



FILTRATION SYSTEM

MODEL: FILTER - 5

MULTI-SHIFTER, INC.

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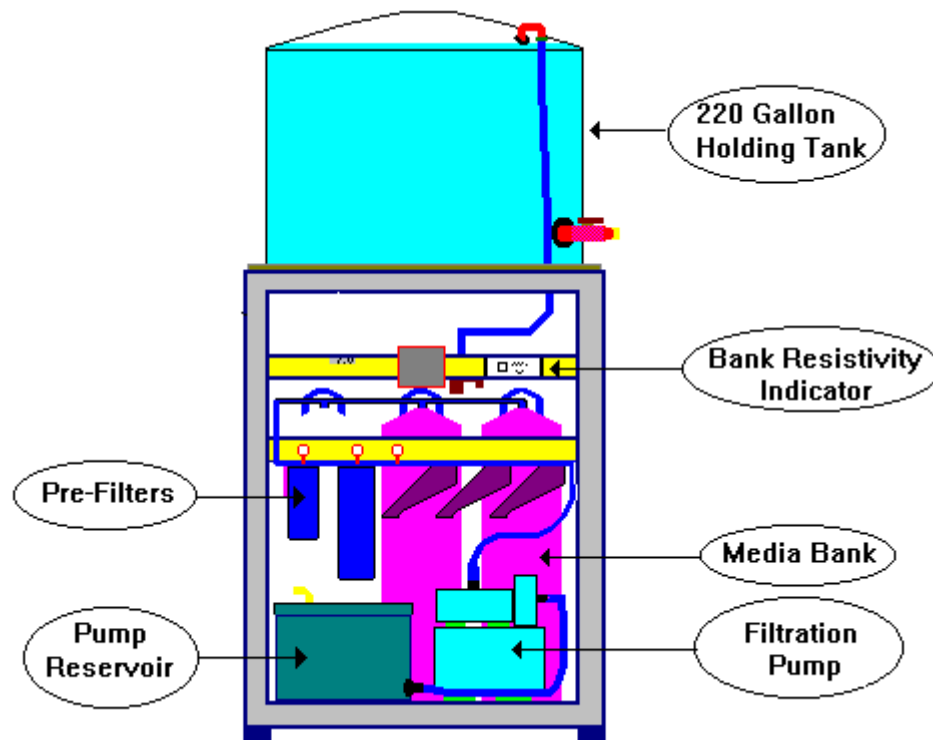
FILTRATION SYSTEM

SYSTEM OVERVIEW

The Multi-Shifter Filter-5 Filtration System is a recirculating water purification system for battery waste water. It is designed to perform two functions; first, it removes the heavy metals and other contaminants from the waste water. Second, it provides a source of clean water with which to wash your batteries.

The Filter-5 filtration system features two media tanks, a bank resistivity indicator that lets you know when your media tanks need to be recharged, a 220 gallon holding tank that captures and stores the purified water, a 15 gallon pump reservoir that stages the battery waste water before it is purified, a series of washable pre-filters followed by a 20 inch carbon filter for microorganisms and a 5 micron filter for the smaller particles, a filtration pump, and a filtration platform that maximizes floor space by taking advantage of vertical space (it measures approx. 48" square and is 10 feet tall).

Optional equipment includes a media tank bank switch option, which automatically switches the filtration process to an extra set of media tanks when the original tanks are full, and an automatic pH monitor and adjustment tank, which will automatically monitor and adjust the pH level as the water is processed.



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AIR AND ELECTRICAL REQUIREMENTS

Filtration System: One 110 volt, 20 amp outlet (system comes equipped with a 10 foot cord connected to a GFCI outlet box, 110 v. grounded male plug end).

Battery Wash Cabinet: One 110 volt, 20 amp outlet (system comes equipped with a 10 foot cord, and an 110 v. grounded male plug end). **The Multi-Shifter Battery Wash Cabinet will not operate without a minimum of 60 P.S.I. constant pressure.** If at any time the pressure drops below 60 P.S.I., the solenoid valves which regulate both air and water flow will shut down until the operating pressure is again achieved

The air requirements can be met in one of two ways. The easiest is to supply a plant air line to the top rear of the wash cabinet. *If your plant does not have a centrally located compressed air source, and you must use an independent compressor to power the wash cabinet, it will have to meet or exceed the following requirements; 5.0 horsepower, 80 gallon, two stage compressor, 200 PSI max. pressure, 20 CFM (at 90 P.S.I.) constant flow at the Battery Wash Cabinet.*

Sump Pump Drain Assembly: One 110 volt, 20 amp outlet (system comes equipped with a 10 foot cord and 110 v. grounded male plug end). The sump pump plug consists of one standard plug end, and one standard plug end with a female receptacle on its back. This is known as a piggyback plug end. Plug the piggyback plug into the wall, then plug the standard plug into its back.

Total Requirements (recommended) -

- 2(two) 110 volt, 20 amp duplex GFCI outlet boxes. The supply line to each box should contain a lockout disconnect located at or near the outlet box and be controlled by a 20 amp circuit breaker. Local code and regulation requirements may vary. Consult with a licensed electrician in your area

WASH CABINET - POWERED ROLLER
WASH CABINET - BOOSTER PUMP
WASH CABINET - SUMP PUMP
FILTRATION SYSTEM - SYSTEM PUMP

MAX AMP DRAW - 10.2 AMP AT 115 VAC
MAX AMP DRAW - 8.6 AMP AT 115 VAC
MAX AMP DRAW - 5.0 AMP AT 115 VAC
MAX AMP DRAW - 8.6 AMP AT 115 VAC

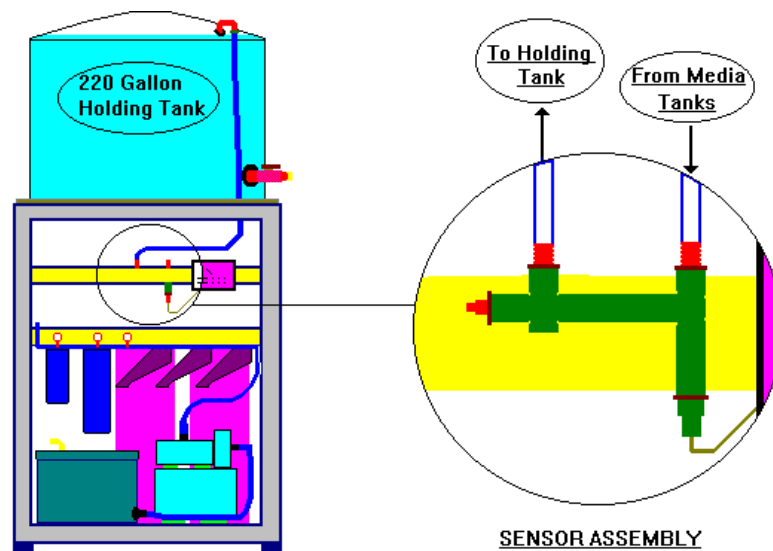
- 1(one) 3/4 inch air supply line, supplying air from a plant wide air system. The air supply must be able to supply a constant air pressure of 60 P.S.I. or greater, and a volume of 20 C.F.M (measured at the point of system connection) for a period of up to 5 minutes.

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ASSEMBLY INSTRUCTIONS

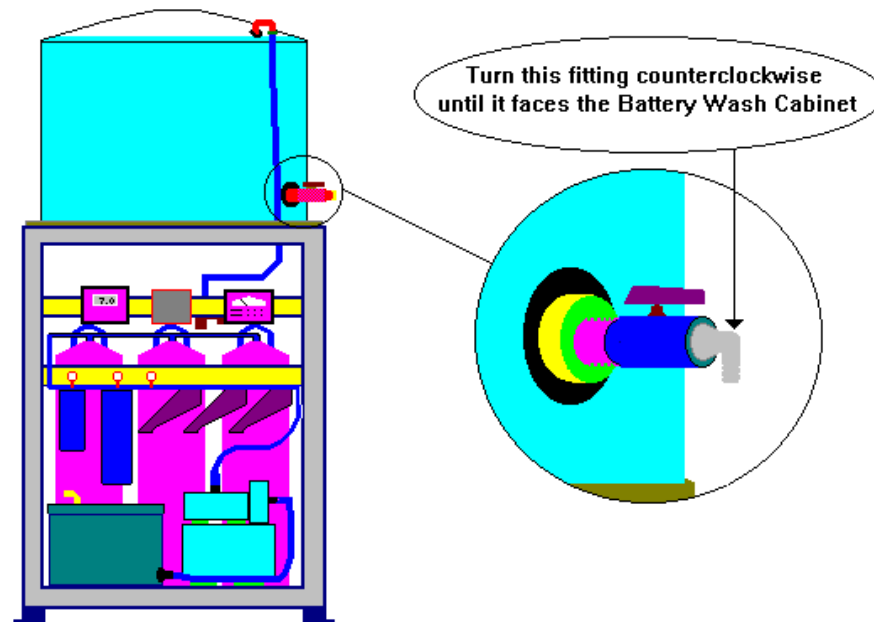
Your Filter-5 filtration system will arrive in two pieces, one being the filtration platform complete with the media tanks, monitoring system, and filtration pump, and the other piece being the 220 gallon holding tank. The first step is to set the filtration platform in place. You should have access to a layout drawing that will show the floor location of the platform. The system requires approximately 52" from front to back and 49" from side to side. Be sure that the monitoring equipment faces the front when the platform is in place so that the controls are accessible from your battery changer.

1. ___ With the filtration platform in place, remove the strapping and all other packing from the filtration platform, setting aside any loose pieces that will be needed later.
2. ___ Unpack the 220 gallon holding tank from the pallet, again setting aside any loose pieces that will be needed later.
3. ___ Check to make sure that there is a 5 to 6 foot length of hose connected to the top of the 220 gallon holding tank. When this hose is in place, hoist the empty 220 gallon holding tank onto the top of the filtration platform. The fittings and hoses should face the front right side of the filtration platform when the tank is in place.
4. ___ On the top section of the filtration platform, there is a 2 inch hole located in the front right corner. The hose connected to the holding tank should run through this hole. Align the holding tank so that the hose runs straight down through this hole.
5. ___ Once the 220 gallon holding tank is in place, connect the loose end of the holding tank hose to the sensor assembly as shown in the following diagram.



NOTE: If your Filtration System Has only two tanks, please skip to step #6.

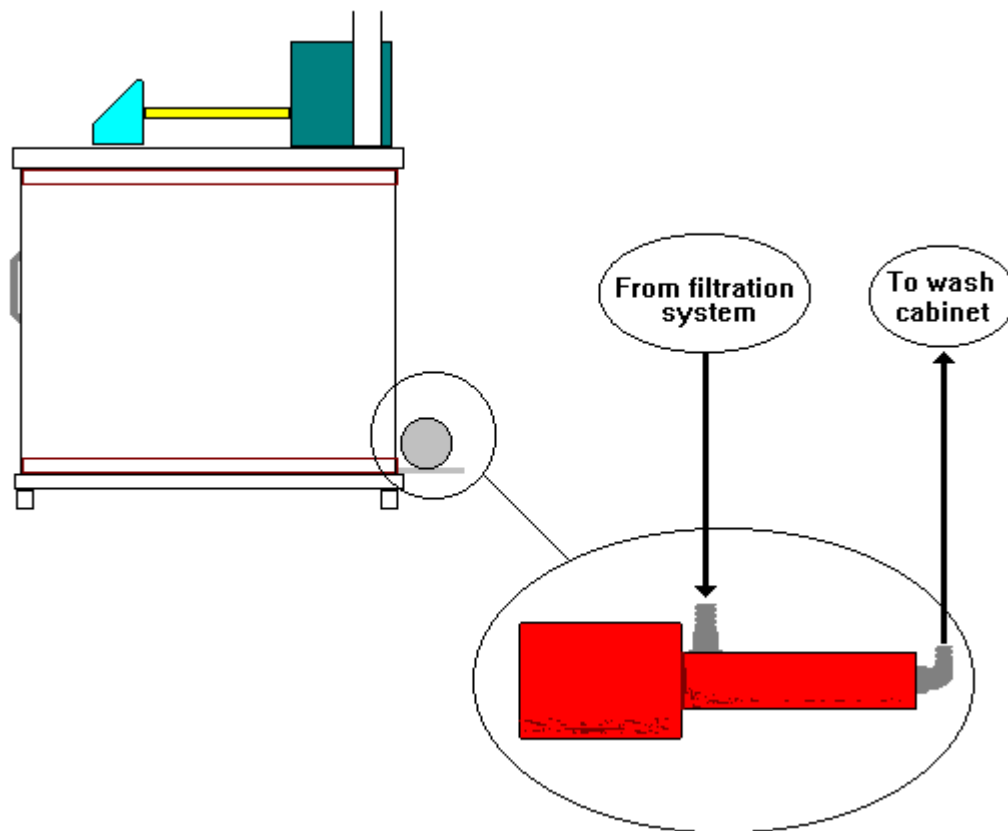
6. Determine which side of the filtration system your washer assembly will be placed (right or left). At the bottom of the 220 gallon holding tank, you will see a shutoff valve with a 90° barbed elbow fitting extending out from it. Turn the barbed elbow clockwise until it points toward the wash cabinet. (Note: the most you should have to turn this fitting is 180°, or one half of a revolution)



7. Take the longest length of 1 inch (inside diameter) hose and connect one side of it to the elbow fitting mentioned in step 6. The other side of the hose will connect to your wash cabinet. Check to make sure that this hose and fitting do not extend into the path of your battery changer. If so, adjust the position of the tank until the path for the battery changer is clear.

The following steps are for hookup to the Multi-Shifter Battery Wash Cabinet:

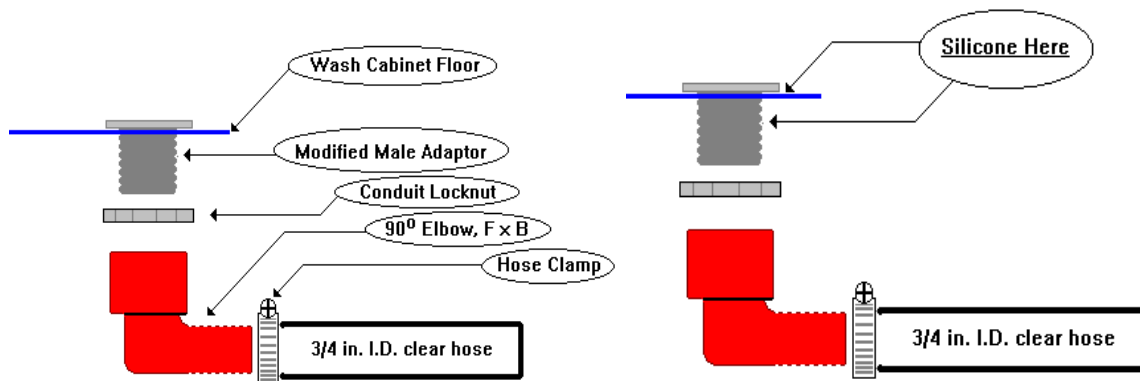
1. Once the wash cabinet is in its proper place, you can connect it to the filtration system. On the back of the wash cabinet you will find a silver and red pump motor. This is the pressurizing pump for your wash cabinet. Find the hose that is connected to the bottom of the 220 gallon holding tank. Take the loose end of the hose and run it to the top fitting on the pressurizing pump. Confirm that the path of the hose does not interfere with the travel of the battery changer or the workings of the wash cabinet. When you are sure that the placement and length are O.K., cut the hose to length and connect it to the pressurizing pump as shown in the following diagram..



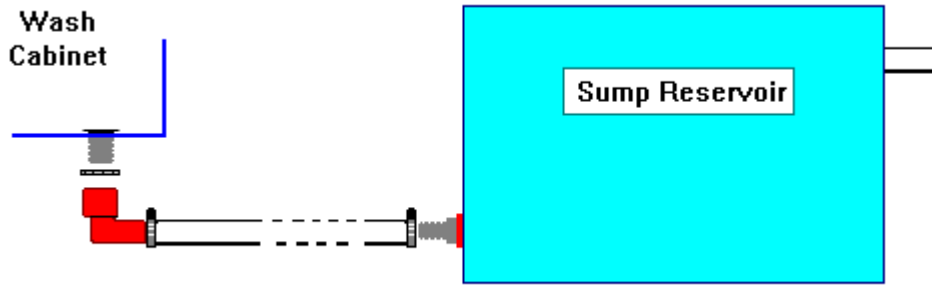
2. Check to make sure that all of the hose connections to this point are correct and that they all have hose clamps which have been tightened.
3. The next step is to hook up the washer sump drain assembly. You will need a one inch knockout to put a hole in the bottom of the wash cabinet. On some wash cabinets, the hole is put in prior to shipping, so check thoroughly before actually making the hole. If you do find a hole in the bottom of the wash cabinet, skip to step two in the following instructions.

Installing the Washer - Sump Drain Assembly

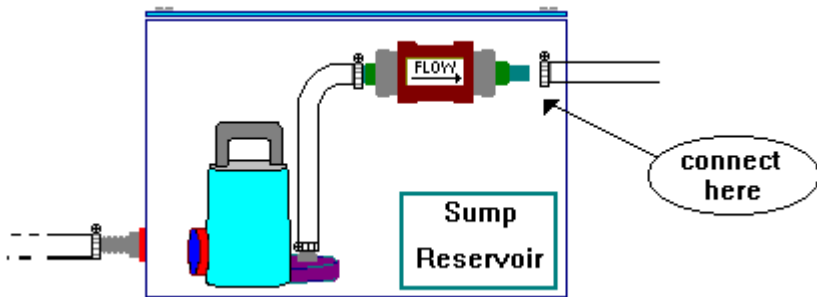
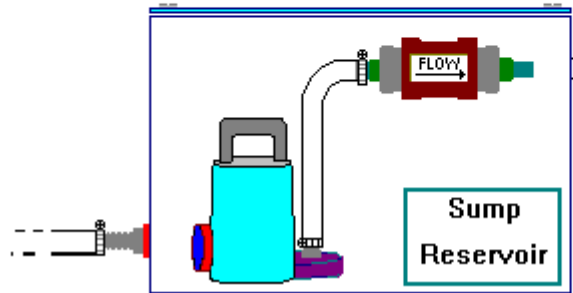
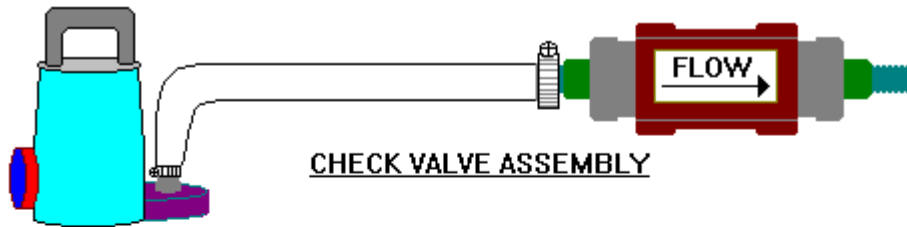
1. Locate the one inch knockout hole approximately 4 inches from both the back wall and the side wall. Either side of the wash cabinet is acceptable, but the side closest to the filtration system is preferred. The placement of the hole is not critical, so put it in a spot that is easily accessed.
2. Silicone around the edge of the hole on the inside of the washer, then place the modified male adaptor in the hole so that the threads extend down through the bottom of the wash cabinet (See diagram on following page). Put the conduit locknut securely onto the threaded end of the male adapter from the bottom of the wash cabinet.
3. Silicone the threaded end of the male adapter with a bead all the way around the fitting, then screw on the 90° elbow fitting onto the threaded end of the male adapter. The elbow fitting should point towards the back of the wash cabinet when you are done.
4. Remove the 12 foot length of 3/4 I.D hose from the blue reservoir. Connect one end of the hose to the elbow fitting located underneath the wash cabinet. Don't forget the hose clamp.



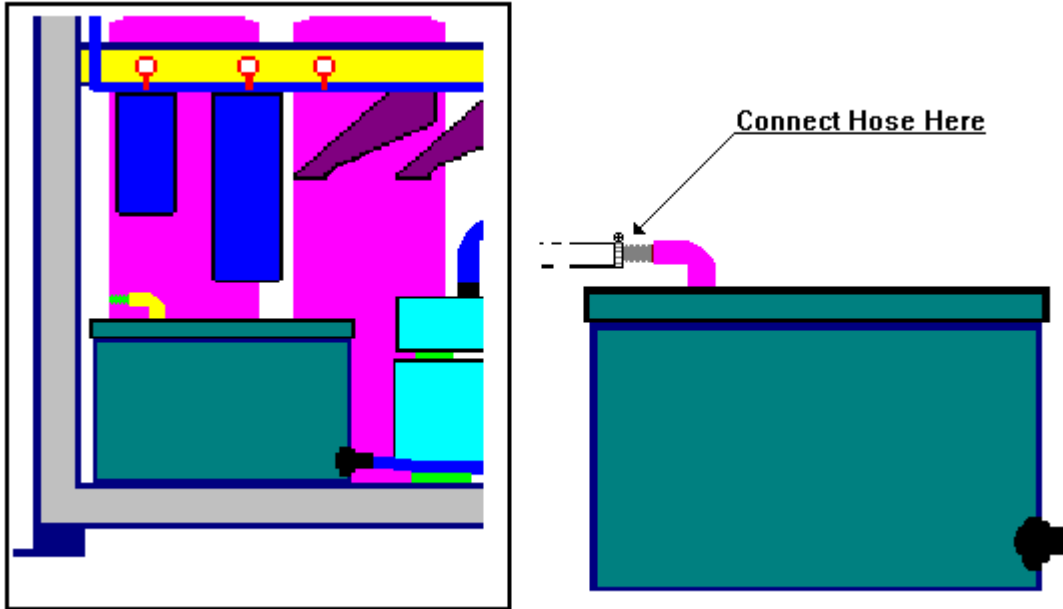
5. Place the blue sump reservoir behind the washer next to the actuator. Take the length of hose coming from underneath the wash cabinet and measure it to the barbed hose filling located at the end of the sump reservoir. Cut the hose to length and connect it to the sump reservoir via the barbed hose fitting. Don't forget the hose clamp.



6. Find the sump pump with the check valve assembly located in the sump reservoir. It should have a short piece of clear hose connecting the two pieces. Remove this assembly from the reservoir. Take the remaining length of 3/4 I.D. hose and insert it through the remaining hole in the end of the reservoir. Connect this end of the 3/4 hose to the barbed fitting on the check valve assembly. When you are done, the check valve and sump pump should be inside the reservoir. Don't forget the hose clamp.



8. Find the opposite end of the clear hose and attach it to the barbed fitting located on top of the small white rectangular holding tank at the front of the filtration system. Don't forget the hose clamp. If the fitting on top of the tank faces the wrong direction, simply remove the lid and turn it in the opposite direction.

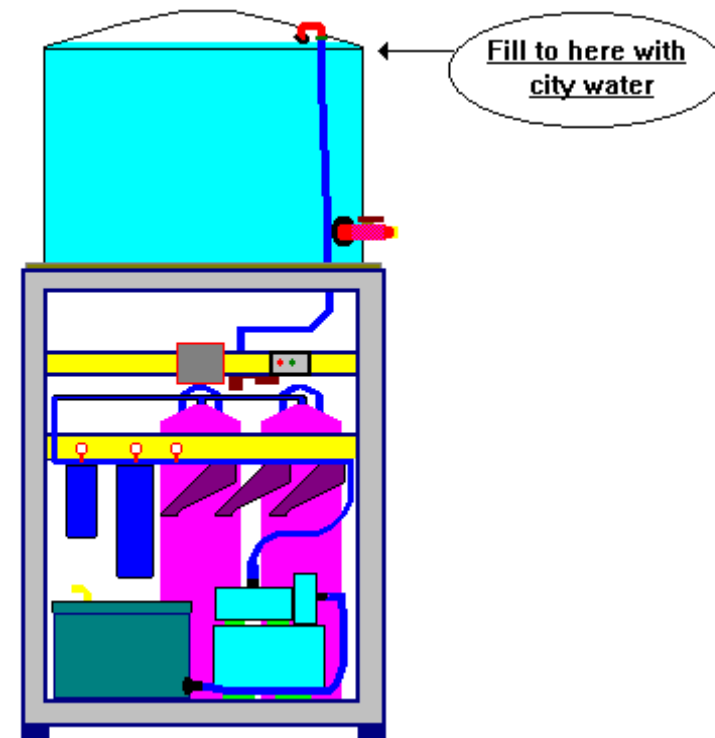


Your Filtration System and Battery Wash Cabinet are now ready to operate.

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OPERATING INSTRUCTIONS

1. Turn the shutoff valve located at the bottom of the 220 gallon holding tank to the **OFF** position. Using standard "city" water, fill the 220 Gallon holding tank until the level of the water in the tank reaches the shoulder of the tank.



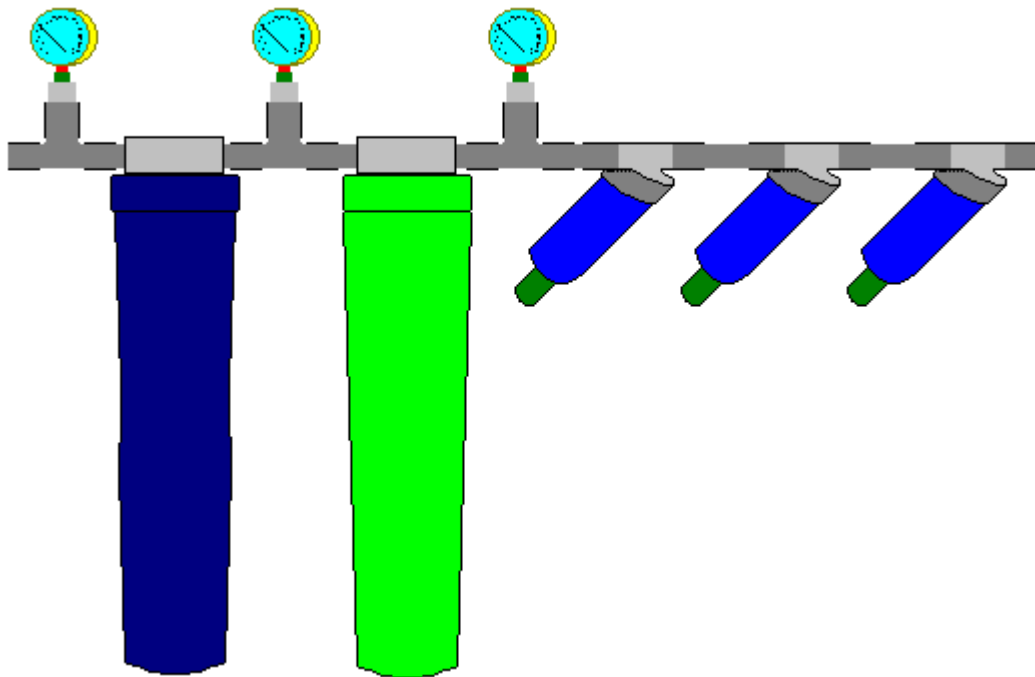
The water collected in the 220 gallon holding tank will be the water supply for your battery wash cabinet.

2. Turn the shutoff valve located at the lower bulkhead on the 220 gallon holding tank in line with the hose (open position).

3. If you have not already plugged in all of the necessary equipment, do so now. Also confirm that the bank monitor on the filtration platform is plugged in to the receptacle located on the right of the platform. Also confirm that the air supply for the wash cabinet is hooked up and turned on.

The battery wash cabinet has two solenoid valves that regulate the air and water supply. These valves are air actuated. They require a constant 60 P.S.I air supply to operate. **If your air supply drops below 60 P.S.I., the wash cabinet will not function.**

This filtration system is a closed loop system, which means that none of the waste water leaves the system. Water is supplied to the battery wash cabinet from the 220 gallon holding tank. From the wash cabinet, the waste water is pumped into a 15 gallon holding tank, where larger particles may settle. When the water level in the 15 gallon holding tank reaches the top of the tank, the filtration pump automatically turns on and forces the waste water through the filtration system process.



The first stage of the filtration system process is the washable pre-filters. These are located in the slanted black housings mounted above the filtration pump. In order of flow, they are; Two 500 micron filters (green), and One 300 micron filter (blue). These are designed to remove larger contaminants such as wood, paper, and some rust.

The next stage of pre-filters are located above the 15 gallon holding tank. In order of flow, they are; One 20 inch 5 micron polyester disposable filter and One 20 inch disposable carbon filter. These filters are designed to remove smaller particulates, including oils and solvents that may have found their way into the battery waste water. These filters are not reusable. They must be discarded when they become full.

For each of these groups of pre-filters there are pressure gages that monitor the resistance of the filters. As the filters become clogged, the amount of pressure required to push water through the system will increase. Refer to the section on Maintenance for the guidelines regarding these gages.

From the pre-filters the battery waste water is pumped into the media tanks. These are the tall beige tanks located in the rear of the filtration platform. These media tanks remove the minute contaminants from the waste water. This includes all of the heavy metals, as well as whatever particulates were not removed by the pre-filters.

After the media tanks, the water goes through the sensor bank. The sensor monitors the heavy metal level of the water, and is connected to the Bank Resistivity Monitor Light located on the right front of the filtration platform.

From the sensor, the water is pumped into the 220 gallon holding tank. At this point, the water is completely clean and ready for use in the battery wash cabinet.

pH ADJUSTMENT

From time to time, it is a good idea to check and adjust the pH level of your purified water.

There are any number of pH analysis kits available to you, either at your local pool supply store or through a water analysis company. If you cannot find one locally, contact your Multi-Shifter dealer and he can provide you with one at a small charge. Since this filtration system is a recirculating system, and the water is never discharged, the monitoring of the pH level in your water is not time critical. However, it is a good idea to keep the pH level from drifting too low. As a general rule, when the pH measures 5.0, you should add a pH neutralizer to bring it back up to 7.0, or neutral. The filtration system will initially put out water with a pH of around 6.5. As the filtration system gets used more and more, the effluent pH level will begin to drop slightly.

DO NOT USE BAKING SODA OR ANY GRANULATED NEUTRALIZING AGENT TO ALTER THE pH LEVEL OF YOUR WASTE WATER.

The use of granulated neutralizer will shorten the life of both your pre-filters and your media tanks. Use a liquid neutralizer such as Multi-Shifter Neutralizing Conditioner available from your Multi-shifter dealer. Add to the holding tank the necessary neutralizing agent to achieve a pH close to 7.0.

READING THE BANK RESISTIVITY

THE BANK INDICATOR LIGHT

The Bank Resistivity Indicator Light will indicate the ability of your media tanks to effectively remove the contaminates from your battery waste water. The light operates in relation to a critical level of contamination, called the "set point". The set point is established and locked in before the system leaves the factory. As long as the resistance of the water is above the set point, your filtration system will operate normally. When the resistance of the water drops below the set point, the media tanks need to be replaced. As long as the quality of the water is *GOOD*, the *GREEN* light will remain on. When the water quality level drops below the set point, the RED light will come on, indicating that the water quality is BAD, and the media tanks need to be replaced.

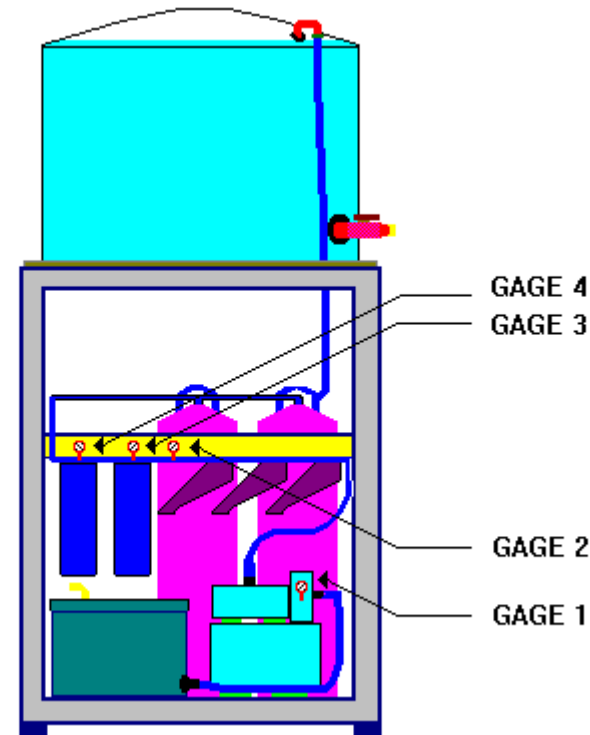
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MAINTENANCE PROCEDURES

The Filter-5 Filtration System requires little maintenance. The area that will require the most attention is the pre-filter cartridges. The pre-filters are designed to collect most of the waste particles that enter the battery wash system. The majority of solid material that enters the filtration system is not considered hazardous. Most of the larger particles of waste are actually rust from the battery case, or paper and other trash that have been left on top of the battery prior to the wash cycle. The pre-filters are designed to prevent these items from clogging up the more expensive media tanks. Because they are designed to collect most of the waste solids, these must be rinsed clean or replaced on a regular basis.

READING THE GAGES

The pressure gages located in line with the pre-filters are there to help you better monitor the life of your disposable cartridges. They should allow you to see at a glance which filters, if any need to be replaced. The gages will help you to determine two vital characteristics of the filtration system; (1) back pressure, and (2) pressure drop.



The main pressure for the entire filtration system is supplied by the filtration pump. Built on to the pump is a pre-set pressure gage (gage 1). This gage should range between 7 and 40 PSI. Below are the most commonly encountered situations in reading these gages.

GAGE 2 LOW: If the first gage on the pre-filter reads 10 PSI or more lower than the filtration pump pressure gage, you need to clean the reusable pre-filters

GAGE 4 HIGH: If the last gage goes above 30 PSI, you need to call Culligan

GAGE 2 HIGH, GAGE 3 LOW: If the difference between the first gage and the second gage on the filter bank is greater than 10 P.S.I., you need to replace the 20" polyester filter

GAGE 3 HIGH: If the second gage on the filter bank is 10 P.S.I. above normal, you need to replace the 20" carbon filter

The above figures are merely guidelines to help you get an understanding of the relationship between the pressure gages and the pre-filters. As you use and maintain the filtration system, the PSI point at which some action must be taken will become more specific, allowing you to quickly monitor the performance of your system.

CLEANING THE WASHABLE PRE-FILTER CARTRIDGES

The washable pre-filter cartridges are easy to clean and maintain. You will need a bucket of adequate size (5 gallon) to collect the drain water. The washable pre-filter cartridges should be cleaned at least once a week.. This is based upon a system with 20 batteries, washing each battery once a day. If you have more batteries, you may find that you need to clean them more frequently.

1. Unplug the Wash Cabinet Sump Pump from the wall so that the filtration system will not operate.
2. The procedure for cleaning the pre-filter elements is the same for each one. Only one will be explained here.
3. At the bottom of each cartridge is a orange handle. Place the bucket under the cartridge and open the valve by turning the orange handle in line with the cartridge. This will drain the cartridge of excess water. When the water stops, unscrew the cartridge housing and remove the pre-filter. The solids will be on the inside of the pre-filter.
4. Remove the lid from the 15 gallon holding tank. This holding tank can be used as a rinse basin for cleaning your pre-filters. You can gently scrub the inside of the pre-filter with a tube brush, but be careful not to damage the filter screen.

5. Replace the pre-filter in the cartridge. BE SURE THAT THE PRE-FILTER CARTRIDGE IS PLACED IN THE CORRECT CARTRIDGE HOUSING WHEN REINSTALLING. Again, in order of flow and color they are green, green, then blue. The pre-filters decrease in micron size from the holding tank to the media tanks. If the pre-filters are placed in the wrong cartridge housing, the filtration system may experience inadequate flow through the system.

REPLACING THE 20 INCH POLYESTER-FILTER (5 MICRON)

1. Unplug the Wash Cabinet Sump Pump from the wall so that the filtration system will not operate.
2. Remove the lid from the 15 gallon holding tank.
3. Unscrew the filter housing and dump the spent filter, into the bucket. Some excess water will come out of the lines, so be prepared to catch as much as you can in the 5 gallon bucket
4. Allow the lines to empty. When this is done, simply place the new filter element into the blue housing and screw the housing back into the housing cap. Your system is ready to run again.

REPLACING THE 20 INCH CARBON-FILTER

1. Unplug the Wash Cabinet Sump Pump from the wall so that the filtration system will not operate.
2. Remove the lid from the 15 gallon holding tank.
3. Unscrew the filter housing and dump the spent filter, into the bucket. Some excess water will come out of the lines, so be prepared to catch as much as you can in the 5 gallon bucket
4. Allow the lines to empty. When this is done, simply place the new filter element into the black housing and screw the housing back into the housing cap. Your system is ready to run again.

REPLACING THE MEDIA TANKS

Once the media tanks are full (as indicated by the Bank Resistivity Indicator Light), the media tanks must be replaced.

1. As before, unplug the Wash Cabinet Sump Pump from the wall so that the filtration system will not operate.
2. Disconnect the hoses at the top of those media tanks needing replacement. Do not discard these hoses. You will need them to hook up the replacement tanks.
3. Locate the white plug end caps that come with the filtration system. They should be in a separate bag stored on the filtration system.
4. First, cap the media tanks so that they do not leak in shipment.
5. With the remaining caps, plug the hoses directly in the flow path. There are enough caps to accomplish both of these tasks.
6. Contact Culligan Inc. at 1-800-999-4195. Tell them that you have expired your Multi-Shifter Filtration system media tanks, and need to exchange them for new ones. They will then tell you how to ship them back to the Culligan factory and when you can expect your new tanks.



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REPLACEMENT PARTS

	A033	8	EA.	BOLT 5/16"-18 X 1-1/4" HHCS
	A034	4	EA.	HEX NUT 5/16-18
	B042	4	EA.	HHCS 1/4-20 X 3/4 STAINLESS
<u>43</u>	B043	9	EA.	HEX NUT 1/4-20 STAINLESS STEEL
<u>44</u>	B044	6	EA.	HHCS 1/4-20 X 1" STAINLESS
	B045	15	EA.	LOCK WASHER 1/4 SPLIT SS
	B046	12	EA.	FLAT WASHER 1/4 SAE SS
	B079	4	EA.	HEX NUT 1/4-20 NYLON INSERT
	B272	4	EA.	FLAT WASHER- 5/16 SAE
	B273	2	EA.	SPLIT LOCK WASHER 5/16 ZINC
	B773	1	EA.	FLAT WASHER 1" SAE ZINC
<u>29</u>	NUA-344	1.00	FT.	EXTRUDED PLASTIC ANGLE
<u>47</u>	WM9999	1	EA.	HANGER, NYLON 1 1/4 #40
	WRB-143	20.00	FT	14-3 S/O
	50-636	3	EA.	CONN., STRAIN RELIEF
	300068	10	EA.	CLAMP, WORM DRIVE HOSE STYLE
<u>30</u>	300069	4	EA.	CONDUIT LOCKNUT 3/4
	300161	6	EA.	CLAMP, WORM DRIVE HOSE STYLE
<u>35</u>	300162	1	EA.	TANK, 15GAL, 18X12X18
	300178	1	EA.	GASKET - 3.25 OD X 2 ID X 1/8T
	400021	1.00	FT.	THREADED ROD, 5/16-18 X 3FT.
<u>24</u>	402070	4	EA.	ANCHOR BOLT, W/FLAT WASHER&NUT
	500006	1	EA.	TERMINAL SOCKET
<u>50</u>	500012	2	EA.	120 OUTLET PLUG
	504002	1	EA.	RELAY SWITCH
	504034	2	EA.	OUTLET, 2 PLUG GFCI
<u>51</u>	509006	1	EA.	OUTLET BOX, WATER PROOF
<u>52</u>	509007	4	EA.	OUTLET BOX PLUG, WATER TIGHT
<u>17</u>	600045	3	EA.	PRESSURE GUAGE, 1/4"MPT
<u>46</u>	600046	1	EA.	SWITCH, PIGGYBACK FLOAT



36	601011	2	EA.	3/4 X 2 1/2 NIPPLE
4	601029	11	EA.	3/4 CLOSE NIPPLE
	601030	1	EA.	3/4 TEE SCHEDULE 80
37	601042	8	EA.	MALE HOSE NIPPLE NYLON SCH 80
	601043	1	EA.	FEM NYLON HOSE FITTING
7	601072	4	EA.	3/4 SCH. 80 PVC TEE T X T X T
5	601075	9	EA.	ELBOW SCH. 80, 90 TXT THREADED
11	601122	4	EA.	COUPLING, 3/4 F X F THREADED
38	601134	1	EA.	1X3/4 HEX M TO FEM REDUCE BUSH
8	601167	3	EA.	BUSHING -THREADED REDUCER 3/4
9	601168	5	EA.	ADAPTER, (BARBED) PVC 3/4 X 1
10	601172	2	EA.	BULKHEAD, TANK ADAPTOR
11	601173	1	EA.	ADAPTER 1 1/4 PVC 80 SXM(MALE)
12	601174	1	EA.	BUSHING-SXF THREADED (FEMALE)
13	601175	1	EA.	ADAPTER, (BARBED) PVC 1 X 1
14	601176	2	EA.	NIPPLE 1-C1- 1/2 X 1 1/2 LG
18	601177	1	EA.	THREADED BUSHING
39	601179	2	EA.	1 X 3/4 MPT X BARB, STRAIGHT
6	601181	2	EA.	90 DEGREES ELBOW M X B, 1"
41	601182	1	EA.	90 DEG ELBOW FEM. X BARB 3/4
	601196	1	EA.	ELBOW, 90DEG, 1-1/2" PVC 80
	601197	1	EA.	BUSHING,REDUCER,1 1/2-3/4 PVC
	601202	1	EA.	REDUCER BUSHING, PVC
	602013	6.00	FT	HOSE, 3/4 GRAY BRAIDED
	602057	15.00	FT	HOSE, 3/4 CLEAR FLEXIBLE VINYL
	602117	25.00	FT	HOSE, 1"ID x 1.5OD, CLEAR VINYL
	603013	1	EA.	UNION BALL CHECK VALVE, SUMP BOX
16	603066	1	EA.	1" PVC BALL CHECK VALVE
19	603067	1	EA.	SHUTOFF VALVE, 1x1
	604008	1	EA.	SUMP PUMP, SUMP BOX
	604017	1	EA.	BOOSTER PUMP, WASHER
64	809002/14	2	EA.	FILTERS/ CARBON (12/CASE)
65	809002/16	4	EA.	FILTERS, 5 MICRON, 20"
	809002/17			FILTER KIT 24 FILTERS, 4 BAGS
31	880009	1	EA.	FILTER BAG
	880010			SPRAY HEAD, REPLACEMNT
	900007	1.00	QT	NEUTRA CLEAN BATTERY CLEANER
	900008	1.00	QT	NEUTRALIZING CONDITIONER