

PRESSURE

Constant pressure has become an industry buzzword. But what does it really mean?

And how can you achieve it for your customers?

ater well contractors know a private water well is one of the best sources of water for the homeowner, but water pressure may sometimes be insufficient for the demands of the home.

There could be many reasons why this happens in a private water well system. Perhaps water levels have dropped in the well, more rooms have been added to the house, a new irrigation sys-

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tem has been added, or your customers are just using more water.

Constant pressure variable speed systems differ from standard installations by incorporating a device that controls the water pressure. There are a couple of different ways to do this. Either with a mechanical control valve or an electronic controller (a variable speed drive).

The benefits of constant pressure variable speed systems are tremendous. Not only does the homeowner enjoy "city-like" water pressure, even during periods of heavy use, but a more constant water pressure helps water-using appliances, such as geothermal heating and cooling systems and water conditioners, operate more efficiently.

A constant pressure system is also ideal for residences where space is at a premium, since the typical large pressure tank is replaced with a much smaller model. Upgrading standard systems to constant pressure systems can also be a new source of business for contractors.

The benefits of constant pressure variable speed water systems are clear. But what's the best way to get there? We'll take a look at two major methods used to achieve constant pressure water supply systems: one mechanical and one electronic.

PRESSURE continues on page 22



A Cycle Stop Valves system for a resort in Jamaica.



"As with many new products, necessity is the mother of invention," Cary Austin says. In his case, his frustration with variable speed drives is what led to the invention of a simple mechanical solution using valves.

Austin, a former pump installer and well driller, called the new valve a "cycle stop valve" because it stops pump cycling. Cycle Stop Valves Inc., which started in the back of Austin's former pump and drilling business, was founded in 1993 and is located in Lubbock, Texas. In the years from 1993 to 1998, the company installed and field-tested its own valves in thousands of installations. Eventually, Austin sold the service business in 1998 to begin manufacturing the valves full-time and now serves as the company's president.

No longer the new kids on the block, the company has gone from shipping a few valves per month in 1993 to shipping approximately 30,000 valves last year.

How It Works

"The cycle stop valve is really a simple answer to a complicated problem," Austin says.

The valve is a mechanical device that makes a variable flow pump out of any standard constant speed pump. There is no need to pull the pump. Attached to the discharge of the pump, the valve automatically chokes back the output of a pump to match the user's requirement for water.

Common Misconceptions

"That's an easy one," Austin says. "Everyone thinks that when you choke the pump back, it's going to hurt the pump. But it's counter-intuitive. It's actually easier on the pump."

Austin says he's heard people compare his valve to "driving with one foot on the accelerator and one foot on the



SubDrive variable frequency drive systems from Franklin Electric.

The Case for Variable Frequency Drives

Another way to achieve constant pressure in a water supply system is through the use of the variable frequency drive (VFD). Although VFDs have been used for years for applications such as conveyor belts and treadmills, it's only fairly recently—in the last 10 years or so—that they have been adapted for use in residential water supply systems.

How It Works

Think of a conventional system, explains Mark Reeder, director of field marketing for Franklin Electric, a manufacturer of pumps, motors, and drives. The pump motor runs at two speeds: on or off. A large tank is needed to maintain pressure. In a constant pressure variable speed system, the motor turns at whatever speed is needed in order to maintain the necessary pressure.

"It's like cruise control for a water system," he says.

The electronic device that allows the motor to self-adjust is the variable speed drive. Specifically, the drive works by controlling the frequency of the electrical power supplied to the motor.

Common Misconceptions

"There are several," Reeder says. The first misconception, he says, is that constant pressure variable speed systems are only for high-end homes, and that they are more expensive than conventional systems.

"Yes, a standard control box is less expensive than a VFD controller," Reeder says. "But if you look at the entire system, this will be offset by having a smaller water tank and smaller wiring. And if the customer needs a protection device, it's already built in."

gas." But that analogy is false, he says, because submersible pumps are not piston pumps. In fact, the centrifugal motor in water pumps is what makes his valves work.

"The guy who invented the centrifugal motor is the real genius," Austin jokes. "It's the motor design and those little impellers that allow the valves to work."

Austin also says it's a common misconception that control valves are "old school," while variable frequency drives (VFDs) are newer technology.

"Variable speed drives have been around a long time," he says, adding that they were introduced commercially in 1968. "Our pump and well drilling business used to install them, but by 1993 we stopped using them. So the cycle stop valve (CSV), invented in 1993, is actually newer technology. Just because it's a mechanical solution, rather than an electronic solution, doesn't mean it isn't a breakthrough."

Benefits of Using a Cycle Stop Valve

"In a nutshell, you get constant pressure and variable flow with a smaller pressure tank, lower cost, and a longer pump life," Austin says. "For example, instead of installing a \$500 pressure tank, you can get away with a small \$100 tank and a \$100 valve."

"Long-term savings come into play when you consider that the CSV makes pump systems last many times longer than normal," he adds. "The longer a pump system lasts, the more you get for your money."

Austin adds that common problems such as noise, vibration, voltage spikes, low flow cycling, and pressure spikes are avoided when using a CSV in favor of a VFD.

Limitations of Cycle Stop Valves

CSVs should not be used for hot water applications or solids pumping, such as sewage, says Austin. They can be used in cool water systems from 1 gpm to 10,000 gpm.

Learning Curve for New Users

"The main thing for new users to understand is that the back pressure on the pump is a good thing," Austin says. "Once they get over that, the learning curve actually goes pretty fast."

Cycle Stop Valves has also debuted a new product called the *psi*de-kickTM, which features "everything in a box" except the pump, Austin says. The kit includes a pre-set CSV, 4.4-gallon pressure tank, and everything needed to install it, down to the wall mount.

The company also offers online and telephone technical support from its Texas headquarters.

"A live person always answers the phone," Austin says.

Contractor Perspectives

Matt Beeman, President Beeman Brothers Drilling Inc. Durango, Colorado

Matt Beeman started installing constant pressure systems for his customers seven years ago. At the time, he was testing both methods of achieving constant pressure and variable Second, it is not true that the systems are difficult to install, he says. "If you can install a 3-wire control box, then you can install a constant pressure variable speed system."

Also, it's a myth that there is a lot of programming that's involved.

"Maybe this is true for off-the-shelf VFDs," Reeder says.
"But if you're buying something specifically for the residential water supply market, all the programming will already be done."

Another misconception is that three-phase power is required.

"It's not," Reeder says. "Power going into the box is single phase, and the VFD generates three-phase."

Benefits of Using Variable Frequency Drives

Water supply systems set up with VFDs have some diagnostic features and protections built in, Reeder says. These protections can indicate when out-of-water conditions are occurring, as well as potential under-voltage or over-voltage problems.

The device will also perform "power conditioning"—basically, taking a less than ideal power supply and rebuilding it, making the motor more tolerant to voltage spikes and low voltage conditions. The motor and the pump will also "soft" start and stop, saving wear and tear on the pump and motor.

"A lot of things just work better when there is constant water pressure," says Reeder, referring to irrigation zones, geothermal heating and cooling systems, and appliances that use water, such as water conditioning units as examples.

Limitations of Variable Frequency Drives

"The only real limitation when using VFDs is if the home has a lot of plumbing issues," Reeder says. "VFDs are not going to fix a plumbing problem."

Learning Curve for New Users

"We have really simplified the products," Reeder says, so the learning curve is less than what it used to be.

To train new installers, Franklin Electric hosts seminars at locations around the country, and also holds sessions at its training facility at its Indiana headquarters. The company also has a technical service hotline and 16 field service representatives available to installers throughout the United States and Canada.

The company has also introduced new products to make installers' jobs easier. The SubDrive QuickPAK includes a motor, pump, pressure sensor, and VFD controller all in one package.

The MonoDrive, primarily used for retrofits, can be used to easily upgrade an existing three-wire system up to 2 hp, by changing the pressure switch to a pressure sensor and the control box to a VFD controller.

"No need to pull the pump or replace the pressure tank," Reeder says. He adds that it is so simple to install that an installer could decide to offer a customer a free trial. Install the MonoDrive for a couple weeks, and check back to see if the

speed—the mechanical way by using a cycle stop valve, and the electronic way by installing a VFD system.

In time, he switched to installing VFDs exclusively.

"The consumer demand seemed to be for VFDs," Beeman says, so he quit selling the CSVs. "Also, I always thought that putting back pressure on the pump would hurt it as much as turning a motor very fast," he adds.

However, in time Beeman was giving CSVs another look.

"For new installations, VFD systems can save money due to the fact that you can use smaller copper wire," he says. "However, some VFDs that I installed were failing in five years and replacement costs are extremely high."

Also, he noted some problems.

"The number one problem that I was experiencing was voltage spikes," he says. "Also, the controllers sometimes interfere with other electronics in the household, like low-voltage lighting systems and high-definition TVs."

When Beeman realized those first few "test" CSVs he installed years ago were still working fine, he decided to switch back to the mechanical method.

"I feel a lot more confident selling the mechanical now," he says. "In the last three years, I have installed more than 250 CSVs and I've never had one fail. And that includes the test valves I installed seven and eight years ago."

Richard King, Owner Ace Water Well & Pump Ben Wheeler, Texas

After experiencing two total system failures with electronic VFD installations, Richard King was looking for another solution.

"Initially, I doubted that such a simple thing could be the solution," he says, referring to his first encounter with the cycle stop valve about four years ago.

But after the company gave him a free valve to test, he was hooked. In the last four years, King has installed more than 200 CSVs, including 64 CSVs at the second-biggest nursery in the United States.

"These pumps move a lot of water every day, and I've had absolutely no problems with them," he says.

The valves are so simple, he says, that once a homeowner even fixed his own problem.

"I was on vacation, and I got a call from one of my residential customers," King says. "I couldn't help him, so I gave him the number to Cycle Stop Valves. They told him what to do, and he was able to fix his own problem in just a few minutes."

A lost service call, perhaps, but a happy customer will always trump that.

customer wants to purchase it.

Or, another opportunity might be when a customer needs to replace an aging pressure tank.

"Instead of replacing the old tank with a new one of the same size, offer to replace it with a smaller tank and use the difference in money towards an upgrade to constant pressure," Reeder suggests. "Our products offer contractors many opportunities to upgrade their customer to a premium system."

Contractor Perspectives

Robert Domer, Service Technician Domer Water Supply Dalton, Ohio

"You know that old saying, 'Lead, follow, or get out of the way'? Well, I decided that I'd lead or follow, but I didn't want to get out of the way," Robert Domer says.

So, in order not to get left behind, Domer started researching VFDs a few years ago and installed his first Franklin Electric system in 2003.

"First thing I did was install one in my own house," he says. "Last year, the company installed 52 units."

As far as the cost goes, Domer says the systems are more expensive but not an impossible sell. The dairy farmers in his area actually turned out to be a pretty easy sell, he says.

"I told them that it was a variable speed system like the vacuum milkers they use, and they just said 'put it in' without even asking what it cost," Domer says.

As far as residential systems go, Domer says that lately the company has begun installing MonoDrives under a "free trial" basis. He installs the MonoDrive, which is ideal for retrofits, and leaves it in for the customer for a couple of weeks. At the end of the trial period, most people are willing to pony up the extra cash, he says.

"I've only had one customer refuse it after the trial." Even then, the customer agreed that the water pressure was better, just not "a thousand dollars better."

Domer, who also occasionally installs Grundfos' SQE system or Cycle Stop Valves, is a big fan of Franklin Electric's MonoDrive system. The system is designed primarily for retrofits, but Domer often uses them in new installations so he can use a standard motor and pump.

"The MonoDrives are easy to install. The customer saves money by using a standard pump, in addition to saving on the smaller wire and pressure tank," he says. "I push a lot of MonoDrives."

In one case, he replaced a cycle stop valve with a Mono-Drive for a customer who was having difficulty with sediment buildup due to bad water quality.

"He ended up getting even better flow and pressure," Domer says.

Over the years, he says he's replaced five or six VFDs that were under manufacturer warranty. One needed a new fan motor, and the others were damaged by lightning. "These things don't take lightning well," he admits. Also, he's had to replace a few switches.

Overall, this is a great time to get into the VFD market, Domer says.

Another Perspective

Greg Giddens, Senior Technician/Installer Partridge Well Drilling Co. Orange Park, Florida

When it comes to installing "constant pressure" systems for his chentele, Greg Giddens says one solution doesn't fit all.

You have to think outside the box," he says. When considering what device to use—whether it be a cycle stop valve, a variable frequency drive, or even an alternative device—at's not a performance thing, it's an application thing," Giddens attests.

Giddens says he tends to use cycle stop valves for most small residential and irrigation applications. "It's a simple and cost-effective solution, and we've had no problems with them.".

When it comes to larger homes that come with wells with more than one pump installed, or even multiple wells with multiple pumps, he prefers to go with a VFD. "The drives enable us to control the multiple pumps more easily," he says.

The company also occasionally turns to the AquaGenie 400 constant pressure valve, originally from Jacuzzi (see Author's Note). The device is described as a multi-functional control valve for residential water systems that have a well pump and a pressure tank. *WWJ*

Author's Note: In 2004, Franklin Electric bought JBD Inc., the company that had formerly been the water systems arm of Jacuzzi. At that time and along with all of JBD's other products, AquaGenie became a part of Franklin Electric's catalog offering. For more information, please contact Franklin Electric.

Bob Wiley, Owner Wiley Water Systems Union City, Indiana

Bob Wiley decided to get into the constant pressure game about six years ago. Since then, he has worked his way up to installing about 40 to 50 units per year.

"It's not always an easy sell," he says, citing price objections as the primary issue. "But that's the trouble with most things that are better," he jokes.

Wiley estimates that, for the end user, VFD systems can cost \$1000 to \$1500 more than a traditional pump and pressure tank installation. But as time goes on, and he completes more installations, Wiley has gotten more confident in extolling the benefits of Franklin Electric's MonoDrive (a retrofit system) and SubDrive (for new installations).

"When a home has an irrigation system, geothermal heat pump, and/or water softening system, the constant water pressure will make them run more efficiently," Wiley says.

As far as installation goes, "they are pretty easy to install," he says. "The manufacturer has relocated some things from the earlier versions to simplify the installation process."

Wiley has not experienced any major problems with the VFDs that he has installed over the last five years. All the units come with a five-year warranty, he says, and manufacturer support has been great.

"I don't know if I've ever worked with a better company than Franklin Electric as far as dealer support goes," Wiley says.

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