

How To Provide LIVE HYDRAULICS

for
FORD 8N TRACTORS

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

LIVE HYDRAULICS

1 PUMP MOUNT

There are several ways to mount an engine-driven hydraulic pump on these tractors as well as the earlier front distributor engines found on Ford 9N, 2N, and early 8N tractors. Tractors with loaders will already have a front pump driven directly off the crank pulley. Loader pumps mount in front and many require removing the grill or hacking a fairly ugly hole in it. Properly-engineered accessories should bolt-on without damage. Several years ago a fellow named Zane Sherman sold me a live hydraulics kit. The kit came with a well-designed pump bracket that shared the same mounting studs as the original generator bracket. Sadly, anyone looking for this kit today is out of luck, Zane no longer sells his kit. The only other offering available is a great live hydraulics kit for the older front distributor engines sold by The Old Hokie (<http://mysite.verizon.net/oldhokie/windyridge/id11.html>). Sadly, his kit will not work on the side distributor engines.

MY COMBINATION BRACKET



This is a prototype bracket designed to mount a hydraulic pump to the 8N side-distributor block, without having to stack two mounts on the studs. This bracket replaces the original generator bracket. This particular one is for an alternator. The generator uses the original adjuster behind the water pump.

This bracket will not fit the front-distributor engines. They do not have the two studs on the left side of the block for the generator.

I also have a universal pump-only bracket that will work for front or side distributor engines. The universal bracket is a new design that slips behind the oil filter bracket. It has two sets of holes, so it will work with any of the cylinder heads. The side distributor engine moved the oil filter back. Some cylinder heads have both sets of holes. I prefer mounting to those since they allow one extra bolt to hold the bracket on the engine.

Plans for both brackets are at the end of this document. Both require cutting, bending, and welding 1/4" steel plate. I can place bulk orders and have the basic steel parts from a machine shop in about a week. I can even set up so people can order the parts direct from the machine shop. Cost for the parts is under \$50. It costs between \$50 and \$75 to bend and weld them together. If you add shipping charges to my shop, plus shipping the finished brackets, you begin to see why I am not planning to go into business selling these.

Once we have a belt-driven pump mounted and ready to go, everything else needed is standard hydraulic parts that are available locally or by mail-order. What follows is hopefully an easy to follow shopping list and instructions.

2 V-BELT

These tractors use a type "B" V-belt that is wider than the typical type "A" automotive V-belts. The original belt is too short, but many replacements are slightly longer and may work. The actual length needed depends on the size pulleys used.

3 THE PUMP



I am using a BARNES Model# 1003044 SAE 8 CW
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
Item# 9-4199

You can use a bigger pump if you want to add external valves and hydraulics like a modern tractor. However, I don't think it's a good idea to try and do much more than 2 GPM with a V-Belt drive. This system is limited because it is impossible to get a very good belt "wrap" on the hydraulic pump pulley.

4 PUMP PULLEY



The pump shaft is 1/2" Diameter.
I am using a 2" Diameter pulley for a type "B" V-Belt

Where To Buy
www.surpluscenter.com
Item# 1-BK24-A

This is cheating a bit. This pulley is smaller than the crank pulley, so the hydraulic pump will be turning more RPM than the engine. This means we will get a little more than the rated GPM at our normal working engine speed of 1500 RPM.

5 HOSES



High Pressure Supply Hose - 8-Foot (96") Length
Apache Hydraulic Hose — 1/2in. 2-Wire, 3500 PSI – 1/2" NPTM fittings
Northern Tool and Equipment or Tractor Supply Company.

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

Lengths indicated are only a suggestion. Measure routes you will use. Try to protect the lines. The original, all internal, hydraulic plumbing on these tractors is a real plus when driving through brush and in the woods. We don't want the new external hoses to become a maintenance nightmare.

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 NPT male ends. NPT is National Pipe Taper thread. You must use a thread sealant on these or they will not seal. 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 NPT because it's what I could find, it's certainly strong enough, and it's less expensive. I used the yellow thread sealant for gas systems and had 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.

6 FITTINGS

Most of these are swivel fittings. They make it a lot easier to assemble hoses to fittings. Even my cheap garden hose has a swivel end.



6a - 3/4 NPTM x 3/4 NPTF 90 SWIVEL Elbow - One (1) required. This fitting replaces the 3/4" pipe plug under the differential. This is where the 3/4" suction hose will connect.

Where To Buy
www.surpluscenter.com
Item# 9-1501-12-12



6b - SAE 8M x 3/4 NPTF 90 SWIVEL Elbow - One (1) required. This fitting goes on suction side of new pump. Other end of suction hose connects here.

Where To Buy
www.surpluscenter.com
Item# 9-6901-8-12



6c - SAE 8M x 1/2 NPTF 90 SWIVEL Elbow - One (1) required. This fitting goes on supply side of new pump. High Pressure 1/2" hose connects here.

Where To Buy
www.surpluscenter.com
 Item# 9-6801-8-8



6d - O-Ring Boss (ORB) x Female Pipe (NPTF) 90° Elbow (M) ORB 1/2 x (F) PIPE 1/2

Where To Buy
www.hydraulicwarehouse.com
 SKU: 6805-08-08

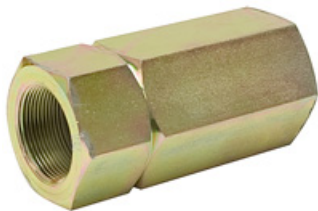
This fitting can be hard to find. This replaces the hex plug at the test port on the tractor's hydraulic pump flange. This fitting will connect directly to the other end of the High Pressure 1/2" hose. You will want the male (NPTM) version of this fitting to attach directly to the optional check valve explained in the next section.

THAT's ALL YOU NEED !

You now have working live hydraulics any time the engine is running, even with the PTO disengaged. With the PTO engaged, both pumps drive the implement up. This can flow more than the relief valve was designed to flow. With no implement mounted, the lift arms may rise up. Moderate hand pressure should override this when hooking up an implement with the engine running. Heavy implements seem to go up and down normally, but a light blade may rise twice as fast as it will drop. If this is undesirable, switch PTO off and run the system with the front pump.

7 OPTIONAL - But highly Recommended

The pump used is a gear pump. 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 near where the high-pressure line connects to the test port. Make sure you install this fitting with the flow arrow pointing towards the tractor hydraulic pump (down in this case).



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

Where To Buy
www.surpluscenter.com
 Item# 9-7933-8-5

You could use a close nipple, but this is the correct adapter to use for the connection to the test port, so this check valve will thread right to it. This fitting replaces item **6d**.

O-Ring Boss (ORB) 1/2" x Male Pipe (NPTM) 90° Elbow (M) ORB 1/2" x (M) PIPE
www.hydraulicwarehouse.com SKU:FF2501-08-08



8 ADDITIONAL OPTIONS

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

Other 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.



This photo shows most of my system, with optional accessories. I added a suction line strainer with a gauge, so I can see when it's time for a new strainer. The gauge was not needed. The pump starts to cry with any backpressure increase as the strainer gets clogged. This system needs a dual strainer to reduce restriction in the suction line.

The high pressure supply hose is not visible. It connects to the other side of the pump, and runs over the engine to the right side. See next photo.

Note the small pulley on my generator. This makes the generator spin faster, making more amps. It also let me use the same belt I was using with just the generator. I can easily go back to normal operation by loosening the belt and taking it off the pump pulley. The generator adjustment just swings out a little further when running only 3 pulleys. This is handy if the filter gets clogged and I'm too lazy to change it.



This photo shows the route I used for the High Pressure Hose. The yellow arrow is where the hose appears, runs along the top of the transmission with the tail light wires, and then drops to the test port under the footboard. The green arrow is pointing at the test port.

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. Both ends are sealed when the fitting is pulled apart.

CLOSE-UP OF THE TEST PORT

This photo is taken from the same angle as above, looking right under the foot board.



This is what happens if you use unrated pot-metal fittings from Lowes. The fitting I originally used was a simple street elbow threaded into the original test port plug. It lasted until something hit it and snapped it off. 2 GPM is a lot when the hot oil is spraying everywhere, and filling your shoe. Use rated hydraulic fittings.

9 COST ESTIMATE

This is an estimate of probable costs. Prices for individual parts are constantly changing and usually headed UP in price. Shop around, and see what you can find. Surplus is perfectly ok. Beware the China logo. For some things the quality is first rate, for other items, not so good.

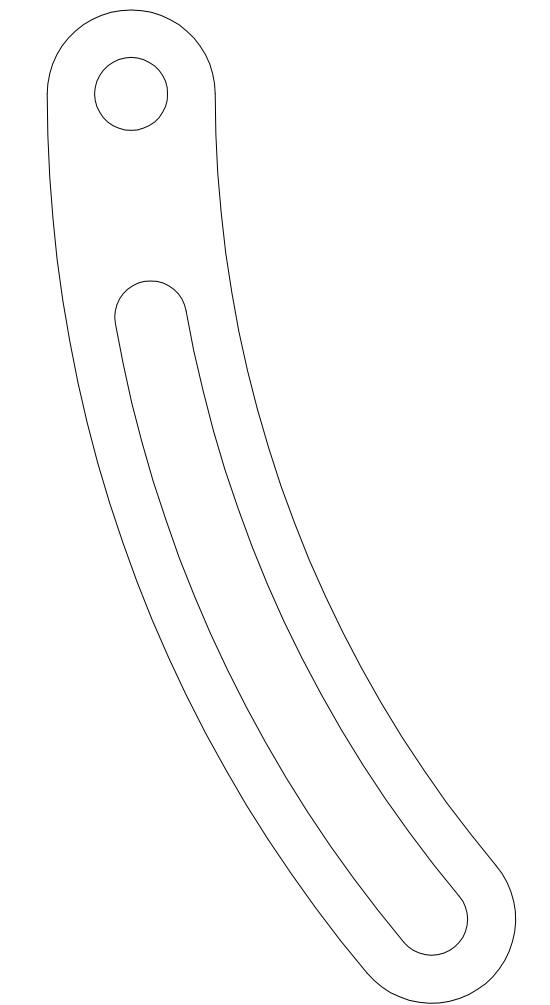
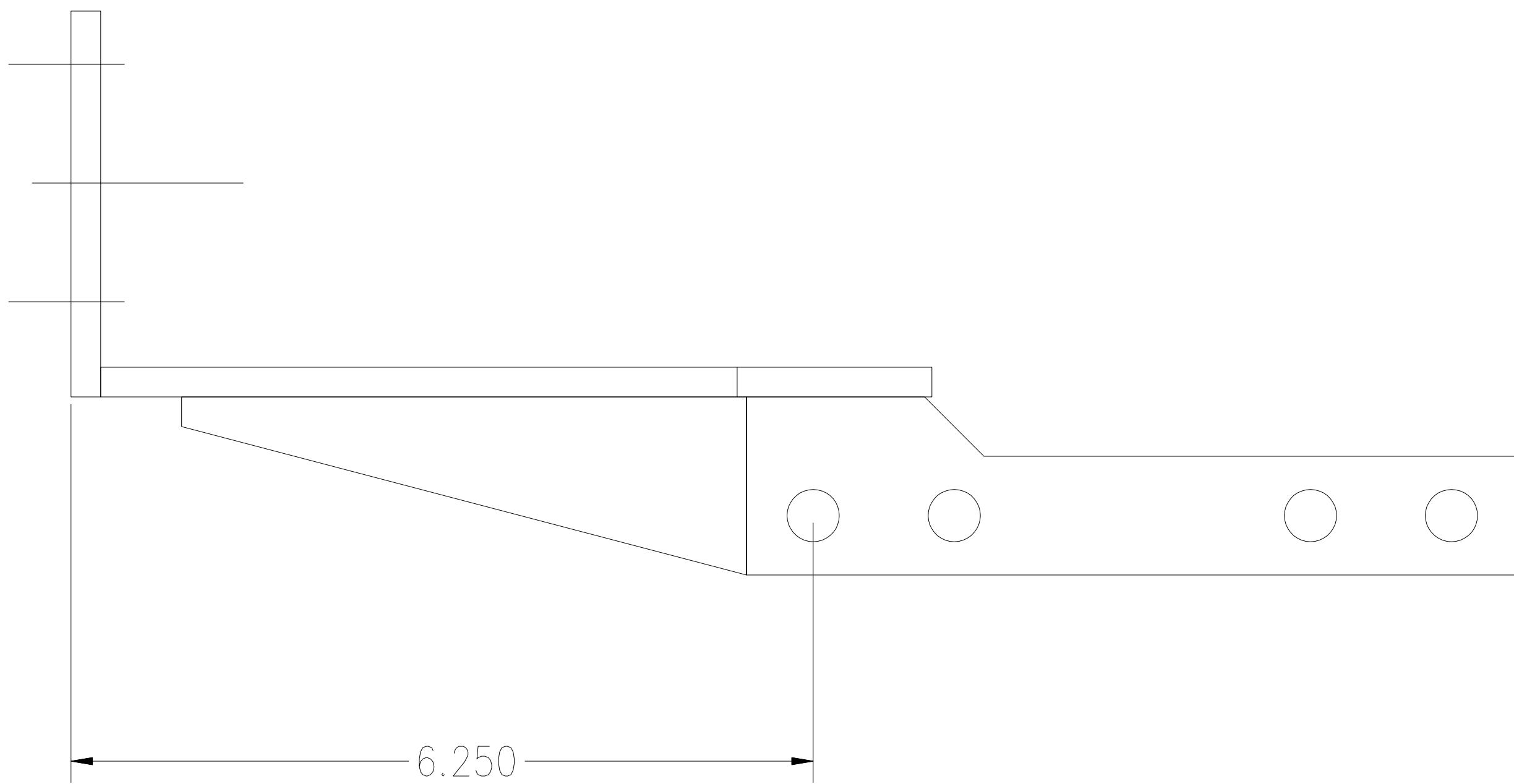
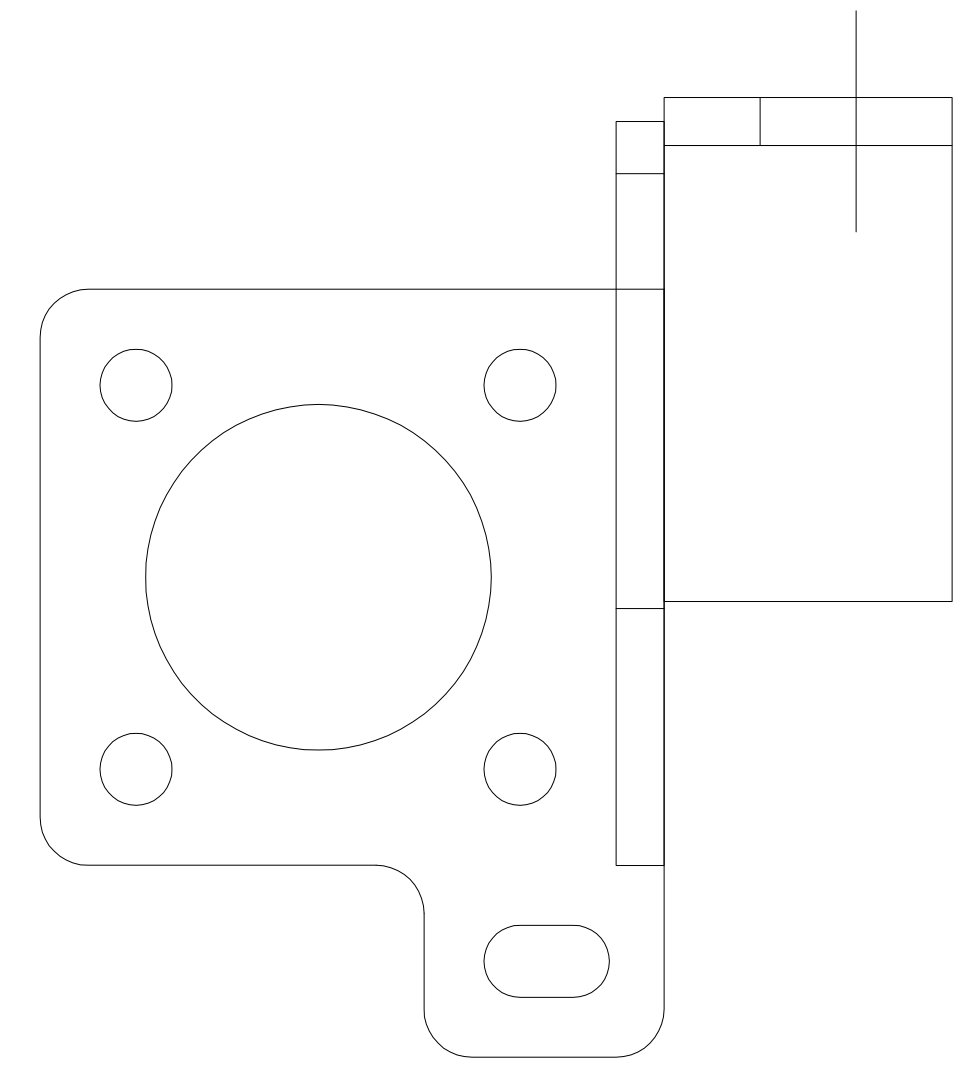
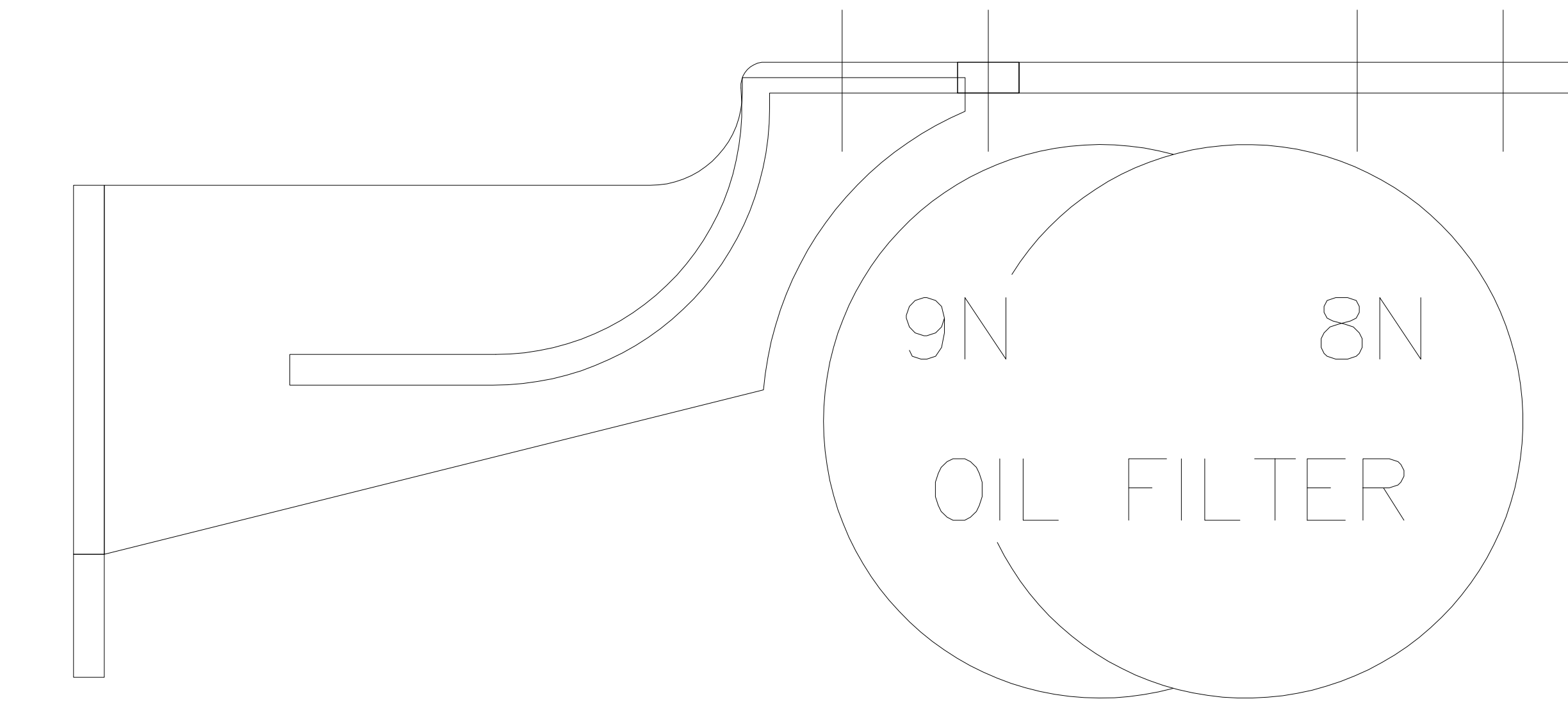
ITEM	DESCRIPTION	BASE	OPTIONS
1	PUMP MOUNT	\$125	
2	V-BELT	\$ 15	
3	PUMP	\$140	
4	PULLEY	\$ 5	
5	HOSES	\$120	
6	FITTINGS	\$ 35	
7	MISC HARDWARE & HOSE BRACKETS	\$20	
8	CHECK VALVE, SUCTION STRAINER, QUICK DISCONNECTS, LARGER PUMP, VALVES, BY-PASS, ETC.		
TOTAL		\$460	

If you dabble in hydraulics, you already have most of this stuff around the shop. Hose brackets, and even the pump mount, are not that hard to make, if you have the tools.

As time permits, I will pull part numbers for some 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.

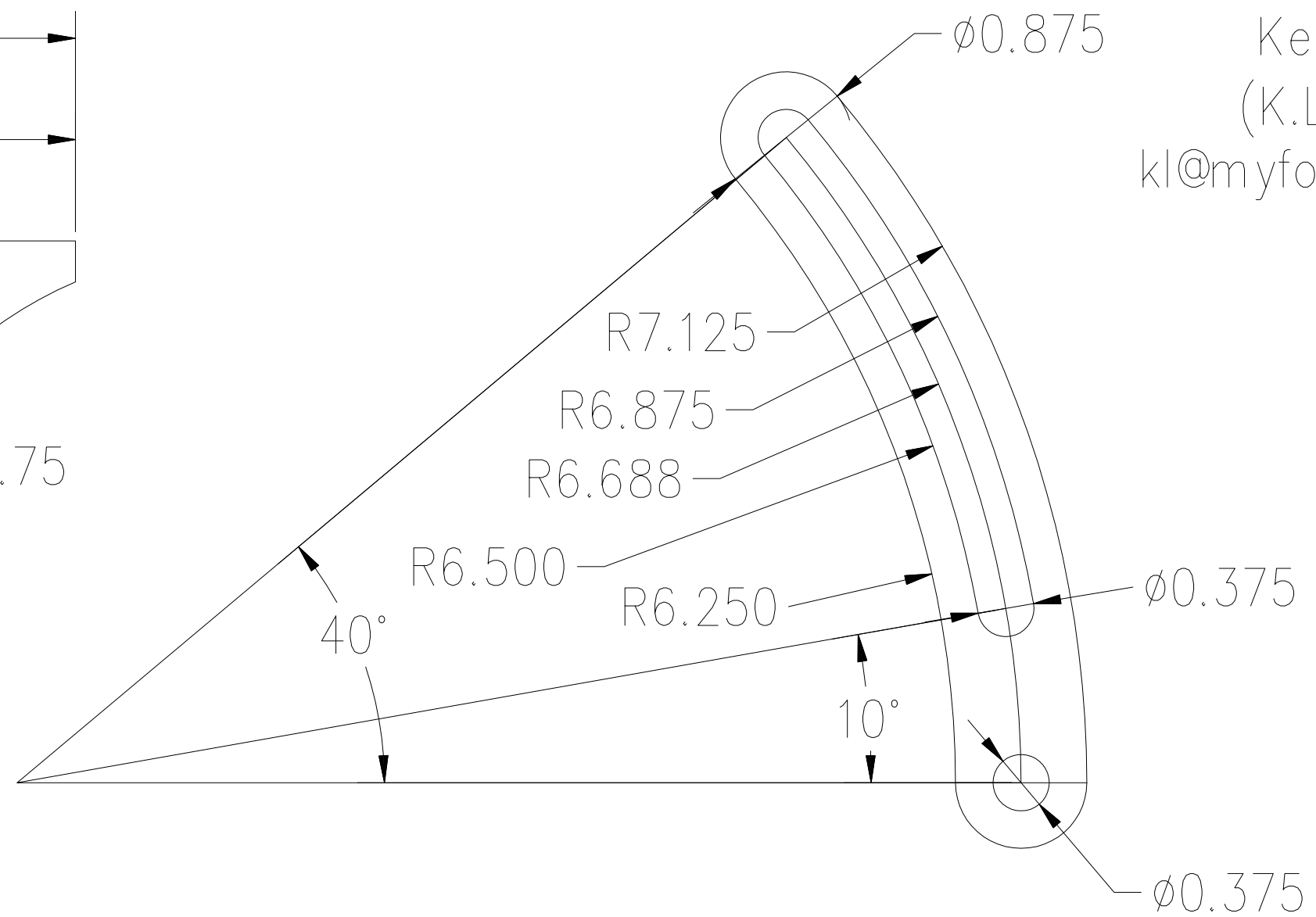
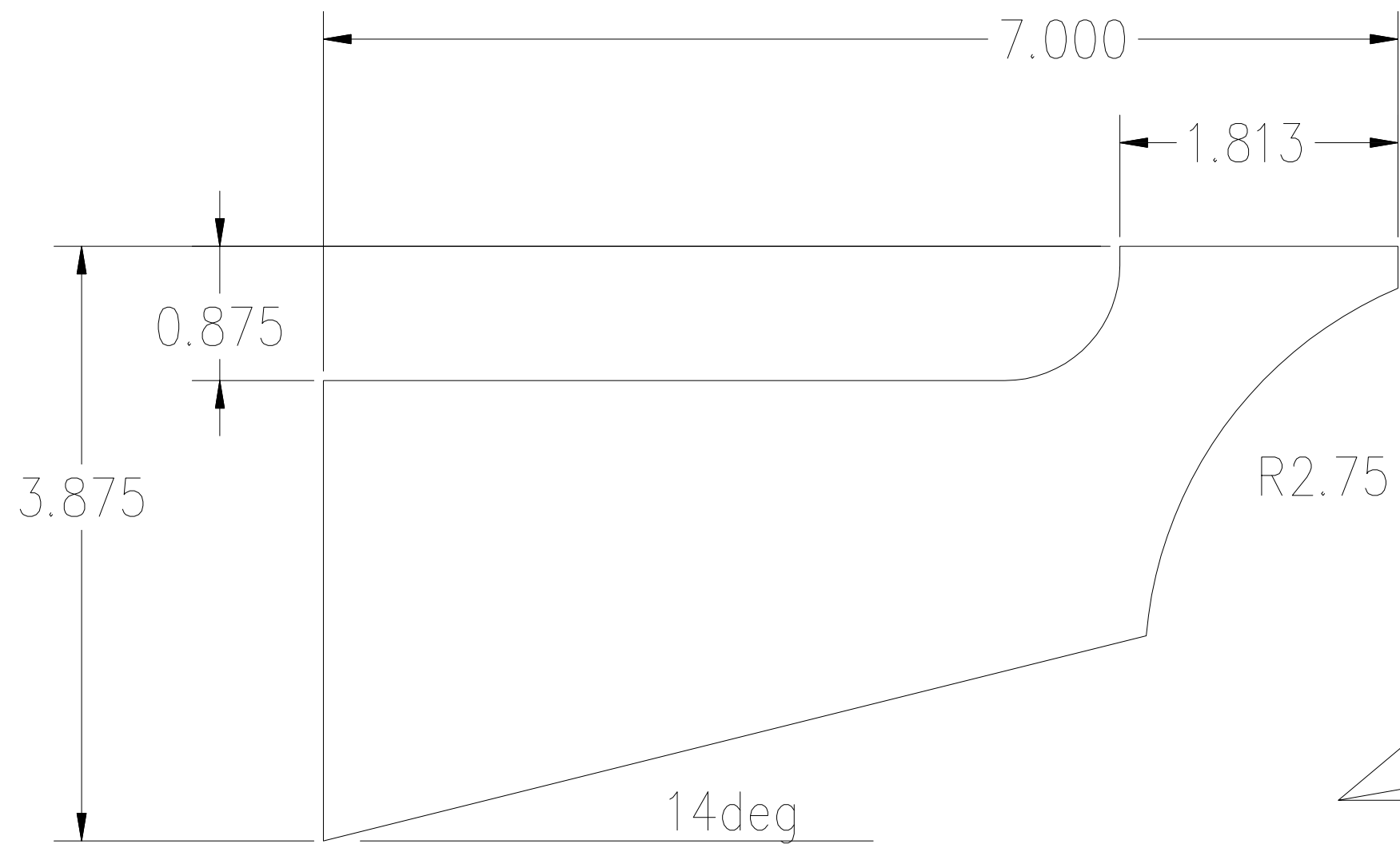
Enjoy!

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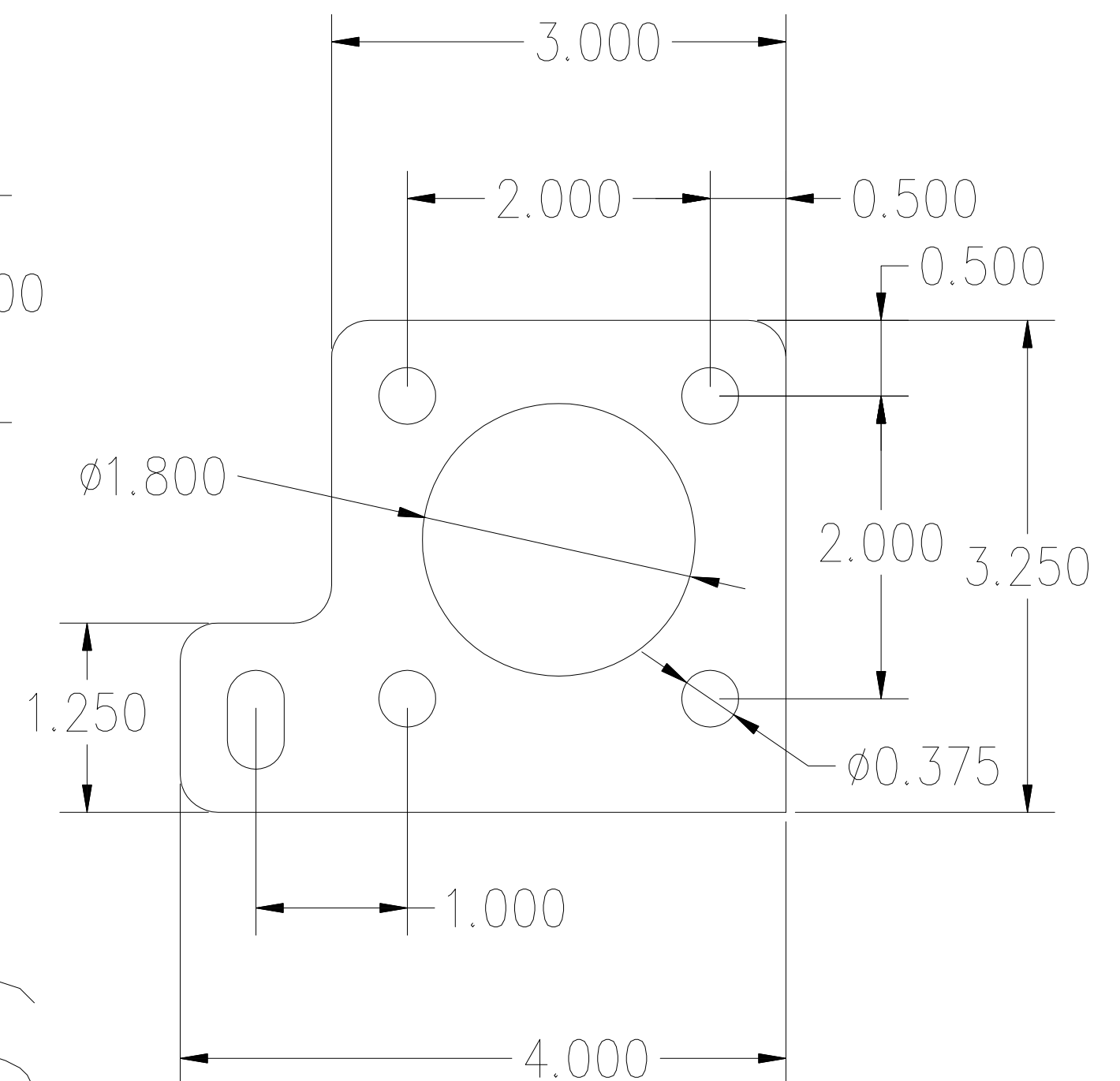
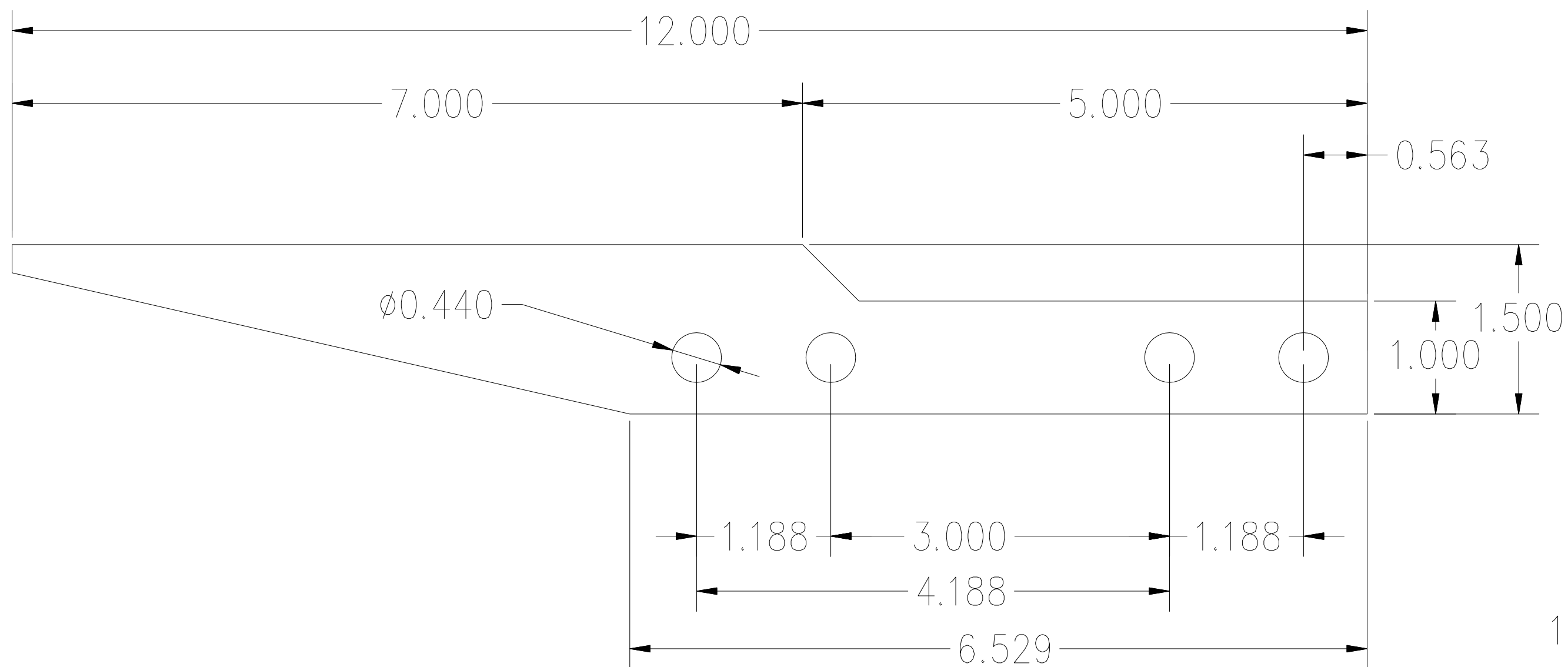


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9N-8N PUMP BRACKET

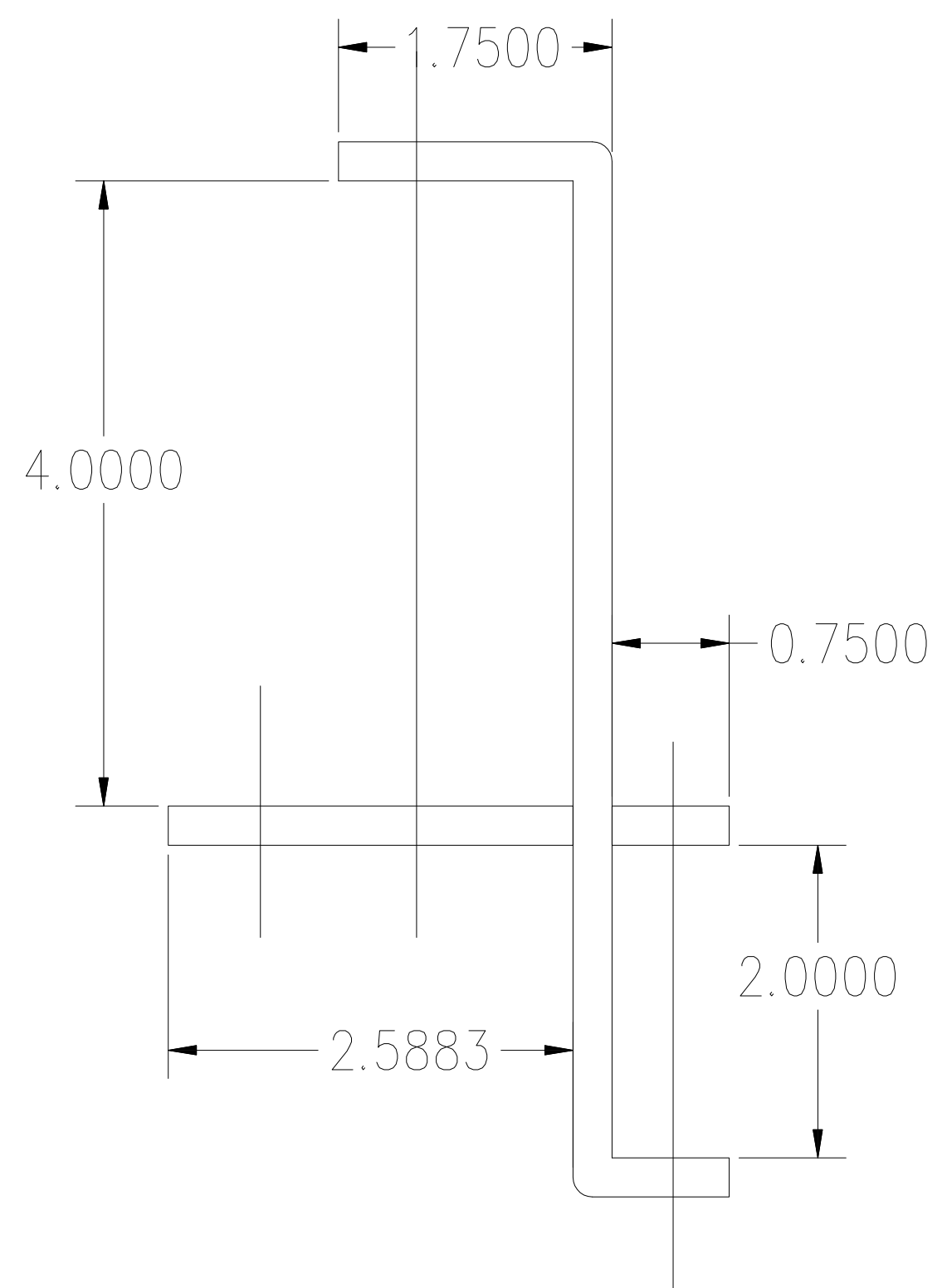
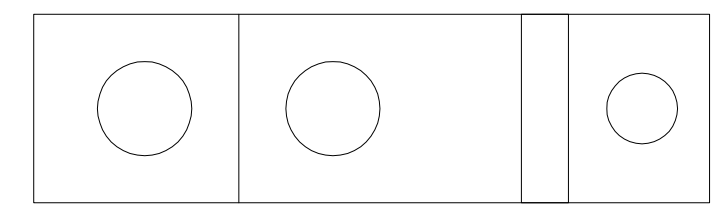
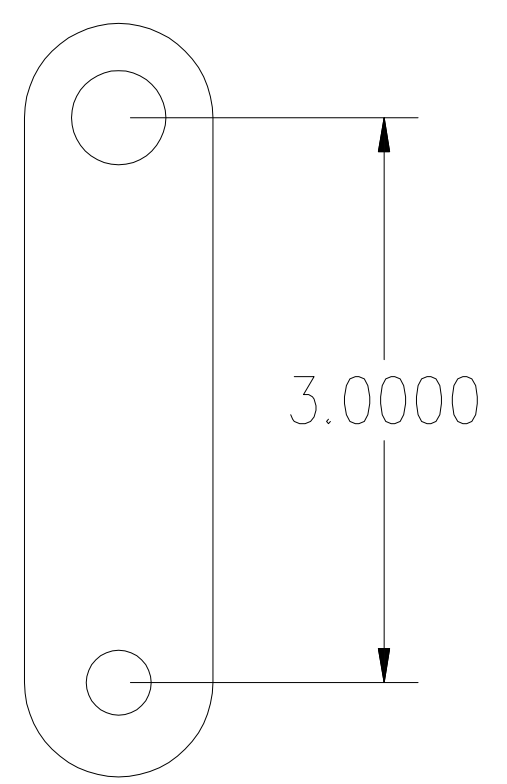
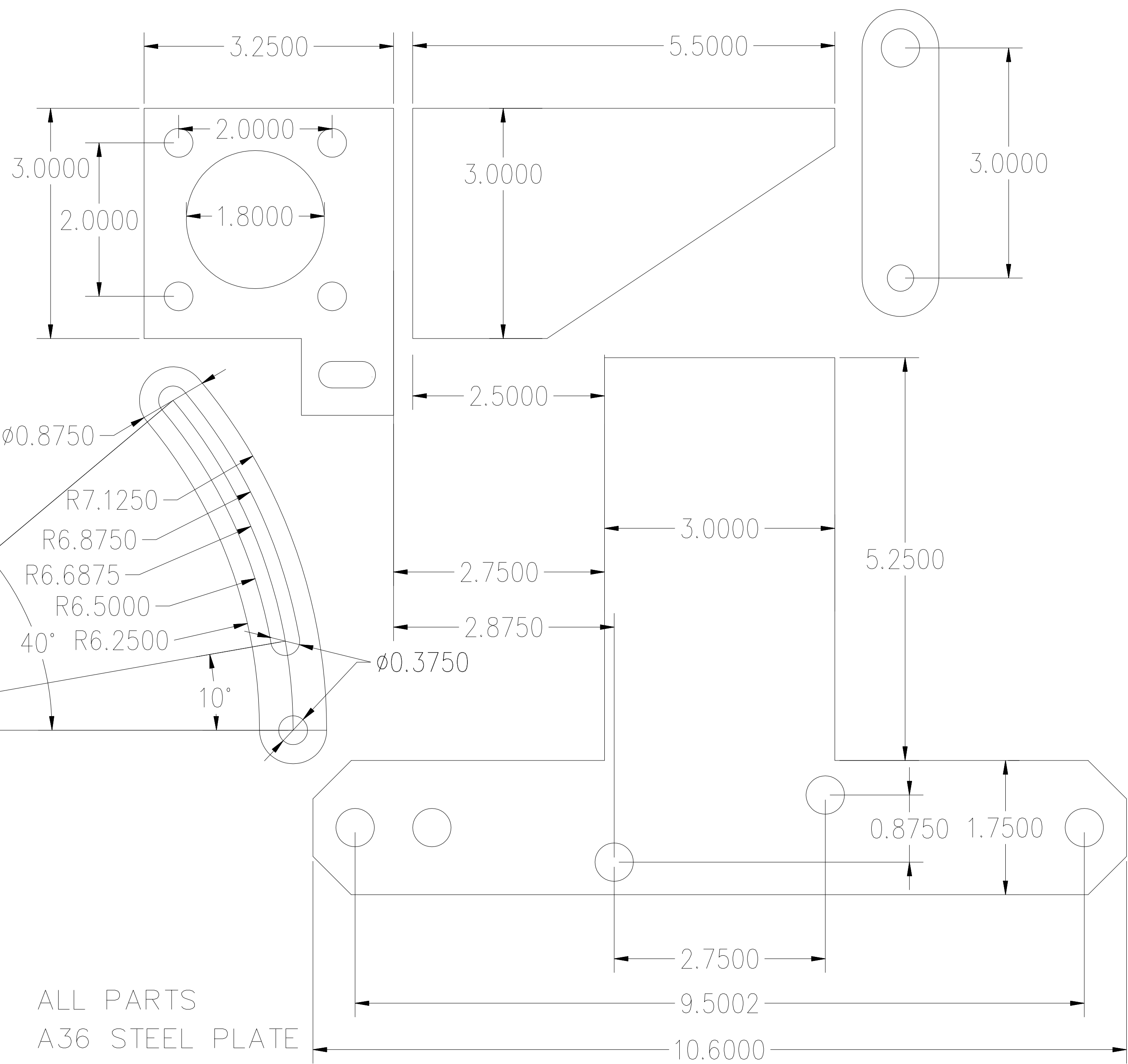


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BRACKET PARTS

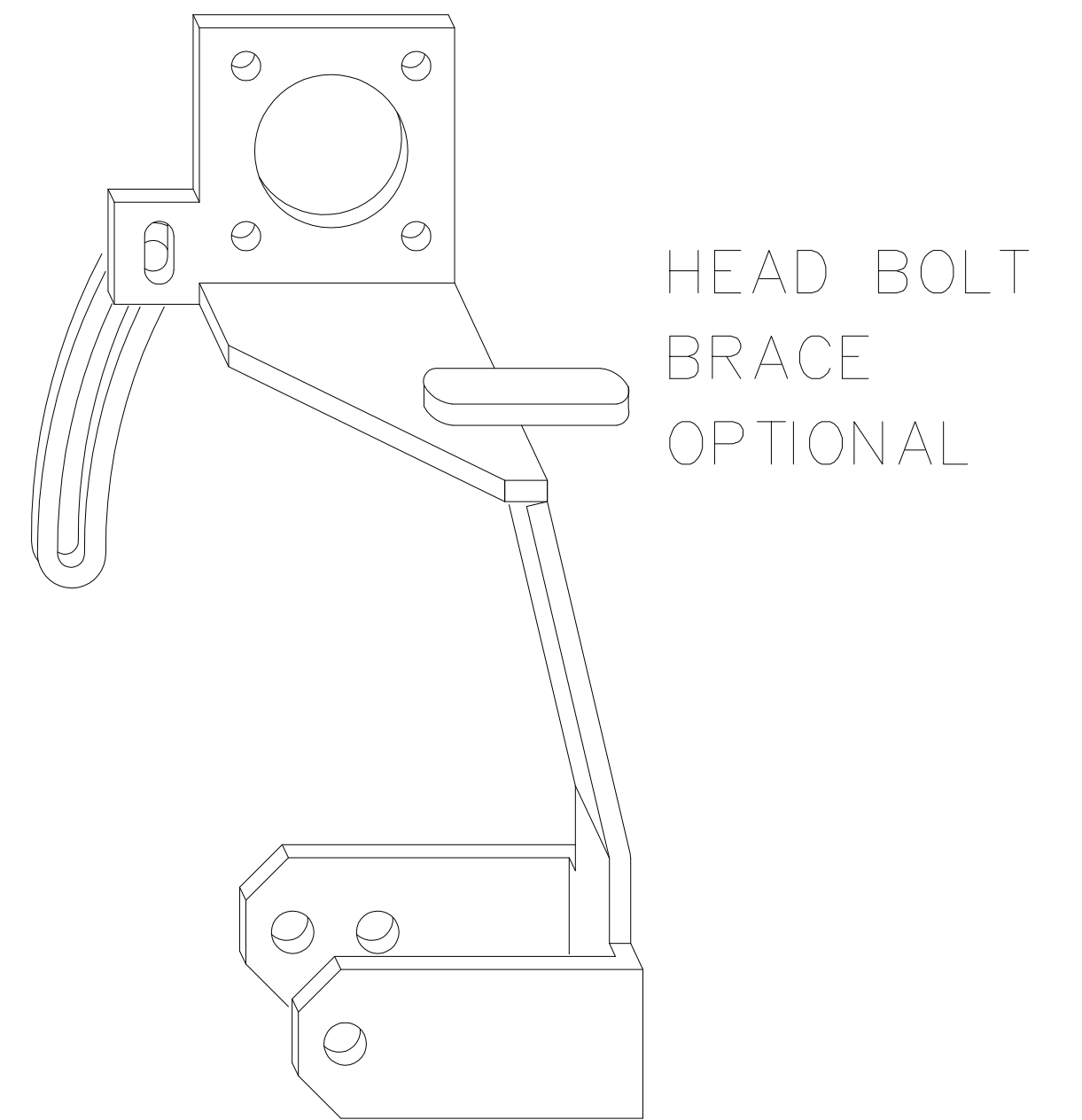
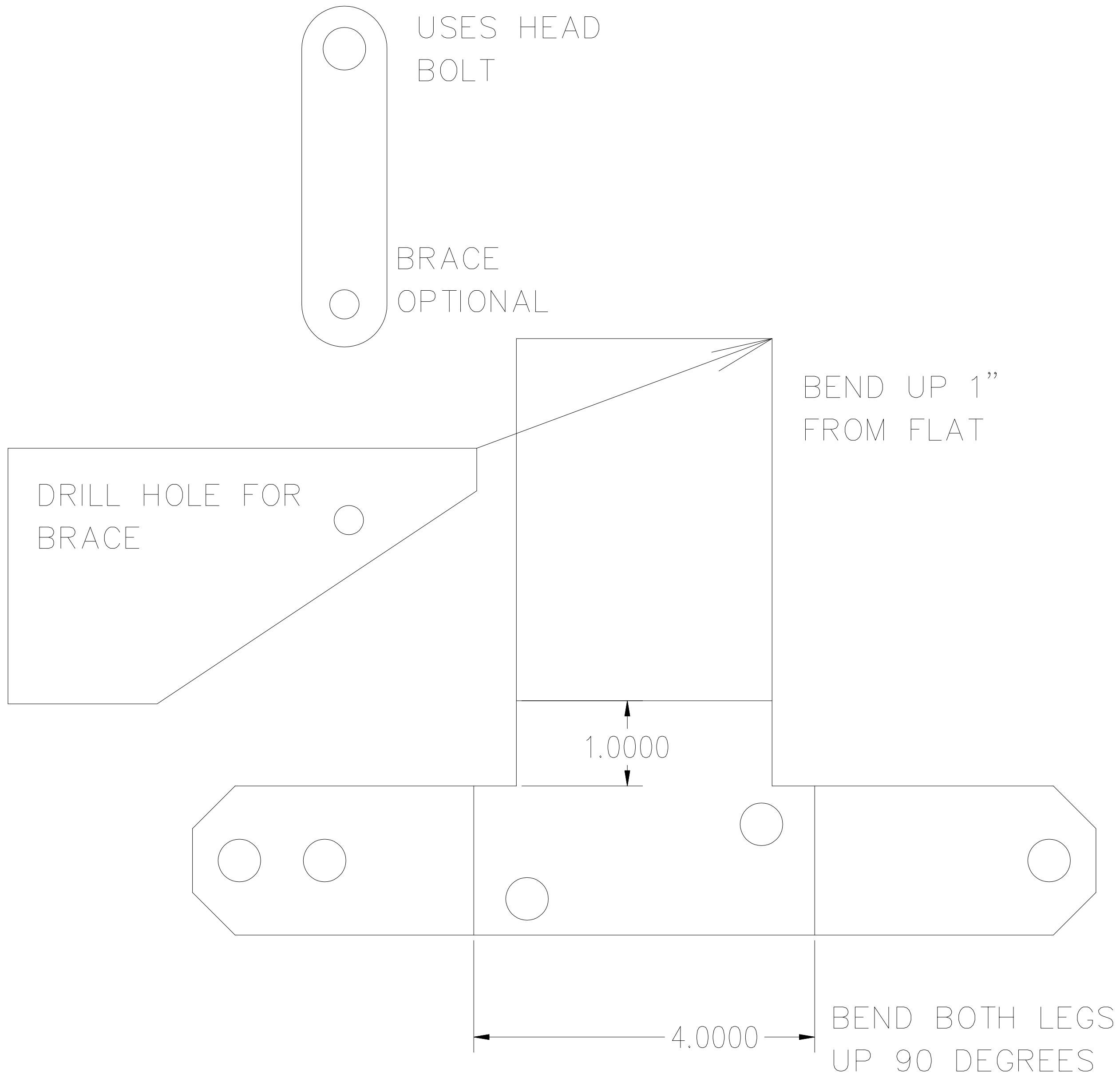
ALL PARTS CUT FROM 1/4" A36 STEEL PLATE



ALTERNATOR
ADAPTOR

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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.

COMBO BRACKET

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