Technical guide #: **3.030.400.002**

Hydro-Force Injection Sprayers – 2011 Models

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. In 2011 the model line was reduced to three models, eliminating the low pressure models. The three different models of Hydro-Force Injection Sprayers in current production are still highly reliable and simple to maintain and repair. Some changes such as the bottle used on the newer units, have no bearing on the repair procedures. The first step in repairing the different sprayers is the identification of the sprayer model and components.

HYDRO-FORCE PRO
High Pressure – Plastic Gunjet
Hydro-Force AS08

HYDRO-FORCE REVOLUTION
High Pressure - Revolution
Hydro-Force AS08R

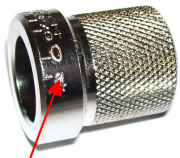
HYDRO-FORCE PLUS
High Pressure – Economy Model
Hydro-Force AS08P

The main variable is the Injection Valve used on the Hydro-Force Injection Sprayers. There are two different injection valves used on the Hydro-Force Injection Sprayers. The AS08 & AS08P use the NA0809A Injection Valve. The AS08R uses the NA0850A Revolution Valve.

Standard Valve (AS08 & AS08P) **NA0809A**
Revolution Valve (AS08R) **NA0850A**

Hydro-Force Injection Valve Assembly
NA0809A

Hydro-Force Revolution - HP Injection Valve Assembly
NA0850A



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

Troubleshooting

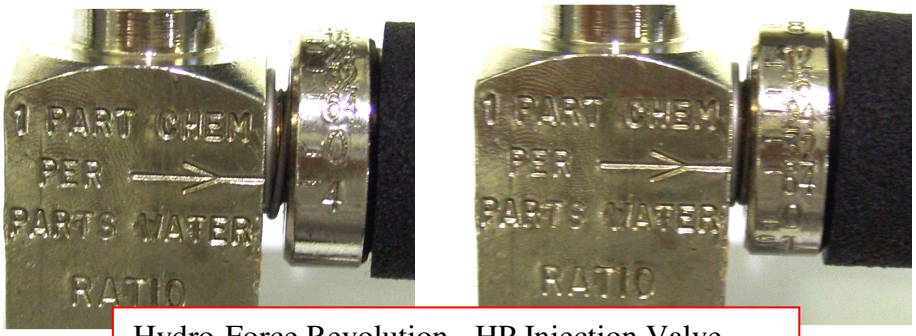
Even with the differences in components described in the previous section, you will find the operation and the problems encountered are similar for all Hydro-Force Injection Sprayers.
The main problem is failure of the injection system to draw chemical. The sprayer can be tested by connecting it to a 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 Hydro-Force injection valves are calibrated at 400 psi.
The flow rate should be at least .6 gpm at 50 psi and 1.5 gpm at 400 psi

With the sprayer connected to a pressurized water source, place the chemical draw tube 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.

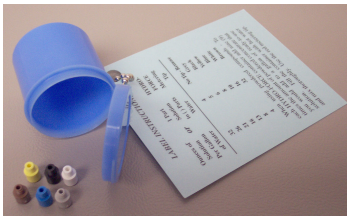
For example: If you have drawn 10 ounces of water and collected 90 ounces of sprayed water, your proportioning rate is 1-8.
10 ounces of drawn water and 80 ounces of incoming water make up the collected 90 ounces. Every ounce of drawn water (chemical) is mixed with 8 ounces of incoming water, a 1-8 dilution.

The standard Hydro-Force Valve NA0809A, with the Yellow Metering Tip, should have a proportioning rate of 1-8 with the high-pressure AS08 & AS08P sprayer. With the tip removed the proportioning rate should be 1-4 with the high-pressure AS08 & AS08P sprayer. Different metering tips can be used to get different proportioning rates with the HP 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. The Revolution valves can be set simply by turning the knob to point to the desired dilution setting.

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



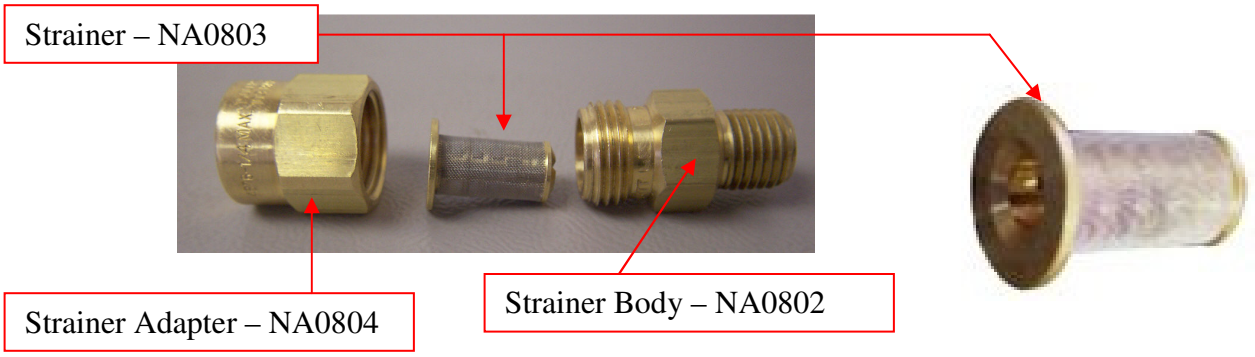
HP Injection Valve Metering Tip Kit - NA0816A
6 HP tips range from: 1-5 to 1-32

Section I: Repairing

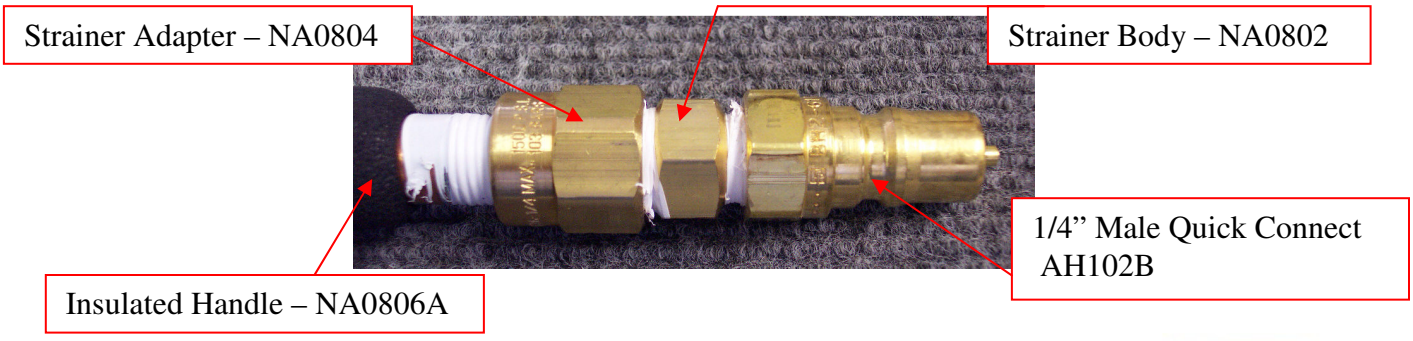
Once you have determined that the Hydro-Force Injection Sprayer is not properly drawing chemical, you must examine, repair and retest to determine and eliminate possible causes of the problem.
There are three different areas to check.
Water Flow
Chemical Flow
Injection Valve Operation

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)**



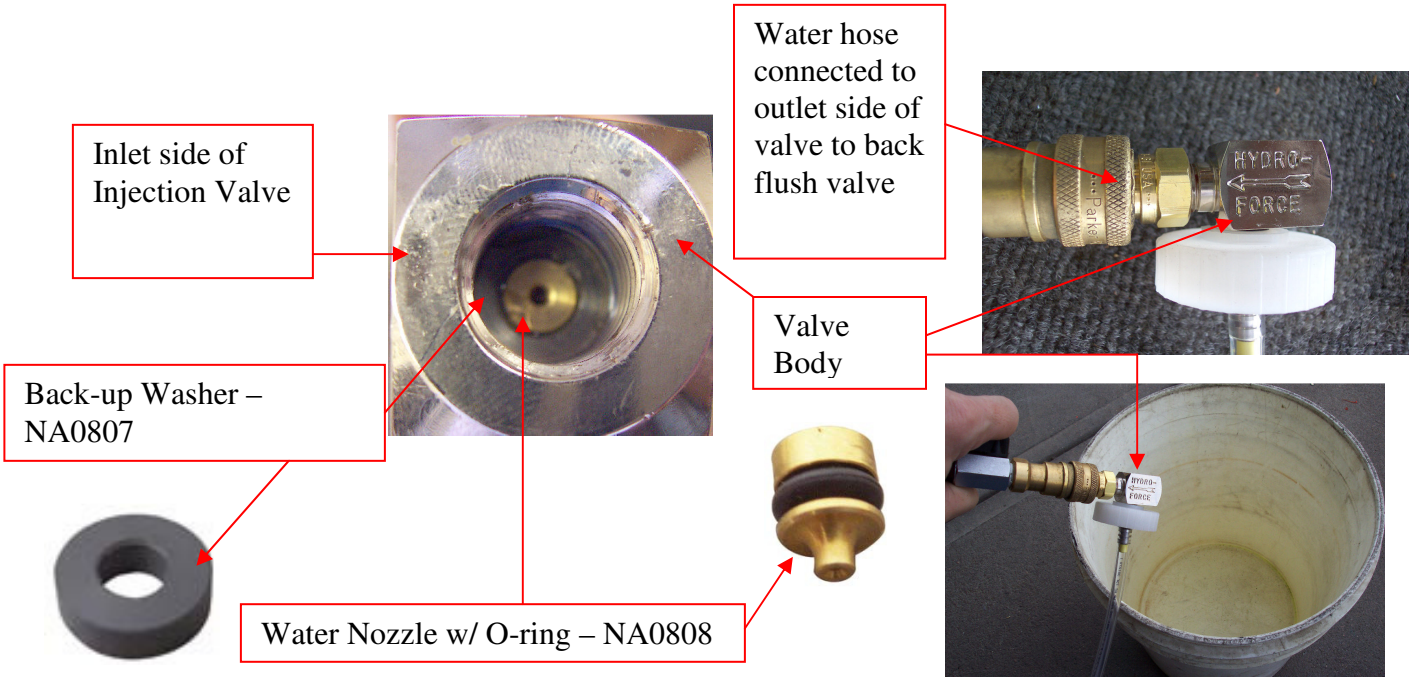
Jet – The Jet must be of the correct size to allow the proper flow. The current production models come standard with a "06" and must have at least a "05" orifice size to get the proper flow and proportioning. The Jet must be clean of debris that can restrict flow. Clean or replace the Jet as needed.

8006 1/4" VeeJet – B280

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.
NA0833 – Used on the AS08, AS08P & AS08R with the 100010 Gunjet

18" Stainless Steel Extension – NA0833

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 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.)



Newer models may have a brass back-up Washer NA0807

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, AS08P & 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 AS08 & AS08R 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

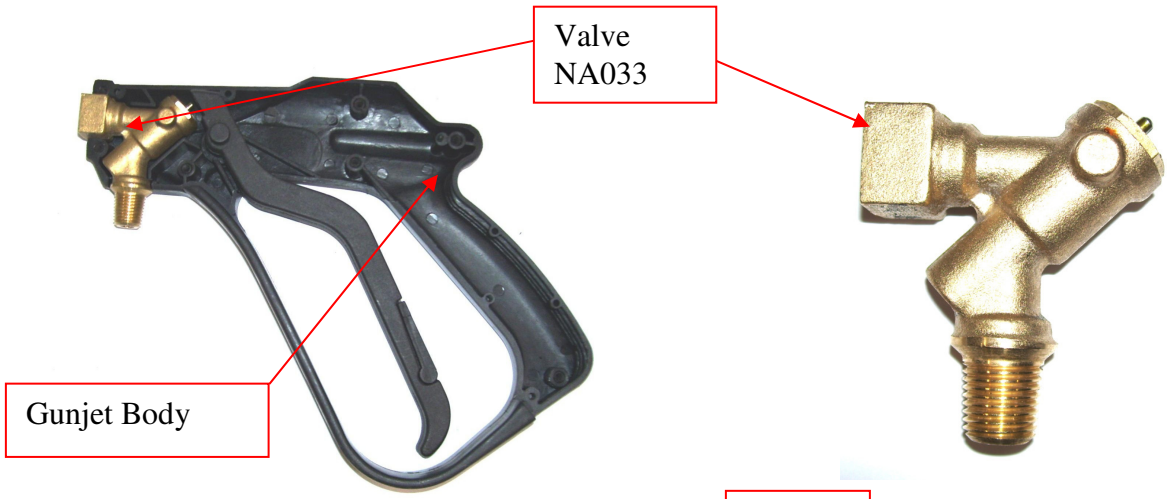
Do not separate the quick connects until the solution pressure supply to the Hydro Force Sprayer has been turned off or disconnected and the pressure has been released from the lines.

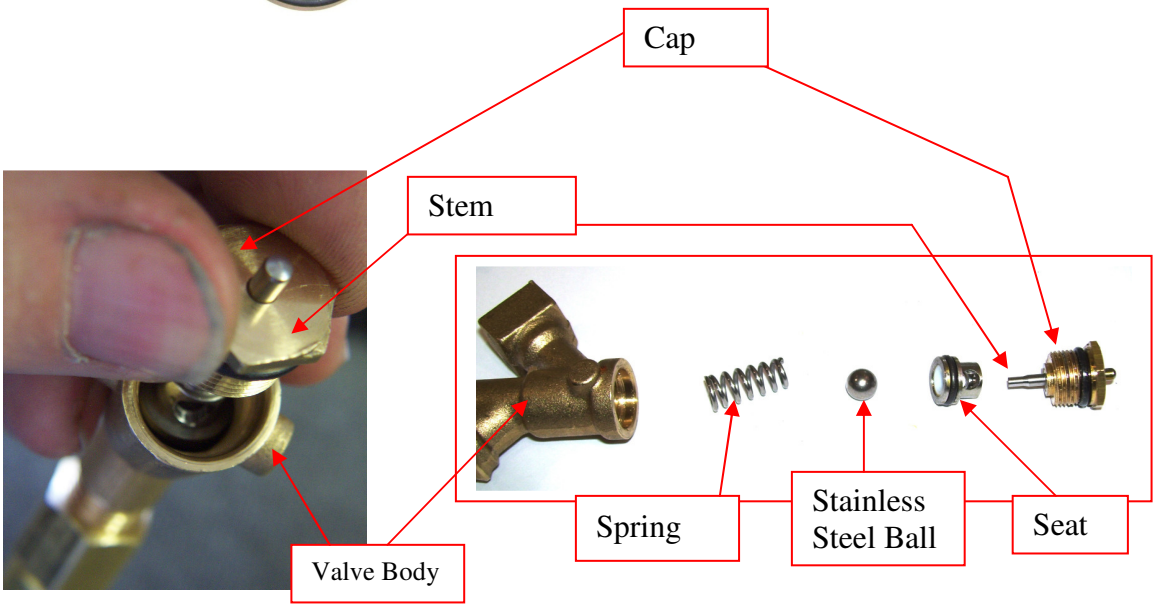
Gunjet/Valve – The gunjet or valve may not be operating properly and restricting the water flow. There may be debris in the valve restricting the flow through the valve and it will need to be cleaned out. If the gunjet is leaking or the valve is not opening, it will have to be repaired or replaced. The gunjet used on the current production models looks similar to the gunjet used on some older models, but is made by a different manufacturer. The repair procedure is the same, but the valves have different repair parts.

100010

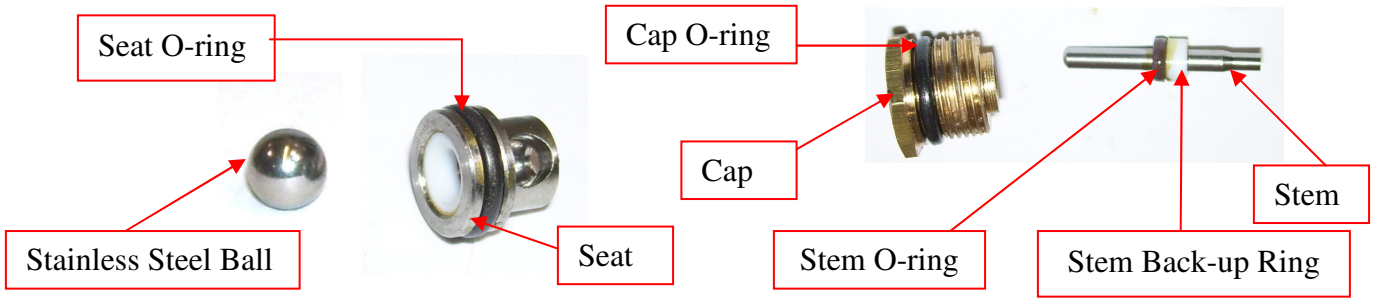
Repairing the 100010 Gunjet

- 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 **(NA033)**. Then remove the Cap and Stem from the valve. Then remove the Seat, Steel Ball and Spring.

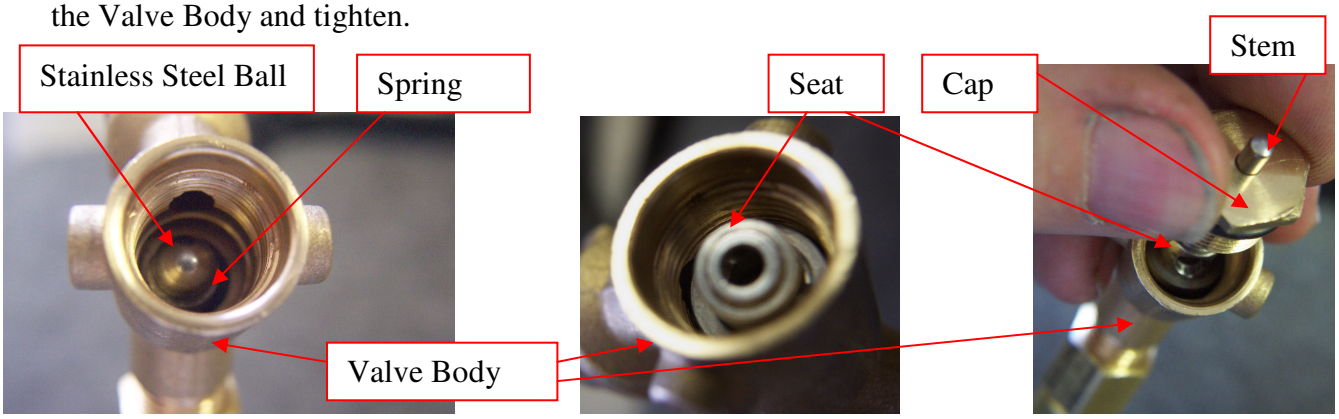




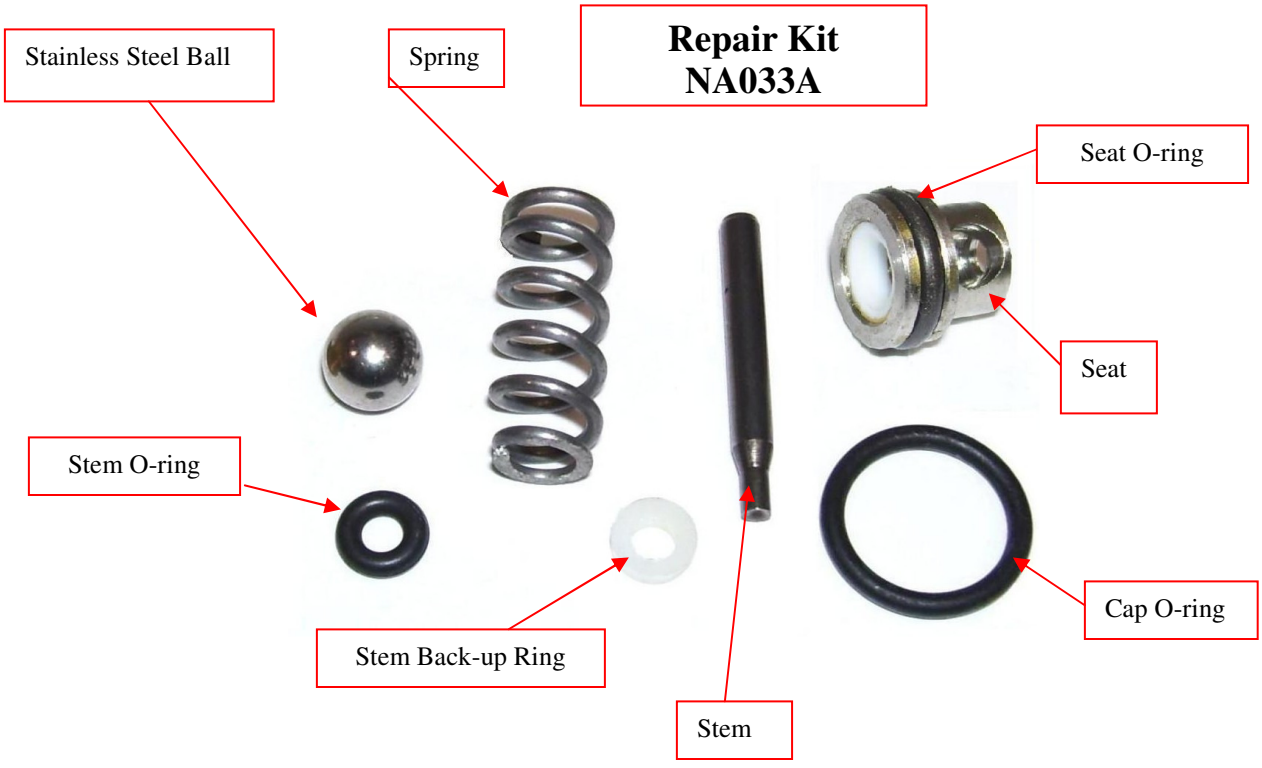
- Examine the Cap, Spring, Seat and Steel Ball for signs of wear or pitting. Replace Spring as needed. Replace the Seat o-ring. Replace Steel Ball as needed. Remove Stem from Cap and replace seals as needed. If the valve body, cap or seat is worn or damaged, replace the whole valve **(NA033)**.



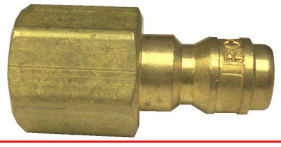
- Re-assemble the Valve using new parts as needed. Repair Kit (**NA033A**) contains commonly used repair parts for the **NA033** Valve. Place the Spring into the Valve Body and set the Steel Ball on top of the Spring. Place the Seat with the curved seating surface against the Steel Ball. Apply Loctite 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.



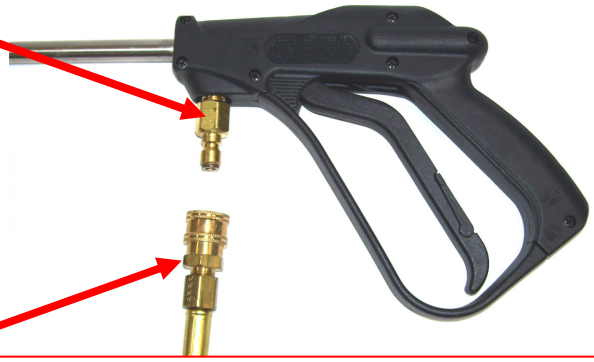
- Place the Valve (Repaired or New) into the Gunjet Frame and replace the Side Plate. Secure the Side Plate with the seven screws.
- Test the Gunjet and repeat repair procedure, replace the valve or replace the Gunjet if problems persists.



Quick Connects are used on the AS08 & AS08R Hydro Force Sprayers to create a swivel connection between th gun and hose. If the quick connects begin to leak there is o-ring in the female quick connect **(BR337)** which can b replaced with a new o-ring **(NA0873)**.
Turn off or disconnect solution supply pressure from sprayer before separating the quick connects.

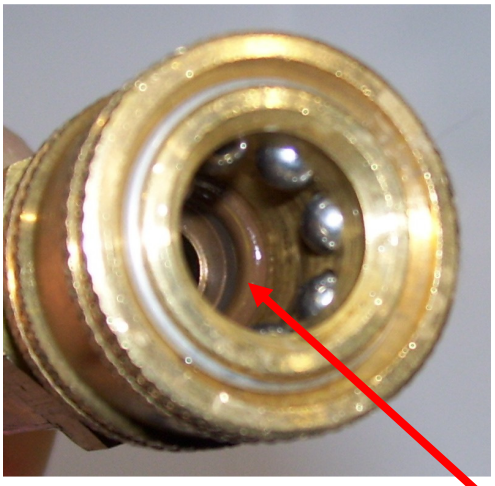


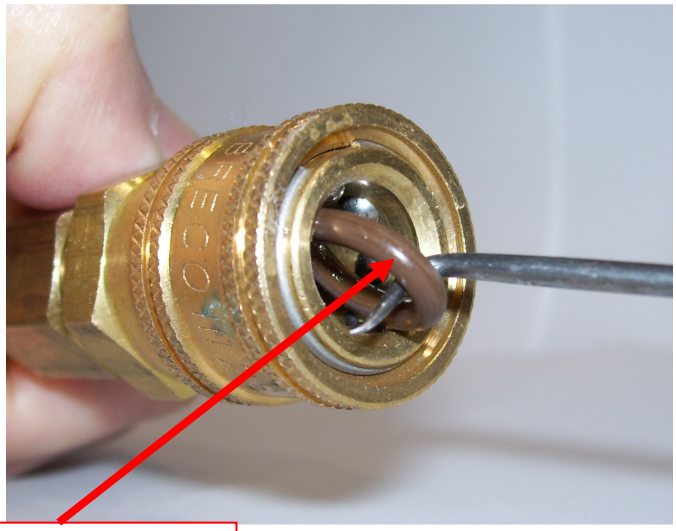
Male Quick Connect - BR335
1/4" Female NPT



Female Quick Connect - BR337
1/4" Male NPT

NEVER SEPARATE QUICK CONNECT WHEN SPRAYER SOLUTION LINE IS PRESSURIZED



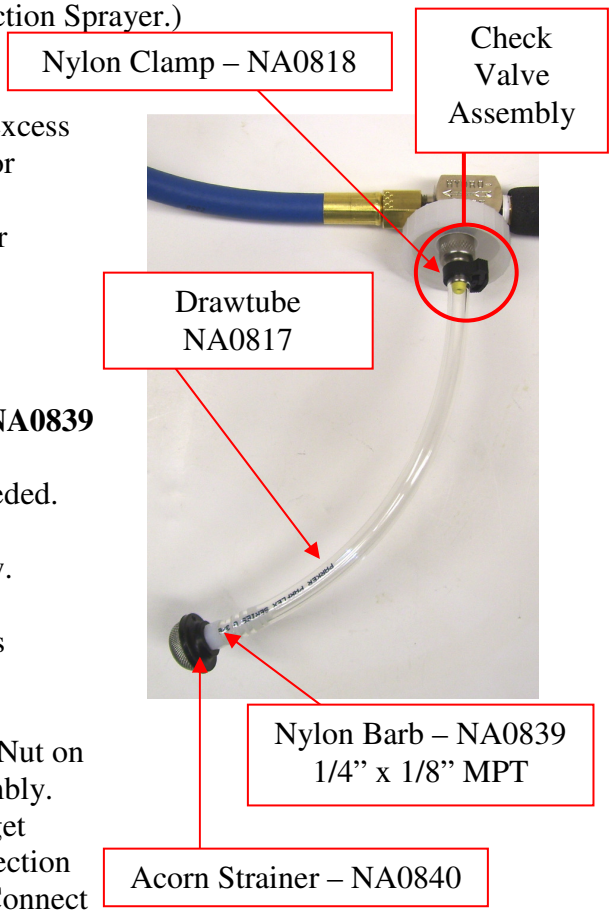


Viton O-ring – NA0873

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.

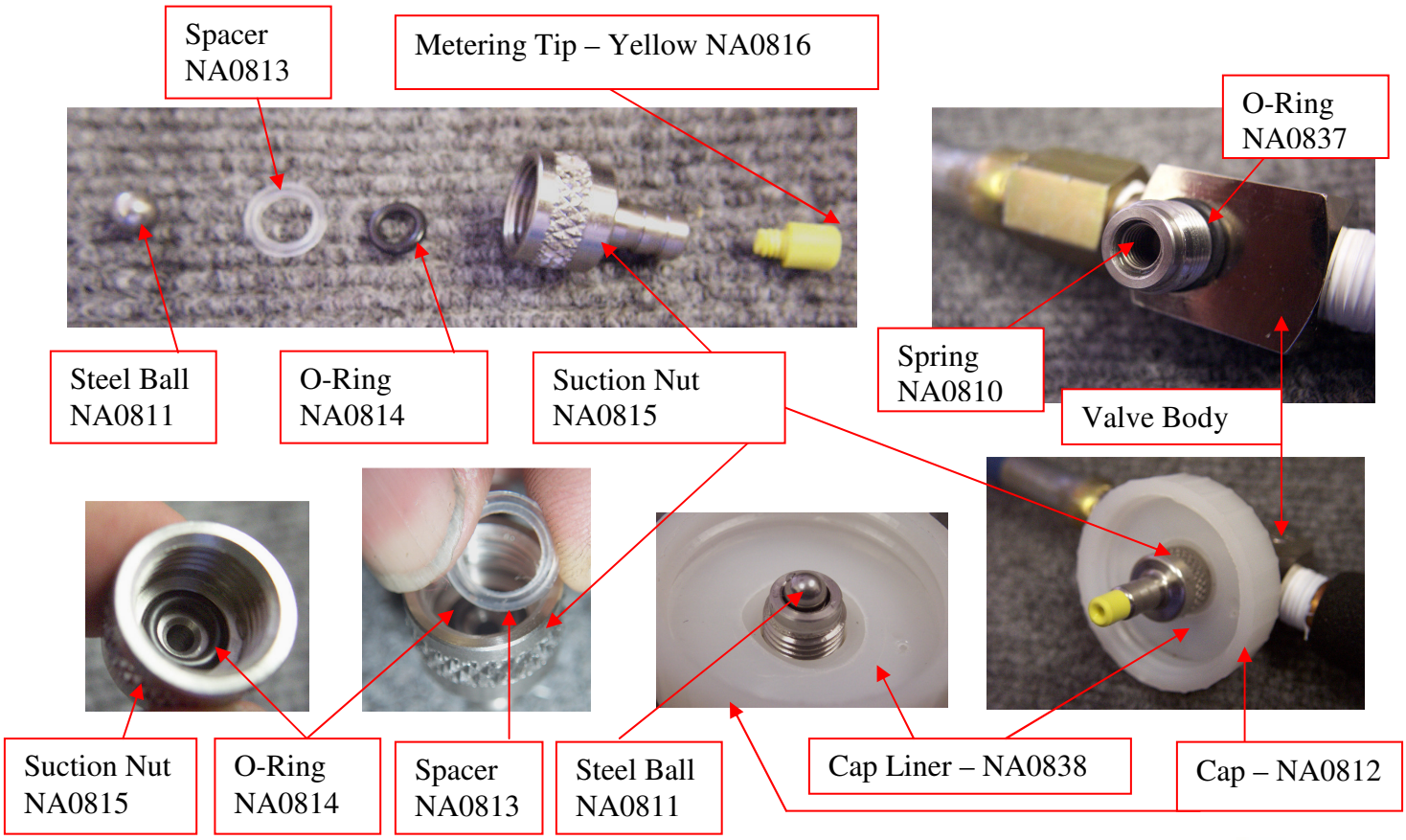
Chemical – The viscosity of the chemical may be too thick for the injection valve to draw the chemical. Dilute the chemical or substitute a different chemical with a lower viscosity. (Chemicals with a viscosity similar to water are best suited for use in the Hydro-Force Injection Sprayer.)



Acorn Strainer – If the acorn strainer screen is plugged with excess chemical or debris the chemical flow will be restricted. Clean or replace the filter as needed. Clean out or replace the chemical container **(AS68 or AS30)** 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 Sprayer AS08R does not have a metering tip.) 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 Check Valve Repair
All Hydro-Force 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 Sprayers AS08 & AS08P

NA0849R – Kit Major Repair Hydro Force Revolution Injection Sprayer AS08R

Chemical Container – Clean out or replace the 5-qt chemical container **(AS68 on AS08 & AS08R or AS30 on AS08P) a**s needed to remove excess chemical or debris before refilling container.

Cap – Side Port
AS68L

Cap Retaining Strap
AS69A

AS68 – 5QT Jug without Cap & Strap – Roto-molded With handle support, side-fill port & spray wand holder

AS68A – 5QT Jug with Cap & Strap – Roto-molded With handle support, side-fill port & spray wand holder

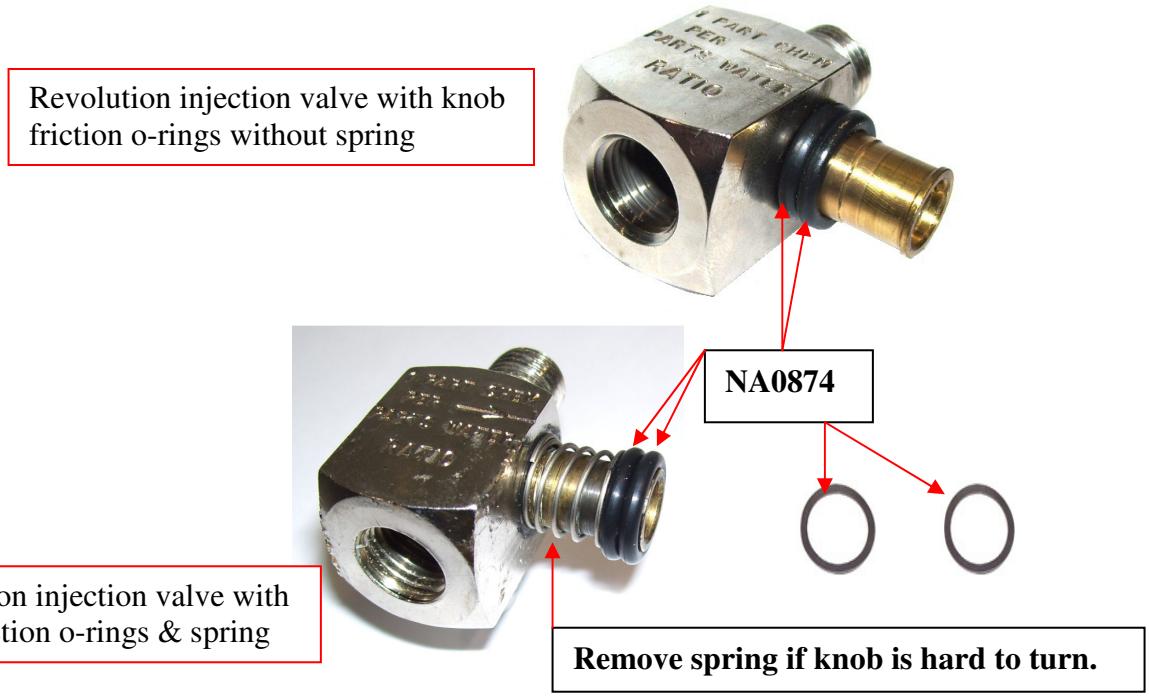
XIN56 – Storage Cap – Front Port Only

AS30 – 5QT Jug with cap Blow molded
XIN95 – 5QT Jug Only
XIN56 – Storage Cap Only

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 AS08R, remove the metering knob and stem assembly before soaking. Lubricate the stem o-rings before re-assembly.) Re-install check valve assembly (and stem on Revolution Sprayers), then back flush the valve before replacing the water nozzle and attaching handle to flush debris out of the valve body.
(See back flush instructions on Page 5)

To prevent the proportioning rate from changing during spraying, 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. The spring has been removed on newer units to make the knob easier to turn. If your valve has a spring it can be removed to make the knob easier to turn.

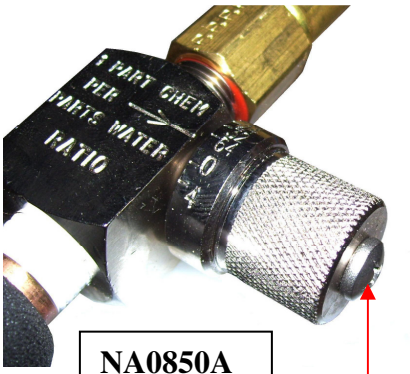


The Revolution Injection Valve can be repaired and recalibrated in the field. The Stem Assembly **(NA0869)** can be replaced on the Revolution Injection Valve. The stem assembly is included in the major repair kit **(NA0849R)**. The seat in the new valve is more resistant to the damage caused by over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



NA0850A

Remove screw to recalibrate

At this point if the "0" 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.
4. Pull the knob off of the end of the stem.
5. Turn the knob so that the "0" 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.
7. Replace the knob cover and test the chemical flow.

If these actions do not correct the chemical flow problem, replace the valve with a new Injection valve.
NA0809A for AS08 and AS08P
NA0850A for AS08R

NA0809A

NA0850A