



2SFX Pumps Service Sheet: Valve Repair

This sheet covers replacing the valves on a 2SFX pump. Most of the information here was taken from the CAT Pumps Service Manual for this pump. We have included some helpful hints where we thought it would be appropriate.

Notes before beginning:

- 1.) This repair sheet assumes that the pump has been removed from the pressure washer.
- 2.) This should go without saying, but make sure everything is turned off on your pressure washer before working on it. Turn off the gas engine or unplug the electricity. Turn off the water supply. Disconnect both the garden hose and the high pressure hose.
- 3.) We highly suggest that you replace all the valves at the same time with new, complete valves. These are wear parts that are under a lot of stress while the pump is running; if one part has gone bad, the rest are probably on their way out as well. Besides, replacing the entire valve is a lot easier than trying to repair them!

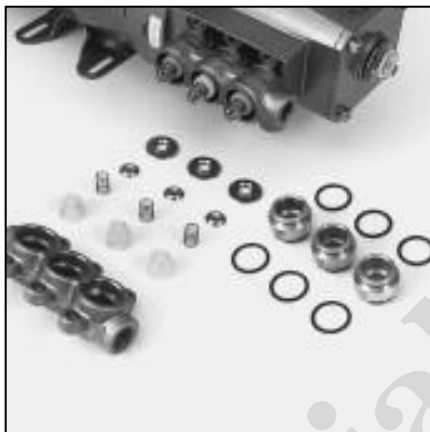


Figure 1 – Pump head and discharge valves



Figure 2 – Discharge Valve kit for most 2SFX pumps (IPF CT34052); 2SFX30GZ uses IPF CT34052

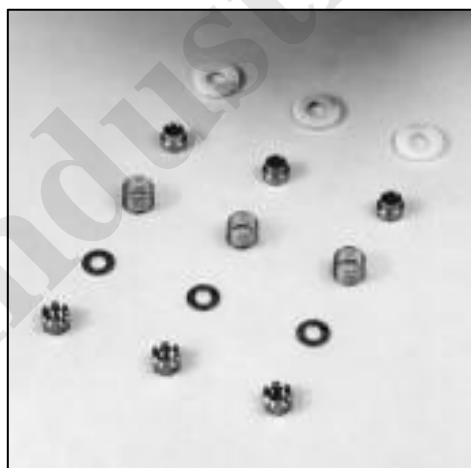


Figure 3 – Inlet valve parts

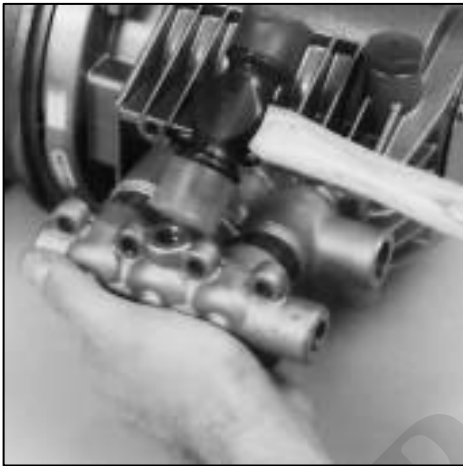


Figure 4 – Inlet Valve kit for 2SFX pumps (IPF CT34668)

SERVICING THE VALVES

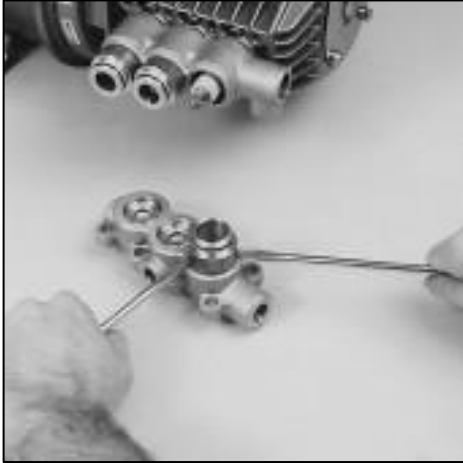
Disassembly of the Discharge and Inlet Valve Assembly

1. Disconnect all plumbing and remove unloader for ease in servicing.
NOTE: CEE and SEEL models do not come with standard unloader.
2. Inspect oil for proper level, presence of water or discoloration and replace as needed.
NOTE: If the oil is cloudy and has a 'chocolate milk' look to it, water has gotten mixed in to it. Look at replacing the water seals in a separate guide.
3. Grab a copy of the parts breakdown diagram. It will help to identify the parts mentioned in this guide.
4. Using a standard M6 allen wrench remove the six (6) Socket Head Screws from the manifold. Remove the outer screws first, then the center screws.
5. Using a soft mallet, gently tap the back side of the Discharge Manifold (part #185 on the breakdown diagram) from alternate sides to maintain alignment and avoid damage to the plungers.



6. Grasp the Discharge Manifold from the from underside and gradually lift manifold while you pull away from the Crankcase. Again, keep the alignment of the Discharge Manifold to the rest of the pump to avoid damaging the plungers. In other words, pull it straight away from the pump without too much side to side wiggling.
7. At this point, take care not to lose parts and to note the order of the parts. You can always refer to the parts breakdown, but seeing them with your own eyes will make putting the part back in easier.

8. The brass Adapter Spacers (part #157) may stay with either the Discharge or Inlet Manifold. By inserting two opposing screwdrivers between Spacer and manifold you can easily pry them out of the Discharge Manifold (use caution, don't damage either the spacer or the manifold). If they stay in the Inlet Manifold, gently work them up and down as you pull away from the Inlet Manifold.



9. The discharge valve assemblies are in the Discharge Manifold ports and will fall out when manifold is turned over. A complete discharge valve assembly includes: Retainer, Spring, and Valve. All these parts for all 3 valves (plus the o-rings on the adapters) are included in kit IPF CT34056. The one exception here is that the 2SFX30GZ pump uses kit IPF CT34052 (that is the same kit as used on 2SF model pumps; you can refer to that valve repair guide for details on that kit).
10. The inlet valve parts are found between the Adapter Spacer and the Inlet Manifold (part #110). All the parts needed for these valves are found in kit IPF CT34668.

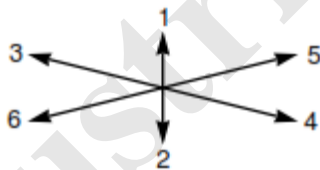
Reassembly of the Inlet Valve Assembly

1. Examine Inlet Valve (part #134) and replace if worn. **Inlet valves cannot be reversed if worn.** Install the S.S. Inlet valves with **square edges towards the plungers** (round edges towards the discharge). Install the Nylon Inlet Valve with **ridged side towards the discharge**.
NOTE: The "Hi-Temp" 2SF models use a Nylon Inlet Valve (order individual parts, not standard Inlet Valve Kit).
2. Examine Spacers (part #135) for wear and replace as needed.
3. Install Spacer on each Plunger Rod with **smaller O.D. towards inlet valve**.
4. Examine Springs (part #136) for damage or fatigue and replace as needed. Place on Plunger Rods.
5. Install Washers (part #137) next with **concave side towards Inlet Manifold**.
6. Install Nuts and torque per chart.

Reassembly of the Discharge Valve Assembly

1. Examine Adapter Spacer O-Rings (part #159 and #152) and replace if worn. Lubricate and install O-Rings on both front and rear of the Adapter Spacer.
2. Examine the Valve Retainers (on the parts diagram it's called the Spring Retainer, part #168) for scale buildup or wear and install into each Discharge Manifold port with tab (aka, pointed end) down into the manifold chamber.
3. Replace worn or damaged Springs (part #167) and place into Retainers.
4. Examine Valve (part #166) and Seats (part #157, it's actually part of the Adapter) for pitting, grooves or wear and replace as needed.
5. Place Valves over Springs with concave side down.
6. Place Valve Seats on Valves with concave side down.
7. Lubricate O.D. of Adapter Spacer and insert smaller I.D. into Discharge Manifold ports. Snap into position. Exercise caution not to cut or pinch o-rings.
8. Carefully guide Discharge Manifold with Spacers over Plunger Rod ends and press into Inlet Manifold.
9. Replace Socket Head Screws and torque per chart. Use torque sequence chart.
10. If oil was not changed, be certain oil is to mark on Oil Gauge before resuming operation.

TORQUE SEQUENCE



TORQUE CHART

Pump Item	Thread	Tool Size	Torque		
			in. lbs.	ft. lbs.	Nm
Outer Bearing Case Screw	M6	M10 Hex/Phil.	50	4.0	6
Inner Bearing Case Screw	M6	M10 Hex/Phil.	50	4.0	6
Manifold Screw	M8	M6 Allen	115	9.4	13
Plunger Rod Nut	M6	M10 Hex	55	4.4	6
Bubble Oil Gauge	M28	Oil Gauge Tool	45	3.6	5
<i>Mounting 2SF</i>					
Adapter Plate to Gas Engine	5/16-24	1/2" Hex	90	7.2	10
Pump to Adapter Plate	3/8-16	9/16" Hex	110	9.0	12
Pump to Electric Motor	3/8-16	9/16" Hex	110	9.0	12