

# Installation / Operation Manual

## Nitrate / Sulfate Water Treatment System

### *Signature Series* Control Valve

For Model Numbers :

**TN15**

**TN25**

***CSI Inc.***

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<b>General Specifications</b>	<b>TN15</b>	<b>TN25</b>
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.)

## How To Calculate Regeneration Frequency

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

**Step 1:** Convert Nitrate ( $\text{NO}_3$ ) and Sulfate ( $\text{SO}_4$ ) to as Calcium Carbonate ( $\text{CaCO}_3$ ).

Nitrate  
( $\text{NO}_3$ )     Divide ppm (mg/l) of Nitrate by 62 and multiply by 50.1.

Example :  $(50 \text{ ppm NO}_3 / 62) \times 50.1 = 40.4 \text{ ppm as CaCO}_3$

Sulfate  
( $\text{SO}_4$ )     Divide ppm (mg/l) of Sulfate by 48 and multiply by 50.1.

Example :  $(75 \text{ ppm SO}_4 / 48) \times 50.1 = 78.28 \text{ ppm as CaCO}_3$

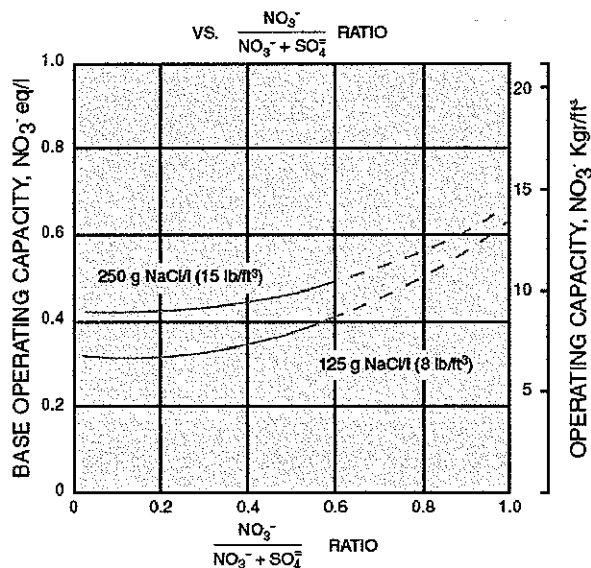
**Step 2 :** Calculate the Nitrate / Sulfate ratio (as  $\text{CaCO}_3$ ).

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

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.

$$\begin{aligned} \text{Example : TN15} &= 1.5 \text{ cu. ft.} \times 8,500 \text{ grains / cu. ft.} \\ &= 12,750 \text{ total grains capacity} \end{aligned}$$

Step 5 : Calculate total grains of nitrate.

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

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

Step 6 : Calculate gallon capacity.

$$\frac{\text{NO}_3 \text{ grains capacity}}{\text{Grains NO}_3} = \text{gallons}$$

$$\text{Example : } \frac{12,750 \text{ grain capacity}}{2.36 \text{ grains NO}_3} = 5,402 \text{ gallons between regeneration}$$

Step 7 : Calculate number of days between regeneration.

$$\begin{aligned} &75 \text{ gallons usage per person / day} \\ &\times \text{ Number of people in family} \end{aligned} = \text{Gallons usage per day}$$

$$\text{Example : } 75 \text{ gallons} \times 4 \text{ people} = 300 \text{ gallons usage per day}$$

$$\frac{5,402 \text{ gallon capacity}}{300 \text{ gallons usage per day}} = 18 \text{ days}$$

Step 8 : Program the Signature Series control valve for every 18 days between regeneration.

### - 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 one (1) day 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.