

SAPPHIRE WATER

CRO 4040-1 – CRO 4040-5

Commercial Reverse Osmosis Units

General Operation & Installation Manual

SAPPHIRE

Commercial Reverse Osmosis Units

If you need to call in for Technical support

Please reference the following information for future reference. Also please see the technical acquisition form at the back of this manual for further assistance.

Model # _____

Serial # _____

Date of Purchase: _____

Note: The serial number is located in the front center of the RO panel.

SAPPHIRE WATER

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General Operation and Specifications

Congratulations for purchasing a SAPPHIRE Commercial Reverse Osmosis System. This unit was specifically designed with you, our customer in mind. Top quality products and years of research and testing have gone into each SAPPHIRE unit to give you years of trouble free operation.

SAPPHIRE products include a whole family of water treatment equipment, including softeners, iron filters; residential and commercial reverse osmosis equipment, carbon, sand and multi media filters and many more products.

SAPPHIRE CRO 4040-1 – 4040-5 units are floor mounted for ease of installation. It is complete and ready for operation when the feed water supply and electrical connections are completed. **SEE CONTROLLER MANUAL.**

Operation

The SAPPHIRE Reverse Osmosis system is fully automatic when used with a storage tank and level control (see diagram). The system requires little attention and maintenance.

The SAPPHIRE Reverse Osmosis system operates by the principle of reverse osmosis. The feed water passes through a 5-micron pre filter which removes suspended particles larger than 5 microns in size. The feed water is then fed into a booster pump that boosts the water pressure from the line pressure up to 150 to 200 psi. The pressurized water enters the membrane(s). The membrane(s) separate the water into two streams; product (permeate) and waste (concentrate) water. The product water has passed through the membrane(s), leaving behind 99% of any attached ions. The wastewater is a concentrated solution that carries the ions left behind by the product water. When the wastewater leaves the membrane(s), a portion of it goes through a recycle valve and goes across the membrane(s) again. The remaining wastewater goes through a concentrate valve and then to drain. Some SAPPHIRE units are equipped with a recycle valve for maximum water savings. If there is no recycle valve on a Reverse Osmosis unit, the waste to product ratio would be 5:1. The recycle valve enables the ratio to be 1:1.

Specifications

Maximum Applied Pressure	225 psi
Normal Operating Pressure	150 – 200 psi
Maximum Operating Temperature	100° F
Feed Water pH Range	3.0 - 10.0
Maximum Feed Water Turbidity	5 NTU
Maximum Feed Water S.D.I. (15 min.)	4.0
Feed water Chlorine Concentration	< 0.1 ppm
Maximum Ratio of Concentrate to Permeate Flow	5:1

Mechanical Installation

Pre treatment requirements vary. A complete water analysis should be conducted before installation and pre treatment recommendations made by your SAPPHIRE dealer.



Note: Chlorine must be removed prior to water reaching the RO system.

Mount system on the floor or a secure stand.

1. Connect a ball valve (1/2" min.) to the inlet side of the pre filter. Connect feed water line to the ball valve.
2. Provide piping from the concentrate outlet to drain. Drain must be equipped with a "P" trap or air gap. Do not install a shut off valve downstream of the Concentrate control valve.
3. Provide piping from the product outlet to the storage tank. Product water should enter the storage tank in through the top of the tank. An air gap should be provided from the water level to product outlet. (See Diagram). Storage tank should have a liquid level control provided to operate the Reverse Osmosis unit. When the control goes down with the water level,

it will turn the power to the RO unit on. When the water level is up to the desired setting, the liquid level switch will cut the power to the RO unit.

To Start Unit

1. Open the water supply valve to the unit. Make sure that both the Recycle valve and Concentrate valve are fully open.
2. Proper electrical connections should be done. Plug the unit in. "OFF" should read on display. If a float switch is being used, proper connections should be done by connecting black and white wires to the wires marked tank full. Unit will start and have three "--" while purging (delayed start). This is a delayed start to allow water to get to the pump before pump start up. Some units will show "FLS" and have a limited flush.



Note: Units equipped with a 2005 computer chip on the circuit board will have a delayed start, solenoid valve will open and unit will purge for 5 seconds. The Unit will then start and some units will display "FLS". Unit will flush for 5 minutes and run for 2 hours and flush again continuously. No adjustments can be made regarding time on flush or run. Units equipped with a 2004 chip (Standard) will purge for 5 seconds and show TDS reading, three chips are available with permeate or auto flush boxes. Refer to R&D Specialties controller manual for flush modes or types.

3. After the unit has run for at least 1 minute, turn the Concentrate valve slowly clockwise until your concentrate flow rate is 2:1 with the permeate flow rate. Then turn the Recycle valve slowly clockwise until the membrane pressure is at factory operating specs. (See chart). These two valves adjust the flow rate and pressure. If you have your desired pressure, but the concentrate flow is too high, simply open the Recycle valve until the membrane pressure drops 10 psi. Close the Concentrate valve until the concentrate flow drops to the desired setting, or the membrane pressure rises 10 psi. If the desired setting is still not achieved, repeat the above steps until your unit is set.



Note: It is recommended that the concentrate/permeate ratio be 2:1. The ratio can be set down to 1:1 by your SAPPHIRE dealer only with permission from the factory. Failure to comply with these ratios could void your warranty.

4. Check entire system for leaks.

Maintenance

1. Check membrane pressure gauge regularly to see that the system pressure is operating according to factory specs.
2. It is good practice to “Fast Flush” the membrane(s) once per week by opening the Concentrate valve fully for 15 minutes to rinse built up scale and solids from the membrane surface.
3. It is good practice to log as much data as possible at least on a weekly basis, e.g. feed pressure, membrane pressure, permeate flow, concentrate flow, feed water temp. For your convenience, an initial data log is included with this manual.

Troubleshooting

Refer to the R&D Manual that was included with your unit; for the troubleshooting guide.

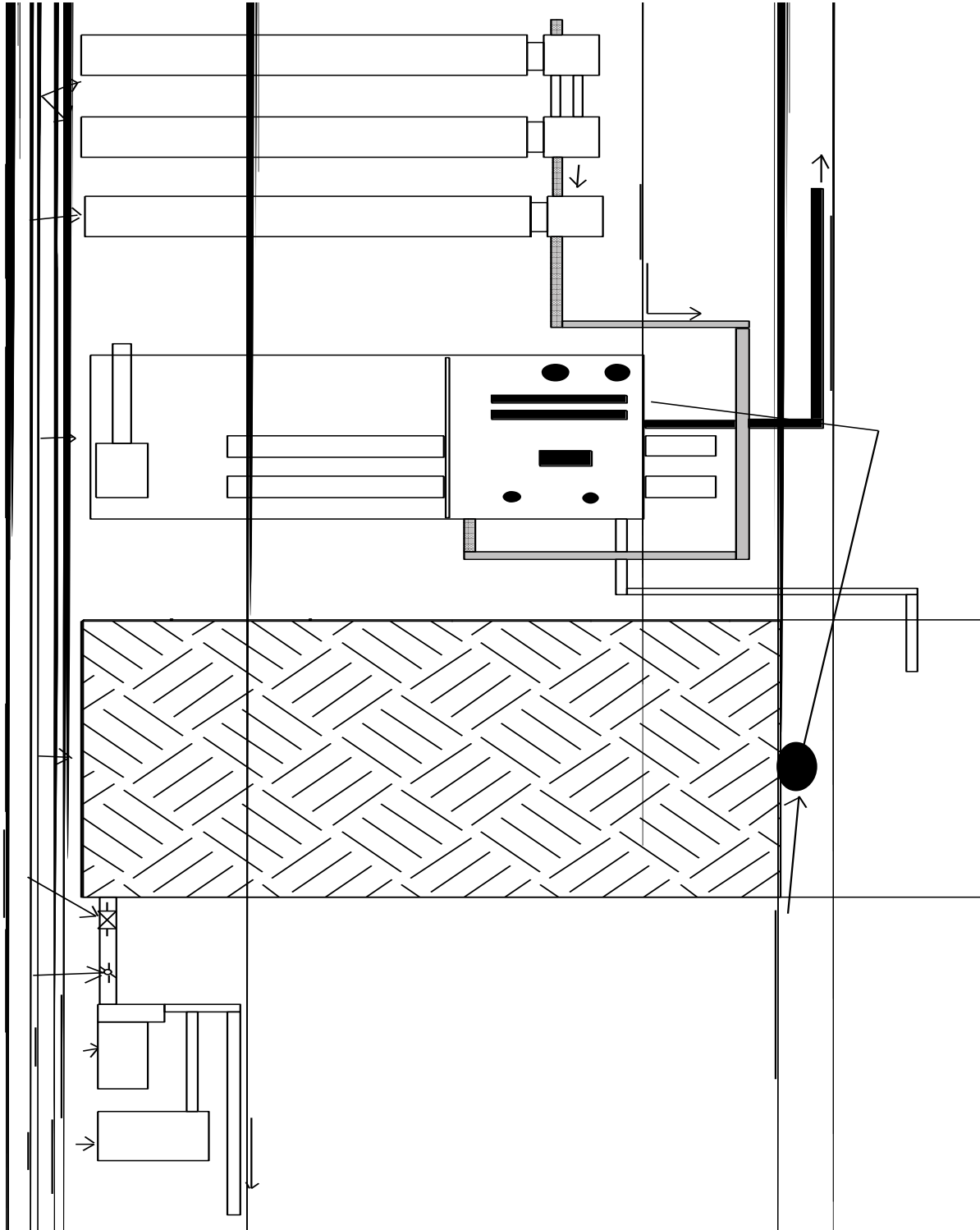


Refer to R & D Specialties Controller Manual for Specific Settings on S-100, S-150 and the S-250. Manuals can be located on the R&D website at rdspec.ca under the tech support section. Pick the manual that refers to your specific unit.

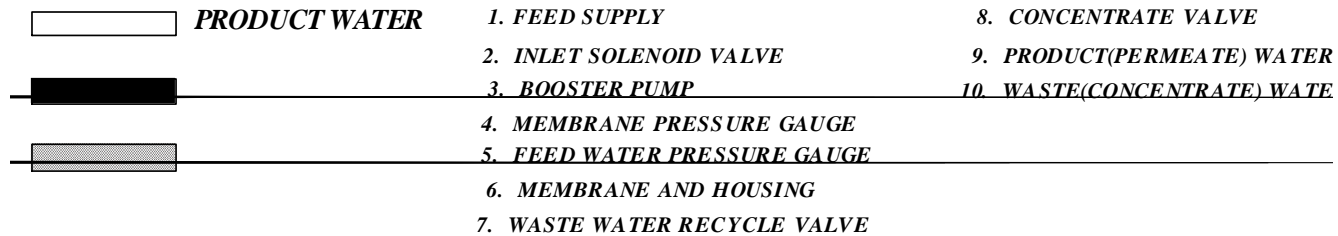
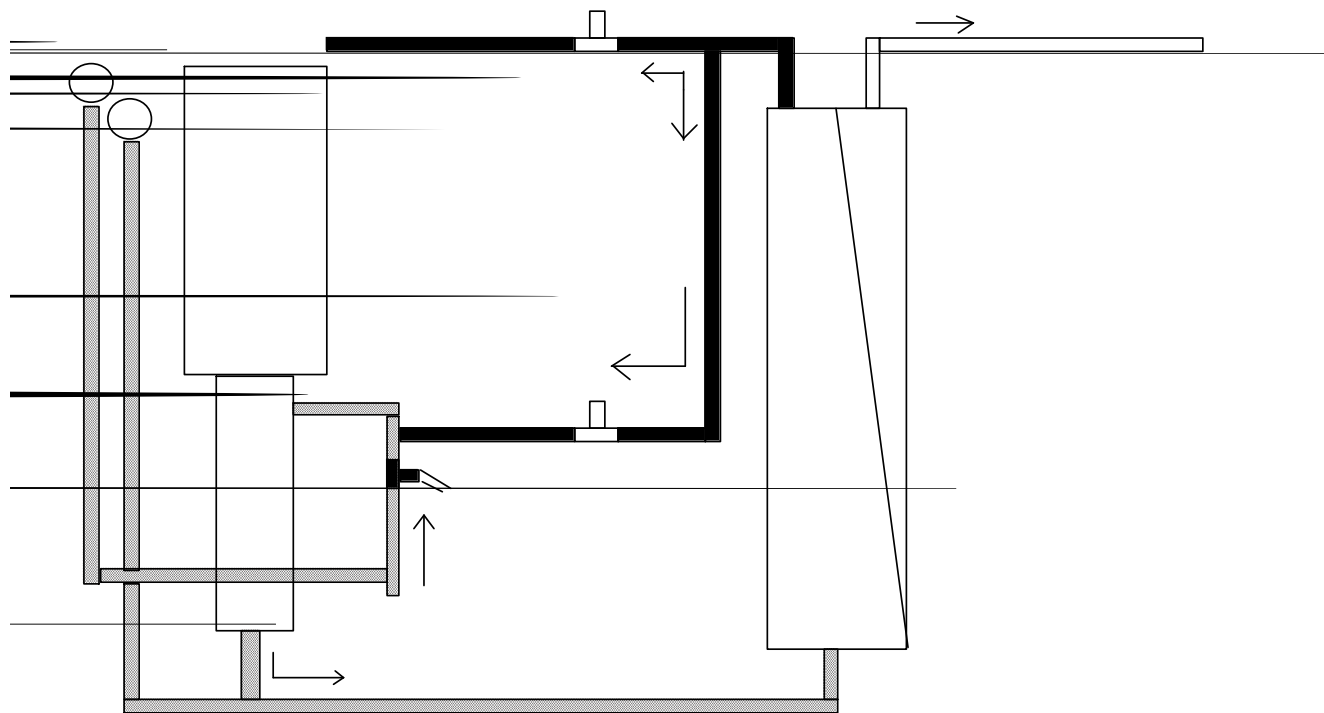
Reverse Osmosis Data Sheet

DATE	WATER TEMP.	FEED PRESSURE	MEMBRANE PRESSURE	PERMEATE FLOW	CONCENTRATE FLOW

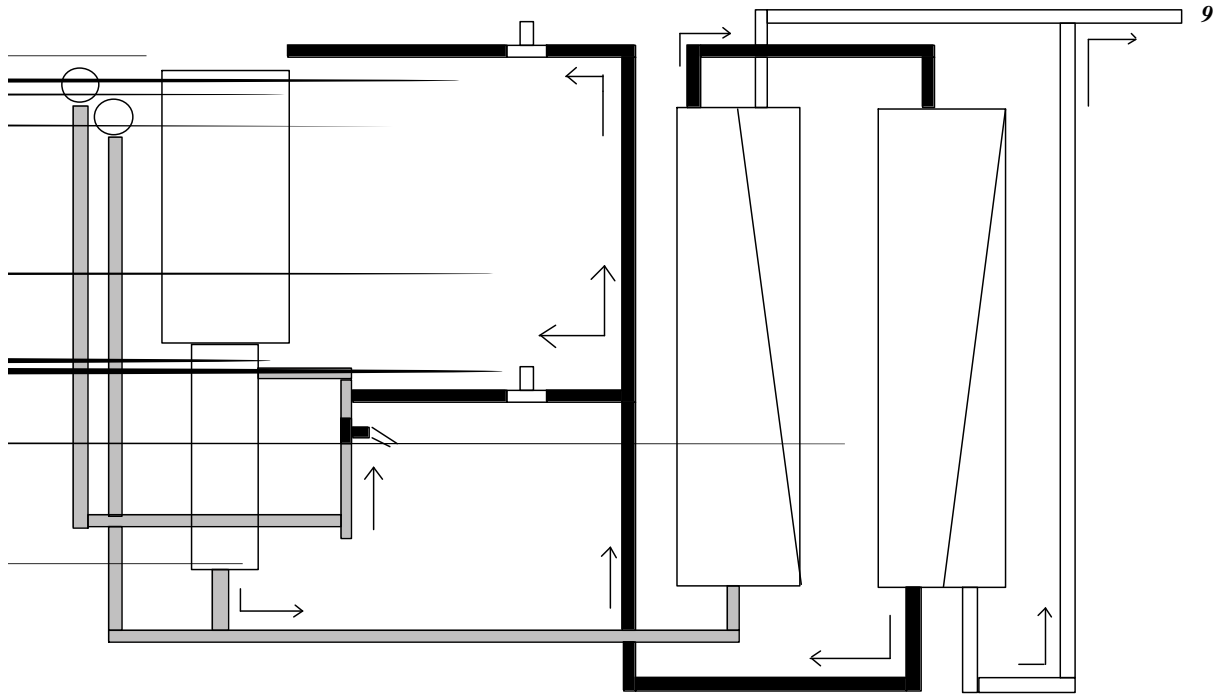
Typical Reverse Osmosis Installation



CRO 4040-1 Flow Chart



CRO 4040-2 Flow Chart



 **PRODUCT WATER**

1. FEED SUPPLY

8. CONCENTRATE VALVE

2. INLET SOLENOID VALVE

9. PRODUCT(PERMEATE) WATER

3. BOOSTER PUMP

10. WASTE(CONCENTRATE) WATER

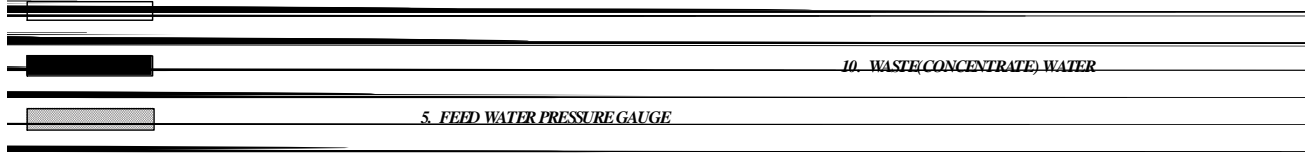
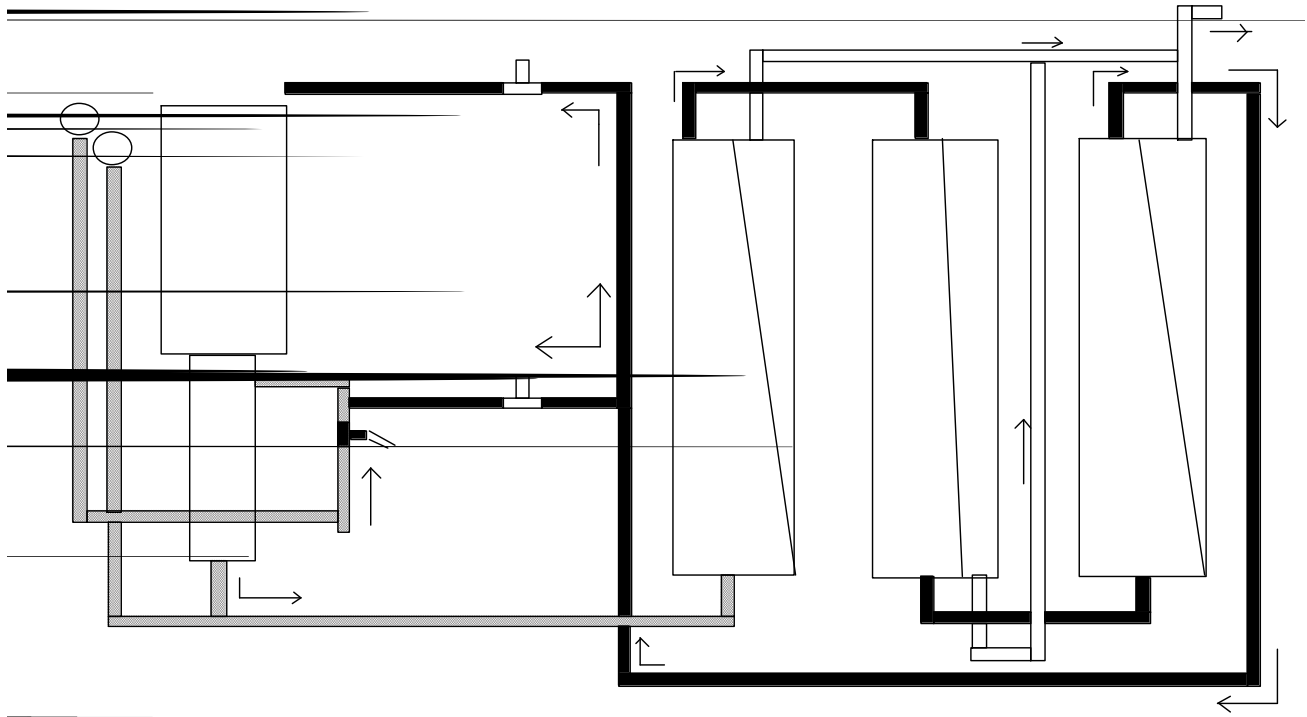
4. MEMBRANE PRESSURE GAUGE

5. FEED WATER PRESSURE GAUGE

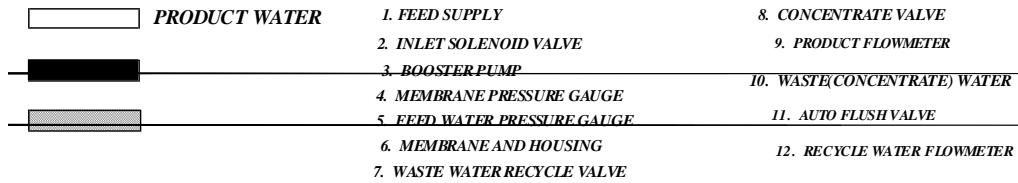
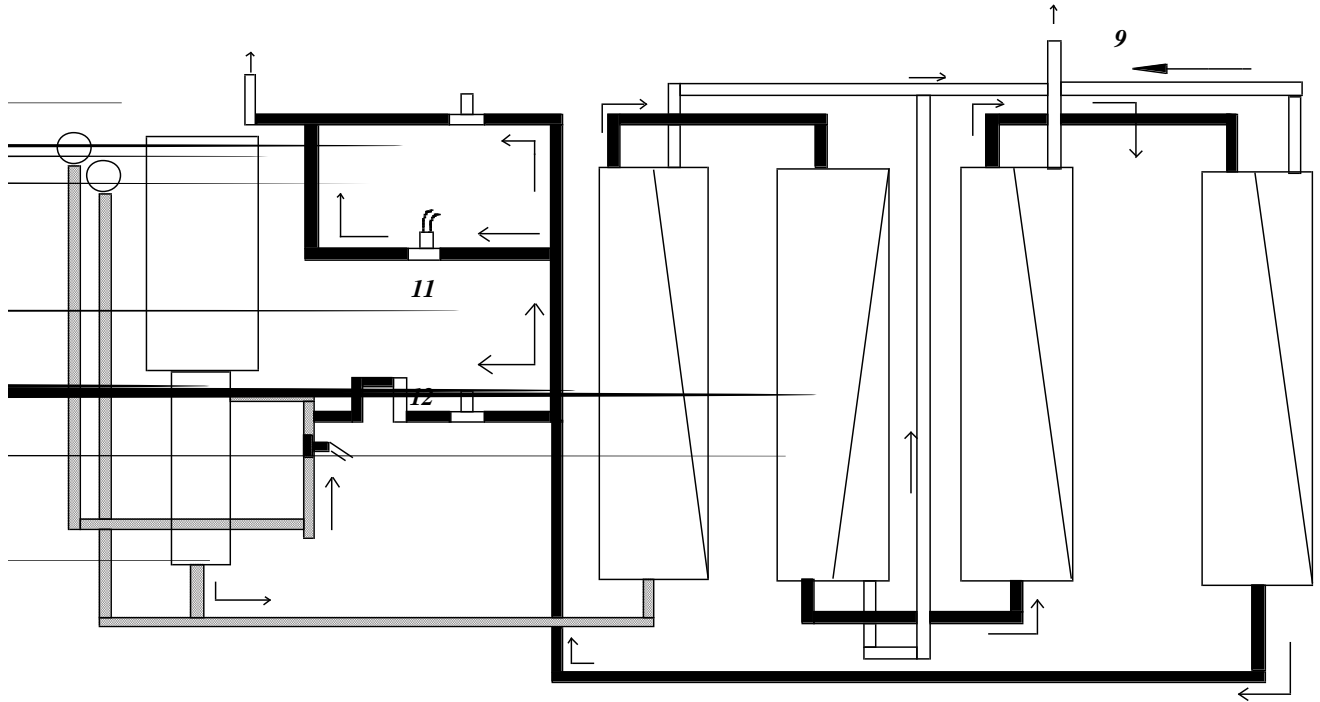
6. MEMBRANE AND HOUSING

7. WASTE WATER RECYCLE VALVE

CRO 4040-3 Flow Chart



CRO 4040-4 Flow Chart



Warranty

SAPPHIRE warrants its equipment against defects in workmanship and materials for a period of one (1) year from date of purchase of equipment by the customer. Such equipment must be used strictly in accordance with instructions furnished by manufacturer and for the purposes disclosed at the time of purchase. Liability of the company shall be limited to the replacement or repair, F.O.B. Watson, Saskatchewan, Canada of any defective equipment or part which, having been inspected by the manufacturer and determined, in the company's sole judgment, as requiring replacement or repair because of defects in original workmanship and/or materials.

Should membrane material or workmanship prove faulty, it will be covered by the warranty of the membrane manufacturer. No other warranties are expressed or implied.

The purchaser is urged to keep accurate records of the operation of the unit. This will serve to protect his/her interests and greatly expedite replacement should it be required.

