

Installation / Operation Manual

Nitrate / Sulfate Water Treatment System

Signature Series Control Valve

For Model Numbers :

MN15

MN25

CSI Inc.

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General Specifications	MN15	MN25
Grains Capacity / Regeneration	15,000	25,000
Maximum Raw Water Nitrate / Sulfate (mg/l)	100	100
Maximum Clear Iron / Manganese (ppm)	0	0
Maximum Raw Water Hardness (grains)	3	3
Salt Used / Regeneration (pounds)	18.0	30.0
Exchange Resin (cu. ft.)	1.5	2.5
Underbed "D" Gravel required (pound)	N/A	50
Mineral Tank (Polyglass)	10 x 54	13 x 54
Brine Tank (Polyethylene with Grid & Safety)	18 x 33	18 x 33
Service Flow Rate (gpm)*	5.0	8.0
Backwash Flow Rate (gpm)	1.2	2.0
Gallons Used / Regeneration	60	80
Space Required (D x W x H inches)	18 x 28 x 62	18 x 30 x 56
Approximate Shipping Weight (pounds)	133	225

*** The pressure drop does not exceed 15.0 psi at Service Flow Rate.**

Typical Installation

Installation Requirements

- A level floor position ahead of piping into water heater.
- Unit must be installed at least 10' ahead of the inlet to a water heater to prevent damage due to back-up of hot water.
- **Do not** install unit in an area of direct sunlight or where freezing temperatures may occur! (See Installation Diagrams for proper placement and plumbing connections.)

Nitrate Filter Location / Other Requirements

- Locate the unit near an unswitched, 120 volt / 60 Hz grounded electrical outlet.
- Check for distance and proper drain installation (e.g. floor drain, washing machine standpipe).
- Determine type and size of piping required for nitrate filter connection (e.g. copper, galvanized, PVC plastic).

Note : If household plumbing is galvanized and you intend to make the installation with copper (or vice versa), obtain di-electric unions to prevent dissimilar metal corrosion.

Note : Where the drain line is elevated above the control valve or exceeds 20 feet in length to reach the drain, use 3/4" I.D. drain line tubing instead of 1/2" I.D. Drain line tubing is not included.

Caution : *If sweat soldering copper pipe (remember to always use lead free solder and flux), cover yoke and bypass valve with wet rags to prevent heat damage to connections and control valve! If using PVC or plastic pipe, primers and solvent cements specifically recommended for use with potable water are required.*

Note : All plumbing lines not requiring "soft" water should be connected "upstream" of the softener. (See Typical Installation Diagrams.)

Installation Procedure

- Water Supply Connections and Bypass Valve -

To allow for filter servicing, swimming pool filling or lawn sprinkling, a manual bypass valve has been installed at the factory. The bypass allows water to be manually routed around the filter.

1. Position filter at desired location for installation. (See Installation Diagrams.)
2. **For MN25 Units ONLY** - The resin material is shipped separately from the mineral tank. Remove the valve by unscrewing from center hole. Leave distributor tube in while filling. Use a cork or tape to place over top of distributor tube to prevent material from entering tube while filling. Place funnel in hole. Pour several gallons of water in the tank. *Pour in the "D" gravel. Pour in the resin material on top of the gravel underbedding.* Remove funnel and cork or tape from distributor tube. Clean tank threads and fill the mineral tank completely with water. Replace the valve, being careful to position the distributor tube into the distributor tube pilot hole.
3. Turn OFF main water supply and OPEN nearest faucet to relieve pressure.
4. Cut main line and install appropriate elbows and extensions. Inlet and outlet connections on the control valve are 3/4" FNPT.

Note : An optional 1" FNPT yoke is available.

Caution : *Raised arrows located on the sides of control valve body and bypass valve indicate proper direction of water flow. Install inlet and outlet piping in direction of arrows.*

5. Rotate inlet and outlet knobs on bypass valve to the bypass position (position of bypass knobs are at right angles to inlet / outlet piping).
6. Turn the main supply line on to restore water service to the home.
7. OPEN nearest faucet to evacuate air and repressurize plumbing lines.
8. Check for leaks!

- Drain Line Connection -

1. Pull out clip and remove drain line assembly located on the left side of control valve. Remove drain line hose barb and wrap threads with Teflon tape. Reinstall drain line hose barb. **Caution :** *Hand tighten only!!!* Replace drain line assembly and reinstall clip.
2. Install 1/2" I.D. drain line tubing (not included) from hose barb to an open drain. A 4" gap between the end of the drain line and the open drain is required to prevent waste water backflow. Keep the drain line as short as

possible. An overhead drain line can be used if necessary, but should discharge below the control valve. A syphon trap (taped loop) at the outlet of the drain line is advisable to keep the drain line full and assure correct flow during regeneration. Elbows or other fittings must be kept at a bare minimum.

Note : Where the drain line is elevated above the control valve or exceeds 20' in length, 3/4" I.D. drain line tubing should be used.

- Brine Line and Overflow Connection -

1. Position brine tank on a smooth, level surface near the nitrate filter resin tank. If necessary, the brine tank can be placed at a higher level than the resin tank, but **never at a lower level.**
2. Install one end of 3/8" O.D. by 1/4" I.D. brine line tubing (included with unit) to compression fitting located on left side of control valve.
3. Remove brine tank cover.
4. Remove cap from brine well.
5. Insert opposite end of brine line through outer hole in brine tank.
6. Connect brine line to compression fitting on safety brine valve located inside brine well.
7. Install 1/2" I.D. drain line tubing (not included) to the overflow fitting on brine tank located just below the brine line.
8. Run the opposite end of brine tank drain line to a suitable drain.

Note : The brine tank drain line is gravity flow and must discharge below the overflow fitting.

Caution : Do not "TEE" to the main drain line from control valve.

Notice : The brine overflow is provided as a back-up in the event the safety float shut-off should fail, allowing the brine tank to overflow. This drain connection would then carry the excess water to the drain and prevent flooding of the floor. Therefore, no liability will or can be assumed by the manufacturer of the nitrate filter should this occur.

- Electrical Connection -

1. Connect the power supply to the control valve and plug into a 115 volt / 60 Hz receptacle.

Note : Do not plug into an outlet controlled by a wall switch or pull chain that could inadvertently be turned off.

- Installing Battery Back-Up -

1. Remove the rear cover.
2. Install a 9 volt battery. Refer to page 3, item 3 of the Signature Series Service Manual.
3. Reinstall rear cover.

- Pressurizing The System -

1. Slowly rotate inlet knob of the bypass valve to the **SERVICE** position. Slowly rotate outlet knob to the **SERVICE** position. (Position of bypass knobs are parallel to inlet / outlet piping).
2. Open the nearest faucet to evacuate air from plumbing lines.
3. Check for leaks!

- Programming The Control Valve -

Refer to page 2 of the Signature Series Service Manual for main menu programming and instruction.

1. Set time of day.
2. Set a.m. or p.m.
3. Set grains of nitrate. (Refer to Regeneration Calculation Procedure.)

How To Calculate Regeneration Frequency

Note : The quantity of both nitrate and sulfate must be known for proper regeneration calculation.

Step 1: Convert Nitrate (NO₃) and Sulfate (SO₄) to as Calcium Carbonate (CaCO₃).

Nitrate
(NO₃) Divide ppm (mg/l) of Nitrate by 62 and multiply by 50.1.

Example : (50 ppm NO₃ / 62) x 50.1 = 40.4 ppm as CaCO₃

Sulfate
(SO₄) Divide ppm (mg/l) of Sulfate by 48 and multiply by 50.1.

Example : (75 ppm SO₄ / 48) x 50.1 = 78.28 ppm as CaCO₃

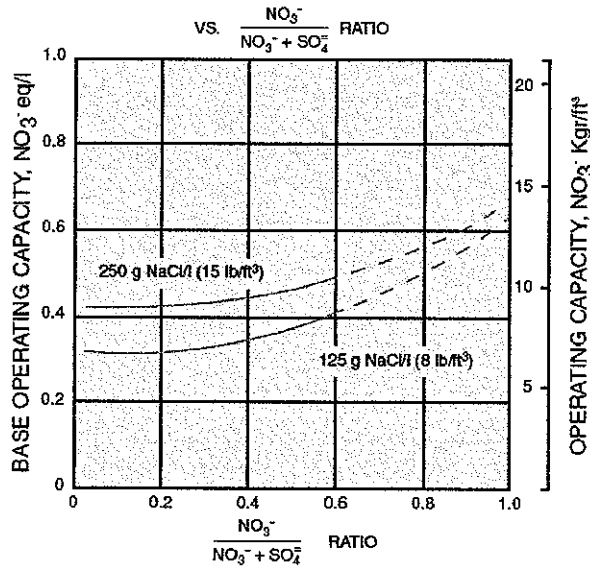
Step 2 : Calculate the Nitrate / Sulfate ratio (as CaCO₃).

$$\frac{\text{NO}_3 \text{ (Nitrate)}}{\text{NO}_3 \text{ (Nitrate)} + \text{SO}_4 \text{ (sulfate)}} = \text{Ratio}$$

Example :
$$\frac{40.4 \text{ ppm}}{40.4 \text{ ppm} + 78.28 \text{ ppm}} = .34 \text{ Ratio}$$

Step 3 : Calculate the operating capacity per cubic foot of resin at 12 lbs. per cubic foot salting (factory setting).

Fig. 3 OPERATING CAPACITY



Note : *DO NOT REDUCE SALT BELOW THIS LEVEL!*

Operating Capacity = 8,500 grain / cu. ft. of media

Step 4 : Calculate the grains capacity for the system being installed.

$$\begin{aligned}\text{Example : MN15} &= 1.5 \text{ cu. ft.} \times 8,500 \text{ grains / cu. ft.} \\ &= 12,750 \text{ total grains capacity}\end{aligned}$$

Step 5 : Calculate total grains of nitrate.

$$\frac{\text{NO}_3 \text{ ppm as CaCO}_3}{17.1} = \text{grains of Nitrate}$$

$$\text{Example : } \frac{40.4 \text{ ppm NO}_3 \text{ as CaCO}_3}{17.1} = 2.36 \text{ grains (or 3 grains)}$$

Step 6 : Enter meter programming mode (see page 7 of the Signature Series Service Manual) and set system capacity (items) to answer in step 4.

$$\text{Example : } 12,750 \text{ grains capacity}$$

Step 7: Program the Signature Series Control Valve for grains of nitrate calculated in step 5.

$$\text{Example : } 3 \text{ grains (always round the number up)}$$

- Control Valve Operation -

Refer to page 4, item 2 of the Signature Series Service Manual Instructions.

1. Manually index control valve to **BACKWASH** (cycle 1) position and allow water to run to drain for 3 to 4 minutes. **Warning** : Close *inlet valve on bypass* prior to selecting the backwash position. After backwash position has been established, *slightly open inlet valve on bypass* to evacuate air from the media tank. Fully open inlet valve when all air is depleted. This procedure will prevent media from being uplifted into control valve.
2. Manually index control valve to **BRINE REFILL** (cycle 4) position and allow the brine tank to fill just over the salt grid plate.
3. Manually index control valve to **BRINE & RINSE** (cycle 2) and allow the control valve to draw water from the brine tank until it stops.
4. Manually index control valve to **SERVICE** (cycle 0) position.
5. Manually index control valve to **BRINE TANK REFILL** (cycle 4) position and allow the control valve to automatically fill the brine tank.

Note : Control valve will advance to service position automatically.

6. After control valve has advanced to **SERVICE** position, press and hold the **SET / CHANGE BUTTON** until 0000 gallons appears in the presentation. This will allow the unit to regenerate the first night, conditioning the resin.

- Filling The Brine Tank With Salt -

To expect a high level of performance and reliability, a salt manufactured specifically for water softeners must be used. Salt of this grade is virtually free from dirt and other particulate that would eventually cause the nitrate filter to malfunction. A pellet type salt is recommended, although any high quality water softener salt (such as solar salt) will suffice. The salt level will decrease after each regeneration cycle. Consequently, the brine tank will need to be checked and replenished periodically.

1. Fill the brine tank with water softener salt as described above. This will be approximately 250 pounds of salt.

Warning : Do not fill above level of the brine well.

2. Replace brine tank lid.

- Final Check -

1. Be certain the bypass valve is in the **SERVICE** position.
2. Make sure the power supply is connected to an uninterrupted 115 volt outlet.
3. Check that the time of day is set.
4. Double check regeneration schedule.
5. Make final check for leaks!
6. Fill out and mail warranty card.
7. Leave all manuals with unit.

Operation, Care and Cleaning

When the inlet / outlet knobs on the bypass valve are in the **SERVICE** position (position of bypass knobs are parallel to the inlet / outlet piping), water is directed through the nitrate filter. Water may be bypassed by turning the inlet / outlet knobs to the bypass position (position of bypass knobs are at right angles to inlet / outlet piping). Water to the home will bypass the nitrate filter and be *untreated*.

You should manually bypass the nitrate filter if :

1. The outside lines do not bypass the nitrate filter and water is to be used for lawn sprinkling or other similar uses.
2. Servicing the nitrate filter.
3. A water leak from the nitrate filter is evident.
4. *Shock treating* water well and piping with chlorine or other disinfectant.

- Extra Regeneration -

If soft water demands are unusually heavy, an extra regeneration can be initiated manually :

Refer to page 4, item 2 of the Signature Series Service Manual.

- To Skip A Regeneration -

1. For vacations or extended periods of absence, the power supply can be disconnected from the control valve.
2. Upon return, plug in cord and reset the time of day, if 9 volt battery was not installed. If battery was installed, replace battery.

- General Care and Cleaning -

1. Do not place heavy or sharp objects on nitrate filter.
2. Use only mild soap and warm water to clean exterior of the unit. Never use harsh, abrasive cleaners.
3. Protect the nitrate filter and drain line from freezing.
4. Reset time for daylight saving time periods.
5. Replace 9 volt battery once a year.
6. Inspect and clean the brine tank when sediment appears in the bottom of the brine tank.
7. Always keep the brine tank supplied with good quality salt, a type designed for use in water softeners.