



DS9 Pure Water System

Effective April 19, 2016

Pure Water Window Cleaning System Operation and Maintenance Manual



Overview

Congratulations on your purchase.

Thank you for purchasing the Time Saver Series DS9 Pure Water System. With proper care, this unit will provide you with years of trouble free service.

This system was designed with professional window cleaners in mind. Bringing the latest technology & advancements to the pure water window cleaning industry, abc Window Cleaning Supply has produced the finest pure water window cleaning system available today. Only the highest quality parts & materials have been used to assure you years of system longevity.

The following information will help you get your system set-up & running. Keep this manual for future reference.

In The Box

Parts Check

- DS9
- Battery Box
- Hose Reel

1. Unpacking/Inspecting The System

Your system is packaged to prevent damage in transit. Carefully remove the packaging material from around the system and discard. Your DS9 comes with all filters installed and ready for use. Check the fittings on the inlet and outlet of the filters as they may loosen while in transit. Please inspect all components to ensure no damage has occurred prior to use. If damage has occurred notify the shipping company that made delivery to begin a damage claim. Because the filters are tested prior to shipping, the filters may be damp when removed from packaging.

2. Select A Power Supply

Because this unit was intended to function in a range of vehicles over varied conditions, your DS9 system comes without a power supply. We want to let you decide on a power source that fits your needs. The power system of the DS9 ends in a weather pack fitting. The provided power lead comes with 3/8 ring style connectors for fitting to deep cycle style batteries. The connectors can be removed for wiring into an AC adapter or RV charger/converter.

Your DS9 operates on a 12 volt DC system. DO NOT EXCEED 12 VOLTS DC OR CONNECT DIRECTLY TO AC CURRENT. The maximum draw for operating the system when filling is approximately 16 amps and approximately 8 amps for pressurizing the output lines to empty the tank. The entire system can draw up to 24 amps when both pumps are used together. Please keep this in mind when attempting to integrate into a vehicle's power system or when selecting a battery or external power source.

You should always follow all manufacturer guidelines with respect to charging and installing your power supply. Failure to do so could result in damage to your DS9 and even lead to injury or death.

What follows are some recommendations, offered in good faith, based on our experimentation during the design process. Feel free to use what is useful and disregard the rest.

Battery

We recommend using a deep cycle battery to power the DS9. It is important to use a deep cycle battery with 50 or more amp hours of capacity. SLI (starting lights ignition) batteries, also called starting batteries, which are usually rated in cranking amps rather than amp hours, should not be used to power this system. They are not meant to provide steady discharge of power or be drained completely as deep cycle batteries are. On a 55 amp hour AGM deep cycle battery we were able to get 2 full 50 gallon tank fillings and drainings off one charge cycle during testing. The battery box provided will hold group 24 to 30 size batteries having internal dimensions of 14.5" x 7.5" x 9.75".

AC Converter

Another option to power the DS9 is to get a mounted AC/DC converter which will allow you to use 110v AC current to power your 12v DC circuit. We used a 35 amp hour AC converter to run the system. The 35 Amp hour unit provided enough power to run both pumps simultaneously. Having an AC power option is especially helpful when filling the unit as most buildings will have a 110v outlet.

RV Charger / Converter

RV charger/converters provide DC power for operation of the system WHILE charging the deep cycle batteries. This option allows users to power pumps for filling or cleaning while charging a deep cycle battery that can be used later to power the system. A deep cycle battery is needed in addition to the RV charger/converter to get the most out of this option.

3. Mounting The Unit

The DS9 can be mounted to a range of vehicles. The unit weighs 210 lbs when shipped and can weigh up to 720 lbs when the tank and filters are full. Check your vehicle's owner's manual to ensure that your vehicle is rated to carry the weight of the unit. Mount the unit to the vehicle by bolting through the frame or other structurally sound area capable of supporting the maximum unit weight. We recommend using 3/8 inch diameter Grade 2 or higher bolts with locknuts to mount the unit to your vehicle.

Failure to securely attach system may result in property damage or injury. User accepts all liability.

Your DS9 unit and its components are designed to be water resistant, not waterproof. Submerging the unit in water, exposing it to corrosive materials, or extended periods of direct exposure to the elements will damage the system. If possible, mount the DS9 unit in a location that protects it from dirt and debris while in transit.

4. System Overview

The following is provided to help you understand how your system purifies water. The DS9 is a multi-stage water purification unit using sediment/carbon, reverse osmosis (RO), and de-ionization (DI) filters to remove impurities from water before delivery to surfaces for cleaning. Source water is pretreated by the Carbon/Sediment filter before flowing into the two RO filters. The RO filters remove roughly 90% of the dissolved solids and deposits the cleaned water into a 50 gallon holding tank. Water from this tank can either be pumped directly into the hose reel for use in your waterfed pole, or it can be further cleaned by a DI filter, depending on the total dissolved solids of the tank water and on the requirements of the surface you are cleaning.

General life span of the filters will vary depending on feed water TDS (Total Dissolved Solids). Because the source water determines filter life, there is no way to determine exactly how long a filter should last.

Based on an average TDS of 100 ppm (parts per million) in your water, approximately 10,000 gallons of water can be passed through the sediment/carbon and DI cartridges before replacement filters are needed. It is recommended that the sediment/carbon and DI cartridges be replaced at the same time.

RO filters use system pressure to force water through the membrane. The membrane rejects dissolved solids which are flushed out of the filter via the bypass hose. The life of RO filters will vary with source water conditions and filter maintenance. With proper care and under ideal circumstances, the filter membranes can process 100,000 gallons of water.

With all three filter types cleaner source water (low TDS) will allow for a longer filter life span, while source water with a higher TDS will lead to a shorter lifespan for the filters. **ALL THREE FILTER TYPES SHOULD BE KEPT FROM FREEZING.** For more detailed instructions on the filters and their maintenance see filter maintenance section (page 7). Testing your source water will give you a rough idea of how much water your filters can process.

Your DS9 system has two pumps, which can be operated independently. The fill pump (on the left side of the control panel) provides pressure to your RO filters which allows them to process higher volumes of water than is possible using tap pressure alone. The outlet pump (on the right side of the control panel) pulls water out of the holding tank and pressurizes the water as it flows through your DI filter or directly out of the tank into the hose reel.

5. Operating The Tank Filtration Side

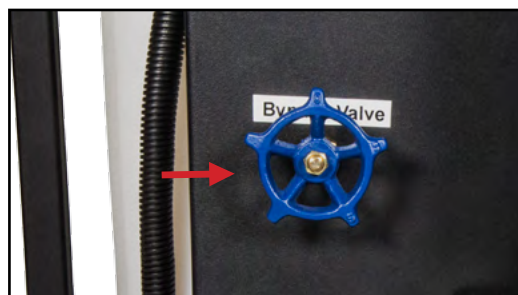
Refer to your quick start guide for more information about getting started. You can also watch the quick start video at:
www.abcWindowSupply.com/ds9quickstart



On the left side of your DS9 system there is a Pressure Gauge, an on/off switch, a bypass valve and a pump. All of these devices are used to control the filtration systems that take your source water and clean it before depositing it in the tank as low TDS water. This allows you to prepare a stock of low TDS water before hand. This can be used as the sole source of water if you wish to run your system away from a water source. The stock of clean water can also act as a buffer supply of water allowing users to apply clean water at a higher rate than would otherwise be possible. This Section will tell you how to successfully fill your tank with clean water.

Filling The Tank

When water is being processed by the RO filters, there will be bypass water flowing out of the bypass hose. **THIS IS AN ESSENTIAL FUNCTION OF RO FILTRATION.** When filtering water through the RO membranes, bypass water must **ALWAYS** flow out of the bypass hose. The removal of bypass water allows the filter to process water efficiently and to protect the membrane from fouling. Decide where you want your bypass water to drain on the worksite. You can also attach a standard garden hose (not included) to the end of your bypass hose to carry the bypass water farther away from your system. Fully open your bypass valve.



Remove the plug from the top brass inlet fitting of the Carbon Sediment Filter. This plug should be retained to seal the filter when your system is not in use. Take your source hose and securely fasten it to the inlet fitting on the top of the Carbon Sediment filter. Turn on the source water.

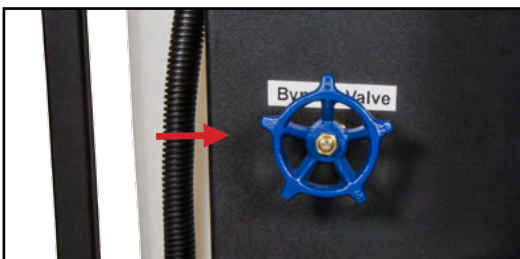
Though water will come out of the bypass hose, your system's overflow prevention system will not allow water to enter the collection tank while the pump is not running (see the section entitled Filling The Tank Without Power (page 4) for information on bypassing the overflow prevention system). To turn on the pump, simply push the ON switch, located on the left hand side. You should hear the fill pump begin to push water through the RO filters and into the holding tank.

Close bypass valve to the desired setting (see next section **Bypass Valve Operation** (page 4) for more information on setting your bypass valve). Water will begin to flow into your tank.

Your system is equipped with a float switch, which will prevent the tank from overflowing. This system works by turning off the pump and closing a Solenoid at the top of the tank once the water has reached a given level. The overflow prevention system is there for your convenience and to prevent spills. You should always oversee your system as it fills your clean water tank. The overflow prevention system will not shut off the bypass hose and bypass water will continue to flow. abc Window Cleaning Supply is not responsible for any damage due to the failure of the overflow prevention system

RO Bypass Valve Operation

The system comes with a bypass valve. The bypass valve controls the pressure of your system and also controls the amount of water that your RO membranes lose as bypass flow. Opening the bypass valve will increase the flow of water coming out of the bypass hose. This will lead to a reduction in system pressure. Closing the bypass valve will decrease the amount of water flowing out of the bypass hose while increasing the system pressure. There should ALWAYS be some water flowing out of the bypass hose to prevent filter damage or loss of flow into the filling tank.



We suggest that you run your system pressure between 80-120 psi for optimal clean water generation across the RO membranes. RO filter production rates will vary with source water temperature.



Running your system pressure in excess of 130 psi will result in damage to your filters. Your pump will automatically power down when it detects excessive system pressure. When this happens, the bypass will continue leaking off pressure which will cause the pump to switch on and off. If this occurs, turn off the pump and remove any obstructions in the output lines before restarting the pump. Operating the pump with on-off cycling action for extended periods of time can damage the pump.

Filling The Tank Without Power

Although your DS9 system's RO filters are more efficient when you are using a pump to increase the system pressure, there may be times when you need to generate clean water without expending your battery or plugging into an outlet. To do this you need to disable the overflow prevention system by removing the Auto Shutoff Solenoid.

At the top of the tank there is a brass and black plastic Auto Shutoff Solenoid. Unscrew the brass fittings from each side of the Auto Shutoff Solenoid and then connect the grey RO hose directly to the brass fitting on the bulkhead on the tank. Water will now flow through the RO filter and begin filling the tank. The time it takes to fill the tank without pumps will depend on the pressure and temperature of the source water.



6. Operating The Water Output Side

The right side of the DS9 system has a TDS meter, an Intelligent Pump controller, an RO only control lever, and another pump. These devices pull water from your tank and pressurize through the hose reel for your use. They also help you decide if the water in your tank is pure enough for your cleaning application or if another round of filtration through the DI cartridge is necessary.

Basic Operations

This section will give you a basic overview of how to get water out of you tank and onto the glass. First start by opening the tank shutoff lever, located on the bottom right side of the tank. Vertical orientation (I) is open and Horizontal Orientation (--) is closed.



Attach your quick connect shut off valve to the hose reel. Turning your quick connect shut off valve to the off position will allow you to plug in the pole tubing from you brush and pole. Remember to turn the valve back on to allow water to flow into your pole tubing.



Power up the output pump by pushing the button with circle on it on your Intelligent Pump Controller (see the next section Using the Intelligent Pump Controller (page 5) for more information). This will turn the output pump on, filling your hose reel and pole tubing with water. This can take some time, depending on your pump controller setting. Shortly after, water should begin to flow from your brush.

Using The Intelligent Pump Controller

A full instruction manual for the pump controller is included with your system. Several notes that apply specifically to the DS9 are as follows. This pump controller is very easy to use. The default settings on your pump controller will work for most conditions.



The pump controller will automatically shut off when it reads high line pressure to avoid running the pump when there is a closed valve down stream. This, unfortunately, could cause your pump to cycle off at some controller settings due to the restriction caused by your brush's jets. Some users will not encounter this issue, since there are many possible brush and pole configurations, from fan jets and short poles to wide nozzle pencil jets, and multiple pole operations which bleed off even more pressure. To allow the DS9 to be useful to you in the widest range possible, we decided that the adaptability of the system was worth losing some of the higher pump control settings on some brushes and pole lengths. During our testing with 35 ft of pole tubing and fan jets, we could easily cycle from 1-6, which gave us acceptable control over our flow from an energy saving trickle to a fairly substantial jet. If you wish, the full pump controller instructions contain a manual calibration procedure that will allow you to fine tune your DS9 to your own specifications. Alternately you can just plug and play, with the understanding that your system may not use all of the numbered settings.

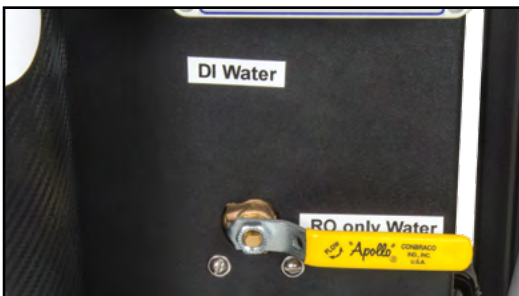
TDS (Total Dissolved Solids) Meter

The DS9 comes with an inline Dual TDS meter which takes readings from two parts of the system. The IN sensor is located near where water is pulled from the tank and can give you an idea of you tank's TDS. The OUT sensor tests the water as it is about to leave the system into the hose reel after the DI filter. Having two sensors allows users to monitor their RO filter output and DI filter output separately.



Deciding Between DI & RO Only Water

Your system comes with a lever that allows you to decide if you want to just use the tank water or if you want to clean it further using the DI filter. This is controlled on the fly with the yellow lever. No need to undo any hoses. abc recommends that water should have a TDS of less than 10ppm to clean glass spot free. Opaque surfaces can be washed with water having up to 40ppm of TDS. Ultimately the decision rests with the window cleaner if RO filtered water has low enough TDS to meet their needs or if the water needs to pass through the DI filters.



7. Using A WaterFed® Pole

As with any new procedure, practice in the use of your WaterFed® pole is the best way to achieve optimal results.

Once your DS9 system is hooked up, and you have a WaterFed® pole connected to the hose, you're ready to clean windows.

Always begin by cleaning the top row or highest windows first, including scrubbing the frames. Work the WaterFed® pole up one side of the frames, across the top, and back down the other side. Scrub the glass in an up and down motion, moving the pole the entire length of the glass with each stroke if possible.

Return the pole to the top of the window, and with a side to side motion, allow rinse water to flow completely down the surface of the glass. Frame rinsing may not be required. If the height of the glass and the weight of the pole allow for it, hold the brush slightly off of the surface of the glass to rinse. If this is not possible, move the pole side to side slowly with the brush on the glass at the top, and let the water flow down the glass to rinse.

Once you have completed the top row or highest glass on one side of the building, repeat these steps for each tier or level of glass, working your way down.

Providing a good initial scrubbing on the glass, followed by a complete rinse will ensure that the glass dries completely spot-free.

Pure water is a great natural solvent for many soils. In some cases where there are heavy soils, a pre-soak or even a double scrub & rinse may be needed to achieve optimal results. The agitation of the brush, coupled with the flow of water through the brush when scrubbing, should break down and suspend most soils, readying them for complete removal via the rinse step.

Soap Residue

A common issue encountered when transitioning buildings from traditional window cleaning methods to pure water cleaning is soap residue. After the initial cleaning with pure water, small white or gray spots and runs will be seen on the glass after drying. Most often this is soap and or detergent residue actually left behind by previous cleanings and brought out of the pores of the glass and out from under the side gaskets and seals of the glass on commercial installations by the pure water cleaning process. This condition is generally rectified by repeating the pure water cleaning process until it is eliminated.

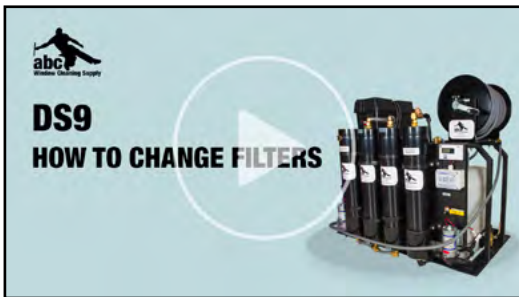
8. Shutdown

- Turn off your filling pump prior to turning off (or disconnecting) your source water. Though your DS9's pumps are diaphragm pumps that can be run dry (briefly), it is still good practice to only run them with water running through them.
- After EACH use, open the bypass fully and let the RO filters flush for 3-5 minutes. If you are letting the overflow prevention system engage just open the bypass fully for 3-5 minutes to perform a flush. Flushing the RO filters on a regular basis will prevent fouling and maximize the life of the membranes.
- Shut off the source water and disconnect the source water hose from the system.

9. Maintenance

Filter Replacement

Learn how to change your filters by video:
www.abcWindowSupply.com/DS9-Filter



Sediment/Carbon Filter

Unscrew brass fittings from the bottom of the Sediment/Carbon filter (P/N WF2CSC-21) and unscrew the two clamps holding your filter in place. Discard spent filter. Place a new filter in the clamp's saddle and attach the clamps. Reattach the brass fittings tightly enough to engage the gaskets, avoiding leaks. Over tightening could result in damage to your brass fittings.

DI Filter

Unscrew brass spider fittings from each end of the DI filter (P/N WF2CDI-21) and unscrew the two clamps holding your filter in place. Discard spent filter. Place a new filter in the clamp's saddle and attach the clamps. Reattach any brass fitting tightly enough to engage the gaskets, avoiding leaks. Over tightening could result in damage to your brass fittings.

RO Filters

The system uses two RO Filters. Remove the ½" bypass tubing from the top rear of the RO filters by pushing down on the retaining ring of the port while pulling on the tubing in the opposite direction.



Repeat for the other filter. In order to access the spent RO filter you may need to remove the DI or Carbon filters, using the same steps provided above. Unscrew brass fittings from both ends of the RO Membranes (P/N WF2CROTANK-21) and unscrew the two clamps holding your filter cartridge in place. Discard spent filter. Place a new filter in the clamps and attach the clamps. Reattach any brass fitting tightly enough to engage the gaskets, avoiding leaks. Over tightening could result in damage to your brass fittings. Re-install the bypass tubing by pushing both ends into the plastic fittings.

Other Maintenance

Your DS9 system requires little maintenance to operate at peak performance.

1. As stated above, a forward flush of your system after each use will help the ROs remain free of contaminants.

2. Periodically check your TDS, both the DI Filter and of the RO water. When the TDS coming out of the DI reaches unacceptable levels for your application (abc suggests 10ppm or less for window cleaning) you should replace both your carbon/sediment filter and your DI filter together. A rough idea of what your ROs normally put out can help you diagnose when your ROs are starting to go bad (look for water TDS that starts creeping up to unacceptable levels). Due to the wide variety of contaminants that exist, both in terms of quantity and severity, there is no hard and fast way to know when to replace your filters beyond watching the quality of the water that they produce.

3. Periodically check your systems anchor points and mounting hardware for damage and strains. The DS9 can be very heavy when full of water and the motion of transport can cause unsafe conditions if the system is not fastened securely.

4. Periodically check the electrical wiring and system for damage. Follow all manufacturer guidelines when charging batteries or using AC/DC converters to power your DS9.

10. Storage

Storage - Short Term (2-4 Weeks)

DO NOT ALLOW DI or RO Cartridges to DRY OUT. Dry DI resin tends to lose its charge (and thus its ability to attract contaminants). RO membranes tend to develop cracks which allow more dissolved solids to pass through the membrane. abc recommends that you run water through your DS9 system once every 2 weeks or so, not only to help keep your filters moist but to also wash out any microorganisms that might try to grow in your filters. Remember that if you are not running water through the DI filter when you are running the output side you could dry out your DI resin. If you are frequently cleaning with water directly out of the RO tank, you may want to run a little water through the DI filter every 2 weeks.

Storage - Long Term (Winterizing)

DO NOT ALLOW DI or RO Cartridges to DRY OUT. Dry DI resin tends to lose its charge (and thus its ability to attract contaminants). RO membranes tend to develop cracks which allow more dissolved solids to pass through the membrane. Wrap Cartridges tightly in plastic wrap or plastic bags, seal with tape. abc recommends that you run water through your DS9 system once every 2 weeks, not only to help keep your filters moist but to also wash out any microorganisms that might try to grow in your filters. Do not allow any of the filters to freeze.

11. Troubleshooting

Low supply water flow or pressure

1. Ensure feed water is open and has water to it.
2. Check all hoses for kinks or blockage.
3. Connect to alternate water source.
4. Replace DI Cartridge (P/N WF2CDI-21).

Low system pressure with low production and/or low discharge water flow

1. Verify Supply water has acceptable flow & pressure.
2. Replace DI Cartridge (P/N WF2CDI-21).

Electrical system and shut offs

1. The DS9 has two power regulators. In between the power supply and the system is a 25 amp circuit breaker which should trip and reset automatically in case of a surge. There is also a 10 amp fuse which protects the intelligent pump controller and the Output side pump, located in the DI side electrical box.

Expressed Warranty

abc Window Cleaning Supply warrants new water purification systems against manufacturing defects under normal use to the original purchaser.

abc Window Cleaning warrants new equipment for one year from the original purchase date to be free from manufacturer defect. Any parts sent out for warranty are warranted from the original purchase date of the machine.

The customer must first contact abc Window Cleaning to notify them of the problem. abc may require the merchandise to be shipped back to them at the customer's expense to evaluate the warranty claim. If the equipment is found to be a manufacturer defect abc Window Cleaning will reimburse shipping expense and parts will be sent out at no charge including standard ground shipping. Rush shipping will be the sole responsibility of the customer.

Wear items exempt from warranty include filters and membranes.

This warranty does not apply to misuse or abuse causing failure of the system. The customer must contact abc Window Cleaning before attempting any repairs or modification to the system. Failure to do so will void your warranty.

abc Window Cleaning holds no responsibility for loss of labor, time or any costs associated with using the equipment. abc Window Cleaning holds the sole discretion of whether a claim falls under warranty.

Return Policy

If for any reason the customer wishes to return the system they may do so at anytime within 30 days of the original purchase date.

The customer must first contact abc Window Cleaning Supply to notify them of their intent to return the merchandise.

The customer is responsible for the return of all merchandise and insuring that the product is properly packaged to arrive in a new resellable condition. The customer is responsible for all costs associated with returning damaged merchandise to a new resellable condition.

The customer is also responsible for a 20% restocking fee, in addition to any costs associated with shipping and repairing the merchandise to a new resellable condition. abc Window Cleaning Supply will issue a refund to the credit card on file once all repairs are completed.

Purchase Date _____



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