

# Owner's Manual

ver 1.0

## **WARNING**

**Not for use in wet applications!**

This Unit Is Acceptable For Indoor Installation Only.

This Unit Is A Non-submersible Pump.

## **RISK OF ELECTRICAL SHOCK –**

This Pump Has Not Been Investigated For Use In Swimming Pool  
Or Marine Areas

## Warranty

ExpressKey, GinSan, IVS, & Trusco Group of Companies (Company) provides a limited one year warranty on components and piece of equipment produced by the Company to be free from defects in material and workmanship. Electrical assemblies see Appendix A, have a limited two year warranty on the controller to be free from defects in material and workmanship. This limited warranty does not cover equipment that has been damaged due to misuse, misapplication, modification, altered, neglected, attempted theft, vandalism, connection to improper voltage supply, modification, or such parts that are commonly recognized to be subject to wear in normal usage. Normal use products are, but not limited to, those listed on Appendix B; which are warranted for 90 days. Every component and piece of equipment is packaged to assist in safe handling of the product.

Claims must be submitted in writing within the appropriate coverage period as covered by this warranty, from date of shipment, to the Company's warranty/repair department. If the return is approved an RMA and labeling instructions will be issued and the product can be returned. Returned product without the appropriate RMA and label will be issued to scrap and all warranties/replacements will be considered null and void. A testing fee of \$15.00 will be applied, if the product passes all tests related to the written claim, then the fee will be applied and paid prior to return of the product. If the product fails the test then the fee will not be applied. The Company may charge a 20% restocking fee for returned product and/or an order, which is canceled, and material has already been ordered and/or received to fill such order.

The Company's warranty/repair department will inspect all components, submitted under warranty. Warranty replacement will be based solely on the analysis and confirmation that the product defect was caused by material and/or workmanship. The company reserves the right to change the design of the product without assuming any obligation to modify any product previously manufactured or to replace warranted product other than with redesigned product.

In some cases it is easier for the customer to send a Company purchased product direct to the manufacturer for replacement. In those cases the customer will be notified that their product falls under that process and should work with that manufacturer directly. Appendix C shows the purchased parts that falls under this case.

**This warranty covers the product replacement only; charges for damages, freight and/or labor will not be accepted. There are no warranties expressed or implied which extend beyond this Limited Warranty. The loss of use of the product, loss of time, inconvenience, commercial loss, incidental or consequential damages is not covered. The Company shall not be liable for incidental, special, or consequential damages including without limitation damages resulting from personal, bodily injury or death or damages to or loss of use of property.**

## System Requirements:

**Electrical: 220vac Single Phase 20amp**

### Plumbing:

Size	Inlet Feed Rate	Inlet Pressure
600 GPD	3 GPM	20 PSI
1200 GPD	6 GPM	20 PSI
2200 GPD	7.5 GPM	20 PSI
4400 GPD	9 GPM	20 PSI
6600 GPD	15 GPM	20 PSI
8800 GPD	15 GPM	20 PSI

### Space Requirements:

#### Free Standing:

52" H x 27" W x 20" D

#### Wall Mount:

50" H x 27" W x 20" D

\*Note: Minimum of 48" of overhead clearance is needed for membrane replacement.

## Installation:

**Wall Mount:** Mount unit with fasteners and washers (not included) using the six keyhole slots on the frame, making sure unit is level.

**Floor Mount:** Screw in four leveling feet (included) to bottom of support legs. Place unit in desired location on floor. Turn feet to level unit.

**Plumbing:** Attach a 3/4" feed to the inlet ball valve from your carbon filter.



**Plumbing (*continued*):** Attach ½” hose to the ½” barbed fitting at the top back side of the product water flow meter using hose clamp.



Attach other end of hose to inlet on the storage tank. **Do not tee this hose with the outlet of the regulator from a delivery stand. Causing back pressure in this manner will destroy the membranes.**

Baseline model: Attach ½” hose to barbed fitting on back of reject control valve using hose clamp. Connect other end of hose to a drain inlet.

Mid line and Top line models: Attach ½” hose to barbed fitting at the top back side of the reject water flow meter using a hose clamp. Connect other end of hose to drain inlet. Also attach a ½” hose to the drain valve (ball valve on mid line units, solenoid valve on top line units). Connect other end of the hose to a drain inlet or tee it into the drain hose coming from the flow meter.

Mid line and Top line models also must have a ¾” product water feed from the storage tank into the flush valve (ball valve on mid line units, solenoid valve on top line units).

**Electrical: The 220v feed to the delivery stand needs to be hardwired to the site's electrical system and must comply with all local and national codes.**

Connect power cable coming from the electrical box of the unit to a 220v supply. The black and red wires are for the 220v feed, the white wire connects to a neutral, and the green wire connects to a ground.

Connect the wires coming from the upper float switch of the storage tank to the wires labeled “upper float switch” inside the electrical box of the R.O. Unit.

## **Startup:**

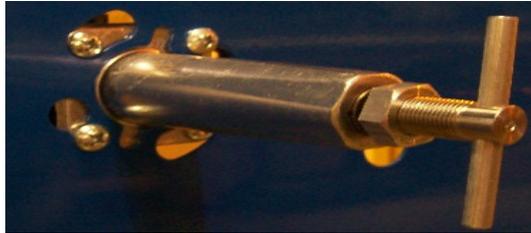
To remove air pockets, remove inlet water TDS probe from the adapter at the top of the prefilter housing. Slowly open the water inlet valve of the R.O. stand. When water starts to come out of the adapter, push probe back into adapter. Finish opening inlet valve. Turn on power to the R.O. stand. Water should start flowing through and pressurizing the R.O. stand.

**Note:** *If the R.O. stand rapidly turns on and off, it is probably due to inadequate water pressure or flow. The R.O. stand has a built in safety pressure switch to protect the production pump. If the incoming water pressure is too low, it will shut down the R.O. stand until adequate pressure is achieved. If this happens, check for the cause of the low pressure.*

As the water begins to flow, the flow meters will begin to respond. Please allow 5-10 minutes for the flow rates to normalize. You will see air in the water as it flows through the flow meter. This is normal and may last for several days.

### **Adjusting the membrane pressure:**

Baseline Units: Locate the reject control valve. Turning the “T” handle clockwise will increase your membrane pressure, therefore increasing the flow rate of the service water.



**Warning:** *Do not adjust pressure above 220 psi or exceed the maximum service flow rate. Doing so will result in premature membrane failure.*

### **Maximum service flow rates:**

**2200 gallons per day (one membrane)--1.5 gpm**  
**4400 gallons per day (two membranes)--3.0 gpm**  
**6600 gallons per day (three membranes)--4.5 gpm**  
**8800 gallons per day (four membranes)--6.0 gpm**

**Reminder:** *After adjusting reject control valve, make sure to tighten the lock nut located on the shaft of the “T” handle. If this is not done, vibration from the pump motor will cause the setting to change.*

Mid line and Top line Units: These units feature a water saver valve (a needle valve located on the inlet manifold of the production pump). This valve helps to limit the amount of water sent to the drain by reintroducing some of the reject water back into the inlet water supply. For example, a setting of 66% recovery is sufficient to handle a raw water feed that is 800 TDS or less. **Knowing the TDS of the water feeding the R.O. unit is necessary to correctly set the water saver and reject control valves of these units. Refer to the Recovery Setting Chart on the following page for your specific settings.**

By using the reject control and water saver valves, adjust the service water and reject water flows according to the TDS of the feed water. **Be sure to**

tighten the set screw on the water saver valve and the lock nut on the reject control valve after adjustments are made.

### Recovery Setting Chart

2200 GALLONS PER DAY				GPM	4400 GALLONS PER DAY			
0-300	500	800	1200		T.D.S. Level	0-300	500	800
1.5	1.5	1.5	1.5	Production Rate*	3.0	3.0	3.0	3.0
0.5	0.75	1.5	3.0	Reject Rate*	1.0	1.5	3.0	6.0
7.0	6.75	6.0	4.5	Recycle Rate	5.0	4.5	3.0	0
2.0	2.25	3.0	4.5	Feed Rate	4.0	4.5	6.0	9.0
1	1	1	1	Membrane Array	1-1	1-1	1-1	1-1
75%	66%	50%	33%	Approx. Recovery %	75%	66%	50%	33%

Spotting may occur

		Starting TDS										
		2000	1750	1500	1200	1000	800	700	600	500	400	300
Recovery	75%	100	87.50	75	60	50	40	35	30	25	20	15
	66%	80	70	60	48	40	32	28	24	20	16	12
	50%	60	52.50	45	36	30	24	21	18	15	12	9
	33%	50	43.75	37.50	30	25	20	17.50	15	12.50	10	7.50
	25%	45	39.50	33.75	27	22.50	18	15.75	13.50	11.25	9	6.75
	0%	40	35	30	24	20	16	14	12	10	8	6

### Flushing (mid line and top line models only):

Mid line model: This unit is equipped with a manual flush feature. To use this feature, close the inlet ball valve (located on the right side of the blue prefilter). Open the 3/4" flush ball valve (at lower side of R.O. inlet manifold) and the 1/2" drain ball valve (from the reject control

valve on lower half of unit. Press and hold the manual flush toggle switch (on front of electrical box) for 30 seconds for each membrane. **This should be done at least once per week.**

Top line model: This unit is equipped with an automatic flush feature. When the upper float in the storage tank rises, it will tell the R.O. to turn off. When this happens, the R.O. will close the raw water inlet solenoid and open the flush solenoid and the drain solenoid. The pump will run to flush the membranes for a set amount of time. To adjust the amount of flush time, turn the dial on the solid state relay inside the electrical box (adjustable from 15 to 300 seconds) using a small flat screwdriver.



***Note: Water temperature and production pump pressure are directly related to the service flow of the R.O. system. As one of these change, the R.O. system service flow rate is drastically effected. If the water temperature increases due to climatic changes, the R.O. system may exceed its maximum GPM service causing premature membrane failure. Consistent and regular monitoring of the R.O. system is the best way to guard against any future problems.***

## **Maintenance:**

### **Membrane Replacement:**

Some of the reasons for replacement may include, but are not limited to:

- membranes fouled due to high TDS
- membranes fouled due to organics or bacteria
- membranes not rejecting enough TDS
- membranes that are passing too much water

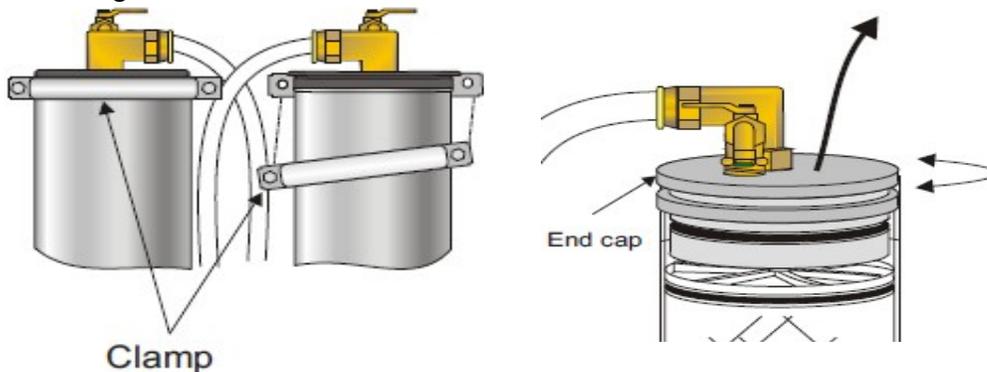
If the membranes should ever need replacement, please follow these instructions carefully.

1. In scheduling this maintenance, the R.O. system will need to be completely shut down.

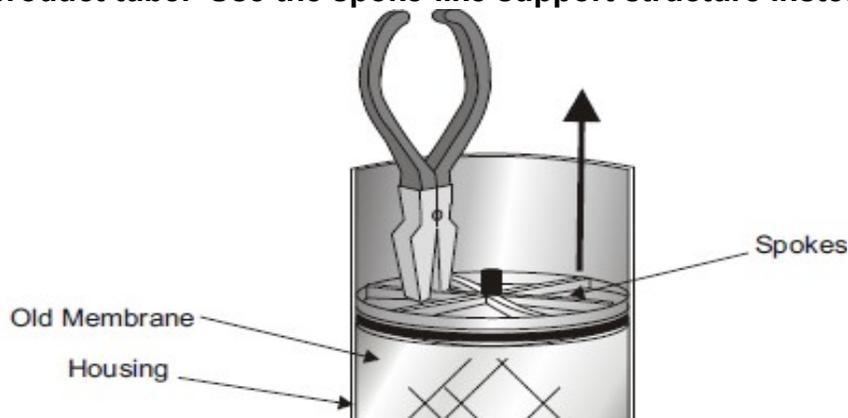
2. There are several different types of membranes as well as different manufacturers. Make sure you have the proper replacement membranes for your system.
3. This Ginsan R.O. system has been specifically designed to operate using Ginsan cold water membranes. If other types of membranes are used, the system may not function properly. The Ginsan part number for this membrane is 63805. You should be able to order these parts from your usual parts distributor using this part number.

**To replace membranes:**

1. Turn off the power supply to the R.O. unit by switching the circuit breaker off.
2. Turn off the water supply to the R.O. stand at the inlet valve.
3. Remove the clamps from each membrane. The clamps hold the end cap into the membrane housing.
4. With a rotating motion, pull the end cap out of the top of each membrane housing.



5. Using a blunt needle nose pliers and a twisting motion, pull the old membrane from its housing. **Do not grab the membrane by the center product tube. Use the spoke-like support structure instead.**



6. Remove the new membrane from its sealed bag. Lubricate the product tube on each end and the V-seal with a silicone lubricant. **Do not use a petroleum based lubricant on any R.O. system parts.**
7. Place the new membrane into the membrane housing with the V-seal end going in last.

8. Lubricate the o-ring both in the inside and around the base of the membrane cap using a silicone lubricant. Carefully replace the membrane cap back into the membrane housing using a turning motion to seat the o-rings.
9. Replace the end cap clamps being careful not to over tighten. These bolts need just to be snugged down. No torque is necessary.
10. Turn on the water supply at the inlet valve. **If the 5 micron filter has not been changed recently, this would be a good opportunity to do so before turning on the water supply.**
11. Turn on the power supply to the unit by switching the circuit breaker on.
12. Follow the start-up procedure to properly start-up the R.O. system.

### **Pre-Filter Replacement:**

***The pre-filter should be replaced at least every 90 days.***

1. Turn off the power supply to the R.O. by switching off circuit breaker.
2. Turn off water supply to the R.O. by closing the inlet valve.
3. Carefully unscrew the blue filter housing using the wrench. **There will be pressure in the housing.**

**NOTE:** When unscrewing the housing it is common for the gasket/O-ring to lift out of the housing and stick to the cap. Remove gasket O-ring, lubricate with silicone lubricant and position into housing groove.

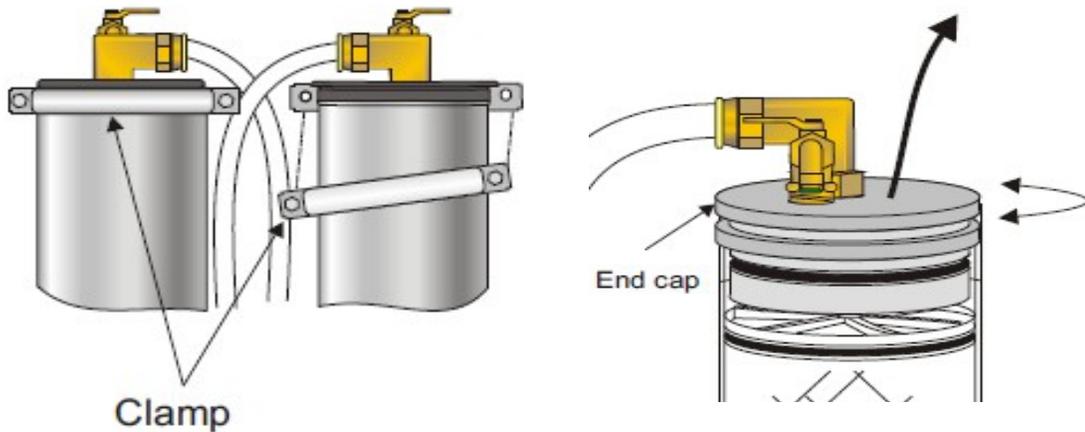
4. Discard used cartridge and insert new cartridge.
5. Screw the blue housing back on. **Hand tighten only.**
6. Turn on the water supply to the R.O. by opening inlet valve.
7. Turn on the power supply to the unit by switching the circuit breaker on.

### **System Sanitation:**

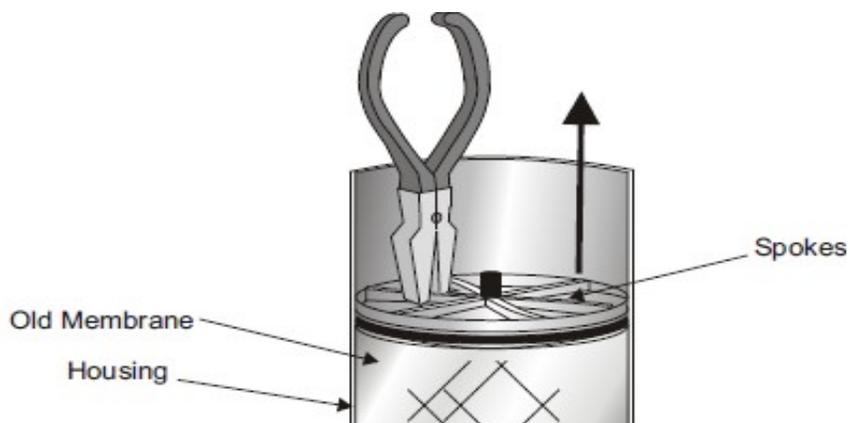
#### ***Disassembly and sanitizing:***

If it becomes necessary to sanitize the R.O. system, follow these steps carefully. It may be necessary when a R.O. system becomes contaminated to sanitize it several times before it will become completely clean. In scheduling this maintenance, the R.O. system will need to be shut down for a minimum of 7 to 8 hours. Before starting this project, make sure you have clean and sanitized membranes to replace the existing ones and that you have a new 5-micron pre-filter. In addition, approximately 1 quart of regular household bleach is required.

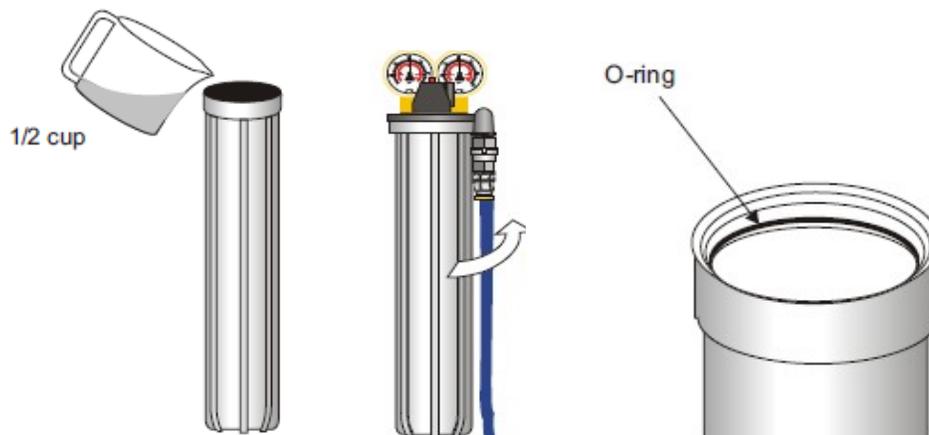
1. Turn off all power to the R.O. stand by turning circuit breakers off.
2. Turn off the water supply to the R.O. stand at the inlet valve.
3. Remove the clamps from each membrane. The clamps hold the end cap into the membrane housing.
4. With a rotating motion, pull the end cap out of the top of each membrane housing.



- Using a blunt needle nose pliers and a twisting motion, pull the old membrane from its housing. **Do not grab the membrane by the center product tube. Use the spoke-like support structure instead.**



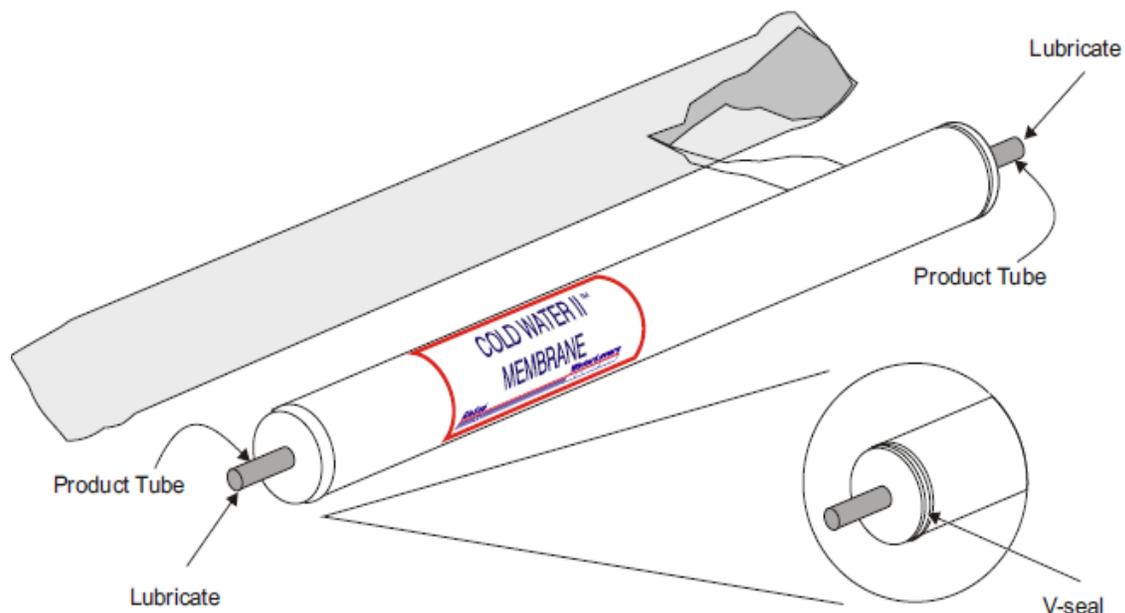
- Inspect the inside of the membrane housings. If there is a slimy coating or an odor it will be necessary to scrub them. To clean the housings, add  $\frac{1}{4}$  cup of bleach to each housing and scrub all sides of the housing with a brush that will reach the full extent of the housing.
- Reassemble the membrane caps on the empty membrane housings.
- Disconnect the product water hose from the inlet of the storage tank and put to drain.
- Unscrew the 20" blue pre-filter housing using a filter wrench.
- Remove the pre-filter cartridge and discard.
- Pour  $\frac{1}{2}$  cup of bleach per membrane into the empty pre-filter housing.



12. Screw the empty pre-filter housing back on hand tight, making sure the o-ring is in the proper position.
13. Open the reject control valve completely.
14. On mid line and top line units, open the water saver valve completely.
15. Turn on the water supply at the inlet valve.
16. Turn on the power supply by switching the circuit breaker on.
17. Let R.O. unit run until a chlorine smell is present at the product and drain hoses.
18. Turn off power supply by switching the circuit breaker off.
19. Let the system stand for a minimum of 6 hours to disinfect the R.O. system. **It is highly recommended at this point to also sanitize the storage tank and any delivery systems being used to pump the water that comes from the contaminated R.O. unit.**
20. Turn on water supply by opening inlet ball valve.
21. Turn on power to the R.O. system by switching the circuit breakers to on.
22. Allow R.O. to run until the chlorine smell is no longer detectable at the product and drain hoses.
23. Remove the housing end caps and inspect. If there is still a noticeable film left in the membrane housing, repeat the system sanitation process before continuing.

**Reassembly:**

1. Turn off system power by switching circuit breaker to off.
2. Turn off water supply by closing the inlet ball valve.
3. Remove the new clean membranes from the sealed bags. **The original (contaminated) membranes should not be reused in a sanitized system.**
4. Lubricate the product tube on each end and the V-seal with a silicone lubricant. **Do not use a petroleum based lubricant on any of the R.O. system parts.**
5. Place the new membrane into the membrane housing with the V-seal end going in last.



6. Lubricate the o-ring both inside and around the base of the membrane cap using a silicone lubricant.
7. Carefully replace the membrane cap back into housing using a turning motion to seat the o-rings.
8. Replace the end cap clamps being careful not to over tighten. These bolts need just to be snugged down. No torque is necessary.
9. Install a new 5 micron filter cartridge in the prefilter housing.
10. Reconnect the product water hose to the storage tank.
11. Turn on the water supply by opening the inlet ball valve.
12. Turn on power supply by switching breaker to on.
13. Follow the start up procedures to properly start up the R.O. system.

## **Troubleshooting:**

### **Low R.O. water production:**

Check water pretreatment equipment. Improperly pretreated water can cause membrane to fail prematurely.

Check the membrane pressure. If premembrane pressure is not maintained between 120-200 psi, a loss in production will occur.

### **Unable to keep premembrane pressure between 120 and 200 psi:**

Check the reject control valve. With the R.O. running, completely shut off the reject control valve. The pressure should climb well above the minimum pressure.

If the pressure does not increase, pinch off the R.O. drain hose. If pressure does not increase, the production pump needs to be repaired or replaced. If the pressure increases when the drain hose is pinched off, the reject control valve needs to be replaced.

Check the feed water rates. The R.O. system requires 50 psi feed water pressure. With low feed water pressure it may be difficult to maintain proper premembrane pressure.

### **Spot free water is spotting (TDS is above 40):**

Check the product water TDS. Test the water as it is being made. Sample the water as it goes to the storage tank from the production water delivery hose. If the TDS is high, it could be a seal in the system. A TDS rating higher than 40 could mean that the membrane has failed.

Check the storage tank TDS. The storage tank is an atmospheric storage container which can make it prone to contamination. Routine cleaning of the tank will eliminate this problem.

Mid and Top line units: Check the raw water TDS. If the raw water TDS is above 1000 the R.O. system may have to be recalibrated to a different recovery rate.

**Low pressure switch keeps shutting down system:**

Check the prefilter. The prefilter should be changed at least once every 90 days.

If the system cuts off during high wash usage, the car wash is using all the water pressure during these high activity periods. To save wear on the R.O. system, the water pressure needs to be increased or the R.O. will shut down during these periods. Increase the water feed supply to the carwash.

Check the carbon filter for flow. If the carbon filter plugs, the water pressure to the R.O. will decrease. If the carbon filter is plugged, it may be necessary to re-bed the carbon filter.

**Production pump does not start:**

Check the power feed. Make sure unit is wired correctly and breaker is on.

Check water pressure to R.O. Check to see if the prefilter needs to be changed. Make sure incoming water pressure is at least 50 psi. If the water pressure is good, make sure the mechanical pressure switch on the inlet side of the pump is switching by removing the cover. Using a meter, verify continuity from the line terminal to the motor terminal on the upper and lower levels.

Verify the upper float switch of the storage tank is working. Remove upper float wires from the R.O. system. Using a meter, verify continuity between the two wires when the upper float is down.

Check fuse in R.O. electrical box.

Check for proper voltage at the pump motor. If proper voltage is verified, the pump motor will have to be repaired or replaced.

**Production pump does not stop:**

Verify the upper float switch in the storage tank is working. Remove upper float wires from the R.O. system. Using a meter, verify there is no continuity between the two wires when the upper float is up.

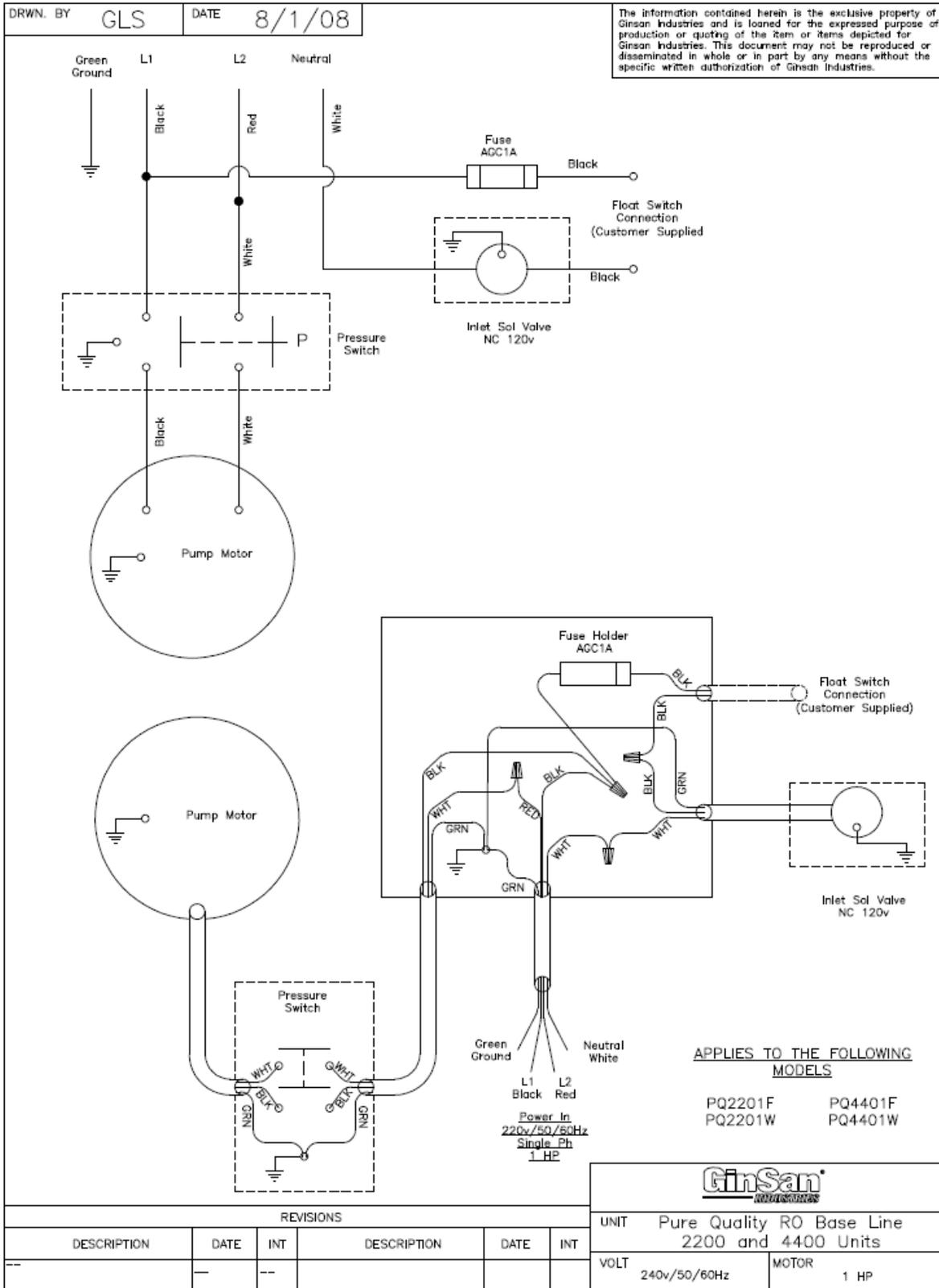
Check the mechanical pressure switch on the inlet side of the pump. Remove the cover. Using a meter, verify there is no continuity between the line and motor terminals.

**R.O. system flushes continuously (mid line and top line units only):**

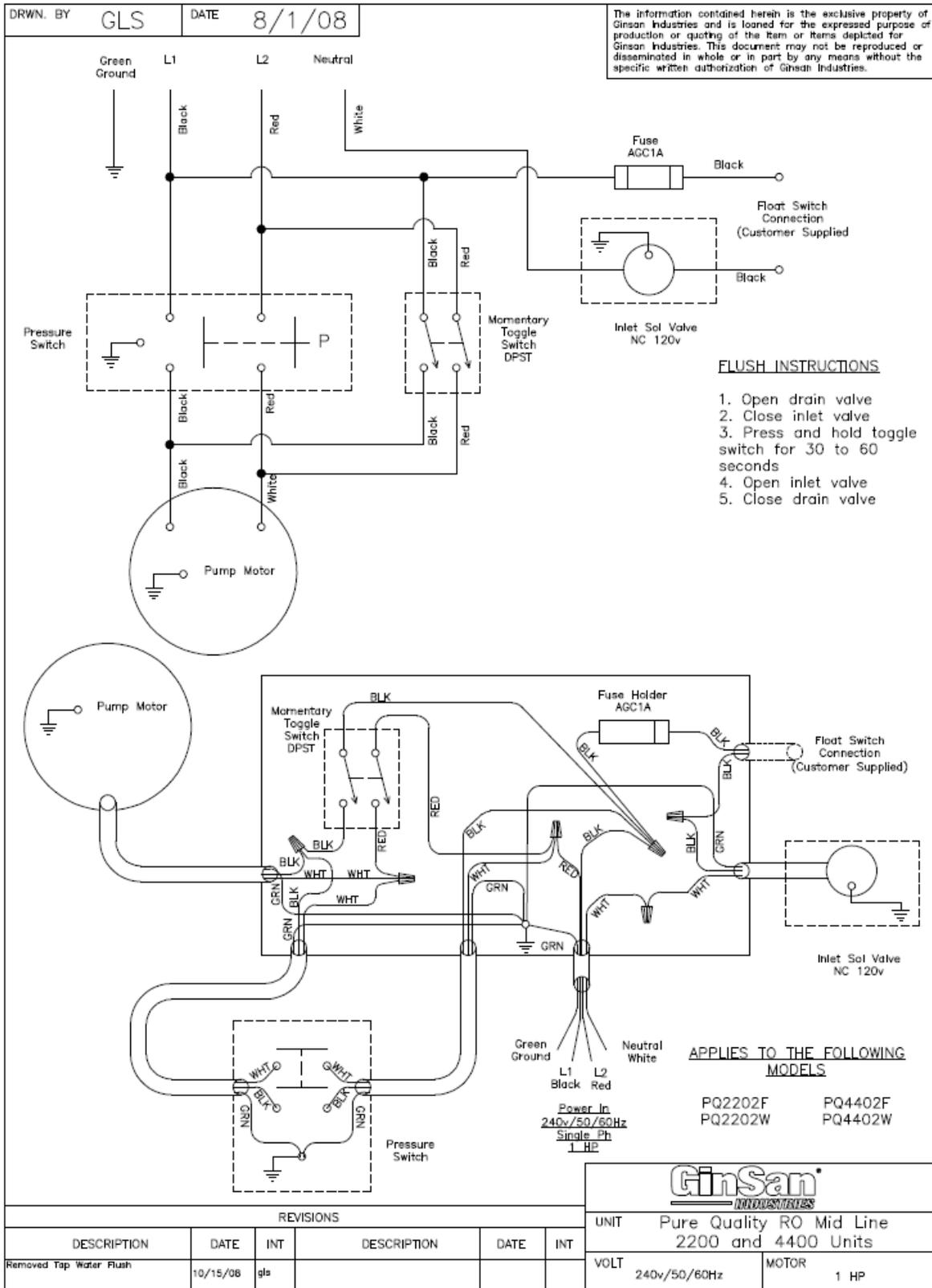
Mid line units: Verify proper operation of the flush switch using a meter.

Top line units: Check the dial on the solid state relay for proper setting

## Wiring Diagram for Base line Units:



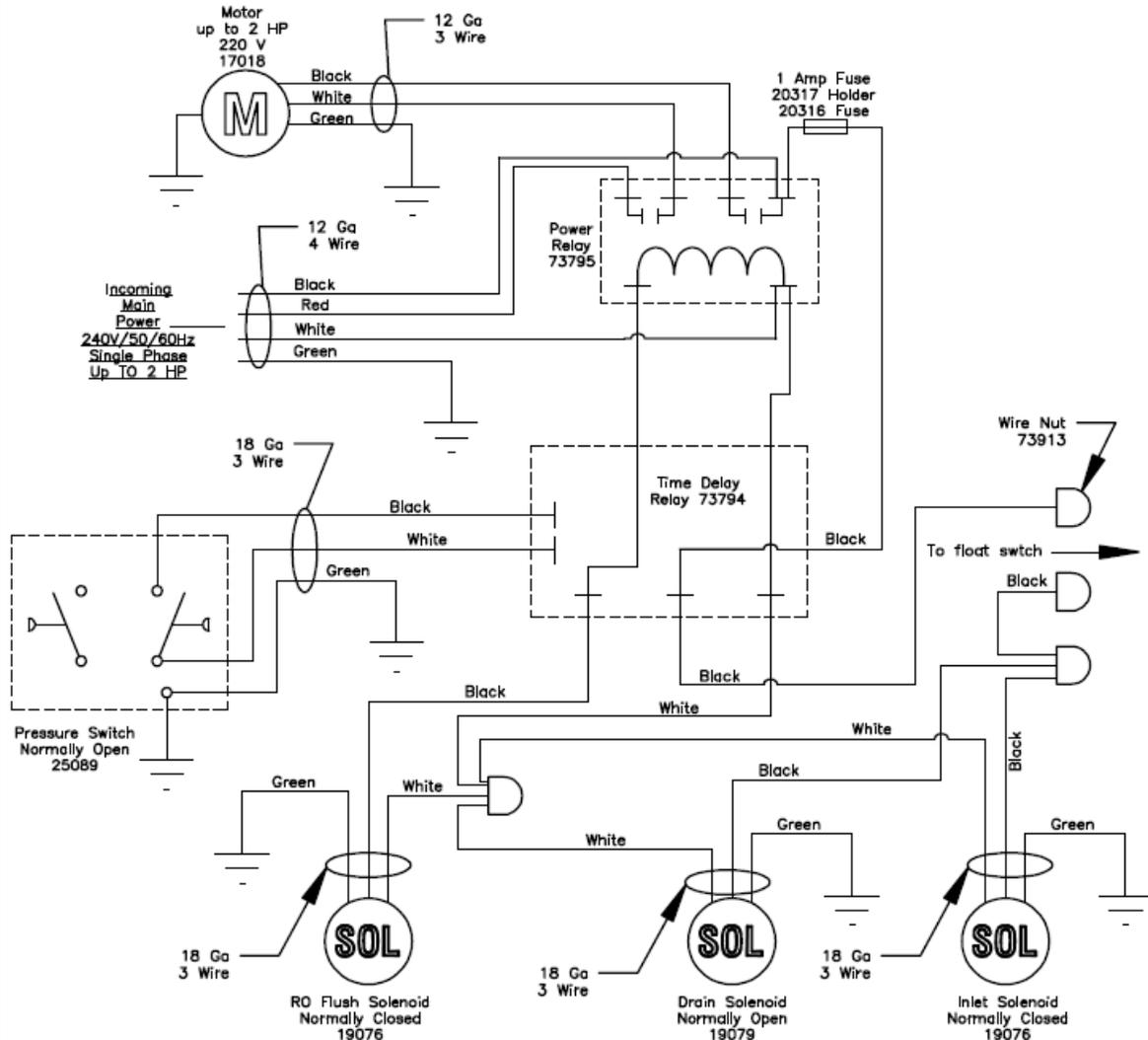
# Wiring Diagram for Mid line Units:



# Wiring Diagram for Top Line Units:

DRWN. BY **DRB**      DATE **3/17/09**

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Applies to the Following Models:

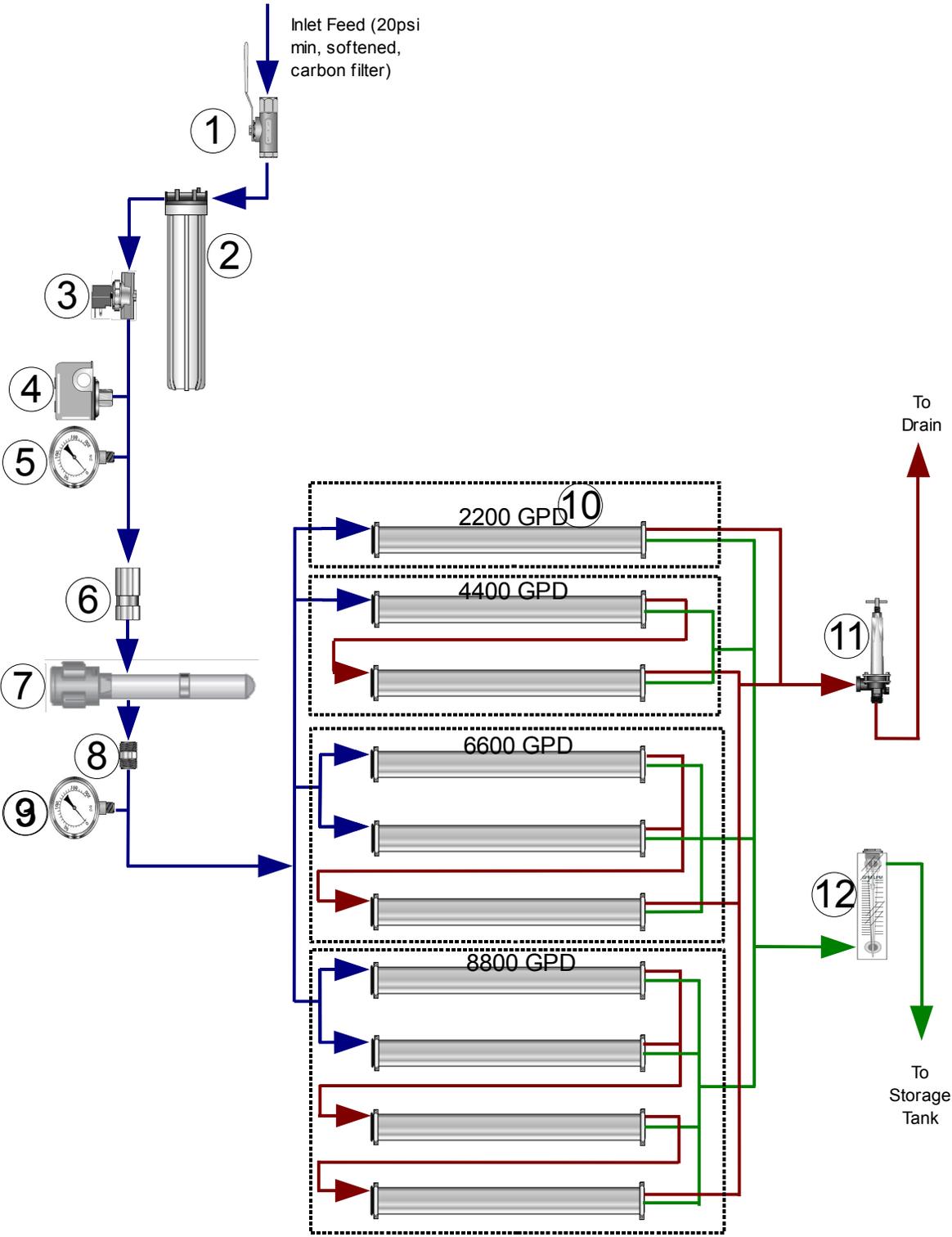
Model	HP
PQ2203F	1
PQ2203W	1
PQ4403F	1
PQ4403W	1
PQ6603F	2
PQ6603W	2
PQ8803F	2
PQ8803W	2



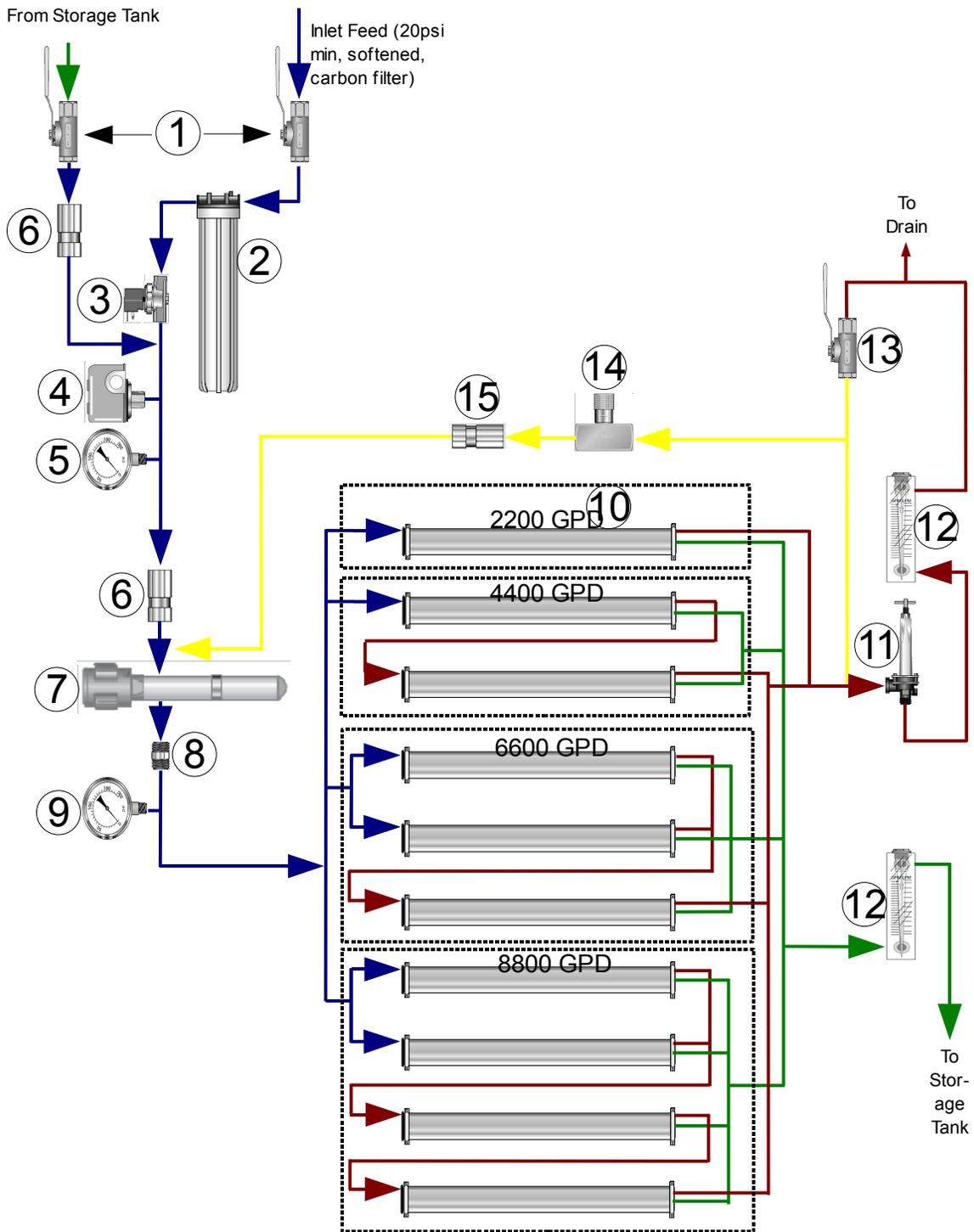
REVISIONS					
DESCRIPTION	DATE	INT	DESCRIPTION	DATE	INT

UNIT Pure Quality RO Top Line 2200, 4400, 6600 & 8800 Units	
VOLT 240v/50/60Hz	MOTOR See chart above

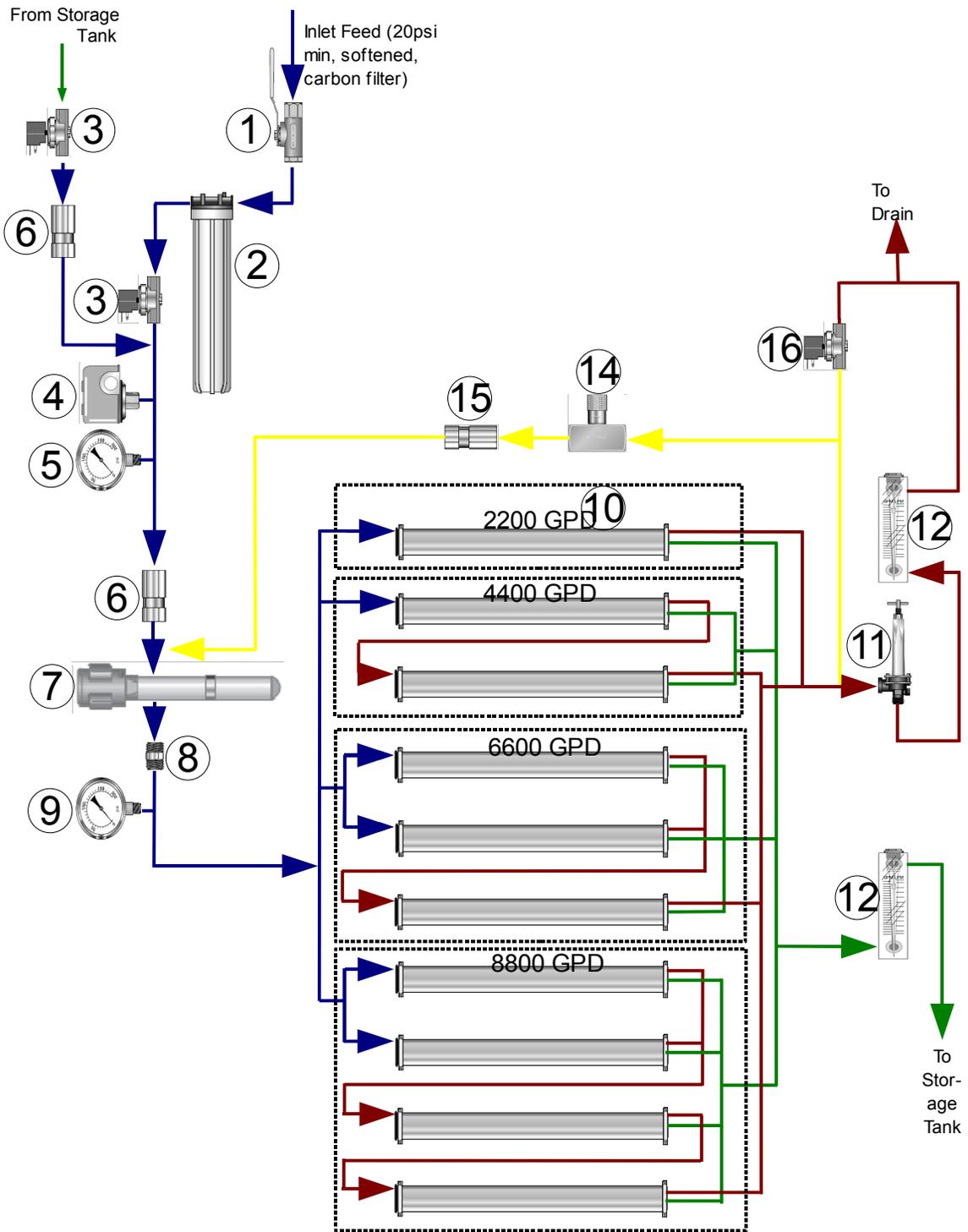
Flow Diagram for Base Line:



# Flow Diagram for Mid Line:



# Flow Diagram for Top Line:



Parts List:

Item	Part Number	Description
1	62965	3/4" Ball Valve
2	62562	Filter Housing
2	62601	5 Micro Sediment Filter
3	19076	3/4" 120VAC NC Solenoid
4	25089	Pressure Switch
5	24655P	Gauge 0-100 psi
6	24912	3/4" Check Valve
7	17018	Pump and Motor for 2200/4400GPD
7	17008	Pump and Motor for 6600/4400GPD
7	18169	1/2 HP Motor for 600/1200GPD
7	30203	Pump for 600/1200GPD
8	64113M	Flow Control for 2200/4400GPD
8	64115	Flow control for 6600/8000GPD
9	24697P	Gauge 0-300PSI
10	63800	4" x 40" Housing and Membrane Assy
10	63805	4" x 40" Membrane only
10	68120	2.5" x 40" Housing w/o Membrane Assy
10	63803	2.5" x 40" Membrane Only
11	89128	Reject Control Valve
12	18162	Flow Meter
13	24802	1/2" Ball Valve
14	24466	Water Saver Valve
15	24894	1/2" check valve
16	18498	1/2" 120VAC NO Solenoid Valve
not shown	15417	TDS monitor