



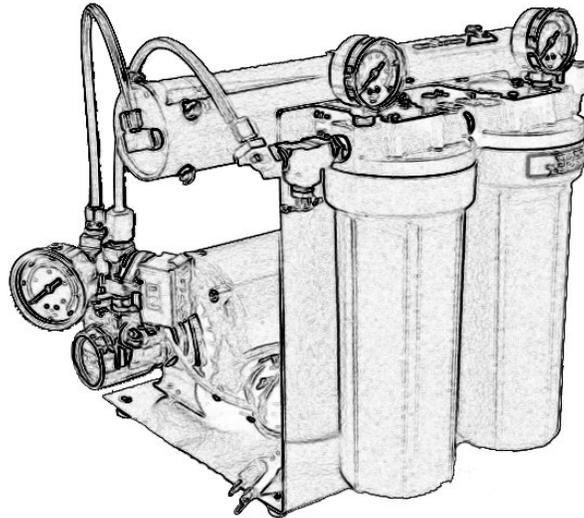
Cak Nak

Water Purification System

TOTAL
SOLIDS AND
100% OF

REMOVE 90% TO 98% OF THE

DISSOLVED
PARTICULATE



CONTAMINANTS

INSTALLATION, OPERATION AND MAINTENANCE MANUAL

PLEASE DO NOT DISCARD

THIS MANUAL CONTAINS IMPORTANT INFORMATION WHICH SPECIFICALLY APPLIES TO THIS UNIT. THIS INFORMATION MAY BE NEEDED AS REFERENCE DURING ANY FUTURE SERVICING OF THE SYSTEM.

DISCLAIMER AND LIMITATIONS

This manual discloses proprietary information developed by Water Equipment Technologies (WET). This information is provided for the purpose of operating and maintaining its water purification systems and may not be used for any other purpose.

It is recommended that this manual be read and understood before performing installation, operation, and maintenance of the system. The equipment warranty may be voided if instructions are not followed correctly.

The information provided may not cover all possible variations of detail in relation to equipment use. Please contact the WET Service Department for any technical questions that are not specifically answered in this manual.

The Seller reserves the right to make enhancements or changes that may not be included in the manual. Therefore, it is understood that the material presented here is subject to change without notice and is for informational purposes only.

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IMPORTANT USER INFORMATION

RO MODEL _____

INSTALLED BY _____

TELEPHONE _____

INITIAL STARTUP DATE _____

SAFETY NOTES – READ AND UNDERSTAND BEFORE PROCEEDING

WARNING

- ◆ High Voltage Electricity
- ◆ High Pressure Components
- ◆ Hazardous Chemicals
- ◆ Spinning Parts
- ◆ Pressurized Water
- ◆ Noise

Failure to follow good safety practices and the instructions included in this manual may result in damage to the unit, its surroundings, personal injury or death. Please take all possible precautions when working on or around this unit.

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The symbols below may be found throughout this manual



Point requiring Special Attention



Don't Do This!



Safety Check Item

I INITIAL INSPECTION AND HANDLING

On receipt of the unit, note any damage on appropriate shipping documents. File damage claims with the carrier immediately and NOT with XYLEM WET.

II QUALITY CONTROL

Each RO unit is tested and preserved before shipment to insure quality and performance. This preservative must be flushed completely from the unit. See the **OPERATION** section of this manual for the procedures to do so.

III ELECTRICITY

The CAK-139 and NAK-139 BP require 115 volts, 60 Hz, single phase power. The service line should have a 15 AMP capacity.

NOTE: 220 volt, 50 and 60 Hz units are available as options, motors used on these models are dual voltage and dual cycle. To verify the electrical specifications, check the "Manufactured By" plate and NOT the motor plate!

IV INSTALLATION

NOTE: For long term performance with minimum maintenance, check for the following:

1. That ALL chlorine is removed from the feedwater
2. Hardness is removed from the feedwater
3. Iron is removed from the feedwater
4. Fill out the operator's log sheet completely and return to XYLEM WET to validate warranty.

NOTE: Hardness and iron will foul the membranes and result in a decrease in the amount and quality of the water produced. The membrane's performance can be restored by a cleaning procedure (contact your local representative).

NOTE: If a water softener is used, it should be set to regenerate at night or when the RO unit is not running.

WARNING: Chlorine must be removed from the feedwater if present. Chlorine will damage the TFC membrane and VOID THE WARRANTY. If activated carbon is used to remove chlorine, the carbon MUST be thoroughly rinsed to remove any small carbon fines before the RO unit is operated.

WARNING: If this pump driven reverse osmosis system is not installed and maintained according to all the instructions provided by the manufacturer, and as a result of not following these instructions by the installer, the water temperature is allowed to exceed 95 degrees F (35 degrees C), then any consequential damages that result from components on the equipment failing due to any resulting heat stress are not the responsibility of the manufacturer and are not covered under the manufacturer's warranty.

RO SYSTEM

The purpose of a Reverse Osmosis (RO) water treatment system is to separate dissolved solids from water. This unit will provide up to 120 gallons of potable water per day.

Incoming water from the supply is pressurized by a booster pump to about 185 psi. The water is forced against a semi-permeable membrane which passes the water and rejects or blocks particulates and dissolved solids. The concentrated salts and solids pass out of the unit and flow to drain.

Recovery of an RO unit is the ratio of the pure water created to the feedwater coming into the unit. Design recovery for this unit is about 80%. This means that in order to produce 120 gallons of pure water, about 150 gallons of feedwater is required, with about 30 gallons of concentrated reject going to drain.

Some things that can reduce water production or upset the recovery are:

- Very high TDS feedwater. Higher levels of contaminants (dissolved solids or organics) require higher pressures in order to obtain the same product flow. This system has a maximum operating pressure of 190psig.
- Cold feedwater. Each 1 degree (Centigrade) of supply water change will result in about a 2% change in water production. If the feedwater temperature drops from 23°C to 18°C, you will get about 10% less water production.
- Reduced feed pressure. Inlet feed pressure (ie: municipal supply, well pump) will directly affect the membrane feed pressure. Reducing the membrane feed pressure will reduce the amount of water produced.
- Clogged inlet filters. As pre-filters age and collect debris, the pressure drop across the filter increases and flow decreases. At some point, the reduced pressure or flow may actually cause the system to not operate at all.
- High pH feedwater. At high pH levels, systems are not only less efficient, but the membranes tend to scale more rapidly. This will also reduce water production.
- Fouled membranes. Scaling, (mineral deposits) and biofouling, (biological growth) either on the membranes or within the RO unit will reduce production. Both causes may be corrected by prompt cleaning with a suitable chemical solution. If detected early, system performance may return to “nearly new” condition.
- Old membranes. As membranes age, water production may decrease or salt passage may increase. In either case, it is time to buy a new membrane for your system. Nominal life expectancy where performance at least meets the minimum specifications for the system is about 3 years. The typical useful life may be as long as 7 or 8 years with care and excellent feedwater quality.

INSTALLATION

1. This RO system requires an adequate water supply, with a line pressure of **40 PSI**, within 6 feet of the installation site. This will insure adequate feed pressure to the booster pump after any filtration.

WARNING: A pressure regulator must be used if the feedwater pressure exceeds a maximum of 50 PSI.

IMPORTANT: When installing a RO system that utilizes a booster pump in an enclosed area such as under a kitchen sink, be sure that there is adequate ventilation to dissipate the heat from the motor. Otherwise the heat buildup can weaken the plastic tubing and may cause it to burst under pump pressure.

2. WATER SUPPLY (feed) - Turn off the water supply. Place the 3/8" brass compression valve in the cold-water line. Attach one end of the 3/8" tubing to the valve using the brass insert and nylon sleeve provided and attach the other end to the RO unit filter connection marked "FEED". See the SYSTEM LAYOUT drawing.
3. DRAIN LINE (concentrate or reject) - Attach the drain saddle tee to the 1-1/2" outside diameter drain pipe. Drill a 3/8" hole into the pipe. Insert the 1/2" npt x 3/8" compression fitting into the saddle tee. Attach the 3/8" tube and connect it to the reject fitting. See the system layout drawing.
4. SERVICE LINE (permeate or product) - Drill a 5/8" hole in the sink top (use a carbon tungsten drill bit) and attach the chrome faucet. Attach the 1/4" outside diameter tubing from the tee (marked permeate) to the compression tee on the pressure tank and then to the compression nut on the bottom of the faucet. See the system layout drawing.
5. ON CHLORINATED WATER - You **must rinse** the activated carbon cartridges. Do this by placing a container under the sample port, (see the system layout drawing, item 21) open the valve 4 or 5 turns and turn on the water supply. Continue this procedure until no more black color appears in the water.

The unit is factory tested at a 5 to 1 recovery ratio. Rejection of the TDS (Total Dissolved Solids) is at least 90% at 185 PSI, 78° F and 1000 PPM TDS.

NOTE: If the RO pump pressure exceeds 190 PSI:

1. Remove the acorn nut on the right side of the pump
2. Using a common screwdriver, turn the slotted screw counter-clockwise to decrease pressure.
3. Replace the acorn nut.

WARNING: PUMP WARRANTY IS VOIDED IF THE PRESSURE EXCEEDS 190 PSI

NOTE: Pump model units will automatically shut down when the pressure in the holding tank reaches 40 PSI. Back pressure on the holding tank should not exceed 40 PSI. The RO pump will start automatically when the product pressure drops below 20 PSI.

V OPERATION

NOTE: On new installations, do not allow any product water to flow into the storage tank until the RO unit has run for one hour and is thoroughly flushed. This will insure the removal of all traces of the preservative from the membranes. Do this by shutting down the storage tank valve and opening up the faucet and let the water run into the drain. Be sure to re-open the storage tank valve for normal operation.

1. After all water hook-ups are complete, turn the water supply on and check for leaks.
2. To start the RO unit, plug in the RO unit using the 3 prong plug in a standard 115 volt outlet or 220 volts if designated for 220 volt power.
3. The unit will not operate unless the feedwater pressure is 20 PSI or higher.
4. The system is equipped with a preset reject water flow controller. No adjustments are required for setting flow rates.

VI RECOMMENDED DISINFECTING PROCEDURE

(AFTER INSTALLATION IS COMPLETE)

The storage tank lines going to the faucet must be disinfected to prevent bacteria contamination and possible odor problems from developing. A dirty prefilter cartridge can also cause odors to develop.

Trace amounts of hydrogen sulfide or methane gas dissolved in the raw water can also cause problems. (These gaseous compounds will permeate into and through the RO membranes).

The method for proper disinfecting is by using household chlorine bleach and the P6UC4 tube fitting supplied with the RO unit in the accessory kit: (Refer to Drawing.)

1. Unplug the RO unit. The power must be off before disinfecting.
2. Turn the water supply off (cold water valve).
3. Drain the storage tank.
4. Disconnect the tube from the feedwater fitting going to the pump (step 1).
5. Disconnect the 1/4" tube on the check valve pressure tee switch from the unit (step 2).
6. Remove the 3/8" and 1/4" nuts, grab rings, spacers, and O-rings from the P6UC4 poly fitting. Put them aside and keep them as spares.
7. Connect the P6UC4 Poly fitting to the ends of the each of the tubing connections removed (step 3). The tubing connections are long enough to bend together but be careful not to kink any tubing connections. Connecting these tubes will by-pass the pump during the disinfecting procedure.
7. Remove both of the carbon cartridges from the housings on the CAK-139 BP or the sediment filter from the housing on the NAK-139 BP. Add 1 ounce of household chlorine bleach to the filter sump and place back on the unit. Open the feedwater supply (cold water valve) and the RO faucet on the sink. Run the water until a strong chlorine bleach smell is noted.
8. Close the RO faucet and fill the pressure tank. Let the tank sit for 30 minutes, allowing the chlorine to kill any bacteria that might be present. Drain the tank and close the cold-water valve.
9. Disconnect the P6UC4 Poly fitting and reconnect the tubing to their original connections.
10. Plug in the RO unit.
11. Open the cold-water valve and let the RO water to fill the pressure tank. Drain and flush the tank several times to remove the chlorine. **DO NOT USE THE FIRST 2 TANK-FULLS OF WATER!!**

VII PREVENTATIVE MAINTENANCE

1. NON-CHLORINATED WATER SUPPLIES, NAK-139 BP (as needed, based on differential pressure).

Check the sediment prefilter (differential pressure should not exceed 15 PSI).

- 1) Un-plug the RO unit and turn the feedwater supply off.
- 2) Remove the filter cartridge from the housing, if it is not soiled, continue with this procedure. You may have to press the red pressure relief button on the filter housing to relieve the pressure.
- 3) Wash the cartridge off under the sink faucet.
- 4) Return the cartridge to the housing (When inserting the cartridge into the housing, be sure the O-ring is set inside groove in the sump.)
- 5) Turn the water supply on and plug the RO unit in.

2. CHLORINATED WATER SUPPLIES, CAK-139 BP (weekly)

The CAK-139 BP utilizes two activated carbon prefilters (GAC-10)

IMPORTANT: The supply water should be checked for chlorine on a weekly basis. This is done by using the Chlorine Test Kit (item 117) and taking a water sample after the prefilters (see test kit instructions). If chlorine is present, the activated carbon filters must be changed. Always remember to **thoroughly flush** the new carbon filters before putting them into service. This is easily done with the sample port. (See the *SYSTEM LAYOUT* drawing)

NOTE: Higher levels of chlorine may require a larger carbon prefilter, if one is needed, contact your local sales representative.

3. RO PUMP (once every month)

The clamp between the motor and pump should be checked monthly to be sure it is tight. To tighten, use the tightening screw located on top of the pump shaft. If the clamp is allowed to become loose, the pump shaft will wear excessively, thus voiding the pump and motor warranty.

PUMP STARVATION

- 1) The minimum feedwater line pressure should be 40 PSI, and the feedwater line must not be more than 6 feet from the RO unit.
- 2) Air should be bled out of the prefilters by depressing the red relief button on top of the filter with the RO pump turned off.

PUMP PRESSURE (check once a day)

If the pressure exceeds 190 PSI, excessive wear to the pump internals will occur, resulting in a gradual loss of pressure. Keep the pressure between 130 and 190 PSI.

NOTE: City water main pressure will tend to be higher at night. Monitor the pressure at night and adjust the RO unit accordingly. On well pumps, check the pressure during the high cycle of the pump.

PUMP CYCLES ON AND OFF (every few seconds)

A defective pump could cause the pump to cycle rapidly on all models. Check for leaks in the product water line. If there is a pressure tank in-line, be sure it is properly pressurized.

4. EXCESS TEMPERATURE (Check on start up and once a month)

BLENDING VALVE

Those installations that are using blend valves to mix hot and cold water going to an RO unit should be check for the maximum temperature of the hot water, especially during the winter. Also, if the hot water leaks past the blend water valve, it could result in leaking ROMAS and fittings. Maximum feedwater temperature should be 100 degrees F at 190 PSI, unless a special heavy duty high-temperature pressure vessel is used.

RECOVERY RATES

Insufficient recovery rates can cause excess heat to build up due to lack of sufficient water flow through the pump. This heat build-up can also cause leaks to develop and will cause fouling of the membranes.

VENTILATION

Inadequate ventilation will cause the pump motor to overheat and cut out. It will also cause leaks due to water temperature build up.

5. RO Membrane Assembly

NOT MAKING ANY WATER	(POSSIBLE REASONS)
	Reject ratio is too low
	Product water line is blocked
	Pressure is too low
	TDS is too high
	Membrane is fouled
	Prefilter is plugged
	Storage tank has too much pressure
MAKING TOO MUCH WATER	O-ring by-pass in the RO membrane assembly
	Chlorine damage to the membrane
	Water temperature increase
	Reverse flow through the membrane (causes a rupture in the membrane)
TDS IS TOO HIGH	O-ring by-pass in the RO membrane assembly
	Chlorine damage to the membrane
	Membrane is fouled
	Ruptured membrane
	Increase in the feedwater TDS
	High pH in the feedwater

VIII CLEANING PROCEDURES

WHEN TO CLEAN

Cleaning is required when the quality and/or quantity of water produced falls off by 10% or more from the original readings at the time of installation. Several conditions can cause a reduction in water quality and/or water production. The following should be checked first to see if they are causing the problem before considering cleaning.

- Water pressure change
- Temperature change
- TDS level increase
- Prefilters plugged
- High pH level

WATER PRESSURE

These RO units are designed to operate at pressures between 130 and 190 PSI, any change up or down; adjustments must be made.

TEMPERATURE

These RO units are tested with water at 25 degrees C and 250 MG/L TDS. Lower water temperature will result in less water passing through the membrane. Higher water temperature results in more water passing through the membrane.

As a rule, at a given pressure and TDS level, for each 1-degree change in water temperature the change in water production is approximately 2%. Thus, if the water temperature is 5 degrees C, the amount of water produced will be 40% less than at 25 degrees C.

TDS AND REJECTION RATE

As the TDS (total dissolved Solids) level climbs, the amount of water passing through the RO membrane decreases. If the TDS level has climbed since the time of installation, the unit will produce less water.

Check the TDS level of the feedwater and compare it with the TDS level at time of installation.

If the TDS levels have climbed, the rejection rate will have to be increased to reduce the TDS level build up within the membrane.

PREFILTERS

Five Micron (NAK-139 BP)

A dirty prefilter can reduce the amount of water and the pressure going to the RO unit. If the cartridge appears dirty and/or the differential pressure exceeds 10 PSI it should be cleaned or replaced (model wars-5). On extremely dirty water, a larger prefilter may be needed.

Activated Carbon (CAK-139 BP)

The activated carbon prefilters are used to reduce volatile organic substances and chlorine. They should be changed every 3 months or sooner if chlorine is detected after the activated carbon cartridges.

Flow Rates - check the product and concentrate flow rates to determine any change from the normal conditions. Adjust the flows and pressures if necessary to maintain the proper settings. If the pump pressure is 190 PSI and the recovery rate is too low, the membrane may be fouled and require cleaning.

Recovery Rates - If the TDS level climbs or an odor develops, measure the amount of water coming out from the concentrate line, and then do the same for the product water line. The difference in concentrate to product should be approximately 5 to 1. If the ratio needs to be adjusted, it can be done by using the adjusting screw on the pump.

NOTE 1 - Under no conditions should you allow the membrane to dry out. Always keep moisture in the RO membrane assembly, and always keep the ends plugged (Use threaded plugs being careful not to over tighten, as a cracked end plug may result). If freezing weather conditions exist, drain the water from the RO membrane assembly and plug the holes before shipping.

NOTE 2 - For the most accurate TDS readings, let the RO unit run for at least 15 minutes.

NOTE 3 - For the warranty to be valid, activated carbon must be used to remove the chlorine from the water supply. Use a chlorine test kit to determine if any chlorine is in the reject water. If it is, replace the activated carbon tank or cartridge. If chlorine passes even with a new carbon filter, you need to get a larger one with greater capacity for chlorine removal.

If you find yourself cleaning the system frequently, a change in the feedwater chemistry may be the cause. Only a detailed water analysis can determine the likely cause of membrane fouling. Consult your water retailer or consult the XYLEM WET service department for information and pricing for membrane cleaning and/or water analysis services.

DO NOT return the RO unit to XYLEM WET without first obtaining Return Merchandise Authorization(RMA). Company will not be responsible for equipment, supplies, or materials returned without an RMA. All shipments should be properly insured.

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