

Ultra Pure Systems

Hydro Cart

Reverse Osmosis / Deionizing water production machines
designed for water fed pole window cleaning.

OPERATIONS MANUAL



IPC Eagle

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System Overview



The following information is provided to help you understand how the system operates.

- Pure water production volume on any Reverse Osmosis system is temperature dependant. Colder feed water, i.e. the late fall, winter and early spring will produce a lower volume (gpm) of pure water. Warmer water, i.e. late spring, summer and early fall will produce a higher volume (gpm) of pure water.
- The reverse osmosis (RO) portion of this system will remove 98% of the total dissolved solids (TDS) from the feed water. If your water supply is 200 parts per million (ppm), then the RO product water will be 4 ppm. If your supply water is 700 ppm, then your RO water will be 14 ppm.
- The RO product water then flows through the deionizing (DI) resin which removes the balance of the dissolved solids, giving you water at 0 ppm TDS. The DI resin acts like sponge that absorbs dissolved solids. Once it is full, it has to be replaced. In the example shown above, the RO water at 4 ppm will give a DI resin cartridge life of 3000 gallons. The RO water at 14 ppm will give a DI resin cartridge life of 900 gallons. (Without the RO system, running 200 ppm water through the DI cartridge would yield 150 gallons of pure water and the 700 ppm water would yield 21 gallons of pure water.)
- The HydroCart Battery machine uses a 12 volt DC electric driven diaphragm pump to boost the feed water pressure to 80 - 90 psi at 1.8 gallons per minute flow rate. This higher and consistent feed pressure produces more than enough pure water for 1 pole at any height and any operating condition.
- The HydroCart Electric machine uses an electric motor to boost the feed water pressure up to 130 psi. This higher feed water pressure produces a much higher volume of product water, enough for 2 poles at any height and operating condition. It also has a concentrate recirculation system to decrease waste water volume.
- The Sediment filter removes all solid particles larger than 5 microns in size from the feed water. This filter should be replaced after 5,000 gallons of feed water has passed through it. (6000 gallons for the electric unit)
- The Carbon block filter removes the chlorine from the feed water. Chlorine will damage the RO membranes and make them ineffective. The carbon block can only hold a finite amount of chlorine. It must be replaced after 5,000 gallons of feed water have passed through it. (6000 gallons for the electric unit)
- Short term and long term storage is an important issue. The system must be protected from algae and bacteria growth in the pressure vessels caused by stagnant water. The membranes and DI resin must not be allowed to dry out either. Please see the **Storage** section in this manual for proper instructions.
- The unit must be protected from freezing.

Two Pole Operation

The only machines that will produce enough pure water to feed two or more poles simultaneously is the electric and gas powered unit. The water flow to each pole is affected by hose length, hose diameter and vertical height differences between the two poles. Water flows to the path of least resistance, so the pole setup with the shorter hose and/or shorter pole height, will get more of the water flow. Use the ball valves at the end of the hoses to regulate and balance the flow between the two poles.

Note: When using a Tucker Mfg. Co. pole with the HydroCart, the nozzles must be replaced with the smaller, non-standard orifice. This will give the brush the appropriate amount of spray water force to rinse the glass.

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New Machine Setup Procedure

1. **Unpack unit** and inspect machine for shipping damage.

2. **Take inventory** of the following items shipped along with the unit.

- Qty. 1 - RO membrane.
- Qty. 1 - DI resin cartridge.
- Qty. 1 - Sediment filter cartridge, 5 micron.
- Qty. 1 - Carbon block filter cartridge.
- Qty. 1 - Large filter housing wrench.
- Qty. 1 - Small filter housing wrench.
- Qty. 1 - Tee pipe cap removal tool.
- Qty. 1 - 100 ft. hose for pure water to pole.
- Qty. 1 - Magic Lube - o-ring lubricant.
- Qty. 1 - TDS meter

2. **Install membrane**, prefilters and DI cartridge as per instruction on pages 4 & 5.

RO Membrane Installation



1. Remove the safety cap on the top of the pressure vessel by turning the plug counterclockwise. Lift cap off.

2. Using your fingers, grab the tab on the white plastic snap ring and pull towards the center to remove.

3. Screw the Tee Pipe Cap Removal Tool into the cap on top of the pressure vessel.

4. Rock tool back & forth to unseat cap. Lift up and remove cap and o-ring.

5. Remove RO membrane from sealed bag.

6. Apply a thin film of o-ring lubricant onto the small tube on the bottom of the RO Membrane.

7. Insert the membrane into the pressure vessel with large white rubber seal positioned on top.

8. Carefully place cartridge down into pressure vessel, push down until it is firmly seated.

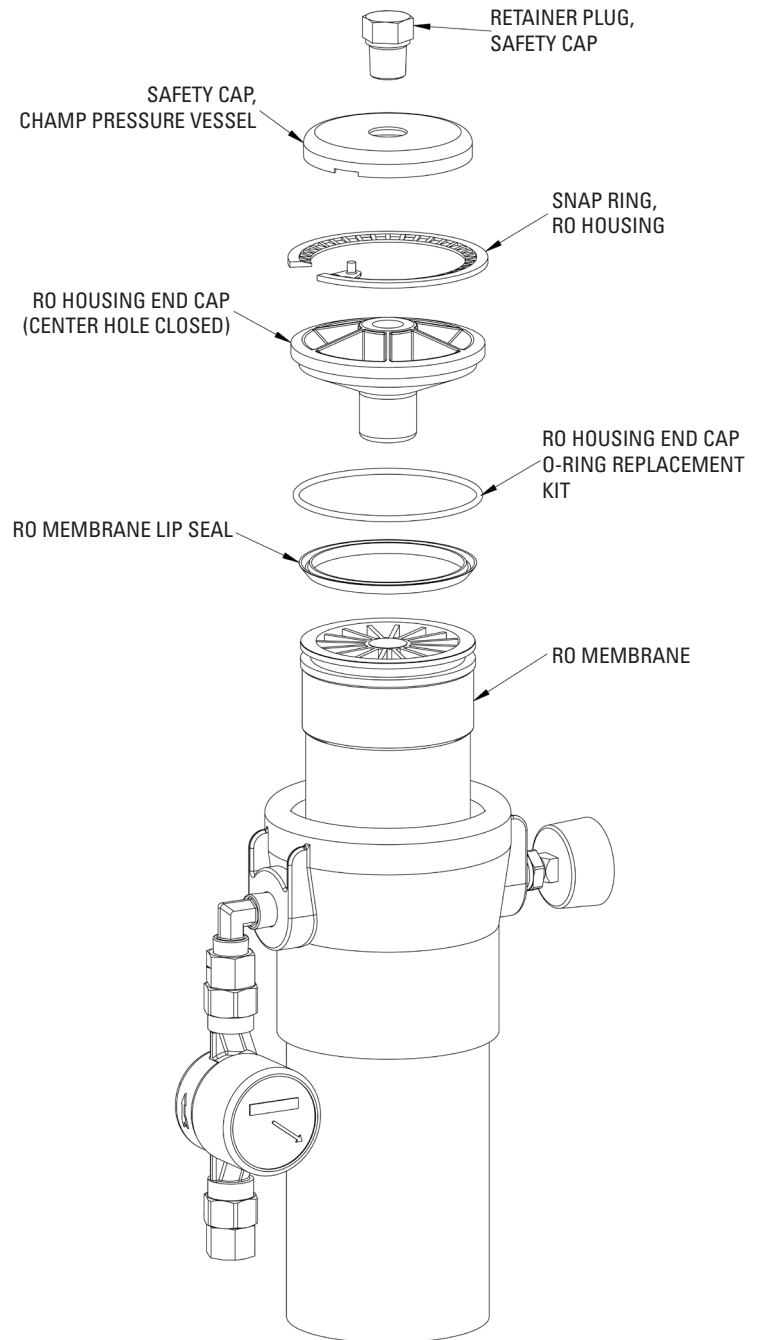
9. Apply a thin film of o-ring lubricant onto the o-ring and insert into housing.

10. Firmly press cap down into the top of the pressure vessel until it is seated.

11. Replace white plastic snap ring into the groove. Start with the tail end and work in around towards finger tab end. Ensure that it is fully seated all the way around the entire diameter.

12. Place the safety cap on top with the slot covering the tab portion of the snap ring. The safety cap should fit on the inside diameter of the snap ring.

13. Install the plug retainer by turning it clockwise until it is snug against the safety cap.



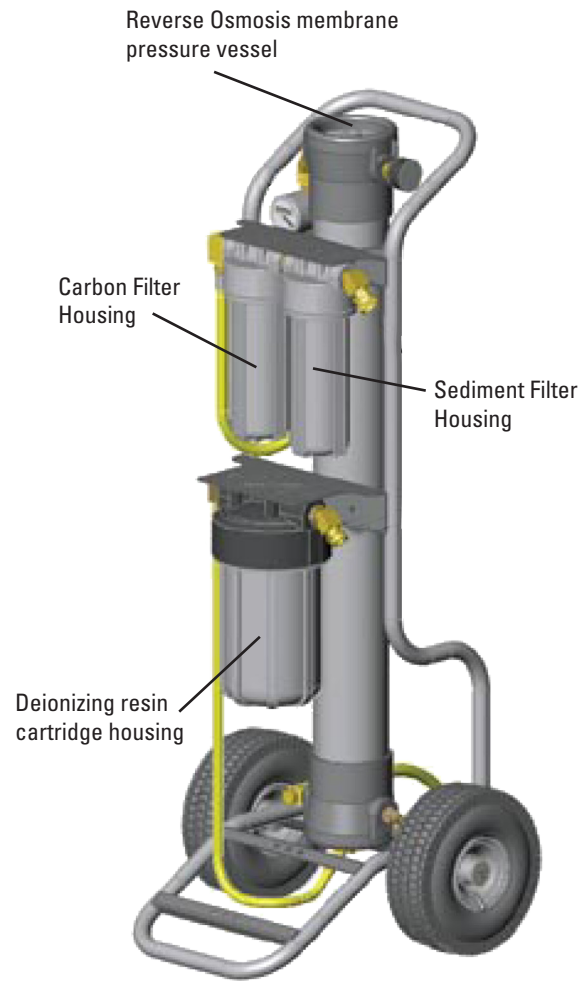
Prefilter Installation



Filter placement: As you face the unit from the front:

- The **5 micron sediment filter cartridge** is the first filter the feed water goes through. Install it in the housing on the right side, next to the water supply hose inlet fitting.
- The **carbon block cartridge** is the second stage filter and goes into the housing on the left side.

1. Slide the small filter housing wrench up from under the bottom of the white housing and turn CCW to loosen. Remove the tool and spin housing completely off.
2. Lubricate both o-rings on housing with Magic Lube o-ring lubricant.
3. Remove plastic wrapping on new filter cartridge. Position center hole on shouldered ring on bottom of housing.
4. Screw housing into base and tighten with small filter housing wrench.
5. Repeat steps a - d for the second filter.



DI resin cartridge Installation:

1. Slide the large filter housing wrench up from under the bottom of the gray housing and turn CCW to loosen. Remove tool and spin housing completely off.
2. Lubricate o-rings on housing with Magic Lube o-ring lubricant.
3. Remove cartridge from the sealed bag and place into housing with seal washer in the up position and locate the bottom hole on shouldered ring inside the bottom of the housing.
4. Screw housing into base and tighten with filter housing wrench.

HydroCart Operating Instructions

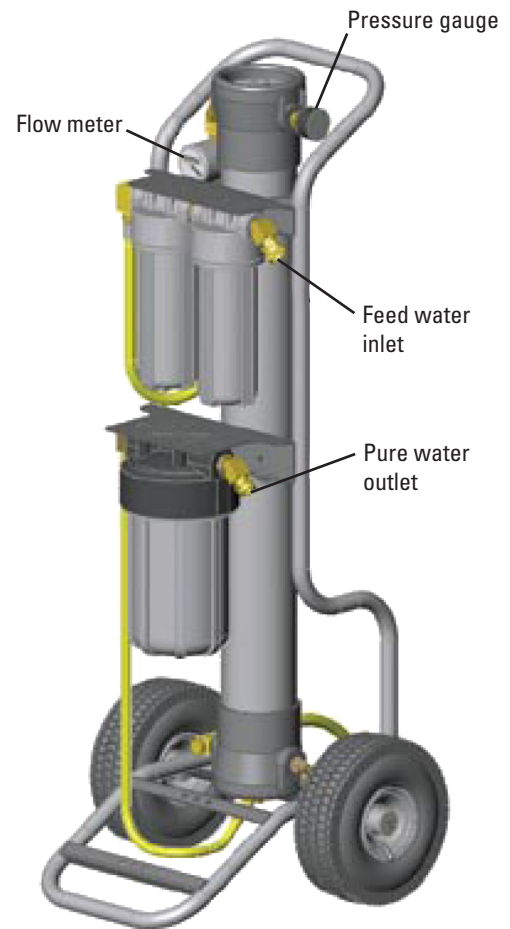


SETUP

1. The machine may be operated standing upright or lying down. Choose the position that offers the most stability at the job site.
2. Chose a location close to the water supply tap if possible. Extension garden hoses may be used but must be 5/8 inch inside diameter or larger to minimize line pressure loss. Additional extension garden hoses may decrease system volume production rate.

STARTUP

1. Connect water supply garden hose to feed water inlet connection.
2. Connect the yellow 100 ft hose to pure water outlet connection.
3. Connect wash pole hose to the other end of the 100 foot hose.
4. Connect waste water hose to an area that can accept the water such as shrubs, trees, grass or drainage that leads to a storm drain. Attach an extra garden hose if needed to reach the desired area.
Note: The waste water will not harm any plant life. It is just tap water with a higher total dissolved solids content.
5. Turn on water supply.
6. Open the flush valve to bleed air from system.
7. Close the flush valve when air has been cleared from system.
8. Check pressure on gauge, minimum 40 psi.
9. Test water at the brush using the handheld TDS meter. Water should be less than 10 ppm.
10. Use the ball valve at the pole to adjust desired amount of pure water supplied to brush.



SHUTDOWN

1. **IMPORTANT:** Open the flush valve to allow water to flush out the RO membranes for 1 minute.
2. Turn supply water off.
3. Open pure water ball valve to relieve pressure in the line. Close valve.
4. Close flush valve after pressure has bled off.

Maintenance



DAILY

IMPORTANT: After the last use of the day, open the flush valve for 1 minute to flush the concentrated water from the membrane. This will increase the life of the membrane.

PREFILTERS

Every 5000 gallons of feed water run through the machine as indicated by the totalizing flow meter.

- Replace the 5 micron Sediment filter.
- Replace the Carbon block filter.

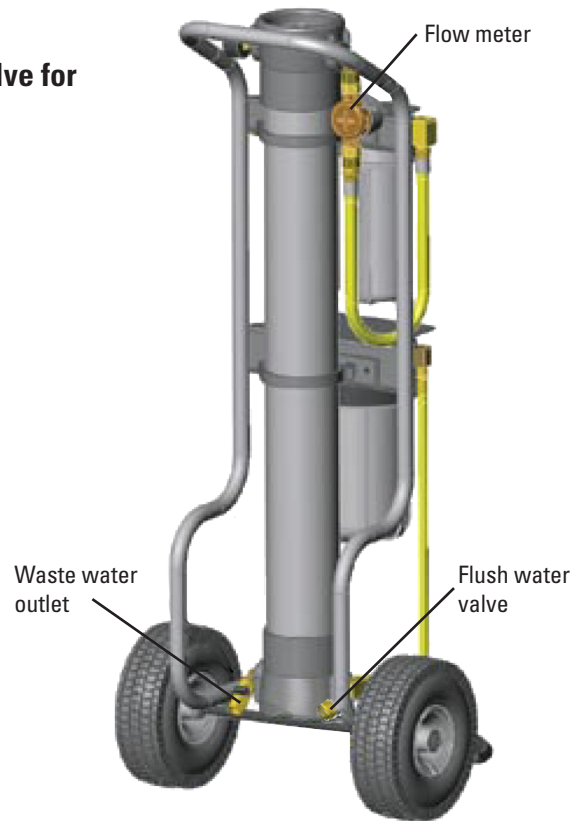
DI RESIN CARTRIDGE

The life expectancy of the DI resin cartridge is based on the TDS level of the RO water going into it. The RO will remove 98% of the TDS from the feed water.

Example: The feed water supply from a garden hose at your job site has a TDS of 300 ppm. The RO will remove 98%, so the water going into the DI resin cartridge will be at 6 ppm. (2% of 300 ppm)

The TDS levels of the feed supply water can vary at each job site due to the water coming from different sources. The chart below will give you an estimated life based on an average of the supply water.

The supply water temperature will affect the pure water production rate from the RO. This will affect the estimated reading for DI cartridge replacement as well. Test the water daily to determine when a change in water quality has occurred and use that to determine when the cartridge needs to be replaced.



Supply Water TDS (ppm)	DI Cartridge capacity (gallons)	Flow Meter Reading (total gallons)
100	7150	15,000
150	4767	10,500
200	3575	7,800
250	2860	6,300
300	2400	5,250
350	2050	4,500
400	1800	4,000
450	1550	3,500
500	1200	2,900

HydroCart Electric Operating Instructions



SETUP

1. The machine may be operated standing upright or lying down. Choose the position that offers the most stability at the job site.
2. Chose a location close to the water supply tap if possible. Additional extension garden hoses may decrease system volume production rate.

STARTUP

1. Connect water supply garden hose to feed water inlet connection.
2. Connect the yellow 100 ft hose to pure water outlet connection.
3. Connect wash pole hose to the other end of the 100 foot hose.
4. Plug GFCI into a properly grounded 115 volt outlet. Test and reset the GFCI. When using an extension cord, make sure the cord is the correct size gauge and suitable for outdoor usage. We recommend the following length and size.

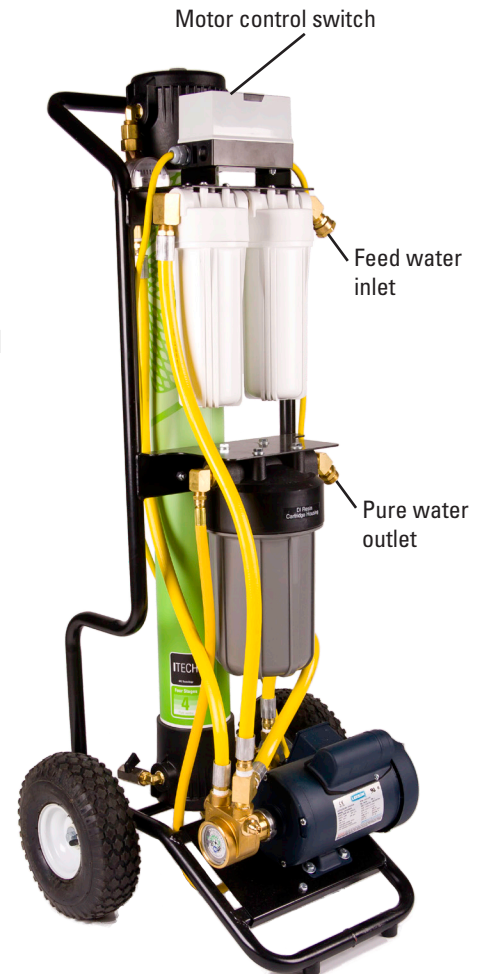
- 1st 50 ft. use a 3 wire, 14 gauge cord.
- From 50 to 150 ft, use a 3 wire, 12 gauge cord

Note: If using a generator, it must be a 3500 watt peak power or larger.

5. Connect waste water hose to an area that can accept the water such as shrubs, trees, grass or drainage that leads to a storm drain. Attach an extra garden hose if needed to reach the desired area.

Note: The waste water will not harm any plant life. It is just tap water with a higher total dissolved solids content.

6. Turn on water supply.
7. Open the flush valve to bleed air from system.
8. Turn motor switch ON by pressing the BLACK push button.
9. Close the flush valve when air has been cleared from system.
10. Check pressure on gauge. Normal operating pressure is 120 - 150 psi.
11. Test pure water quality using the handheld TDS meter. Water should be less than 10 ppm.
12. Use the ball valve at the pole to adjust desired amount of pure water flow supplied to brush.



SHUTDOWN

1. **IMPORTANT:** Open the flush valve to allow water to flush out the RO membranes for 1 minute.
2. Turn motor switch **OFF** by pressing the **RED** push button.
3. Turn supply water off.
4. Open pure water ball valve to relieve pressure in the line. Close valve.
5. Close flush valve after pressure has bled off.

Maintenance

DAILY

IMPORTANT: After the last use of the day, open the flush valve for 1 minute to flush the concentrated water from the membrane. This will increase the life of the membrane.

PREFILTERS

Every 5,000 gallons of feed water run through the machine as indicated by the totalizing flow meter.

- Replace the 5 micron Sediment filter.
- Replace the Carbon block filter.

DI RESIN CARTRIDGE

The life expectancy of the DI resin cartridge is based on the TDS level of the RO water going into it. The RO will remove 98% of the TDS from the feedwater. **Example:** The feed water supply from a garden hose at your job site has a TDS of 300 ppm. The RO will remove 98%, so the water going into the DI resin cartridge will be at 6 ppm. (2% of 300 ppm)

The TDS levels of the feed supply water can vary at each job site due to the water coming from different sources. The chart below will give you an estimated life based on an average temperature and TDS of the supply water.

The supply water temperature will affect the pure water production rate from the RO. This will affect the estimated reading for DI cartridge replacement as well. Test the water daily to determine when a change in water quality has occurred and use that to determine when the cartridge needs to be replaced.

Supply Water TDS (ppm)	DI Cartridge capacity (gallons)	Flow Meter Reading (total gallons)
100	7150	15,000
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300	2400	5,250
350	2050	4,500
400	1800	4,000
450	1550	3,500
500	1200	2,900

Setup & Charging Procedure for HydroCart Battery



1. The following items are included with the battery powered unit:
 - Qty. 1 - 12 volt Deep cycle type, sealed, maintenance free gel battery.
 - Qty. 1 - Battery charger for gel type battery only.
2. Join together the quick-connect coupler from the battery to the quick-connect coupler from the pump control box. See drawing on next page.
3. The switch on the pump control box is a circuit breaker type switch. In the event of a pump circuit overload, the breaker can be reset by turning it to the OFF position and then restarting.

Battery System Operation

To obtain optimum battery life, each battery should be discharged down to 30% of capacity before being placed on the charger. The control box has a battery level indicator that will illuminate **GREEN** until the remaining charge drops below 40%. Then it will change to **YELLOW** until the charge drops to 30% remaining and will then change to **RED**, indicating that the battery needs to be recharged immediately.

The unit run time is approximately 12 hours on a fully charged battery.

Battery Charging

1. Plug charger into a 115 VAC outlet.
2. Disconnect the battery connector from the control box and connect it together with the quick-coupler on the charger.

There are 3 indicator lights on the charger. RED - First phase of charge in progress.

YELLOW - Second phase of charge in process.

GREEN - End of charge cycle.

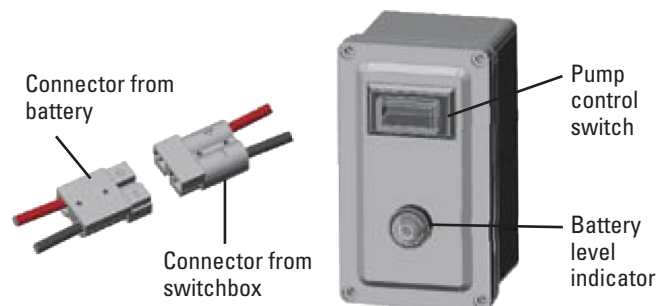
Note: Battery charge cycle takes approximately 5 hours.

Do not remove from charger until charge cycle is complete as indicated by the **Green** light on the charger. Short cycle charging will cause permanent damage to the gel battery and will affect the useful life. The charger will never overcharge the battery. Only use the gel battery charger supplied with machine.

Operating Instructions for HydroCart Battery

The operation and maintenance for the HydroCart Battery unit is exactly the same as the HydroCart unit as explained on page 6 of this manual. The pump operational instructions are as follows:

1. After the RO system is up and running, turn the pump control switch ON. Note: The pump motor has a built in pressure switch that will automatically stop the pump when the system pressure reaches 100 psi and will restart when the pressure drops.
2. When shutting down at the end of the job, turn the pump control switch to the OFF position.
3. Open the ball valve and relieve all the pressure from the hose.



RO Protect™

RO Membrane Protection & Storage Solution



A Open drain/flush valve located at the bottom of the RO pressure vessel.



B Pour entire package of RO Protect™ into 1 gallon of pure water or distilled water, mix thoroughly ensuring all powder has been dissolved.



Note: RV antifreeze (propylene glycol) may be used if freeze protection for system is required.

C Hydro Cart & RODI Cart System

HydroTube™



Use waste water hose to connect the inlet and waste outlet creating a closed loop.

Ultra Pure series Hydro Cart & RODI cart system long term storage instructions

System Preparation:

1. Remove sediment filter and carbon filter, empty water. Reinstall empty housings.
2. Open drain/flush valve located at the bottom of the RO pressure vessel. (see fig. A)
3. Remove safety cap on top of RO pressure vessel.
4. Remove DI resin cartridge or DI sock. Reassemble empty DI pressure vessel.
5. Allow DI resin cartridge or sock to drain for an hour. Then wrap it securely in plastic to prevent it from drying out. Store indoors to protect from freezing.
6. Disconnect pure water discharge hose or hose reel. Drain majority of water from hose.

RO Protect Solution preparation and application:

1. Pour entire package of RO Protect™ into 1 gallon of pure water or distilled water, mix thoroughly ensuring all powder has been dissolved. Note: RV antifreeze (propylene glycol) may be used if freeze protection for system is required. (see fig. B)
2. Use waste water hose to connect the inlet and waste outlet creating a closed loop. (see fig. C)
3. Slowly pour solution into the top of the open RO pressure vessel(s). Close drain/flush valve when solution starts coming out, filling pressure vessel(s) to the top. (see fig. D)
4. Allow time for solution to settle into the membrane, top off as needed, reinstall all covers and store.

System Restart procedure:

1. Install new carbon and sediment filters.
2. Connect water supply hose to inlet, open drain/flush valve, turn on water (turn on pump motor if applicable).
3. Allow solution to flush for 10 minutes then close flush valve.
4. Allow system to run for 5-10 minutes. Check pure water flow rate and TDS level to ensure system is operating properly.
5. Shut down system.
6. Install DI resin cartridge or sock.
7. System is now ready for use.

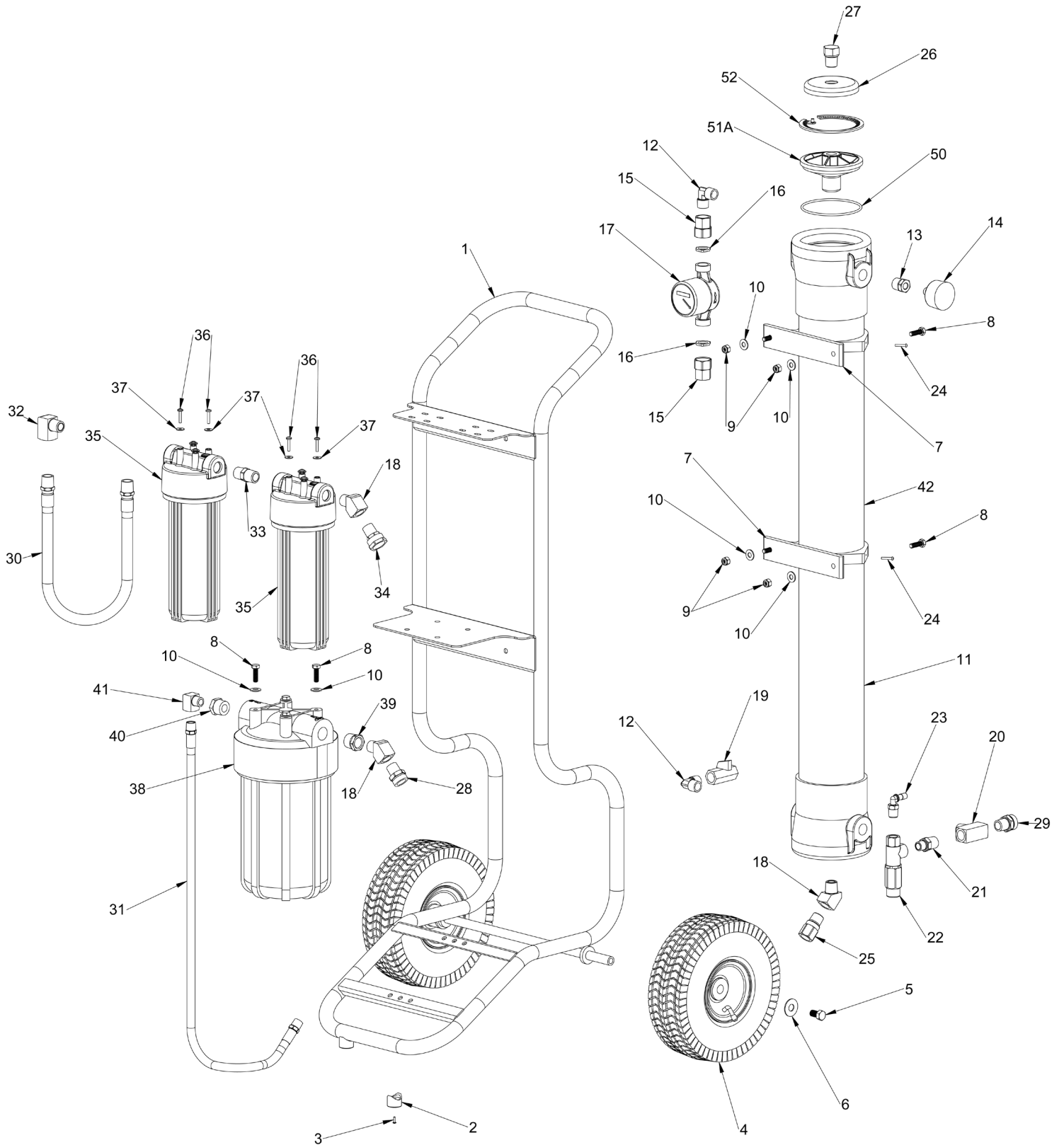
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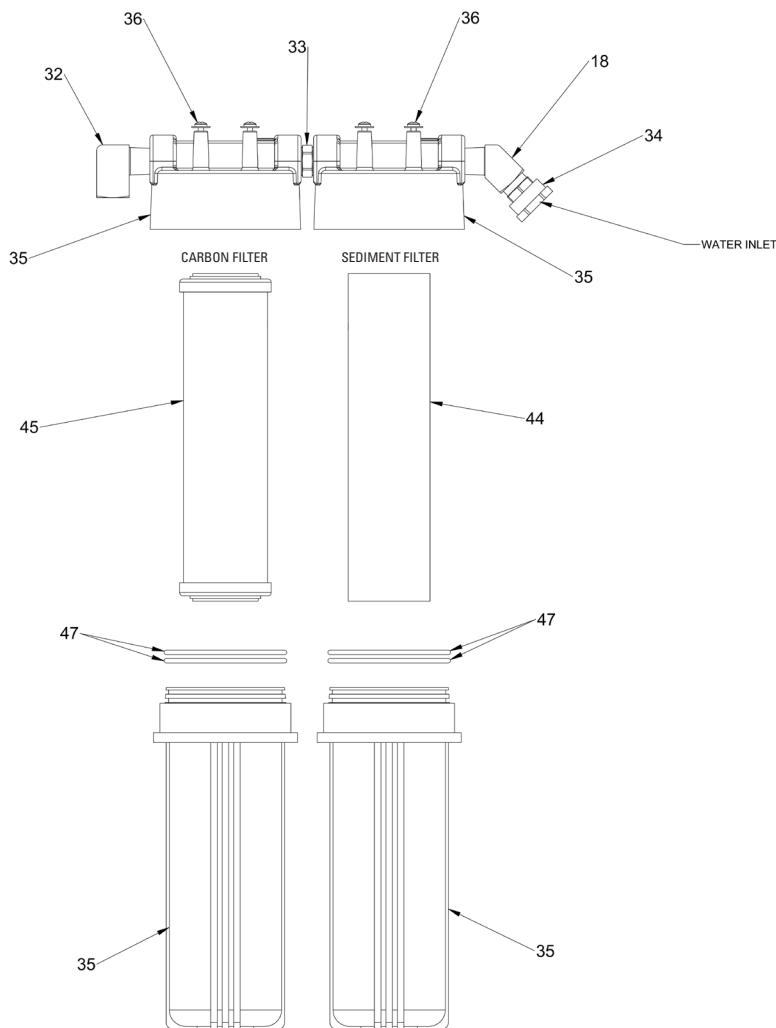
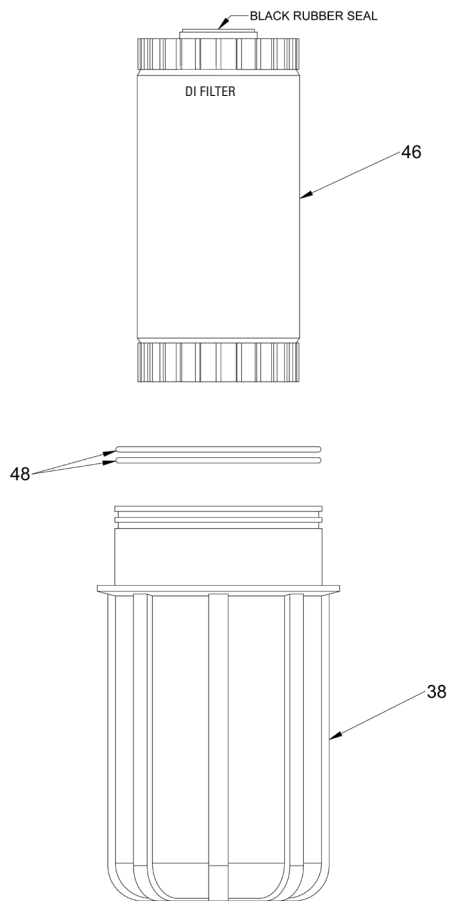
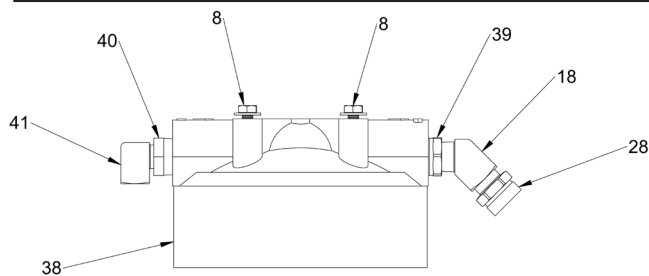
Slowly pour solution into the top of the open RO pressure vessel(s). Close drain/flush valve when solution starts coming out, filling pressure vessel(s) to the top.

MSDS - www.ipceagle.com/MSDS

Exploded Parts View - HydroCart

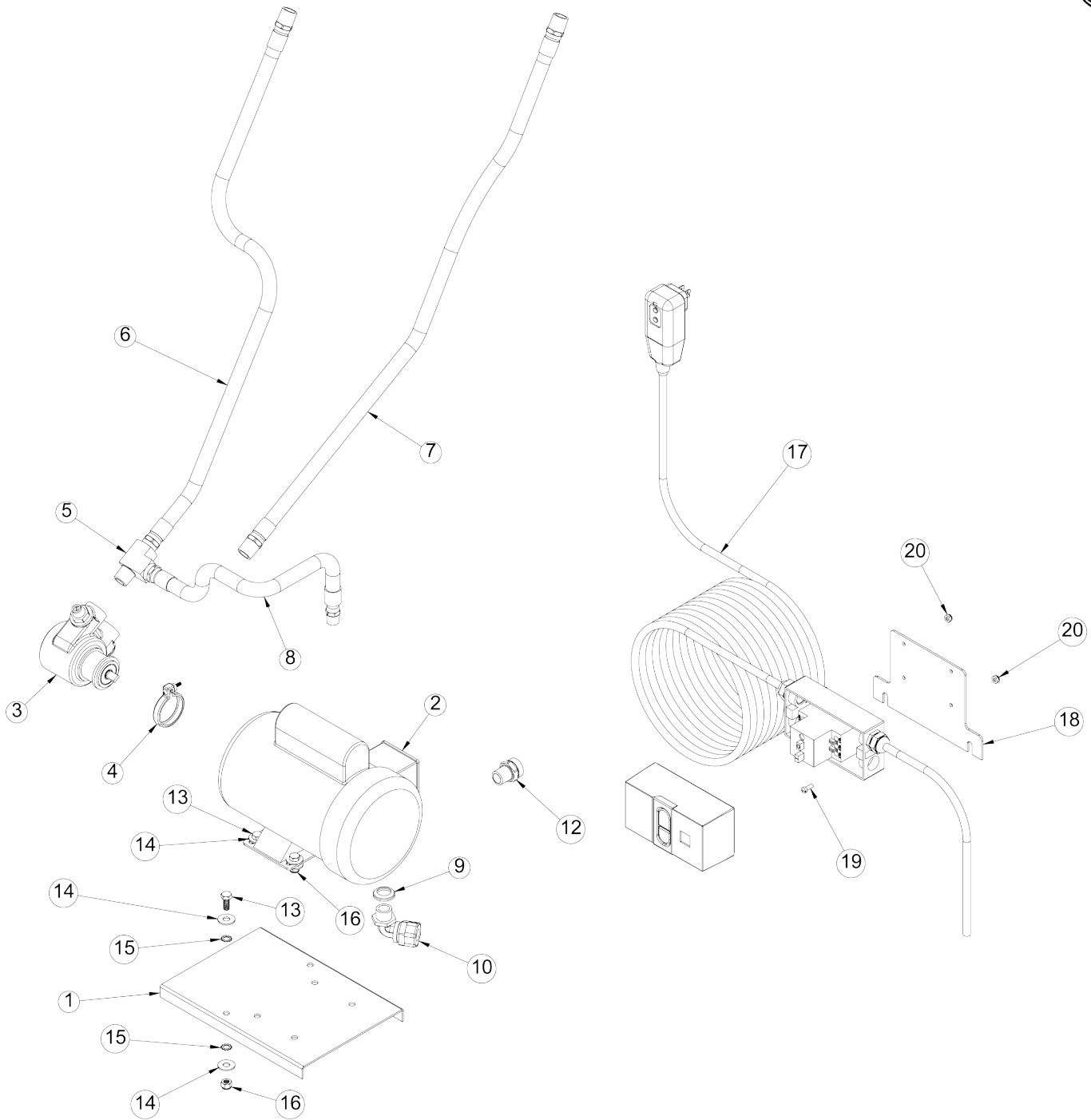


Parts List - HydroCart



ITEM	PART NO.	DESCRIPTION	QTY	U/M	31	BD505101	HOSE ASSEMBLY, 3/8 NPT M	1	EA
1	BD505093	HYDROCART FRAME ASSEMBLY	1	EA	32	BD515058	FITTING, 1/2" NPT STREET ELBOW	1	EA
2	BD515218	BUMPER, NYLON HYDROCART FRONT	2	EA	33	BD515114	FITTING, 1/2" NPT MALE HEX	1	EA
3	BD515217	POP RIVET, 3/16" DIA. X .375 LONG	2	EA	34	BD515092	GARDEN HOSE FITTING 1/2NPTMx3/4	1	EA
4	BD505005	WHEEL, 10" DIAMETER	2	EA	35	BD505104	SLIMLINE PREFILTER HOUSING	2	EA
5	BD413501	BOLT, 7/16-20 X .75 HHCS	2	EA	36	BD407001	SCREW, #10-14 PHILLIPS PAN	8	EA
6	BD434000	WASHER, 7/16" FLAT	2	EA	37	BD430003	WASHER #10 SAE FLAT	8	EA
7	BD515210	CLAMP, 4" NYLON SADDLE	2	EA	38	BD505025	PRE-FILTER PRESSURE VESSEL	1	EA
8	BD411509	BOLT, 5/16"-18 X 1" HHCS	8	EA	39	BD515157	FITTING, REDUCER BUSHING 3/4" NPT-M X 1/2" NPT-F	1	EA
9	BD442000	NUT, 5/16-18 NYLOCK	4	EA	40	BD515213	FITTING, REDUCER BUSHING 3/4" NPT-M X 3/8" NPT-F	1	EA
10	BD432001	WASHER, 5/16" USS FLAT	8	EA	41	BD515036	FITTING, STREET ELBOW 3/8" NPT	1	EA
11	BD505099	PRESSURE VESSEL, 4 X 40	1	EA	42	BD545186	LABEL, HYDROCART PRESSURE	1	EA
12	BD515070	FITTING, 1/2" NPT MALE ELBOW	2	EA	43	BD545132	RO MEMBRANE	1	EA
13	BD515139	FITTING, REDUCER HEX BUSHING 1/2" NPT-M X 1/4" NPT-F	1	EA	44	BD505107	SEDIMENT FILTER	1	EA
14	BD515200	PRESSURE GAUGE 0-200 PSI	1	EA	45	BD505108	CARBON BLOCK FILTER	1	EA
15	BD505100	WATER METER, ADAPTER FITTING	2	EA	46	BD500117	DI FILTER CARTRIDGE	1	EA
16	BD505012	WASHER, SEAL	2	EA	47	BD545155	SLIMLINE HOUSING O-RING REPLACEMENT KIT	1	EA
17	BD515155	WATER METER	1	EA	48	BD505133	BIG GREY HOUSING O-RING REPLACEMENT KIT	1	EA
18	BD515117	FITTING, 1/2" NPT X 45° STREET ELBOW	3	EA	49	BD545133	RO MEMBRANE LIP SEAL	1	EA
19	BD515074	VALVE, MINI BALL ADAPTER	1	EA	50	BD545157	RO HOUSING END CAP O-RING REPLACEMENT KIT	1	EA
20	BD515071	FITTING, 1/2" NPT MALE TEE	1	EA	51A	BD505084-CL	RO HOUSING END CAP (CENTER HOLE CLOSED)	1	EA
21	BD515126	FITTING, REDUCER HEX BUSHING 1/2" NPT-M X 3/8" NPT-F	1	EA	51B	BD505084-OP	RO HOUSING END CAP (CENTER HOLE OPEN)	1	EA
22	BD545114	SAFETY RELIEF VALVE	1	EA	52	BD505072	SNAP RING, RO HOUSING	1	EA
23	BD545119	FITTING, NYLON 3/8"NPT-M X 3/8" HB	1	EA	53	BD515090	FILTER WRENCH, LARGE (NOT SHOWN)	1	EA
24	BD407003	SCREW #6-19 X 3/4" LONG	2	EA	54	BD515214	FILTER WRENCH, SMALL (NOT SHOWN)	1	EA
25	BD515220	CHECK VALVE	1	EA	55	BD515091	PLUG REMOVAL ASSEMBLY TOOL (NOT SHOWN)	1	EA
26	BD505117	SAFETY CAP, CHAMP PRESSURE VESSEL	1	EA	56	BD515153	MAGIC LUBE (NOT SHOWN)	1	EA
27	BD505118	RETAINER PLUG, SAFETY CAP	1	EA	57	BD545179	HAND HELD TDS METER (NOT SHOWN)	1	EA
28	BD515221	FITTING 1/2"NPT MALE X 3/4" GH-MALE	1	EA	58	BD505079	100 FT HOSE ASSEMBLY (NOT SHOWN)	1	EA
29	BD500104	ASSEMBLY, 2 LPM FLOW REGULATOR	1	EA	59	BD505014	BALL VALVE 3/4" F-GH X 3/4" M-GH (NOT SHOWN)	1	EA
30	BD505105	HOSE ASSEMBLY, PRE-FILTER TO WATER METER	1	EA	60	HRCH	WASTE WATER DRAIN HOSE (NOT SHOWN)	1	EA

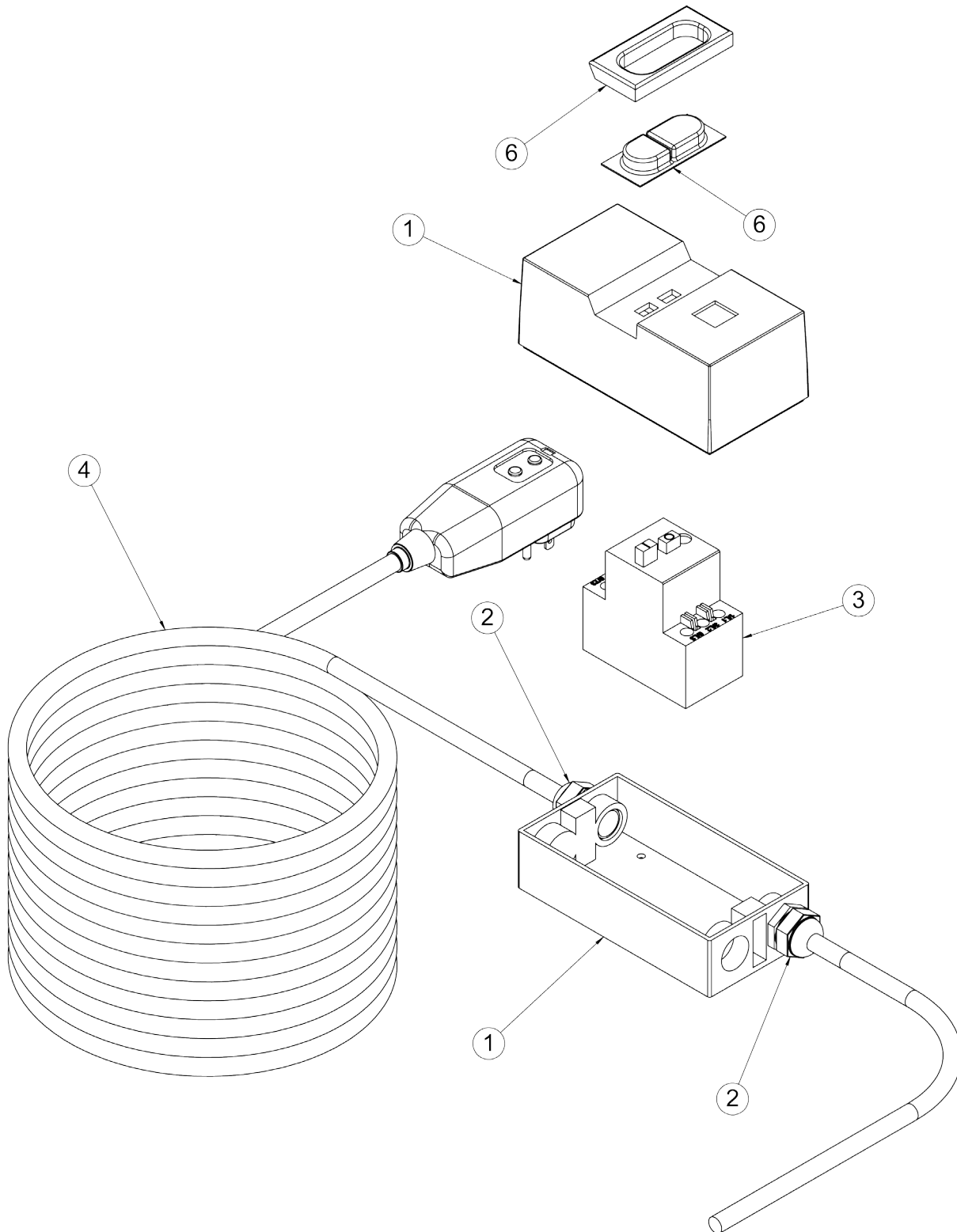
Exploded Parts View - HydroCart Electric



ITEM	PART NO.	DESCRIPTION	QTY
1	BD505094	BASE PLATE - ELECTRIC	1
2	BD505112	MOTOR, CARBONATOR PUMP, 1/2HP	1
3	BD505111	PUMP, ELECTRIC MODULE 701	1
4	BD515216	PUMP CLAMP RING	1
5	BD515121	FITTING, 1/2" NPT STREET TEE	1
6	BD505210	HOSE ASSEMBLY, PRE-FILTER TO WATER METER INLET	1
7	BD505213	HOSE ASSEMBLY, PUMP DISCHARGE TO WM INLET	1
8	BD505214	HOSE ASSEMBLY, PUMP BY-PASS	1
9	BD515165	SEALING GASKET RING	1
10	BD515179	90DEGREE CORD GRIP, 1/2" NPT	1

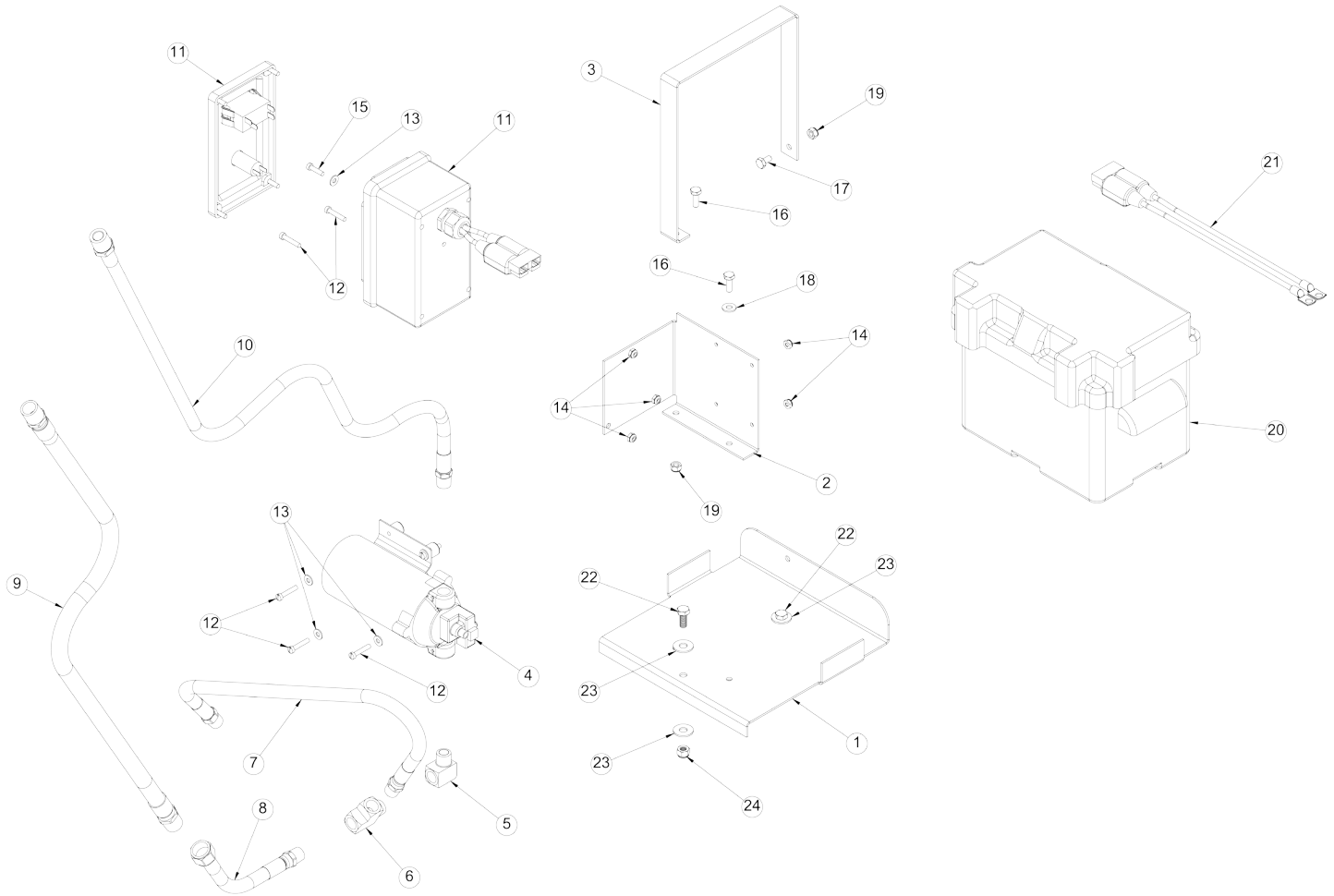
ITEM	PART NO.	DESCRIPTION	QTY
11	BD515166	SEALING LOCK RING (NOT SHOWN)	1
12	BD500105	ASSEMBLY, FLOW REGULATOR ELECTRIC	1
13	BD411505	BOLT, 5/16 - 18 X 3/4" HHCS	6
14	BD432001	WASHER, 5/16 USS FLAT	12
15			1
16	BD442000	NUT, 5/16-18 NYLOCK	6
17	BD505077	SWITCH BOX ASSEMBLY, US	1
18	BD545112	SWITCH MOUNTING PLATE	1
19	BD408006	SCREW, #10-24 X 1/2" LONG FILLISTER HEAD	2
20	BD440001	NUT, #10-24 NYLOCK	2

Exploded Parts View - HydroCart Electric



ITEM	PART NO.	DESCRIPTION	QTY
1	BD545109	SWITCH BOX, MOTOR START/STOP SWITCH	1
2	BD515173	CORD GRIP, PG-13.5	2
3	BD545120	MOTOR START/STOP SWITCH US	1
4	MECB93840	GFCI PLUG WITH CORD ASSEMBLY	1
5	BD545110	SWITCH COVER - IP67 COMES WITH COVER SEAL (NOT SHOWN)	1

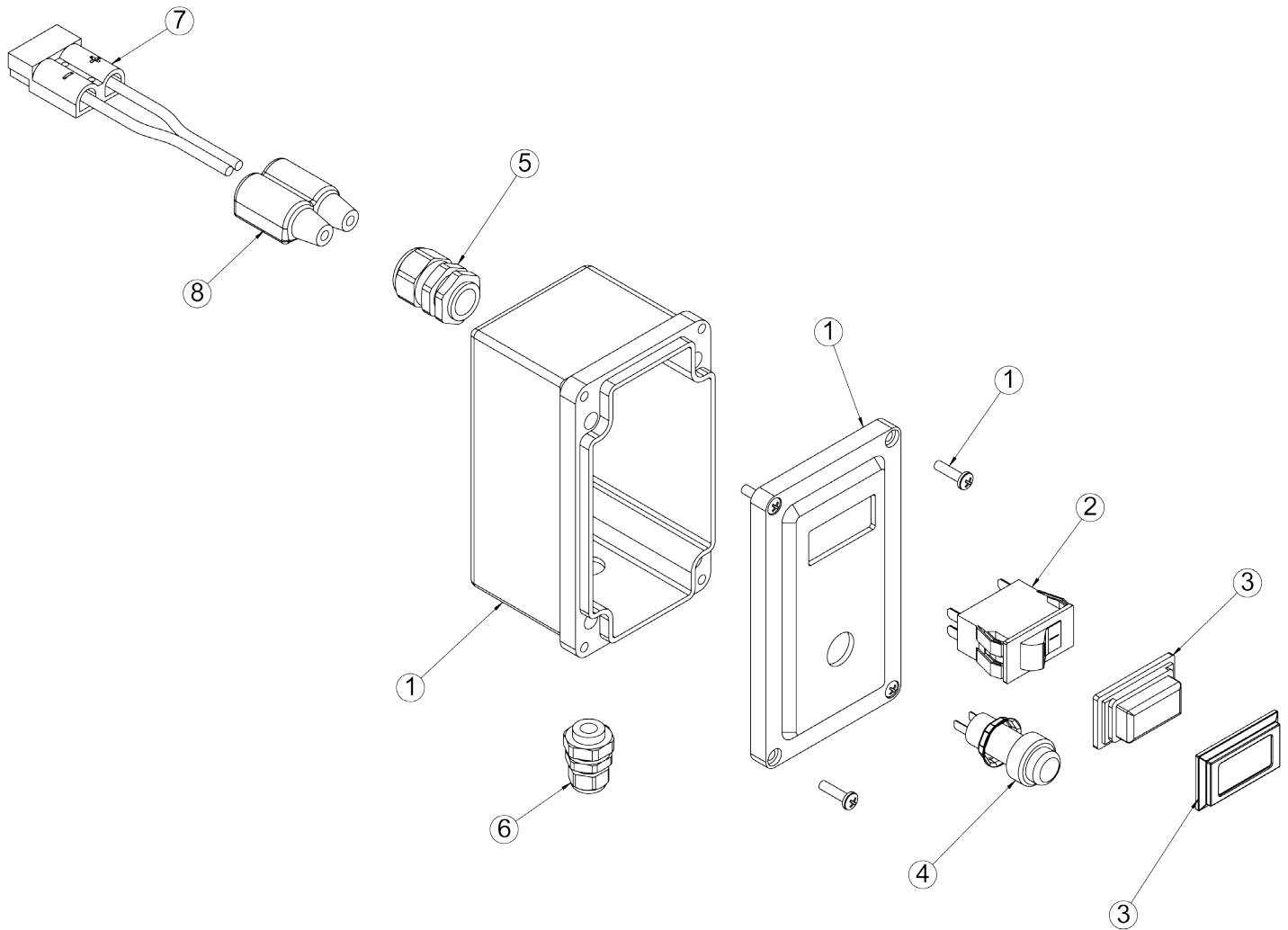
Exploded Parts View - HydroCart Battery



ITEM	PART NO.	DESCRIPTION	QTY
1	BD505096	MOUNTING PLATE, BATTERY MODULE	1
2	BD505098	BATTERY PUMP MOUNTING BRACKET	1
3	BD505097	BATTERY RETAINER STRAP	1
4	BD505023	PUMP, SHUR-FLOW 12VDC, CE	1
5	BD515036	FITTING, 3/8" NPT STREET ELBOW	1
6	BD545197	FITTING, 3/8" NPT STREET TEE	1
7	BD505215	HOSE ASSEMBLY, BATTERY BY-PASS	1
8	BD505212	HOSE ASSEMBLY, BATTERY PUMP INLET	1
9	BD505210	HOSE ASSEMBLY, PRE-FILTER OUTLET (EXISTING HOSE)	1
10	BD505211	HOSE ASSEMBLY, BATTERY PUMP DISCHARGE	1
11	BD505024	SWITCH BOX ASSEMBLY, BATTERY MODULE	1
12	BD408003	SCREW, #10-24 X 1" FILLISTER HEAD	1

ITEM	PART NO.	DESCRIPTION	QTY
13	BD4312003	WASHER, #10 FLAT	5
14	BD440001	NUT, #10-24 NYLOCK	7
15	BD408002	SCREW, #10-24 X 3/4" FILLISTER HEAD	1
16	BD410505	BOLT, 1/4"-20 X 3/4" LONG HHCS	2
17	BD410501	BOLT, 1/4"-20 X 1/2" LONG HHCS	1
18	BD431000	WASHER, 1/4" FLAT	3
19	BD441000	NUT, 1/4" - 20 NYLOCK	3
20	BD515032	BATTERY BOX, PLASTIC U1 STYLE	1
21	BD505164	BATTERY CABLE ASSEMBLY W/PROTECTIVE BOOT	1
22	BD411505	BOLT, 5/16"-18 X 3/4" LONG HHCS	2
23	BD432001	WASHER, 5/16" FLAT	4
24	BD442000	NUT, 5/16"-18 NYLOCK	2

Exploded Parts View - HydroCart Battery



ITEM	PART NO.	DESCRIPTION	QTY
1	BD515042	BATTERY CONTROL BOX, HYDROCART	1
2	BD515043	ON/OFF SWITCH WITH RESET BREAKER	1
3	BD515044	SWITCH COVER, ON/OFF SWITCH	1
4	SPELBF18-12V	BATTERY LEVEL INDICATOR	1
5	BD515054	CORD GRIP, 3/8 NPT X 2 WIRE	1
6	BD515053	CORD GRIP, 1/2 NPT X 2 WIRE	1
7	BD515226	SAFETY BOOT, ANDESON CONNECTOR	1
8	BD505164	BATTERY CABLE ASSEMBLY	1

Troubleshooting Procedure



Electric motor does not start:

1. Check outlet to ensure it has live power.
2. Remove extension cord(s) if being used. Plug GFCI directly into outlet.
3. Test and reset GFCI
 - If GFCI fails to test and reset and you are positive it is plugged into a live circuit –
Replace GFCI
4. Unplug GFCI and check cord wire connections.
5. Inspect cord for damage.
Note: The next steps require a qualified service technician with a volt meter to test the electrical circuit.
6. Check for power at the motor switch and verify switch is functioning correctly.
7. Check for power at motor connection box.
8. If you have verified power to the motor and it does not start
 - The problem is either a capacitor or an internal motor problem. Contact a Leeson Motor service center for repair.

System performance evaluation:

In order to properly evaluate and troubleshoot the system, you will need to perform a complete set of tests on the unit. These tests will help identify the cause of the problem. To run these tests, you will need the following items:

- Watch or clock with a sweep second hand.
- 3 gallon bucket.
- Volume measurement method. This could be volume graduation marks inside the bucket or a measuring cup/container.

Flow testing procedure:

- With water running from hose being tested, direct flow into bucket for exactly 1 minute while timing with watch.
- Measure volume of water and record the gallons per minute flow rate.
- If water volume is very low, perform a 2 - minute test and divide flow by 2.
- If water volume is more than your bucket can hold in 1 minute, take a 30 second flow test and multiply the result by 2.
- Record the results in gpm (gallons per minute).

Use this procedure for all of the required flow tests as listed in the following **System Testing** section.

System Testing



1. Set up unit to run as per operation/owners manual.
2. Before connecting the supply water hose to the machine, measure the water flow from the end of the hose(s).
 - Supply water flow _____ gpm
3. Measure the TDS and temperature of the supply water.
 - Supply water TDS _____ ppm
 - Supply water temperature _____ °C
4. Connect the supply water hose to the machine and turn on the water. Open the flush valve to purge the air from the system. Then close the flush valve and read the pressure on the gauge.
 - Supply water pressure _____ psi
5. Open the flush valve. Start the motor on the machine. Measure the water flow from the flush valve hose.
 - Flush water flow _____ gpm
6. Open the Pure water valve. Allow water to flow onto the ground or into a drain. For testing purposes, do not connect a pole hose. Close flush valve. Wait for 1 minute to allow system to stabilize. Read the system operating pressure on gauge.
 - System operating pressure _____ psi
7. Measure the water flow from the wastewater hose.
 - Wastewater flow _____ gpm
8. Measure the water flow from the pure water hose.
 - Pure water flow _____ gpm
9. Measure the TDS of the pure water.
 - Pure water TDS _____ ppm
10. Measure the TDS of the wastewater.
 - Wastewater TDS _____ ppm
11. Turn off machine and compare test results to normal operation specifications on page 18.

System Analysis



The following information of flows and pressures are median values for the system. All system parameters will vary due to water supply temperature and TDS level. System setup may also affect the readings. i.e. extension cord size and length, hose lengths and diameters. It is imperative to connect the machine directly to the water and power source when evaluating performance.

Description	Actual	Normal		
<u>Supply water</u>				
Flow	_____	4 gpm minimum		
TDS	_____	Check with local water authority		
Temperature	_____	Varies by season and region		
Pressure	_____	20 psi minimum		
		Electric	Battery	Hydro
Flush water flow	_____	4 gpm	2 gpm	2 gpm
System operating pressure	_____	150 psi	90 psi	30 psi
Wastewater flow	_____	1.25 gpm	0.6 gpm	0.5 gpm
Wastewater TDS	_____			
Pure water flow	_____	1.25 gpm	0.75 gpm	0.5 gpm
Pure water TDS	_____	Less than 10 ppm for all machines		

Identify the parameters that are outside of the normal range and use the information in the following troubleshooting matrix to correct the situation.

If after performing all tests and working through the matrix you still have operational issues, please fill out this form completely before contacting IPC Eagle Technical Service Department. This information is required for proper evaluation of the system.

Troubleshooting Procedures



Condition

Solution

Low supply water flow or pressure

1. Eliminate all extension hoses and connect directly to spigot with a single hose.
 2. Check for blockage or kinks in hose.
 3. Connect to different water source.
 4. Clean or replace sediment filter.
 5. Replace carbon filter.
-

**Low system operating pressure
With high waste water flow**

1. Reset pressure regulating valve

**High wastewater flow
With low pure water flow
Good system pressure**

1. Remove DI cartridge and retest
 2. Extremely cold water supply
 3. Plugged RO membrane – Replace RO membrane
-

**High pure water TDS
And/or high pure water flow**

1. Damaged membrane –replace
 2. Membrane installed upside down
-

**Low System pressure
With low flush water flow
And/or low waste water flow**

1. Verify supply water conditions
2. Clean or replace sediment filter.
3. Replace carbon filter.
4. Check pump relief valve setting
5. Damaged pump – replace pump

NOTES



NOTES



IPC Eagle Warranty Policy

Limited Warranty

IPC Eagle warrants new cleaning equipment against defects in material and workmanship under normal use and service to the original purchaser as detailed below.

1 year

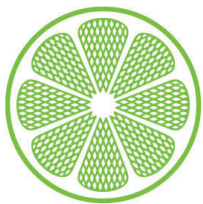
Subject to the conditions stated below, IPC Eagle warrants all other cleaning equipment components to be free from defects in materials and workmanship for a 1-year period. Parts replaced or repaired are warranted for the remainder of the original warranty period. Batteries are pro-rated for one year.

IPC Eagle will furnish and charge for replacement parts, including transportation, to the original owner through an IPC Eagle authorized service center. If the part is returned within 30 days and is found defective, the owner will be credited for the cost of the replacement part including shipping and handling.

Wear items exempt from warranty include belts, carbon brushes, power cords, wheels, handle grips, filters, and screens.

This warranty shall not apply to failures caused by misuse or abuse, improper maintenance as stated in the operation manuals, use of unauthorized repair parts, repairs by other than an IPC Eagle authorized service center, and damage in transit.

IPC Eagle disclaims and denies any liability for any direct, indirect, special incidental or consequential damage which may be suffered as a result of sale, delivery, servicing, use, loss of any product, downtime, labor, freight, or other charges not expressly included herein.



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