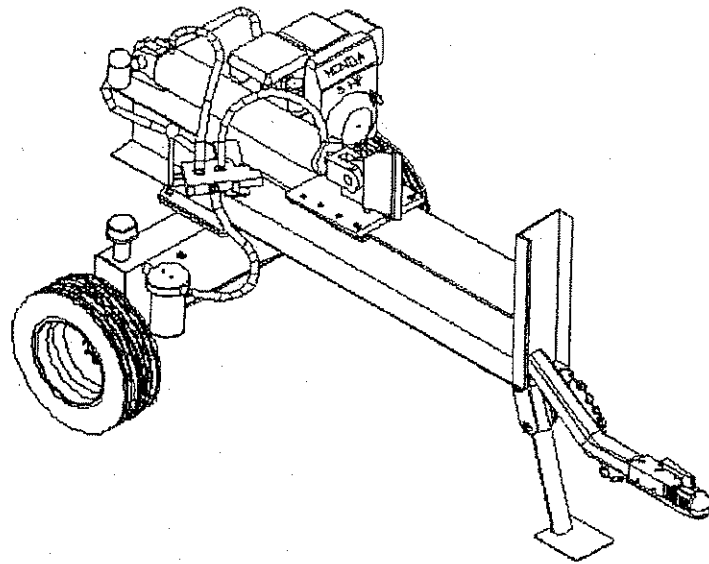


20 TONS LOG SPLITTER
MODEL LS18-24



ALL RIGHT RESERVED



NOTE: Prohibited to use as commercial use or production.
Cad design + does not have any warranty stated & it is the responsibility
of the builder to have all liability for

TABLE OF CONTENT

	Sheet
SUMMARY	1.0
BILL OF MATERIAL	1.1
OVERALL DIMENSIONS & 3D VIEW	2.0
HYDRAULIC TANK ASSEMBLY	3.0
5 H.P. ENGINE & HYDRAULIC PUMP ASSEMBLY	4.0
WEDGE & GUIDE PLATE ASSEMBLY	5.0
BEAM ASSEMBLY	6.0
ASSEMBLY INSTRUCTIONS	7.0, 8.0



SUMMARY

18" logs:

I designed a log splitter using a 5.0 H.P. engine with two-stage hydraulic pump (2.9 GPM @ high press. & 10.6 GPM @ low press.) and is able to split any standard 18 inches log and about a foot in diameter.

An approximative 15.7 tons of force is available using a hydraulic cylinder and goes up to 24 tons with the mechanical advantage (1.5 to 1) of a wedge.

The cycle time is about 10.5 seconds (full extend & retract no load).

The trailer coupler fit on 1 7/8" ball

An adjustable leg hold the log splitter in position while the logs is cut.

The automatic kick off valve (an operated open tandem center) allow both hands to be free to set up a new log while cylinder is retracting.

The operator has plenty of room to work with the log.



24" logs:

To be able to use a 24" stroke hyd. Cyl. Some parts will change like the length of the beam and hydraulic hoses, also the location of the hydraulic tank (see sheet 2.2) and the kick off valve (see sheet 6.2).

Assuming a 4" dia. Cyl and 1 3/4" rod, the new cycle time should be about 13.5 seconds (full extend & retract no load).

BILL OF MATERIAL

Note: All parts# are from www.princessauto.com

HYDRAULIC CYLINDER:

One 4" bore, 18" stroke, or 24" stroke with 1' pinholes or equivalent

DIRECTIONAL CONTROL VALVE:

One kick-off valve with relief valve. (open center type)

All hydraulic hoses ends are jic #8 female except the suction hose.

FRAME ASSEMBLY

One Trailer coupler fit on ^{2"}~~1-7/8"~~ ball P.A.# 4200045

One 1/4" safety chain 14" long, one snap hook

The tongue is made of HSS 3/16 x 2 x 2 (square tubing)

Two tires assy. 4.8-4-8 (4 bolts, 4" center) P.A.# 2026755

Two spindles & hubs assy. (stub axles) P.A.# 2080174

One W-beam 1/4 x 6 x 6 (W150-22), 55" or 67" long

One channel 1/4 x 2 x 6 x 18



HYDRAULIC RESERVOIR:

Hydraulic reservoir is made of an HSS 3/16 x 4 x 8 x 30

One breather cap P.A.# 1252923 & 1 1/2 O.D. x 3" long pipe

One suction hose 3/4" i.d. 15 long

10 microns spin-on return line filter, P.A.# 1270307

HYDRAULIC PUMP & ENGINE:

5 HP Honda engine with 2.9 (high) & 10.6 (low) G.P.M. pump at 3600 RPM

One pump mounting bracket & 3/4" couplings, or buy a gas power packs assy.

Ex: Princess Auto, Parts # 1250307 or equivalent.

Note about welding:

Always start with a temporary weld (tack weld), try if the assembly move freely with the pins or bolts or if they are straight, take the time to do more measurements if need then weld the parts together.

ASSEMBLY INSTRUCTIONS SHEET

You probably asked yourself why the assembly instructions are not at the beginning, well, I thought you should read the plan to get an overview and this way, it would be easier to understand the following steps.

STEP 1 HYDRAULIC TANK ASSEMBLY

Drill 5 holes (sheet 3.0) for items #6, 7, 9, 12 & 14 & tap as show in sheet 3.1, clean the inside of the square tubing , remove all metal flakes, start by welding both side plates (item #8) on the square tubing (item #5) then weld item #3 & # 4 & finally item #9, as show in sheet 3.0 & 3.1. Now test the tank, plug every holes, fill with water then pressurise the tank with 5 psi (no more) for about 2 minutes, if there is no leak, empty the tank & blow the inside with air. Now weld both hubs & spindles (items #2) under the tank, keep the tire at about 3/4" from the tank. Install two safety jacks under the tank to hold it in place, install all fittings, vent & hydraulic filter.

STEP 2 ENGINE & HYDRAULIC PUMP ASSEMBLY

Install the engine in place with bolts & nuts but without the rubbers #13 (sheet 4.0), After the engine is set in place, weld the bolts in the 1.0" square tubing then remove the engine, let cool the bolts then install the rubbers item # 13 & reinstall the engine with the hydraulic pump & suction hoses as illustrate on sheet 4.0

STEP 3 BEAM ASSEMBLY

Now assemble the w-beam item #3, weld the plates items #1,2,4,5,7&8 (sheet 6.0). The position of welding are show on sheet 2.1, 2.2 & 6.2 depending of the length of beam to be use. After it's done weld the tongue items #10 & 11(sheet 6.0), then weld the chain holder, chain, snap hook & trailer coupler item #10, 11, 12 & 13 (sheet 2.0). Weld the leg items #14 & 15 together (sheet 2.0) & bolt them in place. Now install the beam assembly on the hydraulic tank using four spacers, bolts & locknuts, remove the safety jacks & install the hitch pin to hold the leg in place.



ASSEMBLY INSTRUCTIONS SHEET

STEP 4 WEDGE & HYDRAULIC CYLINDER ASSEMBLY

Install the hydraulic cylinder on the beam with the pin & locks.

Make the base cylinder plates item #4, 6 & 7 from sheet 5.0 & 5.1, bolts them on the beam. Some shimms may be required between item #4 & item #7, the base plate should move freely on the beam just by hand.

Weld the cylinder bracket item #3 (sheet 5.0) on base plate as show on sheet 5.4.

Weld 1/2" plate item #5 (sheet 5.2) flush with the cylinder bracket then weld the other plates items #2,3 ,4 & 5 (sheet 5.2) to make the wedge.

STEP 5 HYDRAULIC SYSTEM

Install the kick off valve, all hydraulic hoses, oil filter & fittings.

Fill up the hydraulic tank with hydraulic fluid up to the level indicator glass.

Start the engine, let run at idle & pull the lever to extend the cylinder completely then retract the cylinder & shut the engine off.

Refill the hydraulic tank at the proper level.

Install a tee & hydraulic gauge on the cylinder extending port.

Restart the engine & let run at high idle for about 5 minutes, extend the cylinder then set the relief valve (engine running at maximum speed) on the kick off valve at 2000 psi while holding the cylinder in the full extending position.

Now retract the cylinder with the automatic kick off valve.

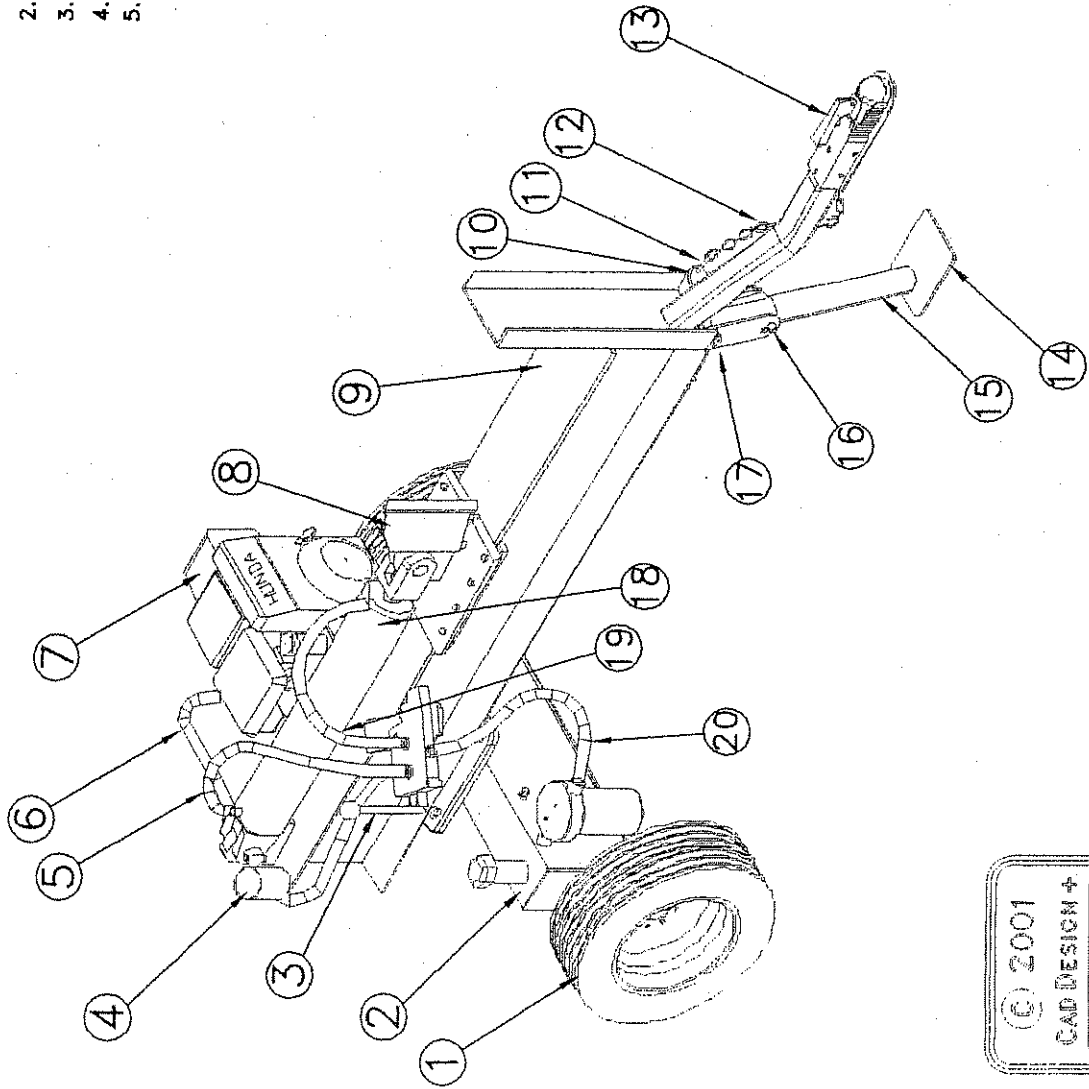
Later on you may have to reset the pressure at 2500 psi if more force are required.

Now you are ready to paint the unit.



NOTE:

- 1.0 ALL HYDRAULIC HOSES ARE #8 AND THE SUCTION HOSE IS 3/4" I.D. 15' LONG.
- 2.0 ALL HOSES LENGTH ARE APPROXIMATIVE.
- 3.0 THE TRAILER COUPLER IS WELD TO THE TUBING.
- 4.0 TRAILER TIRES USE 4 HOLES, 4' CENTER RIM.
- 5.0 THE SIZE OF ITEM #18c COULD BE DIFFERENT DEPENDING OF THE TYPE OF CYLINDER USE.



QTY	DESCRIPTION	ITEM
1	RETURN HOSE 13" LONG	20
1	HOSE 26" LONG	19
2	FITTINGS 1/2 NPTM-JIC #8 MALE	18d
2	PINS 1"DIA. 3 5/8" LONG	18c
2	HAIR PINS (LOCK)	18b
1	HYD. CYL. 4" BORE - 18" STROKE	18
1	LOCKNUT 1/2" N.C. & BOLT 3 1/4"	17
1	PRESTO PIN 3/32-1 3/4"	16b
1	HITCH PIN 1/2" - 3 1/2" LONG	16
1	ROUND TUBING 2" DIA. 18 1/2" LONG	15
1	1/4" PLATE 5 x 6 LONG	14
1	TRAILER COUPLER 7/8"	13
1	CHAIN 1/4" - 14" LONG	12
1	SNAP HOOK	11
1	CHAIN RETAINER 1/4" x 5.0 LONG	10
1	BEAM ASSY SEE SHEET 6.0	9
1	WEDGE & GUIDE PLATE ASSY. SHEET 5.0	8
1	5 H.P. ENGINE & PUMP SEE SHEET 4.0	7
1	PRESSURE SIDE HOSE 46" LONG	6
1	HOSE 31" LONG	5
1	COFFEE CUP 3' x 3 1/2" (OPTIONAL)	4
1	KICK OFF VALVE	3
1	HYDRAULIC TANK ASSY. SEE SHEET 3.0	2
2	TIRES & RIMS ASSY. 4.8-4-8	1

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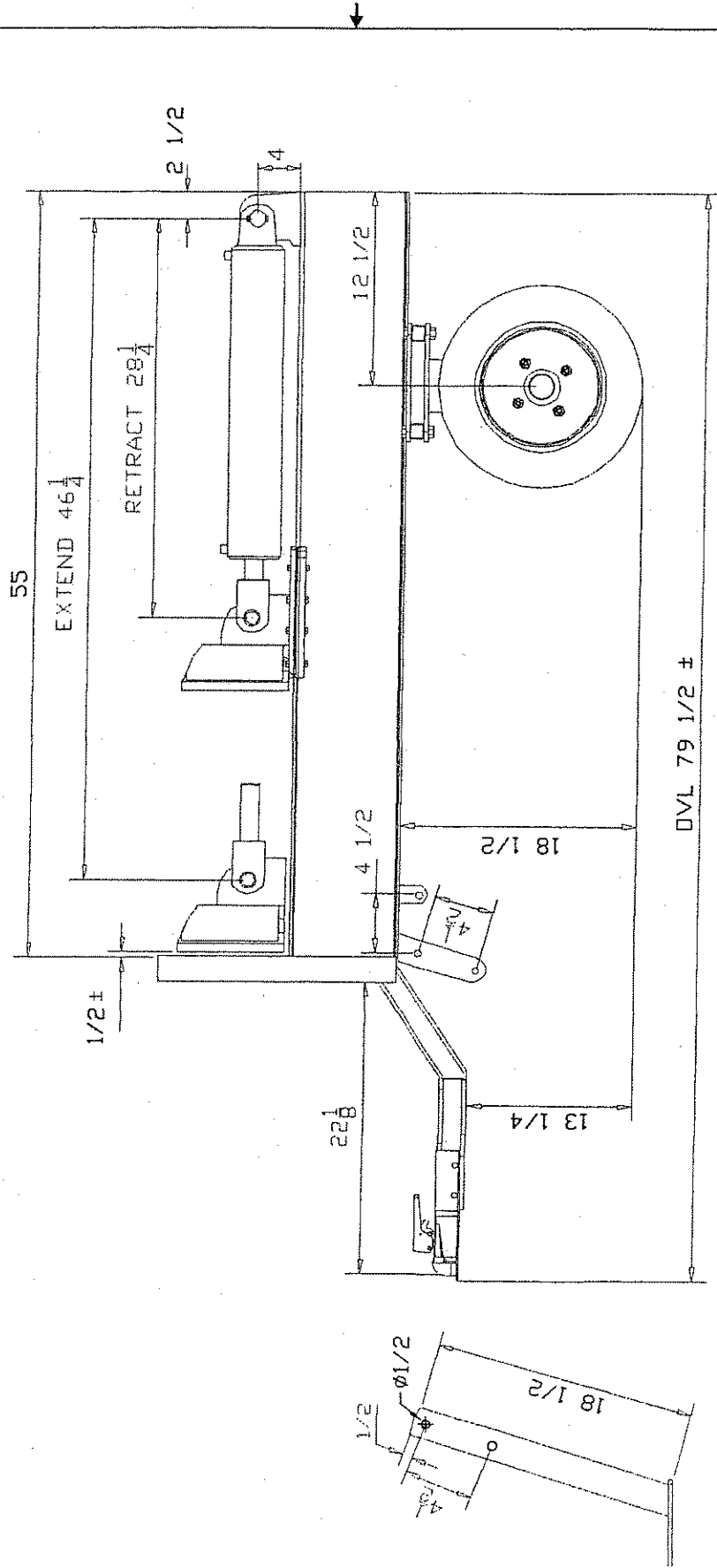
TITLE
LOG SPLITTER

SHEET 2.0 DRW NO. LS18

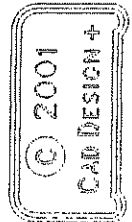


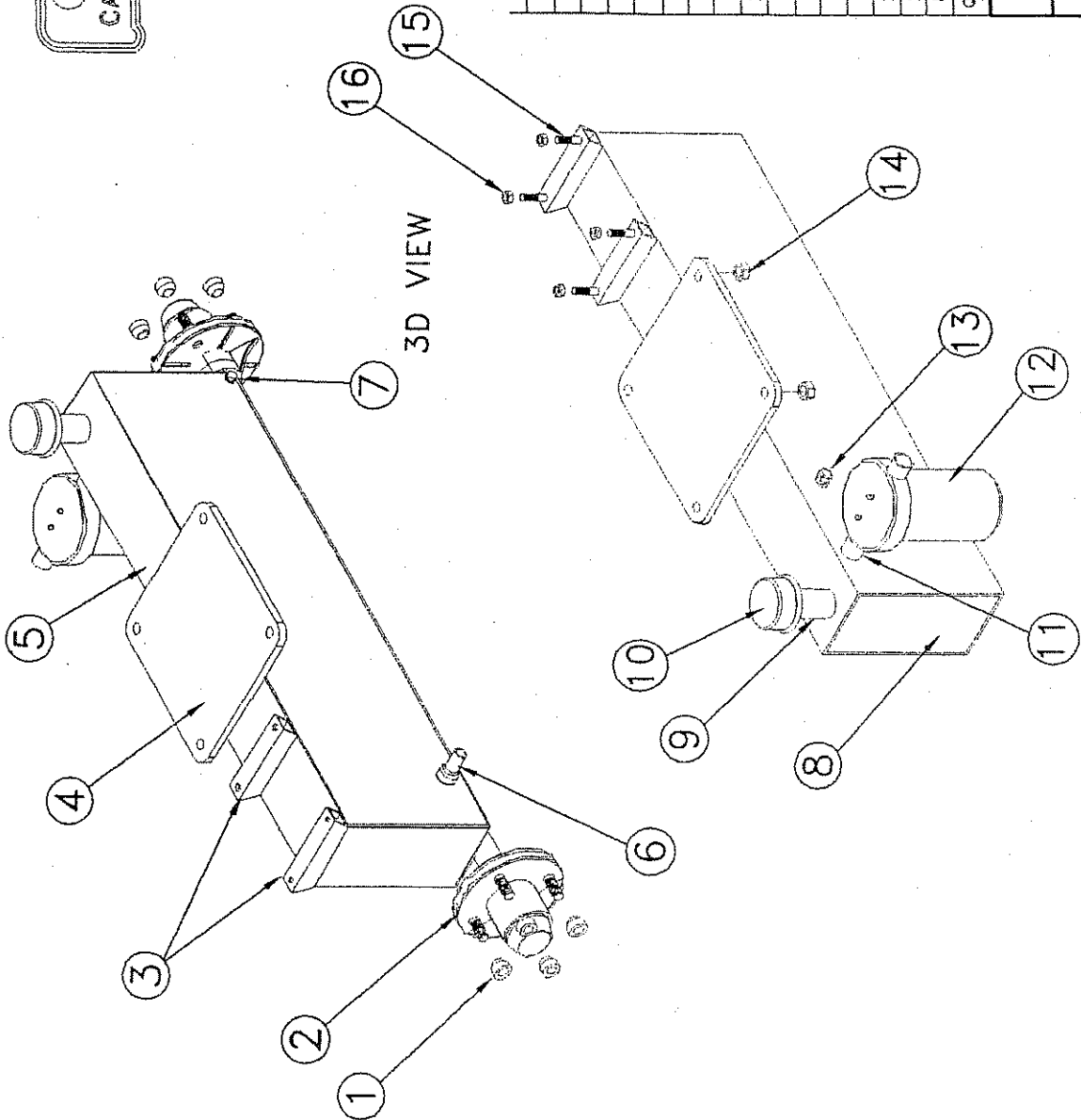
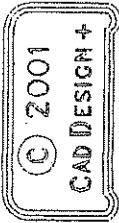
NOTES:

- 1.0 USE 18" STROKE 4.0" BORE HYDRAULIC CYLINDER.
- 2.0 THE 18" LOG SPLITTER USE A BEAM WITH A LENGTH OF 55" LONG



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LOG SPLITTER 18" TM	
SHEET 2.2	DRW NO. LS18





QTY	DESCRIPTION	ITEM
4	LOCKNUTS 5/16 N.C.	16
4	BOLTS 5/16 N.C. 2.0 LONG	15
4	LOCKNUTS 1/2 N.C.	14
1	OIL LEVEL GLASS INDICATOR 1/2 NPTM	13
1	10 MICRONS OIL FILTER ASSY.	12
1	NIPPLE 3/4 NPTM-2.0 LONG	11
1	BREATHER CAP	10
1	PIPE 1 1/2" O.D. 3" LONG	9
2	SIDE PLATES 1/8 x 4 x 8	8
1	DRAIN PLUG 1/4 NPTM	7
1	SUCTION FITTING 3/4 NPTM-3/4" PIPE	6
1	TUBING 3/16 x 4 x 8 x 30 LONG	5
1	PLATE 1/4" SEE SHEET 3.2	4
2	1.0" SQUARE TUBING SEE SHEET 3.2	3
2	SPINDLES & HUBS ASSY.	2
8	LUG NUTS 1/2 N.F.	1

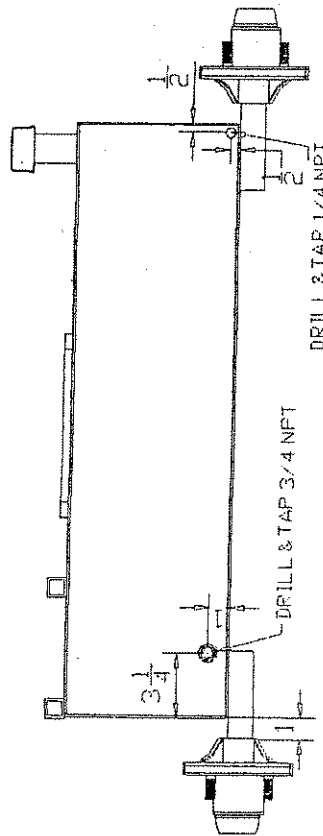
Cad Design +

TITLE
HYDRAULIC TANK ASSEMBLY

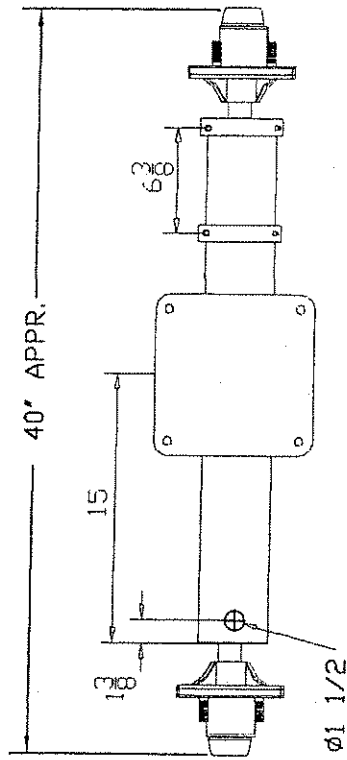
SHEET 3.0 DRW NO. LS18

NOTE:

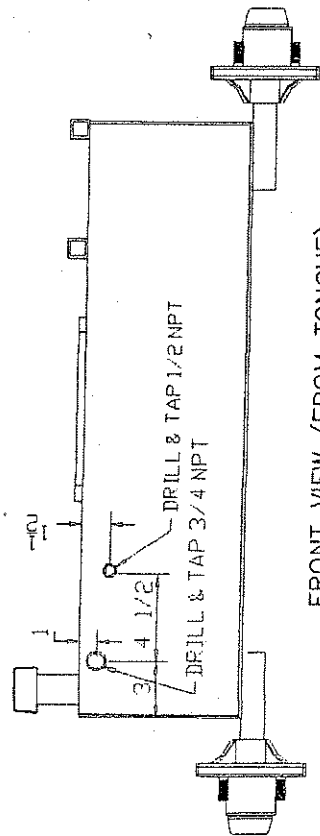
1.0 KEEP TIRES ABOUT 3/4" FROM THE TANK.



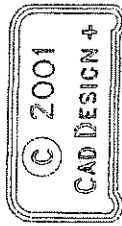
BACK VIEW



TOP VIEW



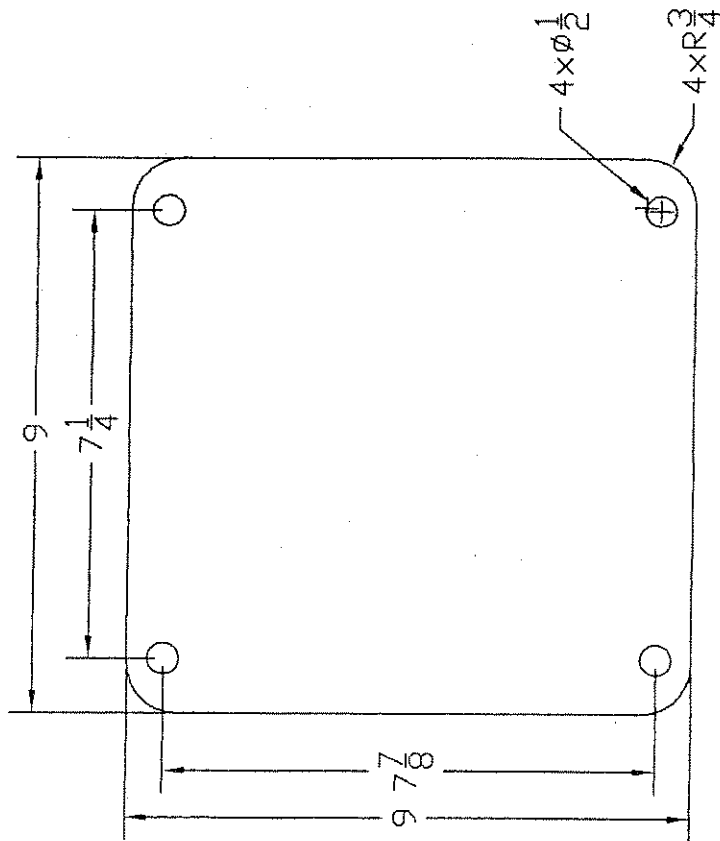
FRONT VIEW (FROM TONGUE)



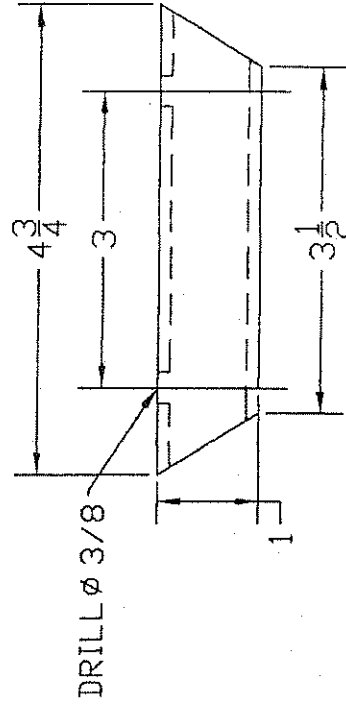
Cad Design +	
HYDRAULIC TANK ASSEMBLY	
SHEET 3.1	DRW NO. LS18

NOTE:

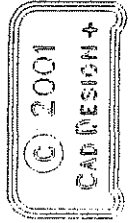
1.0 WELD FOUR BOLTS 5/16 N.C. 2.0 LONG
INSIDE SQUARE TUBING.



ITEM #4
THICKNESS 1/4 INCH



ITEM #3
THICKNESS 1/8 INCH



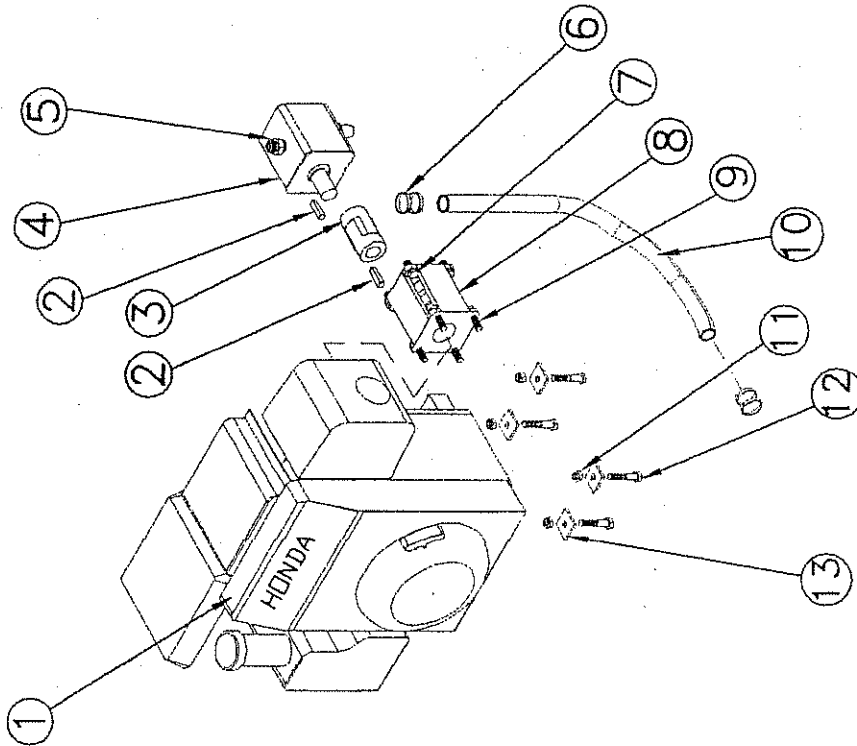
Cad Design +

TITLE
HYDRAULIC TANK ASSEMBLY

SHEET 3.2 | DRW NO. LS18

NOTE:

1.0 ITEM #4 IS A TWO STAGES PUMP WHICH DELIVERS 2.9 GPM @ HIGH PRESSURE AND 10.6 GPM @ LOW PRESSURE.



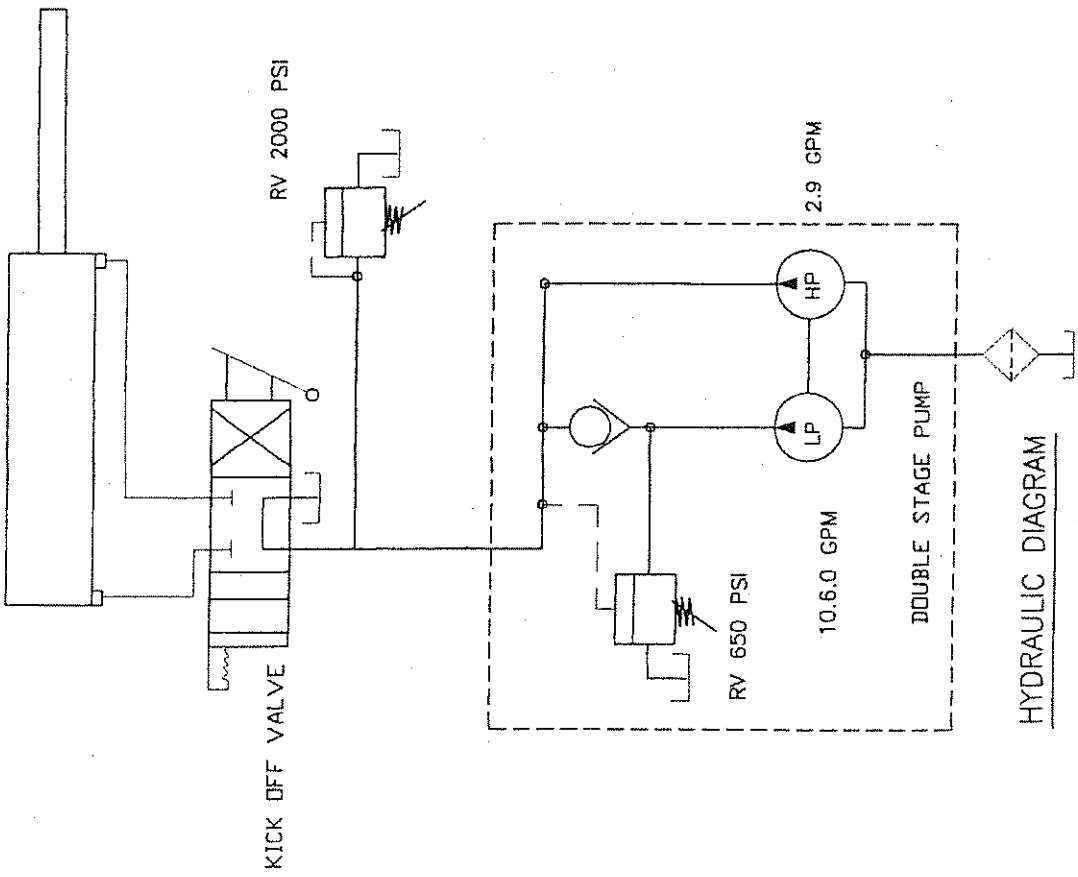
QTY	DESCRIPTION	ITEM
4	RUBBER PADS 1/8 x 1 x 1	13
4	BOLTS 5/16 N.C.-2.0 LONG	12
4	LOCKNUTS 5/16 N.C.	11
1	SUCTION HOSE 3/4" I.D.-15' LONG	10
4	LOCKWASHERS 5/16"	9b
4	BOLTS 5/16 N.C. 1 1/4 LONG (MOTOR)	9
1	PUMP ADAPTER	8
4	LOCKWASHERS 5/16 N.C.	7b
4	BOLTS 5/16 N.C. 1.0 LONG (PUMP)	7
4	HOSE CLAMPS 1 1/2"	6
1	FITTING 1/2 NPT MALE-JIC #8 MALE	5
1	TWO STAGES HYD PUMP 3/4" SHAFT	4
1	3/4' & 1/2" COUPLING ASSY.	3
2	KEYWAYS 3/16"- 1.0 LONG	2
1	5 H.P. ENGINE HONDA 3/4" SHAFT	1

Cad Design +

TITLE
5 HP ENGINE & PUMP ASSY.

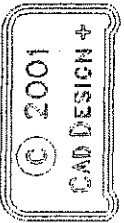
SHEET 4.0 DRW NO. LS18





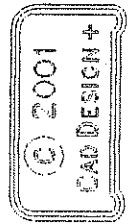
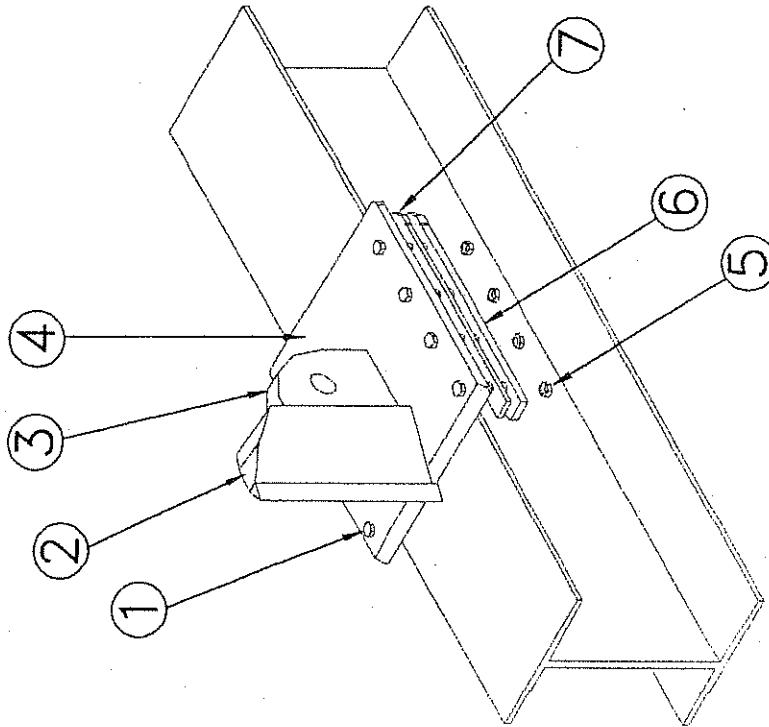
HYDRAULIC DIAGRAM

Cad Design +	
HYDRAULIC SYSTEM	
SHEET 4.1	DRW NO. LS18



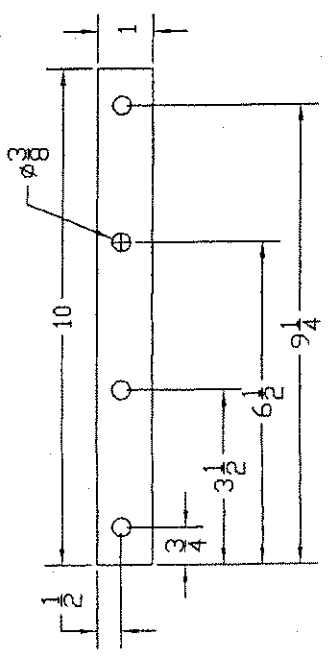
NOTES:

1.0 SOME SHIMMS MAY BE REQUIRED BETWEEN
ITEM #4 & ITEM #7

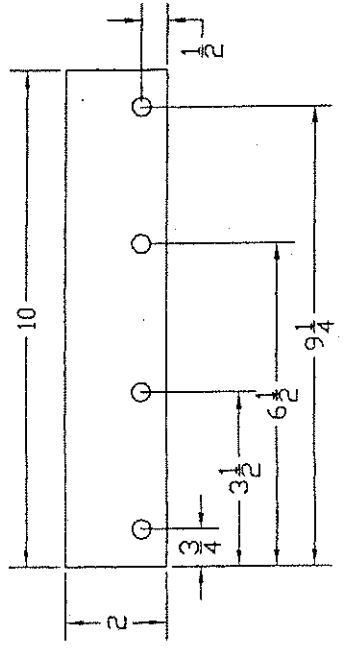


QTY	DESCRIPTION	ITEM
2	5/16" GUIDE PLATES SEE SHEET 5.1	7
2	5/16" BOTTOM PLATES SEE SHEET 5.1	6
8	LOCKNUTS 3/8 N.C.	5
1	3/8" BASE PLATE SEE SHEET 5.1	4
1	1" CYL. BASE PLATE SEE SHEET 5.2	3
1	WEDGE ASSY. SEE SHEET 5.2	2
8	BOLTS 3/8 N.C. 2.0 LONG	1

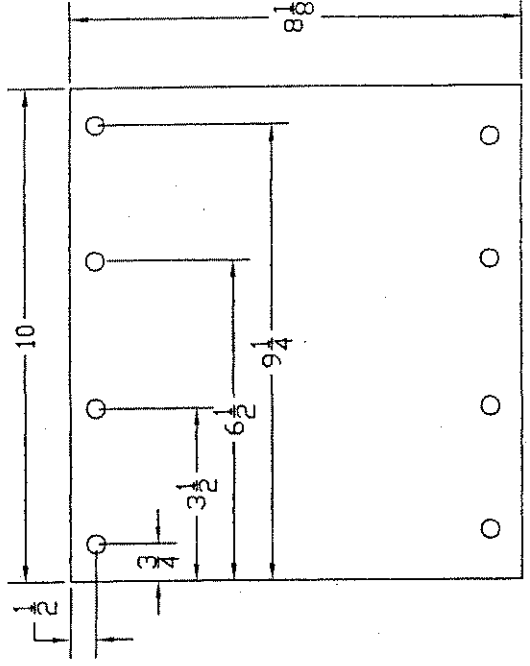
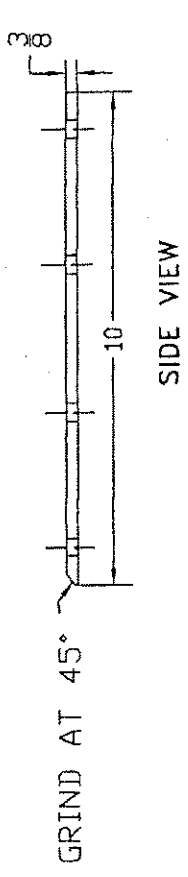
Cad Design +	
TITLE	
WEDGE & GUIDE PLATE	
SHEET 5.0	DRW NO. LS1B



ITEM #7

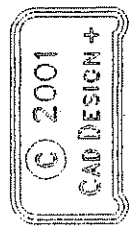


ITEM #6



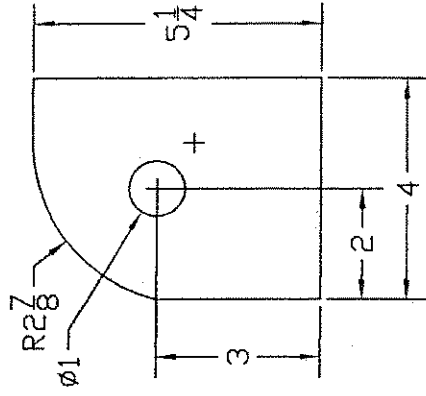
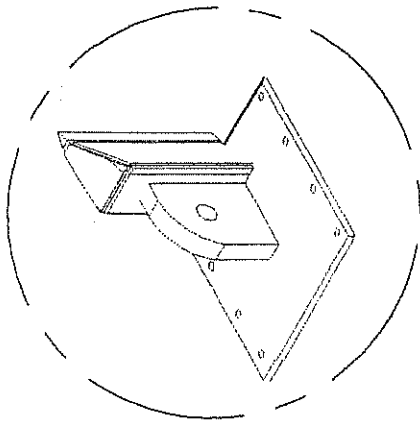
ITEM #4

Cad Design +	
TITLE WEDGE & GUIDE PLATE	
SHEET 5.1	DRW NO. LS18

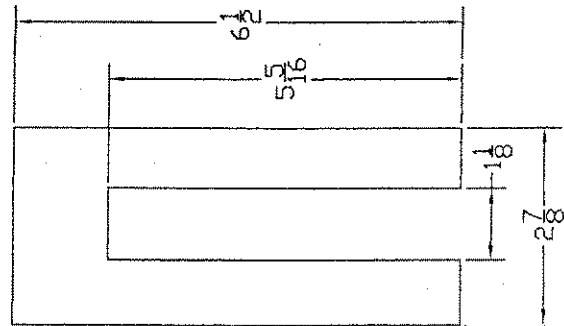


NOTES:

- 1.0 ITEM #1 GOES INSIDE ITEM #2
- 2.0 ITEM #5 IS FLUSH WITH ITEM #1



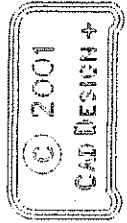
DETAIL H-H



DETAIL G-G

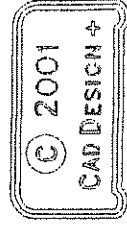
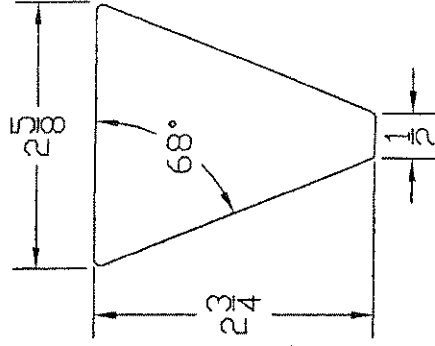
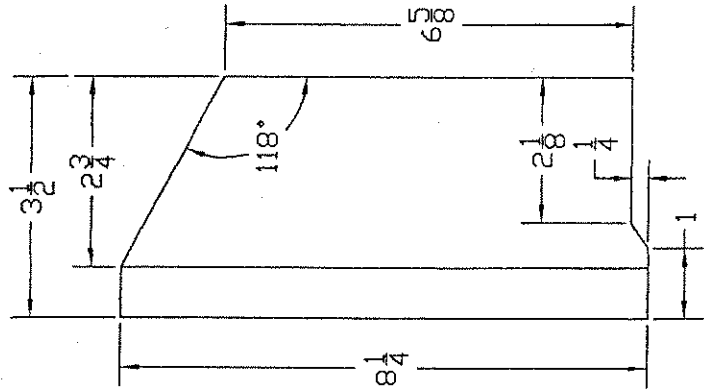
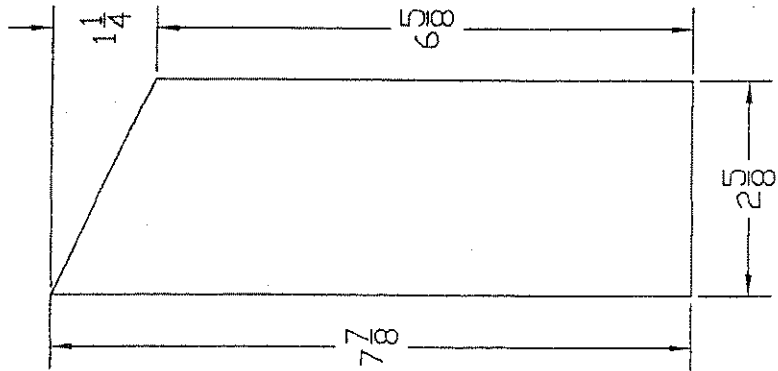
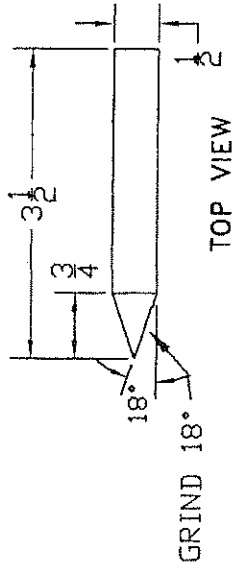
QTY	DESCRIPTION	ITEM
1	1/2" PLATE SEE SHEET 5.3	5
1	3/16" PLATE SEE SHEET 5.3	4
2	3/16" PLATES SEE SHEET 5.3	3
1	3/16" PLATE SEE DETAIL G-G	2
1	1" CYL. BRACKET SEE DETAIL H-H	1

Cad Design +	
TITLE	
WEDGE & GUIDE PLATE	
SHEET 5.2	DRW NO. LS18

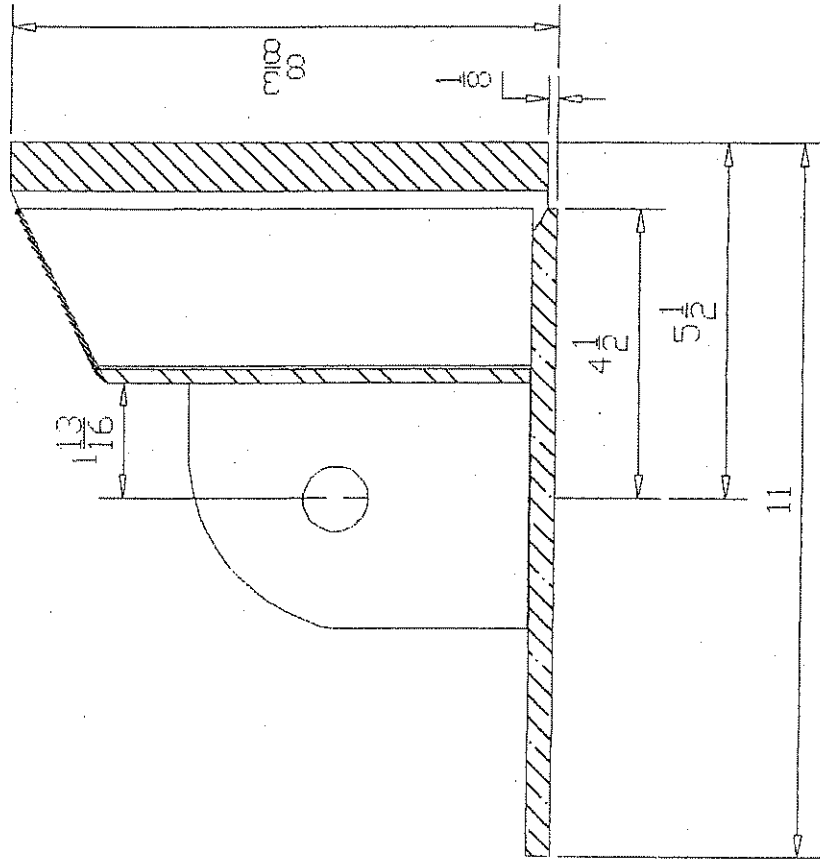


NOTES:

- 1.0 ALL CORNERS TO BE 1/16"
- 2.0 ITEM #5 HAS A MECHANICAL AVANTAGE OF 0.75 / 0.50 = 1.5 TO 1



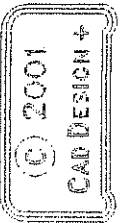
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TITLE WEDGE ASSEMBLY	
SHEET 5.3	DRW NO. LS18

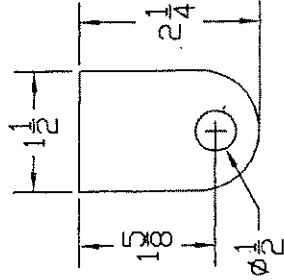
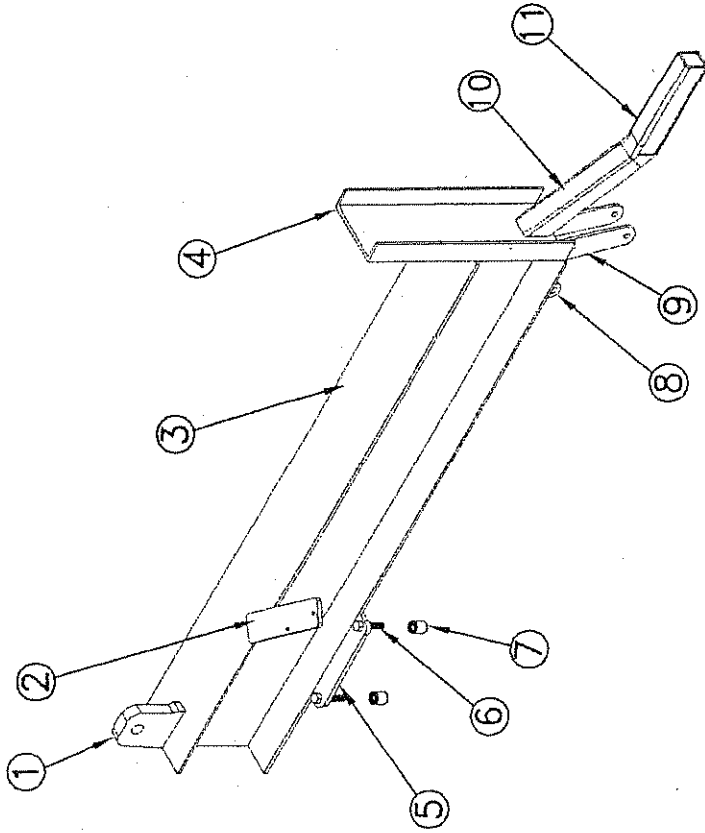


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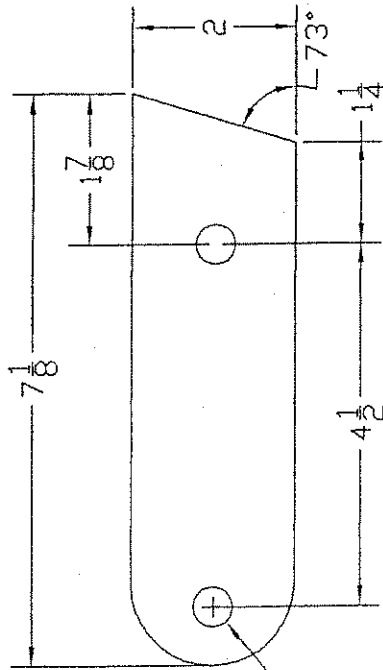
TITLE
 WEDGE & GUIDE PLATE

SHEET 5.4 DRW NO. LS18





DETAIL F-F



DETAIL G-G

3/8 x 8 x 8



QTY	DESCRIPTION	ITEM
1	HSS 3/16 x 2 x 2 x 10 HEET 6.3	11
1	HSS 3/16 x 2 x 2 x 11 SHEET 6.3	10
2	1/4" PLATES SEE DETAIL G-G	9
2	1/4" HIDDEN PLATES SEE DETAIL F-F	8
4	SPACERS 1/2" I.D. - 1.0 LONG	7
4	BOLTS 1/2 N.C. 2.0 LONG	6
1	1/4" ADAPTER PLATE SEE SHEET 6.1	5
1	CHANNEL 1/4 x 2 x 6 x 18	4
1	W-BEAM 1/4 x 6 x 6 (W200x36)	3
1	KICK OFF VALVE BRACKET SHEET 6.1	2
1	CYL. BRACKET SEE SHEET 6.1	1

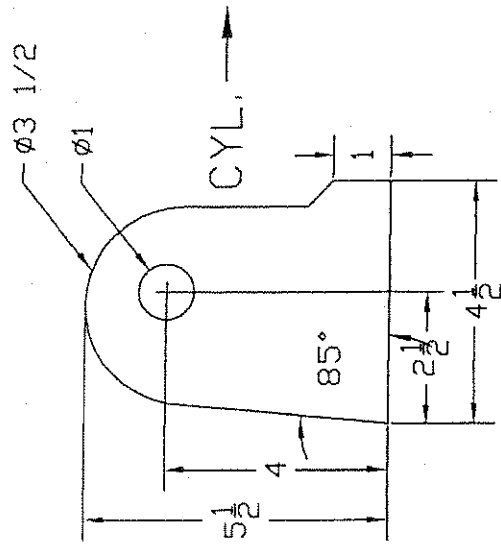
Cad Design +

TITLE
BEAM ASSEMBLY

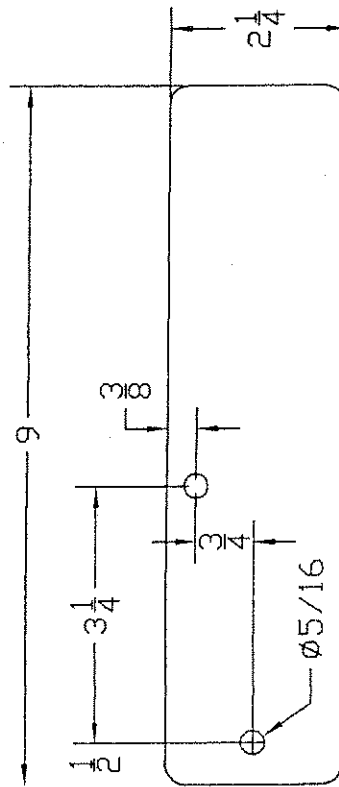
SHEET 6.0 DRW NO. LS18

NOTE:

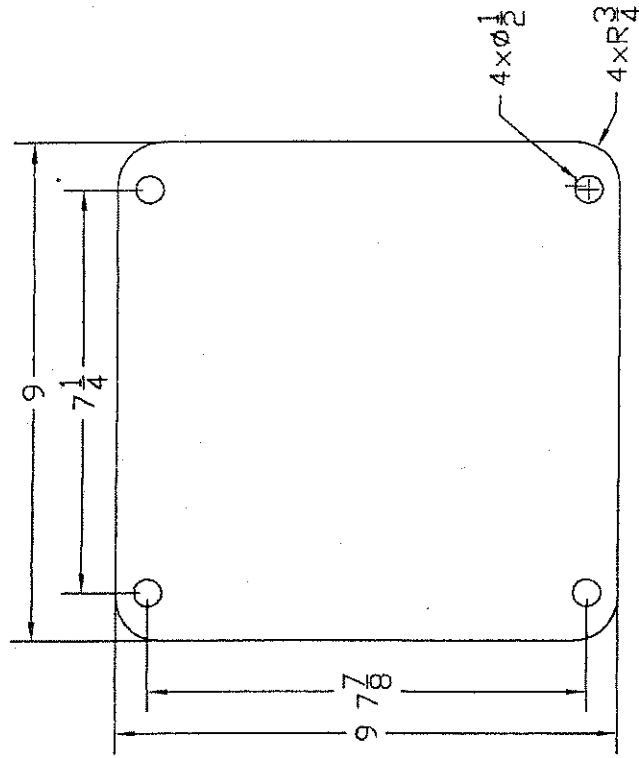
ITEM #2 DIMENSIONS COULD CHANGE DEPENDING ON WHO MANUFACTURE THE KICK OFF VALVE.



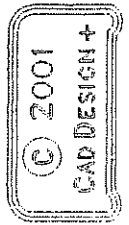
ITEM #1
THICKNESS 1.0 INCH



ITEM #2
THICKNESS 3/8 INCH



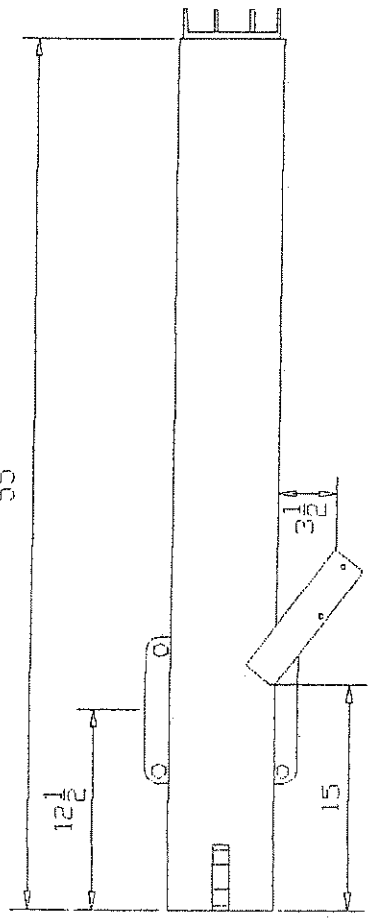
ITEM #5
THICKNESS 1/4 INCH



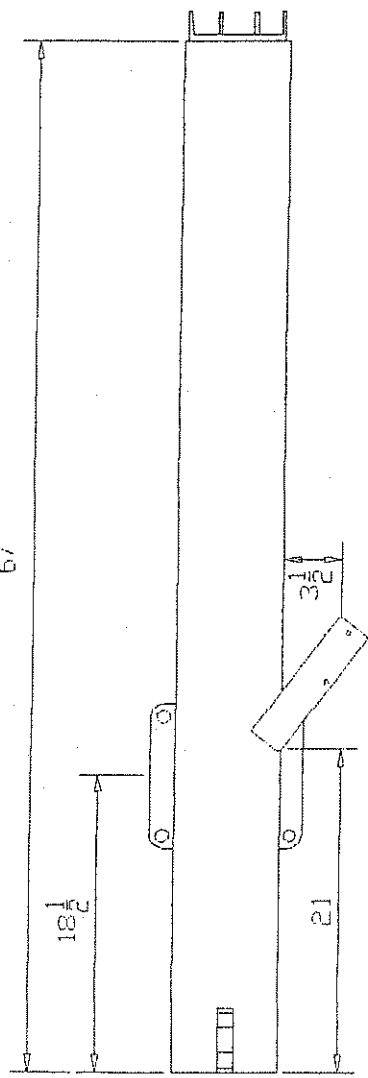
Cad Design +

TITLE
BEAM ASSEMBLY

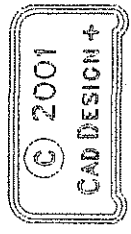
SHEET 6.1 DRW NO. LS18



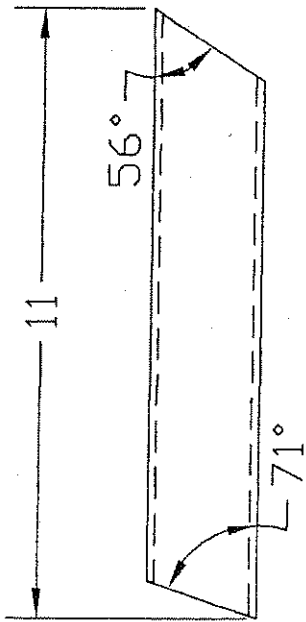
TOP VIEW FOR 18" LOG



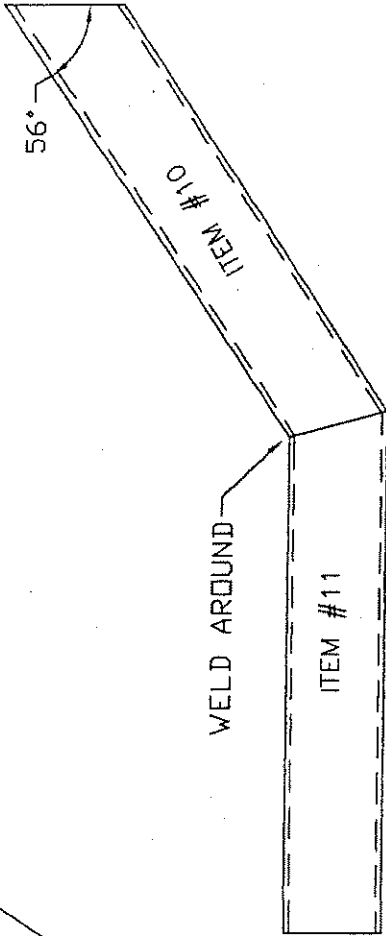
TOP VIEW FOR 24" LOG



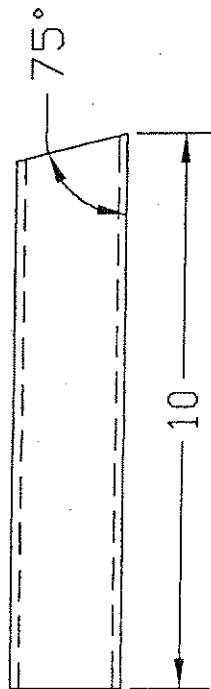
Cad Design +	
TITLE BEAM ASSEMBLY	
SHEET 6.2	DRW NO. LS18



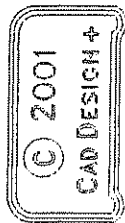
ITEM #10



ITEM #11



ITEM #11



Cad Design +	
TITLE TONGUE	
SHEET 6.3	DRW NO. LS18