

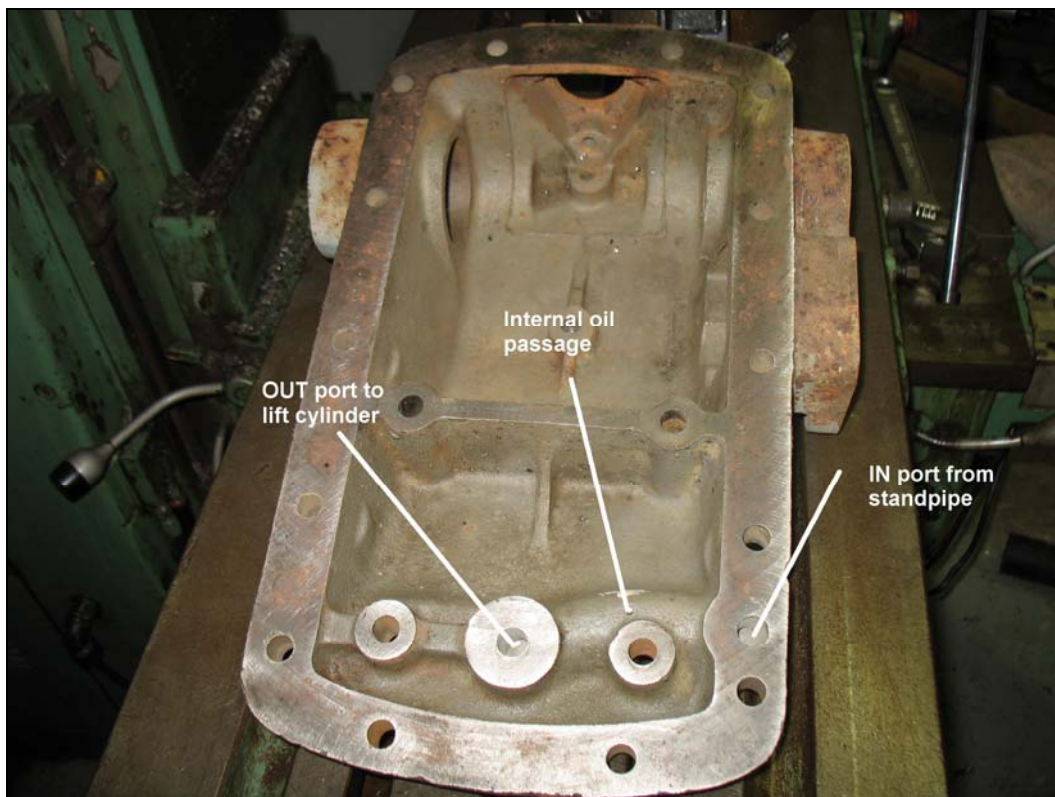
# N-series Remote Port Modification

## Introducing the Old Tractor Guy (tOTG) – by Dan Allen (a.k.a. TheOldHokie)

When I first acquired my 9N in the late 80's one of the first things I wanted to do with it was run a loader. I searched around and found a Sauder loader and installed it on my 9N. It was powered off the test port and I had to chain down the 3pt lift arms when I wanted to use it - not very convenient. That's when I chanced upon a website run by John Bowers - aka the Old Tractor Guy (tOTG). He ran an old tractor parts salvage and repair operation in Colorado. On his web site he had a page that described a modification to the hydraulic lift top cover which allowed you to use the test port on an N-series tractor to power a remote hydraulic circuit without chaining down the lift arms. The years passed and I never got around to making his modification to my tractor. Recently I've been active on several online tractor forums and one of the more common questions is how to power a loader or other hydraulic operated implement using the test port. Unfortunately tOTG has passed away and his original write up of his modification has been lost. So I've undertaken to reproduce his description as best I can remember it. I think you will be as impressed as I was when you see how clever tOTG's idea is.

### How it works

Pictured below is the hydraulic lift cover off a 9N which I am going to modify as John described - the procedure will work just as well with the cover on an 8N. This particular cover is just the bare casting but the modification can be performed on a full assembly by simply removing the lift cylinder. Notice that there are two hydraulic ports in the top cover. The one on the outer edge is where the pressurized oil from the pump enters via the standpipe inside the rear housing. The second port is where the pressurized oil exits the housing into the lift cylinder and the two ports are connected by an internal passage in the casting. We are going to plug the IN port to prevent oil from getting to the lift cylinder - this will have the same effect as chaining down the lift arms. Then we are going to drill and tap a new external port in the cover directly above the OUT port which delivers oil to the lift cylinder. We will add an external two way selector valve to the test port which will let us switch the pressurized oil from the test port to either the lift cylinder (via the newly added port in the top cover) or a remote circuit like our loader. This will allow us to use the test port to power the loader **OR** the 3pt simply by operating the selector valve. The selection is mutually exclusive - when the loader is selected the 3pt is disabled and when the 3pt is selected the loader is disabled. Not as nice as having them both enabled at the same time but a whole lot better than the chain and unchain scenario we have to use otherwise. So let's get started.



### **Step 1 - Plugging the 3pt lift standpipe**

The first thing we are going to do is drill and tap the entry port and install a pipe plug flush with the surface of the cover. This will effectively plug the hydraulic oil standpipe that delivers oil to the lift cylinder from the pump and give us a constant flow of pressurized oil at the test port whenever the 3pt control lever is moved to the "lift" position. There will be no need to chain down the lift arms because the 3pt lift will be "disconnected" and the arms will not raise and shut off the pump. We start by drilling the port out to the next nearest drill size we can find. The ports are cast openings and this one turned out to be almost exactly 31/64 which is just a bit larger than the standard tap drill for a 3/8" pipe plug. All we want to do is clean up the port enough to get our tap to run straight. We also need to exercise care that we do not drill too deeply and weaken or penetrate the walls of the hydraulic passage in the cover. We drill just until the tip of our drill bit bottoms in the existing hole. Once the hole is cleaned up we tap it for a 3/8" socket head pipe plug. You may find that you cannot tap the IN port deep enough to allow the pipe plug to recess below the face of the top cover. In that case simply back the plug out 1/8" or so and use an angle grinder to remove sufficient stock from the top of the plug to bring it flush with the surface when it is screwed back in.





## Step 2 - Installing external lift cylinder port

Since the standpipe is now plugged we need an alternate path for delivering pressurized oil to the lift cylinder - we don't want to permanently disable it. We accomplish that by drilling an opening in the top cover directly above the lift cylinder port. I drilled from the bottom side of the cover using the same 3/16" drill bit that I used on the standpipe port. By using the existing port as a drill guide I am ensured that my new top side port is located directly over the lift cylinder port.



Next we tap the top side opening for a 90° elbow that we will use to reconnect the lift cylinder. I chose to use an SAE-6 ORB elbow for this connection because the o-ring seal allows me to position the elbow at any angle I wish and lock it in place with the jam nut. The ORB port is machined using a special form cutter made specifically for that purpose. You could just as easily tap the drilled opening using a 3/8" pipe tap and install a suitable pipe thread elbow. You will simply have to make sure that you tighten the elbow just until it is positioned to clear the cap screws used to fasten the top cover to the center housing. If you over tighten and then loosen the fitting to get it aligned properly you risk a poor thread seal and the possibility of a leak.





### Step 3 - Reinstall cover and plumb external connections

All that remains is to reinstall the top cover and connect our external plumbing to it. Remember - all we have done so far is plug the standpipe to cut off flow to the lift cylinder so we get constant oil pressure at the test port and we have installed a new external connection to the lift cylinder "downstream" from our plug. So to restore the lift to it's previous operational state all we need do is connect the test port to the new fitting in the top cover with a short external run of hydraulic hose. The hose now functions exactly like the standpipe bypassing our plug and normal lift operation is obtained. I've shown a mockup of such a connection below. Unfortunately I don't have the modified cover actually mounted on my tractor at this point so you will have to use your imagination.



But our real goal was to use the test port to power an external hydraulic circuit like my loader. To do that we need to install a 2 way valve in the line between the test port and the new top cover port. The valve will allow us to switch the pump between normal lift operation and the external port without the necessity of chaining/unchaining the lift. An inexpensive push/pull valve like the one pictured below can be mounted at any spot convenient for the operator (like the black bracket in the picture above) and used to switch back and forth between the remote port and 3pt lift operation without ever leaving the tractor seat. The test port is connected to the IN port on the valve. One of the OUT ports is connected to the fitting in the top cover, the other OUT is used for the remote hookup. Again you will have to use your imagination a bit.

### **Summary**

Altogether a simple, neat, and effective solution to a bothersome problem - thank you tOTG. I used a milling machine to do the job - most of you won't have access to anything like that - but a decent drill press and a hand tap will work nearly as well. I'm sure you could do it with a hand held drill and a vise if you are careful. The main thing to keep in mind is the casting is thin in places so when running your tap by hand or machine do not apply excessive force. The existing ports in the casting are open on one side so the tap will want to run out sideways so stay alert for that as well. I machine tapped the IN port just enough to get the tap set good and straight then finished by hand so I could feel the force that the tap was generating. Even so the last turn on the tap tilted slightly leaving one side of the plug sitting ever so slightly higher than the other.



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