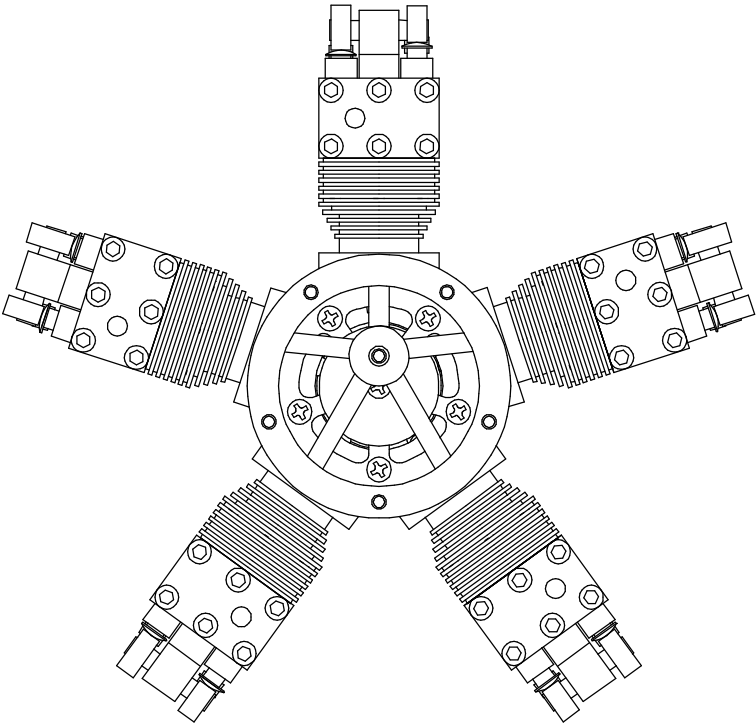
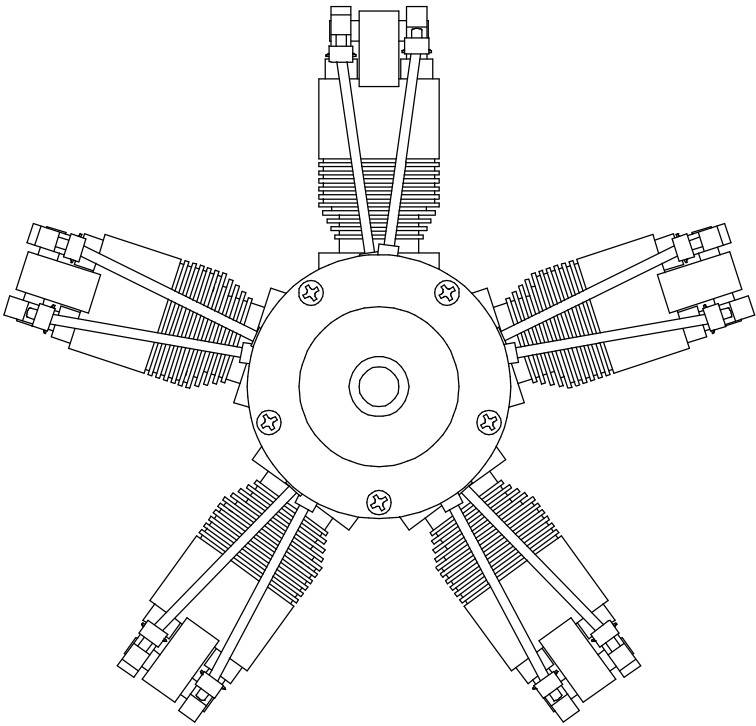


"HALO"

BY LINEY MACHINE - REVISION 07/01/2010



HALO MATERIALS LIST

	CAM HOUSING	CRANKCASE	B. CARRIER	CYLINDER	HEAD	DRIVESHAFT	M. ROD	RODS	PISTONS	BRACKETS	PLATE	INLETS	ROCKER	CAMS	VALVE PLU	CRANK	ROD PLUNG	CRANK PIN	ROCKER PIN	PUSH RODS		
20	2-56 X 5/8	5			15																	
2	BEARING	1	1																			
40	2-56 X 3/16										30									10		
6	2-56 X 3/8 (CAP)									5								1				
5	2-56 X 1/4 (PHIL)		5																			
5	2-56 X 1/2 (CAP)				5																	
30	2-56 X 1/4 (CAP)			20									10									
10	2-56 NUTS												10									
4	1/16X.125 PINS	These pins must be made from 1/16 rod (provided in kit)						4														
5	1/16 X 5/16 PINS								5													
3	2-56 X 3/8 (FLAT)													2		1						
10	#2 WASHER																			10		
5	6-32 PRES. FITTING											5										
10	.125 BALLS																10					
10	.1875 BALLS				10																	
20	M3 WASHER																			20		
5	SPRINGS													5								
1	1.75 RND BAR	1																				
1	1.75 OD ALU TUBE		1																			
8	.125X1.5 ALU BAR			3									5									
12	.75 BRASS SQR				6	6																
3	.625 ALU RND						3															
2	1/16 X .75 BRS BAR						2															
5	.125 BRASS SQR							5														
4	.375 BRS RND								4													
5	.25X .5 BRS BAR									5												
4	.125 x .75 ALU BAR										4											
1	7/8 BRS RND													1								
7	.25 BRASS RND														7							
1	.75 STEEL															1						
12	.125 BRASS RND																7			5		
1	.375 STEEL RND																		1			
18	.0625 DRILL ROD																				18	

TOOLS			
REAMERS	BITS	TAP	END MILL
.1260	#43	2-56	.0625
.1240	#44	2-56 B	.1250
.3745	#50		
.5010	#49		
.0615			

NOTES

Congratulations, I'm glad that you have chosen to build the Halo. Should you run into any problems or find that you are missing anything, please do not hesitate to contact us at info@lineymachine.com.

All material in this packet is copyrighted. Please do not make copies without permission.

Disclaimer:

Machining can be hazardous! If you are not familiar with machine safety precautions, do not use them!

This engine design has exposed fast moving parts which can cut, pinch, burn, or otherwise injure you. Parts, hot water, steam, or lubricant may be thrown from the engine and cause injury or damage. By building and/or operating this engine you are assuming responsibility for any damage or injury you or any bystanders may incur. Be safe.

General information:

These plans are not intended as machining how-to instructions. How you machine the parts is up to you. We are always happy to make suggestions or answer questions.

In an effort to keep the drawings from being too cluttered, we have not written every dimension. As a rule of thumb, everything that looks symmetrical is symmetrical unless otherwise dimensioned.

All machine screws used are size 2-56. The proper drill size for tapping these holes is #50. Be careful not to over tighten these screws. 2 in-lbs. is adequate.

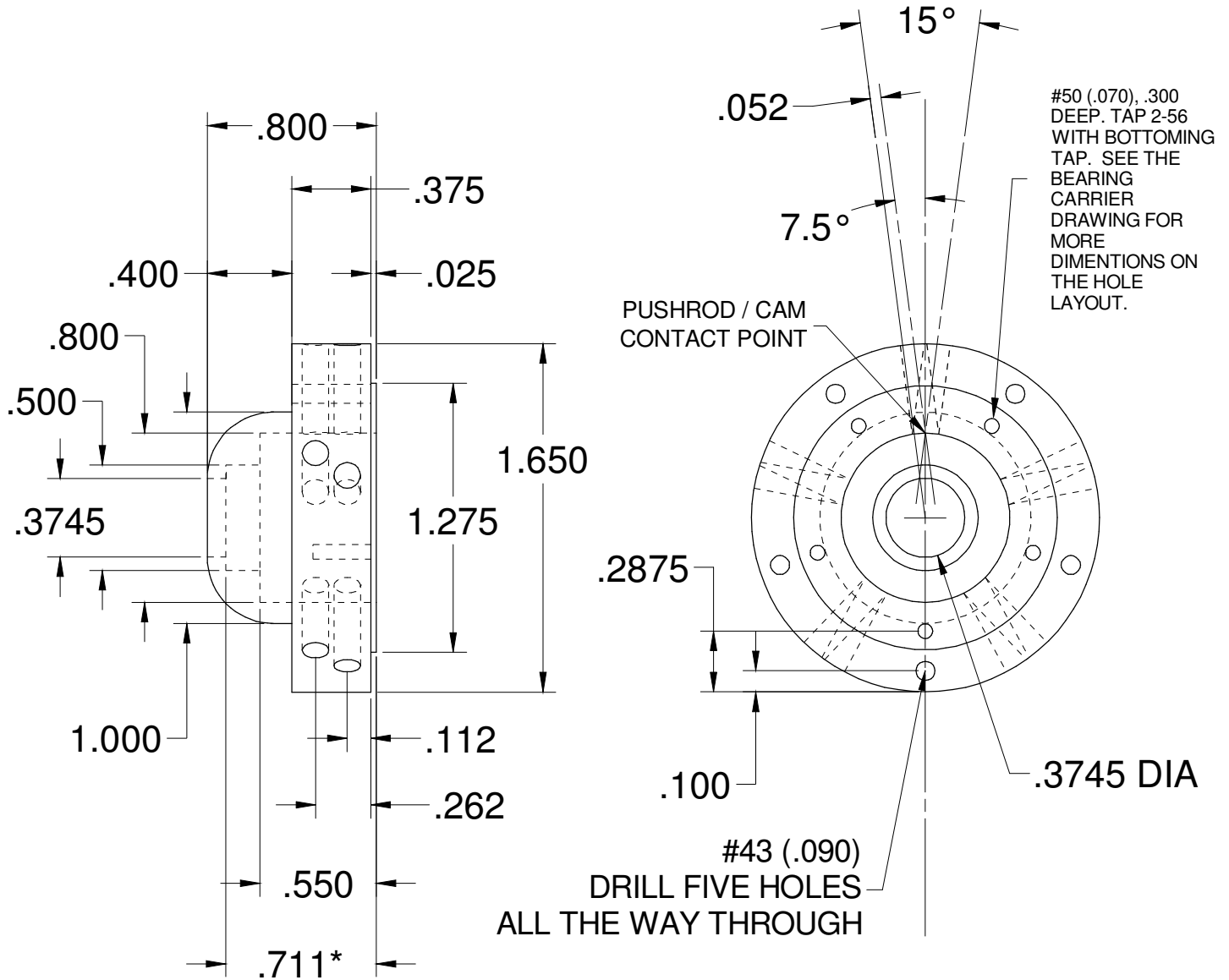
Because this is a five cylinder engine, all parts arranged radially are 72 degrees apart ($360 / 5 = 72$)

By varying this angle; one, two, three, or four cylinder versions can be built using these same drawings. More than five cylinders will require more significant modifications.

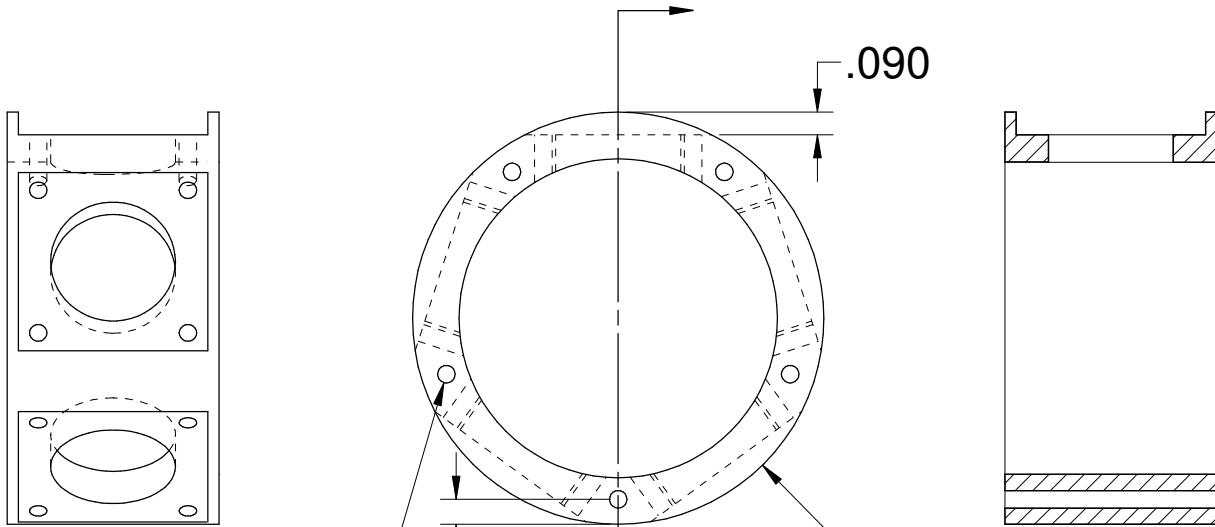
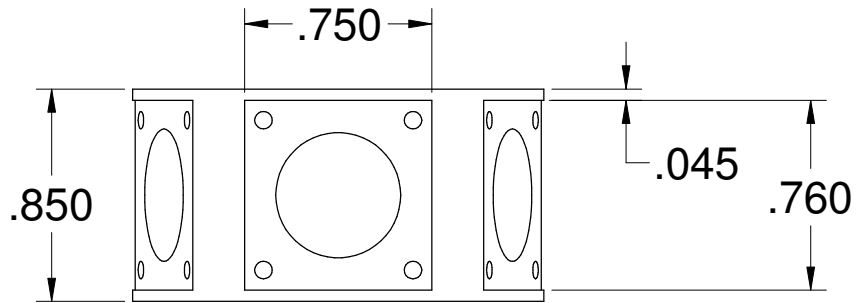
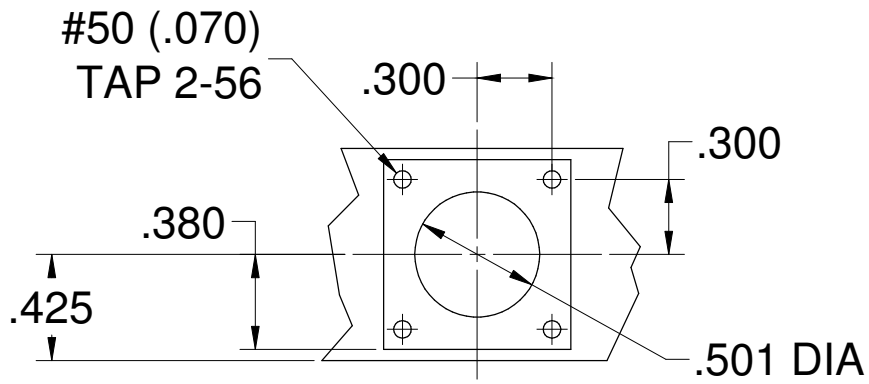
Check www.lineymachine.com for more notes, tips, and updates on the Halo.

* THIS DIMENTION MUST BE
PRECISE TO AVOID BINDING
OR PLAY IN THE DRIVESHAFT.

EACH PUSHROD HOLE (.125 DIA) IS CANTED 7.5 DEGREES OFF THE
CENTERLINE OF THE CYLINDER AND IS ALSO OFFSET FROM
CENTER BY .052 IN THE OPPOSITE DIRECTION OF THE CANT. THIS
IS SO BOTH PUSHRODS WILL CONTACT THE CAMS AT THE SAME
RADIAL POSSITION.



MODEL	PART/DRAWING #	QUANTITY REQUIRED
HALO	CAM HOUSING	1
LAST REVISION	MATERIAL	STOCK DIMENTIONS
07/01/2010	ALUMINUM	1.75" RND BAR

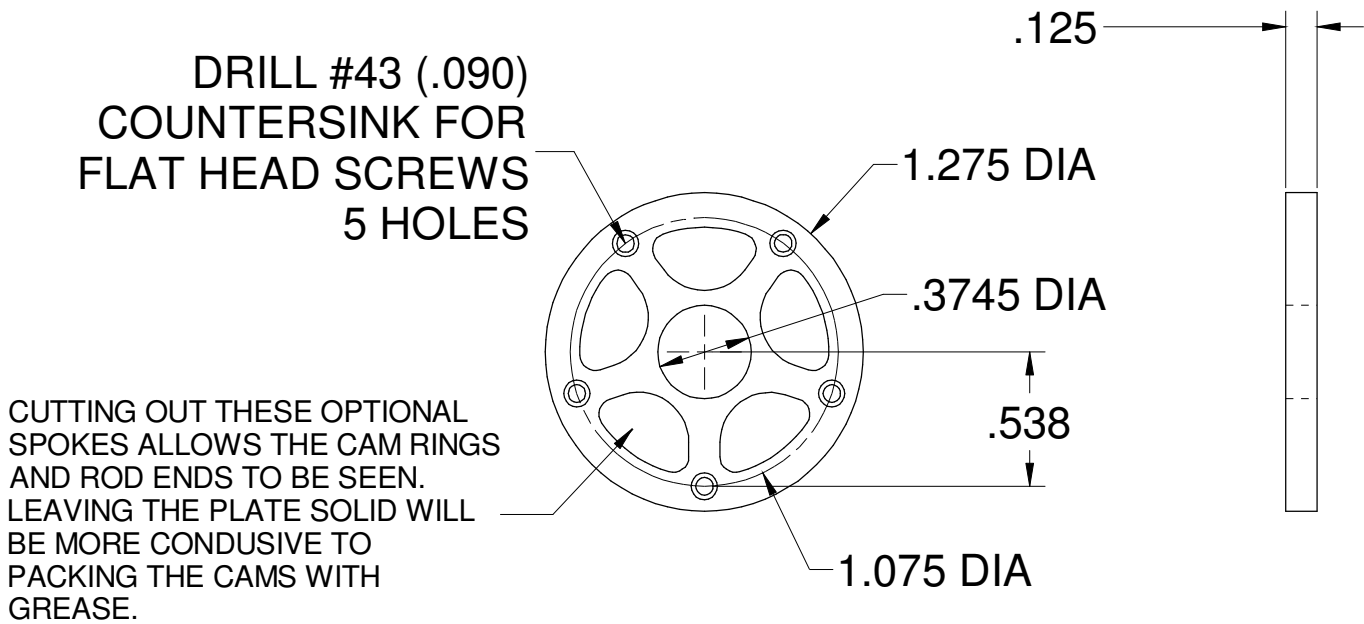


DRILL #50
THESE 5 HOLES MUST BE TAPPED
2-56 AT LEAST .25 DEEP. THEY
CAN BE DRILLED ALL THE WAY
THROUGH TO PROVIDE MOUNTING
POINTS ON THE BACK.

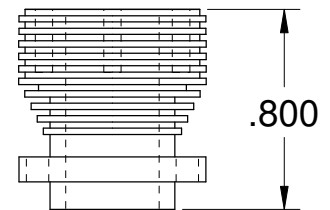
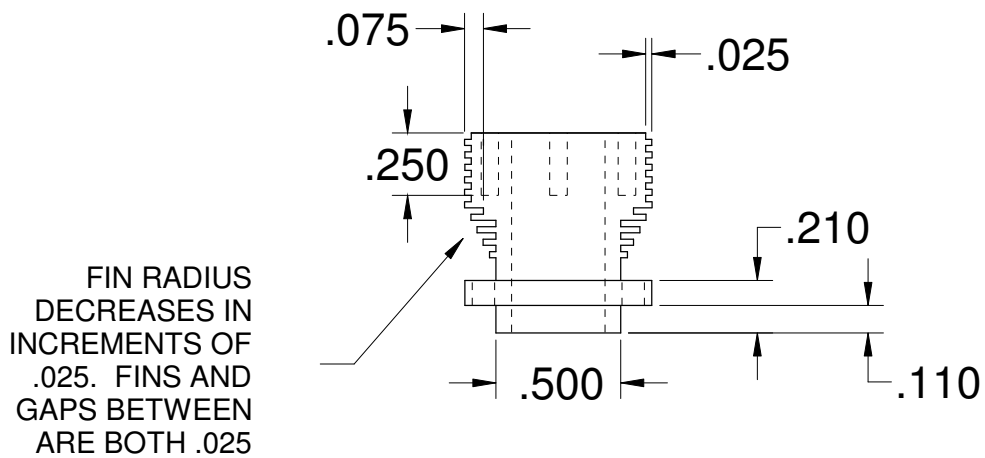
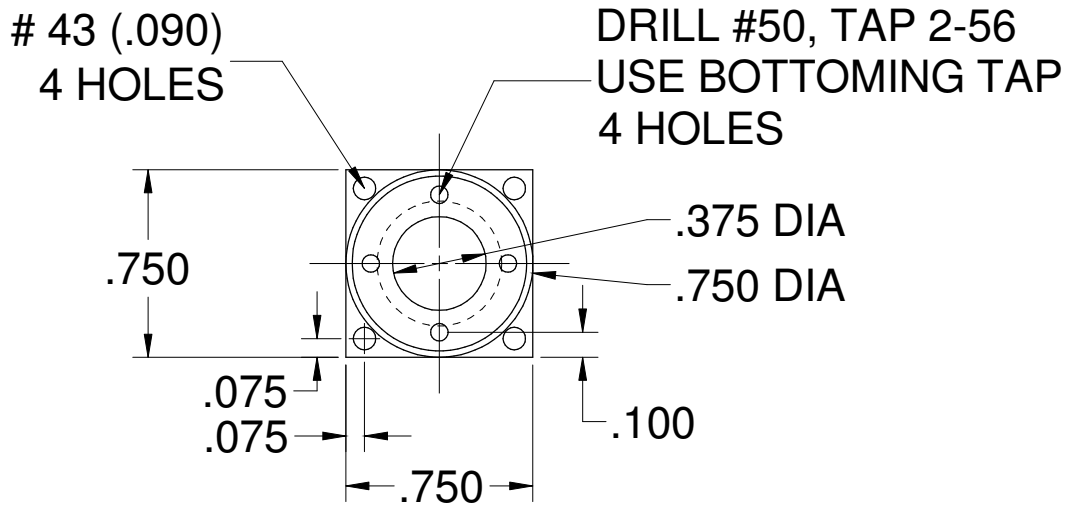
.100

MODEL	PART/DRAWING #	QUANTITY REQUIRED
HALO	CRANKCASE	1
LAST REVISION	MATERIAL	STOCK DIMENTIONS
8/01/07	ALUMINUM	1.75 OD, 1.25 ID TUBE

PART IS CUT FROM .125 THICK 6061 ALUMINUM PLATE.

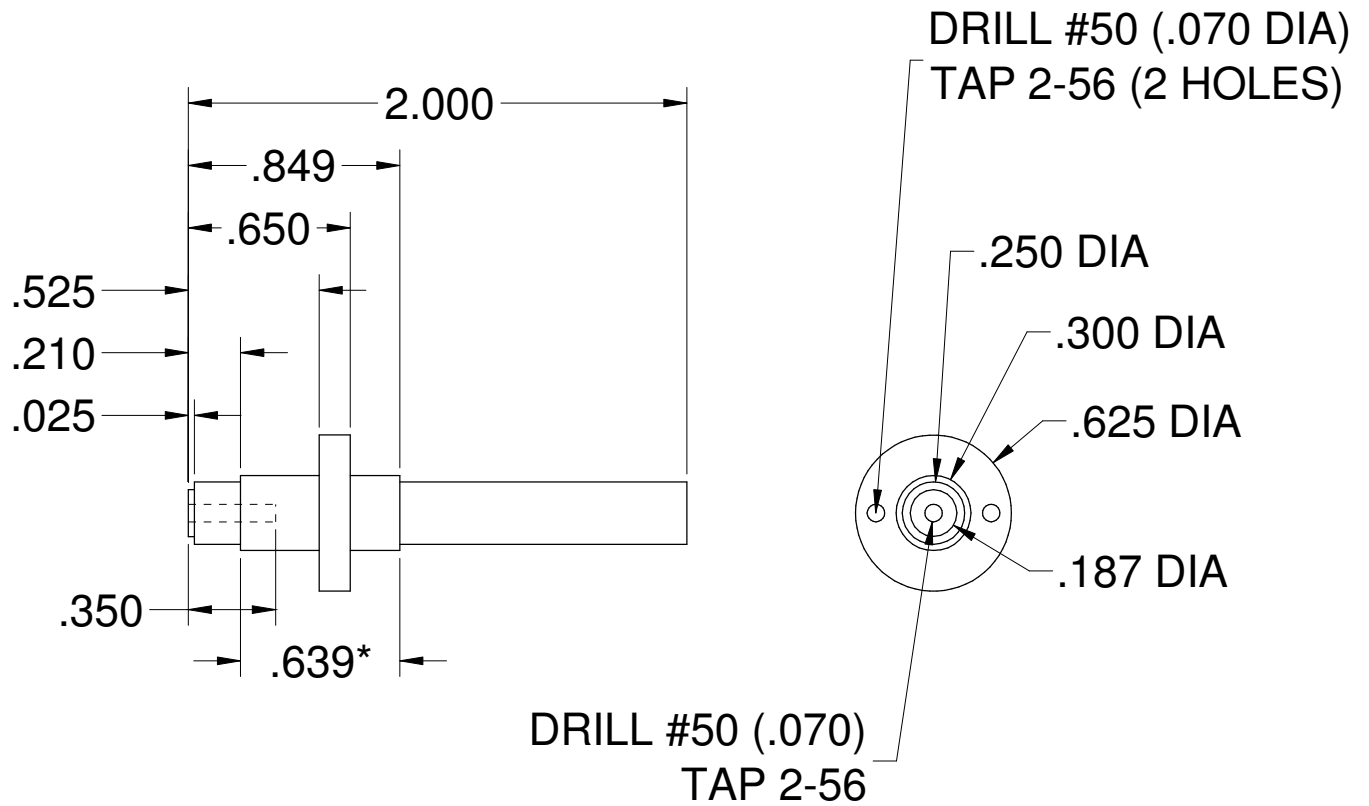


MODEL	PART/DRAWING #	QUANTITY REQUIRED
HALO	BEARING CARRIER	1
LAST REVISION	MATERIAL	STOCK DIMENTIONS
8/01/07	ALUMINUM	1/8" PLATE

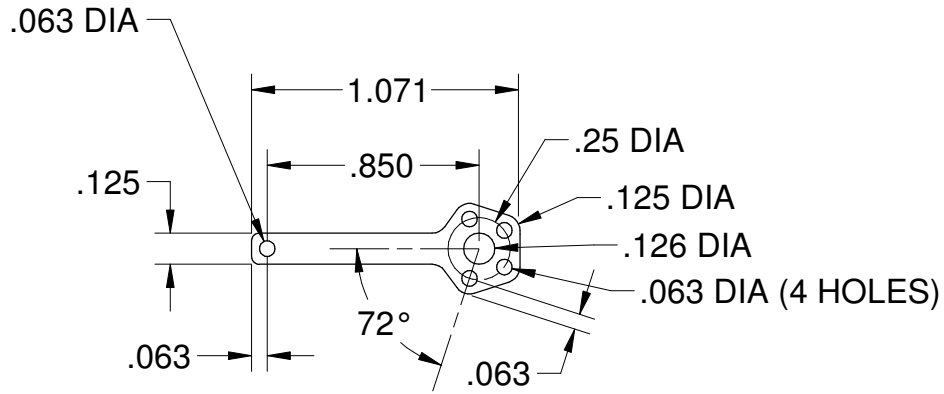


MODEL	PART/DRAWING #	QUANTITY REQUIRED
HALO	CYLINDER	5
LAST REVISION	MATERIAL	STOCK DIMENTIONS
8/01/07	360 BRASS	.75" SQUARE BAR

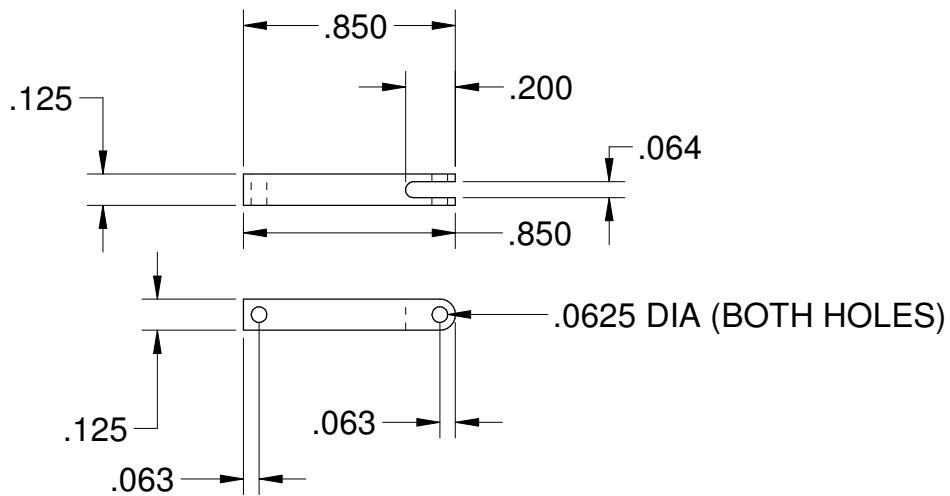
* THIS DIMENTION MUST BE
 PRECISE TO AVOID BINDING
 OR PLAY IN THE DRIVESHAFT.
 IF THE PRELOAD ON THE
 BEARINGS IS TOO TIGHT,
 REDUCE THIS DIMENTION BY
 .001 AND RECHECK.



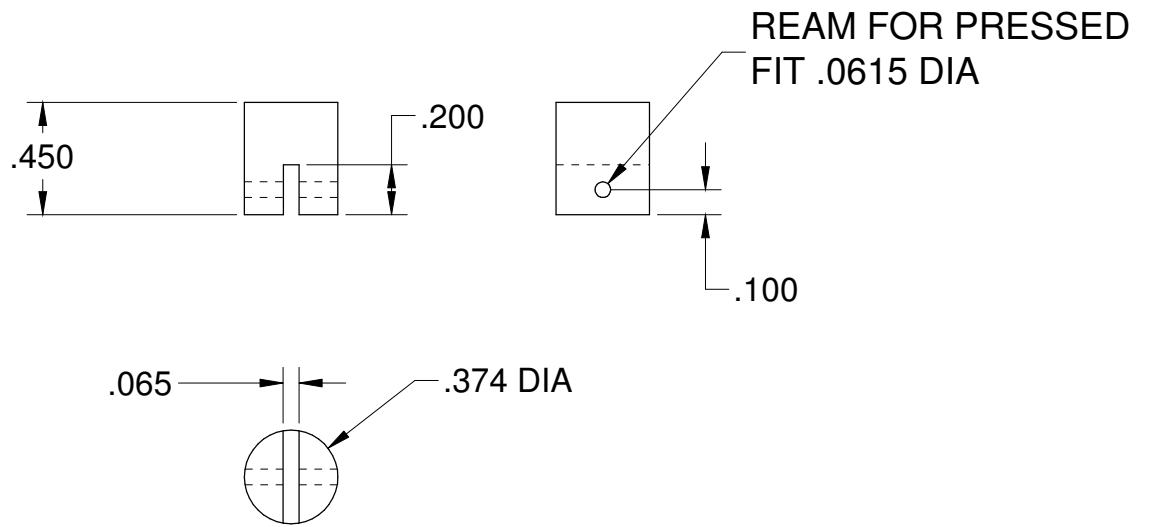
MODEL	PART/DRAWING #	QUANTITY REQUIRED
HALO	DRIVE SHAFT	1
LAST REVISION	MATERIAL	STOCK DIMENTIONS
6/4/07	STEEL	5/8" ROUND BAR



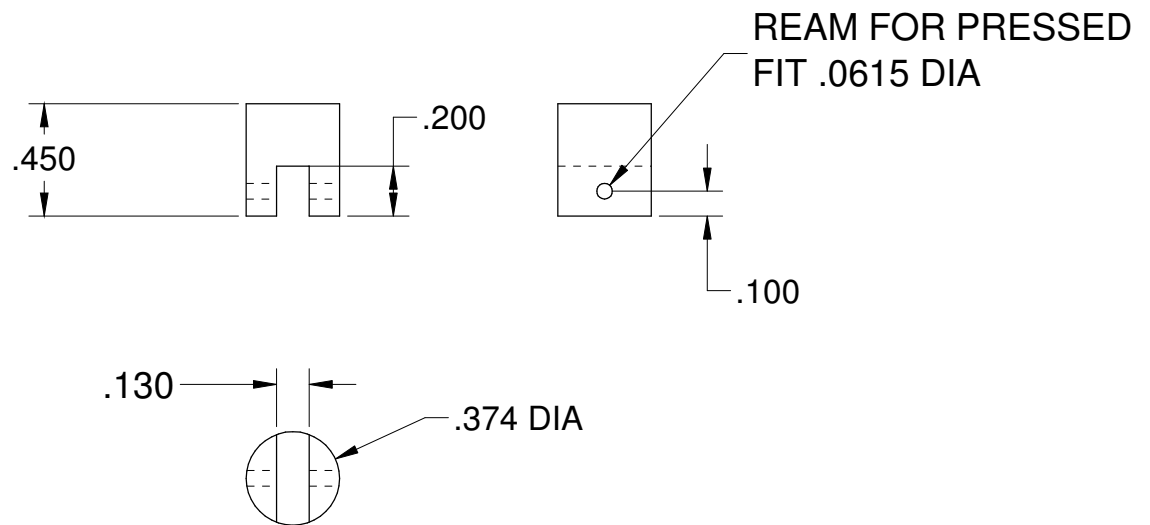
MODEL	PART/DRAWING #	QUANTITY REQUIRED
HALO	MASTER ROD	1
LAST REVISION	MATERIAL	STOCK DIMENTIONS
8/01/07	360 BRASS	1/16" SHEET



MODEL	PART/DRAWING #	QUANTITY REQUIRED
HALO	ROD	4
LAST REVISION	MATERIAL	STOCK DIMENTIONS
8/01/07	360 BRASS	1/8" SQUARE BAR



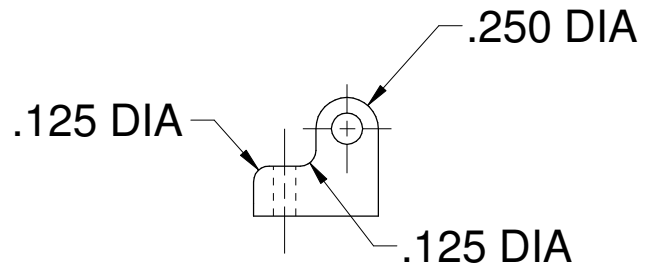
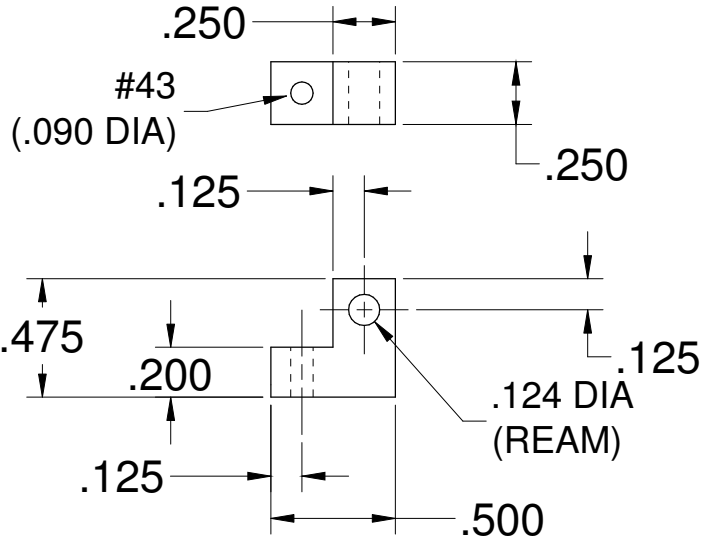
MODEL	PART/DRAWING #	QUANTITY REQUIRED
HALO	MASTER PISTON	1
LAST REVISION	MATERIAL	STOCK DIMENTIONS
8/01/07	360 BRASS	3/8 ROUND BAR



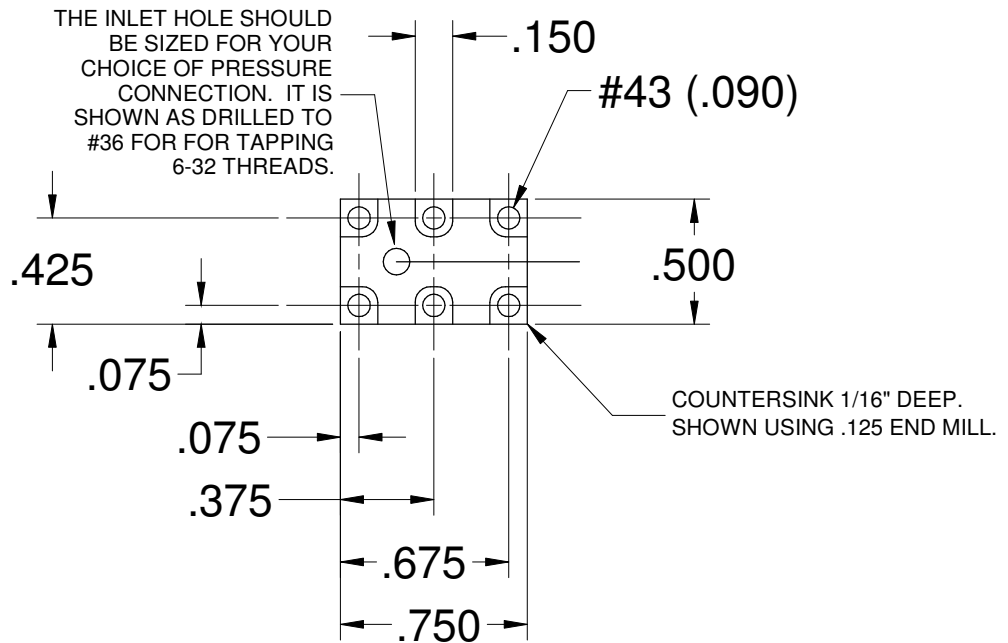
MODEL	PART/DRAWING #	QUANTITY REQUIRED
HALO	PISTON	4
LAST REVISION	MATERIAL	STOCK DIMENTIONS
8/01/07	360 BRASS	3/8 ROUND BAR

SIMPLE SHAPE

WITH OPTIONAL RADIUSED CORNERS



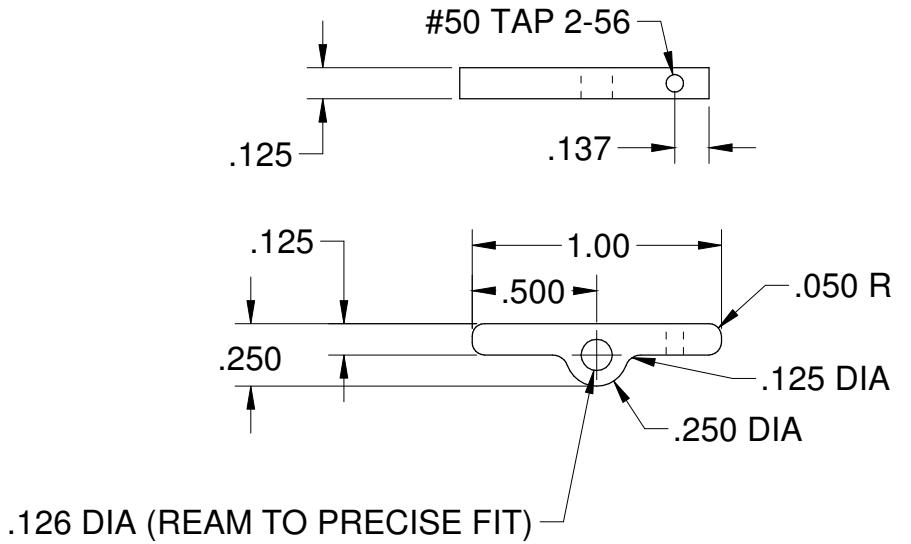
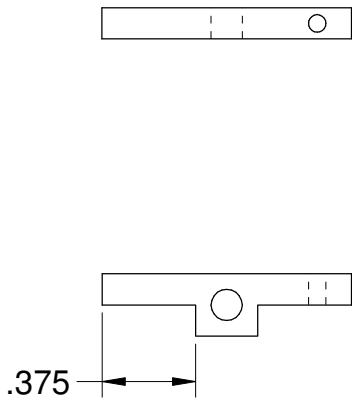
MODEL	PART/DRAWING #	QUANTITY REQUIRED
HALO	ROCKER BRACKET	5
LAST REVISION	MATERIAL	STOCK DIMENTIONS
8/01/07	360 BRASS	1/4" X 1/2" BAR



MODEL	PART/DRAWING #	QUANTITY REQUIRED
HALO	VALVE COVER	5
LAST REVISION	MATERIAL	STOCK DIMENTIONS
8/01/07	ALUMINUM	1/8" PLATE

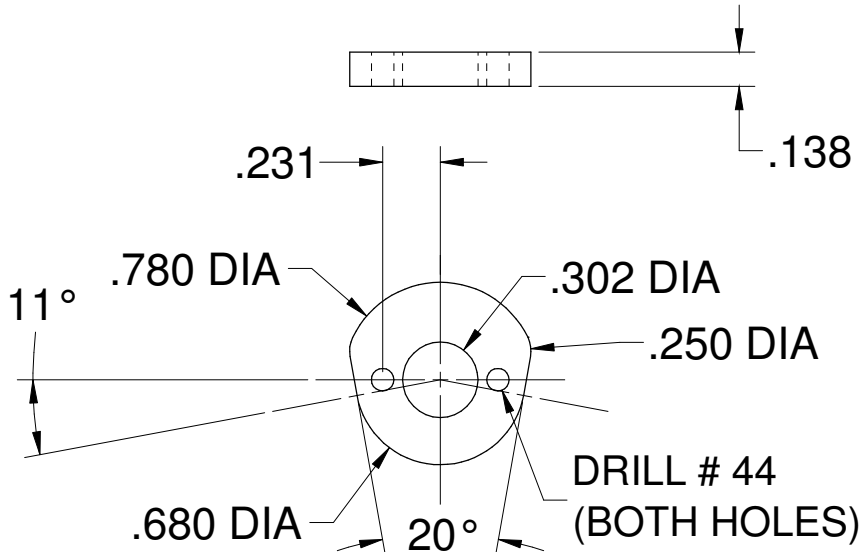
SIMPLE SHAPE

WITH OPTIONAL RADIUSED CORNERS

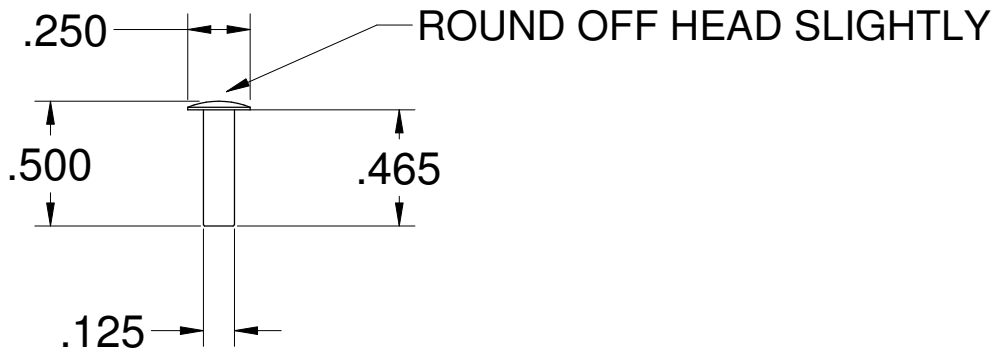


MODEL	PART/DRAWING #	QUANTITY REQUIRED
HALO	ROCKER ARM	10
LAST REVISION	MATERIAL	STOCK DIMENTIONS
8/01/07	ALUMINUM	1/8" PLATE

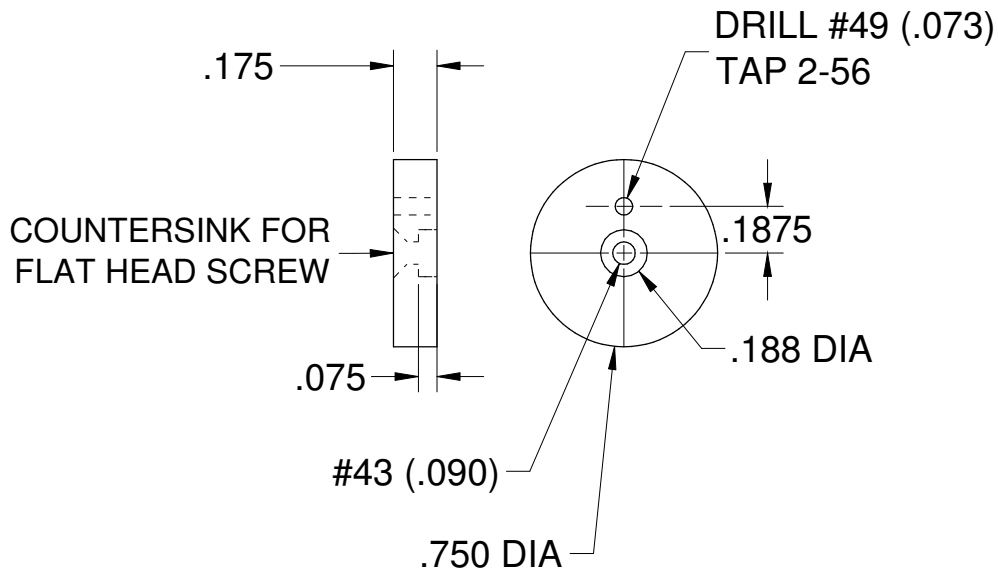
COUNTERSINK ONE SIDE OF ONE CAM SO THAT FLAT HEAD SCREWS FIT FLUSH.



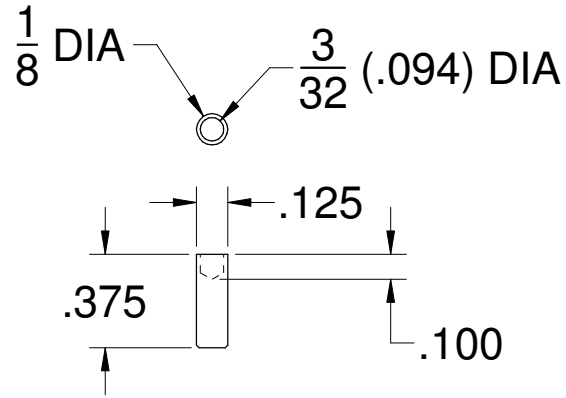
MODEL	PART/DRAWING #	QUANTITY REQUIRED
HALO	CAM	2
LAST REVISION	MATERIAL	STOCK DIMENTIONS
8/01/07	360 BRASS	7/8" ROUND BAR



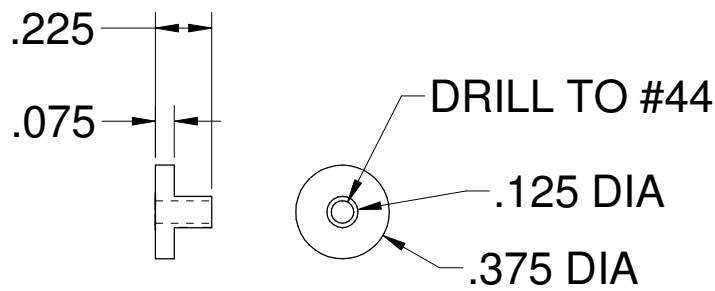
MODEL	PART/DRAWING #	QUANTITY REQUIRED
HALO	VALVE PLUNGER	10
LAST REVISION	MATERIAL	STOCK DIMENTIONS
8/01/07	360 BRASS	1/4" ROUND BAR



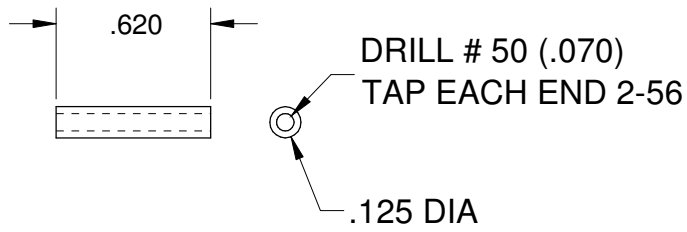
MODEL	PART/DRAWING #	QUANTITY REQUIRED
HALO	CRANK	1
LAST REVISION	MATERIAL	STOCK DIMENTIONS
8/01/07	STEEL	3/4" ROUND BAR



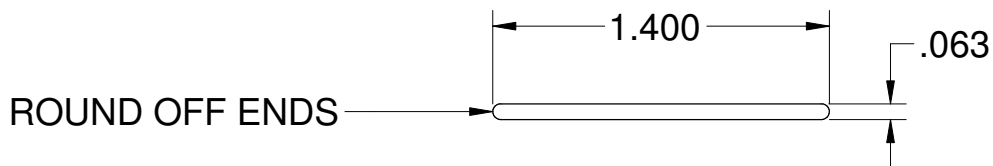
MODEL	PART/DRAWING #	QUANTITY REQUIRED
HALO	ROD PLUNGER	10
LAST REVISION	MATERIAL	STOCK DIMENTIONS
8/01/07	360 BRASS	1/8" RND BAR



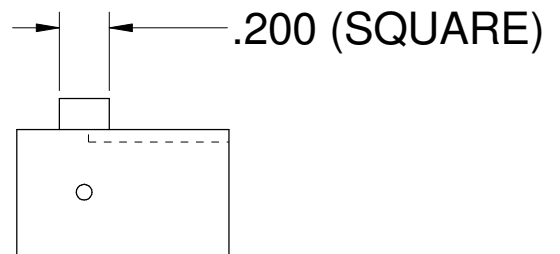
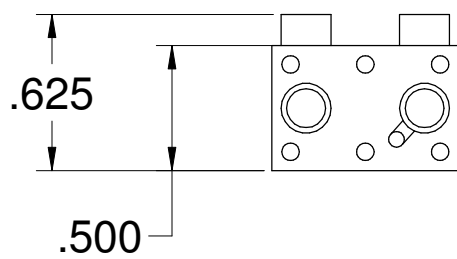
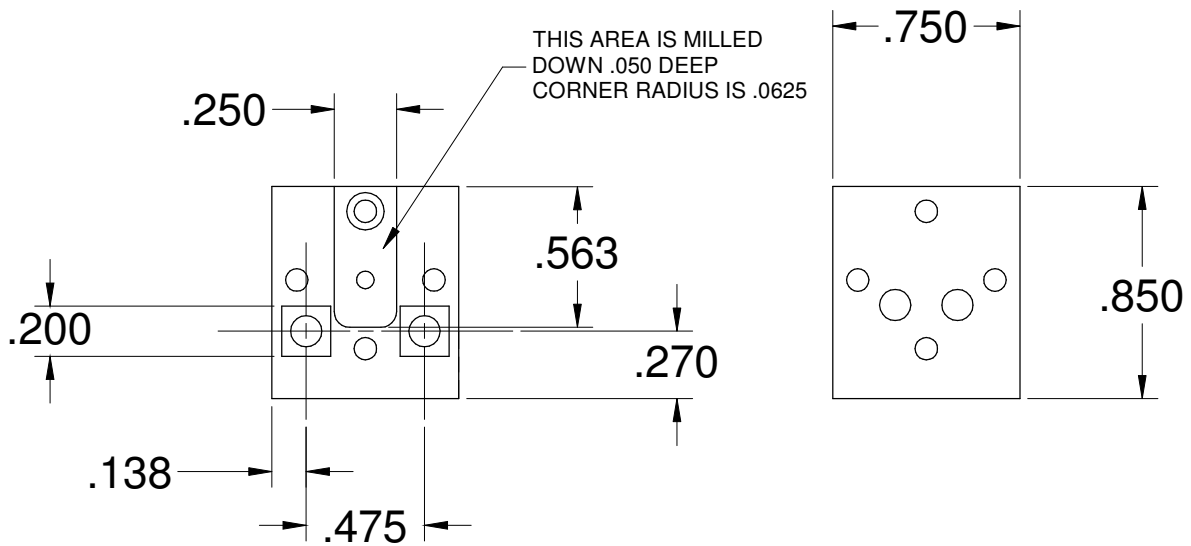
MODEL	PART/DRAWING #	QUANTITY REQUIRED
HALO	CRANK PIN	1
LAST REVISION	MATERIAL	STOCK DIMENTIONS
8/01/07	STEEL	3/8" ROUND BAR



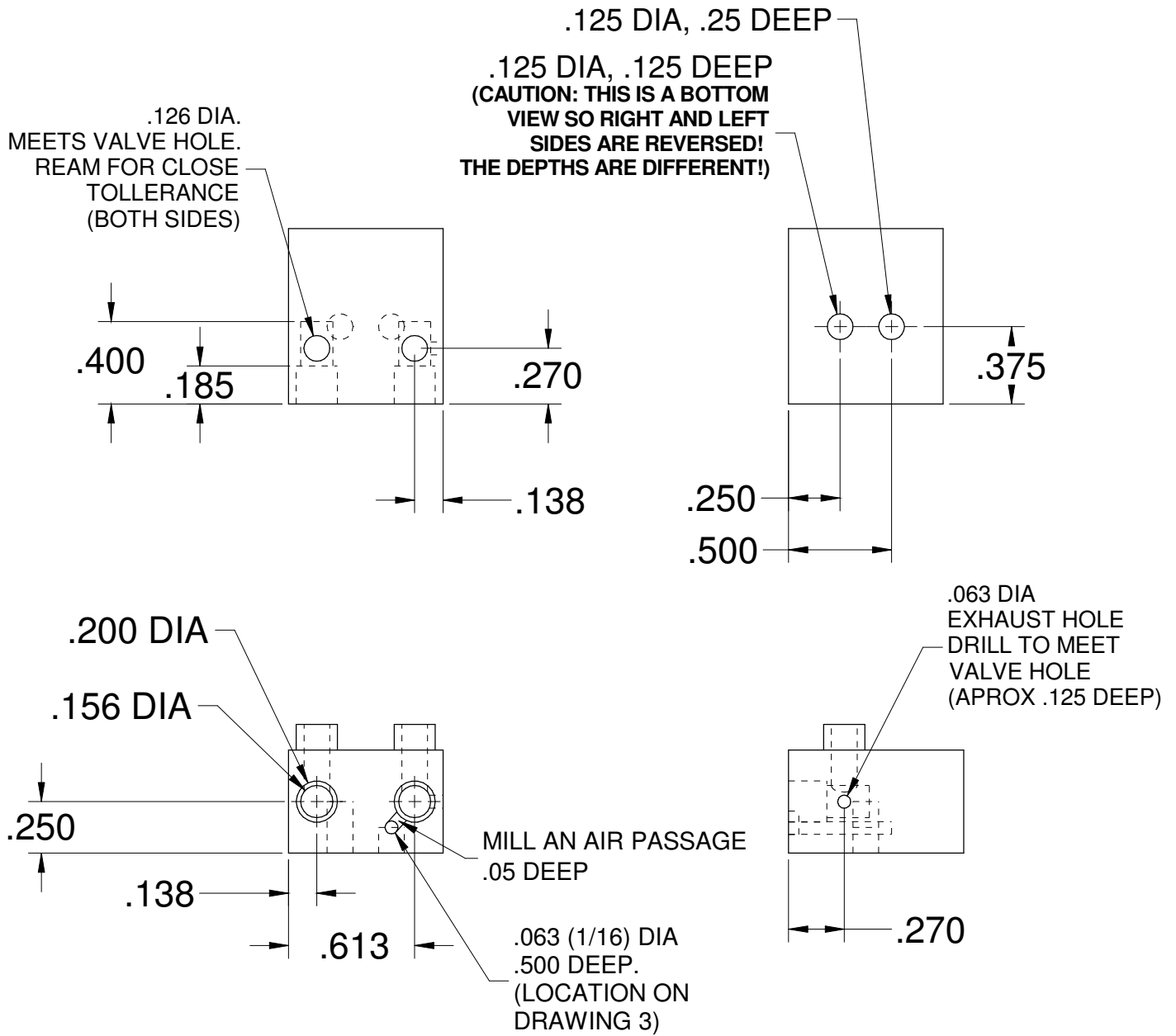
MODEL	PART/DRAWING #	QUANTITY REQUIRED
HALO	ROCKER ARM PIN	5
LAST REVISION	MATERIAL	STOCK DIMENTIONS
8/01/07	360 BRASS	1/8" ROD



MODEL	PART/DRAWING #	QUANTITY REQUIRED
HALO	ROD	10
LAST REVISION	MATERIAL	STOCK DIMENTIONS
8/01/07	STEEL	1/16" ROD



MODEL	PART/DRAWING #	QUANTITY REQUIRED
HALO	HEAD (DRAWING 1)	5
LAST REVISION	MATERIAL	STOCK DIMENTIONS
8/01/07	360 BRASS	3/4" SQUARE BAR

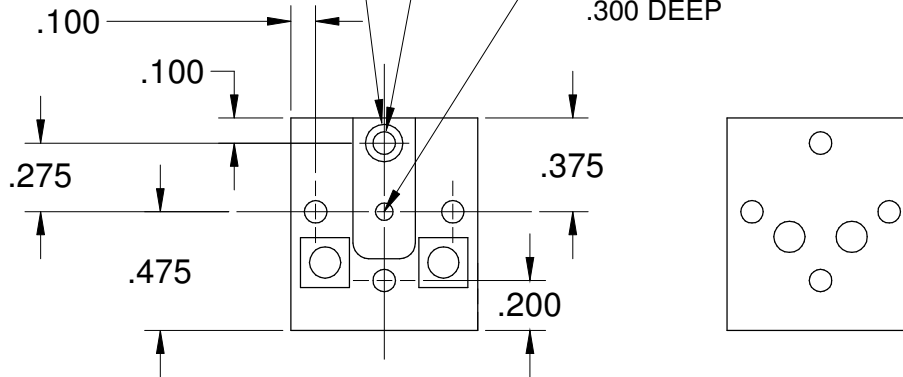


MODEL	PART/DRAWING #	QUANTITY REQUIRED
HALO	HEAD (DRAWING 2)	5
LAST REVISION	MATERIAL	STOCK DIMENTIONS
8/01/07	360 BRASS	3/4" SQUARE BAR

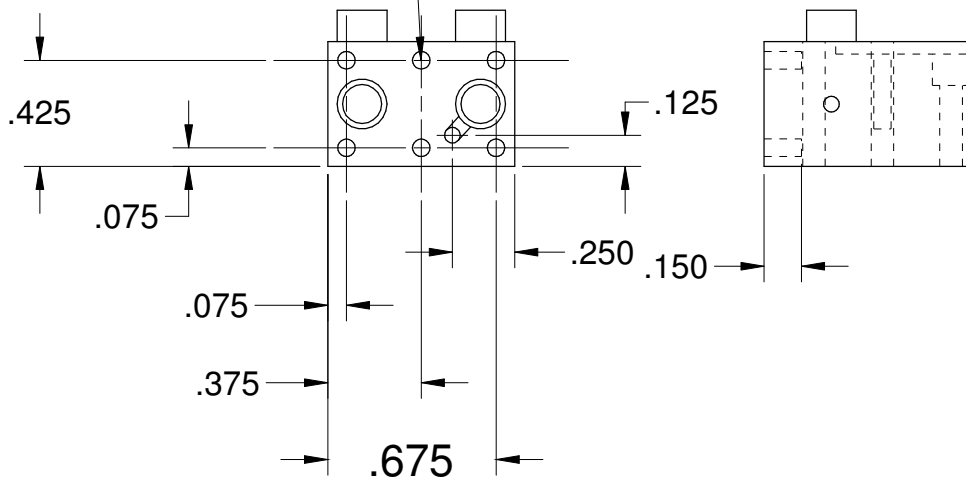
COUNTERSINK WITH #25 (.150)
.150 DEEP
THIS HOLE ONLY

DRILL FOUR MOUNTING
HOLES TO #43 (.090 DIA)
ALL THE WAY THROUGH

DRILL #50 (.070)
TAP 2-56
.300 DEEP



DRILL SIX HOLES TO # 50 (.070),
.150 DEEP. TAP TO 2-56 WITH BOTTOMING TAP.
THE CENTER HOLES CAN BE DRILLED DEEP
ENOUGH TO MEET THE MOUNTING HOLE.
THE CORNER HOLES MUST BE NO DEEPER
THAN .150



MODEL	PART/DRAWING #	QUANTITY REQUIRED
HALO	HEAD (DRAWING 3)	5
LAST REVISION	MATERIAL	STOCK DIMENTIONS
8/01/07	360 BRASS	3/4" SQUARE BAR

