

Let's get started –

Mount the unit by its left side in a large padded vise with the Hydraulic Lift Draft Control Spring (item 547) to the left, the Hydraulic Lift Control Lever Quadrant Assembly (item 313296) up, and the innards facing you. Tighten the vise down good; you don't want it to slip. There are pictures of the mounted control further down in this document.

Unscrew the Hydraulic Lift Yoke (item 546) that holds the Hydraulic Lift Draft Control Spring (item 547). This may give you trouble, use solvent, use heat, whatever it takes, but get it off. You might want to loosen it before removing it from the tractor to get some real torque on it. Having said that, I need



to caution you not to apply too much force, or you'll



damage the internal linkage (shown here) that it is connected to. If it is stuck so badly that it won't come loose with a good yank and a grunt, you'll need to heat up the yoke with a torch and a rosebud tip to get enough BTU's on it. The original Ford manuals said to reach

through the spring coils and cut the shaft with a hack saw. That was easy for the Ford dealership to say, as they were selling the replacement parts, definitely an expensive last resort. Reassemble with anti seize to make it easier next time.

Remove the three bolts that hold the Hydraulic Lift Cover Plate Assembly (item 527) and the Spring Seat Support (item 624) in place. Inspect the Hydraulic Lift Cover Plate Assembly for wear. It is not unusual to find that the pin is damaged. You can see below that mine has suffered much abuse and is no longer round. This pin can be driven out and replaced. Use a hardened steel pin, 1/4" x 1.3" and weld it on the outside to secure it in place. The weld may need a little grinding to prevent interference with the Draft Control Spring. Optionally, you can try permanent Loctite and/or JB Weld to secure it, but I like welding, done right, it will last forever.

Here's mine, notice the wear mark around the center hole on the inside of the plate. It almost looks factory, but it is from years of wear. This part rides metal-on-metal against the surface of the Hydraulic Lift Draft Control Plunger (item 541), and after all the years will show some wear. It is the first prime candidate for replacement.



If the inside of this plate is not perfectly flat, it will allow the Hydraulic Lift Draft Control Plunger to extend too far, and there will be no way to get the controls back in spec. Replace it, repair it (weld/fill & grind flat), or shim it, but don't try to use it if it's worn. To make a shim by using a 5/8" grade 8, flat washer, reduce/grind the OD of the flat washer to fit inside the hole that the Hydraulic Lift Draft Control Plunger has worn in it, and notch the outer edge to receive the pin in the Hydraulic Lift Cover Plate Assembly.

Here's the part I made with a bench grinder and a Dremel tool, which improved things.



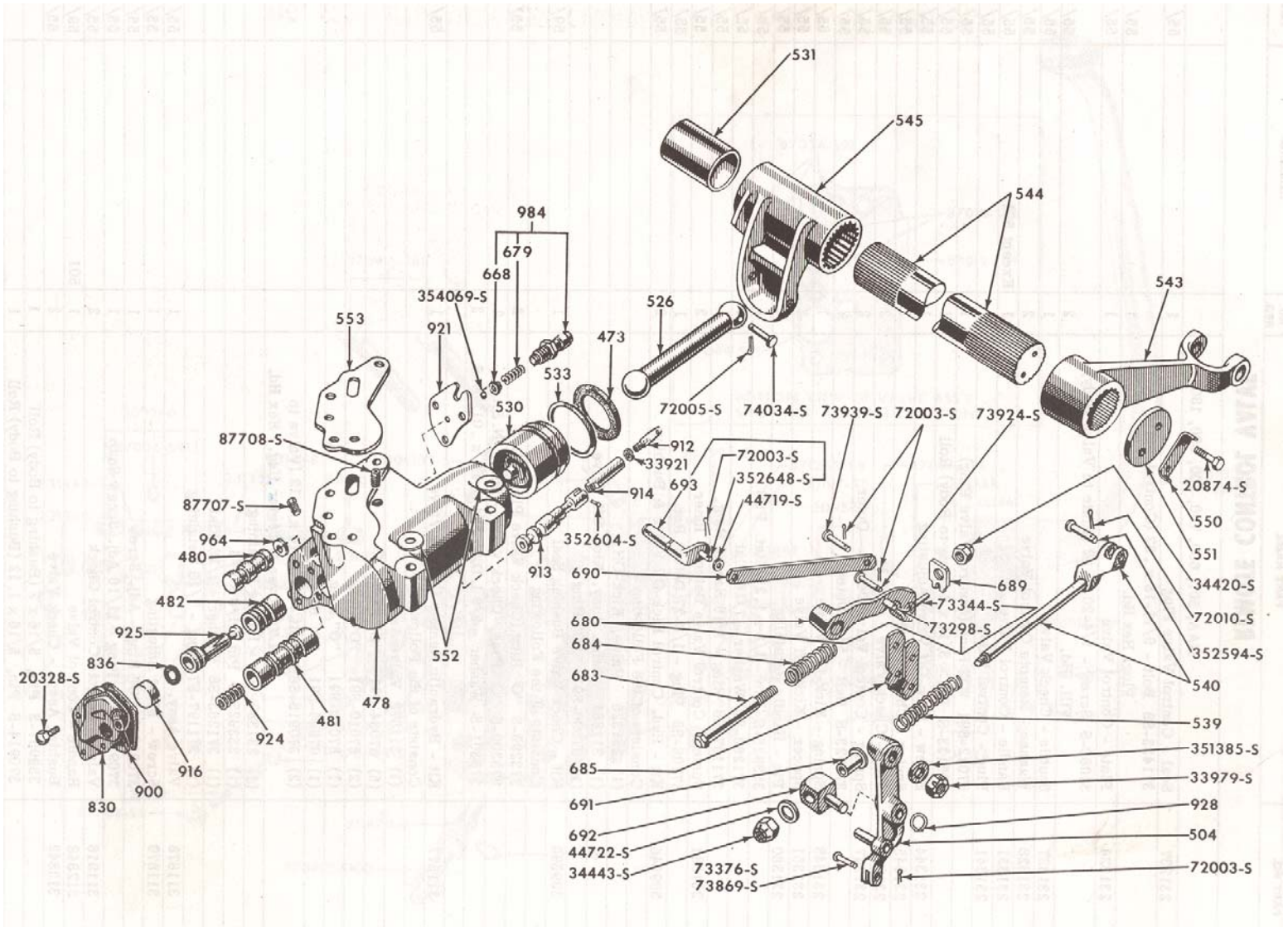
I could get the draft mode to adjust perfectly, but the position control mode was way off, so I had to split the difference, which I didn't like, so I visited my CNH dealer.

Here's the new CNH part number 957E527 (cost \$61.54). It is thicker and heavier than the original part, and should still be in service long after I'm gone. I will put the original part in the to-be-refurbished bucket and proceed using the new part...



When you get it all checked out and repaired, reassemble the unit using a new Hydraulic Lift Spring Seat Felt (item 529) and tighten the Hydraulic Lift Yoke until there is no play left in the Hydraulic Lift Draft Control Spring, then tighten another full turn. This is important, as we will use its position as a reference to set the lift arms in the following procedures.

Now refer to this image while we go inside the unit –



Inspect the linkage for any obvious damage or wear. Look closely for worn or damaged parts.



The Draft Control Connecting Link Assembly & Fork (shown here on the left) will bend where the fork welds to the connecting link if too much force is applied during removal of the yoke. The opposite end of this shaft has a 5/16-24 Lock Nut (item 34443-S) on it. Tighten it down and leave it be, it is NOT used in the alignment procedure. The



Drawbar Control Arm Assembly (shown here on the right) can bend in the process of replacing the (5/16" x 7/8") Dowel Pin it contains.

This Dowel Pin is the second prime candidate for replacement. Known as the 'Cam Follower' it rides on the edge of the Hydraulic Lift Shaft Arm (item 545) to sense the position of the Hydraulic Shaft Ram Arm (item 543). Drive it out carefully using a deep socket to cover the pin and to support the Drawbar Control Arm Assembly, use an extension and a large sledge backing it all up. Use a long 1/4" drift punch and another smaller hammer to drive the pin out into the deep socket. The sledge on the other side of all this will absorb the shock and keep the Drawbar Control Arm Assembly from bending. You'll certainly need a helper to make this happen. Have the helper hold the deep socket/extension/sledge assembly on the back side while you drive the pin out from the other side. Make sure not to damage or enlarge the hole in the Drawbar Control Arm Assembly when you do this. Drive the new pin back in and all the way through until it's flush with the Drawbar Control Arm Assembly. Also check the Hydraulic Lift Hand Control Lever Assembly (shown here on the right) for damage. It has a (3/8" x 1.75") pin which can be bent. Remove and replace it using the same method if needed.



Once everything is checked out and repaired, we can begin setting the control clearances back to spec.

For this procedure you will need a 36" length of 1/2" all-thread and a nut to thread on one end of it. You will also need one section of 1/4" square key stock about 12" long and one section of 3/16" square key stock, also about 12" long, to use as feeler gauges.

Raise the lift arms all the way up, then thread the nut on one end of the threaded rod and drop the rod down through the holes in the lift arms. Now lower the lift arms until the threaded rod contacts the control spring. If you tightened the control spring securely in the earlier procedure, this will place your control arms in the proper position for control valve adjustment. The holes in the lift arms should center up about 1/2" above the plane of the lift cover (where the seat spring attaches). Refer to the picture on the right. Notice that the touch control handle is all the way up against the adjustable cam at the top of the quadrant. Make sure that the adjustable cam is adjusted so that its lobe is facing forward, which will give you some adjustment should you ever need it. Place the selector lever down, in the constant draft position.

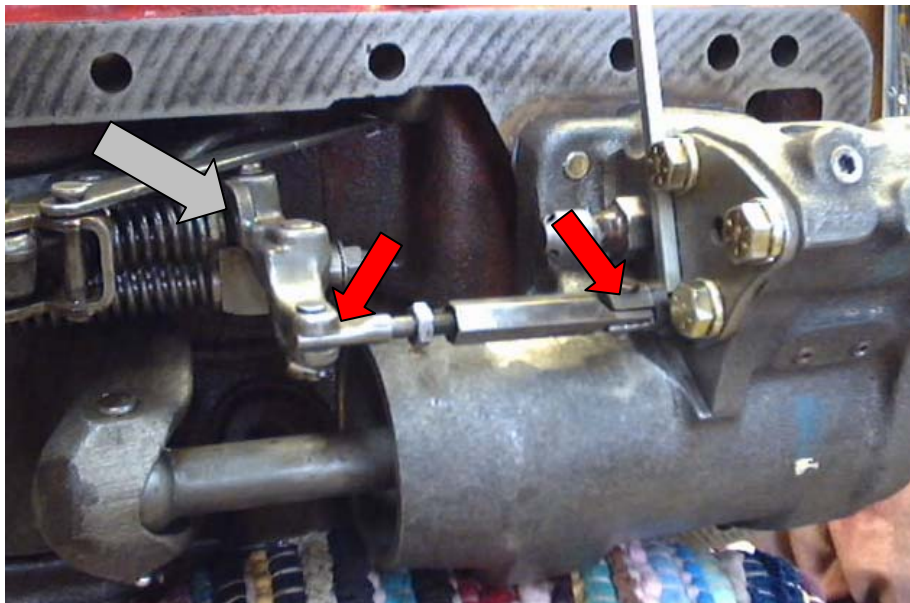


Constant Draft Control Adjustment

Let's review... Your lift arms are set $\frac{1}{2}$ " above the plane of the lift cover (like in the picture above), your touch lever is at the top of the quadrant against the lobe of the properly adjusted cam, and your control lever is down in the constant draft position. Loosen the locking nut on the turnbuckle and compare yours to this picture of mine ready for adjustment of Constant Draft Control mode.



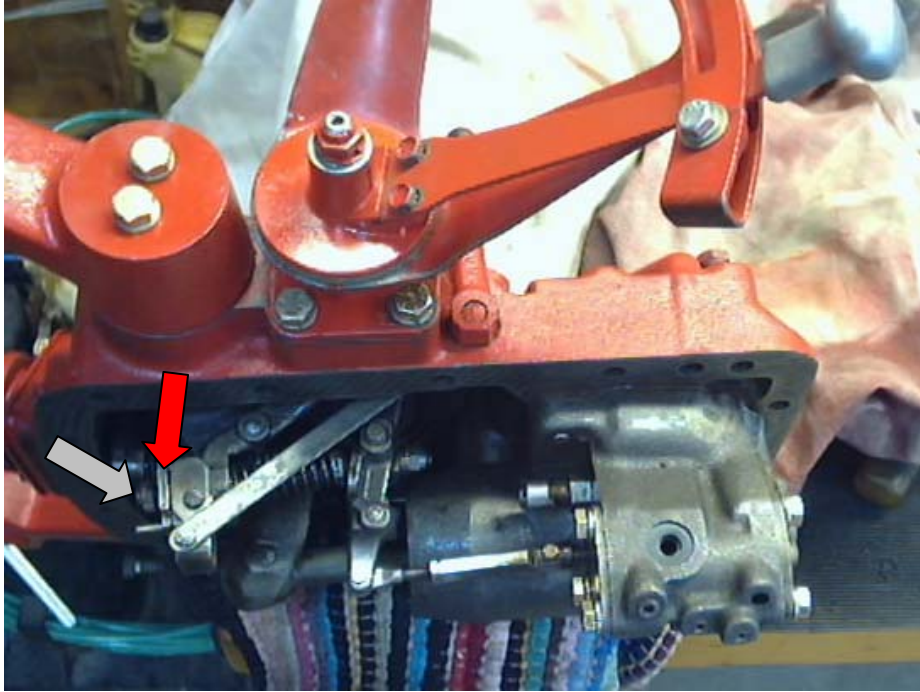
If everything is right, you will notice that there is considerable clearance between the implement position control spring and the boss on the control lever. You can see in the picture below that I have about $\frac{1}{4}$ " of clearance there, indicated by the grey arrow. Now, with the lock nut loose on the turnbuckle, adjust the turnbuckle for $\frac{3}{16}$ " of clearance between the end plate and the control valve, using your $\frac{3}{16}$ " key stock as a feeler gauge (see picture below), then orient the slot in the control valve piston linkage to line up with the slot in the control arm (to prevent possible binding) and lock it down with the lock nut. You can see this orientation indicated by the red arrows in the picture below.



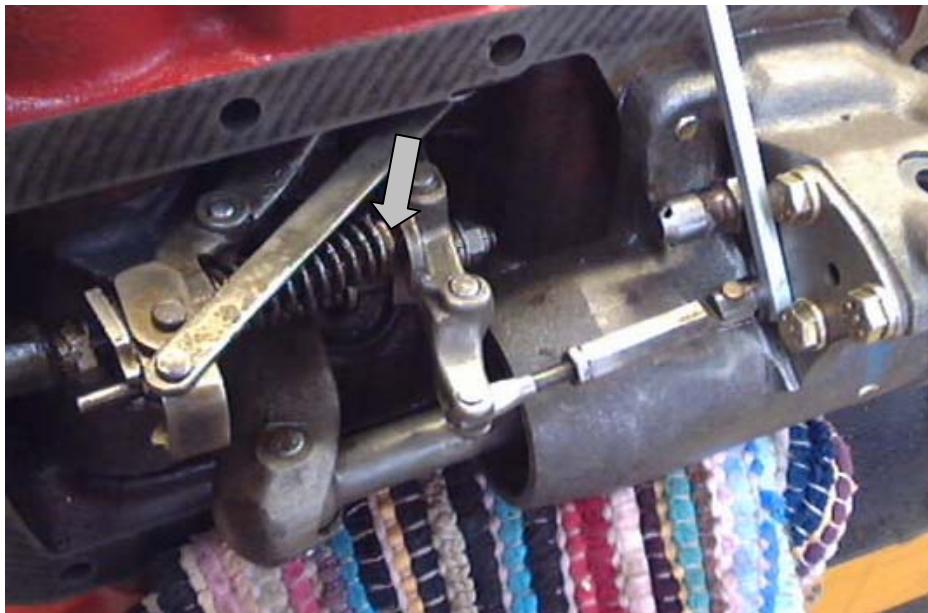
That's it for draft control; let's move along to position control adjustment. Raise the control lever to its vertical position, and move the touch lever to the bottom of the quadrant, against the stop to prepare for the next procedure.

Implement Position Control Adjustment

Again, let's review... Your lift arms are still set in position (1/2" above the plane of the lift cover), your touch lever is at the bottom of the quadrant against the stop, and your control lever is up in its (vertical) implement control position. Loosen the lock nut (item 34420-S) that jams against the flat plate (item 689) on the position control adjusting rod (item 683), indicated by the grey arrow in the picture below, while you hold the flat plate, indicated by the red arrow, with an adjustable wrench to prevent breaking the index pin (item 73344-S), then compare yours to this picture of mine ready for adjustment of Implement Position Control mode.



Now, use a thin 5/8" tappet wrench, and adjust the hex end of the position control adjusting rod (indicated by the grey arrow on the picture below) for 1/4" of clearance between the end plate and the control valve, using your 1/4" key stock as a feeler gauge (see picture below), then hold the flat plate to protect the pin and tighten the lock nut. Now, recheck the clearance, as it tends to change, and adjust again if necessary, then lock it down.



That's it for position control, and your lift is now in spec.

The Iron-Clad Guarantee...

I guarantee that this document is flawed.

This procedure was a great source of frustration to me during the Old Warrior's restoration (before picture on the right). I researched all available published sources (at significant expense) and found no complete and easy- to-follow procedure. Having reached that conclusion, it fell to me to figure this thing out.



I believe that no question is too dumb to ask once, and most are not too dumb to ask twice, so I started asking questions. My local CNH dealer answered a few; a local after market parts dealer answered a couple more, but it still wouldn't come together in my head. I went to the Internet for answers and Googled 'Old Tractors'. Now I was on to something. I gleaned information from every hit, asked endless dumb questions, got a lot of dumb answers, a few good ones, and pressed on.

Then I found [Yesterday's Tractor Company](#) on the web. They had parts, pictures, documentation, and discussion forums for every known tractor, old and new. And the best thing was a lot of guys were in there asking a lot of dumb questions. I had found a home. There are guys on that site that know everything (yes, everything) about the 9N, 2N, and 8N tractors, and almost everything about the NAA. Most of the information for this document was gleaned from the archives of the [Ford 9N, 2N, 8N Tractor Information](#) forum on that web site, and adapted, adjusted, and upgraded to apply to the NAA tractor. Credit goes where credit is due. Thanks guys.

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Don't overlook the tips and tricks section below...

Tips and Tricks

First, the tool set I used...


A pair of 7/16" wrenches, a 9/16" wrench, a 5/8" x 11/16" tappet wrench, a 12" adjustable wrench, 3/16" and 1/4" square key stock, a 5/8" deep socket, and the ever-present jug of WD-40 will cover most of this procedure.



Next, the Hydraulic Repair Video Tape...

This is where it all starts. Get this tape and watch it a couple of times before you begin; it is a great resource, and the only known working procedure to rebuild the piston type hydraulic pump using common tools. It also demonstrates all of the repairs to the hydraulic unit and describes many common problems and their solutions. It is widely available; I got mine cheaper on eBay.

**Hydraulic Repair
For
Ford Tractors**



**Featuring Ford Tractors
NAA, Jubilee, 600, 700, 800 &
900 series and 2000 & 4000
with 4 cylinder engines.**

This video addresses common hydraulic problems with Ford NAA, Jubilee, 600-900 series and 2000 & 4000 Tractors with 4 cylinder engines.


If your tractor's hydraulics shake, operate slowly or perhaps don't work at all, this video will help you determine what is causing the problem and show you how to make the necessary repairs or completely rebuild the round, piston type, hydraulic pump.

Guy & Dan work together in an easy to follow format which encourages you to watch and then make the same repairs on your tractor. All repairs are performed using ordinary shop tools you probably already own.

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Duplicated,
Packaged and
Printed in the USA
Approx. 65 minutes

The producers of this video are not affiliated with Ford New Holland.



Clean up your act...

You will certainly want to clean up the control unit during the rebuild, so don't forget about the center section sump while you're cleaning. If you haven't already done it, pull the drain plug and drain the oil into a 5 gallon bucket. Then, get a flashlight and look down in the bottom of the cavity to see the sludge left behind by decades of use and abuse. This stuff should be circulating in your newly rebuilt hydraulic unit? I think not! Replace the drain bucket with another clean, empty bucket, get the trash can and a roll of paper towels, roll up your sleeves, get in there and start mopping up. Get all you can, then break out the bug sprayer and fill it with kerosene. (If you have a good air compressor, get yourself a siphon



sprayer. They're kinda hard to find, but well worth the trouble. You can put a gallon of kerosene in the drain bucket, drop the pick up hose in the bucket, and get after it.) Spray the inside from the top down, let it drain into the clean bucket, then pour it through a screen back into the sprayer and go at it again and repeat until it's really clean. Be sure to get all the nooks and crannies. Now mop up with clean paper towels and check again with the flashlight. When it's really clean, grab the WD-40 and rinse it down well. Now when you mop up, the paper



towel will come out clean. Spray it down again with WD-40 and admire your clean sump. Now, if you're like me, you won't do things in the proper order, so it's almost certain that your sump will sit and wait after cleaning while you do something else.

Cover it up to keep it clean, and before you finally reassemble the unit, clean it again. I collected grass clippings, bugs, sand, and other nice stuff in mine, so I used my shop vac and a big paint brush to sweep up inside, then blew it out with air until it was clean again. Above is the final picture, just before the top went back on. Shiny and clean...

While you're at it...

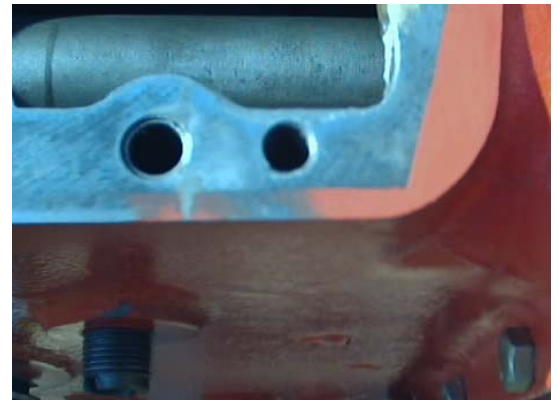
OK, stop admiring your work and check out the gasket surface on the top of the center section. It will need to be cleaned up too. I use a putty knife scraper to start, then finally a palm sander to get it down to bare metal. Don't forget to plug that



pressure line with a bit of clean rag to keep it from collecting debris. Once it's clean, look closely at the area around the pressure line. This area depends solely on the gasket to keep it together, and it is not unusual to see it leak. If it is allowed to leak for extended periods, it will eat away at the surface, just like an exhaust manifold leak, and leave a fissure behind.

These pictures show mine after it was fixed. I cleaned it, degreased it, and buffed it with a coarse Scotchbrite pad, then got in there with my razor knife and

scratched it up really well to give the epoxy some teeth. JB Weld followed after a final cleaning and degreasing, and the next day, I leveled it with a coarse flat file, followed by a fine flat file, and finished with a fine Arkansas stone. The important thing here is to match the plane of the original gasket surface. When you finally reassemble it, use your favorite gasket goop around the hole on all four surfaces, top, bottom, and both sides of the gasket to keep it leak free. Credit goes to Dan of Project Rustbucket fame for this tip.



The Hydraulic Lift Rebuild Gasket Kit...

CNH has all of the individual gaskets and o-rings, but does not sell a complete gasket kit for rebuilding the hydraulic controls. One is available after market, and is good enough except for a few major problems.

The generic unloading valve o-ring (Item 836) in the kit will not work. Be sure to use the original CNH part when you replace the o-ring on the unloading valve. The CNH part number is NCA 836B. It's the right part, nothing else will do. Just take my word for this.

The after market hydraulic piston o-ring (Item 533) and back up ring (item 473) will also give you trouble. Again, use only the original CNH parts for the hydraulic piston o-ring and back up ring. At right, you can see the after market and CNH o-rings ready for close examination. Pictured below and on the left, the after market o-ring measured .197", below and on the right, the CNH version measures .208".



The original part number for the CNH o-ring was NAA 533A, it is now replaced by part number 235760. The original leather back up ring part number was NAA 473A, the new neoprene back up ring is part number 87051231. That leather back up ring is famous for breaking during installation. Don't ask how I know...

I find it interesting that the Baffle Plate Gasket (Item 900) is not included in the kit, and no longer available from CNH. Pictured at right is one of the last survivors of the original CNH part. The CNH part number is NAA-900-A, and can still be found in a few locations around the country via your local CNH locator service. It is made from stiff paper; I think we can get away with making our own from gasket material. I have posted a full size image of the gasket that you can [download](#) and print out to use as a pattern.



Checking your work...

If you have a good air compressor, you can test the unit before reinstalling it. Start with the lift arms all the way down, and the touch lever at the bottom of the quadrant. Use a rubber tipped blow gun to supply at least 100psi to the pressure line input. When you pressurize this line, it will blow oil and air back out the other hole, so use a rag to keep the exhaust from blowing up right in your face. Just take my word for this too, and don't ask...

In position control mode, pressurize the unit and move the touch control lever up a bit. The lift arms should move up a bit to match. You should be able to repeat this until the lift arms move up all the way, a bit at a time, to coincide with the touch lever moving to the top of the quadrant.

In draft control mode, pressurize the unit and move the touch control lever up a bit at a time. The lift arms should not move until the touch lever is well up near the top of the quadrant, and then they should go all the way up. This is correct, as draft control is about keeping the implement down at a constant depth.