How to keep your DIG 5006-IP propagation timer misting your cuttings during power outages

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Disclaimer

Although all the information in this report was tested to be accurate, your results may vary. I have done my best to ensure no mistakes have been made and the information herein to be correct to the best of my ability, but I cannot be held responsible for any mistakes that may result in poor performance, loss or damages.

Neither warranty nor guarantee is given that your cuttings will survive a power outage if you put this method to use. This method is for short term power outages (between 1-2 hours typical) and should not be expected to provide power to your timer for extended periods. For extended power outages, a generator is suggested.

Due to the nature of electricity and water, extreme caution should be taken at all times when implementing this system. A licensed electrician and plumber should be employed to be sure safety and code compliance is adhered to. Failure to follow safety protocols may result in loss of crops, fire, injury or death.

I must state now that because of the many variables associated with misting cuttings, like duration of mist and the interval between, I cannot guarantee this process will work as effectively for you as it does for me. The system will supply power for a limited time depending on how much power is required by the timer. This power requirement is determined by how long the solenoid is activated (duration) and how often (interval). The system worked for my settings of 5/10 for one zone consisting of two nozzles but may not work as effectively with yours. Testing the system using your specific settings is highly recommended.

For multiple zones, I recommend a generator. Again, because of the thousands of different combinations that the timer can be programmed for, this system is not recommended. If you are fretting over the cost of a generator if you have multiple zones or far too many cuttings to be effectively covered using this system, compare the cost of the generator with the potential loss of revenue from all the lost cuttings. The generator will most surely be less expensive.

I am currently wrapping up the design of a system that will allow the DIG 5006-ip (or any other DIG electric timer) to work **without any electricity** nearby. It has passed my design and the approval phase by an electrical engineer and will soon be in the testing phase. To be kept in the loop you can sign up here and receive a note when it is done and ready for release. Don't miss out on this report! Think about it; using a DIG electric timer capable of controlling 6 stations at a location where there is no electricity available. As an added bonus, you will receive two free reports; ***Build an arbor in one weekend*** and ***10 reasons you should be using intermittent mist.***

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Introduction

I, like you, propagate plants using a misting system. However, I also design and build misting systems that I sell to customers. These misting systems are used throughout the U.S., Canada, and other countries to propagate plants for fun and profit. A reliable misting system is one of (if not THE) best tools a plant propagator has available to them, because it allows them to root hundreds, thousands or hundreds of thousands of cuttings quickly. Ideally, a reliable misting system should run during power outages, but I am not aware of any that actually do unless they are powered by a generator.

Misting systems that use mechanical timers are at a distinct disadvantage when the power is out because they require power at all times to operate the clock mechanism that is an integral part of the timer. Without power, the clock stops working for the exact amount of time the power is out. When power is restored, the clock mechanism in the mechanical timer begins to run, allowing the timer to follow the program regardless of whether it should or not. This often leads to the cuttings being misted at the wrong time. Misting systems that use digital timers like the DIG 5006-IP have an almost unfair advantage over the mechanical operated misting systems because the timer uses a 9 volt battery to retain the preset program when the power fails. When power is restored the timer knows if it should mist according to the programming or wait until the next day. In my opinion, this is one of the best features of the DIG 5006-IP propagation timer.

I have had many inquiries as to how to continue to mist cuttings in the event the power is interrupted when using the DIG 5006-IP. Up until now, I did not have a good answer. I basically told my customers that they would have to hand water the cuttings, something that is quite time consuming and in some cases impractical. So I did a bit of research and testing to come up with this extremely easy solution. Once I discovered this solution I called the tech department at DIG to confirm this would work. I was told that it should indeed work and he wondered why no-one else had thought of it. I laughed and told him it was our little secret and if I made a million I would be sure to give him some.

Before I reveal what this great secret is, let's learn a little about why the unrooted cuttings need to be kept moist.

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Cutting requirements

Softwood cuttings need to be continuously kept moist for a number of reasons. Here are my top two:

1. The cuttings have no root system to draw moisture up into the plant and into the leaves. When the moisture lands on the leaves it slowly evaporates. This evaporation causes a slight vacuum in the stem of the cutting. This vacuum draws moisture up into the stem and into the leaves where it also evaporates. This process is called transpiration and occurs naturally in every plant. This process is how a tree can draw water up through its roots to the trunk, and into the leaves far above the ground.
2. The cuttings need to be kept moist to keep them cool. If the cutting gets overheated it will soon wilt and die. The transpiration process naturally keeps a plant cool by drawing the water up into the leaves where it evaporates. This evaporation wicks heat away from the leaves, much like when perspiration evaporates from a human and makes them feel cooler.

A word of caution: the cuttings can get too moist! They need to just begin to dry out before the next round of mist is delivered. Too much moisture may cause disease, fungus and rot.

Here is a tip that is a little off topic but you may find quite useful:

Depending on your geographical location, you may find that you need supplemental shade. The first year I rooted cuttings in the direct sun. I had great success, but I had to pay close attention to ensure the cuttings received the correct amount of mist and were never allowed to dry out. The next year I decided to buy a piece of 50% shade cloth and use it to shade one of the two misting beds and see how the shaded cuttings reacted.

The first thing I noticed was that I did not have to pay such close attention to the cuttings. The moisture didn't evaporate as quickly as it did in the bed in full sun. The next thing I discovered was that I could change the programming to deliver less water at a less frequent interval. Using less water is always a good thing!

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For a quick and relatively inexpensive way to provide shade for your cuttings here is an article I wrote awhile back for another website.

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How to provide shade for your misting bed

Once your misting or propagation beds are made you may decide you want a way to provide shade for your cuttings while they are being rooted. An easy way to do this is by using pipe clips and a few lengths of electrical plastic conduit. This is the grey PVC pipe that electricians use when running electrical wires outside or underground. It is much more flexible than the white PVC pipe that is used for plumbing and will hold up much longer when exposed to the sun's UV rays.

List of materials (quantities not given. please read on to determine the quantity you will need)

- 1" galvanized pipe clips
- 3/4" grey electrical conduit (PVC)
- 1 1/2" galvanized screws
- large binder clips

This method uses the half-round galvanized pipe clamps that can be found in the electrical section of a building supply store. You will want to purchase 1' clamps. To figure out how many clamps to purchase, simply take the number of PVC pipes you will need and double it. If you will have 5 lengths of pipe, you will need 10 clips. Read on to figure how many lengths of electrical conduit you will need:

Next, you need to figure how many ¾" grey electrical conduit pipes to purchase. You will be using 10' long pieces, so I is advise purchasing them this way to eliminate cutting the pipes to length. You will be making a hoop every 2', so to figure how many lengths of pipe you will need, simply take the length of your bed in feet and divide it in half, then add 1. An 8 foot long bed will need 5 lengths of pipe (8/2=4+1=5), and a 10' long bed will require 6 (10/2=5+1=6).

The first thing you need to do is remove the larger "bell" end from the PVC pipe. Use a hand saw to cut **just** the bell off. Next, on the inside of the misting bed, screw a pipe clip in each corner. Remember, you will be attaching the clips on the inside of the LONG sides. Attach them about 1" below the top of the board and with the opening facing up. You will be sliding the PVC pipe down into them, so be sure they are facing the right direction.

Make a mark every 2' on the side of your bed and attach the remaining clips 1" below the top edge. See picture:

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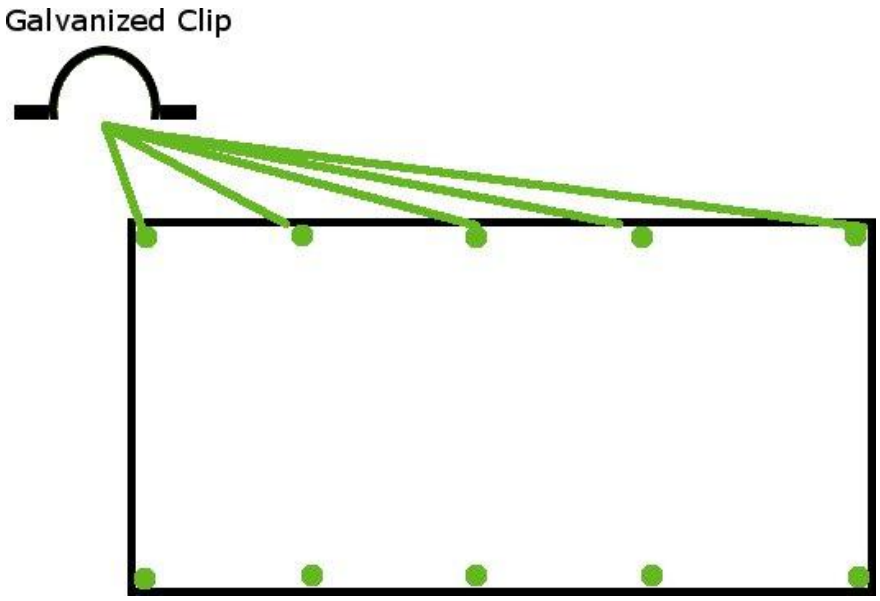

Measure 3” from each end of the PVC pipe and mark a line around the pipe. Now make another line at 2”. Be sure to do both ends of the pipe. Drill a 1/8” hole on the 2” mark on one end of the pipe. Do not drill the other end yet. Slide the end of the pipe with the drilled hole down into the clip and line up your 3” mark with the top of the clip. Now drive a screw through the 1/8” hole and into the side of the bed. Repeat this for the remaining pipes. See picture for layout of the pipe:

Now that you have a bunch of PVC pipes sticking up in the air, it is now time to bend them over and place them into the remaining clips. Start on one end and bend the pipe over, insert it into the clip, and line up the 3” mark with the top of the clip. Drill the 1/8 hole through the pipe to be able to hold it with a screw. Once the hole is drilled, be sure the 3” mark is lined up with the top of the clip and screw the pipe to the side of the bed. Repeat with the remaining pieces of pipe.

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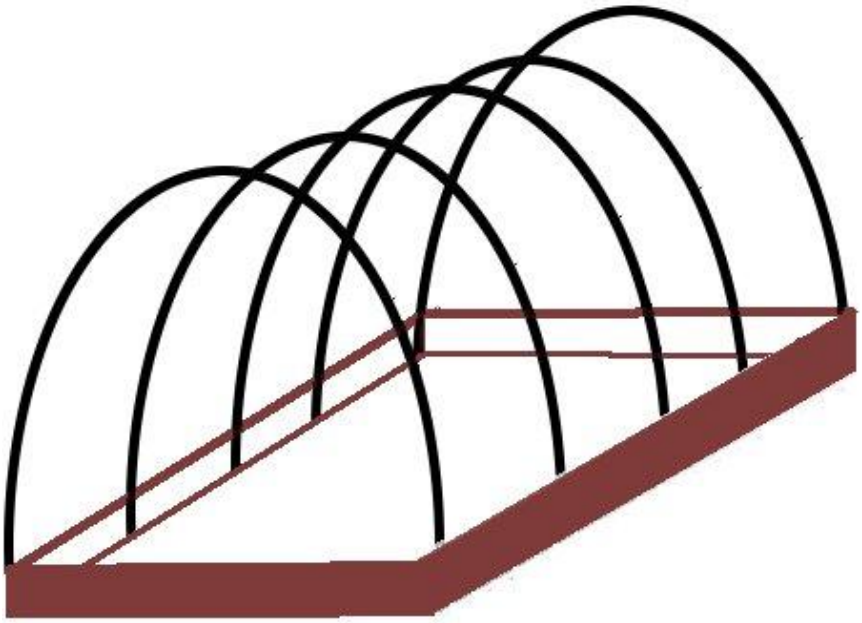

At this point you should now have something that resembles a small hoop house. The hoops will be a bit wobbly at this point and if you desire, you can drill more holes and add more screws or add bracing in a few locations to help make them more rigid, but it really is not necessary because the shade cloth is very light. Lay the cloth over the hoops and align it so it will provide the maximum amount of shade at the hottest part of the day. Take the large binder clips and fasten the cloth to the hoops.

If you are looking for a piece of shade cloth, check to see if it is currently available at the Mistkits website.

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Pros and cons of the DIG 5006-IP

Pros:

First let me say that I LOVE the DIG 5006-IP propagation controller. Here is why:

1. It is far less expensive than any other comparable misting/propagation timer I have found. Yes, there are other timers available, but go ahead and take out a loan to buy it!
2. The timer can be programmed with six completely different and independent programs. This means you can have 6 misting beds, 6 irrigation areas, or any combination of the two.
3. The timer can be used to operate lighting or other equipment as I show in this series of articles.
4. As mentioned earlier, the timer has a 9 volt battery that retains the program in the event of a power failure.
5. The timer has a 3 year manufacturer warranty, and DIG has great tech support if needed.
6. The timer is professional propagator proven; even Monrovia nursery has purchased this timer.
7. The timer is extremely compact.
8. The built in transformer instantly converts the voltage to a much safer 24 volts

Cons:

Then there are the things I am not too fond about:

1. The manufacturer instructions are not very clear when programming for misting so I have rewritten them to be much clearer for my customers.
2. Individual zones cannot be turned off. Mistkits has a waterproof box that solves this problem.
3. The timer cannot operate the solenoids when the power fails, hence this report.

FINALY! Now we get to the good part; how to get the DIG 5006-IP propagation timer to keep our misting systems operating when the power is out.

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Parts needed

- UPS (Uninterruptable Power Supply) Yes, the same type of UPS that you would purchase for your computer! WARNING: the UPS is not waterproof and must be protected!

Other parts that may be needed

- Pressure tank
- Various plumbing fittings
- Backflow preventer or check valve

So how exactly would you go about it? Well, it isn't as hard as you would think, but first a word about the UPS.

The UPS I purchased to determine if the timer would actually work was purchased at Walmart. Amazon also carries UPS's, also known as battery backups. Typically I would go to Staples to purchase an item like this, but decided to save time and a little money by going to Walmart, which is closer. I chose the 43 minute APC Battery backup because I figured 43 minutes would be plenty of time for the test and also because it was the least expensive of the two available.

I got the UPS home, unpacked it, and plugged it in to charge. The UPS had to charge for about 18 hours before it could be put to use. Be sure to read the instructions for your UPS to make sure you charge yours the proper length of time before using it.

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Now for a confession: When I initially plugged the timer into the UPS and killed the power, the timer did not operate the solenoid. I was crushed! I plugged the UPS back in and the timer operated the solenoid just like it should. Again, I unplugged the UPS to discover the timer not operating the solenoid. What was the problem?

I took a close look at the UPS. It had 4 outlets and I had plugged the timer into the master. I then took a look at the directions and noticed a picture that showed 8 outlets on the UPS. The instructions didn't mention two sets of outlets… Another glance at the UPS revealed a label over the outlets that were protected by the battery backup. I had been plugging the timer into the surge protected outlets which are not powered by the battery backup feature. Once I removed the label and plugged the timer into the proper outlet, I unplugged the UPS and…..it worked!

Once again: Like the timer, the UPS MUST be protected from the elements so do not place it anywhere it can get wet.

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Now let's get to how you can supply water to run your misting system during a power outage:

If using a water supply unaffected by power outages such as City water:

If you are one of the lucky ones that have a water supply that still works when the power is out, congratulations! The only thing you will need is a UPS (Uninterruptable Power Supply) that will allow your timer to operate for whatever length of time you have determined. You will need to determine the size of your UPS requirements by looking at past power outages and how long they lasted. If the average was an hour or less, buy a UPS capable of lasting 60 minutes or so. If the outage lasted longer than an hour, buy a UPS that covers that amount of time. You may find that for long power outages a correctly sized UPS may be quite expensive. In that case, I would buy the best I could but also keep in mind that the value of the loss of the cuttings may far outweigh the cost of the UPS.

If using a water supply that IS affected by power outages such as well water:

Unless you are on City water, which usually is not affected by power outages, you may need an alternative way of supplying pressurized water to your misting beds. Determining the size of the pressure tank as well as the subsequent installation, should be done by a licensed plumber familiar with your current water pressure and flow. However, if you are quite confident you can do this yourself, I have put together an easy way to figure out how many misting nozzles can be used per zone which will give you a close approximation of how much water you may need. You would then use this figure to purchase a pressure tank, or tanks, with enough capacity. To explain this in extremely simple terms, this is done by determining how much water your nozzles will use per zone then comparing that figure with your water flow.

One thing to keep in mind: be sure you determine the length of time you will want the UPS to supply power and then determine how much water you will need for that amount of time. For instance, I purchased a 43 minute UPS. I use the Green Pin Perfect nozzles from Dramm that use 1.08 gpm at 36 psi, close enough to my 40 psi for this calculation.

I have a 4x8 bed that uses two of the green pin perfect nozzles and is set up to mist 5 seconds every 10 minutes, so let's do some quick math:

43 minutes (the amount of time the UPS will run) divided by the 10 minute interval gives us 4.3. 4.3 times the nozzle will actually spray in that 43 minute window. Multiply the 4.3 by 5 seconds, the duration of the mist. This gives us 21.5; the total number of seconds the nozzle will need to spray for the 43 minutes the UPS will supply power to the timer. Remember, each nozzle uses 1 gallon per minute so in actuality, the nozzle will spray about .33 gallons in the 43 minute time frame (21 seconds is roughly 1/3 of 1 minute. 1/3 of a gallon used in 43 minutes, not much really. Because I have two nozzles, I double the 1/3 gallon to get 2/3 of a gallon.

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So using the above example, I would only need a pressure tank with a capacity of at least 1 gallon to be able to supply enough water to my misting nozzle for the 43 minutes the UPS will keep the system operating. Remember, this assumes I will not be using ANY water other than for the nozzle. If I open a faucet, flush the toilet or anything else that will release the water pressure and reduce the volume of water in the tank, the ability of the tank to supply water to the nozzles will be greatly affected. For this reason, you may decide you need to isolate your domestic water from your misting system. This may be done by simply installing the pressure tank in your main waterline that supplies water to your misting system, a backflow preventer, or check valve in your water piping, and a valve to isolate the tank from the misting system, but be sure to follow your local plumbing code to be sure you are adhering to the current plumbing code. An illustration is shown a little later on how to do this.

Be sure to calculate the flow requirements of your misting system to be sure the UPS and pressure tank are sized correctly. If you skip this important step you may find your system requires much more water than your pressure tank or tanks can provide or the UPS doesn't last as long as you need. This may result in the failure of the cuttings, exactly what you are trying to avoid.

Word of caution:

Develop a power outage plan before you put this plan into action. Doing so now may eliminate panic and/or loss of cuttings. Determine if you can reconfigure your cutting beds, move the rooting flats, consolidate your cuttings, or whatever it takes to minimize the number of nozzles and the size of the area you need to cover. Can you simply move the cuttings together so they can all be misted during the outage? Can you modify your cutting beds now so they can be all be misted with this system? Do you have too large an area or too spread out to effectively put this system to use? Do you need to install a larger tank or multiple tanks to supply the amount of water needed?

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How I installed my pressure tank into my water supply

Expansion tanks can be purchased at plumbing supply stores; home improvement stores like Home Depot and Lowes, and even found free on Craigslist. I got mine from a plumbing job I was working on. The owner upgraded their supply line and no longer needed the tank. Lucky for me it was installed just a few years before so was in great shape. If you are looking for a used one be sure to look it over real well and look for signs of leaks. Also ask why the owner is getting rid of it. If the owner says their pressure was very low and the tank would not keep pressure, do not take it! There is an internal bladder that gets pressurized with air and if the bladder leaks the tank is useless.

Also be sure the tank is at least the size you need to supply enough water to your nozzles or better yet, larger. I already have a pressure tank on my system so I don't really need the extra capacity. However, I installed it anyway to be absolutely sure I had the capacity if I needed it. I also added the pressure tank to reduce the cycle rate of my well pump, which will save wear and tear in the long run.

For clarification, I already have a pressure tank on my system. The new tank will be used in conjunction with the existing pressure tank to give me more volume of water under pressure. I decided that the existing 20 gallon tank was not quite the proper size to supply pressurized water to my misting system and house. The new 30 gallon tank along with the existing 20 would be plenty of capacity and as stated above, gives me more water under pressure so my well pump should not cycle as much during everyday use.

To begin, I set the tank in place and took stock of what I needed to connect it to my system. I determined that I needed just a few fittings like 2 PEX adapters, a 1"x3/4" adapter and a tee. I also purchased a new ¾" ball valve to install after the tank but more on that later.

If you are unfamiliar with PEX, it is a relatively new product that is much easier to use than copper pipe. It is far less expensive too! It is basically plastic tubing that uses special fittings and special "rings" that get compressed over the tubing and fitting to create a watertight seal. PEX, the fittings and the special tool for installing the rings can be found at plumbing stores and home improvement stores as well. PEX is not required to install the new tank to your system. Copper piping can be used but with the price of copper nowadays, converting to PEX may be your best bet. The PEX crimp tool can usually be rented from home improvement stores or borrowed from a plumber friend if you don't want to purchase one.

If you are unfamiliar with soldering I would suggest getting a knowledgeable friend or even better, a licensed plumber to do it. Properly preparing the fittings and pipe are essential and will ensure no leaks.

I started by soldering the 1"x3/4" adapter and a PEX adapter together and installing it onto the tank. After it cooled I slid a piece of PEX over the adapter and compressed the ring using the crimping tool. I then adjusted the tank and determined where I would need to cut my existing water pipe and install the

tee. After cutting the pipe and installing the tee I then used my other PEX adapter and installed it into the tee. After soldering, I then connected the PEX to the PEX adapter. DONE! Easy huh?

Not so fast…. After installing the tank I installed a new ball valve into the line **after** the new tee I had just soldered. I did this because I had installed the new tee after my original main shutoff valve. This means that if I needed to turn the water off, the second tank would still deliver pressurized water to my system. The new valve was installed after the new tank so I could turn off the existing tank as well as the new one I had just installed. An added benefit was that I installed the valve in a more desirable location that was easier to access.

Below is a series of pictures showing how I installed the tank in my existing system:

Positioning tank

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Installing PEX adapter onto tank

Gauging location of tee and length of PEX required

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Tee to install onto piping

Tee installed and PEX attached

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Pressure tank fully installed

The last step I did was to install the new ball valve in the piping after the new tank. It is not shown in the picture, but the valve was installed on the right side of the newly installed tee just above where it disappears from the previous picture.

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Ball valve installed after the new tank

This new ball valve simply allows me to turn off the pressurized water to my house and misting system. The old valve was before the new tank, meaning if that one was closed, the new tank would still provide pressurized water.

If this all sounds daunting, fear not! You don't actually have to install the tank into your existing water supply system. You could install it in the water supply line for just your misting system. The only thing I would suggest is if you do install the tank into the water line for your misting system; install a check valve before the tank and a shut off valve after.

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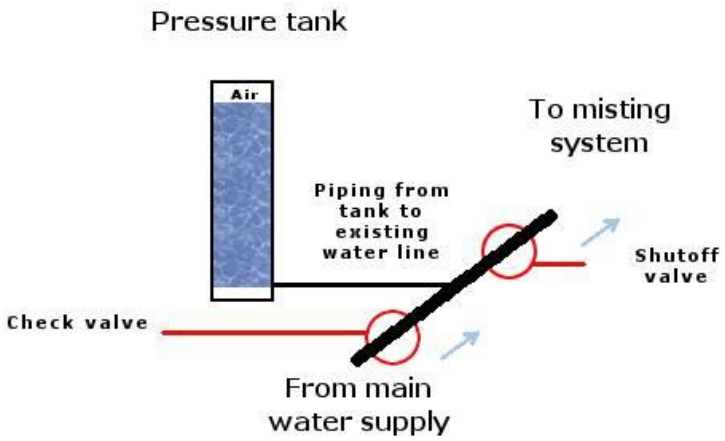
Here is a diagram of a typical installation of the tank just for the misting system: NOTE the check valve location



A check valve allows water to flow in just one direction. Installing it before the pressure tank will isolate the misting system from the rest of the plumbing because it will not allow water to flow back into your homes plumbing. This results in the tank supplying pressurized water to only the misting system. Opening a faucet in the house will have no effect on the misting system whatsoever, all the pressurized water will be used by just the misting system. The valve will allow you to turn off the water supply to your system.

One thing to remember about check valves is they are directional. They are designed to allow water to flow in only one direction. Check valves usually have an arrow cast into the body that shows the direction of flow. Simply point the arrow towards your misting system to ensure it is installed correctly. If you are still unsure, consult a licensed plumber.

MILLION DOLLAR TIP: After cutting, soldering, or installing anything into your plumbing, flush out all lines before supplying water to your misting system. Small metal flakes, solder, debris, and other stuff will be dislodged when working on the piping. Flushing all this junk out prior to charging up the misting system with it will reduce the likelihood of damaging vital parts like the solenoid valve or clogging up the nozzles. Payments can be made via PayPal to: info@mistkits.com.

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Special circumstances

If you have many nozzles, the battery backup and pressure tank solution may not work as described. Here's why:

There is a limit to the size and number of pressure tanks you can use. If you have a lot of misting beds that have many nozzles, the water requirements may be too large to be able to provide water for.

Remember, just two nozzles in the previous calculation required 21.5 gallons of water for the 43 minutes of battery backup power my UPS supplied. Four nozzles would be 43 gallons; eight would be 64.5, and so on. Finding a pressure tank that holds almost 65 gallons of water would be quite a feat and expensive. For comparison, a typical home hot water tank is 30-40 gallons. Think about how large one of those is, and you can quickly see the problem.

I know what you are thinking; why can't a hot water heater be used? Simple, it doesn't have a bladder that allows it to pressurize the water inside. Without this bladder, the water heater is just a holding tank.

If you can get your hands on a few smaller pressure tanks that have the capacity you need, just connect them all together. This will give the needed volume of water, but will also take up a considerable amount of space.

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Conclusion

Using a UPS and a pressure tank may be just what you are looking for to get you through a power outage. Doing a bit of homework beforehand and getting help from professionals if needed

Careful consideration of your requirements and the space available will reveal the feasibility of using pressure tanks as an emergency water supply.

Be sure to create a power outage plan for your misting system and cuttings. Something as simple as moving cuttings into an area covered by this system may ensure their survival. Reconfiguring the system before the outage to create this zone may ease a ton of stress and loss of cuttings later.

Be sure to test this system prior to the outage. Testing beforehand will reveal any problems and give you confidence it will work when needed.

If you enjoyed this report, you may also enjoy my E-books available at Mistkits (multiple E-book formats including pdf) and on Amazon (Kindle versions only).