

**Hydro-Force Injection Sprayers**

The Hydro-Force Injection Sprayer provides a fast and efficient way for the carpet cleaner to spray chemical solutions onto the carpet. It can be used for pre-sprays, deodorizers, protectors, dyes and other chemical solutions. It is highly reliable and simple to maintain and repair. There are a few different models of Hydro-Force Injection Sprayers in current production and many changes made in the sprayers over the years. Some changes such as the bottle used on the newer units, have no bearing on the repair procedures. There are many changes made from past production models which require different troubleshooting and repair procedures. The first step in repairing the different sprayers is the identification of the sprayer model and components.



High Pressure – Plastic Gunjet  
Hydro-Force AS08



High Pressure - Revolution  
Hydro-Force AS08R



High Pressure – Metal Gunjet  
Hydro-Force AS08M



Low Pressure  
Hydro-Force AS12



Low Pressure - Revolution  
Hydro-Force AS12R

The first critical variable is the valve or gunjet on the Hydro-Force. There are four different valves used on the Hydro-Force Injection Sprayers. The NA0820 Metal Gunjet was used on the original Hydro-Force Injection Sprayers and was replaced by the NA0820A Plastic Gunjet. The metal gunjet was later returned as an optional upgrade and is available on the AS08M. The 100010 Plastic Gunjet has now replaced the NA0820A. The 100010 is now the standard Gunjet used on the AS08 & AS08R. The NA1229 K-Valve has always been the valve used on the Low Pressure Hydro-Force Injection Sprayers AS12 & AS12R. Differences in the gunjets and valves change the repair procedures.

**Metal Gunjet**

**Plastic Gunjet (Old Style)**

**Plastic Gunjet (New Style)**

**K-Valve (Low Pressure)**

**NA0820**

**NA0820A**

**100010**

**NA1229**

**For repair instructions go to Section II – Page 11**

**For repair instructions go to Section III – Page 13**

**For repair instructions go to Section IV – Page 15**

**For repair instructions go to Section V – Page 18**



High Pressure - Hydro-Force Valve  
NA0820

High Pressure - Hydro-Force Valve  
NA0820A (Old Style)

High Pressure - Hydro-Force Valve  
100010 (New Style)



Low Pressure - Hydro-Force Valve  
NA1229 (K-Valve w / lever)

The second variable is the Injection Valve used on the Hydro-Force Injection Sprayers. There are three different injection valves used on the Hydro-Force Injection Sprayers. The AS08 and AS12 both use the NA0809A Injection Valve. The AS08R uses the NA0850A Revolution Valve. The AS12R uses the NA0852A Revolution Valve. The NA0850A & NA0852A have the same construction and parts, but are calibrated differently for the differences between high pressure and low pressure uses.

**Standard Valve (Low & High Pressure)**

**Revolution Valve (High Pressure)**

**Revolution Valve (Low Pressure)**

**NA0809A**

**NA0850A**

**NA0852A**



Hydro-Force Revolution - LP  
Injection Valve Assembly  
NA0852A



Hydro-Force Revolution - HP  
Injection Valve Assembly  
NA0850A



Hydro-Force Injection Valve Assembly  
NA0809A

Knob for LP Injection valve has an  
“L” stamped into the knob as the zero  
set point.

Knob for HP Injection valve has a “0”  
stamped into the knob as the zero set  
point.



**Troubleshooting**

Even with the differences in components described in the previous section, you will find the operation and the problems encountered are similar for all Hydro-Force Injection Sprayers.

The main problem is failure of the injection system to draw chemical. The sprayer can be tested by connecting it to a water source of the appropriate pressure and flow rate. Adequate pressure and flow is required to draw chemical at the correct proportion. Check the manufacturer’s specifications to be sure your pump provides the correct pressure and has the proper water flow rate. The water temperature must no more than 180°F for the injection sprayer to properly draw chemical.

The HP valves are calibrated at 400 psi. LP valves are calibrated at 100 psi.

**50-250 psi for a low pressure sprayer**

**250-500 psi for a high pressure sprayer**

**The flow rate should be at least .6 gpm at 50 psi and 1.8 gpm at 500 psi**

With the sprayer connected to a pressurized water source, place the chemical drawtube in a container of water. Open the Hydro-Force valve and spray water. Watch the drawtube to see if the water is being drawn up into the injection valve. If the drawtube is old and discolored, replace the tube so you can see the flow. If necessary, you can measure the amount of water being drawn and the amount of water being sprayed to determine the proportioning rate.



*For example: If you have drawn 10 ounces of water and collected 90 ounces of sprayed water, your proportioning rate is 1-8. 10 ounces of drawn water and 80 ounces of incoming water make up the collected 90 ounces. Every ounce of drawn water (chemical) is mixed with 8 ounces of incoming water, a 1-8 dilution.*

The standard Hydro-Force Valve NA0809A, with the Yellow Metering Tip, should have a proportioning rate of 1-8 with the high-pressure AS08 & AS08M sprayer and 1-4 with the low-pressure AS12 sprayer. With the tip removed the proportioning rate should be 1-4 with the high-pressure AS08 & AS08M sprayer. Different metering tips can be used to get different proportioning rates with the HP and LP sprayers. The proportioning rate of the Revolution valves should be close to the rate shown on the adjusting dial at the position at which it is set during testing. This can vary from 1-4 to 1-64 on the high-pressure AS08R sprayer and 1-3 to 1-32 on the low-pressure AS12R sprayer. The new style Revolution valves can be set simply by turning the knob to point to the desired dilution setting. To set the older style high-pressure Revolution valve to the 1-4 rate, the knob must be turned from the closed position, counter-clockwise past the 4 mark and continue around until you again come to the 4 mark.

**Note: Chemicals with a higher viscosity (thickness) than water will have lower proportioning rates. These figures are for chemicals with a similar viscosity to water. Due to very slight variances in the valve components, the 1-64 setting on the Revolution valves may give inconsistent metering. For more consistent metering in the 1-64 range, dilute the chemical 1-1 before pouring into the Hydro-Force 5-qt container and then meter at 1-32. Each valve is independently calibrated and settings may vary slightly with each valve.**



Hydro-Force Revolution - HP Injection Valve Assembly - NA0850A  
Adjust from: 1-4 to 1-64



Hydro-Force Revolution - LP Injection Valve Assembly - NA0852A  
Adjust from: 1-3 to 1-32

NA0816A



NA0816B



HP Injection Valve Metering Tip Kit - NA0816A  
6 HP tips range from: 1-5 to 1-32  
LP Injection Valve Metering Tip Kit - NA0816A  
6 LP tips range from: 1-4 to 1-32

**Section I: Repairing**

Once you have determined that the Hydro-Force Injection Sprayer is not properly drawing chemical, you must examine, repair and retest to determine and eliminate possible causes of the problem.

There are three different areas to check.

**Water Flow**

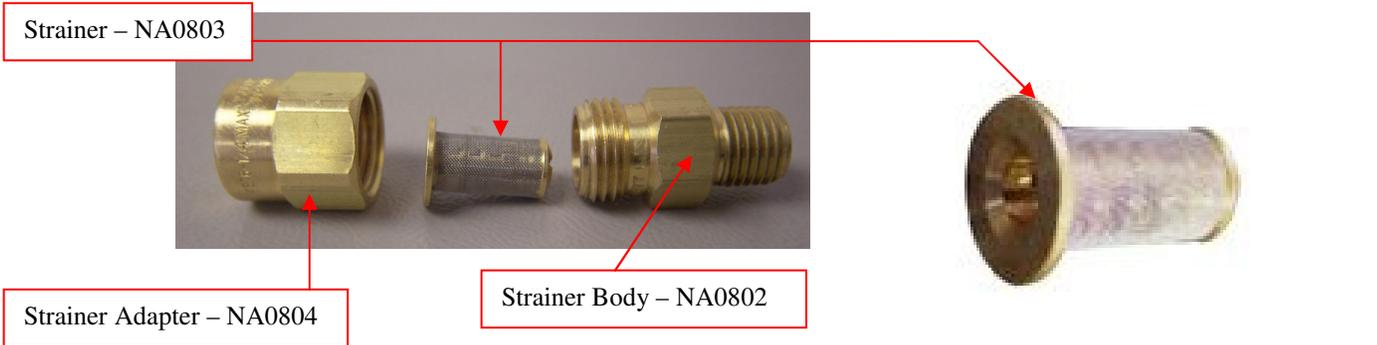
**Chemical Flow**

**Injection Valve Operation**

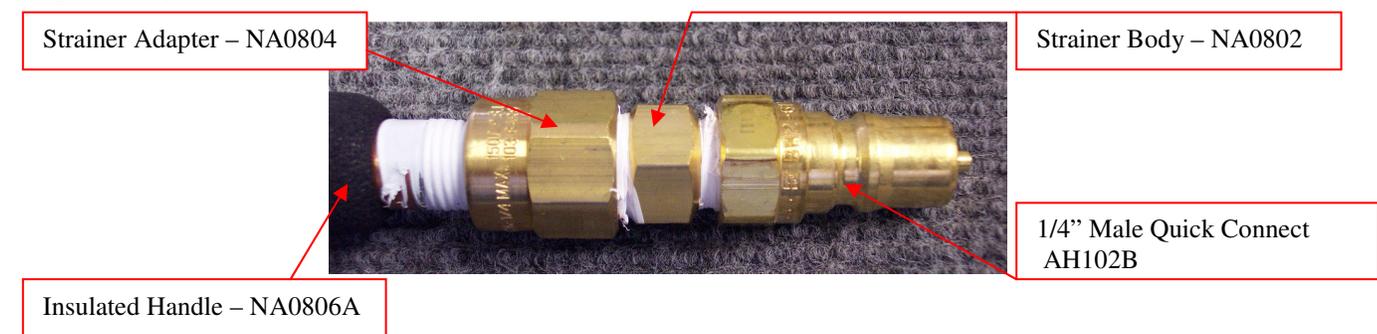
**Water Flow**

If the flow of water through the injector valve is restricted, the lower flow will not properly draw the chemical. The following items can be checked to assure that the flow is not restricted.

**Inlet Strainer** – The Inlet Strainer is located between the incoming water quick connect and the insulated handle. Remove the inlet strainer screen from the strainer body. Clean or replace the inlet strainer screen as needed.



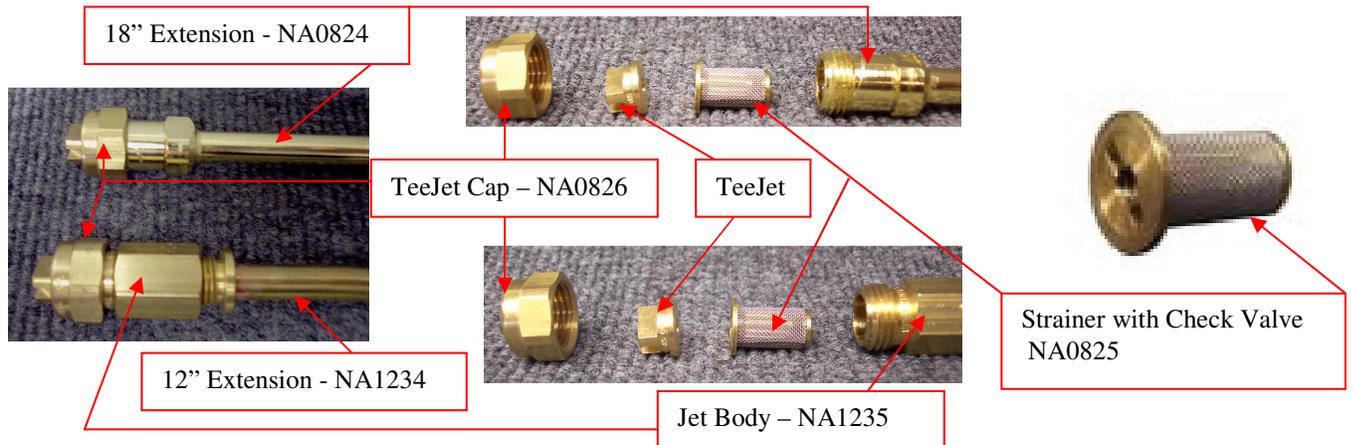
**Quick Connect** – The inlet quick connect may be damaged or obstructed and not allowing the proper water flow through. Clean or replace the quick connect as needed. (AH102B)



**Jet** – The Jet must be of the correct size to allow the proper flow. The current production models come standard with a “06” and must have at least a “05” orifice size to get the proper flow and proportioning. The Jet must be clean of debris that can restrict flow. Clean or replace the Jet as needed.



**Outlet Strainer** – On some sprayers there is an Outlet Strainer (NA0825) located behind the Jet. This strainer has a check valve to reduce dripping at the end of the wand. This strainer can be clogged with debris or the check valve can stick and stop or reduce the flow. Remove, clean or replace as needed.

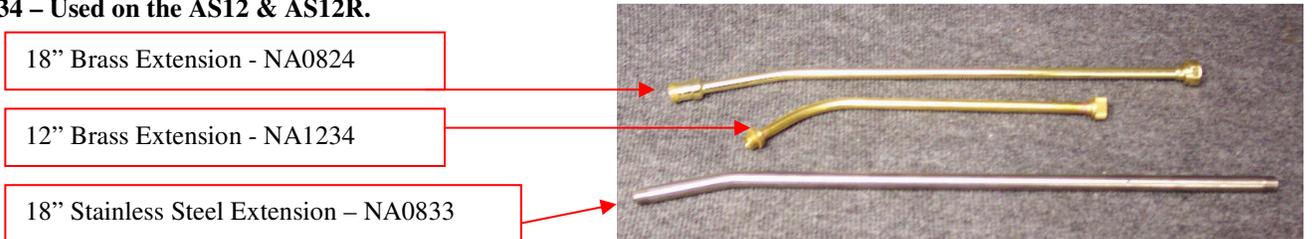


**Sprayer Extension** – The Sprayer Extension between the Gunjet or Valve and the Jet may be restricted. Remove the Sprayer Extension from Gunjet or Valve and examine. Clean out or replace as needed.

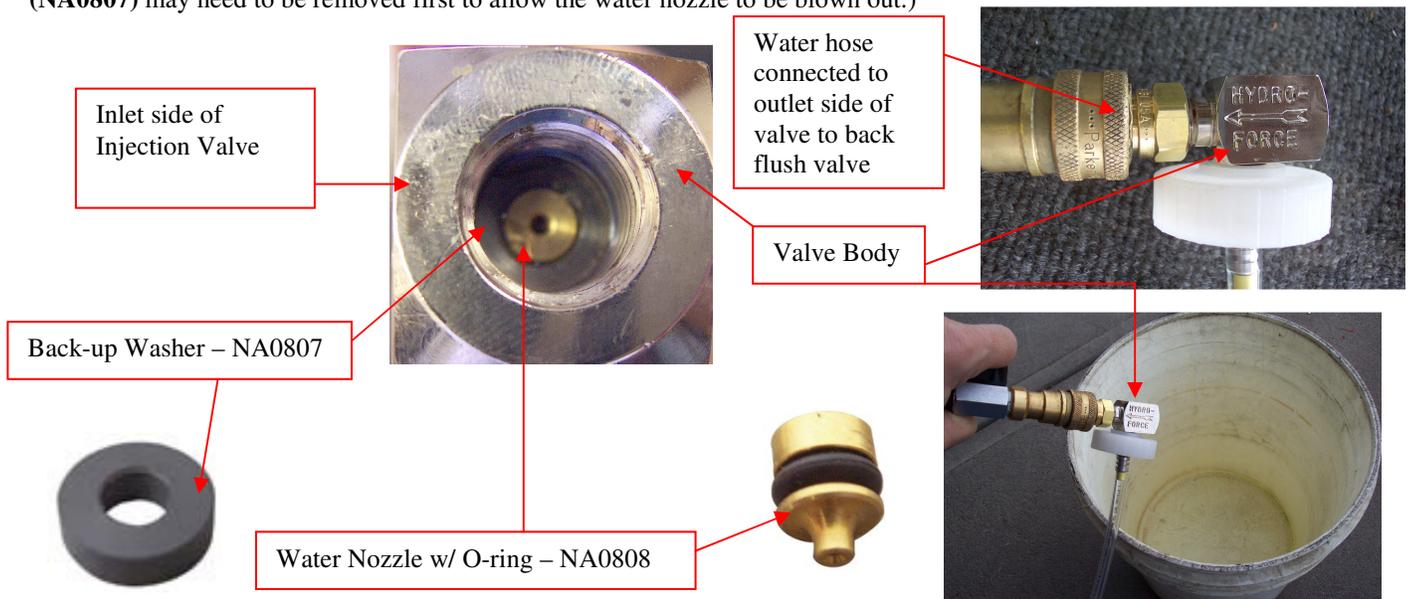
NA0824 – Used on the AS08M. Also used on the AS08 & AS08R old style with NA0820A Gunjet

NA0833 – Used on the AS08R & AS08 new style with the 100010 Gunjet

NA1234 – Used on the AS12 & AS12R.



**Injection Valve Assembly** – Debris can get past the Inlet Strainer and clog the small opening on the Water Nozzle (NA0808) on the inlet side of the Injection Valve. The valve can be back flushed by removing the Insulated Handle from the inlet side of the valve. Also remove the Hose (HP models) or Extension (LP models) from the outlet side of the valve. Connect a water hose to the outlet side of the valve and flow water backward through the valve. Be sure to point the valve into a bucket to catch the Back-up Washer and Water Nozzle as they are blown out of the injection valve by the water pressure. (The Back-up Washer (NA0807) may need to be removed first to allow the water nozzle to be blown out.)



Let the water flow for a short time to flush debris out of injection valve. On the Revolution Injection Valves, remove the metering knob and stem assembly and let water blow out the metering knob port to flush out debris. Remove water hose from valve. Examine Water Nozzle and clean or replace as needed. Do not damage water nozzle while cleaning. The water nozzle opening is critical in the function of the injection valve must not be enlarged during cleaning. If needed, the Injection Valve can be soaked in a descaling solution to remove hard water and chemical deposits before re-assembly. Re-install water nozzle and Back-up Washer. Examine Insulated Handle (NA0806A) to be sure it is not obstructing flow. Clean out or replace as needed. Then reinstall handle on inlet side of injection valve. Re-assembly Revolution metering knob and stem assembly as required.

**High-Pressure Hose Assembly** – On the High-Pressure Sprayers AS08, AS08M & AS08R the High-Pressure Hose Assembly (NA0828) from the outlet side of the injection valve to the gunjet may be restricted. Clean out or replace as needed. Then reconnect hose to outlet side of injection valve. The quick connects used on the newer units should not have any effect on the chemical draw. If the quick connects are leaking, replace the o-ring NA0873 or the quick connects as needed.



High Pressure Hose Assembly – NA0828



BR337



NA0873



BR335

**Do not separate the quick connects until the solution pressure supply to the Hydro Force Sprayer has been turned off or disconnected and the pressure has been released from the lines.**

**Gunjet/Valve** – The gunjet or valve may not be operating properly and restricting the water flow. There may be debris in the valve restricting the flow through the valve and it will need to be cleaned out. If the gunjet is leaking or the valve is not opening, it will have to be repaired or replaced. The different gunjets or valves have different repair parts and procedures.

- NA0820 - See Section II – Page 11
- NA0820A - See Section III – Page 13
- 100010 - See Section IV – Page 15
- NA1229 - See Section V – Page 18



NA1229



NA0820



NA0820A



100010

**Chemical Flow**

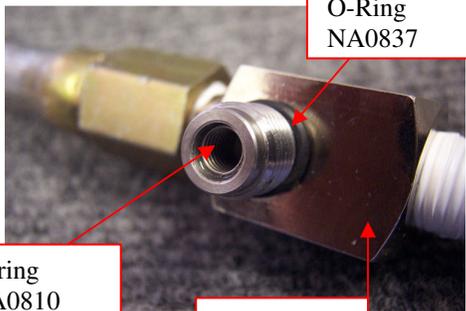
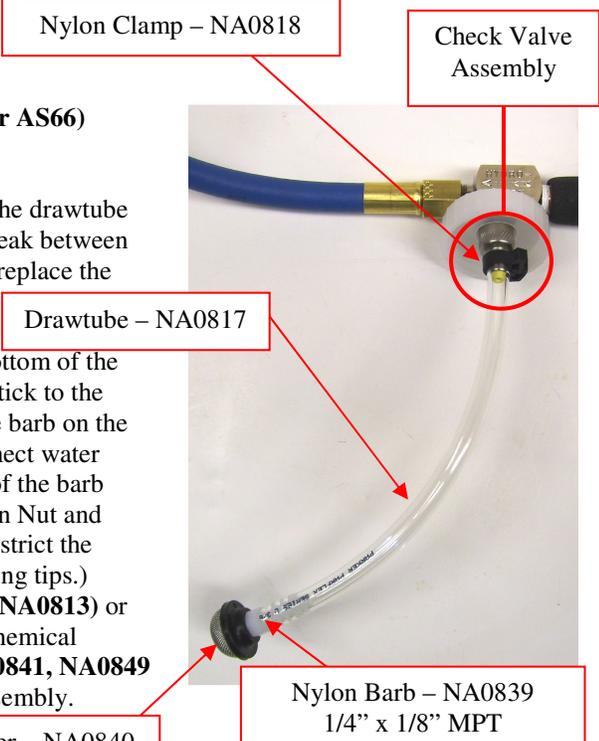
If the chemical flow path is restricted, even if the injection valve is creating the draw, the chemical will not be able to draw properly. The following items can be checked to assure that the flow is not restricted.

**Chemical** – The viscosity of the chemical may be too thick for the injection valve to draw the chemical. Dilute the chemical or substitute a different chemical with a lower viscosity. (Chemicals with a viscosity similar to water are best suited for use in the Hydro-Force Injection Sprayer.)

**Acorn Strainer** – If the acorn strainer screen is plugged with excess chemical or debris the chemical flow will be restricted. Clean or replace filter as needed. Clean out or replace the chemical container (AS30, AS65 or AS66) to remove excess chemical or debris before refilling container. NA0840

**Barb, Drawtube & Clamp** – Make sure the nylon hose barb NA0839 and the drawtube NA0817 are not clogged or cracked. Clean out or replace as needed. An air leak between drawtube and Suction Nut barb can slow or stop chemical draw. Tighten or replace the nylon clamp NA0818 on drawtube or replace the drawtube as needed.

**Check Valve Assembly** – The components inside the Suction Nut on the bottom of the valve body; make up the Check Valve Assembly. Often the Steel Ball will stick to the O-ring or the Spring will get distorted and the Steel Ball will stick inside the barb on the Injection Valve. Remove the Suction Nut and Check Valve Assembly. Connect water source to the Inlet Quick Connect, turn on water and let the water flow out of the barb on the bottom of the Injection Valve to flush out debris. Examine the Suction Nut and Check Valve Assembly. If the Metering Tip (NA0816) is damaged, it can restrict the chemical flow. (Revolution Sprayers AS08R and AS12R do not have metering tips.) If the Suction Nut (NA0815), O-ring (NA0814), Spring (NA0810), Spacer (NA0813) or Steel Ball (NA0811) are damaged they may also allow water to fill up the chemical container. Examine the parts and replace as needed. Valve Repair Kits (NA0841, NA0849 & NA0849R) have the commonly needed parts to repair the check valve assembly.



**Cap & Liner** – If the Cap (NA0812) has its vent plugged or the Cap Liner (NA0838) is damaged, air may not be able to enter the 5-qt container as the chemical is being used. This can create a vacuum, which the Injection Valve suction cannot overcome. Replace cap or liner as needed to keep the container properly vented. Valve Repair Kits (NA0841, NA0849 & NA0849R) each have a Cap Liner and Cap O-ring (NA0837).



NA0841 – Kit Valve Repair Hydro Force All Injection Sprayers

**Injection Valve** – Debris can block the flow of chemical through the barb on the injection valve body. Clean out or replace the Injection Valve as needed.



NA0849 – Kit Major Repair Hydro Force Injection Sprayer AS12, AS08 & AS08M



NA0849R – Kit Major Repair Hydro Force Revolution Injection Sprayer AS12R & AS08R

**Chemical Container** – Clean out or replace the 5-qt chemical container (AS30, AS65 or AS66) as needed to remove excess chemical or debris before refilling container.



AS65 – 5QT Jug Rotomolded



AS66 – 7QT Jug Rotomolded



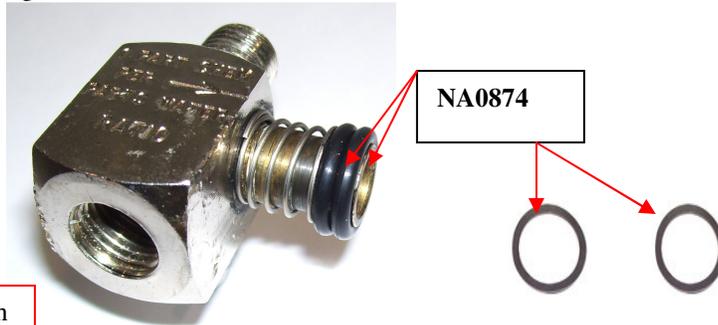
AS30 – 5QT Jug Blow molded

**Injection Valve Operation**

If the flow of water is adequate and the chemical flow path is not restricted, the failure to draw chemical has to be the Injection Valve itself. Replacing the water nozzle (NA0808) may improve the Injection valve operation. Soak the Injection Valve in a descaling solution to remove any chemical build-up inside the valve. (On the Revolution, remove the metering knob and stem assembly before soaking. Lube the stem o-rings before re-assembly.)

To prevent the proportioning rate from changing during spraying newer Revolution Sprayers have two o-rings NA0874 on the shaft inside the metering knob. With these o-rings on the shaft, when you set your Revolution Injection Sprayer at your desired rate, the added friction of the o-rings, inside the knob, prevent the knob from moving. An older Revolution sprayer can easily be updated by adding the o-rings & removing the set screw. If the knob becomes hard to turn, lubricate the two o-rings with Super Lube or other synthetic grease.

Revolution injection valve with knob friction o-rings



The new style Revolution Injection Valves can be repaired and recalibrated in the field. The Stem Assembly (NA0869) can be replaced on the Revolution Injection Valve. The stem assembly is included in the major repair kit (NA0849R). The seat in the new valve is more resistant to the damage caused by over tightening the stem.

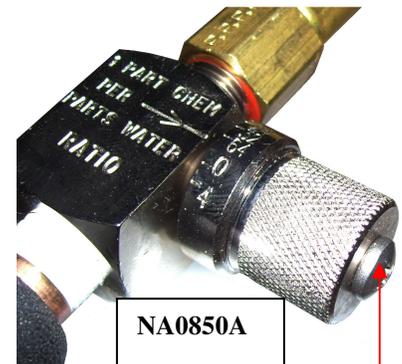
Use the appropriate repair kit for your sprayer to replace the components in the injection valve and sprayer that can affect its ability to properly draw chemical.

To recalibrate the Revolution Injection Valve:

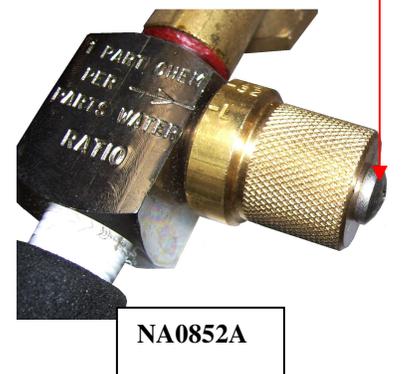
1. Remove the foam cover from the knob.
2. Turn the knob clockwise until the stem contacts the seat. **Do not over tighten the stem.** If the stem has been over tightened, it can damage the seat changing the proportioning calibration to the point that the valve will need to be replaced.

At this point if the “0” or “L” on the knob is aligned with the arrow on the valve body, the valve is calibrated properly and no further adjustment is needed. Replace the knob cover and locking thumbscrew and test the chemical flow. If the “0” on the knob is not aligned with the arrow on the valve body, continue with the calibration procedure.

3. Remove the screw on the end of the knob. (Some valves have a set screw which must be removed from the knob before the knob can be removed.)
4. Pull the knob off of the end of the stem.
5. Turn the knob so that the “0” or “L” aligns with the arrow on the valve body.
6. Push the knob back onto the stem. Replace and tighten the screw on the end of the knob. (Replace set screw if so equipped.)
7. Replace the knob cover and test the chemical flow.



Remove screw to recalibrate



If these actions do not correct the chemical flow problem, replace the valve with a new Injection valve.

**NA0809A for AS08 and AS12**

**NA0850A for AS08R**

**NA0852A for AS12R**



**NA0809A**



**NA0850A**



**NA0852A**

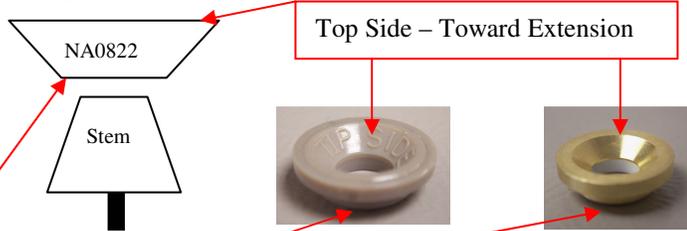
**Section II – Repairing the NA0820 Gunjet**

The Metal Gunjet NA0820 can be easily repaired using the Gunjet Repair Kit (NA0821) and Shutoff Disk (NA0822).

- If the Gunjet does not shutoff the spray, it may just be that that Shutoff Disk is bad or installed incorrectly. Remove the Sprayer Extension from the end of the Gunjet. This will expose the Shutoff Disk. The Shutoff disk should be installed with the narrow side of the disk down and the wide side up.

Examine seating surface of shutoff disk and replace if worn or damaged.

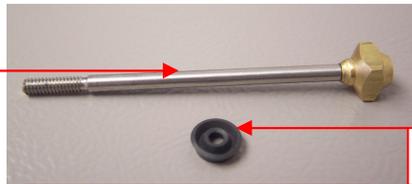
Examine end of stem. If worn or damaged, replace the stem. The stem is included in the Gunjet Repair Kit (NA0821) with a new V-Packing. The Stem can be purchased separately (PS7482-1-BR).



Bottom Side – Toward Valve Stem

NA0822 Shutoff Disk  
New Style Nylon  
Old Style Brass with Nylon Insert

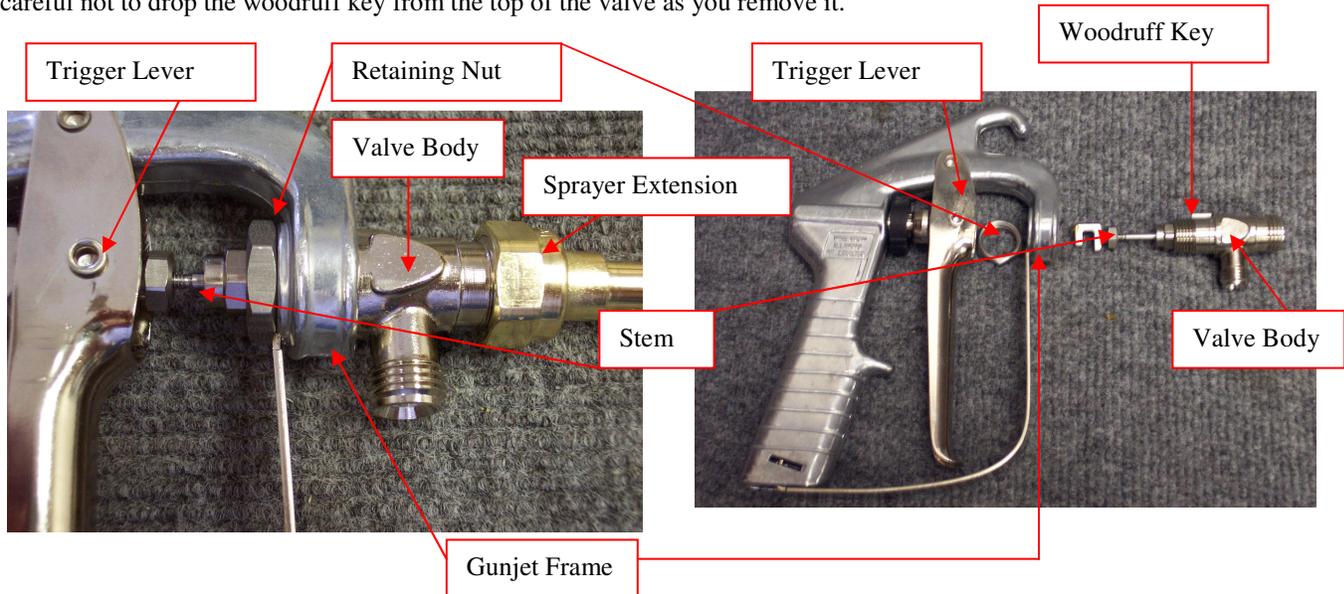
Stem: PS7482-1-BR



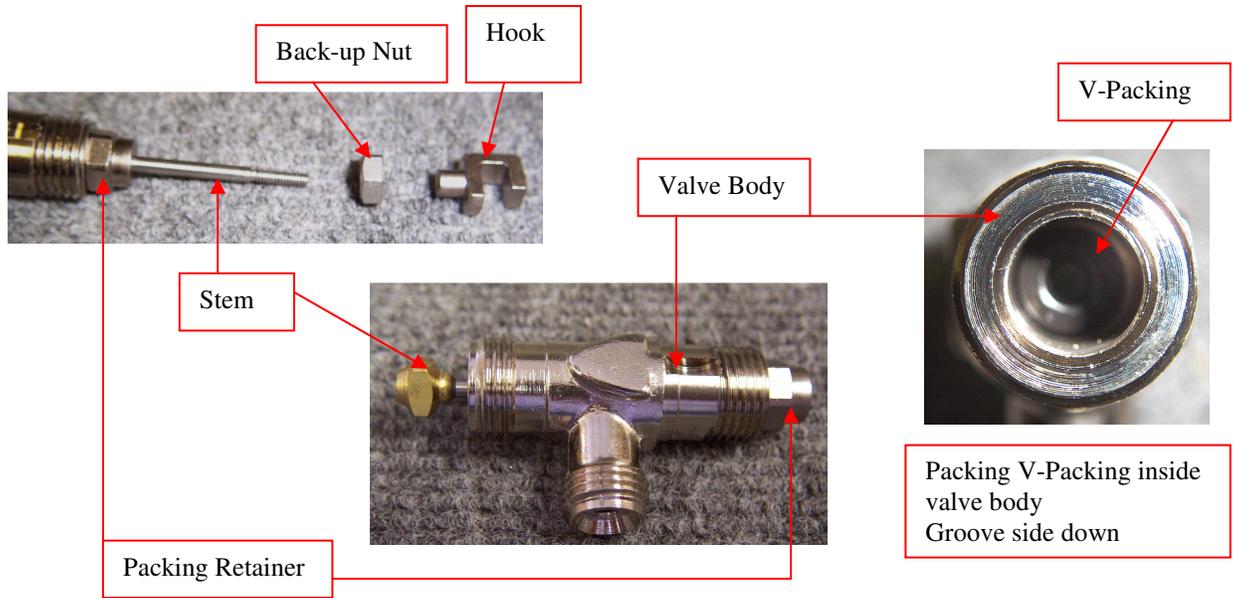
V-Packing: PF1425S-1-VI

Gunjet Repair Kit: NA0821

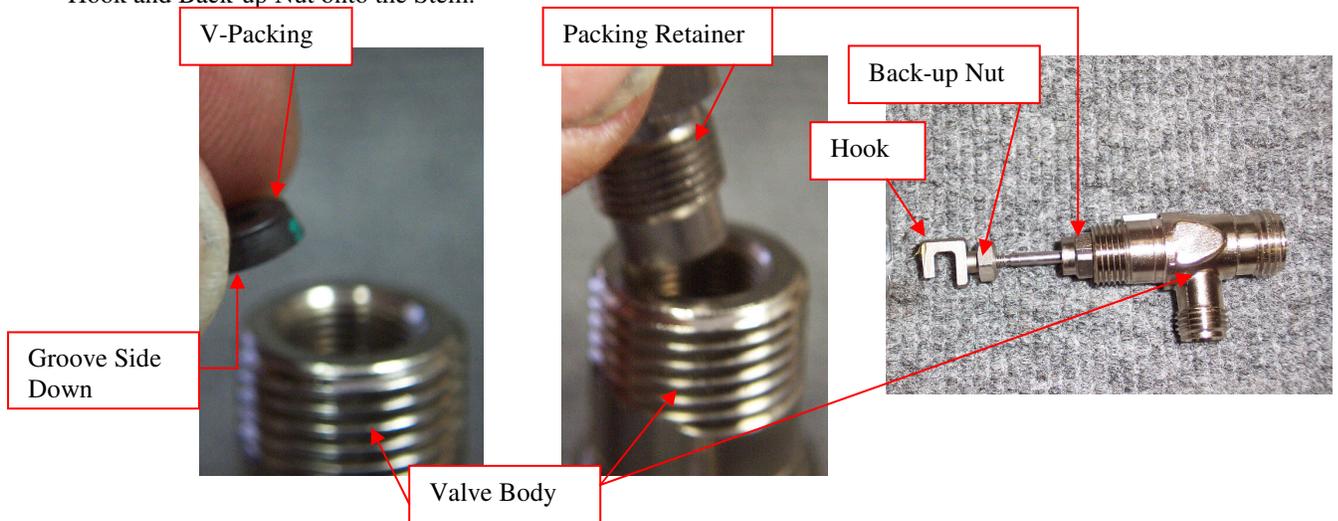
- If the Gunjet is leaking around the valve, the V-Packing will need to be replaced. The V-Packing is included with the Stem in the Gunjet Repair Kit (NA0821). The V-Packing can be purchased separately (PF1425S-1-VI).  
With the Sprayer Extension and Shutoff Disk removed, use a 3/4” wrench to unthread and remove the valve retaining nut. Extend the stem and lift the end of the stem of the trigger lever as you pull the valve forward off of the Gunjet Frame. Be careful not to drop the woodruff key from the top of the valve as you remove it.



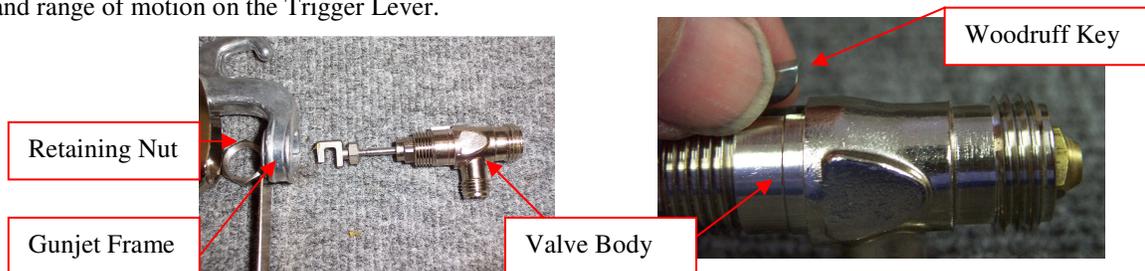
- Remove the hook and back-up nut from the end of the Stem. Then use a 7/16” wrench to unthread and remove the packing retainer. Pull the Stem out from the front of the valve and use a pick to pull out the V-packing from the back of the valve.



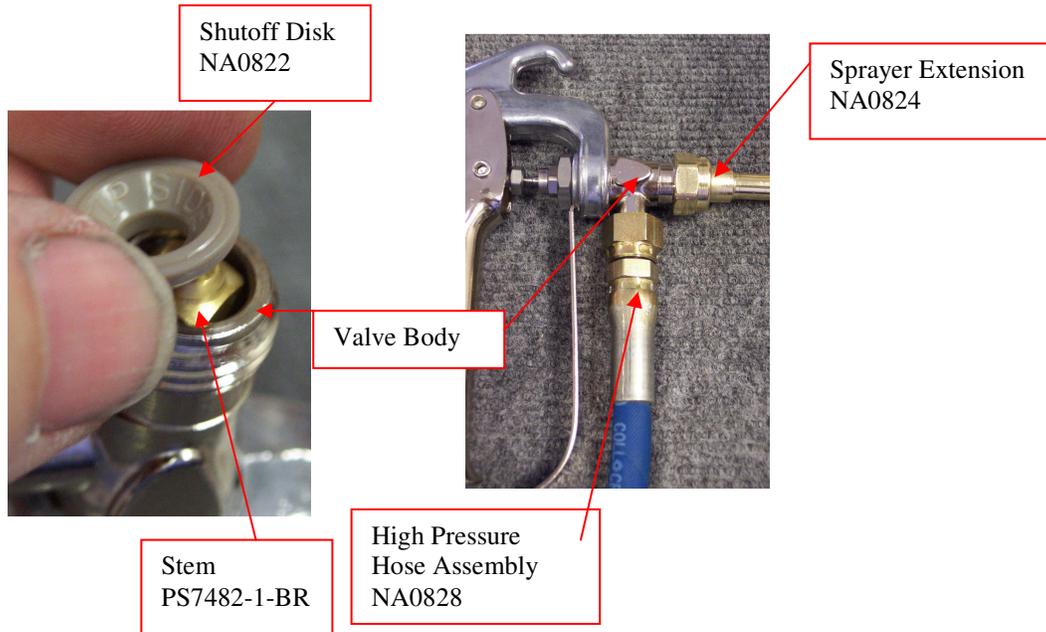
- Place new V-Packing into valve body. (Groove side down.) Make sure V-Packing does not roll up as you push it down in place. It must sit flat on the bottom with the groove side down. Re-install and tighten the packing retainer. Lube the Stem and insert end of Stem into the front of the valve, through the V-Packing and Packing Retainer. Re-install the Hook and Back-up Nut onto the Stem.



- Insert back of valve and stem through the front of the Gunjet Frame. Place Retaining Nut over end of Stem before placing Hook onto Trigger Lever. Be sure to place Woodruff Key into top of valve and slide into slot of Gunjet Frame. Tighten retaining nut. If necessary the Hook and Back-up Nut can be moved to allow the proper positioning of the Stem and range of motion on the Trigger Lever.

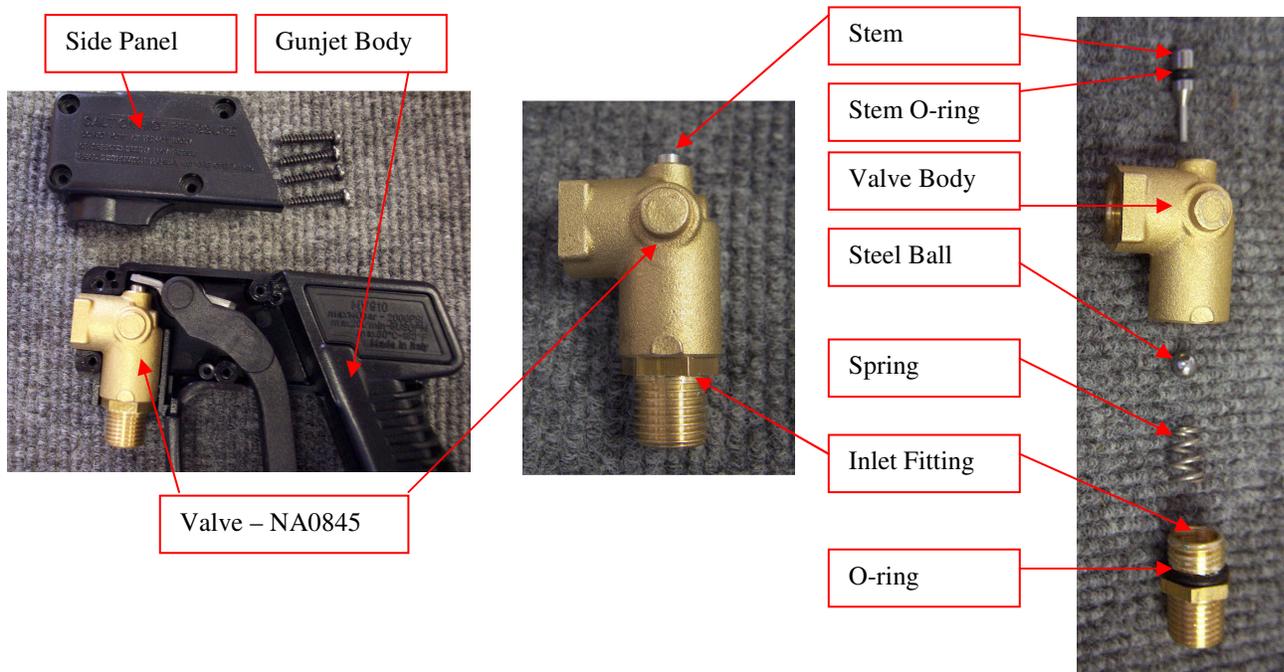


- Examine the Shutoff Disk and replace if the seating surface is worn or damaged. Re-install Shutoff Disk and reconnect Sprayer Extension and High-Pressure Hose Assembly. Test Gunjet and repeat repair procedure or replace gun if problems persists.

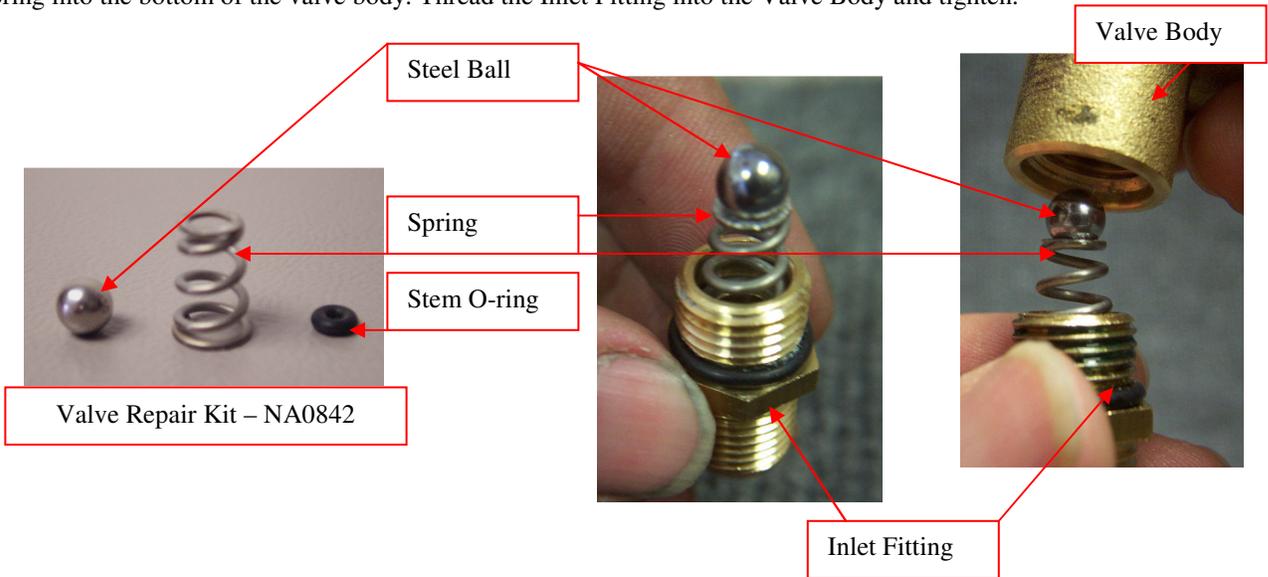


**Section III – Repairing the NA0820A Gunjet**

- To service the NA0820A Gunjet, remove the four screws holding the side panel on the Gunjet Body. This will expose the valve. Remove the High Pressure Hose Assembly from the bottom of the valve. The Sprayer Extension on the front of the valve does not need to be disconnected to service the valve, but will need to be removed if the valve is going to be replaced. Remove the valve from the Gunjet Body. Replace the valve with a new Valve NA0845 or repair as needed.
- To repair valve, use a 15mm - 6 point Deep Socket wrench to remove the Inlet Fitting from the bottom of the valve. Then remove the Stem, Steel Ball and Spring from the Valve Body.



- Repair Kit NA0842 contains a new Stem O-ring, Spring and Steel Ball. Examine the valve and components. If the Stem or Valve Body is damaged, replace the whole valve. If you decide to repair the valve, replace the Stem O-ring and re-assemble the valve, using the new Steel Ball and Spring. Apply Loctite 242 or similar thread sealant to the threads on the inlet fitting. Place the wide end of the spring into the base of the fitting and place the Steel Ball on top of the spring. Insert the ball and spring into the bottom of the valve body. Thread the Inlet Fitting into the Valve Body and tighten.



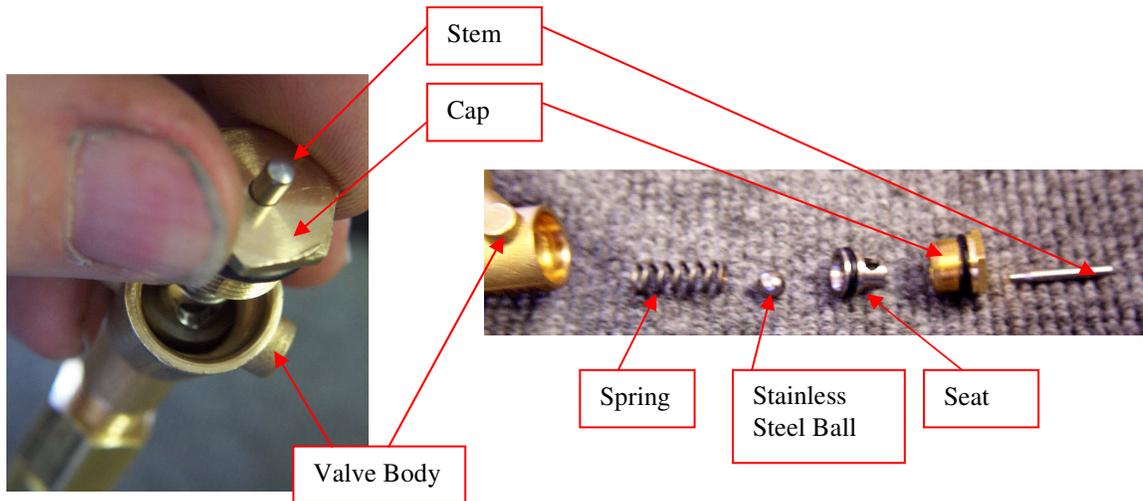
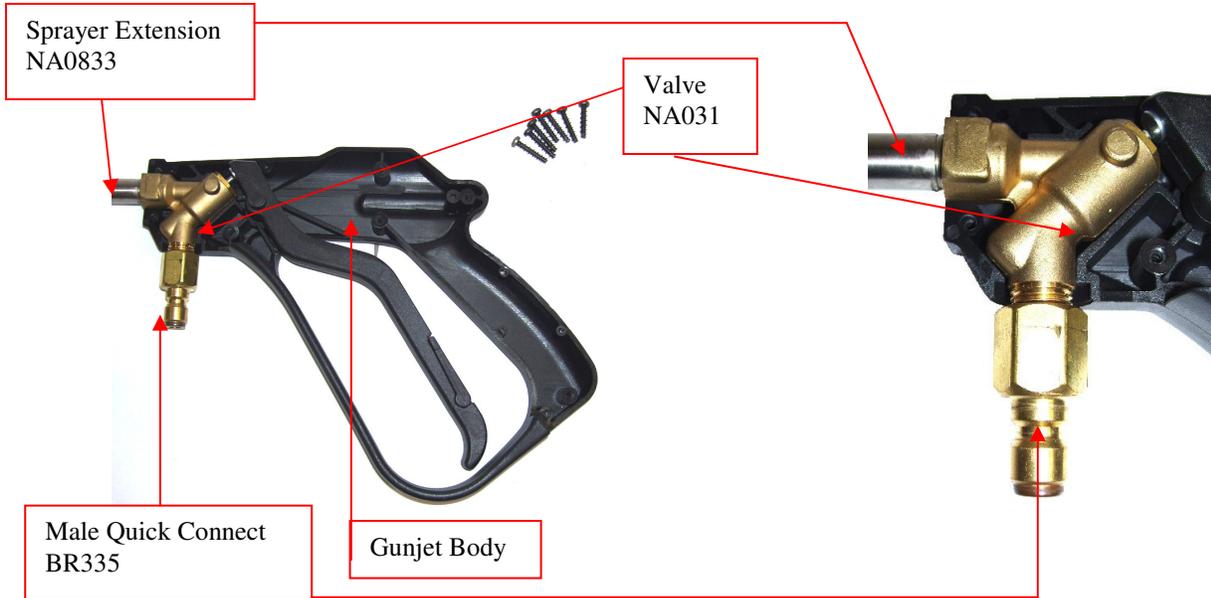
- Re-install the valve into the Gunjet Frame and replace the side panel and screws. Reconnect the High-Pressure Hose Assembly to the Inlet Fitting on the valve. Reconnect the Sprayer Extension and test the Gunjet and repeat repair procedure, replace the valve or replace the Gunjet if problems persists.



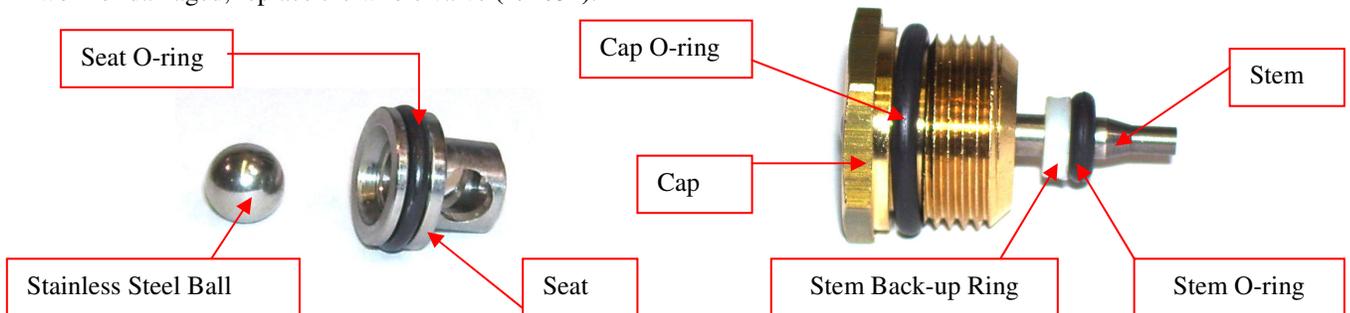
Plastic Gunjet - NA0820A  
Old Style  
Both body styles have the same internal components.

**Section IV – Repairing the 100010 Gunjet**

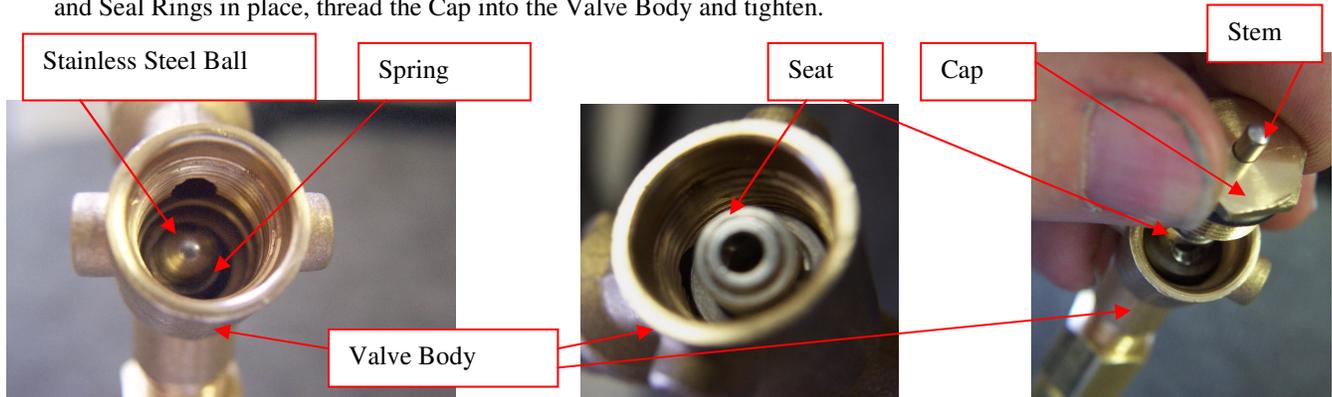
- To service the Gunjet **100010** you do not have to remove the Sprayer Extension (**NA0833**) or the High Pressure Hose Assembly (**NA0828**) or Quick Connect (**BR335**) unless you are replacing the valve. Remove the seven screws holding the side plate on the Gunjet Body and remove the side plate to expose the valve. Use a 15mm - 6 point Socket wrench to remove the Cap from the top of the Valve (**NA031**). Then remove the Cap and Stem from the valve. Then remove the Seat, Steel Ball and Spring.



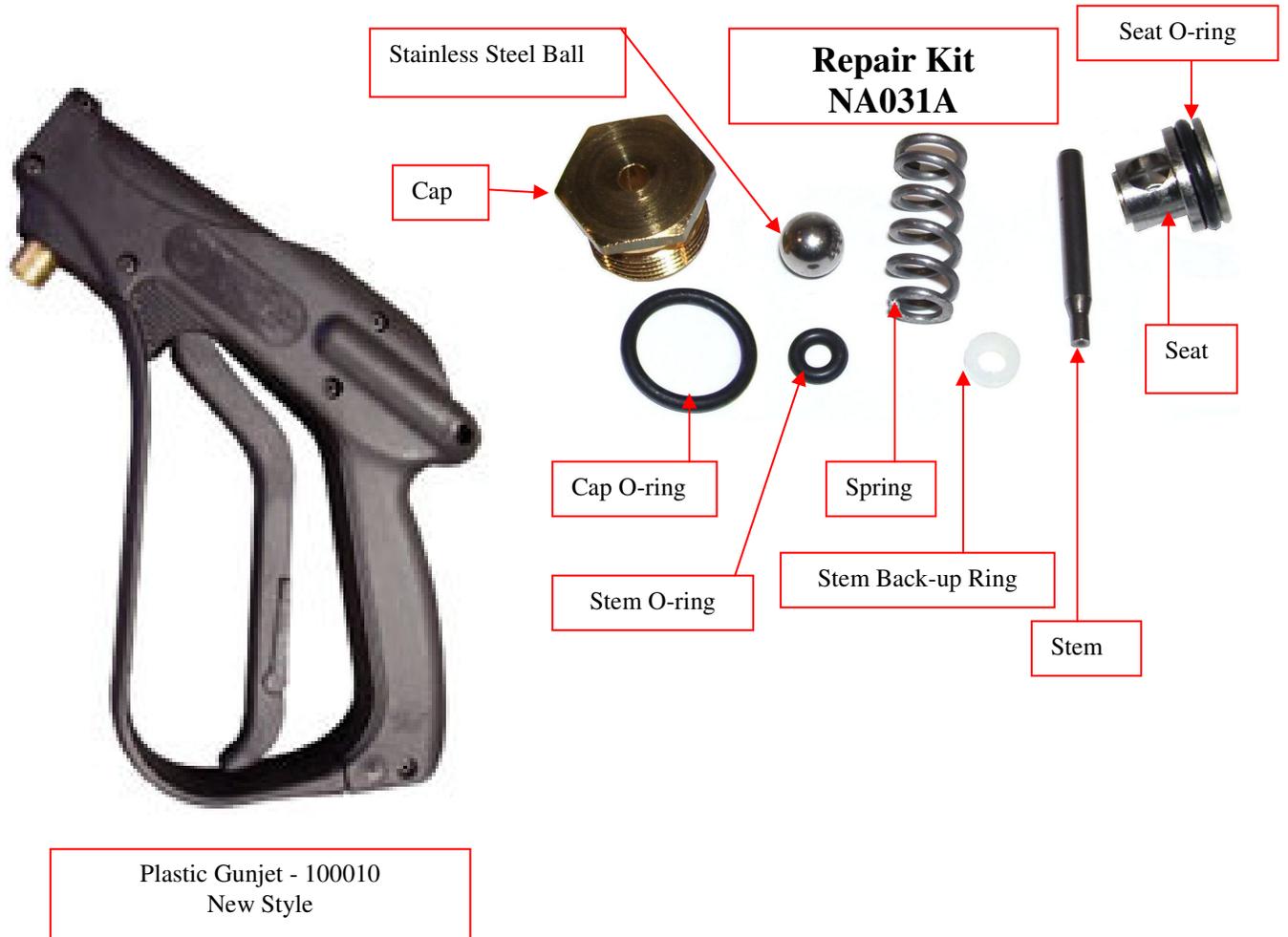
- Examine the Cap, Spring, Seat and Steel Ball for signs of wear or pitting. Replace Spring as needed. Replace the Seat o-ring. Replace Steel Ball as needed. Remove Stem from Cap and replace Cap & seals as needed. If the valve body or seat is worn or damaged, replace the whole valve (**NA031**).



- Re-assemble the Valve using new parts as needed. Repair Kit (NA031A) contains commonly used repair parts for the NA031 Valve. Place the Spring into the Valve Body and set the Steel Ball on top of the Spring. Place the Seat with the curved seating surface against the Steel Ball. Apply Loctite 242 or similar thread sealant on the Cap threads. With the Stem and Seal Rings in place, thread the Cap into the Valve Body and tighten.



- Place the Valve (Repaired or New) into the Gunjet Frame and replace the Side Plate. Secure the Side Plate with the seven screws.
- Test the Gunjet and repeat repair procedure, replace the valve or replace the Gunjet if problems persists.



Plastic Gunjet - 100010  
New Style

Quick Connects have been added to newer Hydro Force Sprayers to create a swivel connection between the gun and hose. A set of quick connects can be easily added to older Hydro Force Sprayers if desired. If the quick connects begin to leak there is an o-ring in the female quick connect (BR337) which can be replaced with a new o-ring (NA0873).

Turn off or disconnect solution supply pressure from sprayer before separating the quick connects.



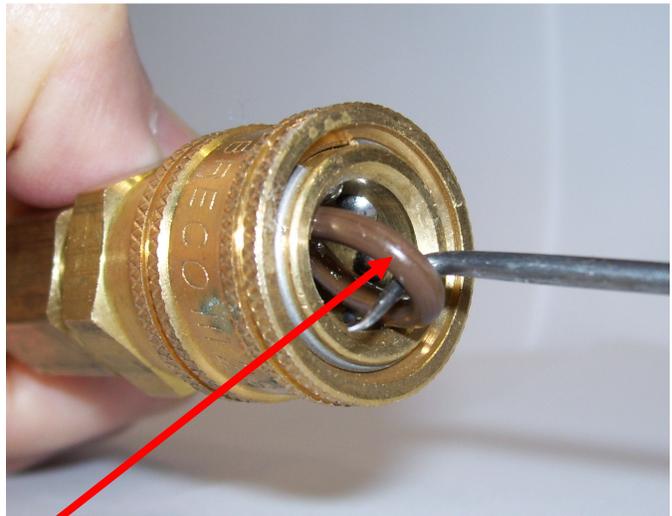
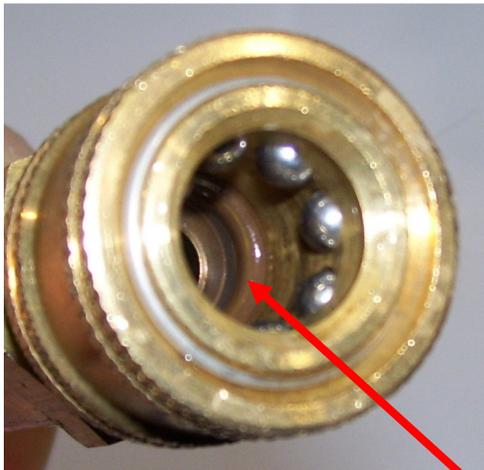
Male Quick Connect - BR335  
1/4" Female NPT



Female Quick Connect - BR337  
1/4" Male NPT



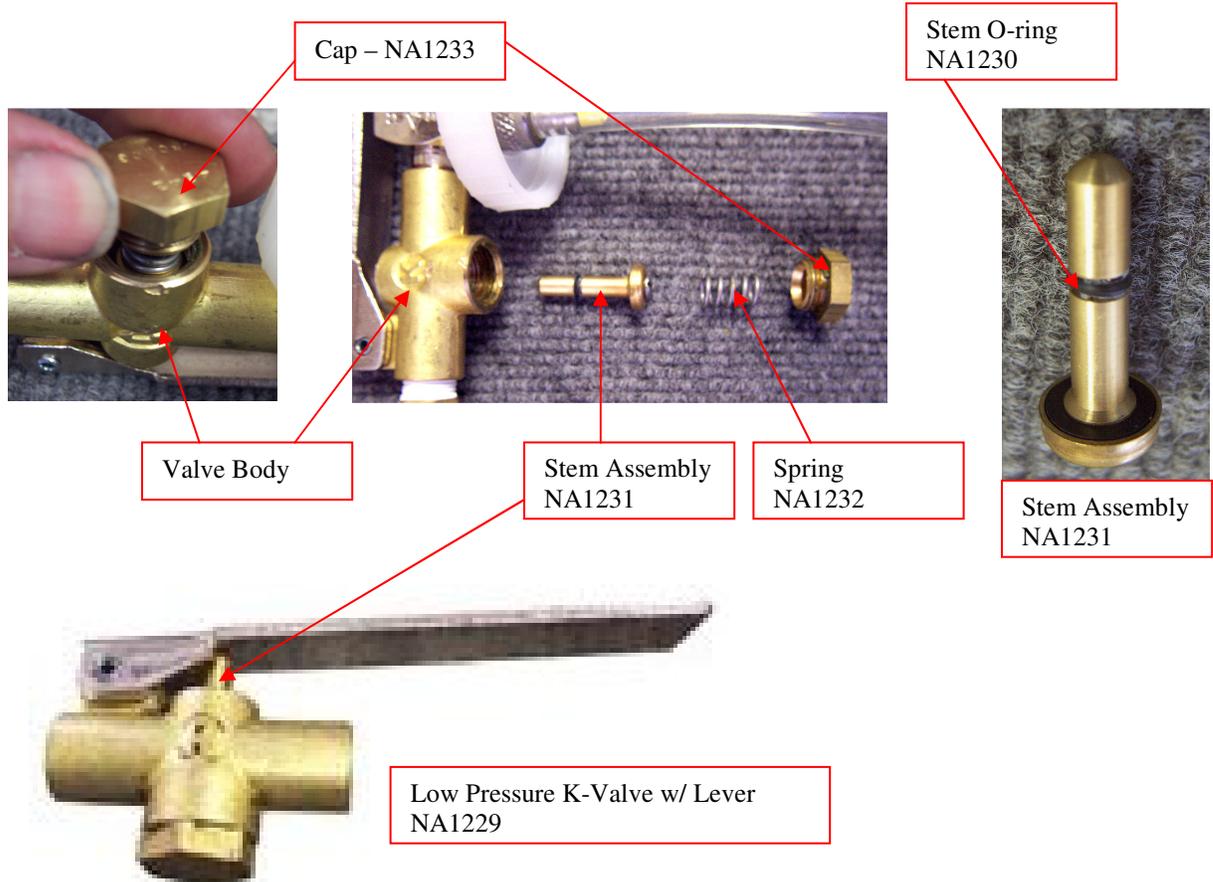
**NEVER SEPARATE QUICK CONNECT  
WHEN SPRAYER SOLUTION LINE IS  
PRESSURIZED**



Viton O-ring – NA0873

**Section V – Repairing the NA1229 K-Valve**

- To service the K-Valve **NA1229** you do not have to remove the Sprayer Extension or the Injector Valve unless you are replacing the valve. Use a 3/4” wrench to remove the Cap from the bottom of the K-Valve. Then remove the Spring and Stem Assembly from the valve.
- Examine the Spring (**NA1232**), Stem Assembly (**NA1231**), Cap (**NA1233**) and Valve Body. If the seat and shaft of the Stem Assembly are not damaged, the Stem O-Ring (**NA1230**) can be replaced without replacing the whole Stem Assembly. If the Valve Body is worn or damaged, the whole K-Valve (**NA1229**) will need to be replaced.



- Lubricate stem and insert Stem Assembly into Valve Body, pushing the end of the stem through the opening in the top of the valve. Place the spring on the bottom of the Stem Assembly between the Stem Assembly and the Cap. Then thread the Cap into the bottom of the Valve Body and tighten. Test the K-Valve and repeat repair procedure, replace the K-Valve if problems persists.