

# How To Provide LIVE HYDRAULICS

for all

## FORD N-TRACTORS

by Kevin LaRue



If the filter wasn't there, you might not notice the pump and hoses tucked under the edge of the hood.

# Ford N Tractor Live Hydraulic System

## All N-Series Tractors - Ford-Ferguson 9N, 2N, and Ford 8N

The hydraulic system on these tractors was designed to plow, and it does that very well. Start using the 3-point lift with other implements, and some obvious limitations become apparent. While stepping on the clutch, the lift will not raise. A lift in good condition should not drop when you step on the clutch, it should stay at whatever level you were just using it. If your lift drops as soon as you hit the clutch or as soon as the engine is turned off, that's a problem. Any problems with the hydraulic lift system need to be fixed before we do anything else.

In some cases, an external pump can be used to avoid rebuilding the internal pump. Installing and connecting an external pump can be done for less than half the cost of a complete pump rebuild. However, the lift piston and control valves in the tractor pump do need to be working. The touch-control linkage should be in good shape, and properly adjusted. If the internal pump is just old, and not putting out much volume, an external pump might "fix" the system.

Please refer to my **HYDRAULIC SERVICE PAGE** to see what I have regarding hydraulic system repairs.

# LIVE HYDRAULICS - COMPLETE KITS

Several years ago a fellow named Zane Sherman was selling live hydraulics kits for the front and side distributor engines. Zane's kits were available with everything necessary to mount a belt-driven pump, hoses, and fittings. Zane had announced that his kits would no longer be available, but as of December 2012, it seems that Zane is still shipping his Live Thang kits. His email is wzsherman@aol.com if you would like to contact him about a complete kit.

The only other complete kits being offered on-line are by The Old Hokie at **Hokie Hydraulics**. The kit for front distributor engines only, replaces the V-Belt drive with a modern belt drive that is capable of transferring a lot more horsepower than a V-Belt. Sadly, the belt drive kit from TOH will not work on the side distributor engines. TOH also offers a front pump bracket and drive shaft that drives the pump directly off the crank pulley. This pump drive takes advantage of the hole that was originally provided for a hand crank. The pump mounts out front and the grill has to be removed (or cut) to provide clearance for the front pump. If you want a complete kit, those are the only people I am aware of who offer them.

Please bear in mind that most of the savings of doing this yourself go away when you buy a complete kit. In addition, these tractors are very old and NOBODY can put together a complete kit that will work for every possible configuration that these tractors may have been turned into. I thought my first 8N tractor was mostly original, until I started checking serial numbers and casting marks. What I really had was an early 9N engine block married to the 8N transmission and rear end. Buying parts and accessories to fit that tractor was often a challenge.

I started this web page when Zane announced his Live Thang kits would no longer be available. I wanted to add Live Hydraulics to my 2N and the pump bracket on my 8N was sagging and needed some attention. Re-working the bracket for the side distributor engine sparked several ideas for brackets. What I really wanted was a smaller (pump-only) bracket that could work on either engine, without changing anything else (other than the length of the V-belt). **My New Universal Pump Bracket** is the result of that work.

# COST ESTIMATE

This is an estimate of probable costs for you to buy and assemble a live hydraulic system. I moved this to the beginning to save some folks a bunch of time. If the cost is going to exceed your budget, it's better to know that now. Be prepared to spend some money, Hydraulic hoses, fittings, and pumps are not cheap. Prices for individual parts are constantly changing and usually headed UP in price. Shop around, and see what you can find. Used or Surplus hydraulic parts are perfectly ok. Beware the China logo. For some things the quality is first rate, for other items, not so good.

ITEM	DESCRIPTION	COST
1	PUMP MOUNT	\$80-\$125
2	V-BELT	\$ 15
3	PUMP	\$140
4	PULLEY	\$ 5
5	HOSES	\$120
6	FITTINGS	\$ 35
7	MISC HARDWARE & HOSE BRACKETS	\$20
	TOTAL	\$460

Add for options such as: CHECK VALVE, SUCTION STRAINER, QUICK DISCONNECTS, LARGER PUMP, VALVES, BY-PASS, ETC. If you decide to buy a kit, expect to pay a good bit more. I do not offer complete kits at this time.

If you can cut and weld your own brackets, save \$80-\$125. The difference in price listed here, depends on the exact bracket you need-or want to use with your engine. My late 8N side distributor combo alternator/pump bracket is large, and more expensive to make than my universal pump-only bracket.

# 1 - PUMP MOUNT

There are several ways to mount an engine-driven hydraulic pump on the 9N, 2N, and 8N tractors. Tractors with loaders will often already have a front pump driven directly off the crank pulley. Many loader pumps mount in front and require removing or hacking a fairly ugly hole in the grill. The hacked grills really bug me, properly-engineered accessories should simply bolt-on without doing permanent damage to the tractor.

## COMBINATION PUMP/GENERATOR BRACKET



This is my redesign of a very clever pump bracket originally designed by Zane Sherman. His pump bracket slips behind the original generator bracket, and provides a pump mount just above the generator. My new bracket accomplishes the same thing, but replaces two separate brackets with a stronger, one-piece design. Sadly, this bracket will not fit the front-distributor engines. They do not have the two studs cast on the LEFT side of the block for the generator bracket.



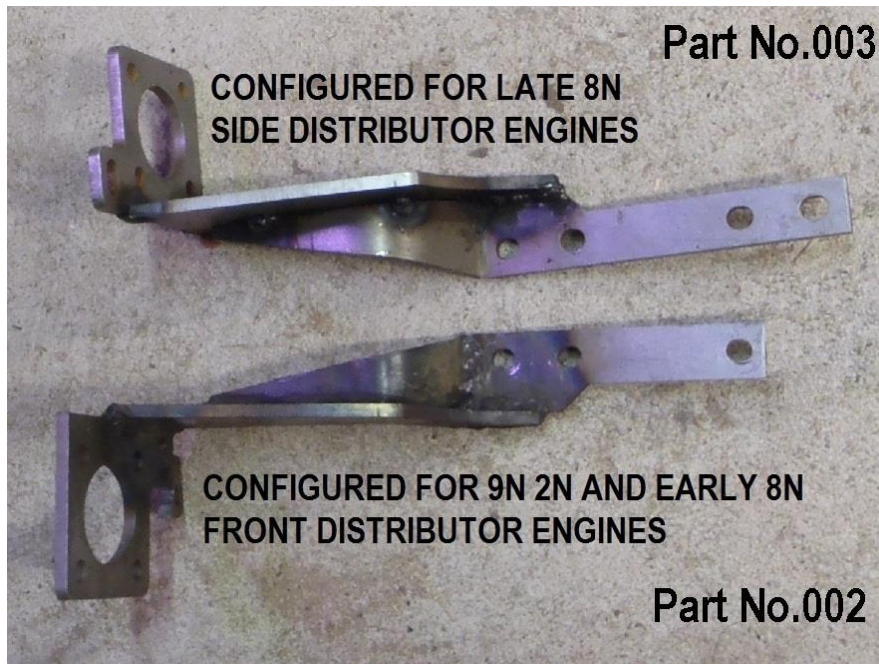
Here's a close-up of the bracket with an alternator adapter attached. The lower part of this bracket is the same dimensions as the original generator mounting bracket. Also shown is my properly curved alternator belt tension adjuster. The loose red bracket on top is a link that can be used to tie the top of the bracket to a cylinder head bolt making it sturdier. To be honest, I only recently added this link to my 8N. This bracket really seems sturdy enough without it, but a little extra support is rarely a bad thing. Make sure you use the correct length and grade head bolt or stud/nut. If you are still using the 6-volt generator, it will continue to use the original generator belt tension adjuster that bolts to the plate behind the water pump.



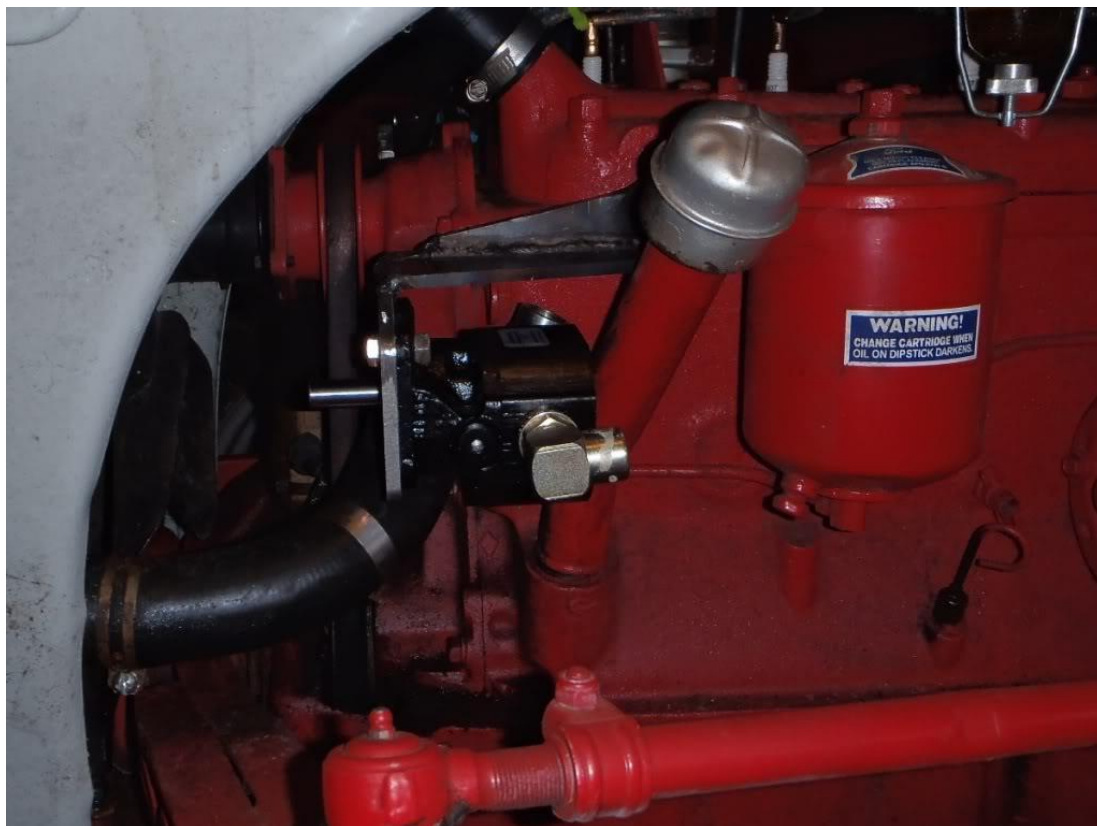
## NEW UNIVERSAL PUMP BRACKET



This is the entirely new set of pump bracket parts I designed that can be configured to work for front or side distributor engines. This pump bracket does not disturb the original generator or alternator mount on either engine. It slips behind the oil filter bracket on the cylinder head. The main bracket part is cut with two sets of holes, to fit either the early or late oil filter location. The late 8N generator and bracket have been removed for these photos. The next photo shows how the same set of brackets is configured for each engine. Two configurations are necessary for the one V-belt to operate all accessories.



The side distributor engine is easier to fit. There is a natural place for the hydraulic pump just above the generator. The front distributor engines are much more challenging. If we try to use the same bracket that works on the other engine, the V-belt will completely miss the water pump pulley! For the front distributor engine, the hydraulic pump needs to be mounted lower and close to the engine.





This is a bracket fitted and mounted on my 2N front-distributor engine. The 9N lower radiator hose is not going to work. The 8N type molded lower radiator hose has to be used, so the belt can come out at an angle to go around the new pump pulley. This is where the belt can start rubbing the casting if the pump pulley is too far away from the engine. Test fits like this are IMPORTANT. Make sure everything fits before doing final finish work and painting. The parts for this bracket were designed using a late 8N block and aftermarket cylinder head. This test fit on my 2N block showed that the serial number pad on this engine is located further forward, and is proud of the surface. We could use spacers between the head and bracket to gain some clearance. The best solution was to simply cut off the extra hole to properly fit this engine.



The pump shaft is long enough to provide a final adjustment to align the pulleys. Another detail is the breather tube. The tube may need to be turned slightly to the rear to clear the back of the pump. It's a tight fit, but mounting the pump higher just isn't an option. Turning the pump in the bracket, so the hoses connect top and bottom, works better than the way I have it mounted in this photo. I welded this particular bracket together allowing just enough space for the hose fitting between the pump and the engine. With the pump turned 90 degrees, the pump can be moved a little closer to the block. That improvement will be made to all future brackets I make.



That strange belt is a twist link belt. I thought it would help figure out what length belt I really need. Each link adds about an inch. Looks like a 50" to 54" belt will be right for this setup.





Once again, using tie wraps for temporary hose hangers. I really need to take some time and make some real hose brackets for both tractors. Please don't connect your hoses to the radius rod (certainly not any further forward than in this photo). The up and down movement of the radius rod will do nasty things to the hoses. My permanent hose brackets will be attached to the castings.



The suction and high pressure supply connections are not all that far apart. I'm still using the pipe fitting under the differential for my suction hose connection. It is possible that the new front pump could suck the differential dry, if the tractor was parked with the front wheels low, or driving down a steep hill. This is another reason I limit my front pump size to 2 GPM.

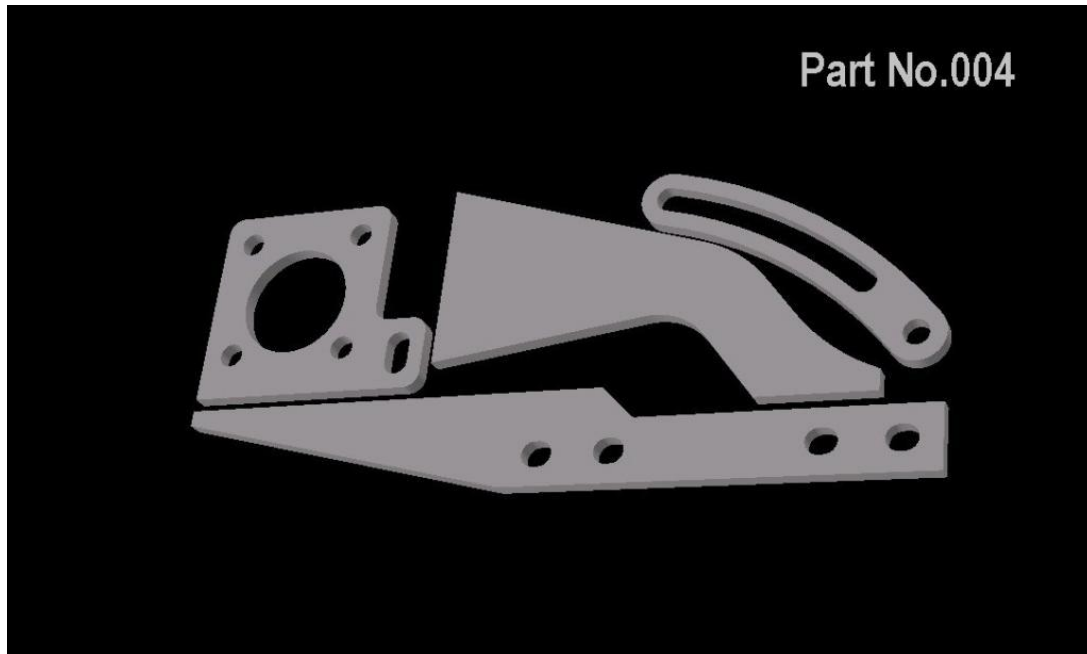
The original hydraulic system flow returns to the sump where the pump is located, so the ideal place to put the new suction line is the drain plug at the hydraulic pump. That requires a custom plug, or drilling and tapping a stock plug for the elbow fitting. There are also a few places in the bottom of the center sump that could be safely drilled and tapped. I prefer not doing anything that can't be put back original later. The Old Hokie sells an adapter that replaces the drain plug and provides a hose connection point. This is a very nice solution. **Hokie Hydraulics**.

A friend had another idea. Fred connected his suction line to the main transmission drain. This location is certainly no worse than the differential drain plug as far as flow is concerned, and the suction hose can be a few feet shorter. Fred made an adapter using an old engine oil drain plug. You could drill and tap the transmission drain plug, but the engine drains have a screen. Fred cut the screen down, and brazed it together to fit in the tranny drain hole. His system now has a screen that should keep any big pieces from getting into the external pump.

If you like to tinker, dimensioned drawings for my brackets are at the end of this page. Even with parts cut by a machine shop, these brackets still require correctly bending, fitting, and welding 1/4" steel plate. I will place bulk orders, if there is a demand for the brackets, but at this time the demand isn't enough to justify keeping many finished brackets on hand. I can set it up so people can order the parts direct from the machine shop. Cost for the cut parts is under \$50. Even using a very low hourly labor rate, it costs between \$50 and \$75 for me to bend and weld them together. After we add shipping charges for the raw materials,



bending/fitting/welding time, plus shipping the finished brackets, you begin to see why I am not planning to go into business making and selling these.



I thought this was a cool 3d image of my latest order for more pump bracket parts. I added more curves, reduced excess weight a little, improved access to the pump mounting bolts, and tried to give the bracket a more "finished" appearance.

Once we have a belt-driven pump mounted, everything else needed is standard hydraulic parts, available locally or by mail-order. What follows is hopefully an easy to follow shopping list and instructions. Please remember, we are dealing with old tractors that may have been altered in many ways over the years since they were built. It is entirely possible that different hardware has been used, other custom modifications may interfere, holes could have been drilled out, and re-threaded to a larger size. Stuff Happens.

## 2 - V-BELT

The original belt will be too short to go around the extra pulley for the pump. These tractors use a type "B" V-belt that is wider than the typical type "A" 1/2" automotive V-belts. Most standard "V" belts can be found in 1" length increments, with a few 1/2" size increments. The actual length needed depends on the size pulleys used, and other options like special alternator brackets. I used a Fenner PowerTwist Plus belt on the 2N. I bought a 60" length of the type B5/L belt. These belts are made up of links approx. 1" long that can be twisted together to make any length needed. They are about 3 times the cost of the regular V-belt, but if the length is wrong, just add or remove links until it is correct. No need to be stuck using a belt that is almost right, or having a project on hold waiting for a trip to town to buy the right belt.

Update: The PowerTwist belt worked great for a temporary solution, but was completely worn out with less than 20 hours of use! My 2N may have had a slight pulley alignment issue, nothing a standard "V" belt wouldn't accommodate with no trouble. The link belt was very quickly worn down to the notches that hold the individual links together. Lesson learned (again): Save money, Stick with standard type parts. The correct belt for my 2N tractor with the hydraulic pump added is a type B47 belt. The belt length, measured around the outside of the pulleys is 50". However, with the small pulleys I am running for my pump, I want to use a Cogged belt. These have notches molded on the inside diameter, so they are more flexible to go around small pulleys. The belt I am using is the "5VX500". This is also a 50" belt. Be careful when buying belts, the part number designation does not always match the outside length measurement.

### 3 - THE PUMP



## BARNES Model# 1003044

The pump on my 8N is a BARNES Model# 1003044 SAE 8 CW  
This may also be found as a Haldex 10564 pump  
0.194 cu in displ, 3000 PSI, 4000 RPM max,  
3 GPM @ 3600 RPM, CW rotation, Mount 4F17,  
Shaft 1/2" dia x 1-1/2", IN and OUT Ports = SAE 8 (3/4-16)

Where To Buy:  
[www.surpluscenter.com](http://www.surpluscenter.com)  
Item# 9-4199

You could use a bigger pump if you want to add external valves and remote hydraulics like a modern tractor. However, I don't think it's a good idea to try and do more than 2 GPM with a V-Belt drive. A smaller displacement pump will also work, the lift will just move a little slower. I'm using the Haldex # 10563 on my 2N because it was about \$30 less when I was looking at pumps.

(Haldex 10563 High Pressure Hydraulic Gear Pump - .129 Cu. In., Model # 1002964) I cannot tell any difference between the operation of this pump and the larger pump on my 8N. This is probably because I used a smaller pulley on the 2N.

## 4 - PUMP PULLEY



1-BK24-A

The pump shaft for these pumps is 1/2" Diameter. My 8N is using a 3" diameter pulley for the type "B" V-Belt, and the 2N has a 2" diameter pulley.

Where To Buy

[www.surpluscenter.com](http://www.surpluscenter.com)

Item # 1-BK24-A

CAUTION - The pump pulleys I am using are smaller than the crank pulley, so my hydraulic pump is turning more RPM than the engine. This means we get a little more GPM at our normal working engine speed of 1500 RPM. Be careful! If you routinely run your engine at higher RPM, you will be overspeeding the hydraulic pump. At 1500 engine RPM a 2" pump pulley will be turning at 3750 RPM. These pumps should not be operated at more than 4000 RPM. These engines are rated at 1500 and 2000 RPM, so to match the max. pump speed to our max. rated engine speed of 2000 RPM, a 2-1/2" pulley is the ideal size.

### PUMP ROTATION - PORT LOCATION

On these engines, the pump rotation will be clockwise when standing in front of the tractor, looking at the pulleys. The location of the pump inlet and outlet ports will depend on how the pump is mounted on each engine. The best way to verify inlet and outlet port location is to turn the pump by hand and check with a thumb over the port. One will obviously have pressure, while the other is suction. Don't do this with the engine turning the pump or you might lose some skin, and the pump shouldn't be run without oil in it. These pumps are reversible, so make sure you are turning the same direction the engine will be turning.



## 5 - HOSES



High Pressure Supply Hose - 6-Foot (72") Length  
Apache Hydraulic Hose - 1/2in. 2-Wire, 3500 PSI - 1/2" NPT  
(Male) fittings  
Northern Tool and Equipment or Tractor Supply Company.

Suction Hose - 8-Foot (96") Length  
Apache Hydraulic Hose - 3/4in. 2-Wire, 2250 PSI - 3/4" NPT  
(Male) fittings  
Northern Tool and Equipment or Tractor Supply Company.

Lengths indicated are only a suggestion. The suction hose only needs to go about 1 foot further than the supply hose if you are connecting to the differential. Measure the actual routes you plan to use. Try to protect the lines. The original, all internal, hydraulic plumbing on these tractors is almost indestructible. We don't want the new external hoses to become a maintenance nightmare. For the 8N I was trying to run the hoses as high as possible on the tractor, to keep them out of harm's way. However, both connections to the tractor are on the bottom. For the 2N, I'm taking the most direct route down from the pump and under the tractor to the connections. I bought two 72" hoses, plus a 12" piece of 3/4" hose to extend the suction line to the differential. This also builds-in a spot in the line for a suction line filter.

The suction hose could be purchased cheaper using a lower quality hose. I used the high pressure hose for durability, and to avoid complicating fittings with additional hose types. I try to buy hose assemblies already made up in standard lengths. Buying custom-made hose and fittings is very expensive.

These hoses have standard NPTF male ends. NPTF is National Pipe Taper FUEL thread. You must use a thread sealant if NPTF connects to NPT or they will not seal. This should only occur at the elbow for the suction line under the differential. NPT is not ideal for hydraulic systems. The fluid power association does not recommend using NPT for hydraulic systems. If you can find or have hoses made with JIC ends you will have a system that is easier to install without leaks. I used NPTF because it's what I could find, it's certainly strong enough, and it's less expensive. I use the yellow thread sealant for gas systems and have no problem with leaks. DO NOT use the white Teflon plumber's tape! That is for 300 PSI water systems and will not seal hydraulic fluid working at 2000 PSI!

You do not need any thread sealant when using NPTF with NPTF or with any of the o-ring type fittings. The NPSM swivel fittings make a seal at the inside diameter of the hose end. They also do not need any sealant on the threads. However, you may need to run a reamer in the end of each hose fitting to properly finish the inside diameter. If there's a lump on the inside of the hose fittings they will not seal.

## 6 - FITTINGS

It is best to find a big chart with pictures of the various fitting types and thread sizes. Sometimes 1/2" means the pipe size, other times it may be referring to the actual thread size. This is very confusing, so test-fit everything. Make sure everything is going to go together, before starting the project.

**FITTINGS 101(-1):** The abbreviations for fittings are very confusing. There are many more types than listed here. These are the types we are using for this system:

NPT = National Pipe Taper

NPSC = National Pipe Straight Coupling

NPSM = National Pipe Straight Mechanical

NPSF = National Pipe Straight Fuel

NPTF = National Pipe Taper Fuel

Of these, the first one (NPT) is the only one that requires any thread sealant. NPT is ok for plumbing systems working at less than 300 PSI, but is not recommended for hydraulic systems. The other types listed above should all seal when put together dry. An exception to that might be when re-using NPTF fittings. Sealant may be necessary if the fitting threads are less than perfect. Use sealant or tape rated for Gas / Fuel systems (yellow color)

### 6a



1/2 NPTF Male x 3/4 NPSM Female 90 SWIVEL Elbow - One (1) required. This fitting replaces the 1/2" pipe plug under the differential. This is where the 3/4" suction hose will connect. The elbow used on my 8N is a 3/4" x 3/4". The pipe plug hole in that tractor must have been drilled out and tapped to the larger NPT size. Maybe some gorilla stripped-out the original threads. Watch for similar non-standard issues on your tractor. Test-fit everything.

Where To Buy

[www.surpluscenter.com](http://www.surpluscenter.com)

Item# 9-1501-08-12

## 6b



ORB - SAE-08(M) x 3/4 NPSM Female 90 SWIVEL Elbow - One (1) required. This fitting goes on suction side of new pump. Other end of 3/4" suction hose connects here. This fits the pumps indicated above. Buy a different pump and it may have different port sizes.

Where To Buy  
[www.surpluscenter.com](http://www.surpluscenter.com)  
Item# 9-6901-8-12

## 6c



ORB - SAE-08(M) x 1/2 NPSM Female 90 SWIVEL Elbow - One (1) required. This fitting goes on supply side of new pump. High Pressure 1/2" hose connects here. This fits the pumps indicated above. Buy a different pump and it may have different port sizes.

Where To Buy  
[www.surpluscenter.com](http://www.surpluscenter.com)  
Item# 9-6801-8-8

## 6d



ORB - SAE-05(M) x 1/2" Female Pipe (NPTF) 90 Elbow - One (1) required. This SAE-05 fitting has 1/2"-20 straight thread x (F) PIPE 1/2" NPT

### Where To Buy

This fitting is hard to find. For the 2N, I could no longer find the fitting that would adapt directly from 1/2"-20 threaded ORB SAE-05(M) to the 1/2" NPTF. I bought two fittings. What I ended up ordering from Surplus Center is an SAE-05M x 1/4 NPTF Swivel fitting Item # 9-6900-5-4. This fitting is 1/4" NPTF and the new supply hose we want to connect to this port is 1/2", so we also need a 1/4" NPTF Male to 1/2" NPTF Female adapter. That one is Item # 9-5405-4-8. These are both straight fittings, so I'm running the supply hose for the 2N under the footboard like I did for the suction hose.

Another option = SAE 5M x 1/4 NPTF Adapter Item # 9-6405-5-4 plus the 1/4 NPTF Male TO 1/2 NPTF Female Adapter Item # 9-5405-4-8.

These fittings replace the hex plug at the test port on the tractor's hydraulic pump flange, so you can connect the High Pressure 1/2" supply hose. You will want the male (NPTF) version of the adapter fitting to attach directly to the optional check valve explained in the next section.

It Figures, right after buying the fittings above, I stumbled on a single straight adapter fitting at [hoseandfittings.com](http://hoseandfittings.com). Search for 6900-05-08 on the web and you should find several sources for the straight adapter. If you want the hose to turn up, standard 90 degree fittings are available for that.

THAT's ALL YOU NEED to have live hydraulics any time the engine is running. The hydraulics now work even when the PTO is disengaged. This is a very basic hydraulic circuit, with no external work ports or valves to run external hydraulics. Almost anything you want can be added, but the more complex the system gets, the more it costs. The basic system is a vast improvement over the original hydraulics, and can often be added for less money than rebuilding a worn-out internal hydraulic pump.



## 7 - HYDRAULIC FLUID

The N tractors have a common sump for the rear end, hydraulic pump and transmission. Therefore, the fluid used is a combination gear lubricant/hydraulic fluid. Gear oil is not the best hydraulic fluid and hydraulic fluid is not the best gear oil.

The original Ford recommended fluid for the 9N-2N-8N hydraulic sump was "mild EP Gear Oil conforming to Ford specification M-4864-A and B, SAE 80 below +32 degrees F, and SAE 90 above +32 degrees F". A modern equivalent to this is a mineral oil. Tractor Supply Company Traveler brand GL-1 or NAPA part number 65-205. These mineral oils are usually the least expensive fluids available. These 80 and 90 weight mineral oils are very thick, and can cause sluggish hydraulics when really cold. The mineral oil may cause pump cavitation or may not work at all in this external hydraulic system we are adding to the tractor.

The current New Holland dealer-recommended fluid is Multi-G 134 (NH-410B) synthetic fluid meeting Ford M2C134D specifications. The synthetic fluid costs about \$25 more than the GL-1, but the Multi-G 134 synthetic is good from -5 to 120 degrees F, and I believe it is a MUCH better all-season combination hydraulic/gear lubricant for the 9N-2N-8N tractors. The TSC Traveler Premium Combination fluid is labeled "Ford M2C134D" so that is what I use. I have experienced no issues with the operation of the hydraulics down to around 14 degrees F. If it's any colder than that outside, I'm going to wait until it warms up a little before I go out there.

Some people claim the synthetic leaks more. I have not noticed that. For a trailer queen that sees little real use, you could rebuild all of the seals and stop the drips regardless of what fluid you put in it. My tractors are working tractors, and I assume they are going to mark their territory with an occasional drip.

## 8 - PROBLEMS

Priming the pump - The new pump should prime itself almost immediately (Maybe not if you have 90 weight in the sump - See previous section). This is assuming the hoses are connected correctly, the belt is tight, and there are no leaks. It's much easier to suck air than hydraulic fluid, so any leaks on the suction side will result in no flow. There is very little lift between the level in the sump and the pump location. Most of the suction hose should begin to fill by gravity when you put fluid in the sump. The hydraulic pump should not be run very long without oil in it, so it is a good idea to verify rotation and prime the system by turning the pump by hand. The system should pump fluid into a bucket turning the pump by hand. Make sure you are turning the same direction the belt will be turning the pump.

Lift Operation - With the PTO disengaged, the lift should operate as it originally did when running off the internal pump. The difference is that now the lift operates whenever the engine is running. With the PTO engaged, there is a small problem. Both pumps are now supplying fluid to the hydraulic system. This can flow more volume than the system was designed for. With both pumps operating, and no implement mounted, the lift arms will rise up on their own even with the touch control lever in the full down position. That's no big deal since moderate hand pressure should override this when hooking up an implement. In truth, the PTO shouldn't be engaged while hooking up implements, so this shouldn't be a problem. Once an implement is attached, you may notice the lift raises faster than it drops when both pumps are running. This is much more noticeable with light-weight implements. If this difference in speed is undesirable, and you don't need the PTO, just disengage the PTO, and let the system run with only the front pump operating.

The Lift Drops When Engine Is Stopped - The belly pump is a piston pump that pumps through check valves. When the belly pump stops turning, the check valves hold pressure in the system. The new belt-driven pump is a gear pump. There are no check valves, so when this pump stops turning, hydraulic pressure will bleed back through the pump. The lift will not stay up with the engine off. To fix that, simply add a check valve in the high-pressure line. Information on the check valve is provided below. Make sure to install this fitting with the flow arrow pointing away from the new pump, towards the original tractor hydraulics.



1/2" NPTF 18 GPM CHECK VALVE 5 PSI CRACKING

Where To Buy

[www.surpluscenter.com](http://www.surpluscenter.com)

Item# 9-7933-8-5



This is the correct fitting to attach directly to the check valve. You could add a 1/2" pipe close nipple, but it is better to minimize the number of fittings and possible leaks. See notes under Item 6D above for issues regarding this difficult to find fitting.

## 9 - ADDITIONAL OPTIONS

Additional accessories are certainly possible. I have added suction-line strainers, and quick-disconnect fittings.

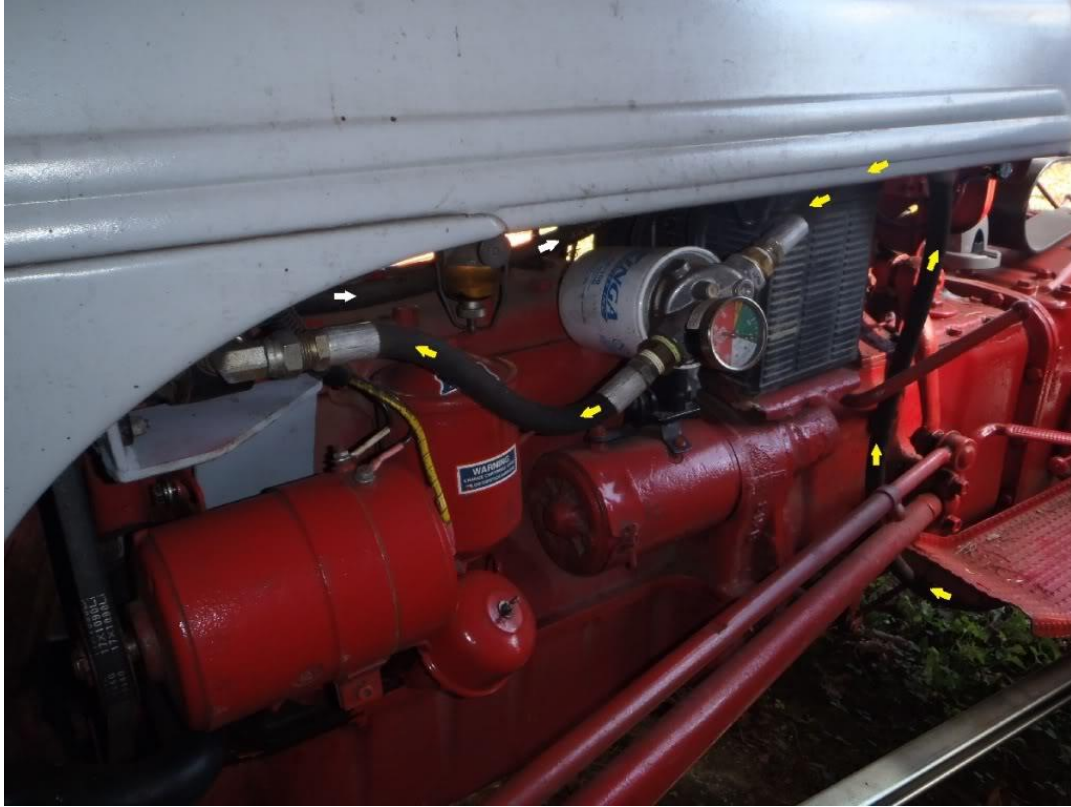
Some folks have used larger pumps and added valve assemblies to run other external hydraulic accessories. Don't ask me how that is done. Hydraulic systems can be very dangerous if you don't use the correct valves and accessories.

## 10 - 8N TRACTOR HOSE ROUTING

Previous photos were of my 2N, the following photos show the routes I used on my 52. Other optional accessories, such as the foot throttle, may push some hoses into less than ideal locations. Watch out for areas like the steering arms. Anything that rubs a hose will quickly make a hole. Hot hydraulic fluid is no fun when it gets loose.



The First Photo is looking at the back of the new front pump. Yellow arrows are the larger Suction hose coming from the bottom of the tractor sump. White arrows are the high pressure Supply going to the Test Port on the belly pump.



This and the next photo shows most of the route for the Suction Hose (Yellow Arrows). The Suction hose ducks up under the hood near the battery momentarily, just because there was a good place for a tie wrap.





Yes, I used tie wraps as temporary hose hangers, and they are still there. If the tie wraps ever become a problem, they will be replaced with something sturdier.



This photo was taken looking through the battery door. It shows both hoses from-to the front pump. The High Pressure Supply (White Arrows) is looping around behind the dash to get to the other side of the tractor.



This is looking from the other side, you can see another tie wrap doing double duty as a hose hanger and battery door bumper.





This and the next photo shows the rest of the route I used for the High Pressure Hose (White Arrows). Pay close attention where the hose passes behind the steering arm. On some tractors, there may not be enough room. The hose might have to run a little higher, by the steering box, or drop this run down under the footboard like we did for the suction hose on the other side.



My check valve and a quick disconnect are the shiny fittings above the foot board. The quick disconnect allows me to un-plug this line with no mess. Ball bearings in both ends seal shut when the fitting is pulled apart. I prefer having this hardware in the vertical position. It seems better protected than coming straight out from the test port under the footboard.



When you are happy with the hose routing, it's time to install something better than tie wraps. I found these hose brackets at [surpluscenter.com](http://surpluscenter.com)



The heavy steel base plate can be welded to a bracket that will slip under a bolt like I did for this one on my 2N.



The base plate is plenty strong enough to simply be welded to any convenient anchor. Since the foot boards on this 2N are aftermarket parts, I did not feel guilty about welding something to them. If the originality police ever want to "restore" this foot board, all evidence of this bracket could be removed with a grinder.

If welding isn't an option for you, these hose brackets will still work. A longer bolt can be used to bolt the assembly to a bracket or other flat surface.

These brackets are available as singles or doubles. For a 1/2" and 3/4" hose double mounting point, I had to go with the 3/4" double bracket. The 1/2" hose is captured in place, but might need a shim to properly secure the smaller hose.

Make sure you match up the published ID of each bracket with the OD of the actual hoses you are using.

There are also some cheaper strap-type, 1-hole clamps available that might work where they can be slipped under a bolt. Most anything will be better than relying on plastic zip ties.

Hopefully, the first question that comes from this page isn't something like, "Where can I buy hoses with the Yellow and White arrows?" GRIN.

Please Note: These routing photos are suggestions, you may find a better way to install hoses on your tractor. The intent is that these external hoses not become a reliability issue. A broken hose will quickly leak or pump all the fluid out of your sump. At the very least, that's going to be messy, and expensive. Plus, if you've been working the tractor a while, the fluid will be quite hot.





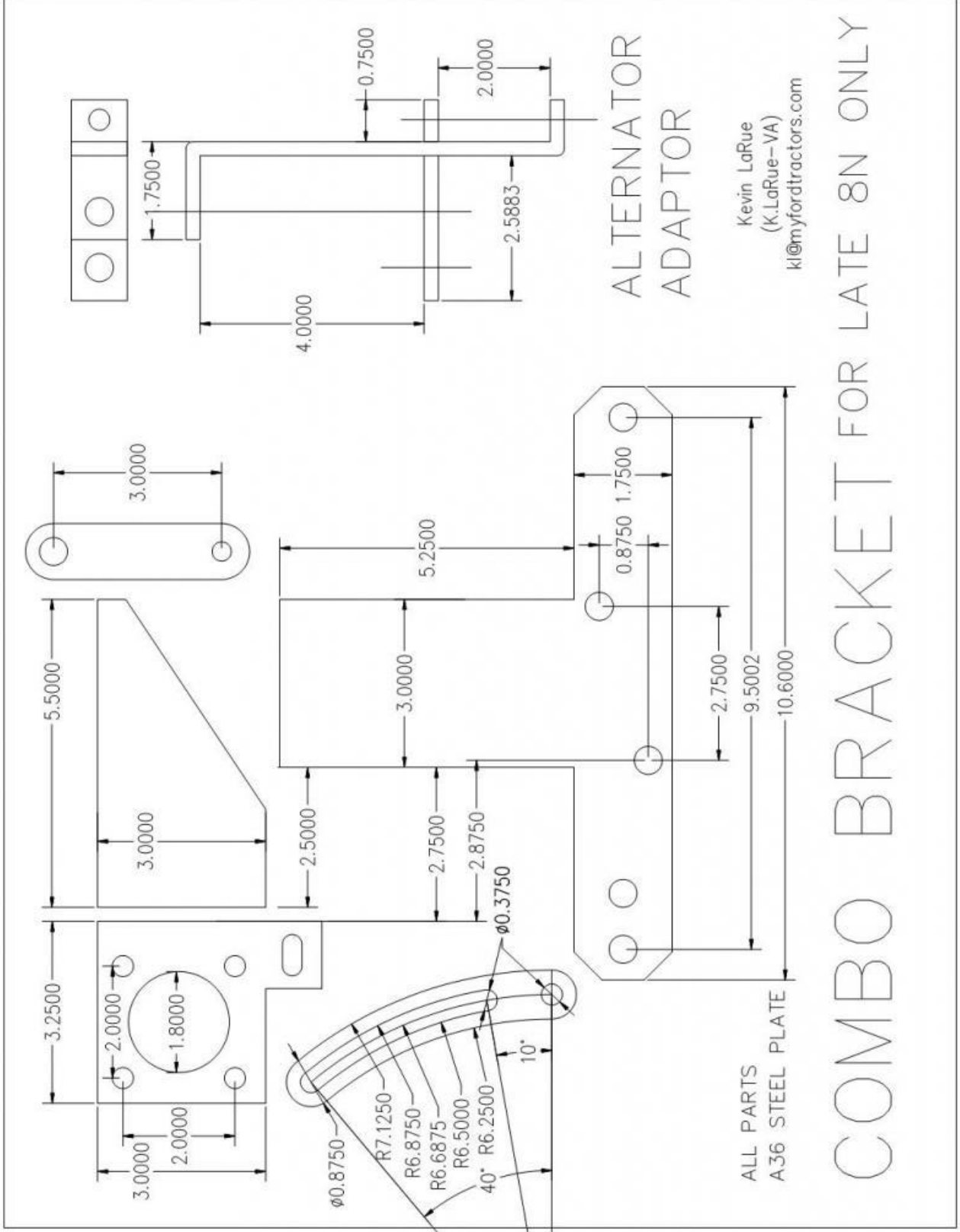
Do not use cast pot metal or unrated brass fittings from the local hardware store! Of course, I had to learn this the hard way. I see these fittings being used on hydraulic systems all the time, so I used an unrated street elbow for the custom fitting made to connect the supply hose to my 8N test port. The fitting lasted several years, but when it broke, hot oil went everywhere. It seemed like at least a quart ended up in my boot. That was uncomfortable.



This is the fitting that broke. As you can see, there's a big difference in this fitting and the correct hydraulic fittings.

As time permits, I will improve this web page, and add part numbers for more of the accessory items I added to my setup. When you start adding valves and external connections, you are on your own. I built a backhoe, but I'm a long ways from being a hydraulics guru. This stuff can be dangerous if you don't know what you are doing. I trust myself to think things through, and ask questions when I get in over my head. I don't feel qualified to advise others how to design hydraulic systems any more complicated than the basic system shown here.

Here are my drawings for the pump brackets:

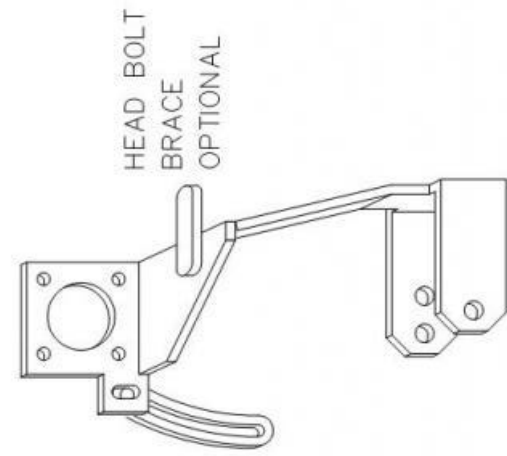


ALTERNATOR  
ADAPTOR

Kevin LaRue  
(K.LaRue-VA)  
k1@myfordtractors.com

ALL PARTS  
A36 STEEL PLATE

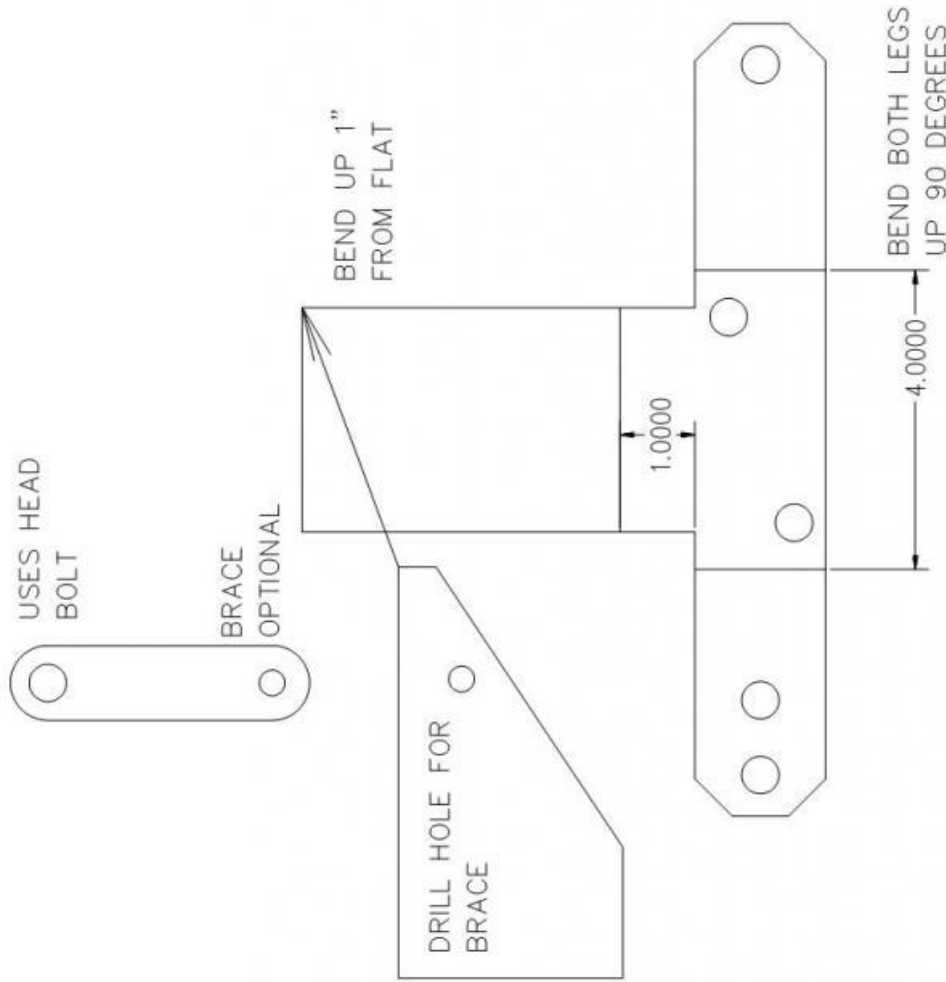
COMBO BRACKET FOR LATE 8N ONLY



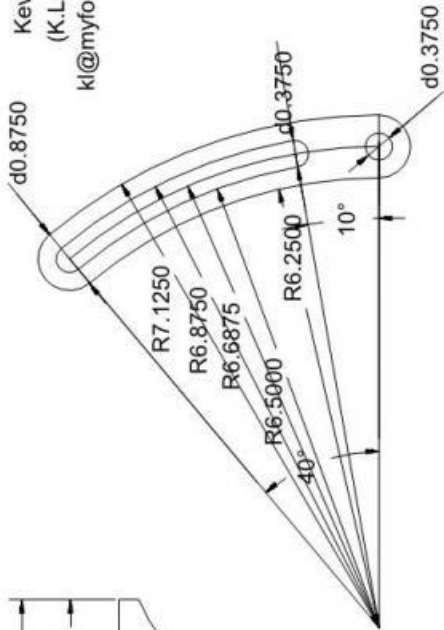
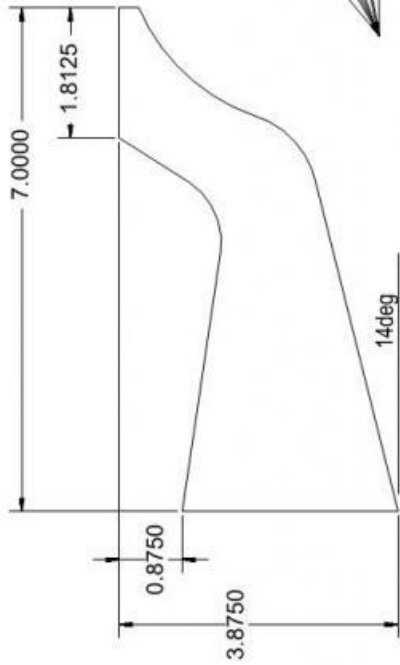
## ASSEMBLY

THIS 1/4" PLATE IS DIFFICULT TO BEND WITHOUT A PRESS BRAKE. YOU CAN CUT PART-WAY THROUGH BACK SIDE, BEND, THEN WELD.

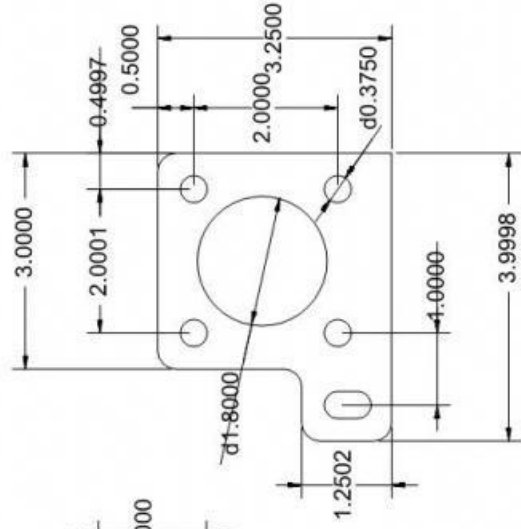
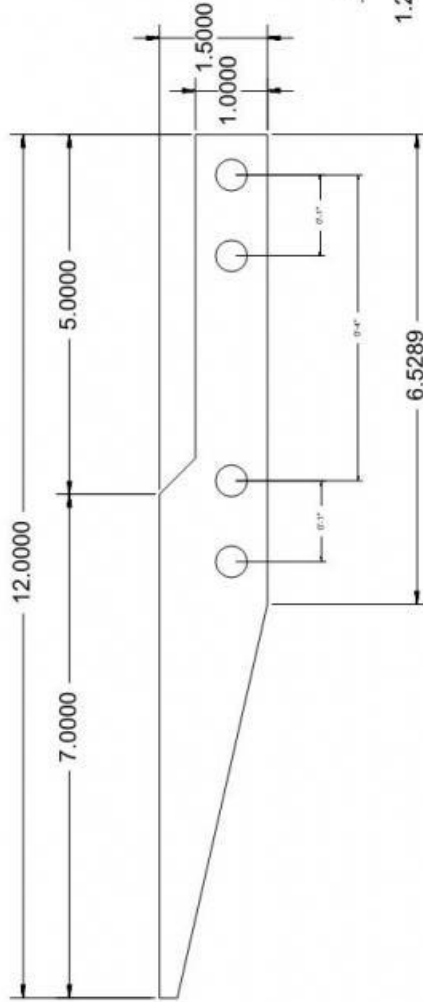
Kevin LaRue  
(K.LaRue-VA)  
kl@myfordtractors.com



# COMBO BRACKET



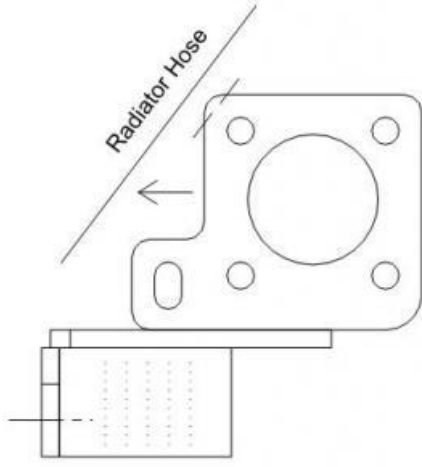
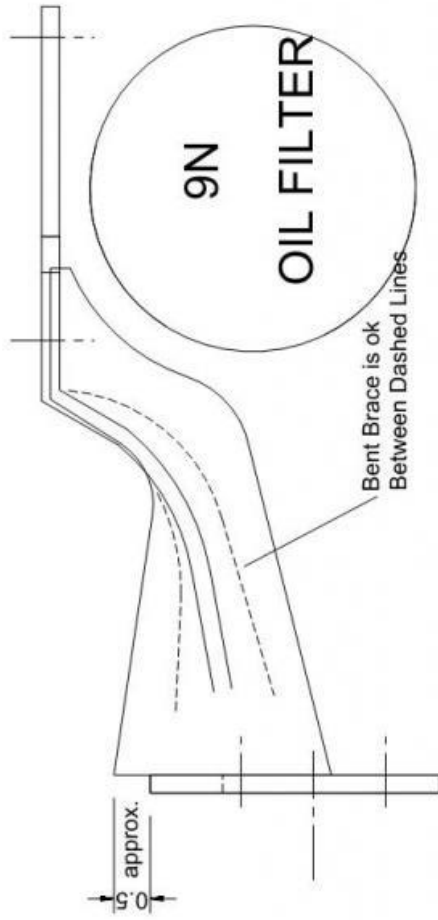
Kevin LaRue  
(K.LaRue-VA)  
kl@myfordtractors.com



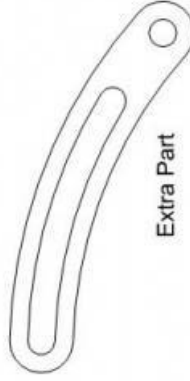
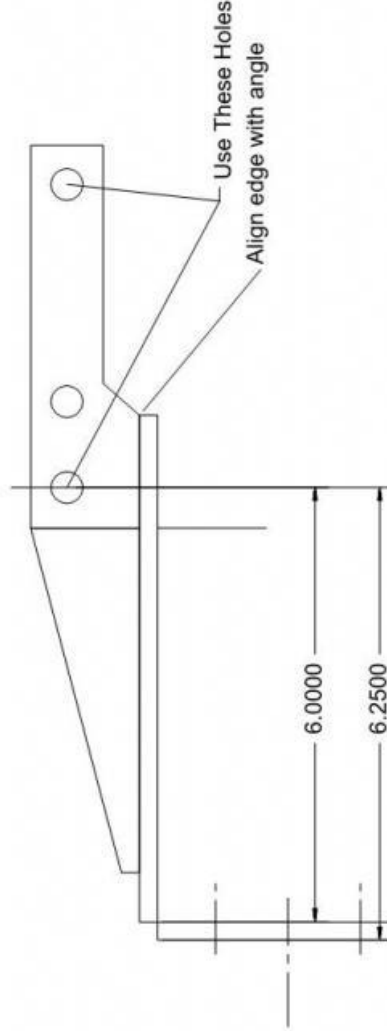
# BRACKET PARTS

ALL PARTS CUT FROM 1/4" A36 STEEL PLATE





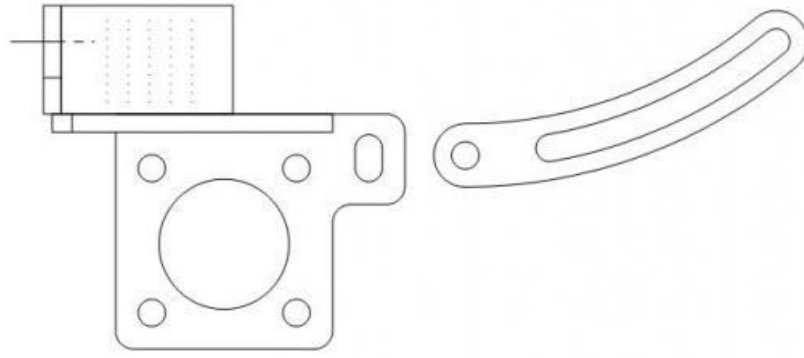
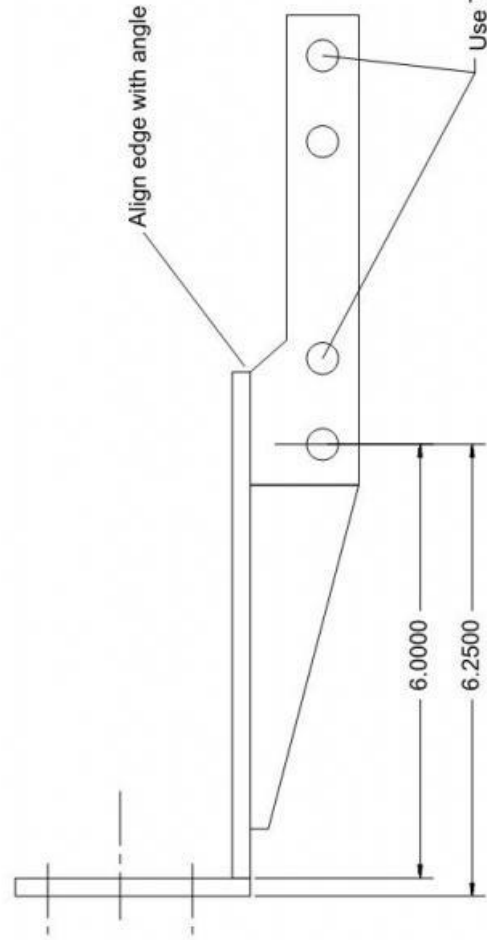
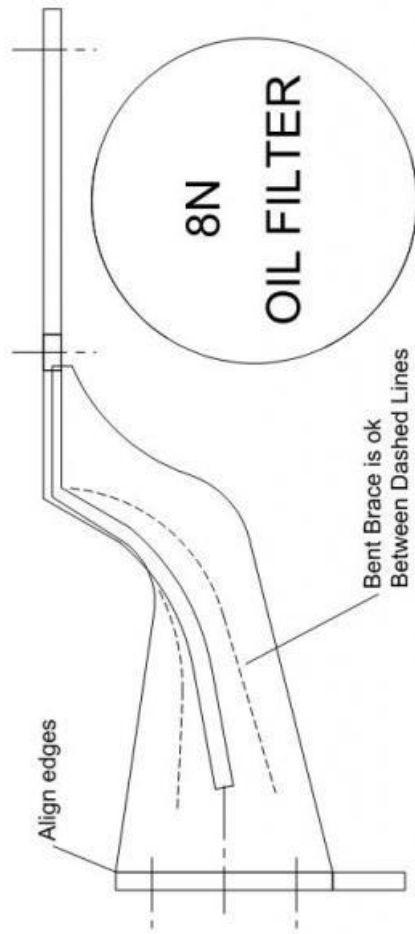
Weld pump flange last  
Adjust to just clear  
Radiator Hose



Kevin LaRue  
(K.LaRue-VA)  
kl@myfordtractors.com

# 9N-2N-Early8N Assembly

Weld Both Sides of all parts



Kevin LaRue  
(K.LaRue-VA)  
kl@myfordtractors.com

# LATE-8N Assembly

Weld Both Sides of all parts