OPEN SOURCE ECOLOGY

LifeTrac

Fabrication Report

Disclaimer:

When building this tractor you are explicitly assuming full responsibility for the safety of yourself, anyone who helps you, anyone who wanders past, and anyone who uses the tractor or is nearby while it is being used. OSE accepts no responsibility for the quality of your work.

Warning:

This tractor is a heavy piece of equipment and carries with it significant operating risks inherent to heavy, mobile machinery. OSE recommends that you obtain experience in construction, agriculture, engines and heavy equipment operation prior to building this tractor.

Warning:

The current design does not include a seat belt, safety bar, or operator cage. However, it does not prohibit them either.

Warning:

Do not use on hillsides or uneven terrain which may cause the tractor to tip.

Warning:

Neither axle should support more than 70% of the combined weight of the tractor and load. Do not lift objects more than 1,000 lbs without ballasting the rear of the tractor to maintain at least this 70/30 distribution. The maximum load the tractor can handle is 4,000 lbs, with proper ballast, or 8,000 lbs if the rear of the tractor is fastened down.

Note:

This tractor is currently in the beta release stage. If you build the tractor you are a developer. It is strongly suggested that you contact OSE prior to building and remain in contact throughout the process.

Note:

This report is the last step in a distributed collaboration process. It is recommended that you obtain the digital OpenProj file and a copy of OpenProj (free and open source). You will be able to organize your fabrication project with only a few mouse clicks. Track your progress with the digital tool, then send your final file back and it can be used to improve the machine and the documentation.

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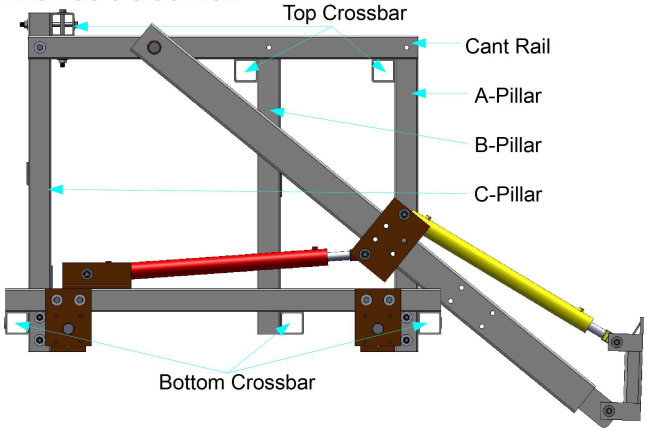
Introduction

This guide will walk you through the entire process of fabricating LifeTrac, Open Source Ecology's general purpose tractor.

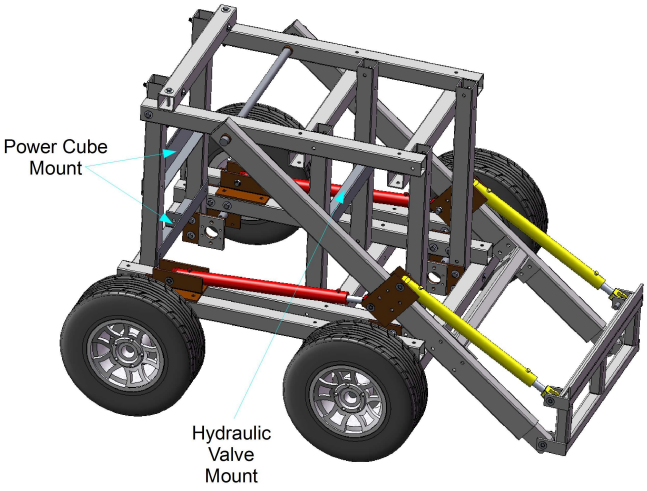
This guide documents Prototype III. Prototype IV has bent loader arms and quick attach wheels. Prototype IV has about 20 hours of run time as of 7 February 2012. The upgrades are recommended, however, documentation is not complete.

There are two primary sections: Definitions & Project Steps. Definitions are sufficient for an experienced fabricator to replicate the LifeTrac. Project Steps are an addition that makes organizing the effort easier and provides a standardized format to guide discussion and feedback.

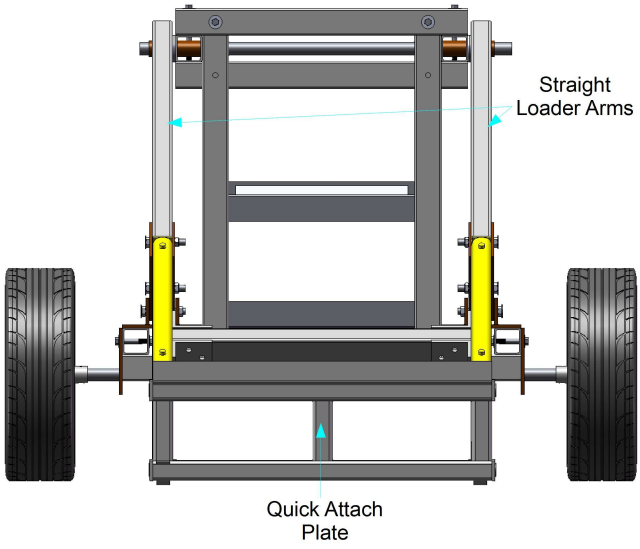
LifeTrac 3 side view



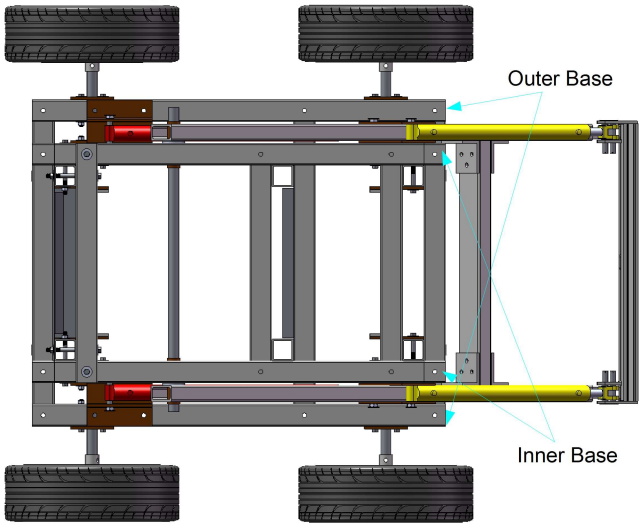
LifeTrac 3 perspective



LifeTrac 3 front view



LifeTrac 3 top view



Bill of Materials

Tools		
	Metal Saw	
	Drill	
	Cutting Torch	
	welding torch	
	Tape Measure	
	hand-held grinder	
	pipe wrench	
	Lathe	
	Center Punch	
	5/16" hex wrench	
	9/16" wrench	
	3/4" wrench	
	cinder block	
	Frame Hole Jig	
Consumables		
	grease	
	Teflon tape	~15 feet
	1/8" drill bit	
	1/4" drill bit	
	1/2" drill bit	
	5/8" drill bit	
	3/4" drill bit	
	13/16" drill bit	
	1" drill bit	
Bar		
	1" dia by 6" bar	x10
	1 3/8" dia by 6" splined shaft	x4
	1 7/8" dia by 26" bar	x4
	1 7/8" dia by 56" bar	

Tube		
	1 7/8" inner dia by 3 1/2" tube	x2
	1 7/8" inner dia by 4 1/2" tube	x2
	1 7/8" inner dia by 6" tube	x4
	3" x 3" by 9" square tube	x3
	3" x 3" by 51" square tube	x2
	3" x 6" x 3/8" by 45" rectangle tube	x1
	3" x 6" x 3/8" by 100" rectangle tube	x2
	4" x 4" x 1/4" by 44" square tube	x3
	4" x 4" x 1/4" by 52" square tube	x2
	4" x 4" x 1/4" by 55" square tube	x2
	4" x 4" x 1/4" by 59" square tube	x2
	4" x 4" x 1/4" by 60" square tube	x3
	4" x 4" x 1/4" by 68" square tube	x2
	4" x 4" x 1/4" by 76" square tube	x4
Flat		
	2" x 1/2" by 51" flat	
	3" x 1/2" by 3" flat	x4
	3" by 1/2" by 6" flat	x4
	3" x 1/2" by 51" flat	
	4" x 1/4" by 26" flat	
	4" x 1/4" by 44" flat	
	4" x 1/4" by 76" flat	
	4" x 1/2" by 4" flat	x17
	4 1/2" x 2" by 8" flat	x2
	8" x 3/8" by 12 1/2" flat	x4
	8" x 1/2" by 6" flat	x4
	8" x 1/2" by 10" flat	x12
	12" x 1/2" by 4" flat	x4
	12" x 1/2" by 12" flat	x6
Angle		
	4" x 6" x 1/2" by 6" angle	x4
	4" x 4" x 1/4" by 36” angle	x3
Hardware		

Nuts		
	9/16" locknut	x32
	3/4" locknut	x114
	1" nut	x12
Washers		
	9/16" washer	x64
	3/4" washer	x238
	1 7/8" washer	x20
Bolts		
	9/16" by 2" bolt	x32
	3/4" by 2" bolt	x8
	3/4" by 4 1/2" bolt	x18
	3/4" by 5 1/2" bolt	x46
	3/4" by 9 1/2" bolt	x42
Misc		
	1/8" cotter pin	x10
	1 7/8" lock collar	x18
Hydraulics		
1/4” Hex		
	1/4" NPT female quick coupler	x4
	1/4" NPT male quick coupler	x5
	1/4" NPTF 90 elbow	
	1/4" NPTF tee	x3
	SAE 4 to 1/4" NPT nipple	x4
	1/4" NPTM hex nipple	x4
1/2” Hex		
	1/2" NPT female quick coupler	x9
	1/2" NPT male quick coupler	x9
	1/2" NPTF tee	x8
	SAE 10 to 1/2" NPT nipple	x10
	1/2" NTPM hex nipple	x4

	SAE 10 to 1/2" NPT swivel	x8
	1/2" NPT swivel	
	3/8" to 1/2" NPT swivel	x6
	3/8" to 1/2" NPT 90 elbow swivel	x2
3/4” Hex		
	3/4" NPT female quick coupler	x8
	3/4" NPT male quick coupler	x8
	3/4" NPTF 90 elbow	
	3/4" NPTF tee	x2
	3/4" hex nipple	x10
	3/4" power beyond sleeve	x2
Hoses		
	1/4" by 36" hose	
	1/4" by 60" hose	x2
	1/4" by 72" hose	
	1/2" by 12" hose	x2
	1/2" by 36" hose	x10
	1/2" by 48" hose	x7
	1/2" by 60" hose	
	1/2" by 120" hose	
	1/2" by 144" hose	
	3/4" by 96" hose	x4
Valves		
	1/2" cushion valve	
	3/4" NPT check valve	x2
	2-spool valve	
	3-spool valve	
Actuators		
	30" cylinder	x2
	36" cylinder	x2
	31.88 cubic inch motor	x4

Frame Hole Jig

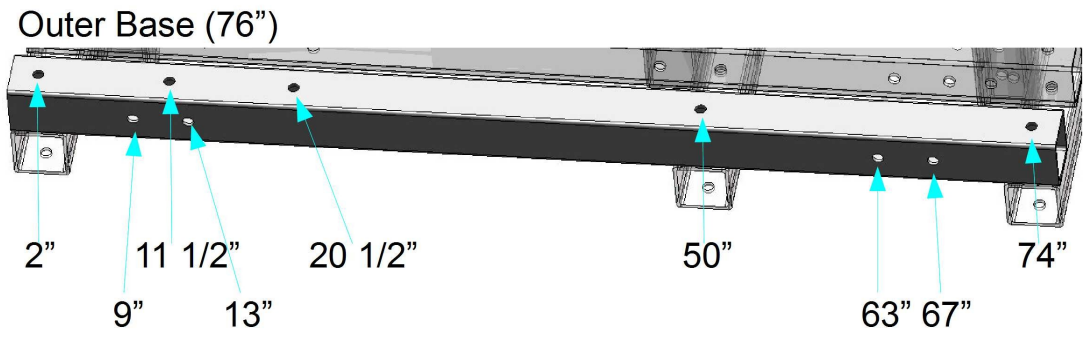
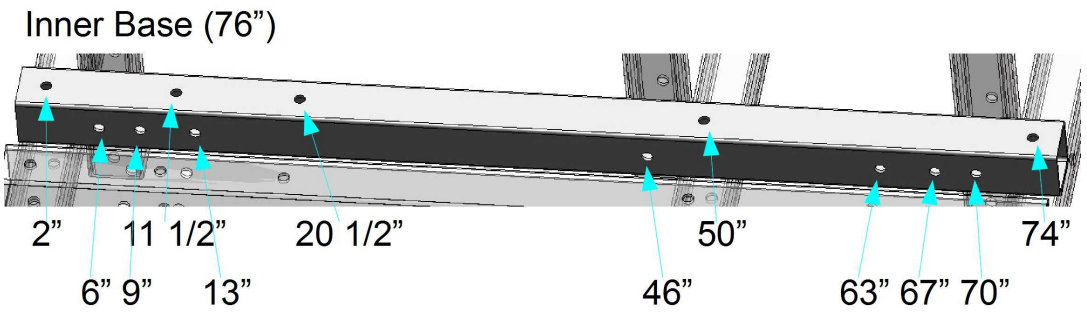
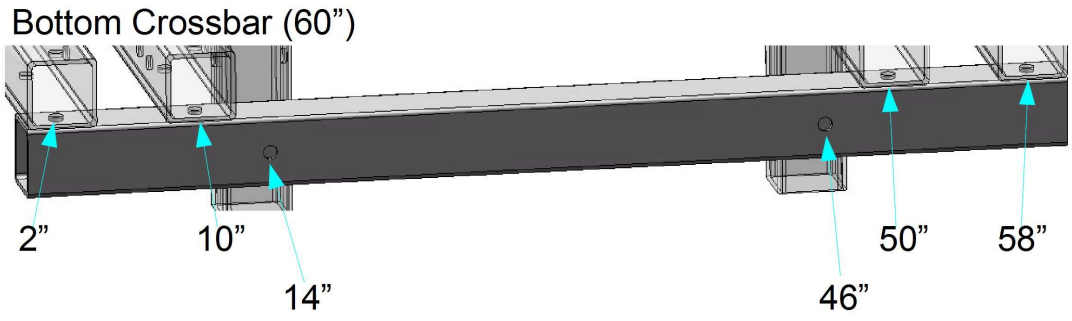
Cut a piece of 4” wide flat stock to 76” long. Starting at one end, mark (centered) and drill 1/4” holes at the following distances:

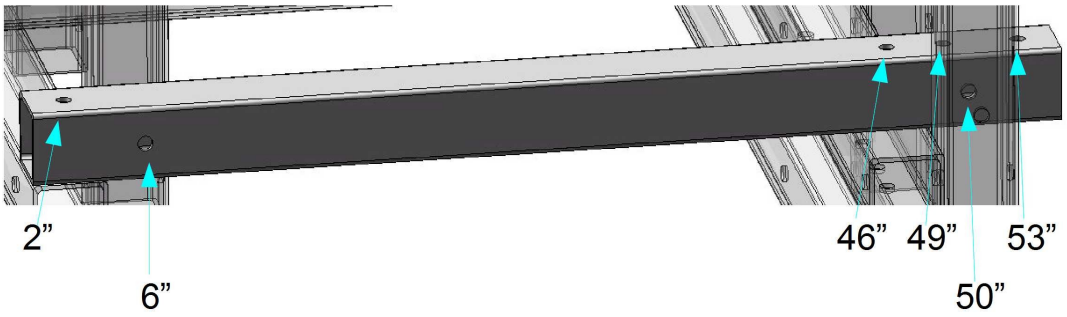
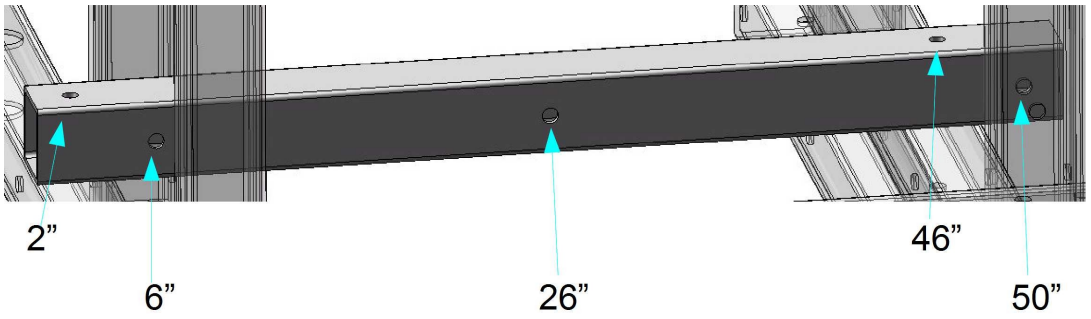
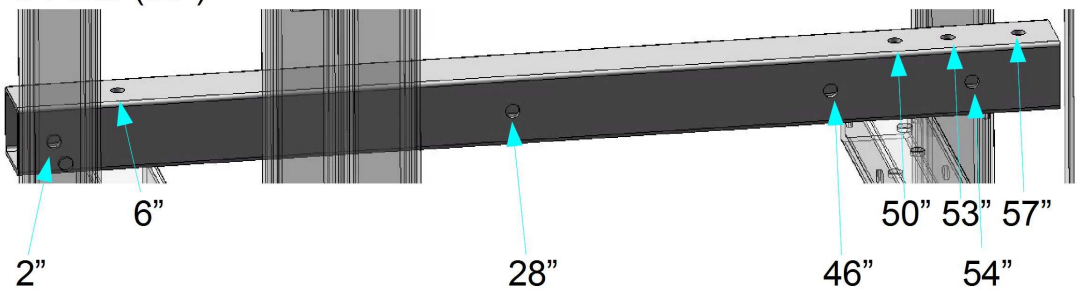
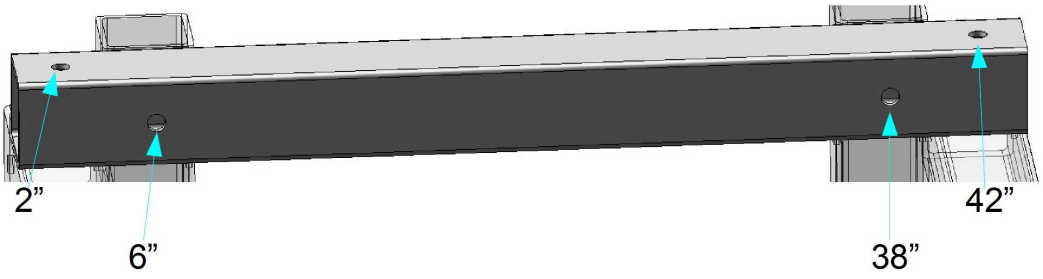
- 2”
- 6”
- 9”
- 10”
- 11 1/2”
- 13”
- 14”
- 20 1/2”
- 26”
- 28”
- 30”
- 38”
- 42”
- 46”
- 49”
- 50”
- 53”
- 54”
- 57”
- 58”
- 62”
- 63”
- 66”
- 67”
- 70”
- 74”

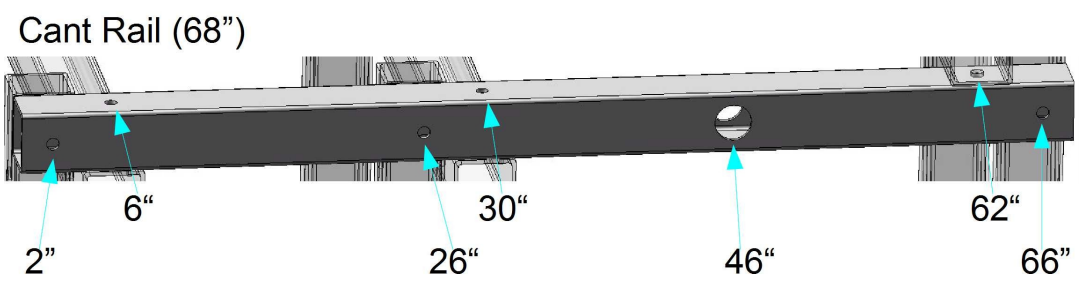
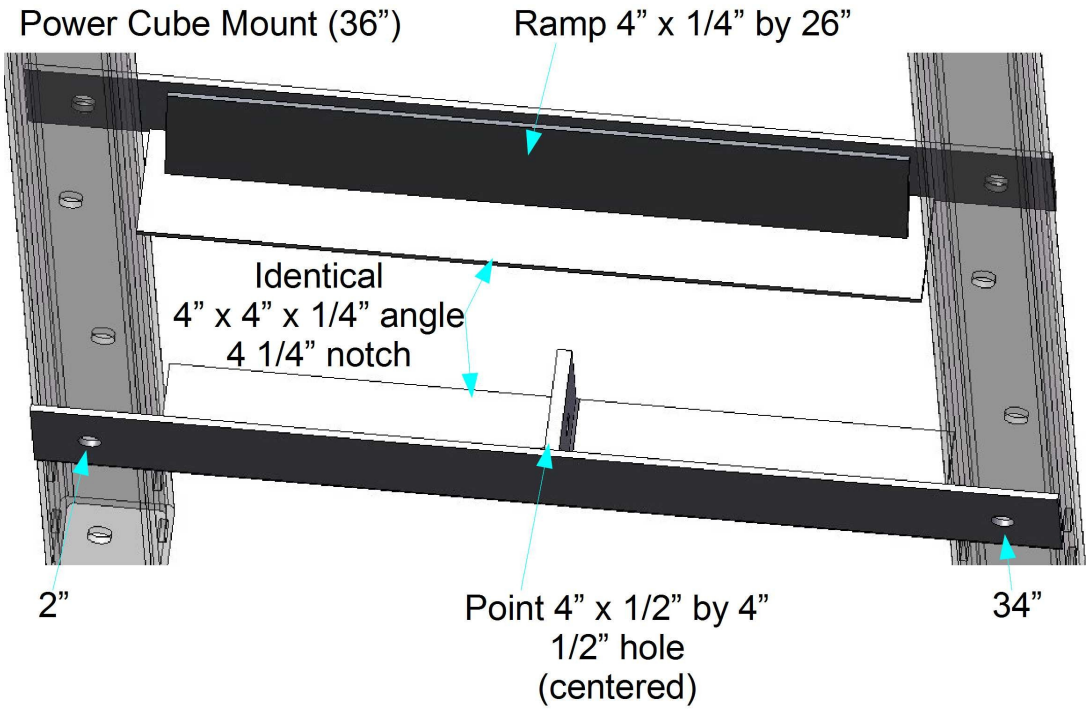
Definitions

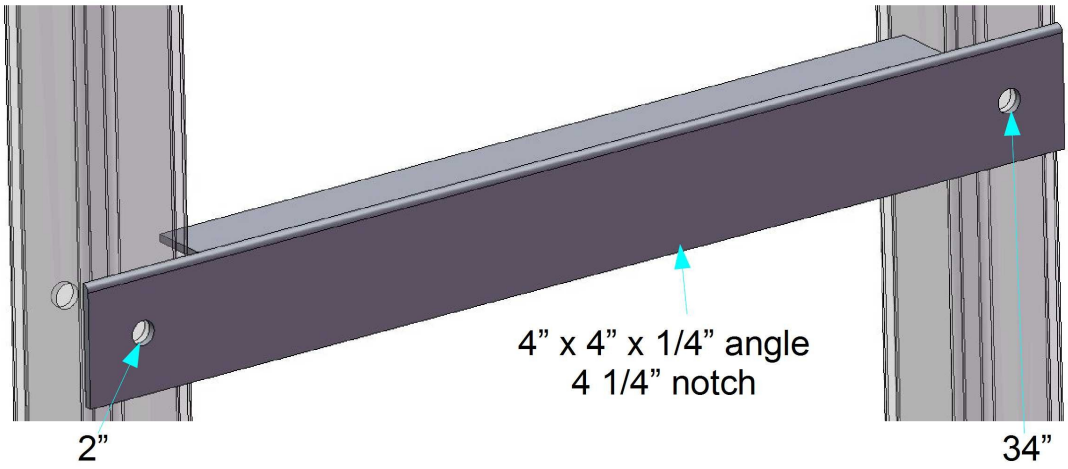
Frame Tube Lengths & Hole Positions

- All frame members are 4” x 4” x 1/4” steel tube.
- Use the Frame Jig to mark matching holes on opposite sides of the tube.
- Drill each mark 13/16” (unless otherwise specified).
- Do not drill all the way through the tube from one side unless using a drill press.

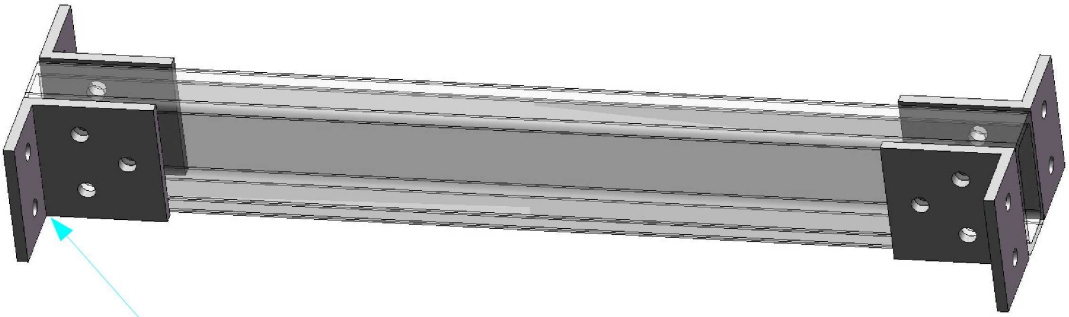
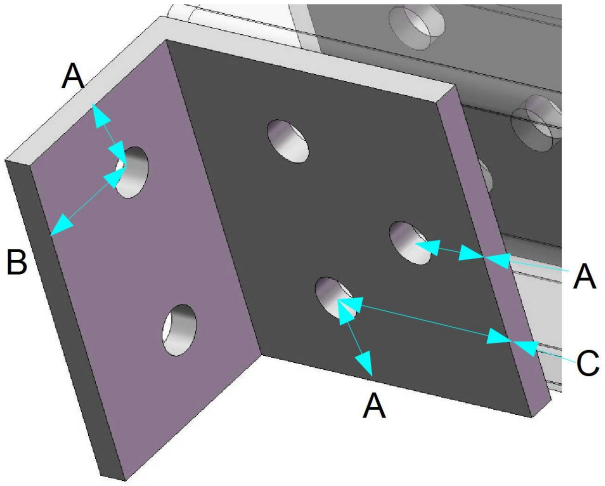
Part	Illustration
Outer Base	
Inner Base	
Bottom Crossbar	

A-Pillar	A-Pillar (55”) 
B-Pillar	B-Pillar (52”) 
C-Pillar	C-Pillar (59”) 
Top Crossbar	Top Crossbar (44”) 

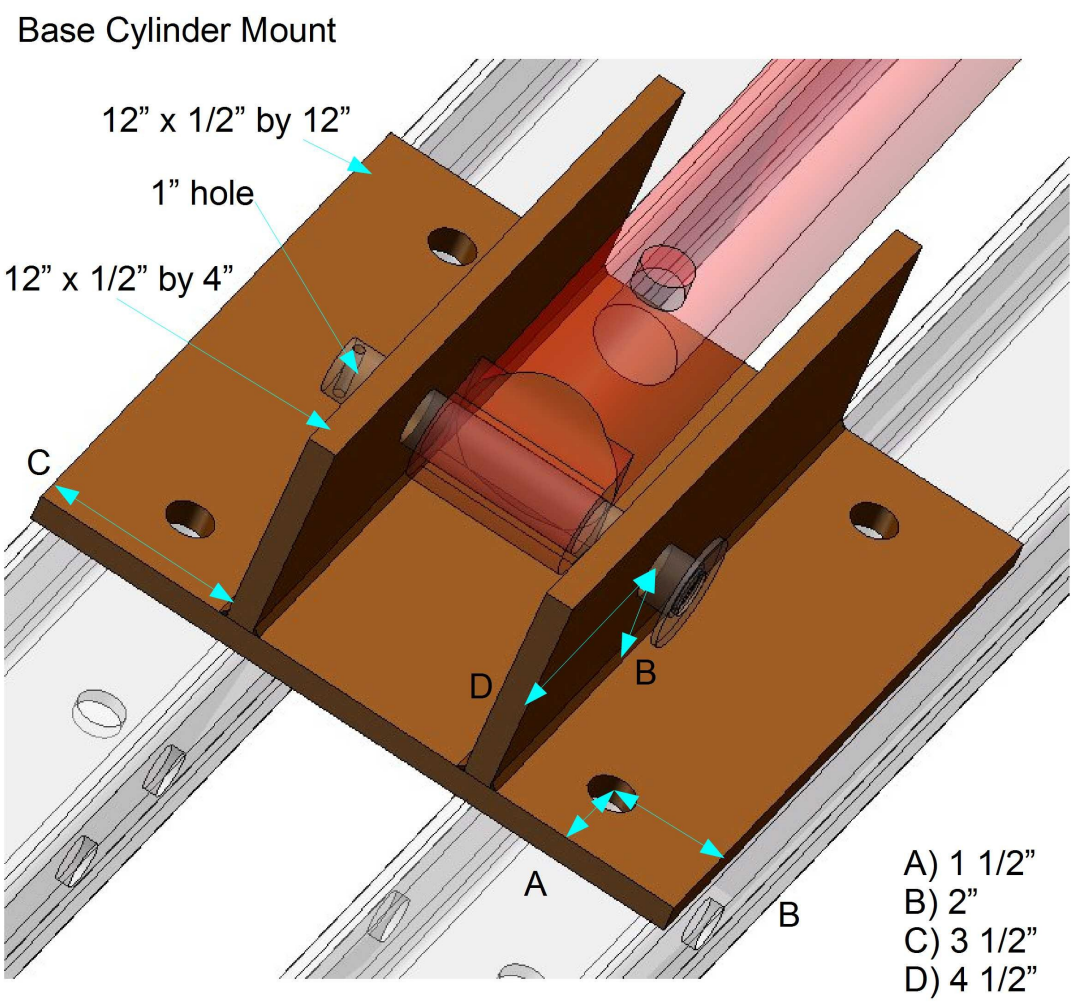
Cant Rail The big hole at 46” should be 2 3/8”. Use a cutting torch.	
Power Cube Mount	
Part	Illustration
Power Cube Mount Holes 13/16 unless otherwise noted. The angle of the ramp needs to match the Power Cube. A good estimate is to leave a 3/4” gap between the top edge of the ramp and the top edge of the angle.	
Hydraulic Valve Mount	
Part	Illustration

Hydraulic Valve Mount Additional holes for the hydraulic valves will be necessary. Use your specific hardware to mark the holes.	Hydraulic Valve Mount (36”) 

Loader Arm Crossbar Support

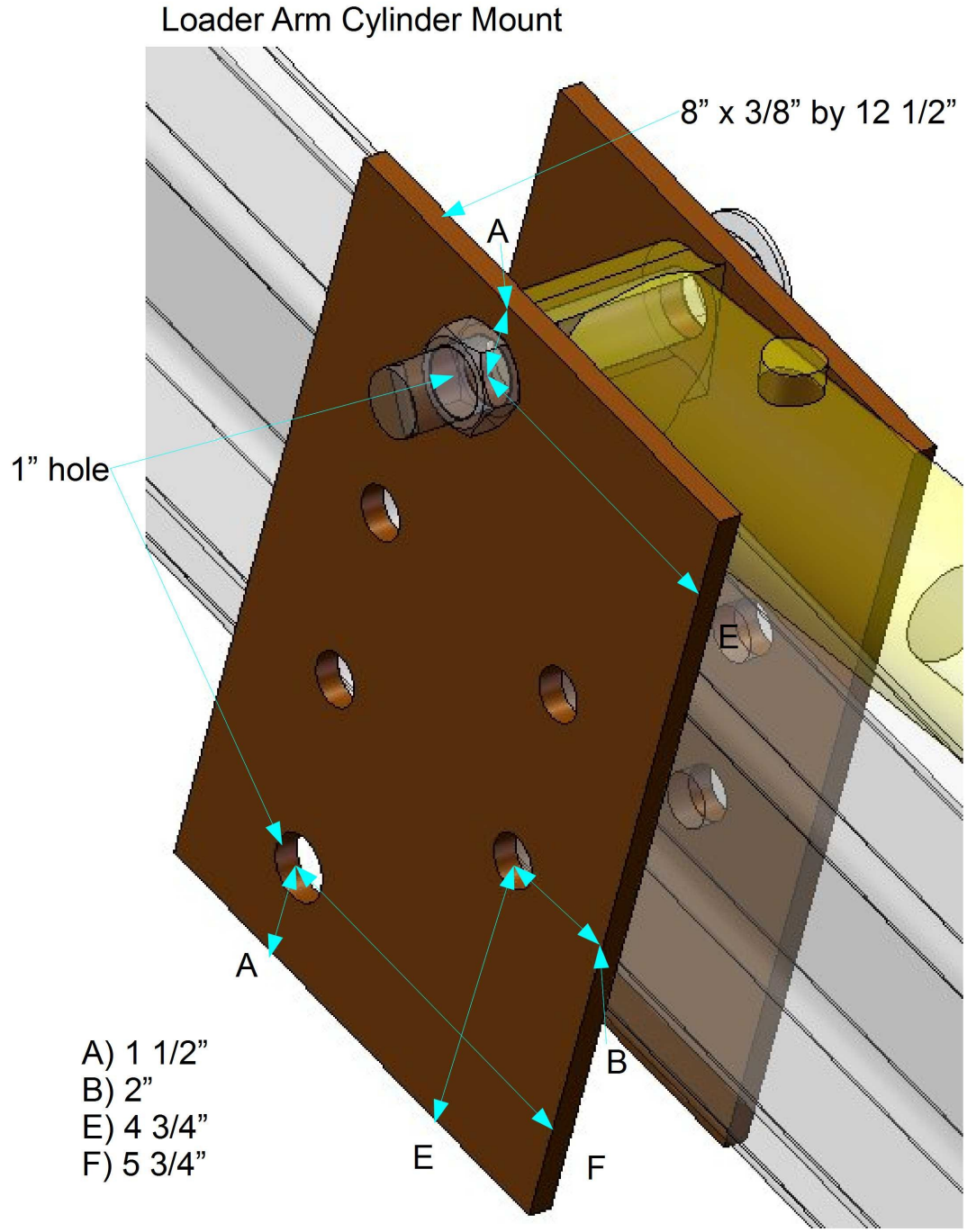
Part	Illustration
Loader Arm Crossbar Support	Loader Arm Crossbar Support  4” x 6” x 1/2” angle x 6”  A) 1 1/2” B) 2” C) 3 1/2”

Base Cylinder Mount

Part	Illustration
Base Cylinder Mount	

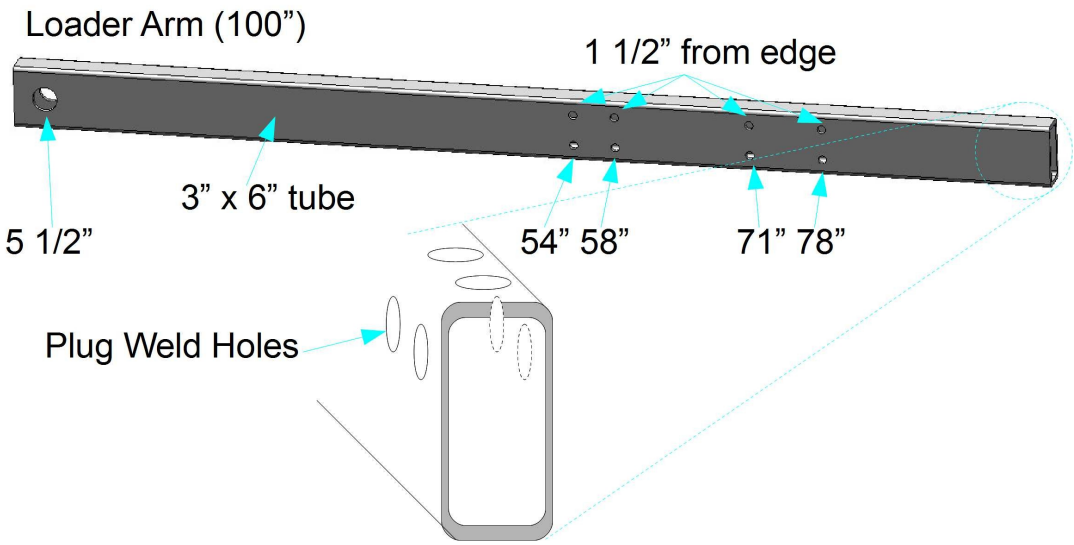
Loader Arm Cylinder Mount

Part	Illustration

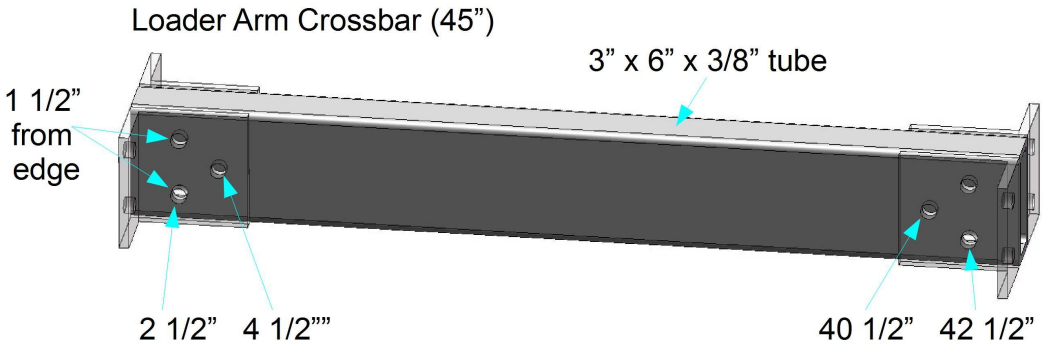
Loader Arm Cylinder Mount Drill out two nuts to 1” inner diameter and weld onto the 1” holes.	

Loader Arm

Part	Illustration

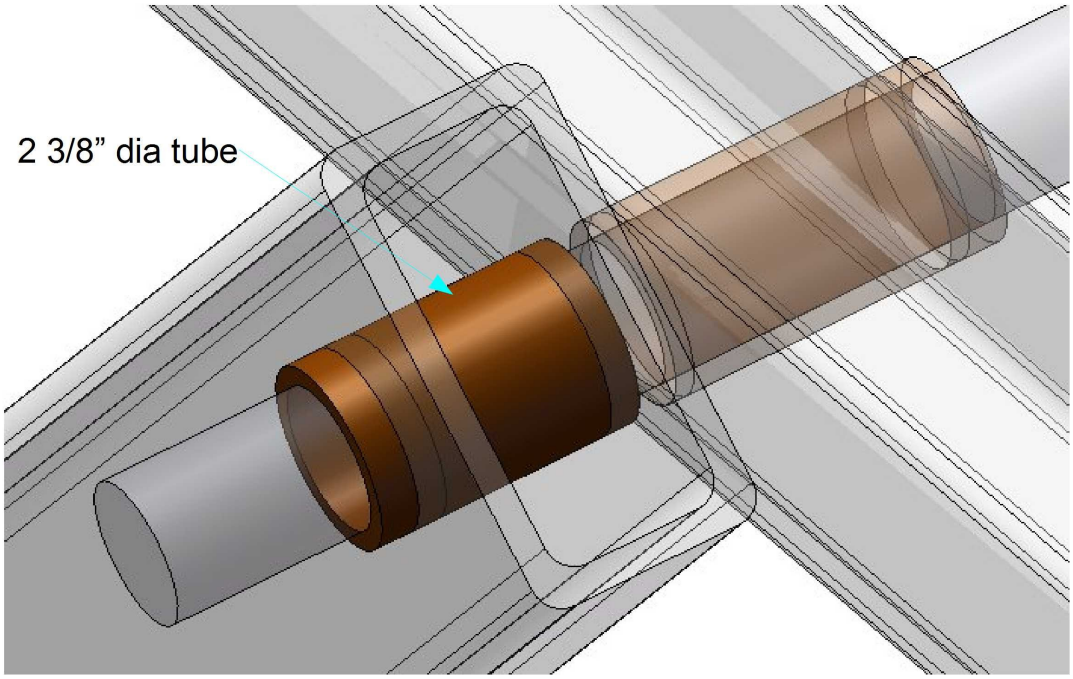
Loader Arm The big hole should be 2 3/8”. Use a cutting torch. The plug weld holes should overlap the lump when it is inserted into the end of the arm. Weld through the holes to secure the lump.	

Loader Arm Crossbar

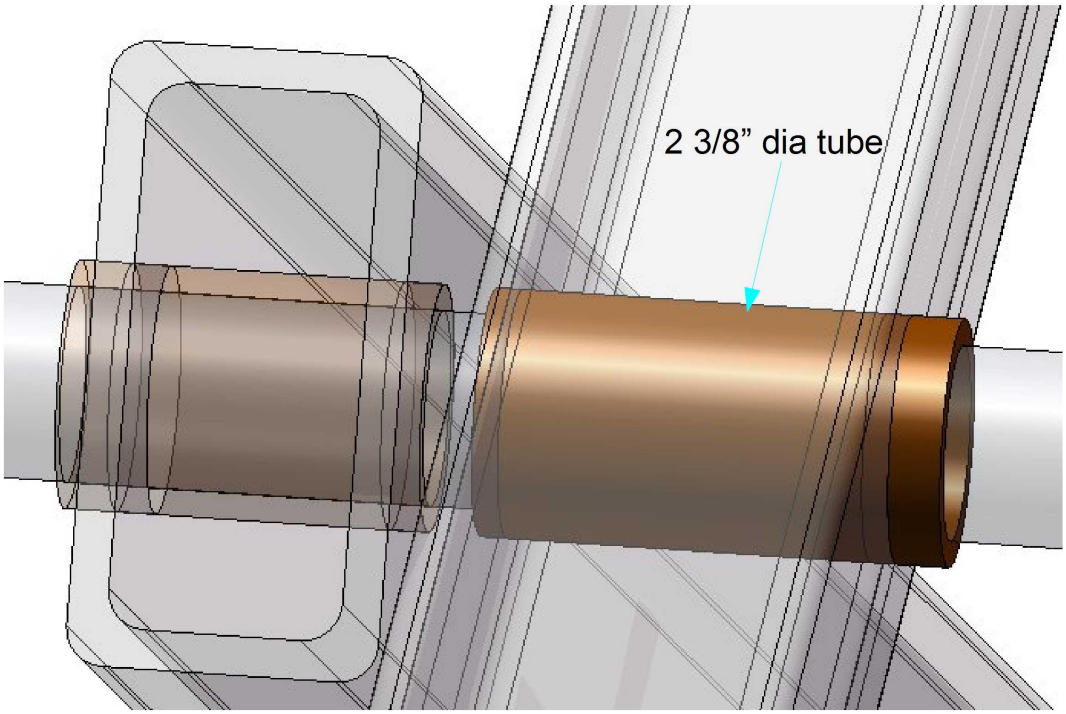
Part	Illustration
Loader Arm Crossbar	

Loader Arm Insert

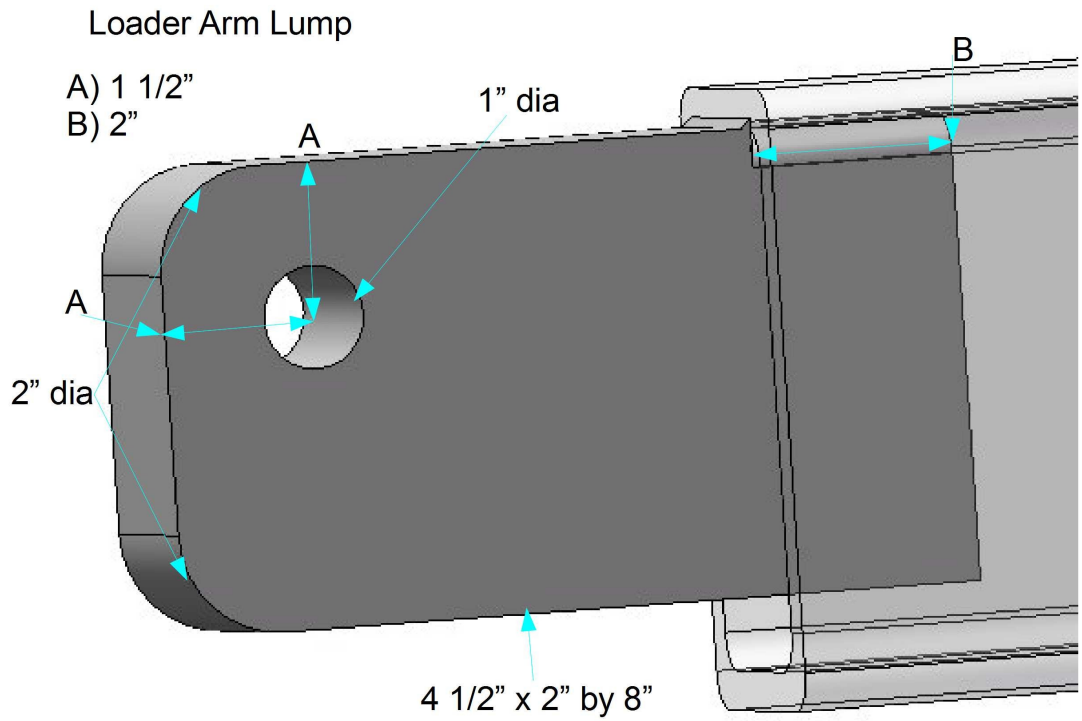
Part	Illustration

Loader Arm Insert	Loader Arm Insert (3 1/2”) 

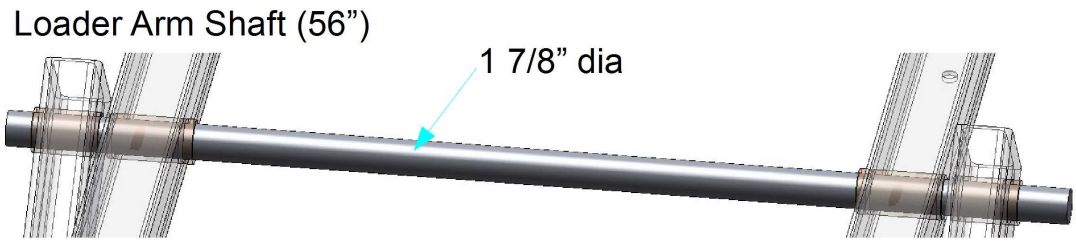
Tractor Frame Insert

Part	Illustration
Tractor Frame Insert	Tractor Frame Insert (4 1/2”) 

Loader Arm Lump

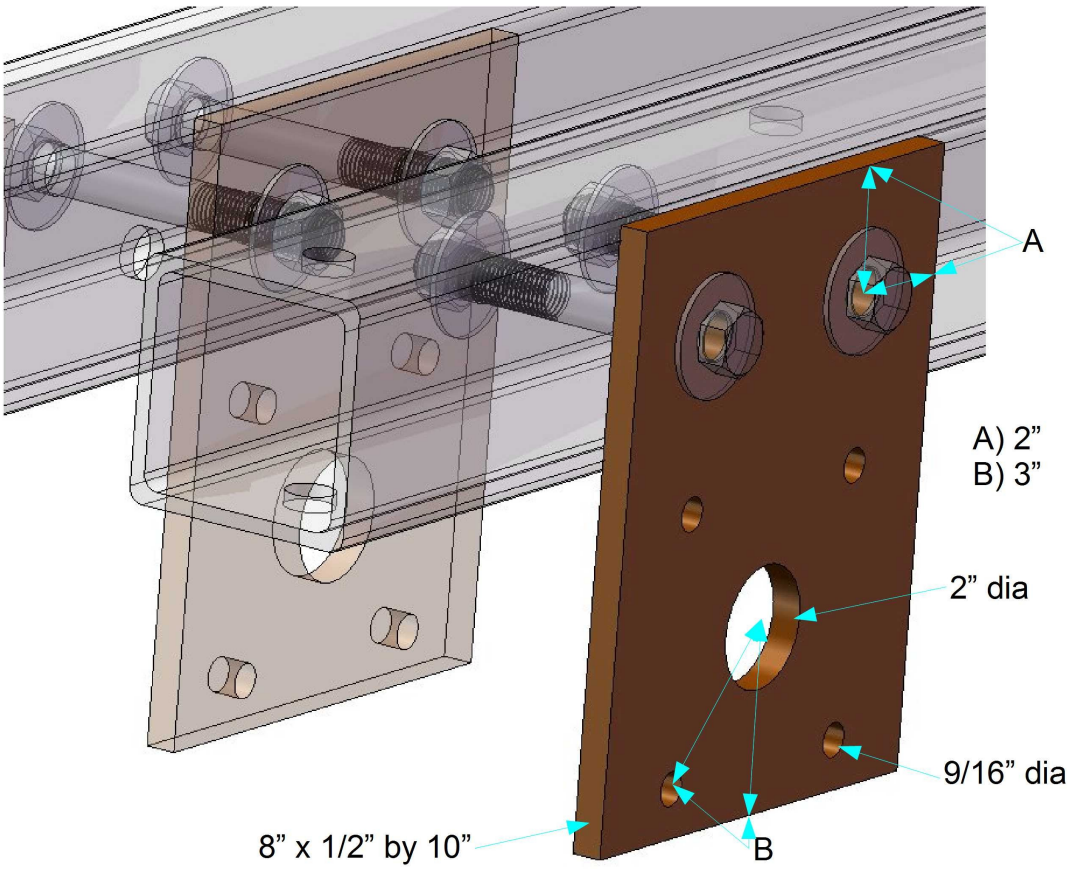
Part	Illustration
Loader Arm Lump The top edges of the lump can be notched and rounded to better fit inside the loader arm tube.	

Loader Arm Shaft

Part	Illustration
Loader Arm Shaft	

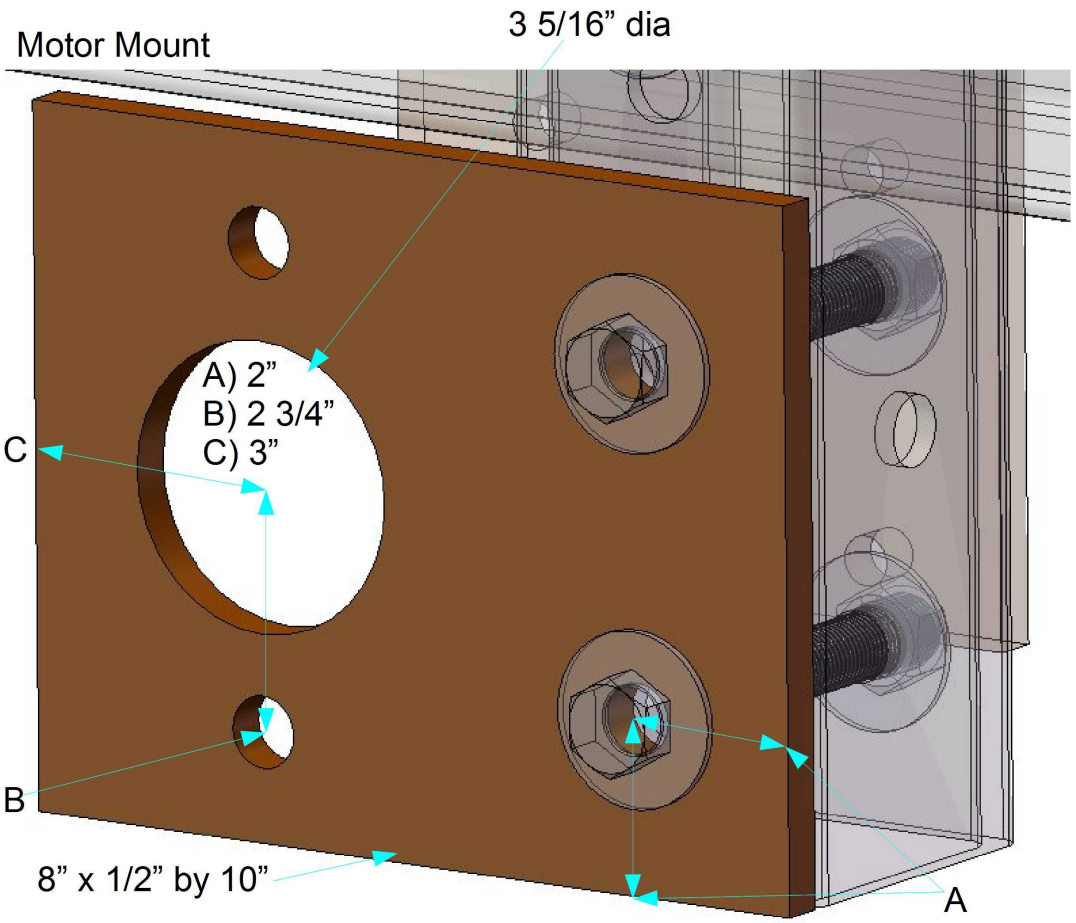
Wheel Shaft Mount

Part	Illustration

Wheel Shaft Mount The position and diameter of the four bearing mounting holes depends on the bearing block you end up using. Pictured is an example. Use a cutting torch for the 2” shaft hole.	Wheel Shaft Mount 

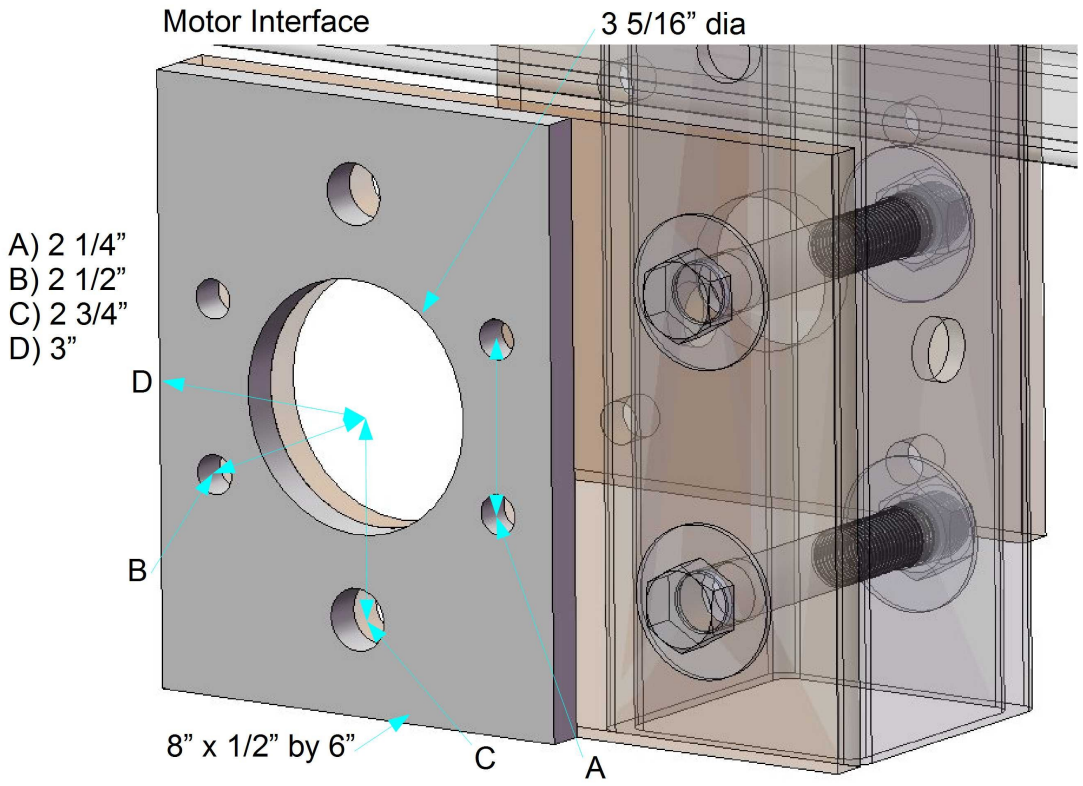
Motor Mount

Part	Illustration

Motor Mount Use a cutting torch to make the large shaft hole. The motor mounting holes will depend on the particular hardware you end up using. This picture is just an example.	

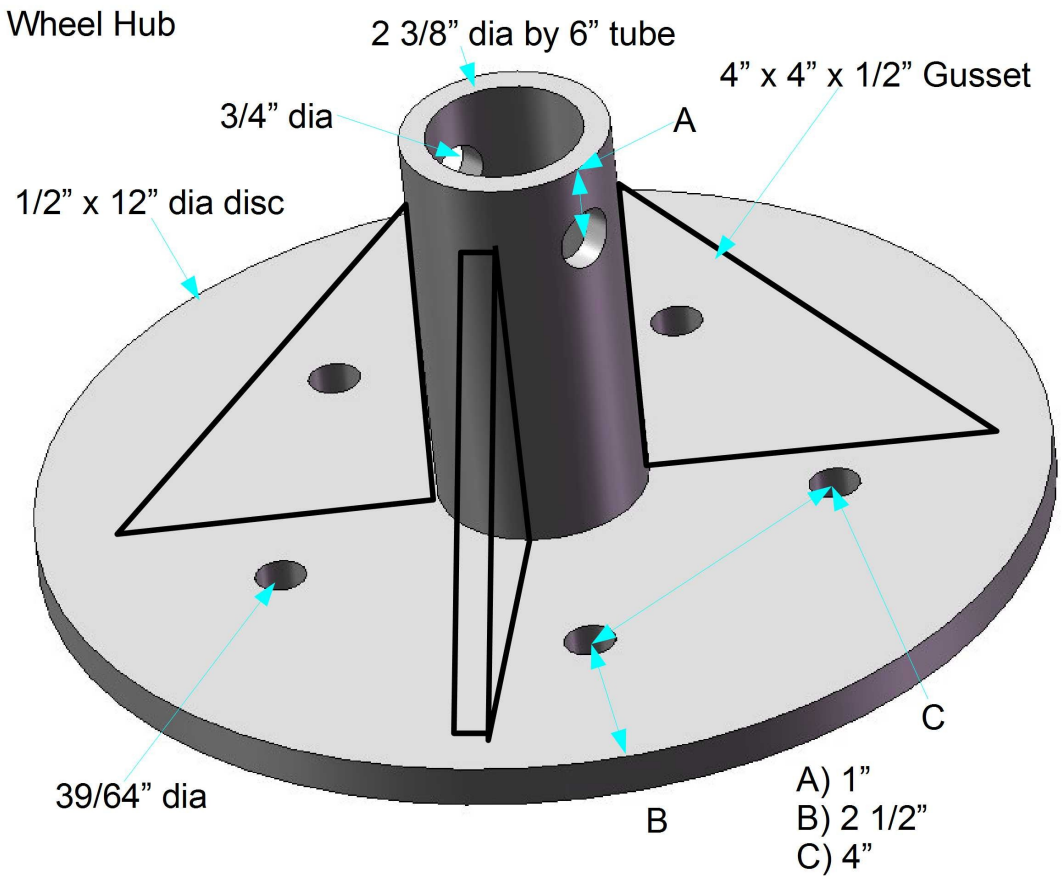
Motor Interface

Part	Illustration

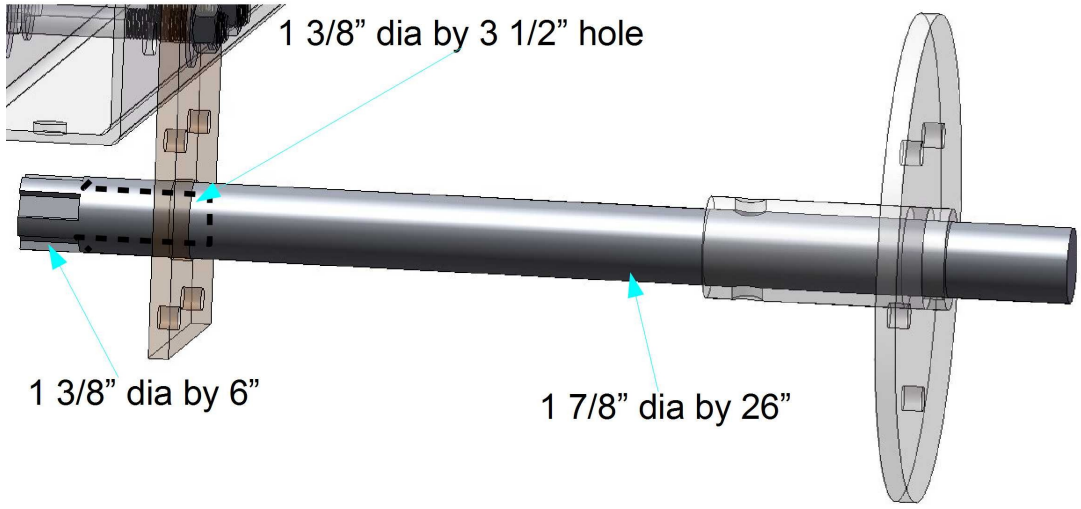
Motor Interface Use a cutting torch to make the large shaft hole. The motor mounting holes, if used, will depend on the particular hardware you end up using. The motor will probably be welded to this plate. This picture is just an example.	

Wheel Hub

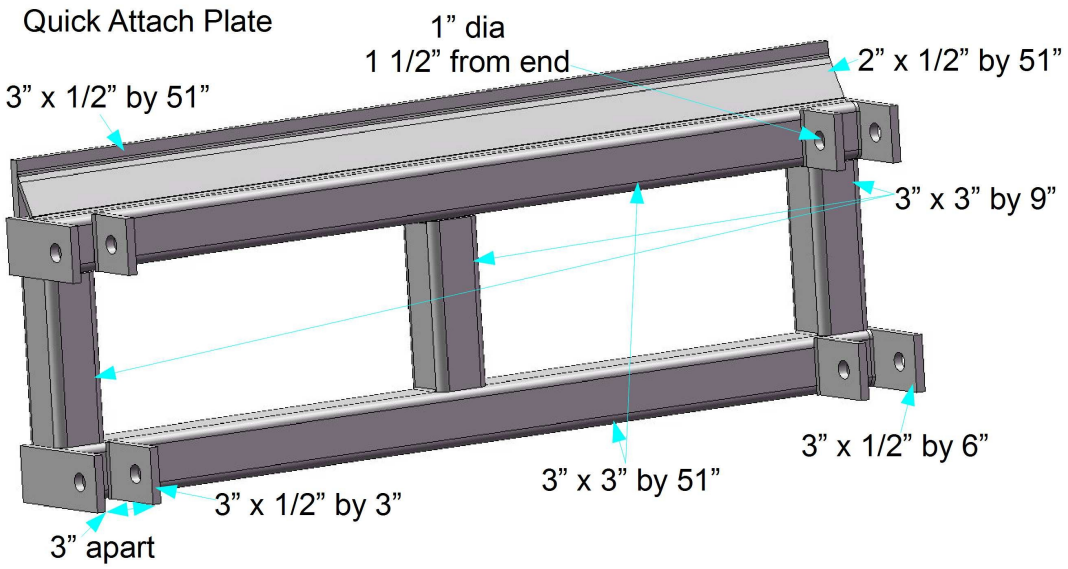
Part	Illustration

Wheel Hub Use a cutting torch to make the shaft hole in the middle of the disc. The layout of the tire rim mounting holes will depend on the hardware you end up using. Pictured is just an example. Gussets should be as close to 90* apart as possible.	

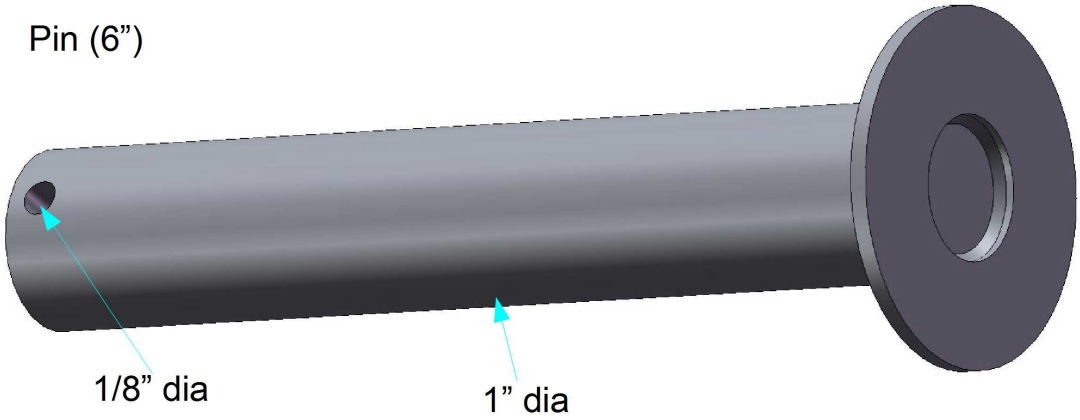
Wheel Axle

Part	Illustration
Wheel Axle Using a lathe, drill into the end of the axle shaft. Cut two slits on either side of the hole. Insert the smaller splined shaft and weld in place. Use the wheel hub to locate and drill a bolt hole through the other end of the shaft.	

Quick Attach Plate	
Part	Illustration

Quick Attach Plate	

Pin

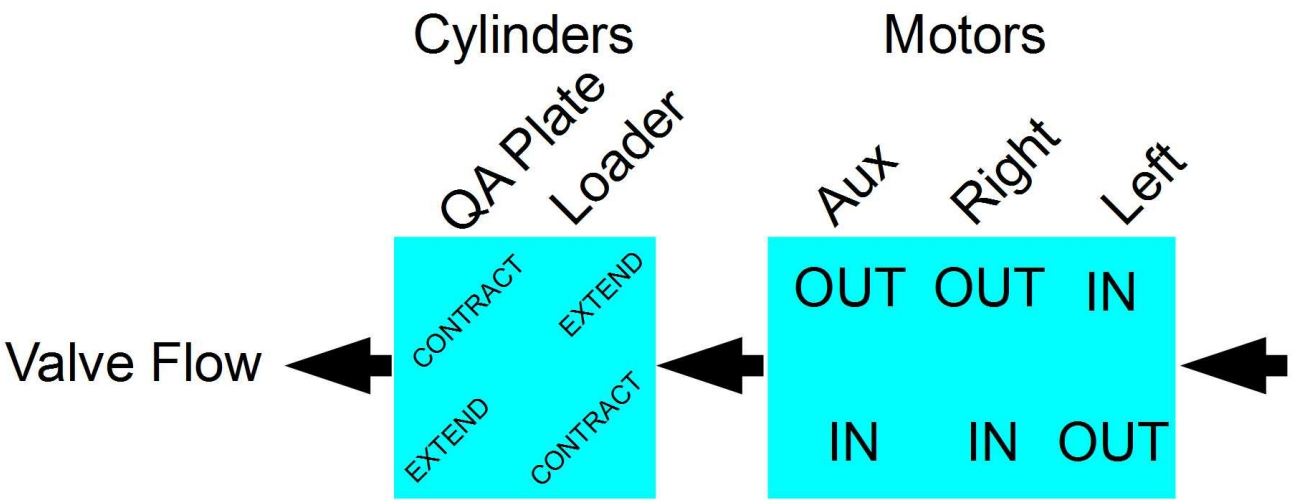
Part	Illustration
Pin Weld a washer onto the end opposite the cotter pin hole.	

Hardware

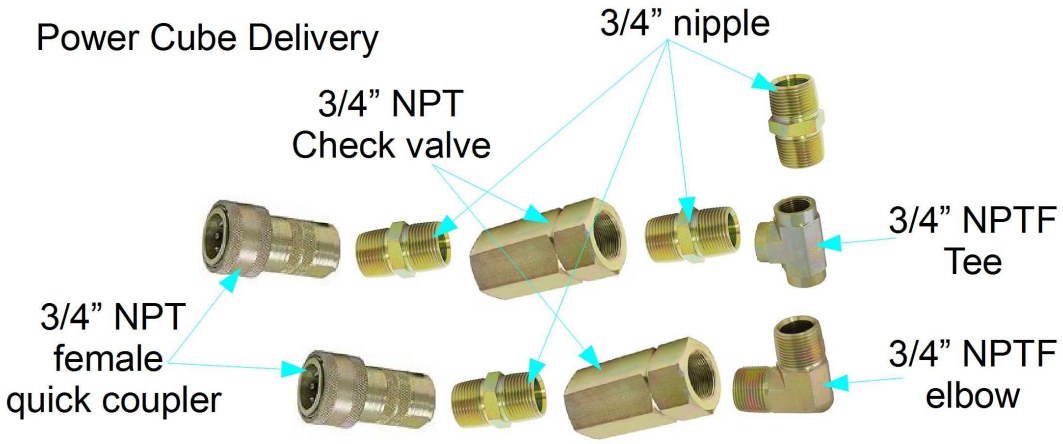
Power Transmission

Part	Illustration
Lock Collar 1 7/8” Double Split https://www.surpluscenter.com/item.asp?item=1-2768-	

187&catname=powerTrans	
Flange Bearing 1 7/8” 9/16” bolt holes https://www.surpluscenter.com/item.asp?item=1-210-30-4&catname=powerTrans	
Shaft Coupler 1 1/4” bore 5/16” keyway https://www.surpluscenter.com/item.asp?item=1-1563-J&catname=	
Splined Shaft 1 3/8” 6 teeth https://www.surpluscenter.com/item.asp?item=1-2938-6&catname=	
Female Splined Coupling 1 3/8” 6 teeth https://www.surpluscenter.com/item.asp?item=1-1562&catname=	
Hydraulics	
Valves	

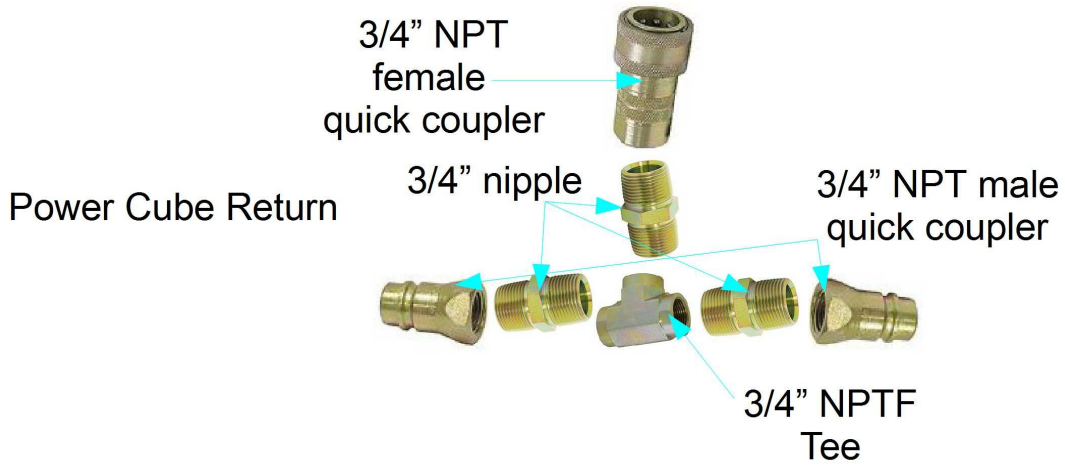


Power Cube Delivery

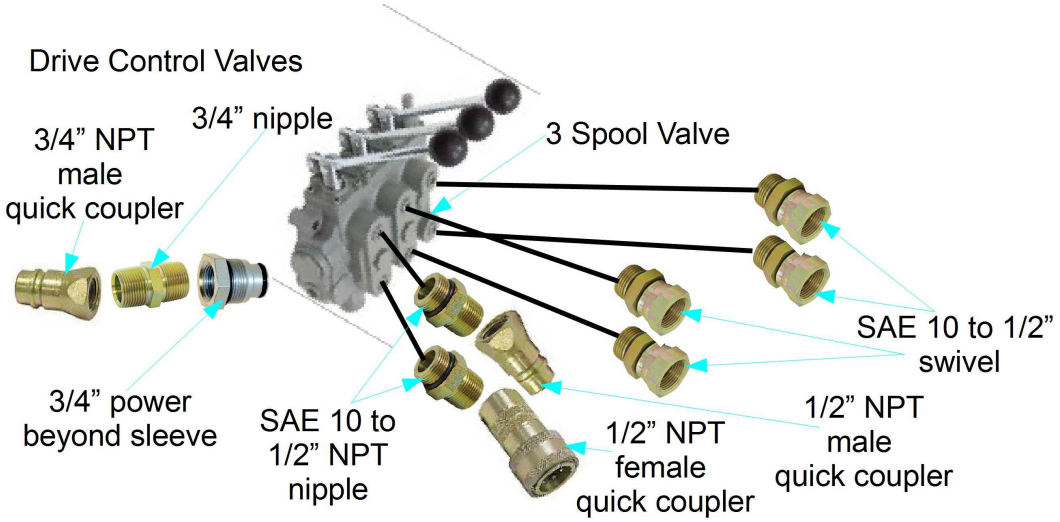
Part	Illustration
Power Cube Delivery Wrap all threads with teflon tape.	

Power Cube Return

Part	Illustration

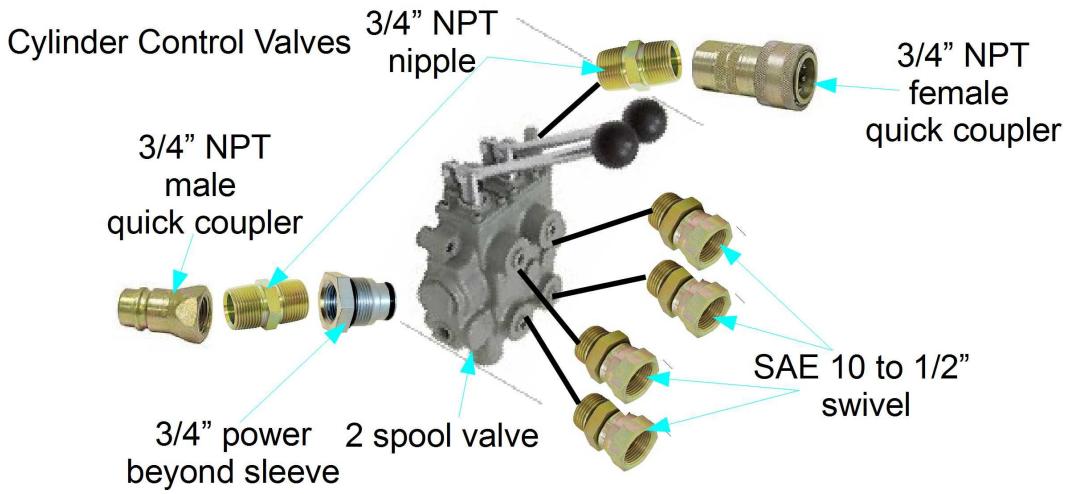
Power Cube Return Wrap all threads with teflon tape.	

Drive Control Valves

Part	Illustration
Drive Control Valves Wrap all threads with teflon tape. Cut off the tip of the power beyond sleeve just below the threads.	

Cylinder Control Valves

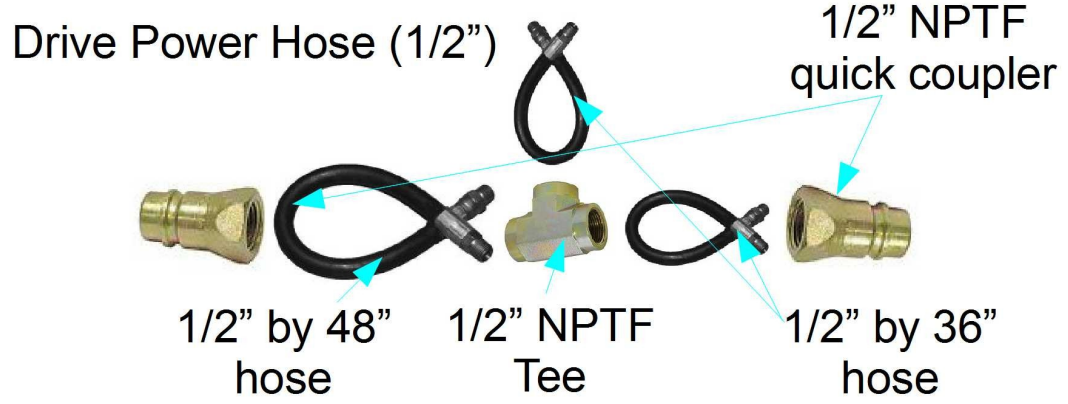
Part	Illustration

Cylinder Control Valves Wrap all threads with teflon tape.	

Hoses

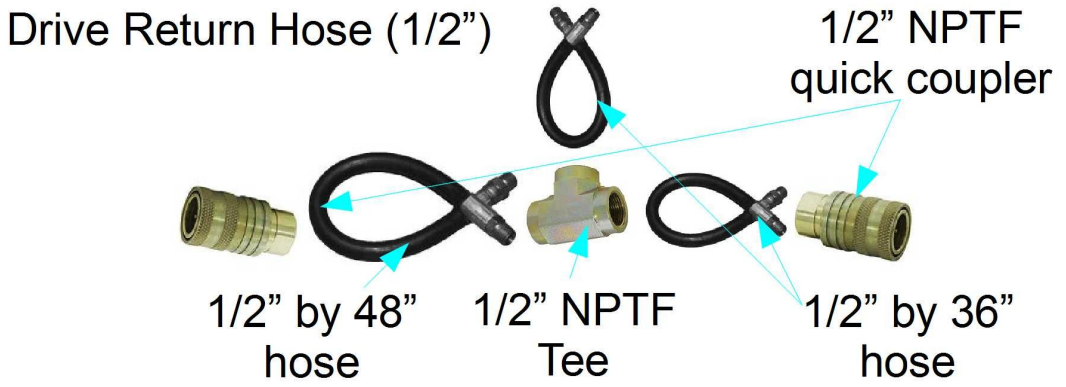
Part	Illustration
1/4”, 1/2” and 3/4” NPTM	

Drive Power Hose

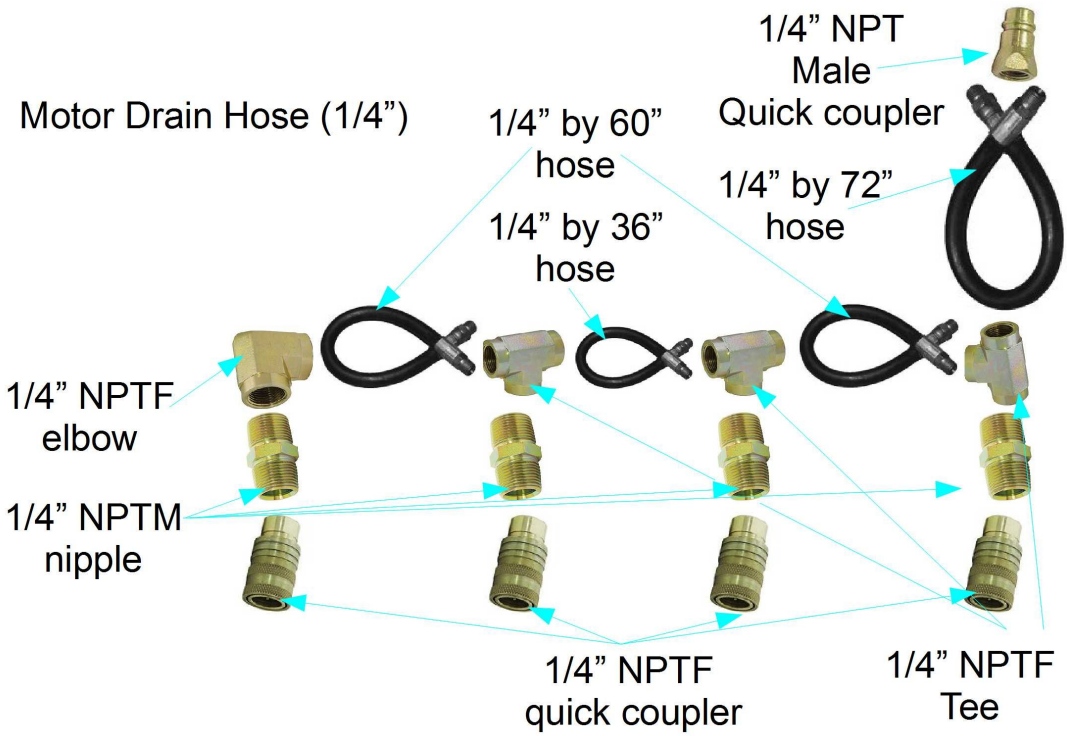
Part	Illustration
Drive Power Hose Wrap all threads with teflon tape.	

Drive Return Hose

Part	Illustration

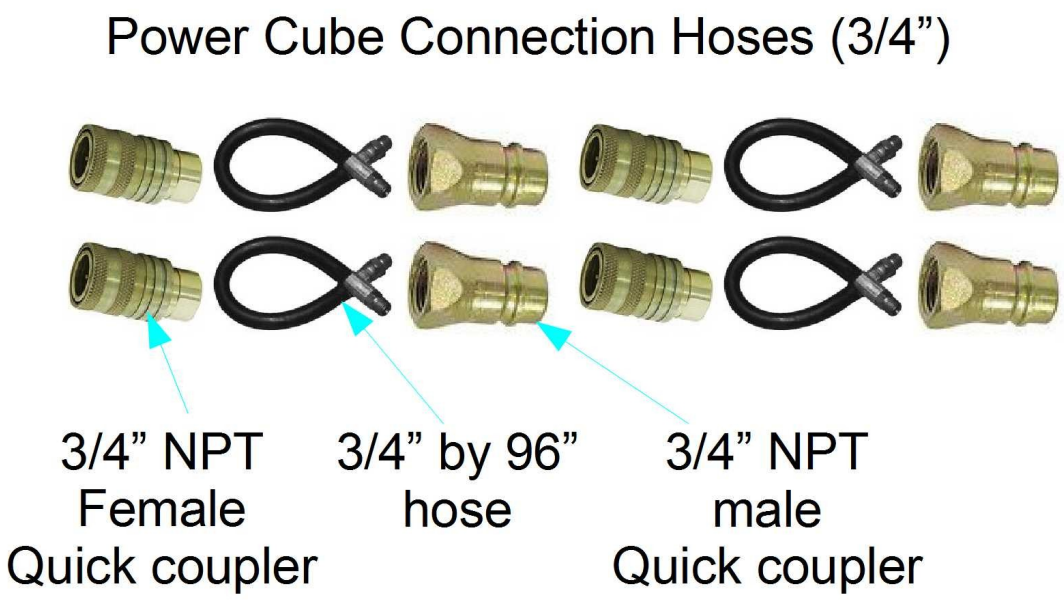
Drive Return Hose Wrap all threads with teflon tape.	

Motor Drain Hose

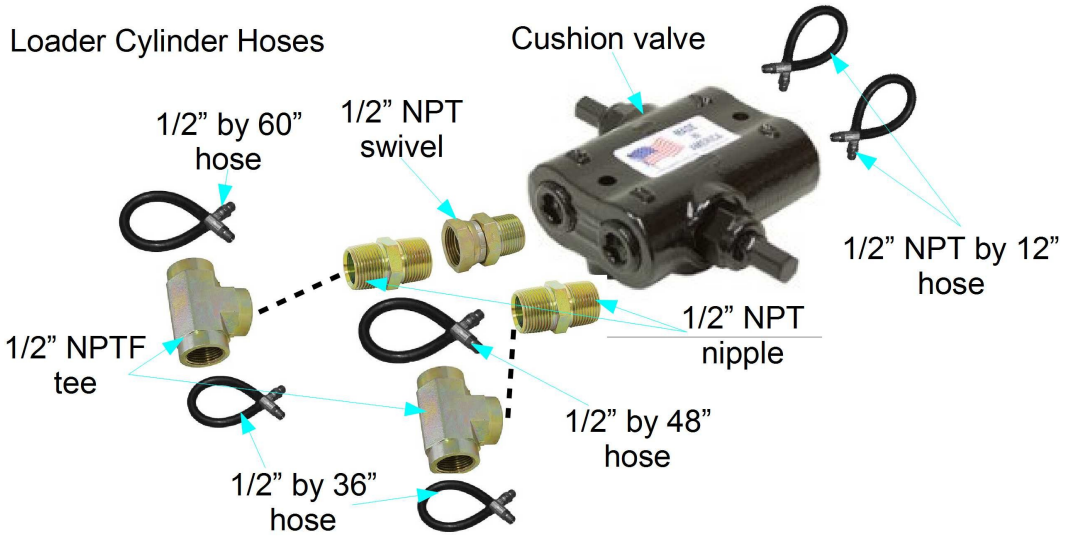
Part	Illustration
Motor Drain Hose Wrap all threads with teflon tape.	

Power Cube Connection Hoses

Part	Illustration

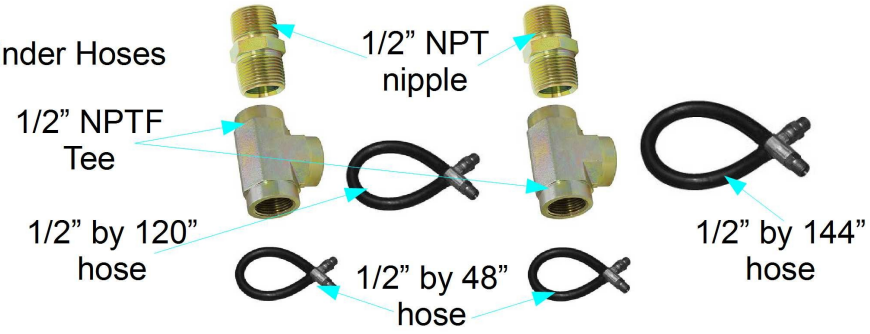
Power Cube Connection Hoses Wrap all threads with teflon tape.	

Loader Cylinder Hoses

Part	Illustration
Loader Cylinder Hoses Wrap all threads with teflon tape.	

QA Plate Cylinder Hoses

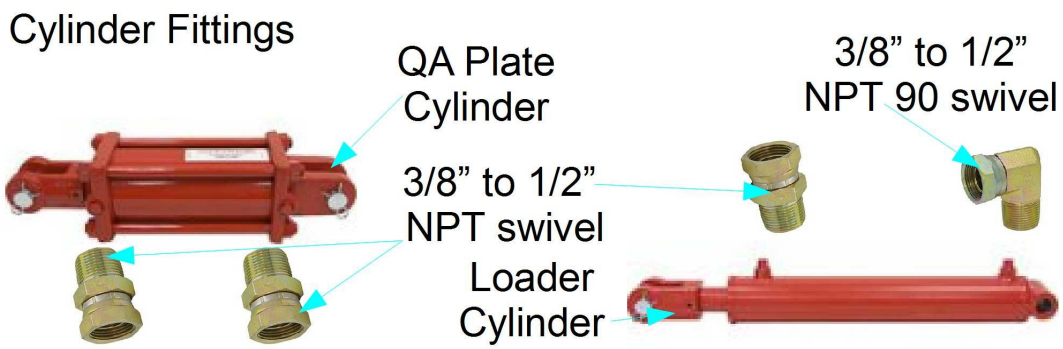
Part	Illustration

QA Plate Cylinder Hoses Wrap all threads with teflon tape.	QA Plate Cylinder Hoses 

Cylinders

Part	Illustration
Loader Cylinder 2.5X36X1.5” double acting 3/8” NPT ports https://www.surpluscenter.com/item.asp?item=9-6775&catname=hydraulic	
QA Plate Cylinder 2.5X30X1.25” double acting 3/8” NPT ports https://www.surpluscenter.com/item.asp?item=9-7619-30&catname=hydraulic	

Cylinder Fittings

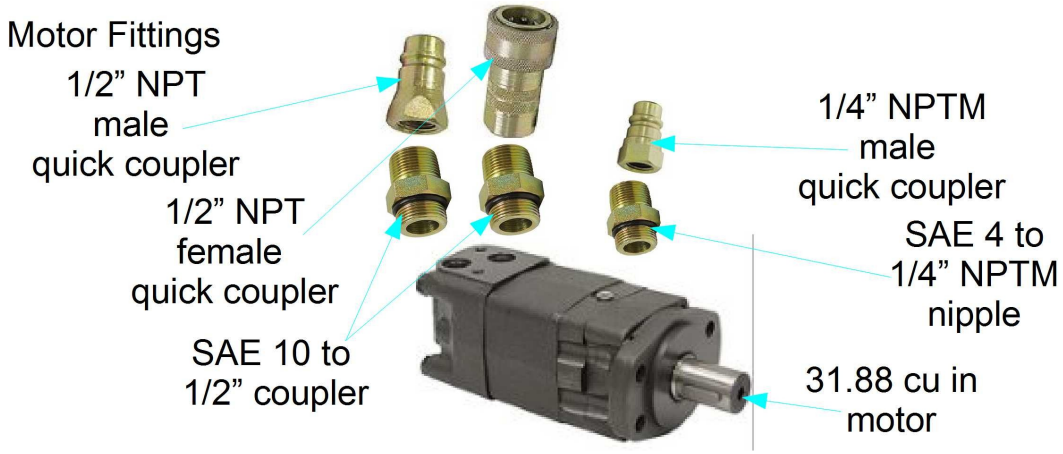
Part	Illustration
Cylinder Fittings	

Motor

Part	Illustration

Wheel Motor 31.88 cubic inch SAE 10 ports SAE 4 case drain https://www.surpluscenter.com/item.asp?item=9-7469&catname=	

Motor Fittings

Part	Illustration
Motor Connections Wrap all threads with teflon tape.	

Valves

Part	Illustration
3-spool spring centered 3/4” NPT ports 1/2” NPT ports https://www.surpluscenter.com/item.asp?catname=hydraulic&qty=1&item=9-6761	

2-spool spring centered 3/4” NPT ports 1/2” NPT ports https://www.surpluscenter.com/item.asp?item=9-6702&catname=hydraulic	

Cushion Valve 1/2” NPT https://www.surpluscenter.com/item.asp?item=9-4019-50-H&catname=hydraulic	
3/4” NPT check valve	

Fittings

Part	Illustration
SAE 10M to 1/2” NPT nipple	
SAE 10M to 1/2” NPTM swivel coupler	
3/4” NPT nipple	
3/4” NPTM 90 degree elbow	

3/4” NPTF tee	

3/4” female quick coupler	
1/2” NPT quick coupler Male and Female in one package	
3/4” NPT power beyond sleeve Cut off the tip of the sleeve just below the threads.	 
SAE 4M to 1/4” NPTM nipple	
1/4” NPTM quick coupler Male and female in one package.	
1/2” NPT nipple	
1/2” NPTF Tee	
1/2” NPT swivel	

1/2” NPT 90 elbow swivel	
3/8” NPTM to 1/2” NPTF swivel	
3/8” NPTM to 1/2” NPTF 90 swivel	
1/4” NPT nipple	
1/4” NPTF Tee	
1/4” NPTF 90 elbow	
3/4” to 1/4” NPT bushing	

Project Steps

Cut Stock Material		
Jig		
	Frame Hole Jig: Cut To Length	
	Frame Hole Jig: Drill Holes	
Bar		
	Loader Arm Shaft: Cut To Length	
	Wheel Axle: Cut To Length	x4
	Wheel Axle: Drill Holes	x4
	Wheel Axle Splined Shaft: Cut To Length	x4
	Pin: Cut To Length	x10
	Pin: Drill Hole	x10
Tube		
	Frame	
	Outer Base: Cut To Length	x2
	Outer Base: Drill Holes	x2
	Inner Base: Cut To Length	x2
	Inner Base: Drill Holes	x2
	Bottom Crossbar: Cut To Length	x3
	Bottom Crossbar: Drill Holes	x3
	A-pillar: Cut To Length	x2
	A-pillar: Drill Holes	x2
	B-pillar: Cut To Length	x2
	B-pillar: Drill Holes	x2
	C-pillar: Cut To Length	x2
	C-pillar: Drill Holes	x2
	Top Crossbar: Cut To Length	x3
	Top Crossbar: Drill Holes	x3
	Cant Rail: Cut To Length	x2
	Cant Rail: Drill Holes	x2
	Cant Rail: Torch Holes	x2

	Loader Arm	
	Loader Arm: Cut To Length	x2
	Loader Arm: Drill Holes	x2
	Loader Arm: Torch Holes	x2
	Loader Arm Crossbar: Cut To Length	
	Loader Arm Crossbar: Drill Holes	
	Loader Arm Insert: Cut To Length	x2
	Tractor Frame Insert: Cut To Length	x2
	Wheel Hub	
	Wheel Hub Tube: Cut To Length	x4
	Wheel Hub Tube: Drill Holes	x4
	Quick Attach Plate	
	Quick Attach Plate Horizontal: Cut To Length	x2
	Quick Attach Plate Vertical: Cut To Length	x3
Flat		
	Cylinder Mounts	
	Base Cylinder Mount: Cut To Length	x2
	Base Cylinder Mount: Drill Holes	x2
	Loader Arm Cylinder Mount: Cut To Length	x4
	Loader Arm Cylinder Mount: Drill Holes	x4
	Power Cube Mount	
	Power Cube Mount Ramp: Cut To Length	
	Power Cube Mount Point: Cut To Length	
	Power Cube Mount Point: Drill Hole	
	Loader Arm Lump	
	Loader Arm Lump: Cut To Length	x2
	Loader Arm Lump: Drill Hole	x2
	Wheel Mount	
	Wheel Shaft Mount: Cut To Length	x8
	Wheel Shaft Mount: Drill Holes	x8
	Wheel Shaft Mount: Torch Hole	x8

	Motor Mount	
	Motor Mount: Cut To Length	x4
	Motor Mount: Drill Holes	x4
	Motor Mount: Torch Hole	x4
	Motor Interface: Cut To Length	x4
	Motor Interface: Drill Holes	x4
	Motor Interface: Torch Hole	x4
	Wheel Hub	
	Wheel Hub Disc: Cut To Diameter	x4
	Wheel Hub Disc: Drill Holes	x4
	Wheel Hub Disc: Torch Hole	x4
	Wheel Hub Gusset: Cut To Triangle	x16
	Quick Attach Plate	
	Quick Attach Plate Ramp Face: Cut To Length	
	Quick Attach Plate Ramp Slope: Cut To Length	
	Quick Attach Plate Small Hinge: Cut To Length	x4
	Quick Attach Plate Small Hinge: Drill Hole	x4
	Quick Attach Plate Large Hinge: Cut To Length	x4
	Quick Attach Plate Large Hinge: Drill Hole	x4
	Seat Mount	
	Seat Mount: Cut To Length	
	Seat Mount: Drill Holes	
Angle		
	Loader Arm Crossbar Support: Cut To Length	x4
	Loader Arm Crossbar Support: Drill Holes	x4
	Power Cube Mount: Cut To Length	x2
	Power Cube Mount: Drill Holes	x2
	Hydraulic Valve Mount: Cut To Length	
	Hydraulic Valve Mount: Drill Holes	
Build Components		
Hardware		
	Position Bottom Crossbars	

Attach Inner and Outer Base

Attach Pillars to Inner Base and Bottom Crossbars

Attach front two Top Crossbars to A & B Pillars

Attach Cant Rail to Pillars and Top Crossbars

Attach last Top Crossbar to Cant Rail and C-pillars

Tighten All Frame Bolts
Get them as tight as possible without deforming the square tubes.
Weld Base Cylinder Mounts
Use a jig, magnet or clamp to hold all the pieces in place. Insert a pin through the pin holes to maintain alignment.
Weld Loader Arm Cylinder Mounts
Weld Motor Interfaces

Weld Axle Shafts

After the 3” hole is drilled into the end of the shaft, torch or cut two channels on either side. When the splined shaft is inserted into the hole, it should be visible through the two channels. Plug weld through the channels to permanently attach the splined shaft.

Weld Pins

Stand the 1” bar upright and weld a washer with roughly a 2” outer diameter on the end.

Weld Quick Attach Plate

Use a bar or a bolt to keep the hinges aligned while welding.

Weld Power Cube Mount

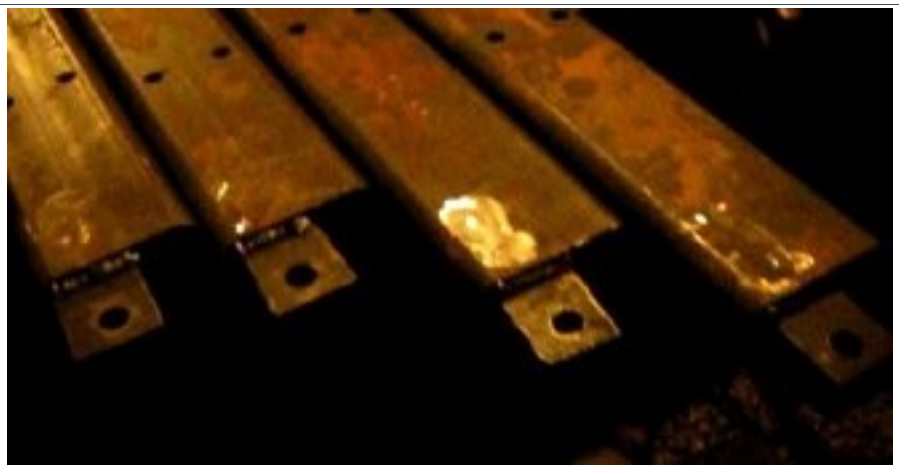
Attach Flange Bearings to Wheel Shaft Mounts

Weld Together Wheel Hubs

Attach Wheel Hubs to Wheels

Plug Weld Lumps into Loader Arms

Run a piece of bar, or a bolt, through one or more holes in the loader arm to maintain alignment. Use a similar method on the lumps. Insert the lumps and weld through the plug weld holes to permanently attach the lumps to the loader arm.



Hydraulics

	Remember to keep the open ends of hydraulic components covered up. Use plastic caps, or rags, or tape. Be particularly careful around grinding/welding operations. The inside of the hydraulic components must remain free of contamination.	
	Assemble Power Cube Delivery	
	Assemble Power Cube Return	
	Assemble Drive Control Valves	
	Assemble Cylinder Control Valves	
	Assemble Drive Power Hose	x2
	Assemble Drive Return Hose	x2
	Assemble Motor Drain Hose	
	Assemble Power Cube Connection Hose	x4
	Assemble Loader Cylinder Hoses	
	Assemble Quick Attach Plate Cylinder Hoses	
	Assemble Loader Cylinder	x2
	Assemble Quick Attach Plate Cylinder	x2
	Assemble Motor	x4

Assemble Tractor

	Prepare Loader Arm	
	Position Frame Inserts and Loader Arm Shaft	
	The insert goes into the 2 3/8” holes in the Cant Rails. The shaft goes through the two inserts, aligning them.	
	Weld Frame Inserts	
	Weld the aligned inserts to the Cant Rail. Grind the outside smooth.	

	Position Loader Arm Inserts and Arms on Shaft
	The inserts go into the 2 3/8” holes in the Loader Arms. Then the Loader Arms go on the shaft sticking out of the Cant Rails. It helps to use one or two bolts to attach the Loader Arm Crossbrace, or use pins and the Quick Attach plate to align the Loader Arms.
	Weld Loader Arm Inserts
	Attach Loader Arm Cylinder Mount to Loader Arm
	Remove the Crossbrace or Quick Attach Plate. Take the Loader Arms off the tractor and attach the Cylinder Mounts.
	Mount Loader Arm
	Position Loader Arms on Shaft
	Put a large washer on the shaft before the Loader Arm. This will keep the Arm from rubbing against the Cant Rail. Then put a lock collar on after the Loader Arm. This will keep the Arm from moving sideways.
	Attach Loader Arm Crossbar
	Tighten and Grease Lock Collars
	Attach Base Cylinder Mounts to Base
	Attach Quick Attach Plate to Loader Arm
	Attach Cylinders to Loader Arm
	Mount Wheels
	Attach Wheel Shaft Mounts and Motor Mounts to Frame
	Attach Motors to Motor Mounts
	Insert Axle Shafts
	After the shaft is through the outer bearing, but before it goes through the inner bearing, put a large washer, two lock collars, and another large washer on the shaft. Continue pushing it through the inner bearing. Push the male splined shaft into the female coupler so there is no more than 1/8” gap.
	Weld Motor Mounts to Pillars
	This is important to keep the Motor Mounts from shifting. Don't spare the welding.
	Tack Weld Wheel Shaft Mounts to Base
	Just a dab along the top. Keep it small so it can be easily removed with a grinder.
	Tighten and Grease Lock Collars
	Attach Wheel Hubs to Axles
	Attach Power Cube and Valve Mounts
	Install Hydraulic System

	Attach Power Cube Delivery to Drive Control Valves
	Attach Power Cube Return to Cylinder Control Valves
	Attach Drive & Cylinder Control Valves
	Either mount the Valves directly to the Valve Mount in the middle of the tractor, or use custom interface plates.
	Attach Cylinder Hoses
	Attach Drive Hoses
	Attach Motor Drain Hose
	Attach Power Cube Connection Hoses