



**INSTALLATION, OPERATION,
and MAINTENANCE MANUAL**

HS Series IC Reverse Osmosis Processor

Model HS-333 PT

Part Number 61301606154

**Service - Sales - Technical Support
(800) 950-9912**

Watts Water Quality
13700 Hwy 90 W
San Antonio, TX 78245



HS-333 Water Treatment System

Watts Water Quality proprietary information statement

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Disclaimers:

This unit is not intended for drinking water. Process water is for equipment only.

Manufacturer is not responsible for service, maintenance, sanitization or sterilization of equipment.

This manual describes the installation, operation, and maintenance requirements for the Watts Water Quality model HS-333 reverse osmosis water treatment system.

SECTION 1. SAFETY PRECAUTIONS

General Safety Requirements

The following general safety requirements are provided to ensure the safe and reliable installation and maintenance of the HS-333. In addition to the precautions given in this manual, standard shop and maintenance safety practices should be used at all times.

WARNING: WHEN EQUIPPED WITH THE OPTIONAL BOOSTER PUMP, THE HS-333 WATER TREATMENT SYSTEM USES 115 VAC ELECTRICAL POWER. POTENTIALLY HAZARDOUS CONDITIONS MAY EXIST WHILE INSTALLING OR PERFORMING MAINTENANCE ON THE SYSTEM.

WARNING: WHEN EQUIPPED WITH THE OPTIONAL BOOSTER PUMP, DISCONNECT ALL ELECTRICAL POWER FROM THE SYSTEM BEFORE PERFORMING ANY ELECTRICAL SERVICE FUNCTIONS. USE APPROPRIATE LOCK OUT TAG OUT PROCEDURES.

WARNING: SHUT OFF THE WATER SUPPLY AND DEPRESSURIZE THE WATER SYSTEM BEFORE PERFORMING ANY MAINTENANCE FUNCTIONS.

WARNING: WEAR APPROPRIATE SAFETY GLASSES OR EYE PROTECTION WHEN WORKING WITH A PRESSURIZED WATER SYSTEM. FAILURE TO DO SO MAY RESULT IN SERIOUS PERSONAL INJURY.

WARNING: ONLY QUALIFIED PERSONNEL SHOULD ATTEMPT TO INSTALL, OPERATE, OR PERFORM MAINTENANCE ON THE SYSTEM.

WARNING: FOLLOW THE PRECAUTIONARY SAFETY INSTRUCTIONS GIVEN IN THIS MANUAL EXACTLY. DO NOT TAKE SHORT CUTS. FAILURE TO FOLLOW THE SAFETY PRECAUTIONS MAY RESULT IN SERIOUS PERSONAL INJURY.

WARNING: MAKE SURE FEED HOT WATER TEMPERATURES DO NOT EXCEED 100 °F. TEMPERATURES IN EXCESS OF 100 °F MAY INJURE PERSONNEL OR DAMAGE EQUIPMENT.

CAUTION: DO NOT USE VASELINE OR OTHER PETROLEUM BASED LUBRICANTS ON THE O-RINGS. PETROLEUM BASED LUBRICANTS WILL DAMAGE THE O-RINGS AND CAUSE LEAKS.

CAUTION: USE TEFLON TAPE ON ALL THREADED CONNECTIONS WITHOUT A GASKET.

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SECTION 2. INTRODUCTION

This manual provides step-by-step procedures to safely install, operate, and maintain the Watts model HS-333 reverse osmosis water treatment system.

Before installing and/or operating the HS-333 reverse osmosis water treatment system, read this manual completely. Keep this manual available for future reference. Further information is available by contacting Getinge USA. Phone: 1-800-950-9912.

WARNING: WHEN EQUIPPED WITH THE OPTIONAL BOOSTER PUMP, THE HS-333 WATER TREATMENT SYSTEM USES 115 VAC ELECTRICAL POWER. POTENTIALLY HAZARDOUS CONDITIONS MAY EXIST WHILE INSTALLING OR PERFORMING MAINTENANCE ON THE SYSTEM.

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WARNING: FOLLOW THE PRECAUTIONARY SAFETY INSTRUCTIONS GIVEN IN THIS MANUAL EXACTLY. DO NOT TAKE SHORT CUTS. FAILURE TO FOLLOW THE SAFETY PRECAUTIONS MAY RESULT IN SERIOUS PERSONAL INJURY.

Special Precautions

Warnings, cautions, and notes in this manual provide the following data:

A **WARNING** is an operation or maintenance procedure or condition that, if not obeyed, can cause injury or death to personnel.

A **CAUTION** is an operation or maintenance procedure or condition that, if not obeyed, can cause damage to the equipment.

A **NOTE** gives data to make the work easier or gives directions to go to a procedure.

WARRANTY

WHAT YOUR WARRANTY COVERS:

If any part of your Watts Water Quality Treatment Device is defective in workmanship (excluding replacement filter elements), return the unit within 1 year of date of original purchase. Watts will repair or, at Watts's option, replace it at no charge.

HOW TO OBTAIN WARRANTY SERVICE:

Contact Getinge USA (1-800-950-9912) to obtain a Return Goods Authorization Number (RGA#). Model and Serial Number are required for obtaining an RGA #. For warranty service, ship your water treatment device with the RGA # printed on the Shipping Label to Watts, freight and insurance prepaid, with proof of original purchase date. Watts will repair or replace the water treatment device and ship it back to you prepaid.

WHAT YOUR WARRANTY DOES NOT COVER:

This warranty does not cover defects resulting from improper installation, customer abuse, misuse, misapplication, improper maintenance, neglect, alteration, accidents, casualties, fire, flood, freezing, heat, environmental factors or acts of nature.

This warranty will be voided if defects occur due to failure to observe the following conditions:

1. The water treatment device must be hooked up to a potable municipal water supply.
2. The pH of incoming water must not be lower than 6.0 or higher than 8.5.
3. The incoming water pressure must not exceed 75 psi. If water pressure exceeds 75 psi a pressure regulator must be installed.
4. Incoming water temperature cannot exceed 100 °F (37.8 °C).

This warranty does not cover any equipment that has been relocated from the site of its original installation.

This warranty does not cover equipment that is installed outside North America.

LIMITATIONS AND EXCLUSIONS:

WATTS WILL NOT BE RESPONSIBLE FOR ANY IMPLIED WARRANTIES, INCLUDING THOSE OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

WATTS WILL NOT BE RESPONSIBLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING TRAVEL EXPENSES, TELEPHONE CHARGES, LOSS OF REVENUE, LOSS OF TIME, INCONVENIENCE, LOSS OF USE OF THE EQUIPMENT, AND DAMAGES CAUSED BY THE EQUIPMENT AND ITS FAILURE TO FUNCTION PROPERLY.

THIS WARRANTY SETS FORTH ALL OF WATTS' RESPONSIBILITIES REGARDING THIS EQUIPMENT.

OTHER CONDITIONS: IF Watts chooses to replace the equipment, Watts may replace it with reconditioned equipment. Parts used in repairing or replacing the equipment will be warranted for 90 days from the date the equipment is returned to you or for the remainder of the original warranty period, whichever is longer. This warranty is not assignable or transferable.

YOUR RIGHTS UNDER STATE LAW:

Some states do not allow limitations on how long an implied warranty lasts and some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights. You may have other legal rights, which vary from state to state.

SECTION 3. DESCRIPTION

General Description

The Watts HS-333 reverse osmosis water treatment system (HS-333) is a point-of-use system designed to significantly reduce contaminants that affect the performance and life cycle of water dependent equipment. The HS-333 utilizes complete pre-treatment processes to include sediment, KDF media, and carbon filtration of the water. In addition to the reverse osmosis process, post-treatment processes include PH adjustment and additional sediment filtration.

The HS-333 is a self-contained, compact unit, which only requires a hot and cold potable water supply, drain and product connection. No electrical service is required. An optional low-pressure booster pump is available for installations with insufficient output pressure. Figure 3-1 shows the HS-333 reverse osmosis water treatment system.



Figure 3-1. HS-333 Water Treatment System

Equipment Description

The following paragraphs provide a brief description of the HS-333 processor assembly and its main components.

Processor Assembly

The HS-333 processor assembly (processor) is shown in Figure 3-2. The processor houses the controls, indicators, filters, and pressure tank necessary for HS-333 operation.

The HS-333 is floor mounted and includes floor mount leg levers. Seismic mount holes are located on the base of the unit. An optional accessory package contains castors, which enable the HS-333 to be moved in and out of tight spaces.



Figure 3-2. HS-333 Front & Side View

Processor Components

The processor main components and their various functions are described in the following paragraphs.

Figure 3-3 shows the processor assembly interior and identifies the main components of the HS-333 processor. The processor pressure tank is located behind the pre-treatment filter assemblies.

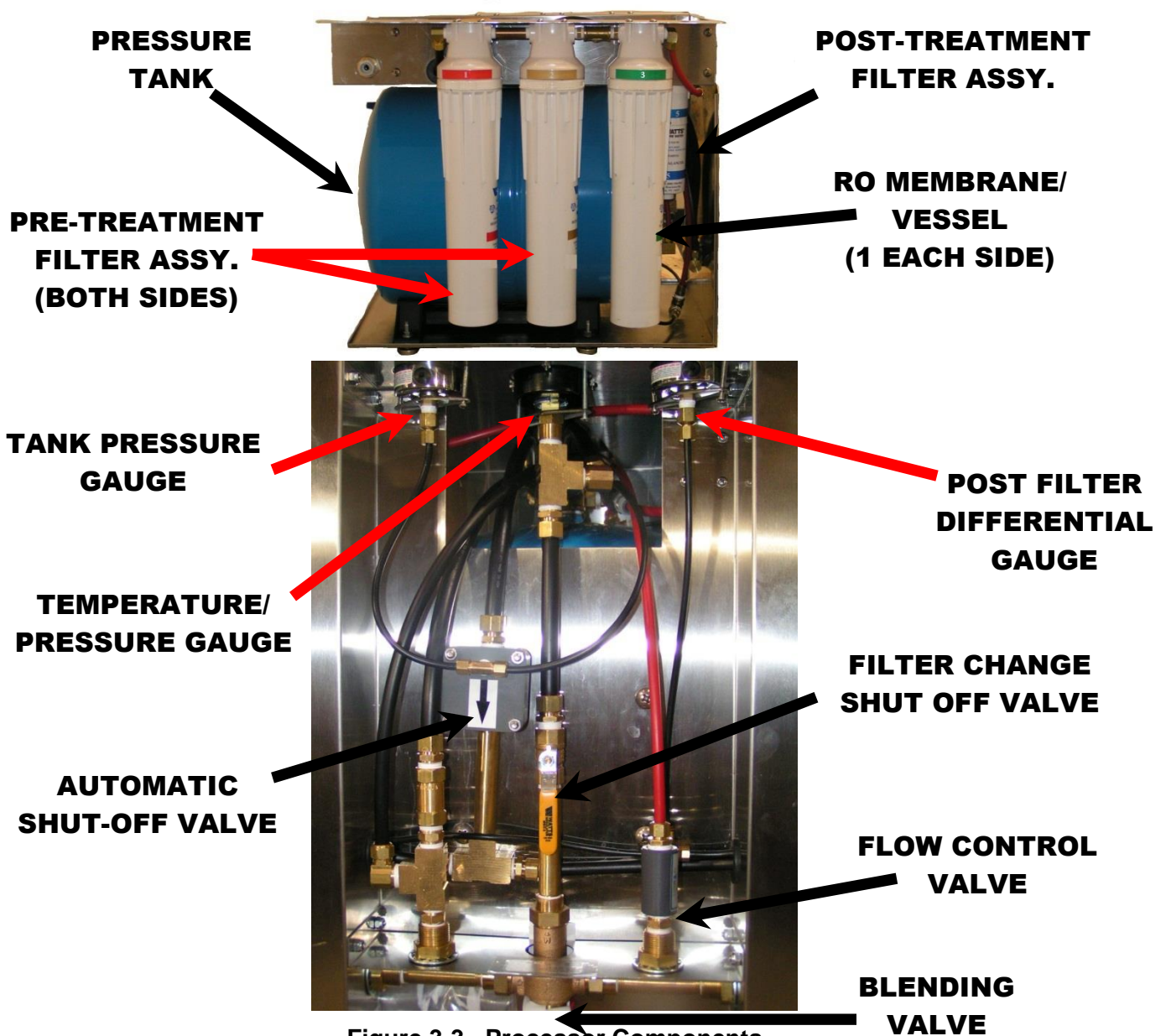


Figure 3-3. Processor Components

A more detailed functional description of the components listed above is given in the OPERATION section of this manual.

Processor Controls

The processor control valves are shown in the following figures. The control valves provide manual control and adjustment of various processor functions.

1. Bypass Valve

The bypass valve (Figure 3-4) is located on the top of the processor. The bypass valve is used to completely bypass the pre-filtration and RO process. If water demand exceeds processor production capability, or if unit is out of service.

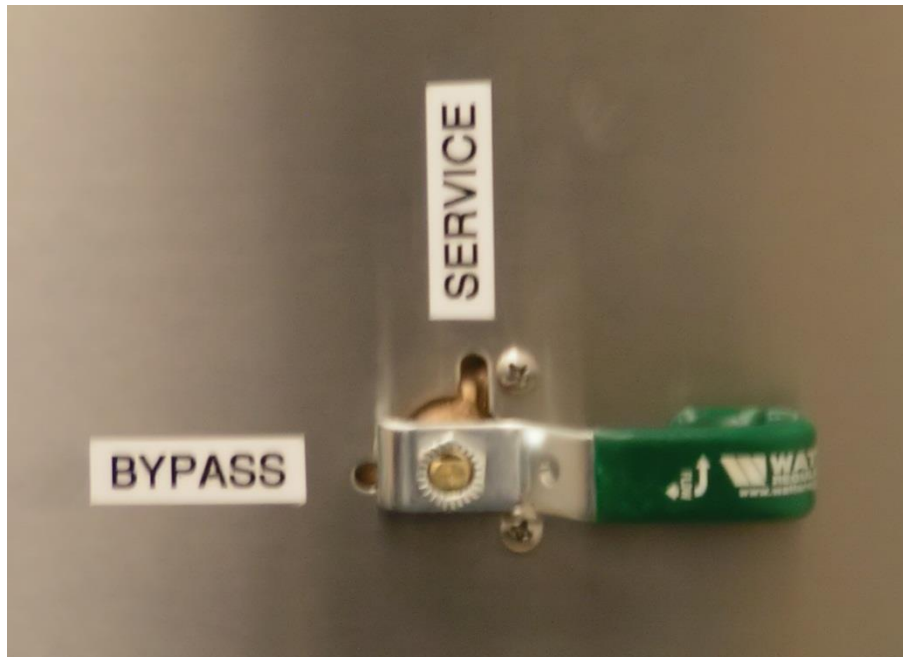


Figure 3-4. Bypass Valve

2. Filter Change Shut Off Valve

The filter change shut off valve (Figure 3-5) is located next to the pre-treatment filter assembly inside the processor. The filter change shut off valve is used to stop water flow and allow easy filter changes.



Figure 3-5. Filter Change Shut Off Valve

3. Blending Valve

The blending valve (Figure 3-6) is located on the top rear of the processor. The blending valve is used to adjust feed water temperature to 77°F for efficient RO water processing.

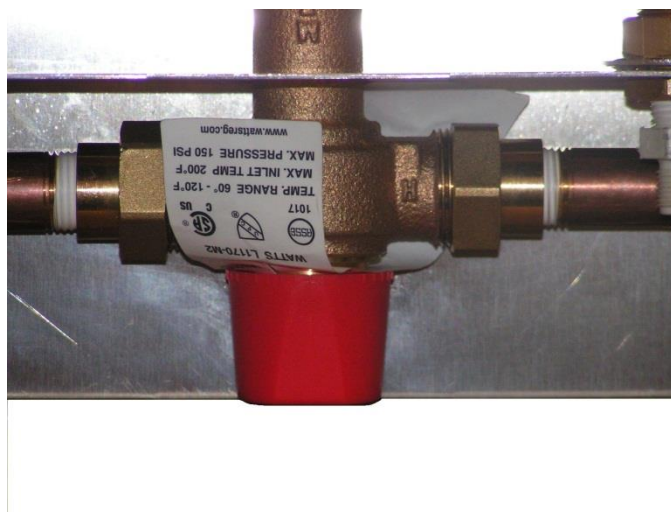


Figure 3-6. Blending Valve

Processor Indicators

The processor pressure gauge and the combination temperature/pressure gauge are shown in the following figures.

1. Feed Water Temperature/Pressure Gauge

The temperature/pressure gauge (Figure 3-7) is on the front panel of the processor unit. The temperature/pressure gauge is used to monitor inlet water pressure and blending valve water temperature. The inlet water pressure must be 50 psi or greater for the processor to operate at maximum efficiency.



Figure 3-7. Temperature/Pressure Gauge

2. Pressure Gauge

The Post Filter pressure gauge (Figure 3-8) is located on the front of the processor. This pressure gauge displays the pressure differential between the feed water and the pre-treatment filter assembly. If the Delta P is greater than 15 psi, change the filters. See the MAINTENANCE section.



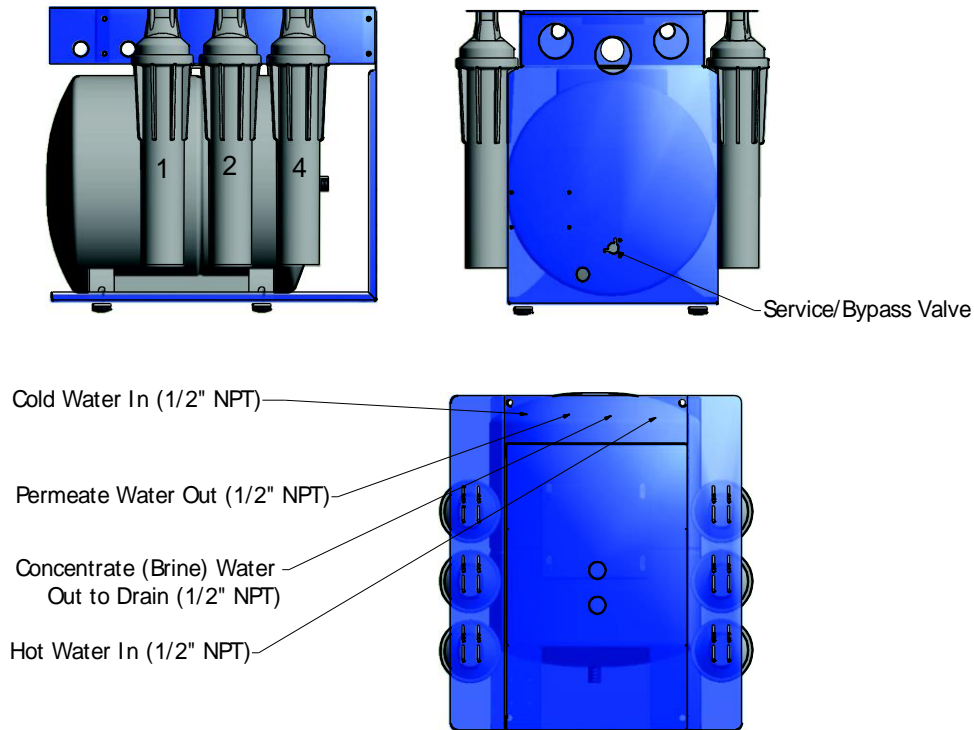
Figure 3-8. Post Filter Pressure Gauge

Specifications: Error! Reference source not found. shows the basic system specifications and installation requirements necessary to install the HS-333. Additional system installation dimensions and clearance requirements are listed on the product data sheets located on the next page (See Table 3-2).

Specifications	
Dry Weight (unit only w/membrane & filters)	118 lbs
Wet Weight (unit only w/membrane & filters)	125 lbs
Feed Water	
Temperature	Not to exceed 100° F
Flow Rate	≥ 1 GPM
Maximum Hardness	< 14 Grains
Maximum TDS	2000 PPM
Maximum Iron	< 0.1 mg/L
Maximum Turbidity	< 1 NTU
Maximum Silica	40 PPM
PH Range	6.0 – 8.5
Silt Density Index (SDI)	< 5
Maximum psig	75
Minimum psig	30
Drain Requirements	
Floor or Sink Drain (minimum size within 6 ft. of processor)	1 1/2"
Additional Plumbing Connections	
Permeate line	1/2" FPT
Concentrate/Drain line	1/2" FPT
Electrical Requirements (optional)	
Optional low-pressure booster pump	115 VAC / 1.7 A

Table 3-1. HS-333 PT System Specifications and Requirements

HS-333 Water Treatment System PT (P/N 61301606154)



NOTES:

1) ELECTRICAL REQUIREMENTS:

□ Optional 115V Pump/Motor can be ordered for low pressure installations; Branch Circuit 15 Amp Breaker Required, at service panel.

2) **INLET WATER:** Designed to handle potable water up to 2000 ppm TDS; Hardness 14 Grains Max; Silica 40 PPM Max; Iron < 0.1 PPM; Turbidity < 1 NTU; Silt Density Index (SDI) < 5; PH Range 6 - 8.5; Free Chlorine < 1.0 ppm.

3) **INLET FLOW REQUIREMENTS:** HS-333 ≥ 1 GPM @ 50 - 75 psi.

4) **WATER TEMPERATURE:** Min 35°F - Max 100°F (2°F - 38°C). Rated/Operating temperature 77°F (25°C). To be tempered with supplied blending valve.

5) **WATER PRESSURE:** 50 - 75 psig. A 60 psig rated pressure regulator P/N 134033 will be required if over 75 psig. For water hammer, A Watts series 15 Water Hammer Arrestor will be required.

6) **CODES:** UL & CUL 508A.

7) **PM KIT:** 1 year preventative maintenance kit included. (Getinge P/N 61301606155).

8) **CLEARANCE:** Top 18" side access 8" front open / back 6". (required access.)

9) **FLOOR SINK DRAIN:** 1-1/2" dia. within 6' of Processor & Tank.

10) **APPROVED PIPING MATERIAL:** Schedule 80 PVC for washer applications and "L" copper for boiler feed applications.

11) **PRE/POST TREATMENT:** #1 Sediment, P/N 61301606259 - Qty 2; #2 GAC/KDF, P/N 61301606165 - Qty 2; #5 Post Feeder, P/N 61301605516 - Qty 1.

12) **MEMBRANE:** Size: 2.5" x 15" Encapsulated.

Replacement: #4 Membrane, P/N 61301606162 - 2 each.

13) **PRESSURE TANK SIZE:** 14 Gallon Total Volume (7.96 Gallons Usable Storage). Pressure SOV set to On @ 20psi Off @ 30psi (with 60psi inlet pressure).

Table 3-2. Product Data Sheet, HS-333 PT

SECTION 4. INSTALLATION

Installation Procedures

This section provides step-by-step instructions for the installation of the HS-333.

WARNING: PERSONNEL MUST BE TRAINED AND FAMILIAR WITH ALL SAFETY PRECAUTIONS (SECTION 2) BEFORE INSTALLING THE HS-333 WATER TREATMENT SYSTEM. HAZARDS ASSOCIATED WITH THIS EQUIPMENT, AND THE NECESSARY PRECAUTIONS TO AVOID DANGER, ARE GIVEN IN THIS MANUAL.

WARNING: ONLY QUALIFIED PERSONNEL SHOULD ATTEMPT TO INSTALL, OPERATE, OR PERFORM MAINTENANCE ON THE SYSTEM.

Membrane Installation

Before operation, the membranes must be installed. There are 2 membranes, one on each side of processor labeled in green with the number 4.

The reverse osmosis (RO) membrane is shown in Figure 4-1.

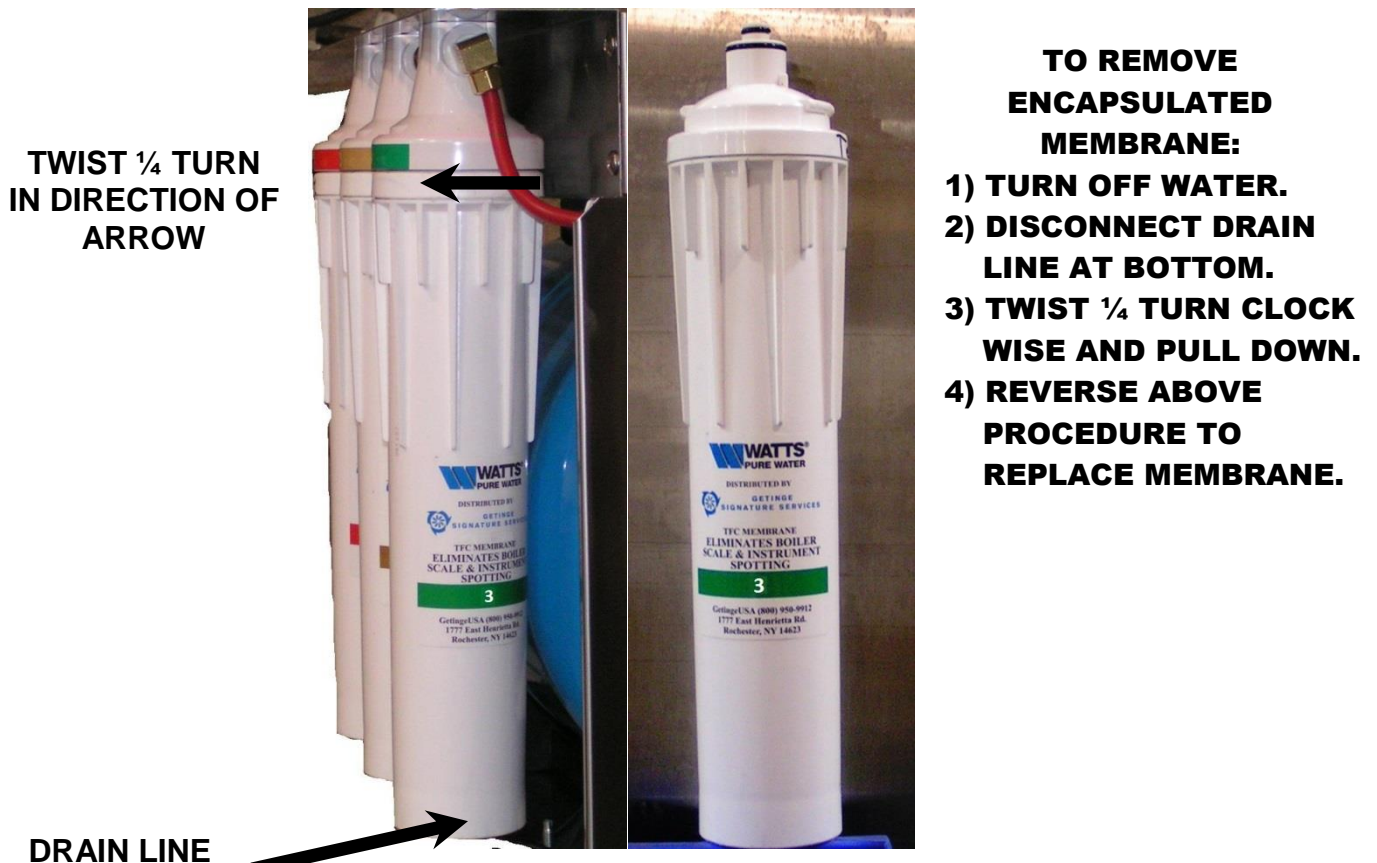


Figure 4-1. RO Membrane

CAUTION: DO NOT USE VASELINE OR OTHER PETROLEUM BASED LUBRICANTS ON THE MEMBRANE CARTRIDGE O-RINGS. PETROLEUM BASED LUBRICANTS WILL DAMAGE THE SEALS AND CAUSE LEAKS.

CAUTION: DO NOT INSTALL THE RO MEMBRANE CARTRIDGE WITHOUT LUBRICATING THE O-RING SEALS. FAILURE TO DO SO MAY DAMAGE THE SEALS.

1. Disconnect the drain hose “quick connect” (Figure 4-2), at bottom of vessel.

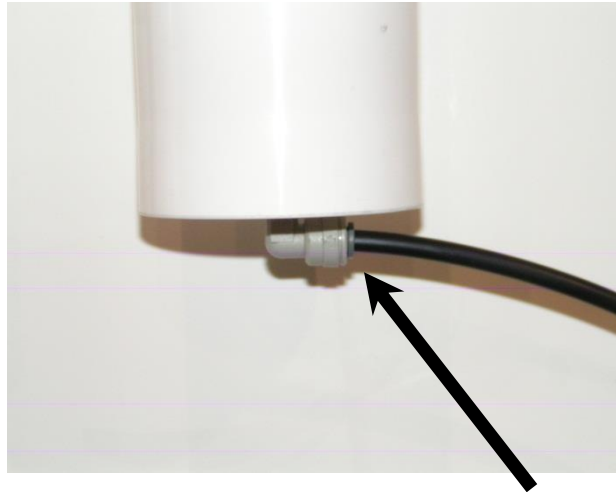


Figure 4-2. Drain Line, Quick Release.

2. Grasp the membrane cartridge (Figure 4-3) and twist ¼ turn clockwise.



Figure 4-3. Encapsulated Membrane Cartridge

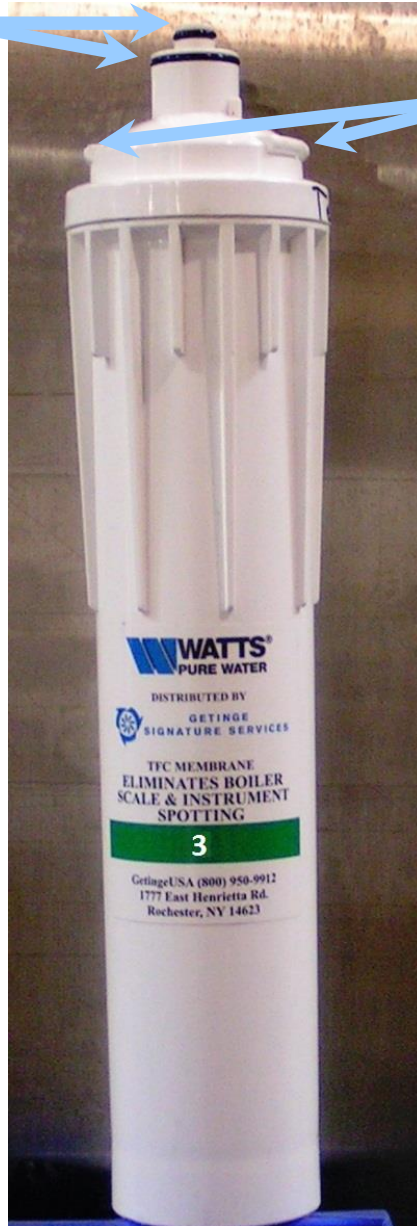
3. Pull straight down firmly. If the filter does not come down easily, the *gentle* use of a screwdriver between head and membrane cartridge may be necessary.

NOTE: Care should be used as not to break the drain connection fitting on the bottom of the membrane cartridge.

CAUTION: ONLY USE A WATER SOLUBLE LUBRICANT SUCH AS A FOOD GRADE SILICONE OR K-Y TYPE JELLY ON THE O-RINGS.

4. Apply lubricant to the O-Rings on the top of the RO Membrane Cartridge.
5. Carefully insert the RO Membrane Cartridge, with the double and single notches lined up with pegs, into the Head.

LUBRICATE



**Line up
notches,
with pegs
in lid**

Figure 4-4. RO Membrane and Membrane Cartridge

6. Make sure the RO Membrane Cartridge is fully seated in the head. Twist ¼ Turn counter clockwise, to lock in place.

CAUTION: ONLY USE A WATER SOLUBLE LUBRICANT SUCH AS A FOOD GRADE SILICONE OR K-Y TYPE JELLY ON THE O-RINGS.

Filter Cartridge Installation

The HS-333 processor assembly pre-treatment and post-treatment filter cartridges are not installed as delivered from the factory. The required filter cartridges are included with the processor. The step-by-step procedures for filter cartridge installation are given below.

CAUTION: DO NOT USE VASELINE OR OTHER PETROLEUM BASED LUBRICANTS ON THE FILTER MANIFOLD O-RING SEALS. PETROLEUM BASED LUBRICANTS WILL DAMAGE THE O-RINGS AND CAUSE LEAKS.

CAUTION: DO NOT INSTALL THE FILTER CARTRIDGES WITHOUT LUBRICATING THE O-RING SEALS. FAILURE TO DO SO MAY DAMAGE THE O-RINGS.

1. Pre-Treatment Filter Cartridge Installation

NOTE: The pre-treatment filter cartridges are numbered and color-coded to make sure they are installed on the correct pre-treatment filter head. The top of the pre-treatment filter head is also numbered and color-coded to aid correct filter cartridge installation.

A. Make sure all O-rings on the pre-treatment filter are installed and clean. Each of the filters, and membranes, has two O-rings (Figure 4-5).



Figure 4-5. Pre-Treatment Filter O-Rings

CAUTION: ONLY USE A WATER SOLUBLE LUBRICANT SUCH AS A FOOD GRADE SILICONE OR K-Y TYPE JELLY ON THE O-RINGS.

B. Apply lubricant to the O-rings on the pre-treatment filters (Figure 4-5).

- a. Remove the pre-treatment filter cartridges from the protective packing.
- b. Make sure the open end of each pre-treatment filter cartridge is clean and undamaged (Figure 4-6).

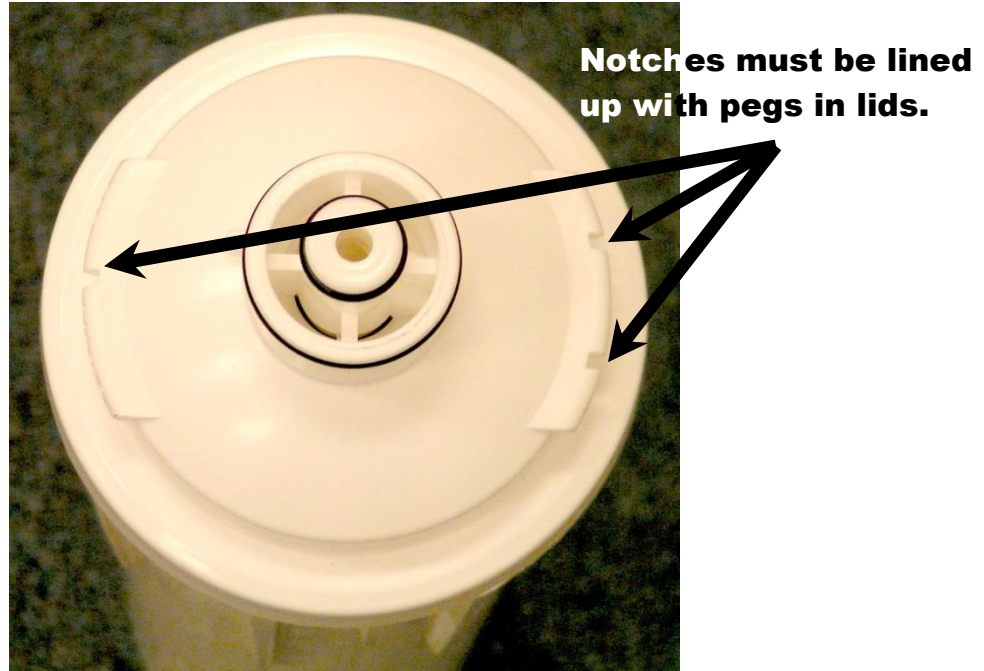


Figure 4-6. End of Filter Cartridge

CAUTION: EACH SIDE OF THE FILTER CARTRIDGE HAS A PROTRUDING TAB, WITH 1 AND 2 NOTCHES. APPLY EVEN PRESSURE TO THE BOTTOM OF THE FILTER CARTRIDGES. PUSH UP FIRMLY. TURN CLOCKWISE $\frac{1}{4}$ TURN. FAILURE TO DO SO MAY DAMAGE EQUIPMENT.

- C. Start with the pre-treatment sediment filter cartridges labeled with a red band and a number one (1) shown in Figure 4-7.

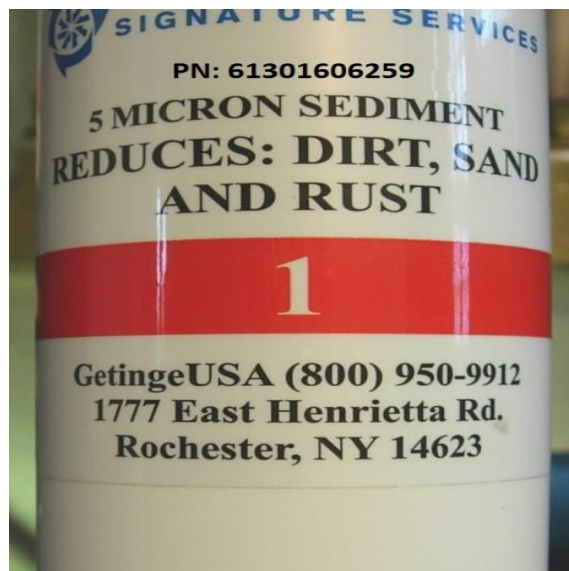


Figure 4-7. Number One (1) Filter Cartridge

- D. Install a number one (1) pre-treatment filter, (Figure 4-8) starting on the right-hand side of processor. These filter cartridges have a red band.



Figure 4-8. Install Pre-Treatment Filter Cartridge One (1)

- E. Turn the pre-treatment filter cartridge $\frac{1}{4}$ turn counter clockwise, hand tight. When cartridge stops turning easily, do not tighten further. Cartridge has a tab stop on it to prevent over tightening.
- F. Install the remaining number one (1) pre-treatment filter cartridge on the opposite side of the processor (Figure 4-5).
- G. Tighten the pre-treatment filter cartridge $\frac{1}{4}$ turn counter clockwise, hand tight.

- H. Install a number two (2) pre-treatment filter, (Figure 4-9) starting on the right-hand side of processor. These filter cartridges have a gold band.

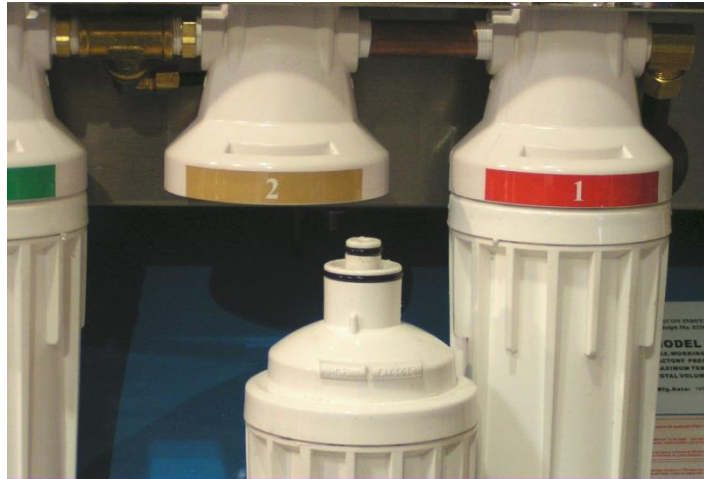


Figure 4-9. Number Two (2) Filter Cartridge

- I. Turn the pre-treatment filter cartridge $\frac{1}{4}$ turn counter clockwise, hand tight. When cartridge stops turning easily, do not tighten further. Cartridge has a tab stop on it to prevent over tightening.
- J. Install the remaining number two (2) pre-treatment filter cartridge on the opposite side of the processor.
- K. Tighten the pre-treatment filter cartridge $\frac{1}{4}$ turn counter clockwise, hand tight.



Figure 4-10. Pre-Treatment Filter Cartridge Two (2) Install

2. Post-Treatment Filter Cartridge Installation

NOTE: The post-treatment filter cartridge is numbered and color-coded to make sure it is installed on the correct filter head. The top of the post-treatment filter head is also numbered and color-coded to aid correct filter cartridge installation.

- A. Make sure the O-rings on the post-treatment filter head are installed and clean. The head has two O-rings (Figure 4-11).

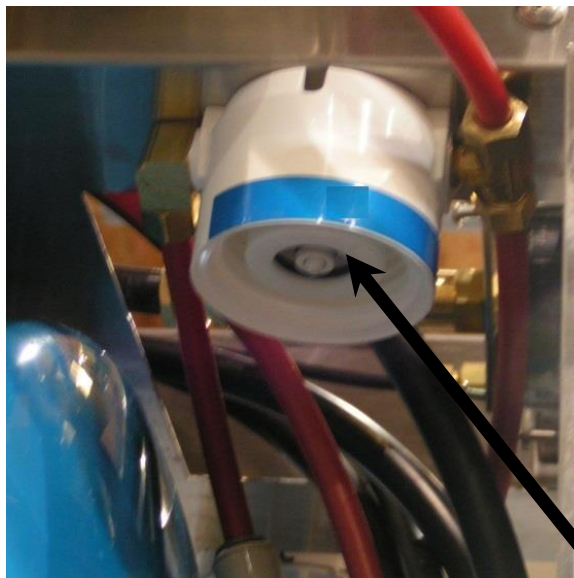


Figure 4-11. Post-Treatment Filter Head O-Rings

CAUTION: ONLY USE A WATER SOLUBLE LUBRICANT SUCH AS A FOOD GRADE SILICONE OR K-Y TYPE JELLY ON THE O-RINGS.

- B. Apply lubricant to the O-rings on the post-treatment filter head.(Figure 4-11).
- C. Remove the Four (4) post-treatment PH balance filter cartridge from the protective packing. The post-treatment PH balance filter cartridge has a blue band.
- D. Make sure the open end of the post-treatment filter cartridge is clean and undamaged (Figure 4-6).

CAUTION: DO NOT CROSS THREAD THE FILTER CARTRIDGE. START BY HAND AND APPLY EVEN PRESSURE TO THE BOTTOM OF THE FILTER CARTRIDGE. FAILURE TO DO SO MAY DAMAGE EQUIPMENT.

- E. Install the number four (4) post-treatment filter cartridge on the filter head.
- F. Tighten the post-treatment filter cartridge hand tight.

Pressure Tank Set Up

Use the step-by-step procedures given below to set up the HS-333 pressure tank.

CAUTION: THE PRESSURE TANK INTERNAL AIR PRESSURE MUST BE SET TO 5-8 PSI WHEN EMPTY.

1. Remove the valve stem cover from the valve stem located on the top of the pressure tank (Figure 4-12).

NOTE: Pressure tank internal air pressure is preset at the manufacturer. The pressure will change due to temperature and altitude differences.

2. Check the pressure tank internal air pressure at the valve stem.
3. Add or remove air until the pressure tank internal air pressure is set to 5-8 psi. Replace the valve stem cover on the valve stem.

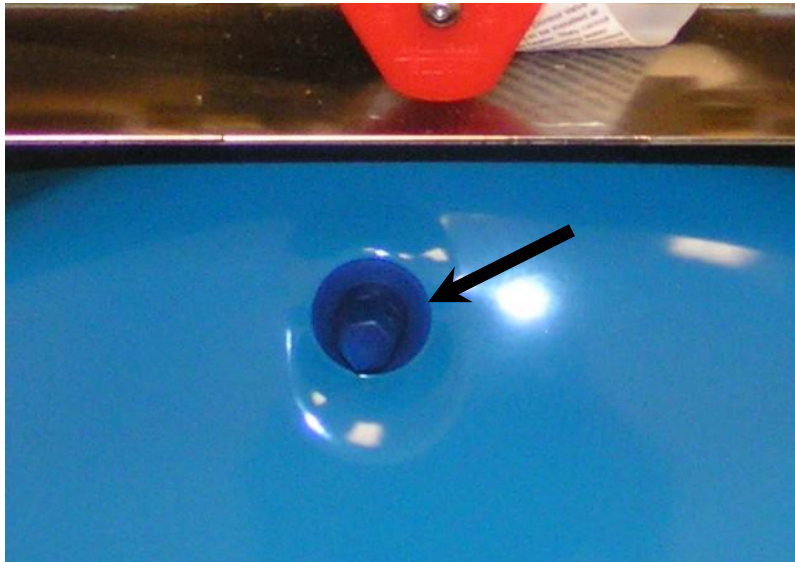


Figure 4-12. Pressure Tank Valve Stem

NOTE: The tank comes preset from the factory (5-8 psi), over time the tank can lose pressure. Make sure to check air pressure during every filter change.

NOTE: Only check air pressure when the tank is empty. You may find it convenient to plumb a valve, from the permeate line to the drain, for draining the tank.

Inlet Connection

The HS-333 uses a feed water blending valve to ensure the water temperature is maintained at 77°F for the maximum efficiency of the reverse osmosis process.

The step-by-step procedures for the blending valve hot and cold feed water connections and temperature adjustment are given below.

WARNING: MAKE SURE FEED HOT WATER TEMPERATURES DO NOT EXCEED 100 °F. TEMPERATURES IN EXCESS OF 100 °F MAY DAMAGE EQUIPMENT AND INJURE PERSONNEL.

CAUTION: THE BLENDING VALVE WILL NOT WORK WITH A SINGLE WATER CONNECTION. BOTH HOT AND COLD FEED WATER MUST BE PLUMBED.

CAUTION: USE TEFLON TAPE ON ALL THREADED CONNECTIONS WITHOUT A GASKET.

CAUTION: USE ONLY L TYPE COPPER PIPE TO HARD PLUMB THE HOT AND COLD FEED WATER CONNECTIONS TO THE HS-333.

NOTE: See Table 1-1 in the DESCRIPTION section for feed water and plumbing requirements.

The feed water-blending valve (Figure 4-13), is installed on the top rear of the processor assembly.



Figure 4-13. Blending Valve Assembly

NOTE: The HS-333 is marked with hot and cold water connection points.

NOTE: It is recommended that ball type shut off valves are installed prior to the hot and cold water feed connections.

4. Plumb the hot and cold feed water connections into the HS-333.
 - A. Plumb the appropriate hot and cold feed water connections (Figure 4-13).

NOTE: It is a good idea to install supply line valves in case there is a need to shut off the feed water connection lines.

CAUTION: THE BLENDING VALVE IS NOT PRESET. IT MUST BE ADJUSTED PRIOR TO USE.

CAUTION: DO NOT PERFORM THE WATER TEMPERATURE ADJUSTMENT PROCEDURE UNTIL ALL INLET, PERMEATE, AND DRAIN CONNECTIONS ARE COMPLETE.

3. Feed Water Temperature Adjustment

The feed water blending valve temperature must be adjusted to ensure optimum RO processing efficiency. The HS-333 has a temperature/pressure gauge (Figure 4-14) to aid feed water temperature adjustment.



Figure 4-14. HS-333 Temperature/Pressure Gauge

Perform the following steps to adjust the blending valve the feed water temperature.

NOTE: The feed water must flow for a minimum of two minutes to allow the water temperature to stabilize before making adjustments.

- A. OPEN the cold feed water valve and let the water flow for at least two minutes.
NOTE: It may be necessary to adjust the blending valve for cold water to flow.
- B. If no feed water flows, go to step E.
- C. When the feed water flow is verified, OPEN the hot water feed valve and let the water flow for at least two minutes.
- D. Verify the blending valve water temperature.
NOTE: The HS-333 feed water should be adjusted to 77°F for maximum RO efficiency.
- E. To adjust the blending valve temperature, loosen the button head cap screw in the center of the blending valve locking cap (Figure 4-15) with a 3/32 inch hex wrench (provided with unit).
- F. Loosen the button head cap screw until a minimum of 1/4 inch of threads are visible under the screw head.



Figure 4-15. Blending Valve Locking Cap

- G. Pull the blending valve locking cap outward against the button head cap screw until the locking cap rotates freely.
- H. Increase the water temperature by rotating the locking cap counterclockwise.
- I. Decrease the water temperature by rotating the locking cap clockwise.
- J. Allow the water to flow for at least two minutes.
- K. Verify the blending valve water temperature.
- L. Continue to adjust the water temperature until the blending valve temperature gauge shows 77°F.
- M. Push the blending valve locking cap in against the blending valve.
- N. Tighten the button head cap screw.
- O. Verify that the blending valve water temperature remains between 77°F. If necessary, readjust the water temperature.

Permeate Line Connection

The permeate line connection (Figure 4-16) is located on the bulkhead panel on the top of the processor assembly. Use the step-by-step procedures given below to plumb the permeate line connection to the equipment.

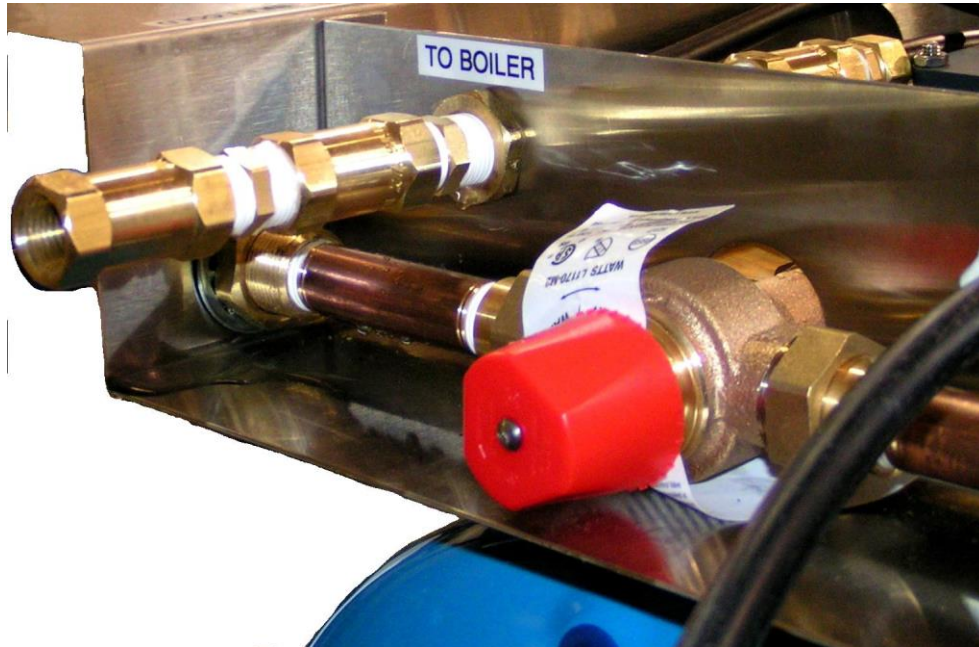


Figure 4-16. Permeate Line Connection

1. Remove the check valve assembly from the packing material.
2. Make sure flow direction (arrow on side of valves) is pointed away from the RO unit.
3. If necessary, apply Teflon sealing tape (Figure 4-17) to the threads of the hex nipple, on the inlet end of the check valve assembly. (Arrow shows direction of flow)

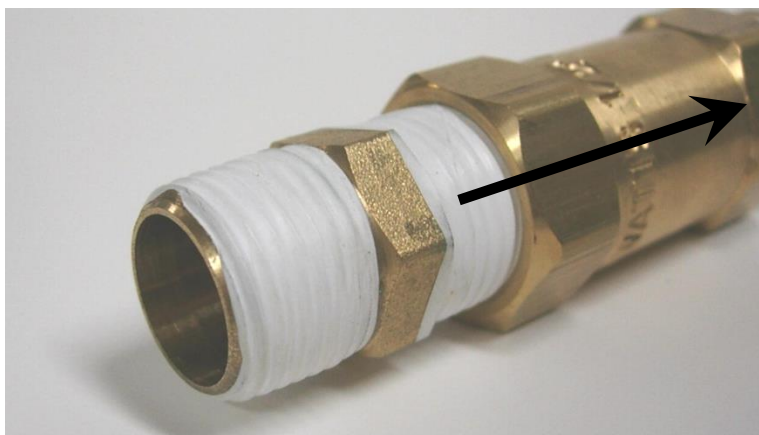


Figure 4-17. Teflon Tape on Threads

4. Insert the threaded side of the check valve assembly into the permeate line fitting labeled "To Boiler" on the processor and tighten.

NOTE: It is advantageous to install a valve to drain, on permeate, for draining the system during routine maintenance.

Optional Low-Pressure Booster Pump Set Up

Use the step-by-step procedures given below, to set up the HS-333 booster pump. A typical booster pump application is shown in Figure 4-19.

WARNING: MAKE SURE THE HOT AND COLD WATER FEED VALVES ARE CLOSED PRIOR TO BOOSTER PUMP INSTALLATION. FAILURE TO DO SO MAY CAUSE INJURY TO PERSONNEL AND DAMAGE TO EQUIPMENT.

1. CLOSE the hot and cold water feed valves.
2. If necessary, remove the processor access panel from the top of the processor.
3. Locate the four (4) mounting holes on the front of unit (Figure 4-19).

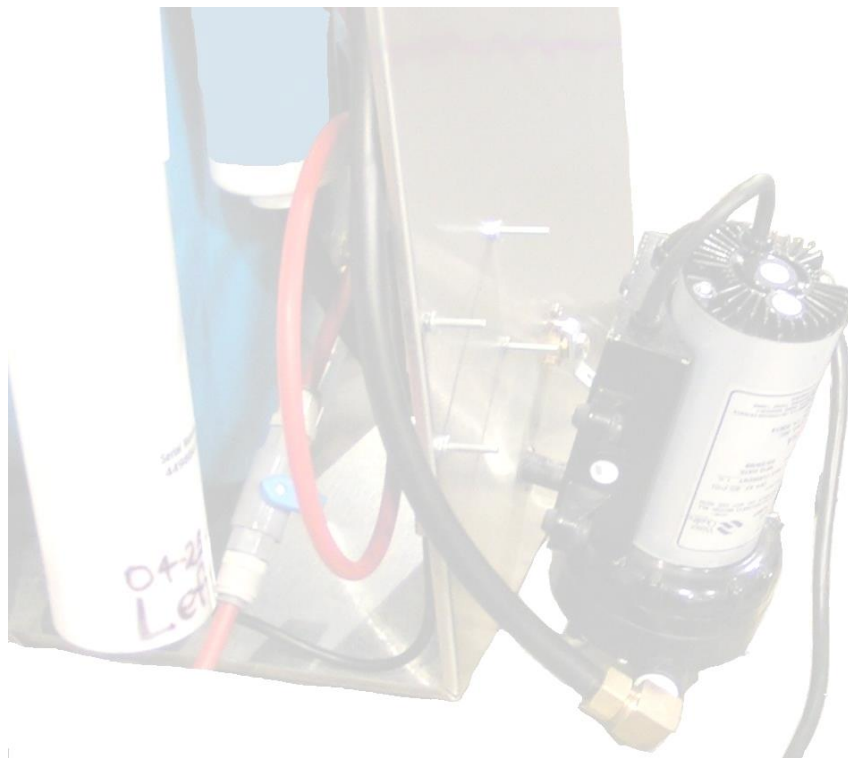


Figure 4-18. Booster Pump Mounting Location

4. Remove the booster pump from the protective packaging.

NOTE: Delrin sleeves and brass inserts must be used in brass compression fittings.

5. Mount the booster pump on the top of the pre-treatment filter manifold assembly with four bolts, four washers, and four nuts provided in the booster pump hardware kit (Figure 4-19). Instructions and a mounting template are also included in the kit.



Figure 4-19. Low-Pressure Booster Pump Mounting Points

6. Wrap two 5/8" compression x 1/2" Male Pipe Thread Elbow, fitting threads with 1/2" Teflon sealing tape. Insert the brass elbows into the inlet and outlet of booster pump.
7. Insert a new piece of 5/8" black plastic tubing into the 5/8" tubing fitting on the booster pump inlet port. Plumb to the inlet supply line, coming from the red handled ball valve on the top of the unit (Figure 4-20).
8. Tighten the compression fitting.
9. Insert a new piece of 5/8" black plastic tubing into the 5/8" tubing fitting on the booster pump outlet port, and plumb to the brass compression fitting on back portion of 1/2" brass tee, connected to the Pressure/Temperature Gauge on front panel of the unit (Figure 4-21).
10. Tighten the compression fitting.
11. OPEN the hot and cold water feed valves.
12. Connect the booster pump power cord to a 115 VAC electrical outlet.
13. The booster pump starts and automatically runs until the pressure tank reaches 38 psi.

14. When the pressure tank reaches 38 psi, the booster pump automatically shuts off.
15. The booster pump automatically re-starts when the pressure tank internal pressure drops below 10 psi.

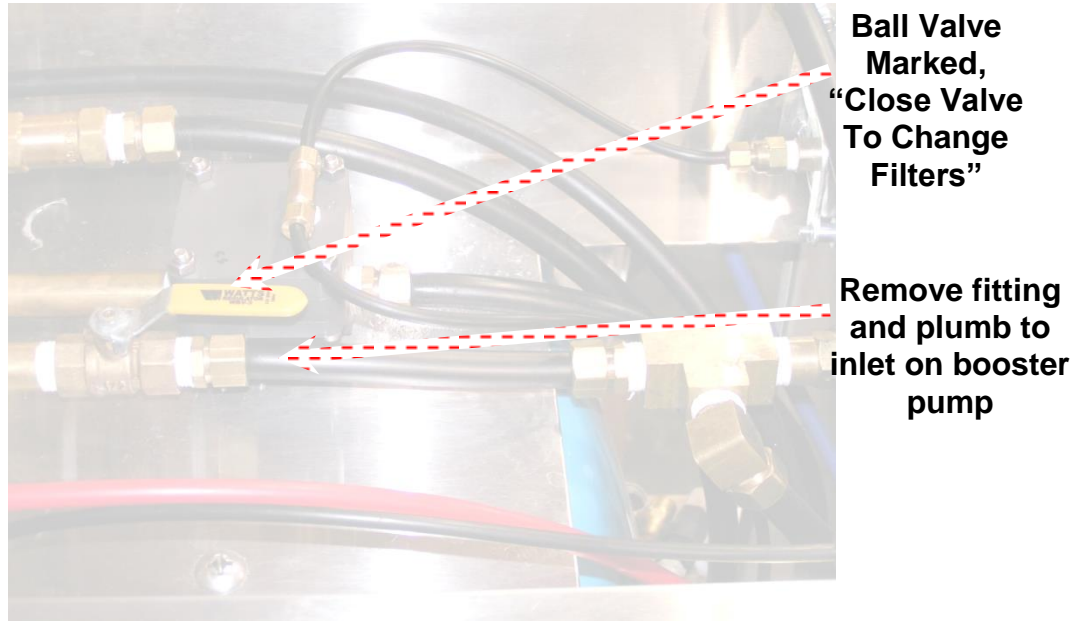


Figure 4-20. Booster Pump Installation Detail

(Figure 4-20), shows the cold water inlet port on the left side of the processor.

Connect the outlet from booster pump to the fitting on the back side of the tee that holds the Pressure/Temperature Gauge (Figure 4-21).

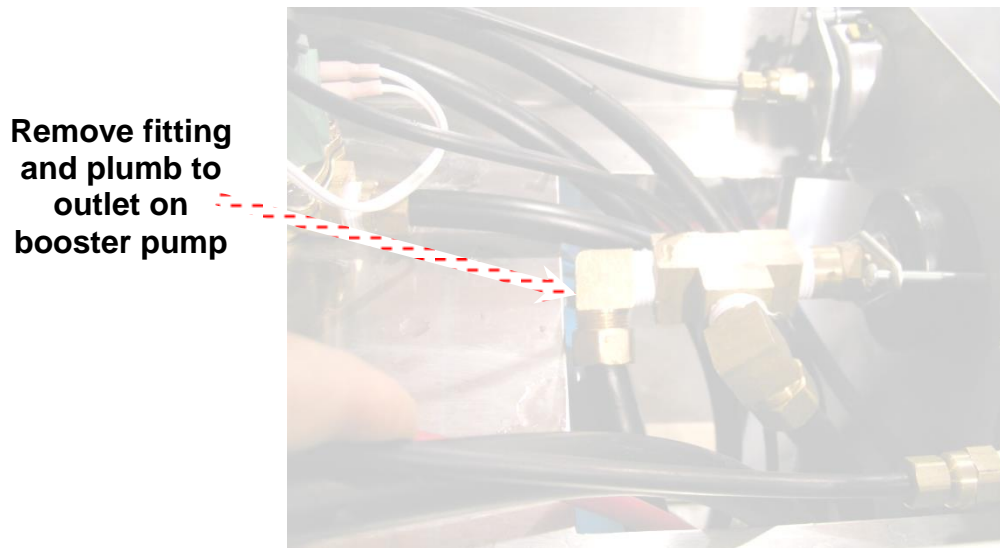


Figure 4-21. Connect To Outlet on Booster Pump

Drain Connection

The drain connection (Figure 4-22) is located on the bulkhead panel on the top of the processor assembly.

CAUTION: MAKE SURE THE DRAIN MEETS THE REQUIREMENTS GIVEN IN ADDITIONAL SYSTEM INSTALLATION DIMENSIONS AND CLEARANCE REQUIREMENTS ARE LISTED ON THE PRODUCT DATA SHEETS LOCATED ON THE NEXT PAGE (SEE TABLE 3-2), IN THE DESCRIPTION SECTION.

1. Insert the appropriate fitting into the drain fitting on the processor.
2. Plumb the drain connection to the facility drain selected for the processor installation.



Figure 4-22. Drain Connection

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SECTION 5. OPERATION

Operating Instructions

This section provides specific operating instructions for the HS-333.

WARNING: WHEN EQUIPPED WITH THE OPTIONAL BOOSTER PUMP, THE HS-333 WATER TREATMENT SYSTEM USES 115 VAC ELECTRICAL POWER. POTENTIALLY HAZARDOUS CONDITIONS MAY EXIST WHILE INSTALLING OR PERFORMING MAINTENANCE ON THE SYSTEM.

WARNING: WHEN EQUIPPED WITH THE OPTIONAL BOOSTER PUMP, DISCONNECT ALL ELECTRICAL POWER FROM THE SYSTEM BEFORE PERFORMING ANY ELECTRICAL SERVICE FUNCTIONS. USE APPROPRIATE LOCK OUT TAG OUT PROCEDURES.

WARNING: ONLY QUALIFIED PERSONNEL SHOULD ATTEMPT TO INSTALL, OPERATE, OR PERFORM MAINTENANCE ON THE SYSTEM.

Start Up

The following procedures provide step-by-step instructions for HS-333 initial start up.

CAUTION: DO NOT ALLOW THE FEED WATER TEMPERATURE TO EXCEED 100 °F FOR AN EXTENDED LENGTH OF TIME. HIGH WATER TEMPERATURE CAN DAMAGE THE RO MEMBRANE.

1. If necessary, remove the processor access panel from the top of the processor.
2. Make sure the filter change shut off valve is in the OPEN position (Figure 5-1).



Figure 5-1. Filter Change Shut Off Valve shown CLOSED

3. Make sure the bypass valve is in the SERVICE position (Figure 5-2).

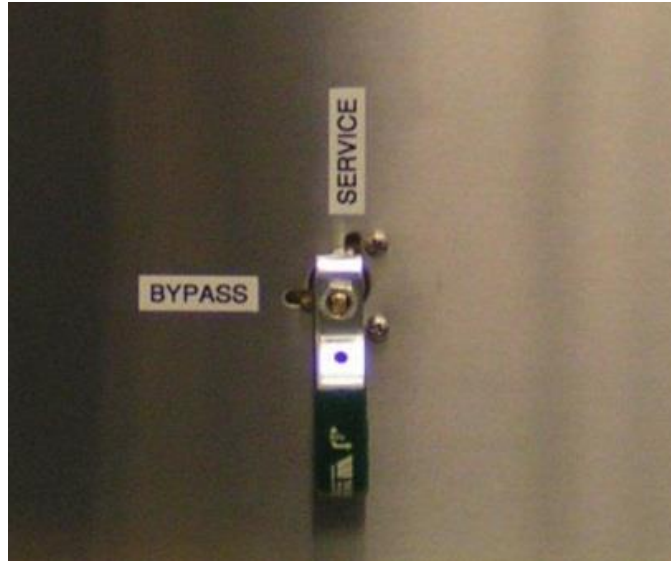


Figure 5-2. Bypass Valve in Service Position

4. OPEN the cold water feed ball valve and check for flow.

5. Make sure there is sufficient feed water inlet pressure. Check the blending valve temperature/pressure gauge (Figure 5-3) and verify 50 psi to 75 psi water pressure.
6. OPEN the hot water feed ball valve and wait for approximately two minutes.
7. Check the feed water temperature on the temperature/pressure gage (Figure 5-3).
8. If the feed water temperature is not between 77°F, perform the feed water temperature adjustment procedures given in the INSTALLATION section.



Figure 5-3. Feed Water Temperature

9. Check the pressure gauge (Figure 5-4). The pressure differential should not exceed 15 psi.
10. If the pressure differential is 15 psi or greater, the pre-treatment filters should be checked and/or changed. See the MAINTENANCE section.



Figure 5-4. Post Filter Pressure Gauge

11. Install the processor access panel on top of the processor.

HS-333 Processor Operation

CAUTION: MAKE SURE THE HS-333 PROCESSOR START UP PROCEDURES GIVEN ABOVE ARE ACCOMPLISHED PRIOR TO OPERATING THE PROCESSOR. FAILURE TO DO SO MAY DAMAGE EQUIPMENT.

The following procedures describe basic HS-333 processor operation.

1. If necessary, remove the processor access panel from the top of the processor.
2. OPEN the cold and hot water feed ball valves.
3. Make sure the inlet water pressure displayed on the pressure/temperature gauge is between 50 psi and 75 psi. If the inlet water pressure is below 50 psi, the optional low-pressure booster pump may be required. If inlet water pressure is above 75 psi, use a pressure regulator to reduce the inlet water pressure.
4. After the feed water has flowed for at least two minutes, make sure the feed water temperature is approximately 77°F.
5. If the feed water temperature is not approximately 77°F, perform the feed water temperature adjustment procedure described in the INSTALLATION section.
6. Check the pressure gauges located on the front of the processor. Make sure the pressure differential between the pressure shown on the Post Filter Pressure Gauge and the pressure shown on the Feed Pressure/Temperature Gauge is less than 15 psi.
7. If the pressure differential is greater than 15 psi, the pre-treatment filter cartridges may require service. See the pre-treatment filter cartridge replacement procedures in the MAINTENANCE section.
8. Install the processor access panel on top of the processor.
9. The HS-333 processor is now operational.

Permeate flow varies with feed water temperature. Divide the membrane rated flow with the corrected factor below to get the permeate flow at that temperature.

Temp. °C	Temp. °F	Correction Factor
5°	41.0°	2.58
6°	42.8°	2.38
7°	44.6°	2.22
8°	46.4°	2.11
9°	48.2°	2.00
10°	50.0°	1.89
11°	51.8°	1.78
12°	53.6°	1.68
13°	55.4°	1.61
14°	57.2°	1.54
15°	59.0°	1.47
16°	60.8°	1.39
17°	62.6°	1.34
18°	64.4°	1.29
19°	66.2°	1.24
20°	68.0°	1.19
21°	69.8°	1.15
22°	71.6°	1.11
23°	73.4°	1.08
24°	75.2°	1.04
25°	77.0°	1.00
26°	78.8°	0.97
27°	80.6°	0.94
28°	82.4°	0.91
29°	84.2°	0.88
30°	86.0°	0.85

Table 5-1. Temperature Correction Table

NOTE: OPTIMUM TEMPERATURE IS 77° F.

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SECTION 6. MAINTENANCE

WARNING: WHEN EQUIPPED WITH THE OPTIONAL BOOSTER PUMP, THE HS-333 WATER TREATMENT SYSTEM USES 115 VAC ELECTRICAL POWER. POTENTIALLY HAZARDOUS CONDITIONS MAY EXIST WHILE INSTALLING OR PERFORMING MAINTENANCE ON THE SYSTEM.

WARNING: WHEN EQUIPPED WITH THE OPTIONAL BOOSTER PUMP, DISCONNECT ALL ELECTRICAL POWER FROM THE SYSTEM BEFORE PERFORMING ANY ELECTRICAL SERVICE FUNCTIONS. USE APPROPRIATE LOCK OUT TAG OUT PROCEDURES.

WARNING: SHUT OFF THE WATER SUPPLY AND DEPRESSURIZE THE WATER SYSTEM BEFORE PERFORMING ANY MAINTENANCE FUNCTIONS.

WARNING: ONLY QUALIFIED PERSONNEL SHOULD ATTEMPT TO INSTALL, OPERATE, OR PERFORM MAINTENANCE ON THE SYSTEM.

CAUTION: DO NOT USE VASELINE OR OTHER PETROLEUM BASED LUBRICANTS ON THE O-RINGS. PETROLEUM BASED LUBRICANTS WILL DAMAGE THE O-RINGS AND CAUSE LEAKS.

CAUTION: DO NOT INSTALL THE FILTER CARTRIDGES, RO MEMBRANE CARTRIDGE WITHOUT LUBRICATING THE O-RINGS. FAILURE TO DO SO MAY DAMAGE THE O-RINGS.

Quarterly Preventive Maintenance

The HS-333 requires quarterly preventive maintenance. Quarterly preventive maintenance consists of water pre-treatment and post-treatment filter cartridge replacement. The water pre-treatment filters are mounted on the right and left side of the processor. The water post-treatment filter is mounted internally on the left side of the processor. The filter cartridges and filter heads are numbered and color-coded to aid identification.

Order the HS-333 Preventive Maintenance (PM) Kit, Part Number 61301606155. Kit contents are shown in Table 6-1 which is located in the MAINTENANCE section.

The following procedures provide step-by-step instructions for HS-333 quarterly preventive maintenance.

1. Remove the processor access panel from top of the processor.
2. If the HS-333 is configured with the optional booster pump, disconnect the booster pump from the 115 VAC electrical outlet.
3. CLOSE the filter change shut off valve (Figure 6-1).



Figure 6-1. Filter Change Shut off Valve CLOSED

WARNING: SHUT OFF THE WATER SUPPLY AND DEPRESSURIZE THE WATER SYSTEM BEFORE PERFORMING ANY SERVICE FUNCTIONS.

4. Place a pan under the pre-treatment filters (Figure 6-2) to catch the water from the filters if possible.



Figure 6-2. Pre-Treatment Filters

5. Loosen the pre-treatment filter cartridges starting with the number one (1) cartridges.
6. Remove the number one (1) pre-treatment filter cartridges from the filter heads.
7. Remove the number two (2) pre-treatment filter cartridges from the filter heads.

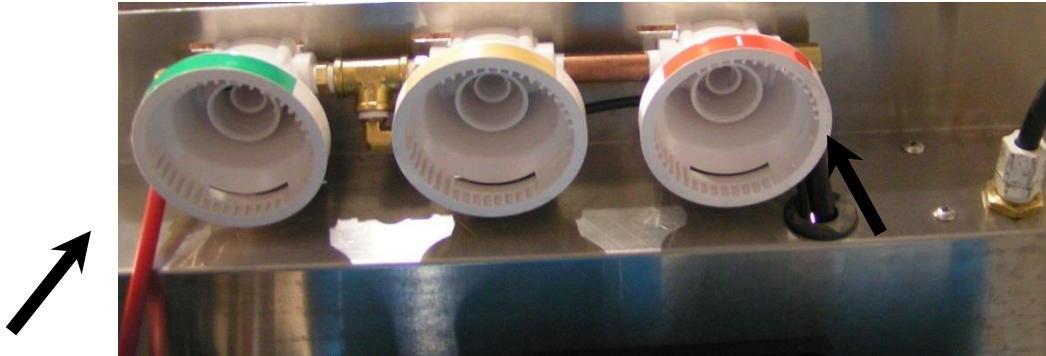


Figure 6-3. Filter Heads

CAUTION: ONLY USE A WATER SOLUBLE LUBRICANT SUCH AS A FOOD GRADE SILICONE OR K-Y TYPE JELLY ON O-RINGS LOCATED ON THE FILTERS.

8. Install the new pre-treatment filter cartridges into the pre-treatment filter head assembly starting with the number one (1) filters (Figure 6-3) on the right-hand side of the unit. Repeat procedure for the left hand side of unit.
9. Tighten the filter cartridges $\frac{1}{4}$ turn counter clockwise, hand tight. Do not over tighten. The cartridge will turn easily then come to a sudden stop. Do not turn further. There is a stop tab built in to each cartridge to prevent over tightening.

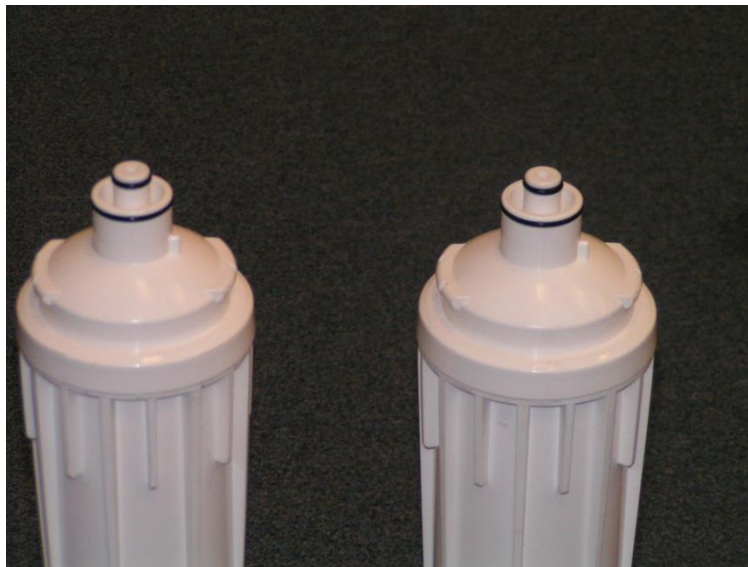


Figure 6-4. Pre-Treatment Filters

10. Install the new number one (1) pre-treatment filter cartridge on the pre-treatment filter head.
11. Tighten the filter cartridges $\frac{1}{4}$ turn counter clockwise, hand tight. Do not over tighten. The cartridge will turn easily then come to a sudden stop. Do not turn further. There is a stop tab built in to each cartridge to prevent over tightening.

12. Place a bucket or pan under the post-treatment filter (Figure 6-5) to catch the water from the filter heads if possible.



Figure 6-5. Post-Treatment Filter

13. Remove the number four (4) post-treatment filter cartridge from the filter head.
14. Inspect the O-ring seals on the post-treatment filter head (Figure 6-6). Replace the O-ring seals if damaged.

CAUTION: ONLY USE A WATER SOLUBLE LUBRICANT SUCH AS A FOOD GRADE SILICONE OR K-Y TYPE JELLY ON THE O-RINGS.

15. Apply lubricant to the O-rings located in the post-treatment filter head if necessary (Figure 6-6).

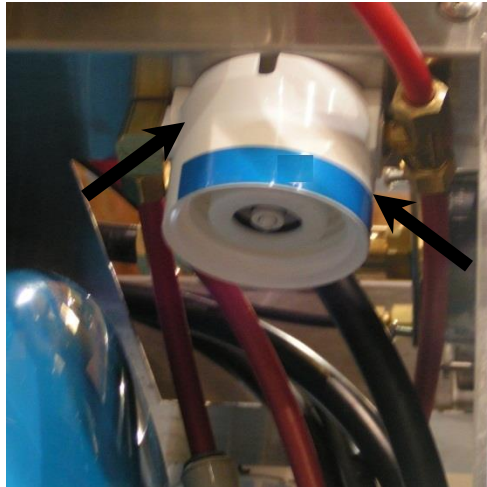


Figure 6-6. Post-Treatment Filter Housing O-rings

CAUTION: DO NOT CROSS THREAD THE FILTER CARTRIDGE. START BY HAND AND APPLY EVEN PRESSURE TO THE BOTTOM OF THE FILTER CARTRIDGE. FAILURE TO DO SO MAY DAMAGE EQUIPMENT.

16. Install the new number four (4) post-treatment filter cartridge on the post-treatment filter manifold.
17. Tighten the filter cartridge hand tight. Do not over tighten. The cartridge will turn easily then come to a sudden stop. Do not turn further. There is a stop tab built in to each cartridge to prevent over tightening.

CAUTION: FOLLOW THE START UP PROCEDURES GIVEN IN THE OPERATION SECTION OF THIS MANUAL BEFORE RESTARTING THE SYSTEM. FAILURE TO DO SO MAY DAMAGE EQUIPMENT.

Flow Control Valve.



Figure 6-7. Flow Control Valve, Type 3

There are 3 different types of flow control valves on various versions of HS-333 PT RO Systems. Type 3 is the most recent, shown in Figure 6-7.

Type 2 was used after March 2008 and before March 2013 shown in Figure 6-8. The Type 3 Flow Control Valve has superseded it.

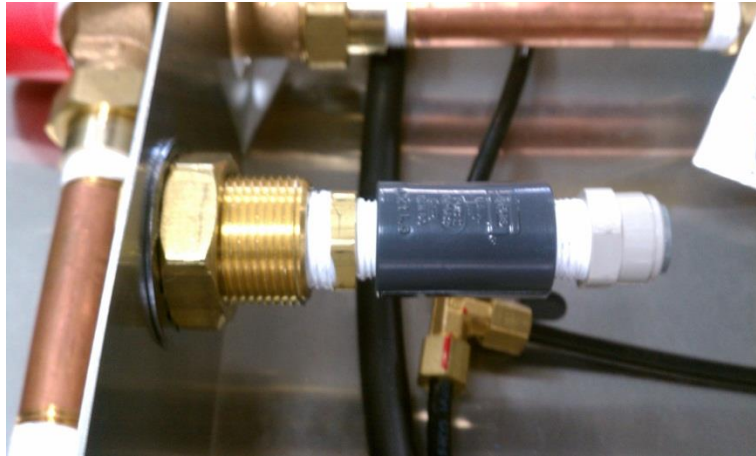


Figure 6-8. Flow Control Valve Type 2

The Flow Control Valve shown in Figure 6-7, is located on the top left rear of the HS-333 PT. This valve is preset for 2 gallons per minute to the drain (concentrate water) and is not adjustable.



Figure 6-9. Flow Control Valve, Type 1

The Type 1 Flow Control Valve is the first one that was used. If you HS-333 has this type it will not need replacing, unless the flow to the drain is less than 2 GPM, or greater than 2.5 GPM.

Figure 6-10 shows a typical type 3 Flow Control Valve installed on an HS-333 PT.



Figure 6-10. Type 3 Flow Control Valve Installed

Generally the flow control valve does not require maintenance. However, if the concentrate flow to the drain becomes excessive.

The Flow Control Valve should be replaced immediately, if the HS-333 PT you are working on has a Type 2 valve. The Type 3 is the replacement and can be obtained free of charge from Watts Water Quality.

Annual Preventive Maintenance

The HS-333 requires annual preventive maintenance.

Annual preventive maintenance consists of the quarterly preventive maintenance procedures to change filter cartridges described above and RO membrane replacement.

Order the HS-333 Preventive Maintenance (PM) kit, Part Number 61301606155. Kit contents are shown in Table 6-1 which is located in the MAINTENANCE section.

The following paragraphs provide directions for the additional procedures necessary to perform the HS-333 annual preventive maintenance.

WARNING: MAKE SURE ALL PROCESSOR SHUT DOWN STEPS REQUIRED FOR THE QUARTERLY PREVENTIVE MAINTENANCE PROCEDURES ARE ACCOMPLISHED PRIOR TO REPLACING THE RO MEMBRANE. INJURY TO PERSONNEL OR DAMAGE TO EQUIPMENT MAY OCCUR.

The reverse osmosis (RO) membrane is shown in Figure 6-11. The step-by-step procedures for annual RO membrane replacement are given below.



Figure 6-11. RO Membrane Replacement

CAUTION: DO NOT USE VASELINE OR OTHER PETROLEUM BASED LUBRICANTS ON THE RO MEMBRANE O-RINGS. PETROLEUM BASED LUBRICANTS WILL DAMAGE THE O-RINGS AND CAUSE LEAKS.

CAUTION: DO NOT INSTALL THE RO MEMBRANE WITHOUT LUBRICATING THE O-RING SEALS. FAILURE TO DO SO MAY DAMAGE THE SEALS.

1. CLOSE the red handled Filter Change ball valve located on top of the processor.
2. If necessary, remove the processor access panel from the top of the processor.
3. If the HS-333 is configured with the optional booster pump, disconnect the booster pump from the 115 VAC electrical outlet.
4. Remove the old RO Membrane Cartridges from processor.
5. Remove the new RO Membrane Cartridge from packaging.
6. Use only a water SOLUBLE lubricant such as a food grade silicone or K-Y type jelly on the o-rings.

NOTE: A small amount of water will come out from the Membrane Cartridge and head when the new RO Membrane Cartridge is installed. Place a bucket or absorbent towel under the Membrane Cartridge during RO Membrane Cartridge replacement.

7. Carefully insert the new RO Membrane Cartridge into the filter head marked with the green band and the number three (3) (Figure 6-12).



Figure 6-12. RO Membrane Replacement

8. Make sure the two RO Membrane Cartridges, located on either side of the processor, are fully seated in the filter heads marked with a green band and the number three (3).
9. Twist clockwise ¼ turn to lock into place.

CAUTION: ONLY USE A WATER SOLUBLE LUBRICANT SUCH AS A FOOD GRADE SILICONE OR K-Y TYPE JELLY ON THE O-RINGS.

10. Apply lubricant to the O-ring seals on the Membrane Cartridge (Figure 6-11).

CAUTION: FOLLOW THE START UP PROCEDURES GIVEN IN THE OPERATION SECTION OF THIS MANUAL BEFORE RESTARTING THE SYSTEM. FAILURE TO DO SO MAY DAMAGE EQUIPMENT.



Schematics

Figure 6-13 shows the HS-333 internal plumbing diagram.

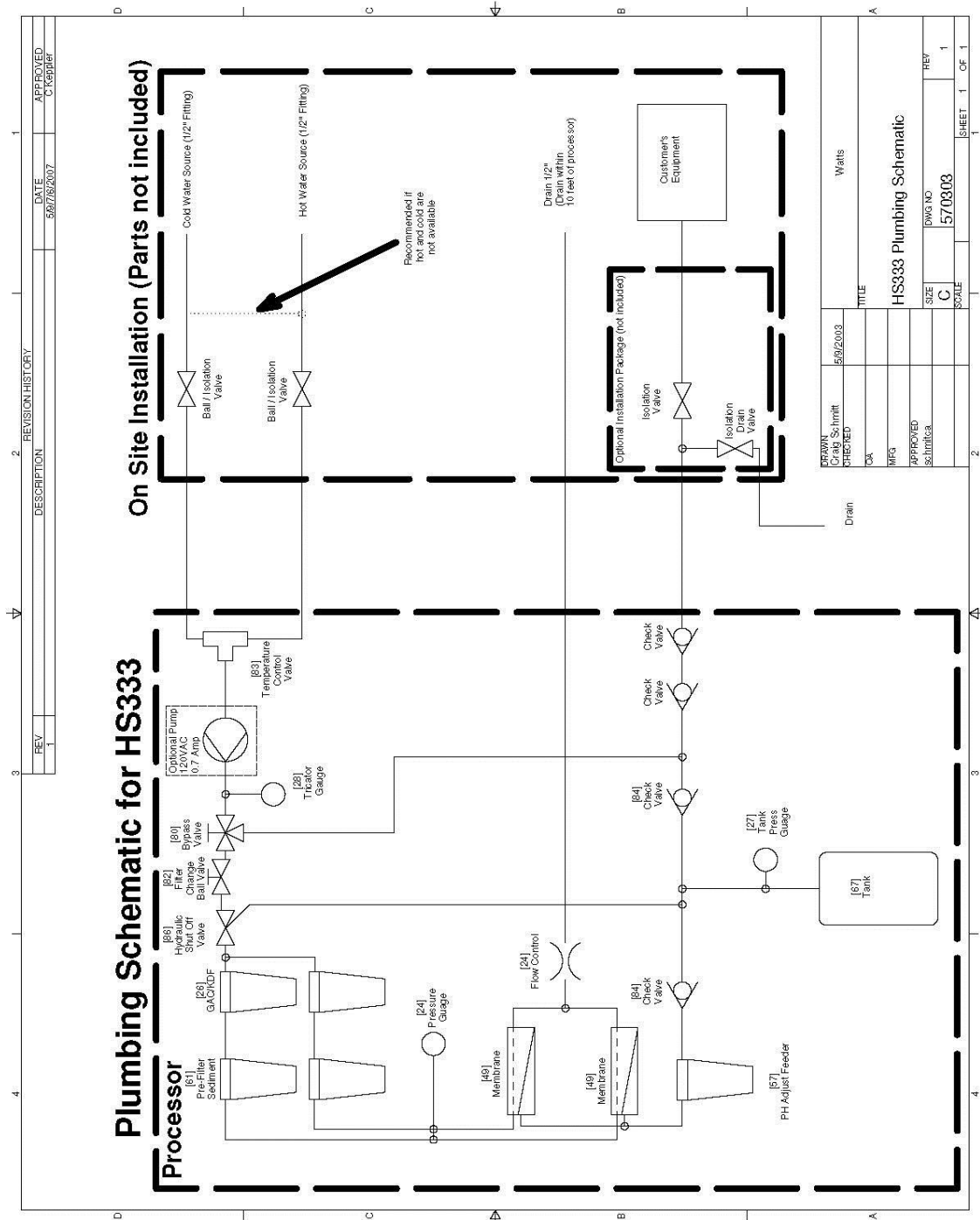


Figure 6-13. HS-333 Internal Plumbing Diagram

ITEM	QTY.	PART NO.	DESCRIPTION
1	1	F237063	PANEL TOP BRACE
2	2	F231272	ADAPT-BR-BULKHEAD-1/2F
3	4	I35218P-8	PLB NIPPLE HEX BRASS .50
4	1	I35220B-8	PLB TEE BRASS .50 PIP-F
5	1	F231155	ELB-BR-1/2CX1/4-90
6	3	F234010	VALVE-CHECK-BR-1/2F-#6
7	1	F231061	CON-BR-5/8CX1/2M
8	1	F1001-0608	FTG MALE CONNECTOR 3/8" TUBE x 1/2" MPT SERIES 10
9	1	F740138	PLB COUPLING PVC SCH 80 0.5" PIP-SR
10	1	V2001-MCH	FC PVC 0.50" MDM HSG F/25-3.5 GPM
11	1	V7101-2.0	FC BUTTON 2.0 GPM
12	1	PF301208W	FTG-3/8-1/4-3/8 REDUCING BRANCH
13	1	CI061208W	FTG 3/8 - 1/4 REDUCER WHITE

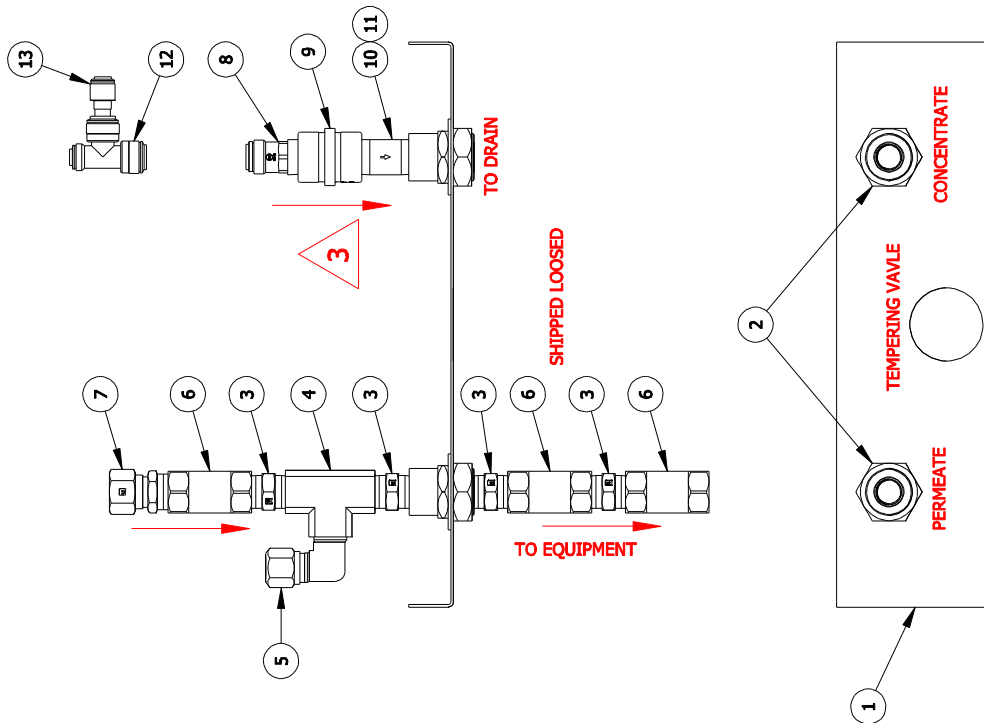


Figure 6-14. HS-333 PT Permeate and Drain Assembly

WATTS®
WATER QUALITY & CONDITIONING PRODUCTS

Revised: 3/11/2010
Checked by: 3/11/2013
All dimensions are in inches (mm)
Tolerances:
FRACTIONS: ±.02
DECIMALS: .30 ±.01 (LIM)
DIMENSIONS: .000" ±.001 (LIM)
MATERIALS: 1

Commercial & Industrial
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TITLE: GETTING RO-HS-333-PT
SIZE: C
DRAWING: F570303
SCALE: NTS
SHEET: 4 OF 7
REV: 3

Parts List

Table 6-1 lists the contents of the HS-333 Preventive Maintenance (PM) kit, 61301606155.

Table 6-1. PM-Kit HS-333 61301606155

	Getinge No.	Item Description	Qty
1	61301606259	FILTER SEDIMENT 5 MICRON	8
2	61301606165	FILTER GAC/KDF 3LB	8
3	61301605516	FILTER PH BALANCER-6"	4
4	61301605476	1/2" BRASS CHECK VALVE	2
5	61301606258	MEMBRANE TFM 400GPD	2

Table 6-2 lists the accessories for the HS-333.

Table 6-2. Accessory List for the HS-333

	Getinge No.	Item Description
1	61301605930	STANDARD INSTALLATION KIT (HS 333)
2	61301605933	LOW PRESSURE BOOSTER PUMP
3	61301605934	PRE-FILTER SEDIMENT 50 MICRON

Table 6-3 lists the parts that will be replaced more often for the HS-333.

Table 6-3. Frequently Replaced Parts List for the HS-333

	Getinge No.	Item Description	Qty
1	61301605927	FLOW CONTROL-2GPM-1/2"	1
2	61301605511	GAUGE-0/100-GLY-PNL/MT-CTR BK	2
3	61301605926	GAUGE-0/200-PRES/TEMP-2 1/2-CT	1
4	61301606166	HEAD-ELF-3/8"-DK7	6
5	61301605489	LID-Q-SERIES 3/8"F VALVED HEAD	1
6	61301606161	LOW PRESSURE BOOSTER PUMP	1
7	61301606162	MEM-TFM-400GPD-ELF-XL	2
8	61301606167	PRE-FILTER SEDIMENT 50 MICRON	0
9	61301606163	VALVE-BALL-3 WAY-1/2"-PNL MNT	1
10	61301605517	VALVE-BALL-BR-1/2"F	1
11	61301605929	VALVE-BALL-PVC80 1/2"FX1/2"F	1
12	61301605484	VALVE-BLENDING 1/2"NPT 60-120	1
13	61301605476	VALVE-CHECK-BR-1/2"F	3

	Getinge No.	Item Description	Qty
14	61301605481	VALVE-CHECK-PLA-OZONE-1/4"F	1
15	61301605928	VALVE-SHUT OFF-HS300	1

Table 6-4 provides the replacement parts list for the HS-333 processor.

Table 6-4. HS-333 Processor Replacement Parts List

	Part No.	Item Description	Qty
1	231125	ADAP-BR-1/4CX1/4F	2
2	231272	ADAP-BR-BULKHEAD-1/2"F	4
3	246033	BOLT-DOME-1/4"-20X1/2"L-PHIL-SS	8
4	246035	BOLT-DOME-3/8"-18X1"L-PHIL-SS	4
5	246026	BOLT-HEX-SS-1/4"-20-1 3/4"	4
6	246029	BOLT-HEX-SS-1/4"-20-1 1/8"	1
7	299027	BOX/FOAM-HS300	1
8	231246	BUSHING-BR-3/4"MX3/8"F	1
9	240024	CAP PLUG 8X – M200	4
10	231095	CON-BR-1/2"CX1/2"M	2
11	231092	CON-BR-1/2"CX3/8"M	2
12	231071	CON-BR-1/4"CX3/8"M	3
13	231085	CON-BR-3/8"CX1/2"M	2
14	231082	CON-BR-3/8"CX3/8"M	1
15	231061	CON-BR-5/8"CX1/2"M	5
16	249052	DIAPHRAGM-1 13/16-SOV HS300	1
17	249051	DIAPHRAGM-2 11/16-SOV HS300	1
18	231001	DISC HOLDER-BR-SOV HS300	1
19	249050	DISC-DURO 90-95-SOV HS300	1
18	231155	ELB-BR-1/2CX1/2M-90	2
19	231147	ELBOW-BR-3/8"CX3/8"M-90	3
20	231060	ELBOW-BR-5/8"CX1/2"M	3
21	231142	ELBOW-BR-90-1/4"CX3/8"M	2
22	125086	FITTING-CONNECT-QC-3/8JGX1/4M	2
23	125088	FITTING-ELBOW-90°-QC-1/4TX1/8M	2
24	222039	FLOW CONTROL-2GPM-1/2"	1
25	237037	FRAME-SS-HS300-GULL WING	1

	Part No.	Item Description	Qty
26	303005	GAC/KDF-ELF-XL-3LB	8
27	261009	GAUGE-0/100-GLY-PNL/MT-CTR BK	2
28	261008	GAUGE-0/200-PRES/TEMP-2 ½-CT	1
29	313000	HEAD-ELF-3/8"-DK7	6
30	231038	HEX NIPPLE-BR-1/2"M	8
31	231062	HEX NIPPLE-BR-3/4"MX1/2"M-REDUCER	1
32	231032	HEX NIPPLE-BR-3/8"M	4
33	213080	HOUSING-LOWER-SOV-HS300-BB1	1
34	213081	HOUSING-UPPER-SOV-HS300-BB2	1
35	246002	INSERT 1/4-20	4
36	231029	INSERT-BR-1/2"	6
37	131017	INSERT-BR-1/4"	12
38	231026	INSERT-BR-3/8"	12
39	231025	INSERT-BR-5/8"	6
40	299324	LABEL-FILTER-GET-KDF-3LB-GOLD #2	8
41	299322	LABEL-FILTER-GET-SED-RED HS333	8
42	299320	LABEL-FILTER-GET-TDS/PH-BLUE #4	4
43	299303	LABEL-MEMBRANE-GET-GREEN-#3	2
44	299309	LABELS-KIT-#'S FILT-HS333-1-4	1
46	249019	LEG-GLIDE-1/4"-20	4
47	107027	LID-Q-SERIES 3/8"F VALVED HEAD	1
48	299130	MANUAL-HS333	1
49	210014	MEM-TFM-400GPD-ELF-XL	2
50	231040	NIPPLE-BR-1/2"MX4"L	2
51	231030	NIPPLE-BR-1/2"MX5"L	2
52	231043	NIPPLE-BR-3/8"MX3"L	2
53	246081	NUT-1/4"-20 HEX FINISH STAR LOC	4
54	246082	NUT-1/4-20 NYLON LOCKING	6
55	246090	NUT-HEX-3/8"-16-5/16"H-ZINC	4
56	246074	NUT-HEX-JAM-SS-1/4"-20-7/16"	1
57	307020	PH/TDS BALANCER-Q SERIES-6"	4
58	249054	PISTON-SOV HS300	1

	Part No.	Item Description	Qty
59	146006	SCREW-#10-3/4" SS PHIL PANHEAD	28
60	146010	SCREW-8-32X3/8" SS PHIL PANHEAD	2
61	303000	SEDIMENT-ELF-XL-5M	8
62	231023	SLEEVE-DELRIN-1/2"-PL	6
63	131012	SLEEVE-DELRIN-1/4"	12
64	231020	SLEEVE-DELRIN-3/8"	12
65	231012	SLEEVE-DELRIN-5/8"-PL	6
66	249053	SPACER-SOV HS300	1
67	219003	TANK-PRES-(RP-12)104 OC	1
68	199060	TAPE TEFLON 1/2" X 520" ROLL	1040"
69	231171	TEE-BR-1/4"CX1/4"CX1/4"M	1
70	231176	TEE-BR-1/4C ALL	1
71	231217	TEE-BR-3/4"F ALL	1
72	231177	TEE-BR-3/8C ALL	1
73	231172	TEE-BRANCH-BR-3/8"CX3/8"CX3/8"M	1
74	231212	TEE-BR-BLOCK-1/2"F ALL	5
75	231209	TEE-BR-FORGE-3/8"F ALL	3
76	240001	TUBING-PLA-3/8"ODX1/4"ID-RED	4 FT
77	240017	TUBING-PLA-1/2"ODX3/8"ID-BLACK	6 FT
78	140005	TUBING-PLA-1/4" BLACK	4 FT
79	240018	TUBING-PLA-5/8"ODX1/2"ID-BLACK	6 FT
80	234025	VALVE-BALL-3 WAY-1/2"-PNL MNT	1
81	334001	VALVE-BALL-BR-1/2"F	1
82	134027	VALVE-BALL-PVC80 1/2"FX1/2"F	1
83	234058	VALVE-BLENDING 1/2"NPT 60-120	1
84	234010	VALVE-CHECK-BR-1/2"F	3
85	234028	VALVE-CHECK-PLA-OZONE-1/4"F	1
86	234005	VALVE-SHUT OFF-HS300	1
87	246076	WASHER-BR-UPPER-SOV-HS300-BB62	1
88	246095	WASHER-FLAT-1/4	4
89	246098	WASHER-FLAT-5/16"	4

Glossary of Terms

By-Pass: A feature that allows tap water to be delivered to downstream demands in the event the RO processor is unable to meet demand.

Brine Seal: A black “O-ring” type seal located on one end of the membrane that seals the membrane to the vessel preventing cross contamination of process water and feed water.

Concentrate: Water being rinsed to drain after it has been rejected by the membrane.

Concentrate Line: Tubing or pipe used to transport the concentrate water to a suitable drain.

Feed Pressure: Referring to the water pressure being supplied to the RO processor before it has entered the pre-filter. Raw water.

Feed Pressure Gauge: The gauge inside the processor that indicates the water pressure the membrane is receiving.

GPM: Gallons per minute.

Hardness: Total quantity of CaCO₃ (Calcium/magnesium) present in water.
1 gr. = 17.1 TDS in ppm per U.S. gallon.

Iron: A naturally occurring mineral that has detrimental effects on a membranes ability to produce water. Reduced by ion exchange (water softening) or KDF media.

KDF Media Filter: A proprietary blend of copper and zinc and other substances that help reduce Iron and CaCO₃ (hardness). Used as pretreatment on some models of high production RO systems.

L Copper Pipe: A high grade of copper pipe that will withstand water temperatures up to 160 degrees Fahrenheit.

Membrane: A thin sheet or surface film, either natural or man-made, of microporous structure that performs as an efficient filter of particles down to the size range of chemical molecules and ions. Such membranes are termed “semi-permeable” because some substances will pass through but others will not. Usually small ions, water, solvents, gases, and other very small molecules can pass through a membrane, but other ions and macromolecules such as proteins and colloids are barred form passage. Membranes are the primary means of treatment in reverse osmosis.

Permeate: That portion of the feed water which passes through the membrane to become product water.

Permeate Line: Tubing or pipe used to transport purified (RO processed) water from processor to the equipment.

PPM: Parts per million. Parts per million per 1 U.S. gallon.

Pressure Tank: A water storage device which uses a pressurized bladder that provides water delivery pressure to down stream devices.

PSI: Pounds per square inch.

PSIG: Pounds per square inch gauged.

Purge: The act of flushing out. A term to describe the purging of entrained air in a system.

Glossary of Terms (continued)

Reverse Osmosis (RO): A water treatment process that removes undesirable material from water by using pressure to force the water molecules through a semi-permeable membrane. This process is called “reverse” osmosis because the pressure forces the water to flow in the reverse direction (from the concentrated solution to the dilute solution) to the flow direction (from the dilute to the concentrated) in the process of natural osmosis. RO removes ionized salts, colloids, and organic molecules down to a molecular weight of 100. May be called hyper-filtration.

RO Processor: The system that consists of the stainless steel enclosure, Membrane Cartridge, RO membrane, and pressure gauges. A term used to signify a specific piece of the overall system.

Sediment Filter: A filter used to trap and reduce rust, dirt and sand. Typically made from spun poly.

TDS: Total Dissolved Solids. The total weight of dissolved matter present in water that does not constitute pure water molecules. Measured in the form of resistivity and or conductivity equated into TDS in ppm (parts per million per 1 U.S. gallon).

VOC: Volatile Organic Compounds, organic chemicals that have a high vapor pressure that can easily form vapors at normal temperature and pressure.

SECTION 7. TROUBLESHOOTING

WARNING: WHEN EQUIPPED WITH THE OPTIONAL BOOSTER PUMP, THE HS-333 WATER TREATMENT SYSTEM USES 115 VAC ELECTRICAL POWER. POTENTIALLY HAZARDOUS CONDITIONS MAY EXIST WHILE INSTALLING OR PERFORMING MAINTENANCE ON THE SYSTEM.
WARNING: WHEN EQUIPPED WITH THE OPTIONAL BOOSTER PUMP, DISCONNECT ALL ELECTRICAL POWER FROM THE SYSTEM BEFORE PERFORMING ANY ELECTRICAL SERVICE FUNCTIONS. USE APPROPRIATE LOCK OUT TAG OUT PROCEDURES.
WARNING: SHUT OFF THE WATER SUPPLY AND DEPRESSURIZE THE WATER SYSTEM BEFORE PERFORMING ANY MAINTENANCE FUNCTIONS.
WARNING: ONLY QUALIFIED PERSONNEL SHOULD ATTEMPT TO INSTALL, OPERATE, OR PERFORM MAINTENANCE ON THE SYSTEM.

HS-333 Troubleshooting Guide

The following is a guide of possible HS-333 problems with their probable cause and the recommended solution or fix. Use this guide as an aid to troubleshoot the HS-333.

Problem	Cause	Solution
1. Low Production	Fouled membranes	Replace membranes
	Clogged pre-filters	Replace pre-filters
	Tank bladder defective	Replace tank
	Tank air pressure too high	Relieve air pressure at schrader valve on tank
	Low incoming pressure	Establish incoming pressure at 50 psi minimum
	Low incoming pressure	Install accessory booster pump
	Inadequate feed flow available	Establish adequate inlet feed flow (see specifications)
2. Unit Will Not Start Up	Inlet or feed water valves not open	Open all feed water valves
	Automatic shut off valve defective	Replace automatic shut off valve

Problem	Cause	Solution
	Tank is full and delivery not needed	Drain product water at point of use
	Clogged pre-filters	Replace filters
	Filter change shut off valve in off position	Open filter change shut off valve
3. Conductivity/TDS too High	Blown membrane	Replace membrane
	Membrane O-rings leaking	Replace O-rings
	Feed water parameters do not meet specifications (see Additional system installation dimensions and clearance requirements are listed on the product data sheets located on the next page (See Table 3-2). in DESCRIPTION section)	Replace membrane more frequently or pre-treat incoming water
	Automatic shut off valve could be mixing with inlet water (creating bypass)	Replace automatic shut off valve
	Unit in bypass	Turn bypass valve to service position
4. Unit does not shut off (constantly runs)	Product water demand too high	Replace membrane
	Check valve on permeate line defective	Replace check valve
	Low inlet water supply	Install a booster pump
5. Unit Does Not Build Pressure (only applies if booster pump is installed)	Booster pump is over worked and has overheated. Thermal protection has shut off the pump	Allow booster pump to cool down and it will reset
	Pressure switch on booster pump defective	Replace switch or pump
	Automatic shut off valve stuck closed	Replace or repair automatic shut off valve
	Defective pump	Replace pump