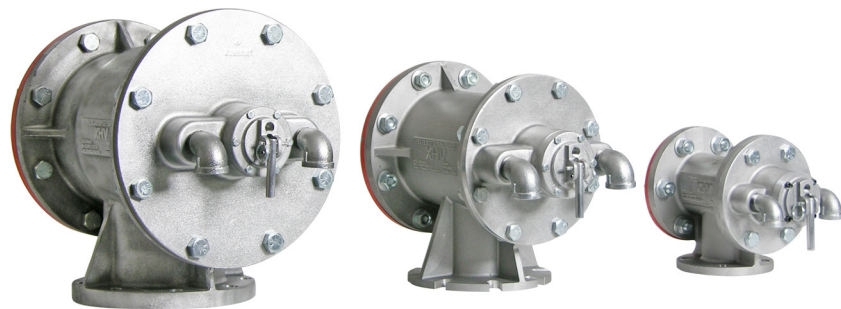


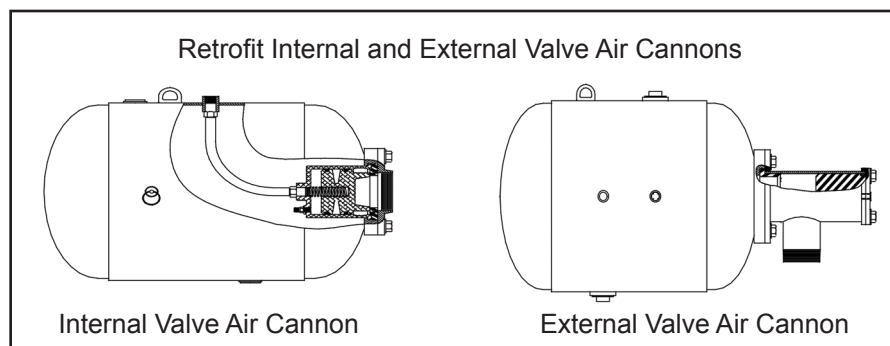


Martin® Tornado Retrofit Valve

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Martin® Tornado Retrofit Valves



Operator's Manual
M3405-T

Important

MARTIN ENGINEERING HEREBY DISCLAIMS ANY LIABILITY FOR: DAMAGE DUE TO CONTAMINATION OF THE MATERIAL; USER'S FAILURE TO INSPECT, MAINTAIN AND TAKE REASONABLE CARE OF THE EQUIPMENT; INJURIES OR DAMAGE RESULTING FROM USE OR APPLICATION OF THIS PRODUCT CONTRARY TO INSTRUCTIONS AND SPECIFICATIONS CONTAINED HEREIN. MARTIN ENGINEERING'S LIABILITY SHALL BE LIMITED TO REPAIR OR REPLACEMENT OF EQUIPMENT SHOWN TO BE DEFECTIVE.

Observe all safety rules given herein along with owner and Government standards and regulations. Know and understand lockout/tagout procedures as defined by American National Standards Institute (ANSI) z244.1-1982, *American National Standard for Personnel Protection - Lockout/Tagout of Energy Sources - Minimum Safety Requirements* and Occupational Safety and Health Administration (OSHA) Federal Register, Part IV, 29 CFR Part 1910, *Control of Hazardous Energy Source (Lockout/Tagout); Final Rule*.

The following symbols may be used in this manual:



Danger: Immediate hazards that will result in severe personal injury or death.



Warning: Hazards or unsafe practices that could result in personal injury.



Caution: Hazards or unsafe practices that could result in product or property damages.



Important: Instructions that must be followed to ensure proper installation/operation of equipment.



Note: General statements to assist the reader.

Inspection Instructions

⚠ WARNING

Before retrofitting with the valve assembly, inspect existing air cannon mount, pressure vessel, control system, air supply system, and structure walls. If you have any doubts or concerns about the integrity of any of these components, **DO NOT RETROFIT**. Failure to inspect can result in damage to property and injury to personnel.

1. **Inspect mount** for wear, broken or cracked welds, and loose fasteners. If any exist, repair or replace before retrofitting. If you have doubts or concerns about the integrity of the mount, do not retrofit.
2. **Inspect pressure vessel** (air cannon tank):
 - a. Make sure pressure vessel was manufactured according to governing body codes and specification on pressure vessel construction (i.e., American Society of Mechanical Engineers [ASME] or CE codes). If pressure vessel was not manufactured according to ASME or CE codes, do not retrofit.
 - b. Visually inspect interior and exterior of pressure vessel for cracked welds, rust, metal pitting, and damage. If any exists, repair or replace before retrofitting.
 - c. Inspect safety relief valve. If valve does not relieve pressure when actuated, replace before retrofitting.
 - d. If you have any doubts or concerns about the integrity of the pressure vessel, do not retrofit.
3. **Inspect control system** for operation. Repair or replace any defects before retrofitting.
4. **Inspect air supply system** for operation and leaks. Repair or replace any defects before retrofitting.

Inspect structure walls. If wall thickness is less than 1/4 in. (6 mm) for steel walls or 3/8 in. (9 mm) for aluminum walls, contact Martin Engineering before retrofitting. For cement walls, inspect for cracks. If any exist, do not retrofit.

Installation



⚠ DANGER

Turn off and lock out/tag out air supply and energy source before blasting air cannon to prevent air cannon from refilling.

Do not open door/port or enter structure before turning off compressed air source, locking out controls, purging line pressure, and venting air from tank. Opening structure door while cannon is operational can kill you.

1. Turn off and lock out/tag out energy source (A) according to American National Standards Institute (ANSI) z244.1-1982 and Federal Register, Volume 54, Number 169, Part IV, 29 CFR Part 1910.
2. De-energize air cannon to remove air from tank. Pull safety relief valve ring to make sure air stored in cannon has been released. Disconnect air hoses.



3. Remove safety cable (B) and quick exhaust valve (QEV) (C), if present, from existing air cannon. Remove existing cannon from its mount.



4. Remove existing piston/cylinder mechanism from tank (E). If mechanism is an internal style, cut out old hose assembly (F).



5. If necessary, plug current air inlet fitting on tank with supplied plug (G).
6. Position supplied gasket on tank flange (H).



7. Position valve assembly over gasket and secure with fasteners (J). Tighten to snug.
8. Position discharge flange on existing mount and install fasteners (K). Tighten securely.



9. Tighten bolts and run air lines to Martin[®] Tornado Retrofit Valve. Position pipe elbows down so they do not collect dirt. Reinstall safety cable.
 - a. For single solenoid operation follow step 10.
 - b. For solenoid enclosure operation see Figure 1.
10. The original normally-opened solenoid line will be used as the new air fill line.
11. From the solenoid exhaust port connect the control line.

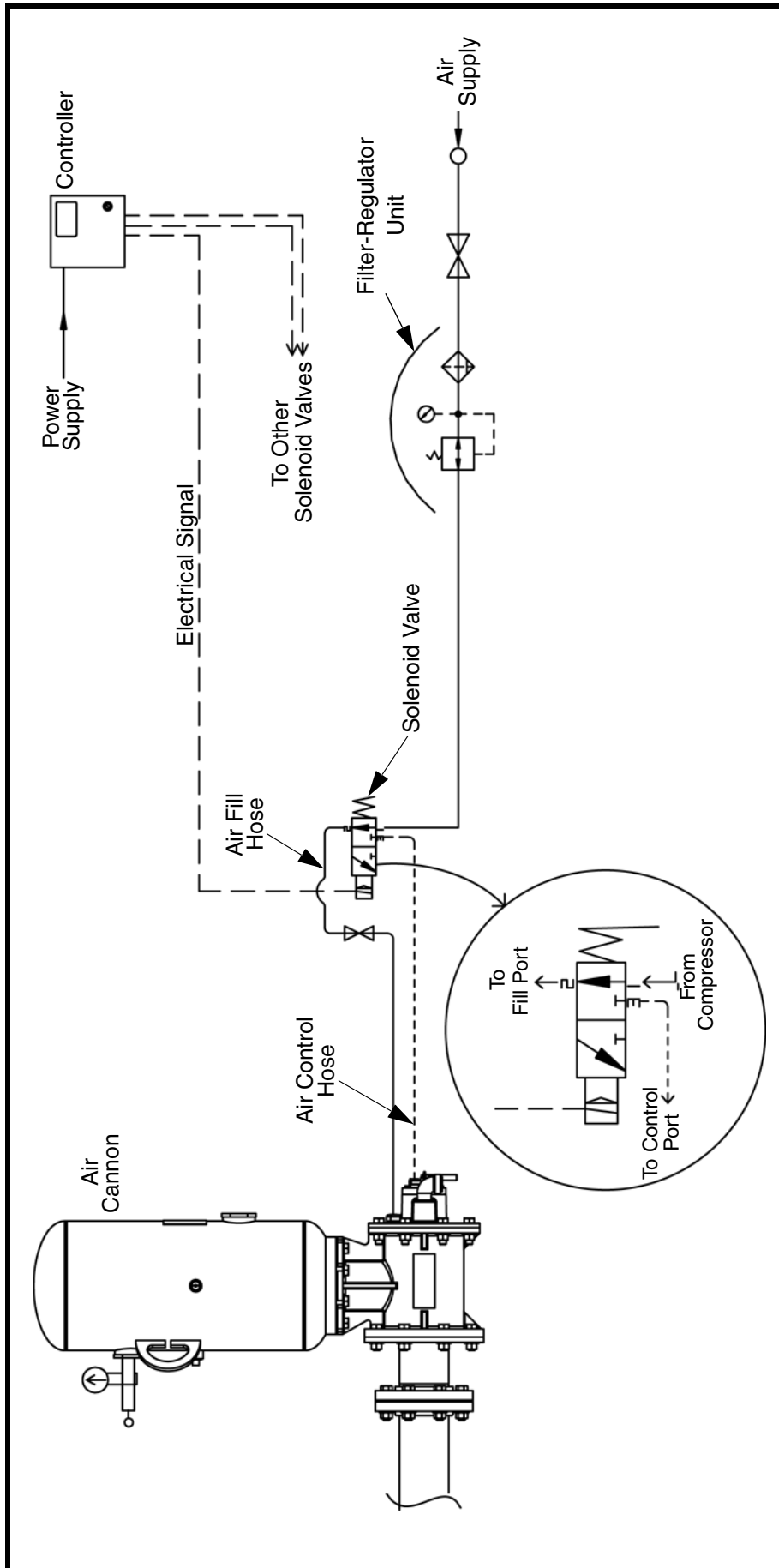
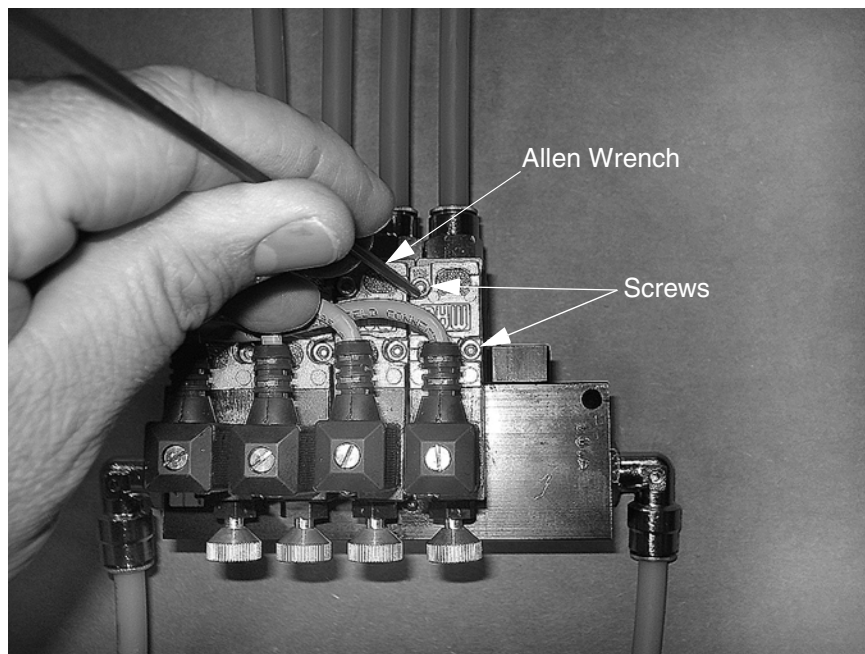
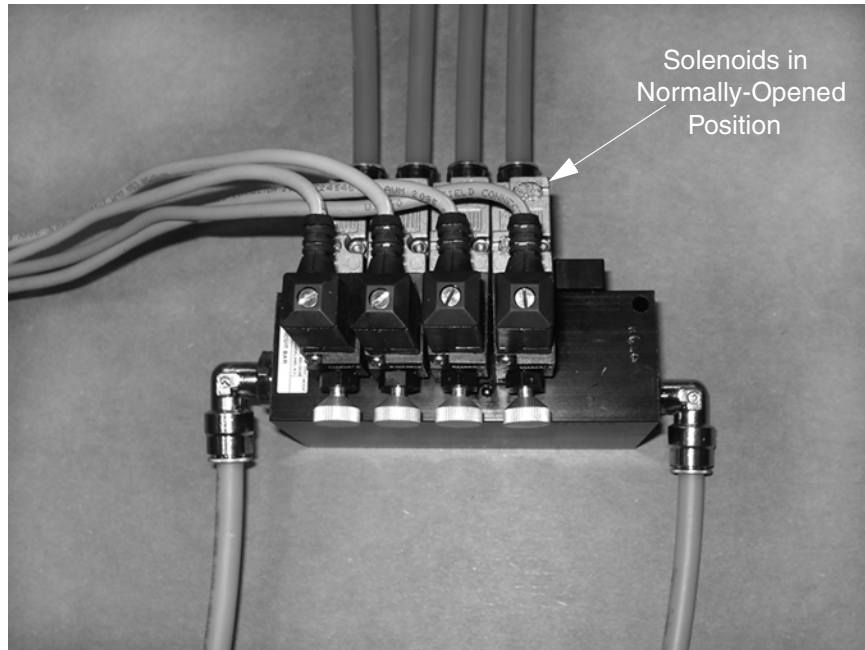


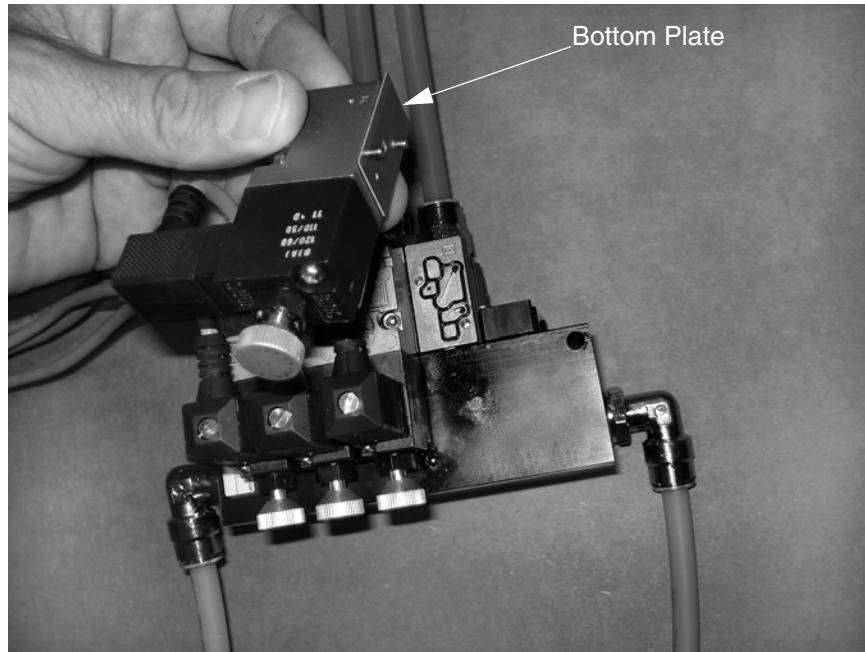
Figure 1. Normally-Opened Solenoid Plumbing Schematic

Solenoid Enclosure Conversion Procedure

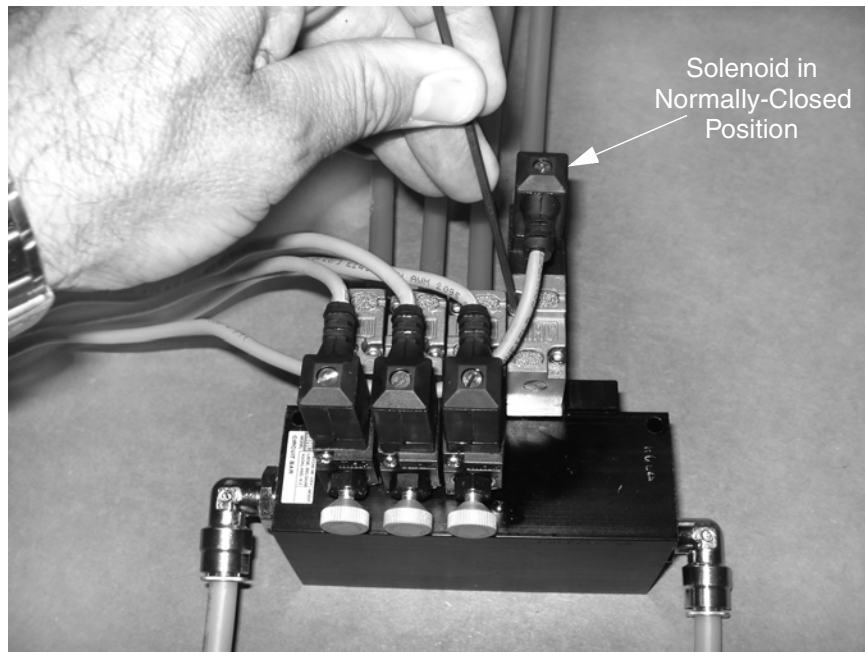
This procedure shows how to convert the normally-opened solenoid enclosure to normally closed, by relocating the pilot valve.



1. Remove two screws from solenoid using a 2.5-mm Allen wrench.



2. Remove the solenoid and bottom plate. Make sure the position of the bottom plate does not change with respect to the solenoid. Leave screws extended through plate to maintain proper position.



3. Rotate solenoid 180 degrees. Reinstall screws and tighten. Repeat this procedure for each solenoid to place all solenoids in the normally-closed position.

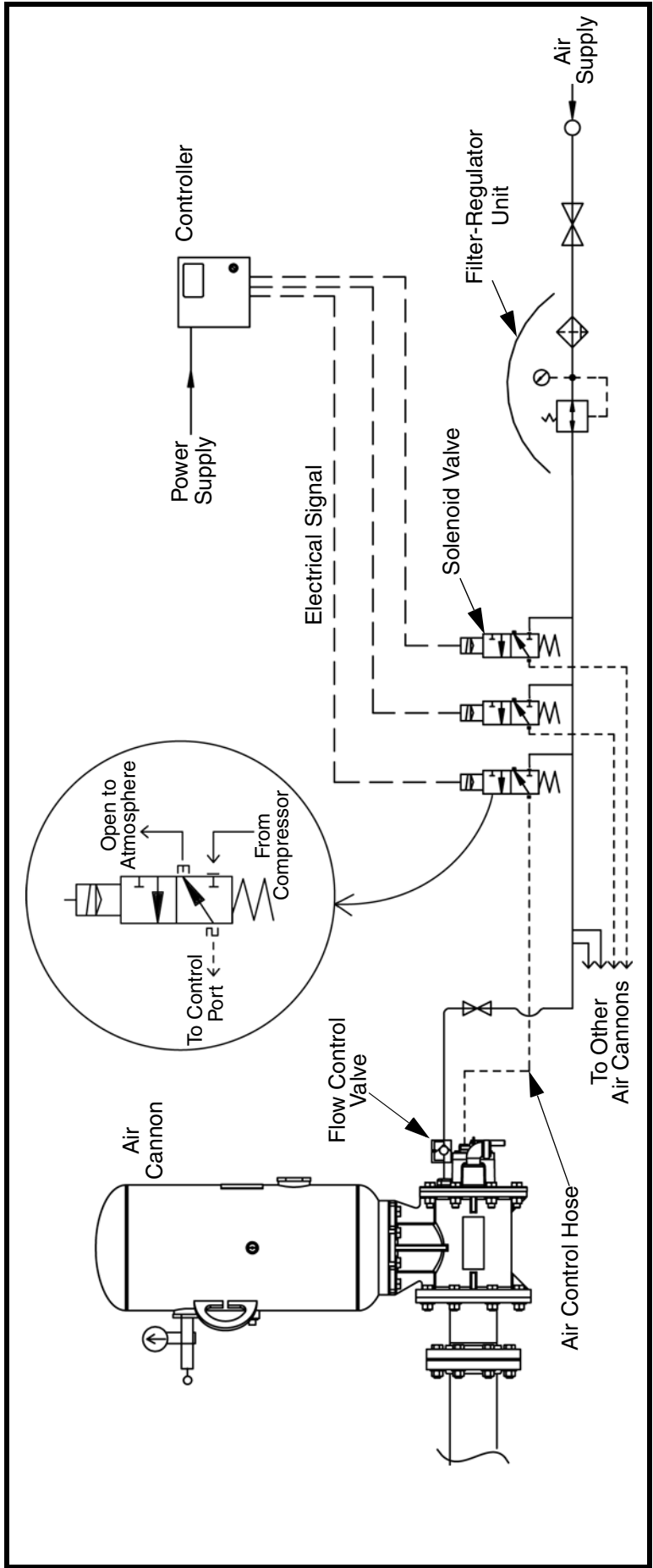


Figure 2. Normally-Closed Solenoid Plumbing Schematic

After Installation



1. In the normal state, the solenoid pressurizes the tank through the fill line. When the solenoid is actuated, air is routed through the control line, which fires the Martin[®] Tornado Retrofit Valve.

⚠ WARNING

Do not exceed 125 psi (8.62 bar) maximum working pressure or the pressure relief valve will open. Minimum recommended pressure for most applications is 80 psi (5.52 bar), but lower pressures can be used.

⚠ WARNING

The pressure relief valve may relieve at any point between 90% and 100% of set pressure. Exceeding the Maximum Allowable Working Pressure (MAWP) of the tank can cause it to rupture.

NOTE

Pressure relief valves of up to 150 psi are available from Martin Engineering. Consult the Maximum Allowable Working Pressure (MAWP) on the tank's name plate before substituting a different pressure relief valve. Never use a pressure relief valve with a set pressure that is higher than the MAWP of the tank.

2. Charge air cannon to original air pressure specification and check for air leaks in piping system.

⚠ WARNING

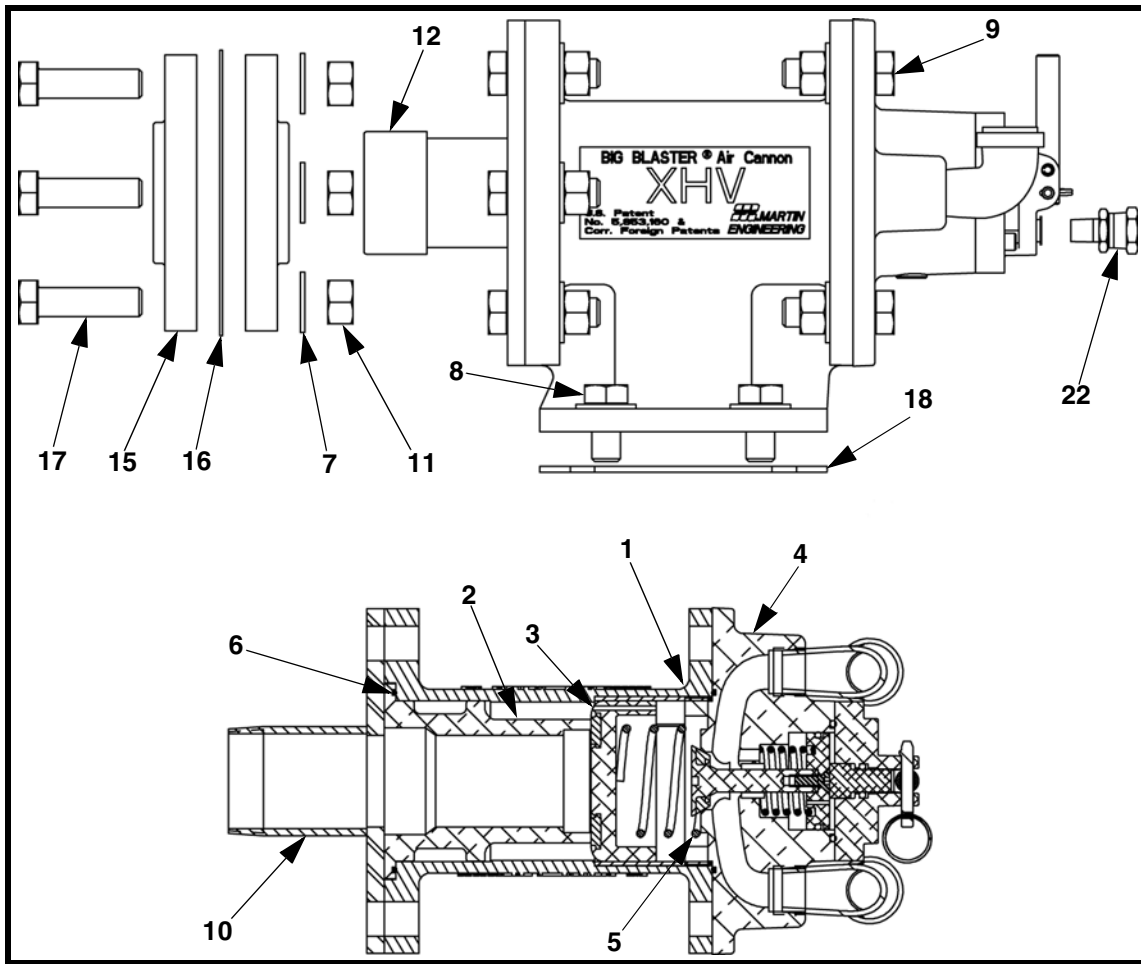
**Air cannon may produce loud noise when blasting.
Wear ear protection to avoid impairment or loss of
hearing.**

3. Blast air cannon five times to ensure proper operation. Allow tank to fill after each blast. If air cannon blasts properly, continue to operate as needed. If air cannon does not blast properly, contact Martin Engineering for assistance.



4. Thoroughly wipe storage vessel wall clean next to structure door/port. Place Air Blast Warning Label, P/N 31913, on structure wall visible to anyone opening door/port. If structure has more than one door or port, request additional labels from Martin Engineering or representative.
5. If using lockout ball valve on piping to air cannon, attach Lockout Valve Warning Tag, P/N 35146, to lockout valve using supplied cable tie.

Part Numbers

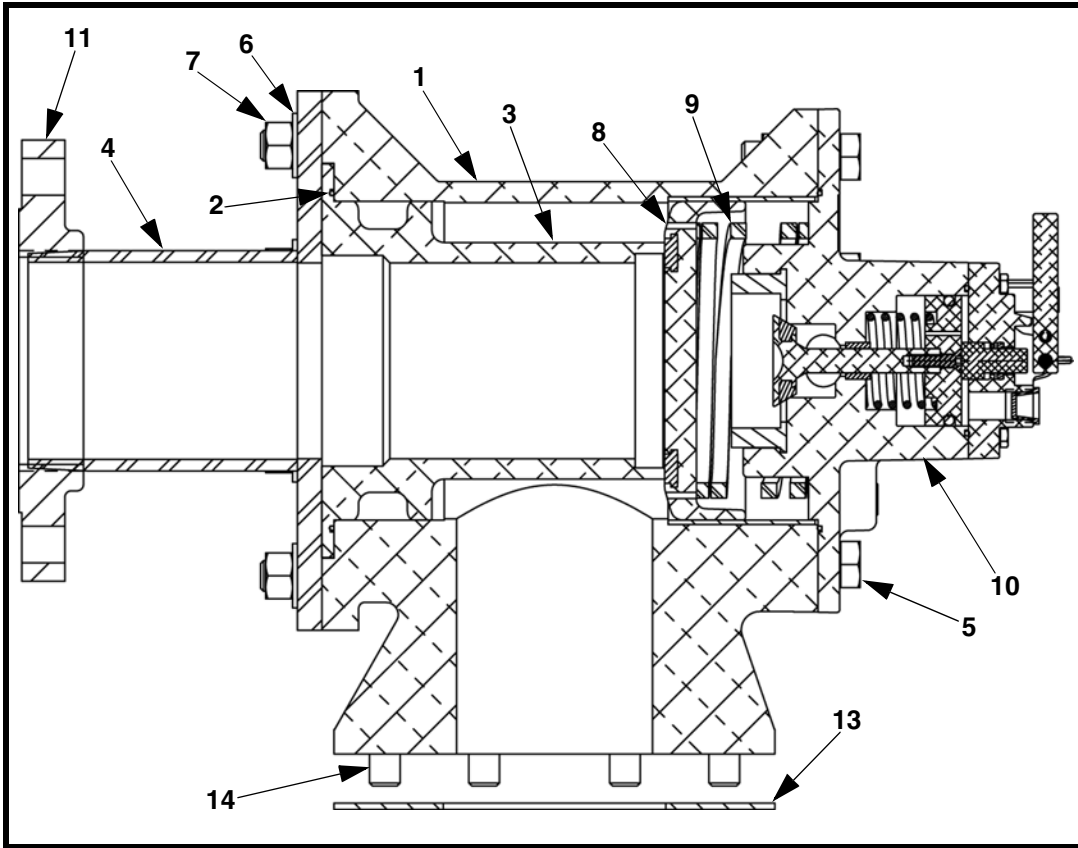


Martin® Tornado Retrofit Valve Parts List, P/N 37862

Item	Qty.	Description	Part Number
1	1	Valve Body Assembly	35853-B
2	1	Piston Seat	35861
3	1	Piston with Urethane	37961
4	1	2.00 Valve Cap Subassembly	37984
5	1	Compression Spring	35865
6	1	O-Ring 3-3/4 ID Viton	35863
7	18	Compression Washer 5/8	11752
8	4	Screw HHC 5/8-11NC x 1-1/4 ZP	15798
9	10	Screw HHC 5/8-11NC x 2 ZP	18831
10	1	Discharge Weldment for 2.00 XHV	35860
11	14	Hex Nut 5/8-11NC ZP	11772
12	1	Plastic Discharge Cap	25451
13 (NS)	1	Label Kit	34517-01T
14 (NS)	1	Operator's Manual	M3754
15	2	Screwed Pipe Flange 2NPT 125lb	23214-P
16	1	Gasket	22631
17	4	Screw HHC 5/8-11NC x 2-1/4 ZP	34478
18	1	Tank Gasket	35872
19 (NS)	1	Operator's Manual	M3405-T
20 (NS)	1	Plug SQ HD 3/4NPT	18446-01
21 (NS)	1	Swivel Fitting 1/4NPTM x 3/8NPTF	38010

NS = Not Shown

Martin[®] Tornado Retrofit Valve Parts List, P/N 37862

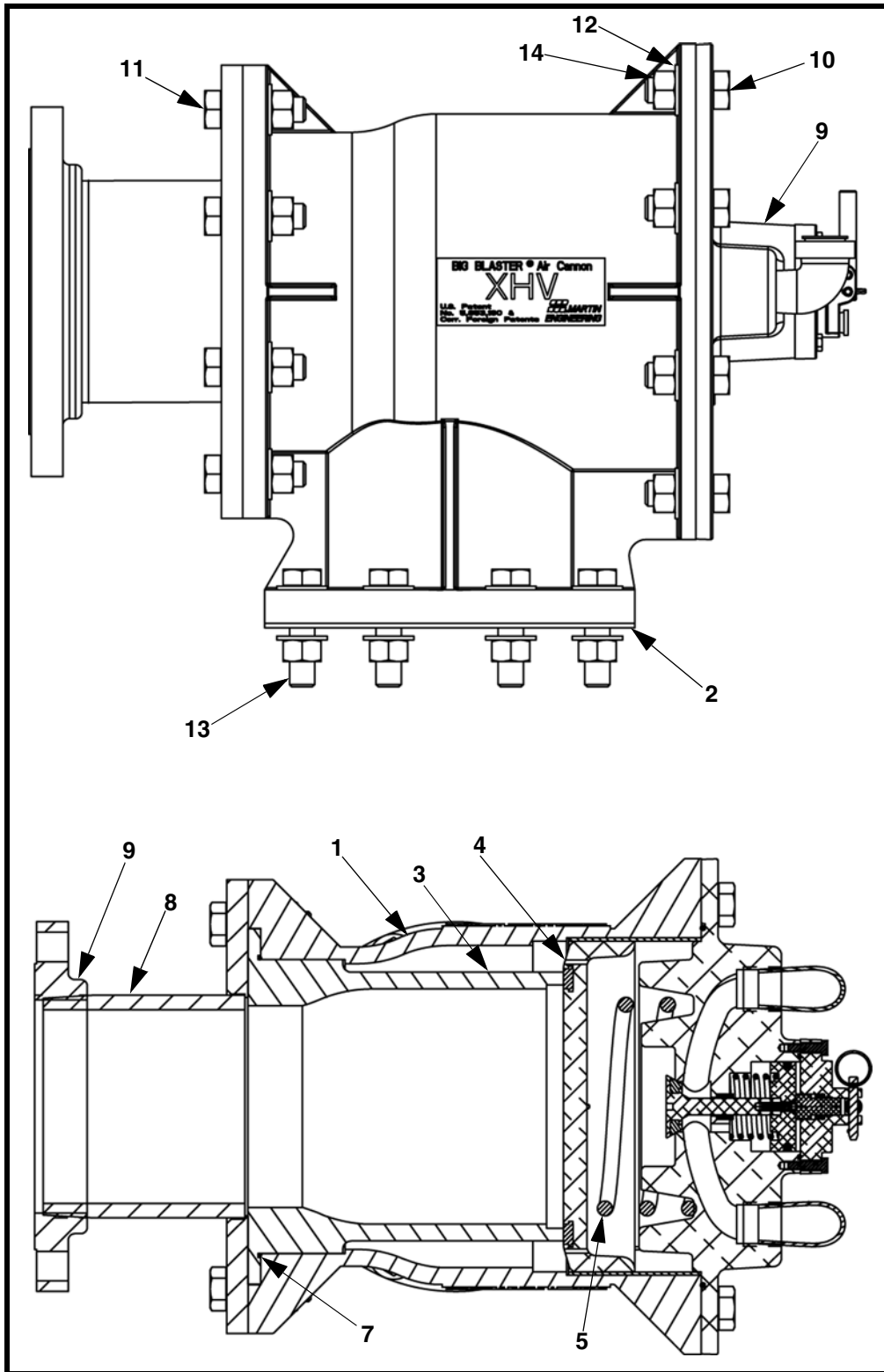


Martin[®] Tornado Retrofit Valve Parts List, P/N 37797

Item	Qty.	Description	Part Number
1	1	Valve Body	35076
2	1	O-Ring #166 6.737 ID x .094 CS	35078
3	1	Piston Seat	35075
4	1	Discharge Flange Weldment	35081
5	16	Screw HHC 5/8-11NC x 2 ZP	18831
6	24	Compression Washer 5/8	11752
7	16	Hex Nut 5/8-11NC ZP	11772
8	1	Piston with Urethane	37962
9	1	Compression Spring	35077
10	1	4.00 Valve Cap Assembly	37985
11	1	Flange 4-NPT 150# STD	23213
12 (NS)	1	Plastic Cap	25452
13	1	Tank Gasket	35080
14	8	Screw HHC 5/8-11NC x 1-1/4 ZP	15798
15 (NS)	1	Label Kit	35149
16 (NS)	1	Operator's Manual	M3754
17 (NS)	1	Operator's Manual	M3405-T

NS = Not Shown

Martin[®] Tornado Retrofit Valve Parts List, P/N 37797



Martin® Tornado Retrofit Valve Parts List, P/N 37852

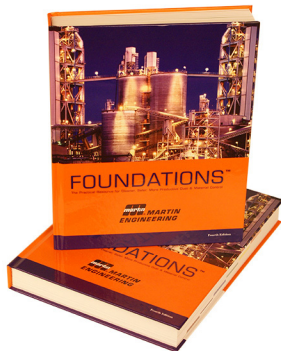
Item	Qty.	Description	Part Number
1	1	Valve Body Assembly	36114
2	1	Transition Gasket	36173
3	1	Piston Seat	36113
4	1	Piston with Urethane	37963
5	1	Compression Spring	36167
6	1	6.00 Valve Cap Subassembly	37986
7	1	O-Ring #174 8.737 ID x .103 CS	36262
8	1	Discharge Flange Weldment	36170
9	1	Flange 6-NPT 150#	24612-P
10	8	Screw HHC 3/4-10NC x 2 ZP	19135
11	8	Screw HHC 3/4-10NC x 2-1/2 ZP	17770
12	32	Compression Washer 3/4	11754
13	8	Screw HHC 3/4-10NC x 3 ZP	17594
14	24	Hex Nut 3/4-10NC ZP	11773
15 (NS)	1	Plastic Cap	36264
16 (NS)	1	Label Kit	35149
17 (NS)	1	Operator's Manual	M3754
18 (NS)	1	Operator's Manual	M3405-T

NS = Not Shown

Martin[®] Tornado Retrofit Valve Parts List, P/N 37852

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