



Total System Cleaning and Disinfection

Presented By
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Mar Cor Purification

PRESENTATION OVERVIEW

- What is TSD
- How Sanitants Work
- Importance of monthly cleaning and sanitization
- Cleaning protocol
- TSD process
- Summary

What is TSD

- TSD – Total System Disinfect
- Perform “Closed loop” single disinfection process of:
 - RO
 - Storage Tank
 - Distribution Loop
 - Dialysis Machine
 - Incoming water line
 - Machine
 - Drain

How Sanitants Work

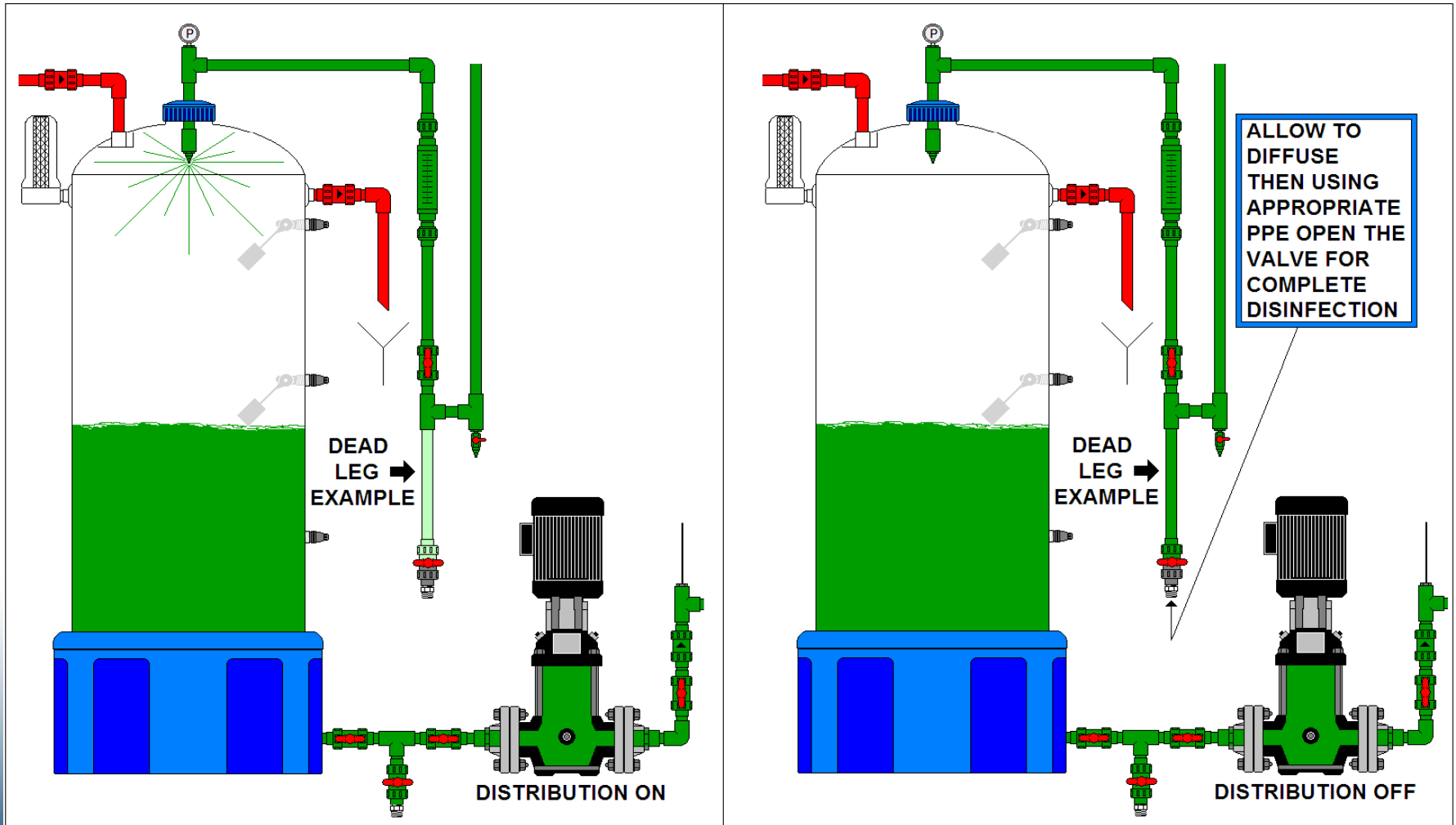
- Recirculation vs. Dwell
 - To kill we need
 - Concentration
 - Contact
 - Time
 - Recirculation is best in a clean design loop
 - Dwell allows sanitizer to migrate into “dead” areas via diffusion
- TSD combines both

How Sanitants Work

RECIRCULATION

vs.

DWELL



TSD Rationale

- Clean and Sanitize MONTHLY per CMS Guidelines
 - RO, Storage Tank & Loop
- RO requires primary cleaning (hi/lo)
- Easy validation of strength and rinse
- Safe for all water system components
- Continuous discharge of biological debris

TSD Process

“TWO STEP PROCEDURE”

- 1. CLEAN – BOTH LOW AND HIGH PH**
- 2. TOTAL SYSTEM DISINFECTION - TSD**
“OPTIMIZED” RO / TANK / LOOP PROCEDURE

“Cleaning RO – Procedure Overview”

Low pH (To Remove Mineral Deposits)

High pH (To Remove Organics)

- **LABEL RO**
- **FILL Cleaning Tank (10 gal RO Water)**
- **PPE / ADD Cleaner (Low pH)**
- **Verify pH = 1 - 3**
- **CIP mode for 5 minutes to mix**
- **Re-Circ RO for 10 minutes**
- **RINSE completely**
- **Check for normal pH**

Cleaning The RO Both Low and High pH

Getting Started

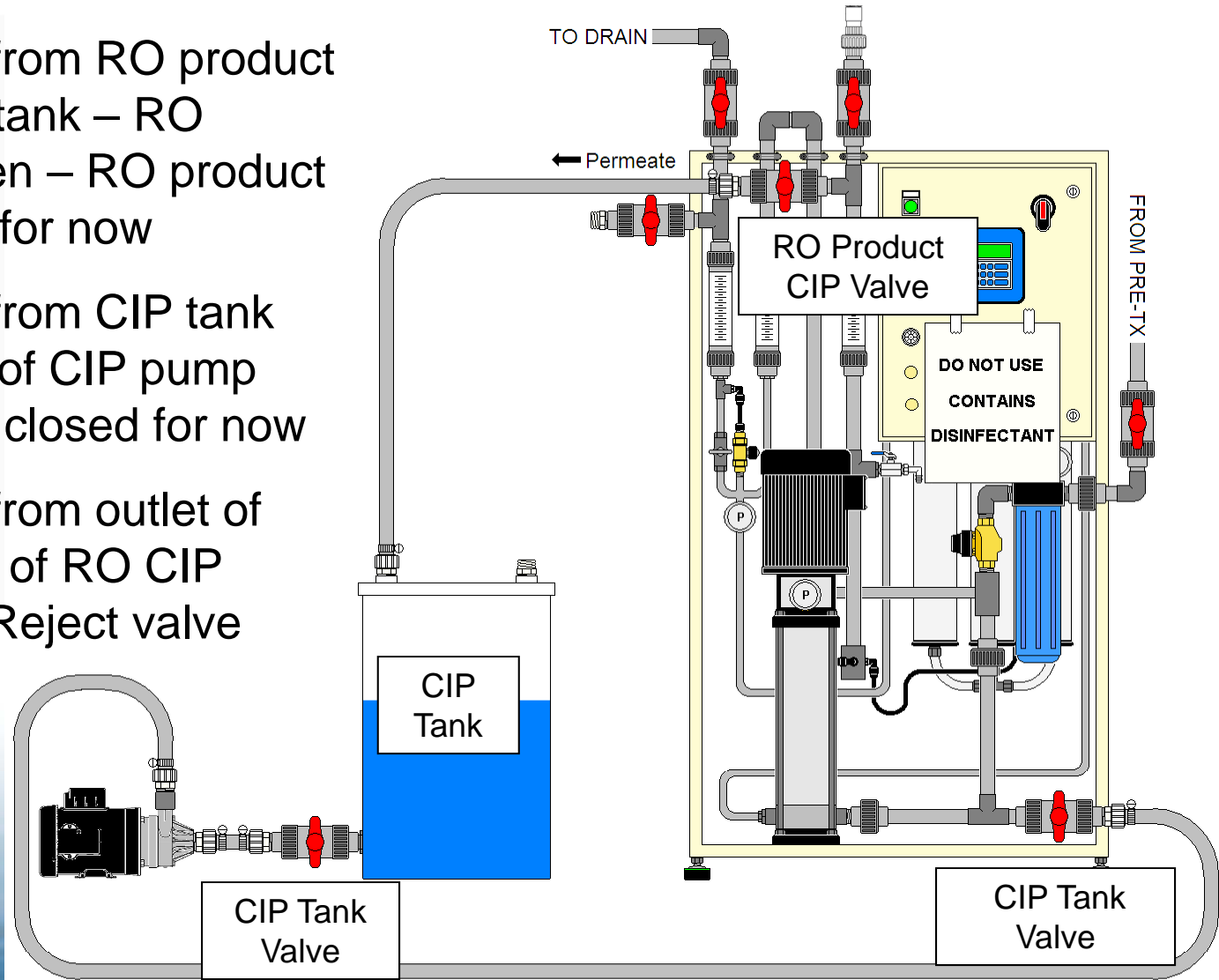
Always label dialysis machines and any point of use as **“DO NOT USE”** before beginning the process.

Record the following:

- RO Pump Pressure
- RO Reject Pressure
- RO Product Flow
- RO Reject Flow
- RO Recycle Flow

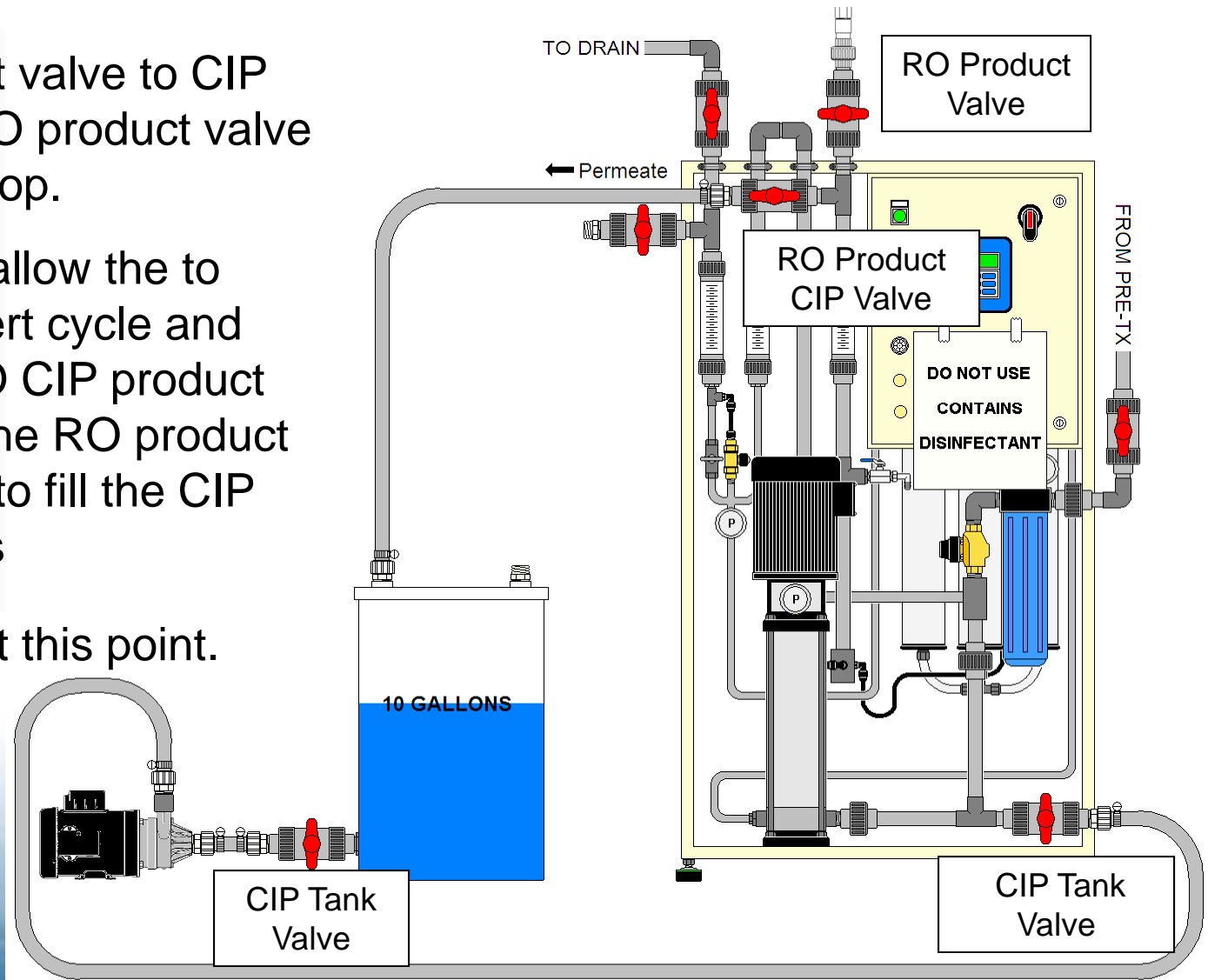
FILLING CIP TANK WITH RO WATER

- Attach CIP hose from RO product CIP valve to CIP tank – RO product valve open – RO product CIP valve closed for now
- Attach CIP hose from CIP tank ball valve to inlet of CIP pump – CIP tank valve closed for now
- Attach CIP hose from outlet of CIP pump to inlet of RO CIP valve – CIP RO Reject valve closed for now



FILLING CIP TANK WITH RO WATER

- Open RO product valve to CIP tank and close RO product valve to storage tank/loop.
- Turn on RO and allow the to complete the divert cycle and then open the RO CIP product valve and close the RO product valve - allow RO to fill the CIP tank to 10 gallons
- **STOP** RO fill at this point.



FILLING CIP TANK WITH CLEANERS

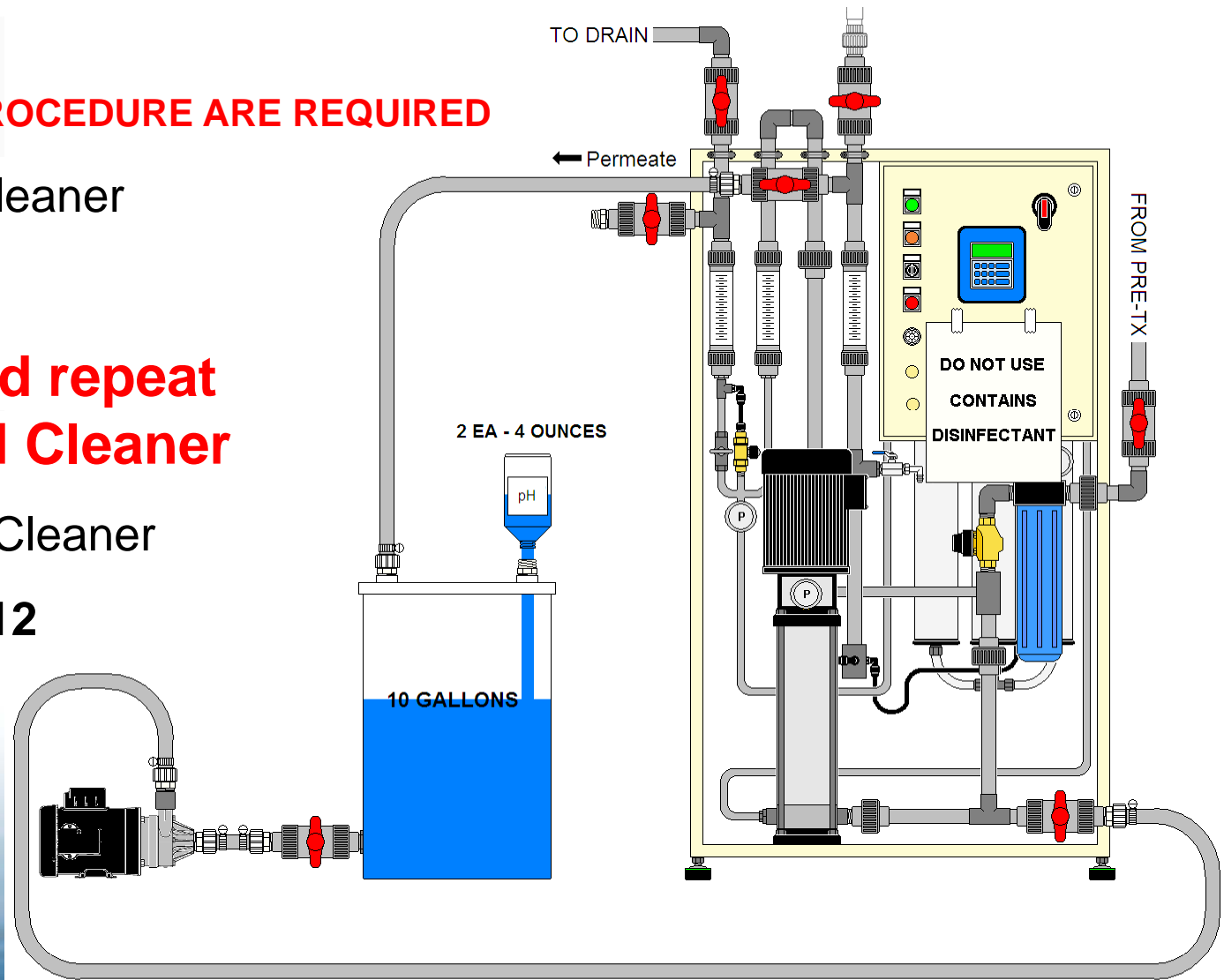
NOTE:

BOTH LOW & HIGH PROCEDURE ARE REQUIRED

- Add **LOW pH** Cleaner
- Target pH: **1-3**

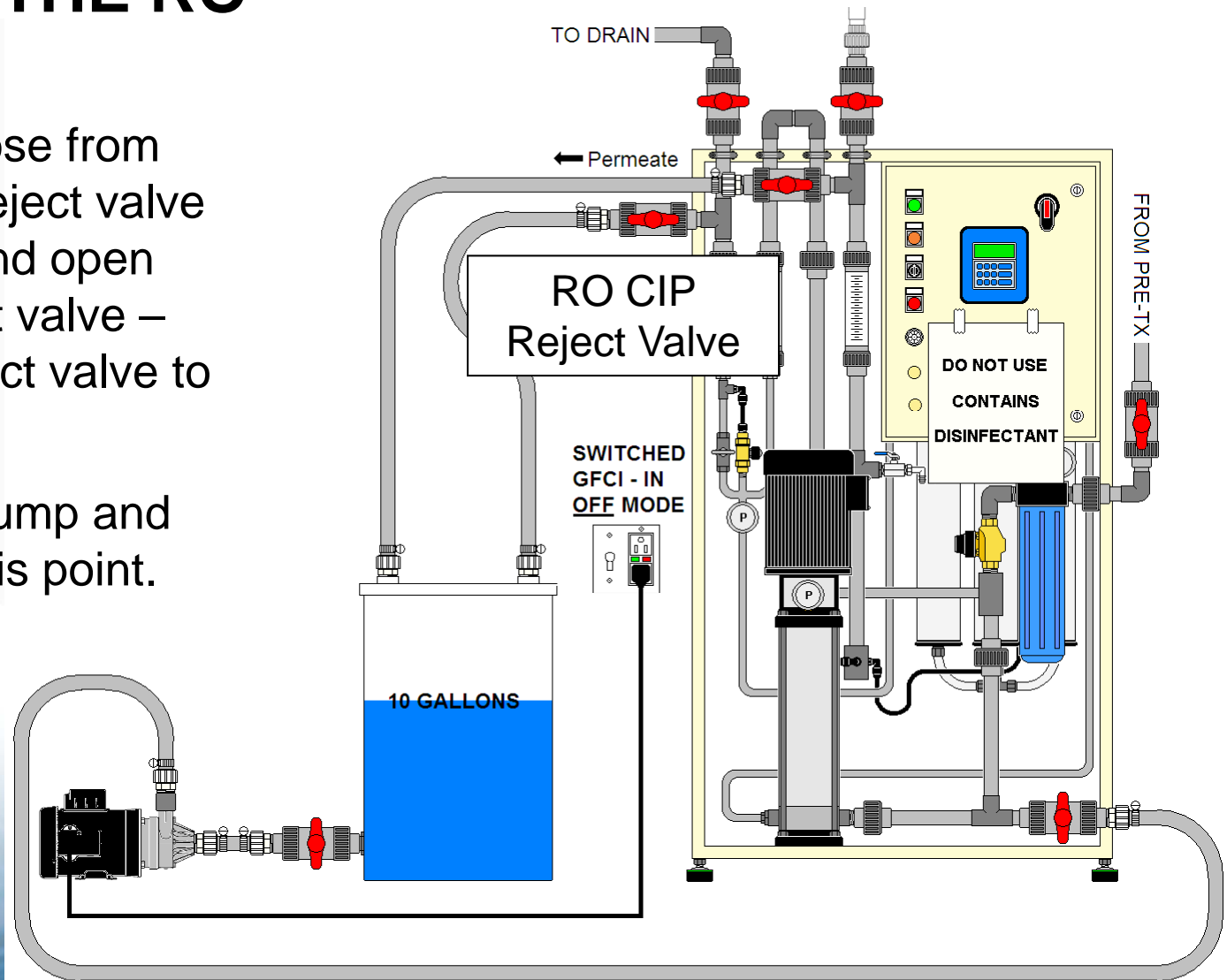
**Empty tank and repeat
with High pH Cleaner**

- Add **HIGH pH** Cleaner
- Target pH: **11-12**



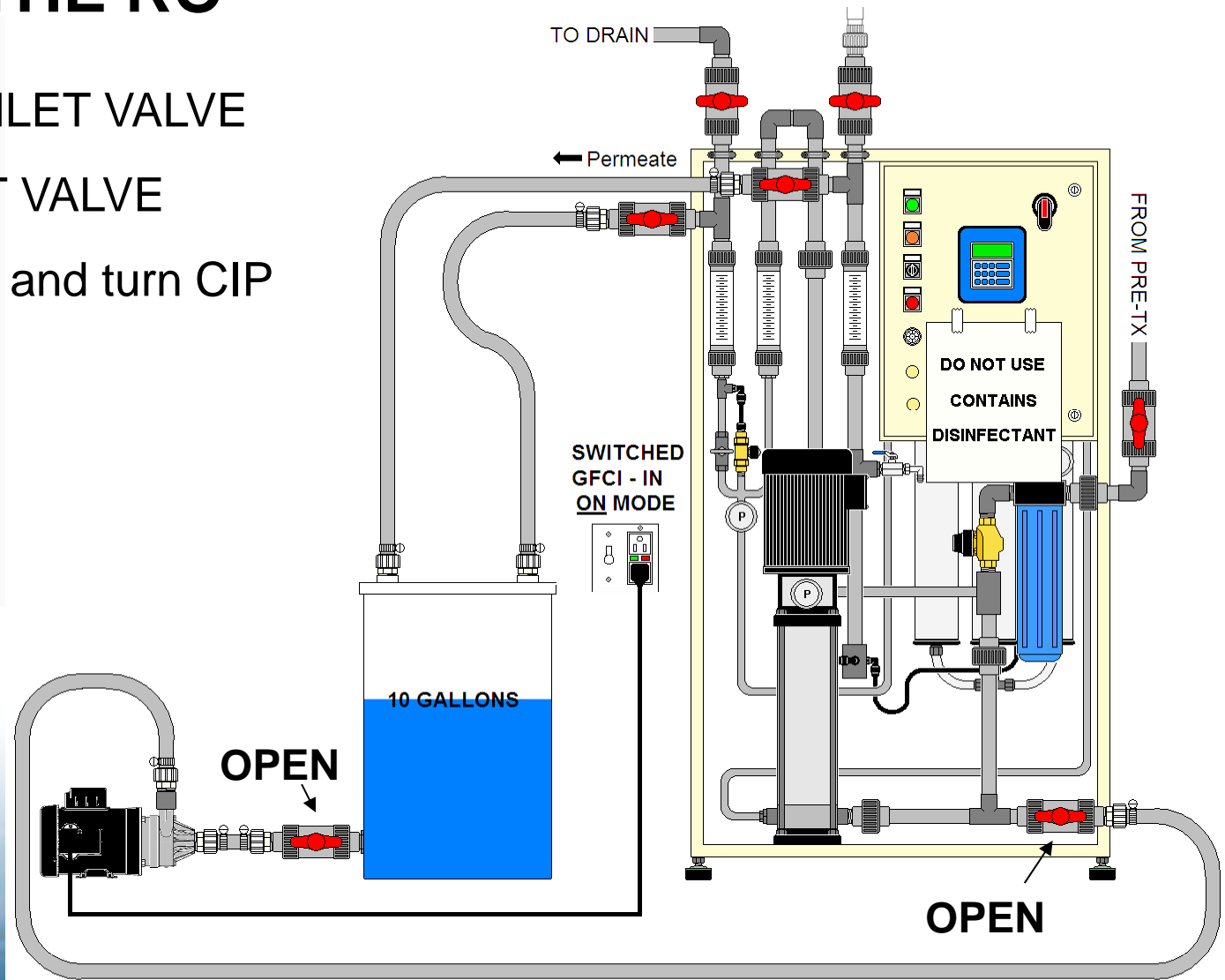
CLEANING THE RO

- Attach CIP hose from RO product reject valve to CIP tank and open RO CIP reject valve – close RO reject valve to drain
- Plug in CIP pump and leave off at this point.



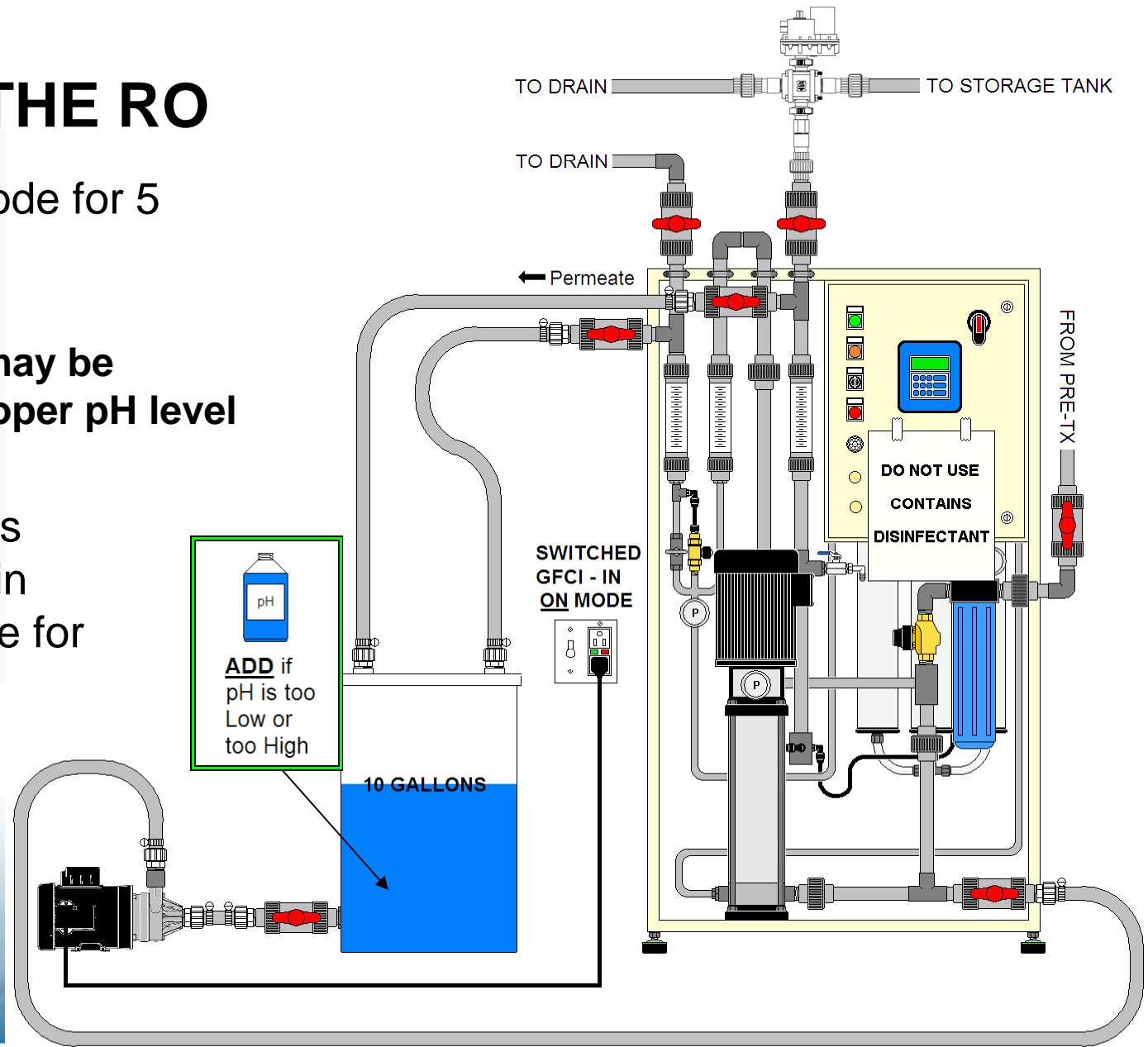
CLEANING THE RO

- OPEN RO CIP INLET VALVE
- OPEN CIP INLET VALVE
- Initiate CIP mode and turn CIP pump ON



CLEANING THE RO

- Run RO in CIP Mode for 5 minutes to mix
- * **Additional cleaner may be needed to obtain proper pH level**
- When correct pH is obtained, run RO in re-circulation mode for 10 minutes
- After 10 minutes rinse until normal pH is established



RETURN RO MACHINE BACK TO ORIGINAL OPERATING MODE

NORMAL OPERATING MODE:

- RO Inlet from Pre-tx Open
- RO CIP Inlet Closed
- RO CIP Product Valve Closed
- RO CIP Reject Valve Closed
- RO Product Valve to Divert Valve Open
- RO Reject to Drain Valve Open

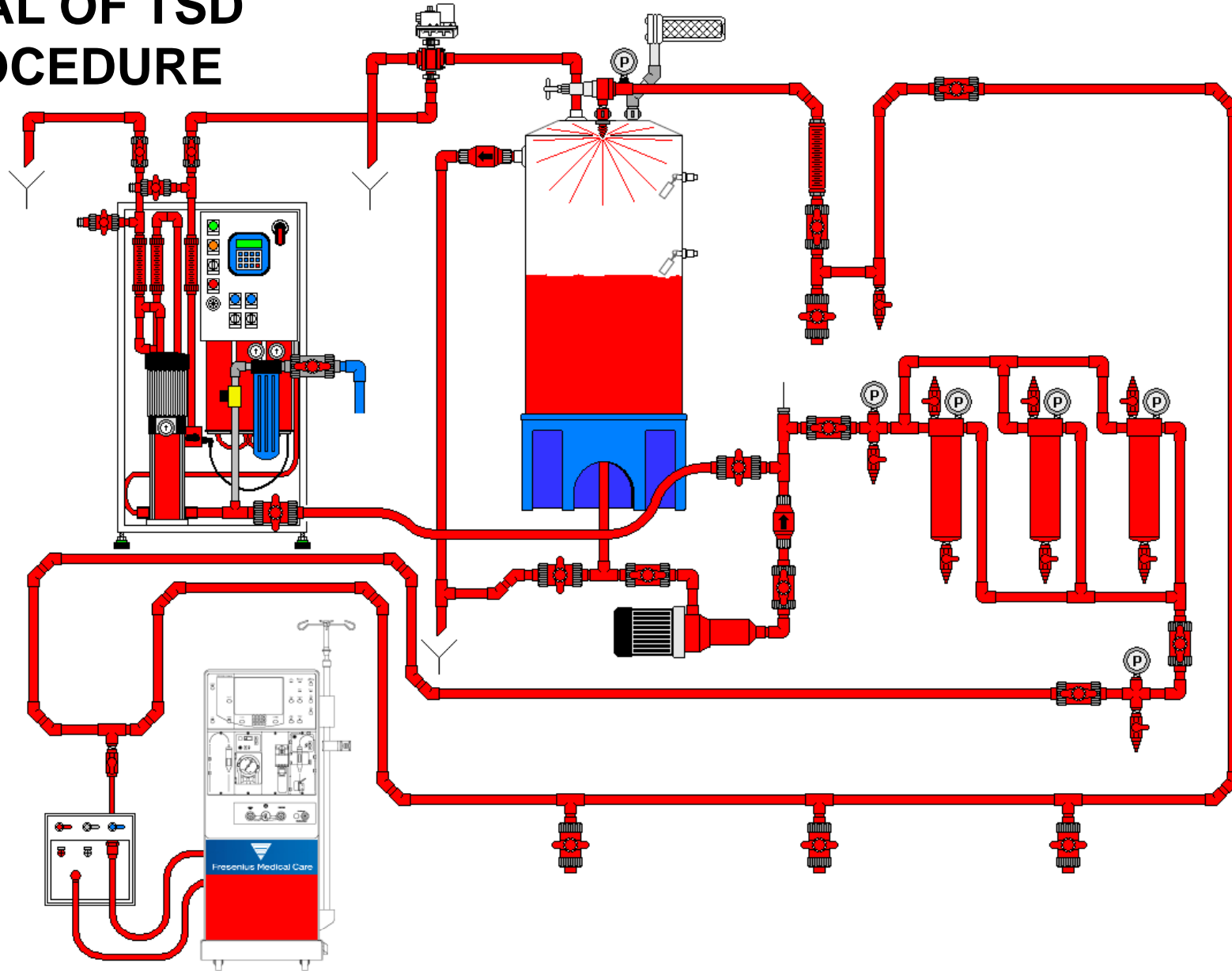
Total System Disinfection - TSD

“OPTIMIZED” RO / TANK / LOOP PROCEDURE

Total System Disinfect

Goal is to target **ALL** of the areas of the RO and water distribution system to achieve the required concentration and contact time.

GOAL OF TSD PROCEDURE



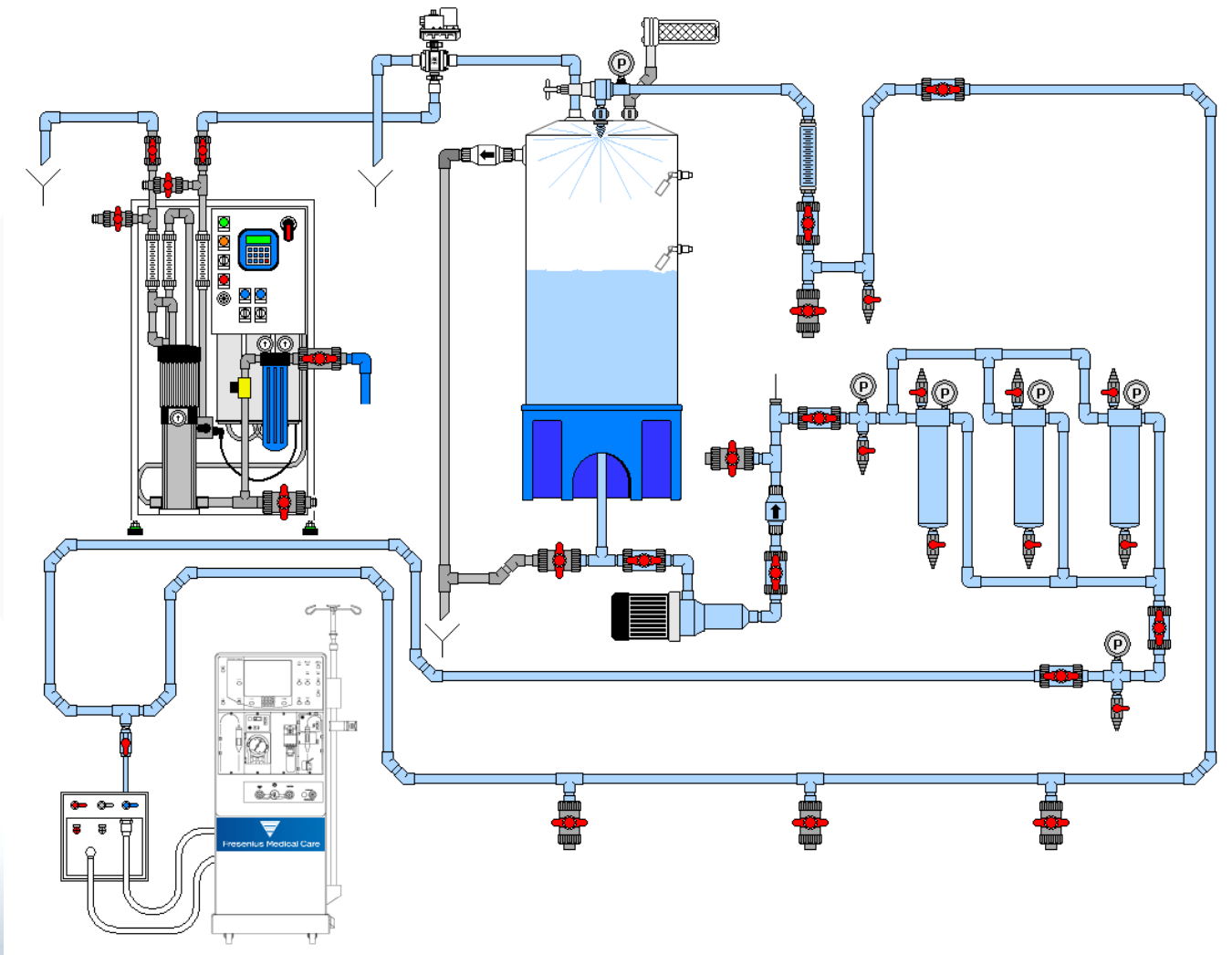
Getting Started

Always label dialysis machines and any point of use as **“DO NOT USE”** before beginning the process.

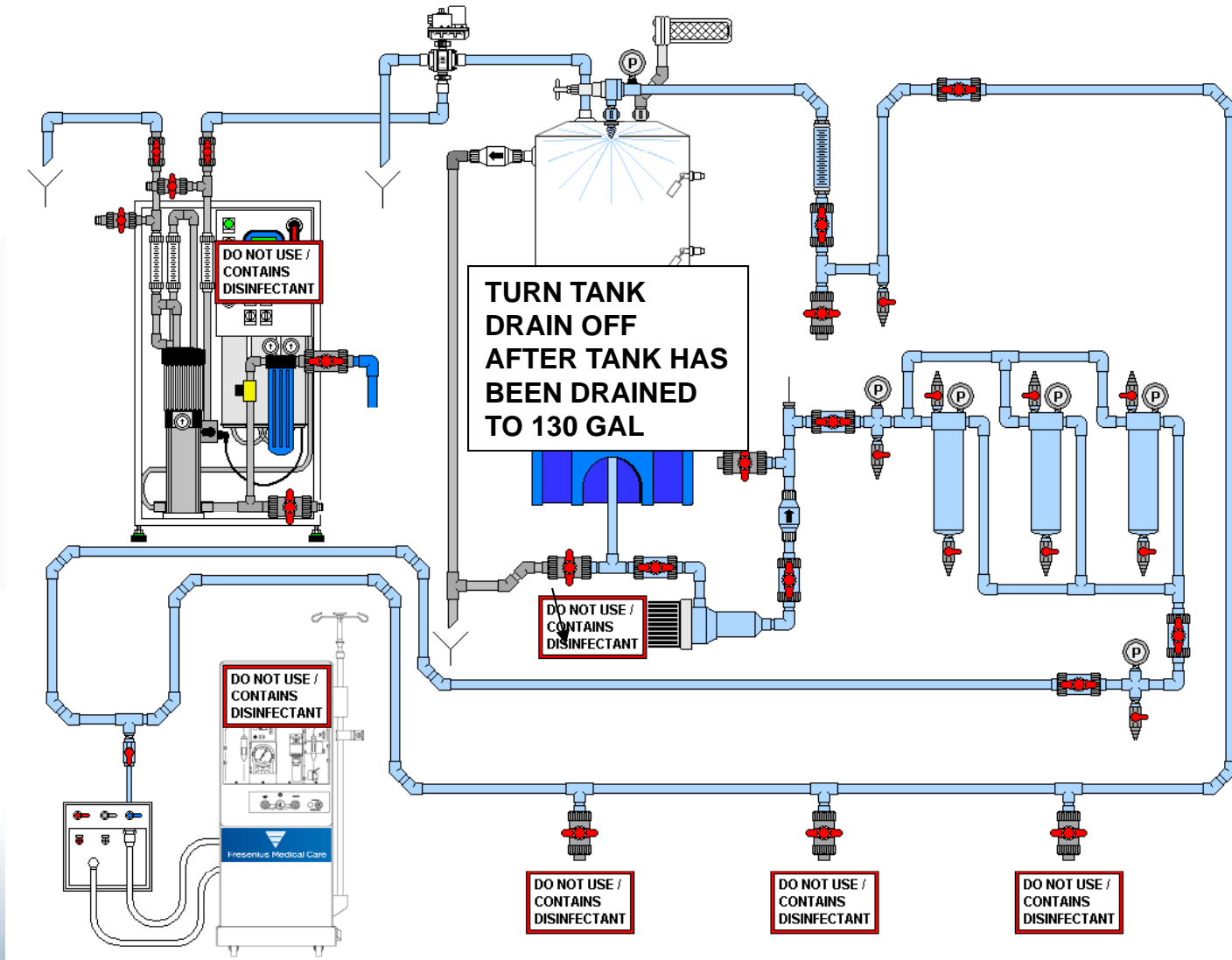
Record the following:

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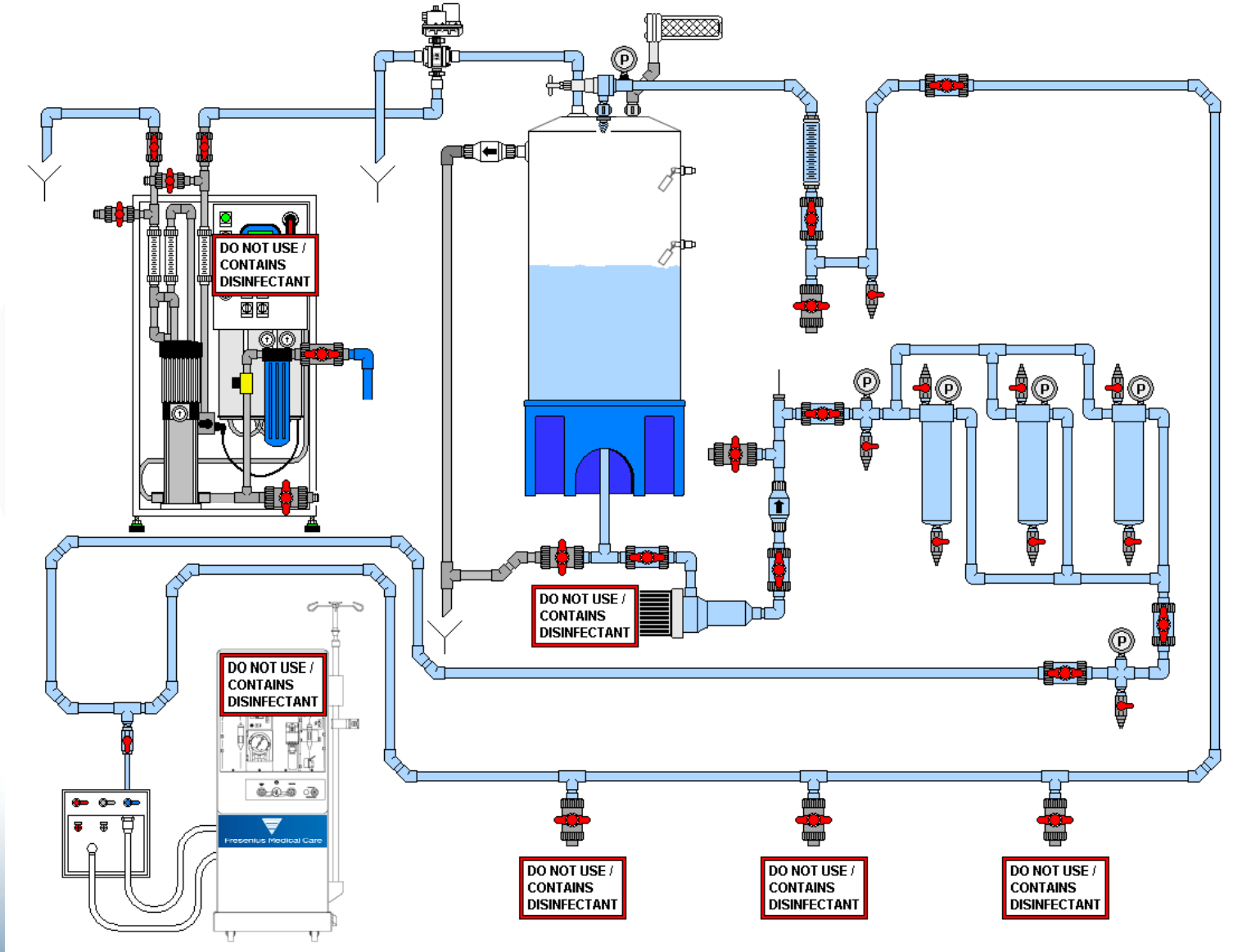
STEP 1 PROCEDURE OVERVIEW “MINNCARE INTO TANK & LOOP”



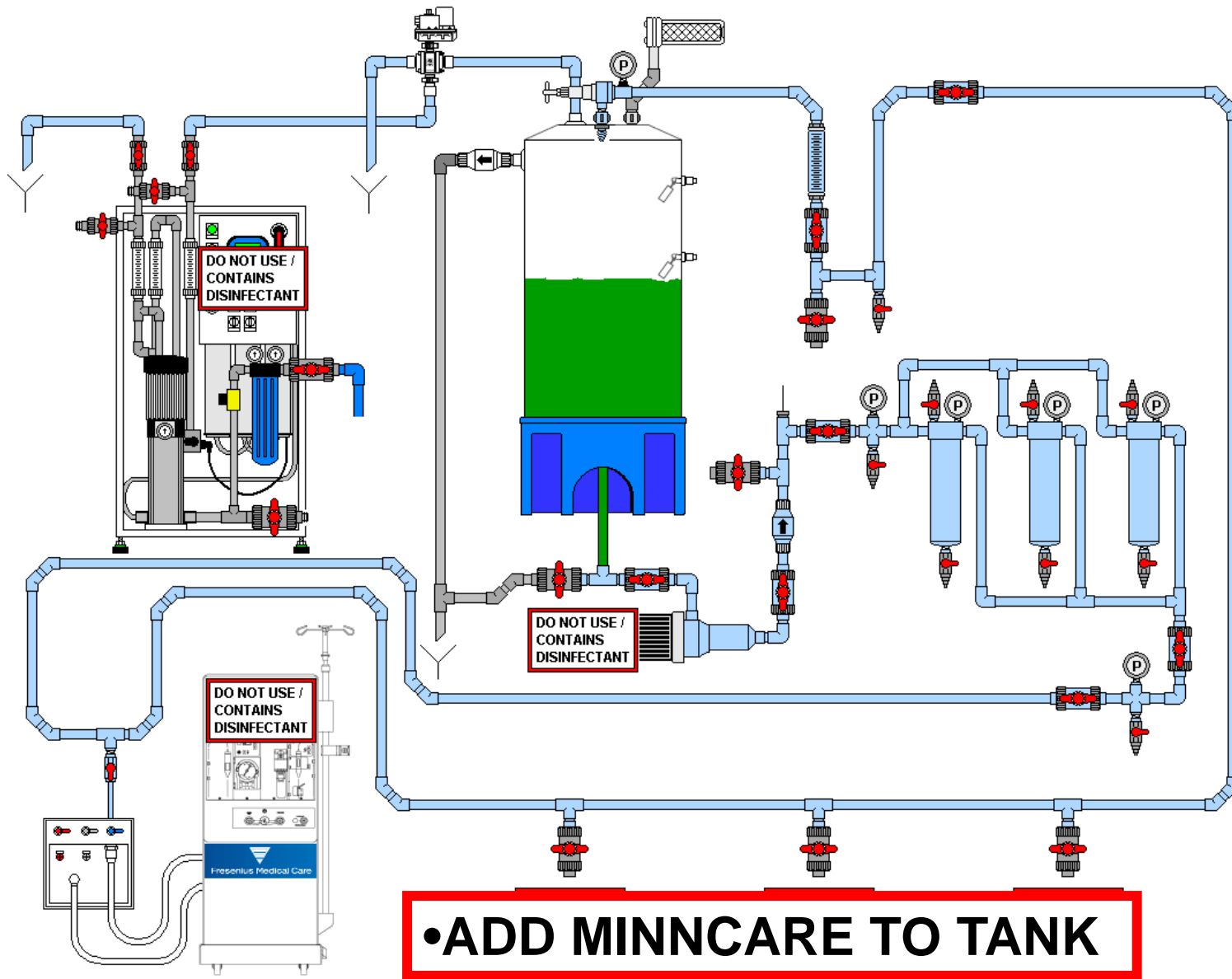
• IMPORTANT - RUN RO & RECORD PRE-DATA

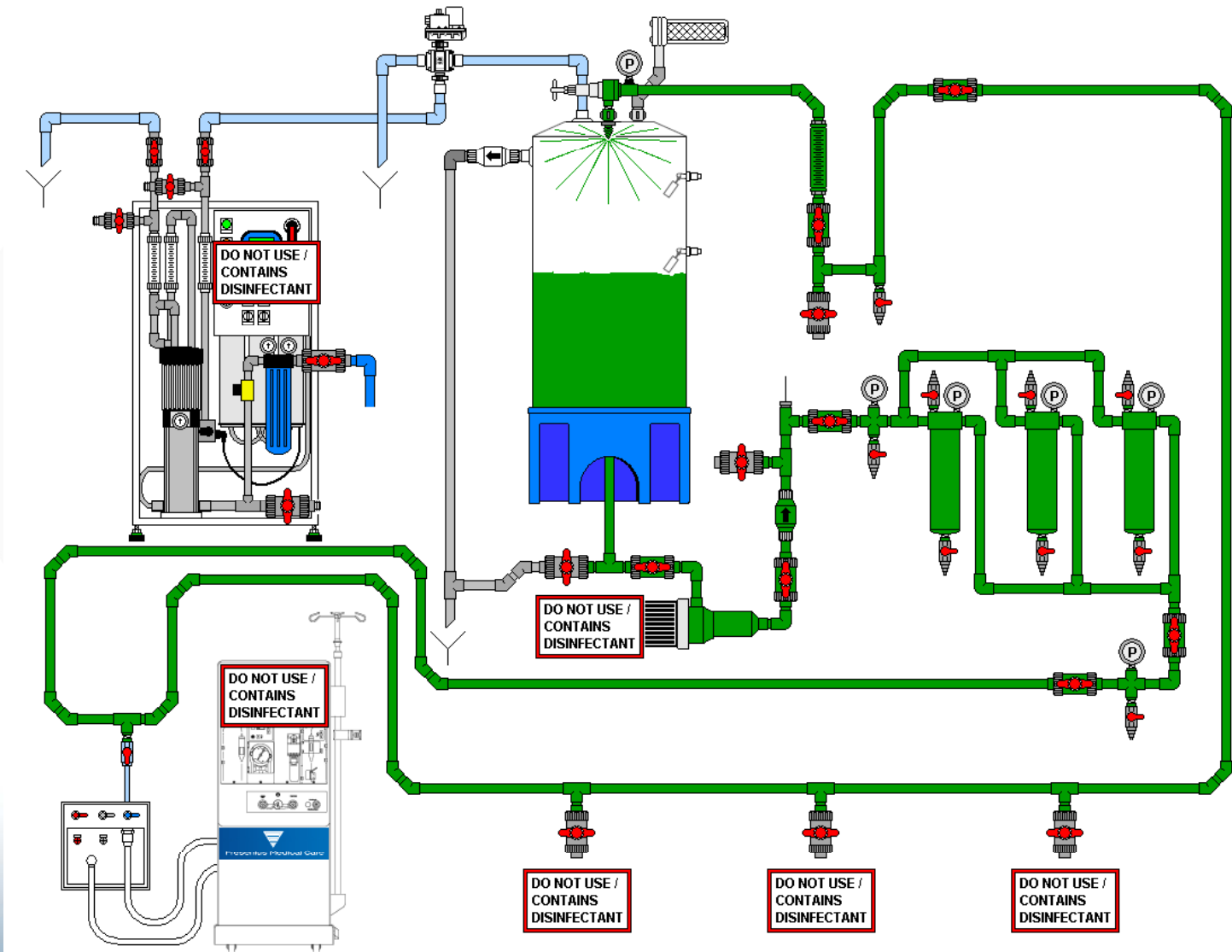


• DRAIN STORAGE TANK TO 130 GALLONS

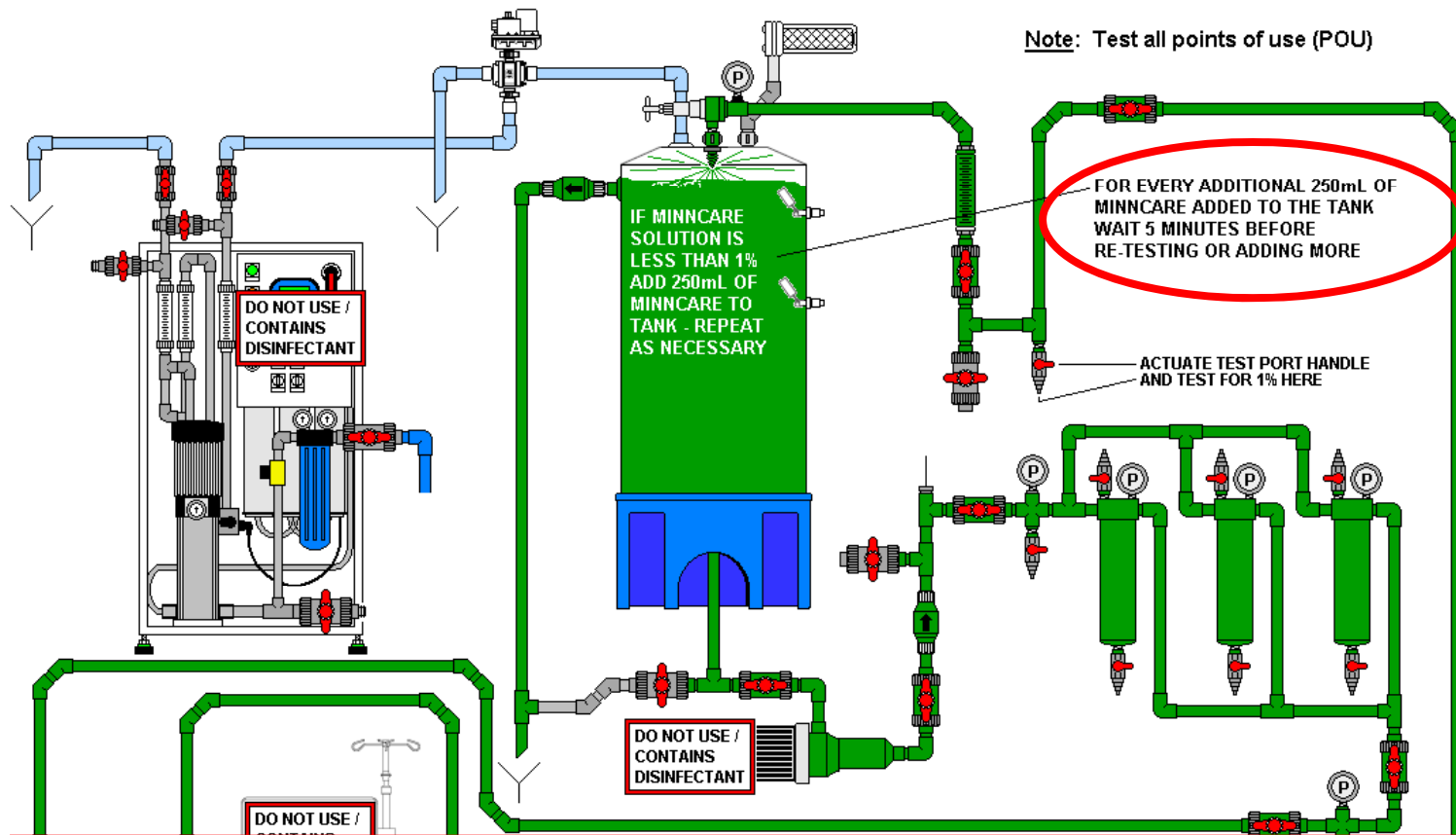


• DISTRIBUTION PUMP OFF





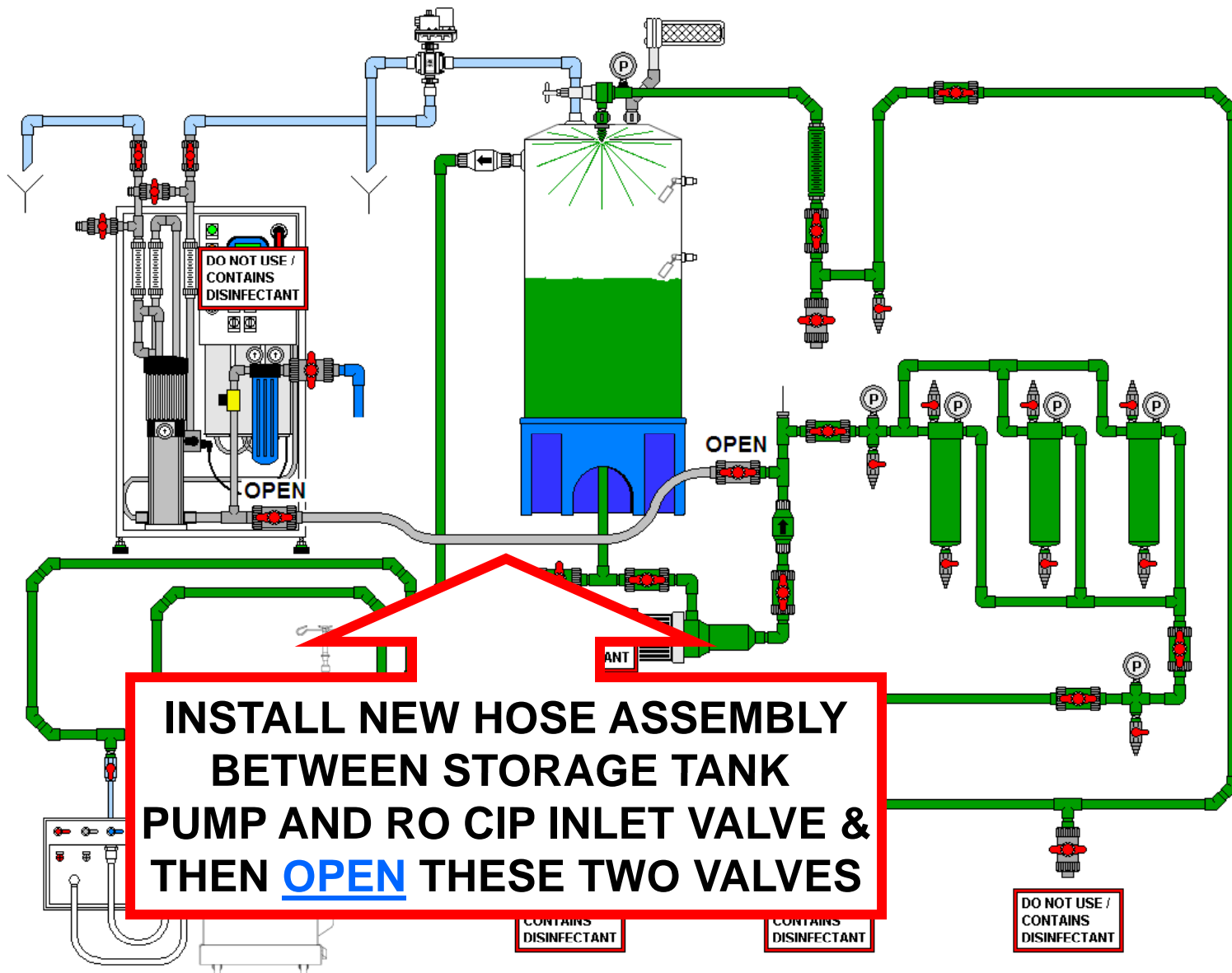
• TURN DISTRIBUTION PUMP(S) ON

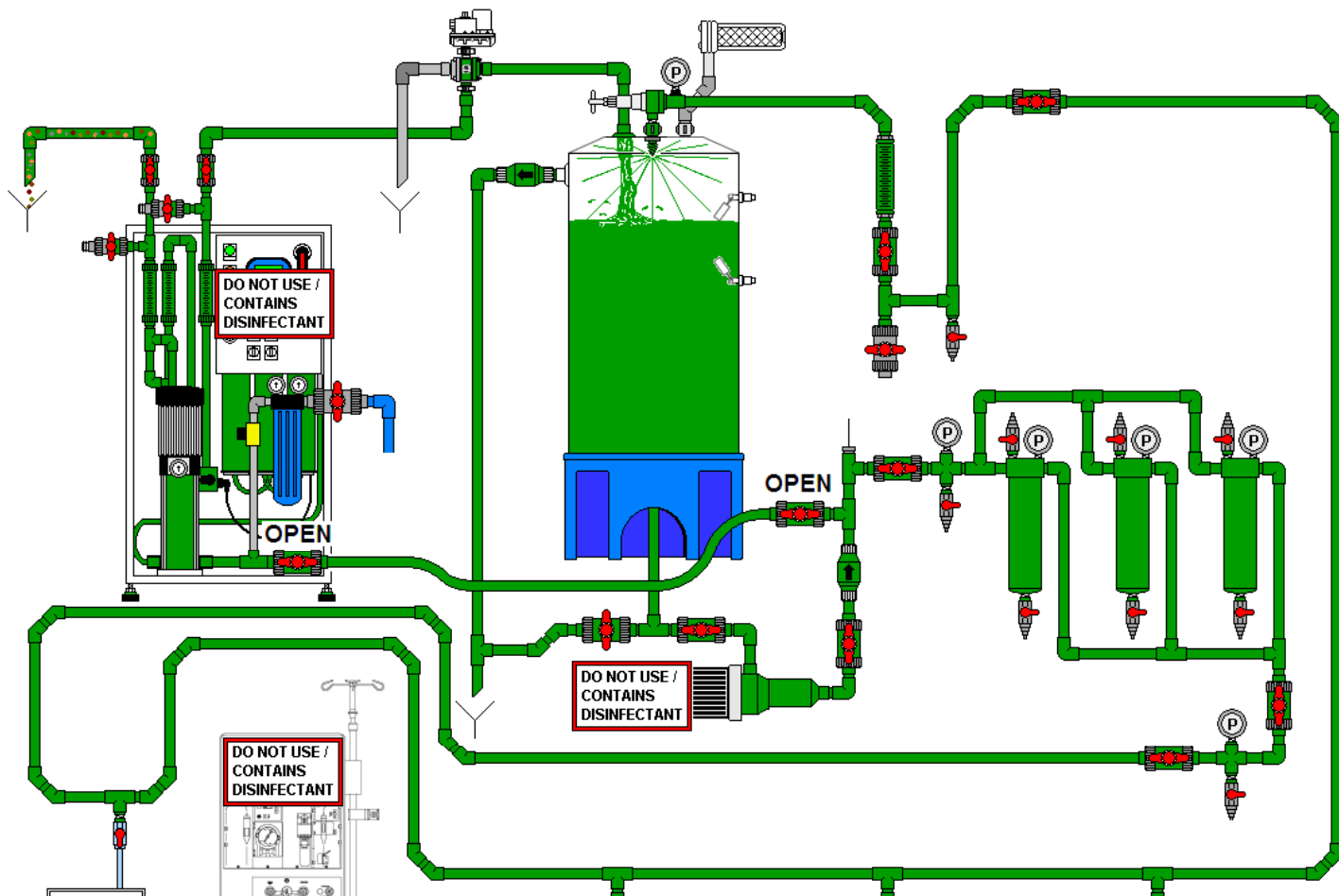


- **MIX MINNCARE IN TANK/LOOP**
- **RUN DISTRIBUTION PUMP FOR 5 MINUTES**
- **TURN RO ON AND ALLOW TANK TO OVERFLOW FOR 30 SECONDS**
- **TEST 1% MINNCARE**
- **IF < 1% = ADD, MIX, RE-TEST**

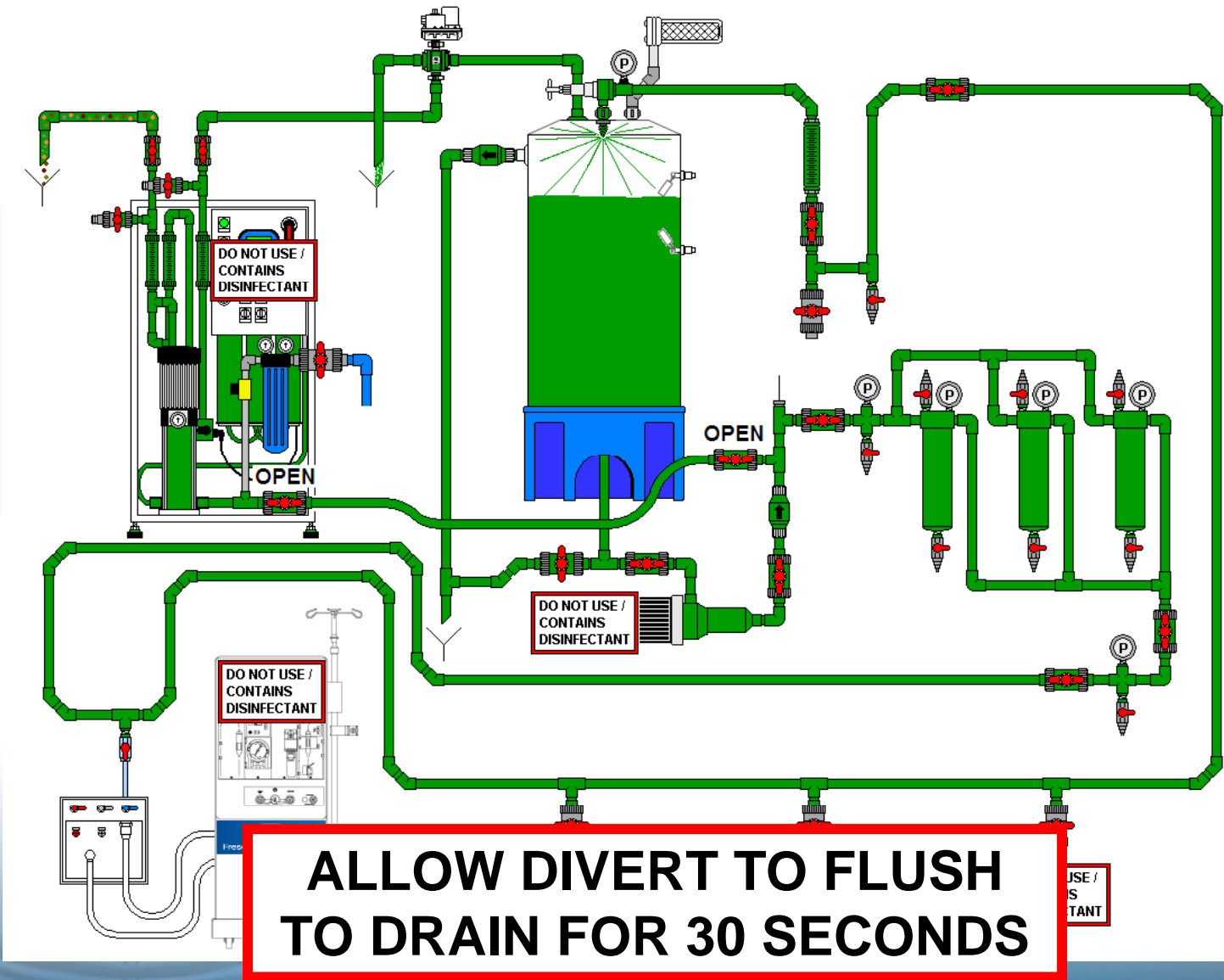
STEP 2 PROCEDURE OVERVIEW

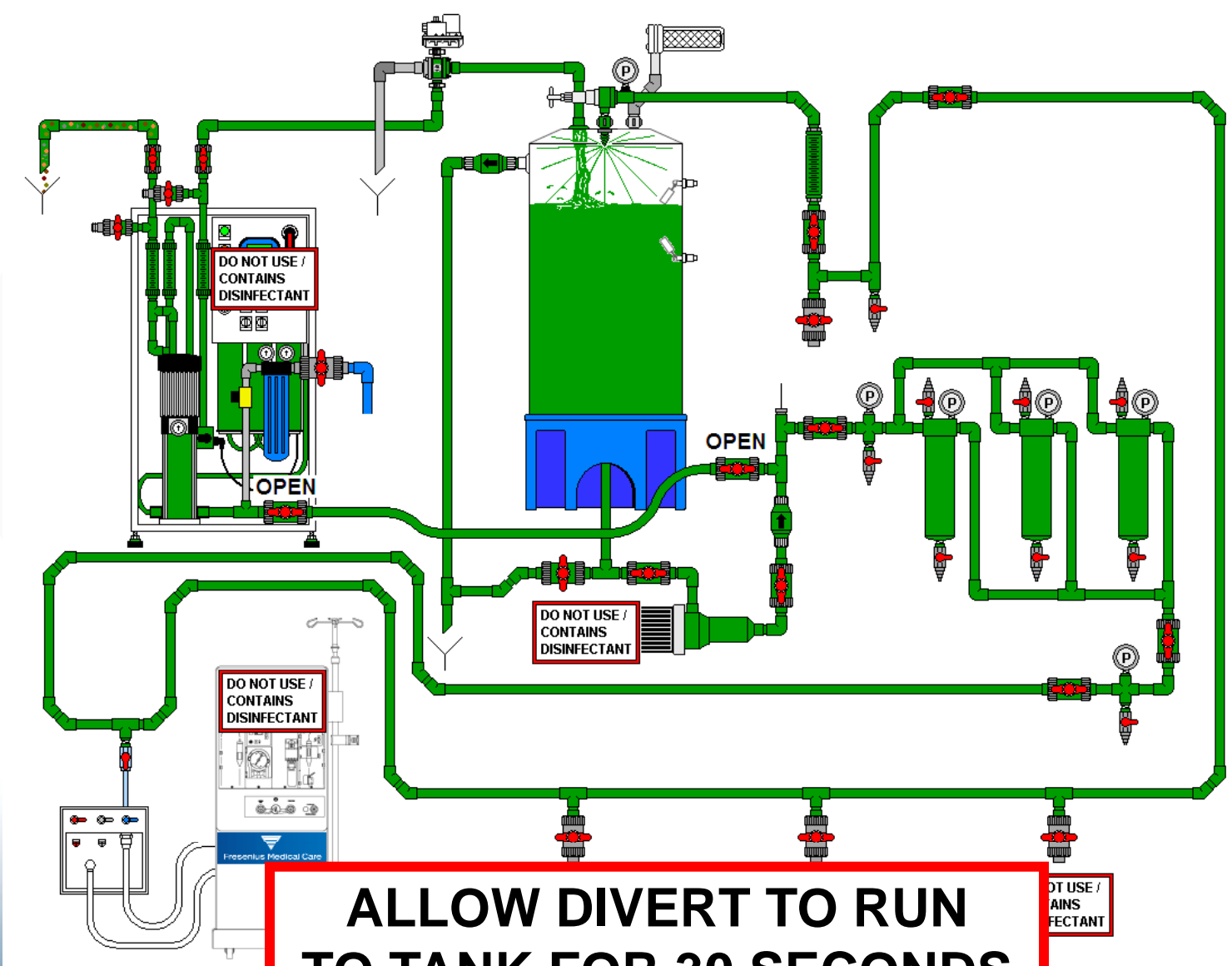
“MINNCARE INTO & THROUGH RO”





- **TURN RO ON IN CIP MODE FOR 15 MIN**
- **TEST RO SAMPLE PORT - 1%**
- **IF < 1% = ADD, MIX, RE-TEST**

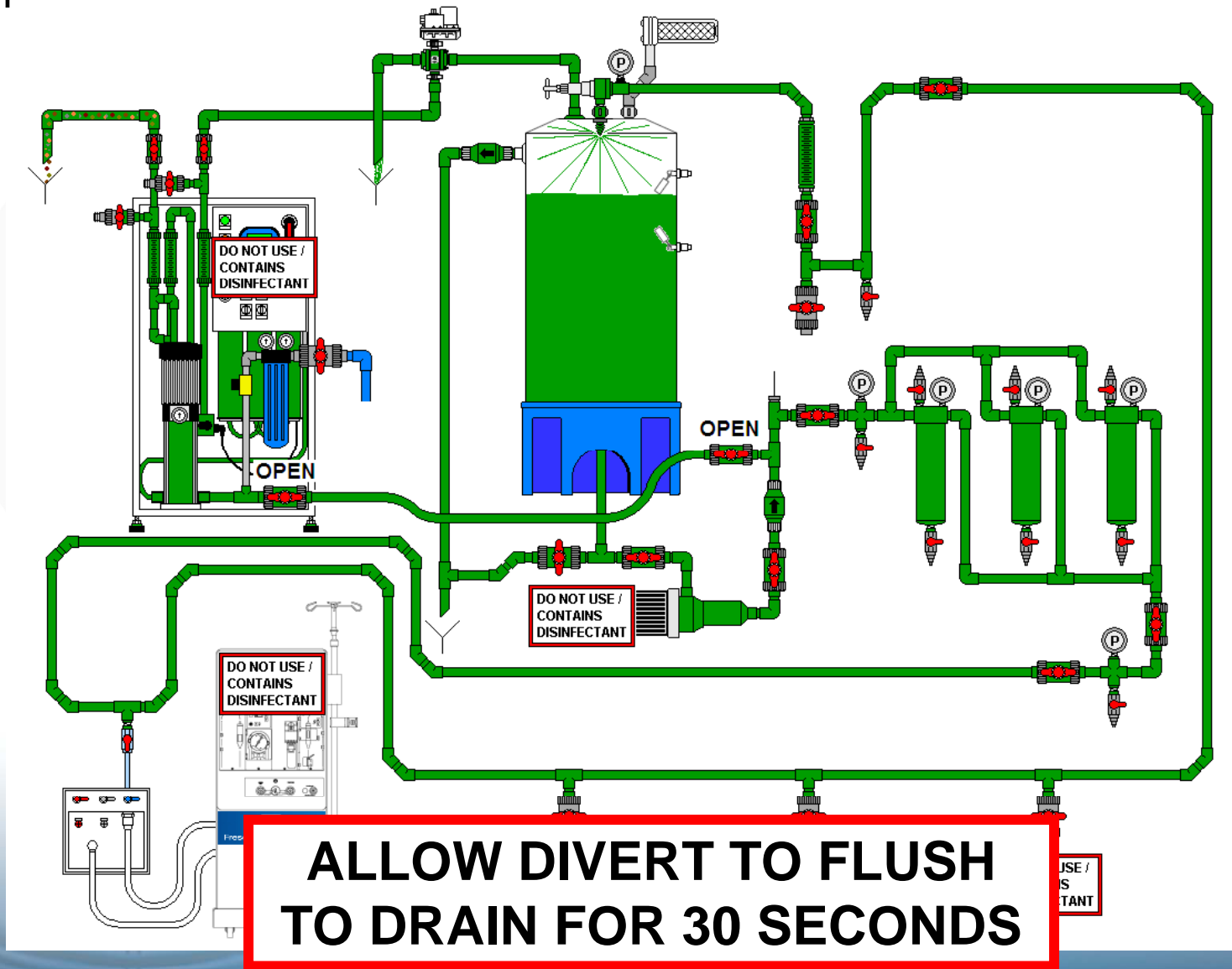




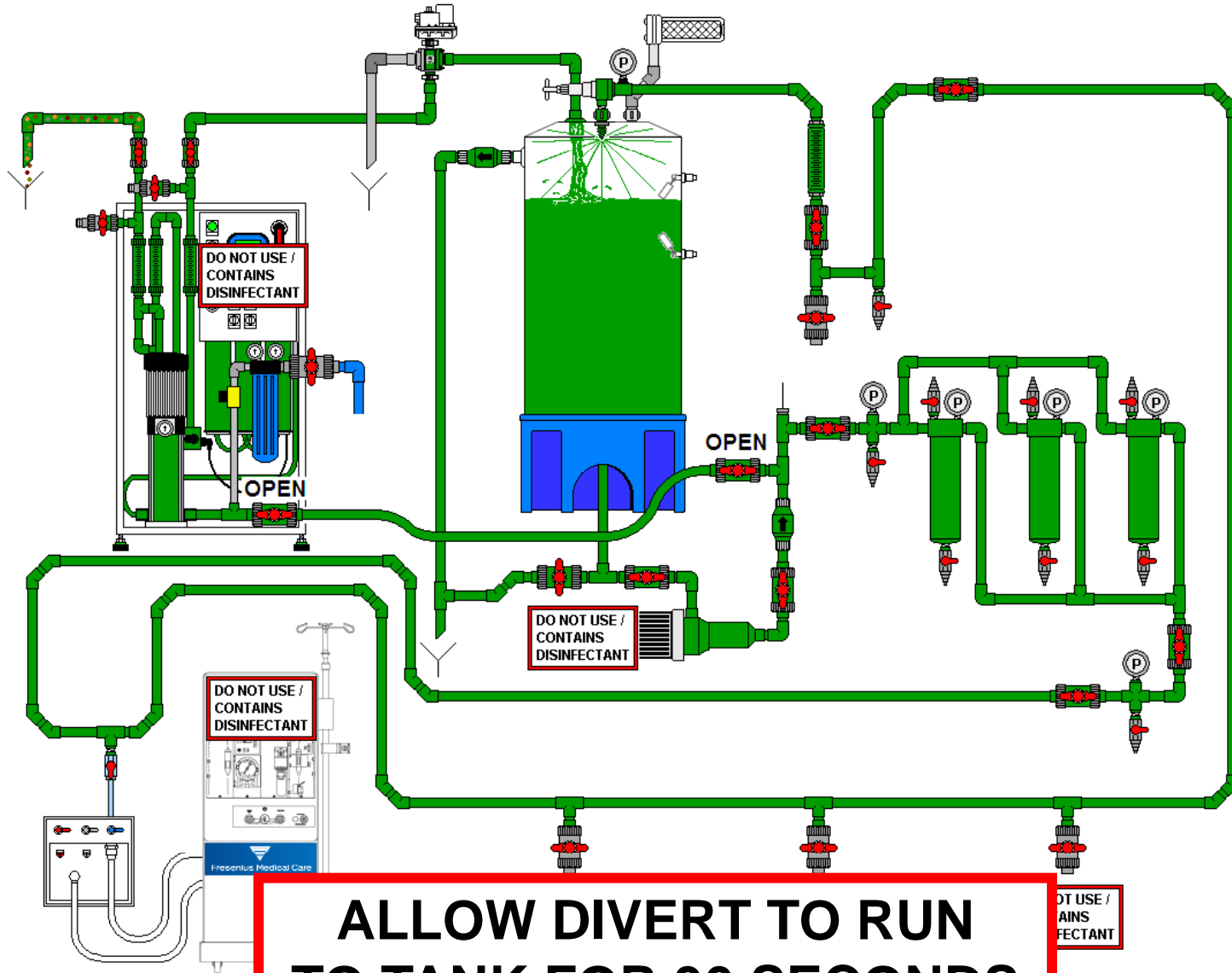
ALLOW DIVERT TO RUN TO TANK FOR 30 SECONDS

DO NOT USE / CONTAINS DISINFECTANT

REPEAT

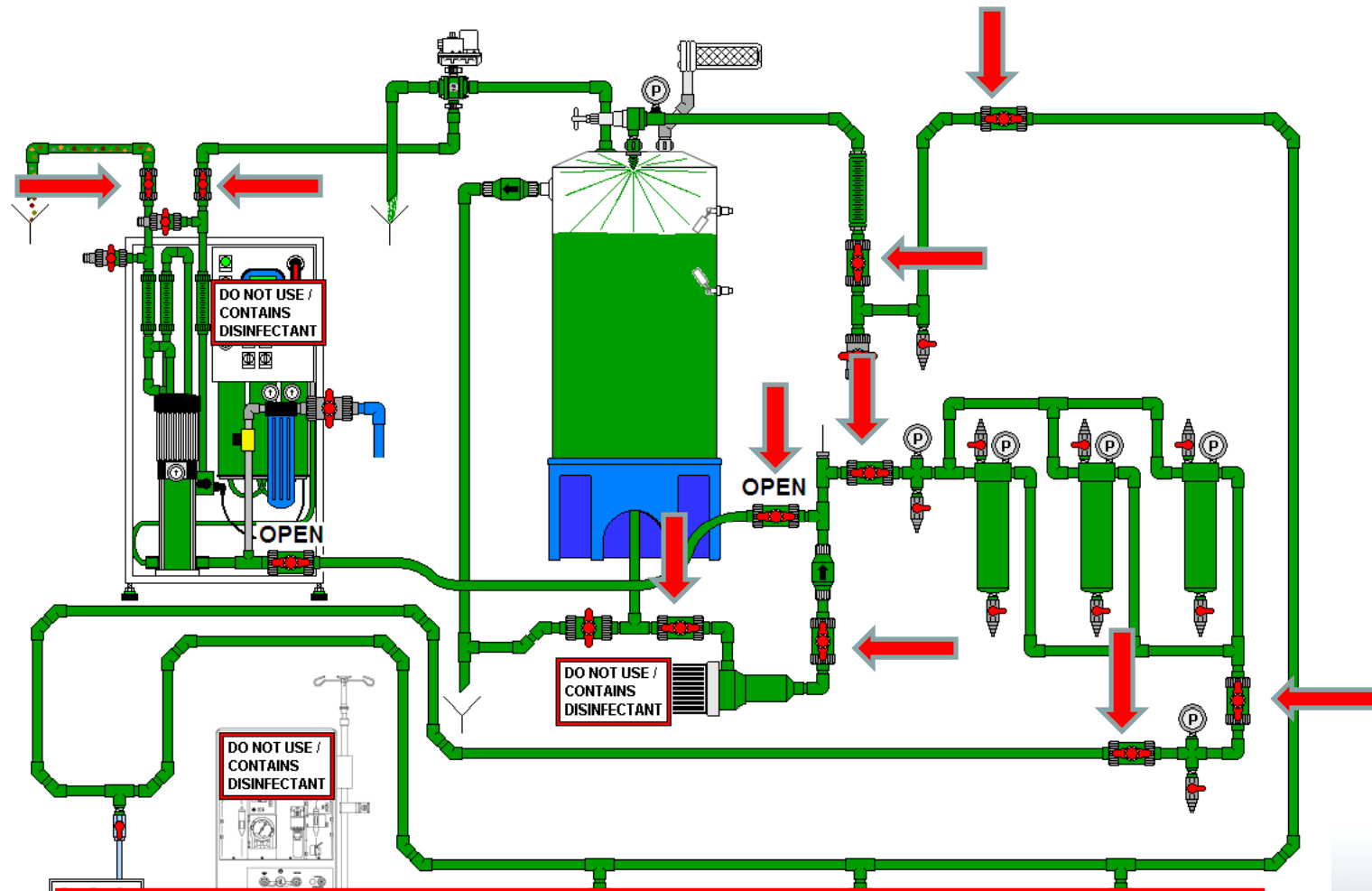


REPEAT

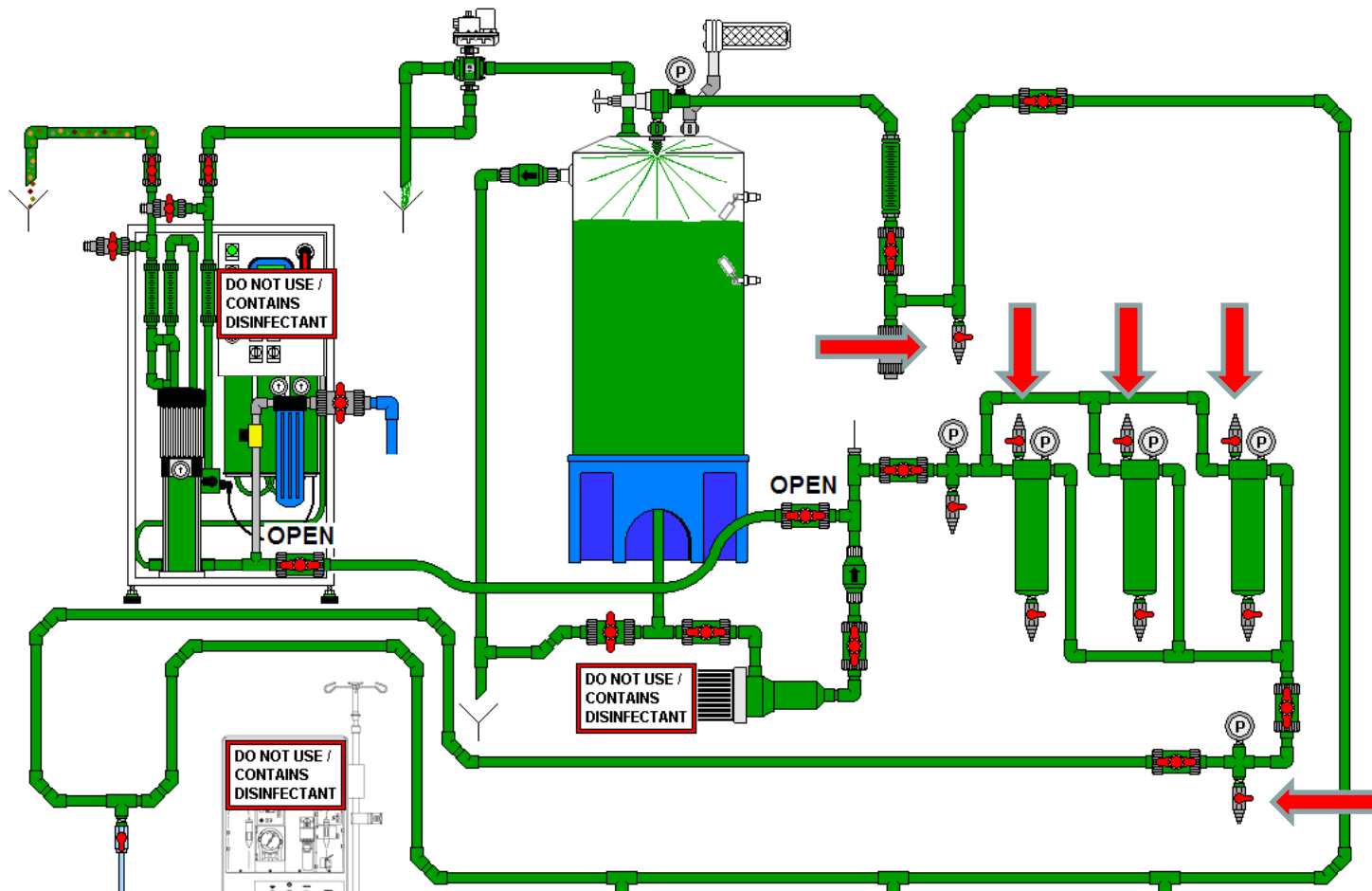


**ALLOW DIVERT TO RUN
TO TANK FOR 30 SECONDS**

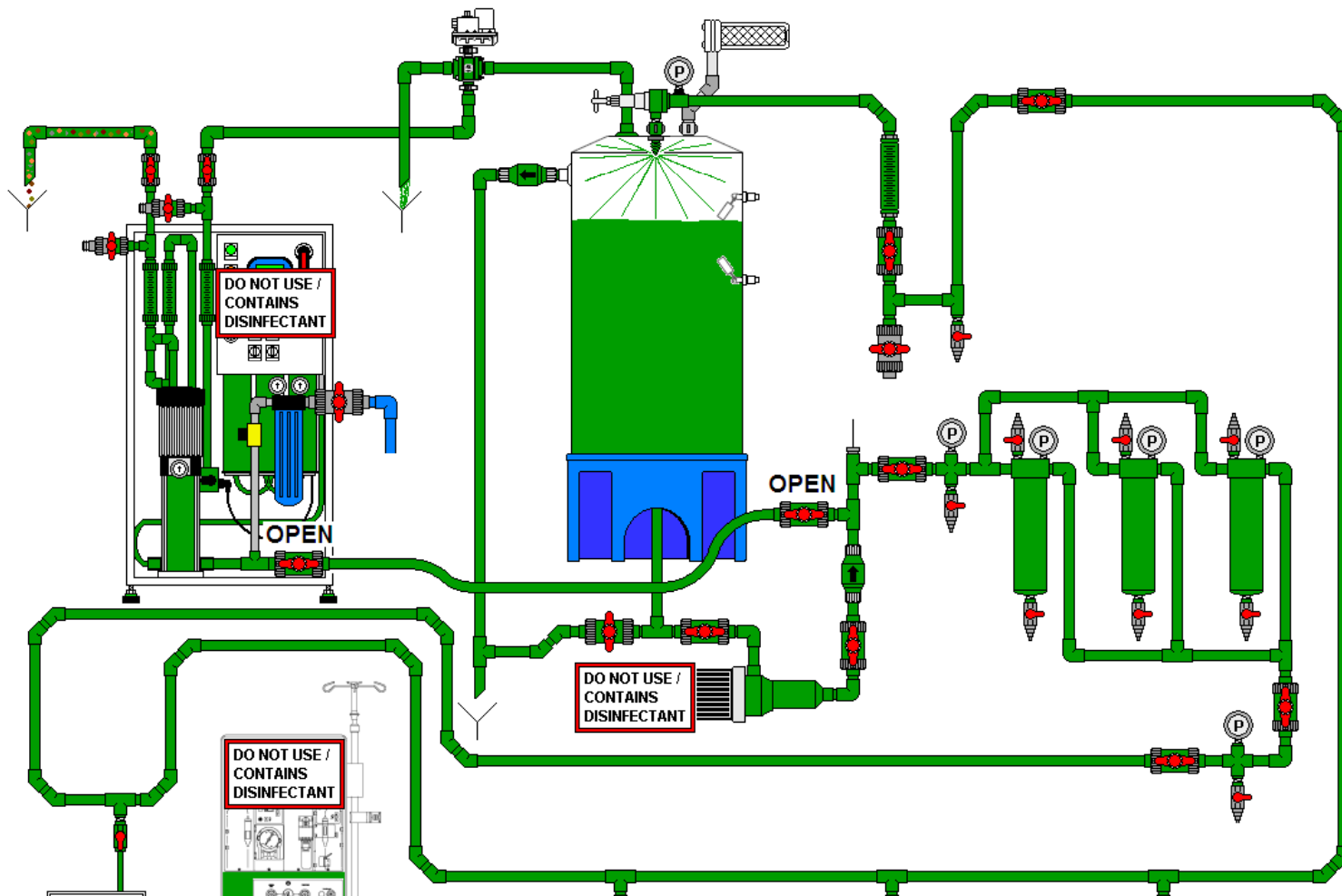
STEP 3 PROCEDURE OVERVIEW
**“MINNCARE INTO AND THROUGH ALL
POINTS OF USE AND DIALYSIS MACHINES”**



**TURN OFF DISTRIBUTION PUMP(S) AND
CYCLE ALL INLINE VALVES X 3 TIMES**



TURN ON DISTRIBUTION PUMP(S) AND CYCLE ALL TEST PORTS, ANCILLARY VALVES, ETC. 3 TIMES. TEST ALL PORTS, ANCILLARY VALVES, ETC. TO ASSURE 1% CONCENTRATION IS ACHIEVED.



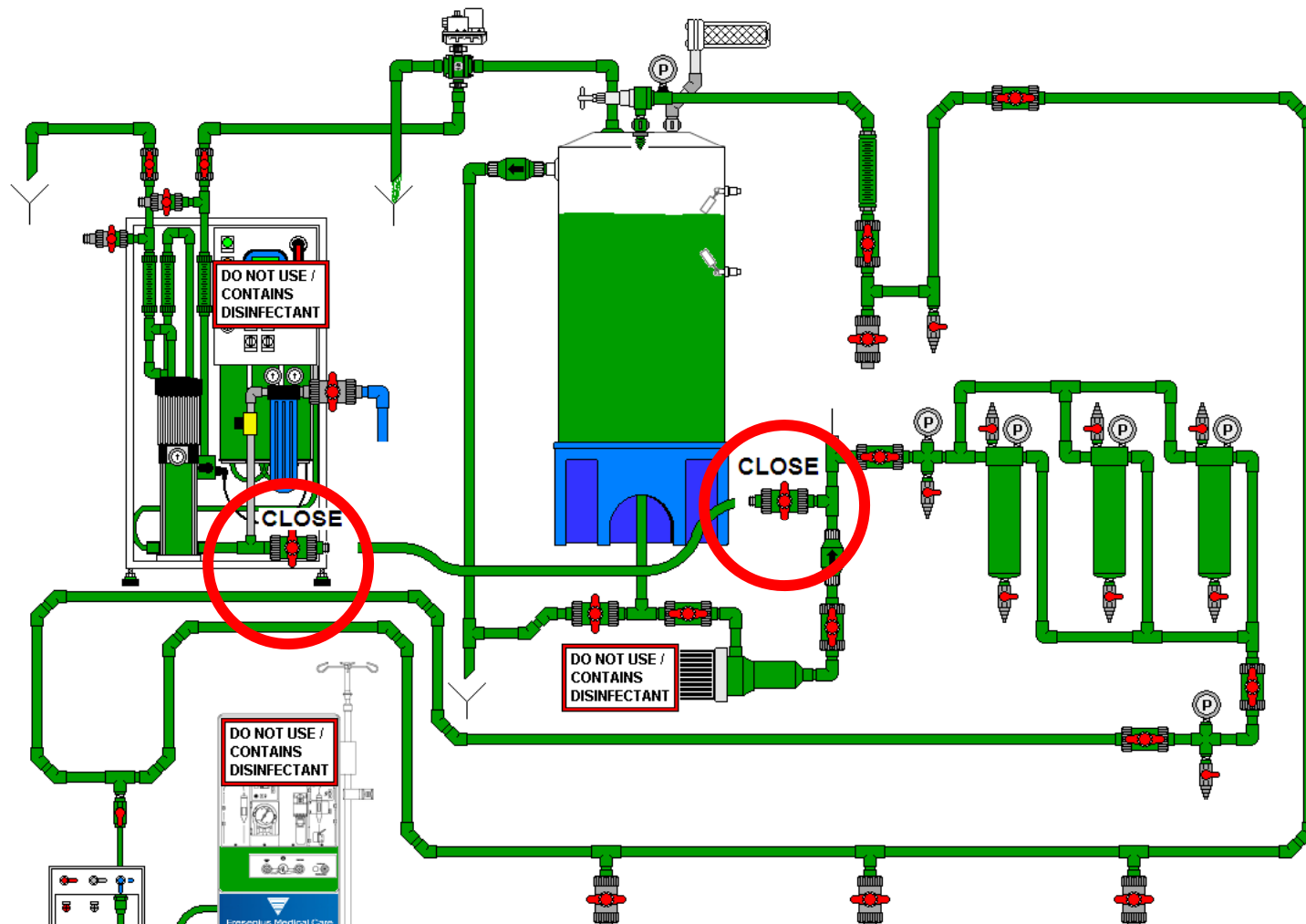
TURN ON ALL DIALYSIS MACHINES AND INITIATE A RINSE CYCLE. TEST THE MACHINE'S DRAIN TO ASSURE A 1% SOLUTION IS ACHIEVED.

***NOTE**

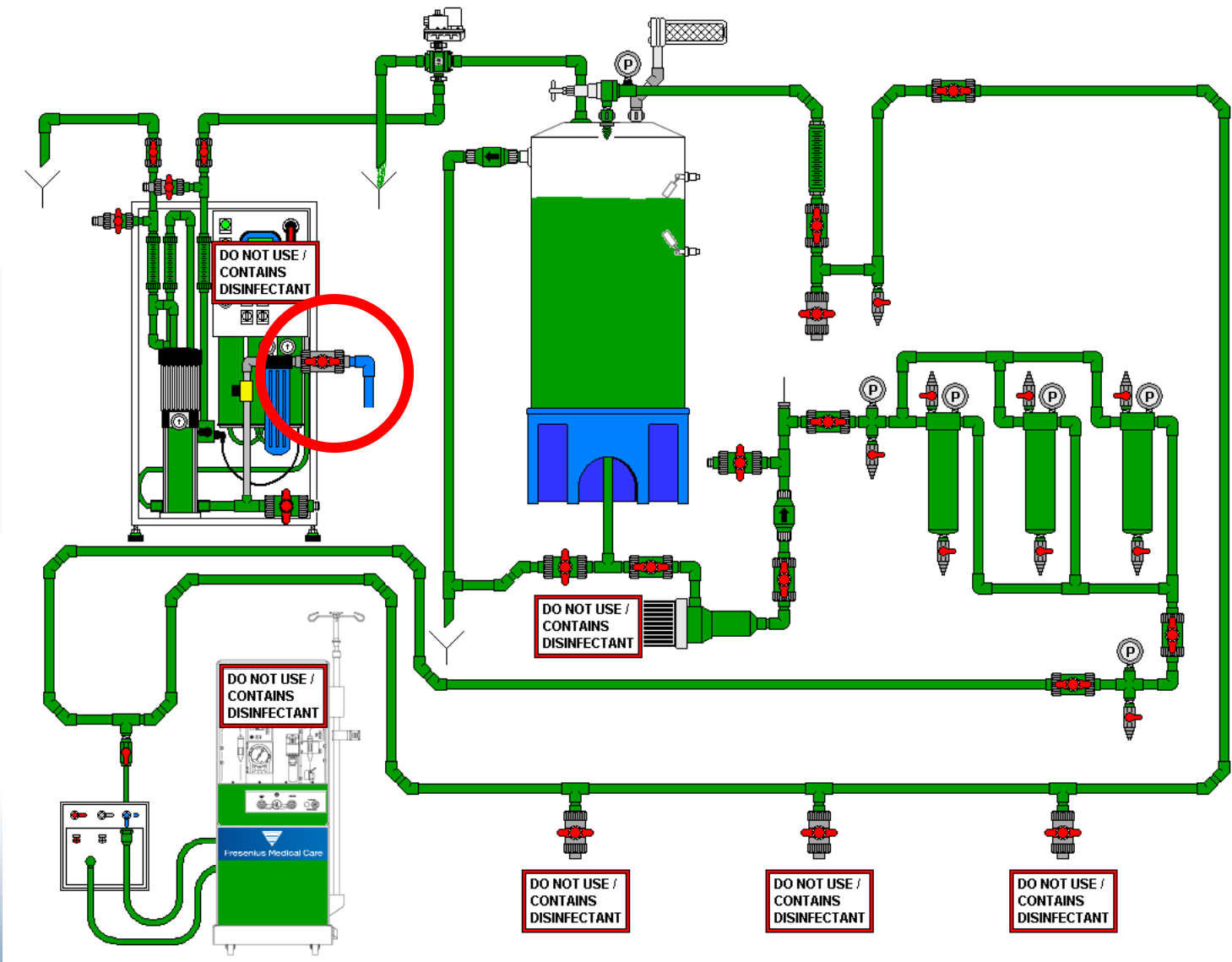
**BE SURE TO ALLOW RO, LOOP, AND
MACHINES TO DWELL PER FACILITY
POLICIES AND PROCEDURES**

STEP 4 PROCEDURE OVERVIEW

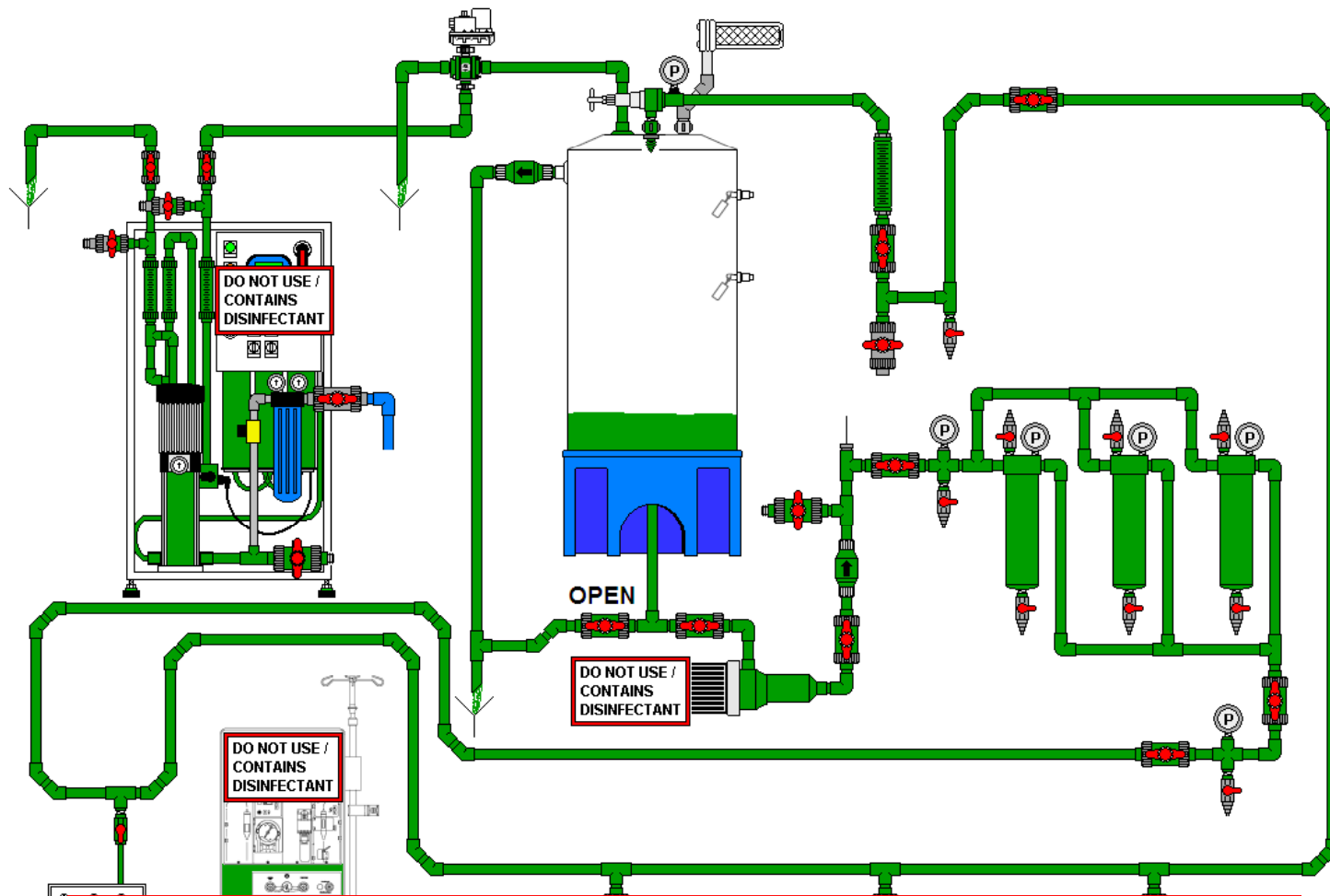
“RINSE RO, TANK, LOOP, AND MACHINES”



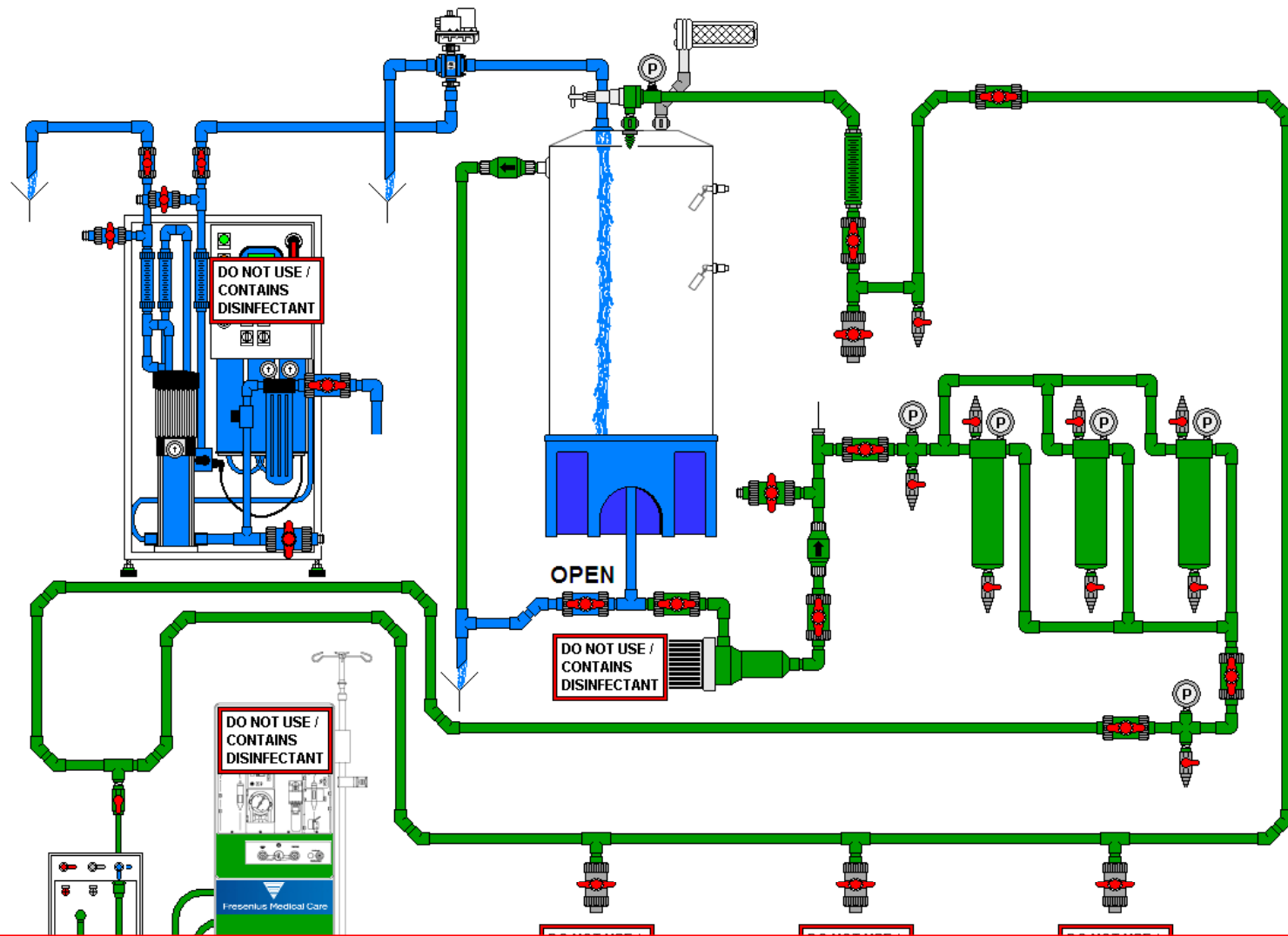
- TOGGLE RO ON & OFF TO RELIEVE PRESSURE
- CLOSE RO PUMP CIP VALVE
- DISCONNECT HOSE FROM RO INLET / PLACE IN DRAIN



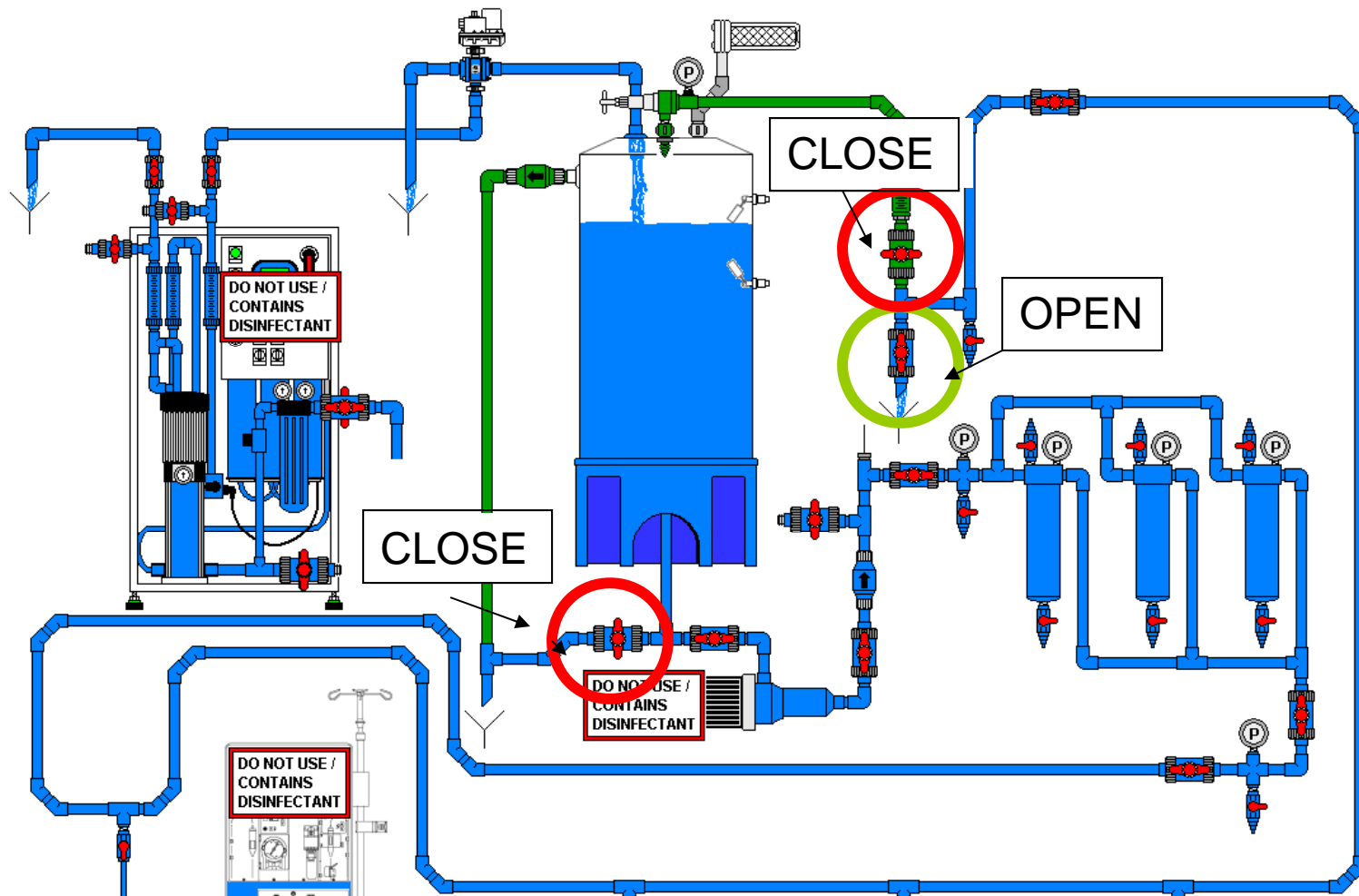
OPEN NORMAL RO FEED WATER INLET VALVE



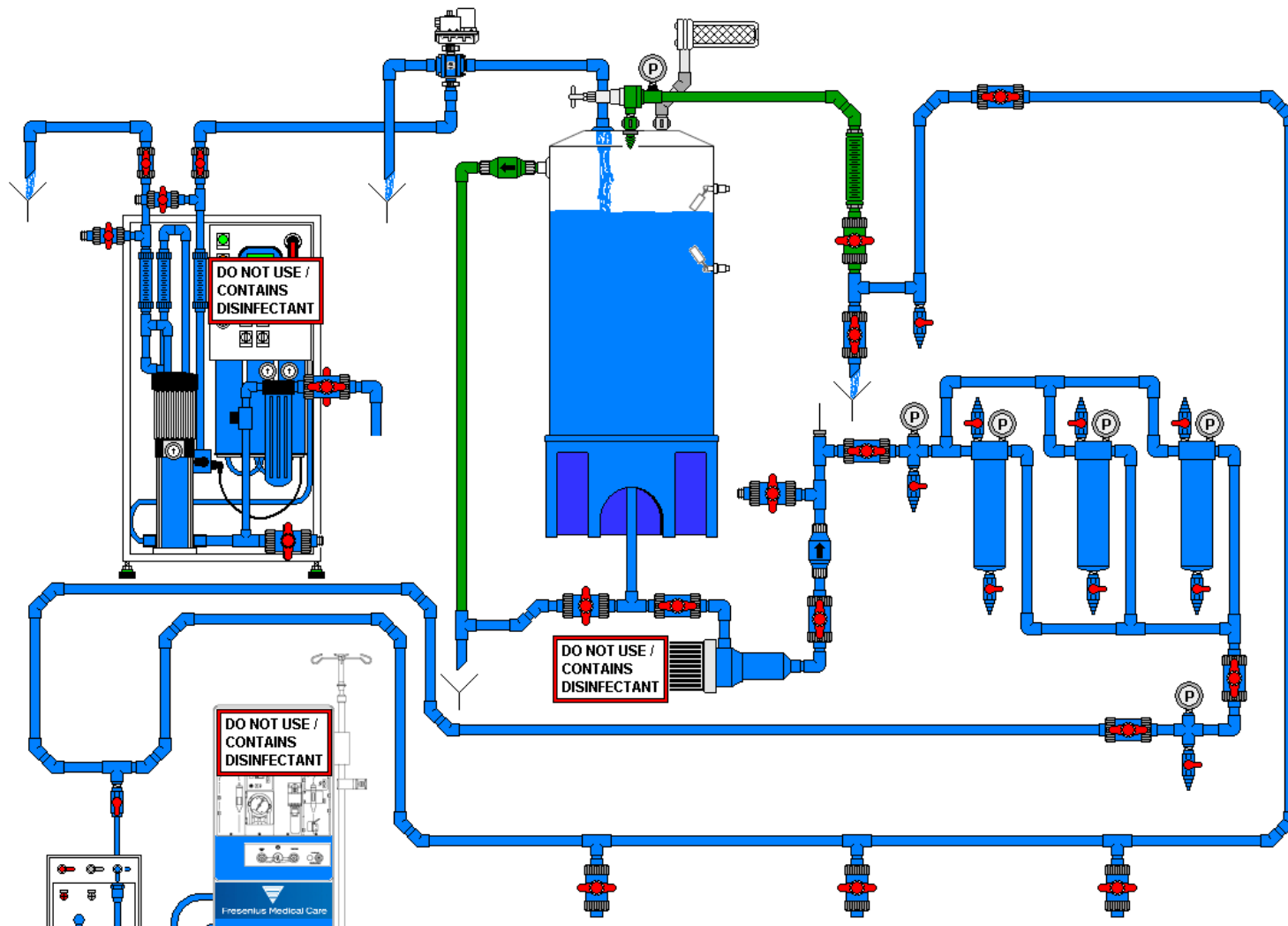
**WHILE RO IS IN FLUSH MODE OPEN
TANK DRAIN AND LEAVE OPEN UNTIL
TANK IS COMPLETELY EMPTY**



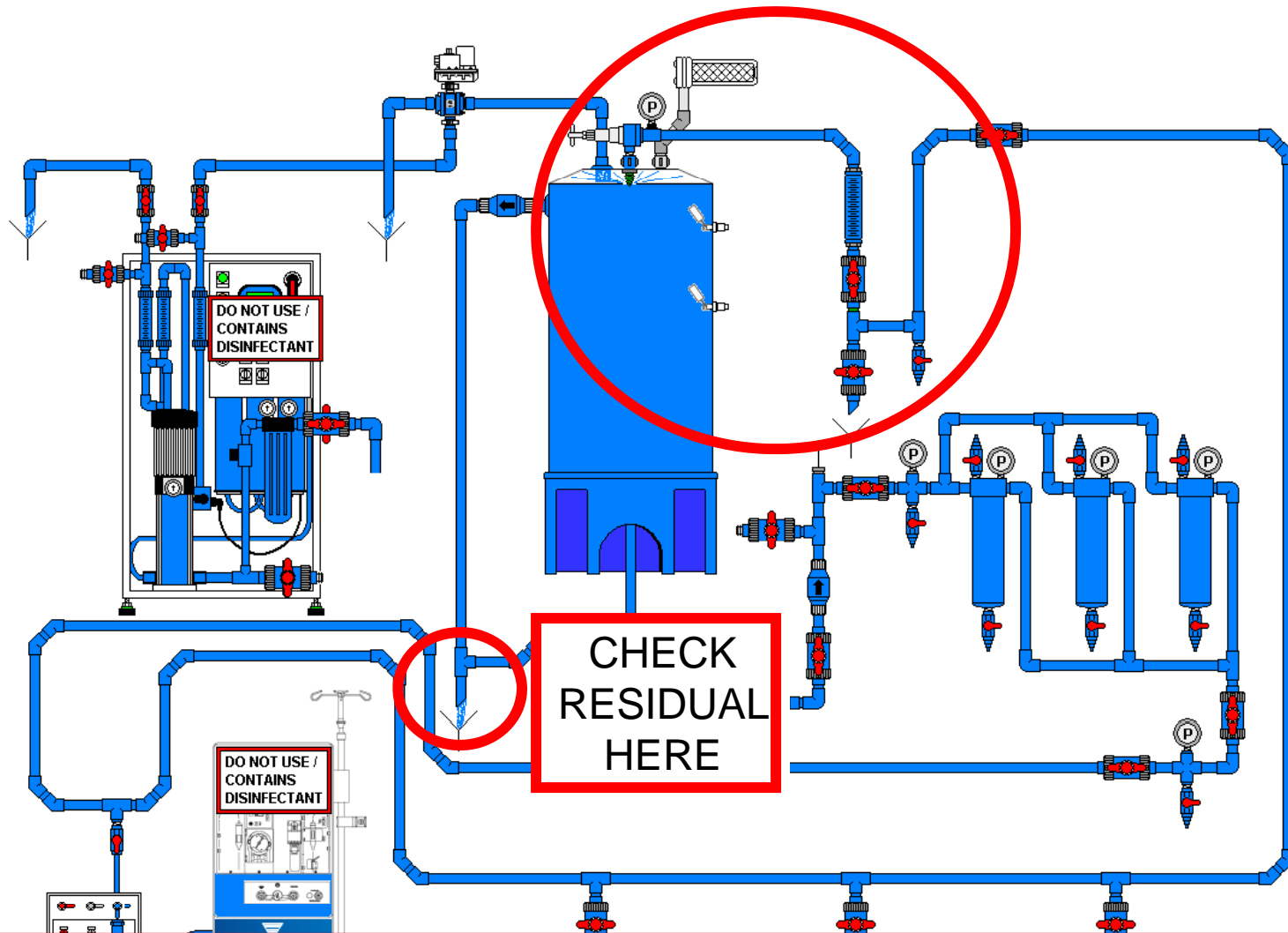
- CONTINUE ALLOWING RO TO RUN
- TANK DRAIN SHOULD STILL BE OPEN
- TEST TANK DRAIN UNTIL NEAR CLEAR OF MINNCARE UTILIZING RESIDUAL TEST STRIP



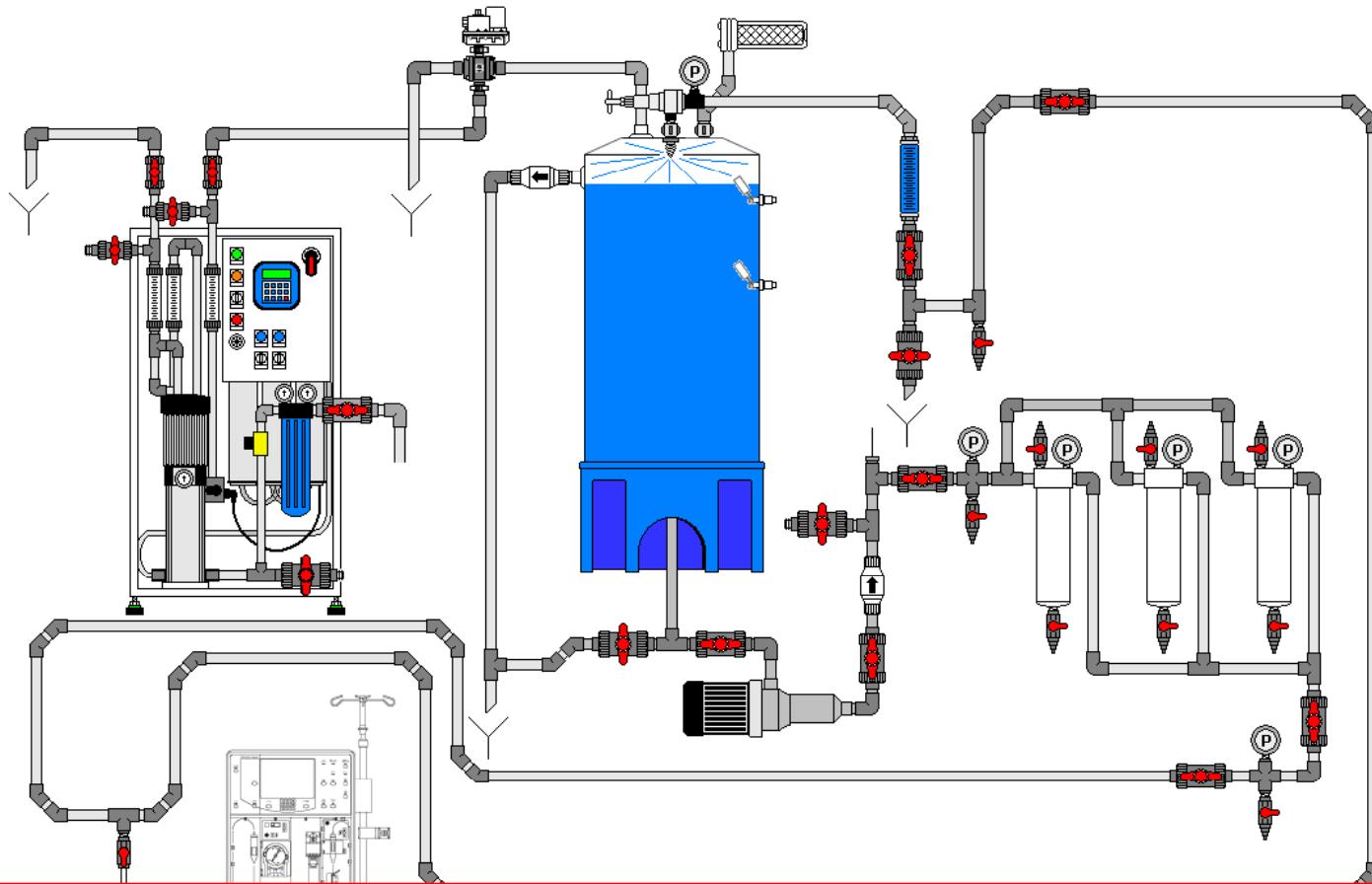
- **CLOSE STORAGE TANK DRAIN VALVE**
- **ALLOW RO TO FILL STORAGE TANK**
- **CLOSE LOOP RETURN TO TANK ISOLATION VALVE**
- **OPEN LOOP TO DRAIN VALVE**
- **TURN ON DISTRIBUTION PUMP(S)**



- **FLUSH AND CYCLE ALL PORTS AND VALVES 3 TIMES**
- **TEST ALL SAMPLE PORTS ARE CLEAR WITH RESIDUAL STRIPS**
- **PLACE DIALYSIS MACHINES IN RINSE MODE AND TEST DRAIN WITH RESIDUAL TEST STRIPS UNTIL CLEAR**
- **TURN OFF DISTRIBUTION PUMPS**



- **TURN ON DISTRIBUTION PUMPS TO FLUSH OUT TANK ISOLATION VALVE, FLOW METER, AND PRESSURE REGULATING VALVE.**
- **OVERFLOW TANK UNTIL OVERFLOW DRAIN IS CLEAR OF MINNCARE**



- REMOVE DISINFECT SIGNS FROM ALL MACHINES, VALVES, TEST PORTS, ETC.
- LOG TSD DISINFECTION PER IN-CENTER POLICIES AND PROCEDURES
- ASSURE RO TURNS OFF WHEN THE TANK LEVEL REACHES THE TOP FLOAT

TSD - Summary



- ✓ Maintain closed loop continuous operation whenever possible
- ✓ Clean and Disinfect monthly with a consistent process – TSD end to end
- ✓ Always tag out during disinfection
- ✓ Validate concentration at all points
- ✓ Validate adequate rinse at all points
- ✓ Sample carefully and consistently

Total System Disinfect

Questions?