

REVERSE OSMOSIS SYSTEM

DOUBLE PASS REVERSE OSMOSIS SYSTEM

System Features and Functional Highlights

The **PRIME 12,000 x 8,000 GPD-DP Series** is designed with advanced features that enhance performance, monitoring, and water efficiency for dialysis-grade water treatment. Below are the key system components and capabilities:

PLC-Based Control System: Equipped with a Programmable Logic Controller (PLC) for precise and efficient system management.

Individual Membrane Monitoring: Each RO membrane includes a dedicated in-line flow meter to allow real-time monitoring of product flow.

Flexible RO Membrane Configuration: Supports variable membrane configurations, including parallel and parallel-series setups, allowing adaptability to operational demands.

Comprehensive Pre-Filtration Monitoring: Integrated pressure gauges and sampling ports at each pre-filter stage enable accurate diagnostics and quality control.

Manual RO Membrane Flushing: Manual flushing function post-operation helps extend membrane life and maintain optimal performance.

Automated Water Recycling: Automatically recycles RO 2 reject water back to the raw water tank, significantly improving water use efficiency.

Integrated Flushing & Declogging Line: Built-in lines facilitate RO membrane flushing and declogging for simplified maintenance and consistent output.

Variable Reflux System: Enables reflux control, allowing a portion of the reject water to be recirculated back into the feed for improved processing.

Advanced RO 2 Reflux System: Allows a portion of RO 2 reject to be returned to the raw holding tank to dilute the raw water. The system includes a manual option to divert this to the RO 1 holding tank. Once both tanks are full, flow is automatically diverted to the reject line to prevent overflow.

Individual Valve Control

Individual Flow Meter

High Pressure Pump

4040 RO Membranes



Description

PRIME 12k x 8k DP Series

The PRIME 12,000 x 8,000 GPD-DP Series is a locally manufactured and assembled water treatment system specifically designed for dialysis use. Built with versatility in mind, the system allows end-users to configure and program settings tailored to their operational requirements—delivering both functionality and convenience.

At the core of the system is a Schneider TM221CE24R Programmable Logic Controller (PLC), ensuring efficient and reliable control of the entire treatment process.

At RC PRIME, we are committed to innovation and continuous improvement. Our systems are developed with an emphasis on ergonomic design, quality, and affordability, positioning them to compete with international brands.

Safety and compliance remain our top priorities. The system is designed to fully comply with AAMI Water Quality Standards and the regulatory guidelines of the Department of Health (DOH), ensuring it meets the highest standards for dialysis applications.



RC PRIME
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REVERSE OSMOSIS SYSTEM

12,000 X 8000 GPD RO SYSTEM



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Core Control & Monitoring

- PLC Control: Schneider TM221CE24R Series Programmable Logic Controller
- Visual Monitoring: Real-time system status display
- Digital TDS/Conductivity Meters: For raw and product water quality monitoring

Filtration & Purification System

- **Sediment Filters:**
 - 10" Slim 5 Micron Pre-RO Sediment Filter
 - 10" Slim 0.22 Micron Bacteria Filter
 - **RO Membrane:**
 - ULP 4021 Membrane with 90% rejection rate
 - Average Permeate: 4-5 LPM
 - Capacity: 600-800 GPD (conservative)
 - **Carbon & Softening:**
 - 8 x 44 FRP Carbon Filter
 - 8 x 44 FRP Water Softener
 - **UV System:** 1 GPM Ultraviolet Disinfection
- #### Mechanical Components
- **Pump:** 1.5 HP Horizontal Pump, 5 Impellers
 - **Storage:** 3.2-Gallon RO Water Pressurized Tank
 - **Distribution:**
 - RO Loop System
 - 4 HD Machine Outlets
 - Recirculating System for consistent flow
 - **Valves & Safety:**
 - Low and High Pressure Switches
 - Feed Water Release Valve
 - Auto-Flushing Function to extend membrane life

Key Advantages

- Automated, user-friendly operation
- Real-time maintenance alerts for consumables
- Compact and portable design
- Designed for stable pressure and reliable water quality
- Fully compliant with AAMI and Department of Health standards

Key Components and System Features

Control and Monitoring

Main Controller – Central processing unit for managing system functions
Auto and Manual Mode Switch – Enables selection between automatic and manual operations
Visual Indicators – LED/LCD indicators for system status and alerts
Sensor and Safety Mechanisms
Low and High Water Level Sensors – Ensures proper water level management in tanks
Low and High Pressure Switches – Protects system from operating under unsafe pressure conditions

Flow and Pressure Management

Raw Water Input Control – Regulates incoming water supply
Drain Control Valve – Controls discharge and flushing cycles
RO Inlet Pressure Gauge (Oil-Filled) – Monitors pressure before RO membrane
Concentrate Pressure Gauge (Oil-Filled) – Measures pressure of reject stream
RO Pre-Filter Pressure Gauge (Oil-Filled) – Assesses pre-filter loading and performance

Conductivity Monitoring

Conductivity Meter (Feed Water) – Monitors input water quality
Conductivity Meter (Product Water) – Ensures treated water meets quality standards
Conductivity Meter (Return/Loop Water) – Tracks water quality in the distribution loop

System Redundancy and Backup

Automatic Backup System – Provides uninterrupted operation in case of primary system failure
Manual Backup System – Allows manual override and operation during system faults

Additional Controls

Temperature Control – Monitors and regulates water temperature to maintain optimal system performance



Control and Safety Features of PRIME 16,000x12,000 GPD-DP Series Water Treatment System

- Control Module
- PLC Controller: Utilizes Schneider TM221 PLC Module for intelligent automation and system control.
- Float Switches: Interlocked with the PLC to automatically manage water levels in all tanks.
- Valve and Water Input Control
- Electronic Solenoid Valves: Automatically manage incoming water, interlocked with level sensors for responsive operation.
- Manual Bypass Valve: Allows manual control in case of solenoid valve malfunction.
- Safety Control Valve: Prevents accidental drainage of water during raw water tank refilling.
- Pressure Monitoring and Safety
- Mechanical Pressure Switch: Monitors and responds to both the feed water pressure and pressure generated by the RO membranes.
- Oil-Filled Pressure Gauges:
- RO Inlet: 0-300 PSI
- Concentrate/Reject Line: 0-300 PSI
- Pre-Filter Stage: 0-100 PSI
- Operation Modes and Visual Indicators
- Auto/Manual Mode Selector: Enables users to switch between fully automatic and manual operation.
- Pilot Lamps: 14 mm indicators to display system status and errors at a glance.
- Pump Switching Timer: Internal PLC timer controls pump alternation every 30 minutes (user-configurable).
- IDEC 2-Position Selector Switch: Lets users manually select between Pump A and Pump B in case of fault or maintenance.
- Water Quality and Temperature Monitoring
- In-line Conductivity Meters:
- Feed Water
- Product Water
- Return/Loop Water
- Measurement in ppm / $\mu\text{S/cm}$



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