

## **SURGE-TROL™**



### **For Models:**

SPT-7	SPT-35
SPT-11	SPT-42
SPT-14	SPT-50
SPT-18	SPT-56
SPT-21	SPT-70
SPT-28	



**THIS IS THE SAFETY ALERT SYMBOL. IT IS USED TO ALERT YOU TO POTENTIAL PERSONAL INJURY AND OTHER HAZARDS. OBEY ALL SAFETY MESSAGES THAT FOLLOW THIS SYMBOL TO REDUCE THE RISK OF PERSONAL INJURY AS WELL AS PROPERTY DAMAGE.**

### **WARNING**

**READ CAREFULLY THE PRODUCT INSTALLATION, OPERATING AND MAINTENANCE MANUAL. FAILURE TO FOLLOW THE INSTRUCTIONS AND WARNINGS IN THE MANUAL MAY RESULT IN SERIOUS OR FATAL INJURY AND/OR PROPERTY DAMAGE, AND WILL VOID THE PRODUCT WARRANTY. THIS PRODUCT MUST BE INSTALLED BY A QUALIFIED PROFESSIONAL. FOLLOW ALL APPLICABLE LOCAL AND STATE CODES AND REGULATIONS, IN THE ABSENCE OF SUCH CODES, FOLLOW THE CURRENT EDITIONS OF THE NATIONAL PLUMBING CODE AND NATIONAL ELECTRIC CODE, AS APPLICABLE.**





# IMPORTANT GENERAL SAFETY INFORMATION

ADDITIONAL SPECIFIC SAFETY ALERTS APPEAR IN THE FOLLOWING INSTRUCTIONS

**⚠️ WARNING EXPLOSION OR RUPTURE HAZARD** A relief valve must be installed to prevent pressure in excess of local code requirement or maximum working pressure designated in the Product Manual, whichever is less. Do not expose Product to freezing temperatures or temperatures in excess of 240° F. Do not exceed maximum allowable working pressure 275 psig. Do not adjust the pre-charge or re-pressure this Product except for any adjustments required at the time of initial installation, especially if Product is corroded, damaged or with diminished integrity. Adjustments to pre-charge must be done at ambient temperature only. Failure to properly size the Product or follow these instructions may result in excessive strain on the system leading to Product failure, serious or fatal personal injury, leakage and/or property damage.

**⚠️ WARNING** This Product, like most Products under pressure, may over time corrode, weaken and burst or explode, causing serious or fatal injury, leaking or flooding and/or property damage. To minimize risk, a licensed professional must install and periodically inspect and service the Product. A drip pan connected to an adequate drain must be installed if leaking or flooding could cause property damage. Do not locate in an area where leakage of the tank or connections could cause property damage to the area adjacent to the appliance or to lower floors of the structure.

**⚠️ WARNING Chlorine & Aggressive Water.** The water quality can significantly influence the life of this product. You should test for corrosive elements, acidity, total

solids and other relevant contaminants, including chlorine and treat your water appropriately to insure satisfactory performance and prevent premature failure.

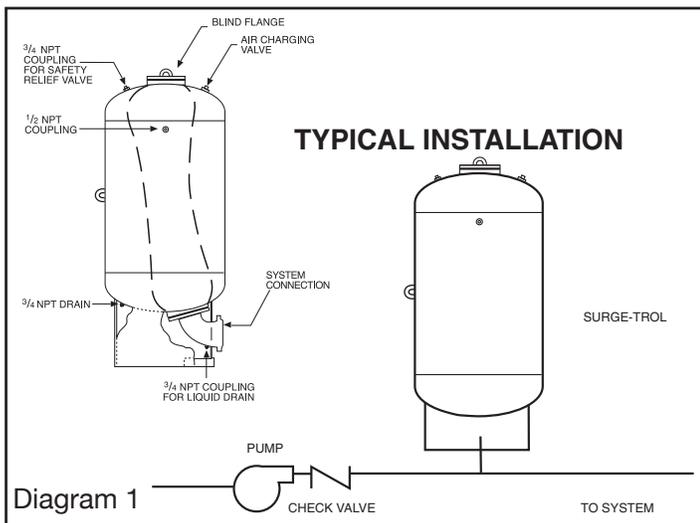
**Note:** Inspect for shipping damage and notify freight carrier or store where purchased immediately if damage present. If the product appears to be malfunctioning or shows signs of corrosion, call a qualified professional. Current copies of the product manual can be viewed at [www.amtrol.com](http://www.amtrol.com). Use proper safety equipment when installing.

**⚠️ IMPORTANT GENERAL SAFETY INFORMATION - ADDITIONAL SPECIFIC SAFETY ALERTS APPEAR IN THE FOLLOWING INSTRUCTIONS.**

**⚠️ WARNING CALIFORNIA PROPOSITION 65 WARNING:** This product contains a chemical known by the State of California to cause cancer and to cause birth defects or other reproductive harm. (California Installer/Contractor - California law requires that this notice be given to consumer/end user of this product.) For more information: [www.amtrol.com/prop65/htm](http://www.amtrol.com/prop65/htm).

**⚠️ WARNING DO NOT USE OXYGEN - EXPLOSIVE!** Protect against freezing temperatures. Never pre-charge below 50% of maximum system pressure.

## INSTALLATION AND OPERATION INSTRUCTIONS



### Pre-Installation

1. Visually inspect the Surge-Trol for any damage. If damage exists return product for replacement.
2. Remove air cap.
3. For applications with pump start-up creating water hammer adjust the factory pre-charge setting to 15% below static pressure.
4. For applications with surge issues created by pump shut down adjust the factory pre-charge setting to 50% below static pressure.
5. For applications with quick closing valves, please consult manufacturer for tank location and pre-charge settings. (401) 535-1216.
6. Replace and tighten cap on air valve.

**⚠️ WARNING** If adjusting the pre-charge pressure higher than 55 PSIG the unit must be tied to the system immediately. Failure to do so could damage the bladder and void all warranties.

### Installation

1. The Surge-Trol should be installed as close to the offending fixture as possible in applications where there are issues with a quick closing valve.
2. The Surge-Trol should be installed as close to the pump as possible in surge applications.
3. Once the Surge-Trol is installed and the pre-charge adjusted properly, check for any leakage. Make repairs if necessary

### Maintenance

1. A qualified professional should check the complete system, including the Surge-Trol, yearly and more frequently as the system ages.

### Operation

1. The Surge-Trol is designed to provide surge protection as well as provide a cushion to prevent water hammer depending on its application.
2. Water temperature is not to exceed 240°F. or fall below 35°F.
3. The factory pre-charge setting is 25 PSIG and should only be adjusted at the time of the installation.
4. System velocity shall not exceed 22 fps.

# SIZING THE **SURGE-TROL**™

## Precise Sizing For Pump Shut-down:

$$\text{Volume of Tank in Gallons} = \frac{Vv}{AF}$$

$$AF - \text{Acceptance Factor} = 1 - \left( \frac{P_1 + 14.7}{P_2 + 14.7} \right)^{1/n}$$

$$Vv - \text{Vacuum Volume} = Q_{ss} \times T_c \times 7.481$$

$$T_c - \text{Critical Time in seconds} = \frac{2L}{a}$$

NOTE: Set pre-charge pressure 50% below static pressure.

## Use:

SG = Specific gravity of fluid: Water 1  
Ethylene glycol 1.1  
Propylene glycol 1.1  
Glycerin 1.3

Qs = Fire pump flow rate in gpm  
Qss = Fire pump flow rate in feet per second  
L = Length of pipe in feet  
a = Speed of pressure wave in feet per second: Steel pipe 4500 ft/sec  
Cast iron = 4500 ft/sec  
Ductile iron 4500 ft/sec  
PVC pipe = 1250 ft/sec

P<sub>2</sub> = Maximum allowable pressure  
P<sub>1</sub> = Tank pre-charge pressure setting  
n = Gas constant (pre-charge gas) dry air 1.2  
nitrogen 1.4

A = Area of Pipe - pipe size  
V = Velocity of water in feet per second

## Precise Sizing For Pump Start-up:

$$\text{Volume of Tank in Cubic Feet} = \left( \frac{SG \times 2 \times Q_s \times L}{449a} \right) \left( \frac{P_2 + 14.7}{P_1 + 14.7} \right)^{1/n} - 1$$

NOTE: Set pre-charge pressure 15% below static pressure.

NOTE: To convert cubic feet to gallons multiply by 7.481.

## Precise Sizing Example

### For Pump Shut-down Based On:

Pump = 100 GPM  
Pipe = 2" Steel Pipe; 1000 ft of pipe  
Static Pressure = 100 psig  
Max. Pressure = 150 psig  
Pre-charge Gas = Dry Air

$$T_c = \frac{2L}{a} = \frac{2(1000)}{4500} = \frac{2000}{4500} = .444$$

$$Vv = Q_{ss} \times T_c \times 7.481 = 9.5 \times .444 \times 7.481 = 31.55$$

$$AF = 1 - \left( \frac{P_1 + 14.7}{P_2 + 14.7} \right)^{1/n} = 1 - \left( \frac{64.7}{164.7} \right)^{1/1.2} = .54$$

$$\text{Volume of Tank in Gallons} = \frac{Vv}{AF} = \frac{31.55}{.54} = 58.4$$

Recommendation = SPT-11

Model No.	Tank Vol.		A Height		B Diameter		Sys. Conn.	C Conn. Inset	D Conn. CtrLine	E Stand Dia	Ship Wt.	
	Lit.	Gal	mm	ins.	mm	ins.					ins.	ins.
SPT-7	200	53	1245	48 <sup>7</sup> / <sub>8</sub>	610	24	4	1 <sup>9</sup> / <sub>16</sub>	8 <sup>3</sup> / <sub>16</sub>	19	166	367
SPT-11	300	80	1600	62 <sup>7</sup> / <sub>8</sub>	610	24	4	1 <sup>9</sup> / <sub>16</sub>	8 <sup>3</sup> / <sub>16</sub>	19	208	459
SPT-14	400	106	1956	76 <sup>7</sup> / <sub>8</sub>	610	24	4	1 <sup>9</sup> / <sub>16</sub>	8 <sup>3</sup> / <sub>16</sub>	19	282	618
SPT-18	500	132	2311	90 <sup>7</sup> / <sub>8</sub>	610	24	4	1 <sup>9</sup> / <sub>16</sub>	8 <sup>3</sup> / <sub>16</sub>	19	333	731
SPT-21	600	158	1893	74 <sup>11</sup> / <sub>16</sub>	762	30	4	1 <sup>3</sup> / <sub>8</sub>	7 <sup>1</sup> / <sub>4</sub>	24	433	950
SPT-28	800	211	2365	93 <sup>1</sup> / <sub>8</sub>	762	30	4	1 <sup>3</sup> / <sub>8</sub>	7 <sup>1</sup> / <sub>4</sub>	24	513	1125
SPT-35	1000	264	2086	82 <sup>1</sup> / <sub>8</sub>	914	36	6	3 <sup>1</sup> / <sub>4</sub>	7 <sup>1</sup> / <sub>2</sub>	30	693	1520
SPT-42	1200	317	2465	94 <sup>1</sup> / <sub>2</sub>	914	36	6	3 <sup>1</sup> / <sub>4</sub>	7 <sup>1</sup> / <sub>2</sub>	30	784	1720
SPT-50	1400	370	2781	109 <sup>1</sup> / <sub>2</sub>	914	36	6	3 <sup>1</sup> / <sub>4</sub>	7 <sup>1</sup> / <sub>2</sub>	30	866	1900
SPT-56	1600	422	2178	85 <sup>3</sup> / <sub>4</sub>	1220	48	8	1 <sup>3</sup> / <sub>4</sub>	10 <sup>7</sup> / <sub>8</sub>	42	1049	2300
SPT-70	2000	528	2528	99 <sup>5</sup> / <sub>8</sub>	1220	48	8	1 <sup>3</sup> / <sub>4</sub>	10 <sup>7</sup> / <sub>8</sub>	42	1231	2700

Description	Standard Construction
Shell	Steel
Bladder	Heavy Duty Butyl NSF/ANSI 61
Bladder Thickness	.100 Minimum
System Connection	Steel - ANSI Flange
Coating	Red Oxide Primer
Factory Precharge	25 PSIG (1.7 bar)

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## AMTROL INC. LIMITED PRODUCT WARRANTY

**Products covered: all Products manufactured by AMTROL Inc. ("AMTROL").**

This warranty cannot be transferred – it is extended only to the original Purchaser or First User of the Product. By accepting and keeping this Product you agree to all of the warranty terms and limitations of liability described below.

**IMPORTANT WARNING – READ CAREFULLY THE INSTALLATION, OPERATING AND MAINTENANCE INSTRUCTIONS MANUAL ("MANUAL") to avoid serious personal injury and/or property damage and to ensure safe use and proper care of this product.**

### Who Receives AMTROL's Product Warranty

All purchasers or first users of the new Product. The Warranty is non-transferable.

### What is covered by this Warranty

AMTROL warrants to the purchaser or first user of the new Product that at the time of manufacture, the Product is free from defects in material and workmanship. **Any warranty claim must be made within one (1) year unless another time period is set forth in the Manual, measured from the time the Product was purchased.**

### What AMTROL Will Do If You Have a Covered Warranty Claim

In the event of a breach of the foregoing warranty, AMTROL will at its option either make repairs to correct any defect in material or workmanship or supply and ship either new or used replacement parts or products. AMTROL will not accept any claims for labor or other costs.

### What This Warranty Does Not Cover – Exclusions and Limitations

This Warranty does not cover any failure or problem unless it was caused by a defect in material or workmanship. In addition, this Warranty shall not apply:

- if the Product is not correctly installed, operated, repaired or maintained as described in the Manual provided with the Product;
- to any failure or malfunction resulting from abuse (including freezing); improper or negligent: handling, shipping (by anyone other than AMTROL), storage, use, operation, accident; or alteration, lightning, flood or any other environmental condition;
- to any failure or problem resulting from the use of the Product for any purpose other than those specified in the accompanying Manual or alteration of any part of the product;
- if the Product is used anywhere except the United States, its territories or possessions, or Canada;
- this Warranty does not cover labor costs, shipping charges, service charges, delivery expenses, administrative fees or any costs incurred in removing or reinstalling the Product;
- this Warranty does not cover any claims submitted to AMTROL or an AMTROL-authorized distributor or retailer more than 30 days after expiration of the applicable warranty time period described in this Warranty;
- this Warranty also does not cover repair or replacement costs not authorized in advance by AMTROL.

### Additional Warranty Limitations

**ALL IMPLIED WARRANTIES, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE SPECIFICALLY DISCLAIMED. Some states do not allow limitations on how long an implied Warranty lasts, so the above limitation may not apply to you.**

### Limitations of Remedies

**THE REMEDIES CONTAINED IN THIS WARRANTY ARE THE PURCHASER'S OR FIRST USER'S EXCLUSIVE REMEDIES. IN NO CIRCUMSTANCES WILL AMTROL BE LIABLE FOR MORE THAN, AND PURCHASER-FIRST USER'S REMEDIES SHALL NOT EXCEED, THE PRICE PAID FOR THE PRODUCT. IN NO CASE SHALL AMTROL BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, WHETHER RESULTING FROM NONDELIVERY OR FROM THE USE, MISUSE, OR INABILITY TO USE THE PRODUCT OR FROM DEFECTS IN THE PRODUCT OR FROM AMTROL'S OWN NEGLIGENCE OR OTHER TORT.** This exclusion applies regardless of whether such damages are sought for breach of warranty, breach of contract, negligence, strict liability, in tort or under any other legal theory. Such damages include, but are not limited to, inconvenience, loss or damage to property, mold, loss of profits, loss of savings or revenue, loss of use of the Products or any associated equipment, facilities, buildings or services, downtime, and the claims of third parties including customers. Some states do not allow the exclusion or the limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

### What To Do If You Have a Problem Covered By This Warranty

Any covered Warranty service must be authorized by AMTROL. Contact the person from whom you purchased the Product, who **must** receive authorization from an AMTROL distributor or AMTROL. If you do not receive a prompt response, call AMTROL directly at 877-517-9673. Notice of a Warranty claim should be submitted by the authorized distributor to AMTROL at the following address:

AMTROL Inc.  
Warranty Claim Dept.  
1400 Division Rd.  
West Warwick, RI 02893

Before AMTROL determines to provide any replacement part or Product, it may as a pre-condition to making such a determination require that the warranty claimant ship the Product, postage prepaid to an authorized AMTROL distributor, or to AMTROL and provide proof of purchase evidenced by the original sales receipt or Product registration.

### Replacement Product Warranty

In case of replacement of a Product or any component part, AMTROL reserves the right to make changes in the design, construction, or material of the substitute components or products, which shall be subject to all of the terms and limitations of this Warranty, except that the applicable warranty periods shall be reduced by the amount of time the warranty claimant owned the product prior to submitting notification of the warranty claim.