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Overview
The Marlo ‘MGT’ water softener system offers the commercial or institutional facility a robust and efficient solution for reducing mineral scale, soap usage, and energy consumption in their plumbing and other water-using equipment.

The corrosion resistant fiberglass reinforced polyethylene tank design and reliable top mounted valve will provide many years of service.

Standard Features
• Corrosion resistant fiberglass tanks
• Piston actuated, multi-port, brass control valves
• Timeclock or meter initiated regeneration cycle
• Brine tank assembly with safety overflow
• Sodium form cation exchange resin
• Hard water bypass during regeneration
• Water hardness testing kit

Materials of Construction
• Control Valve Body: Low lead brass
  Fleck 1500 - 3/4” Valve-(Timeclock Only)
  Fleck 2750 - 1” Valve
  Fleck 2850 - 1-1/2” Valve
• Resin Tanks: Fiberglass reinforced polyethylene - NSF 44 certified
• Internal Distributors: Sch 80 PVC/ABS
• Brine Tank: Corrosion resistant polyethylene
• Meter: Brass or glass filled Noryl

Instrumentation / Controls
• Timeclock - electromechanical control
• Metered - XT and NXT electronic control
  LED Status lights
  On board diagnostics and error reporting
  Flow totalizer

Operating Parameters
• Inlet Pressure: 30-100 psig
• Electrical: 24V circuitry
• 120/24 VAC, 50/60 Hz wall mount transformer
• Temperature: 35-100 °F

Options Available
• Skid mounted, pre-piped, pre-wired systems
• Multi-tank system configurations (twin, triple, quad)
• ASME Pressure vessels
• Signet flow sensors
• Stainless steel meters - 1-1/2”
• Inlet/Outlet pressure gauges and sample valves
• Electromechanical controls and meters
• Larger brine tanks
• Multiple voltage options
### Specifications

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<tr>
<th>CATALOG NUMBER</th>
<th>EXCHANGE CAPACITY (Grains)</th>
<th>SALT USAGE (Pounds)</th>
<th>FLOW RATES</th>
<th>PIPE SIZE</th>
<th>RESIN</th>
<th>TANK SIZES</th>
<th>SALT STORAGE</th>
<th>OVERALL DIMENSIONS (INCHES)</th>
<th>SHIPPING WEIGHT (LBS)</th>
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### ‘MGT’ Series Dimensions

**NOTE:**

Installation piping (shown in broken lines) are provided by others.

### Notes

1. Maximum capacity based on 30,000 grains per cubic foot of resin when regenerated with 15 lbs. salt. Minimum capacity based on 20,000 grains per cubic foot of resin when regenerated with 6 lbs. salt.
2. At pressure loss not exceeding 15 psi.
3. At pressure loss not exceeding 25 psi.
4. Dimensions are estimate only. Actual dimensions may vary based on job-site space limits and piping layout. Allow a minimum of 24” above height dimension for resin loading. Use of ASME rated tanks may add up to 12” of tank height.
5. Shipping weights are estimate only. Weights include resin and support gravel, which are added to the tanks after installation.
‘MGT’ Series 2” and 3” Water Softeners

Overview
The Marlo ‘MGT’ 2” and 3” water softener systems are engineered to handle higher flow rates. Whether its mineral scale in boiler feed or supply water for a car wash, the MGT offers a robust and efficient solution for reducing mineral scale, soap usage, and energy consumption in the plumbing and other water using equipment.

The multiple tank design offers a modular platform with several configuration options that brings a customized water treatment plan that fits most demands. The corrosion resistant fiberglass reinforced polyethylene tank design and reliable top mounted valve will provide many years of service.

Standard Features
- Corrosion resistant fiberglass tanks
- Piston actuated, multiport, brass control valves
- Timeclock or meter initiated regeneration cycle
- Brine tank assembly with safety overflow
- Sodium form cation exchange resin
- Water hardness testing kit

Materials of Construction
- Control Valve Body: Low lead brass
  Fleck 2900 - 2” Valve
  Fleck 3900 - 3” Valve
- Resin Tanks: Fiberglass reinforced polyethylene
  NSF 44 certified
- Internal Distributors: Sch 80 PVC/ABS
- Brine Tank: Corrosion resistant polyethylene
- Meter: Brass or glass filled Noryl

Instrumentation / Controls
- Timeclock - electromechanical control
- Metered - XT, NXT and NXT14 - electronic control
  LED status lights
  On board diagnostics and error reporting
  Flow totalizer

Operating Parameters
- Inlet Pressure: 30-100 psig
- Electrical: 24V circuitry
- 120/24 VAC, 50/60 Hz wall mount transformer
- Temperature: 35-100 °F

Options Available
- Skid mounted, pre-piped, pre-wired systems
- NXT System 14 Progressive Parallel Demand configurations (twin, triple, quad)
- ASME Pressure vessels
- Signet flow sensors
- Stainless steel meters - 2” and 3”
- Inlet/Outlet pressure gauges and sample valves
- Electromechanical metered controls
- Larger brine tanks
- Multiple voltage options
### ‘MGT’ Series 2” and 3” Water Softeners

#### Specifications

<table>
<thead>
<tr>
<th>CATALOG NUMBER</th>
<th>EXCHANGE CAPACITY (Grains)</th>
<th>FLOW RATES</th>
<th>PIPE SIZE</th>
<th>RESIN</th>
<th>TANK SIZES</th>
<th>SALT STORAGE</th>
<th>OVERALL DIMENSIONS (INCHES)</th>
<th>SHIPPING WEIGHT (LBS)</th>
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### ‘MGT’ Series Dimensions

**NOTE:**
Installation piping (shown in broken lines) are provided by others.

### Notes

1. Maximum capacity based on 30,000 grains per cubic foot of resin when regenerated with 15 lbs. salt. Minimum capacity based on 20,000 grains per cubic foot of resin when regenerated with 6 lbs. salt.
2. At pressure loss not exceeding 15 psi.
3. At pressure loss not exceeding 25 psi.
4. Dimensions are estimate only. Actual dimensions may vary based on job-site space limits and piping layout. Allow a minimum of 24" above height dimension for resin loading. Use of ASME rated tanks may add up to 12" of tank height.
5. Shipping weights are estimate only. Weights include resin and support gravel, which are added to the tanks after installation.

---

**01-04**
'MAT' Series Softener Systems

Overview

The Marlo 'MAT' softener is a meter initiated twin-alternating softener that effectively reduces hardwater scale. This results in lower energy costs and longer equipment life.

The twin alternating design provides a continuous supply of softened water for critical applications, such as boiler feed, with a fully recharged tank always in standby.

Standard Features

- Top-mounted, twin-tank control valve with integral brine injector
- High capacity, sodium form cation resin
- Water meter initiated regeneration
- Inlet/Outlet Sizes - 3/4", 1" or 1-1/2"
- NSF certified corrosion resistant pressure vessels
- Brine tank assembly with salt shelf and safety overflow valve
- Hardness test kit

Materials of Construction

- Control Valve Body:
  - Glass-filled Noryl - Fleck 9100, (3/4” and 1”)
  - Bronze - Fleck 9500, (1-1/2”)
- Meter: Brass or glass filled Noryl
- Resin Tanks: FRP
- Internal Distributor: PVC/ABS
- Brine Tank: Corrosion resistant polyethylene

Instrumentation / Controls

- Fleck SXT digital display electronic timer
- Meter initiated with override option
- Blue backlit LCD display
- Adjustable cycle times
- Service and diagnostic indicators

Operating Parameters

- Flow Range: 2 gpm - 62 gpm
- Inlet Pressure: 30-125 psig
- Temperature: 40-100°F
- Electrical: 120VAC, 1-Ph, 60 Hz

Options Available

- Skid mounted, pre-piped, pre-loaded system
- Electromechanical controller
- XT electronic controller with resettable totalizer
- 220 VAC/50Hz electrical power
- Application specific resin
- Larger brine bank
### 'MAT' Series Softener Systems

#### Specifications

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<th>EXCHANGE CAPACITY (Grains)</th>
<th>FLOW RATES</th>
<th>PIPE SIZE</th>
<th>RESIN PER TANK</th>
<th>TANK SIZES</th>
<th>SALT STORAGE</th>
<th># OF REGENS</th>
<th>OVERALL DIMENSIONS</th>
<th>APPROX SHIPPING WEIGHT</th>
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#### 'MAT' Series Dimensions

**NOTE:**
Leave a minimum 24 inch clearance above the height of the unit for loading media. Installation piping (shown in broken lines) are provided by others.

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**Notes**

1. Maximum capacity based on 30,000 grains per cubic foot of resin when regenerated with 15 lbs. salt. Minimum capacity based on 20,000 grains per cubic foot of resin when regenerated with 6 lbs. salt.
2. At pressure loss not exceeding 15 psi.
3. At pressure loss not exceeding 25 psi.
4. Dimensions are estimate only.
5. Shipping weights are estimate only. Weights include resin and support gravel.
Overview

The Marlo ‘MGTE’ water softener system offers the commercial or institutional facility a robust and efficient solution for reducing mineral scale, soap usage, and energy consumption in their plumbing and other water-using equipment.

The corrosion resistant fiberglass reinforced polyethylene tank design and reliable top mounted valve will provide many years of service.

Standard Features

- Corrosion resistant fiberglass tanks
- Piston actuated, multiport, plastic or brass control valves
- Timeclock or meter initiated regeneration cycle
- Brine tank assembly with safety overflow
- Sodium form cation exchange resin
- Hardwater bypass during regeneration
- Water hardness testing kit

Materials of Construction

- Control Valve Body:
  - 1” & 1-1/4” Noryl Plastic
  - 1-1/2” & 2” Low Lead Brass
- Resin Tanks: Fiberglass reinforced polyethylene - NSF 44 certified
- Internal Distributors: Sch 80 PVC/ABS
- Brine Tank: Corrosion resistant polyethylene
- Meter (optional): Internal or Stainless Steel

Instrumentation / Controls

- Timeclock
- Metered - LCD Display Screen
  - On board diagnostics and error reporting
  - Flow totalizer (with optional meter)

Operating Parameters

- Inlet Pressure: 25-125 psig
- Electrical: 12V circuitry
- 120/12 V AC, 50/60 Hz wall mount transformer
- Temperature: 40-110 °F

Options Available

- Skid mounted, pre-piped, pre-wired systems
- Multi-tank system configurations (twin alternating)
- ASME pressure vessels (18” diameter and larger)
- Bypass valve for use on 1” & 1-1/4” Systems
- Stainless steel meters - 1-1/2”, 2”
- Inlet/Outlet pressure gauges and sample valves
- Larger brine tanks
- Multiple voltage options
## ‘MGTE’ Series Water Softeners

### Specifications

<table>
<thead>
<tr>
<th>MODEL</th>
<th>EXCHANGE CAPACITY (Grains)</th>
<th>SALT USAGE (Pounds)</th>
<th>FLOW RATES</th>
<th>PIPE SIZE</th>
<th>TANK SIZES</th>
<th>SALT STORAGE</th>
<th>OVERALL DIMENSIONS (INCHES)</th>
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### Notes

1. Maximum capacity based on 30,000 grains per cubic foot of resin when regenerated with 15 lbs. salt. Minimum capacity based on 20,000 grains per cubic foot of resin when regenerated with 6 lbs. salt.
2. At pressure loss not exceeding 15 psi.
3. At pressure loss not exceeding 25 psi.
4. Dimensions are estimate only. Actual dimensions may vary based on job-site space limits and piping layout. Allow a minimum of 24” above height dimension for resin loading. Use of ASME rated tanks may add up to 12” of tank height.
5. Shipping weights are estimate only. Weights include resin and support gravel, which are added to the tanks after installation.
‘MGTC’ Series Water Softeners

Overview
The Marlo ‘MGTC’ water softener systems are engineered for higher flow rates and ease of use. The removable operator interface makes it easy to view valve diagnostics and make programming adjustments. The quick-connect valve mount, along with the 2” valve's built in meter, make installation and service quick and easy. The corrosion resistant fiberglass reinforced polyethylene tanks are designed to provide many years of reliable service.

The multiple tank configurations and available options make the MGTC a robust solution for boiler pretreatment, car washes or any application requiring mineral scale reduction.

Standard Features
- Corrosion resistant fiberglass tanks
- Piston actuated, multiport, lead free brass control valves
- Meter initiated regeneration cycle
- Brine tank assembly with safety overflow
- Sodium form cation exchange resin
- Hardwater bypass during regeneration
- Water hardness testing kit

Materials of Construction
- Control Valve Body: Epoxy coated lead free brass
  - Clack WS2H - 2” Valve
  - Clack WS3 - 3” Valve
- Resin Tanks: Fiberglass reinforced polyethylene - NSF 44 certified
- Internal Distributors: Sch 80 PVC/ABS
- Brine Tank: Corrosion resistant polyethylene

Instrumentation & Controls
- Easy access front removable operator interface
- LCD Display Screen
- On board diagnostics and error reporting
- Meter: 2” internal meter or 3” Signet paddle-type
- Flow Totalizer

Operating Parameters
- Inlet Pressure: 20 – 125 psig
- Electrical: 20V Circuitry
- 120/20 VAC, 50/60 Hz wall mount transformer
- Temperature: 40 – 100 °F

Options Available
- Skid mounted, pre-piped, pre-wired systems
- Available Flow Configurations:
  - Single Tank
  - Twin Alternating
  - Multi-tank Progressive
- ASME pressure vessels
- Stainless steel meters
- Inlet/Outlet pressure gauges and sample valves
- Larger brine tanks
- Multiple voltage options
- Side Mount Control Valve
‘MGTC’ Series Water Softeners

Specifications

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<thead>
<tr>
<th>MODEL</th>
<th>EXCHANGE CAPACITY (Grains)</th>
<th>SALT USAGE (Pounds)</th>
<th>FLOW RATES</th>
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Notes

1. Maximum capacity based on 30,000 grains per cubic foot of resin when regenerated with 15 lbs. salt. Minimum capacity based on 20,000 grains per cubic foot of resin when regenerated with 6 lbs. salt.
2. At pressure loss not exceeding 15 psi.
3. At pressure loss not exceeding 25 psi.
4. Dimensions are estimate only. Actual dimensions may vary based on job-site space limits and piping layout. Allow a minimum of 24” above height dimension for resin loading. Use of ASME rated tanks may add up to 12” of tank height.
5. Shipping weights are estimate only. Weights include resin and support gravel, which are added to the tanks after installation.
‘MATC’ Series Water Softeners

Standard Features
- Top mounted, twin tank control valve
- NSF certified corrosion resistant fiberglass tanks
- Piston actuated, multiport, plastic or brass control valves
- Water meter initiated regeneration cycle
- Brine tank assembly with safety overflow
- High capacity sodium form cation exchange resin
- Water hardness testing kit

Materials of Construction
- Control Valve Body: 1” Noryl Plastic
- Resin Tanks: Fiberglass reinforced polyethylene - NSF 44 certified
- Internal Distributors: Sch 80 PVC/ABS
- Brine Tank: Corrosion resistant polyethylene
- Meter: Internal

Instrumentation / Controls
- Metered - LCD Display Screen
  - On board diagnostics and error reporting
  - Flow totalizer

Operating Parameters
- Inlet Pressure: 25-125 psig
- Electrical: 12V circuitry
- 120/12 VAC, 50/60 Hz wall mount transformer
- Temperature: 40-110 °F

Options Available
- Skid mounted, pre-piped, pre-loaded systems
- Bypass valve
- Inlet/Outlet pressure gauges and sample valves
- Larger brine tanks
- Multiple voltage options
- Application specific resin

Overview
The Marlo ‘MATC’ water softener system is a meter initiated twin-alternating softener that offers the commercial or institutional facility a robust and efficient solution for reducing mineral scale, soap usage, and energy consumption in their plumbing and other water-using equipment.

The twin-alternating design provides a continuous supply of softened water for critical applications, such as boiler feed, with a fully recharged tank always in standby.
### ‘MATC’ Series Water Softeners

**Specifications**

<table>
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<tr>
<th>MODEL</th>
<th>EXCHANGE CAPACITY (Grains)</th>
<th>SALT USAGE (Pounds)</th>
<th>FLOW RATES</th>
<th>PIPE SIZE</th>
<th>RESIN</th>
<th>TANK SIZES</th>
<th>OVERALL DIMENSIONS (INCHES)</th>
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### ‘MATC’ Series Dimensions

**Top View**

**Front View**

### Notes

1. Maximum capacity based on 30,000 grains per cubic foot of resin when regenerated with 15 lbs. salt. Minimum capacity based on 20,000 grains per cubic foot of resin when regenerated with 6 lbs. salt.
2. At pressure loss not exceeding 15 psi.
3. At pressure loss not exceeding 25 psi.
4. Dimensions are estimate only. Actual dimensions may vary based on job-site space limits and piping layout. Allow a minimum of 24” above height dimension for resin loading.
5. Shipping weights are estimate only. Weights include resin and support gravel, which are added to the tanks after installation.
'MR' Series Water Softener Systems

Overview
The Marlo 'MR' Series water softener system offers the commercial or institutional facility a robust and efficient solution for reducing mineral scale, soap usage, and energy consumption in their plumbing and other water-using equipment.

The standard, all-steel exterior design will be reliable for many years of service. A modular platform allows for single, twin, or triplex tank designs to be easily configured to meet the exact flow requirements matched with the incoming water quality. Numerous custom engineered options are available to meet most specifications.

Standard Features
- Carbon steel resin tanks with epoxy-lined interior
- Water activated diaphragm style control valves
- Volume and/or time initiated regeneration cycle
- Polyethylene brine tank assembly with injector
- Sodium form cation exchange resin
- Inlet/Outlet tank sampling valves
- Water hardness testing kit
- Factory Hydro-tested at 100 psig

Materials of Construction
- Resin Tanks: Carbon steel with Safety Blue exterior paint
- Tank Lining: NSF 61 rated epoxy coating
- Exterior Piping: Galvanized steel pipe & cast iron fittings
- Internal Distributors: Sch 80 PVC/ABS
- Control Valves: Painted cast iron body

Instrumentation / Controls
- Marlo MX-II electronic system controller
- Time or metered control with bypass for single tank
- Alternating or parallel progressive metered control for twin and triple tank units
- NEMA-4X electrical enclosures
- Signet paddle-type flow sensors
- Inlet/Outlet pressure gauges

Operating Parameters
- Inlet Pressure: 30-100 psig
- Electrical: 120 VAC, 1-Ph, 60Hz
- Temperature: 35-110 °F

Options Available
- Skid mounted, pre-piped, pre-wired systems
- ASME code stamped resin tanks
- Allen-Bradley PLC systems
- Alternate water meter types
- Brine pump systems
- PVC or CPVC exterior piping
- Copper or Stainless steel exterior piping
- Stainless steel internal distributor piping
- Butterfly control valves (air operated)
- 'SRS' Salt Recycling Systems
- Online hardness monitor
## 'MR' Series Water Softener Systems

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<td>18,000 x 41 x 67</td>
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</table>

**Notes**

1. **Maximum capacity based on 30,000 grains per cubic foot of resin when regenerated with 15 lbs. salt. Minimum capacity based on 20,000 grains per cubic foot of resin when regenerated with 6 lbs. salt.**
2. **At pressure loss not exceeding 15 psi.**
3. **At pressure loss not exceeding 25 psi.**
4. **Dimensions are estimate only. Actual dimensions may vary based on job-site space limits and piping layout. Allow a minimum of 24” above height dimension for resin loading. Use of ASME rated tanks may add up to 12” of tank height.**
5. **Shipping weights are estimate only. Weights include resin and support gravel, which are added to the tanks after installation.**

**Specifications**

- **EXCHANGE CAPACITY**
- **SALT USAGE**
- **FLOW RATES**
- **TANK SIZES**
- **REGENERATION**
- **OVERALL DIMENSIONS**
- **SHIPPING WEIGHT**

**Notes**

- Maximum capacity based on 30,000 grains per cubic foot of resin when regenerated with 15 lbs. salt. Minimum capacity based on 20,000 grains per cubic foot of resin when regenerated with 6 lbs. salt.
- At pressure loss not exceeding 15 psi.
- At pressure loss not exceeding 25 psi.
- Dimensions are estimate only. Actual dimensions may vary based on job-site space limits and piping layout. Allow a minimum of 24” above height dimension for resin loading. Use of ASME rated tanks may add up to 12” of tank height.
- Shipping weights are estimate only. Weights include resin and support gravel, which are added to the tanks after installation.
'MRG' Series Water Softener Systems

Overview
The Marlo ‘MRG’ Series water softener system offers a corrosion resistant alternative for commercial & industrial applications. Equipped with FRP resin tanks and external control valve manifold, it achieves higher service flow rates than traditional top-mount, multi-port valve configurations. All systems are completely factory skid mounted, pre-piped, pre-wired, and pre-tested for minimal installation time and cost. Standard designs available for twin and triple tank configurations.

Standard Features
- Composite FRP resin tank with tri-pod base
- Aquamatic diaphragm style control valves
- Volume and/or time initiated regeneration cycle
- Polyethylene brine tank assembly
- Air or water actuated control valves
- High capacity, cation exchange resin
- Tank isolation valves & system bypass valve
- Inlet/Outlet tank sampling valves
- Factory Hydro-tested at 100 psig

Materials of Construction
- Resin Tanks: FRP
- Exterior Piping: Sch 80 PVC
- Internal Distributors: Sch 80 PVC / ABS
- Control Valves: Noryl Thermoplastic
- Skid: Painted, Carbon Steel

Instrumentation / Controls
- Marlo MX-III electronic system controller
- Alternating or parallel progressive flow control
- NEMA-4X electrical enclosures
- Signet paddle-type flow sensors
- Inlet/Outlet tank pressure gauges

Operating Parameters
- Inlet Pressure: 30-100 psig
- Electrical: 120VAC, 1-Ph, 60 Hz.
- Temperature: 35-110°F

Options Available
- ASME rated resin tanks
- Allen-Bradley PLC systems
- Bulk Brinemaker Silos
- Brine pump skids
- CPVC exterior piping
- Butterfly control valves (air-operated)
- Alternate ion exchange resins
- Online hardness monitor
- Polyurethane skid painting
- 'SRS' Salt Recycling Systems
### 'MRG' Series Water Softener Systems

#### Specifications

<table>
<thead>
<tr>
<th>MODEL NUMBER</th>
<th>CAPACITY (Grains)</th>
<th>SALT DOSAGE (LBS.)</th>
<th>FLOW RATES (PER TANK)</th>
<th>PIPE SIZE</th>
<th>RESIN</th>
<th>TANK SIZES</th>
<th>HEADER SIZES</th>
<th>OVERALL DIMENSIONS (LxWxH, INCHES)</th>
<th>SHIPPING WEIGHT (LBS.)</th>
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#### Notes

1. Salt dosage equal to 15 lbs. per cu. ft. resin for maximum exchange capacity.
2. At a pressure drop not exceeding 15 psig.
3. At a pressure drop not exceeding 25 psig.
4. Brine tanks designed for a salt storage of at least 4 regeneration cycles.
5. Main service headers indicated for parallel flow applications. Headers sizes for twin alternating systems are equal to the tank service pipe size.
6. Dimensions are estimate only. Actual dimensions may differ dependent on options selected.
7. Shipping weights are estimate only. Weights include resin and gravel.
Overview

The Marlo ‘MHC’ Series water softener system is designed to effectively meet the rigorous demands of institutional and industrial facilities where high flow rates and hardness capacities are required.

The standard, all-steel exterior design will be reliable for many years of service. A modular platform allows for single, twin, or triplex tank designs to be easily configured to meet the exact flow requirements matched with the incoming water quality. Numerous custom engineered options are available to meet most specifications.

Standard Features

- Carbon steel resin tanks with epoxy-lined interior
- Water activated diaphragm style control valves
- Volume and/or time initiated regeneration cycle
- Polyethylene brine tank assembly with injector
- Sodium form cation exchange resin
- Inlet/Outlet tank sampling valves
- Water hardness testing kit
- Factory Hydro-tested at 100 psig

Materials of Construction

- Resin Tanks: Carbon steel with Safety Blue exterior paint
- Tank Lining: NSF 61 rated epoxy coating
- Exterior Piping: Galvanized steel pipe & cast iron fittings
- Internal Distributors: Sch 80 PVC/ABS
- Control Valves: Painted cast iron body

Instrumentation / Controls

- Marlo MX-II electronic system controller
- Time or metered control with bypass for single tank
- Alternating or parallel progressive metered control for twin and triple tank units
- NEMA-4X electrical enclosures
- Signet paddle-type flow sensors
- Inlet/Outlet pressure gauges

Operating Parameters

- Inlet Pressure: 30-100 psig
- Electrical: 120 V AC, 1-Ph, 60Hz
- Temperature: 35-110 °F

Options Available

- Skid mounted, pre-piped, pre-wired systems
- ASME code stamped resin tanks
- Allen-Bradley PLC systems
- Alternate water meter types
- Brine silo and/or brine pump systems
- PVC or CPVC exterior piping
- Copper or Stainless steel exterior piping
- Stainless steel internal distributor piping
- Seismic zone rated systems
- Butterfly control valves (air operated)
- ‘SRS’ Salt Recycling Systems
- Online hardness monitor
'MHC' Series Water Softener Systems

Specifications

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Exchange Capacity (Grains)</th>
<th>Flow Rates GPM</th>
<th>Pipe Size</th>
<th>Resin Tank Sizes</th>
<th>Salt Storage</th>
<th>Regen Per Salt Refill</th>
<th>Overall Dimensions (Inches)</th>
<th>Shipping Weight (LBS)</th>
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<tbody>
<tr>
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Notes

1. Maximum capacity based on 30,000 grains per cubic foot of resin when regenerated with 15 lbs. salt. Minimum capacity based on 20,000 grains per cubic foot of resin when regenerated with 6 lbs. salt.
2. At pressure loss not exceeding 15 psi.
3. At pressure loss not exceeding 25 psi.
4. Dimensions are estimate only. Actual dimensions may vary based on job-site space limits and piping layout. Allow a minimum of 24" above height dimension for resin loading. Use of ASME rated tanks may add up to 12" of tank height. Consult factory for dimensions on skid mounted systems.
5. Shipping weights are estimate only. Weights include resin and support gravel, which are added to the tanks after installation.
## Commercial & Industrial Water Softeners

**Comparison Guide**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>MAT</th>
<th>MGT</th>
<th>MGTE</th>
<th>MRG</th>
<th>MR</th>
<th>MHC</th>
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<td>10–45 GPM</td>
<td>7–205 GPM</td>
<td>15–95 GPM</td>
<td>80–235 GPM</td>
<td>50–190 GPM</td>
<td>215–1,150 GPM</td>
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<td><strong>Capacity (per tank)</strong></td>
<td>Up to 450,000 Grain</td>
<td>Up to 1,200,000 Grain</td>
<td>Up to 1,500,000 Grain</td>
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<td>2”–3”</td>
<td>1.5”–3”</td>
<td>3”–8”</td>
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<td>Fleck Top Mount</td>
<td>Clack Top Mount</td>
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<td>Plastic: 1”–1.25”</td>
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<td>Fiberglass</td>
<td>Fiberglass</td>
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<td>Clack ‘MA’</td>
<td>Marlo MX-III</td>
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<td>Duplex Alternating Tank Design</td>
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<td>ASME Option: FRP Tank (18” Diameter or Higher)</td>
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<td>Programmable Logic Controller (PLC) Option</td>
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<td>Remote Monitoring to BMS Option</td>
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<td>Butterfly Valve Option (Standard for 6” &amp; 8”)</td>
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<td>Stainless Steel or Copper Piping Option</td>
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</table>
Section 02. Commercial & Industrial Media Filters

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'MFG' Series Media Filter Systems

Overview
The Marlo ‘MFG’ Series automatic backwashing media filter system is designed to provide the highest quality in water filtration equipment while covering a wide variety of commercial applications including turbidity reduction, iron removal, and chlorine removal. A broad range of filter media and component options are offered to fit your exact specifications.

‘MID’ Multi-Media Filters
High efficiency, in-depth filter system using a layered media bed of anthracite, silica sand, and two grades of garnet for excellent filtration down to the order of 5 - 10 micron.

‘MZA’ Natural Zeolite Filters
An alternative, single media approach to traditional multi-media filters that achieves a finer filtration to 3-5 micron with longer service run times.

‘MGA’ Iron Removal Filters
Filter system capable of reducing iron, manganese, and hydrogen sulfide using manganese greensand filter media.

‘ACA’ Carbon Filters
Granular Activated Carbon (GAC) is designed for the reduction of chlorine, taste, odor, and dissolved organic material from municipal and industrial water supplies.

Standard Equipment & Features
- Control Valve:
  Top Mount, Multi-port Type, Low Lead Brass
  Fleck 2750 - 1” Valve
  Fleck 2850 - 1-1/2” Valve
  Fleck 3150 - 2” Valve
  Fleck 3900 - 3” Valve
- Resin Tanks: Fiberglass reinforced polyethylene - (FRP) NSF 44 certified
- Internal Distributors: Sch 80 PVC/ABS
- 12-Day Timeclock Initiated Backwash Cycle (Electro-mechanical)
- Automatic Backwash Flow Controller

Operating Parameters
- Inlet Pressure: 30-100 psig
- Electrical: 120VAC, 1-Phase, 60 Hz
- 120/24 VAC, 50/60 Hz wall mount transformer (Digital Control Valves Only)
- Temperature: 35-100 °F

Options Available
- Skid mounted, pre-piped, pre-wired systems
- Multi-tank system configurations (twin, triple, quad)
- Fleck XT/NXT Digital Control Timers
- ASME Stamped Pressure vessels (18” dia. & higher)
- Inlet/Outlet pressure gauges and sample valves
- Differential pressure switch backwash cycle
- Separate Source Backwash Cycle
- Recirculation Pumps (Cooling Towers)
- Backwash Water Supply Pumps
- Alternate filter media (Birm, Filter-AG, Calcite)
- RO Lockout Switch
- Greensand Intermittent Regenerant Tank Systems
- Greensand Continuous Regeneration Systems
### 'MFG' Series Media Filter Systems Specifications

#### MZA - Natural Zeolite Filter Specifications (Turbidity Reduction)

<table>
<thead>
<tr>
<th>CATALOG NUMBER</th>
<th>SERVICE FLOW RATES</th>
<th>PIPE SIZE</th>
<th>MEDIA</th>
<th>TANK SIZE</th>
<th>OVERALL DIMENSIONS (INCHES)</th>
<th>SHIPPING WEIGHT (LBS)</th>
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#### MID - Multimedia Filter Specifications (Turbidity Reduction)

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#### MGA - Manganese Greensand Filter Specifications (Iron Removal)

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### Notes

1. **Pressure Loss**: At expected pressure loss not exceeding 5 psig, based on a clean filter bed.
2. **Dimensions**: Dimensions are estimate only. Actual dimensions may vary based on job-site space limits and piping layout. Allow a minimum of 24" above height dimension for media loading. Consult factory for dimensions on skid mounted systems.
3. **Shipping Weights**: Shipping weights are estimate only. Weights include media and support gravel, which are added to the tanks after installation. Double weight for twin tank systems.

### Installation Piping

Installation piping (shown in black lines) are provided by others.

---

**Dimensions**

- **Single**: Installation piping (shown in black lines) are provided by others.
- **Twin**: Installation piping (shown in black lines) are provided by others.

---

* Sizing assumes inlet water supply of less than 2 ppm iron with continuous or intermittent regeneration with potassium permanganate \((KMnO_4)\).
'MFGE' Series Media Filter Systems

Materials of Construction

- Control Valve Body:
  - 1” Valve & 1-1/4” Valve - Noryl
  - 1-1/2” Valve & 2” Valve - Low Lead Brass
- Resin Tanks: Fiberglass reinforced polyethylene - (FRP) NSF 44 certified
- Internal Distributors: Sch 80 PVC/ABS

Instrumentation & Controls

- Clack Digital Control Timers
- Timeclock Initiated Backwash Cycle
- Automatic Backwash Flow Controller

Operating Parameters

- Inlet Pressure: 25-125 psig
- Electrical: 12V circuitry
- 120/12 VAC, 50/60 Hz wall mount transformer
- Temperature: 40-110 °F

Options Available

- Skid mounted, pre-piped, pre-wired systems
- ASME Stamped Pressure vessels (18” dia. & larger)
- Inlet/Outlet pressure gauges and sample valves
- Differential pressure switch backwash cycle
- Recirculation Pumps (Cooling Towers)
- Backwash Water Supply Pumps
- Alternate filter media (Birm, Filter-AG, Calcite)
- RO Lockout Switch

Overview

The Marlo ‘MFGE’ Series automatic backwashing media filter system is designed to provide the highest quality in water filtration equipment while covering a wide variety of commercial applications including turbidity reduction, iron removal, and chlorine removal. A broad range of filter media and component options are offered to fit your exact specifications.

‘MZE’ Natural Zeolite Filters

An alternative, single media approach to traditional multi-media filters that achieves a finer filtration to 3-5 micron with longer service run times.

‘ACE’ Carbon Filters

Granular Activated Carbon (GAC) is designed for the reduction of chlorine, taste, odor, and dissolved organic material from municipal and industrial water supplies.
'MFGES' Series Media Filter Systems

Specifications

MZE - Natural Zeolite Filter Specifications (Turbidity Reduction)

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'MFGES' Series - Dimensions

NOTE: Installation piping (shown in broken lines) are provided by others.

Notes

1. At expected pressure loss not exceeding 5 psig, based on a clean filter bed
2. Dimensions are estimate only. Actual dimensions may vary based on job-site space limits and piping layout. Allow a minimum of 24" above height dimension for media loading. Consult factory for dimensions on skid mounted systems.
3. Shipping weights are estimate only. Weights include media and support gravel, which are added to the tanks after installation. Double weight for twin tank systems.
'MFG-SM' Series Water Filter Systems

Overview

The Marlo 'MFG-SM' Series is the corrosion resistant alternative to the 'MFS' Series of media based water filters. These filter systems are equipped with FRP resin tanks and side-mounted Sch 80 PVC exterior piping and valves. All 'MFG-SM' systems are factory skid mounted, pre-piped, pre-wired for ease of installation. Pre-engineered standard designs available for twin and triple tank configurations for the following filtration technologies:

'MZA' Natural Zeolite Filters

An alternative, single media approach to traditional multi-media filters that achieves a finer filtration to 3-5 micron with longer service run times.

'ACA' Carbon Filters

Granular Activated Carbon (GAC) is designed for the reduction of chlorine, taste, odor, and dissolved organic material from municipal and industrial water supplies.

Materials of Construction

- Resin Tanks: Composite FRP with Tri-Pod Base
- Exterior Piping: Sch 80 PVC
- Internal Distributors: Sch 80 PVC / ABS
- Control Valves: Noryl Thermoplastic
- Skid: Painted, Carbon Steel

Standard Equipment / Features

- Marlo MX-III Electronic System Controller
- Motorized Stagers for Automatic Operation
- Timer Initiated Backwash Cycle
- Aquamatic Diaphragm Style Control Valves (Hydraulically Operated)
- NEMA-4X Electrical Enclosures (FRP)
- Inlet/Outlet Tank Pressure Gauges & Sample Valves

Operating Parameters

- Inlet Water Pressure: 30-100 psig
- Electrical: 120VAC, 1-Ph, 60 Hz.
- Temperature: 35-110°F

Options Available

- ASME Rated Media Tanks
- Allen-Bradley PLC/HMI Systems
- Differential Pressure Initiated Backwash Cycle
- Separate Source Backwash Water Supply
- CPVC Exterior Piping
- Butterfly or Ball Control Valves (Air or Electric Operated)
- Multi-Media Layers (Anthracite, Sand, Garnet)
- Greensand Filter Media for Iron Removal
- Catalytic Carbon Media for Chloramine Removal
## 'MFG-SM' Series Specifications

### Natural Zeolite Filters

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<th>SKID HEADER SIZES</th>
<th>OVERALL DIMENSIONS (LxWxH, INCHES)</th>
<th>SHIPPING WEIGHT (LBS.)</th>
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### Activated Carbon Filters

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<th>FILTER MEDIA</th>
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<td>160-250</td>
<td>240-375</td>
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### Notes

1. Continuous Service Flow is based on 10 gpm/ft$^2$ surface loading for Zeolite Filters. Expected pressure drop less than 5 psig (clean bed).
2. Continuous Service Flow is based on 2 gpm/ft$^3$ volumetric loading for Carbon Filters. Expected pressure drop less than 5 psig (clean bed).
3. Peak Service Flow is recommended for intermittent usage only.
4. Main service headers indicated for parallel flow applications. Header sizes may change depending on options selected.
5. Dimensions are estimate only. Actual dimensions may differ dependent on options selected.
6. Shipping weights are estimate only. Weights include media and gravel that is shipped separately on pallets.
Overview

The Marlo ‘MFS’ Series automatic backwashing media filter system is designed to provide the highest quality in water filtration equipment while covering a wide variety of commercial and industrial applications including turbidity reduction, iron removal, and chlorine removal. A broad range of filter media and component options are offered to fit your exact specifications.

‘MID’ Multi-Media Filters
High efficiency, in-depth filter system using a layered media bed of anthracite, silica sand, and two grades of garnet for excellent filtration down to the order of 5 - 10 micron.

‘MZA’ Natural Zeolite Filters
An alternative, single media approach to traditional multi-media filters that achieves a finer filtration to 3-5 micron with longer service run times.

‘MGA’ Iron Removal Filters
Filter system capable of reducing iron, manganese, and hydrogen sulfide using manganese greensand filter media.

‘ACA’ Carbon Filters
Granular Activated Carbon (GAC) is designed for the reduction of chlorine, taste, odor, and dissolved organic material from municipal and industrial water supplies.

Materials of Construction
- Media Tanks: Carbon steel with Safety Blue exterior paint
- Tank Lining: NSF 61 rated epoxy coating
- Exterior Piping: Galvanized steel pipe & cast iron fittings
- Internal Distributors: Sch 80 PVC/ABS
- Control Valves: Painted cast iron body

Standard Equipment / Features
- Marlo MX-II electronic system controller
- Timer initiated backwash cycle
- Water activated diaphragm style control valves
- NEMA-4X electrical enclosures (FRP)
- Inlet/Outlet pressure gauges and sampling valves
- Factory Hydro-tested at 100 psig

Operating Parameters
- Inlet Pressure: 30-100 psig
- Electrical: 120 V AC, 1-Ph, 60Hz
- Temperature: 35-110 °F

Options Available
- Skid mounted, pre-piped, pre-wired systems
- Differential pressure switch backwash cycle
- Multiple tank parallel configurations
- ASME code stamped resin tanks
- Allen-Bradley PLC systems
- PVC or CPVC exterior face-piping
(PVC standard for filters with 6” service)
- Copper or Stainless steel exterior face-piping
- Stainless steel internal distributor piping
- Seismic zone rated systems
- Butterfly control valves
(air operated; standard for filters with 6” service)
- Air-scour backwash system
- Steam / hot water sanitizable carbon filters
- Alternate filter media (Birm, Filter-AG, Calcite)
## 'MFS' Series Media Filter Systems

### Specifications

#### MZA - Natural Zeolite Filter Specifications

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Flow Rates</th>
<th>Pipe Size</th>
<th>Media</th>
<th>Tank Size</th>
<th>Overall Dimensions (Inches)</th>
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### Notes

1. At expected pressure loss not exceeding 5 psig, based on a clean filter bed.
2. Dimensions are estimate only. Actual dimensions may vary based on job-site space limits and piping layout. Allow a minimum of 24” above height dimension for resin loading. Use of ASME rated tanks may add up to 12” of tank height. Consult factory for dimensions on skid mounted systems.
3. Shipping weights are estimate only. Weights include resin and support gravel, which are added to the tanks after installation.
## 02. Commercial & Industrial Media Filters

### Comparison Guide

<table>
<thead>
<tr>
<th>MODEL</th>
<th>MFG</th>
<th>MFGE</th>
<th>MFG-SM</th>
<th>MFS</th>
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<td>10–125 GPM</td>
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<td>Activated Carbon Flow per tank</td>
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<td>Clack Top Mount</td>
<td>Aquamatic Side Mount Diaphragm</td>
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<td>Brass</td>
<td>Plastic: 1”–1.25” / Brass: 1.5”–2”</td>
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<td>Cast Iron</td>
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<td>Clack ‘MA’</td>
<td>Marlo MX-III</td>
<td>Marlo MX-III</td>
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</table>

### Features / Options

- **Timeclock Initiated Backwash**: ✔️
- **Diff. Pressure Initiated Backwash**: ✔️
- **ASME Option: Steel Tank**: ✔️
- **ASME Option: FRP Tank (18” Diameter or Higher)**: ✔️
- **Single Tank Design**: ✔️
- **Multi-Tank Parallel Design**: ✔️
- **Separate Source Backwash Option**: ✔️
- **Programmable Logic Controller (PLC) Option**: ✔️
- **Remote Monitoring to BMS Option**: ✔️
- **Butterfly Valve Option**: ✔️
- **Stainless Steel or Copper Piping Option**: ✔️
- **Skid Mounted / Pre-Piped Option (Standard for MFG-SM Units)**: ✔️

**NOTE**: Alternate filter medias are available (Birm, Calcite, etc.). Consult factory.
Section 03. Commercial & Industrial Reverse Osmosis Systems

MRO-2.5 ........................................................................................................................03-02
MRO-4LP .......................................................................................................................03-04
MRO-4 ............................................................................................................................03-06
MRO-8 ............................................................................................................................03-08
RO Comparison Guide ............................................................................................03-10
‘MRO-2.5’ Light Commercial Reverse Osmosis Systems

Operating Parameters
- 500 to 2500 GPD Output Capacity
- Operating Pressure: 125-150 psig
- Maximum Recovery: 50%
- Nominal Salt Rejection: 97–99%
- Operating Temperature: 40–85° F (Design: 77° F)
- Minimum Inlet Pressure: 30 psig
- Electrical Requirement: 120 V AC, 1-phase, 60 Hz.
- Inlet Water Quality: Chlorine-Free/Softened 2,000 ppm TDS Max

Materials of Construction
- Powder-coated steel frame
- Membrane Elements: Low Energy, Thin-film Composite (TFC)
- Membrane Housings: FRP
- Piping: Sch 80 PVC
- Tubing: Polyethylene

Pump and Motor
- Pump: Rotary Vane, Stainless Steel Construction
- Motor: ODP, 120 VAC, 1-phase, 60 Hz.

Standard Features
- 5-micron sediment pre-filter housing
- Activated carbon block pre-filter housing
- Automatic inlet shut-off valve
- Remote machine on/off capability
- Product water conductivity monitor
- Operating pressure gauges
- Reject and recycle flow control valves
- Permeate, reject, and recycle flow meters
- Low inlet pressure switch
- High outlet pressure switch

Optional Equipment Available
- Pressurized storage vessels
- Atmospheric storage tanks with level control and repressurization pump
- Skid mounted packages with pre/post treatment equipment

Overview
Marlo’s MRO-2.5 light commercial grade reverse osmosis units combine high quality components with an energy-saving design for a reliable and economical supply of high purity water. The following are just a few of the applications that benefit from the use of RO water.

- Boiler feed
- Spot-free rinse
- Icemaking
- Greenhouses
- Research and medical labs
- Process make-up water
- Humidification
- Ion exchange pre-treatment
## ‘MRO-2.5’ Light Commercial Reverse Osmosis Systems

### SPECIFICATIONS

<table>
<thead>
<tr>
<th>MODEL NUMBER</th>
<th>RATE (GPM)</th>
<th>CAPACITY (GPD)</th>
<th>ELEMENT QUANTITY &amp; SIZE (INCHES)</th>
<th>RO FEED GPM</th>
<th>RO REJECT GPM</th>
<th>SYSTEM PIPING CONNECTIONS (INCHES)</th>
<th>PUMP HP</th>
<th>APPROX. SHIP WT. (LBS.)</th>
<th>OVERALL DIMENSIONS (LxWxH) (INCHES)</th>
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<td>2</td>
<td>2.08</td>
<td>1.04</td>
<td>1&quot; NPT 3/8&quot; Tube 3/8&quot; Tube</td>
<td>3/4</td>
<td>105</td>
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<tr>
<td>MRO-2500</td>
<td>1.75</td>
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<td>3</td>
<td>3.5</td>
<td>1.75</td>
<td>1&quot; NPT 3/8&quot; Tube 3/8&quot; Tube</td>
<td>3/4</td>
<td>115</td>
<td>22x22x56</td>
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</tbody>
</table>

### Front View

### Rear View

### Side View

**Notes**

1. System capacity rated at 77°F water temperature and less than 2,000 ppm TDS incoming water quality. Capacity will be lowered with colder water and/or higher TDS.

2. Reject flow is constant during machine operation. Installer to confirm proper floor drain capacity.

3. The installation should allow for additional overhead clearance space for membrane removal (21" for the 500 & 1000 GPD models and 40" for the 1500 & 2500 GPD models).

4. Electrical is 120 VAC, 1-ph, 60 Hz from a standard wall plug. Consult factory for other electrical requirements.
‘MRO-4-LP’ Low Pressure Reverse Osmosis Systems

Operating Parameters
- Operating Pressure: 125-150 psig
- Nominal Recovery: 65–75%
- Nominal Salt Rejection: 95–99%
- Operating Temperature: 35–85° F
- Design Temperature: 77° F
- Minimum Inlet Pressure: 30 psig
- Inlet Water Quality: Chlorine-Free/Softened
- Electrical Requirements: 220 V AC, 1-phase, 60 Hz.

Materials of Construction
- Frame: Painted carbon steel
- Membrane Elements: Thin-film Composite (TFC)
- Membrane Housings: FRP
- Piping: Sch 80 PVC
- Tubing: Polyethylene

Pump and Motor
- Pump: 304SS Multi-Stage Centrifugal
- Motor: ODP, 220 V AC, 1-phase, 60 Hz.

Standard Features
- 5-micron sediment pre-filter housing
- Automatic inlet shut-off valve
- Solid-state digital controller
- Product water conductivity monitor
- Operating pressure gauges
- Product and concentrate flow meters
- Concentrate and recycle flow control valves
- Low inlet pressure switch with shutdown alarm

Optional Equipment Available
- Pressurized storage vessels
- Atmospheric storage tanks with level control and repressurization pump
- Water softeners and carbon filter pretreatment
- Skid mounted packages with pre/post treatment equipment

Overview
Marlo’s MRO-4-LP low pressure commercial grade reverse osmosis units combine high quality components with an energy-saving design for a reliable and economical supply of high purity water. The following are just a few of the applications that benefit from the use of RO water.

- Boiler feed
- Spot-free rinse
- Icemaking
- Greenhouses
- Research and medical labs
- Process make-up water
- Humidification
- Ion exchange pre-treatment

03-04
‘MRO-4-LP’ Low Pressure Reverse Osmosis Systems

SPECIFICATIONS MRO-3600-4-LP THROUGH MRO-9000-4-LP SERIES

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Design Capacity (gpm)</th>
<th>Capacity (gpd)</th>
<th>Element Quantity</th>
<th>RO Feed (gpm)</th>
<th>RO Reject (gpm)</th>
<th>System Piping Connections</th>
<th>Nominal Operating Pressure</th>
<th>Pump Hp</th>
<th>Approx. Ship Wt.</th>
<th>Approx. Operating Wt.</th>
<th>Length A</th>
<th>Width B</th>
<th>Height C</th>
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<tbody>
<tr>
<td>MRO-3600-4-LP</td>
<td>2.5</td>
<td>3,600</td>
<td>2</td>
<td>3.3–3.8</td>
<td>0.8–1.3</td>
<td>1/2&quot; FNPT 1/2&quot; Tube</td>
<td>125 psi</td>
<td>1</td>
<td>375 lb.</td>
<td>425 lb.</td>
<td>56&quot;</td>
<td>17&quot;</td>
<td>57&quot;</td>
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<tr>
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<td>5,400</td>
<td>3</td>
<td>5.0–5.8</td>
<td>1.2–2.0</td>
<td>1/2&quot; FNPT 1/2&quot; Tube</td>
<td>125 psi</td>
<td>1</td>
<td>425 lb.</td>
<td>475 lb.</td>
<td>56&quot;</td>
<td>17&quot;</td>
<td>57&quot;</td>
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<tr>
<td>MRO-7200-4-LP</td>
<td>5.0</td>
<td>7,200</td>
<td>4</td>
<td>6.7–7.7</td>
<td>1.7–2.7</td>
<td>1/2&quot; FNPT 1/2&quot; Tube</td>
<td>125 psi</td>
<td>1</td>
<td>475 lb.</td>
<td>525 lb.</td>
<td>56&quot;</td>
<td>17&quot;</td>
<td>57&quot;</td>
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<td>9,000</td>
<td>5</td>
<td>8.4–9.7</td>
<td>2.1–3.4</td>
<td>1/2&quot; FNPT 1/2&quot; Tube</td>
<td>125 psi</td>
<td>1</td>
<td>525 lb.</td>
<td>575 lb.</td>
<td>56&quot;</td>
<td>17&quot;</td>
<td>57&quot;</td>
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SPECIFICATIONS MRO-10800-4-LP THROUGH MRO-16200-4-LP SERIES

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<th>Design Capacity (gpm)</th>
<th>Capacity (gpd)</th>
<th>Element Quantity</th>
<th>RO Feed (gpm)</th>
<th>RO Reject (gpm)</th>
<th>System Piping Connections</th>
<th>Nominal Operating Pressure</th>
<th>Pump Hp</th>
<th>Approx. Ship Wt.</th>
<th>Approx. Operating Wt.</th>
<th>Length A</th>
<th>Width B</th>
<th>Height C</th>
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<td>7.5</td>
<td>10,800</td>
<td>6</td>
<td>10–11.5</td>
<td>2.5–4</td>
<td>1&quot; FNPT 1&quot; FNPT 1&quot; FNPT</td>
<td>125 psi</td>
<td>1.5</td>
<td>575 lb.</td>
<td>650 lb.</td>
<td>56&quot;</td>
<td>18&quot;</td>
<td>66&quot;</td>
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<td>MRO-12600-4-LP</td>
<td>8.8</td>
<td>12,600</td>
<td>7</td>
<td>11.7–13.5</td>
<td>2.9–4.7</td>
<td>1&quot; FNPT 1&quot; FNPT 1&quot; FNPT</td>
<td>125 psi</td>
<td>1.5</td>
<td>625 lb.</td>
<td>700 lb.</td>
<td>56&quot;</td>
<td>18&quot;</td>
<td>66&quot;</td>
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<td>10.0</td>
<td>14,400</td>
<td>8</td>
<td>13.3–15.4</td>
<td>3.3–5.4</td>
<td>1&quot; FNPT 1&quot; FNPT 1&quot; FNPT</td>
<td>125 psi</td>
<td>1.5</td>
<td>675 lb.</td>
<td>750 lb.</td>
<td>56&quot;</td>
<td>18&quot;</td>
<td>66&quot;</td>
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<tr>
<td>MRO-16200-4-LP</td>
<td>11.3</td>
<td>16,200</td>
<td>9</td>
<td>15–17.4</td>
<td>3.7–6.1</td>
<td>1&quot; FNPT 1&quot; FNPT 1&quot; FNPT</td>
<td>125 psi</td>
<td>1.5</td>
<td>725 lb.</td>
<td>800 lb.</td>
<td>56&quot;</td>
<td>18&quot;</td>
<td>66&quot;</td>
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</tbody>
</table>
‘MRO-4V’ & ‘MRO-4H’ Reverse Osmosis Systems

Operating Parameters
- Operating Pressure: 200–250 psig
- Nominal Recovery: 65–75%
- Nominal Salt Rejection: 98–99%
- Operating Temperature: 45–85° F
- Design Temperature: 50° F
- Minimum Inlet Pressure: 30 psig
- Inlet Water Quality: Chlorine-Free/Softened
- Control Circuit: 120 V AC, 1-phase, 60 Hz.

Materials of Construction
- Skid Frame: Epoxy-coated carbon steel
- Membrane Elements: Thin-film Composite (TFC)
- Membrane Housings: FRP
- Low pressure piping: Sch 80 PVC
- High pressure piping: 304SS

Pump and Motor
- Pump: 304SS vertical multi-stage centrifugal
- Motor: TEFC, 460 V AC, 3-phase, 60 Hz.

Standard Features
- 4” x 40” High rejection membrane elements
- 5-micron sediment pre-filter housing
- Automatic inlet shut-off valve
- Solid-state digital controller (NEMA-4X)
- Product water conductivity monitor
- Operating pressure gauges
- Product and concentrate flow meters
- Concentrate and recycle flow control valves
- Low inlet pressure switch with shutdown alarm

Optional Equipment Available
- Atmospheric storage tanks with level control and repressurization pump
- Water softeners and carbon filter pretreatment
- Pressurized storage vessels
- Skid mounted packages with pre/post treatment equipment
- Membrane clean-in-place (CIP) systems
- Pretreatment chemical injection systems

Overview
The Marlo MRO Series Commercial and Industrial Reverse Osmosis Systems are engineered to economically produce high purity water by removal of dissolved minerals, bacteria, particles, and organic impurities. Each MRO machine is constructed using the highest quality components and materials for reliable operation and exceptional performance. Standard machines in the MRO-4 Series are available with product water capacities from 2.5–20 GPM (3,600–28,800 GPD). Contact Marlo for larger flow requirements with the MRO-8 Series equipment.

Marlo Reverse Osmosis Systems provide exceptional performance in a wide variety of applications, including:

- Boiler feed
- Spot-free rinse
- Icemaking
- Greenhouses
- Research and medical labs
- Process make-up water
- Humidification
- Ion exchange pre-treatment
### ‘MRO-4V’ & ‘MRO-4H’ Reverse Osmosis Systems

#### SPECIFICATIONS MRO-18K-4H THROUGH MRO-29K-4H SERIES

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Design (gpm)</th>
<th>Capacity (gpd)</th>
<th>Element Quantity</th>
<th>RO Feed (gpm)</th>
<th>RO Reject (gpm)</th>
<th>Nominal Operating Pressure</th>
<th>Pump Hp</th>
<th>Ship Wt.</th>
<th>Length A</th>
<th>Width B</th>
<th>Height C</th>
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<td>12.5</td>
<td>18,000</td>
<td>12</td>
<td>16.7–19.2</td>
<td>4.2–6.7</td>
<td>280 psi</td>
<td>7.5</td>
<td>1050 lb.</td>
<td>144&quot;</td>
<td>30&quot;</td>
<td>76&quot;</td>
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<td>MRO-22K-4H</td>
<td>15.0</td>
<td>21,600</td>
<td>15</td>
<td>20.0–23.0</td>
<td>5.0–8.0</td>
<td>270 psi</td>
<td>7.5</td>
<td>1200 lb.</td>
<td>144&quot;</td>
<td>30&quot;</td>
<td>76&quot;</td>
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<tr>
<td>MRO-25K-4H</td>
<td>17.5</td>
<td>25,200</td>
<td>18</td>
<td>23.2–26.8</td>
<td>5.7–9.3</td>
<td>280 psi</td>
<td>10</td>
<td>1350 lb.</td>
<td>144&quot;</td>
<td>30&quot;</td>
<td>76&quot;</td>
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<tr>
<td>MRO-29K-4H</td>
<td>20.0</td>
<td>28,800</td>
<td>21</td>
<td>26.7–30.8</td>
<td>6.7–10.8</td>
<td>245 psi</td>
<td>10</td>
<td>1500 lb.</td>
<td>144&quot;</td>
<td>30&quot;</td>
<td>76&quot;</td>
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### ‘MRO-4V’ & ‘MRO-4H’ Reverse Osmosis Systems

#### SPECIFICATIONS MRO-3600-4-V THROUGH MRO-16200-4-H SERIES

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<thead>
<tr>
<th></th>
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<td>MRO-3600-4V</td>
<td>2.5</td>
<td>3,600</td>
<td>2</td>
<td>3.3–3.8</td>
<td>0.8–1.3</td>
<td>251 psi</td>
<td>3.0</td>
<td>425 lb.</td>
<td>36&quot;</td>
<td>24&quot;</td>
<td>68&quot;</td>
<td></td>
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<tr>
<td>MRO-5400-4V</td>
<td>3.8</td>
<td>5,400</td>
<td>3</td>
<td>5.0–5.8</td>
<td>1.2–2.0</td>
<td>242 psi</td>
<td>3.0</td>
<td>475 lb.</td>
<td>36&quot;</td>
<td>24&quot;</td>
<td>68&quot;</td>
<td></td>
</tr>
<tr>
<td>MRO-7200-4V</td>
<td>5.0</td>
<td>7,200</td>
<td>4</td>
<td>6.7–7.7</td>
<td>1.7–2.7</td>
<td>235 psi</td>
<td>5.0</td>
<td>525 lb.</td>
<td>36&quot;</td>
<td>30&quot;</td>
<td>68&quot;</td>
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<tr>
<td>MRO-9000-4V</td>
<td>6.3</td>
<td>9,000</td>
<td>5</td>
<td>8.4–9.7</td>
<td>2.1–3.4</td>
<td>230 psi</td>
<td>5.0</td>
<td>575 lb.</td>
<td>36&quot;</td>
<td>30&quot;</td>
<td>68&quot;</td>
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<tr>
<td>MRO-10800-4H</td>
<td>7.5</td>
<td>10,800</td>
<td>6</td>
<td>10.0–11.5</td>
<td>2.5–4.0</td>
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<td>5.0</td>
<td>650 lb.</td>
<td>54&quot;</td>
<td>26&quot;</td>
<td>76&quot;</td>
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<tr>
<td>MRO-12600-4H</td>
<td>8.8</td>
<td>12,600</td>
<td>7</td>
<td>11.7–13.5</td>
<td>2.9–4.7</td>
<td>242 psi</td>
<td>5.0</td>
<td>700 lb.</td>
<td>54&quot;</td>
<td>26&quot;</td>
<td>76&quot;</td>
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<tr>
<td>MRO-14400-4H</td>
<td>10.0</td>
<td>14,400</td>
<td>8</td>
<td>13.3–15.6</td>
<td>3.3–5.4</td>
<td>234 psi</td>
<td>5.0</td>
<td>750 lb.</td>
<td>54&quot;</td>
<td>26&quot;</td>
<td>76&quot;</td>
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<tr>
<td>MRO-16200-4H</td>
<td>11.3</td>
<td>16,200</td>
<td>9</td>
<td>15.0–17.6</td>
<td>3.7–6.1</td>
<td>234 psi</td>
<td>5.0</td>
<td>800 lb.</td>
<td>54&quot;</td>
<td>26&quot;</td>
<td>76&quot;</td>
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### 4V Design

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<td>2.5</td>
<td>3,600</td>
<td>2</td>
<td>3.3–3.8</td>
<td>0.8–1.3</td>
<td>251 psi</td>
<td>3.0</td>
<td>425 lb.</td>
<td>36&quot;</td>
<td>24&quot;</td>
<td>68&quot;</td>
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<td>5,400</td>
<td>3</td>
<td>5.0–5.8</td>
<td>1.2–2.0</td>
<td>242 psi</td>
<td>3.0</td>
<td>475 lb.</td>
<td>36&quot;</td>
<td>24&quot;</td>
<td>68&quot;</td>
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<td>7,200</td>
<td>4</td>
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<td>1.7–2.7</td>
<td>235 psi</td>
<td>5.0</td>
<td>525 lb.</td>
<td>36&quot;</td>
<td>30&quot;</td>
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<td>8.4–9.7</td>
<td>2.1–3.4</td>
<td>230 psi</td>
<td>5.0</td>
<td>575 lb.</td>
<td>36&quot;</td>
<td>30&quot;</td>
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<td>10,800</td>
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<td>10.0–11.5</td>
<td>2.5–4.0</td>
<td>251 psi</td>
<td>5.0</td>
<td>650 lb.</td>
<td>54&quot;</td>
<td>26&quot;</td>
<td>76&quot;</td>
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<td>11.7–13.5</td>
<td>2.9–4.7</td>
<td>242 psi</td>
<td>5.0</td>
<td>700 lb.</td>
<td>54&quot;</td>
<td>26&quot;</td>
<td>76&quot;</td>
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<td>13.3–15.6</td>
<td>3.3–5.4</td>
<td>234 psi</td>
<td>5.0</td>
<td>750 lb.</td>
<td>54&quot;</td>
<td>26&quot;</td>
<td>76&quot;</td>
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<td>16,200</td>
<td>9</td>
<td>15.0–17.6</td>
<td>3.7–6.1</td>
<td>234 psi</td>
<td>5.0</td>
<td>800 lb.</td>
<td>54&quot;</td>
<td>26&quot;</td>
<td>76&quot;</td>
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### 4H Design

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<td>3.3–3.8</td>
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<td>3</td>
<td>5.0–5.8</td>
<td>1.2–2.0</td>
<td>242 psi</td>
<td>3.0</td>
<td>475 lb.</td>
<td>36&quot;</td>
<td>24&quot;</td>
<td>68&quot;</td>
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<td>4</td>
<td>6.7–7.7</td>
<td>1.7–2.7</td>
<td>235 psi</td>
<td>5.0</td>
<td>525 lb.</td>
<td>36&quot;</td>
<td>30&quot;</td>
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<td>8.4–9.7</td>
<td>2.1–3.4</td>
<td>230 psi</td>
<td>5.0</td>
<td>575 lb.</td>
<td>36&quot;</td>
<td>30&quot;</td>
<td>68&quot;</td>
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<td>10.0–11.5</td>
<td>2.5–4.0</td>
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<td>5.0</td>
<td>650 lb.</td>
<td>54&quot;</td>
<td>26&quot;</td>
<td>76&quot;</td>
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<td>12,600</td>
<td>7</td>
<td>11.7–13.5</td>
<td>2.9–4.7</td>
<td>242 psi</td>
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03-07
‘MRO-8H’ Reverse Osmosis Systems

Operating Parameters
- Operating Pressure: 200-250 psig
- Nominal Recovery: 75–80%
- Nominal Salt Rejection: 98–99%
- Operating Temperature: 45–85° F
- Design Temperature: 50° F
- Minimum Inlet Pressure: 30 psig
- Control Circuit: 120 V AC, 1-phase, 60 Hz.

Materials of Construction
- Skid Frame: Epoxy-coated carbon steel
- Membrane Elements: Thin-film Composite (TFC)
- Membrane Housings: FRP (300 psig rated)
- Low pressure piping: Sch 80 PVC
- High pressure piping: Sch 10 304SS

Pump and Motor
- Pump: 304/316SS vertical multi-stage centrifugal
- Motor: TEFC, 460 V AC, 3-phase, 60 Hz.

Standard Features
- 8” x 40” High rejection membrane elements
- 5-micron sediment pre-filter housing (304SS)
- Allen Bradley MicroLogix 1400 PLC System with PanelView 800-7 operator interface
- Prewired motor starter with fused disconnect switch
- NEMA-4 electrical enclosures
- UL-508A Listed electrical panels
- Product water conductivity transmitters
- Product and reject flow transmitters
- 316SS pressure gauges / Inlet pressure switch

Optional Equipment Available
- Variable Frequency Drives (VFD)
- pH/ORP monitors
- Low energy membrane elements
- All stainless steel piping and/or skid
- Ethernet/Modbus PLC communications
- Atmospheric storage tanks with level control and repressurization pump systems
- Membrane clean-in-place (CIP) systems
- Pretreatment chemical injection systems
- Containerized installations

Overview
The Marlo MRO-8H Series Industrial Reverse Osmosis Systems are engineered to economically produce high purity water by removal of dissolved minerals, bacteria, particles, and organic impurities. Each MRO machine is constructed using the highest quality components and materials for reliable operation and exceptional performance. Our standard machines are available with product water outputs from 25-300 GPM (36,000-432,000 GPD). Marlo also offers a wide variety of machine options, pre/post treatment equipment, distribution pumps, and integrated controls for a complete water treatment system. Our specialty is skid mounted, pre-piped, and pre-wired equipment allowing for quick installation and start-up time. Other types of membrane technology are also available including two-pass, two-train, cellulose acetate (CA), and nanofiltration (NF) for custom applications. Marlo engineers are ready to work with you to design a system meeting your water treatment requirements.

The following are just a few of the industrial applications that benefit from the use of reverse osmosis water:
- Boiler Feedwater
- Chemical Manufacturing
- Humidification
- Ice-making
- Bottled Water
- Small Municipalities
- Electronics Manufacturing
- Ink / Dye Production
- Food / Beverage Production
- Deionizer Pre-treatment

The following are just a few of the industrial applications that benefit from the use of reverse osmosis water:
- Boiler Feedwater
- Chemical Manufacturing
- Humidification
- Ice-making
- Bottled Water
- Small Municipalities
- Electronics Manufacturing
- Ink / Dye Production
- Food / Beverage Production
- Deionizer Pre-treatment
### ‘MRO-8H’ Reverse Osmosis Systems

#### SPECIFICATIONS

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<tr>
<th>MODEL NUMBER</th>
<th>CAPACITY</th>
<th>ELEMENT QUANTITY</th>
<th>VESSEL STAGING</th>
<th>RO FEED</th>
<th>RO REJECT</th>
<th>SYSTEM PIPING CONNECTIONS (INCHES)</th>
<th>PUMP HP</th>
<th>OVERALL DIMENSIONS (INCHES)</th>
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#### Notes

1. Feed flow based on 75% recovery.
2. Motor horsepower based on 50°F feedwater and high rejection membranes. Lower horsepower models are available for warmer feedwater and/or higher flow membranes. Consult factory.
3. Requires minimum of 48” additional length on each side of the skid for membrane removal.
4. Feedwater to RO system must be free of chlorine and pre-conditioned by water softening or polymer injection to prevent membrane scaling.
### Comparison Guide

#### 03. Commercial & Industrial Reverse Osmosis Systems

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<tr>
<th>MODEL</th>
<th>MRO-2.5</th>
<th>MRO-4LP</th>
<th>MRO-4V</th>
<th>MRO-4H</th>
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<td>High Rejection TFC 4” x 40”</td>
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<td>High Rejection TFC 8” x 40”</td>
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<td>Micrologix 1200 PLC PanelView C600</td>
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<td>Low Product Quality Divert Option</td>
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Section 04. Commercial & Industrial Deionizers

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MSB ...................................................................................................................................04-04
MMB .................................................................................................................................04-06
EDI Systems ..................................................................................................................04-08
'MSB-F' Series Deionization Systems

Overview
The Marlo ‘MSB-F’ Series Automatic Separate-Bed Deionizer (DI) system offers a corrosion resistant alternative for the economical production of high purity water in industrial applications where DI exchange tank service or reverse osmosis (RO) systems are not desired.

Standard designs are available for product flow rates of 5-250 GPM. All systems are completely factory skid mounted, pre-piped, pre-wired, and pre-tested for minimal installation time and cost. Duplex alternating systems are available when continuous DI water demand is required.

Materials of Construction
- Resin Tanks: FRP
- Exterior Piping: Sch 80 PVC
- Internal Distributors: Sch 80 PVC / ABS
- Control Valves: Noryl Thermoplastic
- Chemical Eductors: PVC
- Skid: Painted, Carbon Steel

Controls / Instrumentation
- Allen-Bradley MicroLogix PLC system
- Allen-Bradley PanelView operator terminal
- NEMA-4X electrical enclosure
- Signet product water flowmeter
- Signet product water conductivity meter
- Visual-type rotometer for chemical dilution water
- Inlet/Outlet tank pressure gauges

Standard Operating Parameters
- Inlet Pressure: 30-100 psig
- Electrical: 120VAC, 1-Ph, 60 Hz.
- Pneumatic: 80-100 psig (Dry, Oil-Free Air)
- Temperature: 35-110°F
- Cation Resin Regenerant: HCL (30%)
- Anion Resin Regenerant: NaOH (50%)

Available Options
- ASME rated resin tanks
- Duplex alternating systems (2-skids required)
- Recirculation pump systems (for low-flow periods)
- Regenerant chemical tank and pump systems
- Alternate PLC systems
- CPVC exterior piping
- Automatic butterfly or ball control valves
- Alternate ion exchange resins
- Wastewater neutralization systems
- Regeneration with sulfuric acid (H2SO4)

Standard Features
- Composite FRP resin tank with tri-pod base
- Aquamatic diaphragm style control valves (air-actuated)
- Volume, time, or conductivity initiated regeneration cycle
- Pre-sized chemical eductors
- High capacity, cation and anion exchange resins
- Tank isolation valves & system bypass valve
- Inlet/outlet tank and dilute chemical sampling valves
- Factory Hydro-Tested at 100 psig
### 'MSB-F' Series Deionization Systems

#### Specifications

<table>
<thead>
<tr>
<th>MODEL NUMBER</th>
<th>NOMINAL CAPACITY</th>
<th>FLOW RATES</th>
<th>SERVICE</th>
<th>TANK SIZE</th>
<th>RESIN VOLUME CATION</th>
<th>RESIN VOLUME ANION</th>
<th>PIPE SIZE</th>
<th>WASTE VOLUME</th>
<th>ACID PER REGENERATION</th>
<th>CAUSTIC PER REGENERATION</th>
<th>OVERALL DIMENSIONS (LxWxH, INCHES)</th>
<th>SHIPPING WEIGHT (LBS.)</th>
<th>OPERATING WEIGHT (LBS.)</th>
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#### Notes

1. System nominal capacity is based on a raw water having no more than 15 grain/gallon (approx. 250 ppm) of total dissolved solids (as CaCO3) and free of color, oil, turbidity, and organic matter. A complete water analysis is required to more accurately predict system capacity and product water quality.
2. Minimum flow rates are established to prevent flow channeling within the resin bed, which can lead to lower capacity and product water quality.
3. At a pressure drop not exceeding 15 psig.
4. Wastewater from the regeneration process may require neutralization prior to final discharge. Size drain flows equal to the maximum flow rating.
5. Acid dosage for the cation resin tank is based on 8 lbs. per cubic foot of 30% hydrochloric acid (HCL). Acid drums or carboys are to be provided by others.
6. Caustic dosage for the anion tank is based on 8 lbs. per cubic foot of 50% sodium hydroxide (NaOH). Caustic drums or carboys are to be provided by others.
7. Dimensions are estimate only. Actual dimensions may vary based on job-site space limits, piping layout, and selected options. Dimensions shown are for a single, cation-anion tank skid and do not included space for chemical regenerant containers. Allow a minimum of 24" above the height dimension for resin loading.
8. Shipping weights are estimate only. Weights include resin and support gravel, which are added to the tanks after installation.
Overview

The Marlo 'MSB' Series Automatic Separate-Bed Deionizer (DI) systems are engineered to economically produce high purity water through the removal of total dissolved solids (TDS). Each MSB system is constructed using robust, industrial-grade components and materials for reliable operation and exceptional performance.

Standard designs are available for product flow rates of 5-600 GPM. All systems are completely factory skid mounted, pre-piped, pre-wired, and pre-tested for minimal installation time and cost. Duplex alternating systems are available when continuous DI water demand is required.

Standard Features

- Carbon steel resin tanks with vinylester lined interior
- Aquamatic diaphragm style control valves (up to 3”, air-actuated)
- Butterfly style control valves (4”-6”, air-actuated)
- Volume, time, or conductivity initiated regeneration cycle
- Pre-sized chemical eductors (acid & caustic containers by others)
- High capacity, cation and anion exchange resins
- Tank isolation valves & system bypass valve
- Inlet/outlet tank and dilute chemical sampling valves
- Factory Hydro-Tested at 100 psig

Materials of Construction

- Resin Tanks: Carbon steel with Safety Blue exterior paint
- Tank Lining: Vinylester (applied at 40-50 mils DFT)
- Exterior Piping: Sch 80 PVC
- Internal Distributors: Sch 80 PVC / ABS
- Control Valves: Noryl Thermoplastic
- Chemical Eductors: PVC
- Skid: Painted, Carbon Steel

Controls / Instrumentation

- Allen-Bradley MicroLogix PLC system
- Allen-Bradley PanelView operator terminal
- NEMA-4X electrical enclosure
- Signet product water flowmeter
- Signet product water conductivity meter
- Visual-type rotameter for chemical dilution water
- Inlet/Outlet tank pressure gauges

Operating Parameters

- Inlet Pressure: 30-100 psig
- Electrical: 120VAC, 1-Ph, 60 Hz.
- Pneumatic: 80-100 psig (Dry, Oil-Free Air)
- Water Temperature: 35-100°F
- Cation Resin Regenerant: HCL (30%)
- Anion Resin Regenerant: NaOH (50%)

Available Options

- ASME Code stamped resin tanks
- Duplex alternating systems (2-skids required)
- Recirculation pump systems (for low-flow periods)
- Rubber lined tank interior surfaces
- Regenerant chemical tank and pump systems
- Alternate PLC systems
- CPVC exterior piping
- 304/316 Stainless steel exterior piping
- Stainless steel internal distributor piping
- Automatic butterfly or ball control valves
- Alternate ion exchange resins
- Wastewater neutralization systems
- Regeneration with sulfuric acid (H2SO4)
- Forced-draft decarbonator systems (CO2 removal)
**'MSB' Series Deionization Systems**

**Specifications**

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<thead>
<tr>
<th>MODEL NUMBER</th>
<th>CAPACITY (Kilograms)</th>
<th>FLOW RATES</th>
<th>RESIN VOLUME CATION</th>
<th>RESIN VOLUME ANION</th>
<th>PIPE SIZE</th>
<th>WASTE VOLUME</th>
<th>ACID PER REGENERATION</th>
<th>CAUSTIC PER REGENERATION</th>
<th>OVERALL DIMENSIONS (LxWxH, INCHES)</th>
<th>SHIPPING WEIGHT (LBS.)</th>
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**Notes**

1. System nominal capacity is based on a raw water having no more than 15 grain/gallon (approx. 250 ppm) of total dissolved solids (as CaCO3) and free of color, oil, turbidity, and organic matter. A complete water analysis is required to more accurately predict system capacity and product water quality.
2. Minimum flow rates are established to prevent flow channeling within the resin bed, which can lead to lower capacity and product water quality.
3. At a pressure drop not exceeding 15 psig.
4. Wastewater from the regeneration process may require neutralization prior to final discharge. Size drain flows equal to the maximum flow rating.
5. Acid dosage for the cation resin tank is based on 8 lbs. per cubic foot of 30% hydrochloric acid (HCL). Acid drums or carboys are to be provided by others.
6. Caustic dosage for the anion tank is based on 8 lbs. per cubic foot of 50% sodium hydroxide (NaOH). Caustic drums or carboys are to be provided by others.
7. Dimensions are estimate only. Actual dimensions may vary based on job-site space limits, piping layout, and selected options. Dimensions shown are for a single, cation-anion tank skid and do not included space for chemical regenerant containers. Allow a minimum of 24” above the height dimension for resin loading.
8. Shipping weights are estimate only. Weights include resin and support gravel, which are added to the tanks after installation.
Overview
The Marlo ‘MMB’ Series Mixed-Bed Deionizer (MBDI) systems are designed for industrial, ultra-pure water applications where only trace amounts of dissolved solids are allowed. The cation and anion exchange processes take place in a single vessel where extremely high water purity is achievable (up to 18.3 Meg-Ohm resistivity). On-site chemical regeneration of the resin also occurs within the vessels after an automatic separation step. Standard designs are available for product flow rates of 5-350 GPM. All systems are completely factory skid mounted, pre-piped, pre-wired, and pre-tested for minimal installation time and cost. Duplex alternating or lead-lag series systems are available when continuous DI water demand and the highest quality water is required.

Standard Features
• Carbon steel resin tanks with vinylester lined interior
• Aquamatic diaphragm style control valves (up to 3”, air-actuated)
• Butterfly style control valves (4”-6”, air-actuated)
• Volume, time, or conductivity initiated regeneration cycle
• Pre-sized chemical eductors (acid & caustic containers by others)
• High capacity, cation and anion exchange resins
• Tank isolation valves & system bypass valve
• Inlet/outlet tank and dilute chemical sampling valves
• Factory Hydro-Tested at 100 psig

Materials of Construction
• Resin Tanks: Carbon steel with Safety Blue exterior paint
• Tank Lining: Vinylester (applied at 40-50 mils DFT)
• Exterior Piping: Sch 80 PVC
• Internal Distributors: Sch 80 PVC / ABS
• Control Valves: Noryl Thermoplastic
• Chemical Eductors: PVC
• Skid: Painted, Carbon Steel

Controls / Instrumentation
• Allen-Bradley MicroLogix PLC system
• Allen-Bradley PanelView operator terminal
• NEMA-4X electrical enclosure
• Signet product water flowmeter
• Signet product water conductivity meter
• Visual-type rotameter for chemical dilution water
• Inlet/Outlet tank pressure gauges

Operating Parameters
• Inlet Pressure: 30-100 psig
• Electrical: 120VAC, 1-Ph, 60 Hz.
• Pneumatic: 80-100 psig (Dry, Oil-Free Air)
• Water Temperature: 35-100°F
• Cation Resin Regenerant: HCL (30%)
• Anion Resin Regenerant: NaOH (50%)

Available Options
• ASME Code stamped resin tanks
• Duplex alternating systems
• Recirculation pump systems (for low-flow periods)
• Rubber lined tank interior surfaces
• Regenerant chemical tank and pump systems
• Alternate PLC systems
• CPVC exterior piping
• 316 Stainless steel resin tanks & exterior piping
• Stainless steel internal distributor piping
• Automatic butterfly or ball control valves
• Alternate ion exchange resins
• Wastewater neutralization systems
• Regeneration with sulfuric acid (H2SO4)
• Forced-draft decarbonator systems (CO2 removal)
# 'MMB' Series Deionization Systems

## Specifications

<table>
<thead>
<tr>
<th>MODEL NUMBER</th>
<th>CAPACITY (Kilograms)</th>
<th>FLOW RATES</th>
<th>TANK SIZE</th>
<th>RESIN VOLUME</th>
<th>RESIN VOLUME</th>
<th>PIPE SIZE</th>
<th>WASTE VOLUME</th>
<th>ACID PER REGENERATION</th>
<th>CAUSTIC PER REGENERATION</th>
<th>OVERALL DIMENSIONS (LxWxH, INCHES)</th>
<th>SHIPPING WEIGHT (LBS.)</th>
<th>OPERATING WEIGHT (LBS.)</th>
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## Dimensions

![Diagram](image)

## Notes

1. System nominal capacity is based on a raw water having no more than 15 grain/gallon (approx. 250 ppm) of total dissolved solids (as CaCO3) and free of color, oil, turbidity, and organic matter. A complete water analysis is required to more accurately predict system capacity and product water quality.
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8. Shipping weights are estimate only. Weights include resin and support gravel, which are added to the tanks after installation.
Electro-Deionization (EDI) Skids

**Operating Parameters**
- Nominal Recovery: 90–95%
- EDI Water Quality: 15–18 meg-ohm
- Feedwater Requirements: See table on next page
- Operating Temperature: 50–100° F
- Maximum Inlet Pressure: 100 psig
- Minimum Inlet Pressure: 60 psig
- Expected Pressure Drop: 30–40 psig
- Electrical Requirement: 460 V AC, 3-phase, 60 Hz.
  120 V AC, 1-phase, 60 Hz.

**Materials of Construction**
- Skid Frame: Epoxy-coated carbon steel
- EDI Housings: FRP
- System piping: Sch 80 PVC
- EDI cell tubing: Polyethylene

**Standard Features**
- Allen Bradley MicroLogix Series PLC system
- Allen Bradley PanelView operator terminal
- DC Power supply/rectifier unit
- NEMA-4 electrical enclosures
- Electric-actuated inlet water valve
- Individual EDI cell sampling ports
- Product water resistivity monitor
- Flowmeters for product, reject, and electrolyte streams
- Feedwater pH monitor

**Optional Equipment Available**
- Product water divert valve
- Alternate PLC systems
- EDI cell clean-in-place (CIP) systems
- CPVC system piping
- Feedwater resistivity monitor
- System pressure transmitters
- Product water pressure relief valve
- Two-pass Reverse Osmosis (RO) pretreatment
- Feed/product water storage tanks
- Feed/product water transfer pump systems

**Overview**
The Electro-Deionization process is the latest technology to achieve ultrapure water. EDI uses ion exchange resins in the presence of a DC voltage potential to remove cation and anion contaminants from the feed water supply. Ion selective membranes are then used within the modules to continuously remove these contaminants and carry them out in a small concentrate stream. The voltage applied across the cell allows for the electrochemical “splitting” of water into hydrogen (H+) and hydroxide (OH-) ions within the ion exchange resins resulting in constant regeneration without the addition of chemicals, wastewater neutralization/disposal, and shutdown time. This results in a major advantage over the operation of traditional, regenerable Mixed-Bed Deionization and Service Exchange DI Systems.

The following are just a few of the industrial applications that can benefit from purified water produced by EDI systems:

- Power Generation
- Chemical Manufacturing
- Electronics / Semiconductor
- Industrial Process Water
- Boiler Feed
- Research Lab Facilities
**Electro-Deionization (EDI) Skids**

### SPECIFICATIONS

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### DIMENSIONS

#### Front View

- **PRODUCT OUTLET**
- **PRODUCT DIVERT (optional)**
- **INLET**
- **ELECTROLYTE OUTLET**
- **REJECT OUTLET**

#### Profile View

#### FEEDWATER REQUIREMENTS

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<th>PARAMETERS</th>
<th>REQUIREMENT</th>
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<td>TOC</td>
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### Notes

- Standard specifications are based on typical applications and incoming water quality from a Two-Pass Reverse Osmosis (RO) System. Specifications may be altered to meet certain site conditions and changes in incoming and/or product water quality requirements.
- Dimensions and shipping weights are estimated only. Actual dimensions and weights differ dependant upon the final system design and options selected.
Section 05. Specialty Equipment & Components

Lab Water Systems ................................................................. 05-02
Membrane Clean-in-Place Systems ................................. 05-04
Bulk Brinemaker Systems ................................................ 05-06
Transfer Pump Systems ...................................................... 05-08
MATD .................................................................................... 05-10
MDAS .................................................................................... 05-12
MCP- Condensate Polisher ............................................... 05-14
MX-III Controller ................................................................. 05-16
05. Specialty Equipment and Components

‘LWS’ Series High Purity Lab Water Skids

Operating Parameters
- Operating RO Pressure: 200-250 psig
- Nominal RO Recovery: 50–65%
- Nominal TDS Rejection: 98–99% (RO unit)
- DI Water Quality: 16-18 Mega Ohms
- Operating Temperature: 45–85° F
- Design Temperature: 50° F
- Minimum Inlet Pressure: 50 psig
- Electrical Requirement: 460 V AC, 3-phase, 60 Hz.
  120 V AC, 1-phase, 60 Hz.
- DI Loop Outlet Pressure: 75 psig

Materials of Construction
- Skid Frame: Epoxy-coated carbon steel
- Membrane Elements: Thin-film Composite (TFC)
- Membrane Housings: FRP
- Low Pressure Piping: Sch 80 PVC
- High RO pressure piping: 304SS
- RO/DI Water Storage Tank: Polyethylene
- DI Water Loop Piping: Fusion-welded Polypropylene

Pump and Motor
- Pump: 304/316SS vertical multi-stage centrifugal
- Motor: TEFC, 460 V AC, 3-phase, 60 Hz.

Standard Features
- Automatic backwashing carbon filter (timer)
- Twin alternating water softener (metered)
- Single pass Reverse Osmosis unit
- Conical bottom, closed top storage tank
- Storage tank level controller and mounting stand
- Duplex RO/DI distribution pumps (2 x 100%)
- Primary/Polisher mixed bed DI polishers
- UV Sterilizer unit with intensity monitor (254 nm)
- NEMA-4 Electrical enclosures
- Pre-wired motor starters with fused disconnect switch
- DI Water outlet flowmeter
- DI Water outlet resistivity monitor

Optional Equipment Available
- Programmable Logic Controller (PLC) systems
- Variable Frequency Drives (VFD's)
- Multi-media filter pre-treatment
- Type III Lab Systems

Overview
Marlo’s Pre-Engineered Laboratory Water Systems are designed to serve as the centralized, purified water source for a variety of academic, medical, and other research laboratory facilities. Designed to meet or exceed the Type II reagent-grade water platform set forth by CAP/NCCLS and ASTM standards. Standard systems are furnished with all the treatment equipment fully pre-piped, pre-wired, and factory-tested on a common skid package to minimize field installation and start-up costs. The standard system includes the following equipment:

- Pre-Treatment (inlet filter / carbon / softener)
- Reverse Osmosis (RO) machine
- RO water storage tank
- Stainless steel distribution pumps
- DI exchange polishers (portable exchange type)
- Ultraviolet (UV) sterilizer
- Final sub-micron filter (0.2 micron)
- Central control panel with purity monitoring

‘LWS’ Series High Purity Lab Water Skids
‘LWS’ Series High Purity Lab Water Skids

SPECIFICATIONS

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<th>MODEL</th>
<th>LWS-1500-20</th>
<th>LWS-2500-20</th>
<th>LWS-3600-30</th>
<th>LWS-5400-40</th>
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<td></td>
<td>12”x52” / 2.5 ft.³ ea.</td>
<td>12”x52” / 2.5 ft.³ ea.</td>
<td>14”x47” / 3.5 ft.³ ea.</td>
<td>14”x47” / 3.5 ft.³ ea.</td>
<td>14”x47” / 3.5 ft.³ ea.</td>
</tr>
<tr>
<td>INLET FEED WATER RATE (GPM)</td>
<td>2.1</td>
<td>3.5</td>
<td>4.25</td>
<td>6.25</td>
<td>7.75</td>
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<tr>
<td>INLET FEED CONNECTION SIZE</td>
<td>1”</td>
<td>1”</td>
<td>1”</td>
<td>1”</td>
<td>1”</td>
</tr>
<tr>
<td>MAXIMUM WATER TO DRAIN (GPM)</td>
<td>7</td>
<td>10</td>
<td>12</td>
<td>13</td>
<td>15</td>
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<tr>
<td>DRAIN CONNECTION SIZE</td>
<td>1”</td>
<td>1”</td>
<td>1”</td>
<td>1”</td>
<td>1”</td>
</tr>
<tr>
<td>SYSTEM DIMENSIONS (LxWxH)</td>
<td>192”x56”x90”</td>
<td>198”x66”x106”</td>
<td>198”x66”x106”</td>
<td>219”x66”x114”</td>
<td>228”x66”x114”</td>
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<tr>
<td>SHIPPING WEIGHT (LBS)</td>
<td>2,700</td>
<td>2,800</td>
<td>3,000</td>
<td>3,200</td>
<td>3,600</td>
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</table>

PROCESS FLOW DIAGRAM

Notes
- Standard specifications are based on typical, general lab applications and incoming water quality. Specifications may be altered to meet certain site conditions and changes in water quality.
- Dimensions and shipping weights are estimated only. Actual dimensions and weights differ dependant upon the final system design and options selected.
Membrane Clean-In-Place (CIP) Systems

Operating Parameters
- Operating Pressure: 40-50 psig
- Operating Temperature: 50–110° F
- Pump Motor Power: 460 V AC, 3-Phase, 60 Hz
- Control Circuit: 120 V AC, 1-phase, 60 Hz.

Materials of Construction
- Skid Frame: Epoxy-coated carbon steel
- Solution Tank: Polyethylene
- Feed Pump: 304 Stainless Steel
- Prefilter Housing: Polypropylene or 304SS
- Interconnecting Piping: Sch 80 PVC
- Hardware & Fasteners: Stainless Steel

Standard Features
- Conical-Bottom, Closed Top Cleaning Solution Tank
- Centrifugal Transfer Pump with TEFC Motor
- Sediment Cartridge Filter Housing (5-micron rating)
- Pre-Wired Motor Starter with Fused Disconnect Switch
- NEMA-4 Electrical Enclosures
- Low Tank Level Switch with Automatic Pump Shutdown
- Temperature Indicator
- Flow Indicator
- Pump Discharge Pressure Indicator
- Manual Recirculation Line for Solution Mixing
- Manual Tank Drain Valve
- Flexible Hose Assemblies with Quick-Disconnects (Integral Mount)

Optional Equipment Available
- Variable Frequency Drives (VFD)
- pH Monitor
- Immersion Heater with Adjustable Thermostat (Skid Mount Only)
- UL-508A Rated Electrical Panels
- CPVC Piping
- All Stainless Steel Piping and/or Skid
- Portability for Skid Systems (Hose Kit & Caster Wheels)

Overview
Marlo Clean-in-Place (CIP) Systems are engineered for on-site cleaning of Reverse Osmosis (RO) and other membrane based water treatment equipment. Periodic cleaning of the membrane elements will extend the useful life and greatly improve the economics of ownership. Systems are designed to work with all types of membrane cleaning procedures including inorganic mineral scale (low pH), biological/organic fouling (high pH), and sanitization cycles. Each system includes a cleaning solution tank, transfer pump, and sediment filter to trap debris from re-entering the membranes during recirculation. All steps of the CIP process are to be performed manually by an equipment operator. The CIP system is available in two (2) types of design configurations:

**Integral Mounted**
The transfer pump and sediment filter housing are mounted, pre-piped, and pre-wired directly on the RO skid. The cleaning solution tank is free-standing and can be stored when not in use. Includes a set of hoses and quick-connect fittings for the feed and return lines to and from the RO skid.

**Skid Mounted**
All CIP equipment including the cleaning solution tank are factory mounted, pre-piped, and pre-wired on a dedicated skid assembly. The Skid Mounted configuration is a good choice for installations where multiple RO systems are in place or where a hard piped CIP system is desired. This option can also be modified for portability for easy movement to storage or other locations within the plant.
Membrane Clean-In-Place (CIP) Systems

### Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>CIP-100</th>
<th>CIP-150</th>
<th>CIP-250</th>
<th>CIP-350</th>
<th>CIP-500</th>
<th>CIP-1000</th>
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<tbody>
<tr>
<td>RO System Served Product Range (GPM)</td>
<td>10-20</td>
<td>25-35</td>
<td>50-80</td>
<td>100-125</td>
<td>150-200</td>
<td>250-400</td>
</tr>
<tr>
<td>Max CIP Inlet Feed Flow (GPM)</td>
<td>30</td>
<td>45</td>
<td>90</td>
<td>135</td>
<td>200</td>
<td>400</td>
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<tr>
<td>Solution Tank Volume (GAL)</td>
<td>100</td>
<td>150</td>
<td>250</td>
<td>350</td>
<td>500</td>
<td>1000</td>
</tr>
<tr>
<td>Solution Tank Dimensions (Dia. x Ht.)</td>
<td>24” x 50”</td>
<td>36” x 55”</td>
<td>36” x 79”</td>
<td>42” x 93”</td>
<td>52” x 93”</td>
<td>64” x 113”</td>
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<tr>
<td>Pump Motor (HP)</td>
<td>2.0</td>
<td>3.0</td>
<td>5.0</td>
<td>7.5</td>
<td>10</td>
<td>20</td>
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<tr>
<td>Pre-Filter Housing (Material/Size)</td>
<td>Polypropylene (1) 4.5” x 20”</td>
<td>Polypropylene (2) 4.5” x 20”</td>
<td>Polypropylene (2) 4.5” x 20”</td>
<td>304SS (7) 2.5” x 40”</td>
<td>304SS (12) 2.5” x 40”</td>
<td>304SS (22) 2.5” x 40”</td>
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<tr>
<td>CIP Feed/Reject Return Connection Size</td>
<td>1”</td>
<td>1.5”</td>
<td>2”</td>
<td>2”</td>
<td>3”</td>
<td>4”</td>
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<tr>
<td>CIP Permeate Return Connection Size</td>
<td>0.75”</td>
<td>1”</td>
<td>1”</td>
<td>2”</td>
<td>2”</td>
<td>2”</td>
</tr>
<tr>
<td>Skid Dimensions (LxWxH)</td>
<td>66” x 30” x 64”</td>
<td>90” x 42” x 66”</td>
<td>90” x 42” x 88”</td>
<td>96” x 46” x 102”</td>
<td>106” x 54” x 102”</td>
<td>150” x 66” x 120”</td>
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<tr>
<td>Shipping Weight (LBS)</td>
<td>800</td>
<td>1,100</td>
<td>1,500</td>
<td>1,800</td>
<td>2,000</td>
<td>3,100</td>
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</tbody>
</table>

### Notes
- Dimensions and shipping weights are estimated only. Actual dimensions and weights differ dependant upon the final system design and options selected.
- Standard specifications listed above are based on the skid mounted configuration. The dimensions and weights shown will not apply to the integral mount option.
- The solution tank for the CIP-100 uses a flat-bottomed tank for the skid mounted configuration.
- The solution tanks for all integral mount configurations are flat-bottomed tanks.
Overview

Marlo Bulk Brinemaker Silos are the ideal complement for industrial water softening systems that require a large amount of daily salt consumption for the regeneration process. The corrosion-free design will allow for on-site truckload delivery of sodium chloride salt that is pneumatically conveyed directly into the silo. An automatic liquid level controller will introduce fresh water into the silo to provide for a consistent supply of saturated brine to be subsequently pumped to the water softener system. Numerous sizes and options are available to provide the best fit for your application.

The key advantages for considering a Bulk Brine System are:

- Significant price savings in delivered bulk salt costs vs. bagged salt (40-50% less).
- Reduces the burden on labor force with less handling, monitoring, and injury risk.
- Creates a cleaner area around the water softener with less storage, salt spillage, and packaging waste.

Materials of Construction

- Silo Shell: Fiberglass Reinforced Plastic (FRP)
- Inlet Water Distributor: Sch 80 PVC
- Brine Outlet Distributor: Sch 80 PVC
- Salt Fill Pipe: 304 SS
- Access Ladder: Epoxy Coated Carbon Steel
- Dust Control Filter: Polyester
- Air Vent Pipe: Sch 40 PVC
- Anchor / Lift Lugs: 304 SS

Standard Equipment / Features

- Use for either Granulated or Rock/Solar Salt
- Pneumatic Salt Fill Pipe
- Inlet Water Spray Ring Distributor
- Brine Collection System
- Air Vent Pipe with Dust Control Filter
- Access Ladder Assembly
- Liquid Level Controller
- Automatic Water Refill Valve
- 24” Covered Upper Access Manway
- 24” Covered Lower Cleanout Manway
- Anchor / Lifting Lugs
- Gravel Support Bed

Options / Accessories

- Freeze Protection System (Insulation & Heat Controls)
- Ladder Safety Cage
- Solid Salt Level Indicator
- FRP Ladder Construction
- Brine Pump & Metering Systems
- Seismic / Wind Load Designs
'MBM' Series Bulk Brinemaker Silos

Specifications

<table>
<thead>
<tr>
<th>MODEL</th>
<th>MBM-30</th>
<th>MBM-36</th>
<th>MBM-40</th>
<th>MBM-50</th>
<th>MBM-72</th>
</tr>
</thead>
<tbody>
<tr>
<td>TANK DIAMETER (D)</td>
<td>108&quot;</td>
<td>120&quot;</td>
<td>144&quot;</td>
<td>144&quot;</td>
<td>144&quot;</td>
</tr>
<tr>
<td>TANK HEIGHT (H) (NOT INCLUDING SALT PIPE)</td>
<td>212&quot;</td>
<td>219&quot;</td>
<td>186&quot;</td>
<td>216&quot;</td>
<td>271&quot;</td>
</tr>
<tr>
<td>USABLE DRY SALT STORAGE (TONS)</td>
<td>30</td>
<td>36</td>
<td>40</td>
<td>50</td>
<td>72</td>
</tr>
<tr>
<td>EMPTY TANK WEIGHT (LBS.)</td>
<td>2,000</td>
<td>2,400</td>
<td>2,600</td>
<td>3,000</td>
<td>3,800</td>
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<tr>
<td>MAX. GROSS (FILLED) WEIGHT (LBS)</td>
<td>76,000</td>
<td>91,000</td>
<td>106,000</td>
<td>129,000</td>
<td>171,000</td>
</tr>
<tr>
<td>INLET/OUTLET CONNECTION SIZE</td>
<td>3” Flange</td>
<td>3” Flange</td>
<td>3” Flange</td>
<td>3” Flange</td>
<td>3” Flange</td>
</tr>
<tr>
<td>MAXIMUM BRINE DRAW GRANULATED SALT (GPM)</td>
<td>40</td>
<td>40</td>
<td>50</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>MAXIMUM BRINE DRAW ROCK/SOLAR SALT (GPM)</td>
<td>20</td>
<td>20</td>
<td>25</td>
<td>25</td>
<td>25</td>
</tr>
</tbody>
</table>

Dimensions

Notes

- Refer to detailed engineering drawings for more clarity on equipment and connection orientation.
- Tank height shown does not include the salt fill pipe. Additional height will vary. For estimate purposes, figure an additional 72” above the tank height.
- Salt delivery companies may require a minimum size load per order. Typically these are in the 20–25 ton range.
- Concrete support pad to be provided by others. Pad must be designed for a fully loaded tank, soil properties, and freeze/thaw forces.
- Consult factory for more details on support pad construction and silo off-loading and mounting instructions.
'MPS' Series Transfer Pump Skids

Operating Parameters
• 460 VAC, 3-Phase, 60 Hz electrical power (motors)
• 120 VAC, 1-Phase, 60 Hz electrical power (controls)
• 40-50 psig Nominal discharge pressure
• 35-110 °F operating temperature

Materials of Construction
• Pump: 304 stainless steel
• Piping: Sch 80 PVC
• Skid: Epoxy-coated carbon steel

Pump and Motor
• Single-stage, end-suction centrifugal pumps
• TEFC motor, 3450 RPM.

Standard Features
• Duplex pumps for redundancy (2 x 100%)
• Automatic on/off capability
• Pre-wired pump motor starter panel
• Fused power disconnect switch
• NEMA-4 electrical enclosure
• Pump discharge check valves & pressure gauges
• Isolation valves for each pump
• Panel mounted operator lights and switches

Optional Equipment Available
• Variable Frequency Drives (VFD)
• 316SS and Noryl bodied pumps
• 304/316 Stainless Steel piping
• Automatic Pump Alternator
• Multi-stage pumps for higher discharge pressures
• Pressure and flow transmitters
• UV Sterilizer and post-filter housings
• UL-508A certified panels
• Explosion proof duty pump motors
• Self-priming pump designs

Overview
The Marlo ‘MPS’ Series Transfer Pump Skid is offered to complement our other water treatment equipment to offer you a more integrated system. The standard product platform is designed for general water transfer such as inlet water pressure boosting and RO water transfer from a storage tank. The skid can be customized to fit other applications including recirculation loops, filter backwash water supply, and liquid brine transfer to water softening systems. A wide variety of equipment options are also available to best suit your project.

All pump skids are furnished completely factory skid mounted, pre-piped, pre-wired, and factory tested for minimal installation time and cost.
'MPS' Series Transfer Pump Skids

**SPECIFICATIONS DUPLEX PUMP SKID**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>FLOW RATE (GPM)</th>
<th>DISCHARGE PRESSURE (psig)</th>
<th>MOTOR (HP)</th>
<th>INLET (INCHES)</th>
<th>OUTLET (INCHES)</th>
<th>DIMENSIONS (LxWxH) (INCHES)</th>
<th>SHIPPING WEIGHT (LBS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPS-10</td>
<td>10</td>
<td>40</td>
<td>1</td>
<td>1-1/2</td>
<td>1</td>
<td>32x26x63</td>
<td>490</td>
</tr>
<tr>
<td>MPS-20</td>
<td>20</td>
<td>50</td>
<td>1.5</td>
<td>1-1/2</td>
<td>1-1/4</td>
<td>32x26x63</td>
<td>515</td>
</tr>
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<td>MPS-35</td>
<td>35</td>
<td>50</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>36x26x63</td>
<td>560</td>
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<td>MPS-50</td>
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<td>3</td>
<td>3</td>
<td>2</td>
<td>39x28x63</td>
<td>610</td>
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<td>MPS-100</td>
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<td>5</td>
<td>4</td>
<td>3</td>
<td>49x34x63</td>
<td>705</td>
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<tr>
<td>MPS-150</td>
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<td>3</td>
<td>56x38x63</td>
<td>1,010</td>
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<tr>
<td>MPS-200</td>
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<td>50</td>
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<td>6</td>
<td>4</td>
<td>56x38x63</td>
<td>1,100</td>
</tr>
</tbody>
</table>

1. Flooded suction at the skid inlet connection is required to prevent pump cavitation.
2. The installer is to take the pre-cautions to ensure the system will not be subject to a dead-heading situation (i.e. blocked discharge line) during pump operation.
3. Dimensions and shipping weights are estimate only. Actual dimensions and weights may differ dependent on options selected.
4. Higher flow rate and/or discharge pressures are available. Consult factory.
Overview

The Marlo ‘MATD’ chloride-cycle dealkalizer system effectively reduces the incoming alkalinity in feed water resulting in lower blowdown rates, lower condensate return corrosion, and a more effective chemical treatment program for your boiler system.

All systems are twin-alternating to provide a continuous supply of dealkalized water. Standard models with treat up to 50-GPM.

Standard Features

- Fiberglass reinforced polyester (FRP) resin tanks
- High capacity, strong-base anion resin in chloride form (Type II)
- Water meter initiated regeneration cycle
- Top-mounted, twin-tank control valve with integral brine injector
- Brine tank assembly with salt shelf and safety overflow valve
- Caustic injection system with metering pump, pump stand, and control panel

Materials of Construction

- Resin Tanks: FRP
- Pump Body: PVC
- Internal Distributor: PVC/ABS
- Brine Tank: Polyethylene
- Pump Stand: Painted carbon steel
- Control Valve Body:
  - Fleck 9100, Noryl thermoplastic (3/4” and 1”)
  - Fleck 9500, Bronze (1-1/2”)

Instrumentation / Controls

- Fleck ‘XT’ digital display electronic timer
- Resettable water usage totalizer
- Attached turbine-type water meter
- Pulsafeeder Series A+ metering pump
- Pre-wired caustic pump outlet with adjustable relay timer

Operating Parameters

- Feedwater Source: Softened Water (<1 gpg)
- Inlet Pressure: 30-125 psig
- Electrical: 120VAC, 1-Ph, 60 Hz.
- Temperature: 40-100°F

Options Available

- Skid mounted, pre-piped, pre-loaded system
- Alternate ion exchange resins
- Alternate chemical pumps
- 220 VAC/50Hz electrical power
Notes

1. Capacity based on 10,000 grains per cubic foot of resin when regenerated with 5 lbs. salt and 0.33 lbs. caustic. Capacity decreases as chloride levels exceed 10% of the total anions.
2. At a pressure loss not exceeding 15-PSI.
3. At a pressure loss not exceeding 25-PSI.
4. Includes space requirements for 50-gallon drum of 50% caustic soda.

Specifications

<table>
<thead>
<tr>
<th>MODEL NUMBER</th>
<th>GRAIN CAPACITY PER TANK</th>
<th>SALT DOSAGE PER REGENERATION</th>
<th>CAUSTIC DOSAGE PER REGENERATION</th>
<th>PIPE &amp; METER SIZE</th>
<th>SERVICE FLOW RATE</th>
<th>BACKWASH FLOW RATE</th>
<th>ANION RESIN PER TANK</th>
<th>TANK SIZES SOFTENER</th>
<th>SALT STORAGE</th>
<th>OVERALL DIMENSIONS (INCHES)</th>
<th>APPROX. SHIPPING WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATD-10-3/4</td>
<td>10,000</td>
<td>5</td>
<td>0.33</td>
<td>3/4</td>
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<td>5</td>
<td>1.1</td>
<td>1</td>
<td>9x48</td>
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<td>72</td>
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<td>3/4</td>
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<td>5</td>
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<td>18x40</td>
<td>96</td>
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<td>2.00</td>
<td>1.5</td>
<td>15</td>
<td>30</td>
<td>6</td>
<td>6</td>
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<td>20</td>
<td>40</td>
<td>8</td>
<td>8</td>
<td>24x72</td>
<td>24x40</td>
<td>114</td>
</tr>
<tr>
<td>MATD-100-1/2</td>
<td>100,000</td>
<td>50</td>
<td>3.33</td>
<td>1.5</td>
<td>25</td>
<td>50</td>
<td>12</td>
<td>10</td>
<td>30x72</td>
<td>24x40</td>
<td>132</td>
</tr>
</tbody>
</table>

Dimensions

NOTE: Installation piping and caustic drum (shown in broken lines) are provided by others.
'MDAS' Series Dealkalizer Systems

Overview
The Marlo 'MDAS' Series dealkalizer system offers an efficient alkalinity reduction solution for larger commercial & industrial applications. Dealkalization of boiler feed water reduces system blowdown and helps lower energy and water costs. It also promotes a more effective boiler chemical program and reduces condensate return line corrosion. Pre-engineered designs are available for single and twin tank configurations with numerous custom options available. MDAS systems can also be specially designed for high silica, nitrate, and sulfate removal applications.

Standard Features
- Carbon steel resin tanks with epoxy-lined interior
- Water activated diaphragm style control valves
- Volume and/or time initiated regeneration cycle
- Polyethylene brine tank assembly with injector
- Caustic injection pump with mounting stand
- Chloride form anion exchange resin
- Inlet/Outlet tank sampling valves
- Alkalinity testing kit
- Factory Hydro-tested at 100 psig

Materials of Construction
- Resin Tanks: Carbon steel with Safety Blue exterior paint
- Tank Lining: NSF 61 rated epoxy coating
- Exterior Piping: Galvanized steel pipe & cast iron fittings
- Internal Distributors: Sch 80 PVC/ABS
- Control Valves: Painted cast iron body
- Caustic Pump Wetted End: PVC
- Caustic Pump Stand: Painted carbon steel

Instrumentation / Controls
- Marlo MX-II electronic system controller
- Metered control with bypass for single units
- Alternating metered control for twin units
- NEMA-4X electrical enclosures
- Signet paddle-type flow sensors
- Inlet/Outlet pressure gauges
- Prewired caustic pump panel with adjustable relay timer

Operating Parameters
- Inlet Feedwater: Pre-softened (<1 gpg)
- Inlet Pressure: 30-100 psig
- Electrical: 120 V AC, 1-Ph, 60Hz
- Temperature: 35-110 °F

Options Available
- Skid mounted, pre-piped, pre-wired systems
- ASME code stamped resin tanks
- Allen-Bradley PLC systems
- Brine pump systems
- PVC or CPVC exterior piping
- Copper or Stainless steel exterior piping
- Stainless steel internal distributor piping
- Butterfly control valves (air operated)
### 'MDAS' Series Dealkalizer Systems

**Specifications**

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Grain Capacity (Grains)</th>
<th>Salt Dosage per Regeneration</th>
<th>Caustic Dosage per Regeneration</th>
<th>Pipe Size (Inches)</th>
<th>Service Flow Rate (GPM)</th>
<th>Backwash Flow Rate (GPM)</th>
<th>Anion Resin (GPM/Cont.)</th>
<th>Product Resistivity (INCHES)</th>
<th>Tank Sizes (Lbs.)</th>
<th>Overall Dimensions (LxWxH, Inches)</th>
<th>Shipping Weight (Lbs.)</th>
</tr>
</thead>
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**Notes**

1. Capacity based on 10,000 grains per cubic foot of resin when regenerated with 5 lbs. salt and 0.33 lbs. caustic. Capacity decreases as chloride levels exceed 10% of the total anions.
2. At pressure loss not exceeding 10 psi.
3. At pressure loss not exceeding 20 psi.
4. Dimensions are estimate only. Actual dimensions may vary based on job-site space limits and piping layout. Allow a minimum of 24” above height dimension for resin loading. Use of ASME rated tanks may add up to 12” of tank height.
5. Shipping weights are estimate only. Weights include resin and support gravel, which are added to the tanks after installation.

**Top View**

![Top View](image)

**Front View**

![Front View](image)

**NOTE:** Installation piping and caustic drum (shown in broken lines) are provided by others.
'MCP' Series Condensate Polisher Systems

Overview
The Marlo 'MCP' Series condensate polisher system offers a sound solution for removing impurities such as iron, copper, and hardness from returned steam condensate resulting in improved boiler feedwater quality and lower operating costs. Using sodium-cycle, cation exchange resin, they operate similar to water softeners requiring only salt for regeneration material. The system is fully automatic as standard and all valves and controls are completely factory pre-piped, pre-wired, and pre-tested for minimal installation time and cost. Multiple tank systems in alternating or parallel configurations, to achieve higher service flow or continuous supply of treated condensate are also available.

Standard Features
- 304 Stainless steel resin tanks
- Air-Operated butterfly style control valves
- Automatic timer initiated regeneration cycle
- Polyethylene brine tank assembly
- High capacity, High cross-link exchange resin
- Cold water backwash/regeneration supply water
- Automatic raw water bypass valve
- Inlet/Outlet tank sampling valves

Materials of Construction
- Resin Tanks: 304SS
- Exterior Piping: 304SS
- Internal Distributors: 304SS
- Control Valve Body: Cast Iron

Controls / Instrumentation
- Allen-Bradley PLC controller
- Simplex, alternating or parallel flow control
- NEMA-4X electrical enclosure
- Inlet/Outlet tank pressure gauges

Operating Parameters
- Inlet Pressure: 30-100 psig
- Electrical: 120VAC, 1-Ph, 60 Hz.
- Temperature: 100-230°F
- Air Source: 80-100 psig (Dry, oil-free)

Available Options
- ASME rated resin tanks
- 316 stainless steel construction
- Sub-surface wash distributor
- Water meter and totalizer
- Differential pressure switch
- Brine pump systems
- Alternate ion exchange resins
- Manually operated design
- Skid mount design for multi-tanks
### 'MCP' Series Condensate Polisher Systems

#### Specifications

<table>
<thead>
<tr>
<th>MODEL NUMBER</th>
<th>CAPACITY (Grains)</th>
<th>FLOW RATES (PER TANK)</th>
<th>PIPE SIZE</th>
<th>RESIN</th>
<th>TANK SIZES</th>
<th>OVERALL DIMENSIONS (INCHES)</th>
<th>SHIPPING WEIGHT (LBS)</th>
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</table>

**Notes**

1. Salt dosage equal to 15 lbs. per cu. ft. resin for maximum exchange capacity.
2. At a pressure drop not exceeding 15 psig.
3. At a pressure drop not exceeding 25 psig.
4. Brine tanks designed for a salt storage of at least 4 regeneration cycles.
5. Dimensions are estimate only. Actual dimensions may vary depending on options selected.
6. Shipping weights are estimate only. Weights include resin and gravel.
The MX-III Water Conditioning Controller simplifies installation and maximizes performance for commercial & industrial water softeners, backwashable media filters, and dealkalizer systems. The controller, coupled with a rotary pilot stager, is designed to be used on equipment where external diaphragm valve nests are incorporated. Numerous system types and customized configurations can be used – all with the same controller making it truly universal. Up to four (4) controllers can be networked together using low-voltage communication cables thereby eliminating the need for an electrician to install. Perfect for both new equipment and retrofit of older equipment in need of an upgraded control system.

Key Features
- Large, 16-character, 2-line backlit LCD display
- UL-508A certified control panel
- NEMA-4X rated fiberglass enclosure
- Large, durable membrane switch keypad
- Integral, pre-wired stager and override solenoid
- Timer or remote signal regeneration initiation
- Timed auxiliary output for brine reclaim or chemical pump operation
- LED light indicates system status or alarm
- English/metric units
- Calendar override regeneration
- Display of time of day, flow rate, batch volume remaining, peak flow, totalizer, valve position, and hours since last regeneration
- Can be used with most third party ‘open collector’ type water meters

System Configuration
Twenty (20) unique systems are available in the MX-III Controller including:
- Single Tank
- Twin Tank Alternating
- Multi-Tank Parallel (2-4 Tanks)
- Multi-Tank Progressive Flow (2-4 Tanks)
- Multi-Tank Sequential (2-4 Tanks)

Electrical Rating
Available in 120/220 V AC, 50/60 Hz Input, 24 VAC Output

Regeneration Types
- Time Clock Delayed
- Meter Immediate Delayed
- Remote Signal Initiation (Meter/DP Switch)
- Manual Initiation