motor gently and ramps it up smoothly. In other words, the gentle start a soft starter adds is something a variable-speed pump does on its own, right out of the box. Bolting a soft starter onto one wouldn't make sense.

A soft starter is the tool for a conventional, single-speed pump — the common kind that slams on at full power. It's an add-on that gives an ordinary pump some of that gentle-start behavior. If you're not sure which kind you have, or you're weighing a variable-speed system, our variable-speed pump guide covers that side in full.

✓ Different tools for different pumps

Short version: a variable-speed pump already ramps itself up. A soft starter is how you add a gentle start to an ordinary pump that doesn't. You wouldn't use both, and knowing which pump you have tells you which path applies.

Can a soft starter let a battery or power station run my pump?

It's a fair question, and the honest answer is: sometimes, for some pumps — but never just assume it.

Power stations and batteries have a harder time with a pump's surge than generators do, and many can't start a well pump at all — especially the larger 240-volt kind. By trimming the surge, a soft starter can sometimes bring a pump within reach of a capable battery, most realistically a smaller or 120-volt shallow-well pump rather than a big deep-well one.

But 'sometimes' is doing real work in that sentence. It depends on the pump, the battery's own surge ability, and how the two are matched. This is a verify-before-you-buy situation, never a promise. Our power station and battery guide goes into the honest limits in detail — read it alongside this one before counting on a battery for your water.

! Never assume — always verify

Please don't buy a power station expecting it to run your pump just because you've added a soft starter. Confirm the specific combination with the pump pro and the equipment maker first. Water is too important to gamble on a maybe.

After it's installed, test it on a calm day

Once a soft starter is in, don't wait for an outage to find out whether it did the job. Try it on an ordinary afternoon.

With the pro's guidance, run your pump on your backup power and pay attention to that first second or two. What you want is a smooth, gentle spin-up — the motor easing up to speed rather than the old hard slam, hum, or strain. Then let it run a full cycle and check that water flows normally at a faucet. A good soft-start install sounds noticeably calmer at startup.

This is really just part of testing your whole backup setup, which is worth doing periodically regardless. Our testing guide walks through a calm, start-to-finish trial run. The first time your pump ever starts on generator power with a new soft starter should be a test you chose — not the night the storm hits.

★ I'm glad to be there for that first run

If you'd like a second set of ears for that first test — to help you tell a healthy, gentle start from one that still sounds like it's straining — call or text me at (330) 200-8042 and we'll run through it together.

What a soft starter won't fix

A soft starter solves exactly one problem — a too-large starting surge. If your trouble is something else, it's the wrong tool.

- **A truly undersized generator.** If your power source can't even run the pump steadily, softening the surge won't save it — you need more power.
- **A failing or worn-out pump.** If the pump itself is on its way out, a soft starter won't revive it. That's a job for your well and pump professional.
- **A bad or unsafe hookup.** A soft starter is not a substitute for a proper transfer switch or interlock — how you connect the generator to the house is a separate, licensed-electrician question.
- **Rough or 'dirty' power.** If the worry is protecting sensitive controls from a rough generator, that's a different set of steps — a soft starter isn't a surge protector.

! Match the tool to the actual problem

The wrong fix wastes money and leaves the real problem in place. If you're not certain the surge is what's stopping you, get the pump's numbers and a pro's read before spending on a soft starter.

None of this works without your pump's real numbers

Every decision on these pages — soft starter or not, which one, how big a generator — depends on your pump's actual numbers. Guessing undoes it all.

The pump's running power and its starting surge are the figures everything turns on. You'll find clues on the nameplate or tag on the pump's control box or pressure-tank setup, or in the paperwork from when the well was drilled or the pump last replaced. No luck? The company that drilled or services your well can look it up, and a licensed electrician can confirm it on a visit.

With those real numbers in hand, a pro can tell you whether a soft starter would actually help and which one fits. Without them, anyone recommending a specific device is guessing. Our sizing guide walks through finding and using these numbers step by step — it's the natural companion to this guide.

★ I never hand out a made-up number

I won't guess your pump's surge, and you shouldn't either. Bring me a nameplate photo, a horsepower figure, or just your well company's name, and we'll turn it into an honest answer about whether a soft starter is worth it. Call (330) 200-8042.

What I help with, and what the pro does

I'm a tech helper, not a licensed electrician or a well and pump contractor. Here's the honest division of labor on a soft starter.

What I help with	What the licensed pro does
Explaining the surge in plain English	Confirming your pump is a fit
Helping you find the pump's numbers	Choosing the matched soft starter
Weighing a soft starter vs. a bigger generator	Wiring it into the pump controls
Being there for the first test run	The 240-volt work and any permit

In plain terms: I help you understand the problem, gather your pump's real numbers, and decide whether a soft starter is even worth pursuing — so you walk into the pro's visit knowing the right questions. Then I help line up a trustworthy licensed electrician or well professional to do the actual matching, wiring, and install.

★ **Start with a conversation, not a purchase**

The cheapest mistake to avoid is buying the wrong device. Talk it through with me first — often right on your screen for \$49 — and we'll make sure you only pay for what actually helps. Call or text (330) 200-8042.

Questions to ask about a soft starter

Take these to your electrician or well professional. They turn a vague idea into a real, honest answer.

Q: Is my pump a good candidate for a soft starter?

Not every pump is. Ask the pro to confirm your specific pump and motor are suitable before anyone talks about buying one.

Q: How much will it actually cut the starting surge?

Ask for a real sense of the reduction, so you can tell whether it closes the gap to your generator or power station — or not.

Q: Will it work with the generator or battery I have or plan to get?

The soft starter, the pump, and the power source all have to work together. Have the pro confirm the whole combination, not just the device on its own.

Q: Does my pump already start gently on its own?

If you have a variable-speed pump, it may already ramp up smoothly, in which case a soft starter would be redundant. Confirm which kind you have.

✓ Write the answers down

Keep these answers with your home papers and your generator's manual. A clear note now saves a lot of second-guessing later.

Common Questions

The soft-starter questions I hear most often, answered plainly.

Q: Will a soft starter make my generator use less fuel?

Its job is easing the pump's start, not the running load, so don't expect much fuel savings. The real benefit is letting a smaller generator start a pump it otherwise couldn't.

Q: Can I install one myself to save money?

No — it wires into your pump's 240-volt controls, which is licensed-pro work. A wrong install is unsafe and can harm the pump.

Q: If I add a soft starter, can I use any small generator?

Not any — it lowers the surge but not the running load, so the generator still has to comfortably run the pump. It widens your options; it doesn't remove the floor.

Q: My generator starts the pump fine already. Do I need one?

Probably not. A soft starter solves a surge problem. If you don't have one, there's nothing for it to fix.

★ Still not sure if it's for you?

This is one of those questions where a short conversation saves real money. Call or text me at (330) 200-8042 and we'll figure out, honestly, whether a soft starter belongs in your plan.

A safety word before you go further

Two safety points deserve to stand on their own, because both can genuinely hurt someone.

First, the electrical side. A soft starter lives inside your pump's 240-volt controls, wired straight into the house. That is not do-it-yourself territory — a wrong connection is dangerous and can damage the pump. Leave the wiring to a licensed electrician or well professional, every time.

Second, don't let a new soft starter tempt you into cutting a corner somewhere else — running a generator in the garage 'just this once,' or feeding the house through a cord. The device makes starting easier; it changes none of the rules about running a generator safely or connecting it to your home.

! Two dangers: the wiring, and the exhaust

Never wire a soft starter, transfer switch, or pump circuit yourself — 240-volt work is for a licensed pro. And if a generator is any part of your plan, its exhaust is carbon monoxide, an invisible gas that kills in minutes: run a generator outside only, well away from the house — the safety agencies say at least 20 feet — with the exhaust pointed away from every window, door, and vent, and keep battery-backup CO alarms on every floor. If an alarm sounds or anyone feels dizzy or sick, get everyone to fresh air first.

Bringing it all together

The startup surge is the hardest moment in a well pump's day, and it's usually what stands between you and running your pump on backup power.

Understand that surge first: a motor asks for far more power to start than to run, and a well pump asks for a lot — often around three times its running power — because it has to get all that standing water moving at once. If your backup can't deliver that surge, the pump strains, and repeated failed starts wear it out.

A soft starter is a real, honest tool for that exact problem. It ramps the motor up gently, cuts the surge a good deal, and can let a smaller generator — or the occasional battery — start a pump they otherwise couldn't. It won't lower the running load, it must be matched to your pump, and a pro installs it. But when the surge is your sticking point, it's well worth asking about. Get your pump's real numbers, weigh it against simply sizing up, and decide with a clear head.

★ Let's soften that surge together

Whether the answer for you is a soft starter, a bigger generator, or a bit of both, I'm glad to help you think it through — honestly, at your pace, with no product to sell. Call or text me at (330) 200-8042, and let's keep your water flowing.

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 the startup surge and soft starters 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.

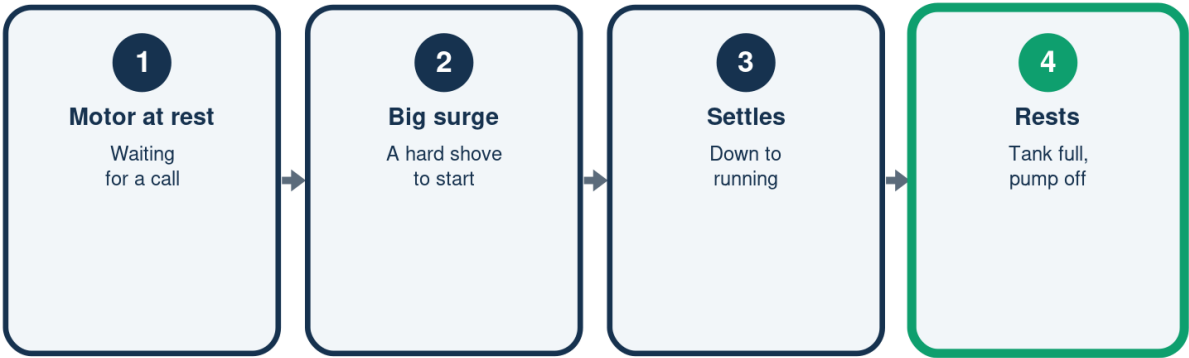
When you'd rather have a hand, that's exactly what I do. I come to your home, work at your pace, and never make you feel rushed or silly for asking. A first visit is a flat \$99, and for the parts that don't need me on-site I can often help right on your screen for \$49. Every visit comes with a 30-day,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

What Happens When a Pump Starts

The surge, in four beats



The brief surge is the number your backup must clear.

Two Ways to Beat the Surge

Both are valid -- with trade-offs

	Bigger generator	Soft starter
What it does	More surge room	Lowers the surge
Where	The machine	At the pump
Installed by	You buy it	A pro wires it
Main limit	Bigger, heavier	Not a cure-all

Sometimes the smart move is a bit of both.

What a Soft Starter Can and Can't Do

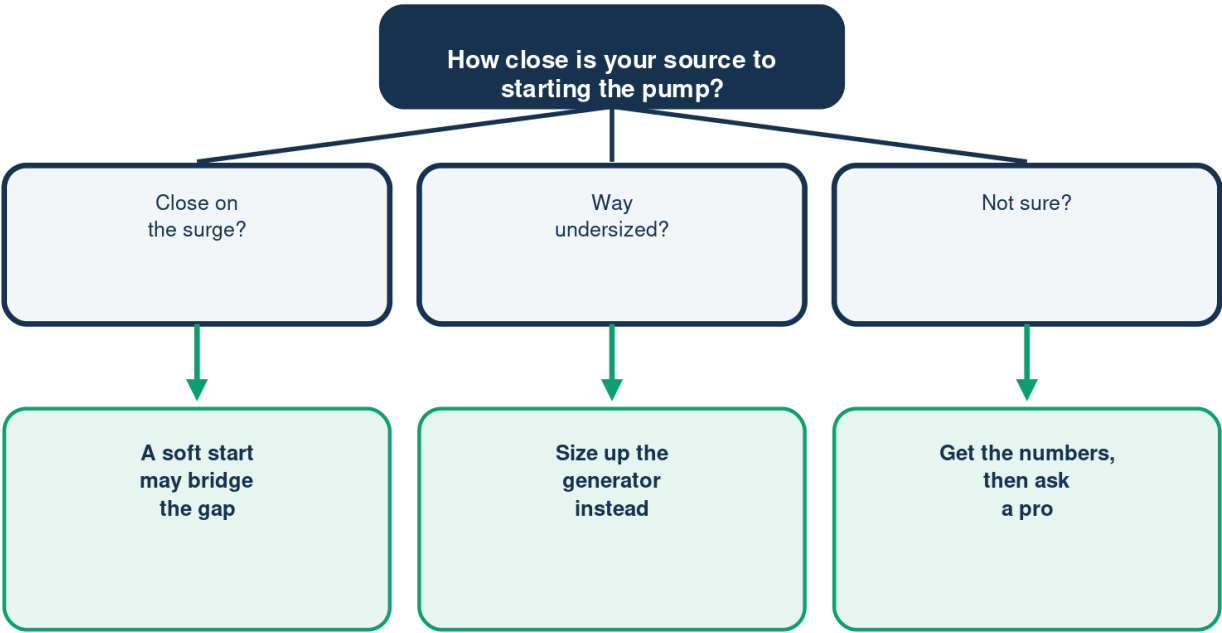
Honest expectations

	Can	Can't
The surge	Cut it a lot	Erase it
Running load	Leave unchanged	Reduce it
A tiny battery	Sometimes help	Make it enough

It shrinks the surge -- it doesn't rewrite the running load.

Would a Soft Starter Help You?

It depends how far off you are



Confirm the soft starter is matched to your specific pump.

Illustration - a schematic, not to scale. Your setup may differ.



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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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