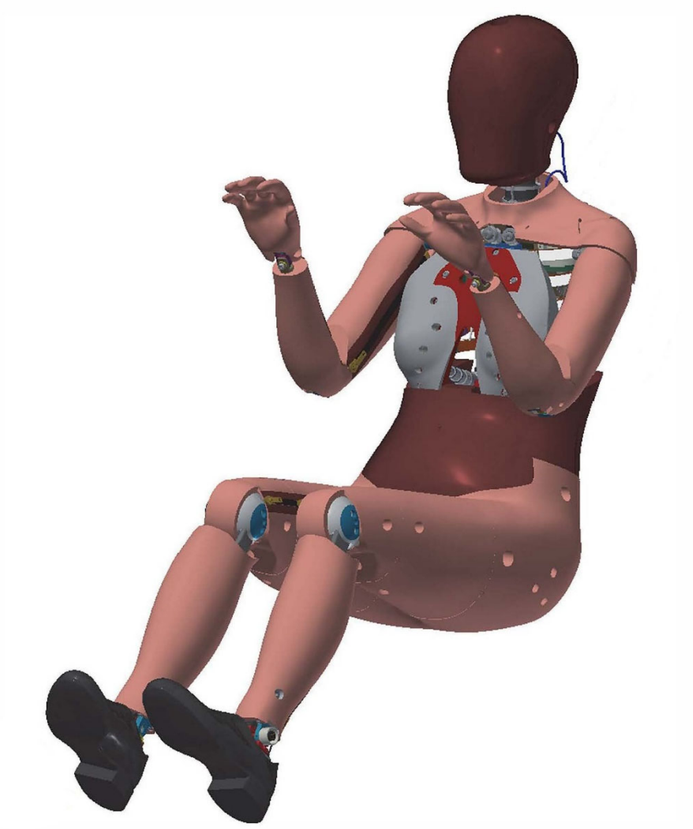
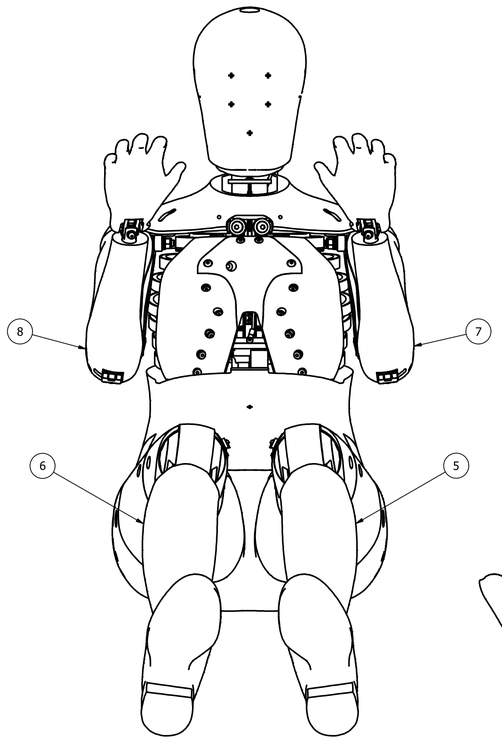
Drawings and Specifications for
THOR-05F Advanced Frontal Crash Test Dummy
THOR-05F Female

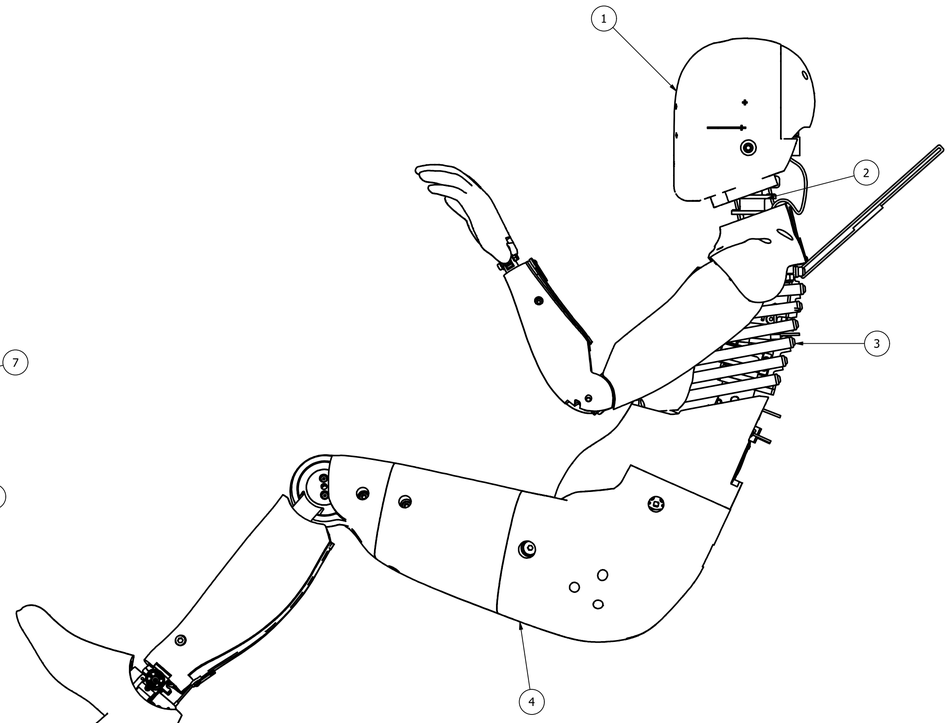


September 2019

Prepared by:
OFFICE OF CRASHWORTHINESS STANDARDS
and
VEHICLE RESEARCH and TEST CENTER
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AB	JW	5/3/2016







ITEM	QTY	PART NUMBER	DESCRIPTION
10	1	474-TOOLKIT	THOR-05F TOOLKIT (NOT SHOWN)
9	1	474-3800	JACKET ASSEMBLY (NOT SHOWN)
8	1	474-6000-2	RIGHT ARM ASSEMBLY
7	1	474-6000-1	LEFT ARM ASSEMBLY
6	1	474-5000-2	LEG ASSEMBLY, RIGHT
5	1	474-5000-1	LEG ASSEMBLY, LEFT
4	1	474-4000	PELVIS ASSEMBLY
3	1	474-3000	UPPER TORSO ASSEMBLY
2	1	474-2000	NECK ASSEMBLY
1	1	474-1000	HEAD ASSEMBLY

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.2, .XX ±.1, .XXX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: A. Barchock	5/3/2016
CHECKED	
ENG	
APPROVED	

MATERIAL
HEAT TREAT
FINISH

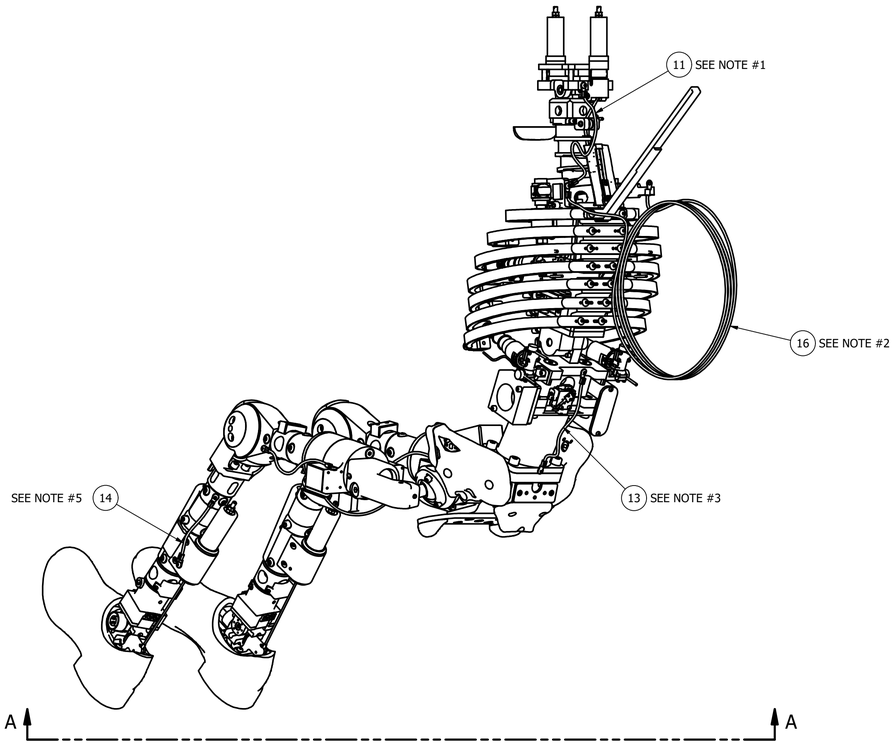
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

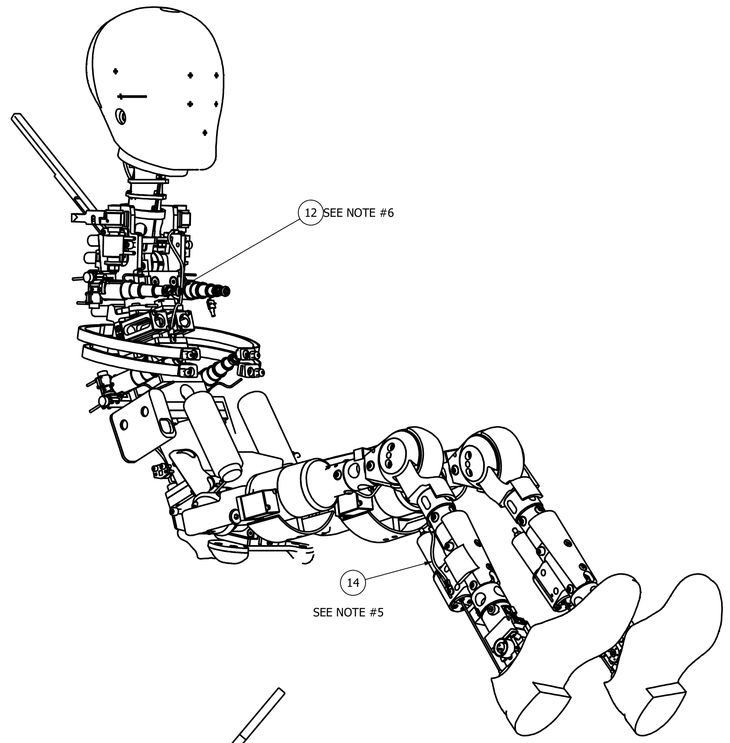
TOP ASSEMBLY, THOR-05F

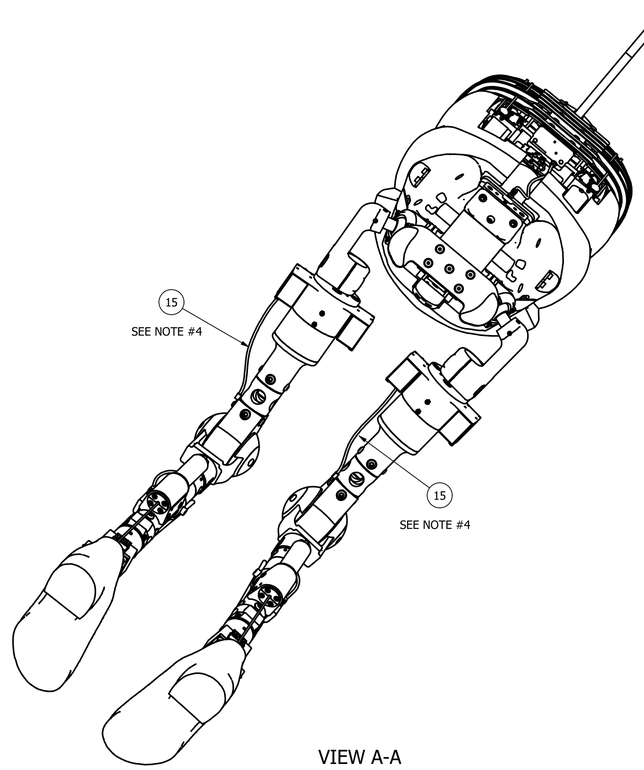
THIRD ANGLE PROJECTION

SIZE A1 | DRAWING NUMBER 474-0000 | REV 1

SCALE: .25:1 | SHEET 1 OF 6







VIEW A-A

NOTES:

1. 474-01AB ATTACHES TO THE 474-2302 HEAD/NECK MOUNTING PLATFORM AND TO THE 474-3100 UPPER SPINE BOX WITH THE HARDWARE PROVIDED.
2. 474-06AB ATTACHES TO THE 474-3100 UPPER SPINE BOX, SHARING THE 474-01AB HEAD/NECK GROUND CABLE CONNECTION, AND EXITS DUMMY TO THE SLED.
3. 474-03AB ATTACHES TO THE 474-3062 LUMBAR POSTURE ADJUSTMENT BASE PLATE AND TO THE 474-3204 BOTTOM LUMBAR PLATE WITH THE HARDWARE PROVIDED.
4. 474-05AB ATTACHES TO THE 474-5165 FEMUR CUP AND TO THE 474-5360 KNEE CAP WITH THE HARDWARE PROVIDED. (LEFT AND RIGHT)
5. 474-04AB ATTACHES TO THE 474-5508 TIBIA COMPLIANT ELEMENT ASSEMBLY AND TO THE 474-5504 LOWER ACHILLES SPRING HOUSING WITH THE HARDWARE PROVIDED. (LEFT AND RIGHT)
6. 474-02AB ATTACHES TO THE 474-3100 UPPER SPINE BOX AND TO THE 474-3101 LOWER SPINE BOX WITH THE HARDWARE PROVIDED.

SOME COMPONENTS NOT SHOWN FOR CLARITY

ITEM	QTY	PART NUMBER	DESCRIPTION
16	1	474-06AB	GROUND CABLE, EXIT
15	2	474-05AB	GROUND CABLE, UPPER LEG
14	2	474-04AB	GROUND CABLE, LOWER LEG
13	1	474-03AB	GROUND CABLE, LUMBAR
12	1	474-02AB	GROUND CABLE, THORAX
11	1	474-01AB	GROUND CABLE, HEAD/NECK

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS TOLERANCES ARE:
DECIMAL X ±.5 X.X ±.2 X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN A. Barchock	5/3/2016
CHECKED	
ENG	
APPROVED	

MATERIAL
HEAT TREAT
FINISH

TOP ASSEMBLY, THOR-05F
GROUND STRAP LOCATIONS

THIRD ANGLE PROJECTION

SIZE A1 | DRAWING NUMBER 474-0000 | REV 1

SCALE: .25:1 | SHEET 2 OF 6

ASSEMBLY WEIGHTS (kg)			
Description	**Part Number**	**MASS**	**TOLERANCE**
HEAD ASSEMBLY, THOR-05F	474-1000	TBD	TBD
NECK ASSEMBLY, THOR-05F	474-2000	TBD	TBD
UPPER TORSO ASSEMBLY, THOR-05F	474-3000	TBD	TBD
PELVIS ASSEMBLY, THOR-05F APTS SENSOR - 40mm DIA. X 125.25 LG.	474-4000 6004707	TBD	TBD
UPPER LEG ASSEMBLY, LEFT	474-5100-1	TBD	TBD
LOWER LEG ASSEMBLY, LEFT	474-5500-1	TBD	TBD
UPPER LEG ASSEMBLY, RIGHT	474-5100-2	TBD	TBD
LOWER LEG ASSEMBLY, RIGHT	474-5500-2	TBD	TBD
UPPER ARM ASSEMBLY, LEFT	474-6100-1	TBD	TBD
LOWER ARM ASSEMBLY, LEFT HAND, MOLDED, LEFT	474-6500-1 474-6900-1	TBD	TBD
UPPER ARM ASSEMBLY, RIGHT	474-6100-2	TBD	TBD
LOWER ARM ASSEMBLY, RIGHT HAND, MOLDED, RIGHT	474-6500-2 474-6900-2	TBD	TBD
JACKET ASSEMBLY	474-3800	TBD	TBD

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED 1.6 | ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL	CHECKED	
HEAT TREAT	ENG	
FINISH	APPROVED	

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: A. Barchock	5/3/2016

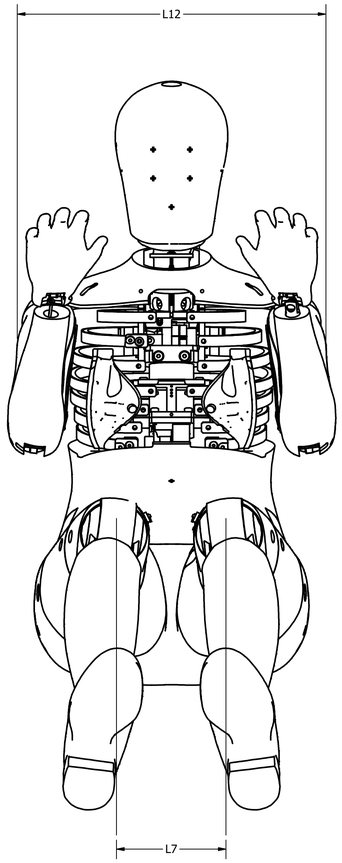
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

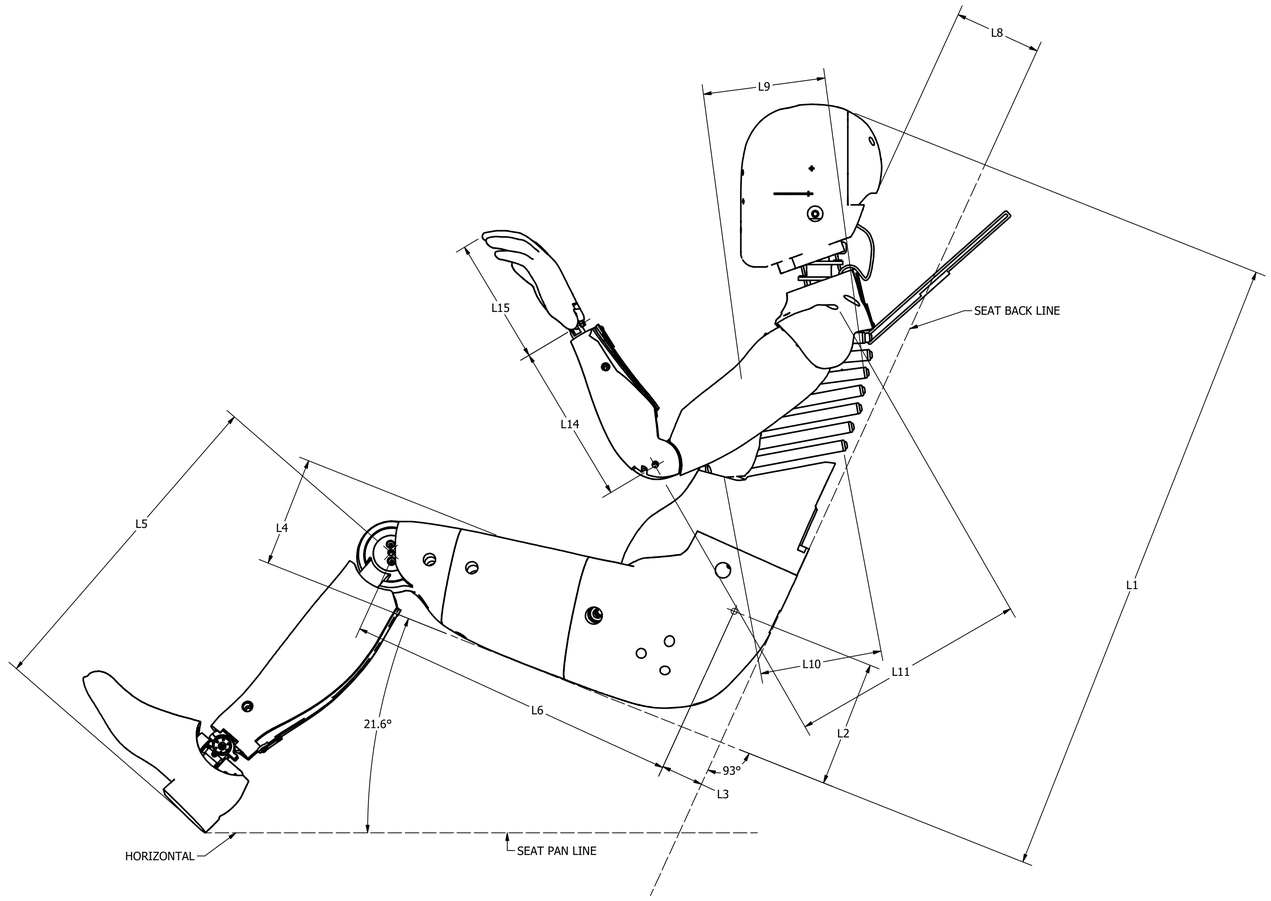
TOP ASSEMBLY, THOR-05F
C.G. & WEIGHT SPECS

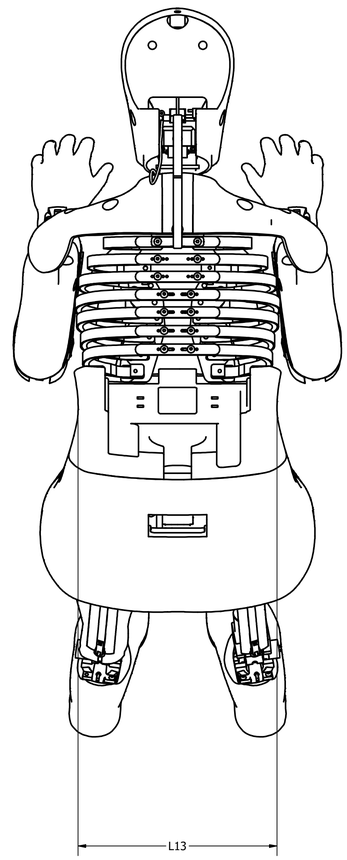
THIRD ANGLE PROJECTION

SIZE	DRAWING NUMBER	REV
A3	474-0000	1

SCALE: .25:1 | SHEET 3 OF 6







USE 472-8520 (THOR-50M MEASUREMENT CHAIR) TO SET UP EXTERNAL MEASUREMENT PROCEDURE.

Linear Measurement Values

Linear Parameter, mm.	Symbol	Specificatio	Actual Value Center, m	Actual Value Left, m	Acutal Value Right,
Seated height	L1	TBD		n/a	n/a
Hip pivot height	L2	TBD	n/a		
Hip pivot to seat back	L3	TBD	n/a		
Thigh clearance	L4	TBD	n/a		
Knee pivot to bottom of foot	L5	TBD	n/a		
Knee pivot to hip pivot	L6	TBD	n/a		
Knee centerline to knee centerline (set-up dimension)	L7	TBD		n/a	n/a
Head back to seat back	L8	TBD		n/a	n/a
Rib 3 depth	L9	TBD	n/a		
Rib 7 depth	L10	TBD	n/a		
Shoulder-Elbow length	L11	TBD	n/a		
Width across arms	L12	TBD		n/a	n/a
Waist Width	L13	TBD		n/a	n/a
Back of elbow to wrist pivot	L14	TBD	n/a		
Wrist pivot to tip of middle finger	L15	TBD	n/a		

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL X.X ±.5 X.XX ±.2 X.XXX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN A. Barchock	5/3/2016
CHECKED	
ENG	
APPROVED	

MATERIAL
HEAT TREAT
FINISH

TOP ASSEMBLY, THOR-05F
EXTERNAL DIMENSIONS

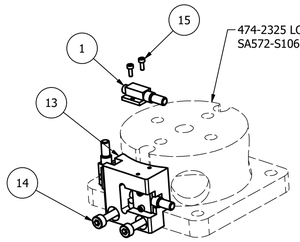
THIRD ANGLE PROJECTION

SIZE A1 | DRAWING NUMBER 474-0000 | REV 1

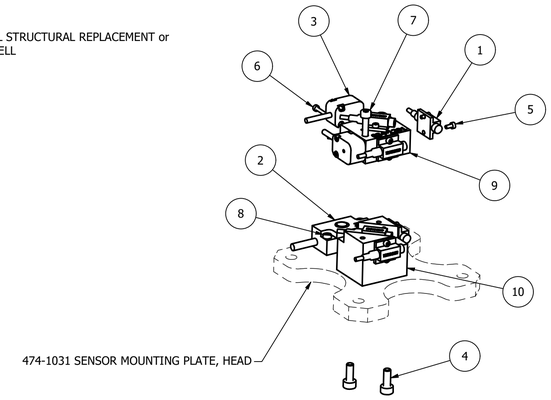
SCALE: .25:1 | SHEET 4 OF 6

INSTRUMENTATION PARTS LIST

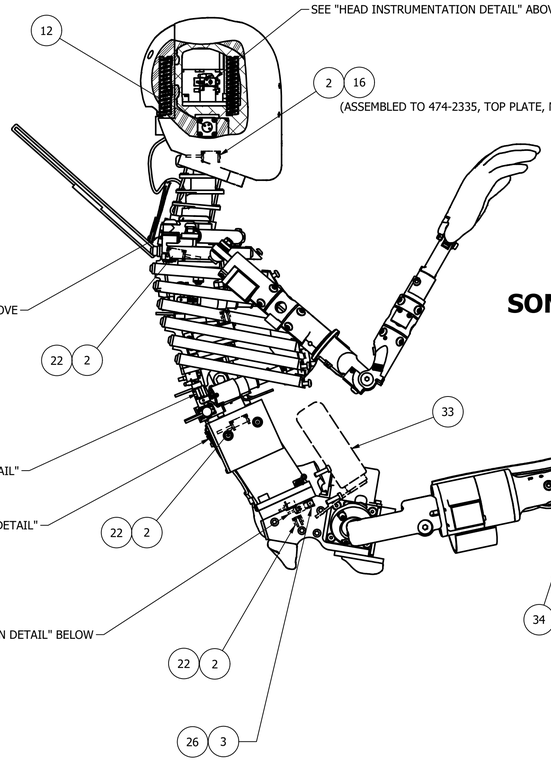
ITEM	QTY	PART NO	DESCRIPTION	HEAD QTY	NECK QTY	UP TOR QTY	PELVIS QTY	LEG QTY
1	29	SA572-S4	UNIAXIAL PIEZORESISTIVE ACCELEROMETER	6	3	7	3	10
2	8	SA572-S44	TILT SENSOR DUAL AXIS	1	1	3	1	2
3	15	SA572-S58	ANGULAR RATE SENSOR - 18K	3		3	3	6
4	2	5000388	M3x0.5 x 8 SHCS	2				
5	36	5000068	M1.4x0.3 x 3 SHCS	12		6	6	12
6	18	5000727	M1.4x0.3 X 8 SHCS	6				12
7	8	5000069	M2.5x0.45 x 16 SHCS	2		2		4
8	2	5000253	M2x0.4 x 12 CHMSS	2				
9	3	SA572-S87	6 AXIS ACCEL/ARS MOUNT	1				2
10	1	SA572-S167	ACCEL MOUNT, THOR-05F	1				
11	5	SA572-S161	FACE LOAD CELL ASSEMBLY	5				
12	7	SA572-S114	ROTARY POTENTIOMETER		1			6
13	1	SA572-S168	ACCEL MOUNT, T1		1			
14	2	5001103	M3 x 0.5 x 12 SHCS		2			
15	22	5000375	M1.4 x 0.3 x 4 LG SHCS		6	8		8
16	4	5000382	M2 x 0.4 x 12 LG SHCS		2	2		
17	1	SA572-S105	LOAD CELL, UPPER NECK		1			
18	1	SA572-S106	LOAD CELL, LOWER NECK		1			
19	2	SA572-S112	.850" SKULL SPRING LOAD CELL		2			
20	1	SA572-S165	LOAD CELL, CLAVICLE, LEFT			1		
21	1	SA572-S166	LOAD CELL, CLAVICLE, RIGHT			1		
22	10	5000215	M2x0.4 x 10 SHCS			4	2	4
23	2	SA572-S80M	S4 TRIAXIAL ACCELEROMETER MOUNTING BLOCK (METRIC)			1	1	
24	1	SA572-S169	ACCEL/ARS MOUNT, UPPER TORSO			1		
25	2	5001376	M2.5x0.45 x 14 SHCS			2		
26	12	5000912	M1.4x0.3 X 10 SHCS			6	6	
27	1	SA572-S107	LOAD CELL, THORACIC SPINE, THOR-05F			1		
28	1	SA572-S159	LOAD CELL, ASIS, LEFT				1	
29	1	SA572-S160	LOAD CELL, ASIS, RIGHT				1	
30	2	5000807	M2.5 x 0.45 x 14 LG SHCS SS				2	
31	1	SA572-S108	ACETABULUM LOAD CELL, RIGHT				1	
32	1	SA572-S109	ACETABULUM LOAD CELL, LEFT				1	
33	2	SA572-S162	APTS SENSOR - THOR-05F (40mm DIA x 125.25 LG)				2	
34	2	SA572-S63	LOAD CELL, FEMUR, THOR-05F					2
35	2	SA572-S90	POTENTIOMETER, STRING, MINI, UNIVERSAL					2
36	4	9002185	#2-56 x 1/8 LG FHMSP SS					4
37	2	SA572-S103	UPPER TIBIA LOAD CELL					2
38	2	SA572-S90	LOWER TIBIA LOAD CELL					2
39	2	SA572-S126	1.0 ACHILLES LOAD CELL					2



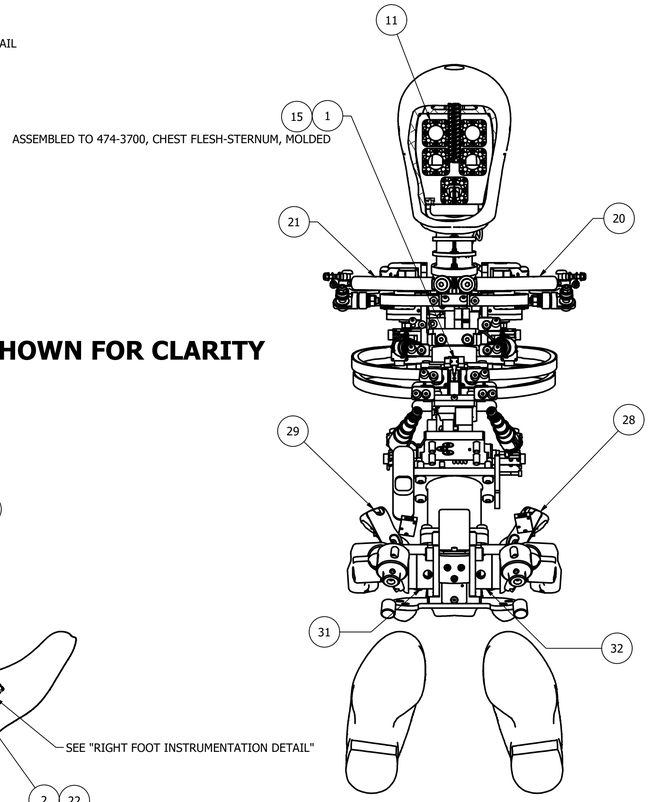
T1 INSTRUMENTATION DETAIL
SCALE 3/4



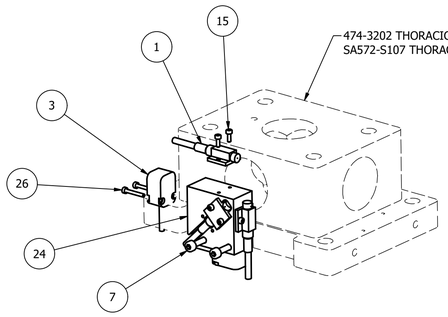
HEAD INSTRUMENTATION DETAIL
SCALE 3/4



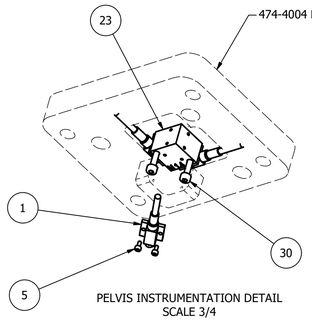
SOME COMPONENTS NOT SHOWN FOR CLARITY



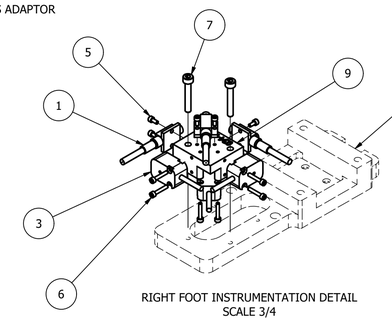
MIDSPINE INSTRUMENTATION DETAIL
SCALE 3/4



LUMBAR INSTRUMENTATION DETAIL
SCALE 3/4



PELVIS INSTRUMENTATION DETAIL
SCALE 3/4



RIGHT FOOT INSTRUMENTATION DETAIL
SCALE 3/4

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.2, .XX ±.1, .XXX ±.1
MACHINED ∠C ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

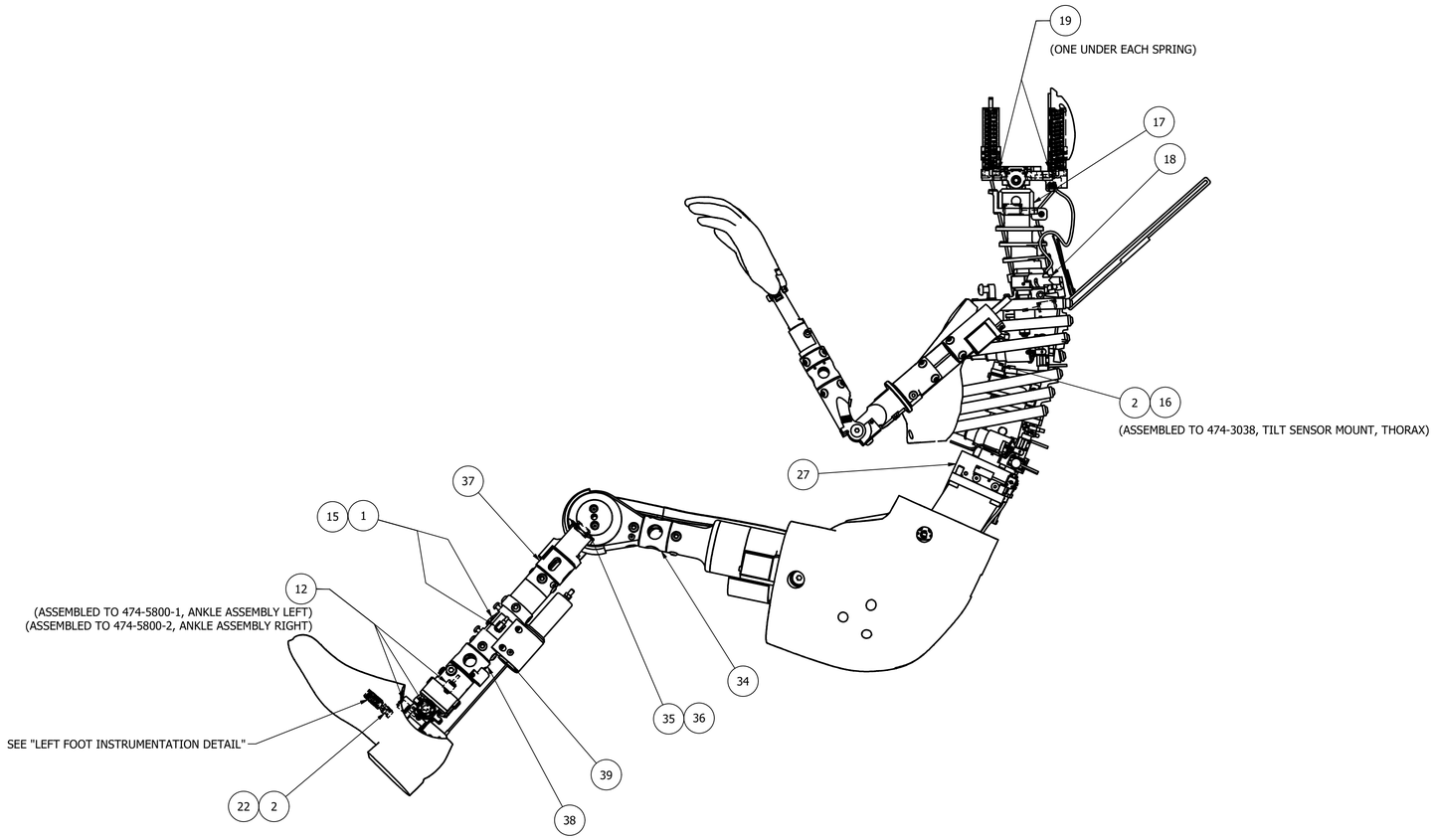
TOP ASSEMBLY, THOR-05F
INSTRUMENTATION LOCATIONS & DATA

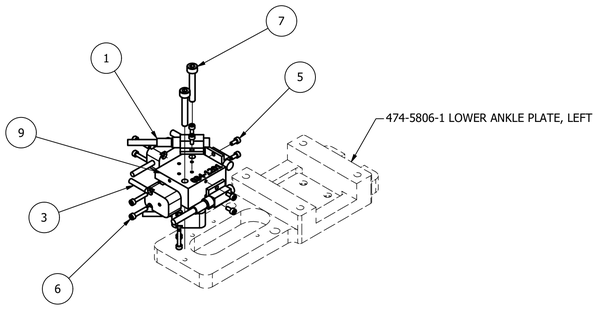
	APPROVALS	DATE
DRAWN	A. Barchock	5/3/2016
CHECKED		
ENG		
APPROVED		

MATERIAL
HEAT TREAT
FINISH

THIRD ANGLE PROJECTION

SIZE A1 | DRAWING NUMBER 474-0000 | REV 1
SCALE: .25:1 | SHEET 5 OF 6





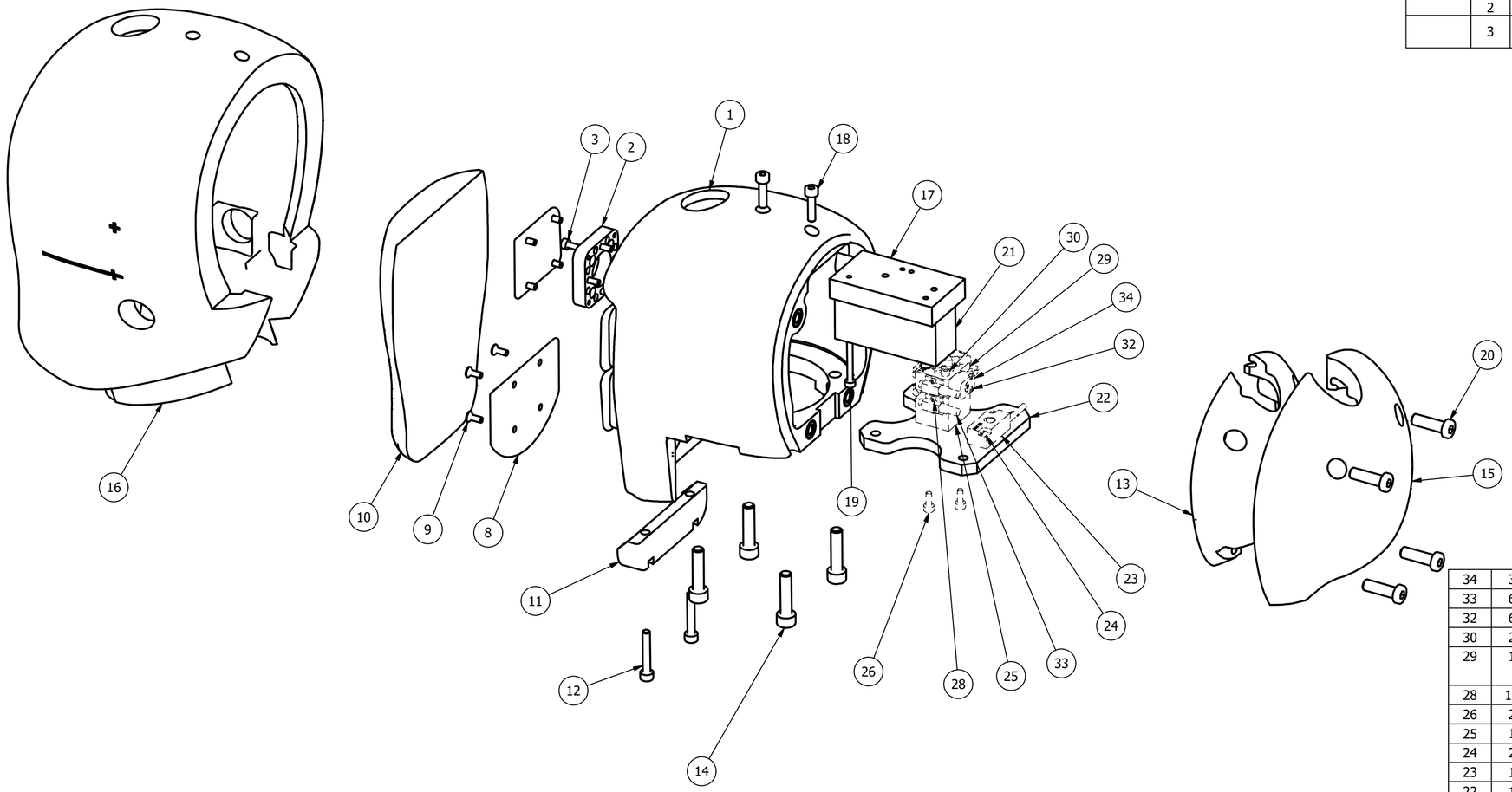
LEFT FOOT INSTRUMENTATION DETAIL
SCALE 3/4

SOME COMPONENTS NOT SHOWN FOR CLARITY
USE INSTRUMENTATION PARTS LIST ON SHEET 5 of 6

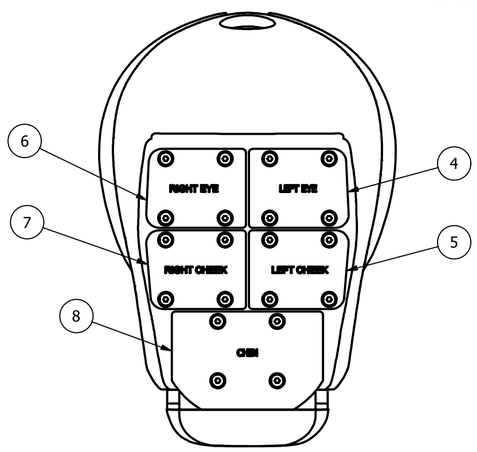
PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS TOLERANCES ARE: DECIMALS X ±.1, X.X ±.2, X.XX ±.1 | MACHINED \^C ANGLES ±.5° ASME Y14.5M - 1994 DO NOT SCALE DRAWING	VEHICLE RESEARCH and TEST CENTER	NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
	APPROVALS / DATE	TOP ASSEMBLY, THOR-05F INSTRUMENTATION LOCATIONS & DATA
MATERIAL	DRAWN: A. Barchock 5/3/2016	
HEAT TREAT	CHECKED	SIZE A1 · DRAWING NUMBER 474-0000 · REV 1
FINISH	ENG	THIRD ANGLE PROJECTION · SCALE: .25:1 · SHEET 6 OF 6
	APPROVED	

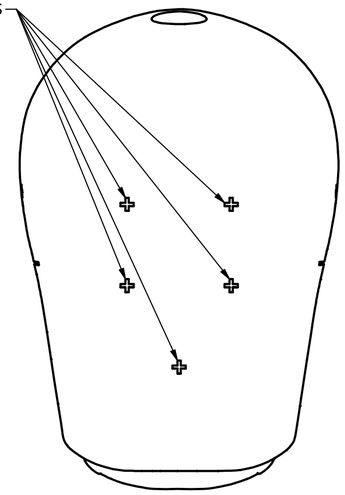
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/5/2016
	2	ADDED PATENT INFORMATION	AT	JW	7/12/2018
	3	REMOVED PATENT INFORMATION; 474-1402 WAS 474-1401	KMSP	JW	8/28/2018

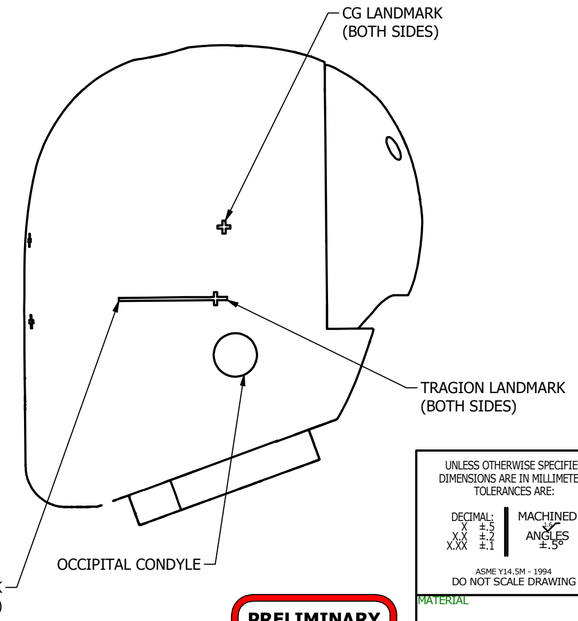


PARTS LIST				
ITEM	QTY	PART NUMBER	DESCRIPTION	
1	1	474-1010	SKULL, MACHINED	
2	5	474-1005	FACE LOAD CELL REPLACEMENT	
3	20	5000119	M3 X 0.5 X 10 LG. SHCS	
4	1	474-1412-1	LEFT EYE LOAD CELL PLATE	
5	1	474-1414-1	LEFT CHEEK LOAD CELL PLATE	
6	1	474-1412-2	RIGHT EYE LOAD CELL PLATE	
7	1	474-1414-2	RIGHT CHEEK LOAD CELL PLATE	
8	1	474-1416	CHIN LOAD CELL PLATE	
9	20	5000116	M3 X 0.5 X 8 LG. FHCS	
10	1	474-1402	FACE FOAM	
11	1	474-1411	CHIN GUARD	
12	2	5000461	M4 X 0.7 X 25 LG. SHCS	
13	1	474-1020	SKULL CAP, MACHINED	
14	4	5000133	M6 X 1 X 25 LG. SHCS	
15	1	474-1025	CAP SKIN	
16	1	474-1008	HEAD SKIN, MOLDED	
17	1	474-1051	BALLAST/ON BOARD DAS MOUNT	
18	2	5000025	M4 X 0.7 X 16 LG. SHCS	
19	4	5000988	M3 X 0.5 X 35 LG. SHCS	
20	4	5001316	M6 X 1 X 20 LG. LHCS	
21	1	474-1033	ON BOARD DAS STRUCTURAL REPLACEMENT	
22	1	474-1031	SENSOR MOUNTING PLATE, HEAD	
23	1	SA572-S44	TILT SENSOR, DUAL AXIS	(REF)
24	2	5000253	M2 X 0.4 X 12 LG. CHMSS ZINC	(REF)
25	1	SA572-S167	ACCEL MOUNT, (7264C)	(REF)
26	2	5000388	M3 X 0.5 X 8 LG. SHCS	(REF)
28	12	5000068	M1.4 X 0.3 X 3 LG. SHCS	(REF)
29	1	SA572-S87	6 AXIS ACCEL/ARS MOUNT, (7264-2000), HEAD & PELVIS, Q DUMMIES	(REF)
30	2	5000069	M2.5 X 0.45 X 16 LG. SHCS	(REF)
32	6	5000727	M1.4 X 0.3 X 8 LG. SHCS	(REF)
33	6	SA572-S4	UNIAXIAL PIEZORESISTIVE ACCELEROMETER	(REF)
34	3	SA572-S58	ANGULAR RATE SENSOR	(REF)



HEAD SKIN REMOVED





PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ∠ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

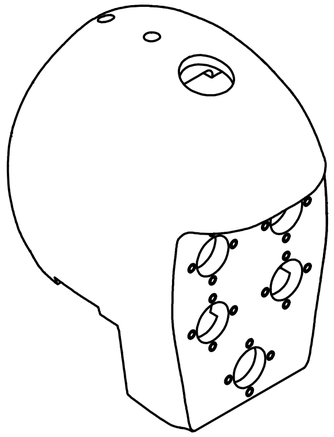
APPROVALS	DATE
DRAWN B. KIMES	4/5/2016
CHECKED	
ENG	
APPROVED	

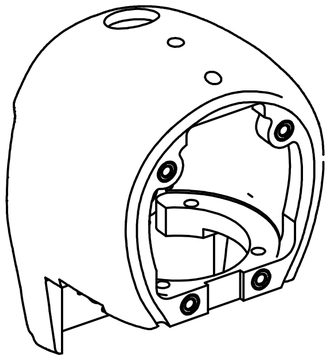
MATERIAL
HEAT TREAT
FINISH

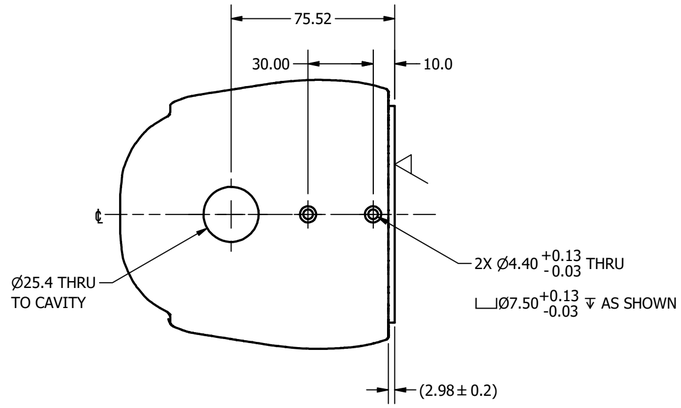
HEAD ASSEMBLY
THOR-05F

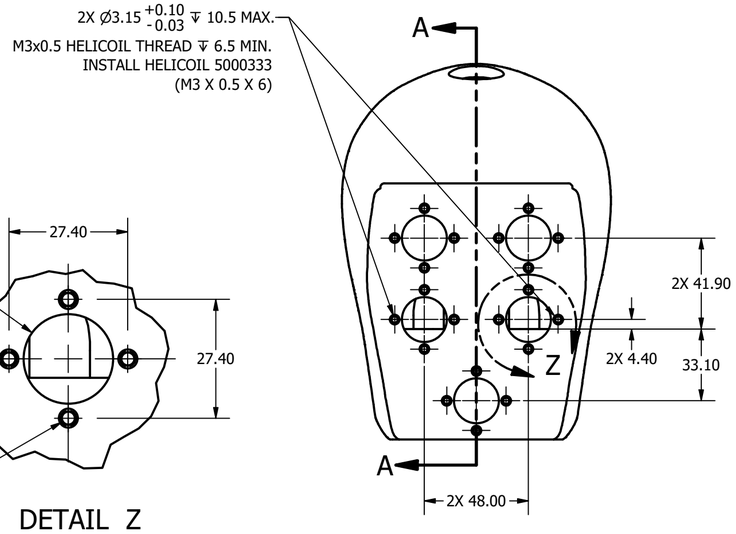
THIRD ANGLE PROJECTION
SIZE A2
DRAWING NUMBER 474-1000
REV 3
SCALE: 1/2
SHEET 1 OF 1

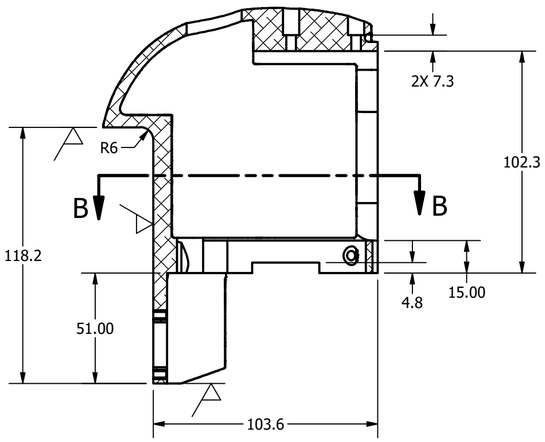
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE TO PROTOTYPE	BK	JW	4/4/2016

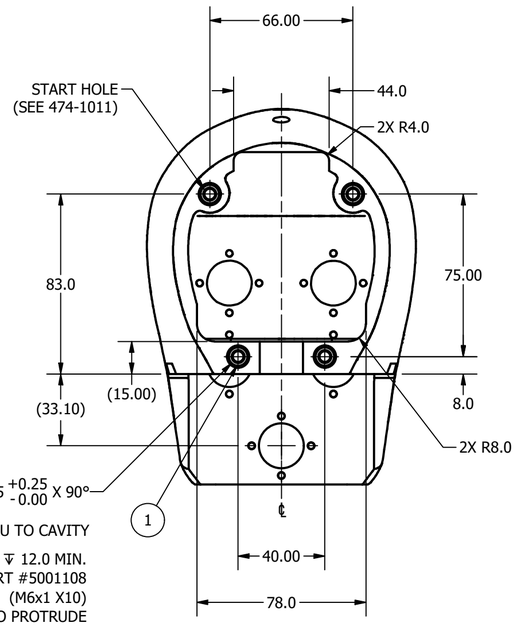


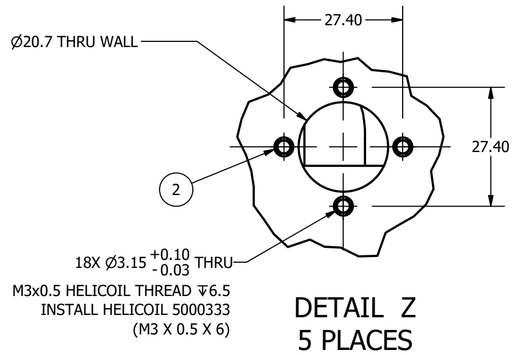




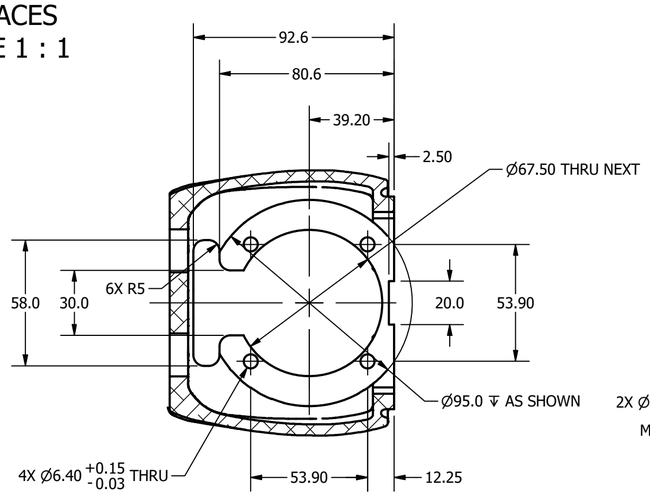




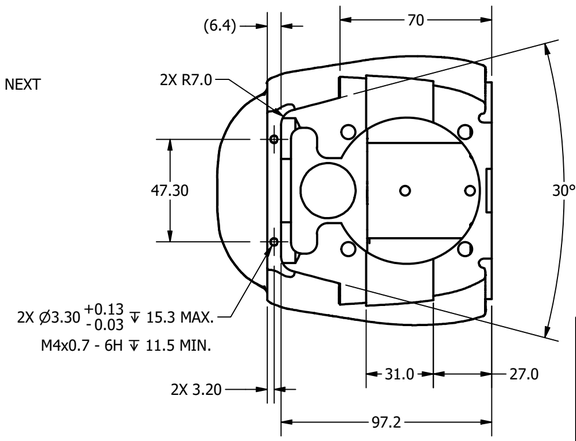




DETAIL Z
5 PLACES
SCALE 1 : 1



SECTION B-B



SECTION A-A

ITEM	QTY	PART NUMBER	DESCRIPTION
2	20	5000333	HELICOIL, M3 X 0.5 X 6
1	4	5001108	M6 X 1 X 10 LG. LIGHTWEIGHT KEENSERT

PARTS LIST

NOTES:

1. MAKE FROM 474-1011, MODIFY AS SHOWN (SEE DRAWING FOR START POINT).
2. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ∠ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTES
HEAT TREAT:
FINISH:

	APPROVALS	DATE
DRAWN	B. KIMES	4/4/2016
CHECKED		
ENG		
APPROVED		

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

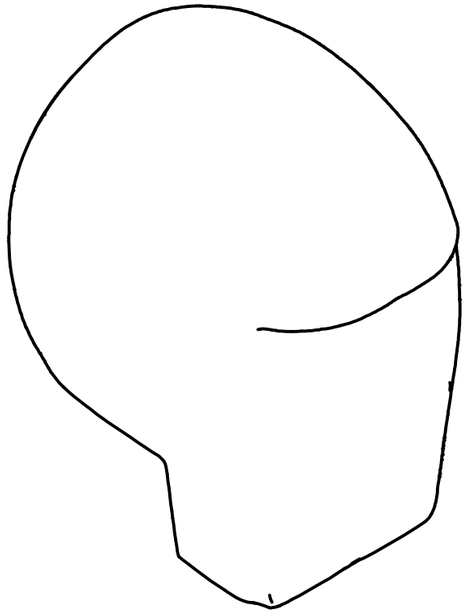
SKULL, MACHINED
THOR-05F

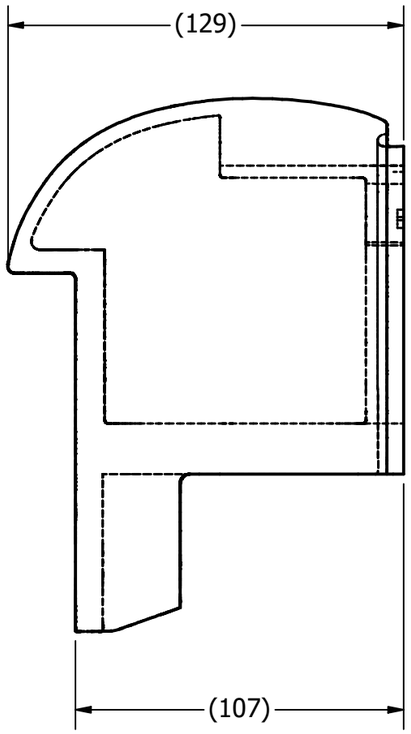
THIRD ANGLE PROJECTION

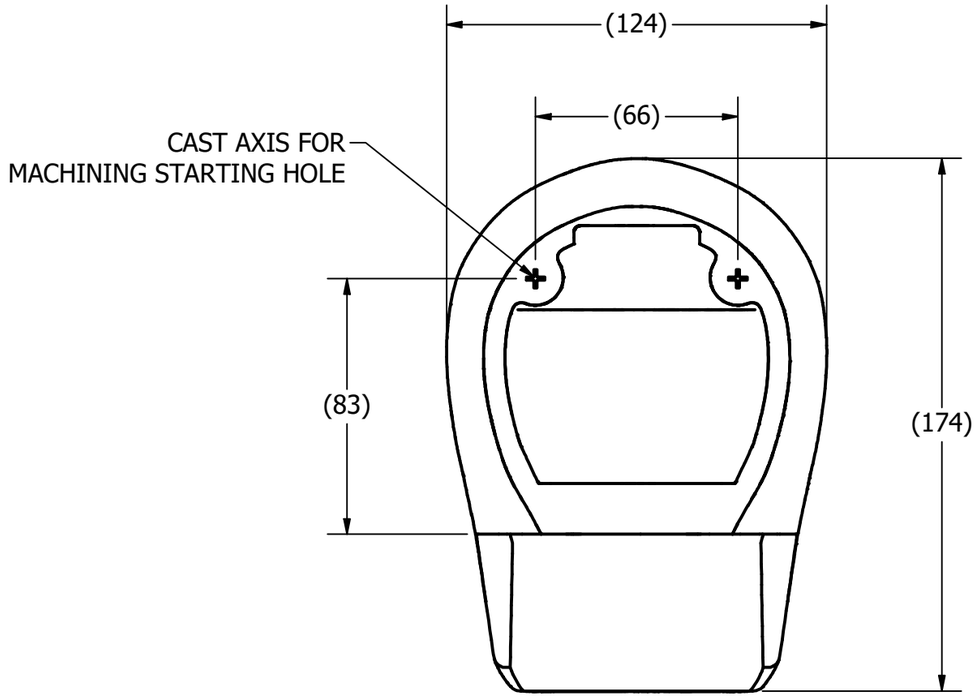
SIZE: A2 | DRAWING NUMBER: 474-1010 | REV: 1

SCALE: .5:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/4/2016







NOTES:

1. REMOVE ALL CAST FLASHING

2. ALL CAST DIMENSION TOLERANCE ±2% BUT NO SMALLER THAN 0.5mm

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 357 CAST ALUMINUM
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: B. KIMES	4/4/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

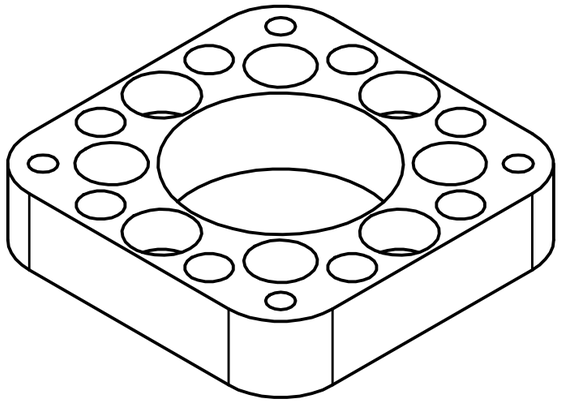
SKULL, CAST

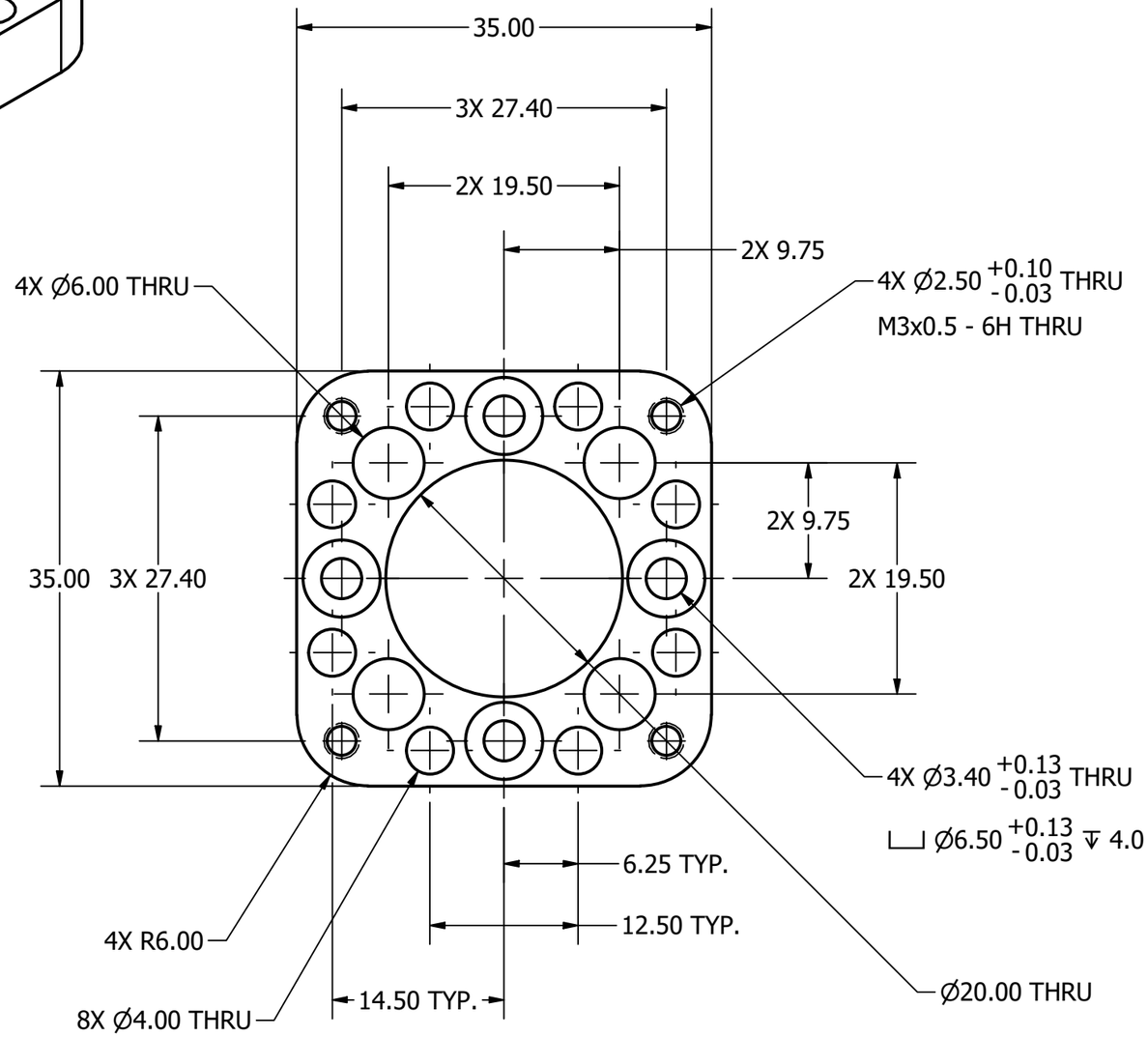
THIRD ANGLE PROJECTION

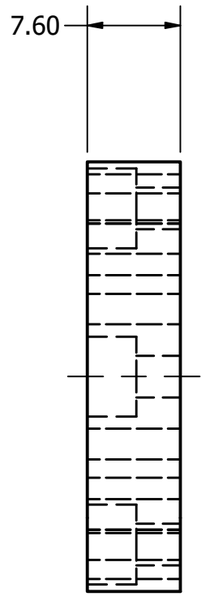
SIZE: A3 | DRAWING NUMBER: 474-1011 | REV: 1

SCALE: .5:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH		4/26/2016







PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED √ ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 1018 STEEL

HEAT TREAT:

FINISH: 0.008mm ELECTROLESS NICKEL PLATE PER SIDE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN NKD	3/4/2015
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

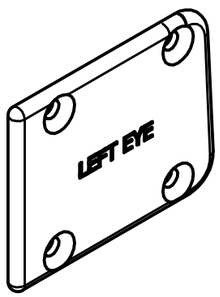
FACE LOAD CELL REPLACEMENT

THIRD ANGLE PROJECTION

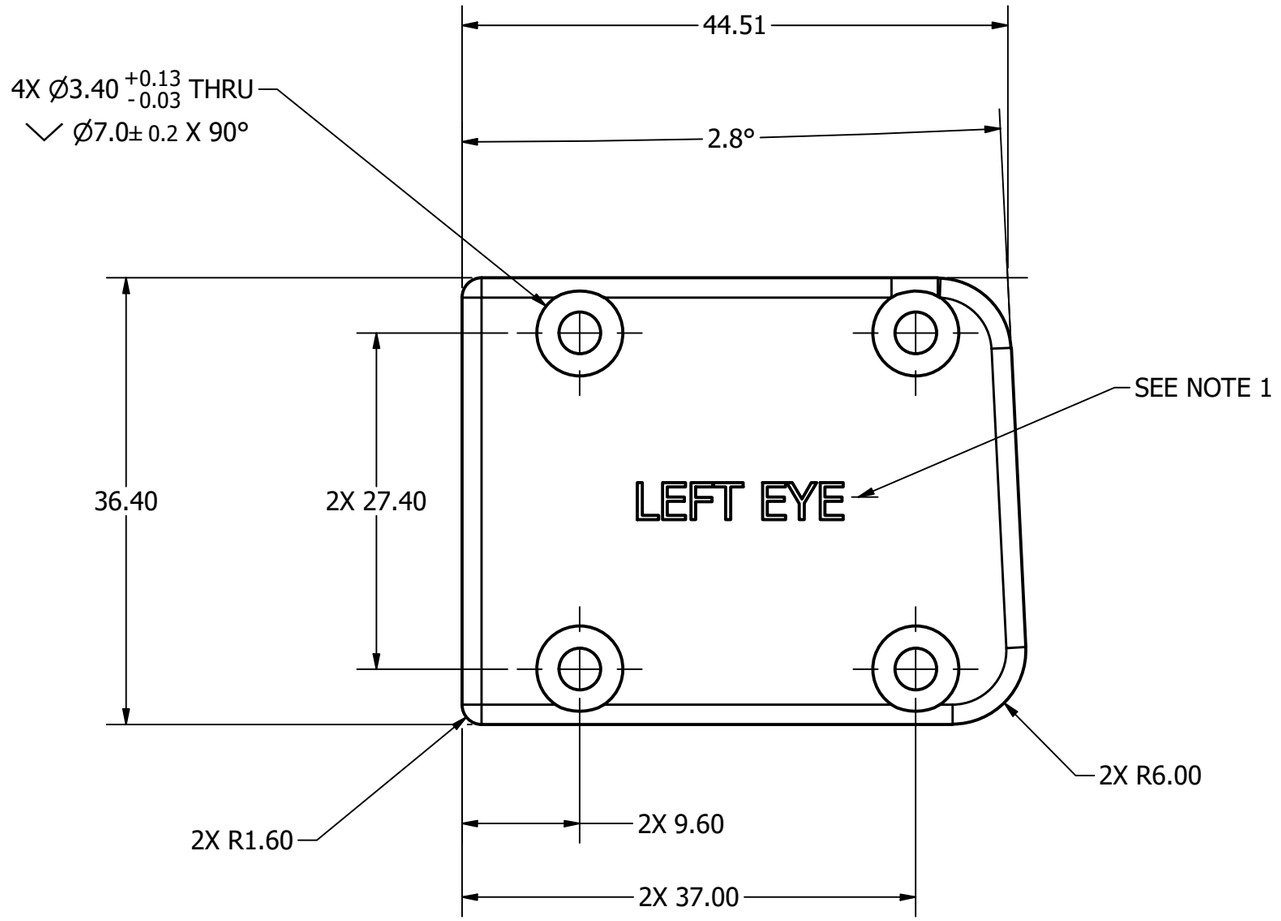
SIZE: A3 | DRAWING NUMBER: 474-1005 | REV: 1

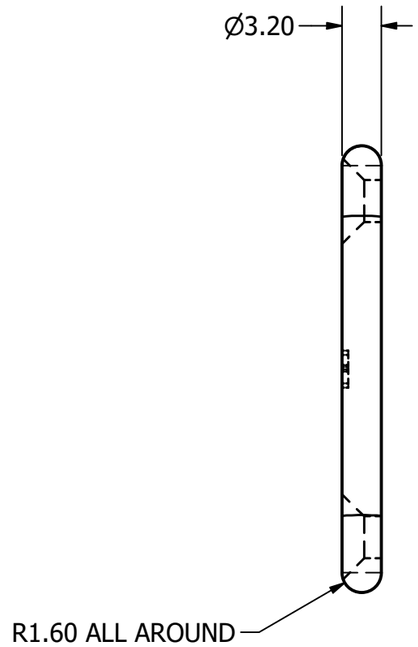
SCALE: 2:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE TO PROTOTYPE	JH		4/27/2016



SCALE 1:1





NOTES:

1. STAMP OR ETCH "LEFT EYE" (3mm CHARACTERS) AS SHOWN.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED √ ±.5°
ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN NKD	3/3/2015
CHECKED	
ENG	
APPROVED	

MATERIAL: 6061-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

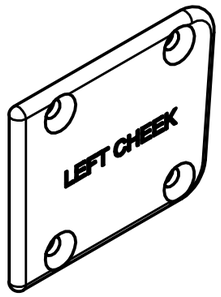
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

LEFT EYE LOAD CELL PLATE

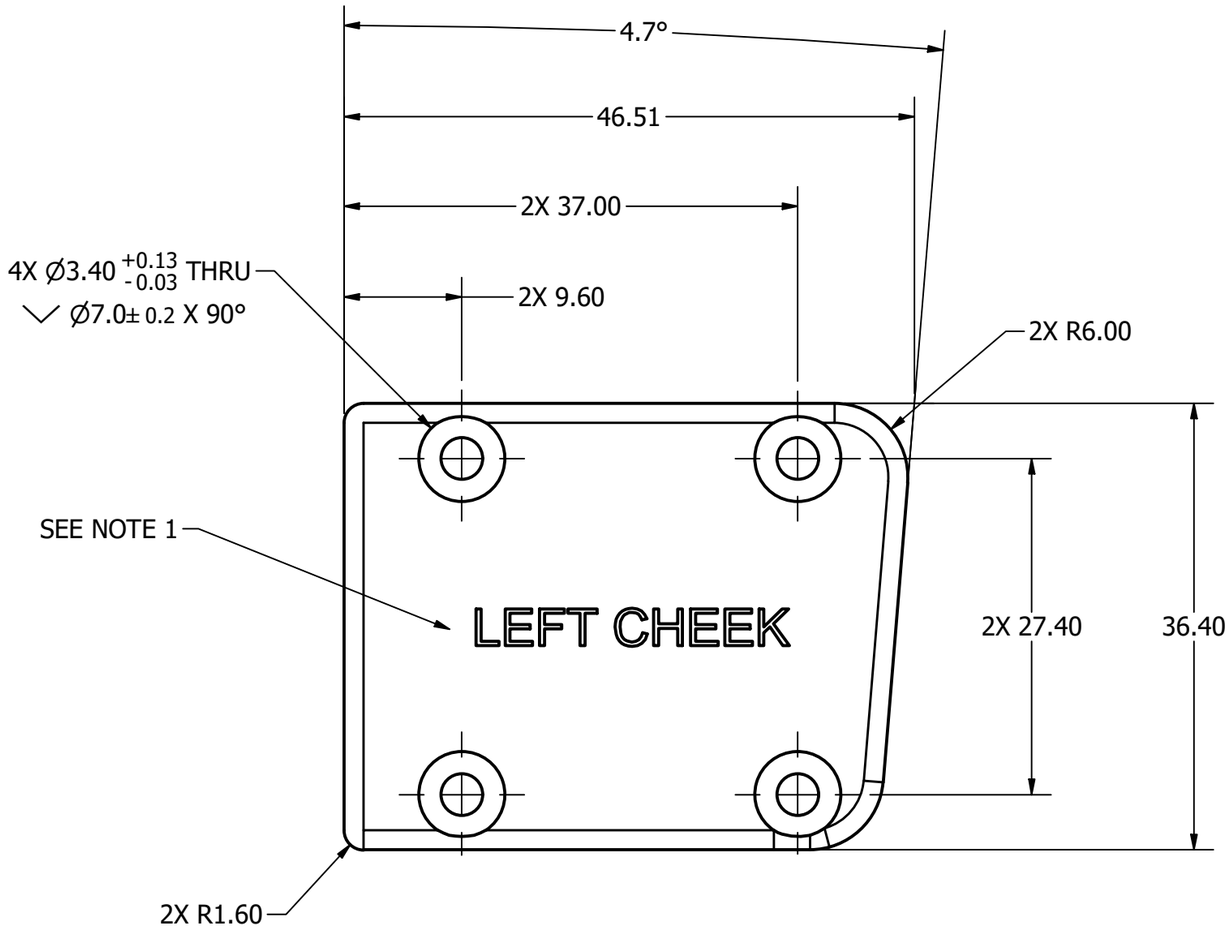
THIRD ANGLE PROJECTION

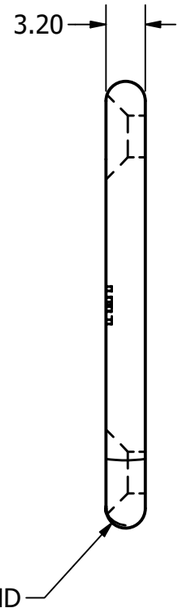
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SCALE: 2:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH		4/27/2016



SCALE 1:1





NOTES:

1. STAMP OR ETCH "LEFT CHEEK" (3mm CHARACTERS) AS SHOWN.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED √ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN NKD	3/4/2015
CHECKED	
ENG	
APPROVED	

MATERIAL: 6061-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

DEPARTMENT OF TRANSPORTATION UNITED STATES OF AMERICA

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

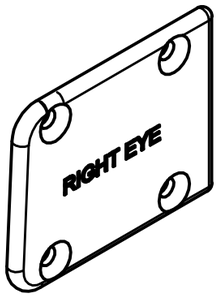
LEFT CHEEK LOAD CELL PLATE

THIRD ANGLE PROJECTION

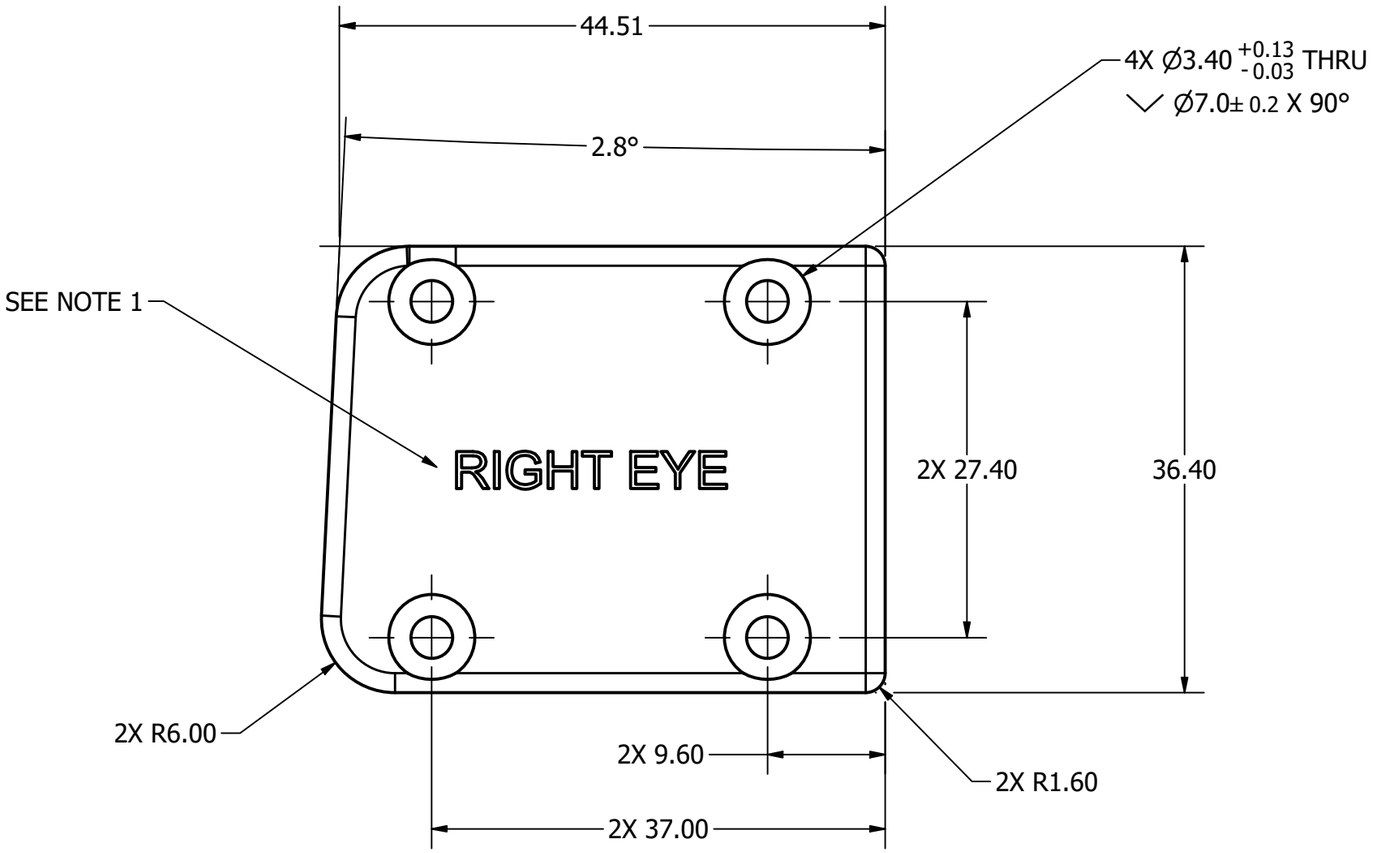
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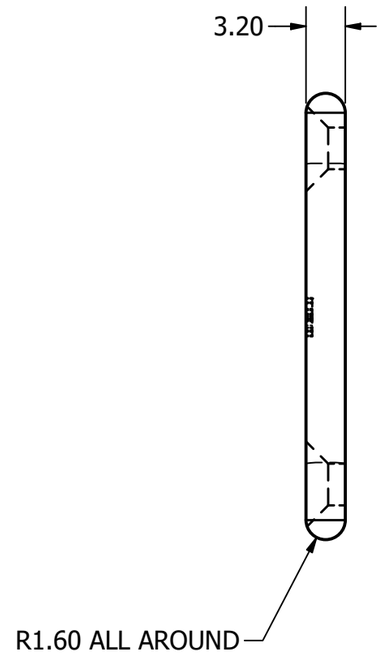
SCALE: 2:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH		4/27/2016



SCALE 1:1





NOTES:

1. STAMP OR ETCH "RIGHT EYE" (3mm CHARACTERS) AS SHOWN.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED √ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN NKD	3/3/2015
CHECKED	
ENG	
APPROVED	

MATERIAL: 6061-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

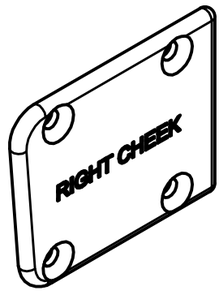
RIGHT EYE LOAD CELL PLATE

THIRD ANGLE PROJECTION

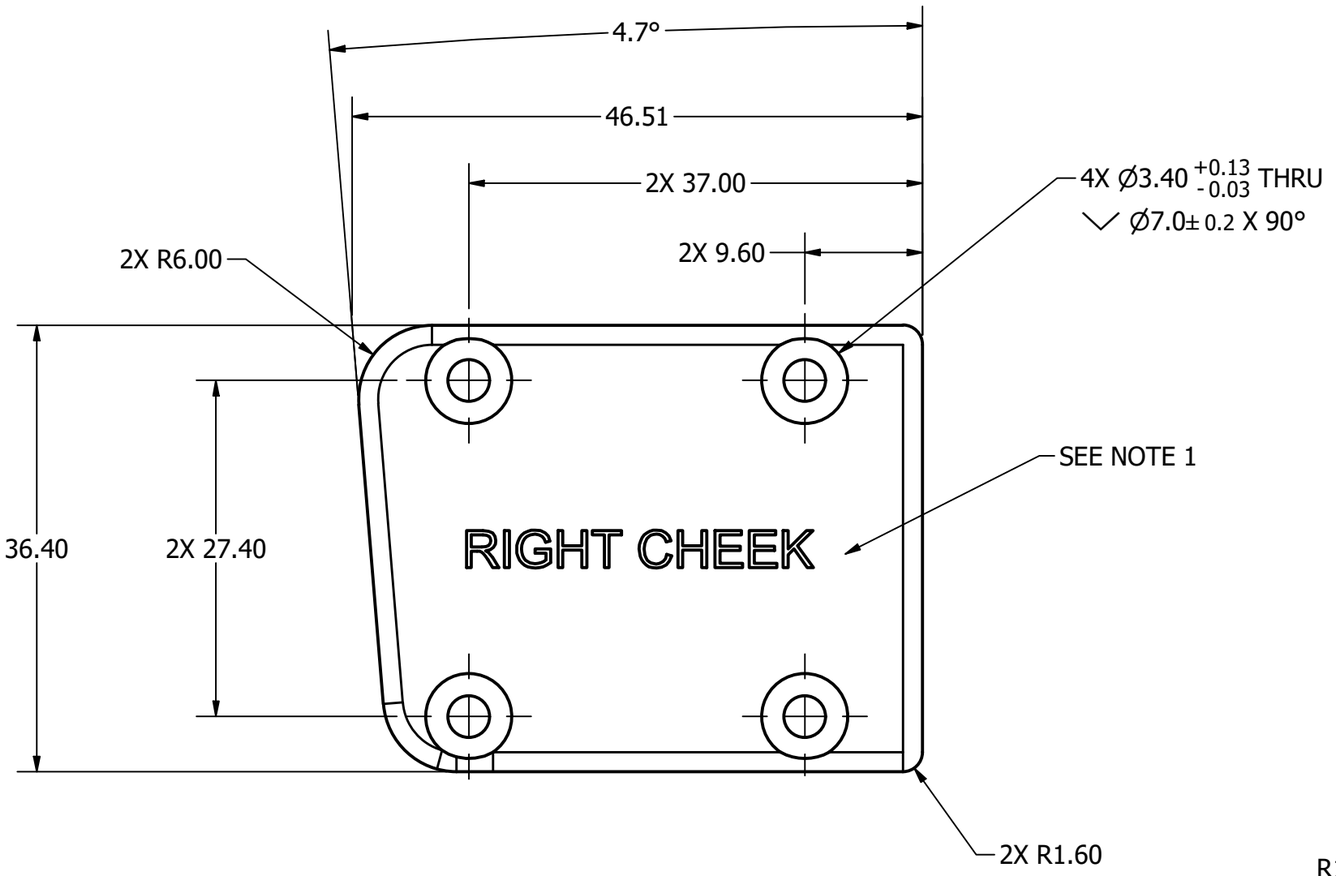
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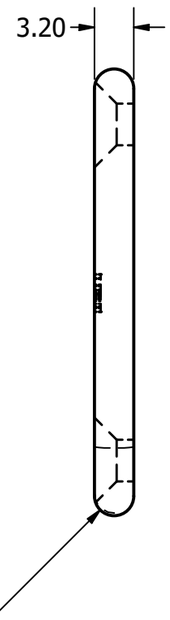
SCALE: 2:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH		4/27/2016



SCALE 1:1





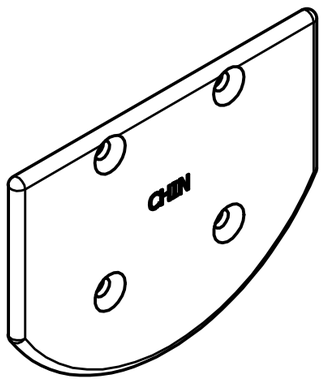
NOTES:

1. STAMP OR ETCH "RIGHT CHEEK" (3mm CHARACTERS) AS SHOWN.

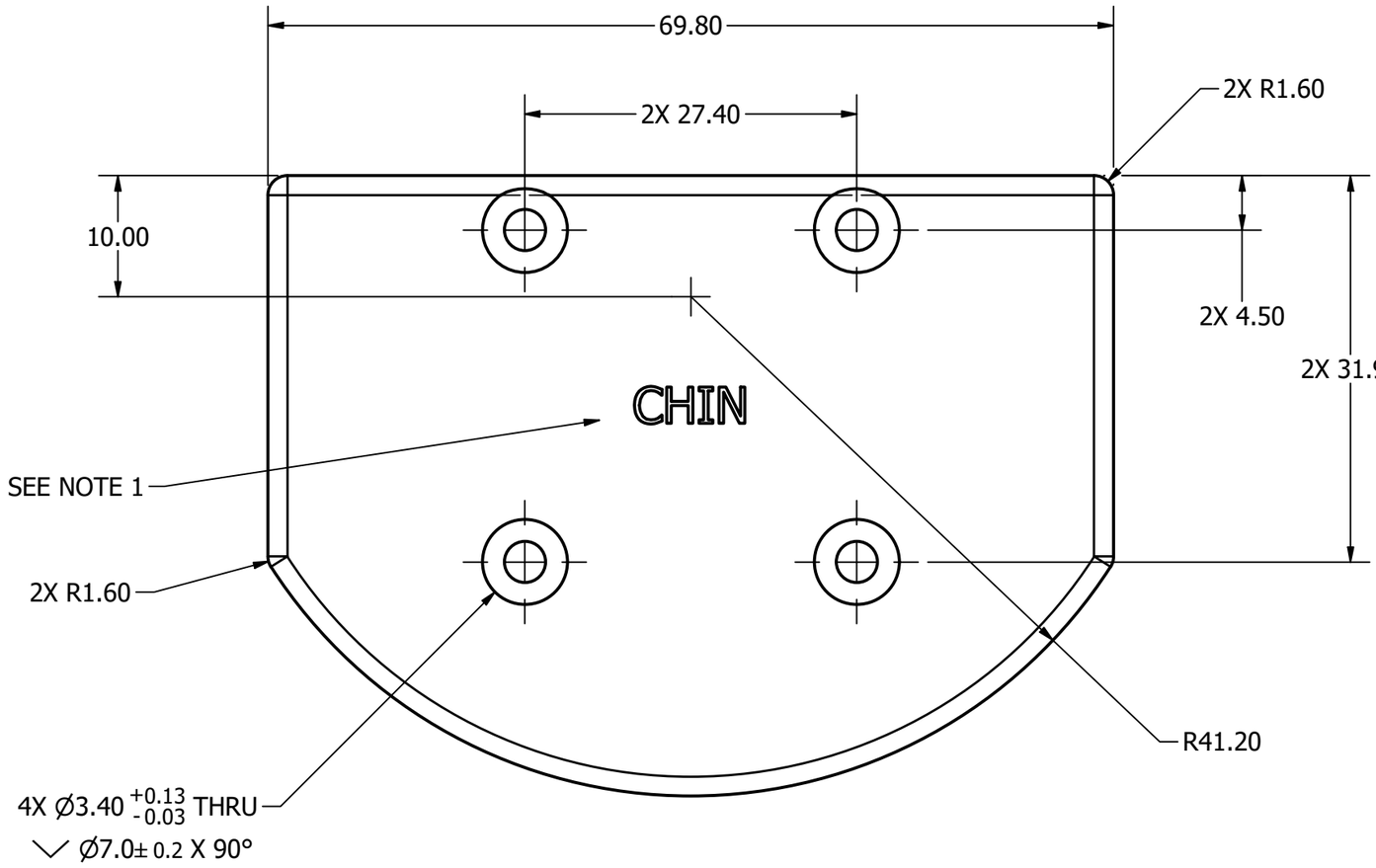
PRELIMINARY DRAWING

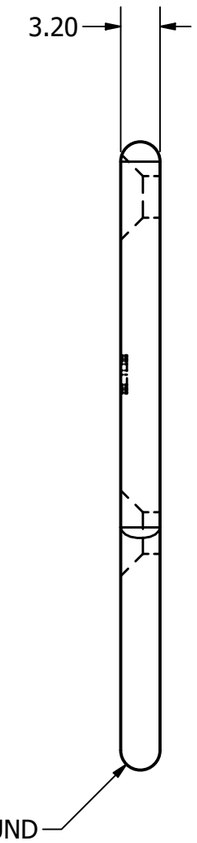
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS TOLERANCES ARE: DECIMAL: X ±.5, X.X ±.2, X.XX ±.1; MACHINED √, ANGLES ±.5° ASME Y14.5M - 1994 DO NOT SCALE DRAWING	VEHICLE RESEARCH and TEST CENTER	NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
	APPROVALS / DATE	RIGHT CHEEK LOAD CELL PLATE
MATERIAL: 6061-T6 ALUMINUM	DRAWN: NKD 3/4/2015	
HEAT TREAT	CHECKED	
FINISH: CLEAR ANODIZE	ENG / APPROVED	THIRD ANGLE PROJECTION
		SIZE: A3 · DRAWING NUMBER: 474-1414-2 · REV: 1
		SCALE: 2:1 · SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH		4/27/2016



SCALE 1:1





NOTES:

1. STAMP OR ETCH "CHIN" (3mm CHARACTERS) AS SHOWN.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 6061-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: NKD	3/4/2015
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

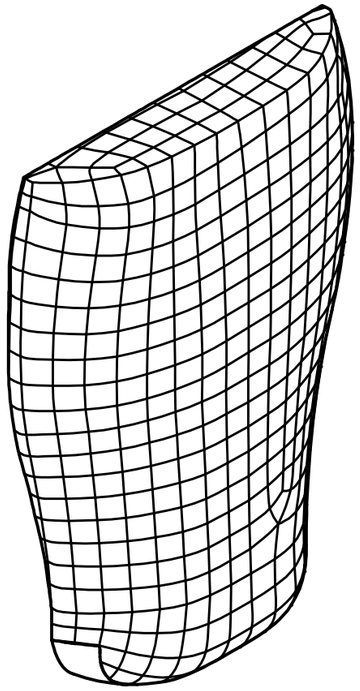
CHIN LOAD CELL PLATE

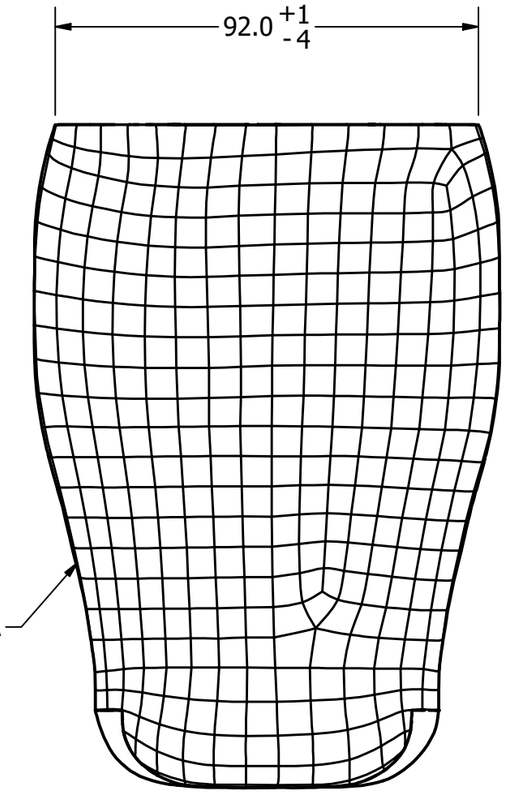
THIRD ANGLE PROJECTION

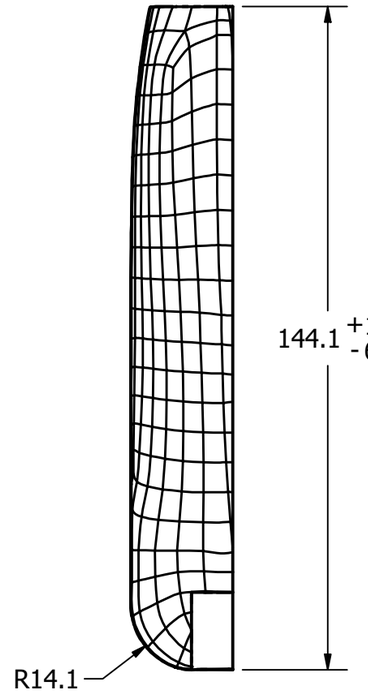
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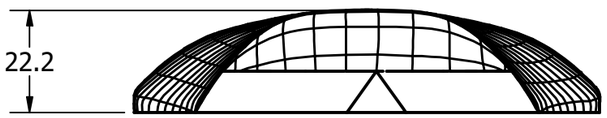
SCALE: 2:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	KMSP	KMSP	10/9/2018









NOTES:
1. FOAM TOLERANCE ±1mm, UNLESS OTHERWISE NOTED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: CONFOR FOAM CF47 (GREEN)
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: kstpierre	10/9/2018
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

FACE FOAM

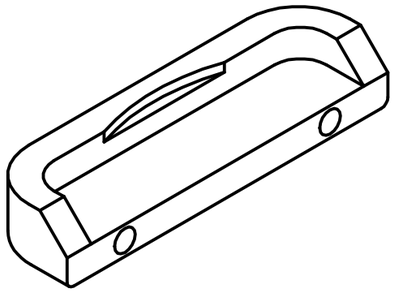
THIRD ANGLE PROJECTION

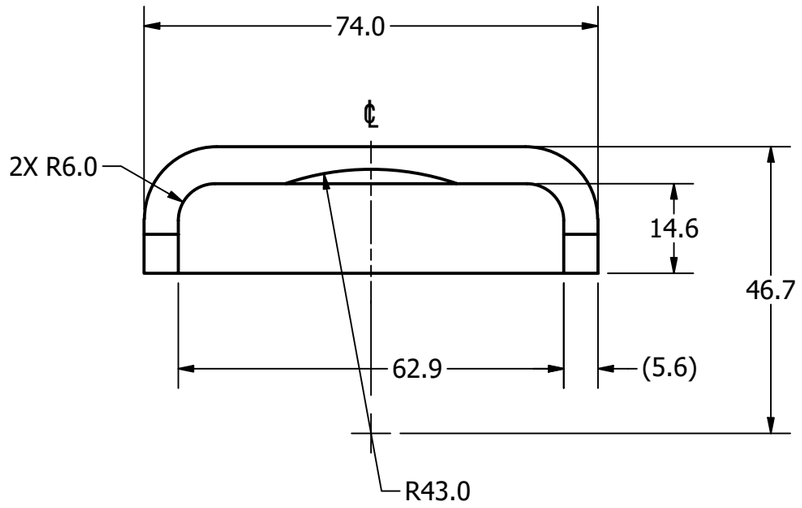
SIZE: A3 | DRAWING NUMBER: 474-1402 | REV: 1

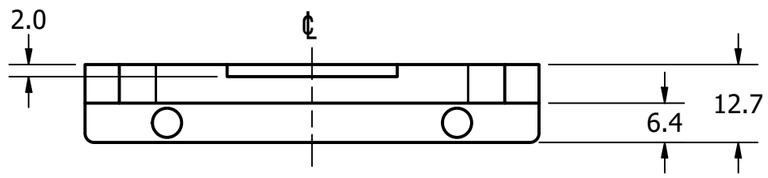
SCALE:

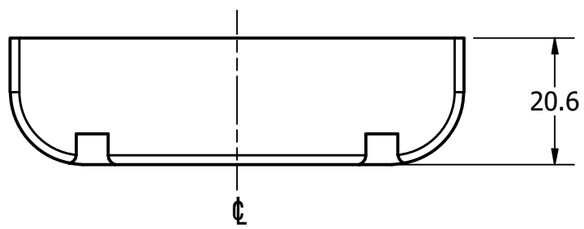
SHEET: 1 OF 1

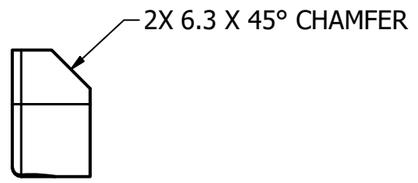
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH		4/27/2016

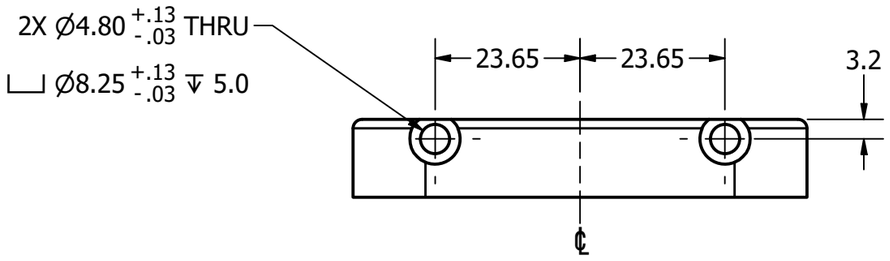












NOTES:

1. DIMENSIONS ARE SYMMETRICAL BETWEEN ℄ UNLESS OTHERWISE SPECIFIED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN B. KIMES	8/15/2013
CHECKED	
ENG	
APPROVED	

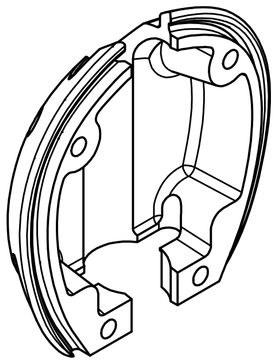
MATERIAL: ACETAL RESIN, BLACK
HEAT TREAT:
FINISH:

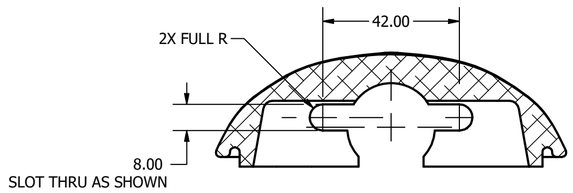
CHIN GUARD

THIRD ANGLE PROJECTION

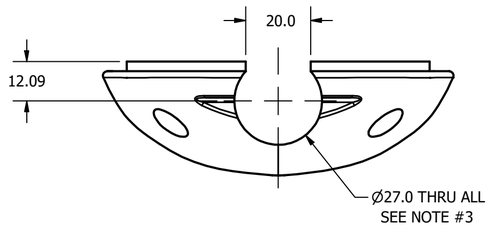
SIZE: A3 | DRAWING NUMBER: 474-1411 | REV: 1
SCALE: 1:1 | SHEET: 1 OF 1

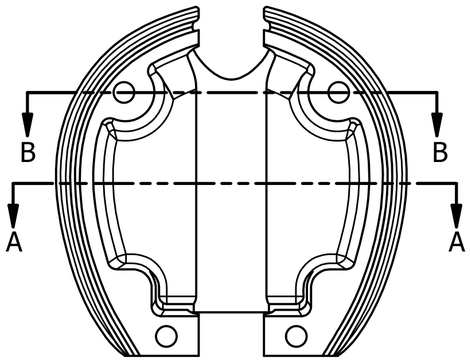
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/4/2016

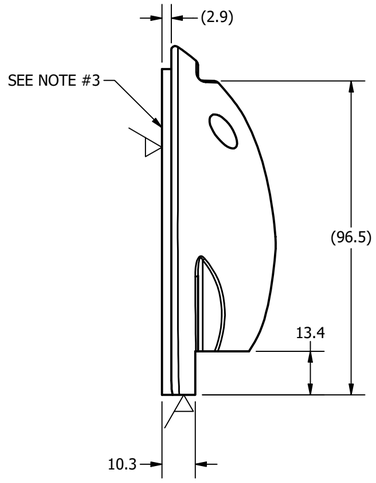


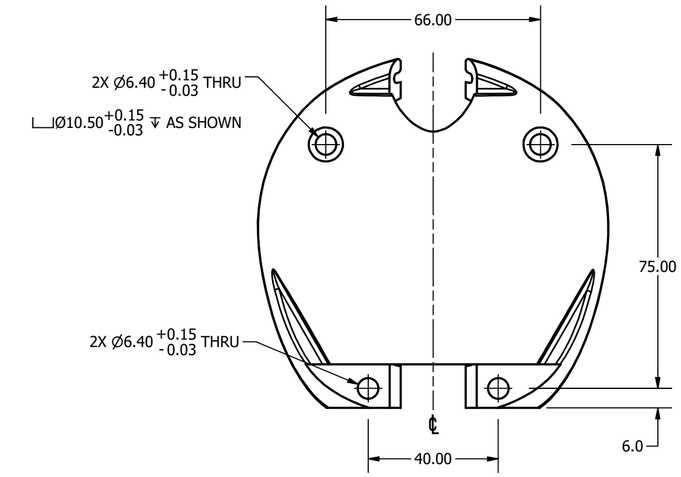


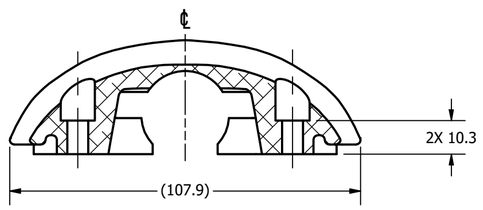
SECTION A-A











SECTION B-B

NOTES:

1. MAKE FROM 474-1112 CAST SKULL, MODIFY AS SHOWN.
2. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.
3. RECOMMENDED MACHINING SEQUENCES TO ADDRESS THE POTENTIAL WARPING AFTER MACHINING.
   a) SKIM OFF SURFACE A.
   b) BORE Ø 27.0 HOLE.
   c) THEN MACHINE OTHER FEATURES.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ∠ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTES
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: B. KIMES	4/4/2016
CHECKED:	
ENG:	
APPROVED:	

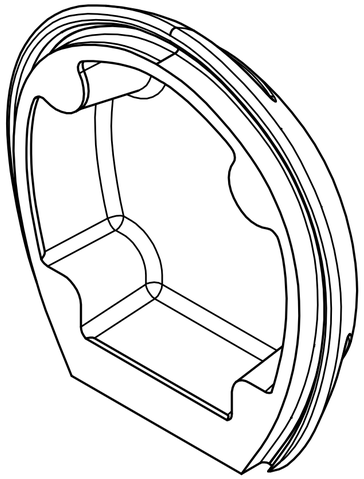
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

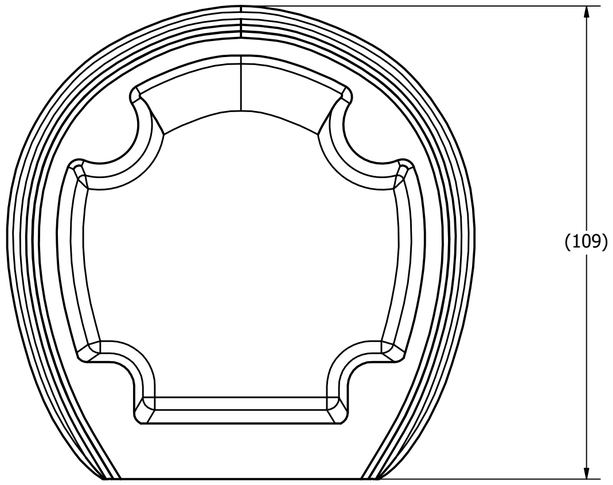
SKULL CAP, MACHINED
THOR-05F

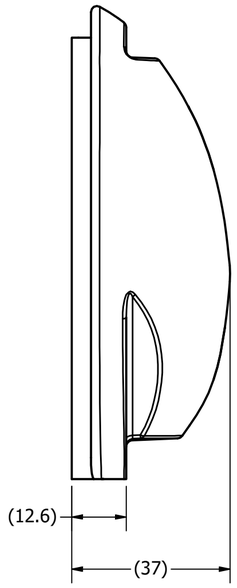
THIRD ANGLE PROJECTION

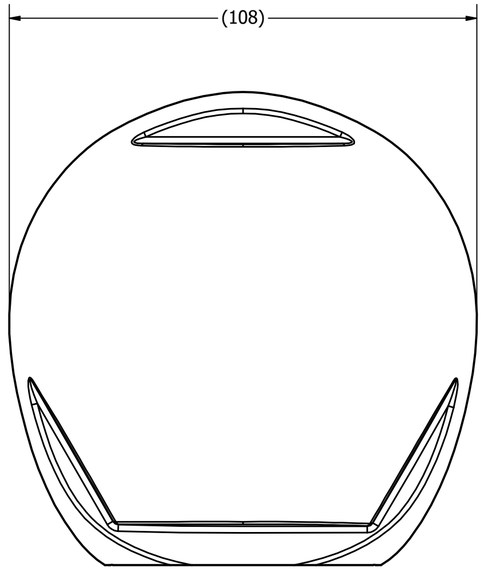
SIZE: A2 | DRAWING NUMBER: 474-1020 | REV: 1
SCALE: .75:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JPM		12/7/17









NOTES:

1. REMOVE ALL CAST FLASHING.

2. ALL CAST DIMENSION TOLERANCE ±2% BUT NO SMALLER THAN 0.5mm.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ∠C ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 357 CAST ALUMINUM
HEAT TREAT:
FINISH:

*V*EHICLE *R*ESEARCH and *T*EST *C*ENTER

APPROVALS	DATE
DRAWN: NKD	12/7/2017
CHECKED:	
ENG:	
APPROVED:	

THIRD ANGLE PROJECTION

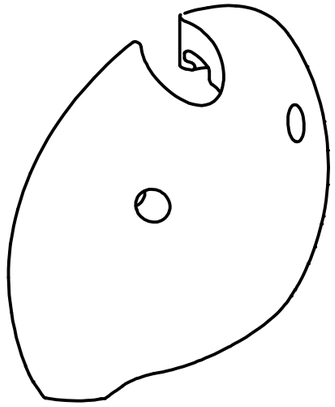
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

SKULL CAP CASTING

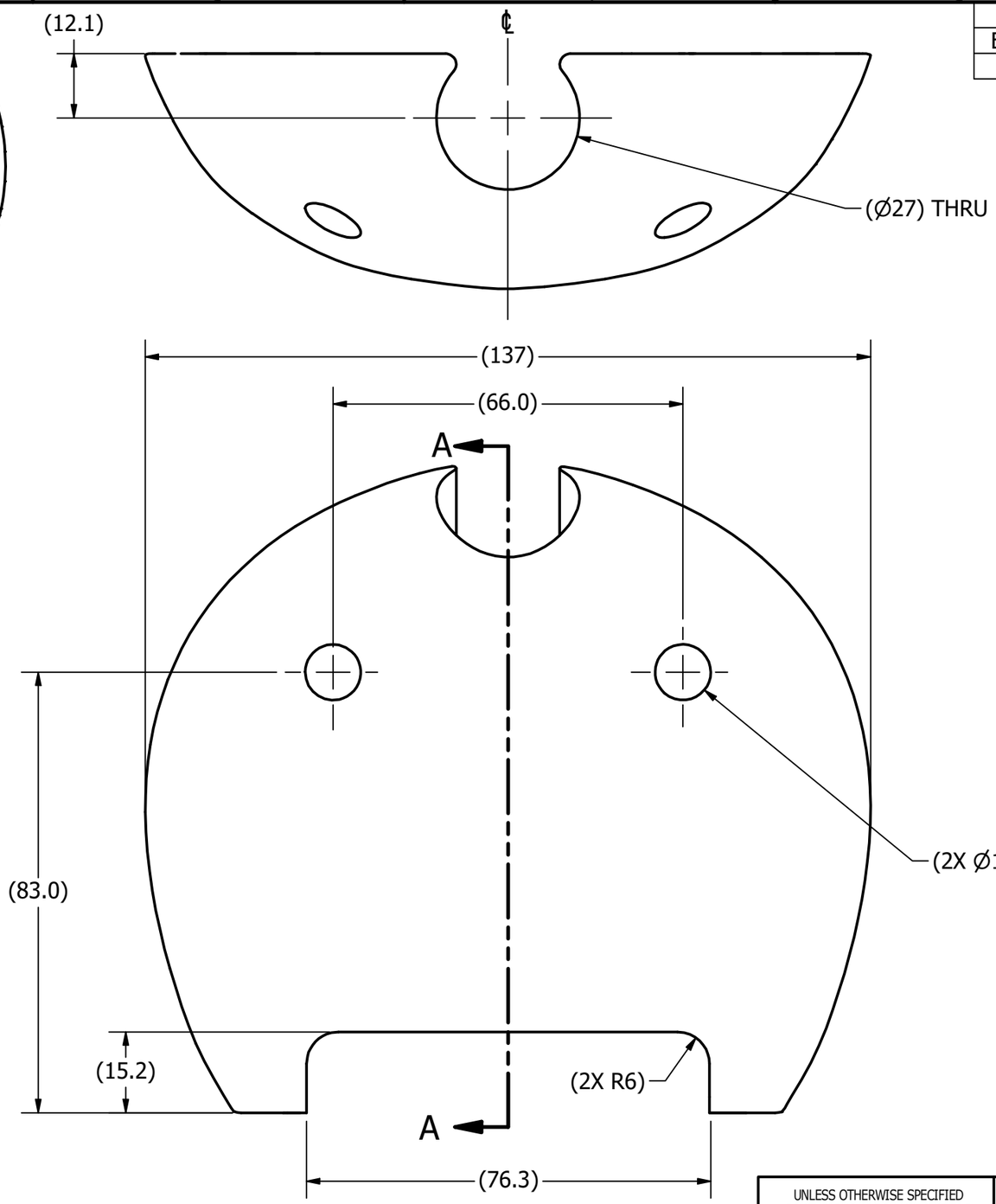
SIZE: A2 | DRAWING NUMBER: 474-1112 | REV: 1

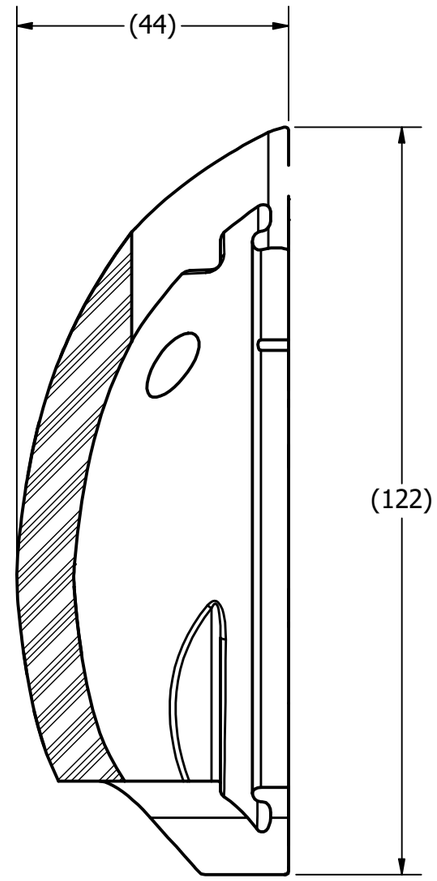
SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/1/2016



SCALE .5 : 1





SECTION A-A

NOTES:

1. MATERIAL: THERMOSET PLASTIC
   COLOR: EURO BROWN
   DUROMETER: 70-75 SHORE "A"
2. REMOVE ALL MOLD FLASHING.
3. ALL MOLD DIMENSION TOLERANCE +1%/-2%
   BUT NO SMALLER THAN 0.5mm
4. MASS: 198±6 GRAMS.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: B. KIMES	4/1/2016
CHECKED	
ENG	
APPROVED	

MATERIAL: SEE NOTES
HEAT TREAT:
FINISH:

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

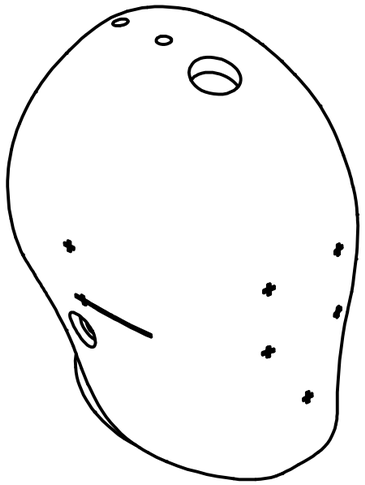
CAP SKIN
THOR-05F

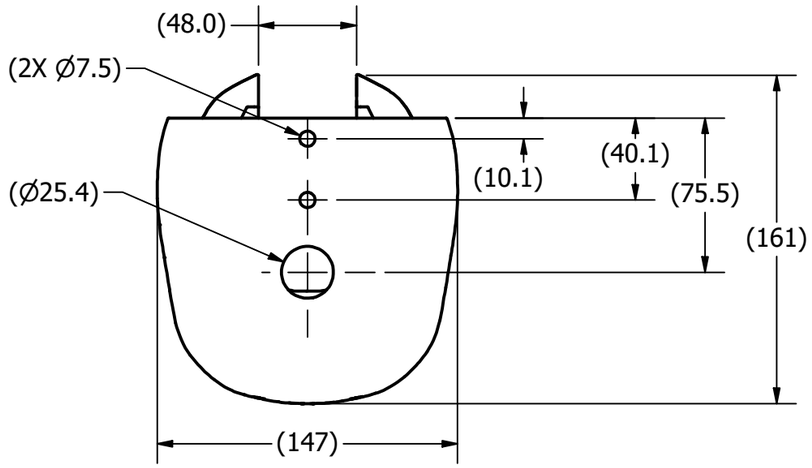
THIRD ANGLE PROJECTION

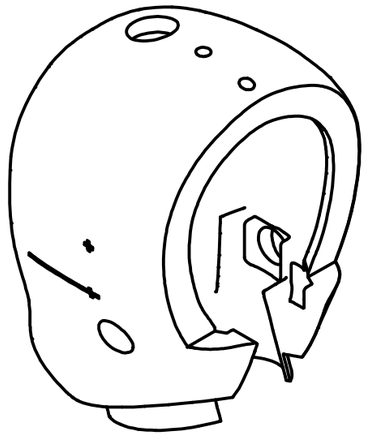
SIZE	DRAWING NUMBER	REV
A3	474-1025	1

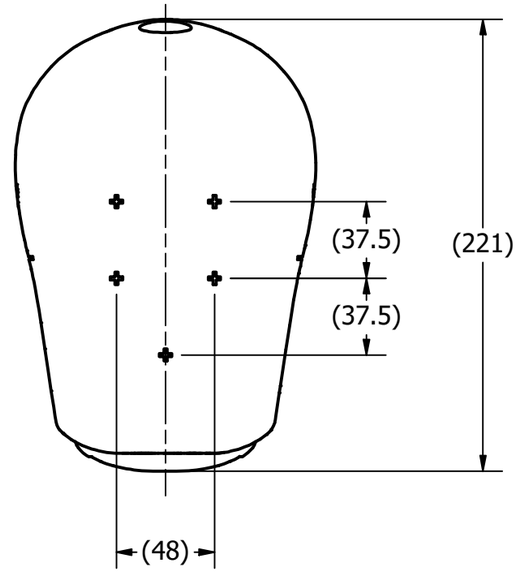
SCALE: 1:1 SHEET 1 OF 1

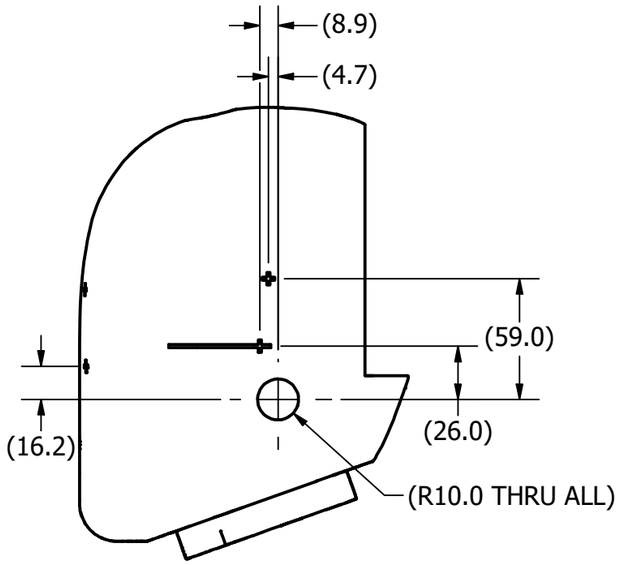
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	1/9/2017











NOTES:

1. MATERIAL: THERMOSET PLASTIC
   COLOR: EURO BROWN
   DUROMETER: 50 ± 5 SHORE "A", CAN BE ADJUSTED TO MEET THE PERFORMANCE REQUIREMENT.

2. REMOVE ALL MOLD FLASHING.

3. ALL MOLD DIMENSION TOLERANCE +1%/-2%
   BUT NO SMALLER THAN 0.5mm

4. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED

5. MASS: 873±26 GRAMS.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTE 1
HEAT TREAT:
FINISH:

*V*EHICLE *R*ESEARCH and *T*EST *C*ENTER

APPROVALS	DATE
DRAWN: B. KIMES	1/9/2017
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

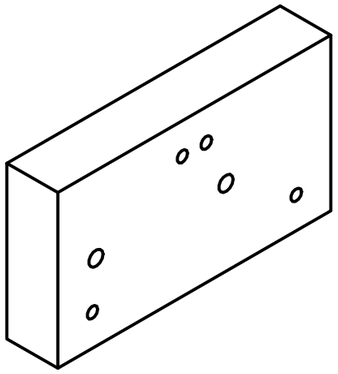
HEAD SKIN, MOLDED
THOR-05F

THIRD ANGLE PROJECTION

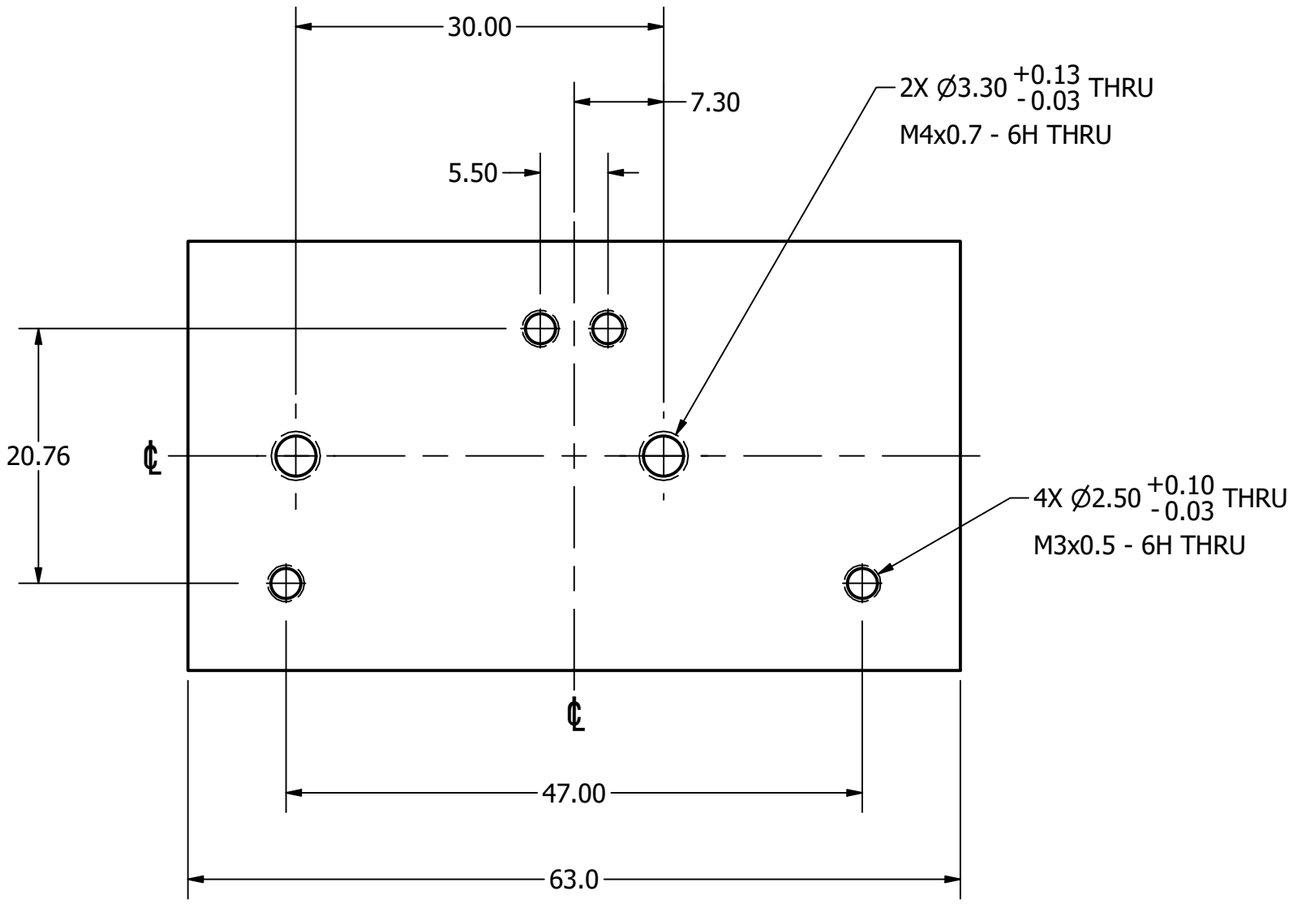
SIZE	DRAWING NUMBER	REV
A3	474-1008	1

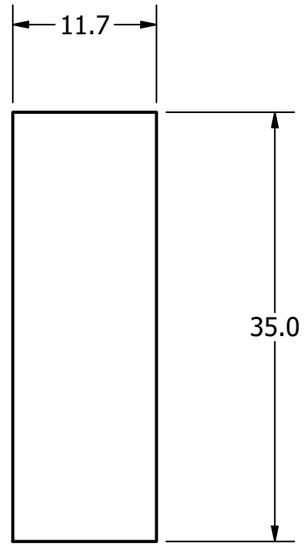
SCALE: .3:1 SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/1/2016



SCALE 1 : 1





NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ±.5°, ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: HD-17 (TUNGSTEN)
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: B. KIMES	4/1/2016
CHECKED:	
ENG:	
APPROVED:	

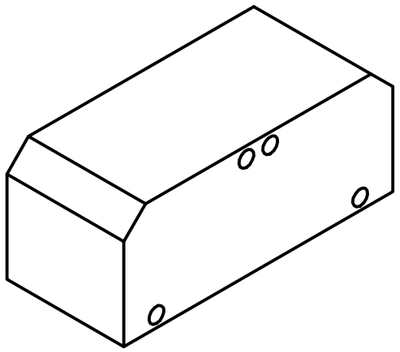
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

BALLAST/ON BOARD DAS MOUNT

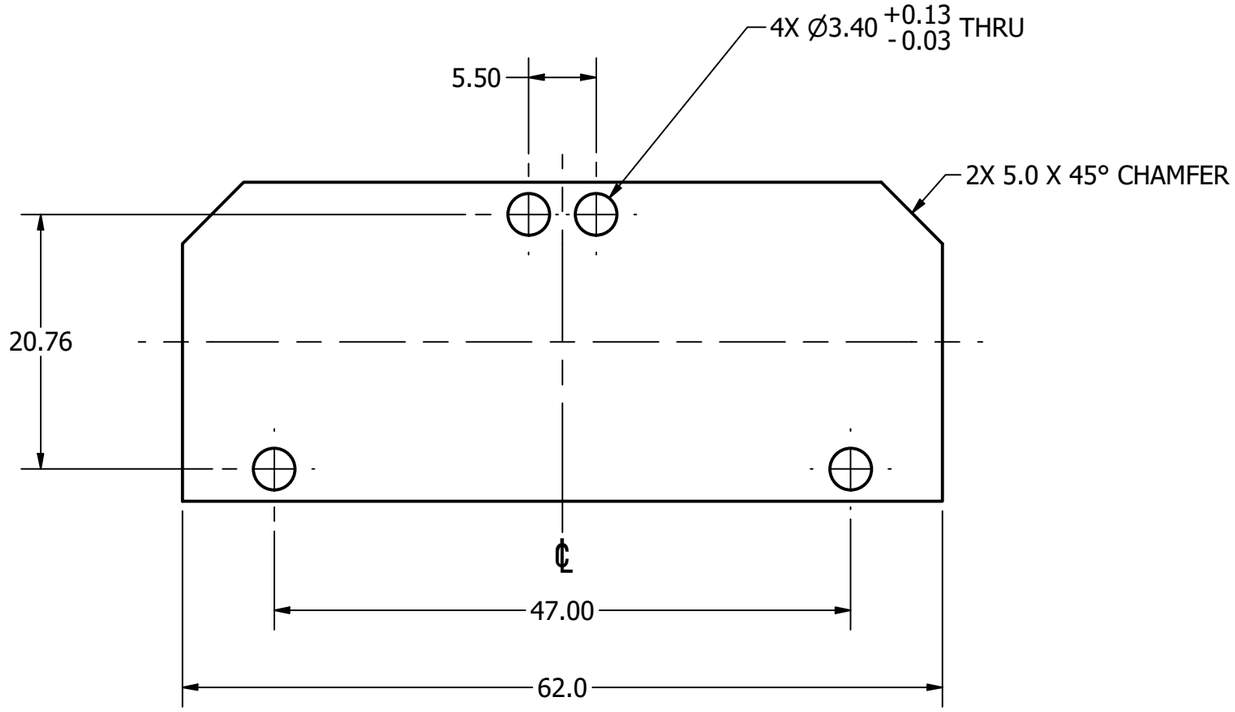
THIRD ANGLE PROJECTION

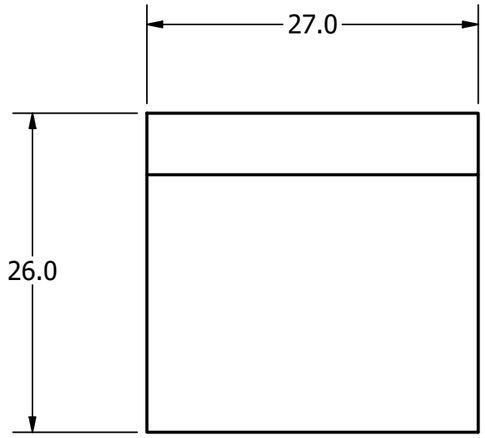
SIZE: A3 | DRAWING NUMBER: 474-1051 | REV: 1
SCALE: 2:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/1/2016



SCALE 1 : 1





NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED
2. MASS = 118 grams ± 9 grams

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: B. KIMES	4/1/2016
CHECKED:	
ENG:	
APPROVED:	

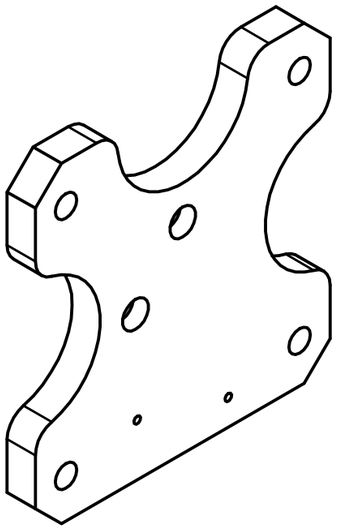
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

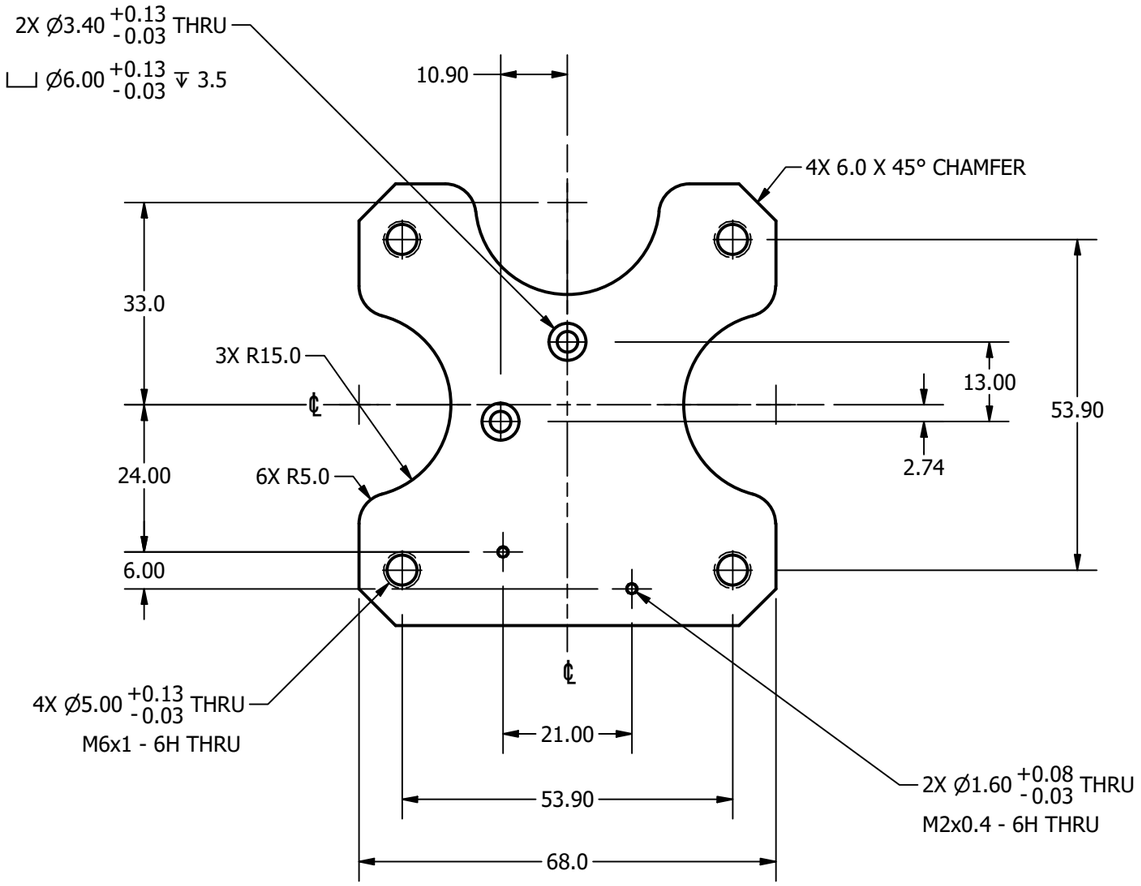
ON BOARD DAS STRUCTURAL REPLACEMENT

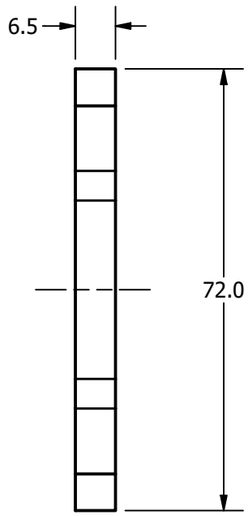
THIRD ANGLE PROJECTION

SIZE: A3 | DRAWING NUMBER: 474-1033 | REV: 1
SCALE: 2:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/4/2016







NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED √ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM	CHECKED	
HEAT TREAT	ENG	
FINISH: CLEAR ANODIZE	APPROVED	

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: B. KIMES	4/4/2016

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

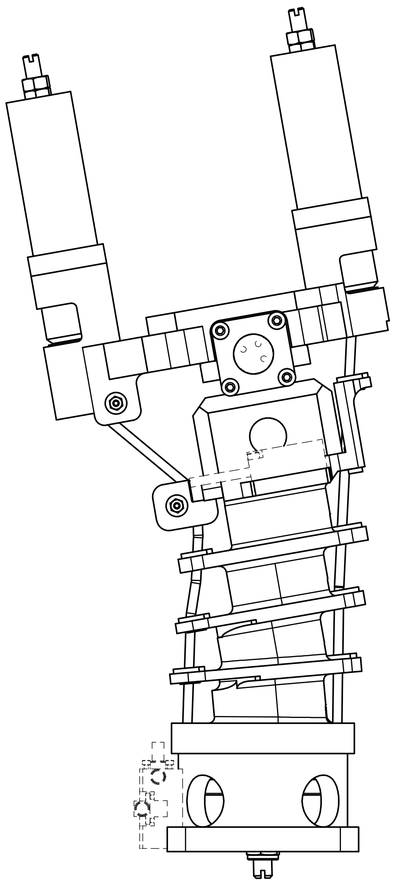
SENSOR MOUNTING PLATE, HEAD

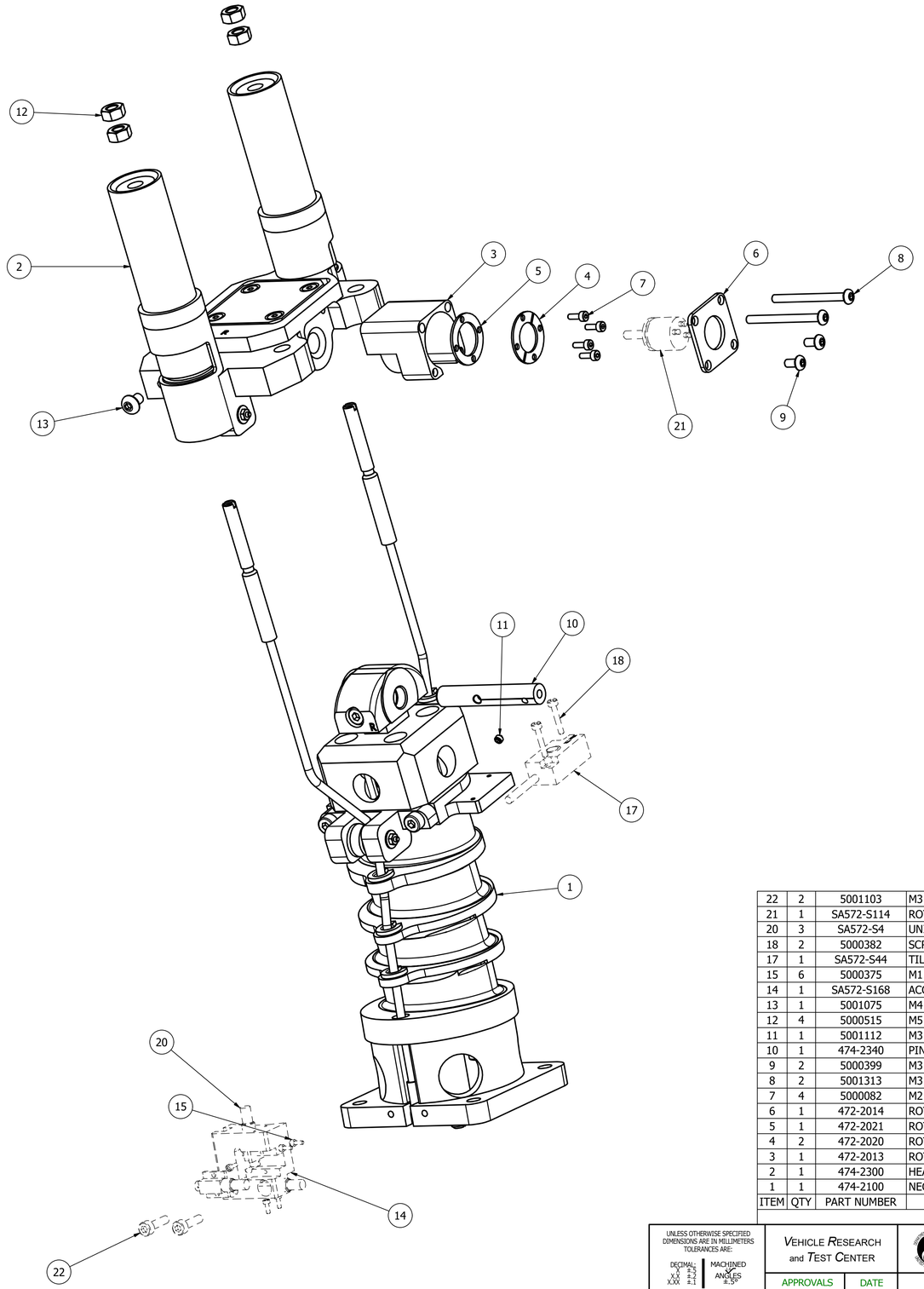
THIRD ANGLE PROJECTION

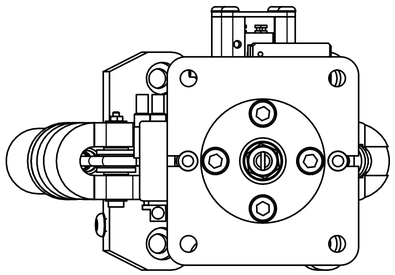
SIZE	DRAWING NUMBER	REV
A3	474-1031	1

SCALE: 1:1 SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH		4/8/2016
	2	ADDED SHEET 2	AT	JW	7/13/2018







ITEM	QTY	PART NUMBER	DESCRIPTION	
22	2	5001103	M3 X 0.5 X 12 LG. SHCS	(REF)
21	1	SA572-S114	ROTARY POTENTIOMETER	(REF)
20	3	SA572-S4	UNIAXIAL PIEZORESISTIVE ACCELEROMETER	(REF)
18	2	5000382	SCREW, SHCS M2-0.4 X 12mm LONG	(REF)
17	1	SA572-S44	TILT SENSOR, DUAL AXIS	(REF)
15	6	5000375	M1.4 X 0.3 X 4 LG. SHCS	(REF)
14	1	SA572-S168	ACCEL MOUNT, T1	(REF)
13	1	5001075	M4 X 0.7 X 6 LG. BHCS	
12	4	5000515	M5 X 0.8 HEX NUT ZINC	
11	1	5001112	M3 X 0.5 X 3 LG. SSS CONE PT.	
10	1	474-2340	PIN, OC	
9	2	5000399	M3 X 0.5 X 6 LG. BHCS SS	
8	2	5001313	M3 X 0.5 X 35 LG. BHCS SS	
7	4	5000082	M2 X 0.4 X 6 LG. SHCS	
6	1	472-2014	ROTARY POTENTIOMETER COVER, NECK	
5	1	472-2021	ROTARY POTENTIOMETER WASHER, NECK	
4	2	472-2020	ROTARY POTENTIOMETER CLAMP, NECK	
3	1	472-2013	ROTARY POTENTIOMETER HOUSING, NECK	
2	1	474-2300	HEAD/NECK PLATFORM ASSEMBLY	
1	1	474-2100	NECK COLUMN ASSEMBLY	

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.1, .XX ±.2, .XXX ±.1
MACHINED ∠ ANGLES ±1.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

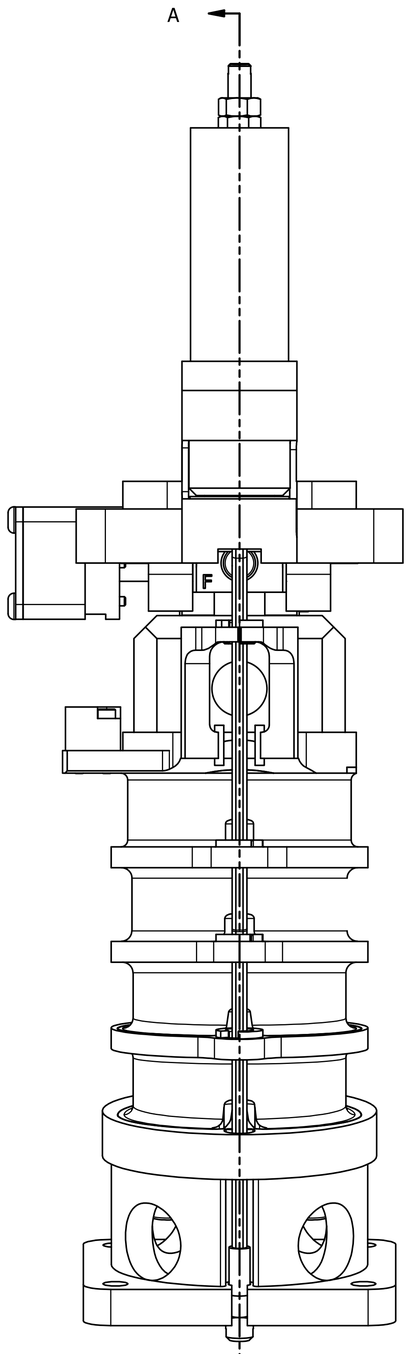
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN ghayden	4/8/2016
CHECKED	
ENG	
APPROVED	

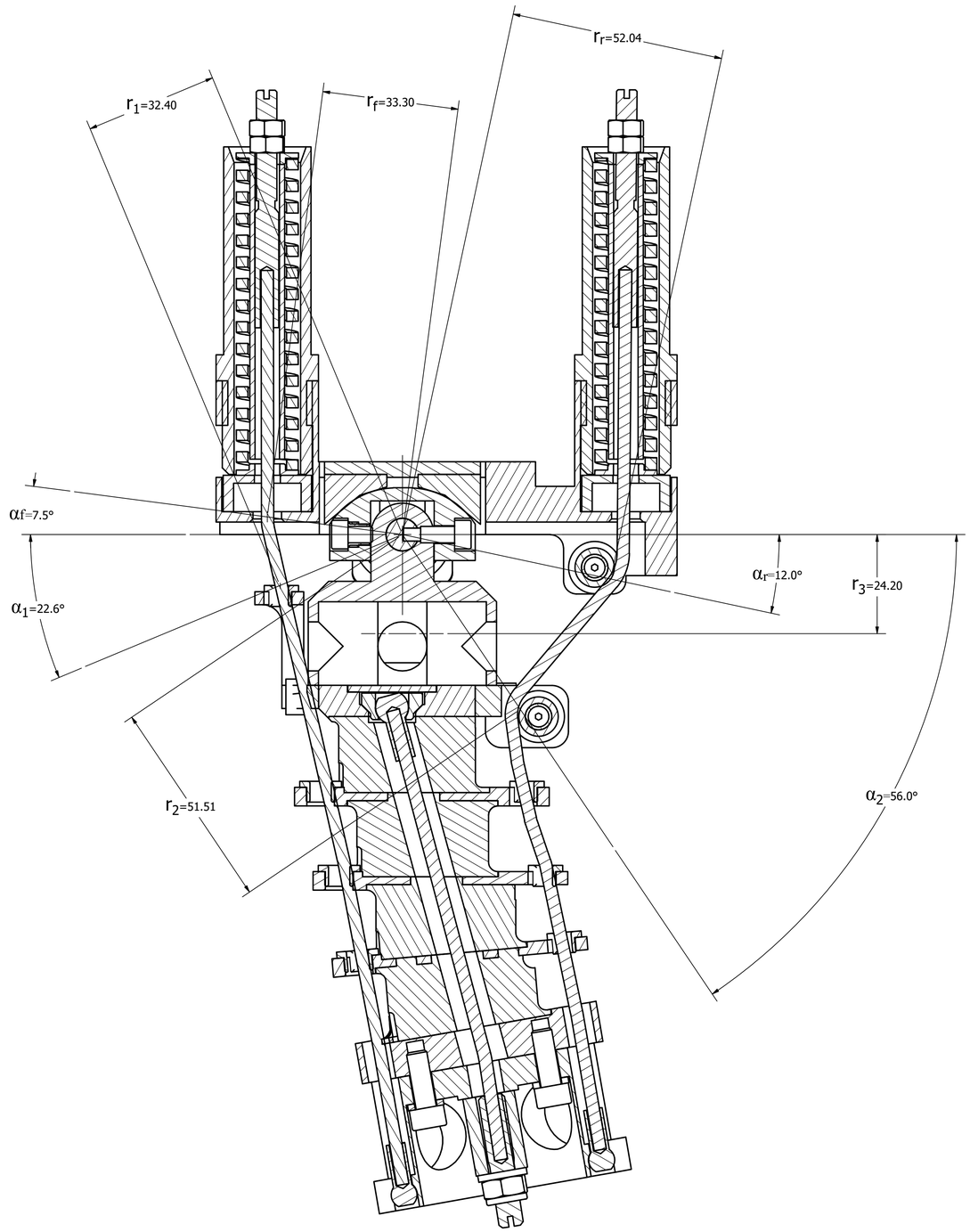
MATERIAL: N/A
HEAT TREAT: N/A
FINISH: N/A

NECK ASSEMBLY
THOR-05F

SIZE A1 | DRAWING NUMBER 474-2000 | REV 2
THIRD ANGLE PROJECTION
SCALE: 1:1 | SHEET 1 OF 2



A
SCALE 1.5 : 1



SECTION A-A
SCALE 1.5 : 1

αf=7.5°
αr=12.0°
α1=22.6°
α2=56.0°
rf=33.30
rr=52.04
r1=32.31
r2=51.51
r3=24.20

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.2, .XX ±.1, .XXX ±.1
MACHINED ∠C ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL
HEAT TREAT: N/A
FINISH: N/A

VEHICLE RESEARCH and TEST CENTER

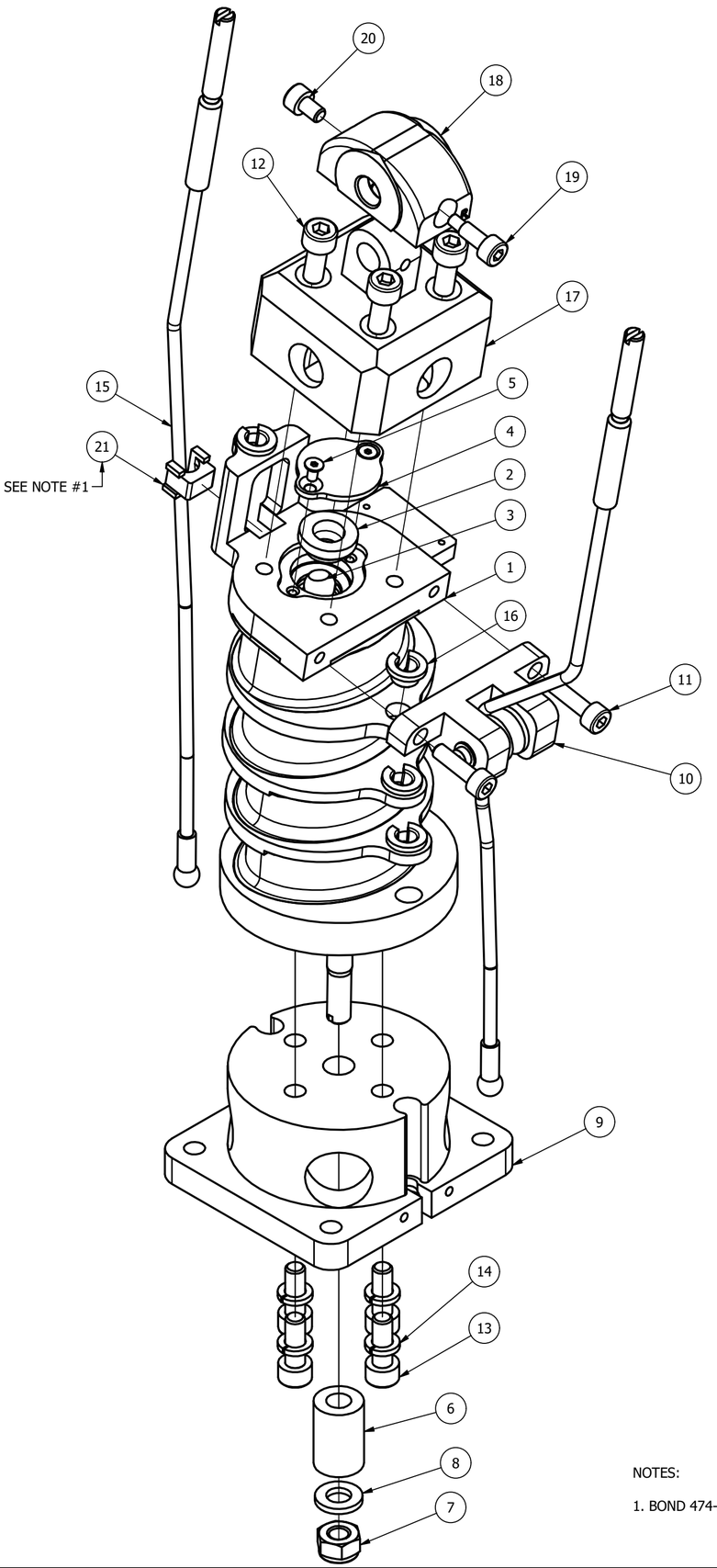
APPROVALS	DATE
DRAWN: ghayden	4/8/2016
CHECKED	
ENG	
APPROVED	

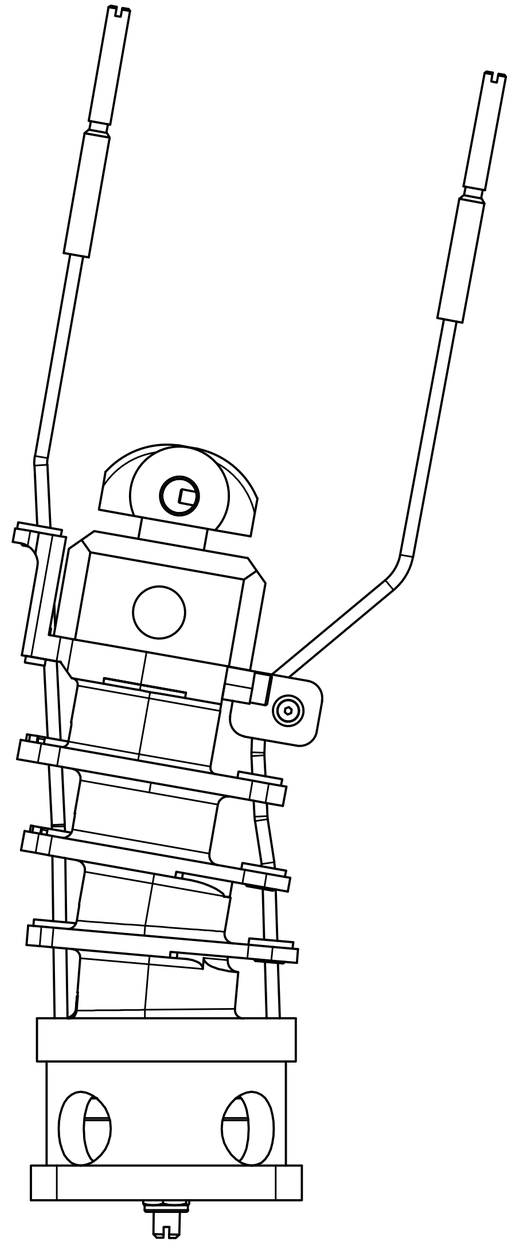
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

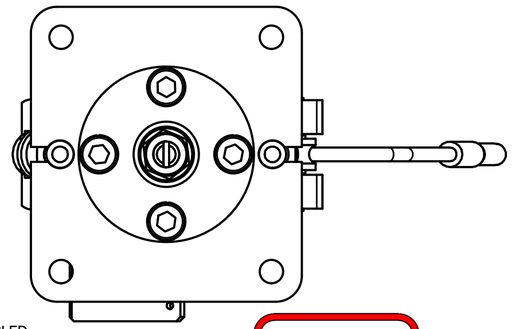
NECK ASSEMBLY
THOR-05F

THIRD ANGLE PROJECTION
SIZE: A1
DRAWING NUMBER: 474-2000
REV: 2
SCALE: 1:1
SHEET: 2 OF 2

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/6/2016







NOTES:

1. BOND 474-2341 TO 474-2110 WHEN ASSEMBLED

PRELIMINARY DRAWING

ITEM	QTY	PART NUMBER	DESCRIPTION
21	1	474-2341	TOP PLATE CABLE GUIDE, NECK
20	1	5000076	M4 X 0.7 X 6 LG. SHCS
19	1	472-2016	OCCIPITAL CONDYLE SCREW
18	1	474-2327	OC FLEXION-EXTENSION CAM
17	1	474-2326	STRUCTURAL REPLACEMENT, UPPER NECK LOAD CELL
16	7	474-2332	CABLE GUIDE HALF
15	2	474-2620	NECK CABLE ASSY., FRONT / REAR
14	4	5001400	WASHER, M5 SPLIT LOCK
13	4	5000300	M5 X 0.8 X 14 LG. SHCS
12	4	5000002	M5 X 0.8 X 12 LG. SHCS
11	2	5000459	M4 X 0.7 X 14 LG. SHCS
10	1	474-2330	REAR PULLEY ASSEMBLY
9	1	474-2325	STRUCTURAL REPLACEMENT, LOWER NECK LOAD CELL
8	1	5000013	M6 FLAT WASHER PLAIN ZINC
7	1	5000503	M6 X 1 HEX LOCK NUT SS
6	1	474-2331	COMPRESSION BUSHING, NECK CENTER CABLE
5	2	5000723	M2.5 X 0.45 X 5 LG. FHCS
4	1	474-2333	COVER, NECK CABLE
3	1	474-2600	CENTER CABLE ASSY., NECK
2	1	474-2334	CENTER CABLE FIXTURE
1	1	474-2110	NECK ASSEMBLY, MOLDED

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

NECK COLUMN ASSEMBLY

APPROVALS	DATE
DRAWN B. KIMES	4/6/2016
CHECKED	
ENG	
APPROVED	

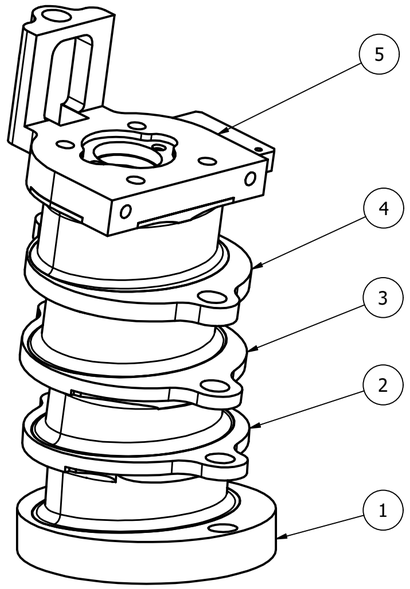
MATERIAL
HEAT TREAT
FINISH

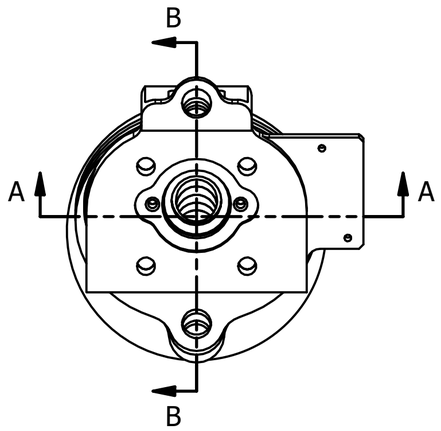
THIRD ANGLE PROJECTION

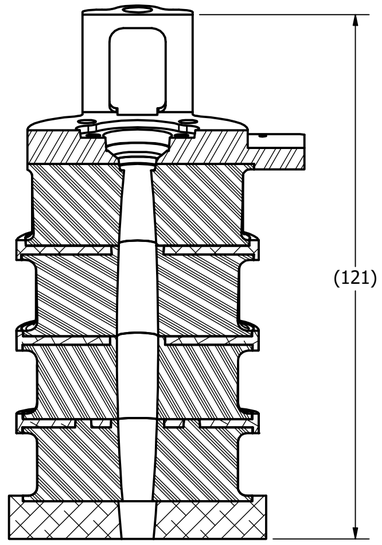
SIZE A2 | DRAWING NUMBER 474-2100 | REV 1

SCALE: 1:1 | SHEET 1 OF 1

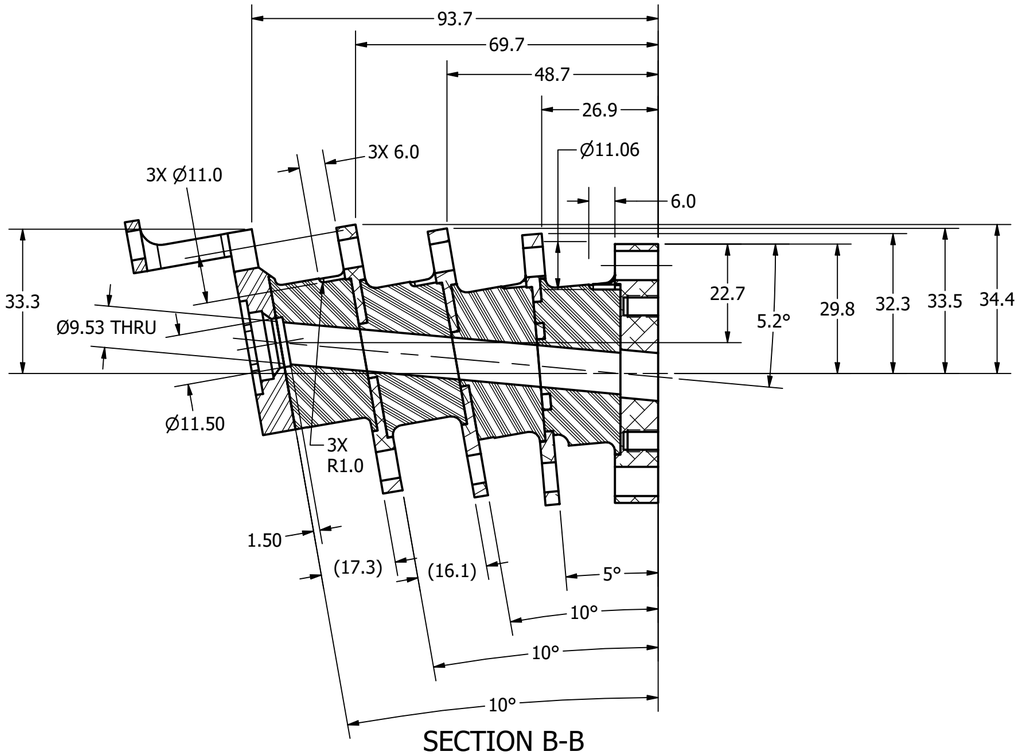
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH		4/6/2016







SECTION A-A



SECTION B-B

NOTES:

1. MATERIAL: BUTYL RUBBER
   COLOR: BLACK
   DUROMETER: 86 ±5 SHORE "A". CAN BE ADJUSTED TO MEET PERFORMANCE SPEC.
2. REMOVE ALL MOLD FLASHING.
3. ALL MOLD DIMENSION TOLERANCE +1%/-2%
   BUT NO SMALLER THAN 0.5mm.
4. NO SPLIT OR DEFECTS ARE ALLOWED
   IN THE RUBBER MOLDING.

ITEM	QTY	PART NUMBER	DESCRIPTION
5	1	474-2335	TOP PLATE, NECK
4	1	474-2336	NECK PLATE 1
3	1	474-2337	NECK PLATE 2
2	1	474-2338	NECK PLATE 3
1	1	474-2339	BASE PLATE, NECK MOLD

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ∜ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTES
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN jhaefner	4/6/2016
CHECKED	
ENG	
APPROVED	

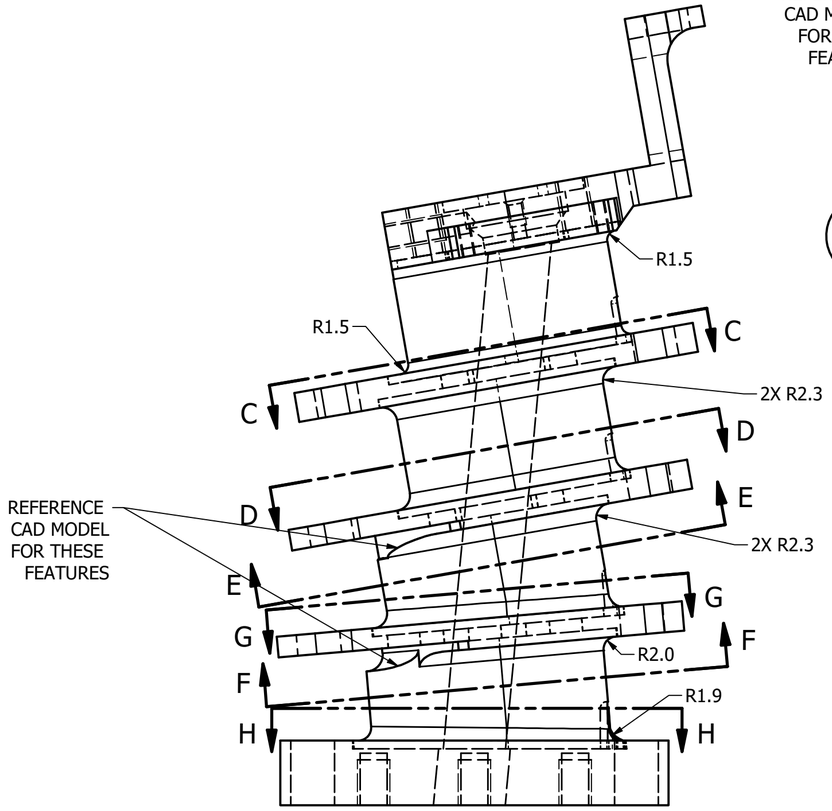
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

NECK ASSEMBLY, MOLDED

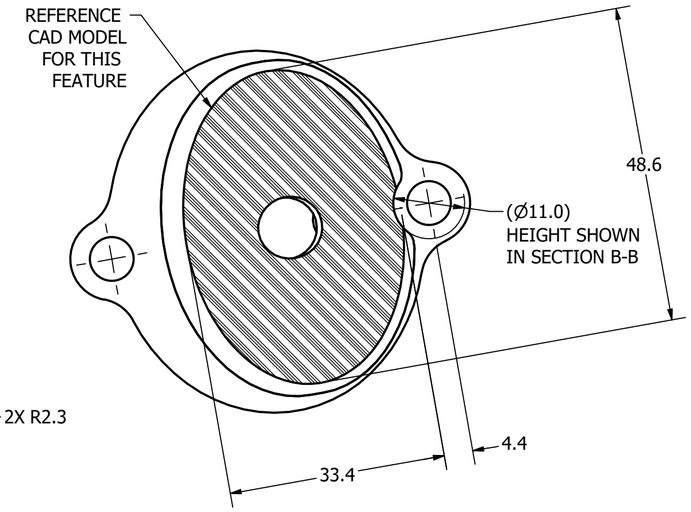
THIRD ANGLE PROJECTION

SIZE A2 | DRAWING NUMBER 474-2110 | REV 1

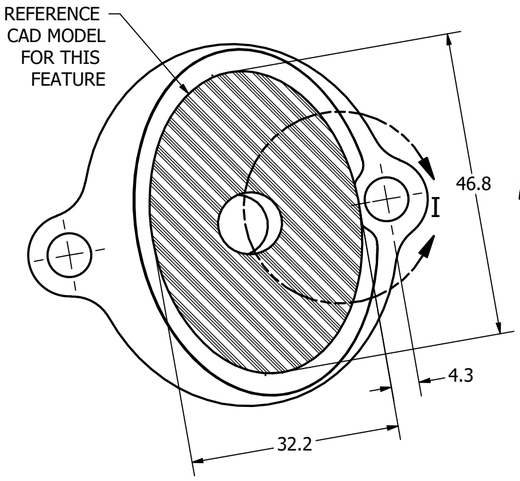
SCALE: 1:1 | SHEET 1 OF 2



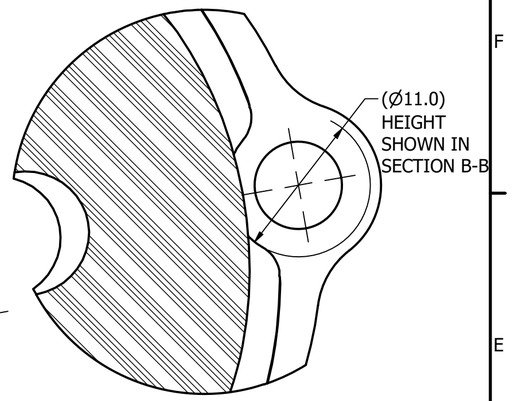
SCALE 1.5:1



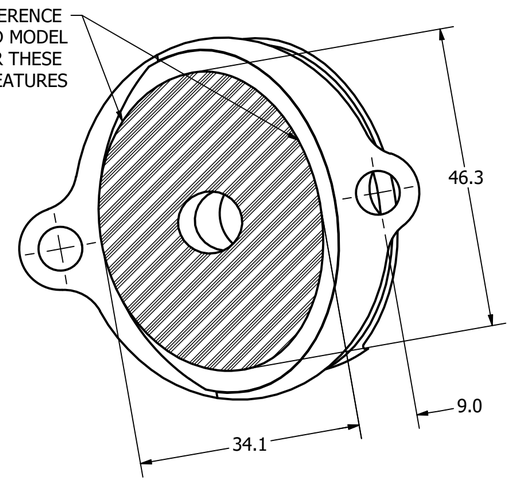
SECTION C-C
SCALE 1.5:1



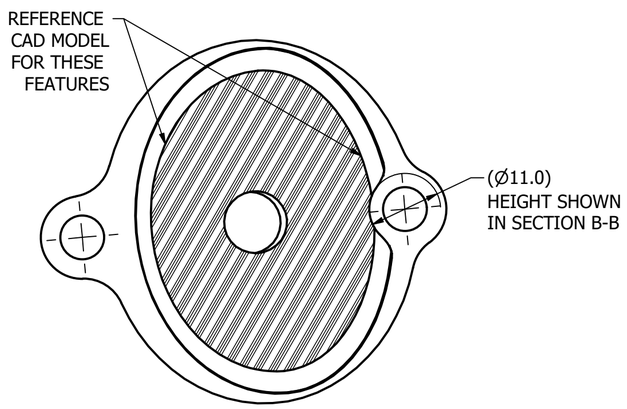
SECTION D-D
SCALE 1.5:1



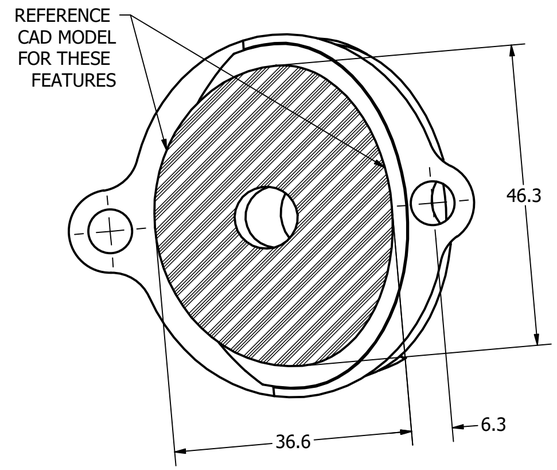
DETAIL I
SCALE 3 : 1



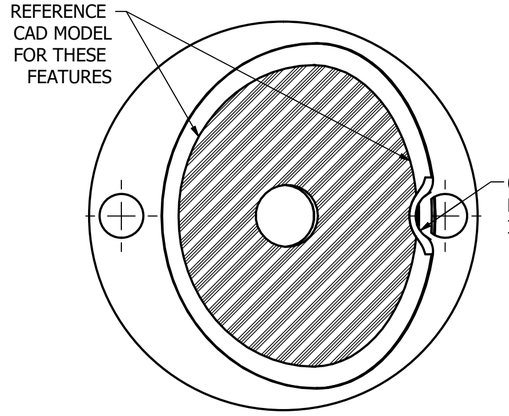
SECTION E-E
SCALE 1.5:1



SECTION G-G
SCALE 1.5:1



SECTION F-F
SCALE 1.5:1



SECTION H-H
SCALE 1.5:1

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ∠ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTES
HEAT TREAT:
FINISH:

PRELIMINARY DRAWING

VEHICLE RESEARCH and TEST CENTER

	APPROVALS	DATE
DRAWN	jhaefner	4/6/2016
CHECKED		
ENG		
APPROVED		

THIRD ANGLE PROJECTION

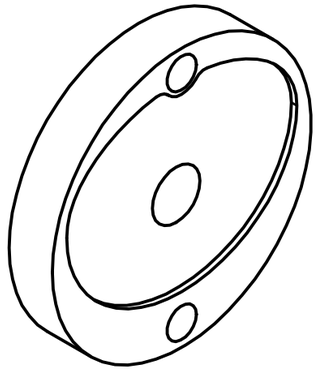
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

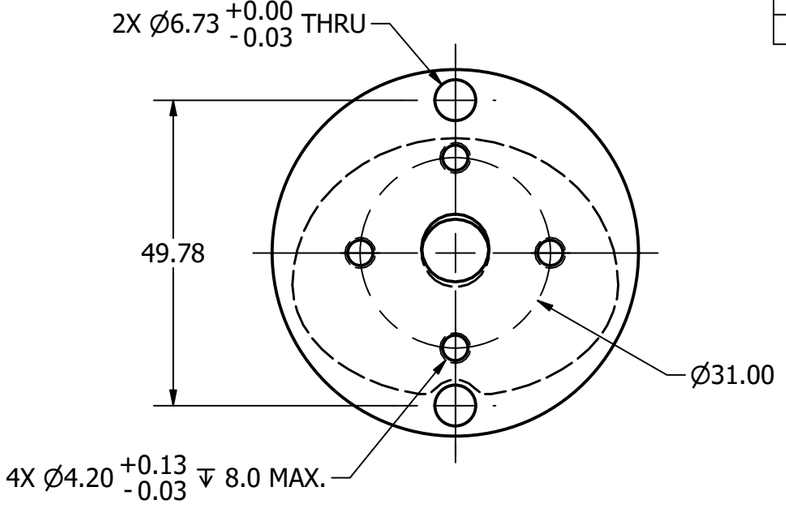
NECK ASSEMBLY, MOLDED

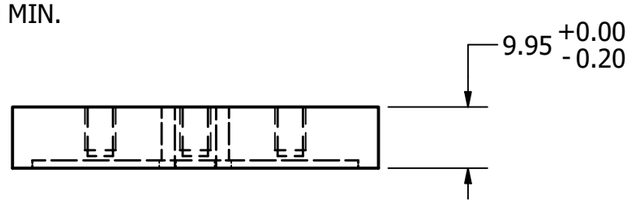
SIZE: A2 | DRAWING NUMBER: 474-2110 | REV: 1

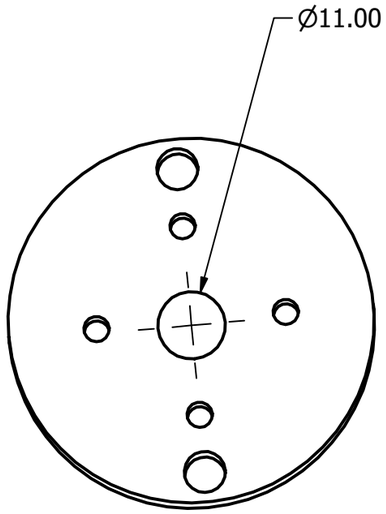
SCALE: 1:1 | SHEET: 2 OF 2

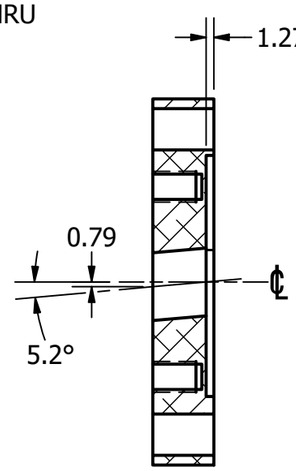
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH		4/5/2016



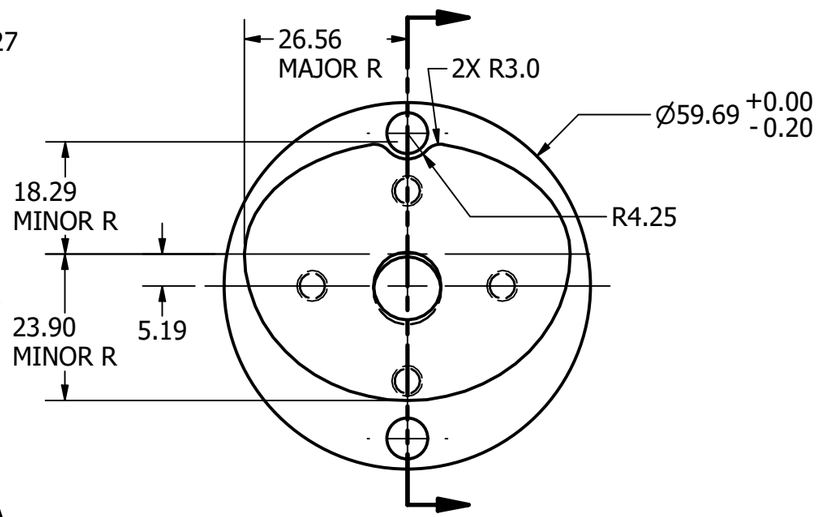








SECTION A-A



PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM	CHECKED	
HEAT TREAT	ENG	
FINISH	APPROVED	

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: jhaefner	4/5/2016

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

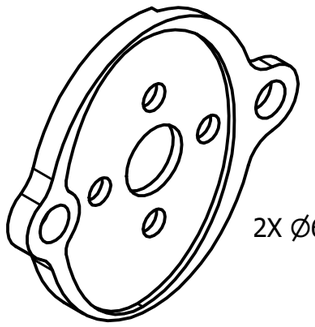
BASE PLATE, NECK MOLD

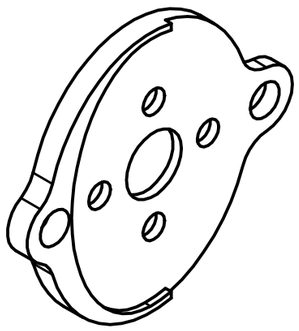
THIRD ANGLE PROJECTION

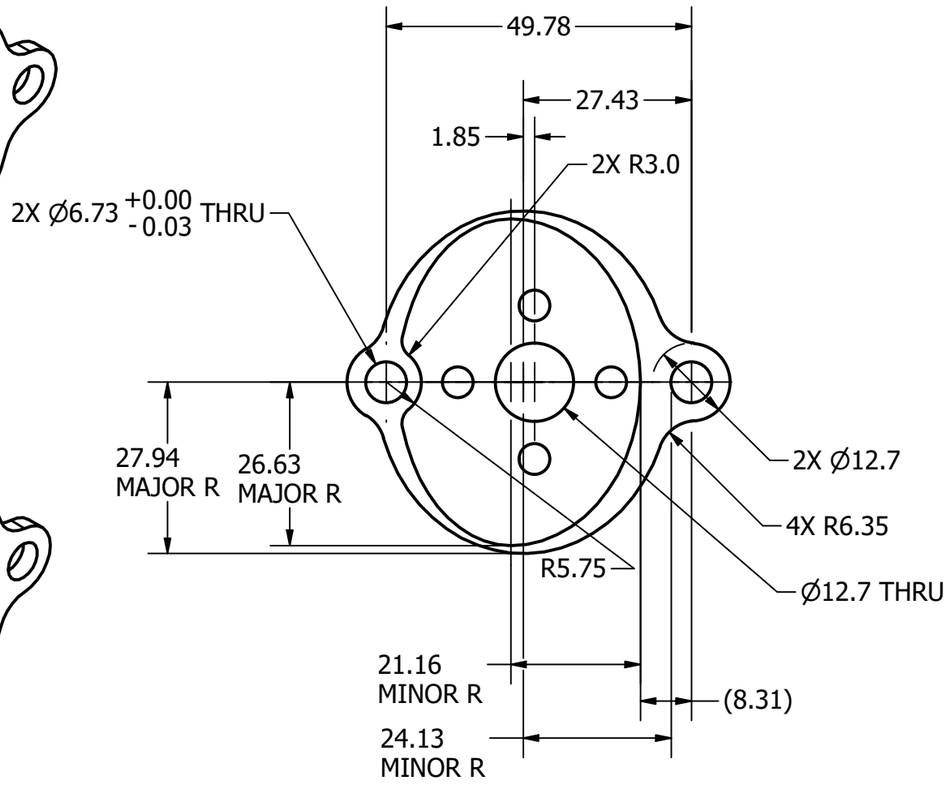
SIZE	DRAWING NUMBER	REV
A3	474-2339	1

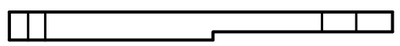
SCALE: 1:1 | SHEET 1 OF 1

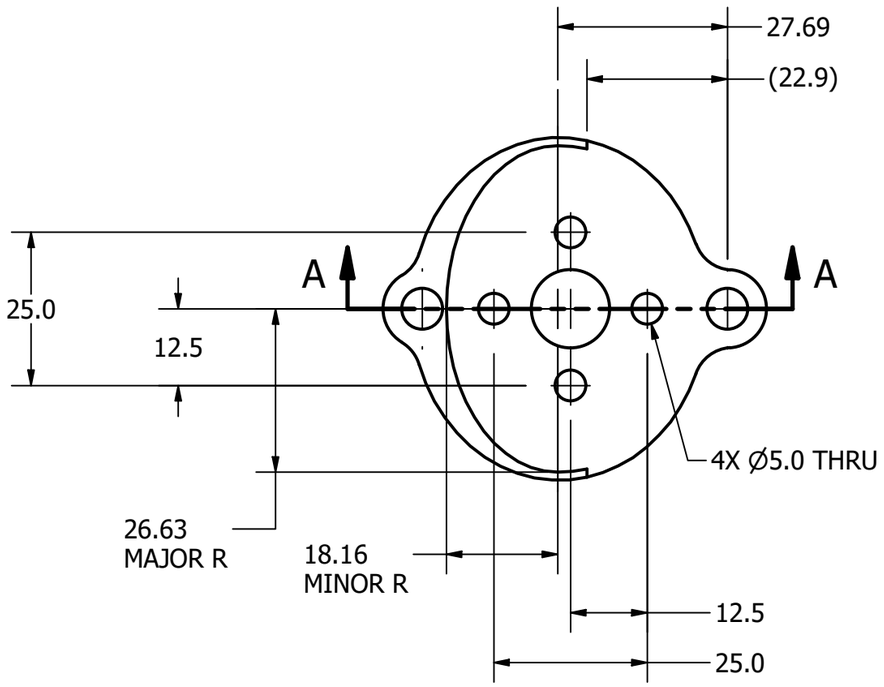
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	·	RELEASE FOR PROTOTYPE	JH		

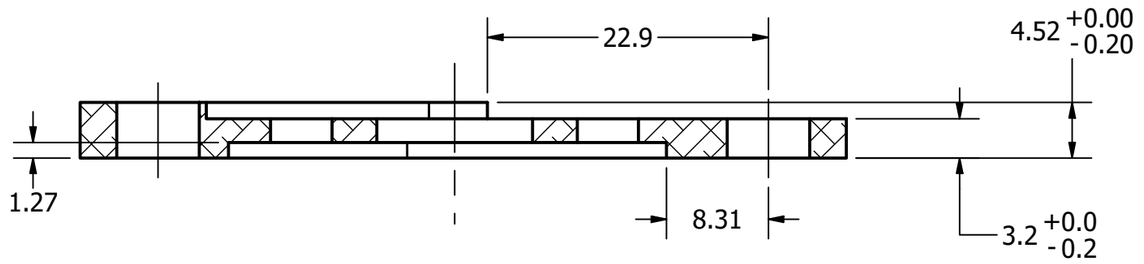












SECTION A-A
SCALE 2:1

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: jhaefner	4/5/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

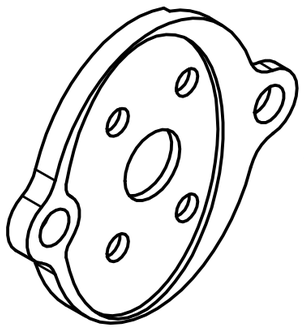
NECK PLATE 3

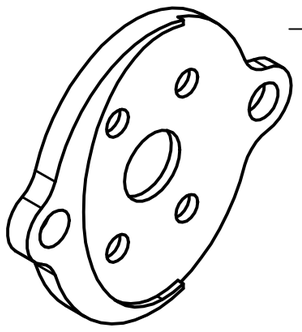
THIRD ANGLE PROJECTION

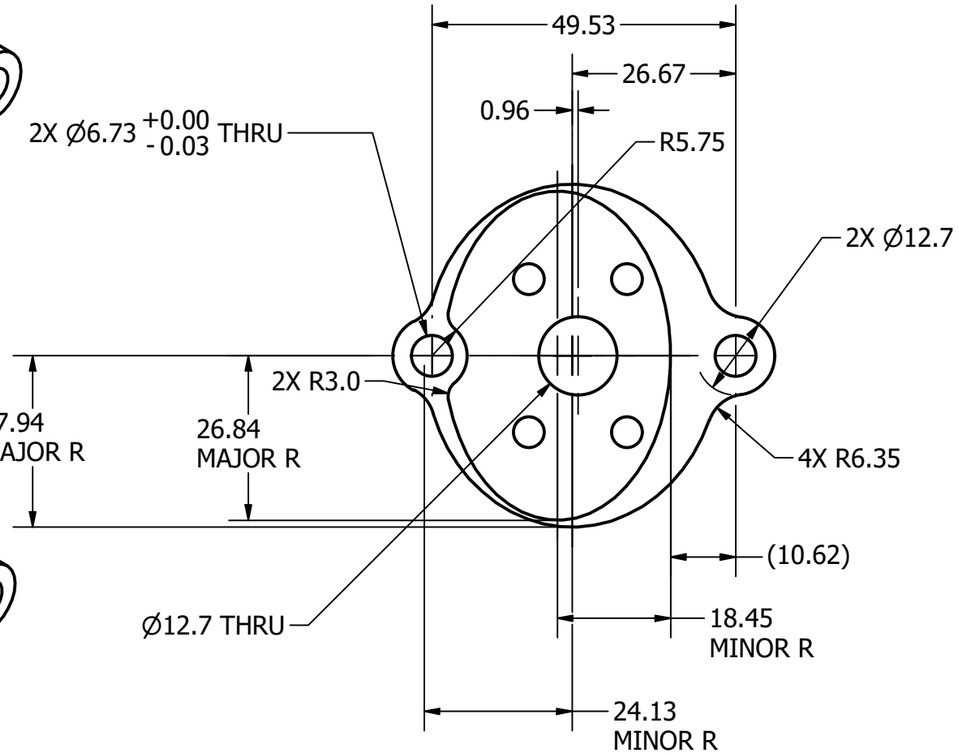
SIZE: A3 | DRAWING NUMBER: 474-2338 | REV: ·

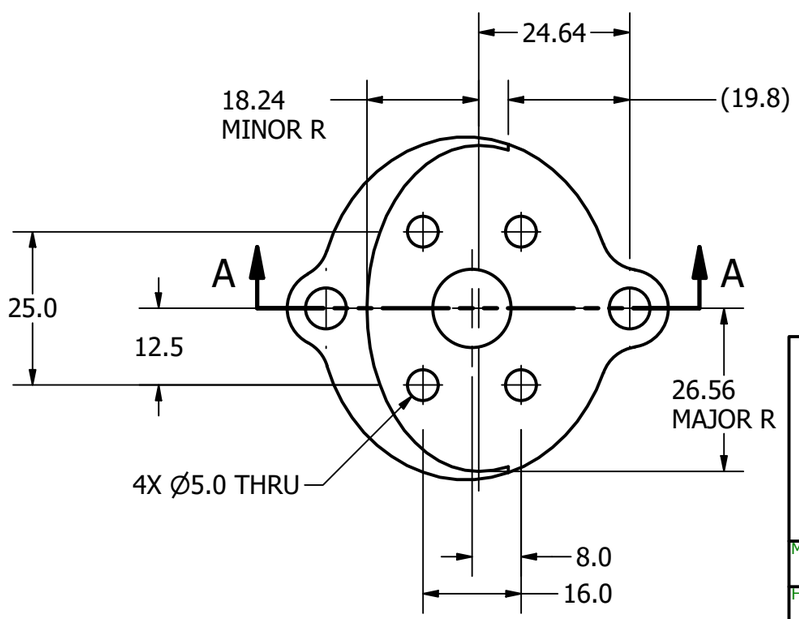
SCALE: 1:1 | SHEET: 1 OF 1

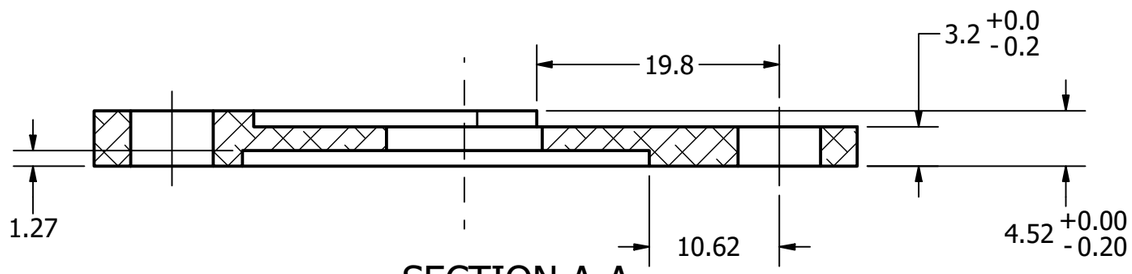
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	·	RELEASE FOR PROTOTYPE	JH		











SECTION A-A
SCALE 2: 1

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: jhaefner	4/5/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

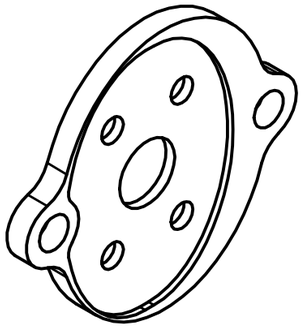
NECK PLATE 2

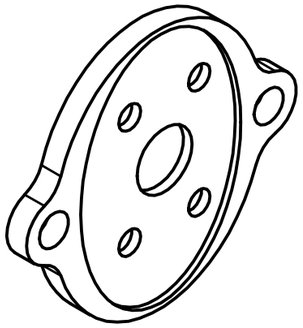
THIRD ANGLE PROJECTION

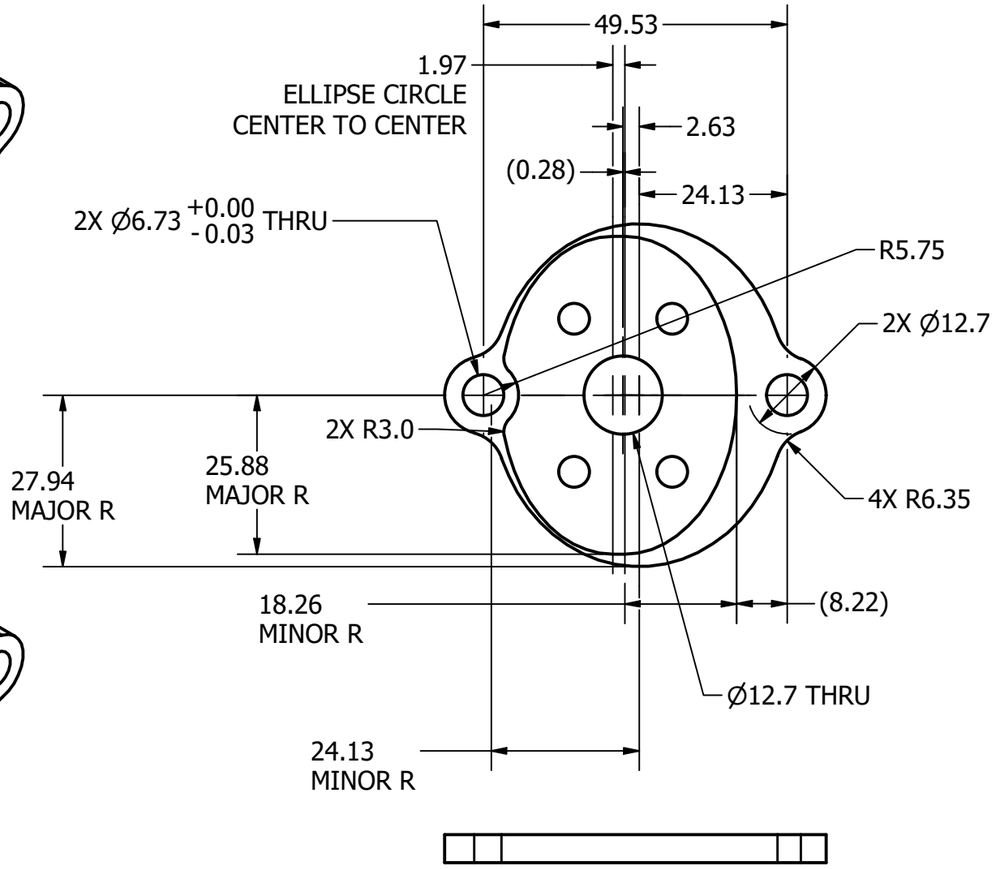
SIZE: A3 | DRAWING NUMBER: 474-2337 | REV: ·

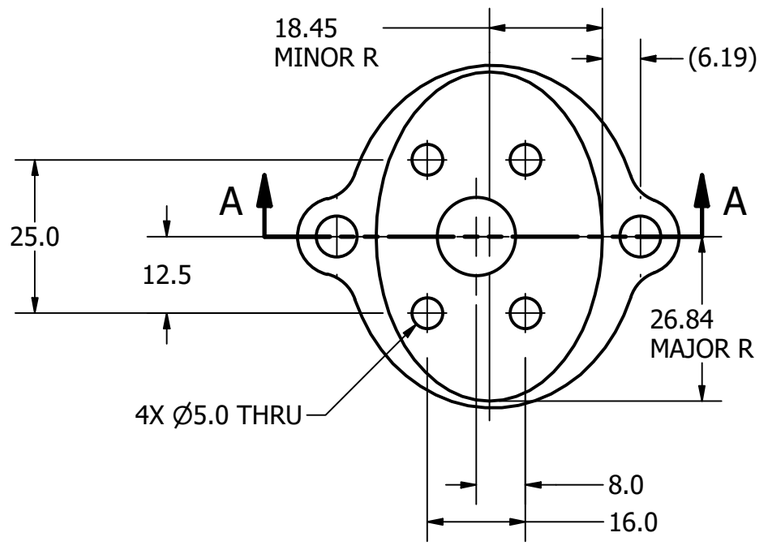
SCALE: 1:1 | SHEET: 1 OF 1

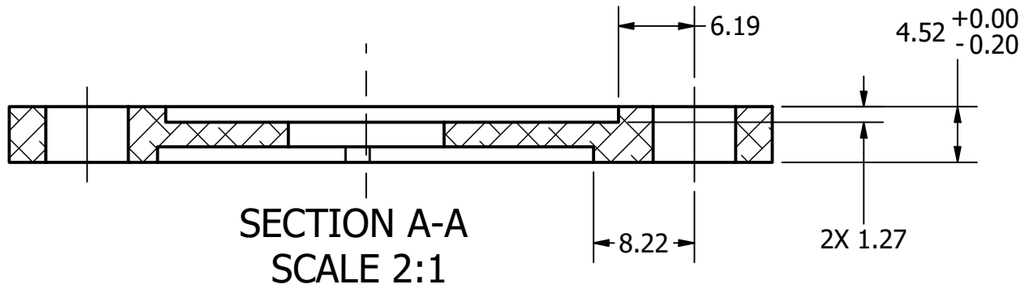
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH		4/5/2016











SECTION A-A
SCALE 2:1

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ±.1
ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: jhaefner	4/5/2016
CHECKED:	
ENG:	
APPROVED:	

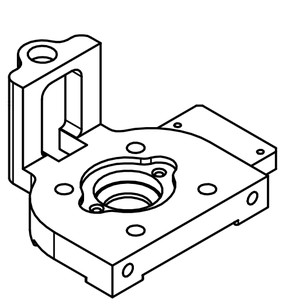
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

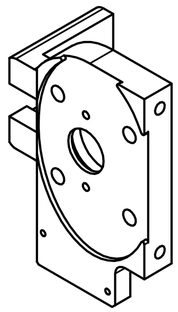
NECK PLATE 1

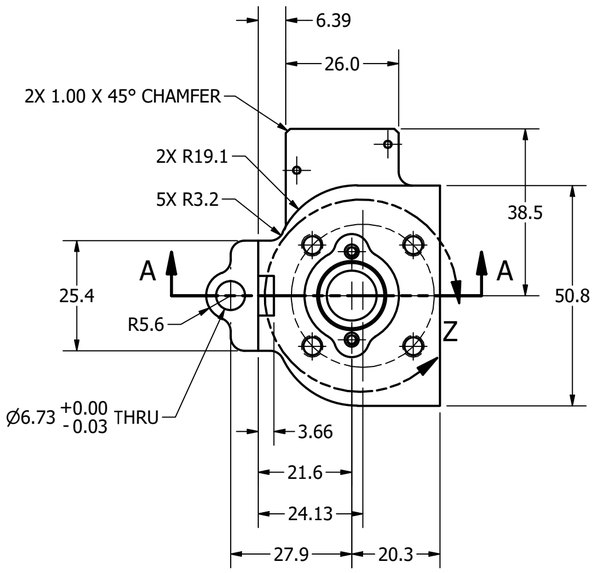
THIRD ANGLE PROJECTION

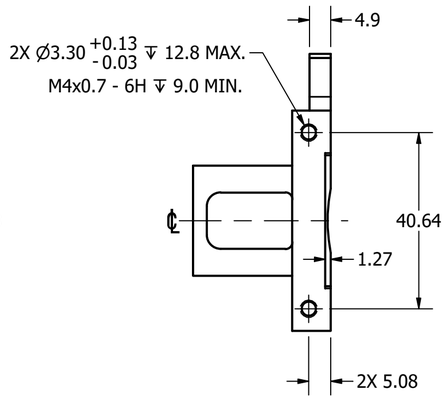
SIZE: A3 | DRAWING NUMBER: 474-2336 | REV: 1
SCALE: 1:1 | SHEET: 1 OF 1

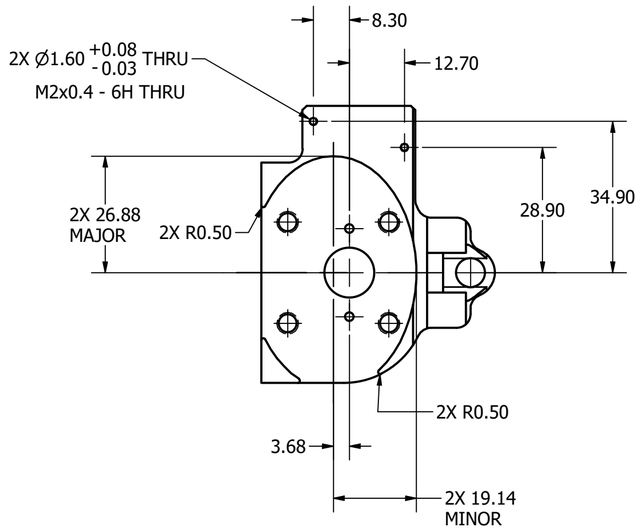
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH		4/6/2016

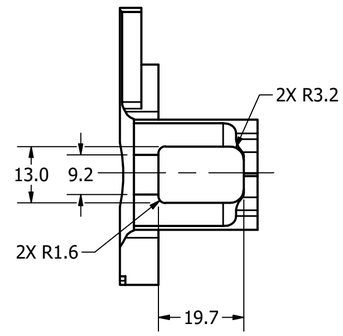


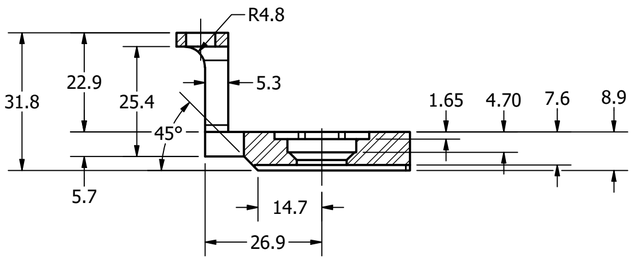




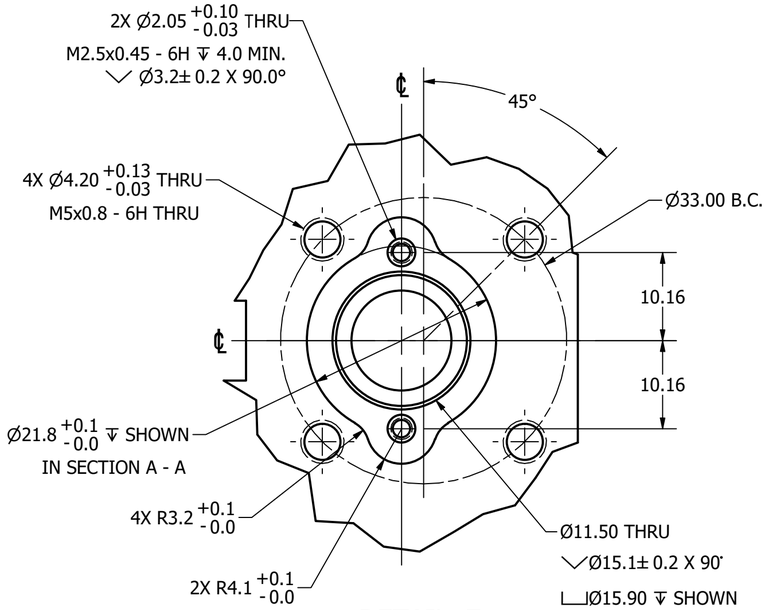








SECTION A-A
SCALE 1 : 1



DETAIL Z
SCALE 2 : 1

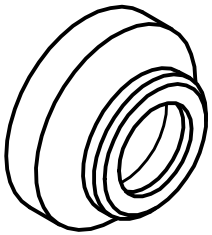
PRELIMINARY DRAWING

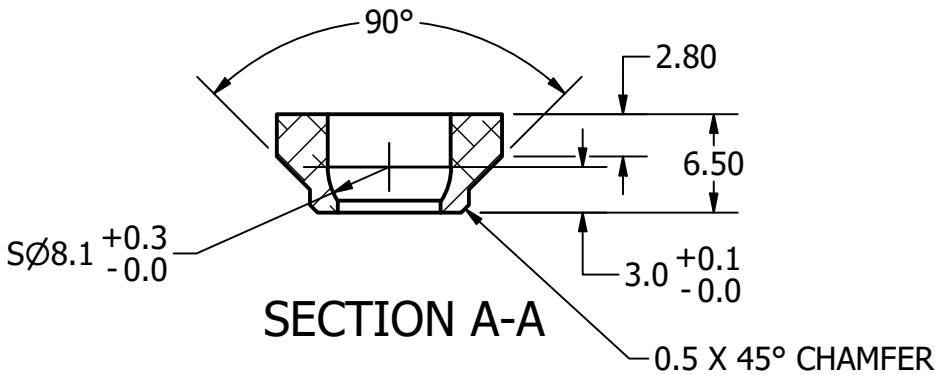
NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

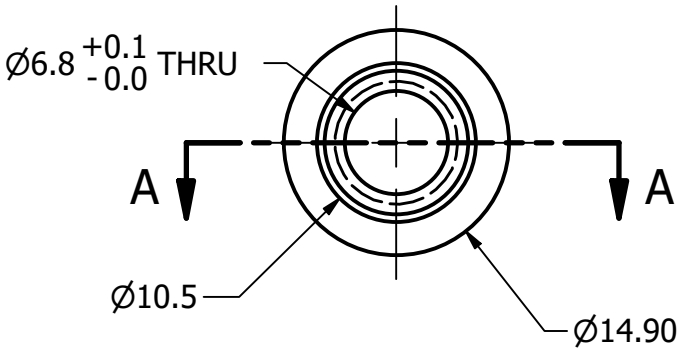
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS TOLERANCES ARE: DECIMAL: X ±.5, X.X ±.2, X.XX ±.1; MACHINED ANGLES ±.5° ASME Y14.5M - 1994 DO NOT SCALE DRAWING	VEHICLE RESEARCH and TEST CENTER	NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
	APPROVALS / DATE	TOP PLATE, NECK
MATERIAL: 1018 STEEL	DRAWN: jhaefner 4/6/2016	
HEAT TREAT	CHECKED	
FINISH: SATIN FLASH CHROME	ENG	
	APPROVED	
THIRD ANGLE PROJECTION	SIZE: A2 · DRAWING NUMBER: 474-2335 · REV: 1 · SCALE: 1:1 · SHEET: 1 OF 1	

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	DJI		4/5/2016





SECTION A-A



UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ±.5 | ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

PRELIMINARY DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

CENTER CABLE FIXTURE

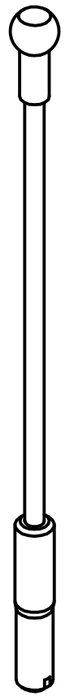
	APPROVALS	DATE
DRAWN	disopi	4/5/2016
CHECKED		
ENG		
APPROVED		

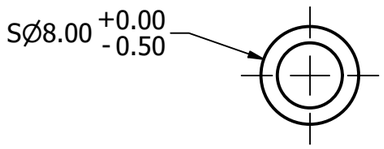
MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

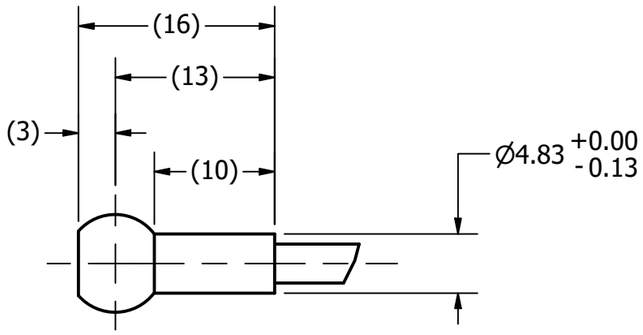
THIRD ANGLE PROJECTION

SIZE: A4 | DRAWING NUMBER: 474-2334 | REV: 1
SCALE: 2:1 | SHEET: 1 OF 1

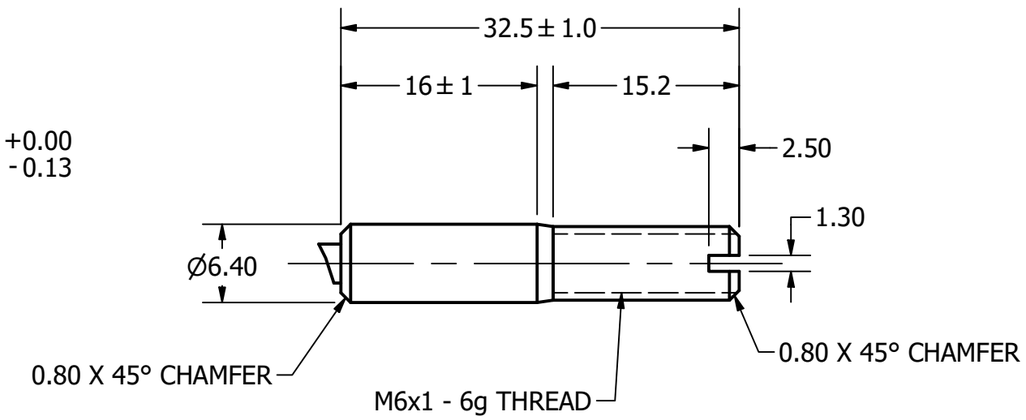
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	DJI		4/5/2016



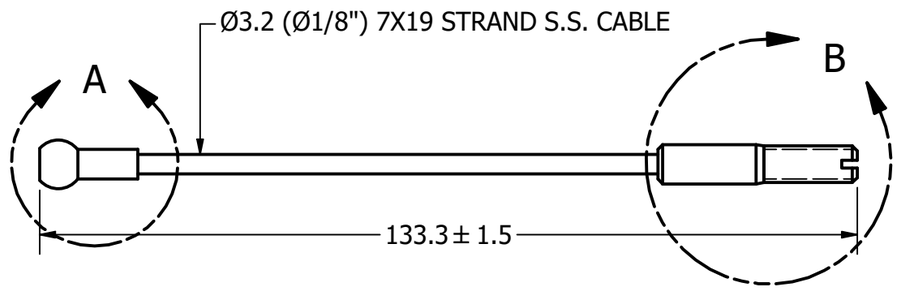




DETAIL A
SCALE 2 : 1



DETAIL B
SCALE 2 : 1



NOTES:

1. TENSILE STRENGTH OF CABLE ASSEMBLY: 771kg (1700 LBS).

2. DIMENSIONS SHOWN ARE AFTER SWAGING AND MACHINING.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ✓ ±.5 | ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

APPROVALS	DATE
DRAWN: disopi	4/5/2016
CHECKED	
ENG	
APPROVED	

MATERIAL
HEAT TREAT
FINISH

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

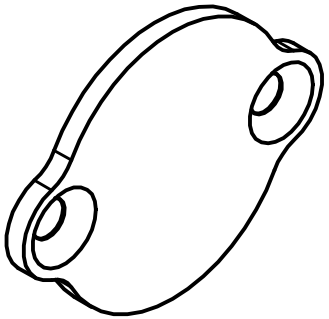
CENTER CABLE ASSY., NECK

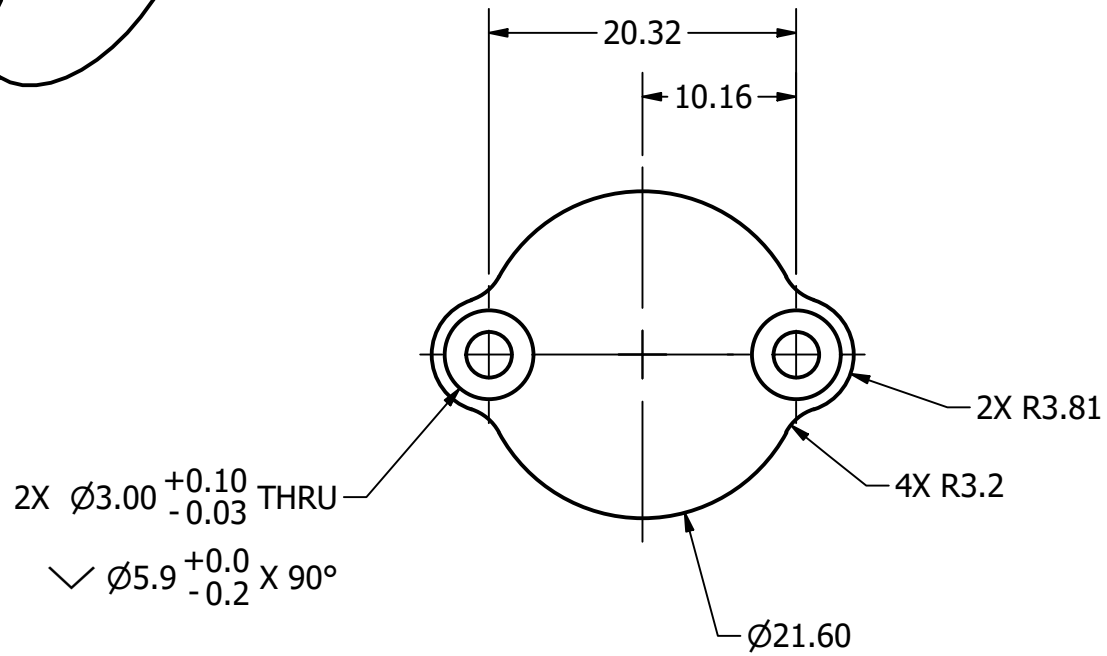
THIRD ANGLE PROJECTION

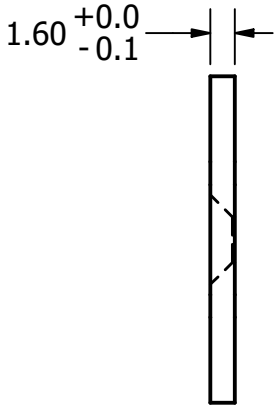
SIZE	DRAWING NUMBER	REV
A3	474-2600	1

SCALE: 1:1 | SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	DJI		4/5/2016







UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ±.5 | ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

PRELIMINARY DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN: disopi	4/5/2016
CHECKED	
ENG	
APPROVED	

MATERIAL: Acetal Resin, Black

HEAT TREAT

FINISH

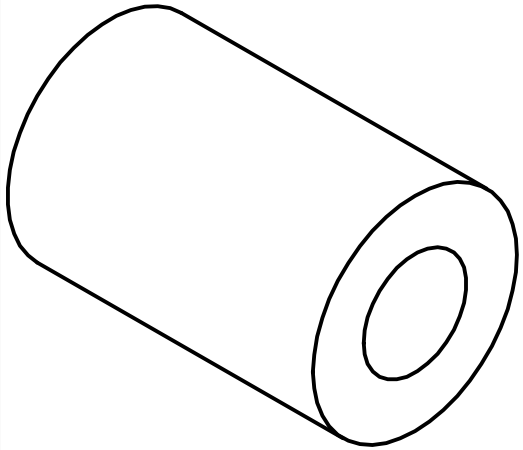
COVER, NECK CABLE

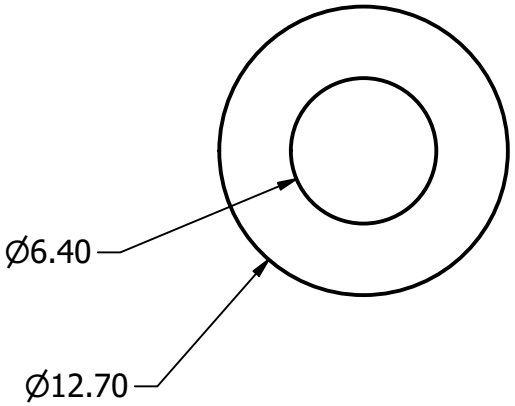
THIRD ANGLE PROJECTION

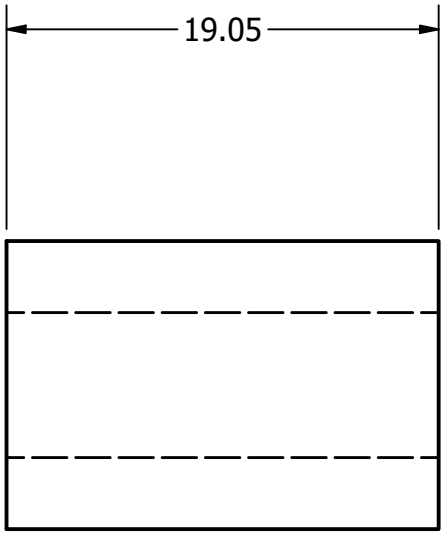
SIZE: A4 | DRAWING NUMBER: 474-2333 | REV: 1

SCALE: 2:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	DJI		4/7/2016







UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ±.5 | ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

PRELIMINARY DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN: disopi	4/7/2016
CHECKED	
ENG	
APPROVED	

MATERIAL: Silicone

HEAT TREAT

FINISH

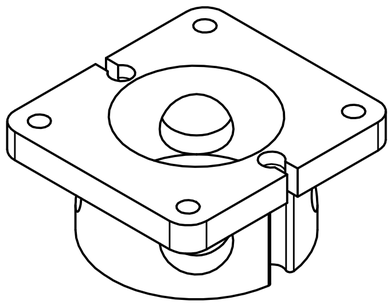
COMPRESSION BUSHING, NECK CENTER CABLE

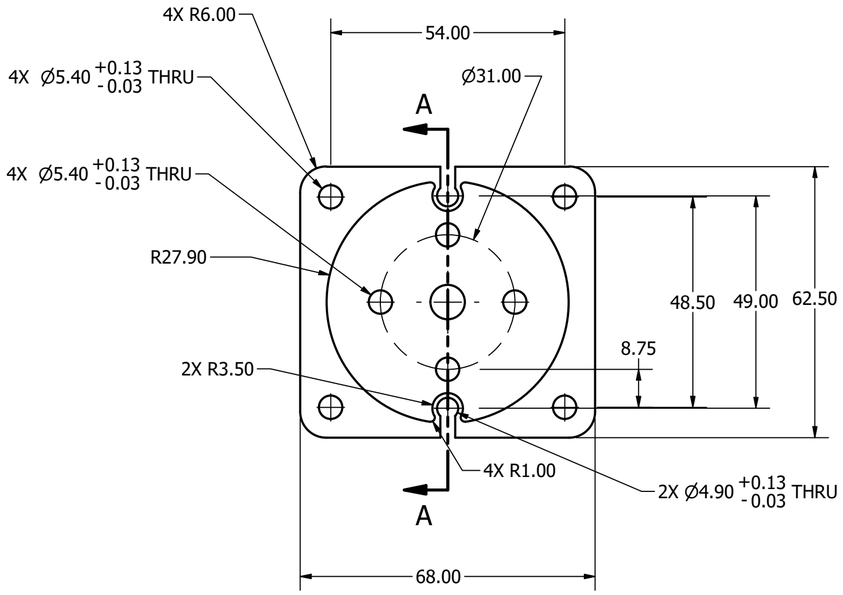
THIRD ANGLE PROJECTION

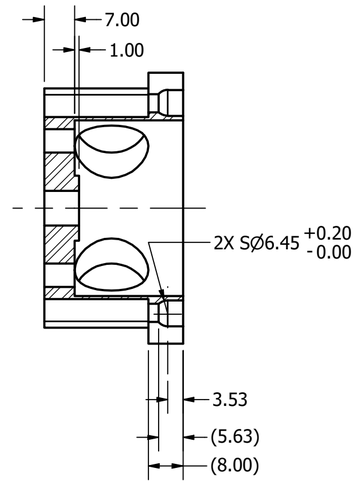
SIZE: A4 | DRAWING NUMBER: 474-2331 | REV: 1

SCALE: 3:1 | SHEET: 1 OF 1

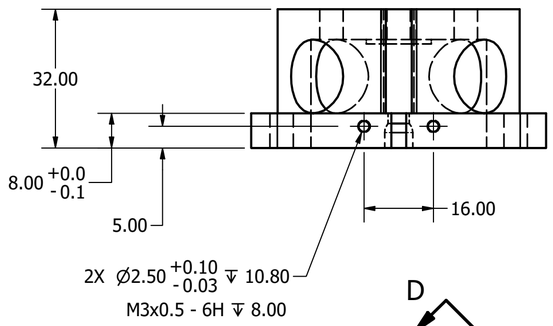
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	DJI		4/5/2016

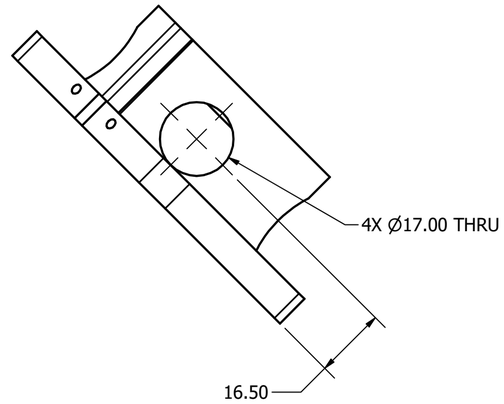




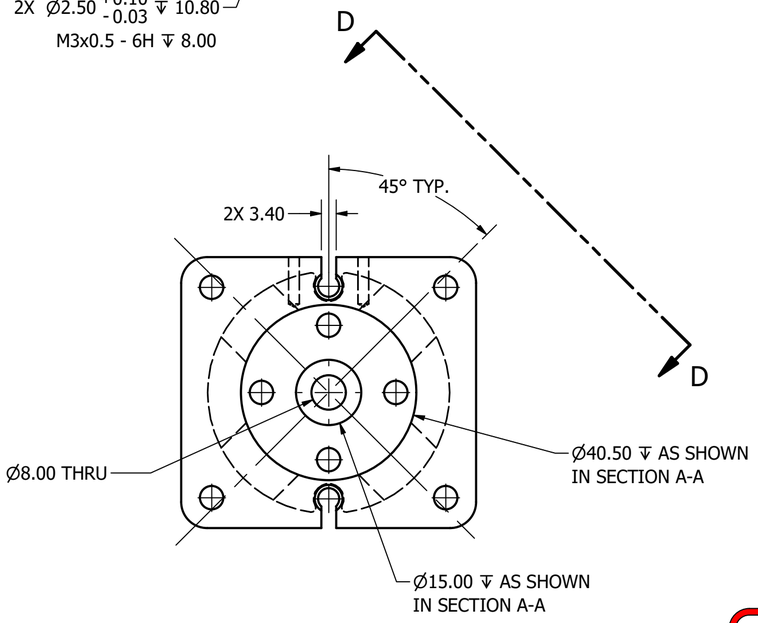


SECTION A-A





VIEW D-D



PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO Nnot SCALE DRAWING

MATERIAL: 1018 STEEL
HEAT TREAT:
FINISH: 0.008mm ELECTROLESS NICKEL PLATE PER SIDE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN disopi	4/5/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

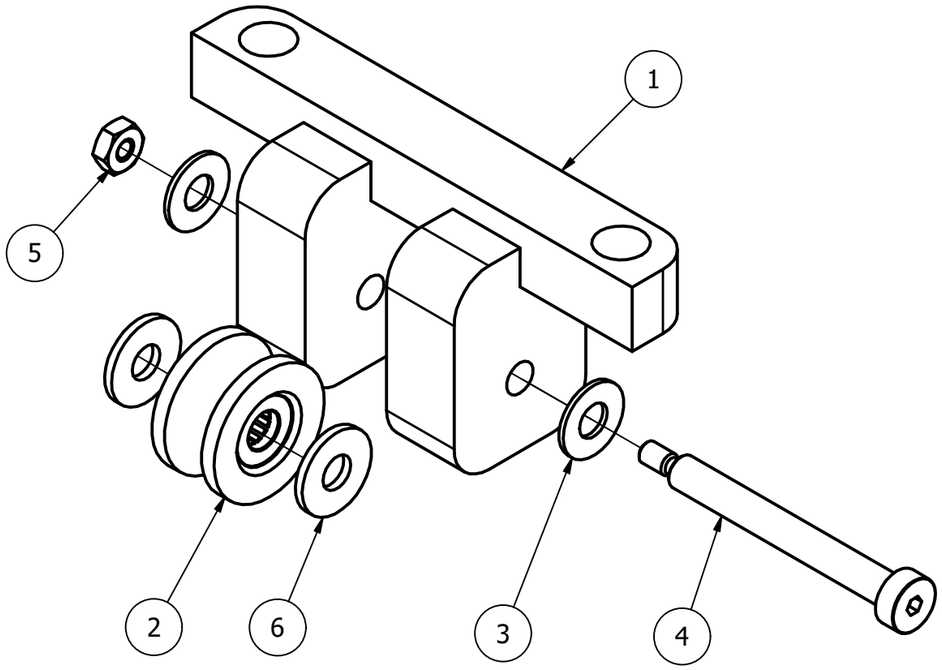
STRUCTURAL REPLACEMENT, LOWER NECK LOAD CELL

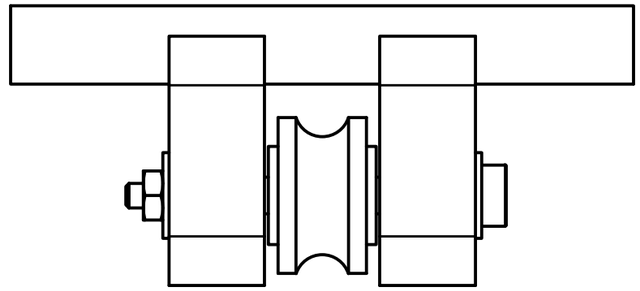
THIRD ANGLE PROJECTION

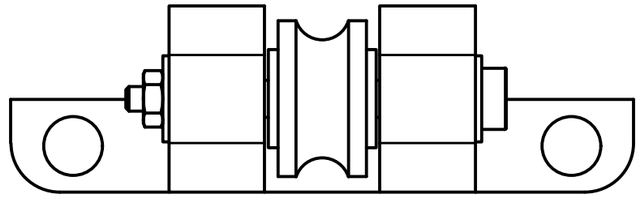
SIZE	DRAWING NUMBER	REV
A2	474-2325	1

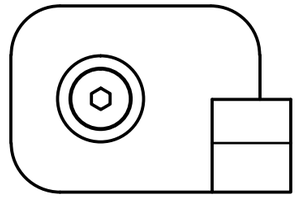
SCALE: 1:1 SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/6/2016









ITEM	QTY	PART NUMBER	DESCRIPTION
6	2	5001410	M3 FLAT WASHER PLAIN PTFE
5	1	5000764	M2 X 0.4 HEX NUT SS
4	1	5001395	3 X 25 LG. PREC. SHSS SS
3	2	5000634	M3 FLAT WASHER PLAIN SS
2	1	474-2308	REAR CABLE PULLEY ASSY.
1	1	474-2329	BRACKET, REAR PULLEY

PARTS LIST

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED 125
ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

PRELIMINARY DRAWING

*V*EHICLE *R*ESEARCH and *T*EST *C*ENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN B. KIMES	4/6/2016
CHECKED	
ENG	
APPROVED	

MATERIAL
HEAT TREAT
FINISH

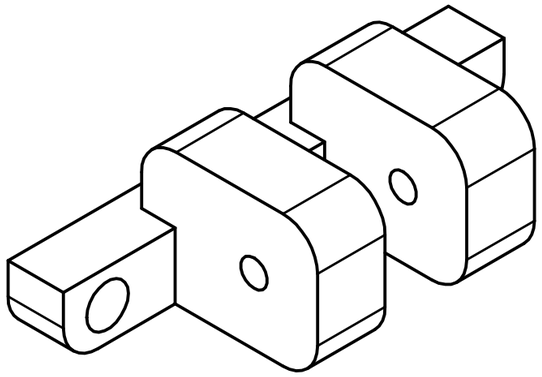
REAR PULLEY ASSEMBLY

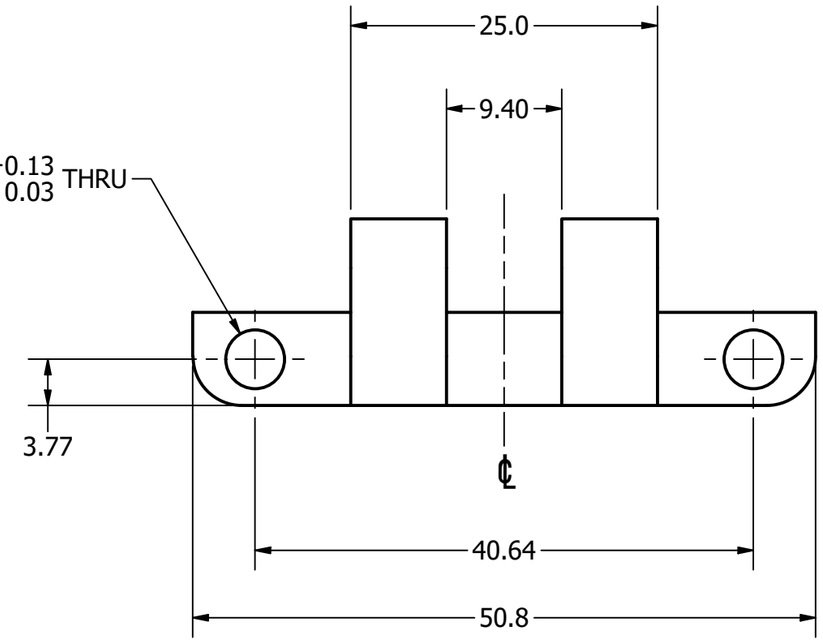
THIRD ANGLE PROJECTION

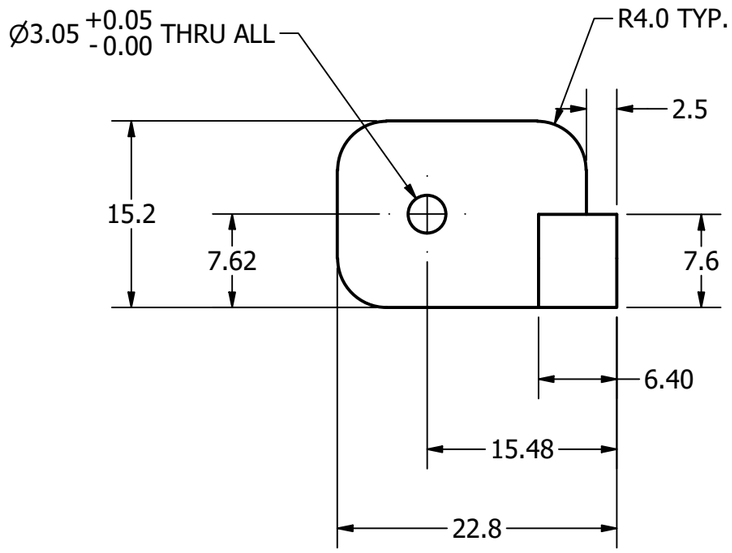
SIZE A3 | DRAWING NUMBER 474-2330 | REV 1

SCALE: 2:1 | SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/5/2016







NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 1018 STEEL
HEAT TREAT:
FINISH: 0.008mm MAX. ELECTROLESS NICKEL PLATE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: B. KIMES	4/5/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

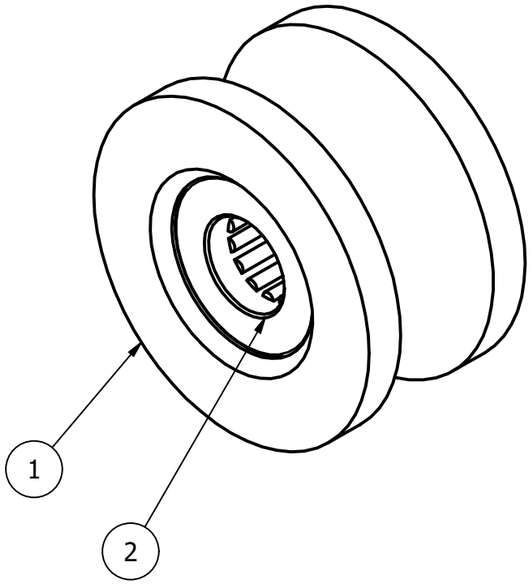
BRACKET, REAR PULLEY

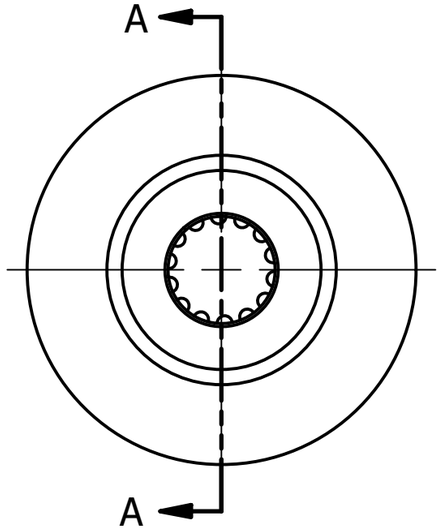
THIRD ANGLE PROJECTION

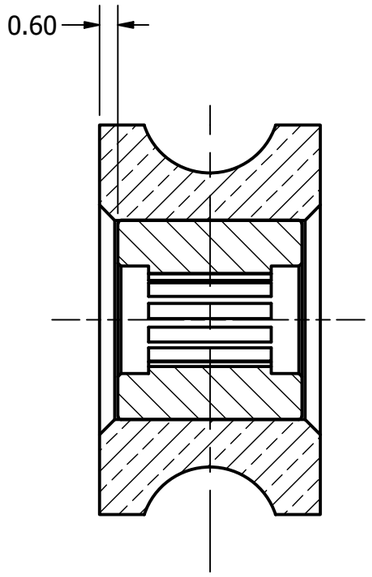
SIZE: A3 | DRAWING NUMBER: 474-2329 | REV: 1

SCALE: 2:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/5/2016







SECTION A-A

ITEM	QTY	PART NUMBER	DESCRIPTION
2	1	5001409	ROLLER BEARING, M3 SHAFT
1	1	474-2307	CABLE PULLEY, REAR

PARTS LIST

NOTES:

1. PRESS BEARING INTO PULLEY AS SHOWN.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

REAR CABLE PULLEY ASSY.

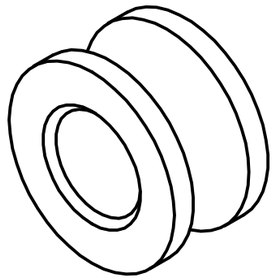
	APPROVALS	DATE
DRAWN	B. KIMES	4/5/2016
MATERIAL		
CHECKED		
HEAT TREAT		
ENG		
FINISH		
APPROVED		

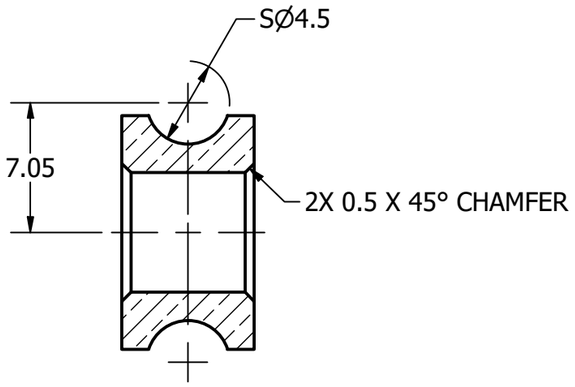
THIRD ANGLE PROJECTION

SIZE A3 | DRAWING NUMBER 474-2308 | REV 1

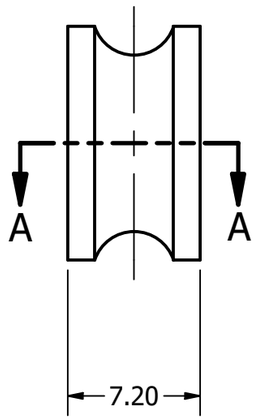
SCALE: 5:1 | SHEET 1 OF 1

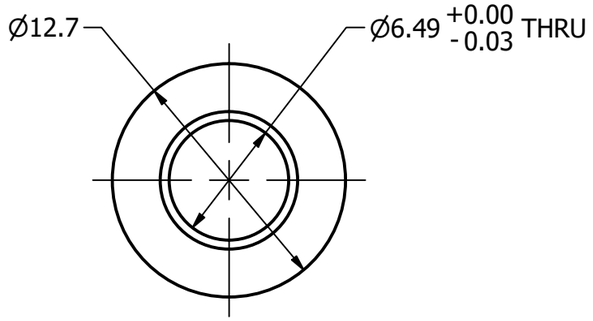
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/5/2016





SECTION A-A





PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED √ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: Brass, Soft Yellow
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: B. KIMES	4/5/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

CABLE PULLEY, REAR

THIRD ANGLE PROJECTION

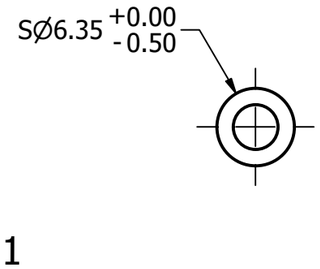
SIZE	DRAWING NUMBER	REV
A3	474-2307	1

SCALE: 3:1 SHEET 1 OF 1

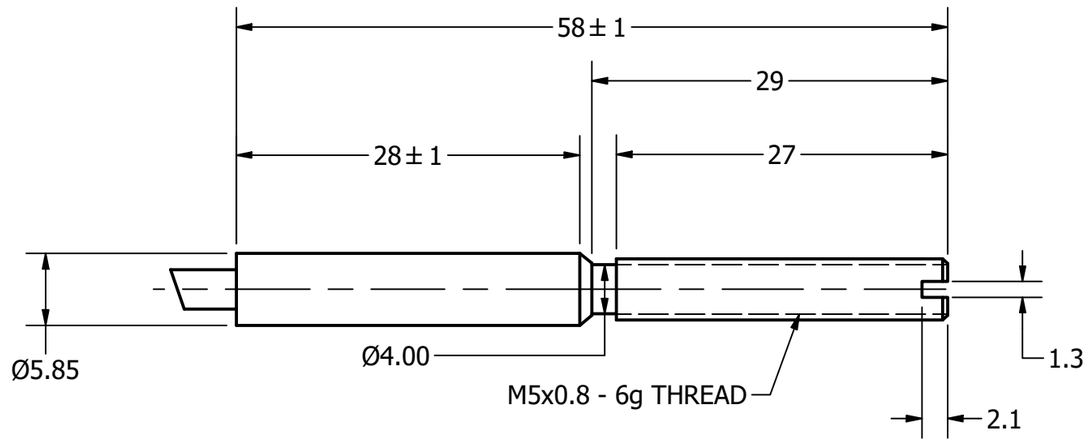
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	3/22/2016



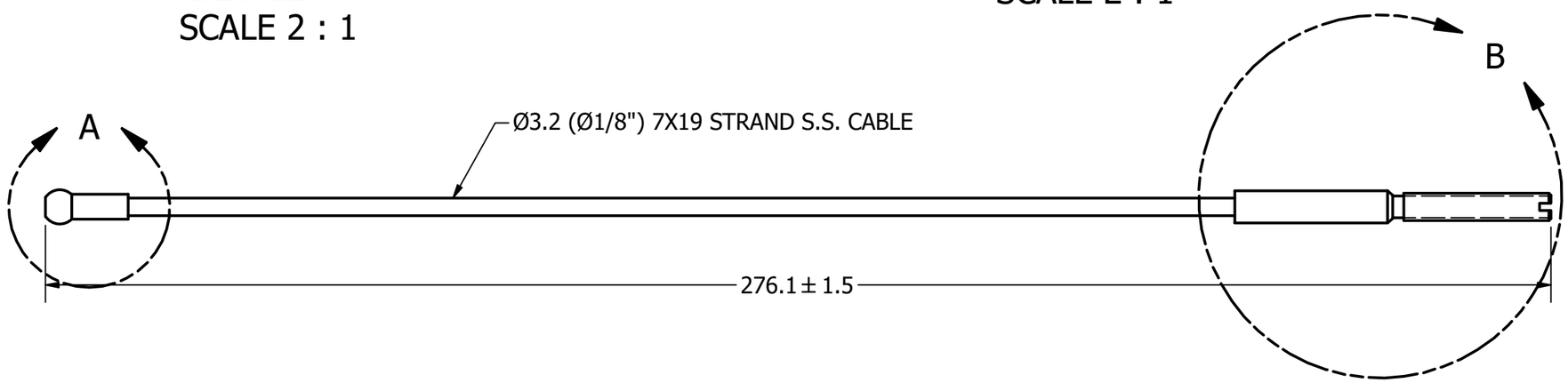
SCALE .5:1



DETAIL A
SCALE 2 : 1



DETAIL B
SCALE 2 : 1



NOTES:

1. TENSILE STRENGTH OF CABLE ASSEMBLY: 771kg (1700 LBS).
2. DIMENSIONS SHOWN ARE AFTER SWAGING AND MACHINING.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED √
ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL	CHECKED	
HEAT TREAT	ENG	
FINISH	APPROVED	

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN B. KIMES	3/22/2016

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

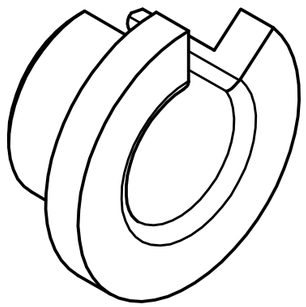
NECK CABLE ASSY., FRONT / REAR

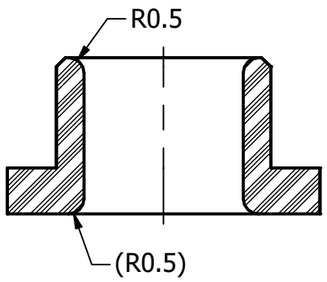
THIRD ANGLE PROJECTION

SIZE	DRAWING NUMBER	REV
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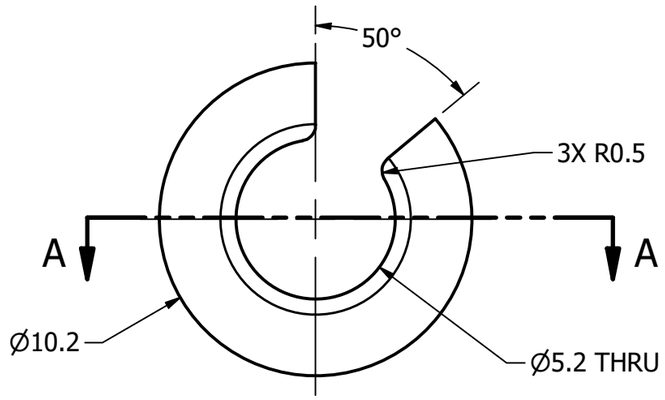
SCALE: 1:1 SHEET 1 OF 1

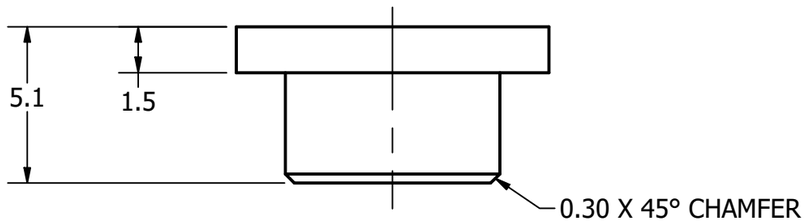
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/6/2016

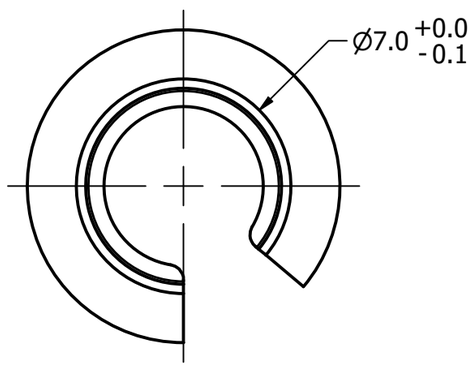




SECTION A-A







PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ±.5, ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: Acetal Resin, White
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: B. KIMES	4/6/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

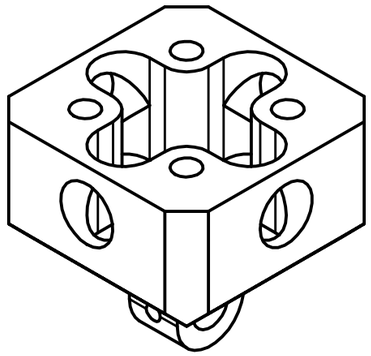
CABLE GUIDE HALF

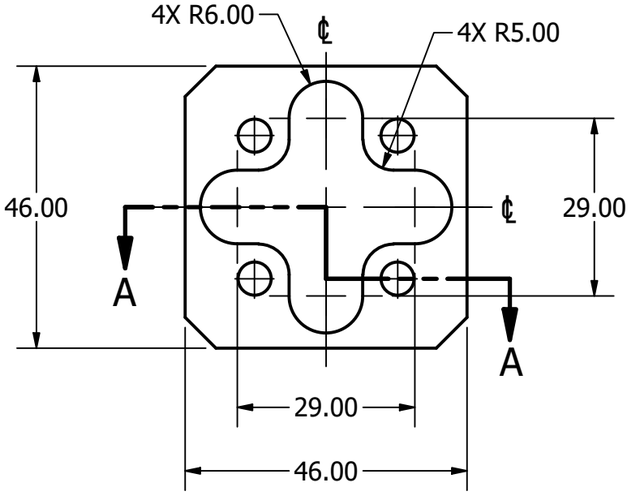
THIRD ANGLE PROJECTION

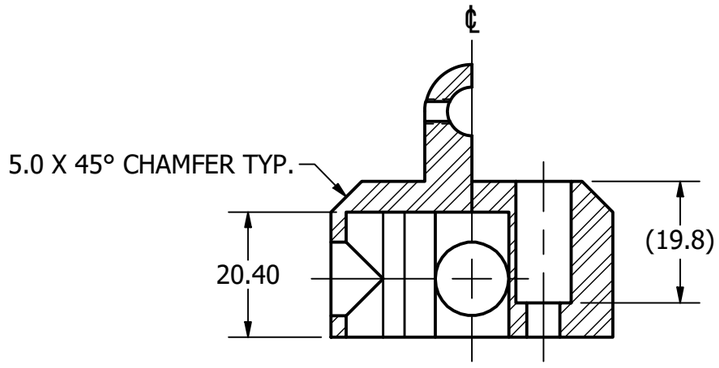
SIZE: A3 | DRAWING NUMBER: 474-2332 | REV: 1

SCALE: 5:1 | SHEET: 1 OF 1

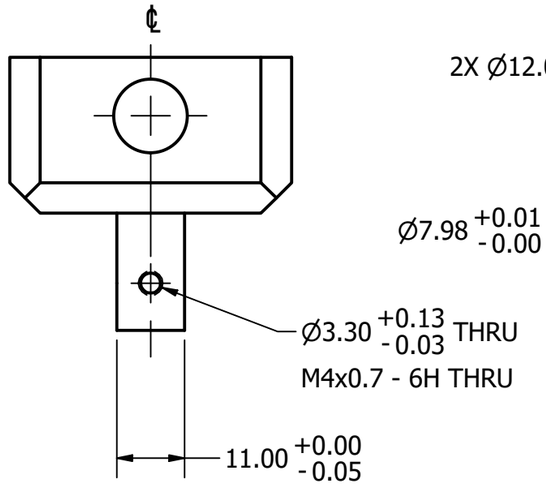
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	DJI		4/7/2016

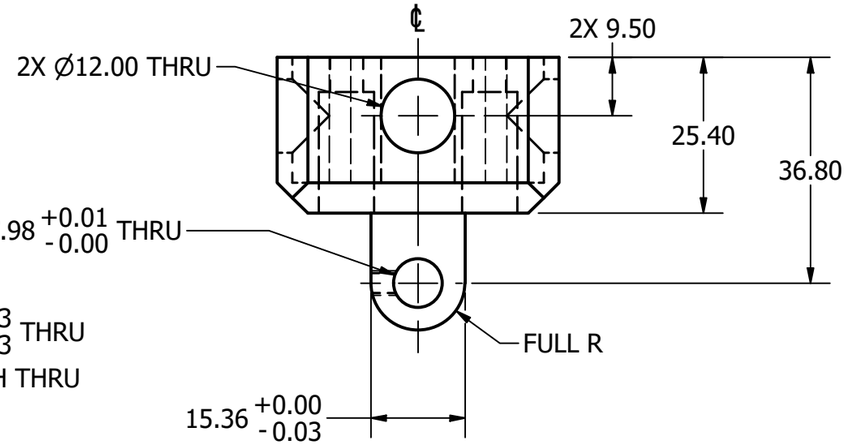


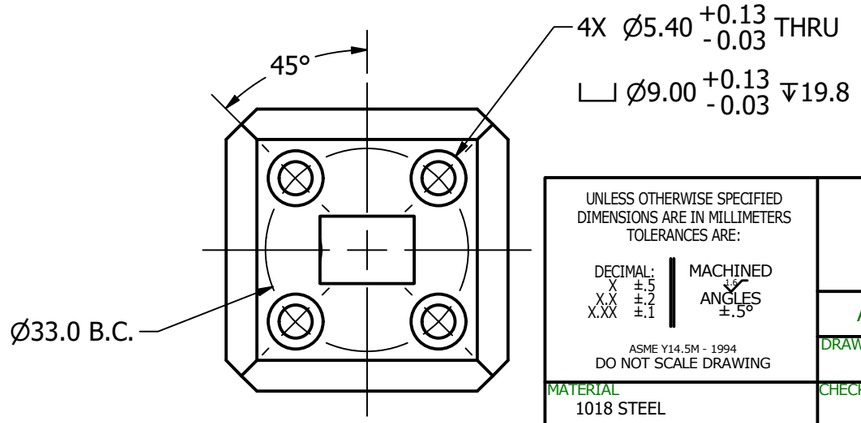




SECTION A-A







PRELIMINARY DRAWING

NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 1018 STEEL
HEAT TREAT:
FINISH: 0.008mm ELECTROLESS NICKEL PLATE PER SIDE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: disopi	4/7/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

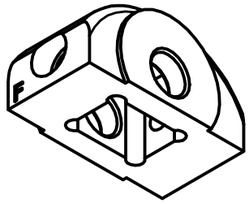
STRUCTURAL REPLACEMENT, UPPER NECK LOAD CELL

THIRD ANGLE PROJECTION

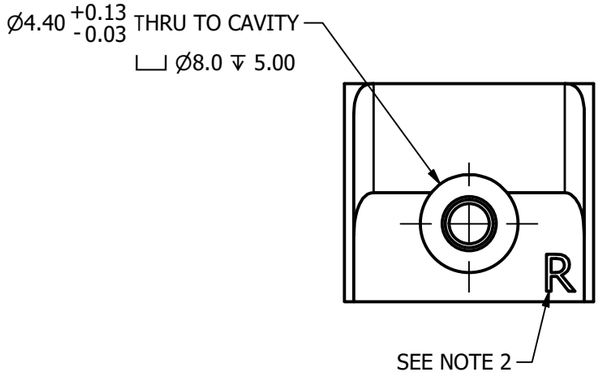
SIZE	DRAWING NUMBER	REV
A3	474-2326	1

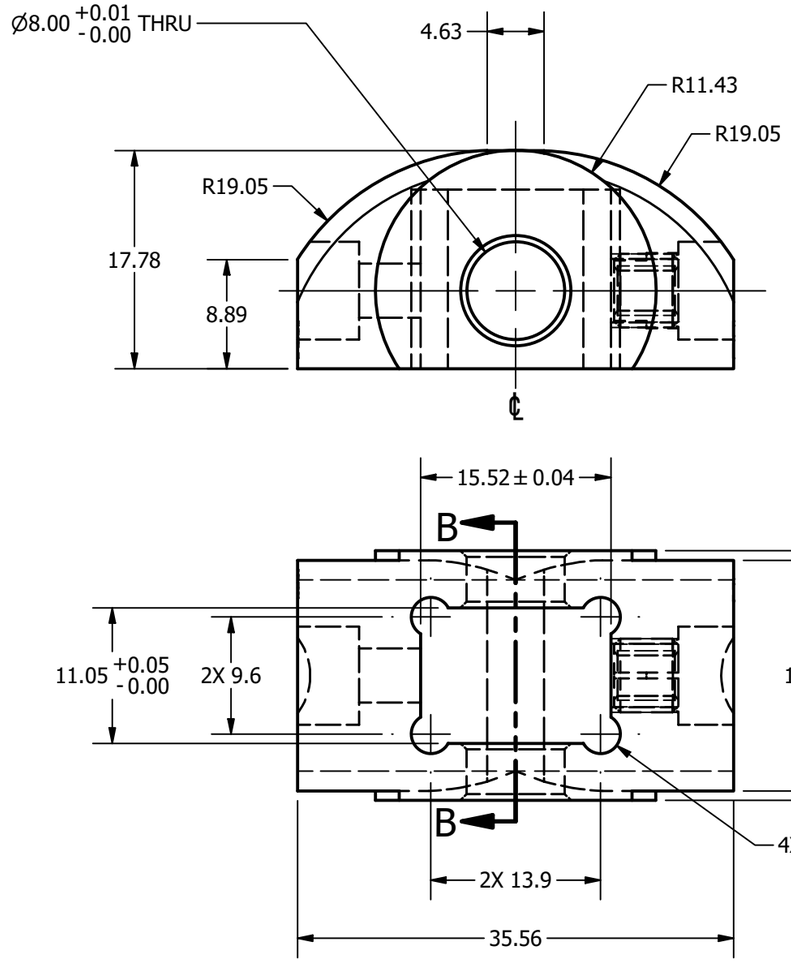
SCALE: 1:1 | SHEET: 1 OF 1

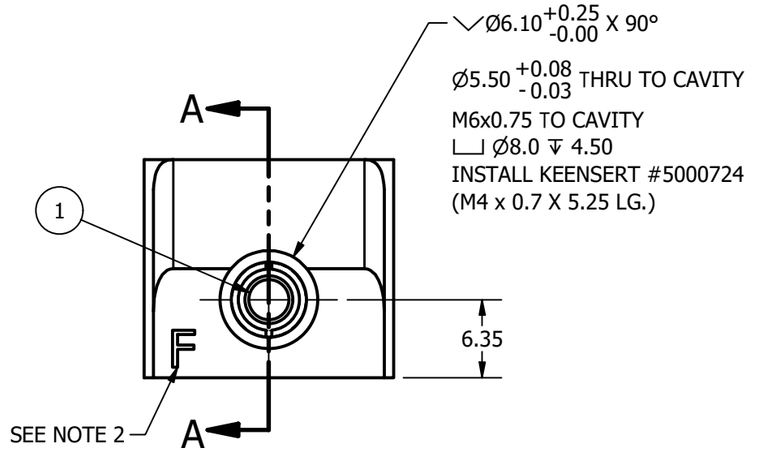
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	DJI		4/7/2016

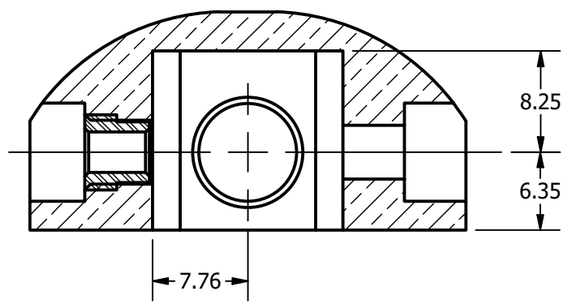


SCALE 1 : 1

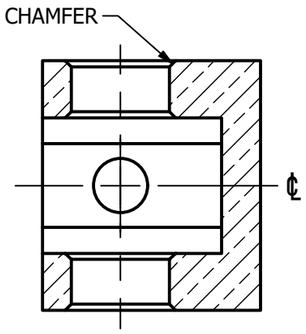








SECTION A-A



SECTION B-B

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	5000724	M4 X 0.7 X 5.25 LG. MINI KEENSERT

PARTS LIST

NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.
2. STAMP OR ETCH (3mm CHARACTERS) AS SHOWN.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN disopi	4/7/2016
CHECKED	
ENG	
APPROVED	

MATERIAL: BRASS, SOFT YELLOW
HEAT TREAT:
FINISH:

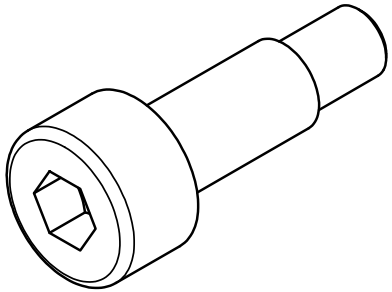
OC FLEXION-EXTENSION CAM

THIRD ANGLE PROJECTION

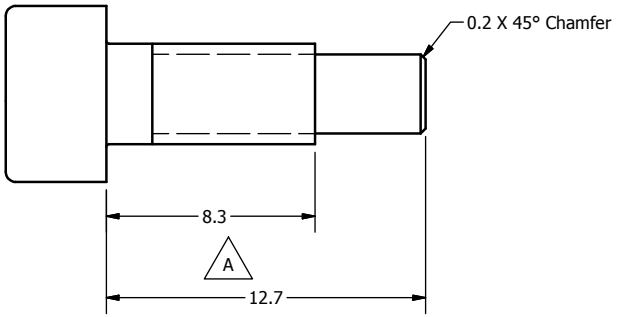
SIZE	DRAWING NUMBER	REV
A3	474-2327	1

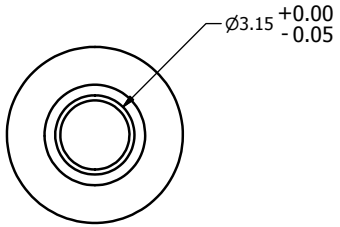
SCALE: 2:1 | SHEET 1 OF 1

REVISION HISTORY				
ECO #	REV	DESCRIPTION	DATE	BY
	A	RENUMBERED FROM T1NKM027 R05 AND CONVERTED TO METRIC FOR THOR-M; 8.3 WAS 8.6, 12.7 WAS (12.7); ADD (5000459) TO NOTE	7/28/2011	BK



SCALE 5.000



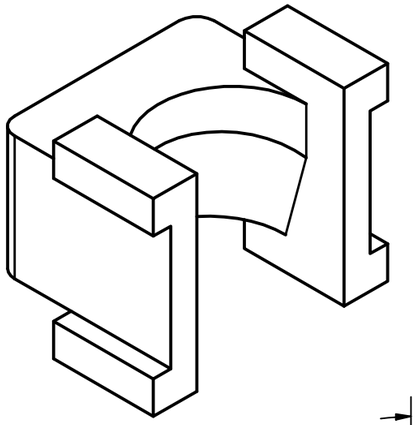


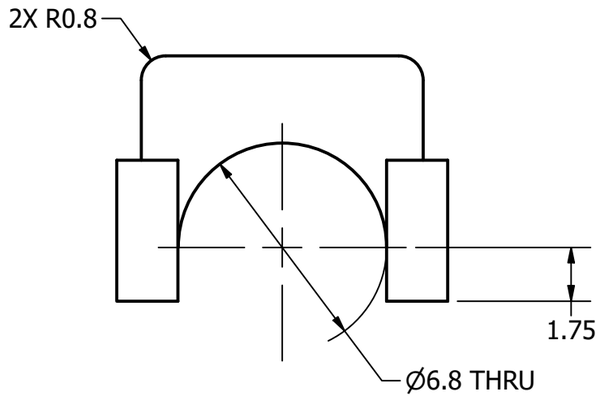
NOTES:

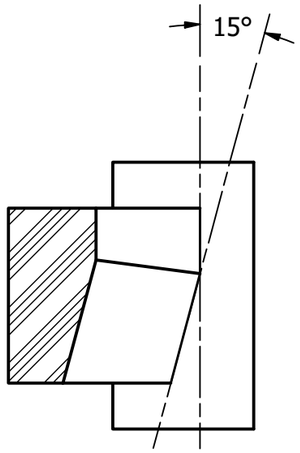
A 1. MAKE FROM M4 X0.7 X 14 SHCS (5000459), MODIFY AS SHOWN.

DO NOT SCALE DRAWING		TOLERANCES	NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION		
THIRD ANGLE PROJECTION		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS DECIMALS X ±0.5, X.X ±0.2, X.XX ±0.1, X.XXX ±0.01; ANGLES ±0.5°; FINISH 1.6			
PROJECT NO.:		REMOVE BURRS & BREAK SHARP EDGES	DESCRIPTION: OCCIPITAL CONDYLE SCREW		
472-2000	1	MATERIAL:	DRAWN BY: B. KIMES	DATE: 7/28/2011	
NEXT ASSEMBLY	QTY	HEAT TREAT:	CHECKED BY:	DATE:	
TOTAL QTY IN DUMMY	1	FINISH:	ENGINEER: J. WANG	DATE: 1/9/2012	SIZE: A3 SHEET 1 OF 1 SCALE: 5.000 DRAWING NO.: 472-2016 REV: A

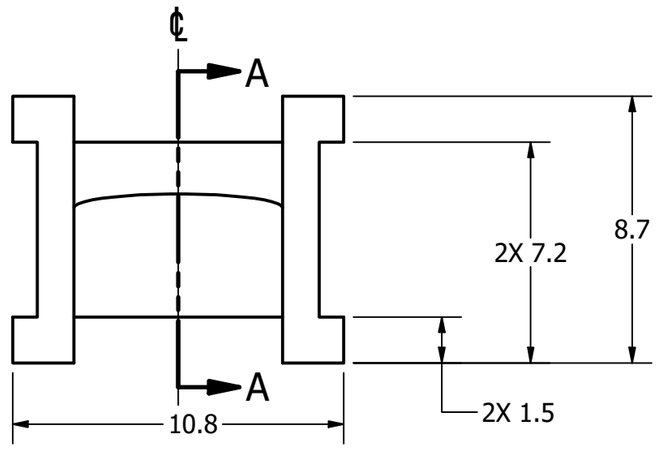
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/6/2016

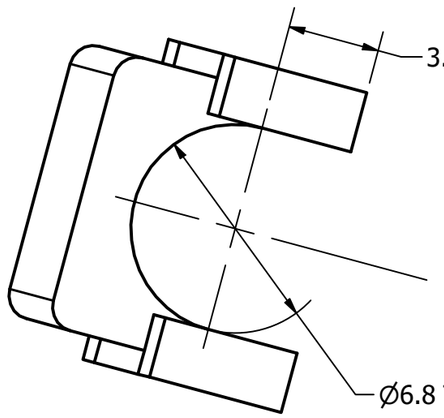


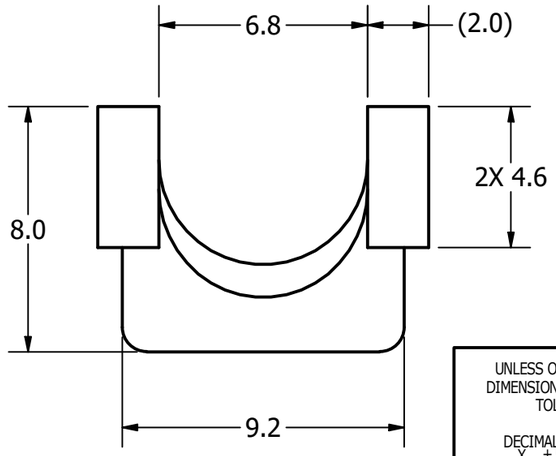




SECTION A-A







NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: Acetal Resin, Black		
HEAT TREAT		
FINISH		

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: B. KIMES	4/6/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

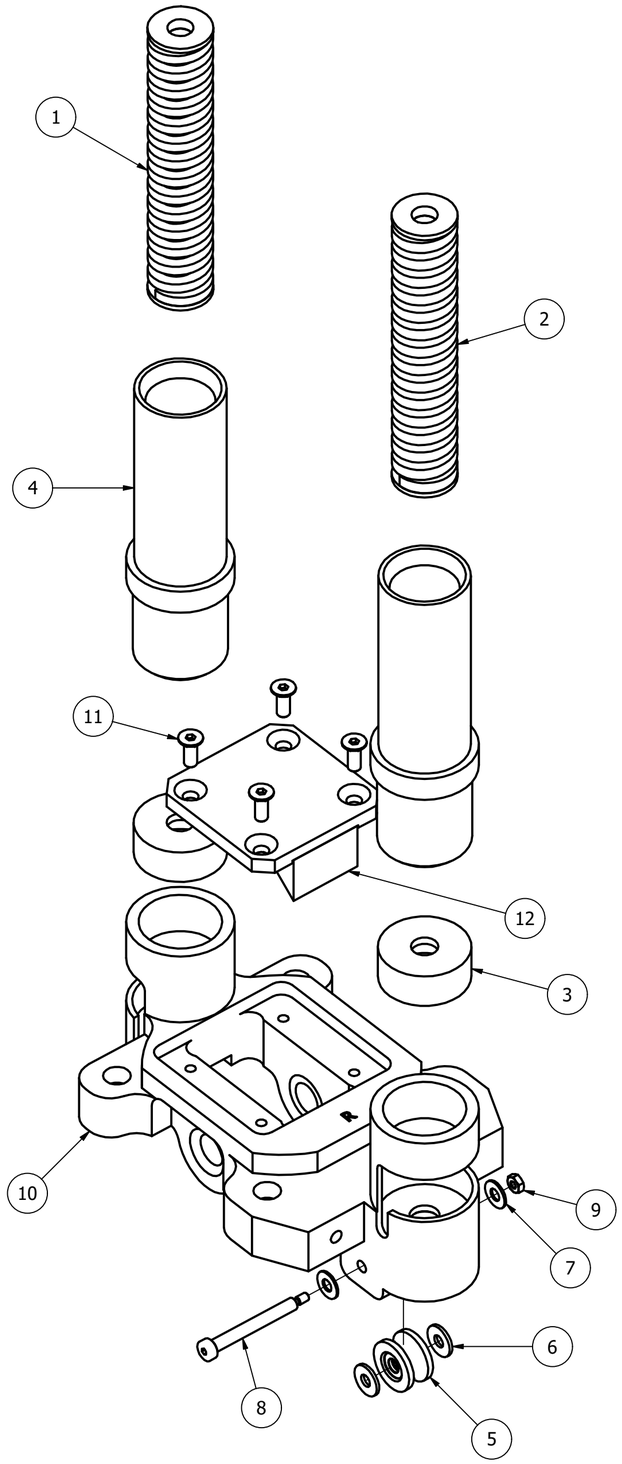
TOP PLATE CABLE GUIDE, NECK

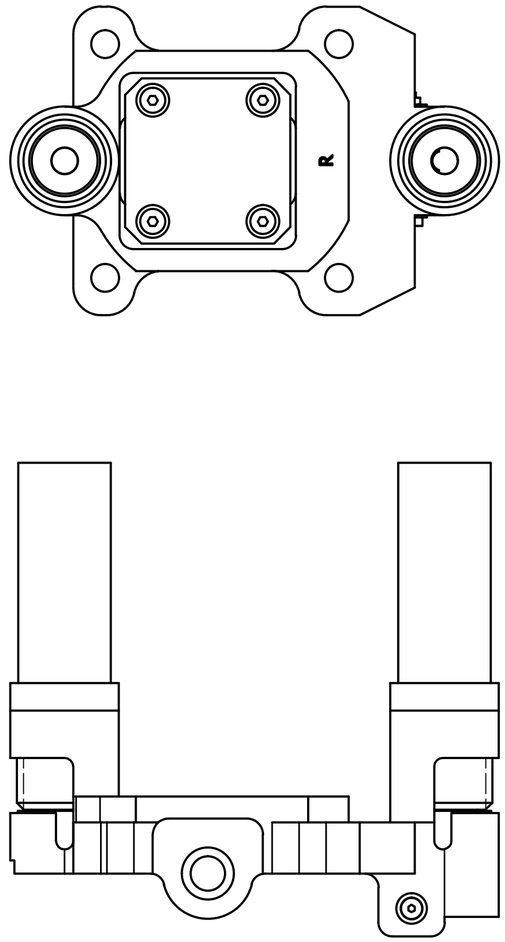
THIRD ANGLE PROJECTION

SIZE	DRAWING NUMBER	REV
A3	474-2341	1

SCALE: 5:1 SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AB	JW	04/14/16





12	1	474-2115	FLEXION/EXTENSION STOP ASSEMBLY
11	4	5000116	M3 X 0.5 X 8 LG. FHCS
10	1	474-2302	HEAD/NECK MOUNTING PLATFORM
9	1	5000764	M2 X 0.4 HEX NUT SS
8	1	5001395	3 X 25 LG. PREC. SHSS SS
7	2	5000634	M3 FLAT WASHER PLAIN SS
6	2	5001410	M3 FLAT WASHER PLAIN PTFE
5	1	474-2308	REAR CABLE PULLEY ASSY.
4	2	474-2303	FRONT/REAR SPRING TUBE
3	2	474-2306	SPRING LOAD CELL S.R.
2	1	474-2304	SPRING ASSEMBLY, REAR
1	1	474-2305	SPRING ASSEMBLY, FRONT
ITEM	QTY	PART NUMBER	DESCRIPTION

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

HEAD/NECK PLATFORM ASSEMBLY

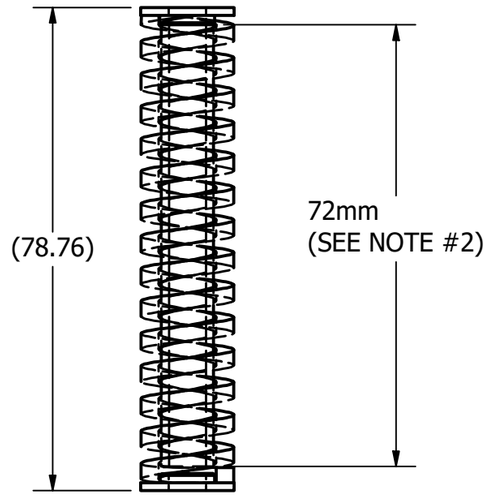
	APPROVALS	DATE
DRAWN	A. Barchock	4/14/2016
MATERIAL		
CHECKED		
HEAT TREAT		
ENG		
FINISH		
APPROVED		

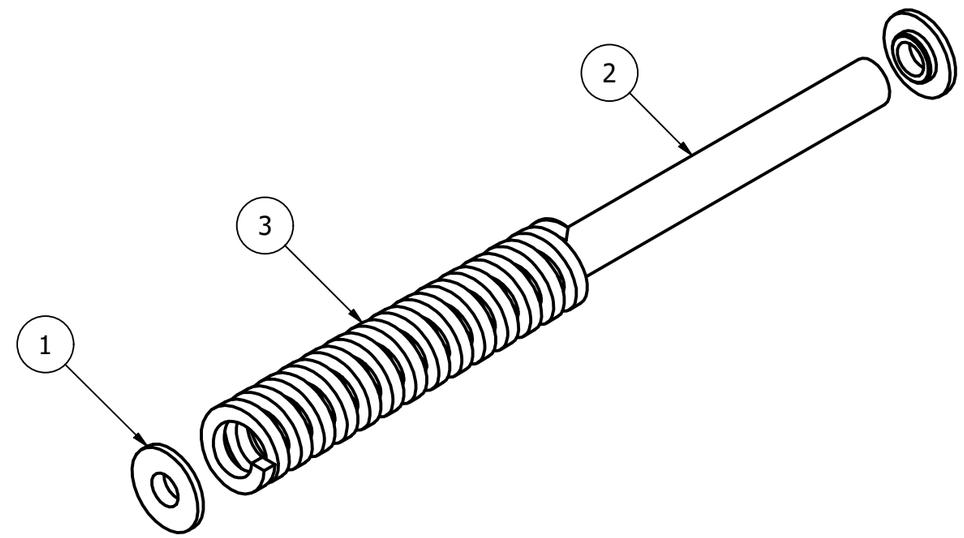
THIRD ANGLE PROJECTION

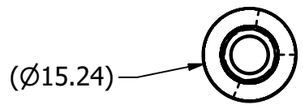
SIZE A2 | DRAWING NUMBER 474-2300 | REV 1

SCALE: 1:1 | SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AT		10/19/17







ITEM	QTY	PART NUMBER	DESCRIPTION
3	1	474-2925	SPRING, FRONT
2	1	474-2323	FRONT/REAR SPRING DAMPING TUBE
1	2	474-2322	SPRING BUSHING

PARTS LIST

NOTES:

1. SPRING BUSHING: CHEMICALLY CLEAN THE MATING SURFACES & JOIN WITH 5 MINUTE EPOXY UNDER LIGHT PRESSURE.

2. LENGTH OF RUBBER ELEMENT MAY BE ADJUSTED TO MEET PERFORMANCE REQUIREMENT.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED 125 µin
ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN: A. Barchock	4/12/2016
CHECKED	
ENG	
APPROVED	

MATERIAL
HEAT TREAT
FINISH

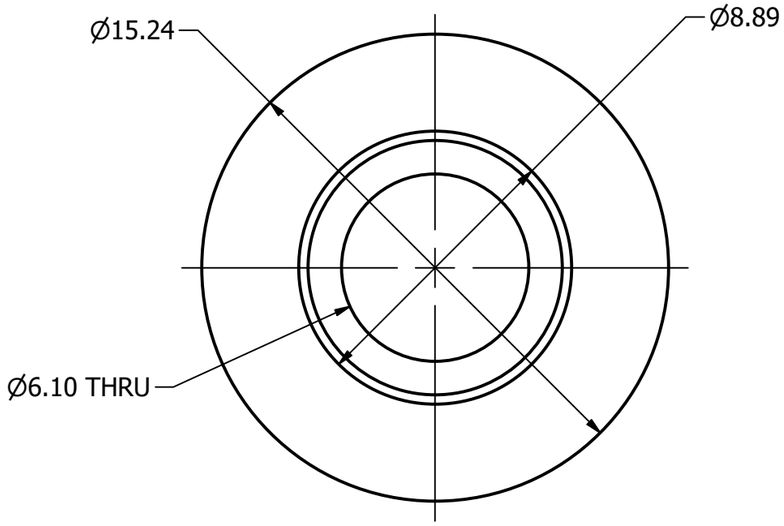
SPRING ASSEMBLY, FRONT

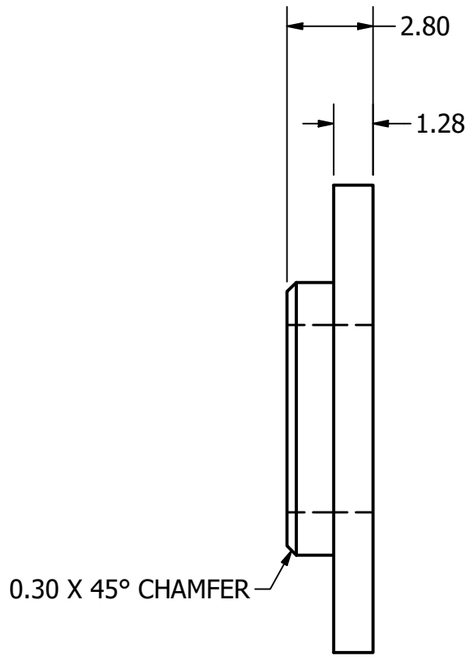
THIRD ANGLE PROJECTION

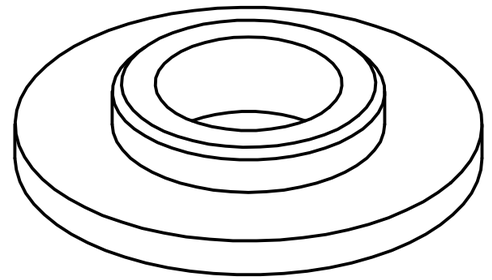
SIZE: A3 | DRAWING NUMBER: 474-2305 | REV: 1

SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AB	JW	4/06/16







PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED √
ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: Steel
HEAT TREAT:
FINISH: .008 ELECTROLESS NICKEL PLATE PER SIDE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: A. Barchock	4/6/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

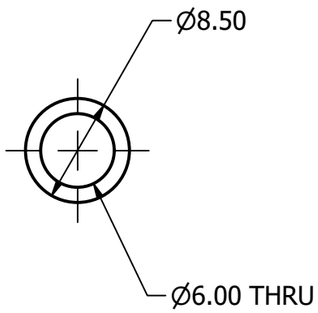
SPRING BUSHING

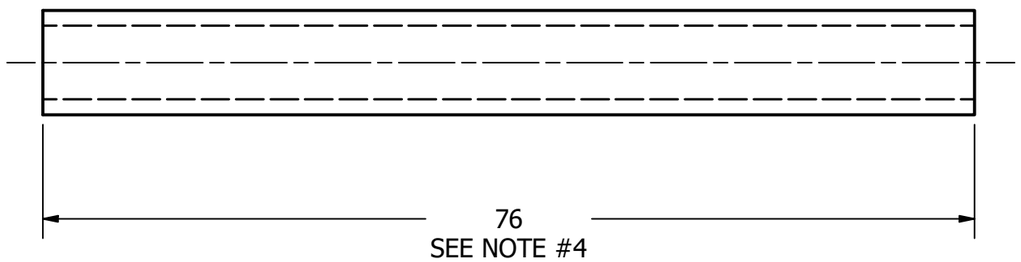
THIRD ANGLE PROJECTION

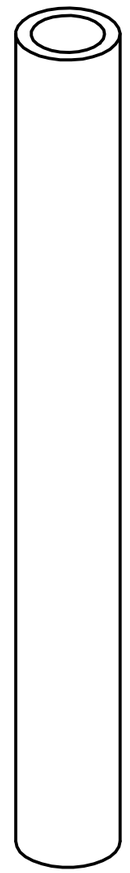
SIZE	DRAWING NUMBER	REV
A3	474-2322	1

SCALE: 5:1 SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AB	JW	04/06/16







NOTES:

1. MATERIAL: BUNA-N RUBBER
   COLOR: BLACK
   DUROMETER: 60 ±5 SHORE "A"
2. REMOVE ALL MOLD FLASHING
3. NO SPLIT OR DEFECTS ARE ALLOWED
   IN THE RUBBER MOLDING
4. FINAL LENGTH WILL BE DETERMINED DURING
   SPRING ASSEMBLY CERTIFICATION.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTE #1
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: A. Barchock	4/6/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

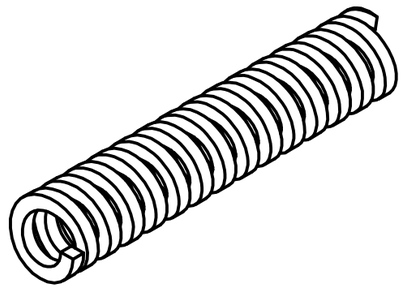
FRONT/REAR SPRING DAMPING TUBE

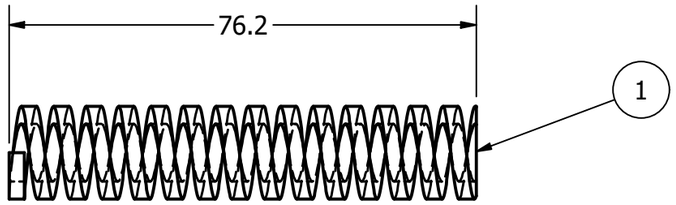
THIRD ANGLE PROJECTION

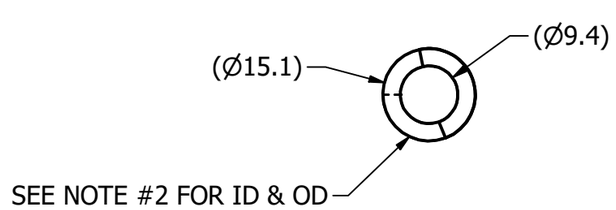
SIZE: A3 | DRAWING NUMBER: 474-2323 | REV: 1

SCALE: 2:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH		5/26/2016







NOTES:

1. MATERIAL: HIGH TENSILE STRENGTH ALLOY STEEL.

2. SPRING RATE: 17.7 N/mm NOMINAL (± 5%)
   FREE LENGTH 76.2mm
   TOTAL TRAVEL TO SOLID 38.0mm AT 682 N
   TO FIT OVER 8.5mm DIA ROD
   TO FIT INSIDE 16mm DIA HOLE

3. SPRING COLOR: BLUE

PRELIMINARY DRAWING

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	5001425-FT	SPRING, FRONT

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTE #1
HEAT TREAT: N/A
FINISH: N/A

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: jhaefner	5/26/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

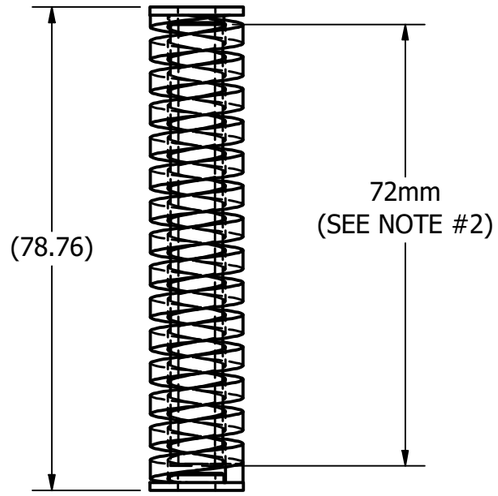
SPRING, FRONT

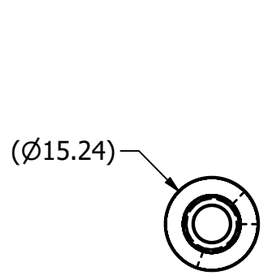
THIRD ANGLE PROJECTION

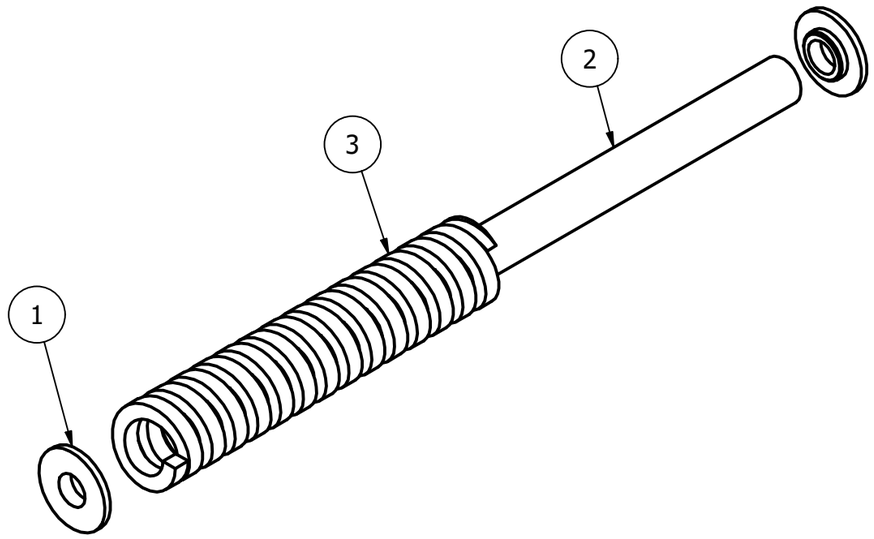
SIZE: A3 | DRAWING NUMBER: 474-2925 | REV: 1

SCALE: 1 : 1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AT		10/19/17







ITEM	QTY	PART NUMBER	DESCRIPTION
3	1	474-2924	SPRING, REAR
2	1	474-2323	FRONT/REAR SPRING DAMPING TUBE
1	2	474-2322	SPRING BUSHING

PARTS LIST

NOTES:

1. SPRING BUSHING: CHEMICALLY CLEAN THE MATING SURFACES & JOIN WITH 5 MINUTE EPOXY UNDER LIGHT PRESSURE.
2. LENGTH OF RUBBER ELEMENT MAY BE ADJUSTED TO MEET PERFORMANCE REQUIREMENT.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED √ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

	APPROVALS	DATE
DRAWN	A. Barchock	4/12/2016
CHECKED		
ENG		
APPROVED		

MATERIAL
HEAT TREAT
FINISH

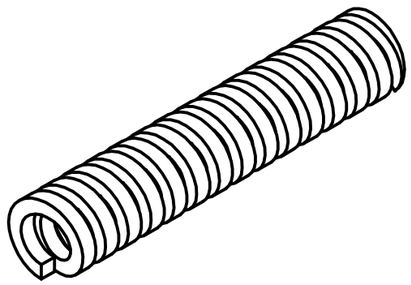
SPRING ASSEMBLY, REAR

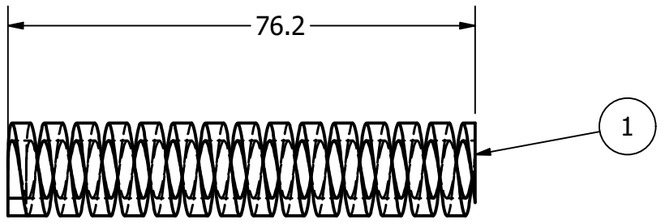
THIRD ANGLE PROJECTION

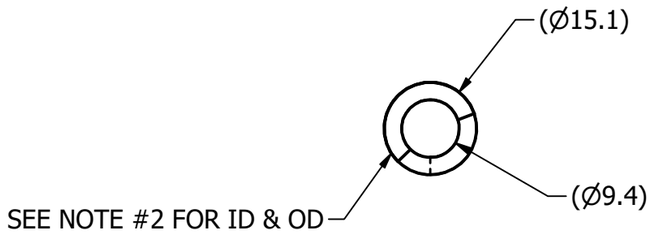
SIZE A3 | DRAWING NUMBER 474-2304 | REV 1

SCALE: 1:1 | SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH		5/26/2016







NOTES:

1. MATERIAL: HIGH TENSILE STRENGTH ALLOY STEEL.

2. SPRING RATE: 24.5 N/mm NOMINAL (± 5%)
   FREE LENGTH 76.2mm
   TOTAL TRAVEL TO SOLID 34.0mm AT 830 N.
   TO FIT OVER 8.5mm DIA ROD
   TO FIT INSIDE 16mm HOLE

3. SPRING COLOR: RED

PRELIMINARY DRAWING

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	5001424-FT	SPRING, REAR

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED √ | ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN jhaefner	5/26/2016
CHECKED	
ENG	
APPROVED	

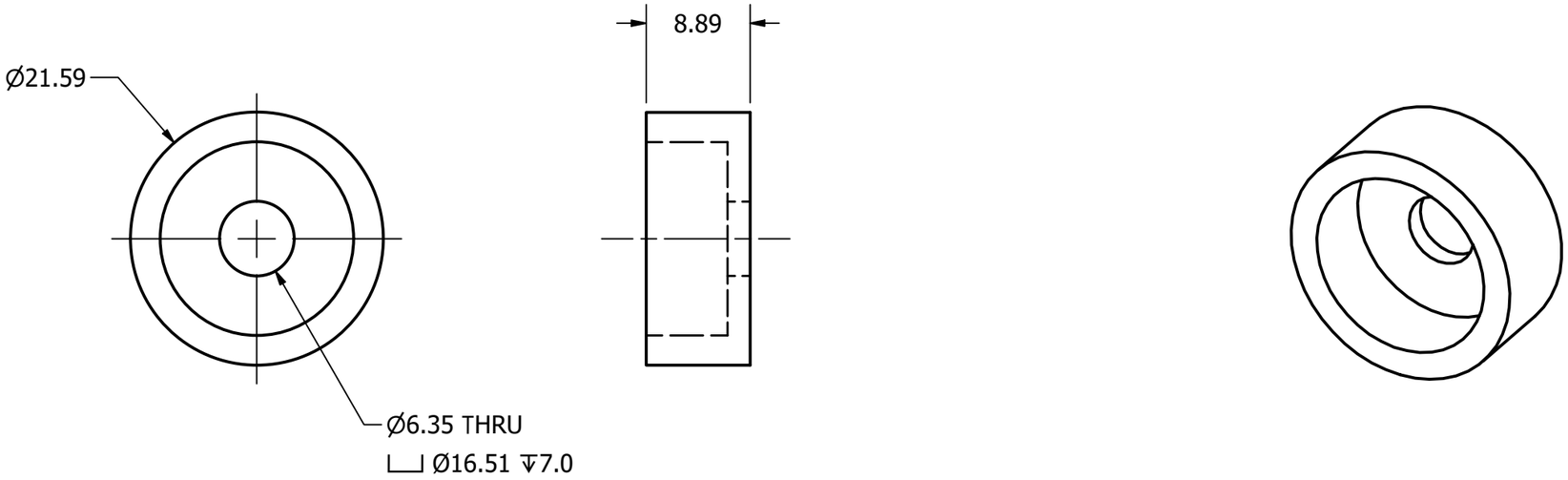
MATERIAL: SEE NOTE #1
HEAT TREAT: N/A
FINISH: N/A

SPRING, REAR

THIRD ANGLE PROJECTION

SIZE: A3 | DRAWING NUMBER: 474-2924 | REV: 1
SCALE: 1 : 1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AB	JW	04/13/16



PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED √ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 304 STAINLESS STEEL
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: A. Barchock	4/13/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

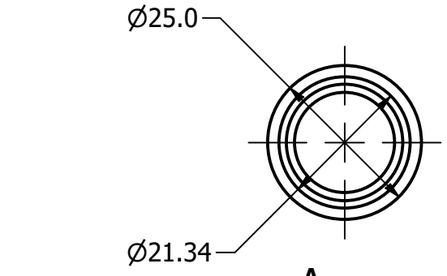
SPRING LOAD CELL S.R.

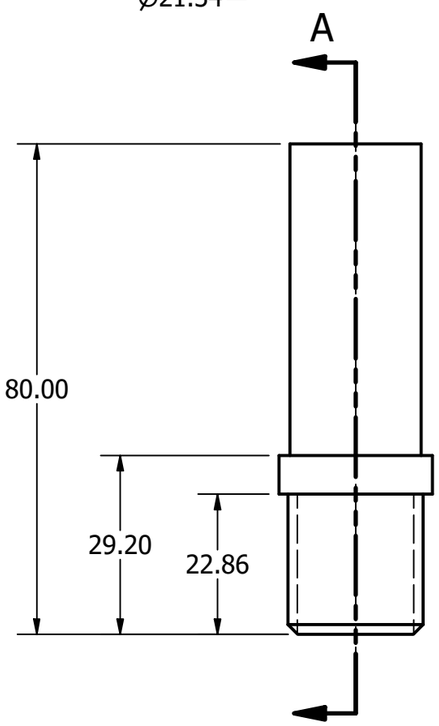
THIRD ANGLE PROJECTION

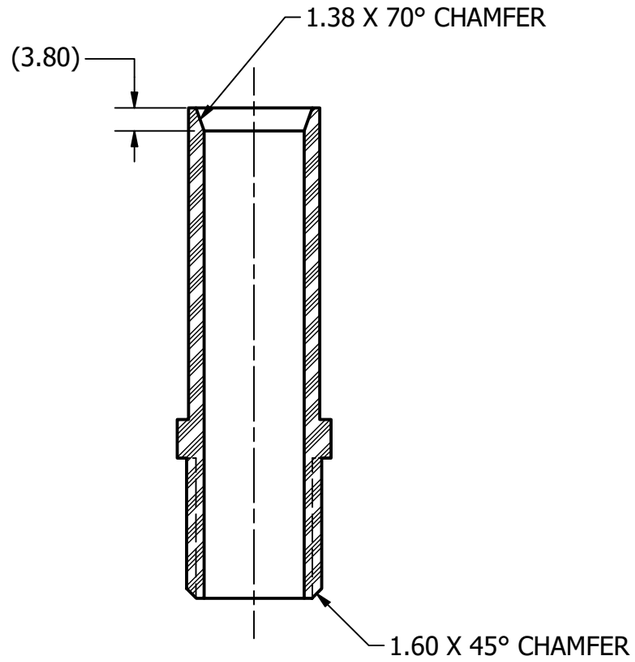
SIZE: A3 | DRAWING NUMBER: 474-2306 | REV: 1

SCALE: 2:1 | SHEET: 1 OF 1

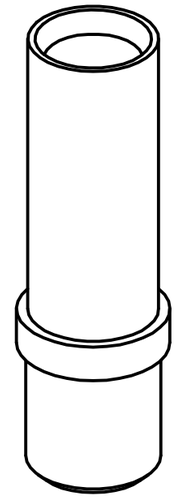
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AB	JW	04/12/16

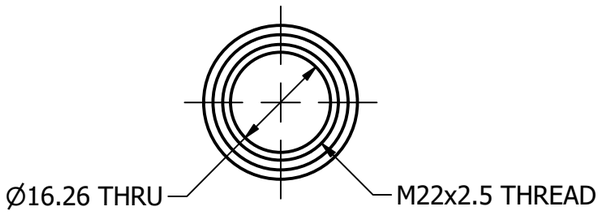






SECTION A-A





PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: Acetal Resin, White
HEAT TREAT:
FINISH:

*V*EHICLE *R*ESEARCH and *T*EST *C*ENTER

APPROVALS	DATE
DRAWN: A. Barchock	4/12/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

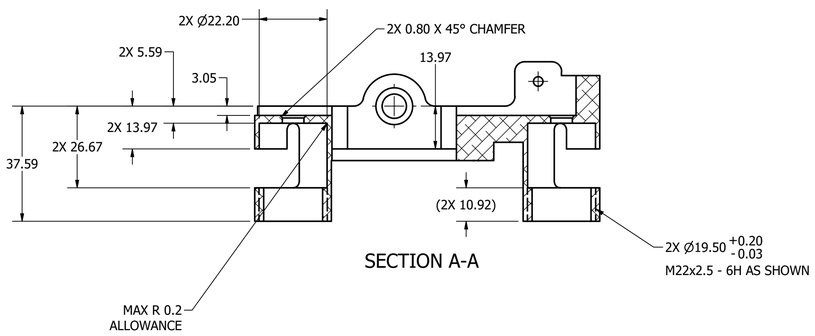
FRONT/REAR SPRING TUBE

THIRD ANGLE PROJECTION

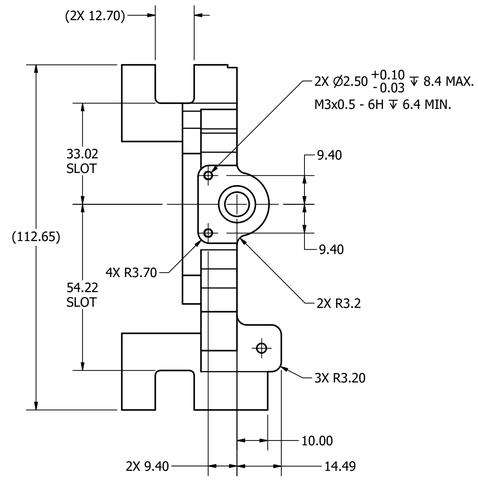
SIZE: A3 | DRAWING NUMBER: 474-2303 | REV: 1

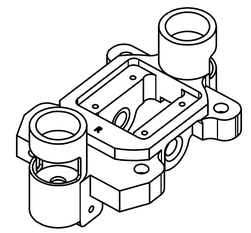
SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AB	JW	4/13/2016

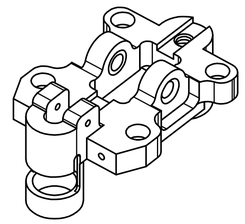


SECTION A-A

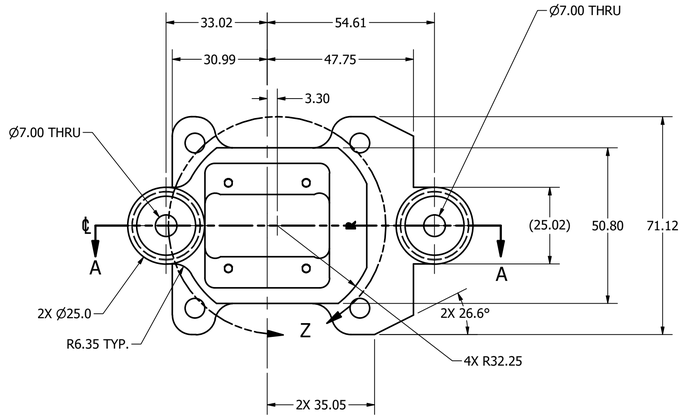


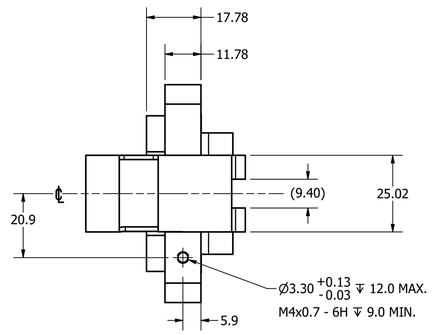


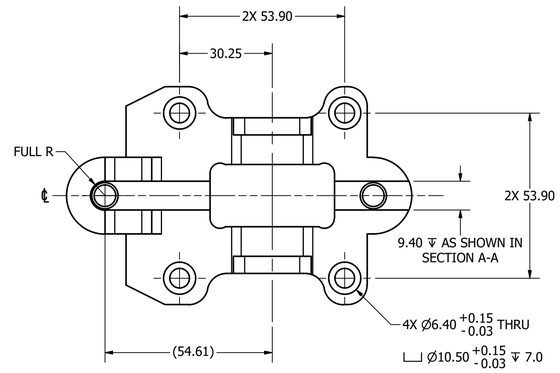
SCALE .75:1

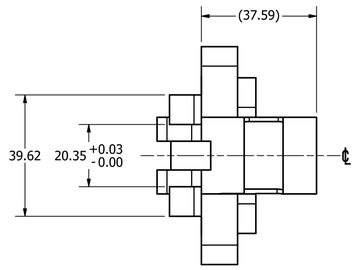


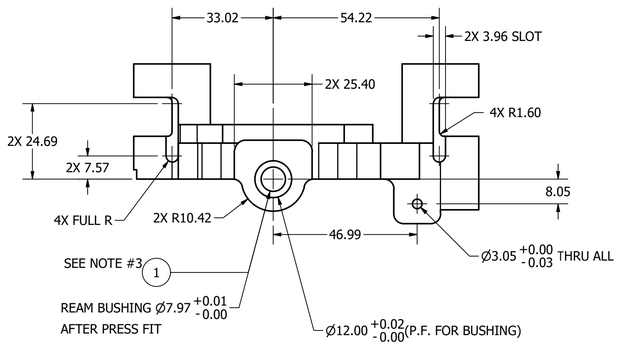
SCALE .75:1

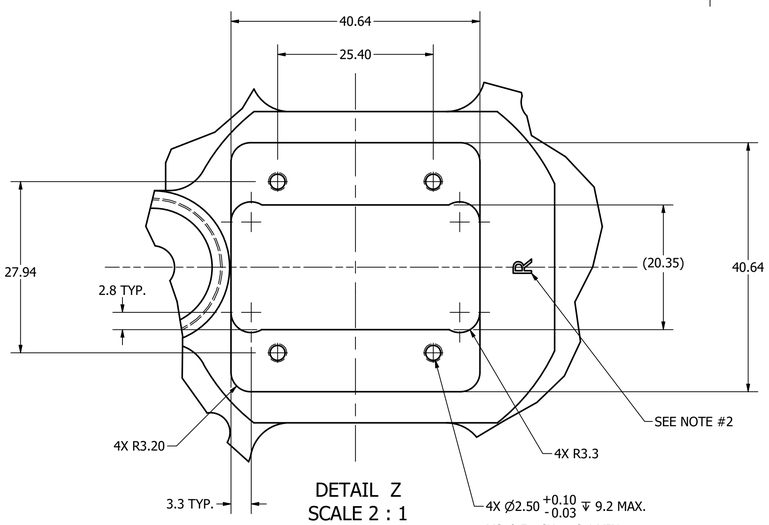












DETAIL Z
SCALE 2 : 1

NOTES:

1. DIMENSIONS ARE SYMMETRICAL ABOUT ℄ UNLESS OTHERWISE NOTED.
2. STAMP OR ETCH "R" (3mm CHARACTERS) AS SHOWN.
3. INSTALL BUSHINGS AFTER ANODIZE.

ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	5001401	BEARING, SLEEVE (Ø8 x Ø12 x 8)

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.2, X.X ±.1, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: A. Barchock	4/13/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

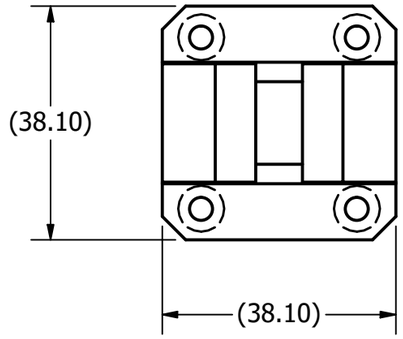
HEAD/NECK MOUNTING PLATFORM

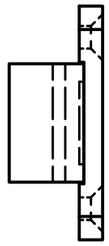
THIRD ANGLE PROJECTION

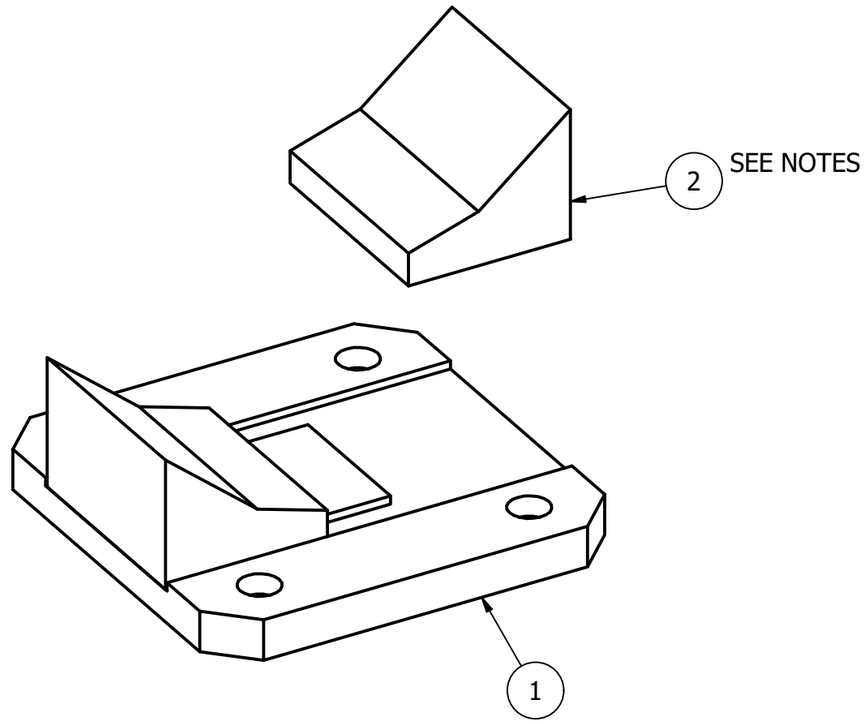
SIZE: A1 | DRAWING NUMBER: 474-2302 | REV: 1

SCALE: 1:1 | SHEET: 1 OF 1

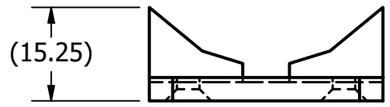
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AB	JW	04/06/16







SCALE 2 : 1



NOTES:

1. PREPARE SURFACES BEFORE ATTACHING 474-2321 TO 474-2320.
2. BOND 474-2321 TO 474-2320 TOGETHER AS SHOWN.

PRELIMINARY DRAWING

ITEM	QTY	PART NUMBER	DESCRIPTION
2	2	474-2321	FRONT/REAR OC STOP
1	1	474-2320	FLEXION/EXTENSION STOP PLATE

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL
HEAT TREAT
FINISH

APPROVALS	DATE
DRAWN A. Barchock	4/6/2016
CHECKED	
ENG	
APPROVED	

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

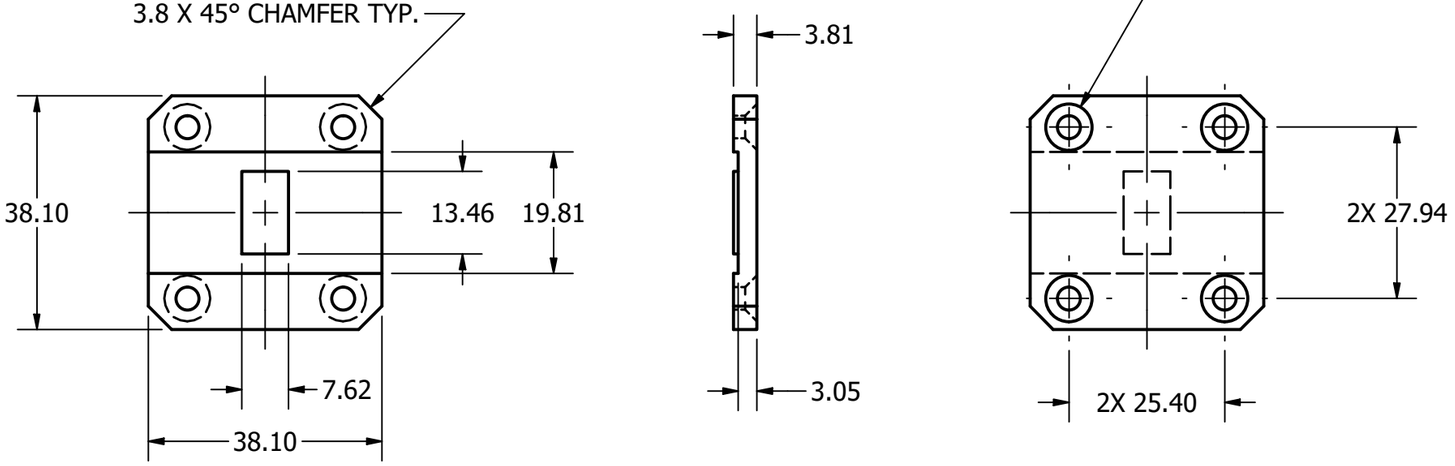
FLEXION/EXTENSION STOP ASSEMBLY

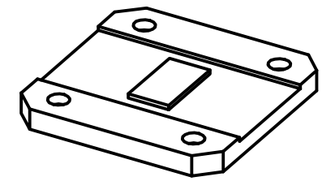
THIRD ANGLE PROJECTION

SIZE A3 | DRAWING NUMBER 474-2115 | REV 1

SCALE: 1:1 | SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AB	JW	04/06/16





NOTES:

1. DIMENSIONS ARE SYMMETRICAL ABOUT ℄ UNLESS OTHERWISE NOTED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN A. Barchock	4/6/2016
CHECKED	
ENG	
APPROVED	

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

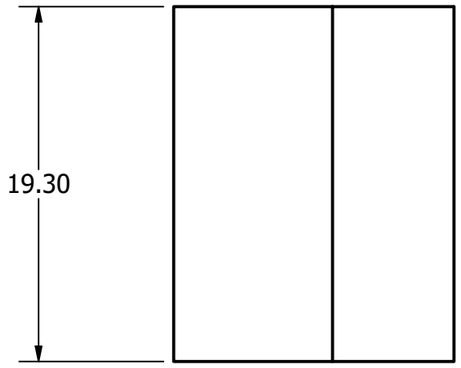
FLEXION/EXTENSION STOP PLATE

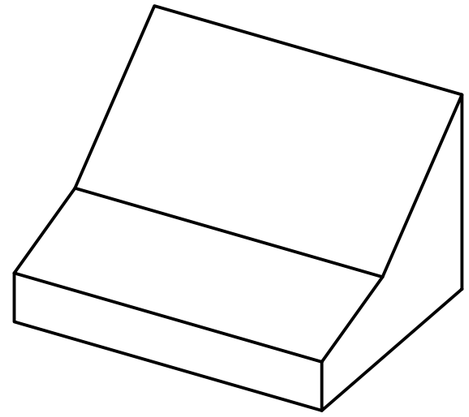
THIRD ANGLE PROJECTION

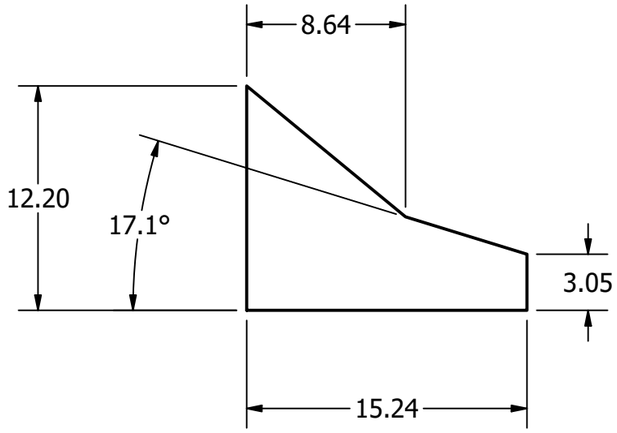
SIZE	DRAWING NUMBER	REV
A3	474-2320	1

SCALE: 1:1 SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AB	JW	04/06/16







NOTES:
1. MATERIAL: NATURAL RUBBER
   COLOR: BLACK
   DUROMETER: 70 ±5 SHORE "A"
2. REMOVE ALL MOLD FLASHING
3. ALL MOULD DIMENSION TOLERANCE +1%/-2%
   BUT NO SMALLER THAN 0.5mm
4. NO SPLIT OR DEFECTS ARE ALLOWED
   IN THE RUBBER MOLDING

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED √ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTE #1
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: A. Barchock	4/6/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

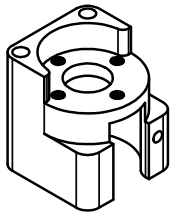
FRONT/REAR OC STOP

THIRD ANGLE PROJECTION

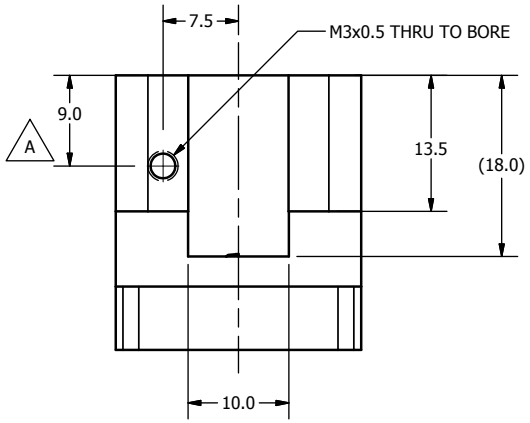
SIZE: A3 | DRAWING NUMBER: 474-2321 | REV: 1

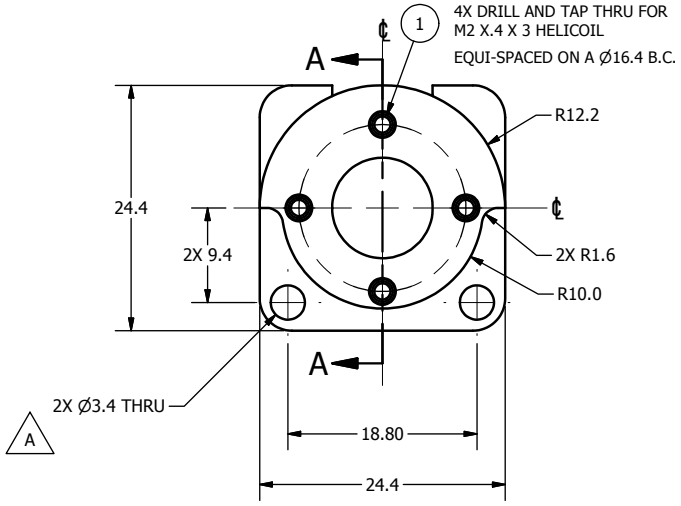
SCALE: 3:1 | SHEET: 1 OF 1

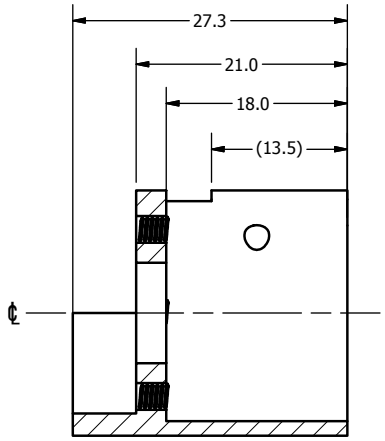
REVISION HISTORY				
ECO #	REV	DESCRIPTION	DATE	BY
	A	RENUMBERED FROM T1NKM017 R06 AND CONVERTED TO METRIC FOR THOR-M9.0 WAS 7.5, Ø3.4 WAS Ø3.2; ADD 2X R3.2	7/29/2011	BK



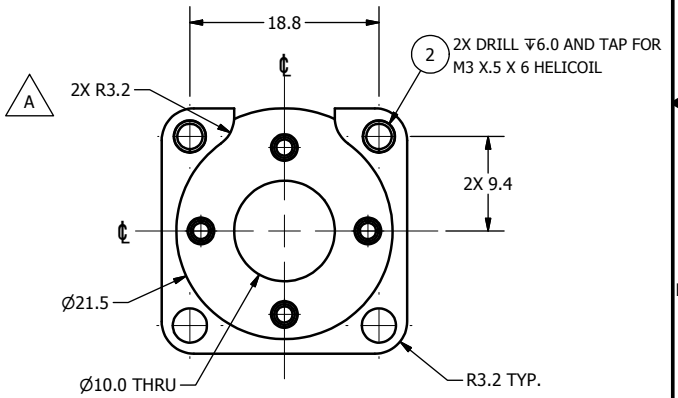
SCALE 1.000







SECTION A-A



NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

2. INSTALL HELICOILS AFTER FINISH.

ITEM	QTY	PART NUMBER	DESCRIPTION
2	2	5000333	M3 X 0.5 X 6 LG. HELI-COIL
1	4	5001111	M2 X 0.4 X 3 LG. HELI-COIL

PARTS LIST

		PROJECT NO.:	
472-2000	1	MATERIAL: 7075-T6 ALUMINUM	
NEXT ASSEMBLY	QTY	HEAT TREAT:	
TOTAL QTY IN DUMMY	1	FINISH: CLEAR ANODIZE	

DO NOT SCALE DRAWING — THIRD ANGLE PROJECTION

TOLERANCES: UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS. DECIMALS X ±0.5, X.X ±0.2, X.XX ±0.1, X.XXX ±0.01; ANGLES ±0.5°; FINISH 1.6. REMOVE BURRS & BREAK SHARP EDGES

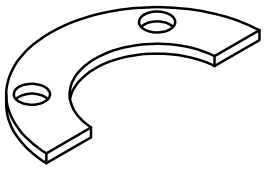
DRAWN BY: B. KIMES	DATE: 7/28/2011	
CHECKED BY:	DATE:	
ENGINEER: J. WANG	DATE: 1/9/2012	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

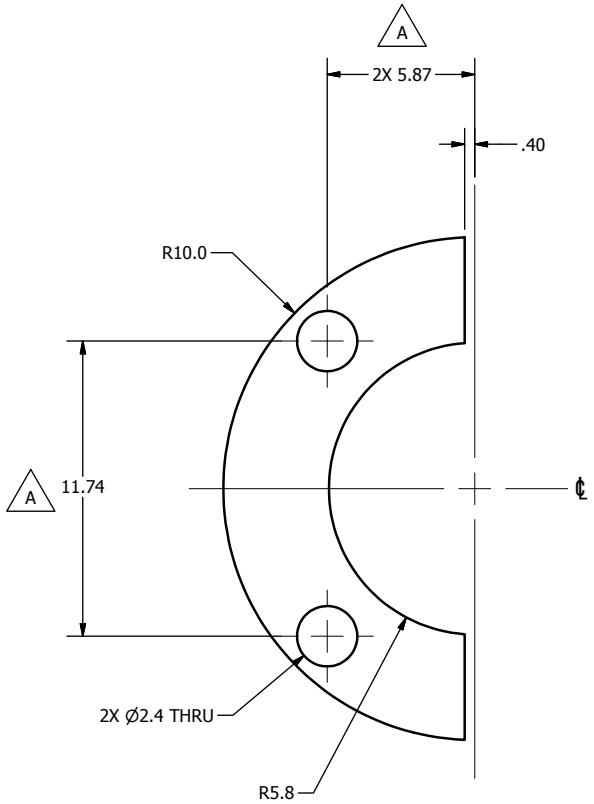
DESCRIPTION: ROTARY POTENTIOMETER HOUSING, NECK

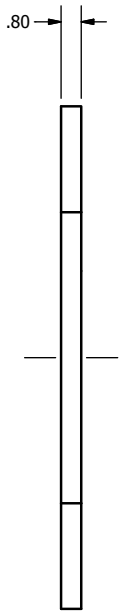
SIZE: A3 | SHEET: 1 OF 1 | SCALE: 2.000 | DRAWING NO.: 472-2013 | REV: A

REVISION HISTORY				
ECO #	REV	DESCRIPTION	DATE	BY
	A	RENUMBERED FROM T1NKM052 R01 AND CONVERTED TO METRIC FOR THOR-M; 5.87 WAS 5.80; 11.74 WAS 11.60	8/23/2011	BK



SCALE 3.000



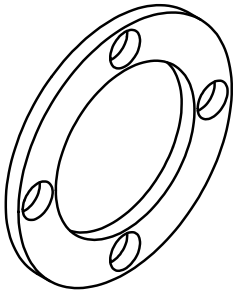


NOTES:

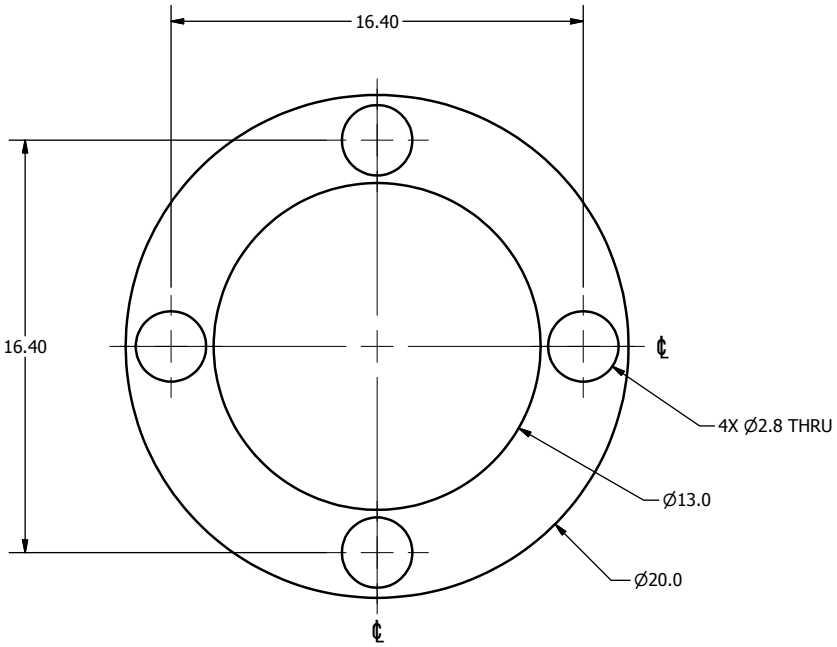
1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

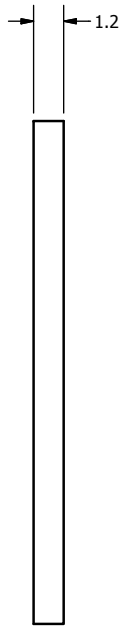
		DO NOT SCALE DRAWING — THIRD ANGLE PROJECTION	TOLERANCES: UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS. DECIMALS X ±0.5, X.X ±0.2, X.XX ±0.1, X.XXX ±0.01; ANGLES ±0.5°; FINISH 1.6. REMOVE BURRS & BREAK SHARP EDGES	NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION	
		PROJECT NO.:		DESCRIPTION: ROTARY POTENTIOMETER CLAMP, NECK	
472-2000	2	MATERIAL: 6061-T6 ALUMINUM	DRAWN BY: B. KIMES	DATE: 7/28/2011	
NEXT ASSEMBLY	QTY	HEAT TREAT:	CHECKED BY:	DATE:	SIZE: A3 SHEET: 1 OF 1 — DRAWING NO.: 472-2020 — REV: A
TOTAL QTY IN DUMMY	2	FINISH: CLEAR ANODIZE	ENGINEER: J. WANG	DATE: 1/9/2012	SCALE: 5.000

REVISION HISTORY				
ECO #	REV	DESCRIPTION	DATE	BY
	A	RENUMBERED FROM T1NKM053 R01 AND CONVERTED TO METRIC FOR THOR-M	7/30/2011	BK



SCALE 3.000



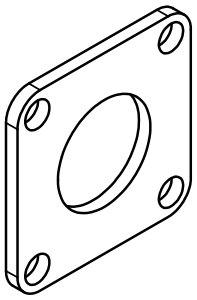


NOTES:

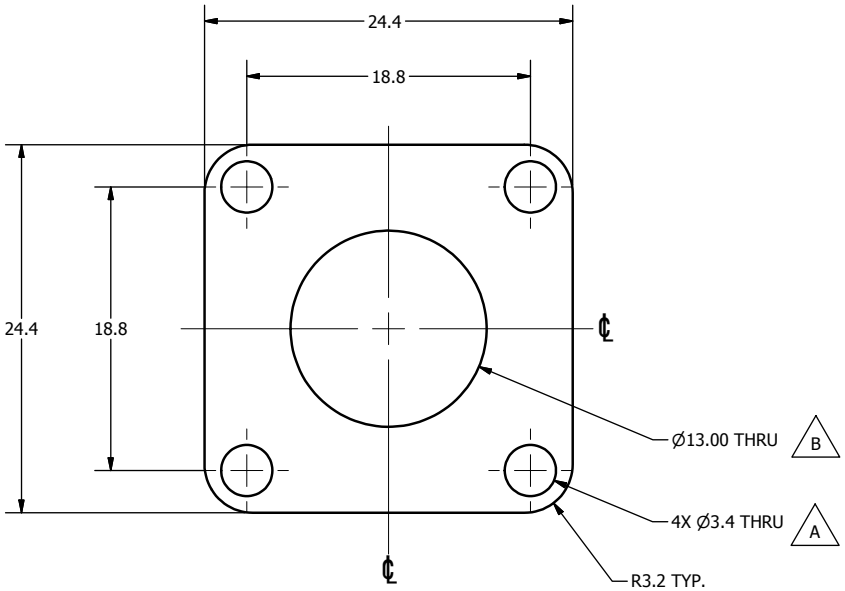
1. DIMENSIONS SYMMETRIC ABOUT ℄ , UNLESS OTHERWISE NOTED.

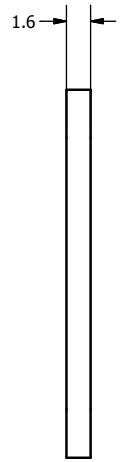
DO NOT SCALE DRAWING		TOLERANCES		NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION	
THIRD ANGLE PROJECTION		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS DECIMALS ANGLES FINISH X ±0.5 ±0.5° 1.6 X.X ±0.2 X.XX ±0.1 X.XXX ±0.01 REMOVE BURRS & BREAK SHARP EDGES		DESCRIPTION: ROTARY POTENTIOMETER WASHER, NECK	
PROJECT NO.:		DRAWN BY: B. KIMES	DATE: 7/28/2011		
472-2000	1	MATERIAL: 6061-T6 ALUMINUM			
NEXT ASSEMBLY	QTY	HEAT TREAT:	CHECKED BY:	DATE:	SIZE: A3 SHEET 1 OF 1 DRAWING NO.: 472-2021 REV: A
TOTAL QTY IN DUMMY	1	FINISH: CLEAR ANODIZE	ENGINEER: J. WANG	DATE: 1/9/2012	SCALE: 5.000

REVISION HISTORY				
ECO#	REV	DESCRIPTION	DATE	BY
	A	RENUMBERED FROM T1NKM018 R12 AND CONVERTED TO METRIC FOR THOR-M; Ø3.4 WAS Ø3.2	7/29/2011	BK
	B	13.00 DIA WAS 6.4	2/8/2012	BK



SCALE 2.000



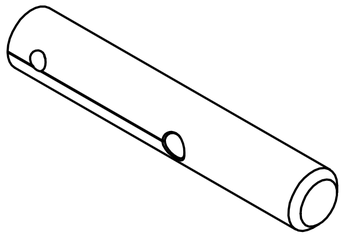


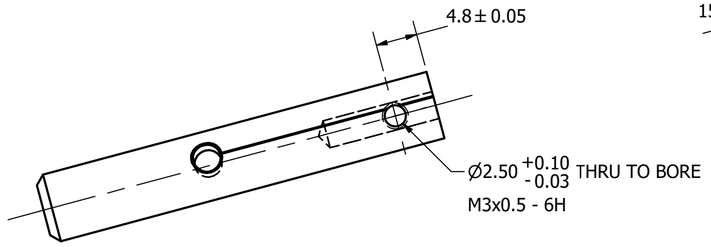
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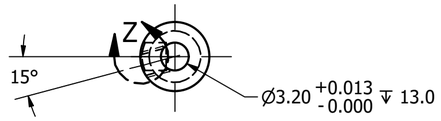
1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

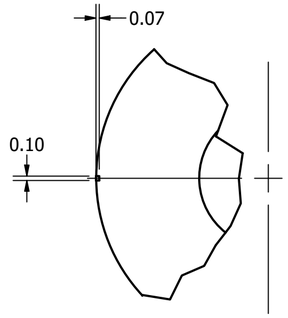
DO NOT SCALE DRAWING		TOLERANCES	NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION		
THIRD ANGLE PROJECTION		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS DECIMALS: X ±0.5, X.X ±0.2, X.XX ±0.1, X.XXX ±0.01 ANGLES: ±0.5° FINISH: 1.6 REMOVE BURRS & BREAK SHARP EDGES			
PROJECT NO.:			DESCRIPTION: ROTARY POTENTIOMETER COVER, NECK		
472-2000	1	MATERIAL: 6061-T6 ALUMINUM	DRAWN BY: B. KIMES	DATE: 7/28/2011	
NEXT ASSEMBLY	QTY	HEAT TREAT:	CHECKED BY:	DATE:	SIZE: A3 / SHEET: 1 OF 1 / DRAWING NO.: 472-2014 / REV: B
TOTAL QTY IN DUMMY	1	FINISH: CLEAR ANODIZE	ENGINEER: J. WANG	DATE: 1/9/2012	SCALE: 3.000

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH		4/8/2016

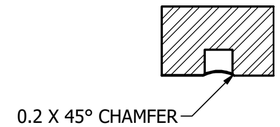




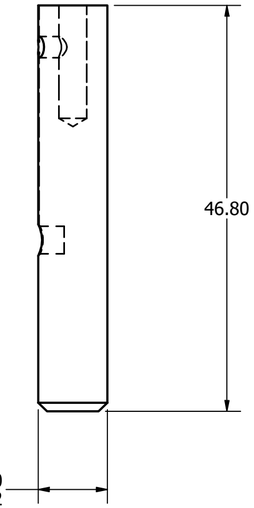


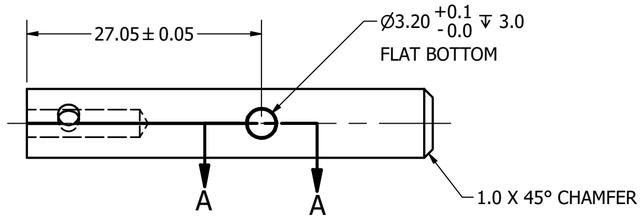


DETAIL Z
SCALE 10 : 1



SECTION A-A







NOTES:

1. POWDER OR BEAD BLAST.
2. DIMENSIONAL LIMITS AND THREADED HOLE SIZES APPLY AFTER FINISH.
3. CHECK HARDNESS ON END.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: S7 TOOL STEEL
HEAT TREAT: Rc 55-57
FINISH: 0.008mm MAX. ELECTROLESS NICKEL PLATE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: ghayden	4/8/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

PIN, OC

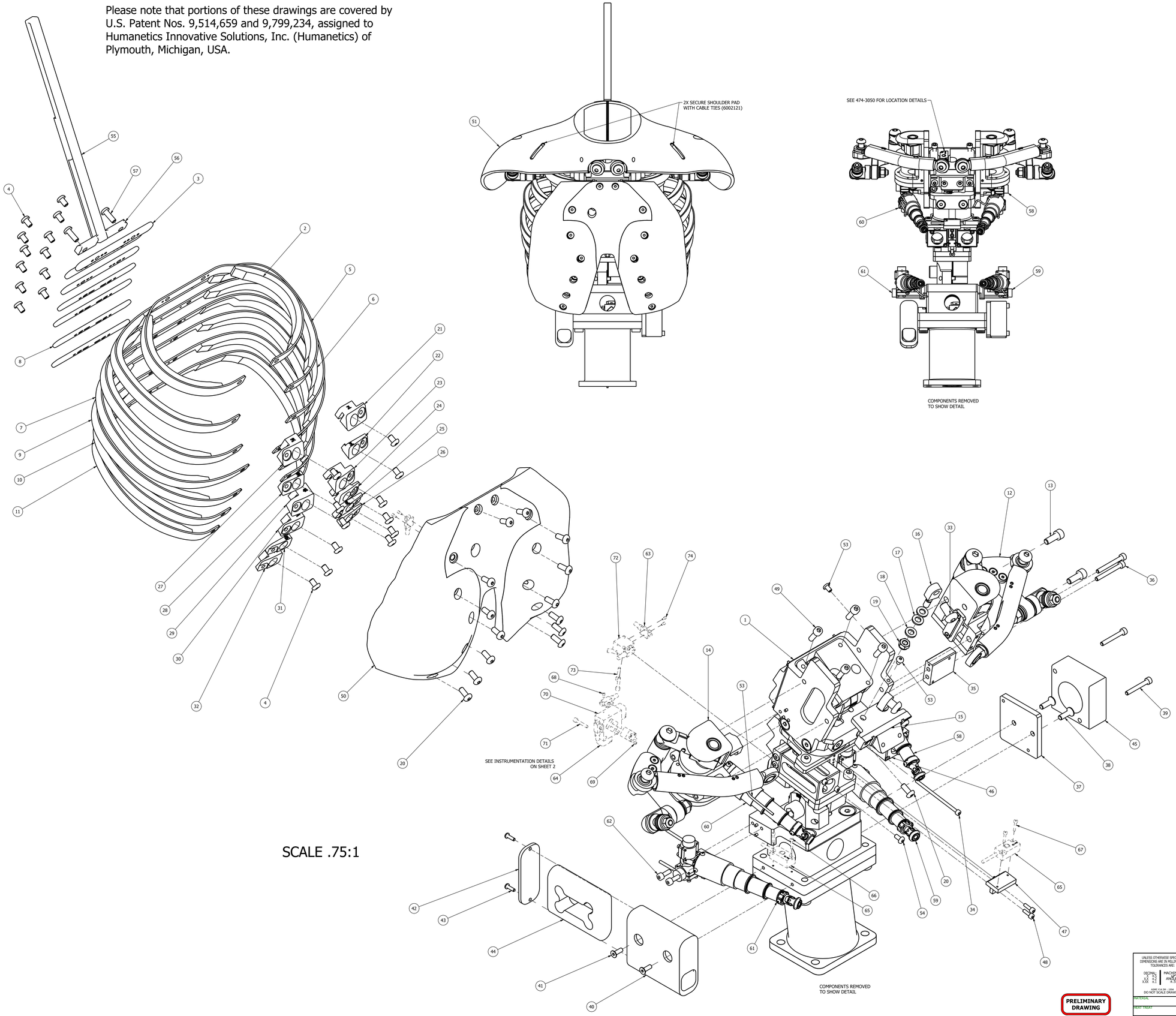
THIRD ANGLE PROJECTION

SIZE	DRAWING NUMBER	REV
A2	474-2340	1

SCALE: 2:1 | SHEET 1 OF 1

Please note that portions of these drawings are covered by U.S. Patent Nos. 9,514,659 and 9,799,234, assigned to Humanetics Innovative Solutions, Inc. (Humanetics) of Plymouth, Michigan, USA.

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENGR.	DATE
	1	RELEASE FOR PROTOTYPE	JH	JW	3/29/2016
	2	REMOVED 2 CABLE TIES 6002121	AT	JW	7/12/2018
	3	ADDED PATENT INFORMATION	AT	JW	7/13/2018



SCALE .75:1

ITEM	QTY	PART NUMBER	DESCRIPTION
74	6	5000068	M1.4 X 0.3 X 3 LG. SHCS (REF)
73	2	5001376	M2.5 X 0.45 X 14 LG. SHCS (REF)
72	1	SA572-S80M	TRI-PACK BLOCK (REF)
71	2	5000069	M2.5 X 0.45 X 16 LG. SHCS (REF)
70	1	SA572-S169	MOUNT, 7264C / ARS-1500 (REF)
69	6	5000912	M1.4 X 0.3 X 10 LG. SHCS (REF)
68	8	5000375	M1.4 X 0.3 X 4 LG. SHCS (REF)
67	2	5000382	M2 X 0.4 X 12 LG. SHCS (REF)
66	2	5000215	M2 X 0.4 X 10 LG. SHCS (REF)
65	2	SA572-S44	TILT SENSOR, DUAL AXIS (REF)
64	3	SA572-S58	ANGULAR RATE SENSOR (REF)
63	7	SA572-S4	UNIAXIAL PIEZORESISTIVE ACCELEROMETER (REF)
62	8	5000152	M4 X 0.7 X 12 LG. SHCS
61	1	474-3570	3D IR-TRACC ASSEMBLY, LOWER RIGHT
60	1	474-3560	3D IR-TRACC ASSEMBLY, UPPER RIGHT
59	1	474-3580	3D IR-TRACC ASSEMBLY, LOWER LEFT
58	1	474-3550	3D IR-TRACC ASSEMBLY, UPPER LEFT
57	2	5001411	M5 X 0.8 X 14 LG. BHCS
56	1	474-3025	LIFTING STRAP BRACKET
55	1	472-3116	THOR LIFT STRAP
54	2	5000103	M4 X 0.7 X 8 LG. BHCS
53	3	5001075	M4 X 0.7 X 6 LG. BHCS
52	2	6002121	CABLE TIE, 3.5 x 280 (NOT SHOWN)
51	1	474-3559	SHOULDER PAD
50	1	474-3700	CHEST FLESH-STERNUM, MOLDED
49	4	5000020	M5 X 0.8 X 16 LG. SHCS
48	2	5000119	M3 X 0.5 X 10 LG. SHCS
47	1	474-3038	TILT SENSOR MOUNT, THORAX
46	2	474-8208	ON BOARD DAS STRUCTURAL REPLACEMENT
45	1	474-3006	STRUCTURAL REPLACEMENT, ON BOARD DAS DB
44	1	474-3005	STRUCTURAL REPLACEMENT, BATTERY PACK
43	2	5001074	M3 X 0.5 X 10 LG. BHCS
42	1	474-3004	BATTERY COVER
41	2	5001086	M4 X 0.7 X 12 LG. FHCS
40	1	474-3003	BATTERY HOUSING
39	2	5000463	M4 X 0.7 X 30 LG. SHCS
38	2	5000467	M5 X 0.8 X 16 LG. FHCS
37	1	474-3002	MOUNTING PLATE, ON BOARD DAS DISTRIBUTOR
36	4	5000549	M4 X 0.7 X 35 LG. SHCS SS
35	2	474-3001	ON BOARD DAS MOUNTING BRACKET, THORAX
34	4	5001056	M3 X 0.5 X 60 LG. SHCS ZINC
33	2	5000563	M8 X 1.25 X 16 LG. BHCS SS
32	1	474-3387-2	ADAPTOR, RIB 7 TO STERNUM, RIGHT
31	1	474-3386-2	ADAPTOR, RIB 6 TO STERNUM / IRTRACC, RIGHT
30	1	474-3385-2	ADAPTOR, RIB 5 TO STERNUM, RIGHT
29	1	474-3384-2	ADAPTOR, RIB 4 TO STERNUM, RIGHT
28	1	474-3383-2	ADAPTOR, RIB 3 TO STERNUM / IRTRACC, RIGHT
27	1	474-3382-2	ADAPTOR, RIB 2 TO STERNUM, RIGHT
26	1	474-3387-1	ADAPTOR, RIB 7 TO STERNUM, LEFT
25	1	474-3386-1	ADAPTOR, RIB 6 TO STERNUM / IRTRACC, LEFT
24	1	474-3385-1	ADAPTOR, RIB 5 TO STERNUM, LEFT
23	1	474-3384-1	ADAPTOR, RIB 4 TO STERNUM, LEFT
22	1	474-3383-1	ADAPTOR, RIB 3 TO STERNUM / IRTRACC, LEFT
21	1	474-3382-1	ADAPTOR, RIB 2 TO STERNUM, LEFT
20	16	5000654	M5 X 0.8 X 12 LG. BHCS
19	2	5000093	M6 X 1 HEX LOCK NUT ZINC
18	2	5000013	M6 FLAT WASHER PLAIN ZINC
17	4	6003562	M6 FLAT WASHER PLAIN NYLON
16	2	474-3041	CLAVICLE-STERNUM ADAPTOR
15	1	474-3040	ADAPTOR, RIB 1 TO STERNUM
14	1	474-3500-2	SHOULDER ASSEMBLY, RIGHT
13	4	5000081	M6 X 1 X 16 LG. SHCS
12	1	474-3500-1	SHOULDER ASSEMBLY, LEFT
11	1	474-3307	RIB 7 ASSEMBLY
10	1	474-3306	RIB 6 ASSEMBLY
9	1	474-3305	RIB 5 ASSEMBLY
8	4	474-3334	STIFFENER, RIBS 4, 5, 6, 7
7	1	474-3304	RIB 4 ASSEMBLY
6	1	474-3303	RIB 3 ASSEMBLY
5	1	474-3302	RIB 2 ASSEMBLY
4	24	5001278	M5 X 0.8 X 8 LG. BHCS
3	3	474-3331	STIFFENER, RIBS 1, 2, 3
2	1	474-3301	RIB 1 ASSEMBLY
1	1	474-3200	SPINE ASSEMBLY

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL X ±.1 XX ±.05 XXX ±.025
MACHINED ANGLES ±.5°
ASME Y14.5M – 1994
DO NOT SCALE DRAWING

MATERIAL
HEAT TREAT
FINISH

VEHICLE RESEARCH and TEST CENTER

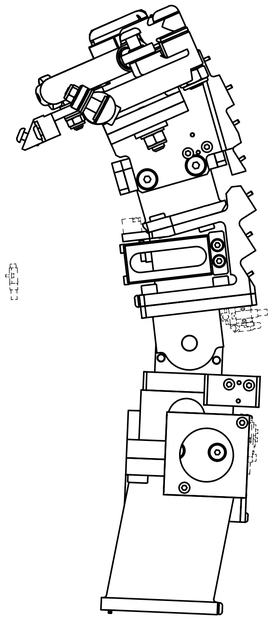
APPROVALS	DATE
DRAWN: jhaefner	3/29/2016
CHECKED	
ENG.	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

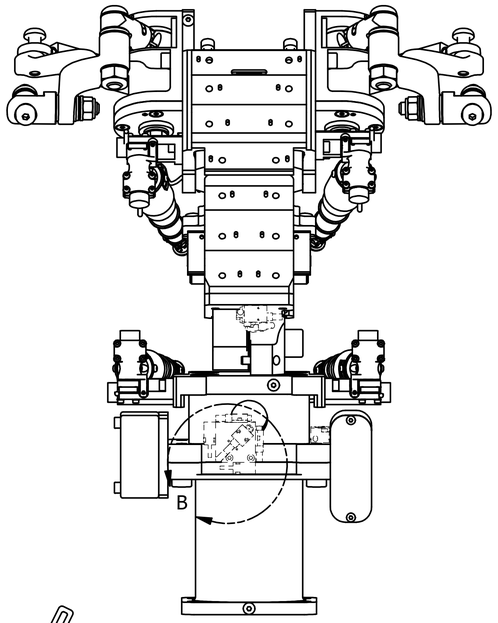
UPPER TORSO ASSEMBLY
THOR-05F

THIRD ANGLE PROJECTION

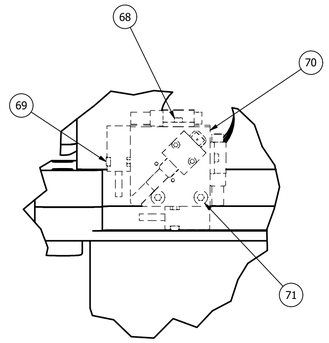
SIZE A0 | DRAWING NUMBER 474-3000 | REV 3
SCALE .5:1 | SHEET 1 OF 2



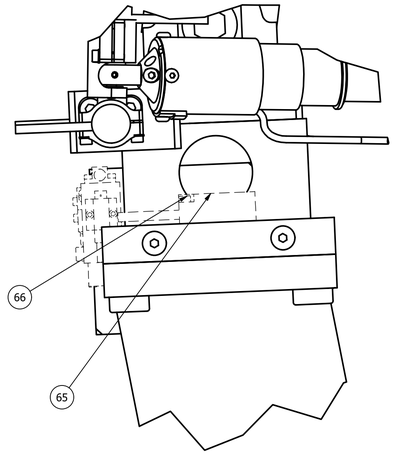
COMPONENTS REMOVED
TO SHOW DETAIL



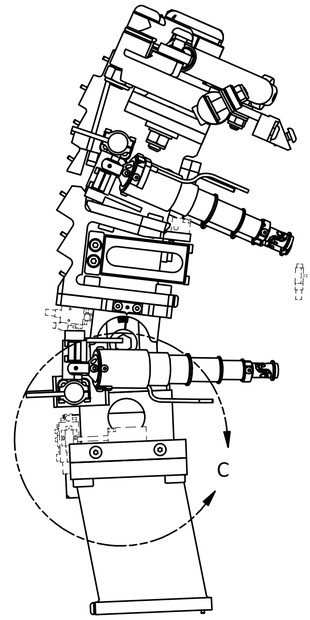
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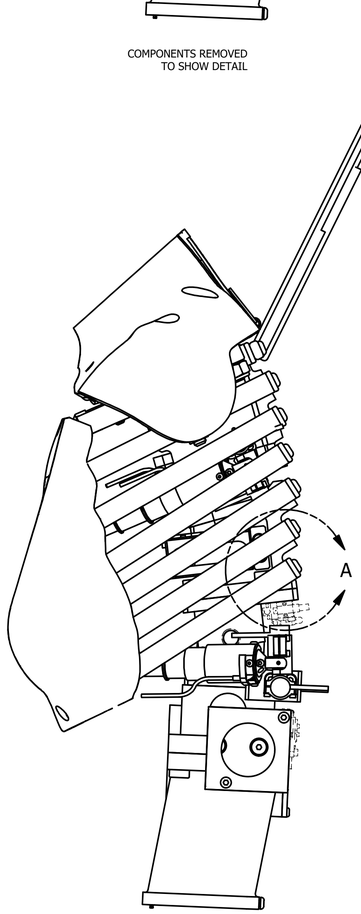
DETAIL B
SCALE 1 : 1

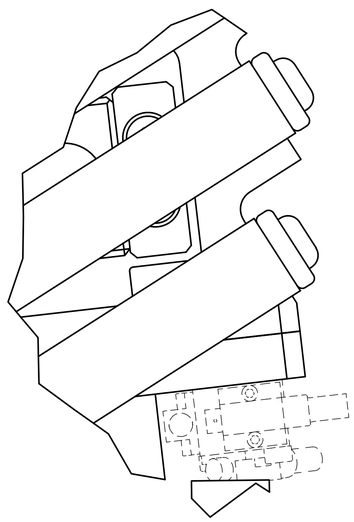


DETAIL C
SCALE 1 : 1

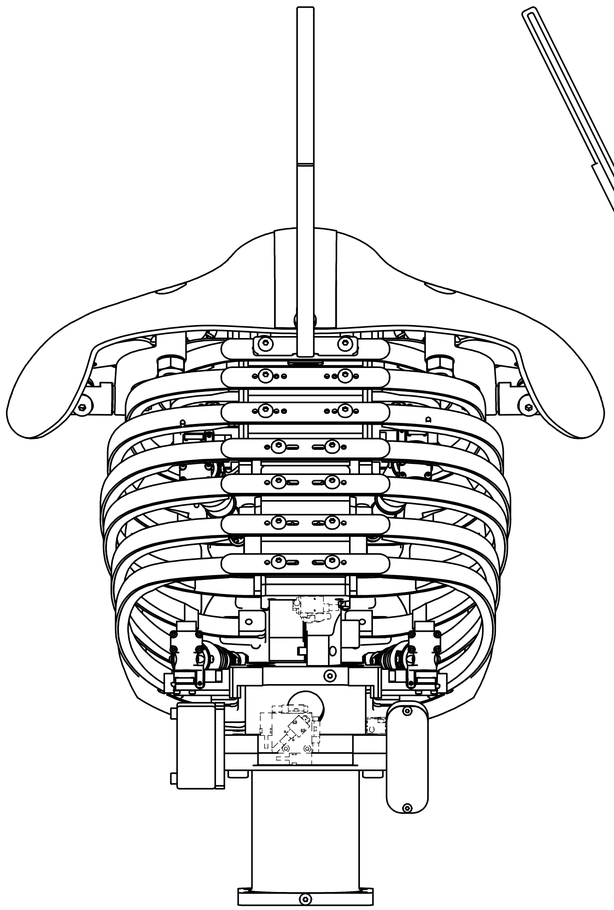


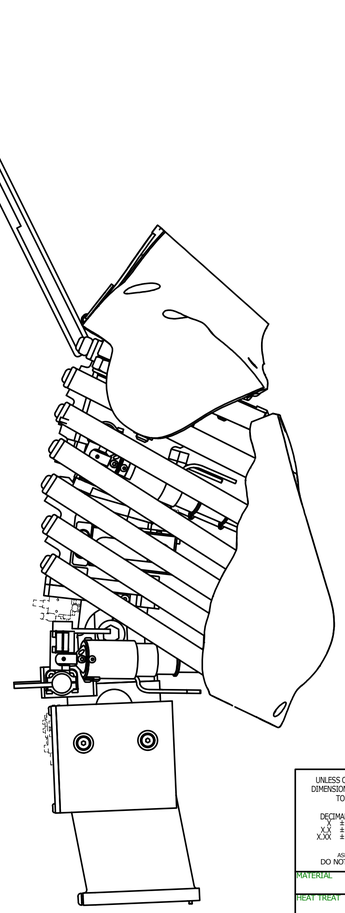
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TO SHOW DETAIL

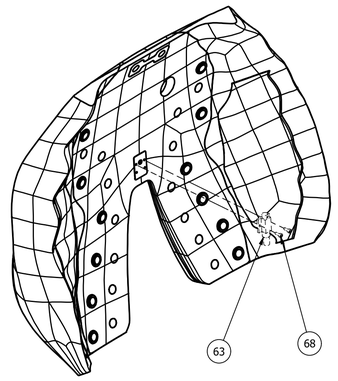




DETAIL A
SCALE 2 : 1





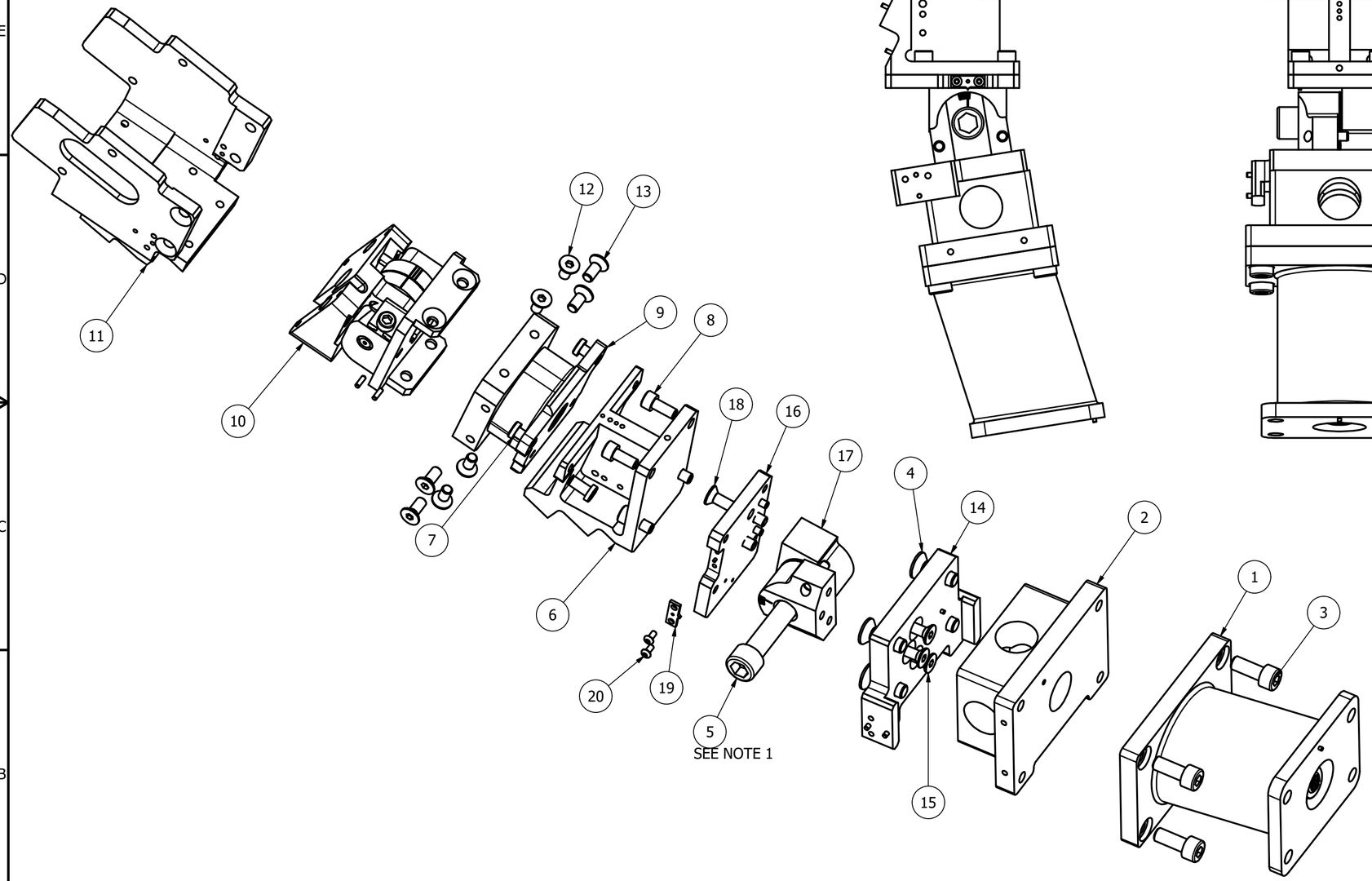


COMPONENTS REMOVED
FOR CLARITY

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS TOLERANCES ARE: DECIMAL .X ±.2, .XX ±.1, .XXX ±.1 | MACHINED ∠C ANGLES ±.5° ASME Y14.5M - 1994 DO NOT SCALE DRAWING	VEHICLE RESEARCH and TEST CENTER		NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
	APPROVALS	DATE	UPPER TORSO ASSEMBLY THOR-05F
MATERIAL	DRAWN Jhaefner	3/29/2016	
HEAT TREAT	CHECKED		SIZE A1 DRAWING NUMBER 474-3000 REV 3
FINISH	ENG		THIRD ANGLE PROJECTION SCALE: .5:1 SHEET 2 OF 2
	APPROVED		

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	3/24/2016



ITEM	QTY	PART NUMBER	DESCRIPTION
20	2	5001020	M3 X 0.5 X 6 LG. BHCS
19	1	474-3069	LUMBAR SPINE PITCH CHANGE INDICATOR
18	3	5000090	M6 X 1 X 16 LG. FHCS
17	1	474-3068	LUMBAR POSTURE GEAR ASSEMBLY
16	1	474-3064	SPINEBOX INTERFACE PLATE, LUMBAR POSTURE ADJUSTMENT
15	3	5001089	M6 X 1 X 20 LG. FHCS
14	1	474-3062	BASE PLATE, LUMBAR POSTURE ADJUSTMENT
13	4	5001324	M6 X 1 X 14 LG. FHCS
12	4	5000139	M6 X 1 X 12 LG. FHCS
11	1	474-3100	UPPER SPINE BOX
10	1	474-3050	NECK POSTURE ADJUSTMENT ASSEMBLY
9	1	474-3240	UPPER SPINE ASSEMBLY
8	4	5000604	M6 X 1 X 14 LG. SHCS
7	4	5001041	M6 X 1 X 12 LG. LHCS
6	1	474-3101	LOWER SPINE BOX ASSEMBLY
5	1	5001169	M12 X 1.75 X 45 LG. SHCS
4	4	5000117	M8 X 1.25 X 25 LG. FHCS
3	4	5000075	M8 X 1.25 X 20 LG. SHCS
2	1	474-3202	STRUCTURAL REPLACEMENT, THORACIC SPINE LOAD CELL
1	1	474-3223	LUMBAR ASSEMBLY

PARTS LIST

NOTES:

1. TORQUE SOCKET HEAD CAP SCREW TO 50 LB-FT.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN ghayden	3/24/2016
CHECKED	
ENG	
APPROVED	

MATERIAL
HEAT TREAT
FINISH

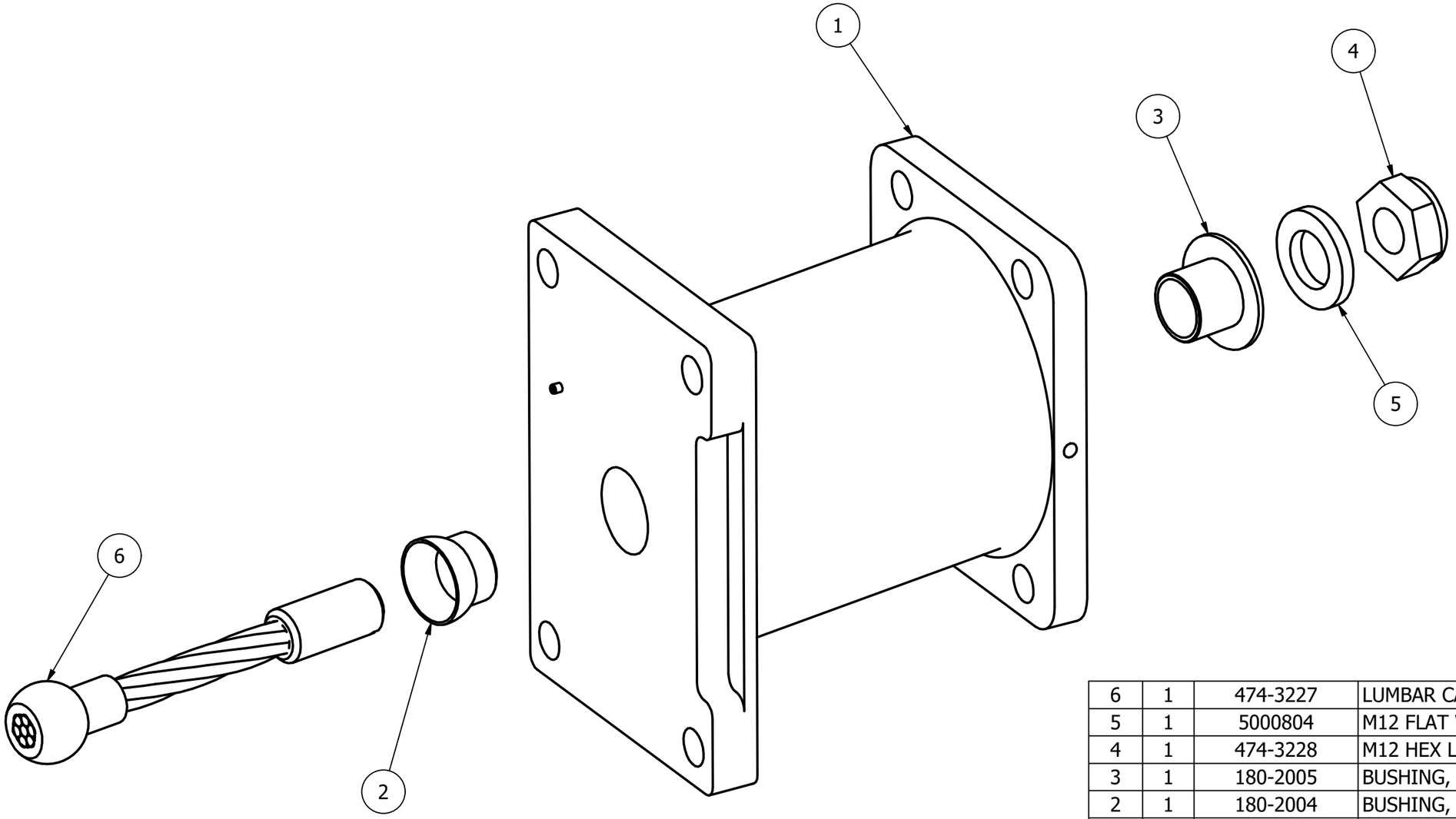
SPINE ASSEMBLY

THIRD ANGLE PROJECTION

SIZE A2 | DRAWING NUMBER 474-3200 | REV 1

SCALE: 1:2 | SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	3/14/2016



ITEM	QTY	PART NUMBER	DESCRIPTION
6	1	474-3227	LUMBAR CABLE
5	1	5000804	M12 FLAT WASHER THICK SS
4	1	474-3228	M12 HEX LOCK NUT, MODIFIED
3	1	180-2005	BUSHING, NECK LOWER
2	1	180-2004	BUSHING, UPPER NECK
1	1	474-3206	LUMBAR, MOLDED

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

LUMBAR ASSEMBLY

APPROVALS	DATE
DRAWN ghayden	3/14/2016
CHECKED	
ENG	
APPROVED	

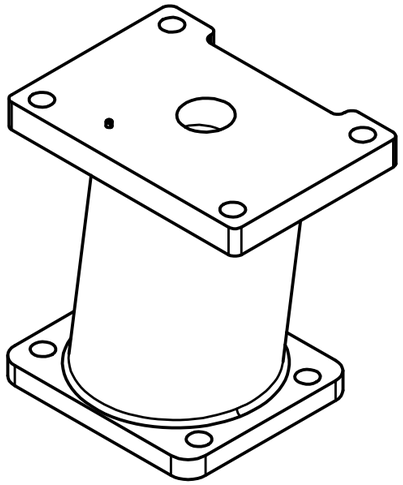
MATERIAL
HEAT TREAT
FINISH

THIRD ANGLE PROJECTION

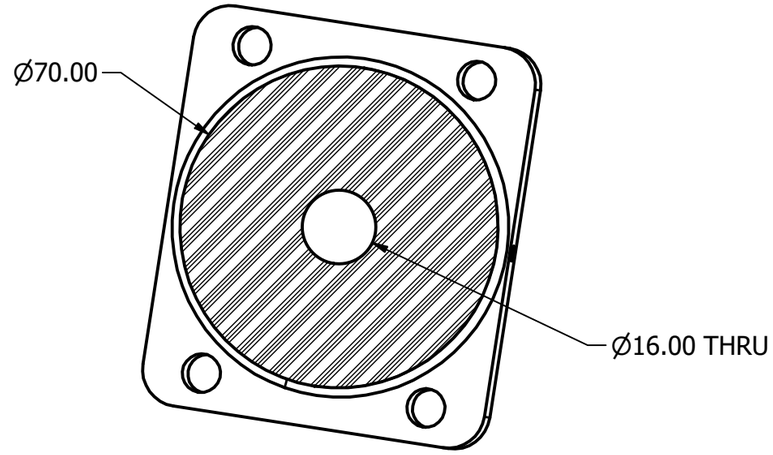
SIZE A3 | DRAWING NUMBER 474-3223 | REV 1

SCALE: 1:1 | SHEET 1 OF 1

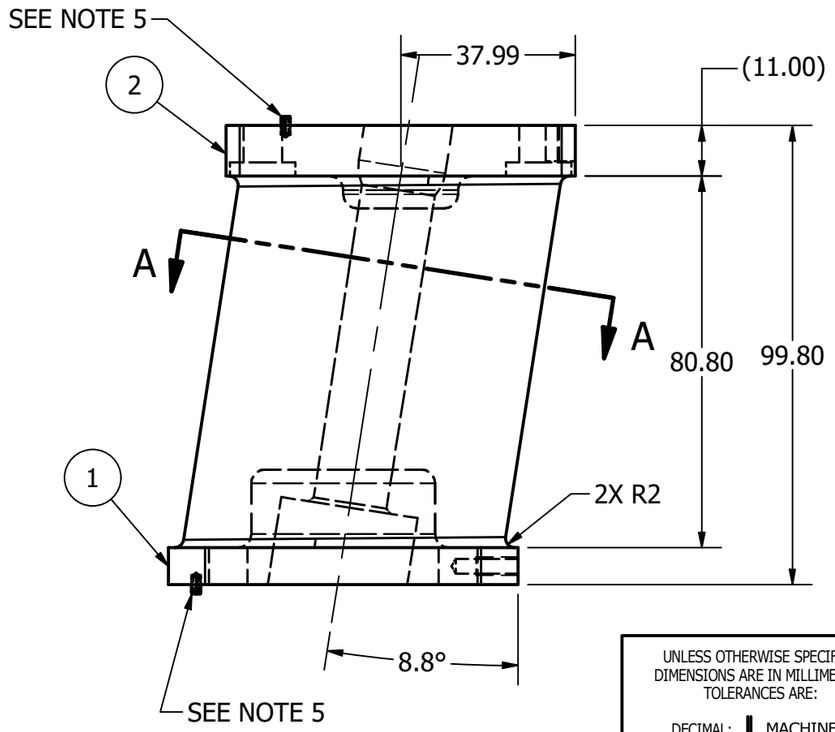
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	3/14/2016



SCALE .5:1



SECTION A-A



NOTES:
1. MATERIAL: NATURAL RUBBER
   COLOR: BLACK
   DUROMETER: 70 ±5 SHORE "A"

2. REMOVE ALL MOLD FLASHING

3. ALL MOLD DIMENSION TOLERANCE +1%/-2%
   BUT NO SMALLER THAN 0.5mm

4. NO SPLIT OR DEFECTS ARE ALLOWED
   IN THE RUBBER MOLDING

5. OPTIONAL - ROLL PIN CAN BE REMOVED BEFORE MOLDING,
   BUT MUST BE REINSTALLED AFTER.

PRELIMINARY DRAWING

ITEM	QTY	PART NUMBER	DESCRIPTION
2	1	474-3205	LUMBAR PLATE, TOP
1	1	474-3204	LUMBAR PLATE, BOTTOM

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED √ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTE #1
HEAT TREAT:
FINISH:

APPROVALS	DATE
DRAWN: ghayden	3/14/2016
CHECKED:	
ENG:	
APPROVED:	

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

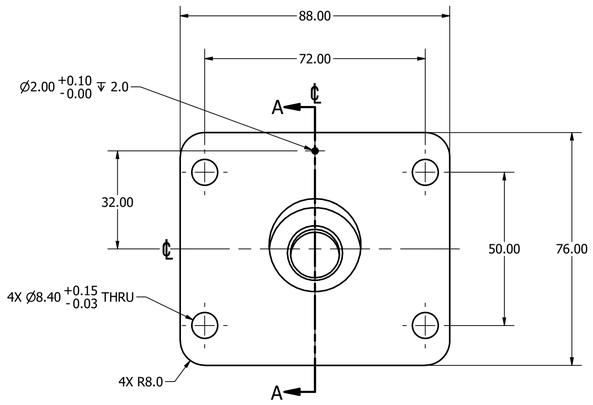
LUMBAR, MOLDED

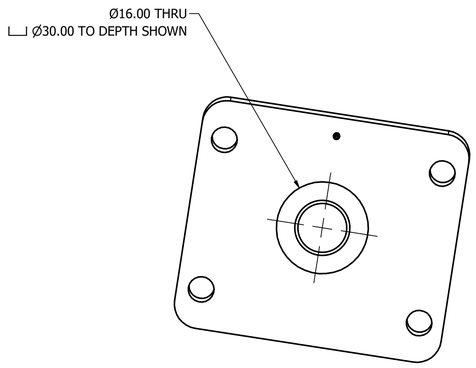
THIRD ANGLE PROJECTION

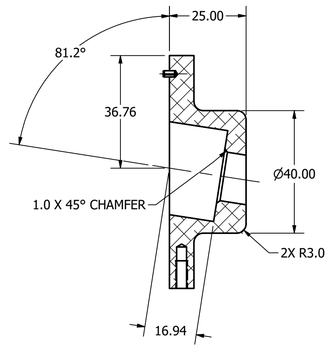
SIZE: A3 | DRAWING NUMBER: 474-3206 | REV: 1

SCALE: .75:1 | SHEET: 1 OF 1

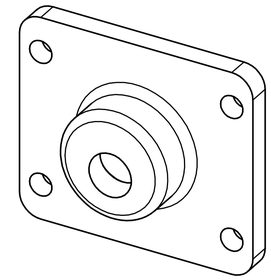
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	3/14/2016

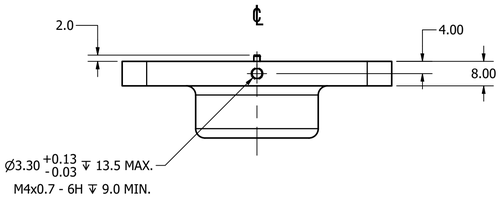


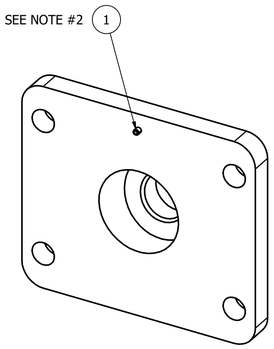




SECTION A-A







NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

2. INSTALL ROLL PIN AFTER ANODIZE.

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	5000765	M2 X 4 LG. ROLL PIN

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.2, X.X ±.1, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: ghayden	3/14/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

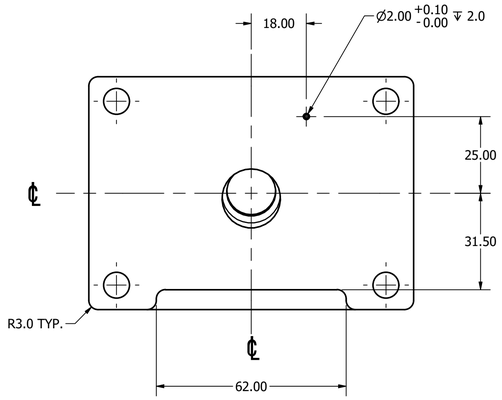
LUMBAR PLATE, BOTTOM

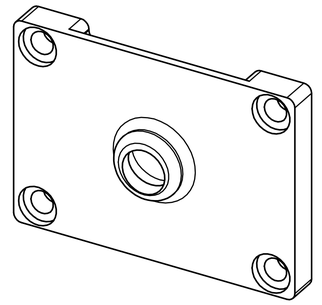
THIRD ANGLE PROJECTION

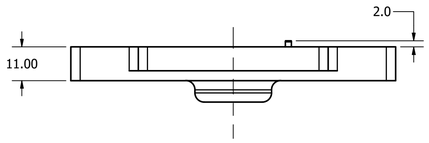
SIZE: A1 | DRAWING NUMBER: 474-3204 | REV: 1

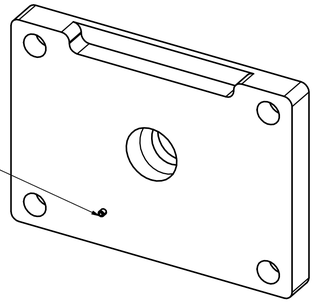
SCALE: 1:1 | SHEET: 1 OF 1

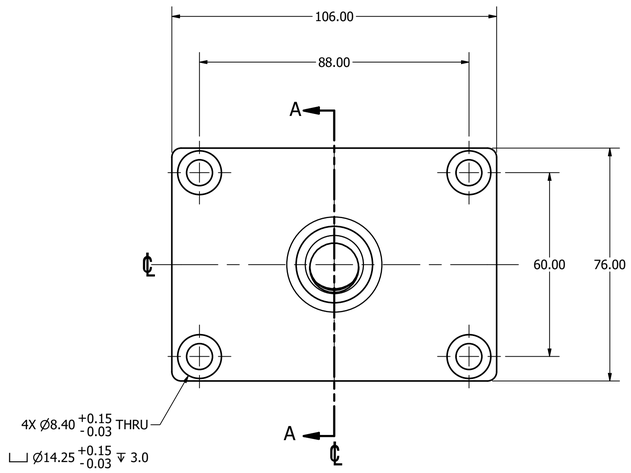
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	3/14/2016

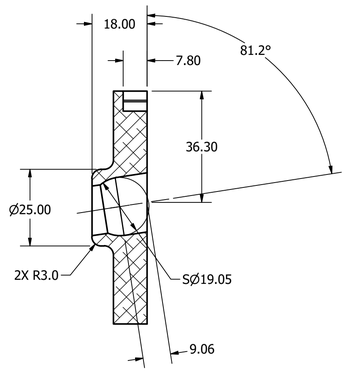




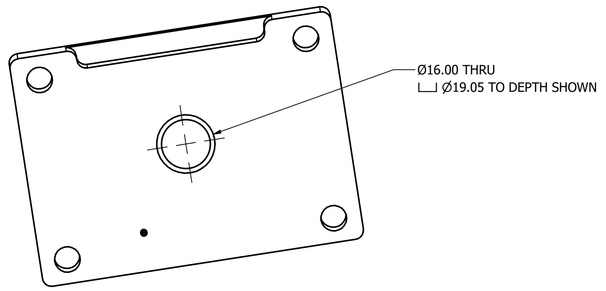








SECTION A-A



NOTES:

1. DIMENSION SYMMETRICAL ABOUT ℄, UNLESS OTHERWISE NOTED.
2. INSTALL ROLL PIN AFTER ANODIZE.

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	5000765	M2 X 4 LG. ROLL PIN

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS TOLERANCES ARE:
DECIMALS X ±.5 X.X ±.1 X.XX ±.1 | MACHINED ANGLES ±1.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075 T-6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN ghayden	3/14/2016
CHECKED	
ENG	
APPROVED	

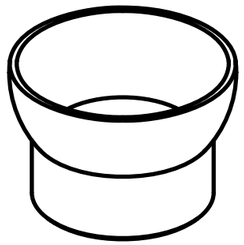
LUMBAR PLATE, TOP

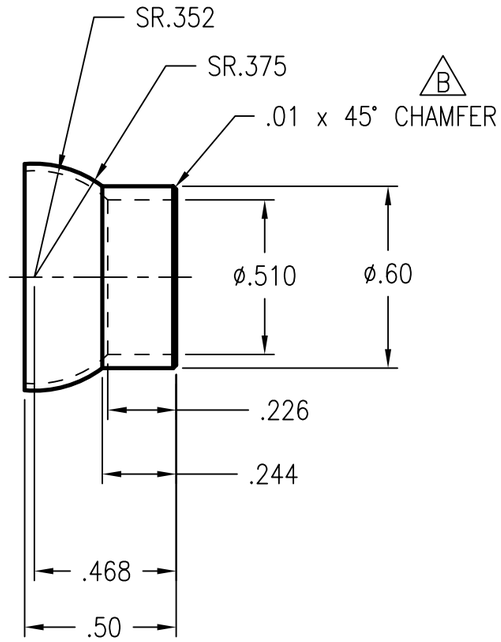
THIRD ANGLE PROJECTION

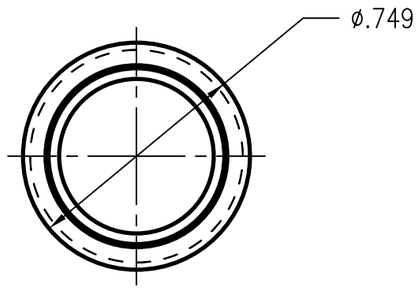
SIZE: A1 | DRAWING NUMBER: 474-3205 | REV: 1

SCALE: 1:1 | SHEET: 1 OF 1

REVISION RECORD			
REV.	DESCRIPTION	DATE	BY
A	NHTSA PART 572 NPRM RELEASE	7/26/04	DMW
B	ADDED CHAMFER DIMENSIONS	4/4/06	JHC
C	ADDED "OR EQUIVALENT" TO MATERIAL BOX	9/1/06	JHC







RELEASED

Sept. 15, 2006

NHTSA

NOTES:

1. REMOVE ALL BURRS AND BREAK ALL SHARP EDGES.

ITEM NO.	QTY	PART NO.	DESCRIPTION

PART LIST

UNITS ARE inches C

TOLERANCES ARE: *

DECIMALS:
.X ±0.1
.XX ±0.01
.XXX ±0.005
FRACTIONS ±1/64

ANGLES: ±0.5°

MACHINED: 63

* unless otherwise noted

MATERIAL: DELRIN OR EQUIVALENT

SCALE: 2.000

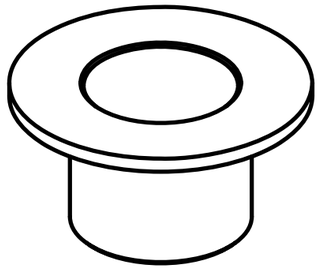
APPROVALS	DATE
DRAWN	
CHECKED	
ENGINEER	

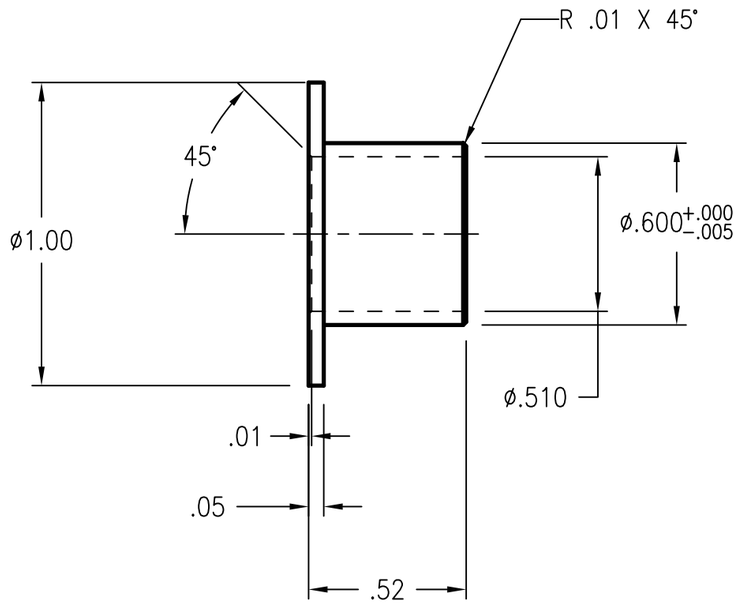
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

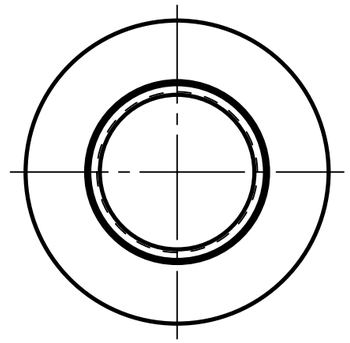
NECK BUSHING UPPER

SIZE	SHEET	DRAWING NUMBER	REV.
B	1 OF 1	180–2004	C

REVISION RECORD			
REV.	DESCRIPTION	DATE	BY
A	NHTSA PART 572 NPRM RELEASE	7/26/04	DMW
B	ADDED "OR EQUIVALENT" TO MATERIAL BOX	9/1/06	JHC







RELEASED

Sept. 15, 2006

NHTSA

NOTES:

1. REMOVE ALL BURRS AND BREAK ALL SHARP EDGES.

ITEM NO.	QTY	PART NO.	DESCRIPTION

PART LIST

UNITS ARE inches △B

TOLERANCES ARE: *

DECIMALS: .X ±0.1, .XX ±0.01, .XXX ±0.005

FRACTIONS ±1/64

ANGLES: ±0.5°

MACHINED: 63

* unless otherwise noted

MATERIAL: DELRIN OR EQUIVALENT

SCALE: 2.000

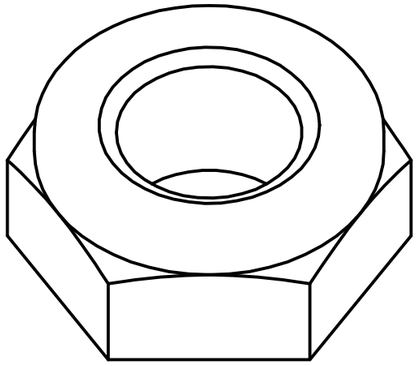
APPROVALS	DATE
DRAWN	
CHECKED	
ENGINEER	

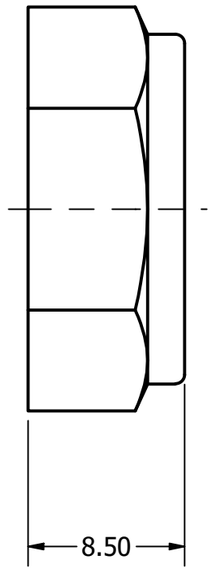
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

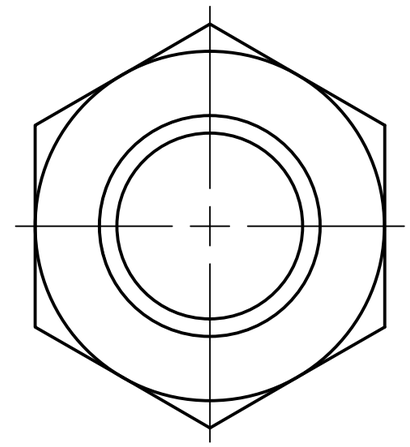
NECK BUSHING LOWER

SIZE	SHEET	DRAWING NUMBER	REV.
B	1 OF 1	180–2005	B

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	DJI	JW	6/17/2016







NOTES:

1. MODIFY PART #5000462 AS SHOWN
   (M12 X 1.75 HEX LOCK NUT)

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED 32 | ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTE #1
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: disopi	6/17/2016
CHECKED:	
ENG:	
APPROVED:	

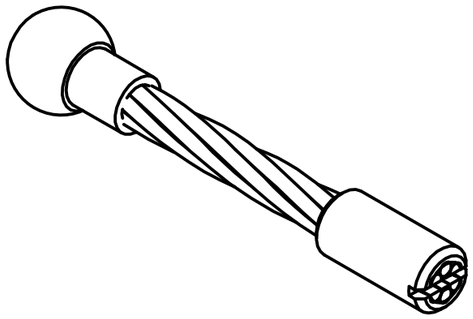
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

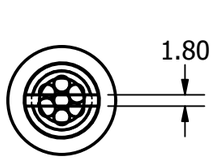
M12 HEX LOCK NUT, MODIFIED

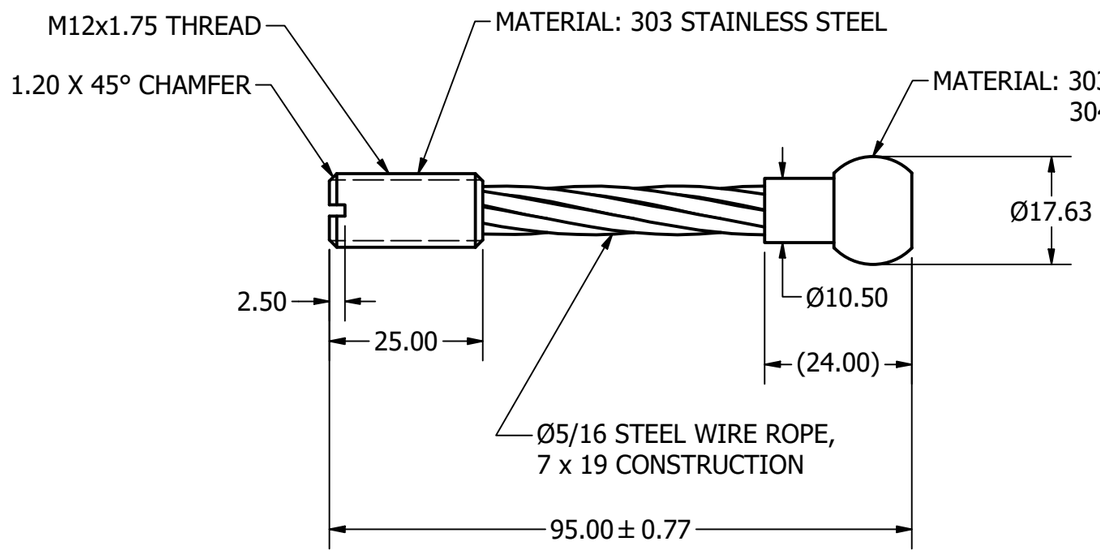
THIRD ANGLE PROJECTION

SIZE: A3 | DRAWING NUMBER: 474-3228 | REV: 1
SCALE: 3:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	3/14/2016







NOTES:

1. DIMENSIONS SHOWN ARE AFTER SWAGING AND MACHINING.
2. TENSILE STRENGTH OF CABLE ASSEMBLY SHALL BE 16kN MINIMUM.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN ghayden	3/14/2016
CHECKED	
ENG	
APPROVED	

MATERIAL
HEAT TREAT
FINISH

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

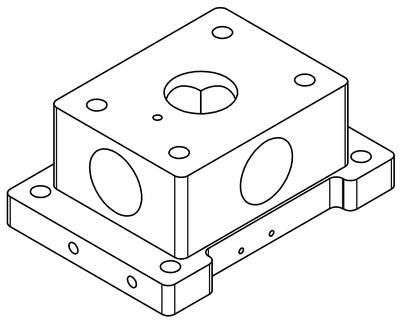
LUMBAR CABLE

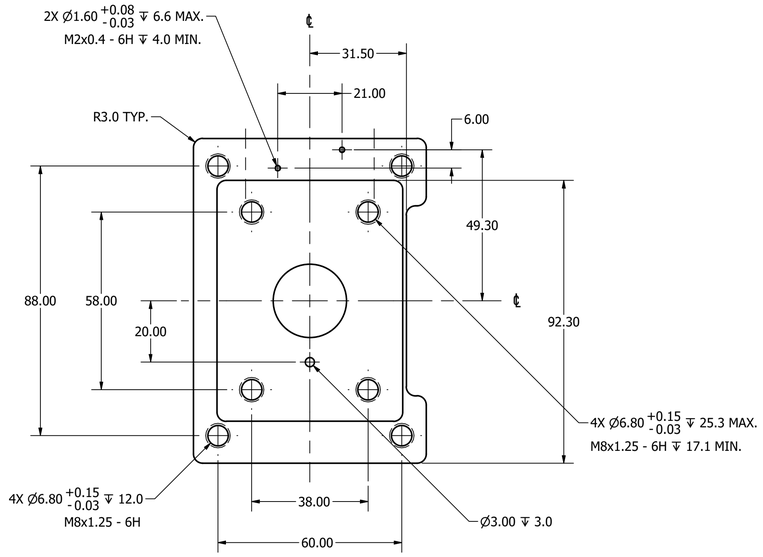
THIRD ANGLE PROJECTION

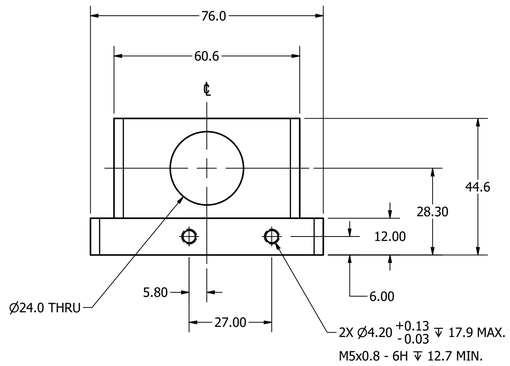
SIZE	DRAWING NUMBER	REV
A3	474-3227	1

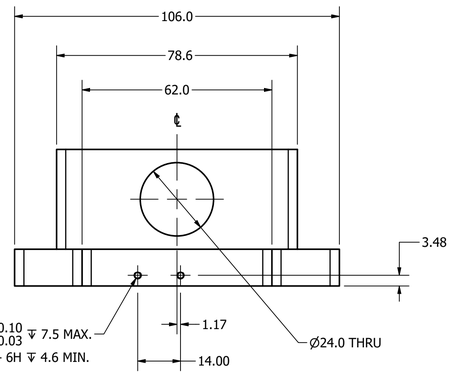
SCALE: 1:1 SHEET 1 OF 1

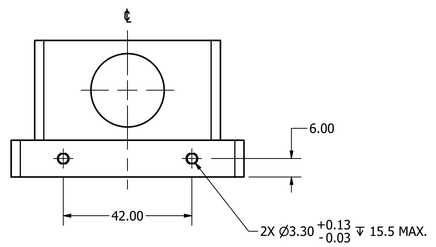
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	3/15/2016

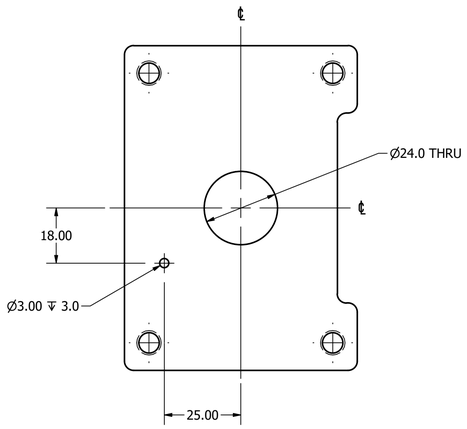












NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.1, X.X ±.2, X.XX ±.1
MACHINED ∠C ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: ghayden	3/15/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

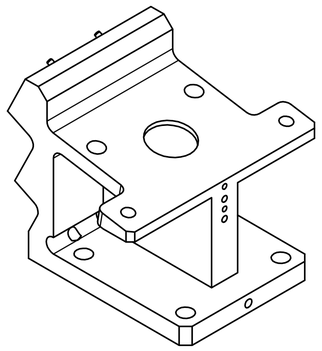
STRUCTURAL REPLACEMENT, THORACIC SPINE LOAD CELL

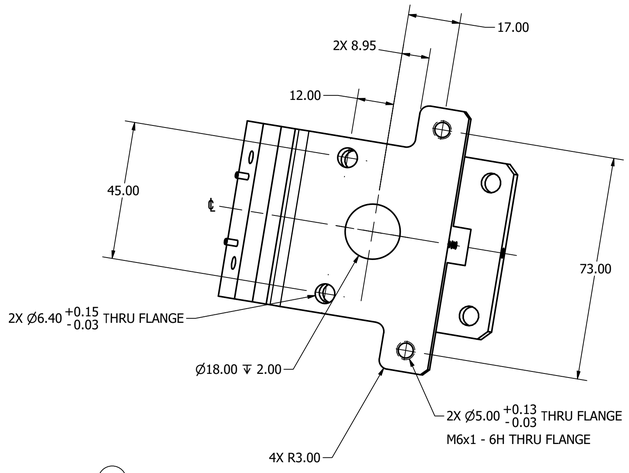
THIRD ANGLE PROJECTION

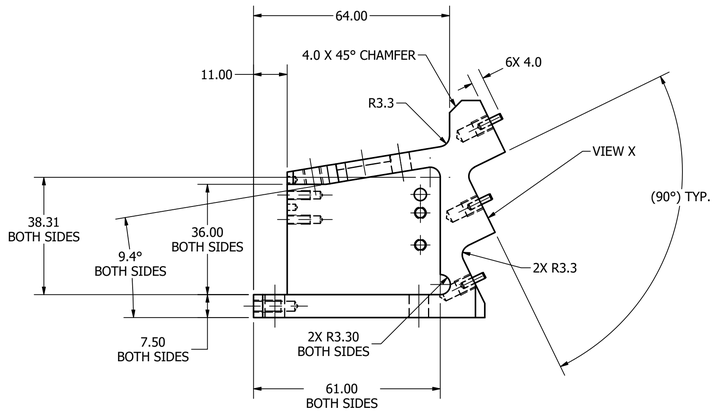
SIZE: A1 | DRAWING NUMBER: 474-3202 | REV: 1

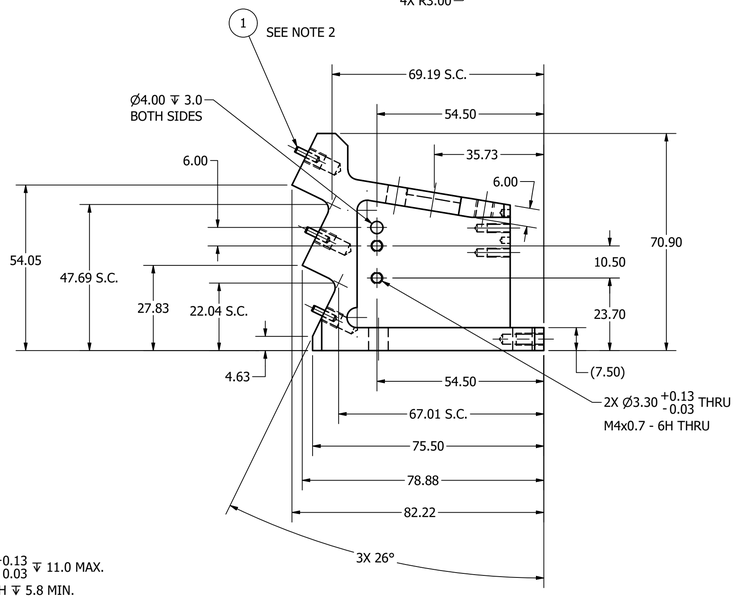
SCALE: 1:1 | SHEET: 1 OF 1

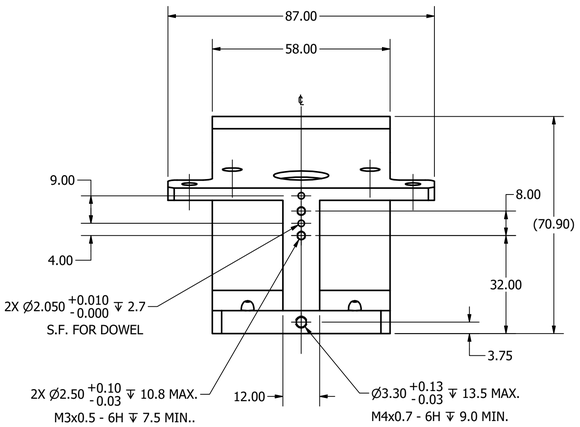
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH	JW	3/17/2016

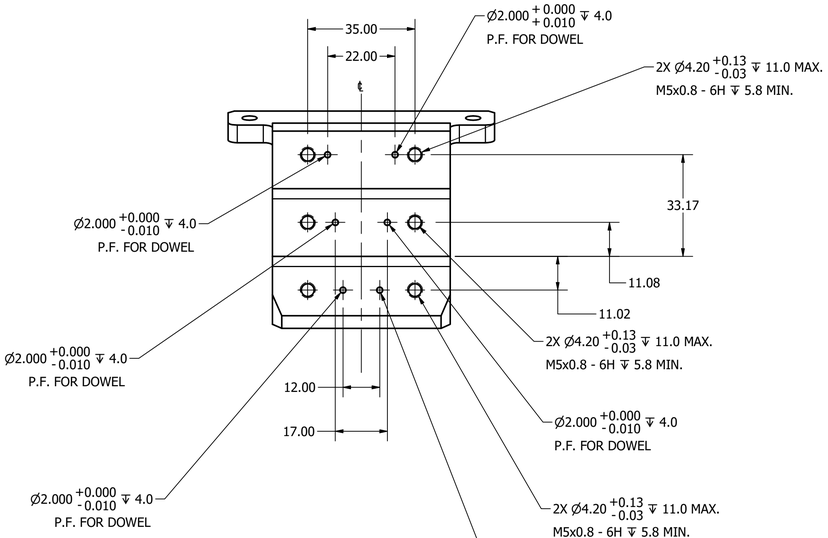




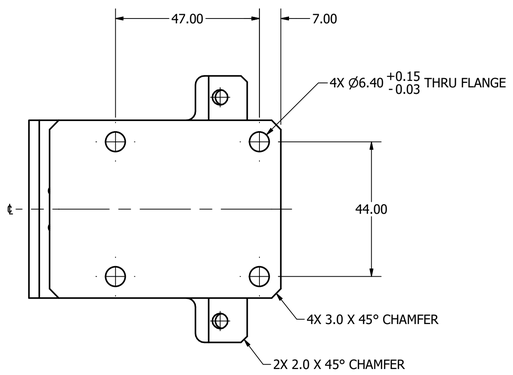








VIEW X



NOTES:

1. DIMENSIONS ARE SYMMETRICAL ABOUT ℄ UNLESS OTHERWISE NOTED.

2. INSTALL DOWEL PINS AFTER ANODIZE.

ITEM	QTY	PART NUMBER	DESCRIPTION
1	6	5000064	M2 X 8 LG. DOWEL PIN

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL X.X ±.5 X.XX ±.2 X.XXX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: jhaefner	3/17/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

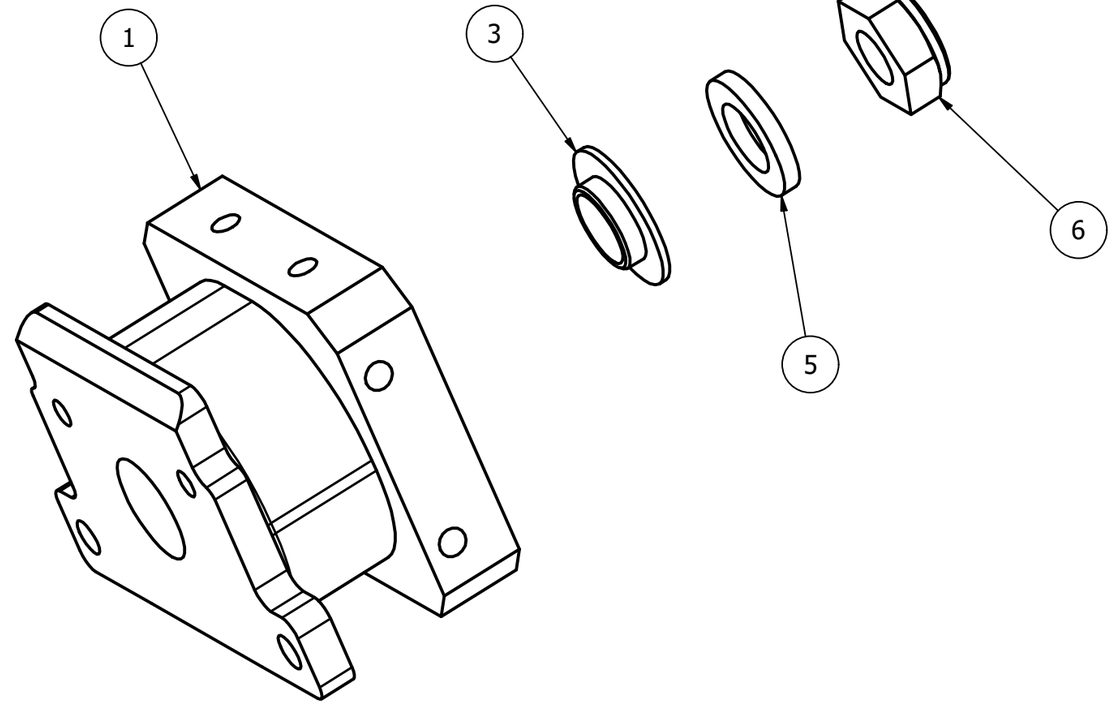
LOWER SPINE BOX ASSEMBLY

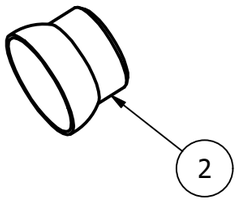
THIRD ANGLE PROJECTION

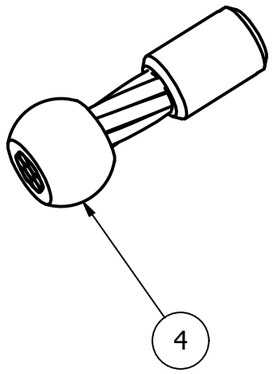
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SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	3/17/2016







ITEM	QTY	PART NUMBER	DESCRIPTION
6	1	474-3228	M12 HEX LOCK NUT, MODIFIED
5	1	5000804	M12 FLAT WASHER THICK SS
4	1	474-3224	UPPER SPINE CABLE
3	1	474-3226	CABLE BUSHING
2	1	180-2004	BUSHING, UPPER NECK
1	1	474-3241	UPPER SPINE, MOLDED

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

	APPROVALS	DATE
DRAWN	ghayden	3/17/2016
CHECKED		
ENG		
APPROVED		

MATERIAL
HEAT TREAT
FINISH

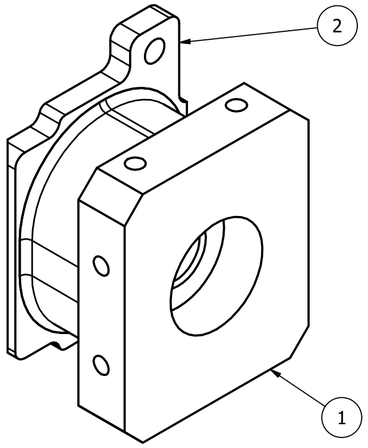
UPPER SPINE ASSEMBLY

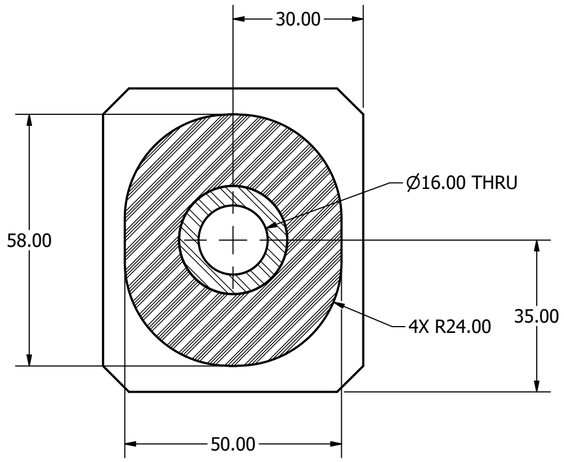
THIRD ANGLE PROJECTION

SIZE A3 | DRAWING NUMBER 474-3240 | REV 1

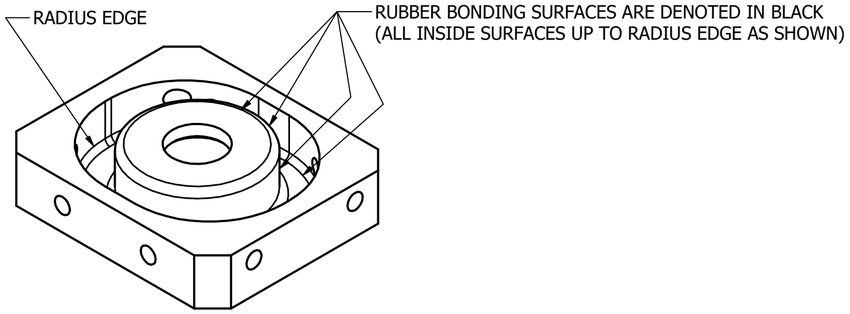
SCALE: 1:1 | SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	3/17/2016

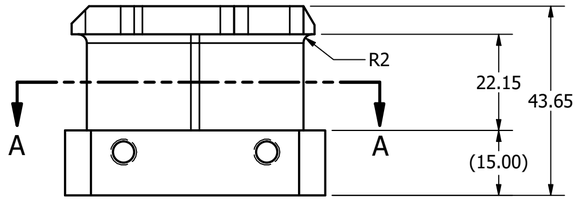


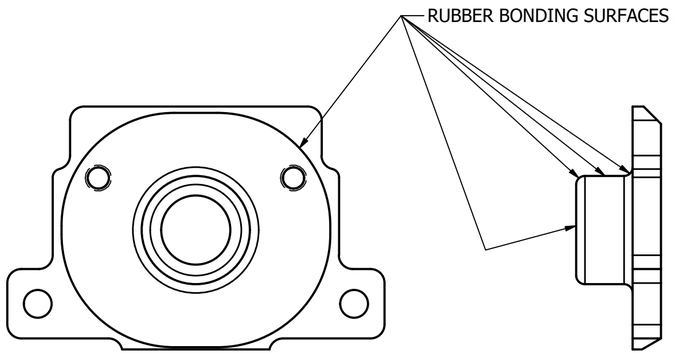


SECTION A-A

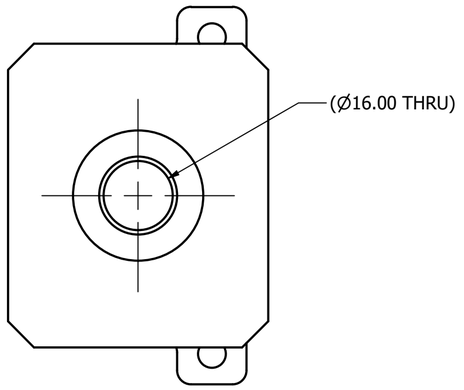


DETAIL VIEW OF 474-3242
SCALE 1 : 1





DETAIL VIEW OF 474-3243
SCALE 1 : 1



NOTES:

1. MATERIAL: BUTYL RUBBER
   COLOR: BLACK
   DUROMETER: 75±5 SHORE "A"

2. REMOVE ALL MOLD FLASHING.

3. ALL MOLD DIMENSION TOLERANCE +1%/-2% BUT NO SMALLER THAN 0.5mm.

4. NO SPLIT OR DEFECTS ARE ALLOWED IN THE RUBBER MOLDING.

5. ALL TAPPED HOLES MUST BE FREE OF RUBBER.

ITEM	QTY	PART NUMBER	DESCRIPTION
2	1	474-3243	UPPER SPINE PLATE, BOTTOM
1	1	474-3242	UPPER SPINE PLATE, TOP

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTE #1
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: ghayden	3/17/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

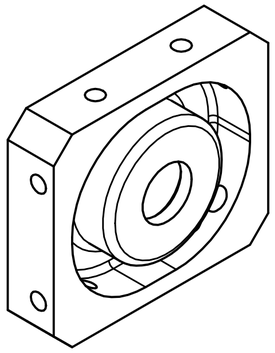
UPPER SPINE, MOLDED

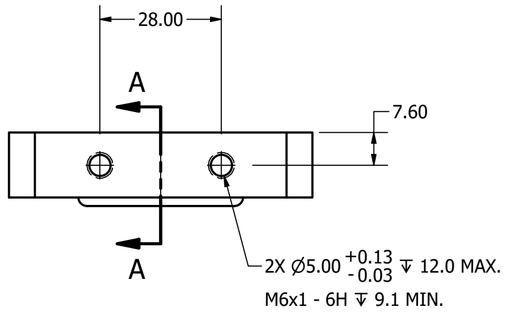
THIRD ANGLE PROJECTION

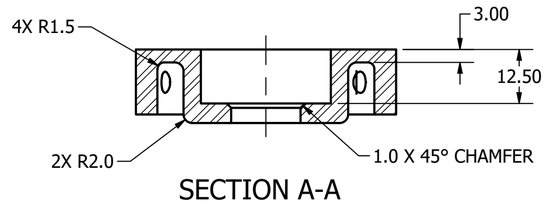
SIZE: A2 | DRAWING NUMBER: 474-3241 | REV: 1

SCALE: 1:1 | SHEET: 1 OF 1

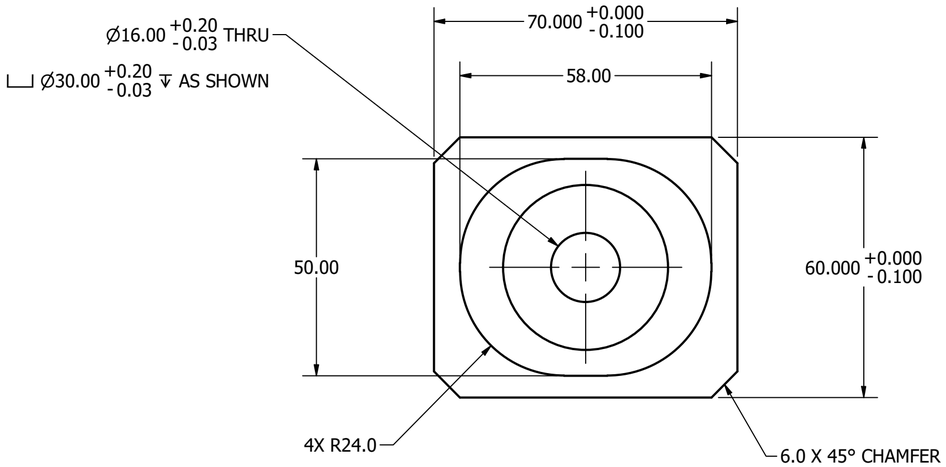
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	3/16/2016

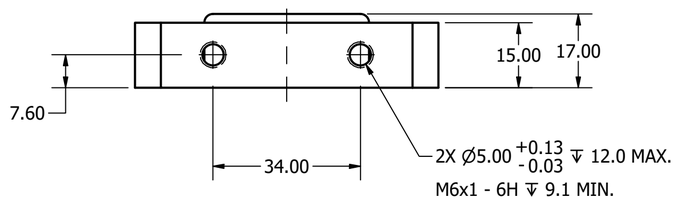






SECTION A-A





NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 1018 STEEL
HEAT TREAT:
FINISH: SATIN FLASH CHROME

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: ghayden	3/16/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

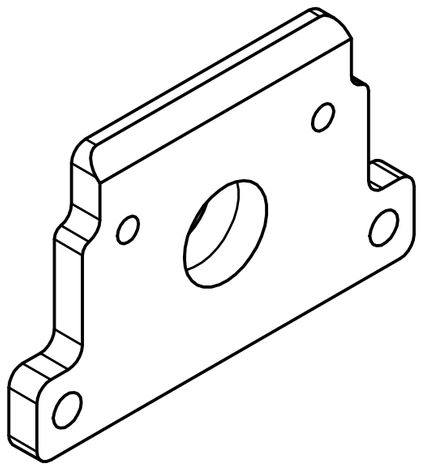
UPPER SPINE PLATE, TOP

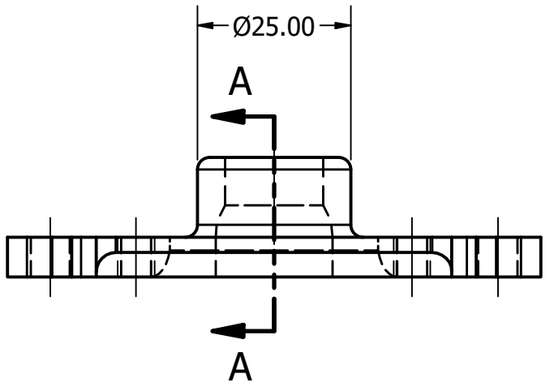
THIRD ANGLE PROJECTION

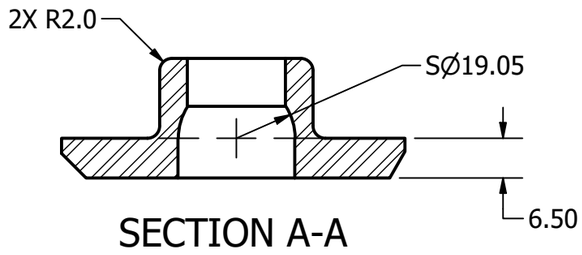
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SCALE: 1:1 | SHEET: 1 OF 1

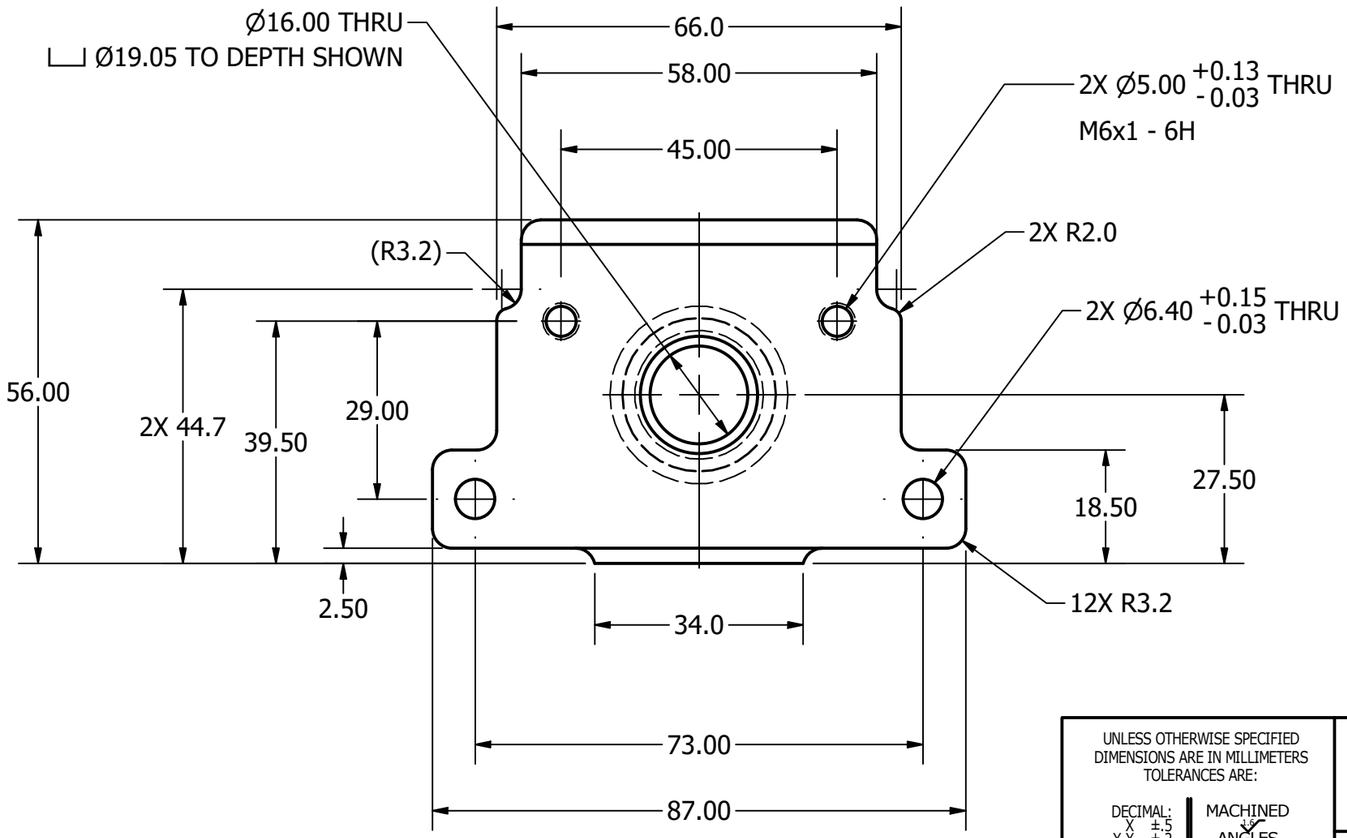
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	3/16/2016

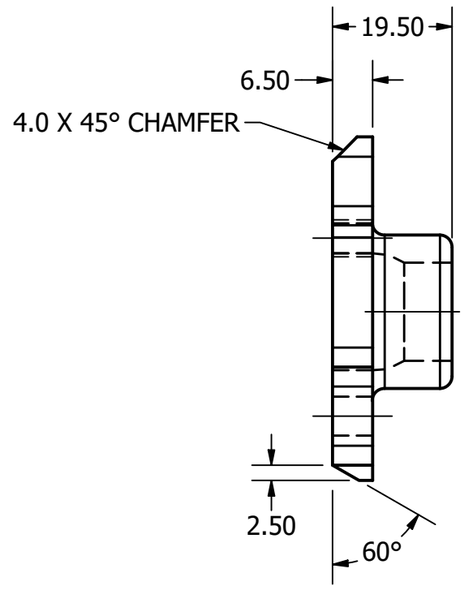






SECTION A-A





NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ±.5 | ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 1018 STEEL
HEAT TREAT:
FINISH: SATIN FLASH CHROME

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN ghayden	3/16/2016
CHECKED	
ENG	
APPROVED	

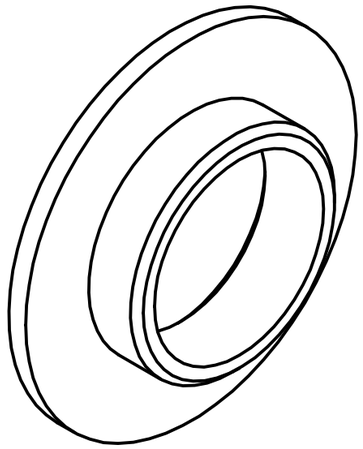
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

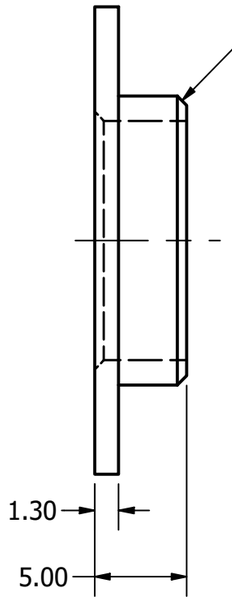
UPPER SPINE PLATE, BOTTOM

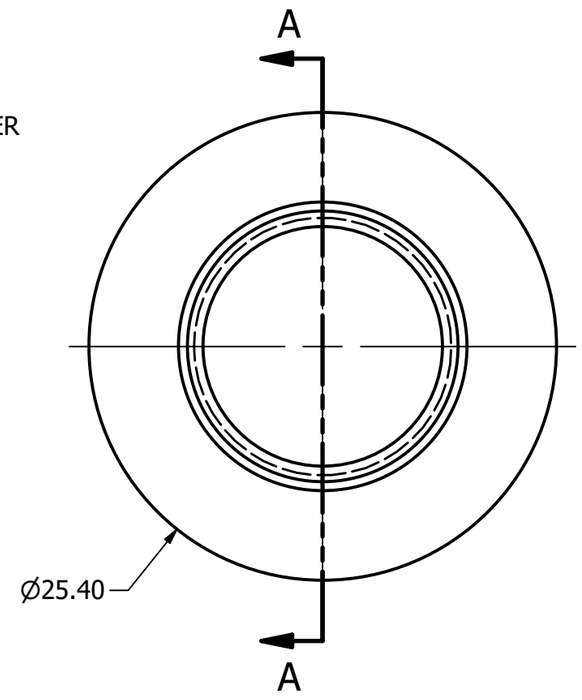
THIRD ANGLE PROJECTION

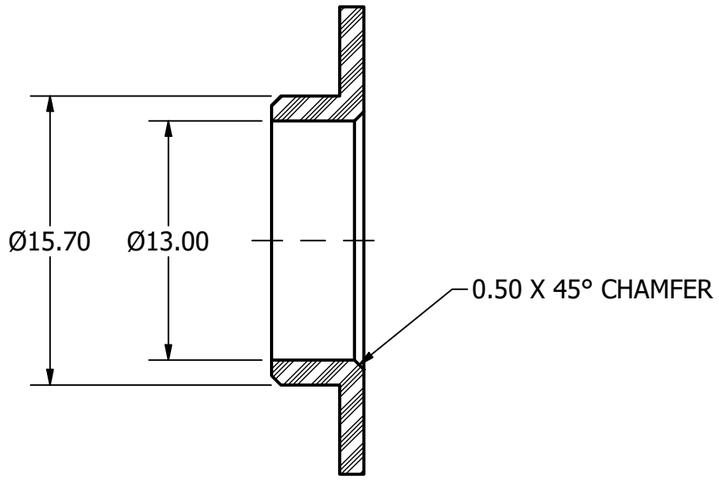
SIZE: A3 | DRAWING NUMBER: 474-3243 | REV: 1
SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	3/16/2016









SECTION A-A

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ±.5
ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: ACETAL RESIN, WHITE
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: ghayden	3/16/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

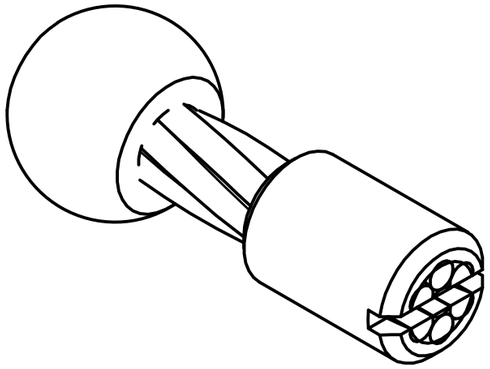
CABLE BUSHING

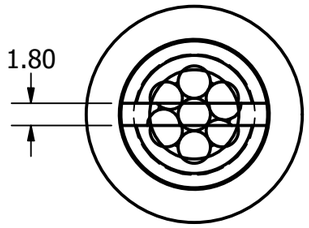
THIRD ANGLE PROJECTION

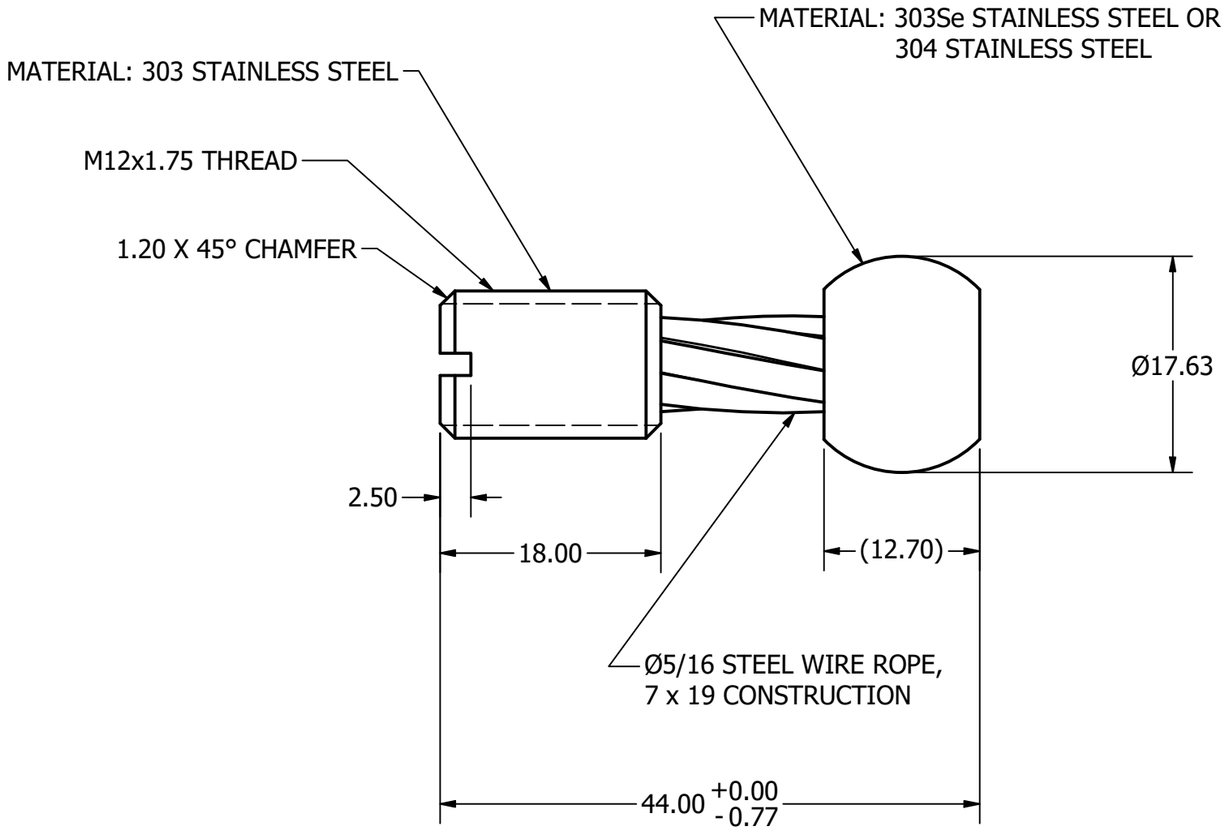
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SCALE: 3:1 SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	3/16/2016







NOTES:

1. DIMENSIONS SHOWN ARE AFTER SWAGING AND MACHINING.
2. TENSILE STRENGTH OF CABLE ASSEMBLY SHALL BE 16kN MINIMUM.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN ghayden	3/16/2016
CHECKED	
ENG	
APPROVED	

MATERIAL
HEAT TREAT
FINISH

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

UPPER SPINE CABLE

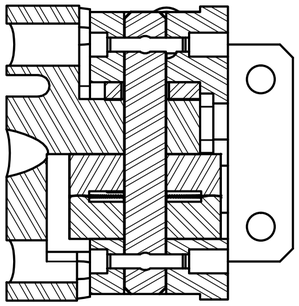
THIRD ANGLE PROJECTION

SIZE	DRAWING NUMBER	REV
A3	474-3224	1

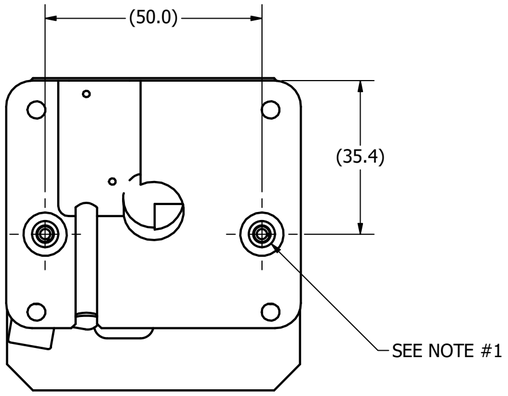
SCALE: 2:1

SHEET 1 OF 1

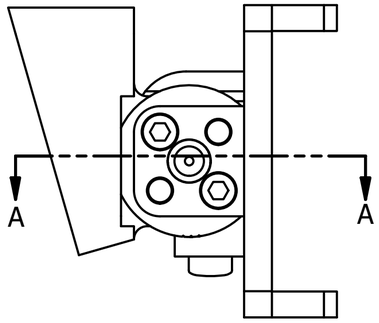
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	3/23/2016

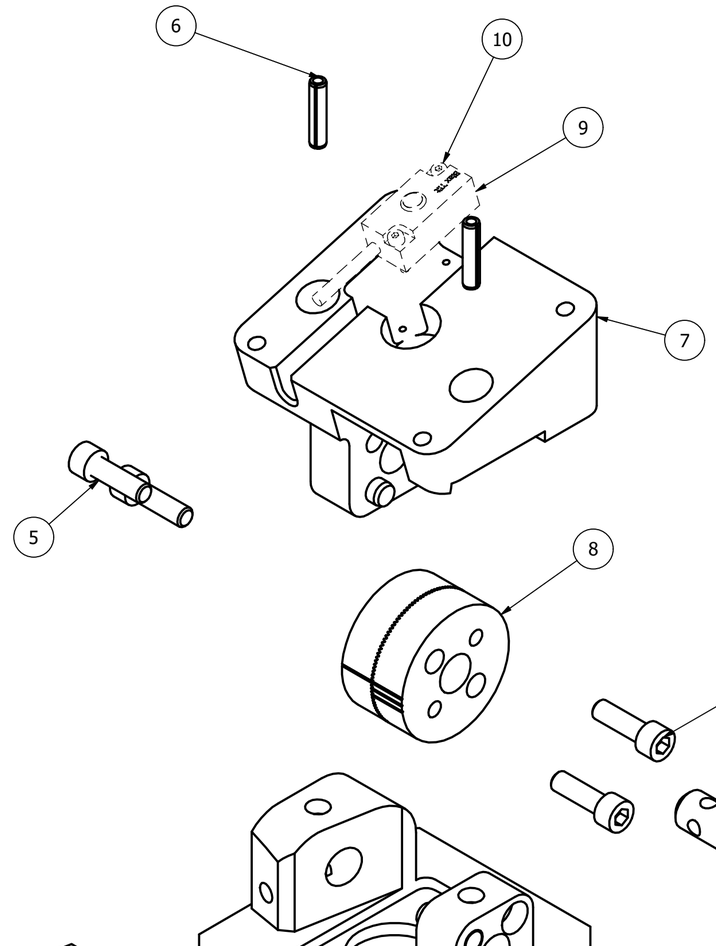


SECTION A-A



TOP VIEW
SCALE 1 : 1





ITEM	QTY	PART NUMBER	DESCRIPTION	
10	2	5000215	M2 X 0.4 X 10 LG. SHCS	(REF)
9	1	SA572-S44	TILT SENSOR, DUAL AXIS	(REF)
8	1	474-3059	NECK POSTURE GEAR ASSEMBLY	
7	1	474-3058	NECK INTERFACE PLATE, NECK POSTURE ADJUSTMENT	
6	2	5001390	M4 X 18 LG. ROLL PIN	
5	4	472-3638	M5 NECK PITCH CHANGE SCREW	
4	1	474-3057	NECK ADJUSTMENT PIVOT PIN	
3	1	474-3053	MODIFIED M6 X 1 X 12 LG. SHCS	
2	1	474-3052	ADJUSTMENT WEDGE	
1	1	474-3051	BASE PLATE, NECK POSTURE ADJUSTMENT	

PARTS LIST

NOTES:

1. INSTALL (2X) ROLL PINS AS SHOWN IN SEC A-A.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

	APPROVALS	DATE
DRAWN	ghayden	3/23/2016
CHECKED		
ENG		
APPROVED		
MATERIAL		
HEAT TREAT		
FINISH		

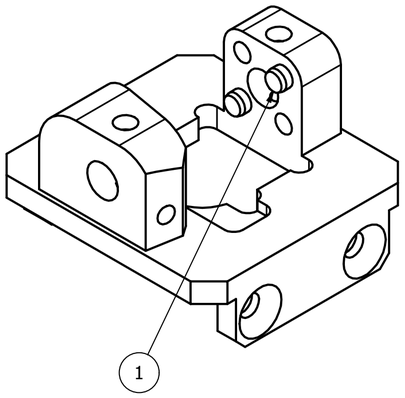
NECK POSTURE ADJUSTMENT ASSEMBLY

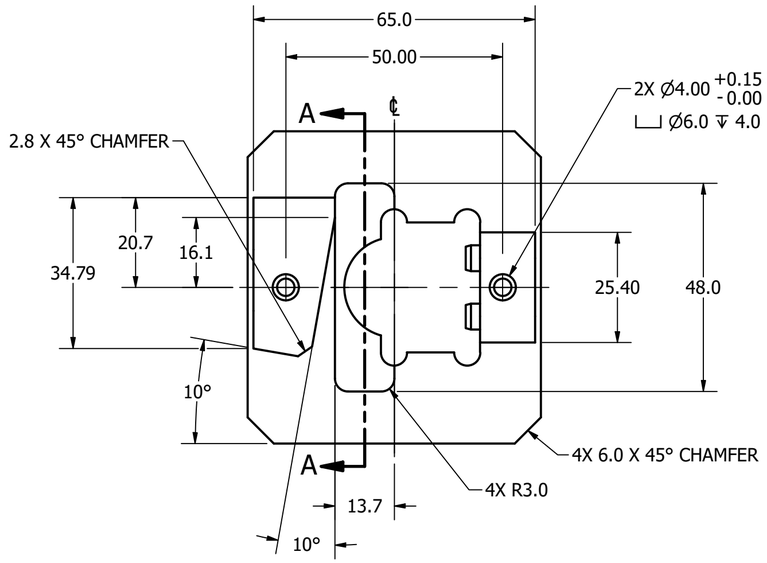
THIRD ANGLE PROJECTION

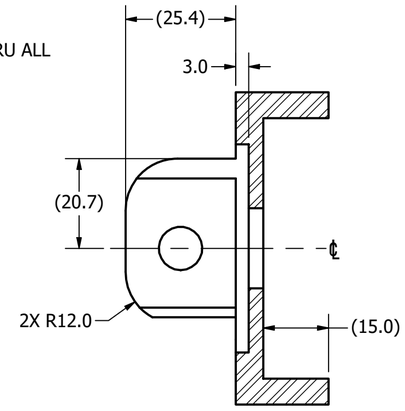
SIZE A2 | DRAWING NUMBER 474-3050 | REV 1

SCALE: 1:1 | SHEET 1 OF 1

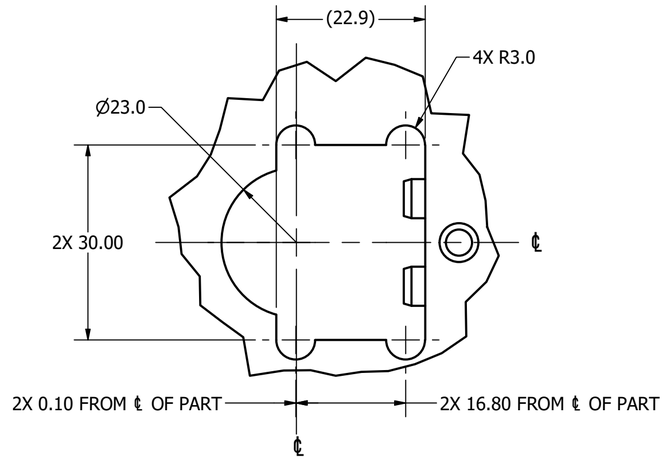
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	3/23/2016



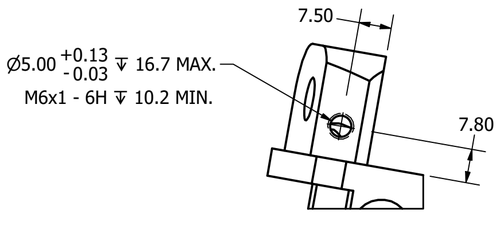


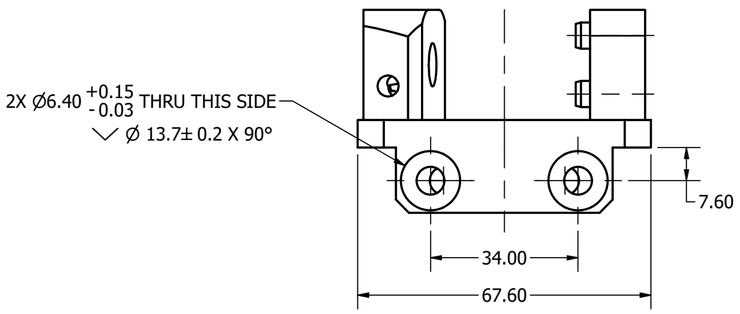


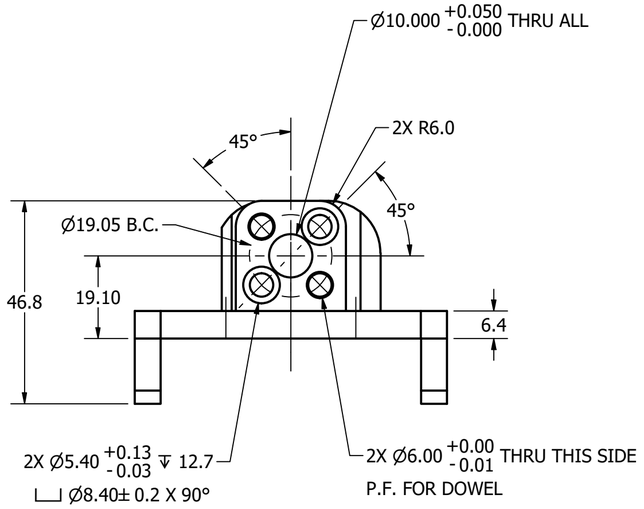
SECTION A-A

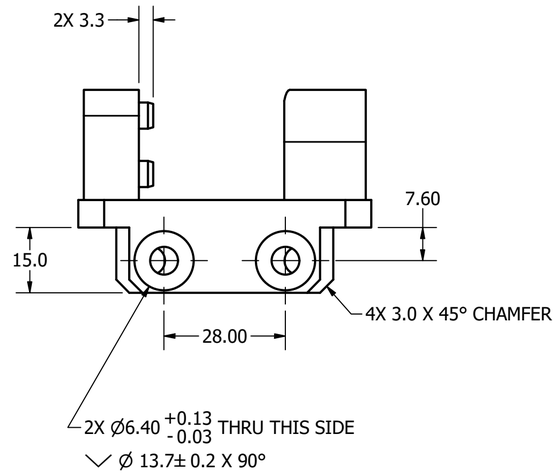


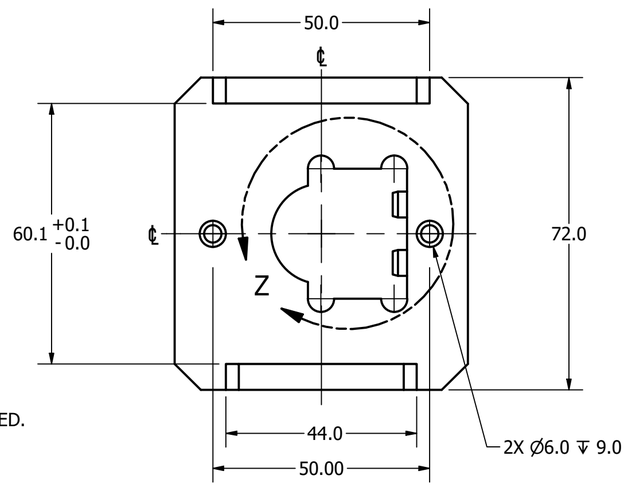
DETAIL Z
SCALE 1.5 : 1











NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

2. INSTALL DOWEL PINS AFTER PLATING.

PRELIMINARY DRAWING

ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	5001266	M6 X 16 LG. DOWEL PIN

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 4140 DCFA
HEAT TREAT:
FINISH: 0.008 ELECTROLESS NICKEL PLATE PER SIDE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: ghayden	3/23/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

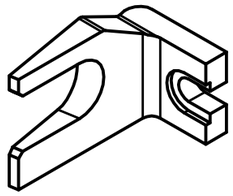
BASE PLATE, NECK POSTURE ADJUSTMENT

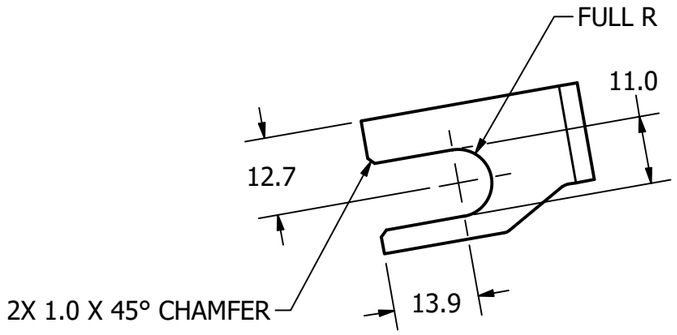
THIRD ANGLE PROJECTION

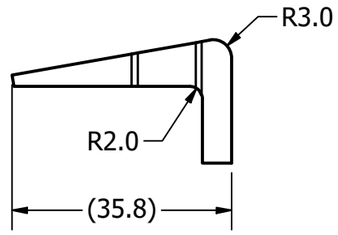
SIZE: A2 | DRAWING NUMBER: 474-3051 | REV: 1

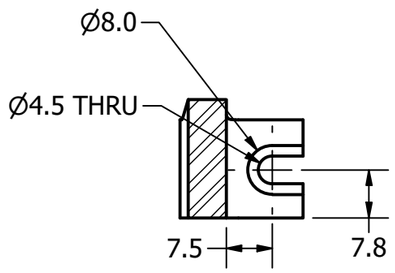
SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	3/21/2016

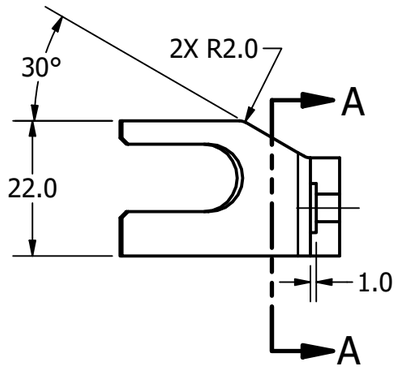


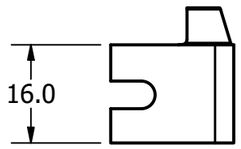


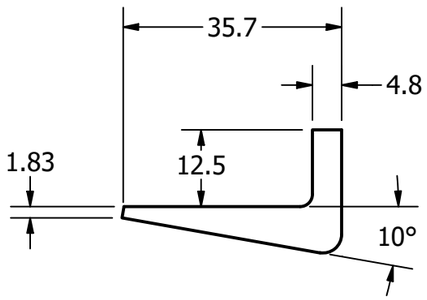




SECTION A-A







PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

ADJUSTMENT WEDGE

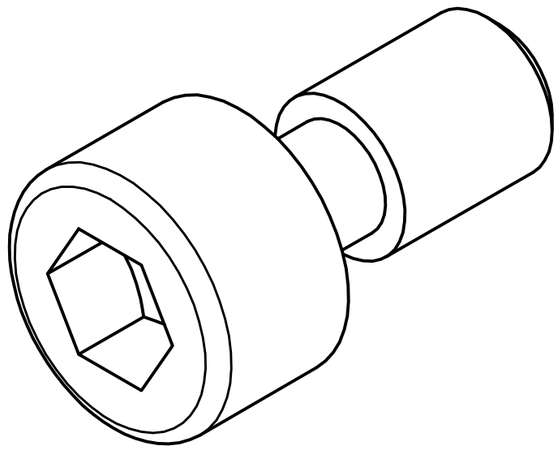
APPROVALS	DATE
DRAWN ghayden	3/21/2016
CHECKED	
ENG	
APPROVED	

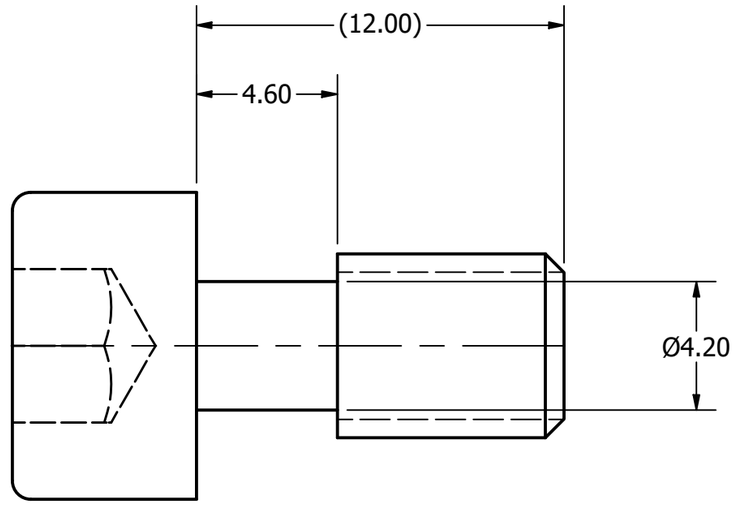
MATERIAL: 1018 STEEL
HEAT TREAT:
FINISH: 0.008 ELECTROLESS NICKEL PLATE PER SIDE

THIRD ANGLE PROJECTION

SIZE: A3 | DRAWING NUMBER: 474-3052 | REV: 1
SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	3/21/2016





NOTES:

1. MAKE FROM 5000281 (M6 X 1 X 12 SHCS), MODIFY AS SHOWN.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED
ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTE #1
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: ghayden	3/21/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

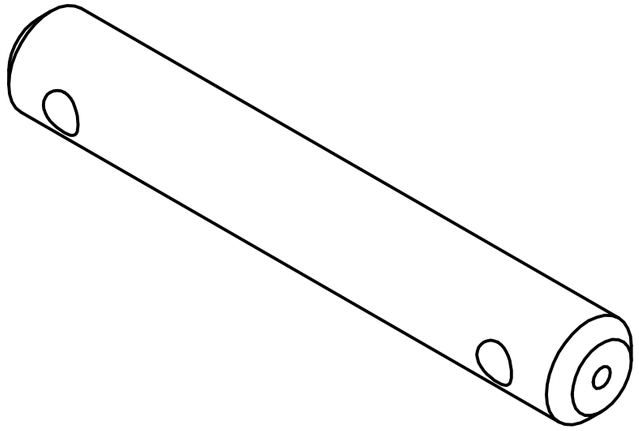
MODIFIED M6 X 1 X 12 LG. SHCS

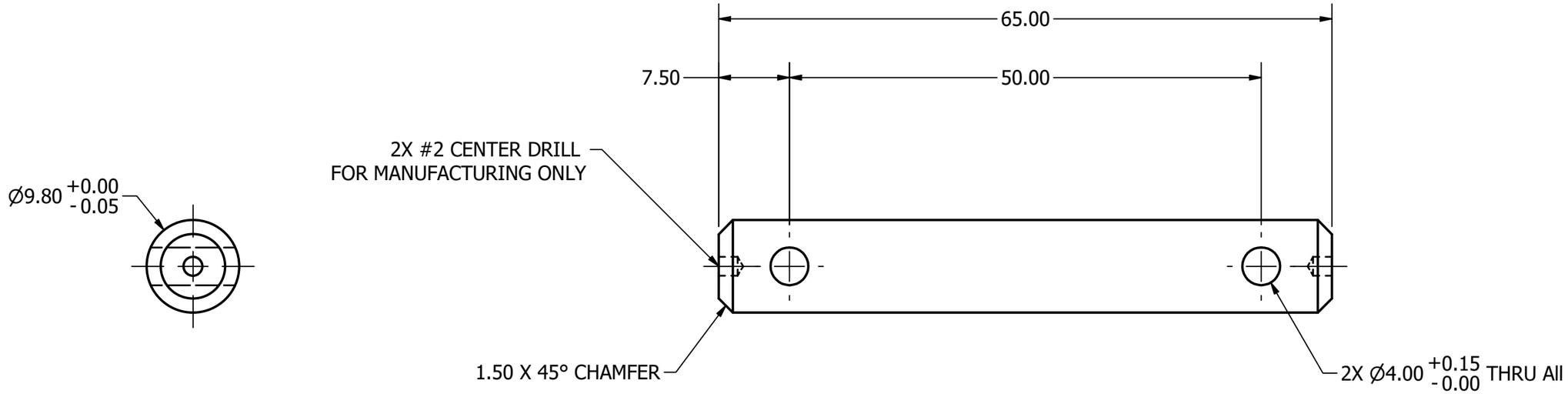
THIRD ANGLE PROJECTION

SIZE: A3 | DRAWING NUMBER: 474-3053 | REV: 1

SCALE: 5:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	3/18/2016





UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

PRELIMINARY DRAWING

MATERIAL: 1018 STEEL
HEAT TREAT:
FINISH: 0.008 ELECTROLESS NICKEL PLATE PER SIDE

*V*EHICLE *R*ESEARCH and *T*EST *C*ENTER

APPROVALS	DATE
DRAWN: ghayden	3/18/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

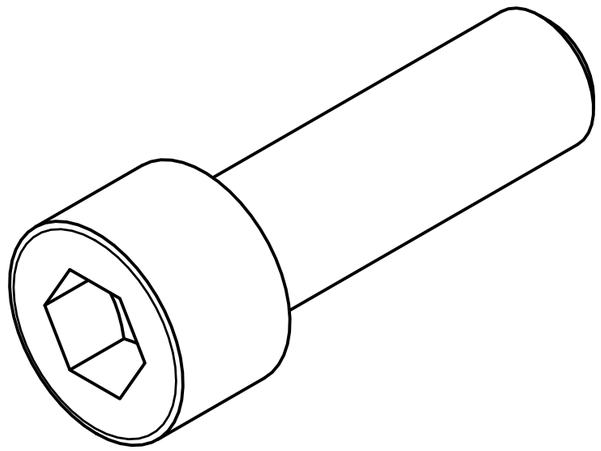
NECK ADJUSTMENT PIVOT PIN

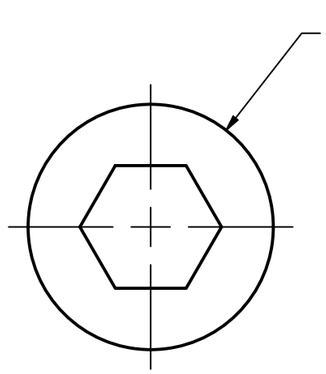
THIRD ANGLE PROJECTION

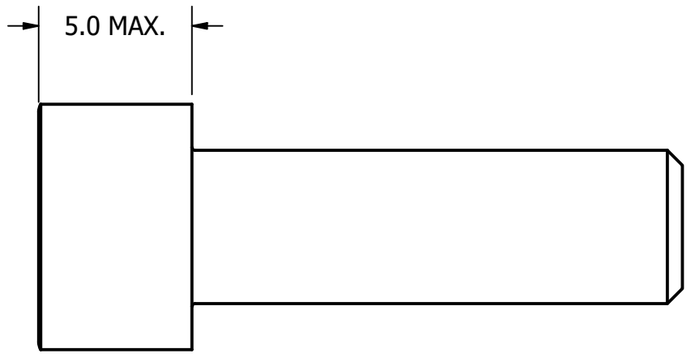
SIZE: A3 | DRAWING NUMBER: 474-3057 | REV: 1

SCALE: 2:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
73417	A	RELEASE TO PRODUCTION	BK	JQG	1/16/2015







NOTES:

1. MAKE FROM M5x0.8 x 16 SHCS, MODIFY AS SHOWN.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED 16 | ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTES
HEAT TREAT:
FINISH:

APPROVALS	DATE
DRAWN: B. KIMES	7/13/2016
CHECKED:	
ENG:	
APPROVED:	

VEHICLE RESEARCH and TEST CENTER

DEPARTMENT OF TRANSPORTATION UNITED STATES OF AMERICA

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

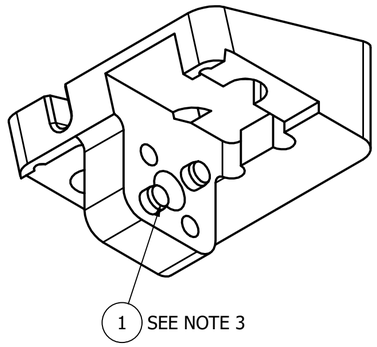
M5 NECK PITCH CHANGE SCREW

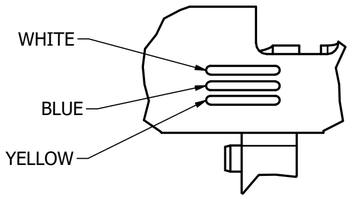
THIRD ANGLE PROJECTION

SIZE: A3 | DRAWING NUMBER: 472-3638 | REV: A

SCALE: 5:1 | SHEET: 1 OF 1

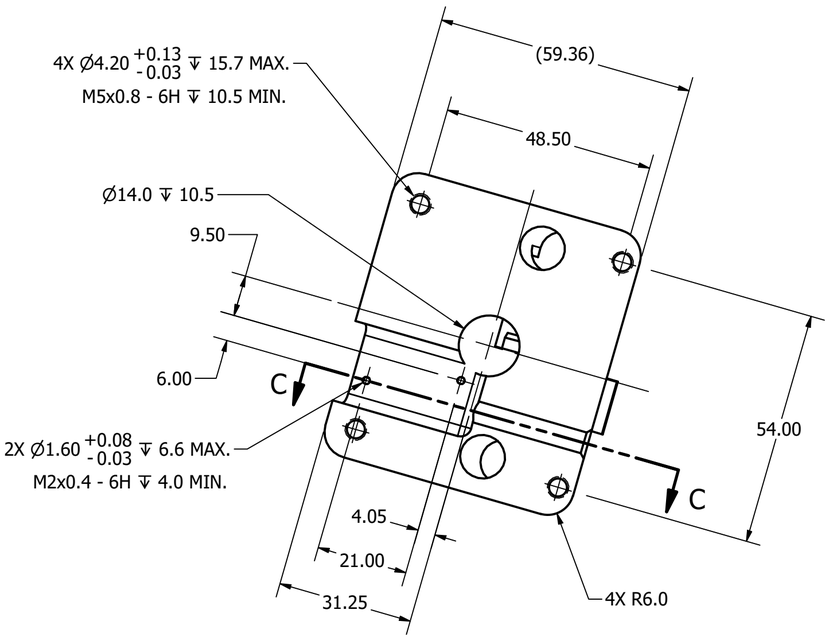
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	3/21/2016

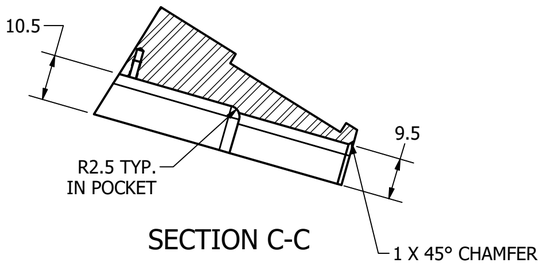




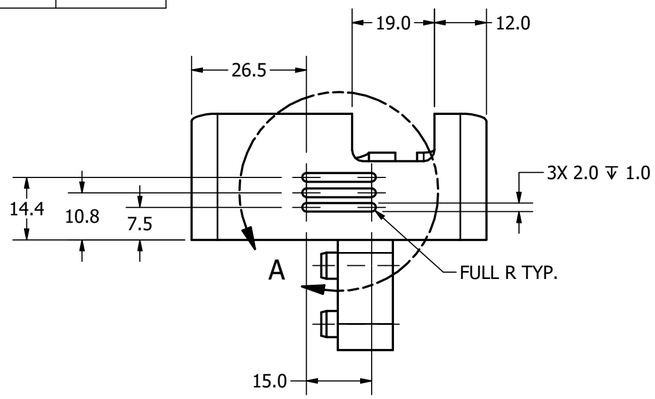
DETAIL A

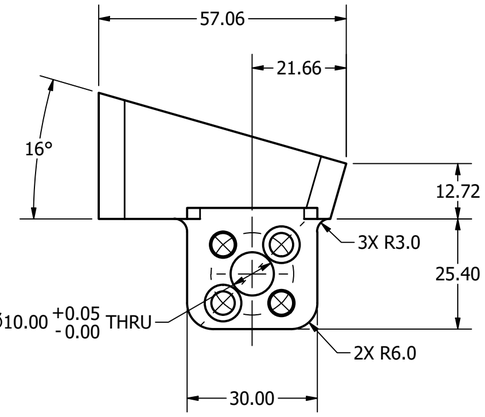
POSTURE CHART		
POSTURE	COLOR	ANGLE
NEUTRAL	WHITE	0°
FORWARD POSTURE 1	BLUE	6°
FORWARD POSTURE 2	YELLOW	12°

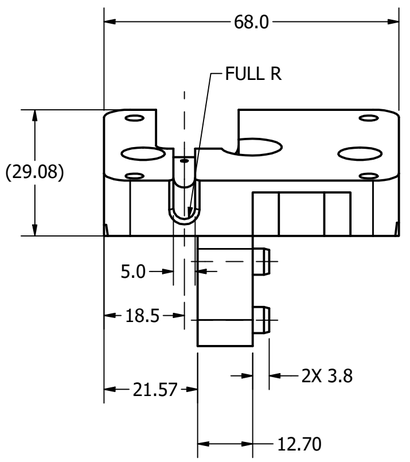


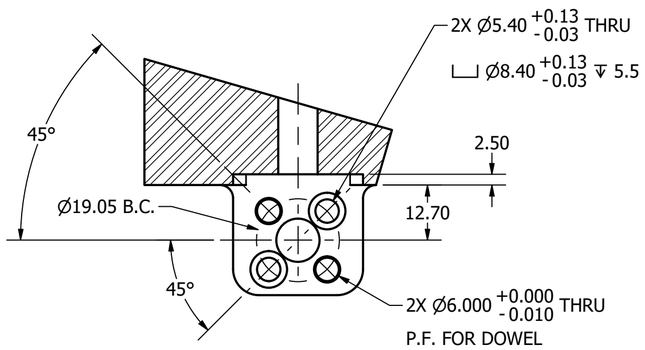


SECTION C-C

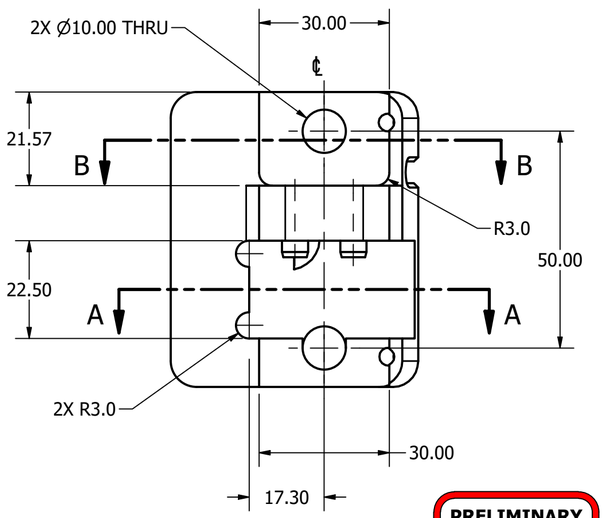


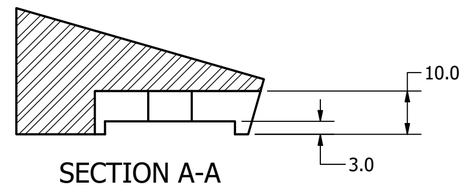






SECTION B-B





SECTION A-A

NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.
2. PAINT INDICATOR MARKS AS SHOWN IN DETAIL A.
3. INSTALL DOWEL PINS AFTER PLATING.

ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	5001266	M6 X 16 LG. DOWEL PIN

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 4140 DCFA
HEAT TREAT:
FINISH: 0.008 ELECTROLESS NICKEL PLATE PER SIDE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: ghayden	3/21/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

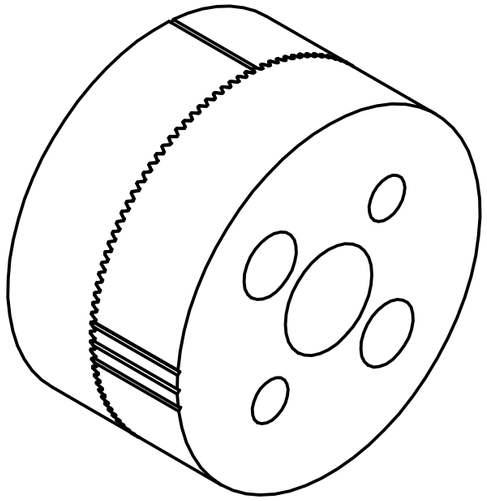
NECK INTERFACE PLATE, NECK POSTURE ADJUSTMENT

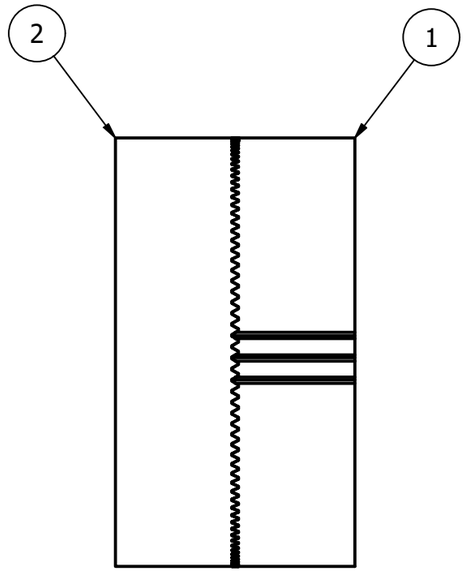
THIRD ANGLE PROJECTION

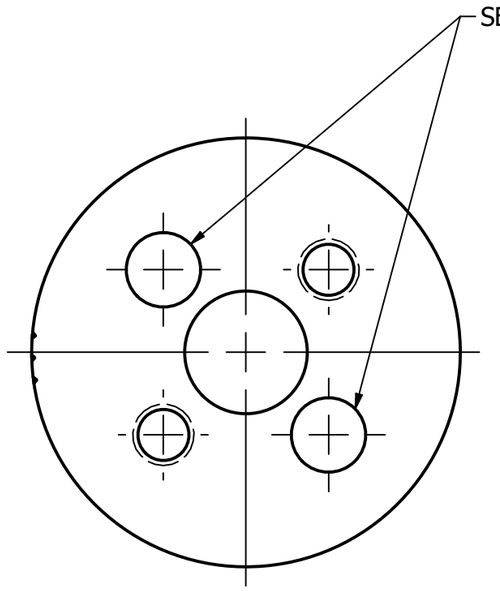
SIZE: A2 | DRAWING NUMBER: 474-3058 | REV: 1

SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JPM		11/29/16







NOTES:

1. ALIGN DOWEL HOLES ON BOTH PARTS FOR ALIGNMENT CHECK.
2. TEETH MUST BE FULLY ENGAGED WITHOUT MECHANICAL PLAY.
3. ENSURE DOWEL HOLES MEET SIZE REQUIREMENTS OF THE INDIVIDUAL PART DRAWINGS 474-3054 AND 474-3055.

ITEM	QTY	PART NUMBER	DESCRIPTION
2	1	474-3055	TOP NECK POSTURE GEAR
1	1	474-3054	BOTTOM NECK POSTURE GEAR

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

NECK POSTURE GEAR ASSEMBLY

APPROVALS	DATE
DRAWN J. MCINNIS	11/29/2016
CHECKED	
ENG	
APPROVED	

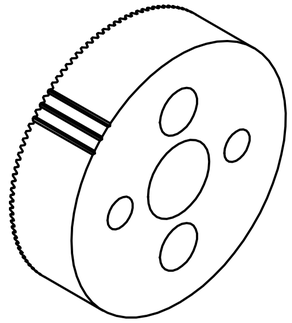
MATERIAL
HEAT TREAT
FINISH

THIRD ANGLE PROJECTION

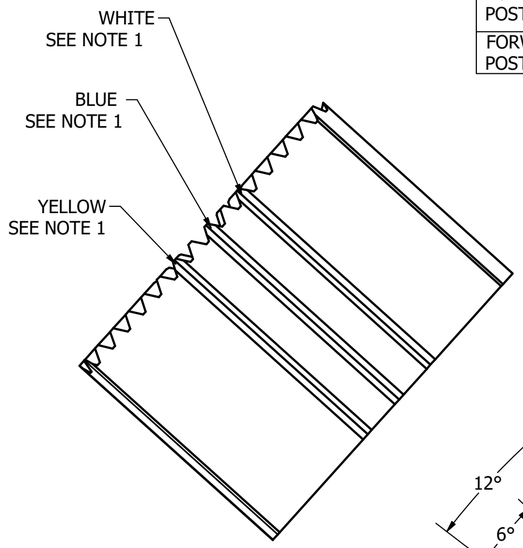
SIZE A3 | DRAWING NUMBER 474-3059 | REV 1

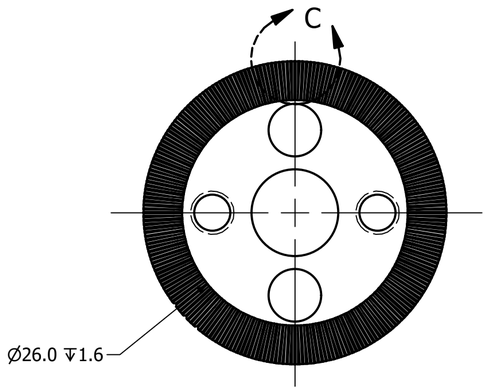
SCALE: 2:1 | SHEET 1 OF 1

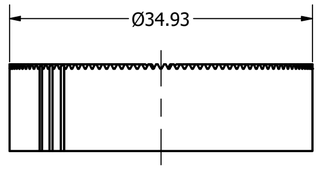
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	3/23/2016

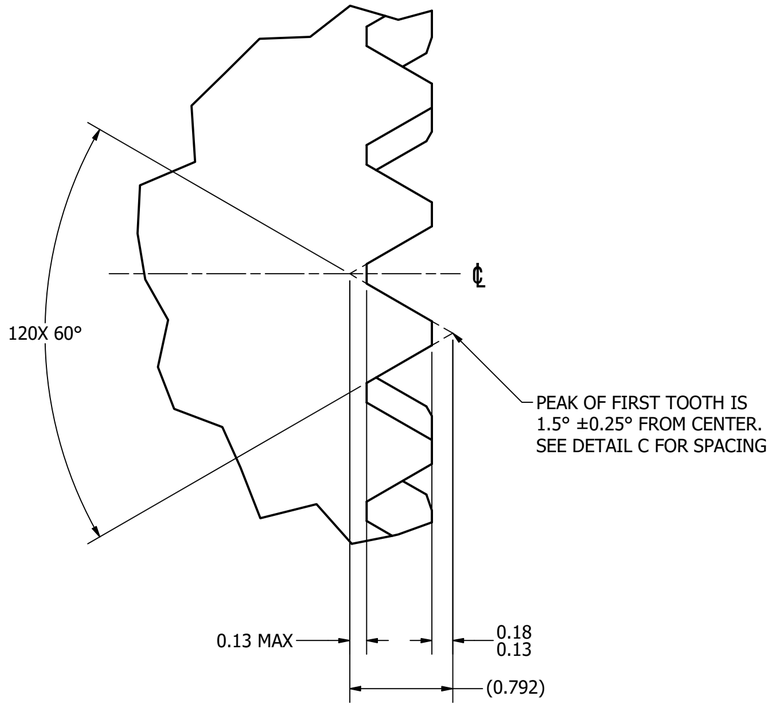


POSTURE CHART		
POSTURE	COLOR	ANGLE
NEUTRAL	WHITE	0°
FORWARD POSTURE 1	BLUE	6°
FORWARD POSTURE 2	YELLOW	12°

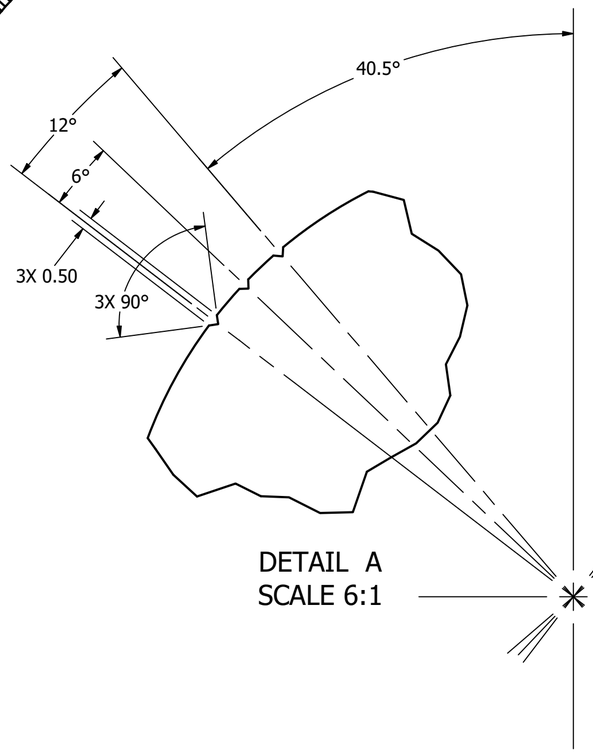




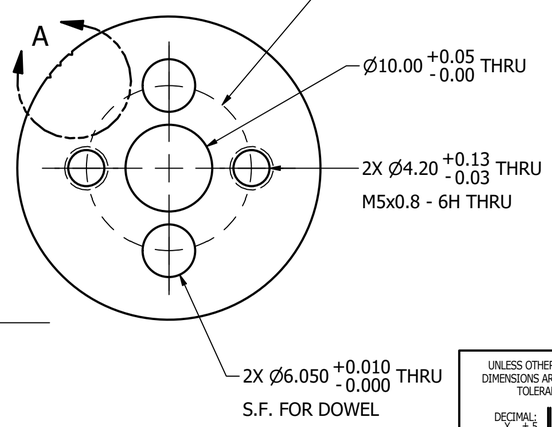


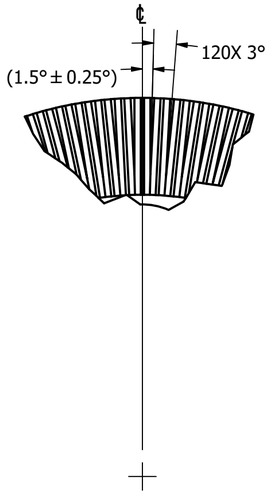


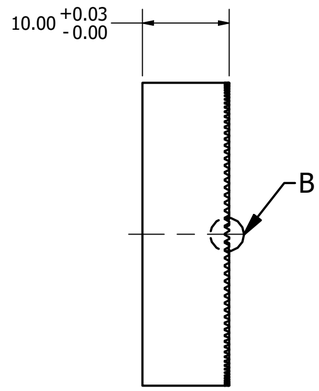
DETAIL B
SCALE 30:1



DETAIL A
SCALE 6:1







DETAIL C
SCALE 5 : 1

NOTES:

1. PAINT INDICATOR MARKS AS SHOWN.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED √ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 440C STAINLESS STEEL
HEAT TREAT: Rc 56-59
FINISH:

APPROVALS	DATE
DRAWN: ghayden	3/23/2016
CHECKED:	
ENG:	
APPROVED:	

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

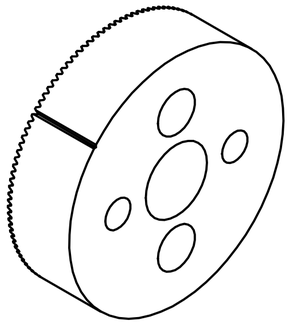
BOTTOM NECK POSTURE GEAR

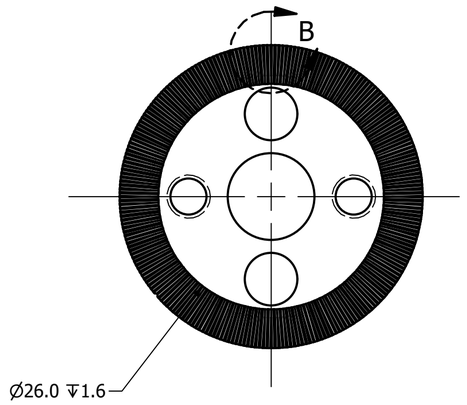
THIRD ANGLE PROJECTION

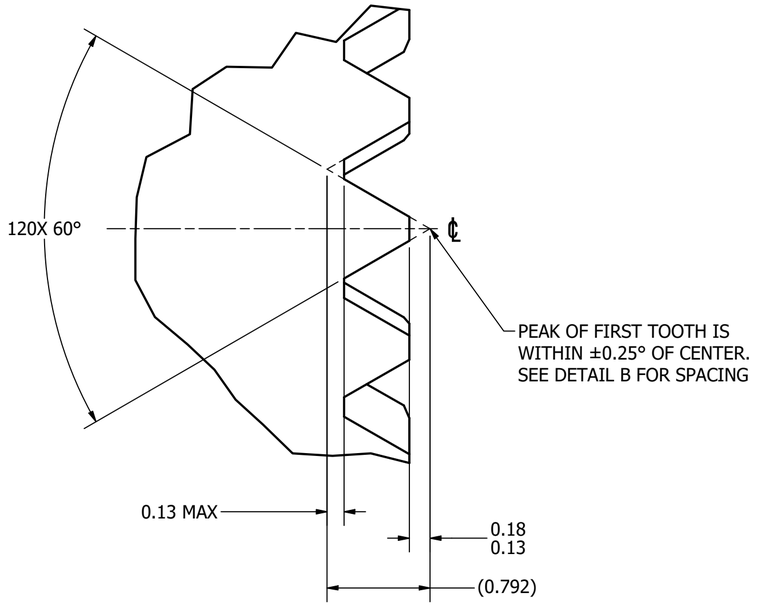
SIZE: A2 | DRAWING NUMBER: 474-3054 | REV: 1

SCALE: 2:1 | SHEET: 1 OF 1

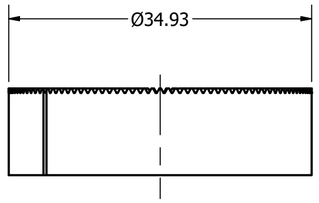
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ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	3/23/2016

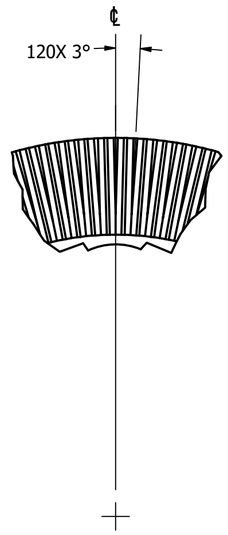




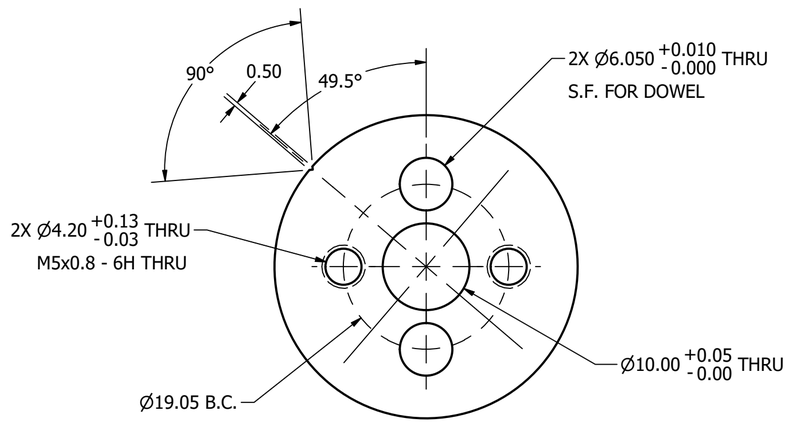


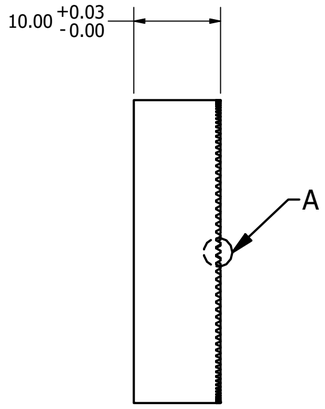
DETAIL A
SCALE 30:1





DETAIL B
SCALE 5:1





PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 440C STAINLESS STEEL
HEAT TREAT: Rc 56-59
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN ghayden	3/23/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

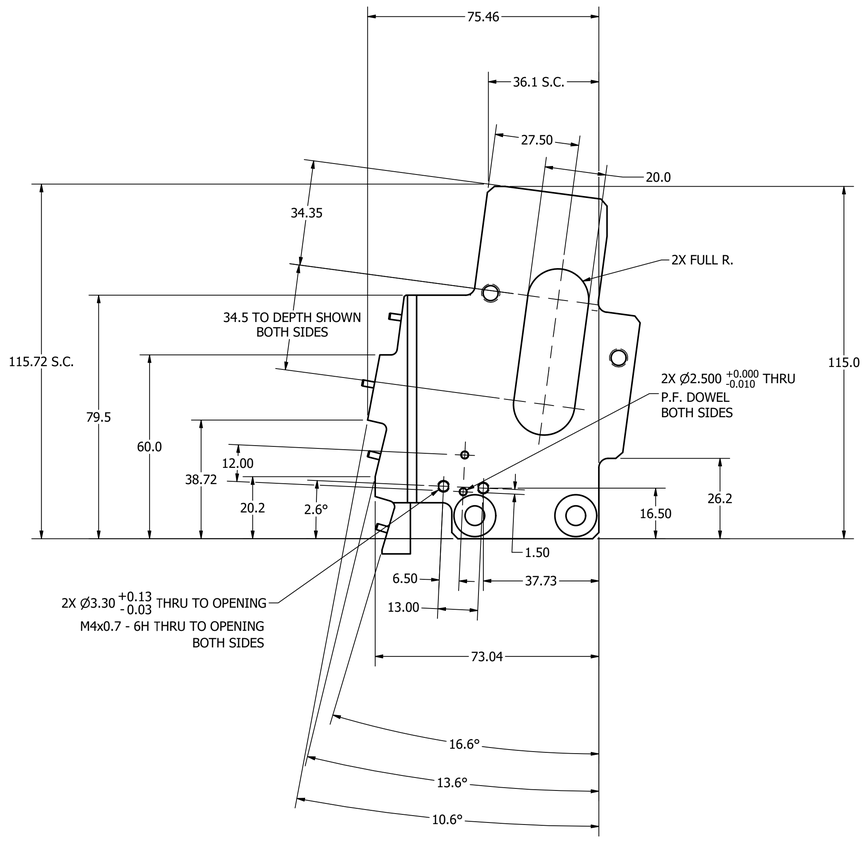
TOP NECK POSTURE GEAR

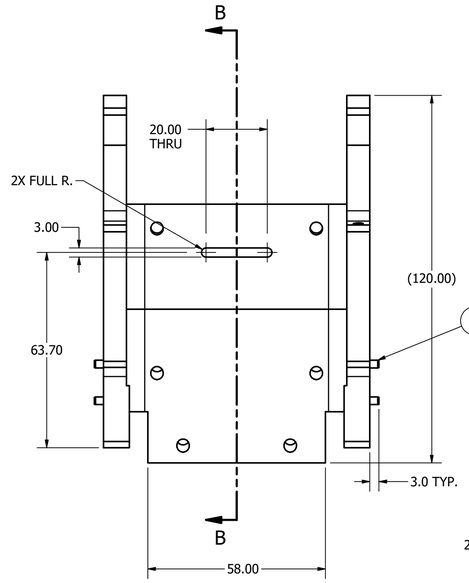
THIRD ANGLE PROJECTION

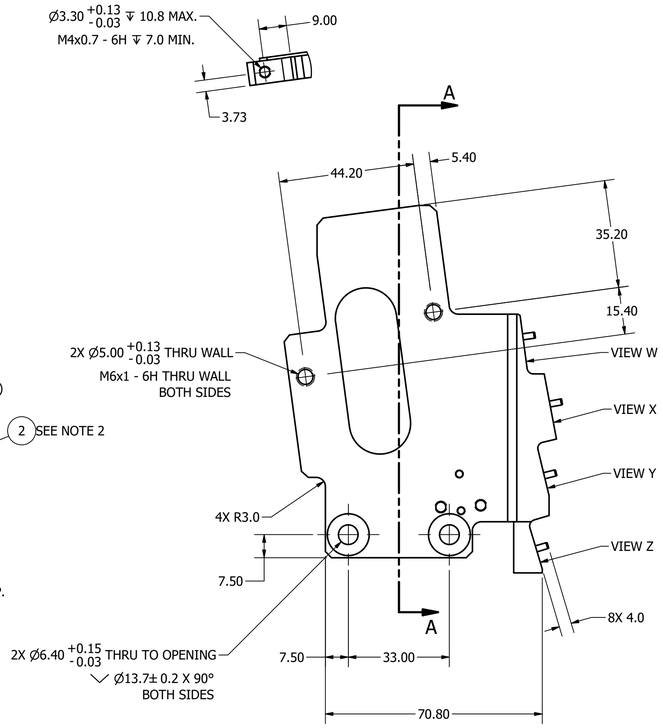
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A2	474-3055	1

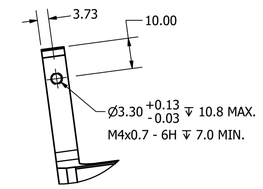
SCALE: 2:1 SHEET 1 OF 1

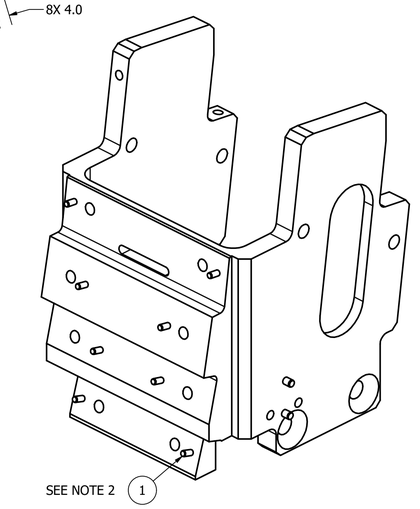
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	3/23/2016

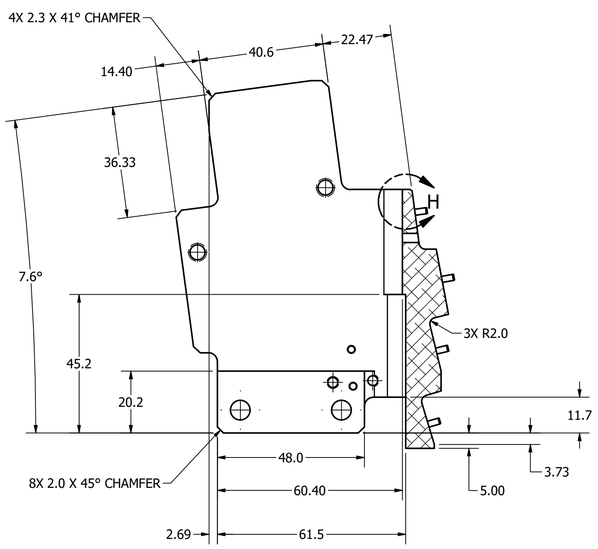




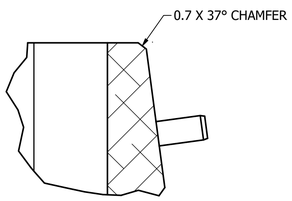




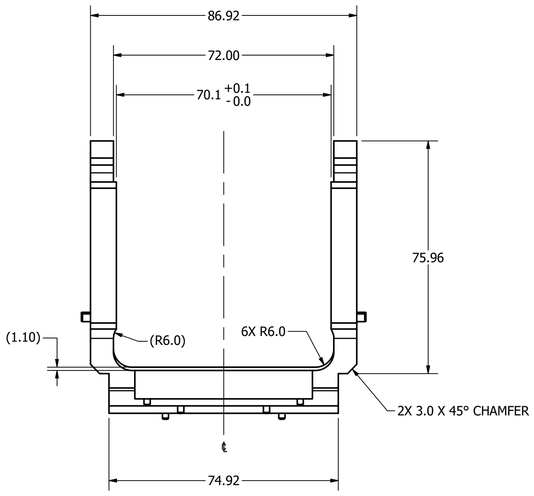


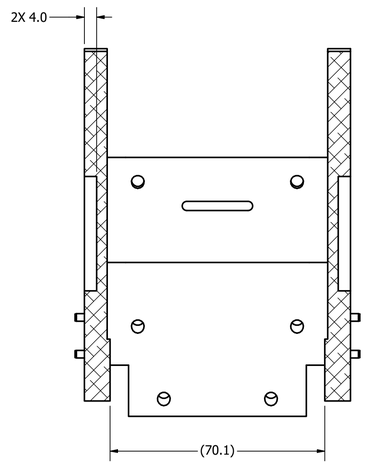


SECTION B-B



DETAIL H
SCALE 4 : 1





SECTION A-A

ITEM	QTY	PART NUMBER	DESCRIPTION
2	4	5000869	M2.5 X 8 LG. DOWEL PIN
1	8	5000064	M2 X 8 LG. DOWEL PIN

PARTS LIST

NOTES:

1. DIMENSIONS ARE SYMMETRICAL ABOUT ℄, UNLESS OTHERWISE NOTED.
2. INSTALL DOWEL PINS AFTER ANODIZE.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±1.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

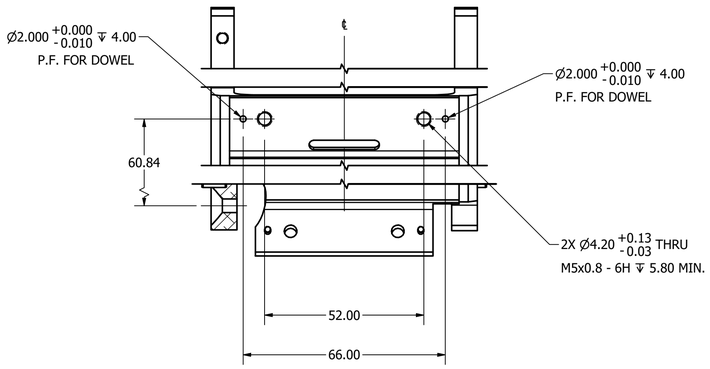
UPPER SPINE BOX

APPROVALS	DATE
DRAWN ghayden	3/23/2016
CHECKED	
ENG	
APPROVED	

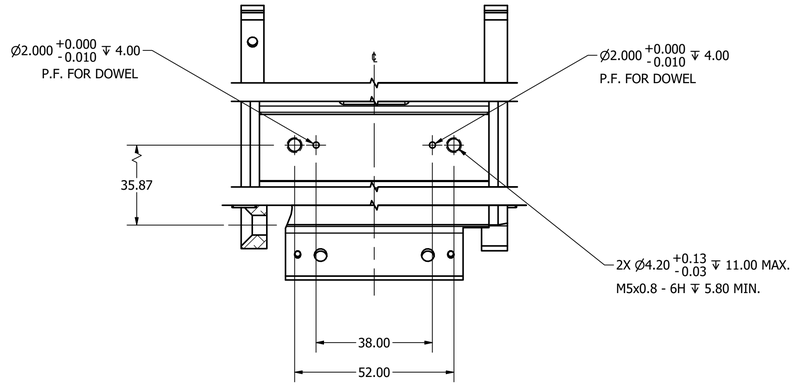
MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

THIRD ANGLE PROJECTION

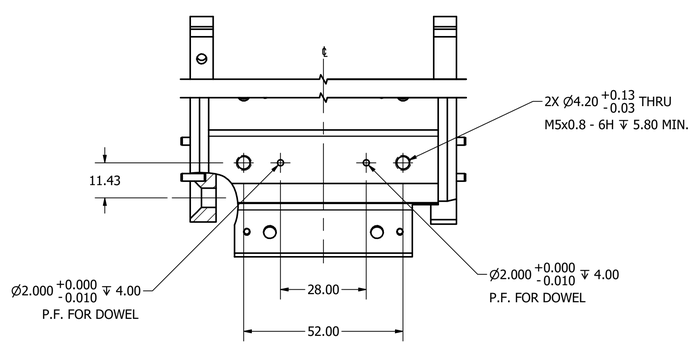
SIZE: A1 | DRAWING NUMBER: 474-3100 | REV: 1
SCALE: 1:1 | SHEET: 1 OF 2



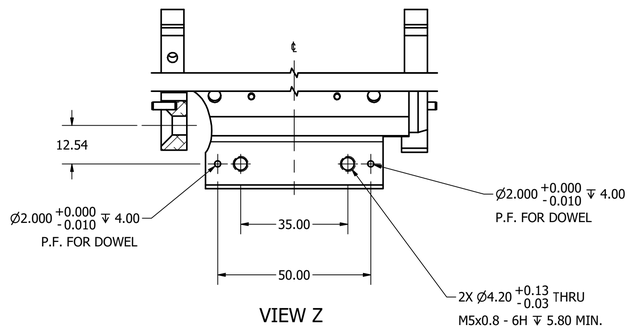
VIEW W



VIEW X



VIEW Y



VIEW Z

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN ghayden	3/23/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

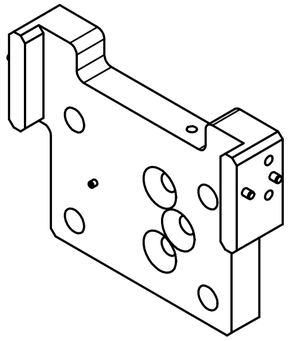
UPPER SPINE BOX

THIRD ANGLE PROJECTION

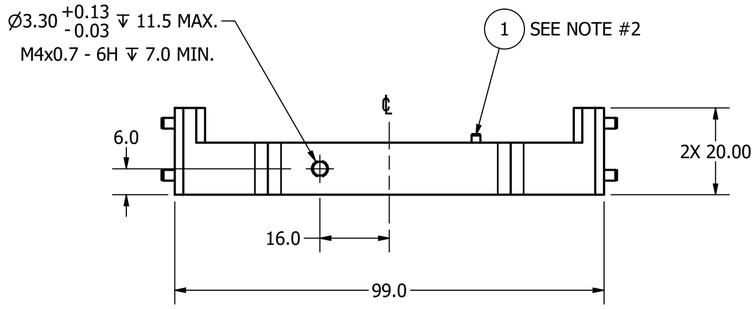
SIZE A1 | DRAWING NUMBER 474-3100 | REV 1

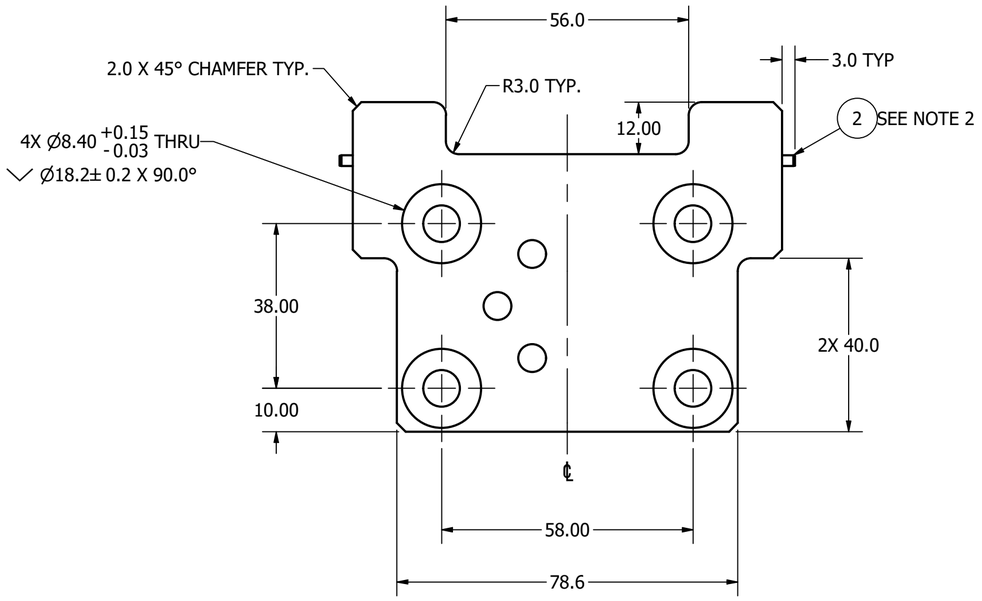
SCALE: 1:1 | SHEET 2 OF 2

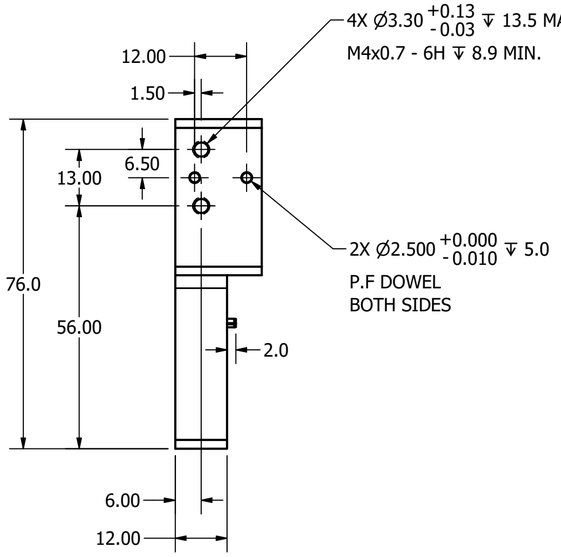
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH	JW	3/15/2016

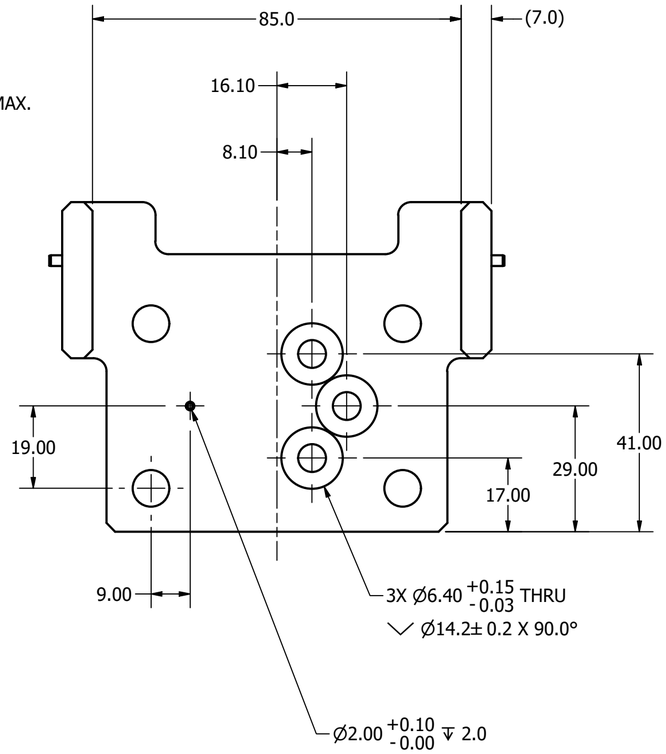


SCALE .75 : 1









ITEM	QTY	PART NUMBER	DESCRIPTION
2	4	5000869	M2.5 X 8 LG. DOWEL PIN
1	1	5000765	M2 X 4 LG. ROLL PIN

PARTS LIST

NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE SPECIFIED.

2. INSTALL PINS AS SHOWN AFTER FINISH.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 1018 STEEL
HEAT TREAT:
FINISH: 0.008 ELECTROLESS NICKEL PLATE PER SIDE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: jhaefner	3/15/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

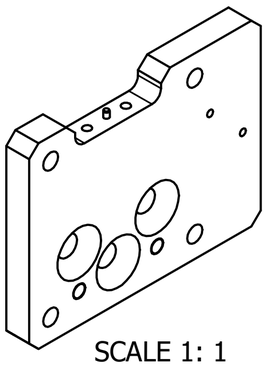
BASE PLATE, LUMBAR POSTURE ADJUSTMENT

THIRD ANGLE PROJECTION

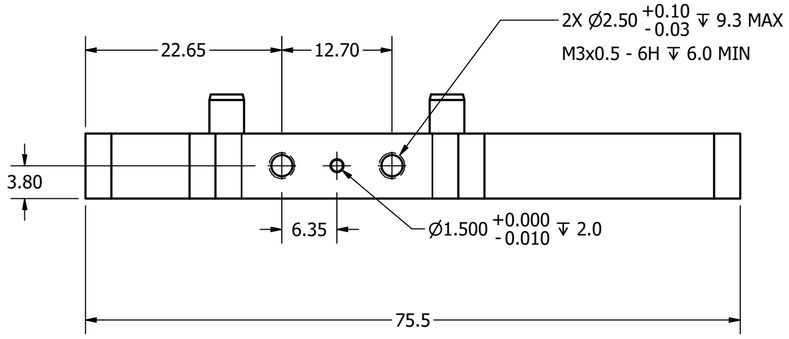
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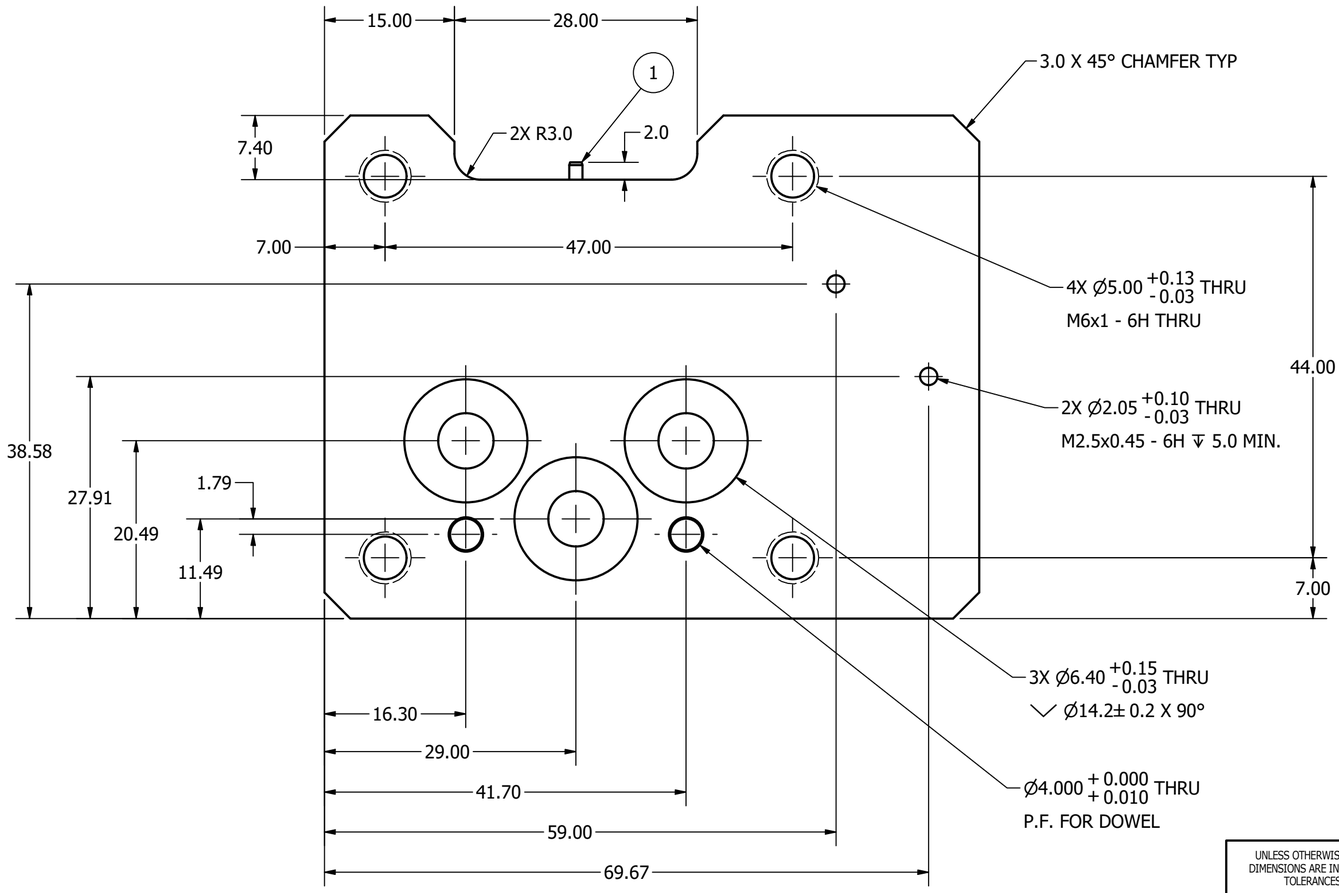
SCALE: 1:1 | SHEET: 1 OF 1

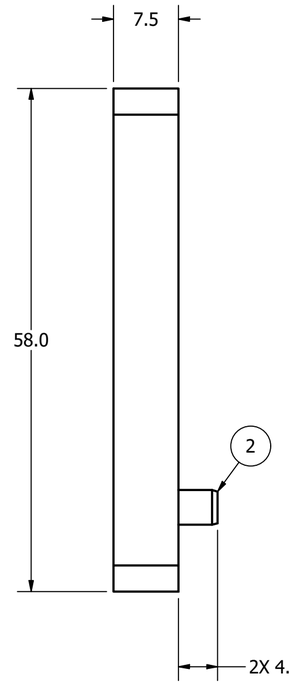
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH	JW	3/16/2016



SCALE 1: 1







ITEM	QTY	PART NUMBER	DESCRIPTION
2	2	5000403	M4 X 12 LG. DOWEL PIN
1	1	5000713	M1.5 X 4 LG. DOWEL PIN

PARTS LIST

NOTES:

1. INSTALL DOWELS AFTER PLATING.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 1018 STEEL
HEAT TREAT:
FINISH: 0.008mm ELECTROLESS NICKEL PLATE PER SIDE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: jhaefner	3/16/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

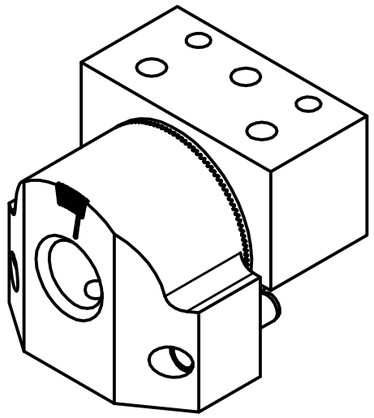
SPINEBOX INTERFACE PLATE, LUMBAR POSTURE ADJUSTMENT

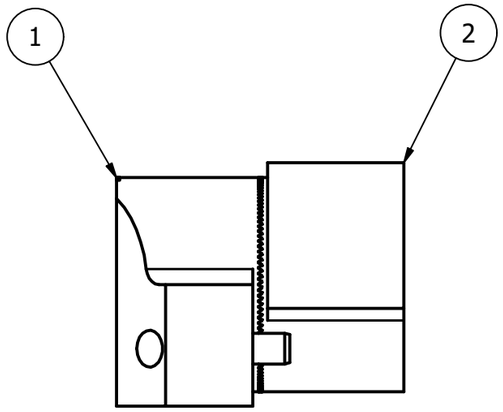
THIRD ANGLE PROJECTION

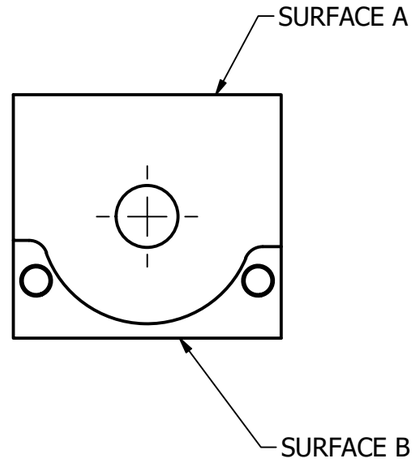
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SCALE: 2:1 | SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JPM		12/2/16







ITEM	QTY	PART NUMBER	DESCRIPTION
2	1	474-3065	TOP LUMBAR POSTURE GEAR
1	1	474-3063	BOTTOM LUMBAR POSTURE GEAR

PARTS LIST

NOTES:

1. TEETH MUST BE FULLY ENGAGED WITHOUT MECHANICAL PLAY.
2. SURFACE B IS TO BE WITHIN ±0.5° OF SURFACE A.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED 125 | ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

LUMBAR POSTURE GEAR ASSEMBLY

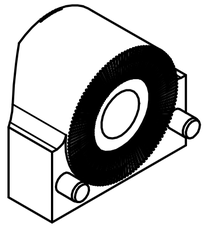
APPROVALS	DATE
DRAWN J. MCINNIS	12/2/2016
MATERIAL	CHECKED	
HEAT TREAT	ENG	
FINISH	APPROVED	

THIRD ANGLE PROJECTION

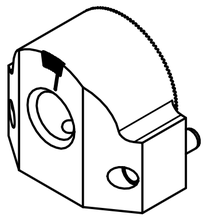
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SCALE: 1:1 | SHEET 1 OF 1

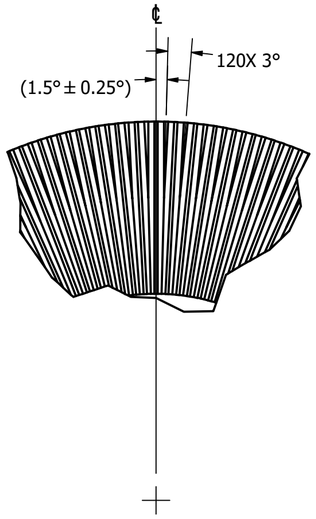
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH	JW	3/15/2016



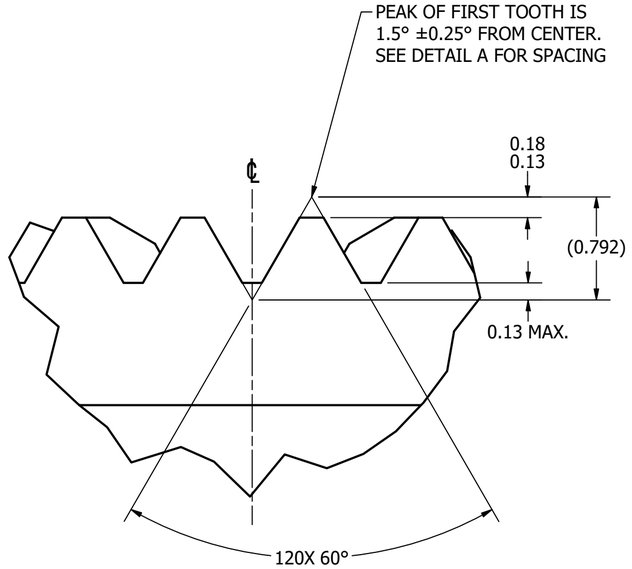
SCALE 1 : 1

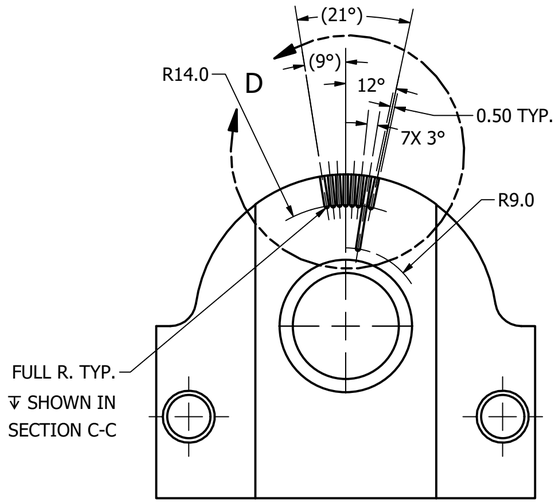


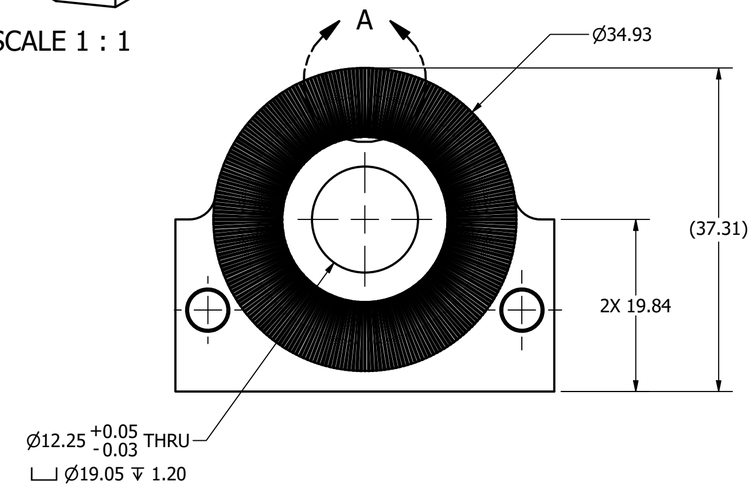
SCALE 1 : 1



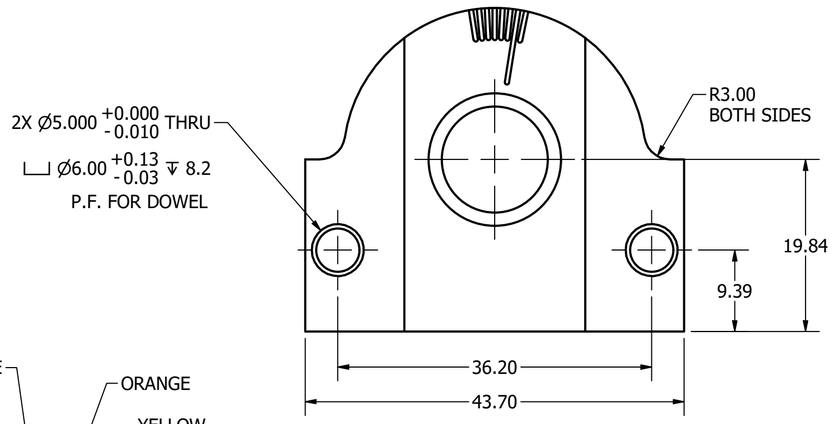
DETAIL A
SCALE 5:1

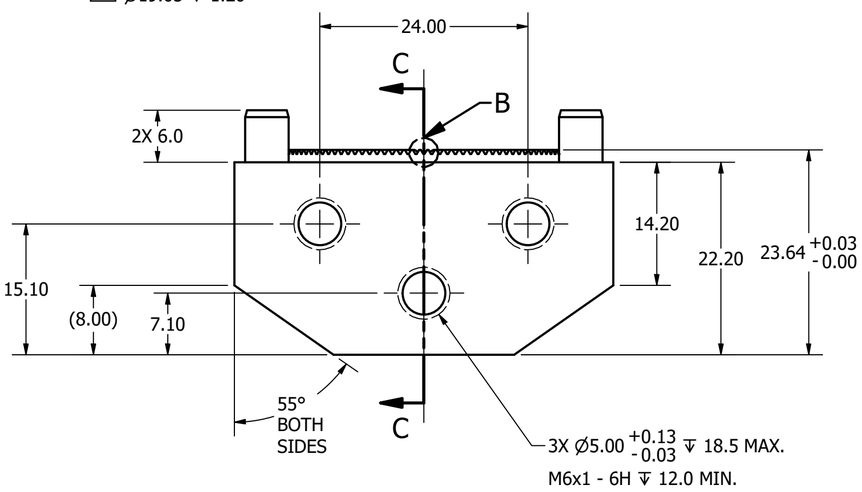


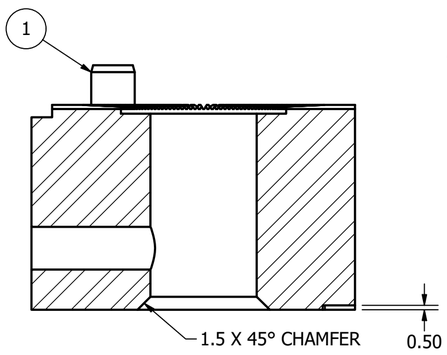




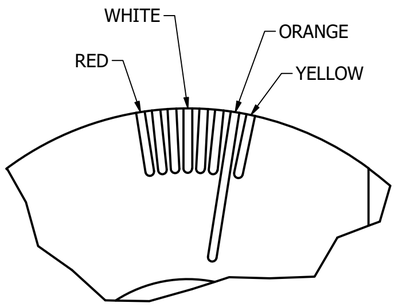
DETAIL B
SCALE 30:1







SECTION C-C



DETAIL D
SCALE 4 : 1

DOWEL PINS NOT SHOWN

POSTURE CHART		
POSTURE	COLOR	ANGLE
ERECT	RED	-9°
NEUTRAL	WHITE	0°
SLOUCHED (UMTRI AMVO POSTURE)	ORANGE	9°
SUPER SLOUCHED	YELLOW	12°

NOTES:

1. PAINT INDICATOR MARKS AS SHOWN IN DETAIL D.

ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	5001155	M5 X 20 LG. DOWEL PIN

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ∠ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 440C STAINLESS STEEL
HEAT TREAT: Rc 56-60
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN jhaefner	3/15/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

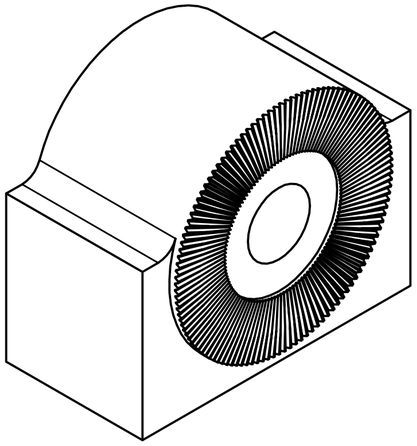
BOTTOM LUMBAR POSTURE GEAR

THIRD ANGLE PROJECTION

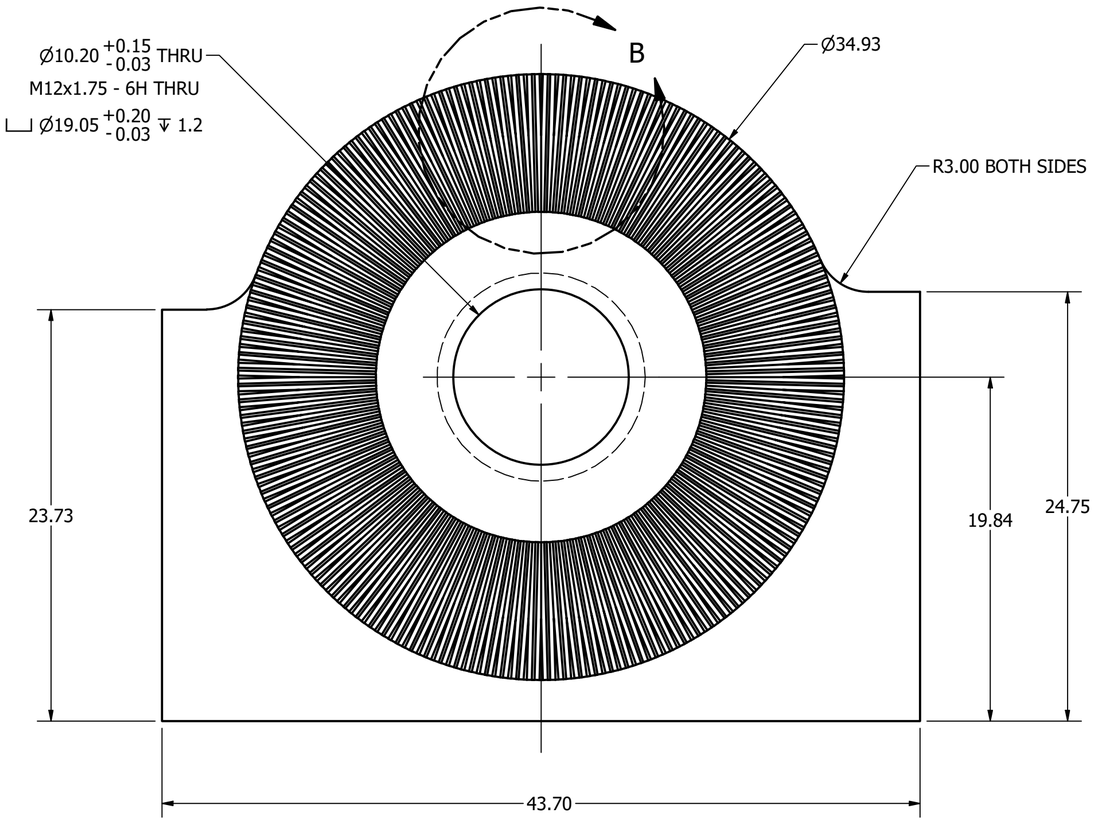
SIZE: A2 | DRAWING NUMBER: 474-3063 | REV: 1

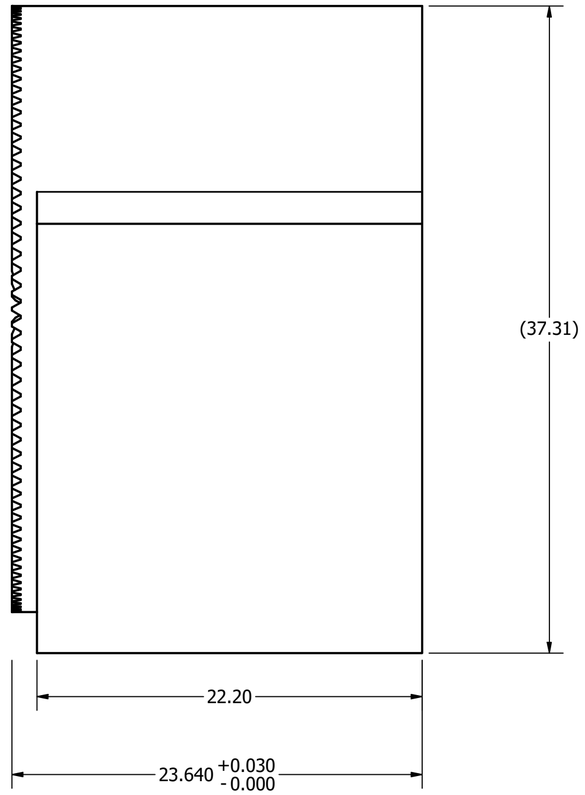
SCALE: 2:1 | SHEET: 1 OF 1

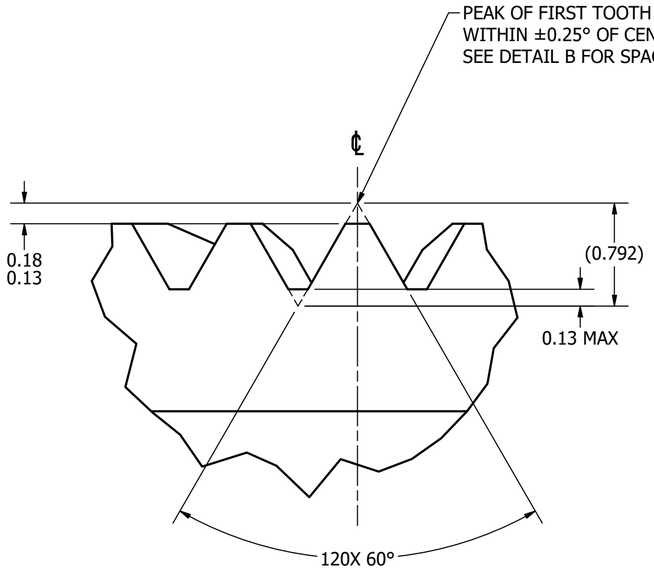
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH	JW	3/16/2016



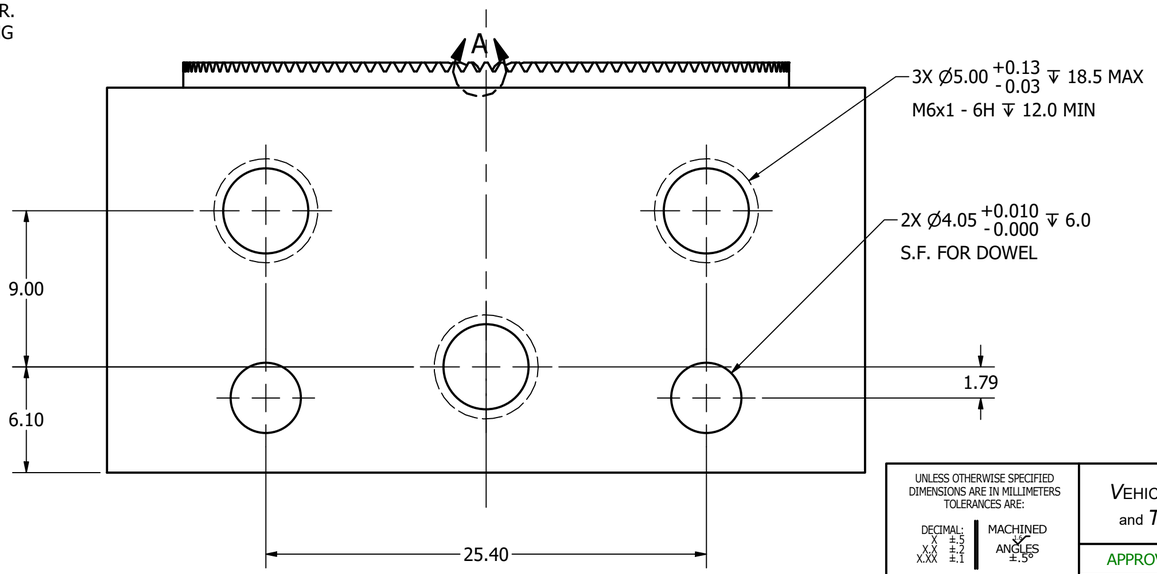
SCALE 2 : 1

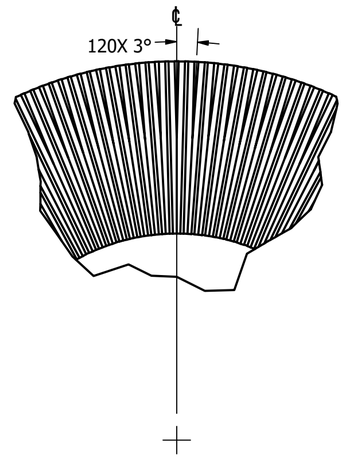






DETAIL A
SCALE 30: 1





DETAIL B
SCALE 5:1

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ∠ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 440C STAINLESS STEEL
HEAT TREAT: Rc 56-60
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN jhaefner	3/16/2016
CHECKED	
ENG	
APPROVED	

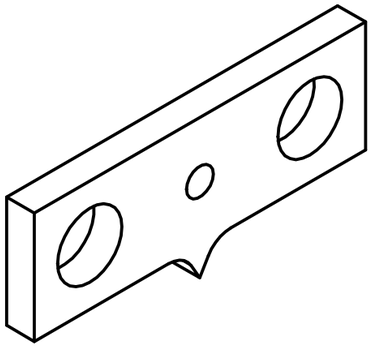
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

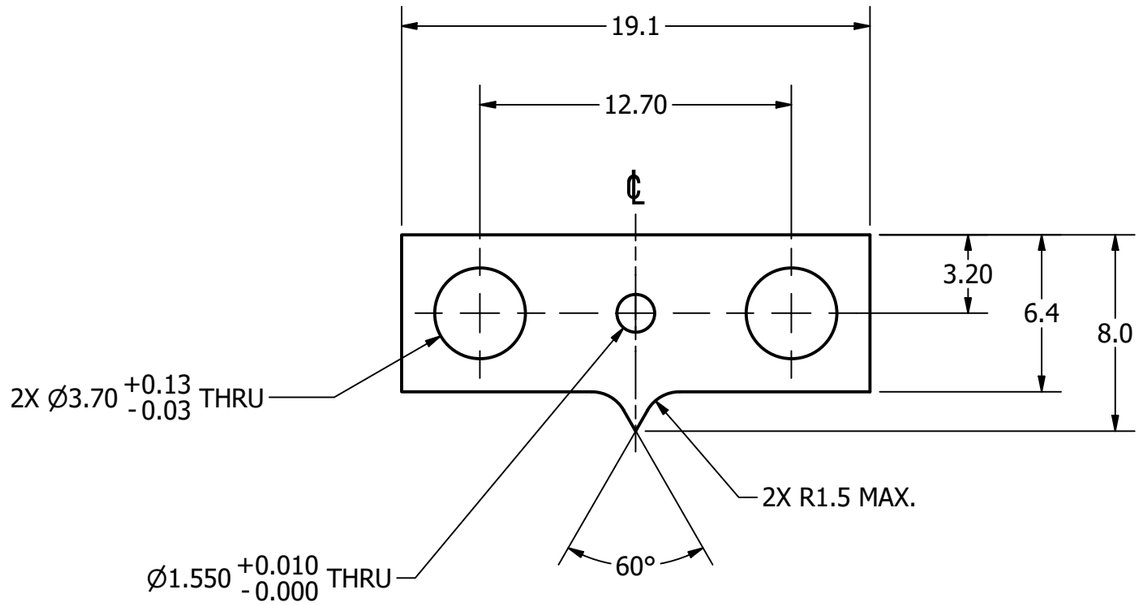
TOP LUMBAR POSTURE GEAR

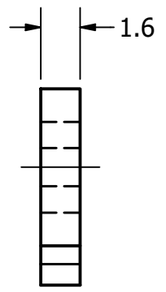
THIRD ANGLE PROJECTION

SIZE A2 | DRAWING NUMBER 474-3065 | REV 1
SCALE: 4:1 | SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JPM		12/6/16







NOTES:

1. UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE SYMMETRIC ABOUT ℄ .

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: Brass, Soft Yellow
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: J. MCINNIS	12/6/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

LUMBAR SPINE PITCH CHANGE INDICATOR

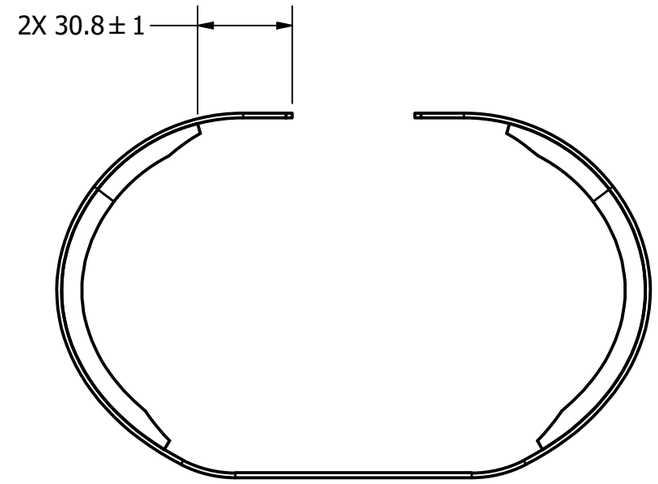
THIRD ANGLE PROJECTION

SIZE: A3 | DRAWING NUMBER: 474-3069 | REV: 1

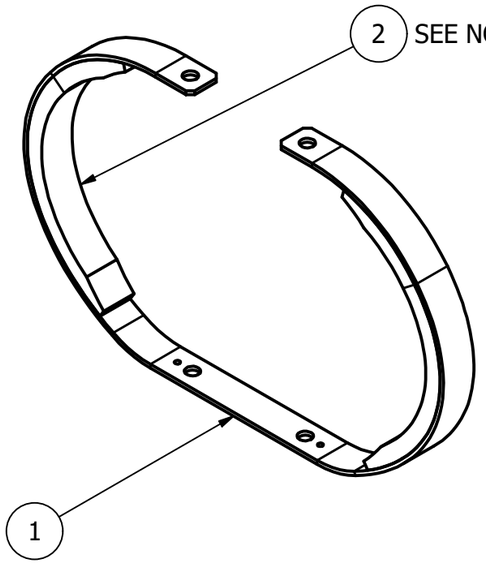
SCALE: 4:1 | SHEET: 1 OF 1

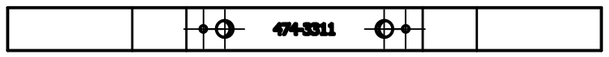
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH	JW	3/18/2016











ITEM	QTY	PART NUMBER	DESCRIPTION
2	2	474-3321	DAMPING, RIB 1
1	1	474-3311	RIB 1

PARTS LIST

NOTE:

1. BOND BOTH 474-3321 DAMPING RIB 1 TO 474-3311 RIB 1 AS SHOWN USING EPOXY ADHESIVE.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

	APPROVALS	DATE
DRAWN	jhaefner	3/18/2016
CHECKED		
ENG		
APPROVED		
MATERIAL		
HEAT TREAT		
FINISH		

VEHICLE RESEARCH and TEST CENTER

DEPARTMENT OF TRANSPORTATION UNITED STATES OF AMERICA

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

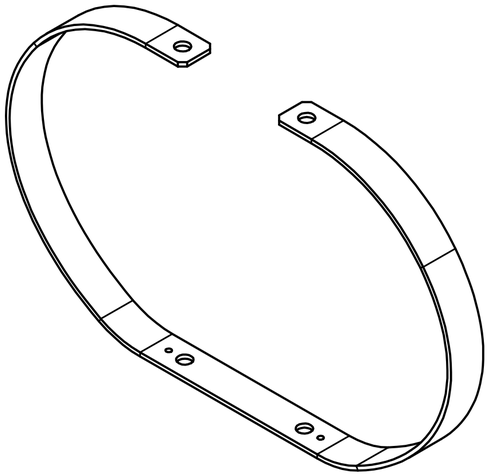
RIB 1 ASSEMBLY

THIRD ANGLE PROJECTION

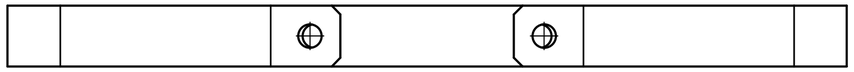
SIZE A3 | DRAWING NUMBER 474-3301 | REV 1

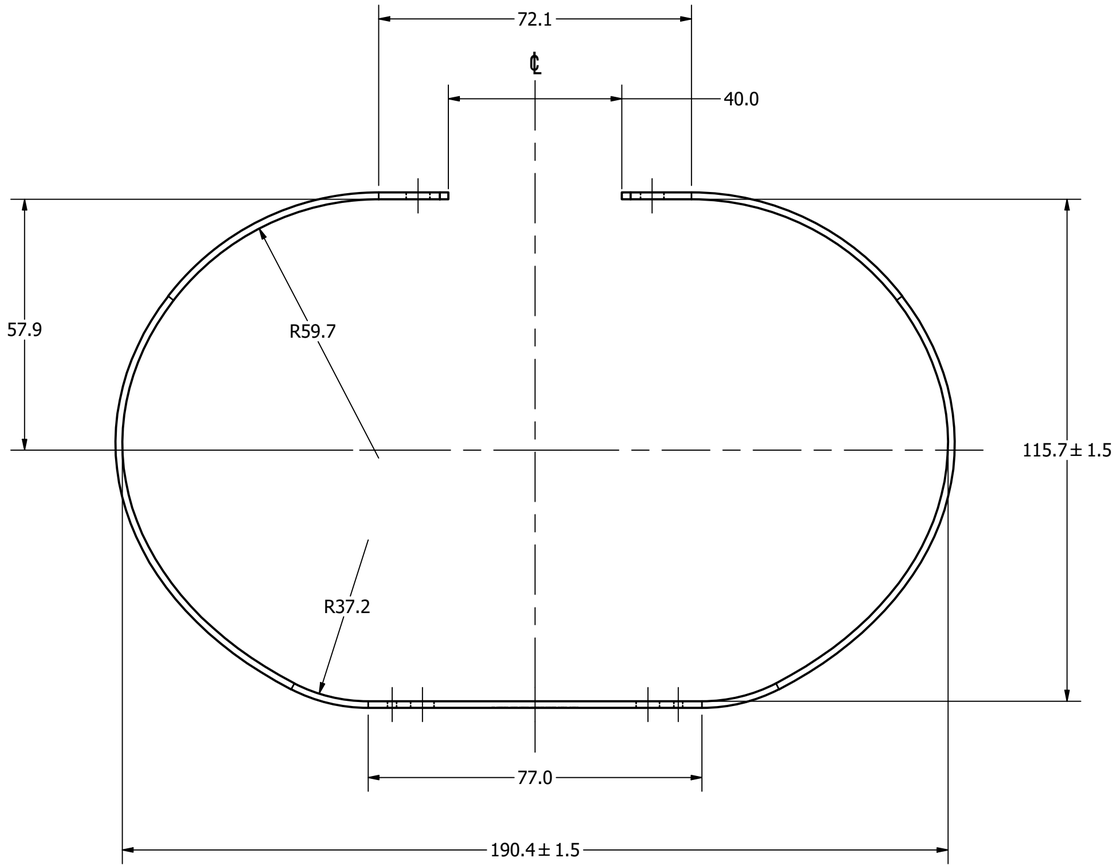
SCALE: .5:1 | SHEET 1 OF 1

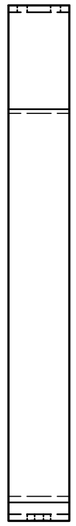
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH	JW	3/18/2016

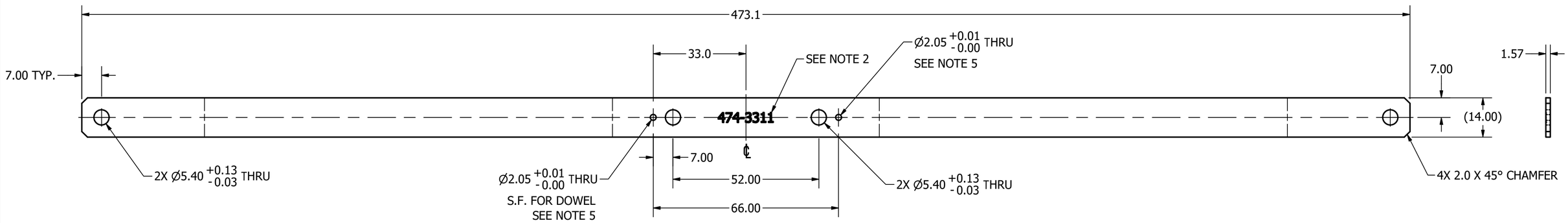


SCALE .75:1









FLATTENED STATE

NOTES:

1. MAKE RIB FROM 1095 ANNEALED SPRING STEEL, 14.0mm WIDE.
2. ENGRAVE DWG: 474-3311 AT LOCATION SPECIFIED.
3. UNLESS OTHERWISE SPECIFIED DIMS SYMMETRICAL ABOUT ℄.
4. FINISH: E-COAT 0.018mm MAX. (.0007in. MAX.).
5. E-COAT FINISH NOT REQUIRED INSIDE THIS HOLE.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ∠ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 1095 SPRING STEEL
HEAT TREAT: Rc 48-52
FINISH: SEE NOTES

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: jhaefner	3/17/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

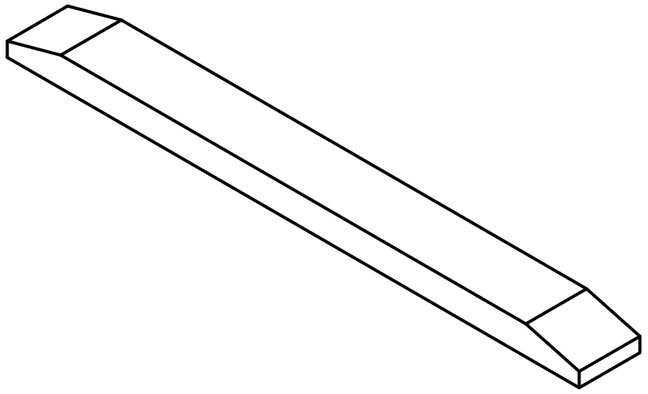
RIB 1

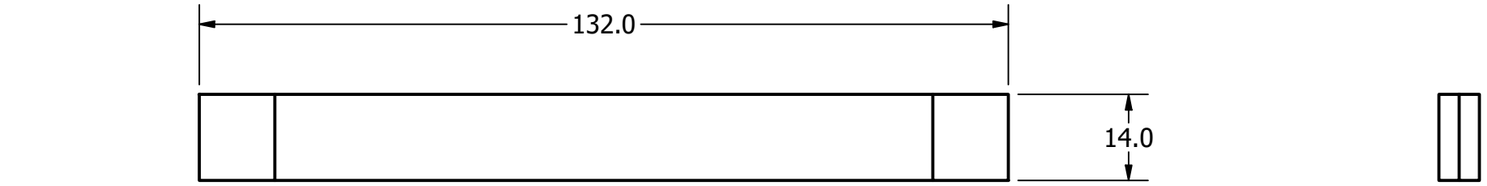
THIRD ANGLE PROJECTION

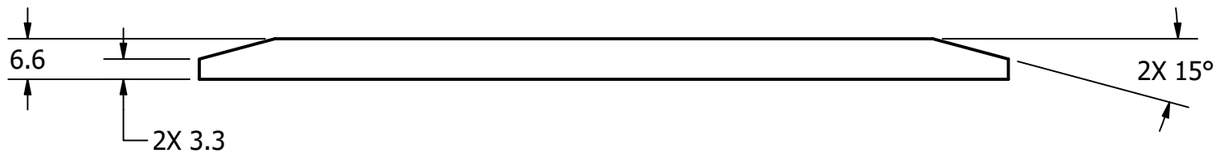
SIZE: A2 | DRAWING NUMBER: 474-3311 | REV: 1

SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH	JW	3/18/2016







PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

*V*EHICLE *R*ESEARCH and *T*EST *C*ENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

DAMPING, RIB 1

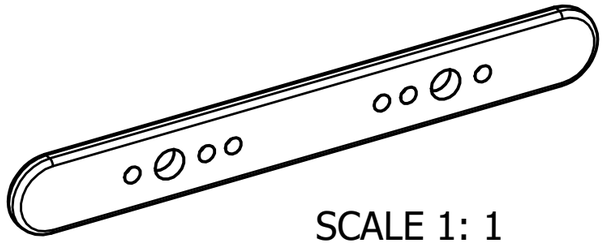
	APPROVALS	DATE
DRAWN	jhaefner	3/18/2016
CHECKED		
ENG		
APPROVED		

MATERIAL: ISODAMP CN-62
HEAT TREAT:
FINISH:

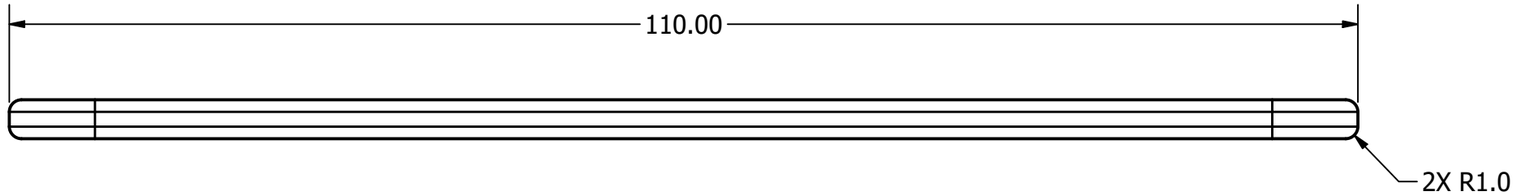
THIRD ANGLE PROJECTION

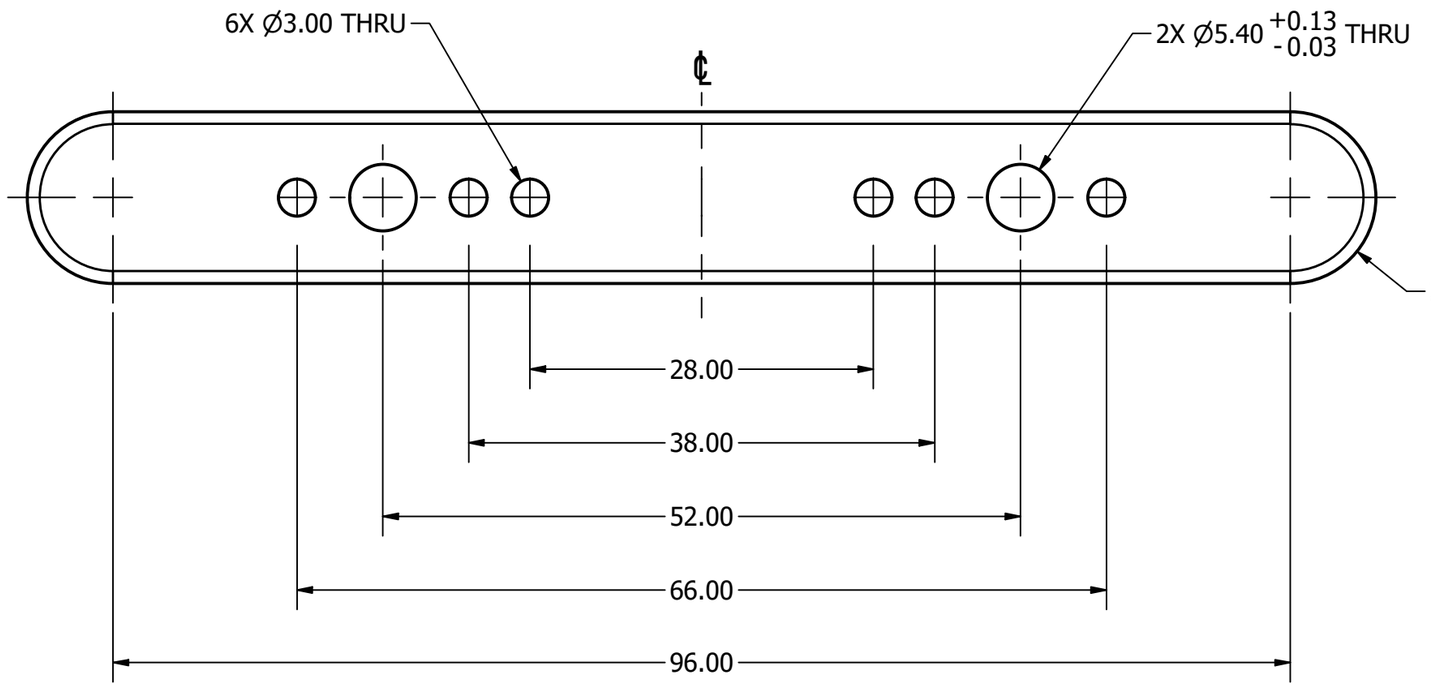
SIZE: A3 | DRAWING NUMBER: 474-3321 | REV: 1
SCALE: 1:1 | SHEET: 1 OF 1

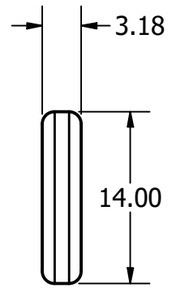
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH	JW	3/21/2016



SCALE 1: 1







NOTES:

1. DIMENSIONS ARE SYMMETRICAL ABOUT℄ UNLESS OTHERWISE NOTED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ±
ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 1075 Spring Steel
HEAT TREAT: Rc 48-52
FINISH: E-COAT

*V*EHICLE *R*ESEARCH and *T*EST *C*ENTER

APPROVALS	DATE
DRAWN: jhaefner	3/21/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

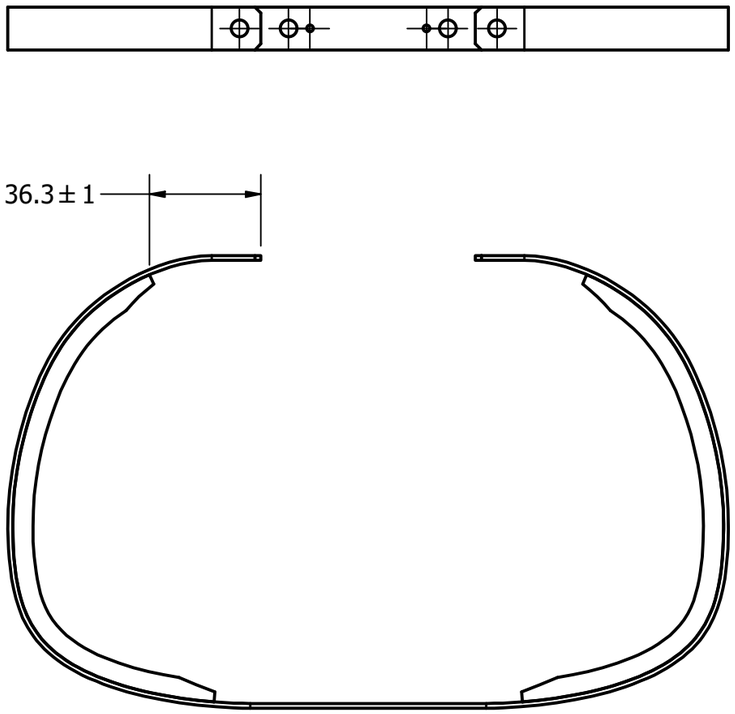
STIFFENER, RIBS 1, 2, 3

THIRD ANGLE PROJECTION

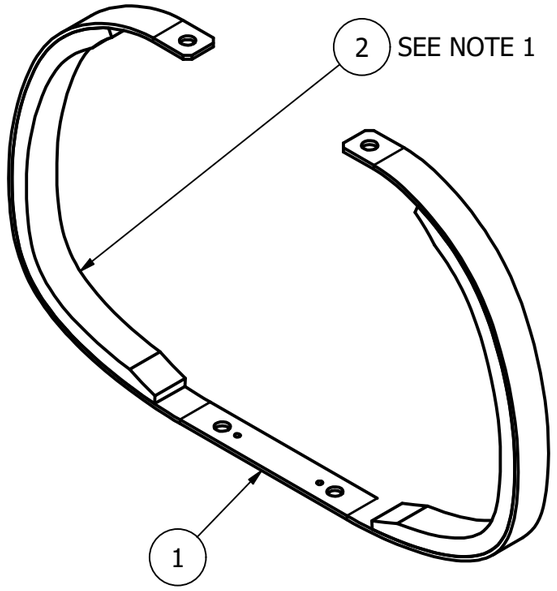
SIZE	DRAWING NUMBER	REV
A3	474-3331	1

SCALE: 2:1 SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH	JW	3/18/2016







ITEM	QTY	PART NUMBER	DESCRIPTION
2	2	474-3322	DAMPING, RIB 2
1	1	474-3312	RIB 2

PARTS LIST

PRELIMINARY DRAWING

NOTES:

1. BOND BOTH 474-3322 DAMPING RIB 2 TO 474-3312 RIB 2 AS SHOWN USING EPOXY ADHESIVE.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN jhaefner	3/18/2016
CHECKED	
ENG	
APPROVED	

MATERIAL
HEAT TREAT
FINISH

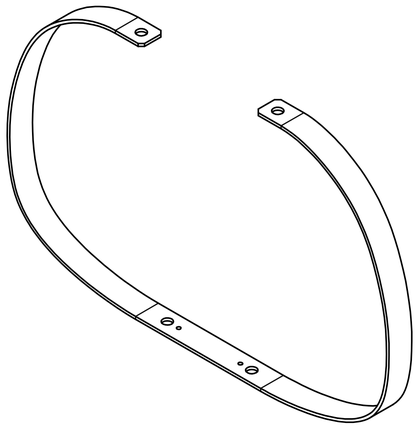
RIB 2 ASSEMBLY

THIRD ANGLE PROJECTION

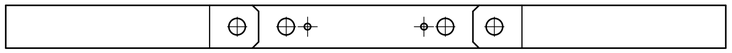
SIZE A3 | DRAWING NUMBER 474-3302 | REV 1

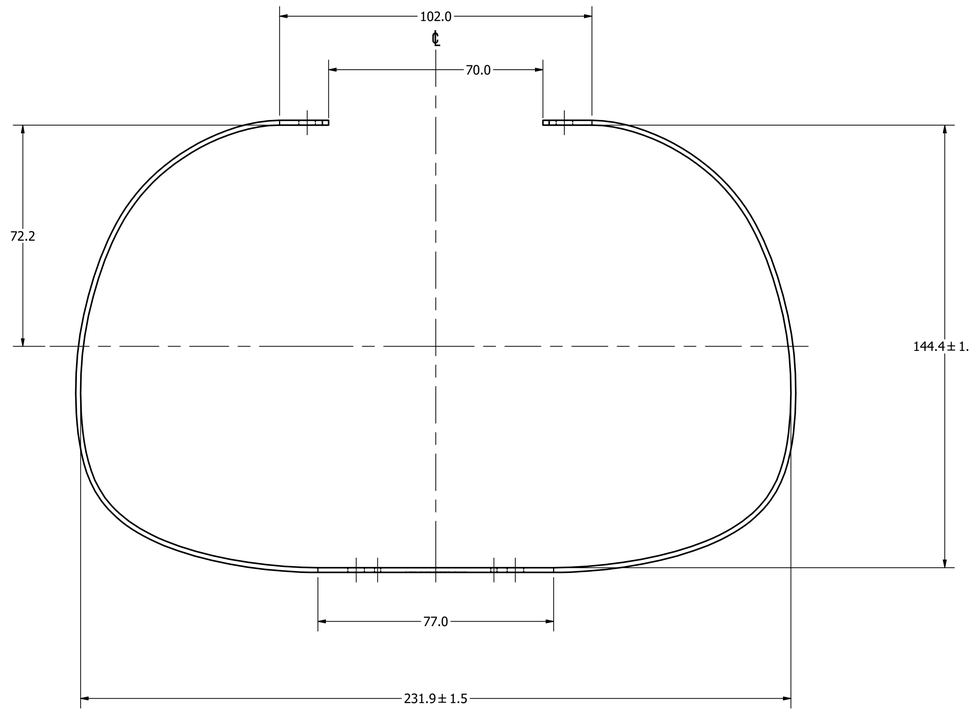
SCALE: .5:1 | SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH	JW	3/18/2016

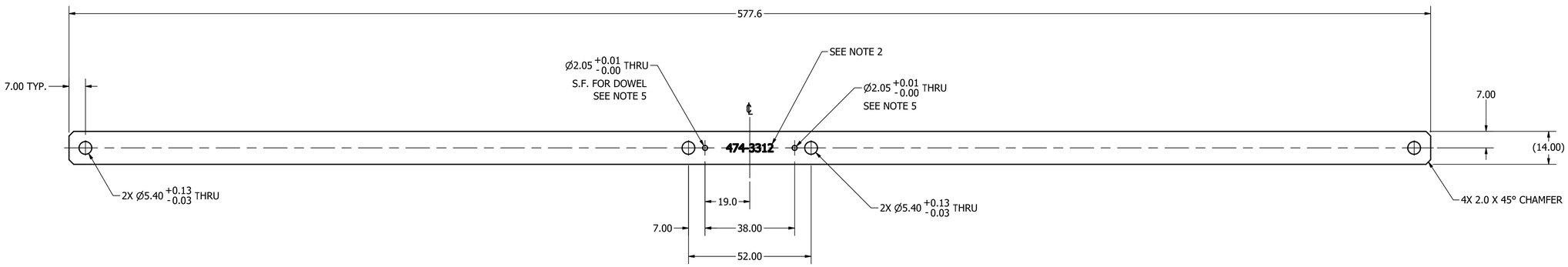


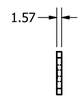
SCALE .75:1











FLATTENED STATE

NOTES:

1. MAKE RIB FROM 1095 ANNEALED SPRING STEEL, 14.0mm WIDE.
2. ENGRAVE DWG: 474-3312 AT LOCATION SPECIFIED.
3. UNLESS OTHERWISE SPECIFIED DIMS SYMMETRICAL ABOUT ℄.
4. FINISH: E-COAT 0.018mm MAX. (.0007in. MAX.).
5. E-COAT FINISH NOT REQUIRED INSIDE THIS HOLE.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ∠ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 1095 SPRING STEEL
HEAT TREAT: Rc 48-52
FINISH: SEE NOTES

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: jhaefner	3/18/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

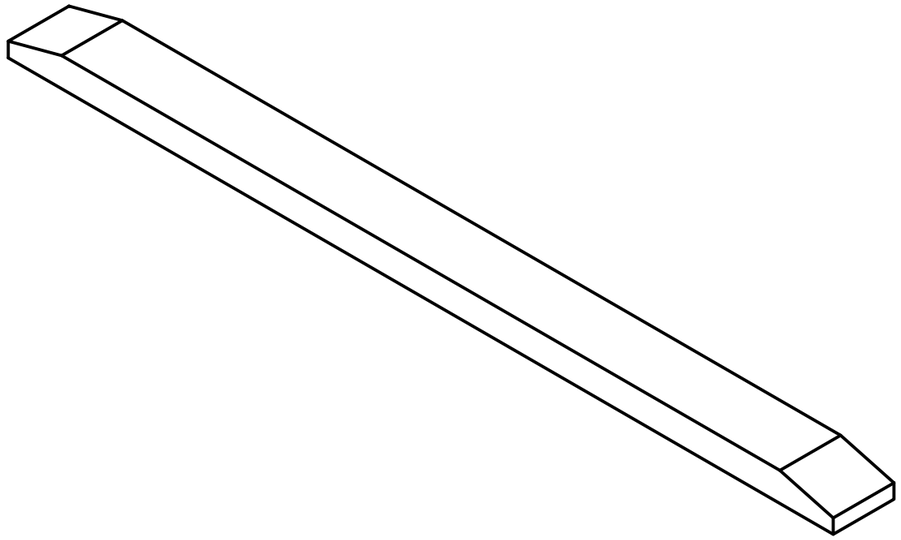
RIB 2

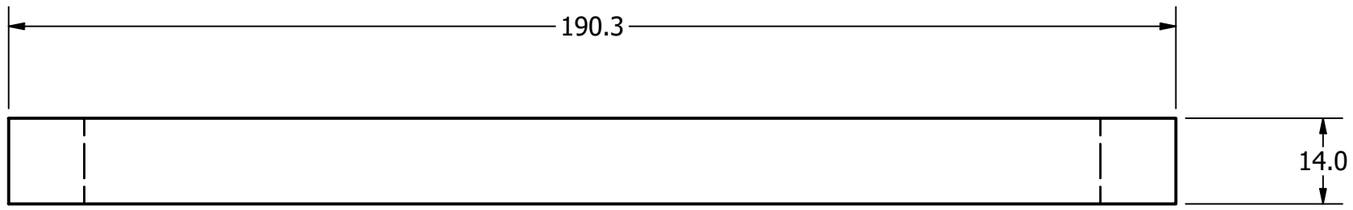
THIRD ANGLE PROJECTION

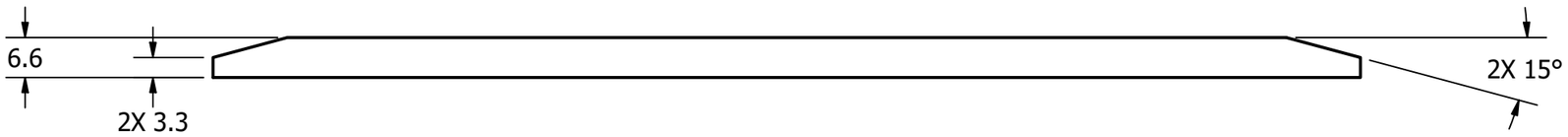
SIZE: A1 | DRAWING NUMBER: 474-3312 | REV: 1

SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH	JW	3/18/2016







PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ±.5°
ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: ISODAMP CN-62
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: jhaefner	3/18/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

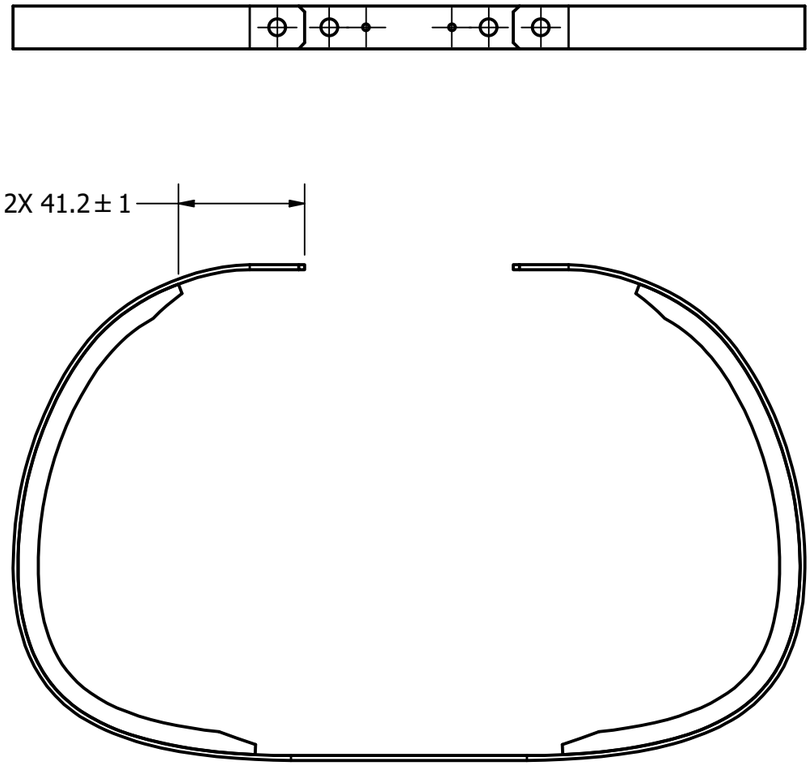
DAMPING, RIB 2

THIRD ANGLE PROJECTION

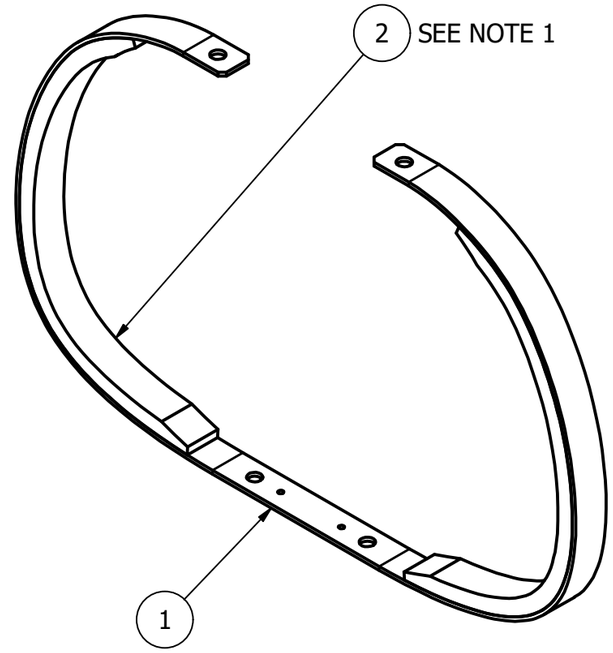
SIZE: A3 | DRAWING NUMBER: 474-3322 | REV: 1

SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH	JW	3/18/2016







ITEM	QTY	PART NUMBER	DESCRIPTION
2	2	474-3323	DAMPING, RIB 3
1	1	474-3313	RIB 3

PARTS LIST

PRELIMINARY DRAWING

NOTES:

1. BOND BOTH 474-3323 DAMPING RIB 3 TO 474-3313 RIB 3 AS SHOWN USING EPOXY ADHESIVE.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN jhaefner	3/18/2016
CHECKED	
ENG	
APPROVED	

MATERIAL
HEAT TREAT
FINISH

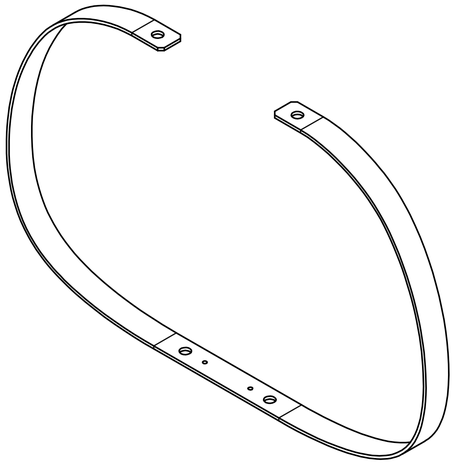
RIB 3 ASSEMBLY

THIRD ANGLE PROJECTION

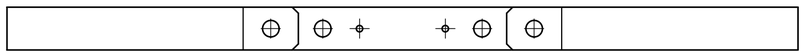
SIZE A3 | DRAWING NUMBER 474-3303 | REV 1

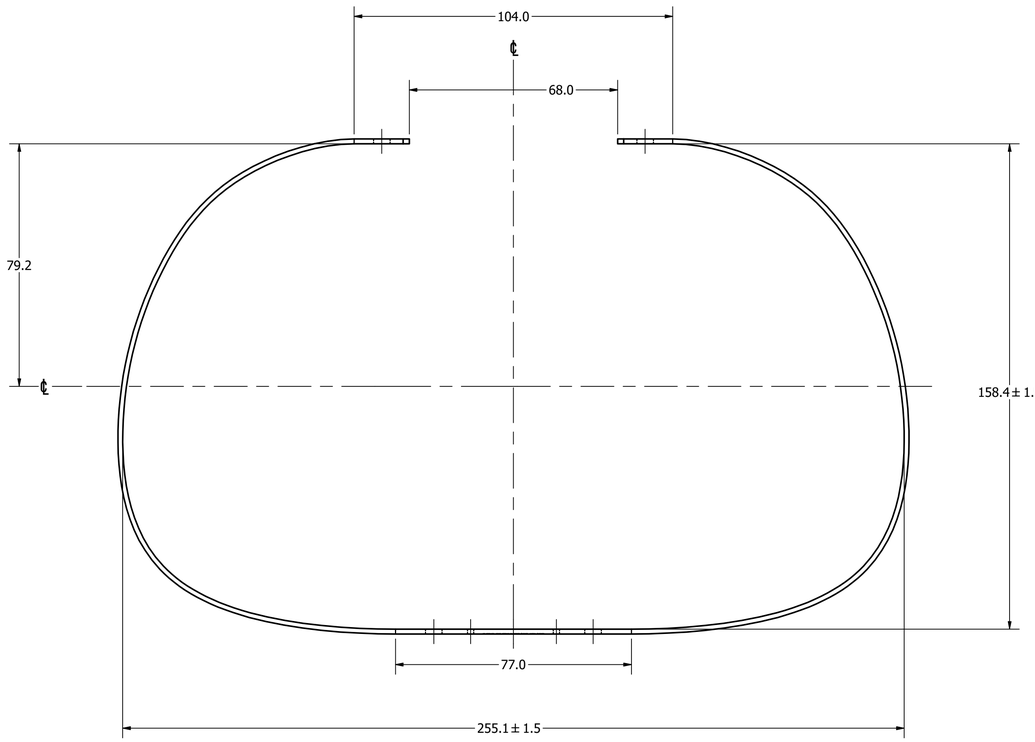
SCALE: .5:1 | SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH	JW	3/18/2016

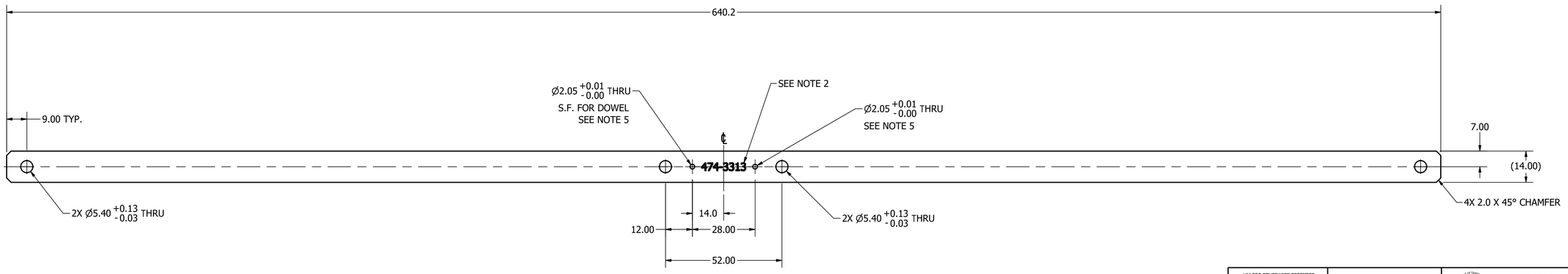


SCALE .75:1









FLATTENED STATE

NOTES:

1. MAKE RIB FROM 1095 ANNEALED SPRING STEEL, 14.0mm WIDE.
2. ENGRAVE DWG: 474-3313 AT LOCATION SPECIFIED.
3. UNLESS OTHERWISE SPECIFIED DIMS SYMMETRICAL ABOUT ℄.
4. FINISH: E-COAT 0.018mm MAX. (.0007in. MAX.).
5. E-COAT FINISH NOT REQUIRED INSIDE THIS HOLE.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.2, X.X ±.1, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL	1095 SPRING STEEL
HEAT TREAT	Rc 48-52
FINISH	SEE NOTES

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: jhaefner	3/18/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

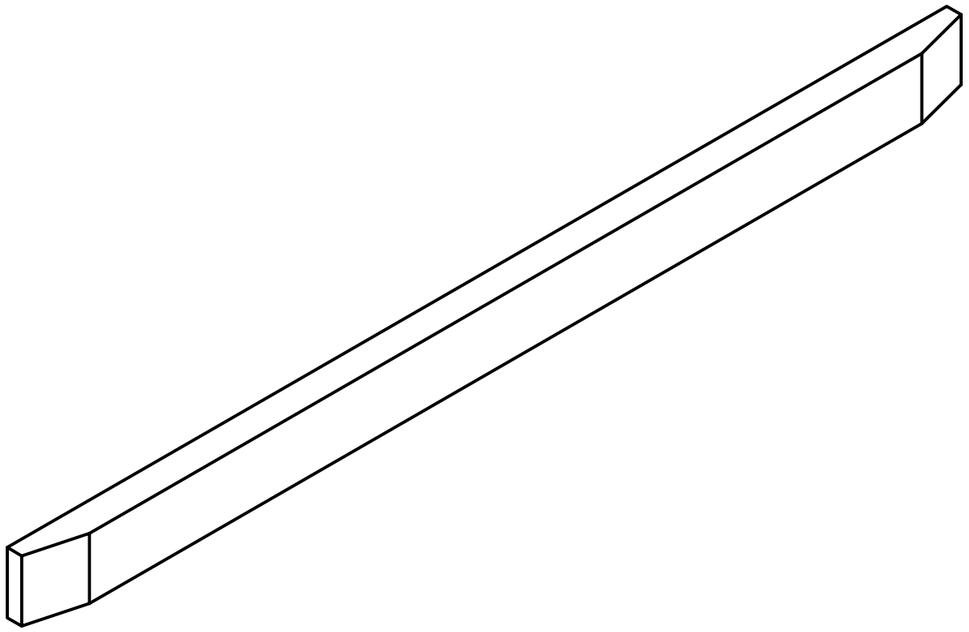
RIB 3

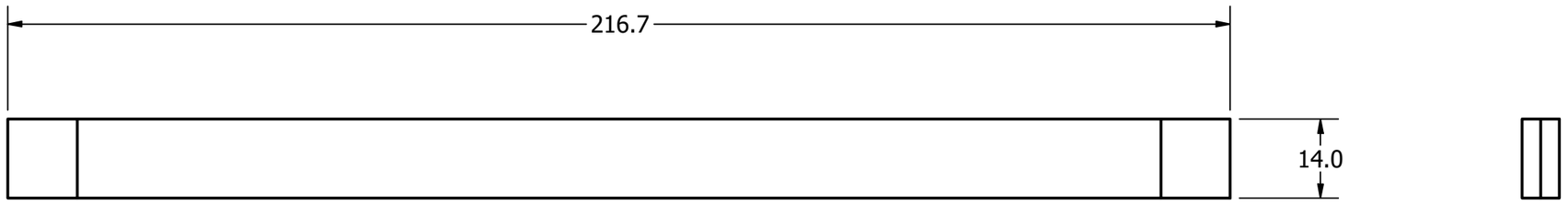
THIRD ANGLE PROJECTION

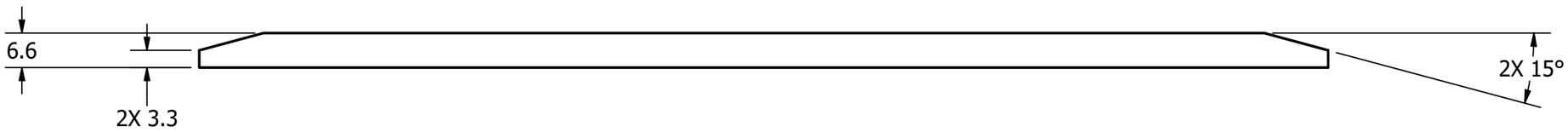
SIZE: A1 | DRAWING NUMBER: 474-3313 | REV: 1

SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH	JW	3/18/2016







PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL	ISODAMP CN-62	
HEAT TREAT		
FINISH		

APPROVALS	DATE
DRAWN jhaefner	3/18/2016
CHECKED	
ENG	
APPROVED	

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

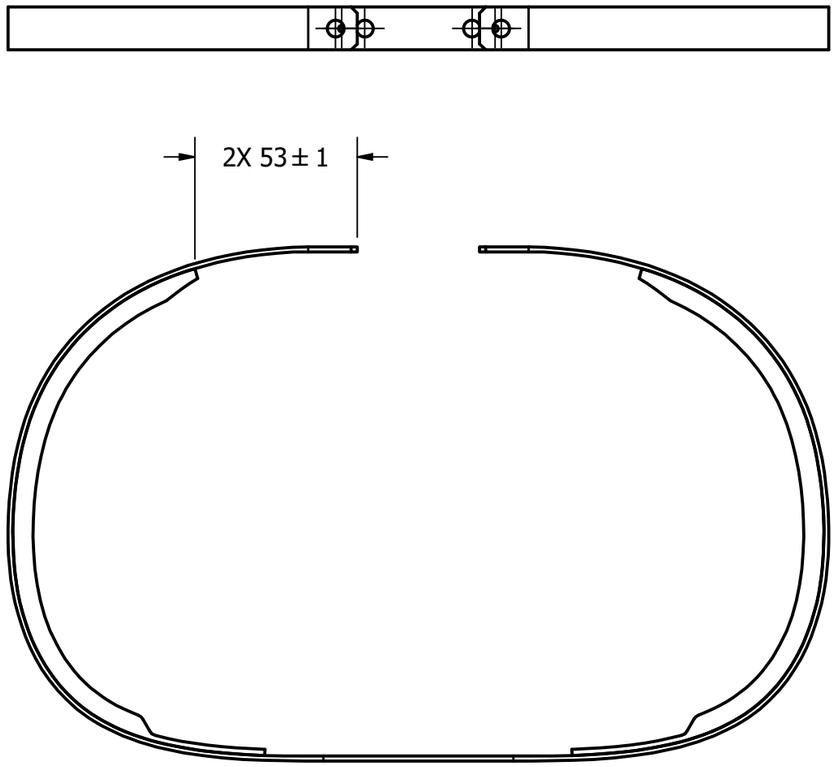
DAMPING, RIB 3

THIRD ANGLE PROJECTION

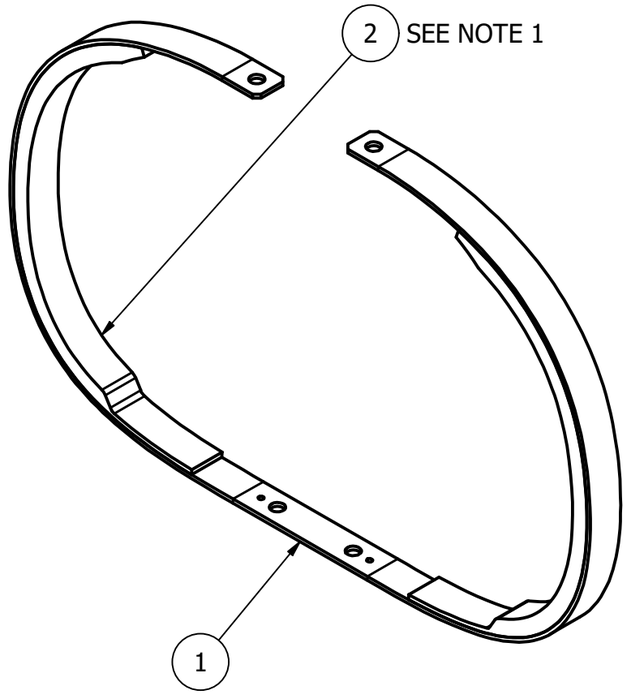
SIZE	DRAWING NUMBER	REV
A3	474-3323	1

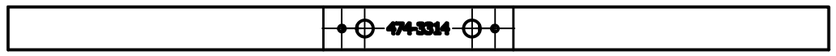
SCALE:	SHEET
1:1	1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH	JW	3/18/2016
	2	UPDATED VIEWS TO SHOW CUTOUTS	KMSP	KMSP	8/2/2018









ITEM	QTY	PART NUMBER	DESCRIPTION
2	2	474-3324	DAMPING, RIB 4
1	1	474-3314	RIB 4

PARTS LIST

NOTES:

1. BOND BOTH 474-3324 DAMPING RIB 4 TO 474-3314 RIB 4 AS SHOWN USING EPOXY ADHESIVE.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL	CHECKED	
HEAT TREAT	ENG	
FINISH	APPROVED	

APPROVALS	DATE
DRAWN jhaefner	3/18/2016

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

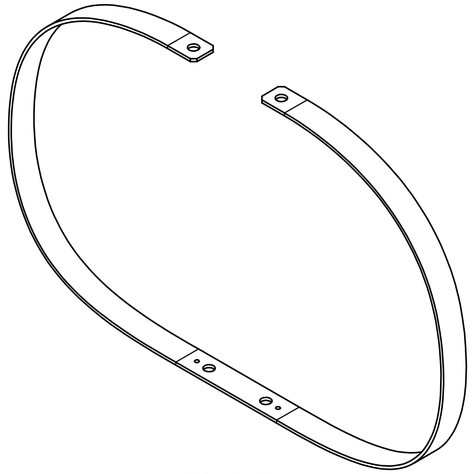
RIB 4 ASSEMBLY

THIRD ANGLE PROJECTION

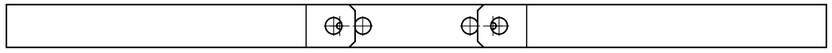
SIZE	DRAWING NUMBER	REV
A3	474-3304	2

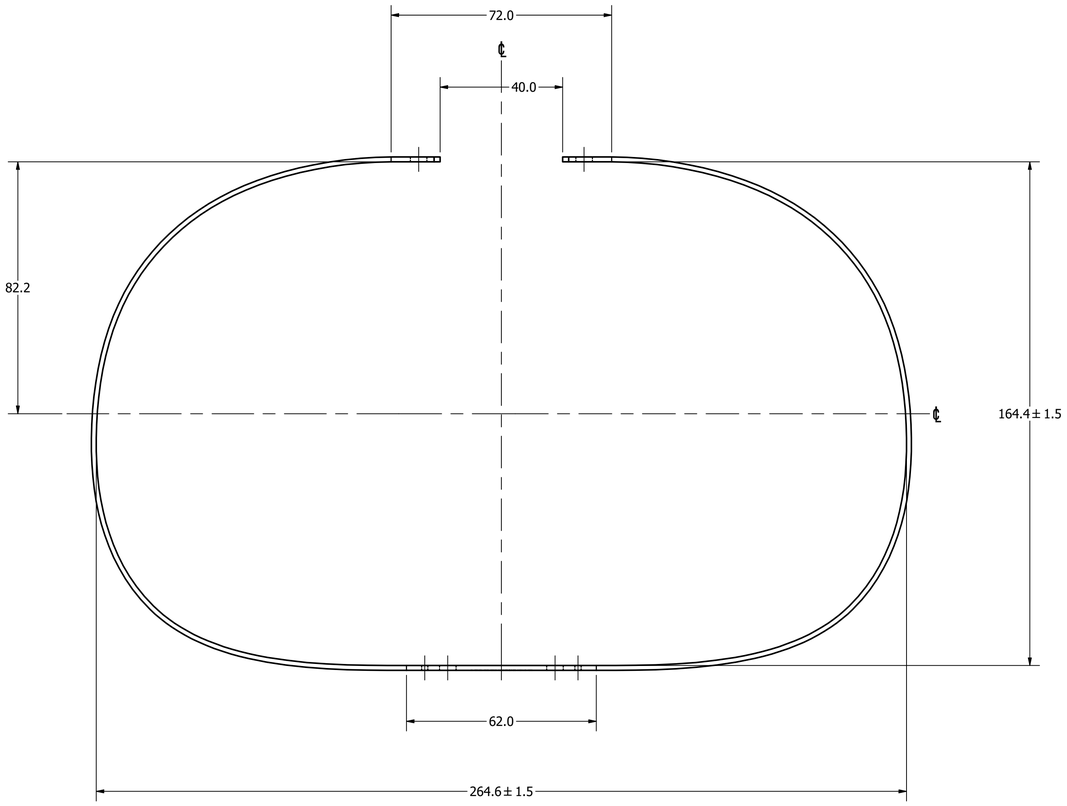
SCALE: .5:1 SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH	JW	3/18/2016

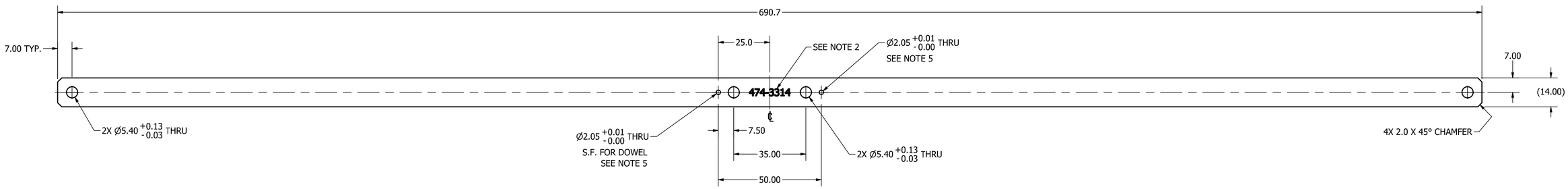


SCALE .75:1









FLATTENED STATE

NOTES:

1. MAKE RIB FROM 1095 ANNEALED SPRING STEEL, 14.0mm WIDE.
2. ENGRAVE DWG: 474-3314 AT LOCATION SPECIFIED.
3. UNLESS OTHERWISE SPECIFIED DIMS SYMMETRICAL ABOUT ℄.
4. FINISH: E-COAT 0.018mm MAX. (.0007in. MAX.).
5. E-COAT FINISH NOT REQUIRED INSIDE THIS HOLE.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMALS X ±1 / X.X ±.1 / X.XX ±.1
MACHINED ∠ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 1095 SPRING STEEL
HEAT TREAT: Rc 48-52
FINISH: SEE NOTES

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: jhaefner	3/18/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

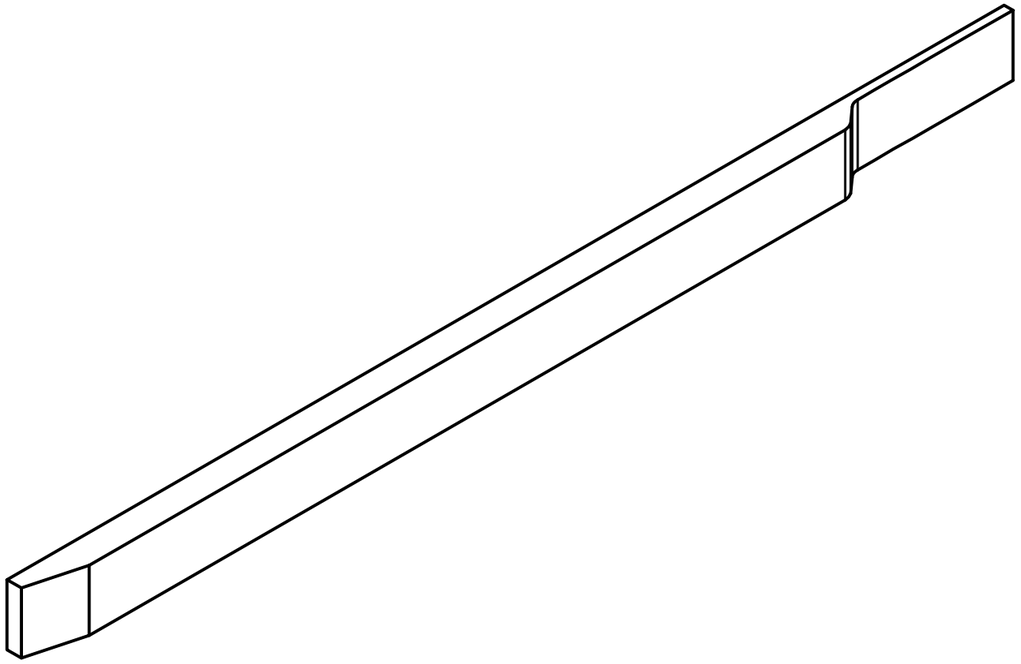
RIB 4

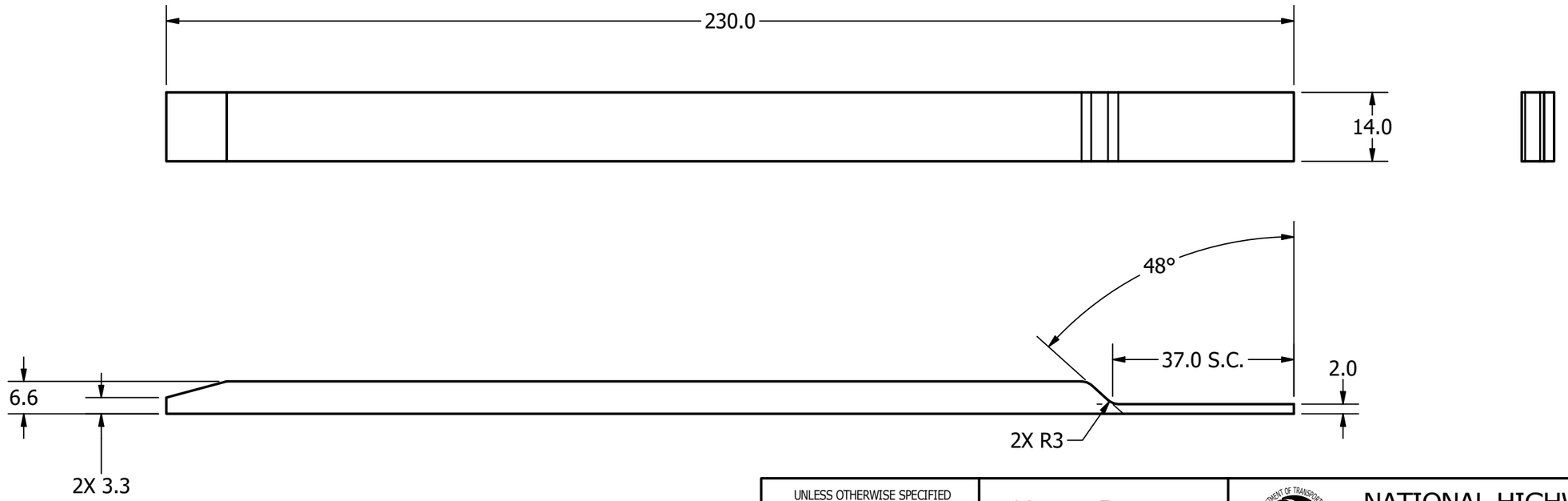
THIRD ANGLE PROJECTION

SIZE: A1 | DRAWING NUMBER: 474-3314 | REV: 1

SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH	JW	3/18/2016
	2	ADDED CUTOUT	KMSP	KMSP	8/2/2018





PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED
ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: ISODAMP CN-62
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: jhaefner	3/18/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

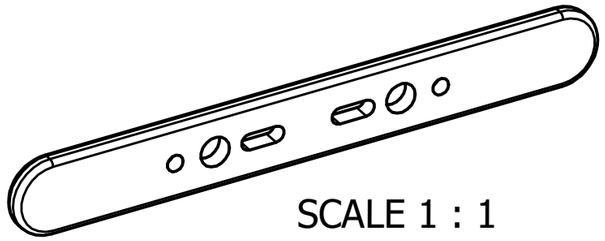
DAMPING, RIB 4

THIRD ANGLE PROJECTION

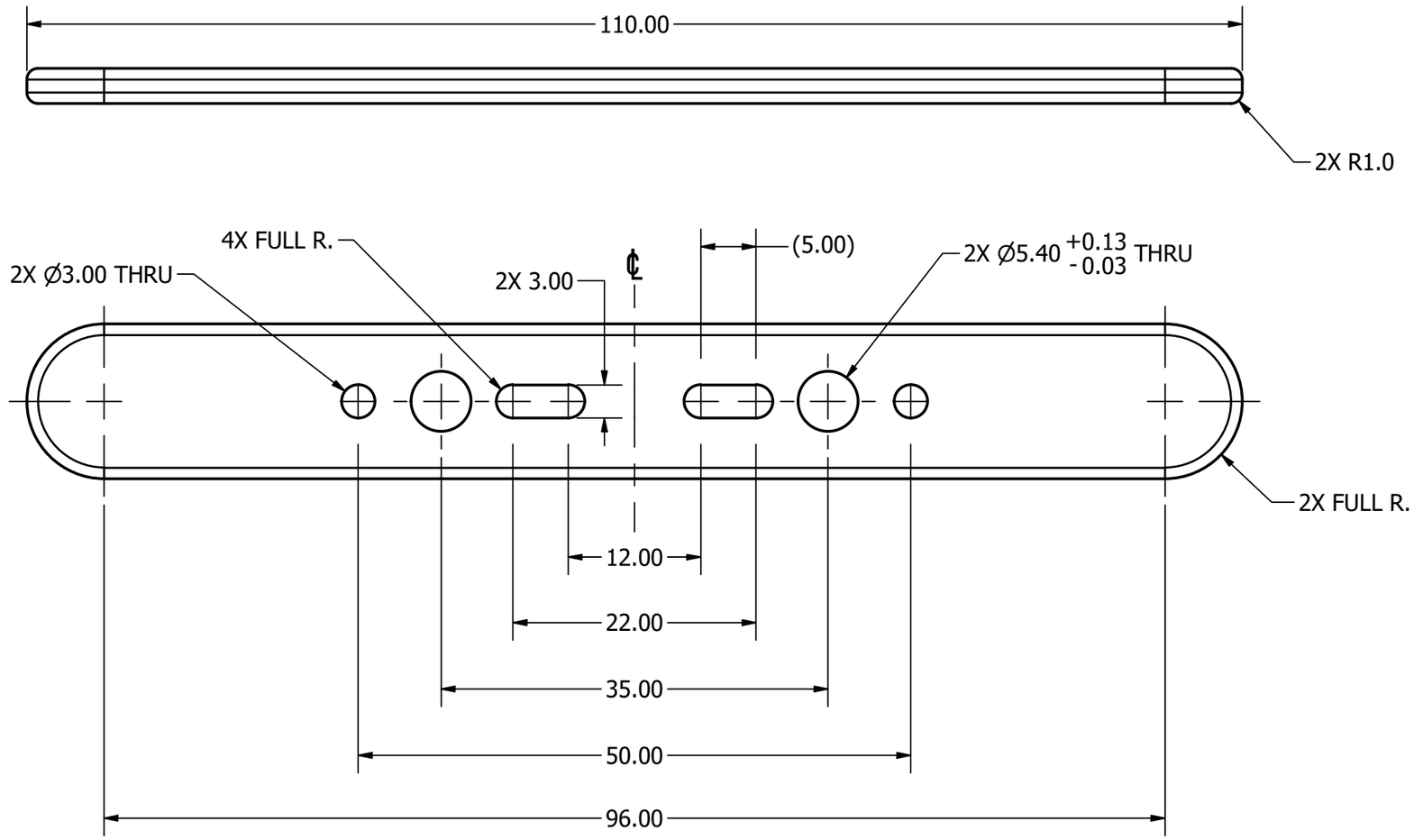
SIZE: A3 | DRAWING NUMBER: 474-3324 | REV: 2

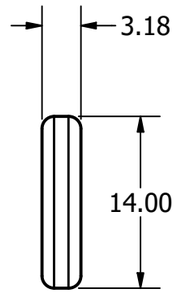
SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH	JW	3/21/2016



SCALE 1 : 1





PRELIMINARY DRAWING

NOTES:

1. DIMENSIONS ARE SYMMETRICAL ABOUT ℄ UNLESS OTHERWISE NOTED.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED √ | ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN jhaefner	3/21/2016
CHECKED	
ENG	
APPROVED	

MATERIAL: 1075 Spring Steel
HEAT TREAT: Rc 48-52
FINISH: E-COAT

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

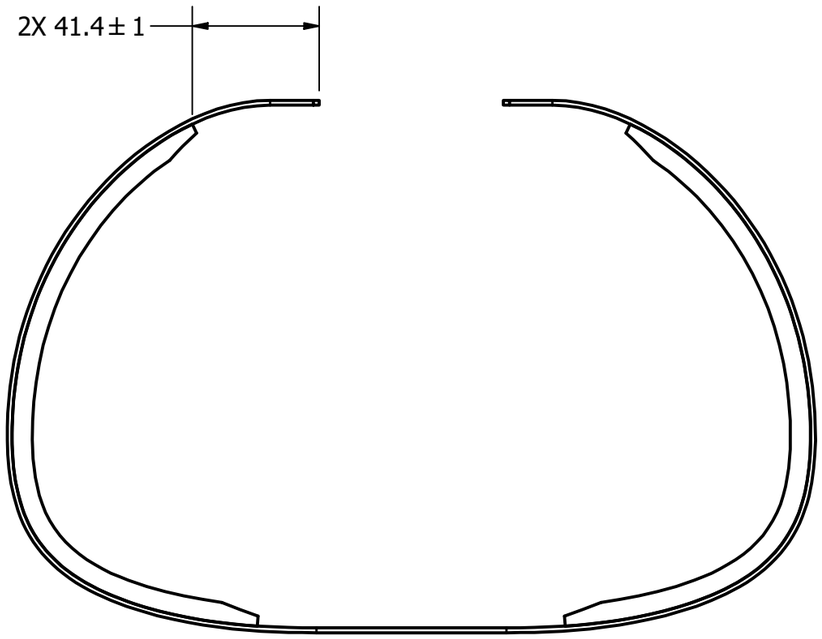
STIFFENER, RIBS 4, 5, 6, 7

THIRD ANGLE PROJECTION

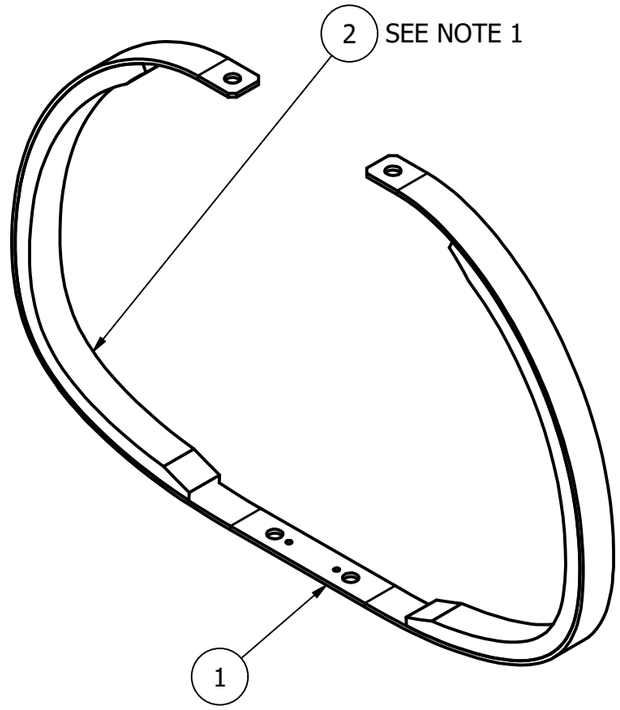
SIZE: A3 | DRAWING NUMBER: 474-3334 | REV: 1
SCALE: 2:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH	JW	3/21/2016











ITEM	QTY	PART NUMBER	DESCRIPTION
2	2	474-3325	DAMPING, RIB 5
1	1	474-3315	RIB 5

PARTS LIST

PRELIMINARY DRAWING

NOTES:

1. BOND BOTH 474-3325 DAMPING RIB 5 TO 474-3315 RIB 5 AS SHOWN USING EPOXY ADHESIVE.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN jhaefner	3/21/2016
CHECKED	
ENG	
APPROVED	

MATERIAL
HEAT TREAT
FINISH

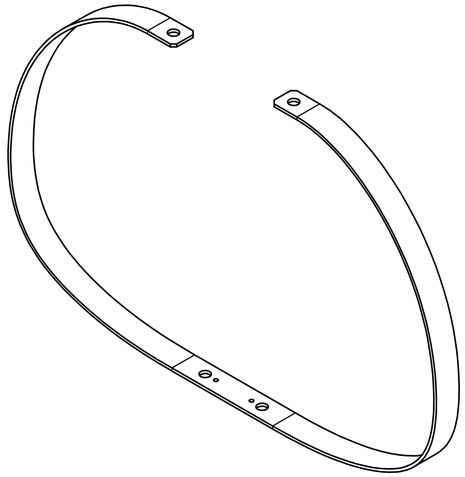
RIB 5 ASSEMBLY

THIRD ANGLE PROJECTION

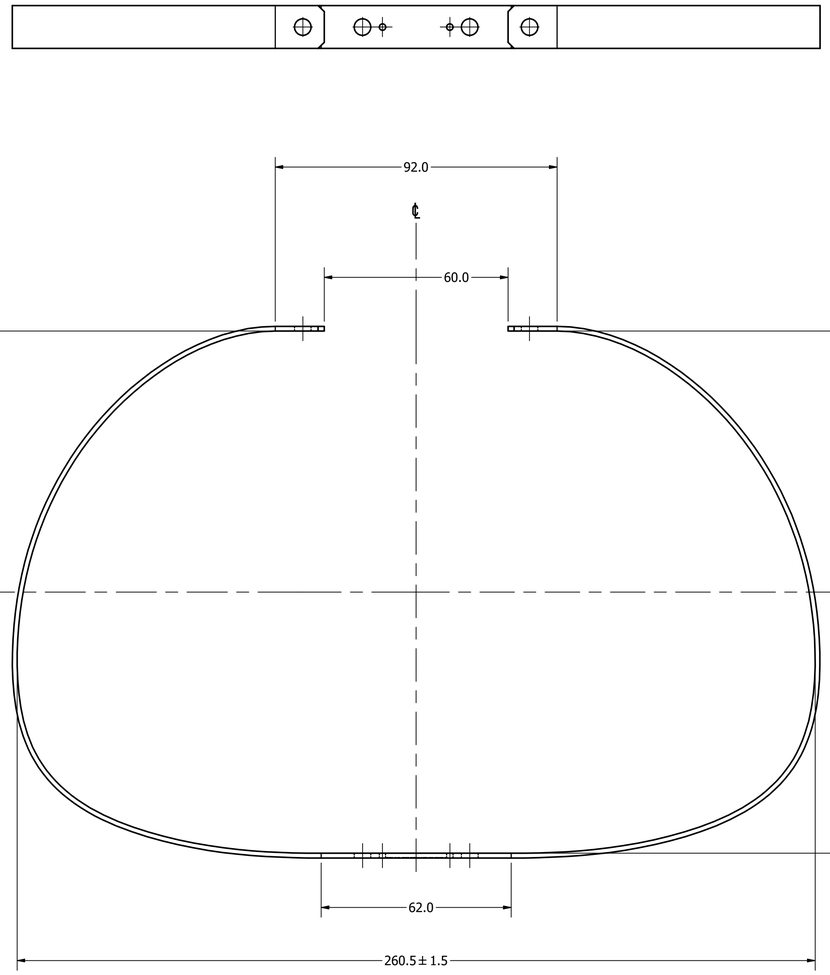
SIZE A3 | DRAWING NUMBER 474-3305 | REV 1

SCALE: .5:1 | SHEET 1 OF 1

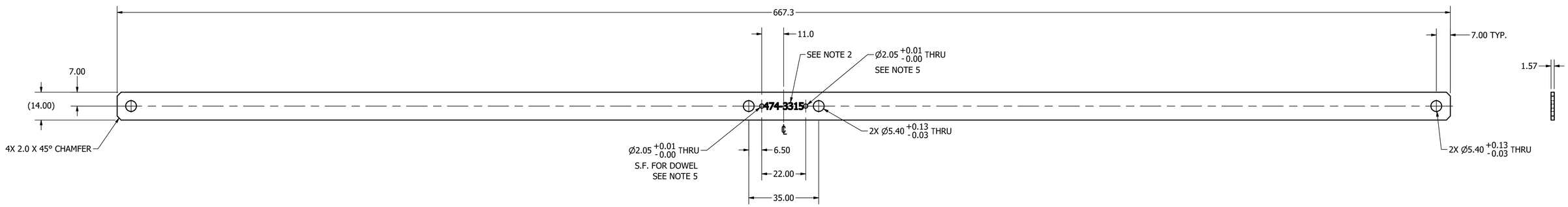
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH	JW	3/21/2016



SCALE .75:1







FLATTENED STATE

NOTES:

1. MAKE RIB FROM 1095 ANNEALED SPRING STEEL, 14.0mm WIDE.
2. ENGRAVE DWG: 474-3315 AT LOCATION SPECIFIED.
3. UNLESS OTHERWISE SPECIFIED DIMS SYMMETRICAL ABOUT ℄.
4. FINISH: E-COAT 0.018mm MAX. (.0007in. MAX.).
5. E-COAT FINISH NOT REQUIRED INSIDE THIS HOLE.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMALS X ±.1, XX ±.2, XXX ±.1
MACHINED ∠ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 1095 SPRING STEEL
HEAT TREAT: Rc 48-52
FINISH: SEE NOTES

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: jhaefner	3/21/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

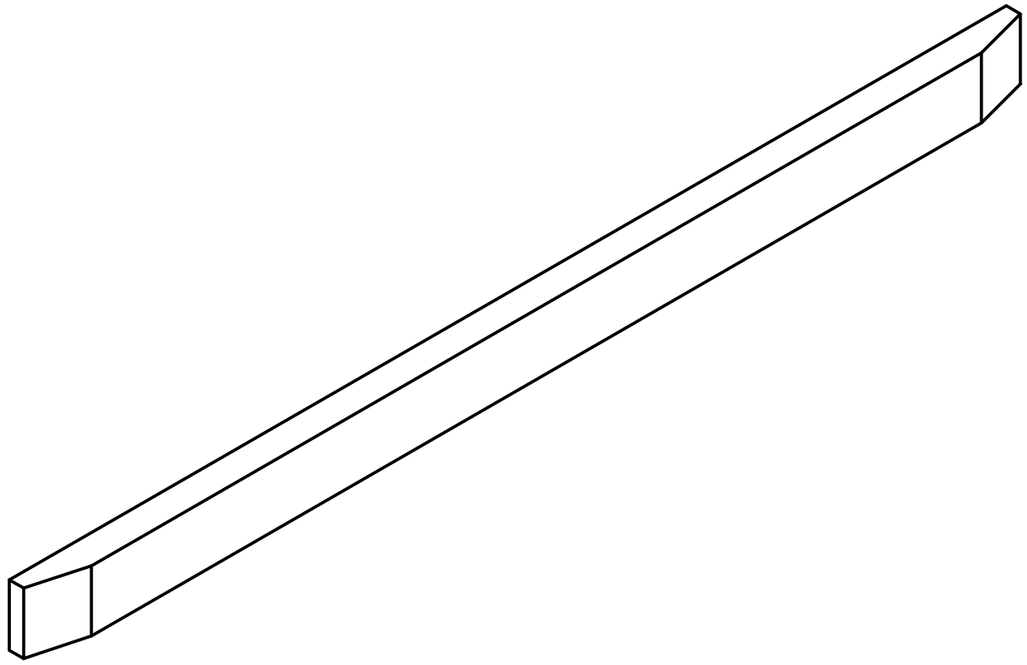
RIB 5

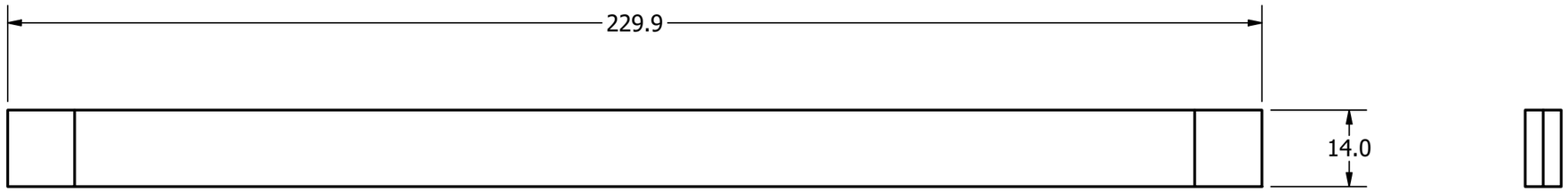
THIRD ANGLE PROJECTION

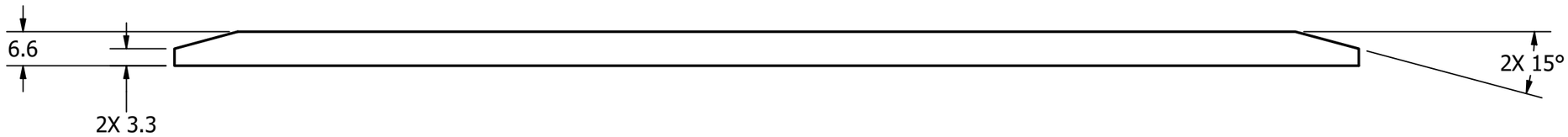
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SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH	JW	3/21/2016







PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: ISODAMP CN-62	CHECKED	
HEAT TREAT	ENG	
FINISH	APPROVED	

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: jhaefner	3/21/2016

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

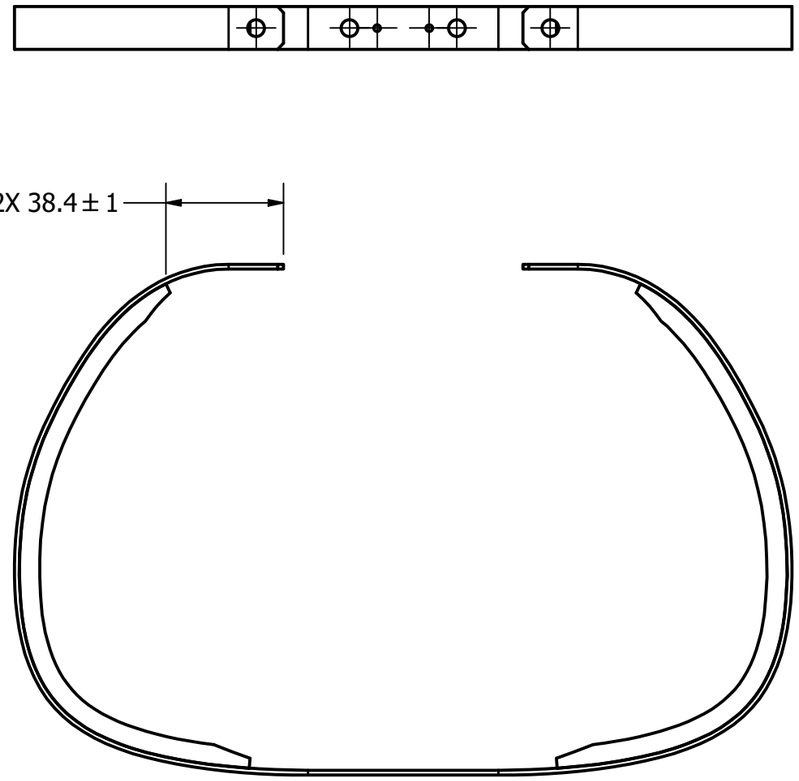
DAMPING, RIB 5

THIRD ANGLE PROJECTION

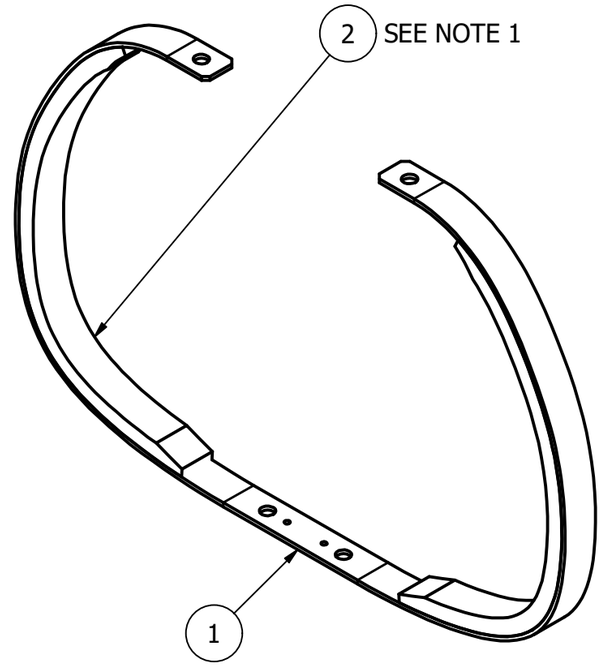
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SCALE: 1:1 SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH	JW	3/21/2016







NOTES:

1. BOND BOTH 474-3326 DAMPING RIB 6 TO 474-3316 RIB 6 AS SHOWN USING EPOXY ADHESIVE.

PRELIMINARY DRAWING

ITEM	QTY	PART NUMBER	DESCRIPTION
2	2	474-3326	DAMPING, RIB 6
1	1	474-3316	RIB 6

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

RIB 6 ASSEMBLY

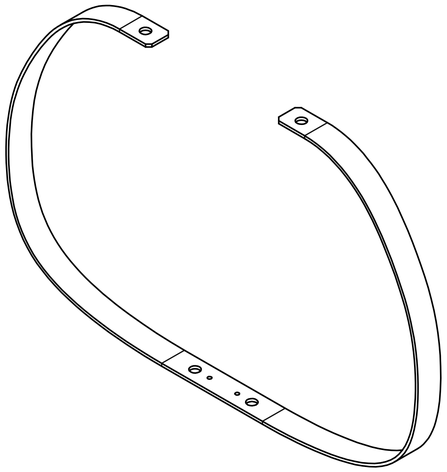
APPROVALS	DATE
DRAWN jhaefner	3/21/2016
CHECKED	
ENG	
APPROVED	

MATERIAL
HEAT TREAT
FINISH

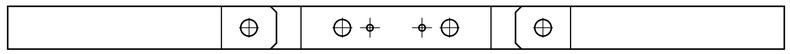
THIRD ANGLE PROJECTION

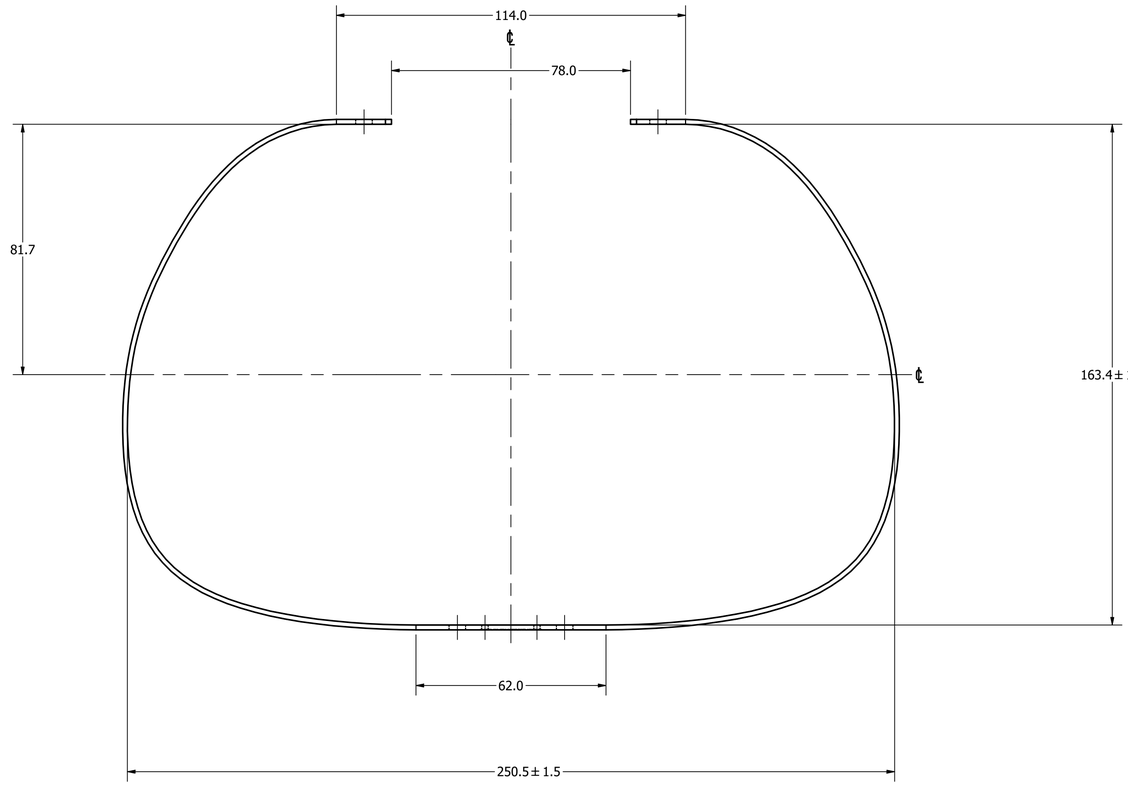
SIZE A3 | DRAWING NUMBER 474-3306 | REV 1
SCALE: .5:1 | SHEET 1 OF 1

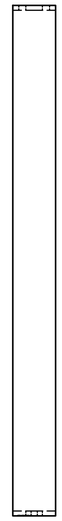
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH	JW	3/21/2016

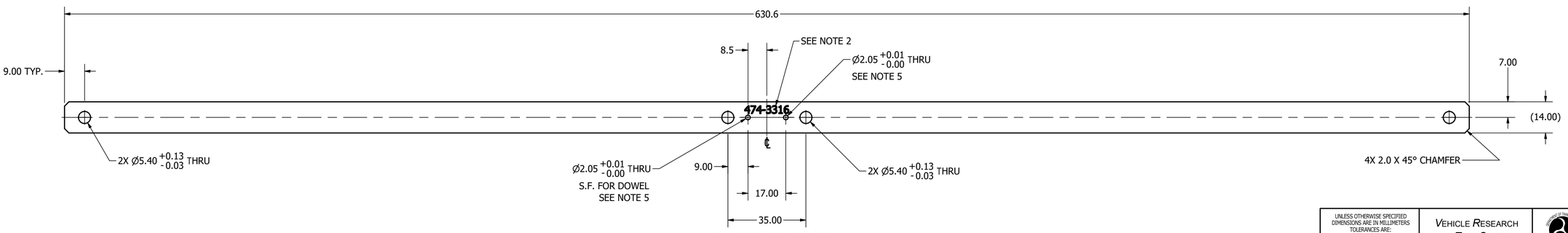


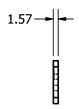
SCALE .75:1











FLATTENED STATE

NOTES:

1. MAKE RIB FROM 1095 ANNEALED SPRING STEEL, 14.0mm WIDE.
2. ENGRAVE DWG: 474-3316 AT LOCATION SPECIFIED.
3. UNLESS OTHERWISE SPECIFIED DIMS SYMMETRICAL ABOUT ℄.
4. FINISH: E-COAT 0.018mm MAX. (.0007in. MAX.).
5. E-COAT FINISH NOT REQUIRED INSIDE THIS HOLE.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL X ±.1, X.X ±.1, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 1095 SPRING STEEL
HEAT TREAT: Rc 48-52
FINISH: SEE NOTES

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: jhaefner	3/21/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

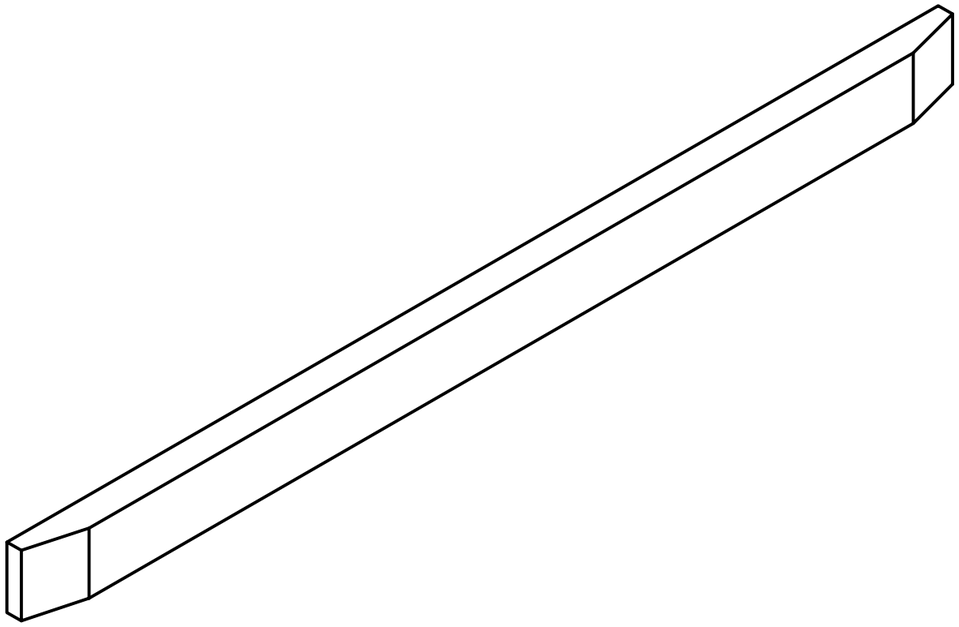
RIB 6

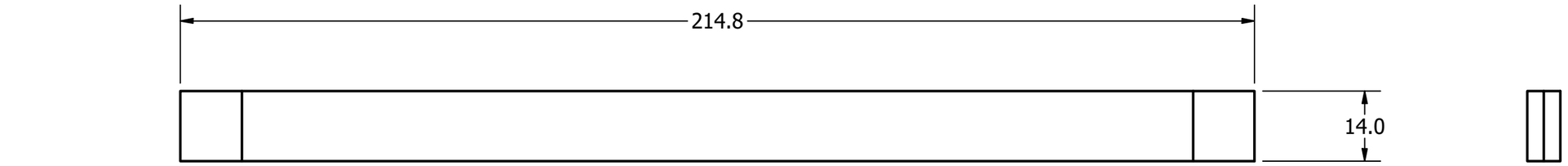
THIRD ANGLE PROJECTION

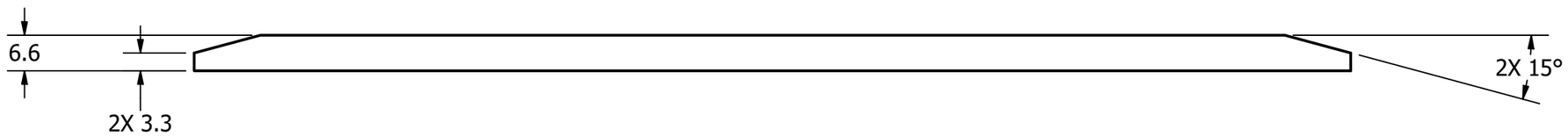
SIZE: A1 | DRAWING NUMBER: 474-3316 | REV: 1

SCALE: 1:1 | SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH	JW	3/21/2016







PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: ISODAMP CN-62
HEAT TREAT:
FINISH:

	APPROVALS	DATE
DRAWN	jhaefner	3/21/2016
CHECKED		
ENG		
APPROVED		

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

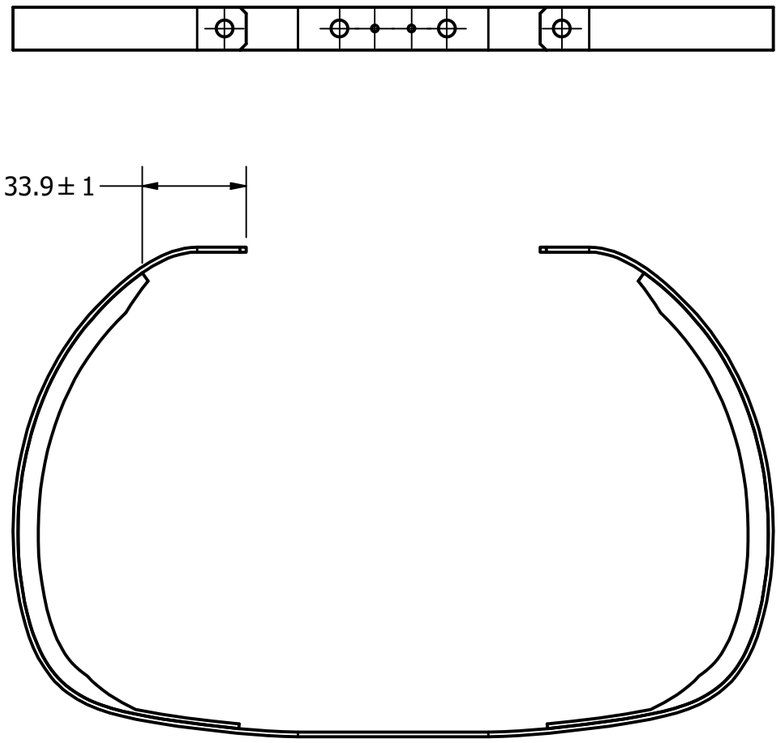
DAMPING, RIB 6

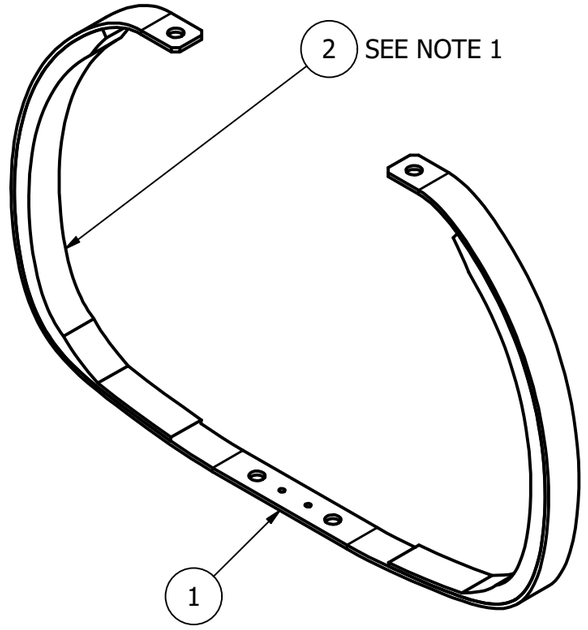
THIRD ANGLE PROJECTION

SIZE: A3 | DRAWING NUMBER: 474-3326 | REV: 1

SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH	JW	3/21/2016







ITEM	QTY	PART NUMBER	DESCRIPTION
2	2	474-3327	DAMPING, RIB 7
1	1	474-3317	RIB 7

PARTS LIST

NOTES

1. BOND BOTH 474-3327 DAMPING RIB 7 TO 474-3317 RIB 7 AS SHOWN USING EPOXY ADHESIVE.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

	APPROVALS	DATE
DRAWN	jhaefner	3/21/2016
MATERIAL	CHECKED	
HEAT TREAT	ENG	
FINISH	APPROVED	

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

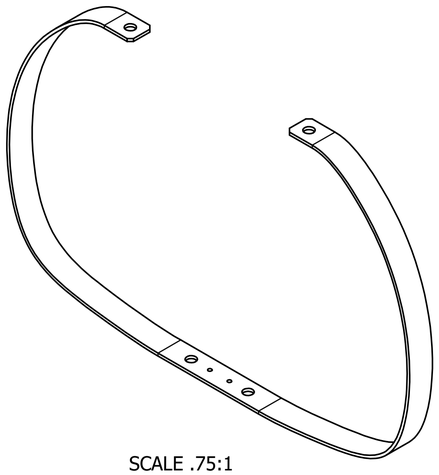
RIB 7 ASSEMBLY

THIRD ANGLE PROJECTION

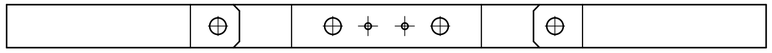
SIZE	DRAWING NUMBER	REV
A3	474-3307	1

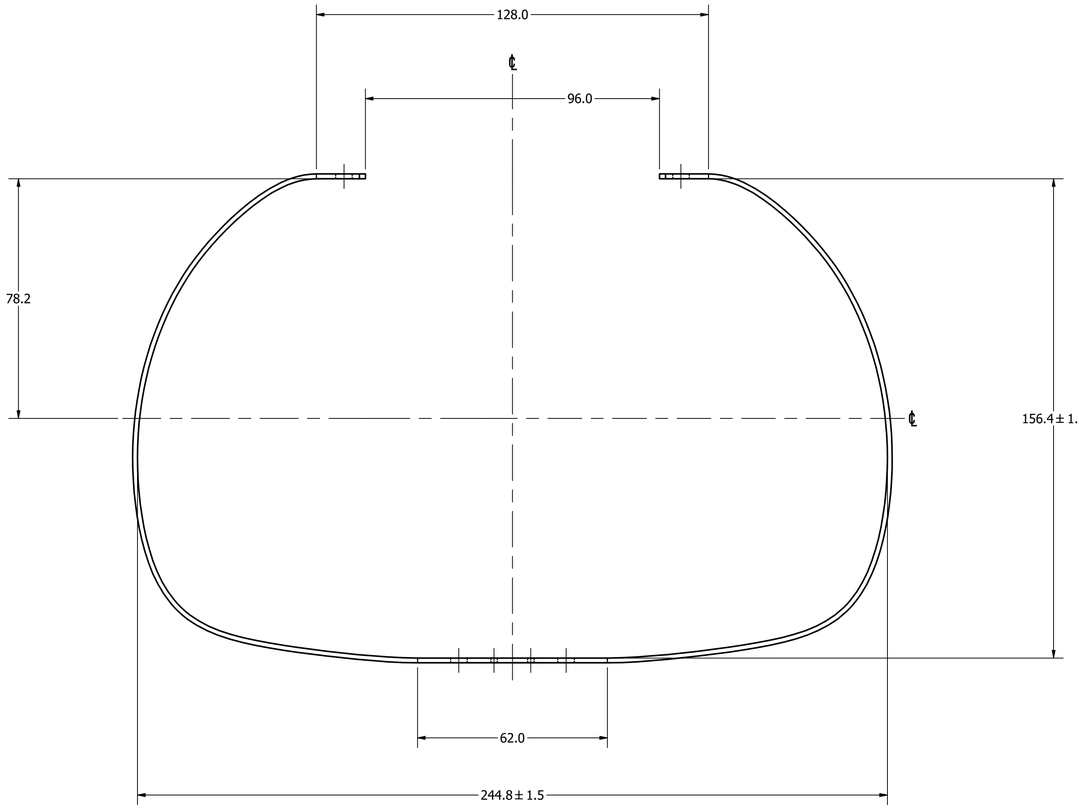
SCALE: .5:1 SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH	JW	3/21/2016

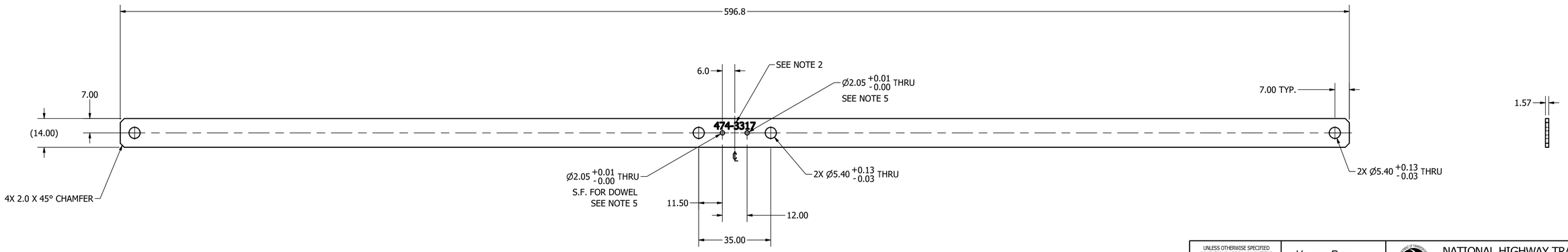


SCALE .75:1









FLATTENED STATE

NOTES:

1. MAKE RIB FROM 1095 ANNEALED SPRING STEEL, 14.0mm WIDE.
2. ENGRAVE DWG: 474-3317 AT LOCATION SPECIFIED.
3. UNLESS OTHERWISE SPECIFIED DIMS SYMMETRICAL ABOUT ℄.
4. FINISH: E-COAT 0.018mm MAX. (.0007in. MAX.).
5. E-COAT FINISH NOT REQUIRED INSIDE THIS HOLE.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMALS X ±.5, .XX ±.2, .XXX ±.1
MACHINED ∠ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 1095 SPRING STEEL
HEAT TREAT: Rc 48-52
FINISH: SEE NOTES

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: jhaefner	3/21/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

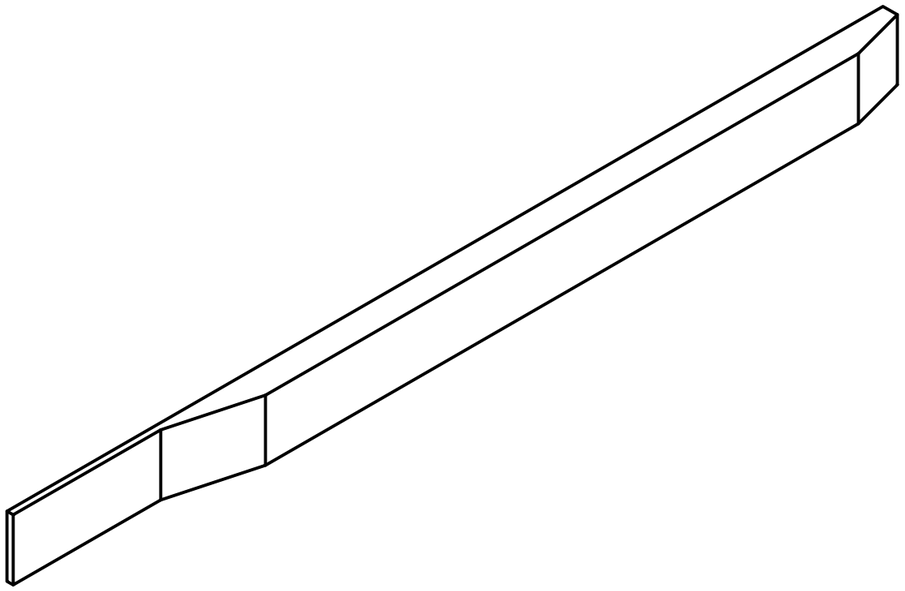
RIB 7

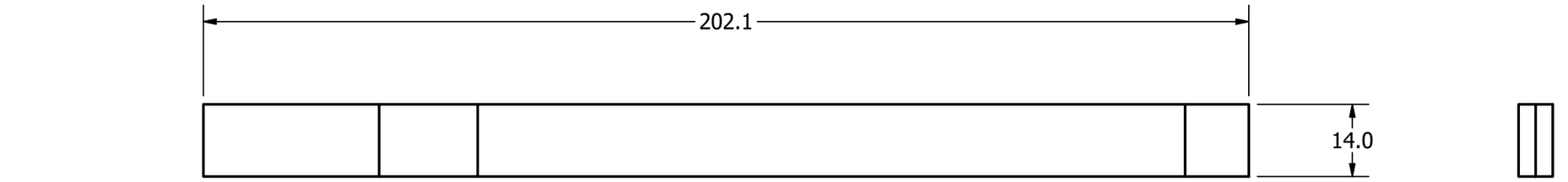
THIRD ANGLE PROJECTION

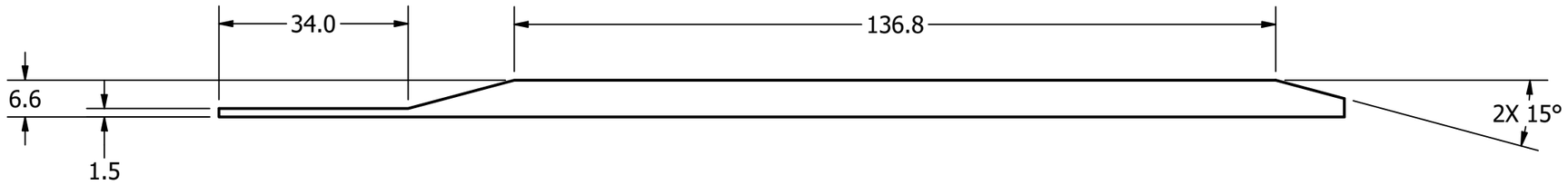
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SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH	JW	3/21/2016







PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: ISODAMP CN-62
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: jhaefner	3/21/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

DAMPING, RIB 7

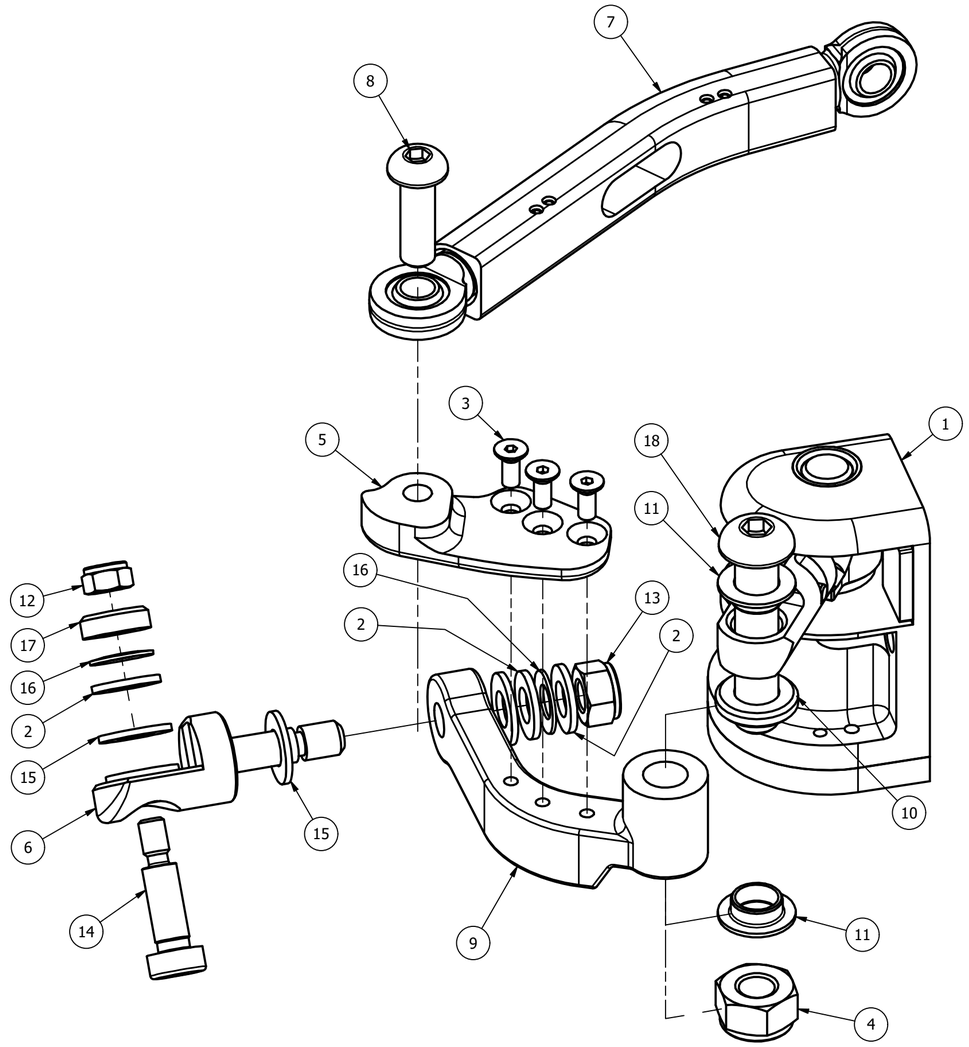
THIRD ANGLE PROJECTION

SIZE	DRAWING NUMBER	REV
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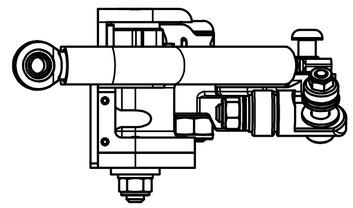
SCALE: 1:1 SHEET 1 OF 1

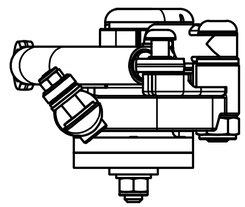
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	3/30/2016
	2	ADDED PATENT INFORMATION	AT	JW	7/12/2018

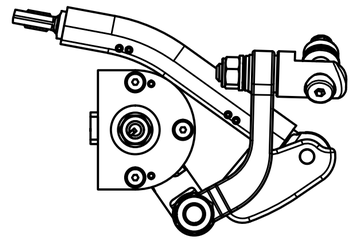
Please note that portions of these drawings are covered by U.S. Patent Nos. 9,514,659 and 9,799,234, assigned to Humanetics Innovative Solutions, Inc. (Humanetics) of Plymouth, Michigan, USA.



SCALE 1 : 1







ITEM	QTY	PART NUMBER	DESCRIPTION
18	1	5001405	M10 X 1.5 X 50 LG. BHCS SS
17	1	474-3537	SHOULDER WASHER, THICK
16	2	5001388	WASHER BELLEVILLE M8 (8.2 X 15 X 0.8)
15	4	474-3535	FRICTION WASHER
14	1	5001154	M8 X 20 LG. SHSS
13	1	5000486	M8 X 1.25 HEX LOCK NUT ZINC
12	1	5000093	M6 X 1 HEX LOCK NUT ZINC
11	2	6004605	BEARING, FLANGE 12mm OD X 10mm ID X 5mm LG
10	1	474-3534	SPACER WASHER, M10, NYLON
9	1	474-3505-1	LOWER SCAPULA, LEFT
8	1	5000255	M8 X 1.25 X 25 LG. BHCS
7	1	474-3508	CLAVICLE ASSEMBLY
6	1	474-3504	SHOULDER CLEVIS
5	1	474-3506-1	UPPER SCAPULA, LEFT
4	1	5000149	M10 X 1.5 HEX LOCK NUT ZINC
3	3	5000023	M4 X 0.7 X 10 LG. FHCS
2	3	5000123	M8 FLAT WASHER PLAIN ZINC
1	1	474-3524-1	SPINE-SHOULDER COUPLER ASSEMBLY, LEFT

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL
HEAT TREAT
FINISH

APPROVALS	DATE
DRAWN ghayden	3/30/2016
CHECKED	
ENG	
APPROVED	

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

SHOULDER ASSEMBLY, LEFT

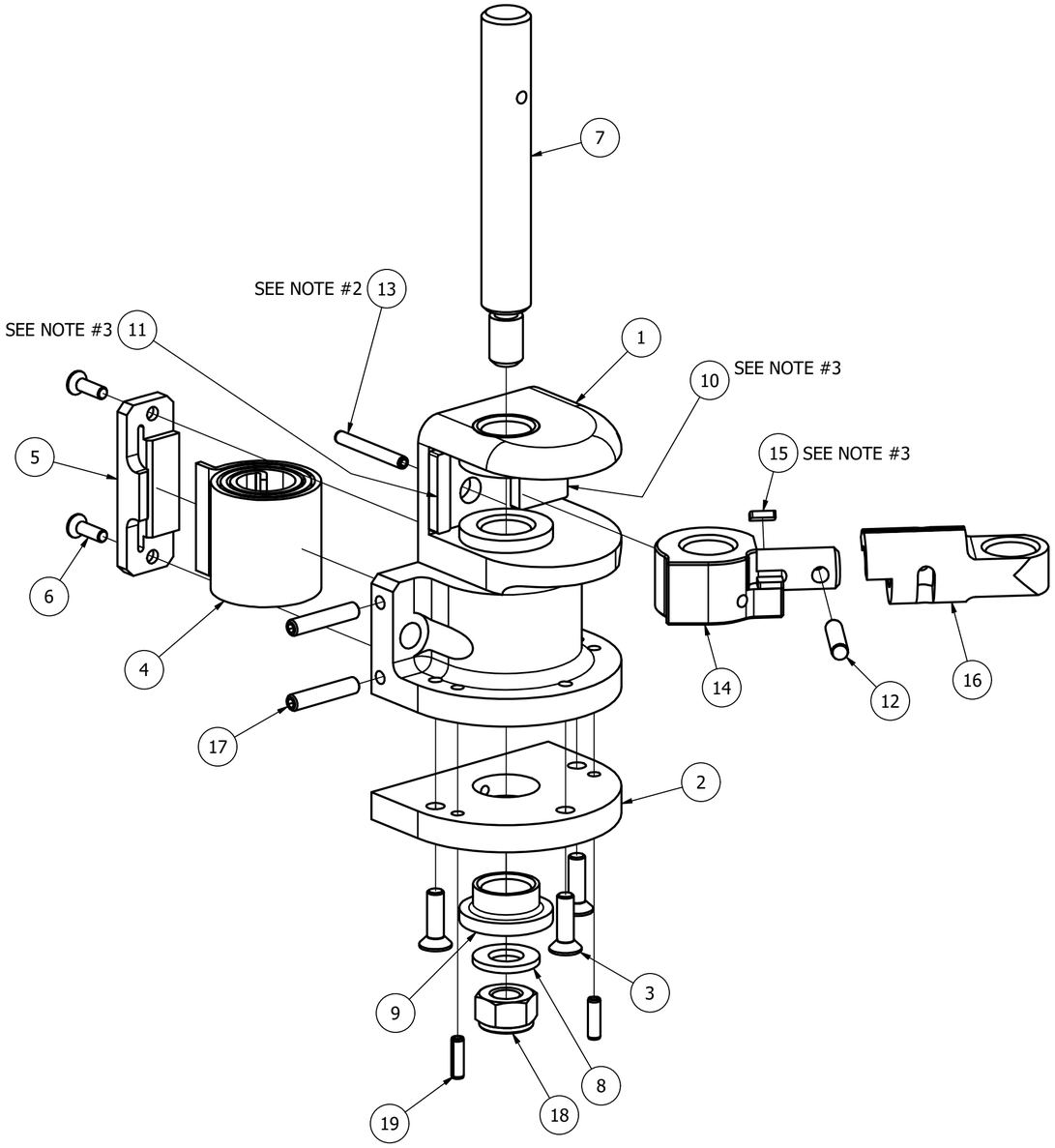
THIRD ANGLE PROJECTION

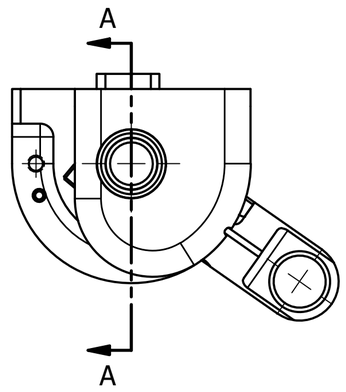
SIZE A2 | DRAWING NUMBER 474-3500-1 | REV 2

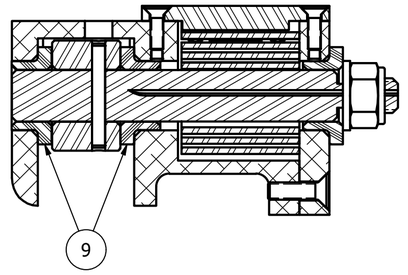
SCALE: .5:1 | SHEET 1 OF 1

PRELIMINARY DRAWING

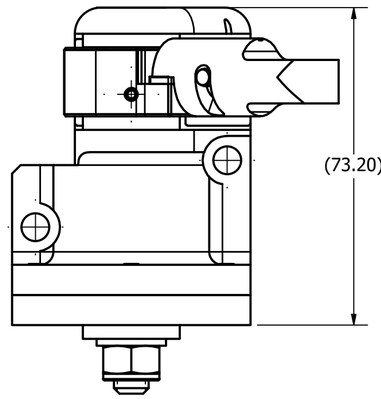
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	3/30/2016







SECTION A-A



ITEM	QTY	PART NUMBER	DESCRIPTION
19	2	5000199	M3 X 10 LG. ROLL PIN SS
18	1	5000318	M8 X 1.25 HEX LOCK NUT SS
17	2	5001433	M4 X 0.7 X 20 LG. SSSFP SS
16	1	474-3503-1	SCAPULA LINK, LEFT
15	2	474-3539	SCAPULA LINK BUMPER
14	1	474-3507-1	CLEVIS, LEFT SCAPULA LINK
13	1	5000140	M3 X 24 LG. ROLL PIN
12	1	5000815	M4 X 18 LG. DOWEL PIN
11	1	474-3558	FRONT SHOULDER STOP
10	1	474-3529	REAR SHOULDER STOP
9	3	474-3527	SHAFT SLEEVE
8	1	5000123	M8 FLAT WASHER PLAIN ZINC
7	1	474-3519	PIN, SPRING TENSION
6	2	5000203	M3 X 0.5 X 10 LG. FHCS
5	1	474-3526	SPRING RETAINER
4	1	474-3582	SPRING, SHOULDER
3	3	5001356	M4 X 0.7 X 14 LG. FHCS SS
2	1	474-3502	SPINE-SHOULDER COUPLER, BOTTOM
1	1	474-3501-1	SPINE-SHOULDER COUPLER, TOP, LEFT

PARTS LIST

NOTES:

1. SECURE SCREWS.
2. SEE SHEET #2 FOR MACHINING INSTRUCTIONS FOR ROLL PIN HOLE.
3. SEE SHEET #2 FOR BONDING INSTRUCTIONS FOR PADS.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ∠ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL
HEAT TREAT
FINISH

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN ghayden	3/30/2016
CHECKED	
ENG	
APPROVED	

DEPARTMENT OF TRANSPORTATION UNITED STATES OF AMERICA

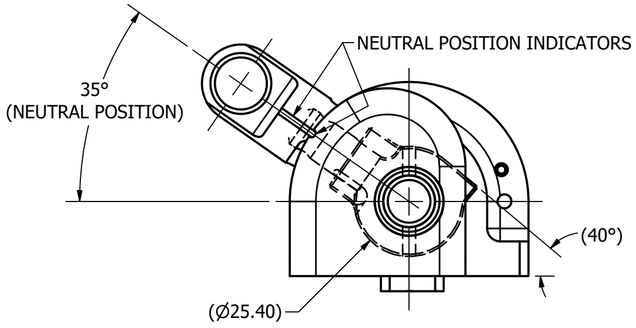
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

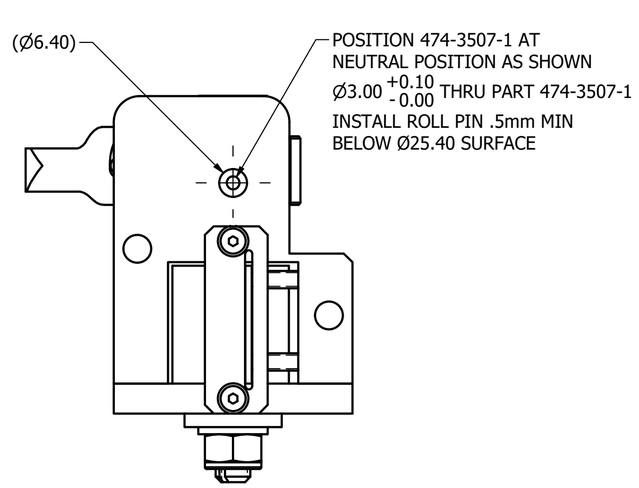
SPINE-SHOULDER COUPLER ASSEMBLY, LEFT

THIRD ANGLE PROJECTION

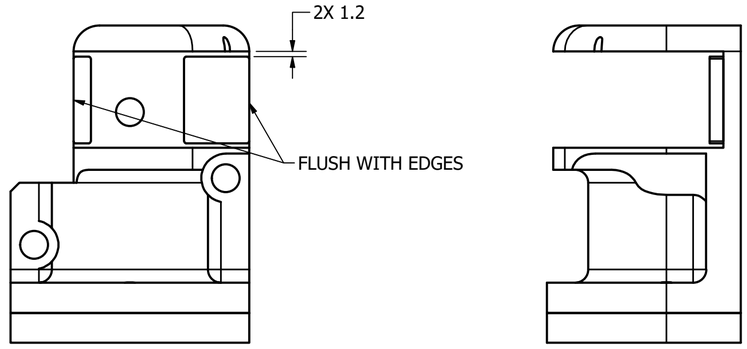
SIZE A2 | DRAWING NUMBER 474-3524-1 | REV 1

SCALE: 1:1 | SHEET 1 OF 2

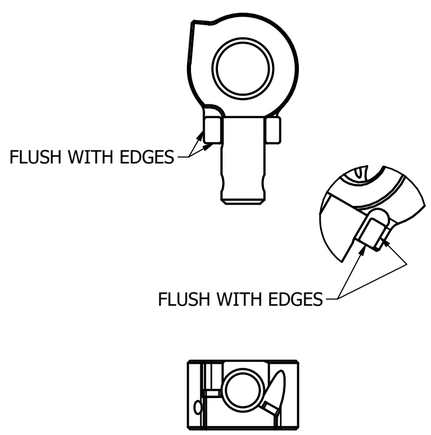




HOLE MACHINING FOR NEUTRAL POSITION



BOND PADS 474-3529 & 474-3558 ONTO 474-3524-1 AS SHOWN



BOND PADS (2X) 474-3539 ONTO
474-3507-1 AS SHOWN.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL
HEAT TREAT
FINISH

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN ghayden	3/30/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

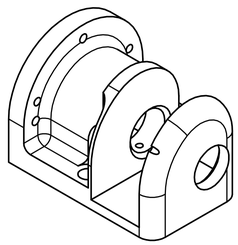
SPINE-SHOULDER COUPLER ASSEMBLY, LEFT

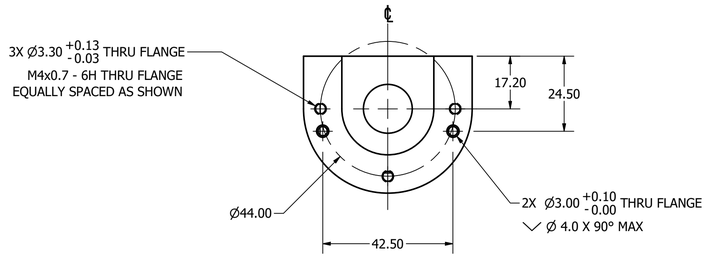
THIRD ANGLE PROJECTION

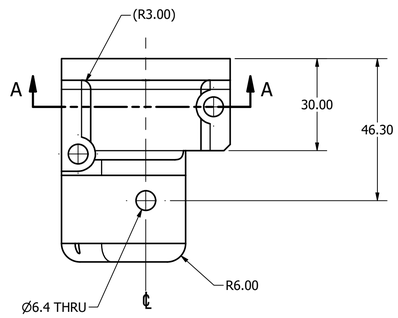
SIZE A2 | DRAWING NUMBER 474-3524-1 | REV 1

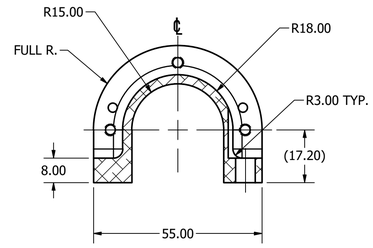
SCALE: 1:1 | SHEET 2 OF 2

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
75046	1	RELEASE FOR PROTOTYPE	GCH	JW	3/29/2016

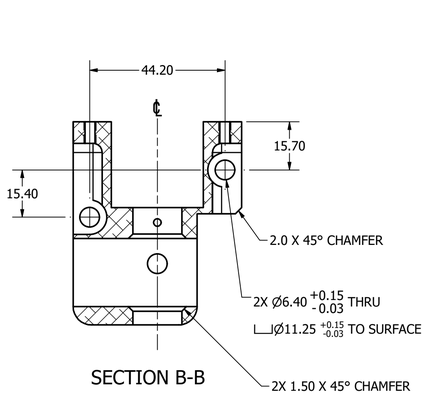




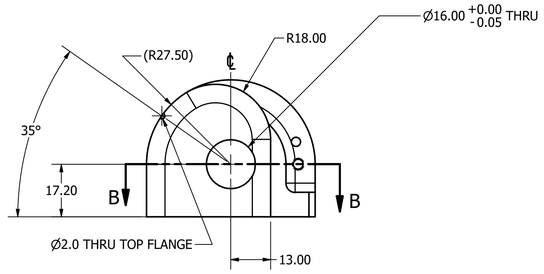


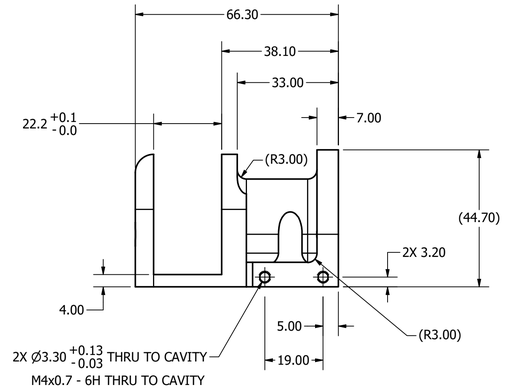


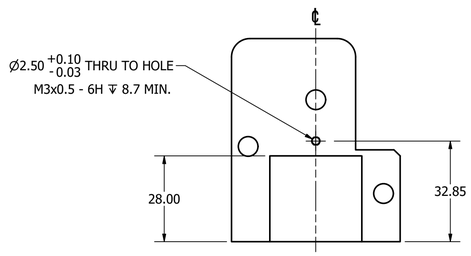
SECTION A-A



SECTION B-B







NOTES:

1. ALL DIMENSIONS ARE SYMMETRICAL ABOUT ℄ UNLESS OTHERWISE NOTED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X.X ±.2, X.XX ±.1, X.XXX ±.1
MACHINED ∠F ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN ghayden	3/29/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

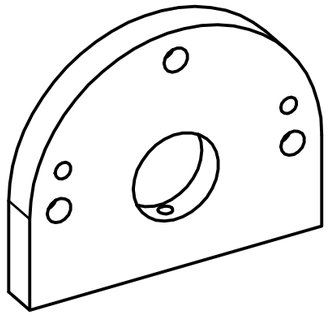
SPINE-SHOULDER COUPLER, TOP, LEFT

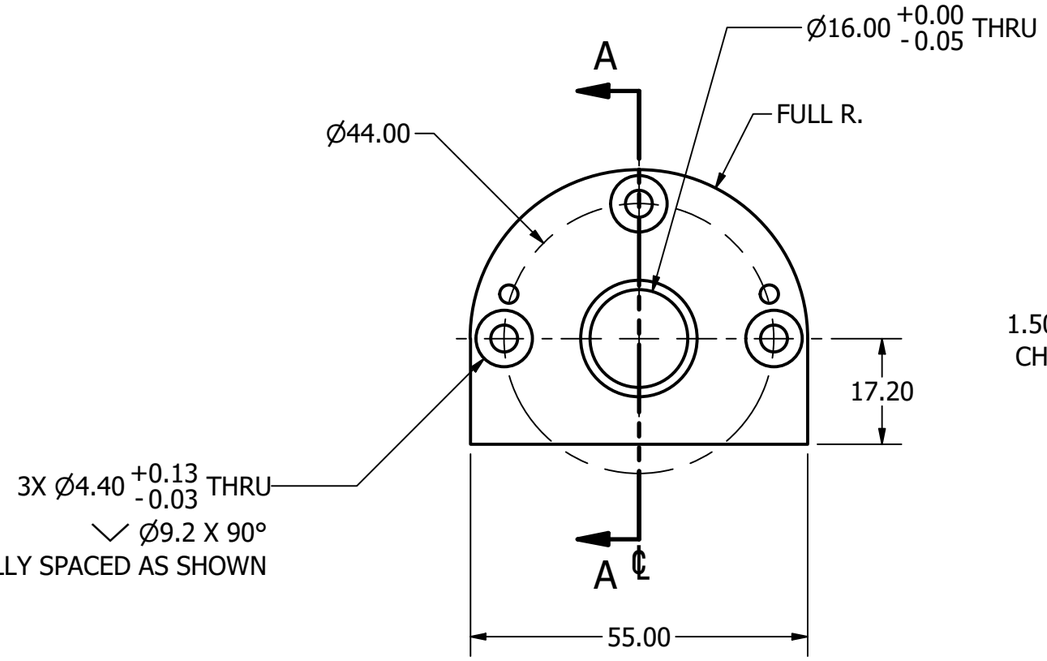
THIRD ANGLE PROJECTION

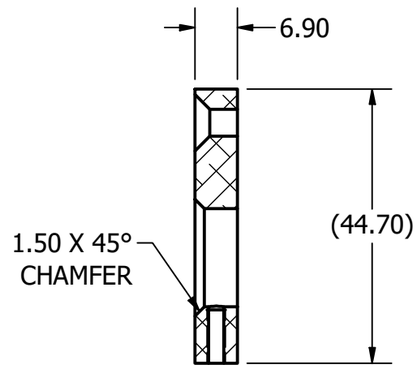
SIZE: A1 | DRAWING NUMBER: 474-3501-1 | REV: 1

SCALE: 1:1 | SHEET: 1 OF 1

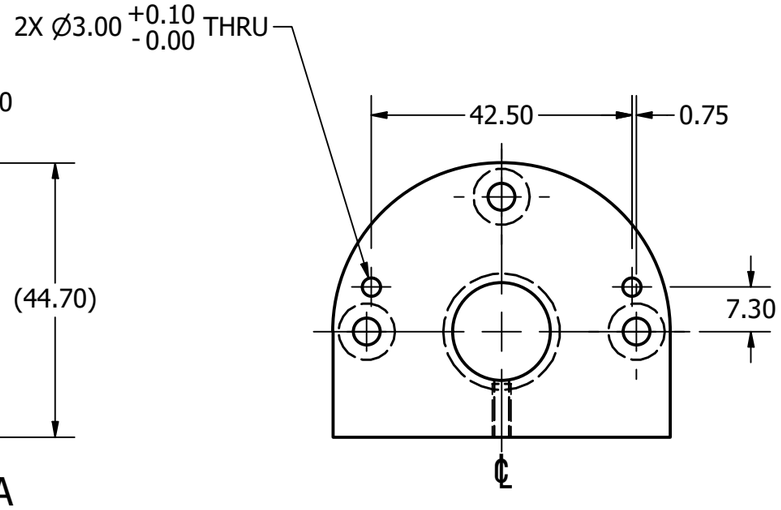
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	3/29/2016

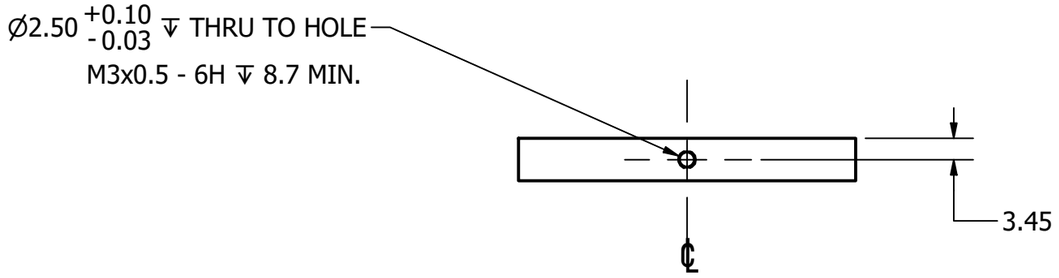






SECTION A-A





PRELIMINARY DRAWING

NOTES:

1. ALL DIMENSIONS ARE SYMMETRICAL ABOUT ℄ UNLESS OTHERWISE NOTED.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: ghayden	3/29/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

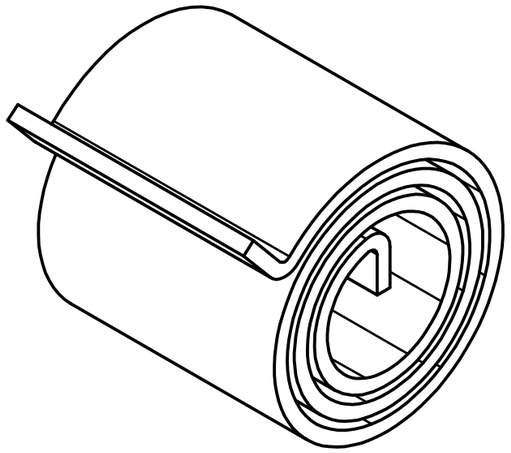
SPINE-SHOULDER COUPLER, BOTTOM

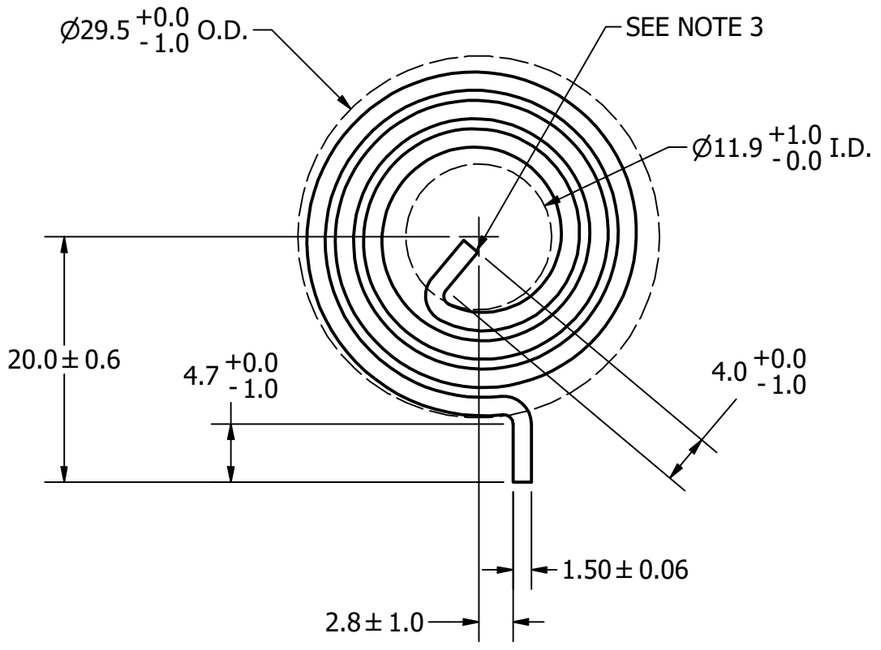
THIRD ANGLE PROJECTION

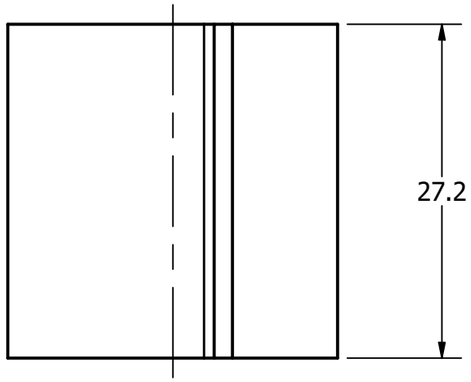
SIZE	DRAWING NUMBER	REV
A3	474-3502	1

SCALE: 1:1 SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	DJI	JW	6/13/2016







NOTES:

1. MATERIAL: SPRING STEEL

2. ROTATION: 50° MINIMUM IN COIL DIRECTION
   35° MINIMUM IN UNCOIL DIRECTION.

3. INSPECT FIT OF INNER TANG TO 474-3519

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ✓
ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTES
HEAT TREAT: Rc 44-50
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: disopi	6/13/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

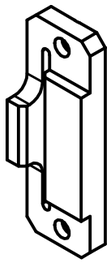
SPRING, SHOULDER

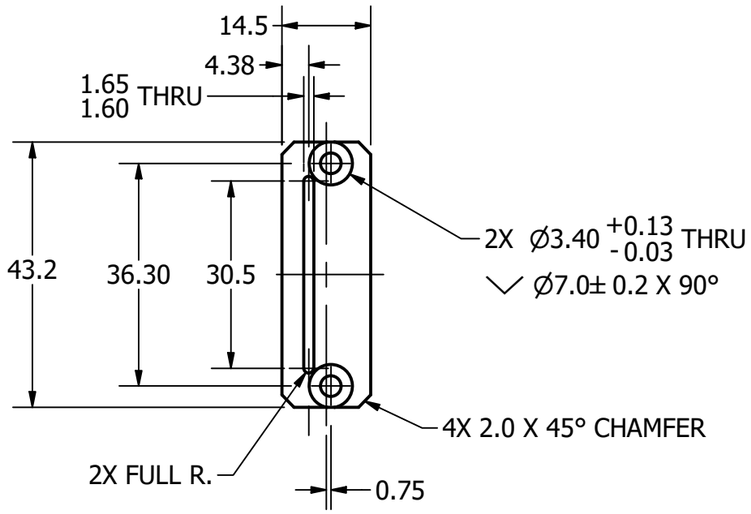
THIRD ANGLE PROJECTION

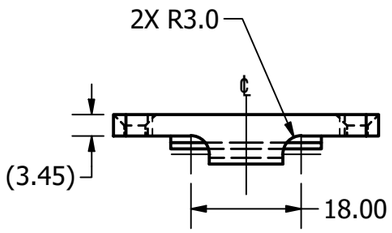
SIZE	DRAWING NUMBER	REV
A3	474-3582	1

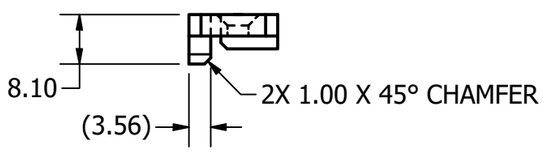
SCALE: 2:1 SHEET 1 OF 1

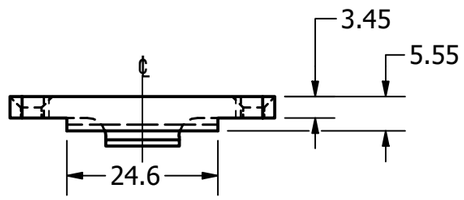
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	DJI	JW	3/29/2016











NOTES:

1. DIMENSIONS ARE SYMMETRICAL ABOUT ℄ UNLESS OTHERWISE NOTED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 1018 STEEL
HEAT TREAT:
FINISH: 0.008mm ELECTROLESS NICKEL PLATE PER SIDE

*V*EHICLE *R*ESEARCH and *T*EST *C*ENTER

APPROVALS	DATE
DRAWN: disopi	3/29/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

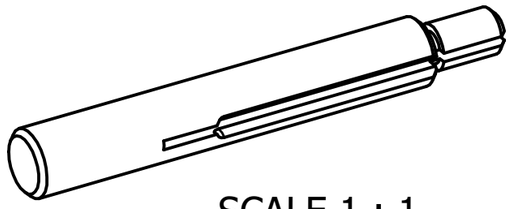
SPRING RETAINER

THIRD ANGLE PROJECTION

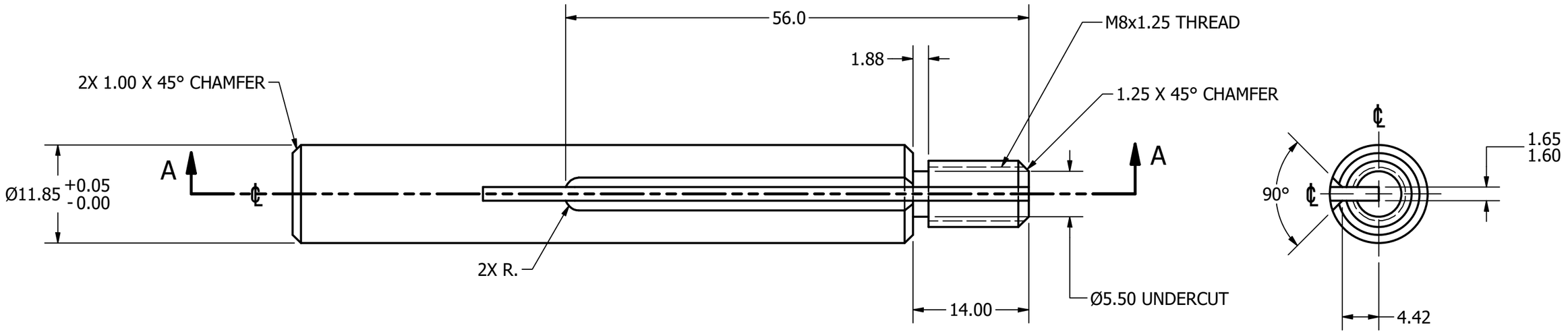
SIZE: A3 | DRAWING NUMBER: 474-3526 | REV: 1

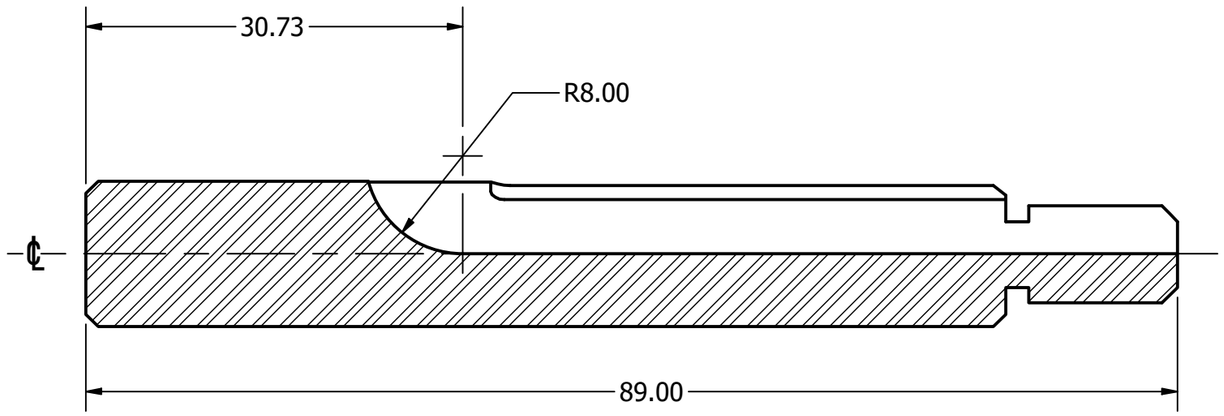
SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	DJI	JW	3/22/2016



SCALE 1 : 1





SECTION A-A

PRELIMINARY DRAWING

NOTES:

1. DIMENSIONS ARE SYMMETRICAL ABOUT ℄ UNLESS OTHERWISE NOTED.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 1018 STEEL
HEAT TREAT:
FINISH: 0.008mm ELECTROLESS NICKEL PLATE PER SIDE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: disopi	3/22/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

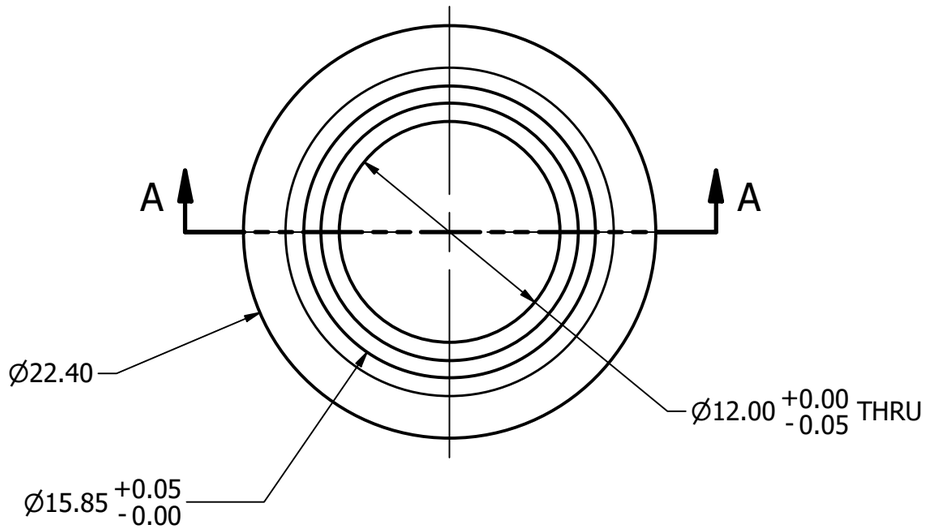
PIN, SPRING TENSION

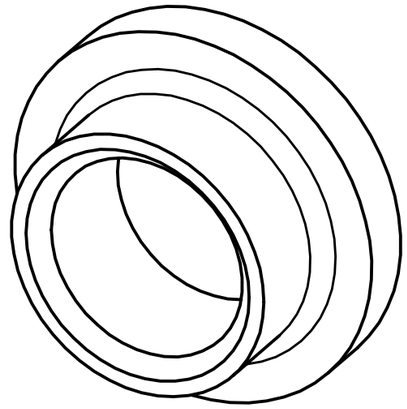
THIRD ANGLE PROJECTION

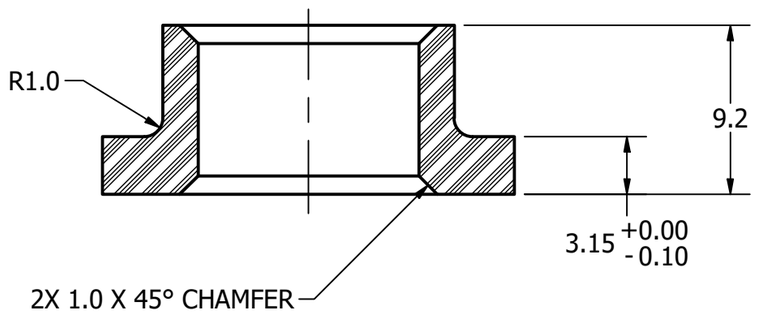
SIZE: A3 | DRAWING NUMBER: 474-3519 | REV: 1

SCALE: 2:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	DJI	JW	3/24/2016







SECTION A-A

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: ACETAL RESIN, BLACK
HEAT TREAT:
FINISH:

*V*EHICLE *R*ESEARCH and *T*EST *C*ENTER

APPROVALS	DATE
DRAWN: disopi	3/24/2016
CHECKED:	
ENG:	
APPROVED:	

THIRD ANGLE PROJECTION

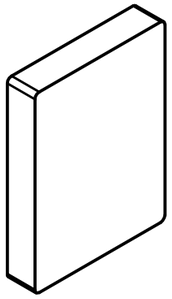
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

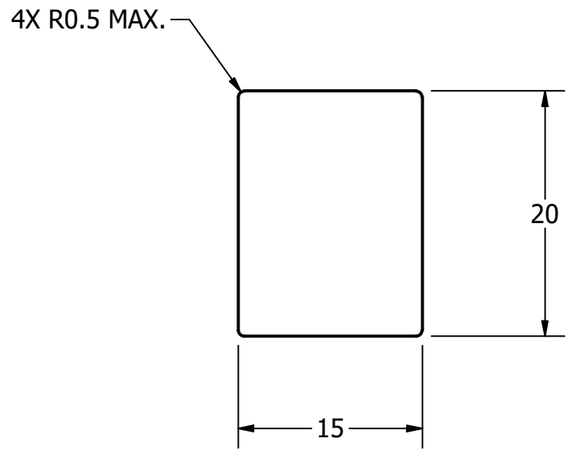
SHAFT SLEEVE

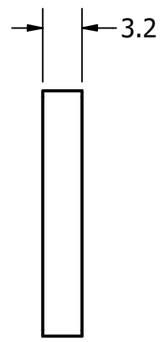
SIZE	DRAWING NUMBER	REV
A3	474-3527	1

SCALE: 3:1 SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	DJI	JW	11/3/17







PRELIMINARY DRAWING

NOTES:
1. MATERIAL: NATURAL RUBBER
   COLOR: BLACK
   DUROMETER: 55 ±10 SHORE "A"
2. REMOVE ALL MOLD FLASHING
3. ALL MOLD DIMENSION TOLERANCE +1%/-2%
   BUT NO SMALLER THAN 0.5mm
4. NO SPLIT OR DEFECTS ARE ALLOWED
   IN THE RUBBER MOLDING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED
ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTE 1
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: disopi	3/31/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

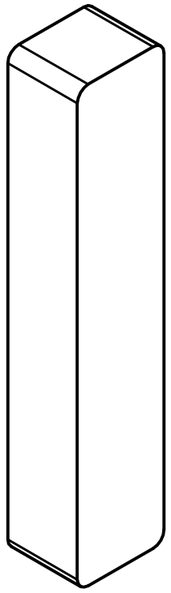
REAR SHOULDER STOP

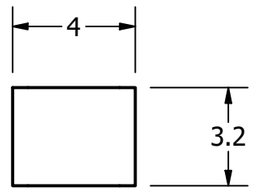
THIRD ANGLE PROJECTION

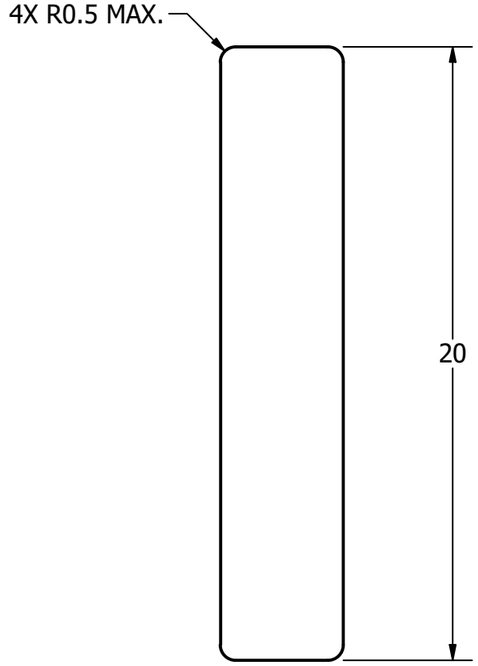
SIZE: A3 | DRAWING NUMBER: 474-3529 | REV: 1

SCALE: 2:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	11/3/17







PRELIMINARY DRAWING

NOTES:
1. MATERIAL: NATURAL RUBBER
   COLOR: BLACK
   DUROMETER: 55 ±10 SHORE "A"
2. REMOVE ALL MOLD FLASHING
3. ALL MOLD DIMENSION TOLERANCE +1%/-2%
   BUT NO SMALLER THAN 0.5mm
4. NO SPLIT OR DEFECTS ARE ALLOWED
   IN THE RUBBER MOLDING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ∠ ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTE #1
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: ghayden	4/11/2016
CHECKED:	
ENG:	
APPROVED:	

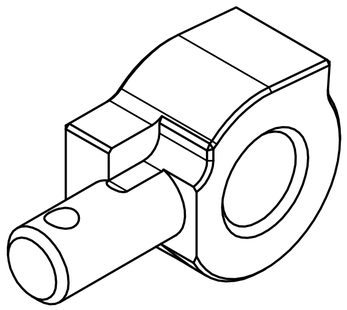
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

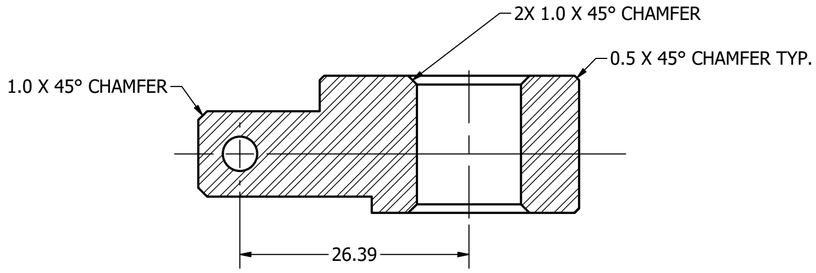
FRONT SHOULDER STOP

THIRD ANGLE PROJECTION

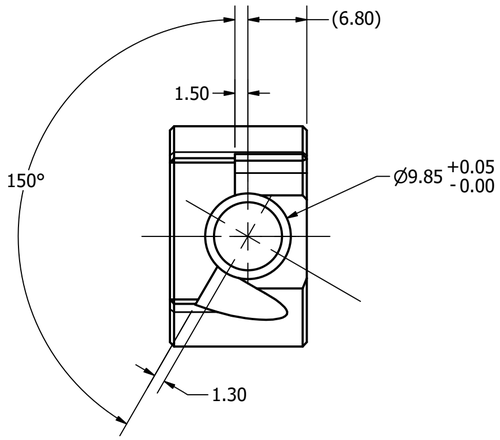
SIZE: A3 | DRAWING NUMBER: 474-3558 | REV: 1
SCALE: 5:1 | SHEET: 1 OF 1

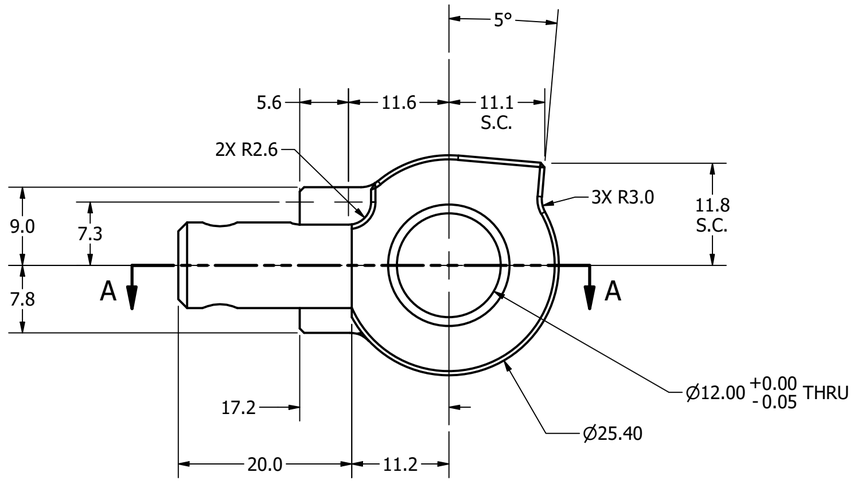
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	DJI	JW	3/29/2016

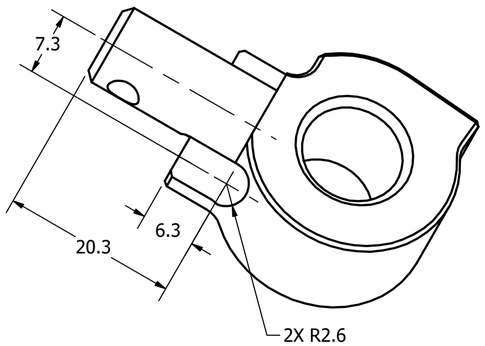


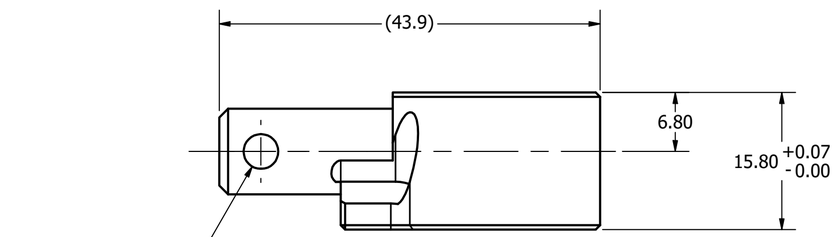


SECTION A-A









PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ∠ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 4130 STEEL
HEAT TREAT:
FINISH: 0.008mm ELECTROLESS NICKEL PLATE PER SIDE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: disopi	3/29/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

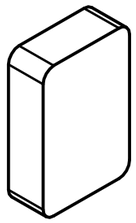
CLEVIS, LEFT SCAPULA LINK

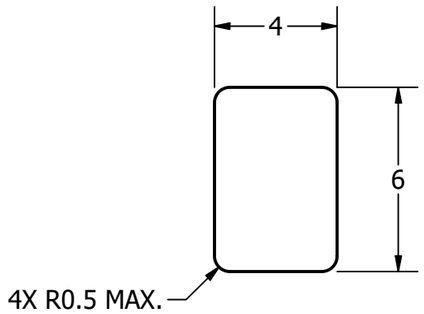
THIRD ANGLE PROJECTION

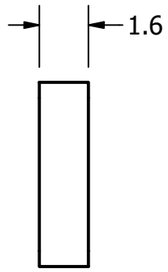
SIZE: A2 | DRAWING NUMBER: 474-3507-1 | REV: 1

SCALE: 2:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	DJI	JW	11/3/17







PRELIMINARY DRAWING

NOTES:
1. MATERIAL: NATURAL RUBBER
   COLOR: BLACK
   DUROMETER: 55 ±10 SHORE "A"
2. REMOVE ALL MOLD FLASHING
3. ALL MOLD DIMENSION TOLERANCE +1%/-2%
   BUT NO SMALLER THAN 0.5mm
4. NO SPLIT OR DEFECTS ARE ALLOWED
   IN THE RUBBER MOLDING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED 32 | ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTE 1
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: disopi	3/29/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

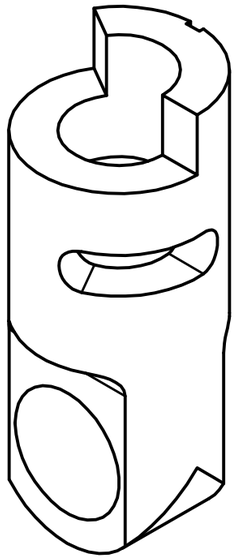
SCAPULA LINK BUMPER

THIRD ANGLE PROJECTION

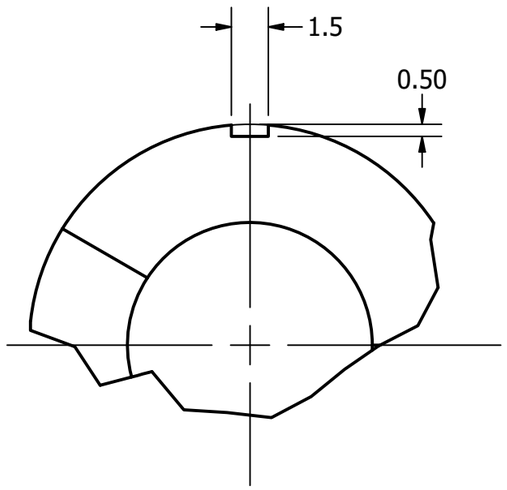
SIZE: A3 | DRAWING NUMBER: 474-3539 | REV: 1

SCALE: 5:1 | SHEET: 1 OF 1

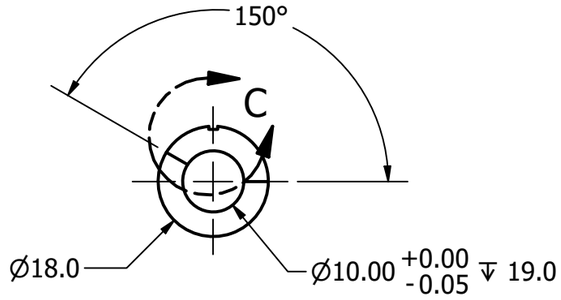
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	DJI	JW	3/31/2016

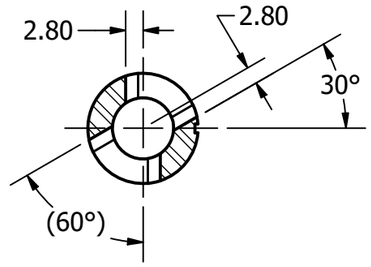


SCALE 2 : 1

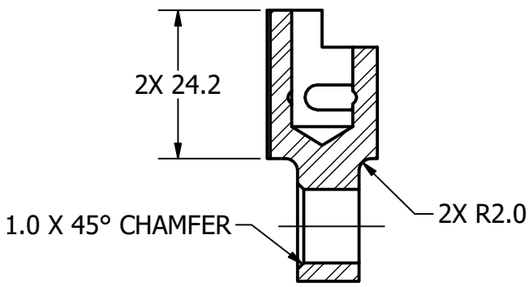


DETAIL C
SCALE 4 : 1

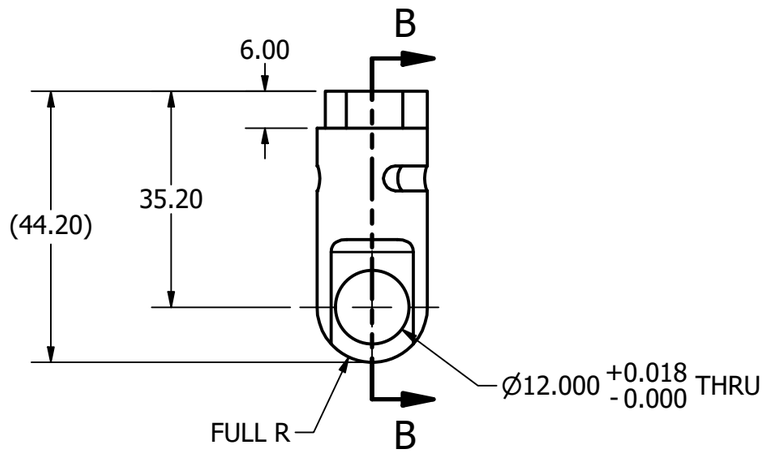


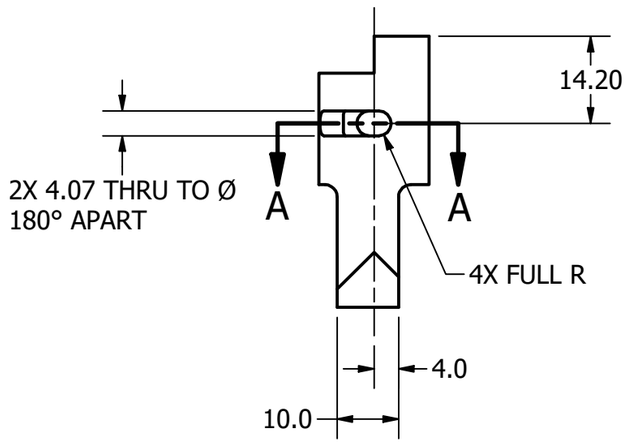


SECTION A-A



SECTION B-B





UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED √ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN disopi	3/31/2016
CHECKED	
ENG	
APPROVED	

SCAPULA LINK, LEFT

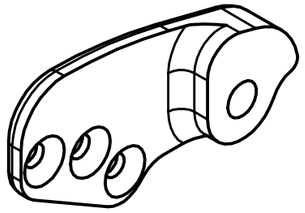
MATERIAL: 4130 STEEL
HEAT TREAT:
FINISH: 0.008mm ELECTROLESS NICKEL PLATE PER SIDE

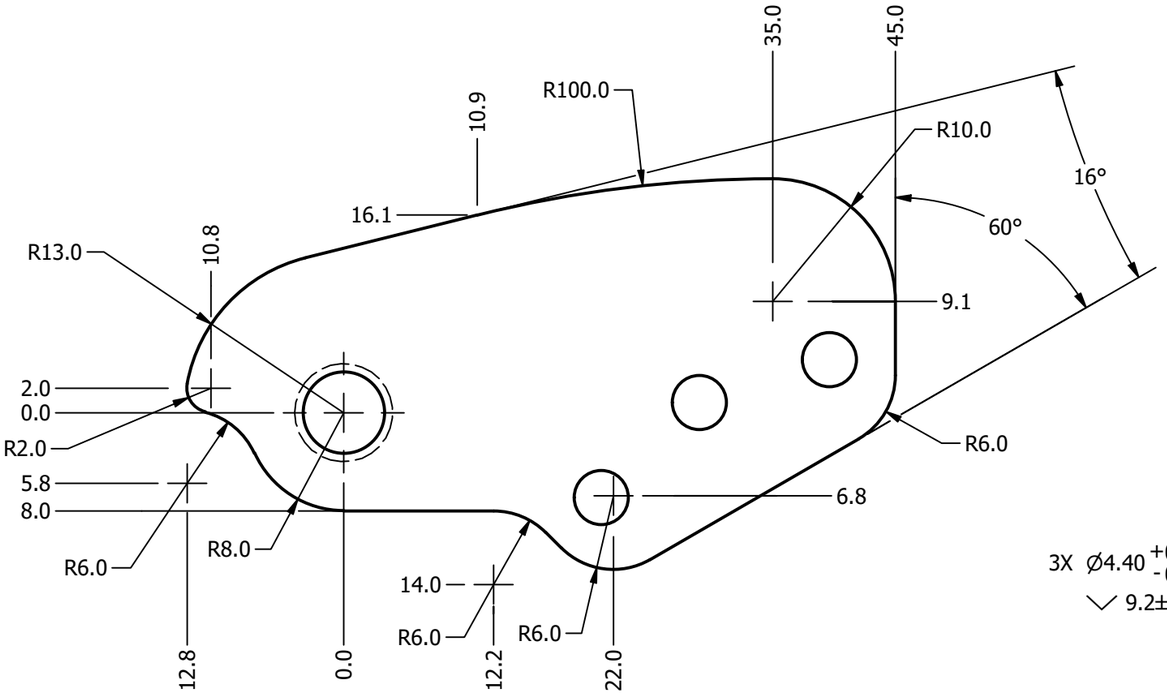
PRELIMINARY DRAWING

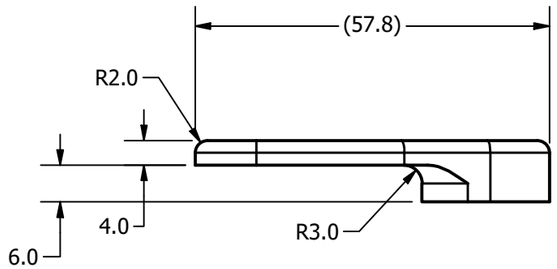
THIRD ANGLE PROJECTION

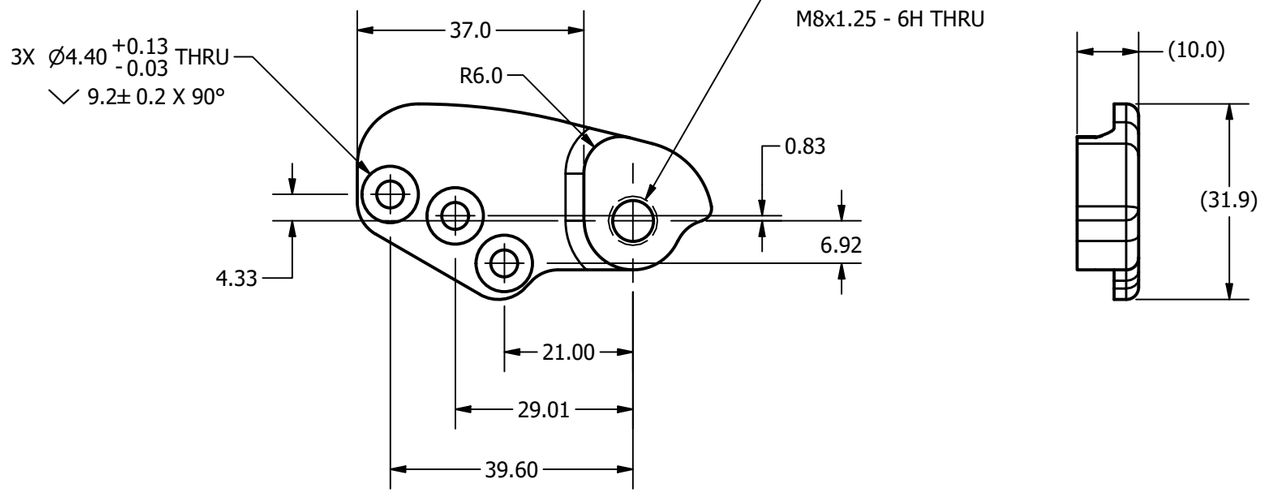
SIZE: A3 | DRAWING NUMBER: 474-3503-1 | REV: 1
SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	DJI	JW	3/24/2016









SCALE 2 : 1

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED √ | ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 4140 STEEL
HEAT TREAT: Rc 44-48
FINISH: 0.008mm ELECTROLESS NICKEL PLATE PER SIDE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: disopi	3/24/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

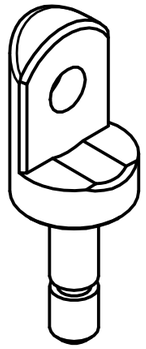
UPPER SCAPULA, LEFT

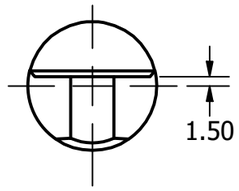
THIRD ANGLE PROJECTION

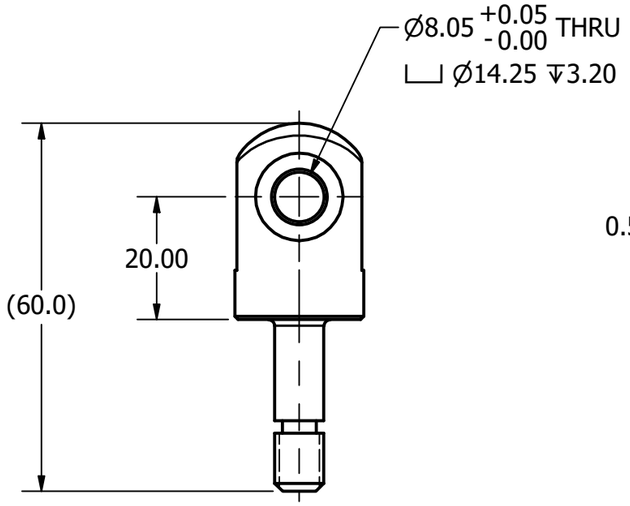
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A3	474-3506-1	1

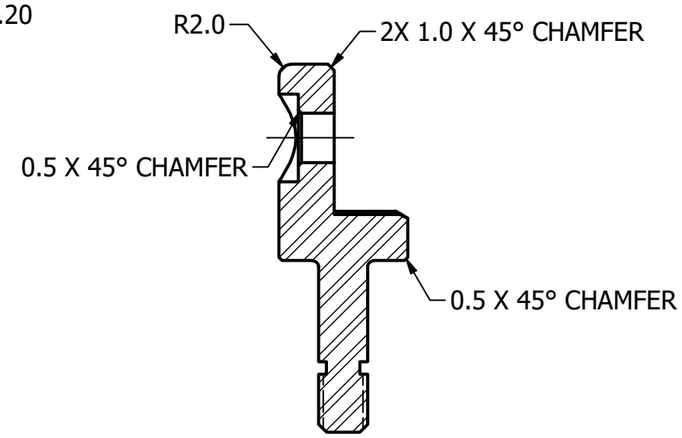
SCALE: 1:1 | SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	DJI	JW	3/31/2016

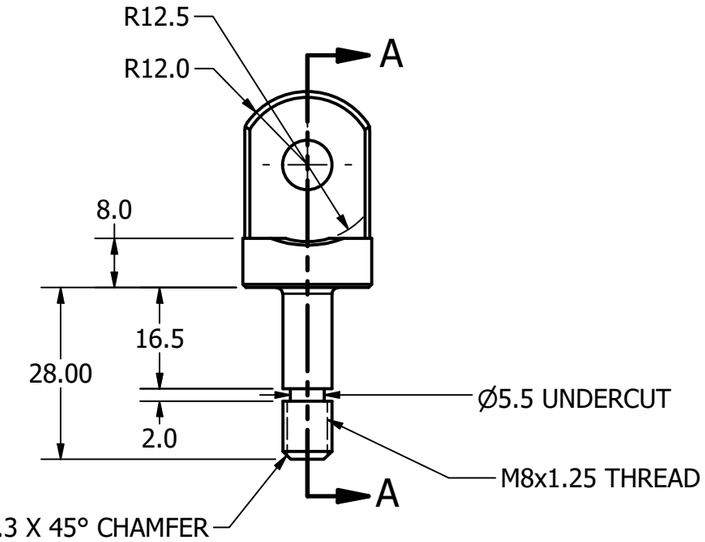


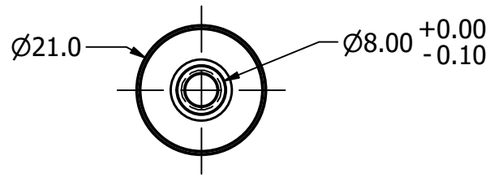






SECTION A-A





PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 4130 STEEL
HEAT TREAT:
FINISH: 0.008mm ELECTROLESS NICKEL PLATE PER SIDE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: disopi	3/31/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

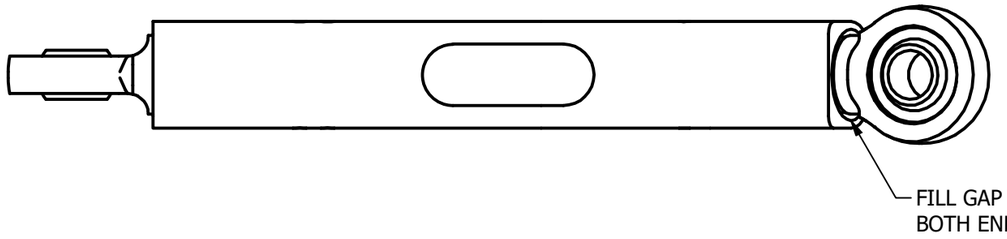
SHOULDER CLEVIS

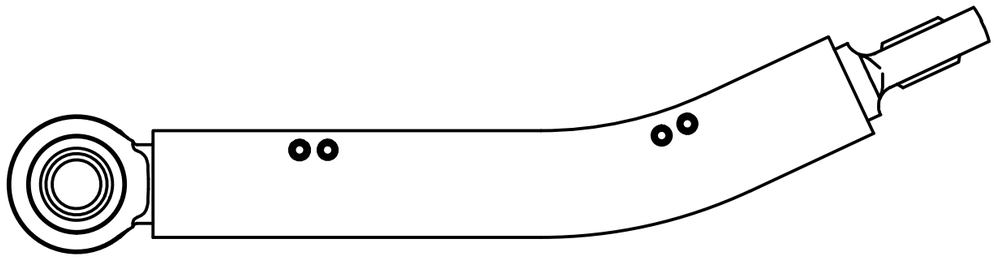
THIRD ANGLE PROJECTION

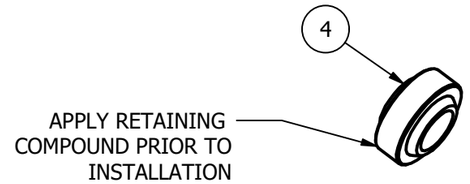
SIZE: A3 | DRAWING NUMBER: 474-3504 | REV: 1

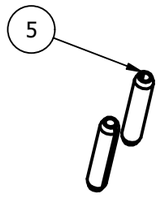
SCALE: 1:1 | SHEET: 1 OF 1

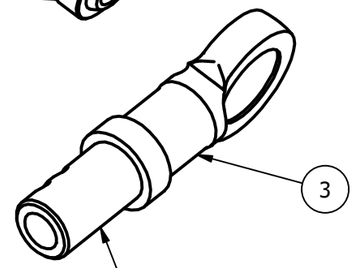
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	3/30/2016

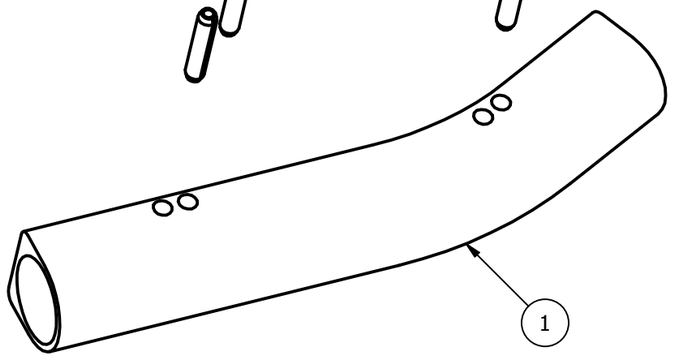


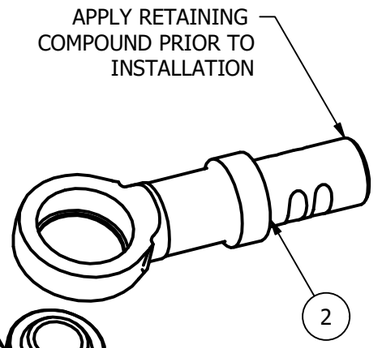


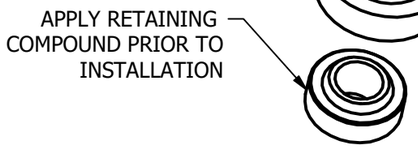












NOTES:

1. CLEAN THE SPHERICAL BEARING O.D. AND SENSOR REPLACEMENT C'BORE WITH SOLVENT.
2. APPLY A THIN LAYER OF RETAINING COMPOUND TO SURFACES OF BEARING (5000946) AND INSERT.
3. CLEAN THE SENSOR REPLACEMENT PILOT DIAMETER AND CLAVICLE BONE BORE WITH SOLVENT.
4. APPLY A THIN LAYER OF RETAINING COMPOUND TO ITEM #2 (AXSDM103) AND INSERT AS SHOWN.
5. ALIGN PINS WITH GROOVES ON SENSOR REPLACEMENT AND INSERT INTO PLACE. USING A DOWEL PIN AS GUIDE IS PERMISSABLE.
6. APPLY A THIN LAYER OF RETAINING COMPOUND TO ITEM #3 (AXSDM104) AND INSERT AS SHOWN.
7. ALIGN PINS WITH GROOVES ON SENSOR REPLACEMENT AND INSERT INTO PLACE. USING A DOWEL PIN AS GUIDE IS PERMISSABLE.

PRELIMINARY DRAWING

ITEM	QTY	PART NUMBER	DESCRIPTION
5	4	9002330	1/8 x 5/8 LG. ROLL PIN
4	2	5000946	METRIC SPHERICAL BEARING
3	1	AXSDM104	MEDIAL SENSOR STRUCTRUAL REPLACEMENT
2	1	AXSDM103	LATERAL STRUCTURAL REPLACEMENT
1	1	474-3509	CLAVICLE

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED √ | ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN ghayden	3/30/2016
CHECKED	
ENG	
APPROVED	

MATERIAL
HEAT TREAT
FINISH

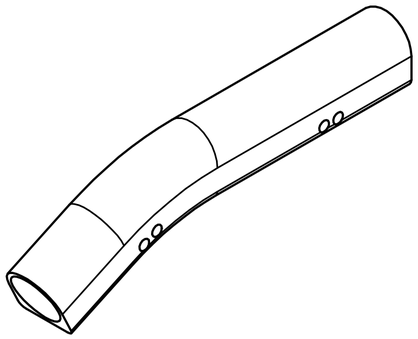
CLAVICLE ASSEMBLY

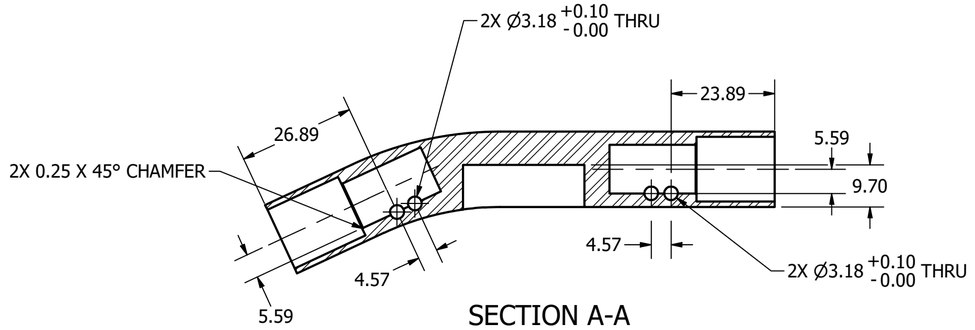
THIRD ANGLE PROJECTION

SIZE A3 | DRAWING NUMBER 474-3508 | REV 1

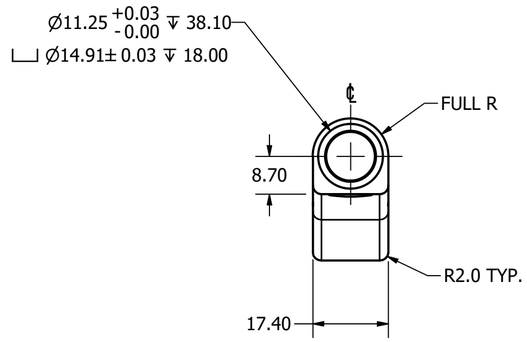
SCALE: 1:1 | SHEET 1 OF 1

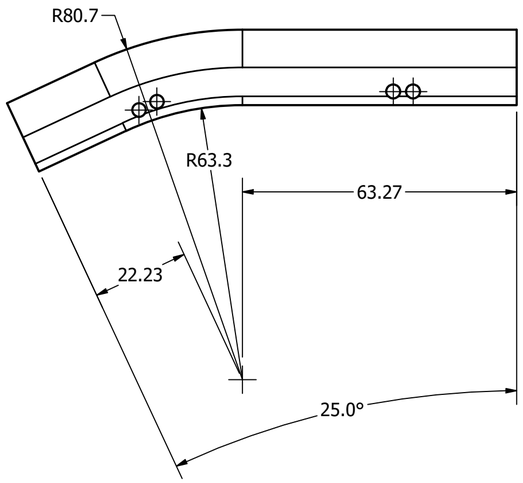
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	3/30/2016

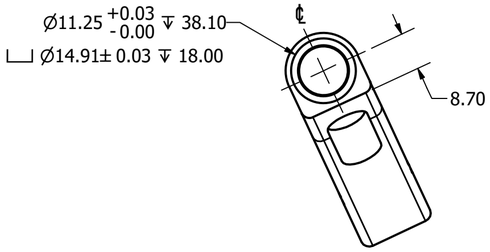


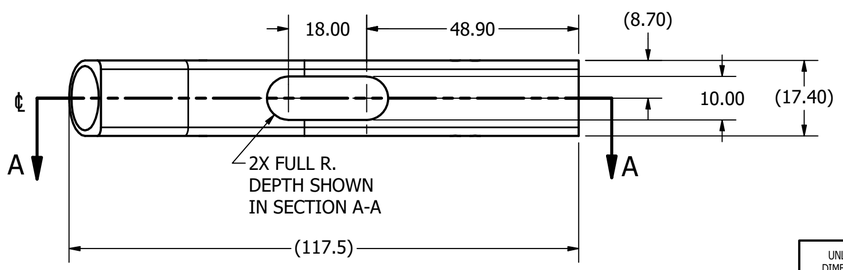


SECTION A-A









UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

PRELIMINARY DRAWING

MATERIAL	4140 PHT STEEL	
HEAT TREAT	Rc 28-32	
FINISH	0.008mm ELECTROLESS NICKEL PLATE PER SIDE	

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN ghayden	3/30/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

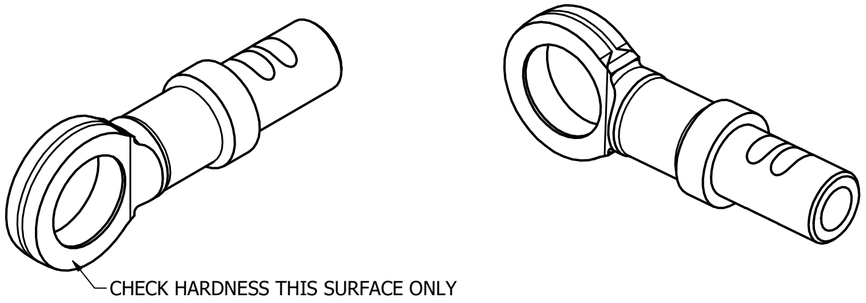
CLAVICLE

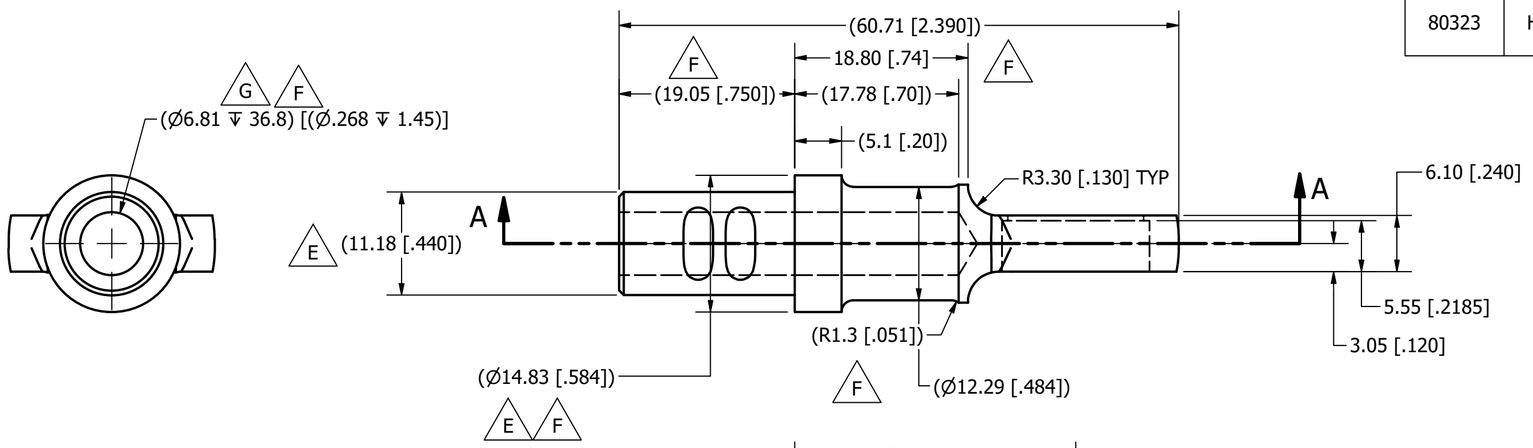
THIRD ANGLE PROJECTION

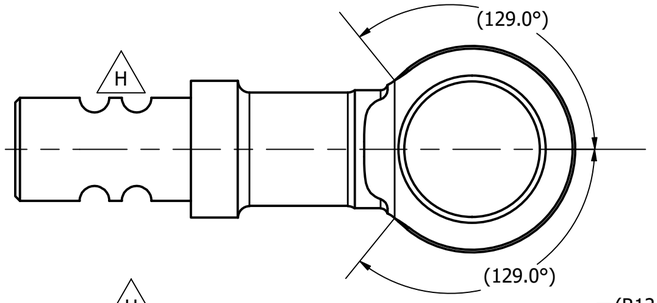
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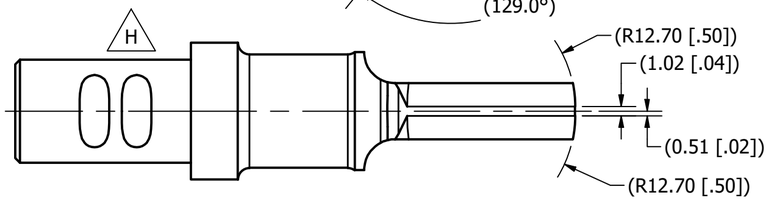
SCALE: 1:1 | SHEET 1 OF 1

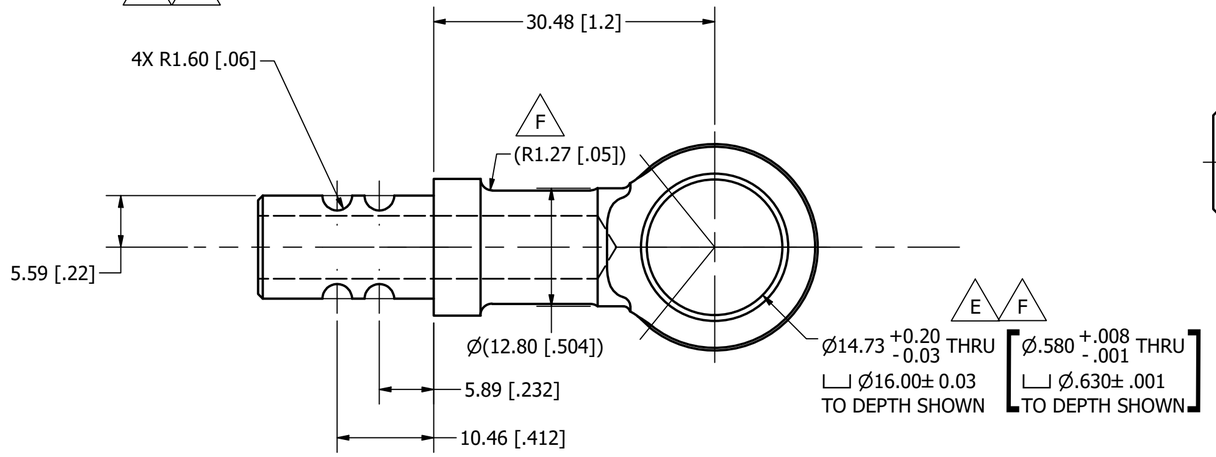
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
N/A	A	RELEASE FOR PRODUCTION			
N/A	B	CIRCLIP GROOVE, DETAIL A ADDED	MJB		5/11/12
71214	C	REDRAWN IN INVENTOR; REDESIGN FOR LOAD CELL INTERFACE CHANGE, UPDATE ALL VIEWS AND DIMENSIONS	BLB		6/25/13
72195	D	1 WAS 1.02	BK	JQG	5/12/2014
72899	E	14.73 +/-0.03 WAS +0.00/-0.03; REMOVED LEADING ZEROS FROM ENGLISH TOLERANCES;	BTH	TORCH	8/29/2014
74910	F	MATERIAL WAS 17-4 STAINLESS STEEL; MADE DIMS REF. MAKE FROM 17-4 PH STAINLESS STEEL; UPDATE HOLE CALLOUTS	JGG	SKK	3/7/2016
75917	G	36.8 WAS 36.83; ADD HARDNESS RANGE	JGG	TORCH	12/5/2016
80323	H	REMOVE DETAIL B; REMOVED 120 DEGREE FROM CENTER VIEW; ADD (2) VIEWS AT SHEET LOCATION C1	RAB	LB	3/13/2018

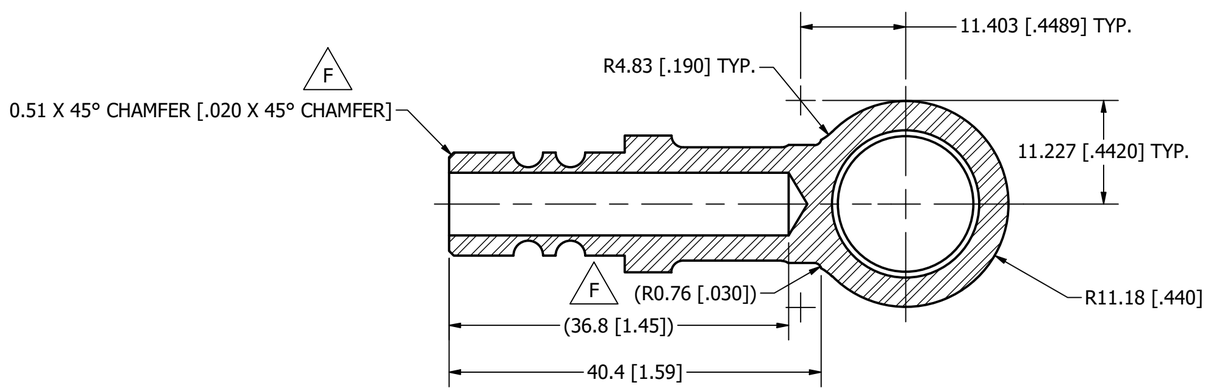












SECTION A-A
SCALE 2 : 1

NOTES:
1. HEAT TREAT: H 900 (900° FOR 1 HOUR, AIR COOL R/C 40-48) (SEE NOTE FOR AREA TO CHECK HARDNESS)
2. MAKE FROM 17-4 PH STAINLESS STEEL.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTE #2
HEAT TREAT: SEE NOTE #1
FINISH: NONE

VEHICLE RESEARCH and TEST CENTER

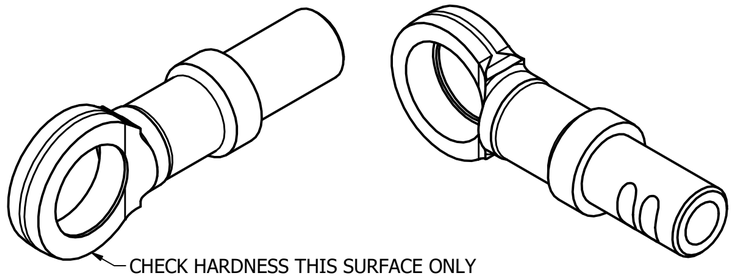
APPROVALS	DATE
DRAWN: MJB	11/5/2012
CHECKED:	
ENG: TORCH	8/29/2014
APPROVED:	

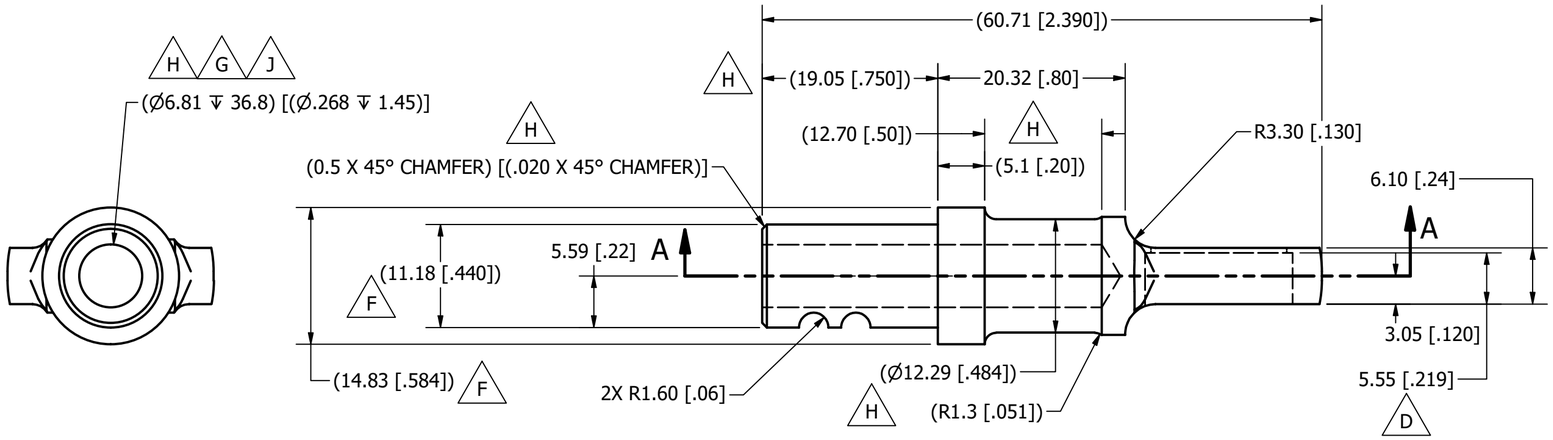
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

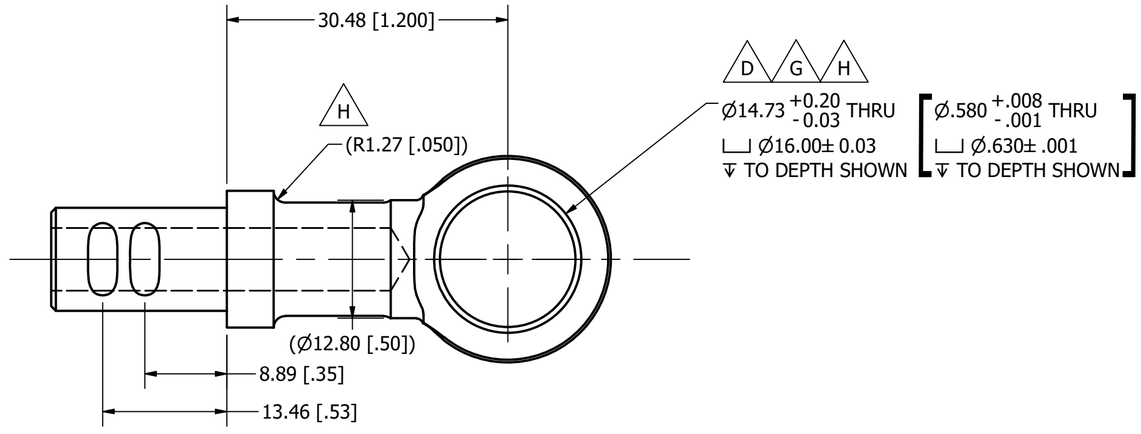
LATERAL STRUCTURAL REPLACEMENT
THOR SD-3 CLAVICLE

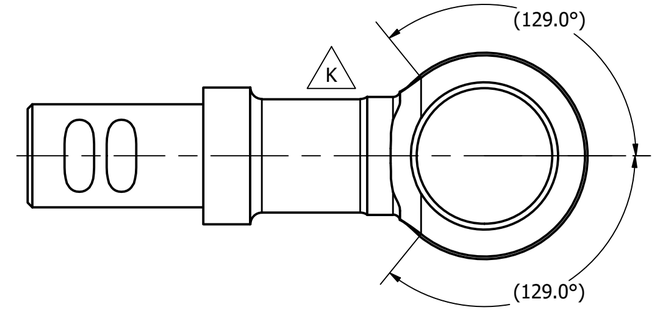
THIRD ANGLE PROJECTION
SIZE: C
DRAWING NUMBER: AXSDM103
REV: H
SCALE: 2 : 1
SHEET: 1 OF 1

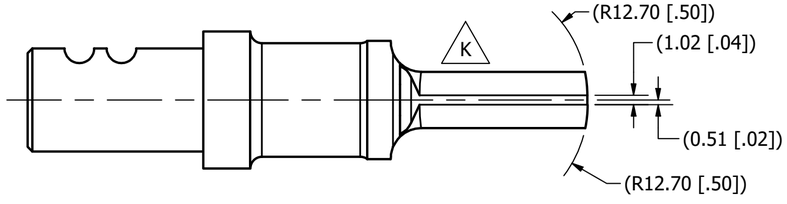
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
N/A	A	RELEASE FOR PRODUCTION			
N/A	B	3.2 SLOTS WERE VERTICAL, R1.0 WAS 2.4, SR8.0 ADDED MATL ADDED	MJB		5/11/12
71214	C	REDRAW IN INVENTOR; REDESIGN FOR LOAD CELL INTERFACE CHANGE, UPDATE ALL VIEWS AND DIMENSIONS	BLB		7/12/13
72086	D	"TO DEPTH SHOWN" WAS 6.550 DEEP; 5.55 WAS (5.55)	TMV		3/5/2014
72195	E	1 WAS 1.02; REMOVE RANDOM TOLERANCE BOX	BK	JQG	5/12/2014
72899	F	14.73 +/-0.03 WAS +0.00/-0.03; REMOVED LEADING ZEROS ON ENGLISH TOLERANCES	BTH	TORCH	8/28/2014
73058	G	0.2 POSITION TOLERANCE WAS 0.02; 16.00 DIA. WAS 16.03 DIA.	CJT	TORCH	10/28/2014
74910	H	MATERIAL WAS 17-4 STAINLESS STEEL; DIMS MADE REF. FROM 17-4 PH STAINLESS STEEL; UPDATE HOLE CALLOUT	JGG	SKK	3/7/2016
75917	J	36.8 WAS 36.83; ADD HARDNESS RANGE	JGG	TORCH	12/5/2016
80323	K	REMOVE DETAIL B; REMOVED 129 DEGREE DIMS FROM CENTER VIEW; ADD (2) VIEWS AT SHEET LOCATION B4	RAB	LB	3/14/2018

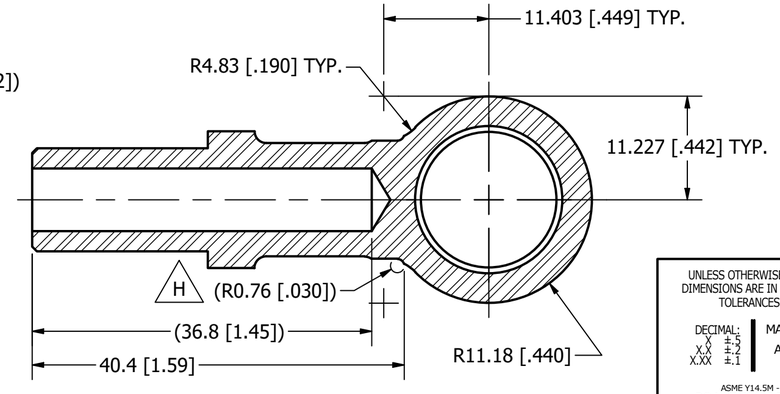












SECTION A-A
SCALE 2 : 1

NOTES:
H J
1. HEAT TREAT: H 900 (900° FOR 1 HOUR, AIR COOL R/C 40-48)
(SEE NOTE FOR AREA TO CHECK HARDNESS)
2. MAKE FROM 17-4 PH STAINLESS STEEL.

PRELIMINARY DRAWING

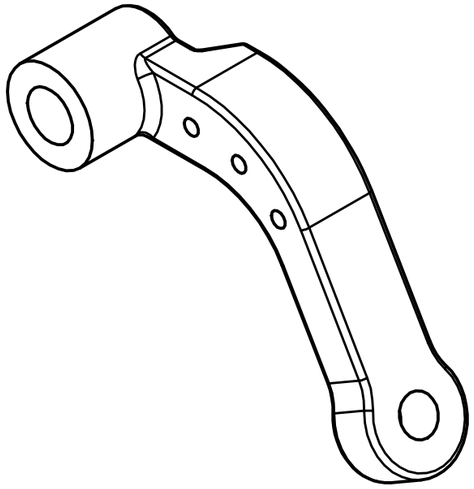
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS TOLERANCES ARE: DECIMAL: X ±.5, X.X ±.2, X.XX ±.1; MACHINED ANGLES ±.5° ASME Y14.5M - 1994 DO NOT SCALE DRAWING	VEHICLE RESEARCH and TEST CENTER	APPROVALS	DATE
		DRAWN MJB	10/28/2011
MATERIAL SEE NOTE #2		CHECKED	
HEAT TREAT SEE NOTE #1		ENG TORCH	8/29/2014
FINISH NONE		APPROVED	

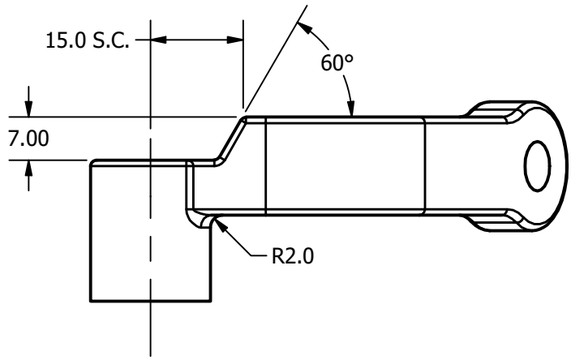
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

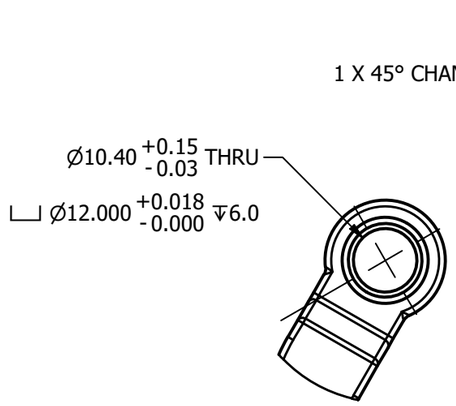
MEDIAL SENSOR STRUCTRUAL REPLACEMENT
THOR SD-3 CLAVICLE

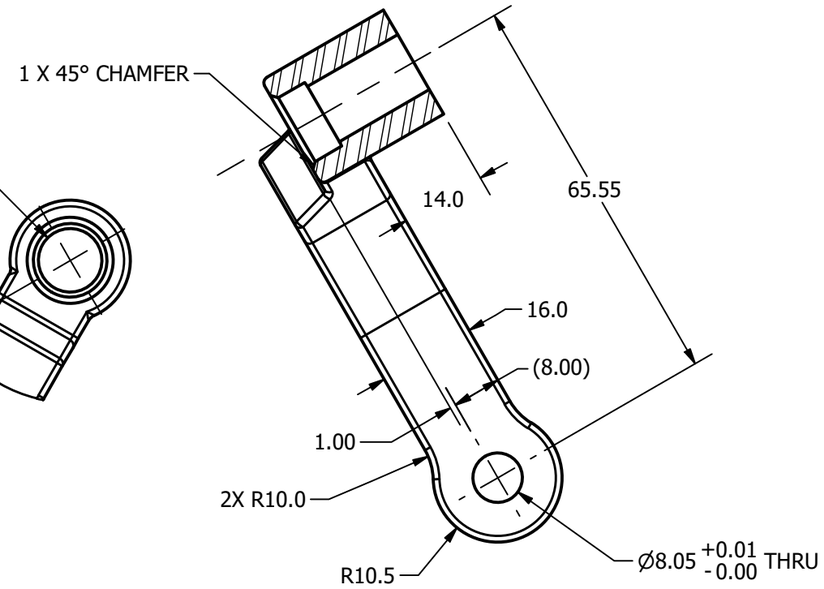
THIRD ANGLE PROJECTION | SIZE C | DRAWING NUMBER AXSDM104 | REV K | SCALE: 2 : 1 | SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	DJI	JW	3/31/2016

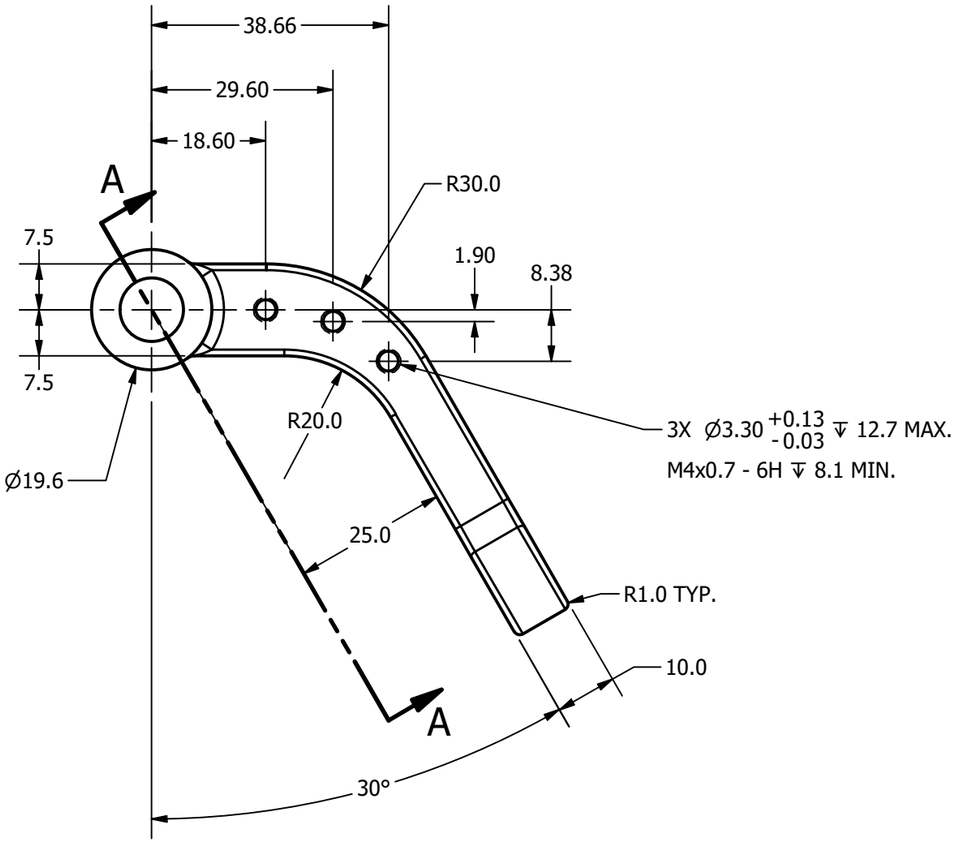








SECTION A-A



PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 4130 STEEL
HEAT TREAT:
FINISH: 0.008mm ELECTROLESS NICKEL PLATE PER SIDE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: disopi	3/31/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

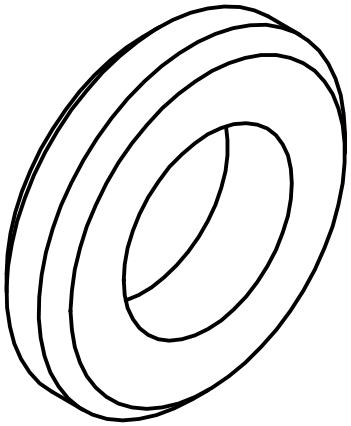
LOWER SCAPULA, LEFT

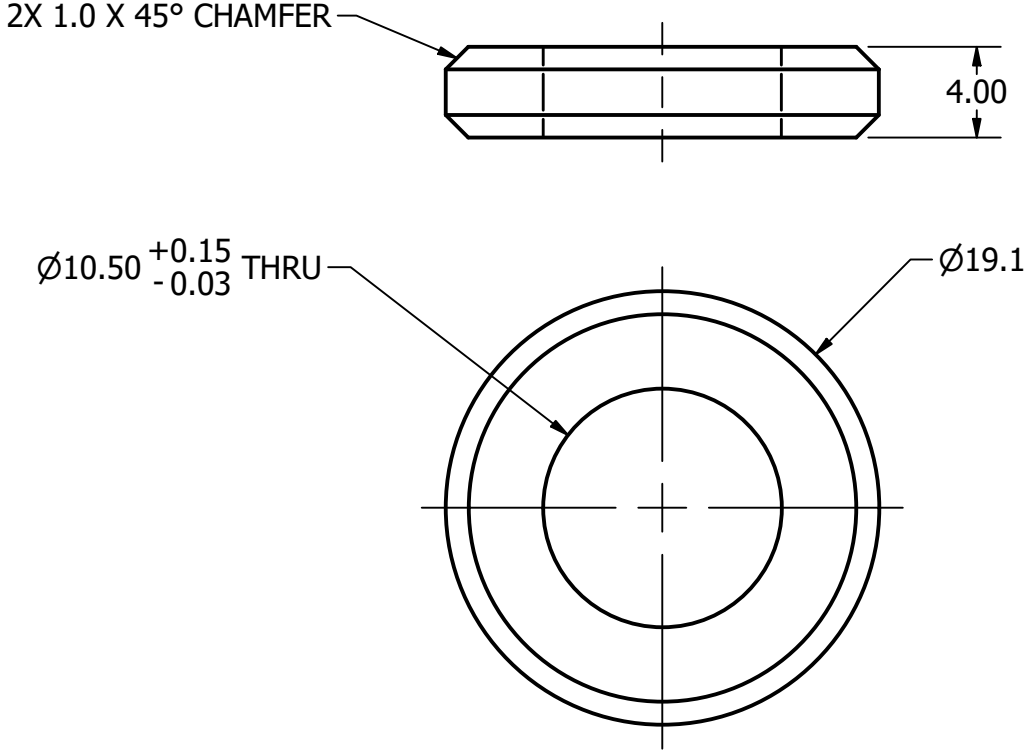
THIRD ANGLE PROJECTION

SIZE: A3 | DRAWING NUMBER: 474-3505-1 | REV: 1

SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	DJI	JW	3/29/2016





UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ±.5 | ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

PRELIMINARY DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

SPACER WASHER, M10, NYLON

APPROVALS	DATE
DRAWN: disopi	3/29/2016
CHECKED	
ENG	
APPROVED	

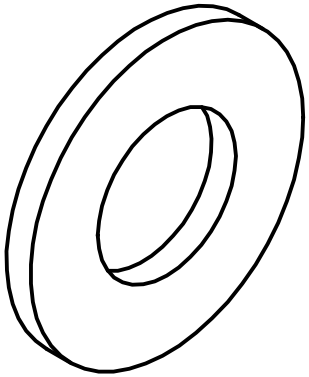
MATERIAL: Nylon-6/6
HEAT TREAT:
FINISH:

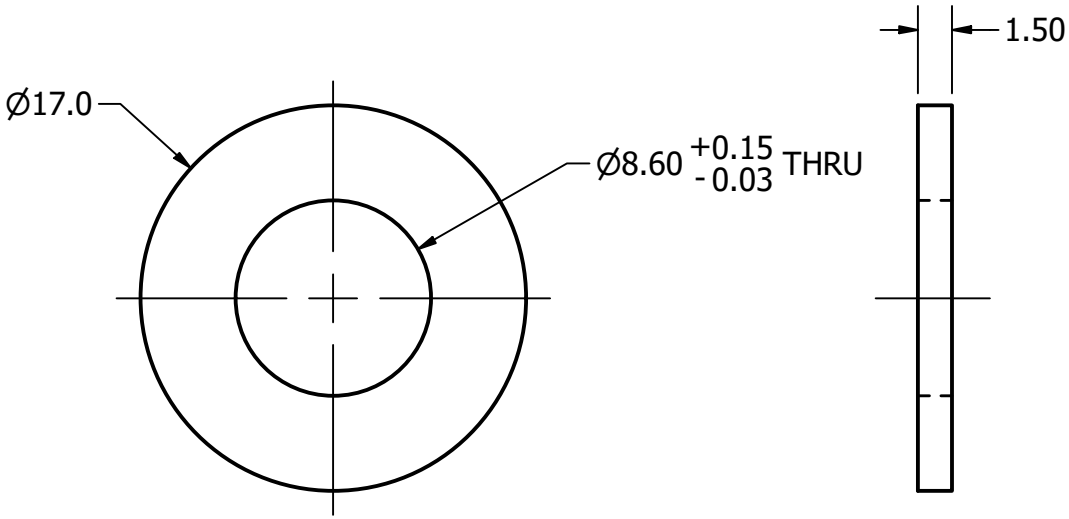
THIRD ANGLE PROJECTION

SIZE: A4 | DRAWING NUMBER: 474-3534 | REV: 1

SCALE: 3:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	DJI	JW	3/29/2016





NOTES:

1. MAKE FROM 6004407 (METAL FREE BRAKE LINING, McM #6175K813)

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ±1° ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTE 1
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: disopi	3/29/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

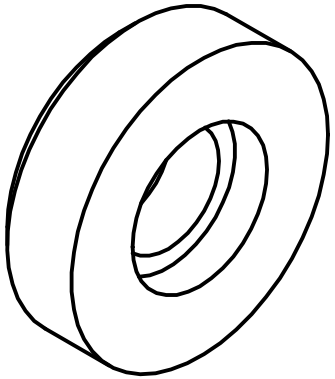
FRICTION WASHER

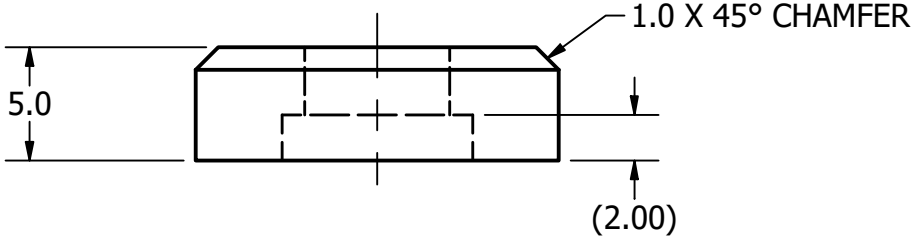
THIRD ANGLE PROJECTION

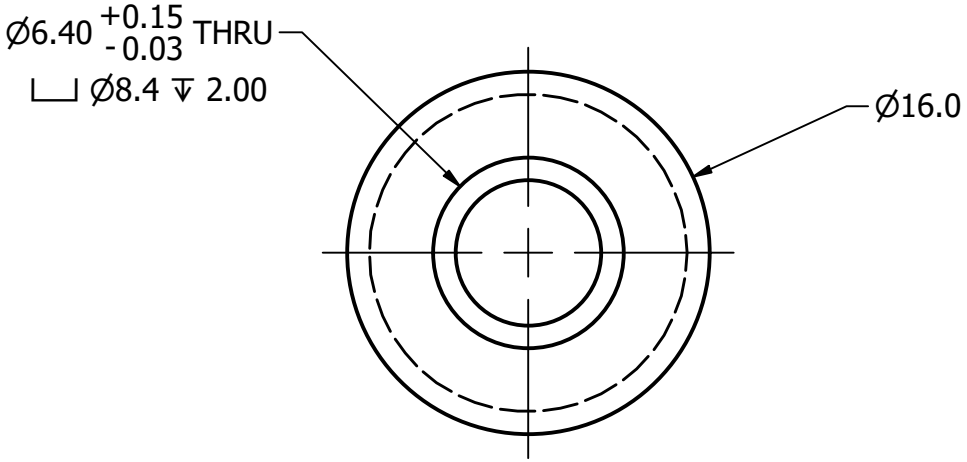
SIZE: A4 | DRAWING NUMBER: 474-3535 | REV: 1

SCALE: 3:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	DJI	JW	3/31/2016







UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ±5° | ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

PRELIMINARY DRAWING

MATERIAL	HEAT TREAT	FINISH
1018 STEEL		0.008mm ELECTROLESS NICKEL PLATE PER SIDE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: disopi	3/31/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

SHOULDER WASHER, THICK

THIRD ANGLE PROJECTION

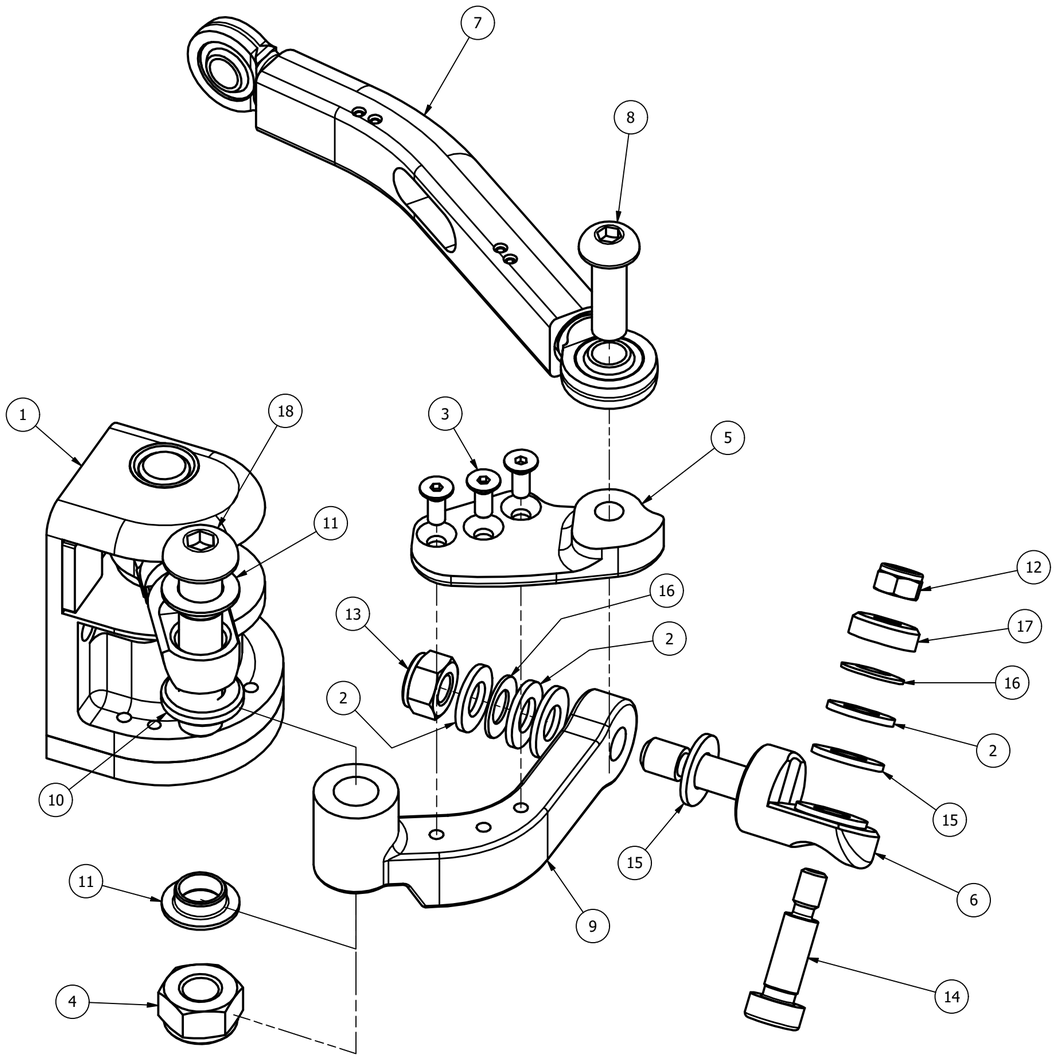
SIZE	DRAWING NUMBER	REV
A4	474-3537	1

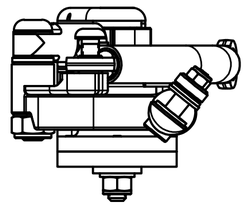
SCALE: 3:1

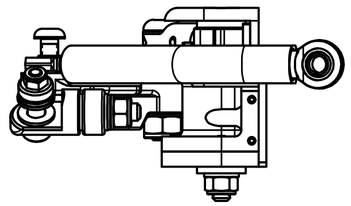
SHEET 1 OF 1

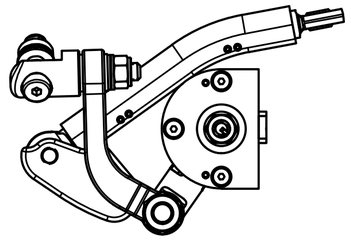
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	3/31/2016
	2	ADDED PATENT INFORMATION	AT	JW	7/12/2018

Please note that portions of these drawings are covered by U.S. Patent Nos. 9,514,659 and 9,799,234, assigned to Humanetics Innovative Solutions, Inc. (Humanetics) of Plymouth, Michigan, USA.









SCALE 1 : 1

ITEM	QTY	PART NUMBER	DESCRIPTION
18	1	5001405	M10 X 1.5 X 50 LG. BHCS SS
17	1	474-3537	SHOULDER WASHER, THICK
16	2	5001388	WASHER BELLEVILLE M8 (8.2 X 15 X 0.8)
15	4	474-3535	FRICTION WASHER
14	1	5001154	M8 X 20 LG. SHSS
13	1	5000486	M8 X 1.25 HEX LOCK NUT ZINC
12	1	5000093	M6 X 1 HEX LOCK NUT ZINC
11	2	6004605	BEARING, FLANGE 12mm OD X 10mm ID X 5mm LG
10	1	474-3534	SPACER WASHER, M10, NYLON
9	1	474-3505-2	LOWER SCAPULA, RIGHT
8	1	5000255	M8 X 1.25 X 25 LG. BHCS
7	1	474-3508	CLAVICLE ASSEMBLY
6	1	474-3504	SHOULDER CLEVIS
5	1	474-3506-2	UPPER SCAPULA, RIGHT
4	1	5000149	M10 X 1.5 HEX LOCK NUT ZINC
3	3	5000023	M4 X 0.7 X 10 LG. FHCS
2	3	5000123	M8 FLAT WASHER PLAIN ZINC
1	1	474-3524-2	SPINE-SHOULDER COUPLER ASSEMBLY, RIGHT

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED & ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

SHOULDER ASSEMBLY, RIGHT

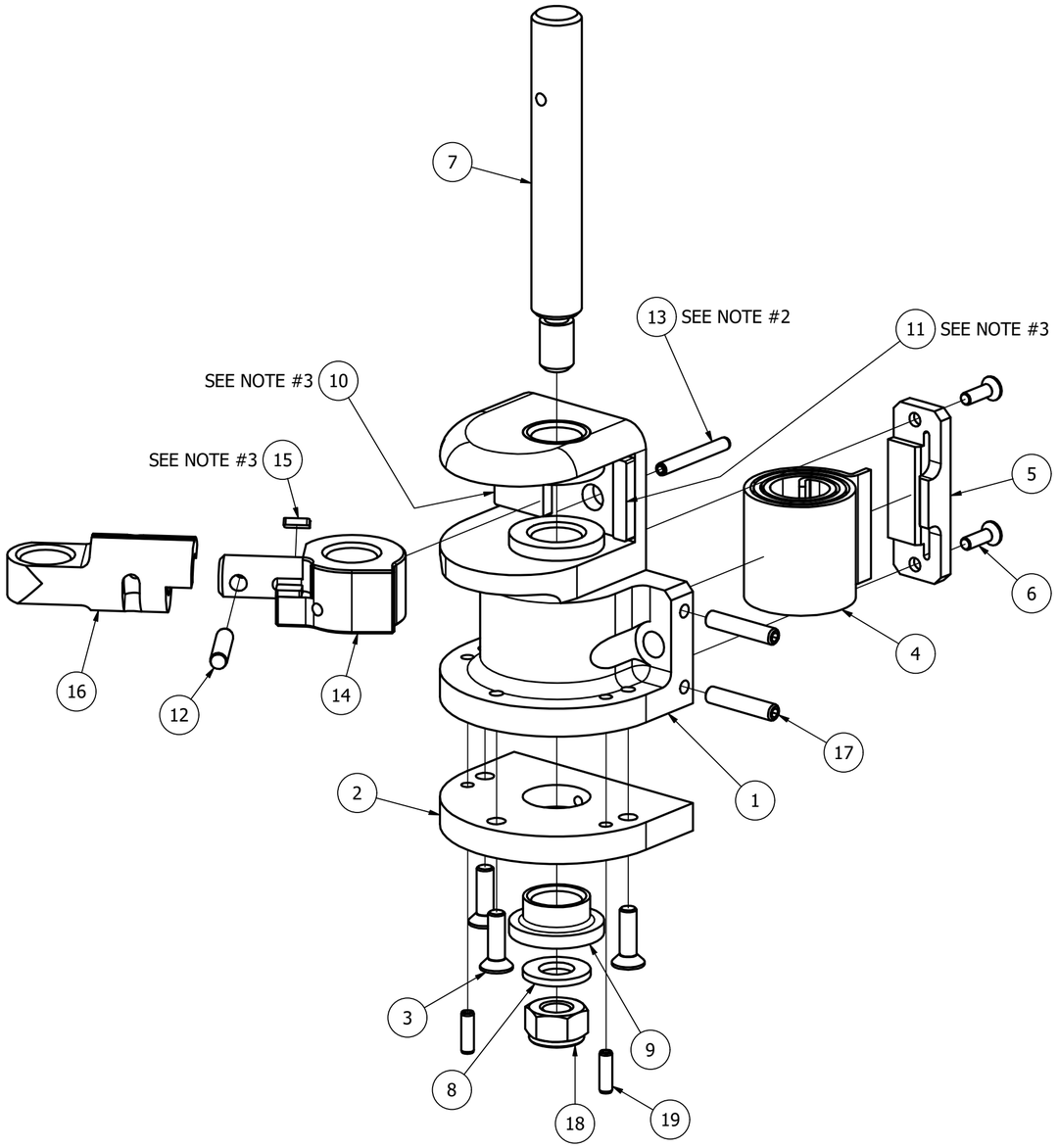
	APPROVALS	DATE
DRAWN	ghayden	3/31/2016
CHECKED		
ENG		
APPROVED		

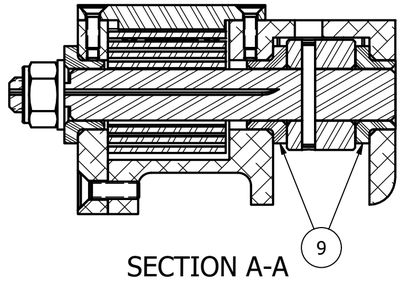
MATERIAL
HEAT TREAT
FINISH

THIRD ANGLE PROJECTION

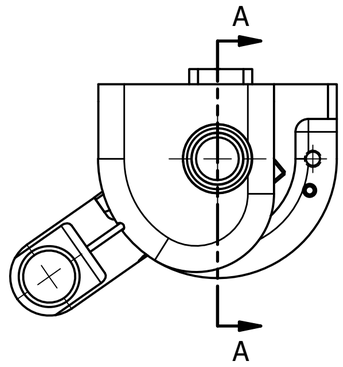
SIZE A2 | DRAWING NUMBER 474-3500-2 | REV 2
SCALE: .5:1 | SHEET 1 OF 1

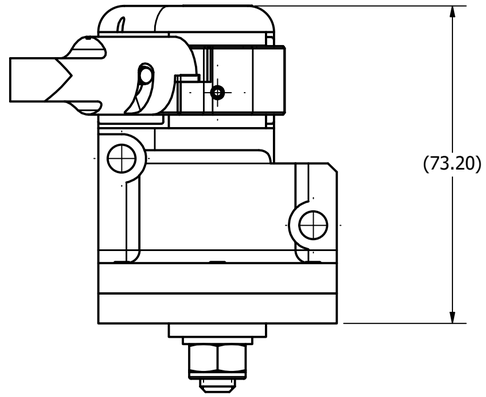
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	3/30/2016





SECTION A-A





ITEM	QTY	PART NUMBER	DESCRIPTION
19	2	5000199	M3 X 10 LG. ROLL PIN SS
18	1	5000318	M8 X 1.25 HEX LOCK NUT SS
17	2	5001433	M4 X 0.7 X 20 LG. SSSFP SS
16	1	474-3503-2	SCAPULA LINK, RIGHT
15	2	474-3539	SCAPULA LINK BUMPER
14	1	474-3507-2	CLEVIS, RIGHT SCAPULA LINK
13	1	5000140	M3 X 24 LG. ROLL PIN
12	1	5000815	M4 X 18 LG. DOWEL PIN
11	1	474-3558	FRONT SHOULDER STOP
10	1	474-3529	REAR SHOULDER STOP
9	3	474-3527	SHAFT SLEEVE
8	1	5000123	M8 FLAT WASHER PLAIN ZINC
7	1	474-3519	PIN, SPRING TENSION
6	2	5000203	M3 X 0.5 X 10 LG. FHCS
5	1	474-3526	SPRING RETAINER
4	1	474-3582	SPRING, SHOULDER
3	3	5001356	M4 X 0.7 X 14 LG. FHCS SS
2	1	474-3502	SPINE-SHOULDER COUPLER, BOTTOM
1	1	474-3501-2	SPINE-SHOULDER COUPLER, TOP, RIGHT

PARTS LIST

NOTES:

1. SECURE SCREWS.
2. SEE SHEET #2 FOR MACHINING INSTRUCTIONS FOR ROLL PIN HOLE.
3. SEE SHEET #2 FOR BONDING INSTRUCTIONS FOR PADS.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL
HEAT TREAT
FINISH

*V*EHICLE *R*ESEARCH and *T*EST *C*ENTER

APPROVALS	DATE
DRAWN ghayden	3/30/2016
CHECKED	
ENG	
APPROVED	

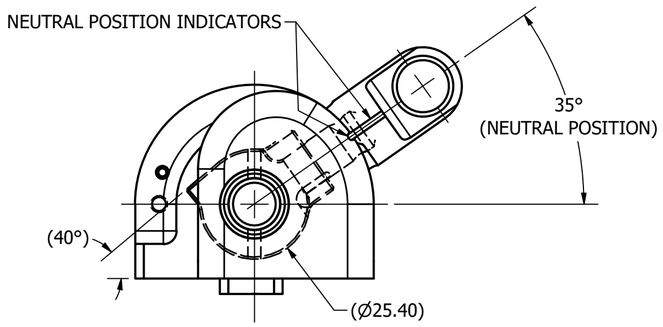
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

SPINE-SHOULDER COUPLER ASSEMBLY, RIGHT

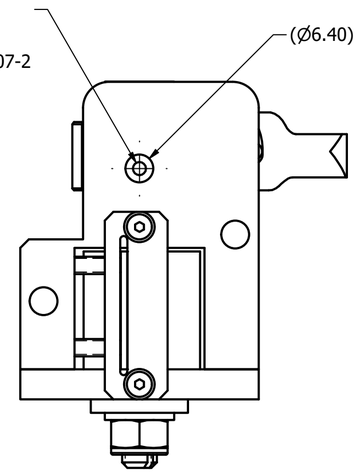
THIRD ANGLE PROJECTION

SIZE A2 | DRAWING NUMBER 474-3524-2 | REV 1

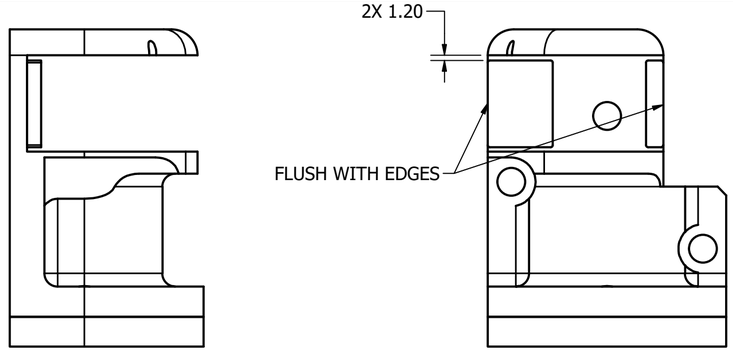
SCALE: 1:1 | SHEET 1 OF 2



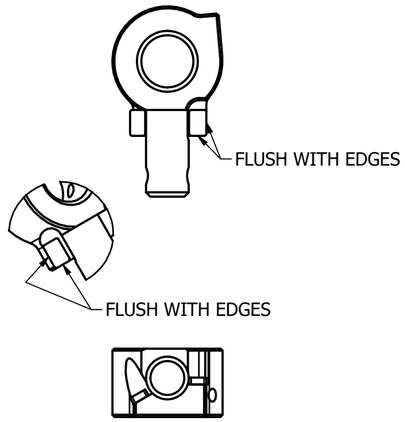
POSITION 474-3507-2 AT
NEUTRAL POSITION AS SHOWN
Ø3.00 $^{+0.10}_{-0.00}$ THRU PART 474-3507-2
INSTALL ROLL PIN .5mm MIN
BELOW Ø25.40 SURFACE



HOLE MACHINING FOR NEUTRAL POSITION



BOND PADS 474-3529 & 474-3558 ONTO 474-3524-2 AS SHOWN



BOND PADS (2X) 474-3539 ONTO
474-3507-2 AS SHOWN.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ∠ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

SPINE-SHOULDER COUPLER ASSEMBLY, RIGHT

	APPROVALS	DATE
DRAWN	ghayden	3/30/2016
CHECKED		
ENG		
APPROVED		

MATERIAL
HEAT TREAT
FINISH

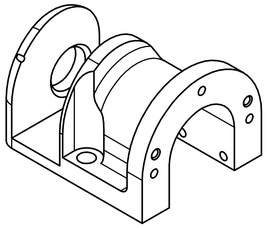
PRELIMINARY DRAWING

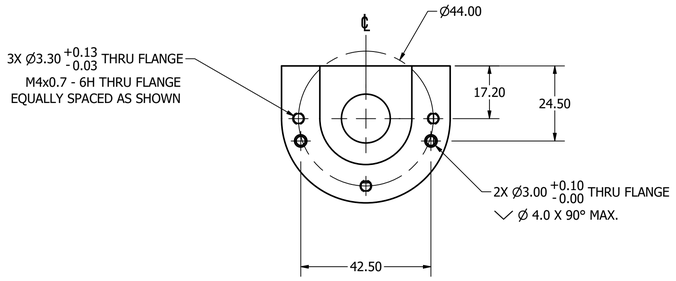
THIRD ANGLE PROJECTION

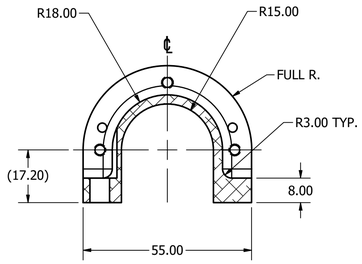
SIZE A2 | DRAWING NUMBER 474-3524-2 | REV 1

SCALE: 1:1 | SHEET 2 OF 2

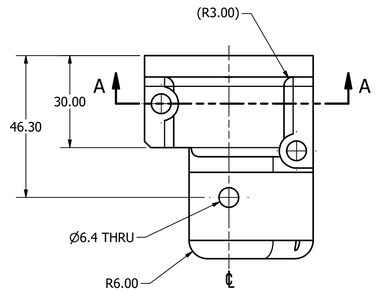
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	3/29/2016

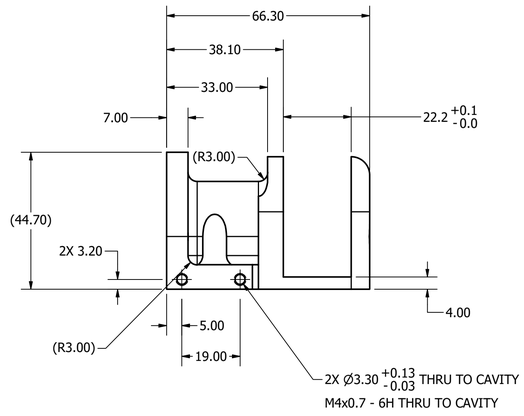


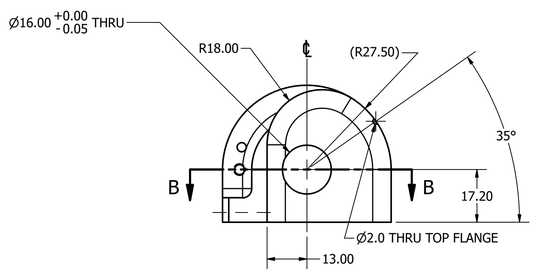


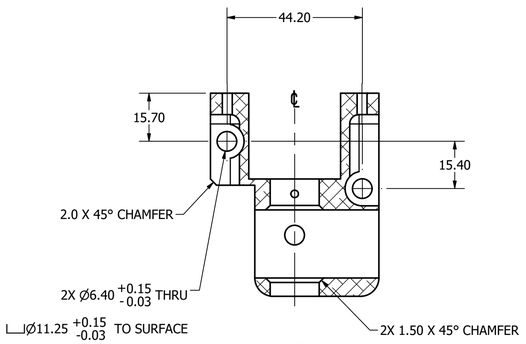


SECTION A-A

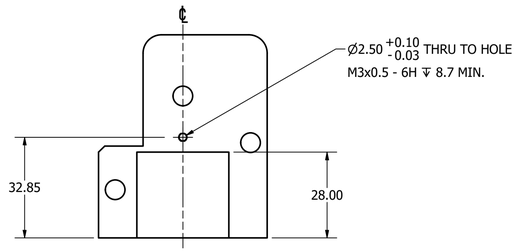








SECTION B-B



NOTES:

1. ALL DIMENSIONS ARE SYMMETRICAL ABOUT ℄ UNLESS OTHERWISE NOTED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.2, X.X ±.1, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: ghayden	3/29/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

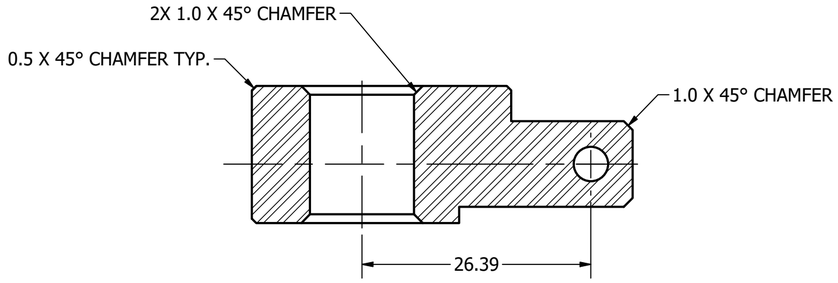
SPINE-SHOULDER COUPLER, TOP, RIGHT

THIRD ANGLE PROJECTION

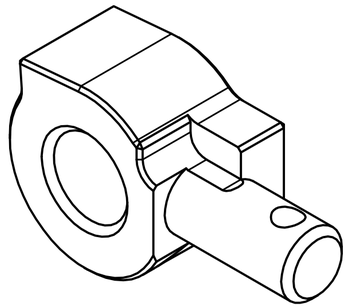
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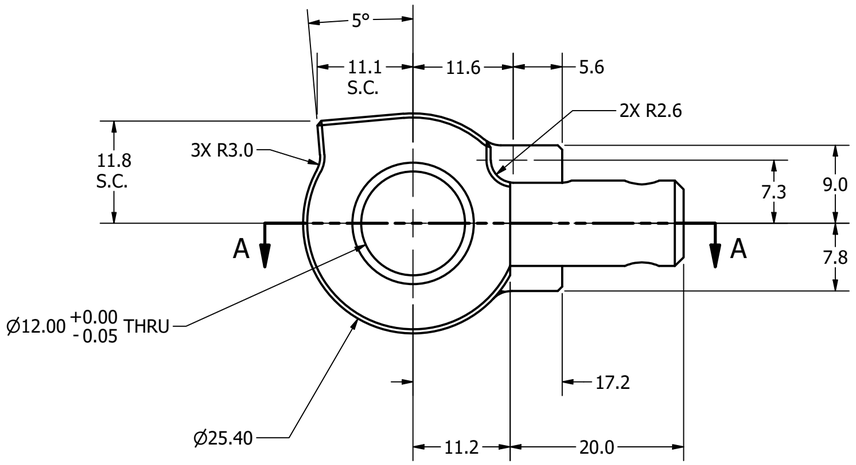
SCALE: 1:1 | SHEET: 1 OF 1

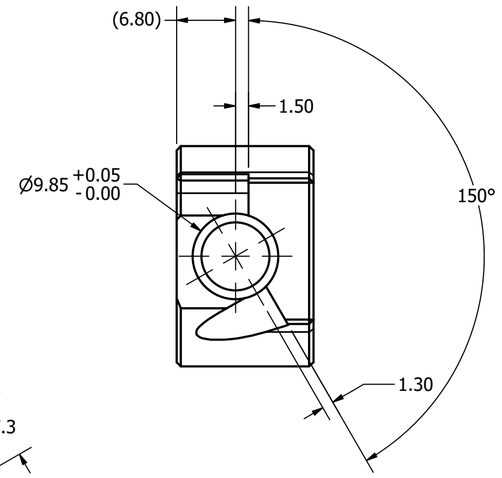
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	DJI	JW	3/29/2016

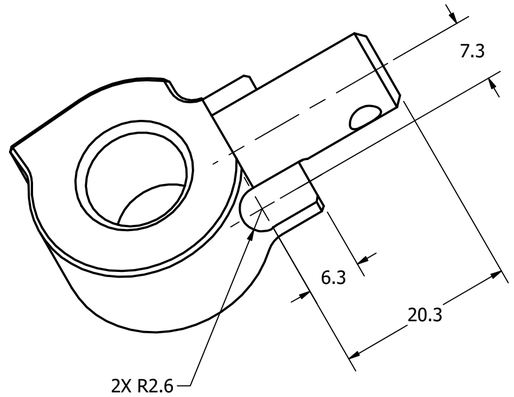


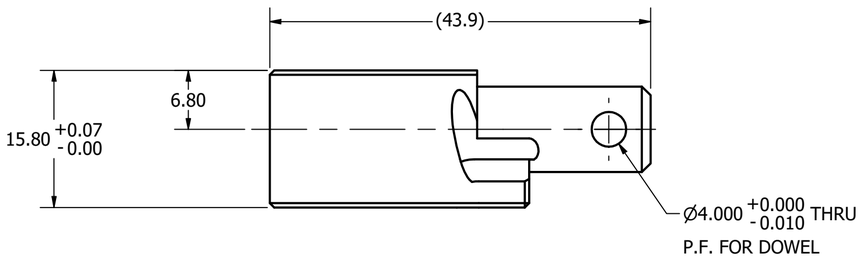
SECTION A-A











PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 4130 STEEL
HEAT TREAT:
FINISH: 0.008mm ELECTROLESS NICKEL PLATE PER SIDE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: disopi	3/29/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

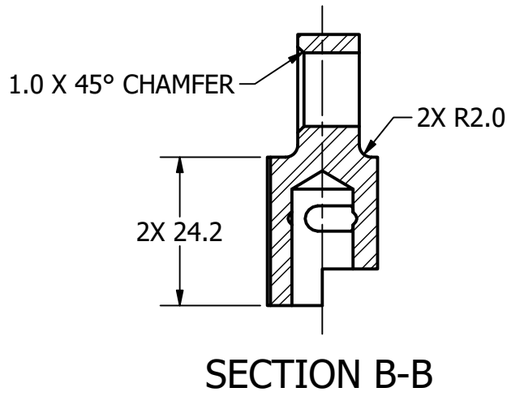
CLEVIS, RIGHT SCAPULA LINK

THIRD ANGLE PROJECTION

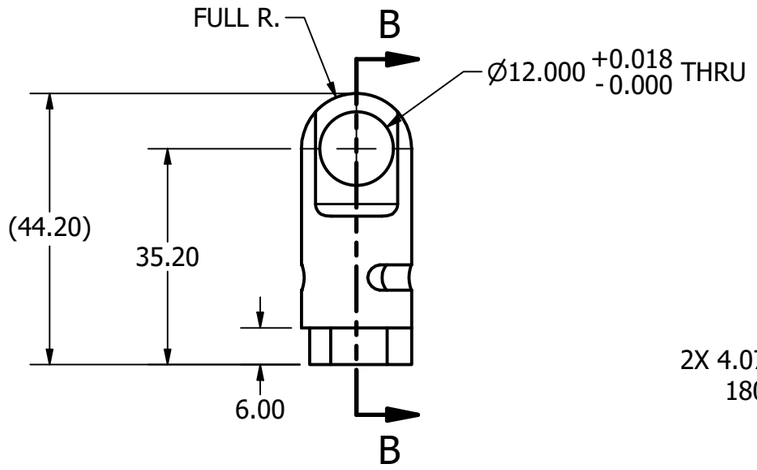
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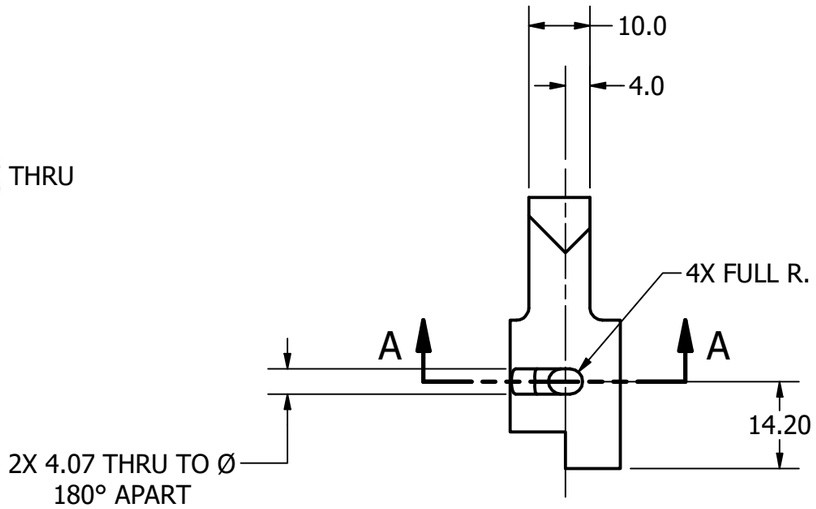
SCALE: 2:1 | SHEET: 1 OF 1

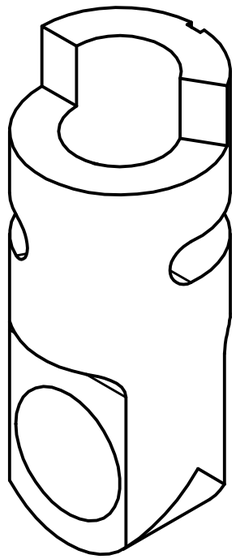
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	DJI	JW	3/31/2016



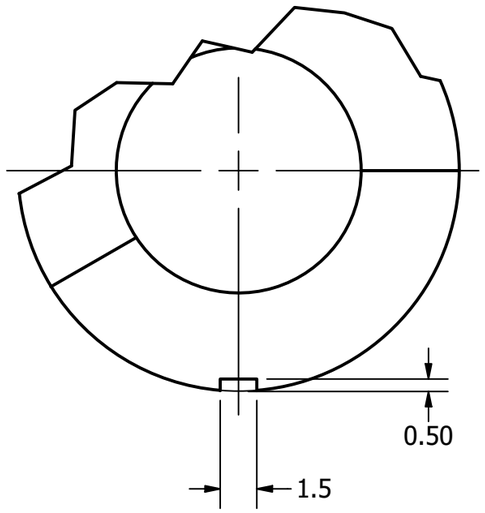
SECTION B-B



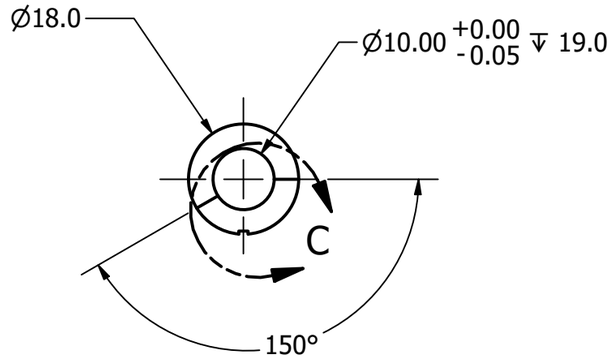


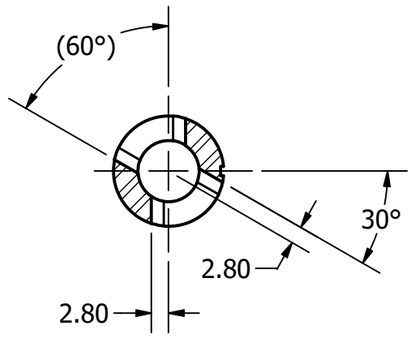


SCALE 2: 1



DETAIL C
SCALE 4 : 1





SECTION A-A

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ±.5, ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 4130 STEEL
HEAT TREAT:
FINISH: 0.008mm ELECTROLESS NICKEL PLATE PER SIDE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: disopi	3/31/2016
CHECKED:	
ENG:	
APPROVED:	

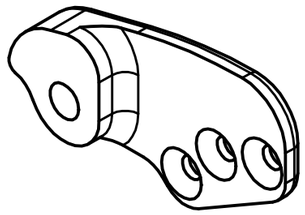
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

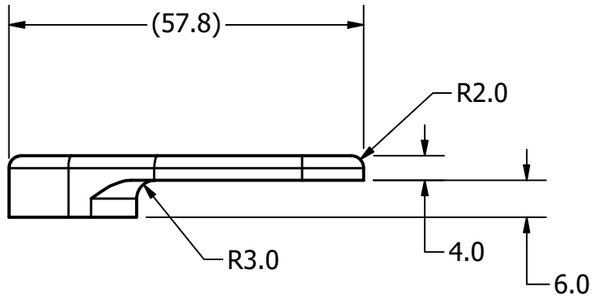
SCAPULA LINK, RIGHT

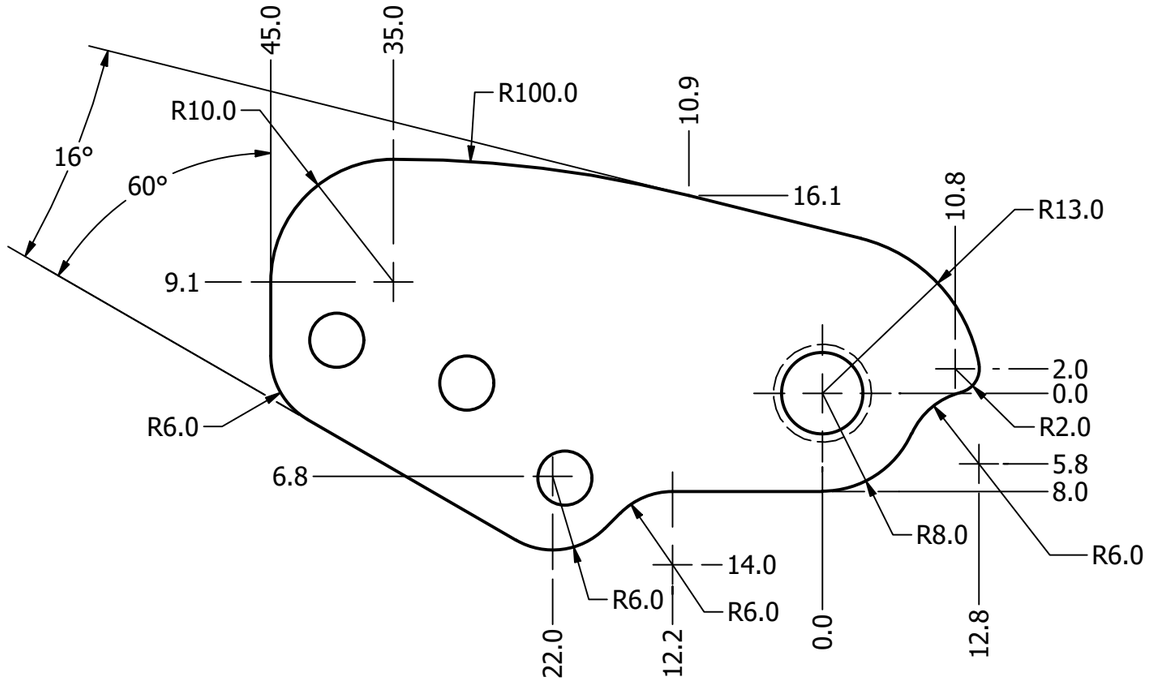
THIRD ANGLE PROJECTION

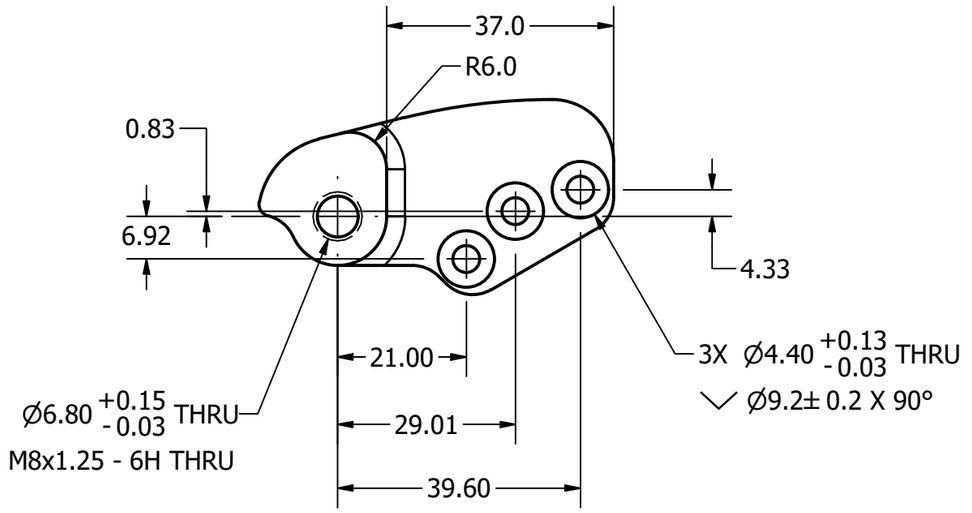
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SCALE: 1:1 | SHEET: 1 OF 1

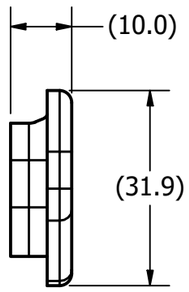
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	DJI	JW	3/24/2016











SCALE 2 : 1

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 4140 STEEL
HEAT TREAT: Rc 44-48
FINISH: 0.008mm ELECTROLESS NICKEL PLATE PER SIDE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: disopi	3/24/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

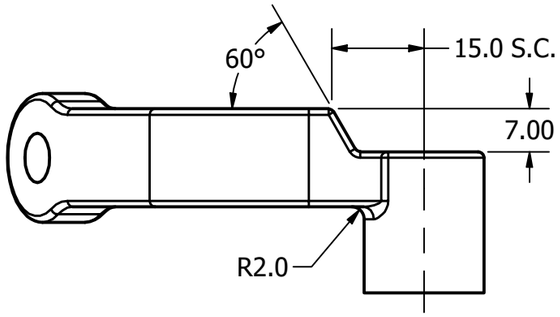
UPPER SCAPULA, RIGHT

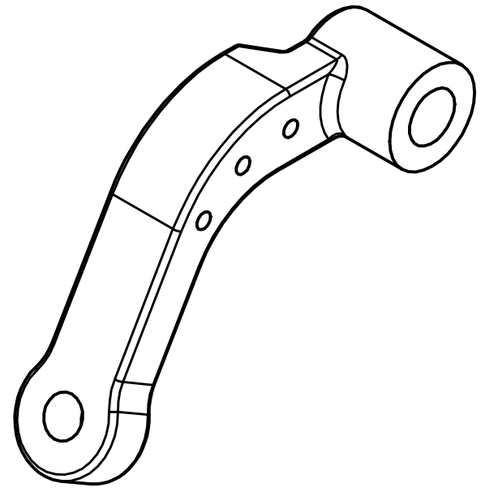
THIRD ANGLE PROJECTION

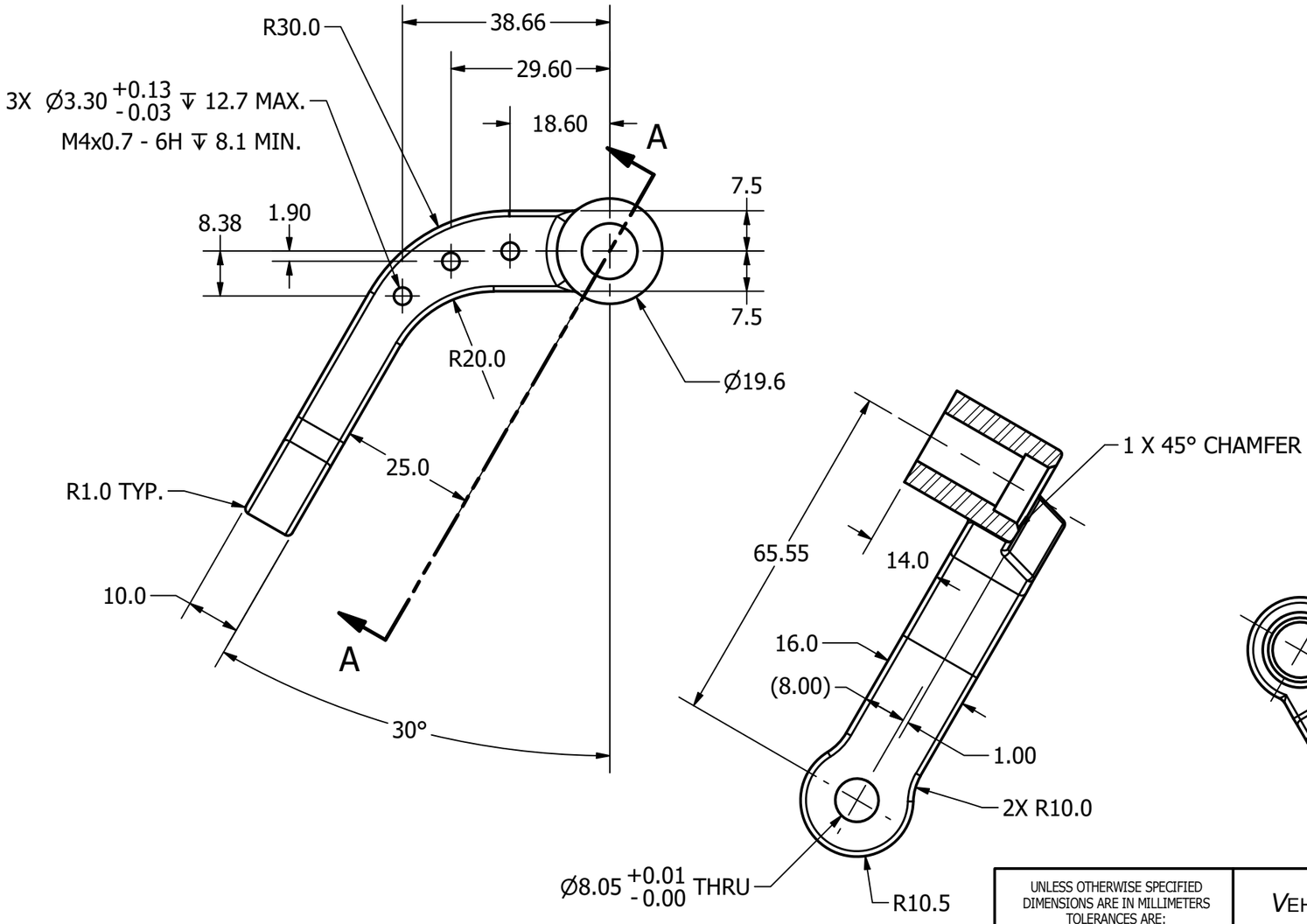
SIZE	DRAWING NUMBER	REV
A3	474-3506-2	1

SCALE: 1:1 | SHEET 1 OF 1

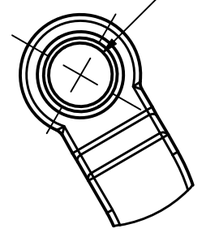
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	DJI	JW	3/31/2016







SECTION A-A



Ø10.40 +0.15 -0.03 THRU

⌴ Ø12.000 +0.018 -0.000 ↧ 6.0

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

*V*EHICLE *R*ESEARCH and *T*EST *C*ENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

LOWER SCAPULA, RIGHT

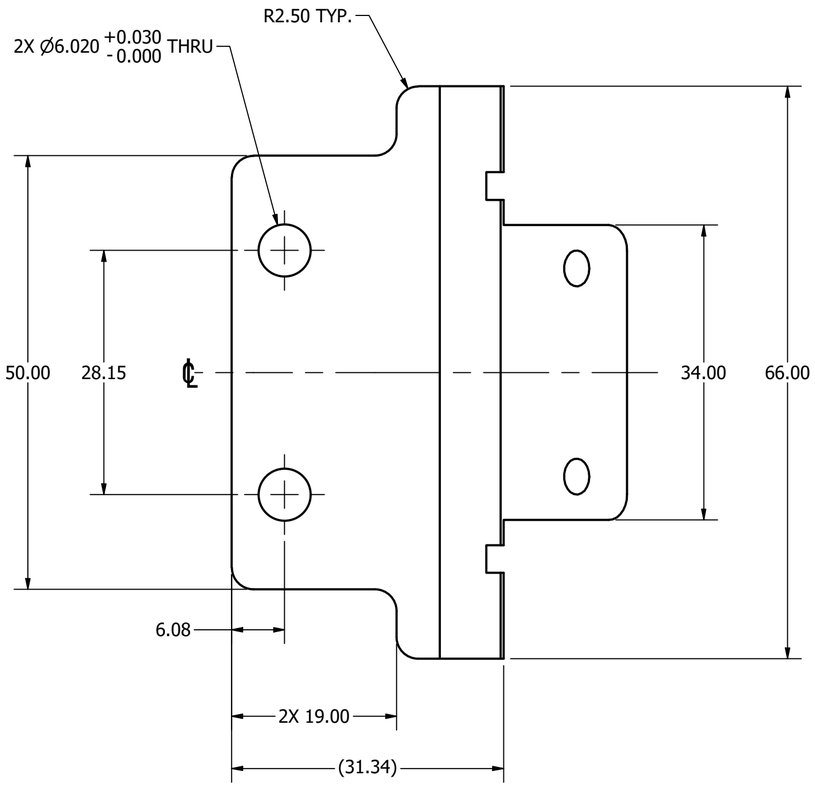
APPROVALS	DATE
DRAWN: disopi	3/31/2016
CHECKED	
ENG	
APPROVED	

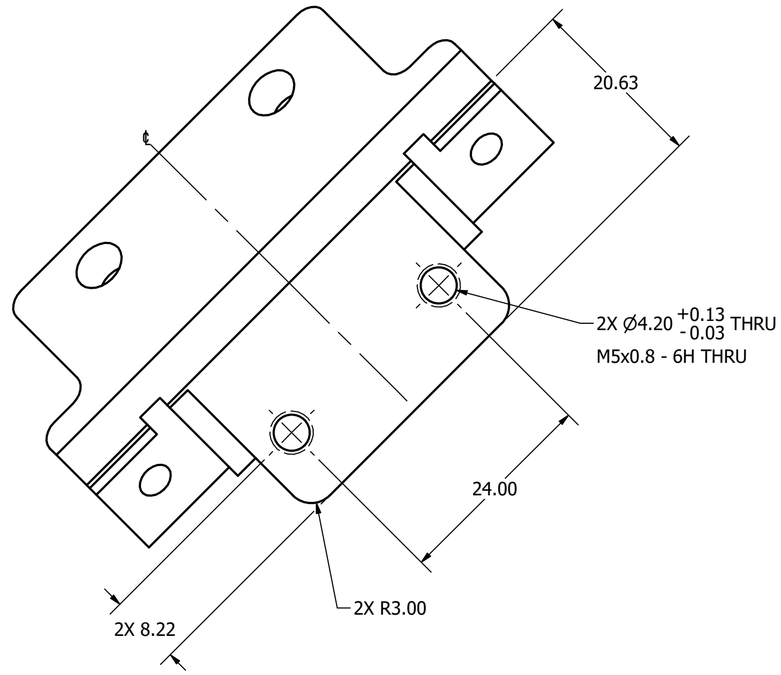
MATERIAL: 4130 STEEL
HEAT TREAT:
FINISH: 0.008mm ELECTROLESS NICKEL PLATE PER SIDE

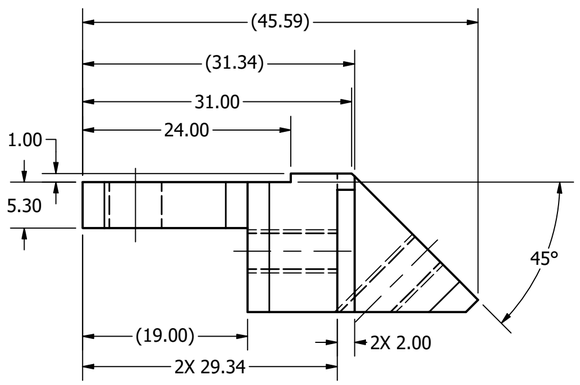
THIRD ANGLE PROJECTION

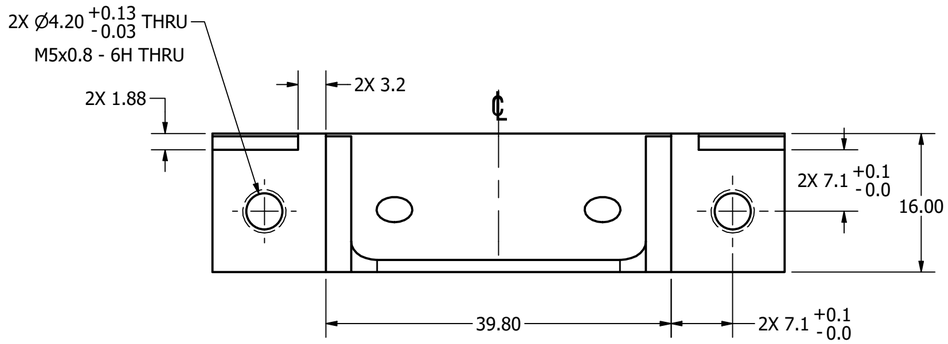
SIZE: A3 | DRAWING NUMBER: 474-3505-2 | REV: 1
SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH	JW	3/21/2016









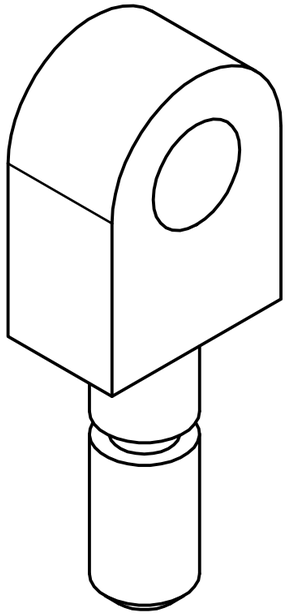
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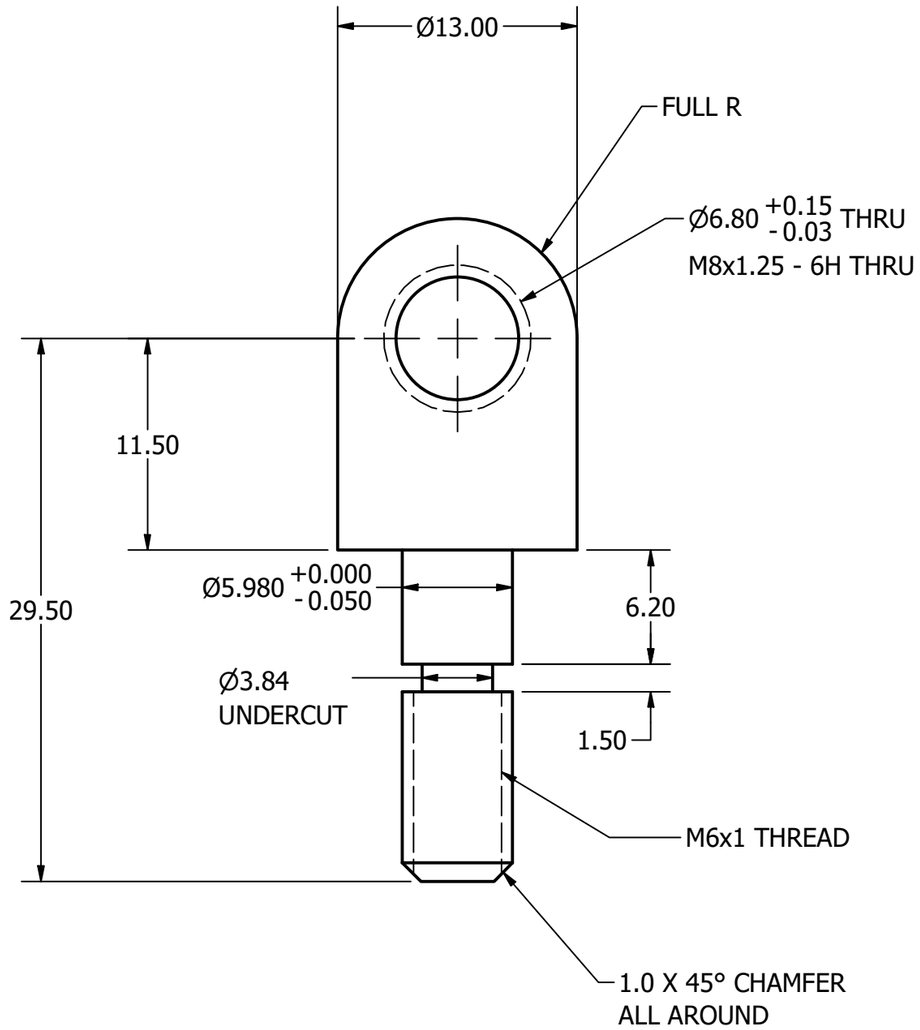
1. DIMENSIONS ARE SYMMETRICAL ABOUT ℄ UNLESS OTHERWISE NOTED.

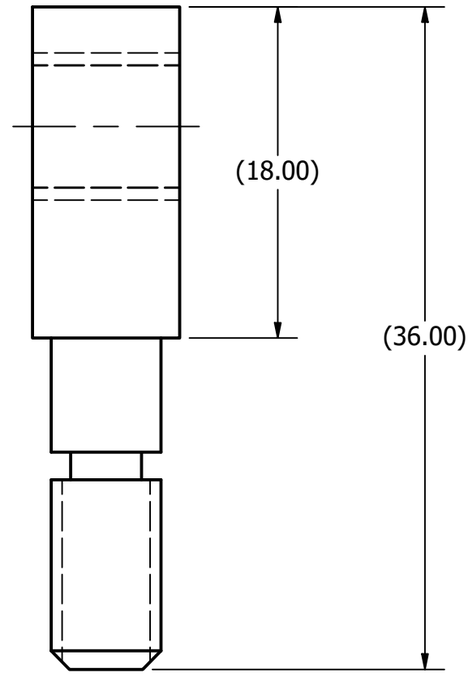
PRELIMINARY DRAWING

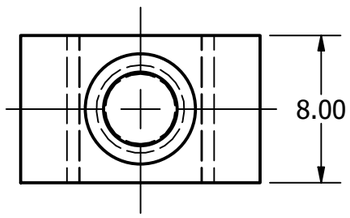
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS TOLERANCES ARE: DECIMAL: X ±.5, X.X ±.2, X.XX ±.1; MACHINED ANGLES ±.5°	VEHICLE RESEARCH and TEST CENTER		NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
ASME Y14.5M - 1994 DO NOT SCALE DRAWING	APPROVALS	DATE	ADAPTOR, RIB 1 TO STERNUM
MATERIAL 7075-T6 ALUMINUM	DRAWN jhaefner	3/21/2016	
HEAT TREAT	CHECKED		
FINISH CLEAR ANODIZE	ENG		SIZE A2 · DRAWING NUMBER 474-3040 · REV 1
	APPROVED		THIRD ANGLE PROJECTION · SCALE: 2:1 · SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH	JW	3/21/2016









PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: jhaefner	3/21/2016
CHECKED:	
ENG:	
APPROVED:	

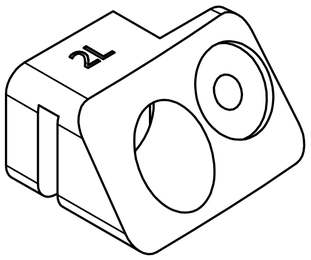
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

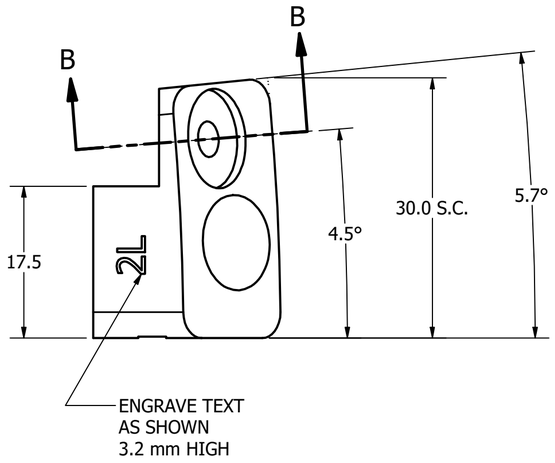
CLAVICLE-STERNUM ADAPTOR

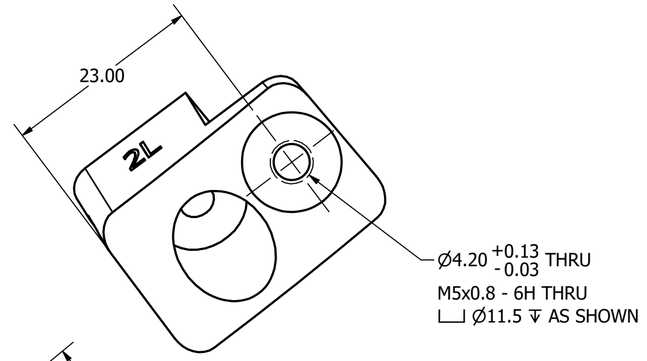
THIRD ANGLE PROJECTION

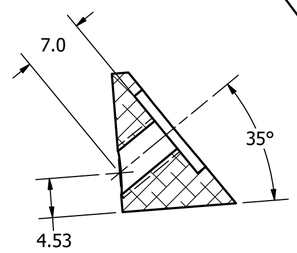
SIZE: A3 | DRAWING NUMBER: 474-3041 | REV: 1
SCALE: 3:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH	JW	3/22/2016

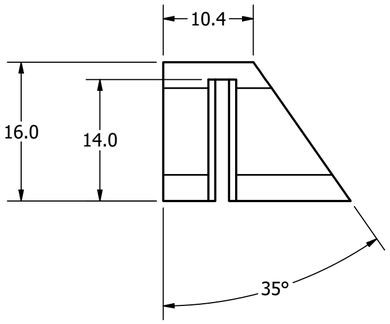


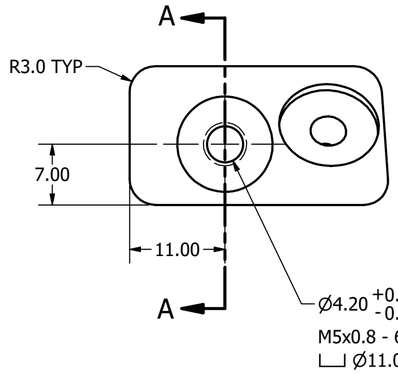


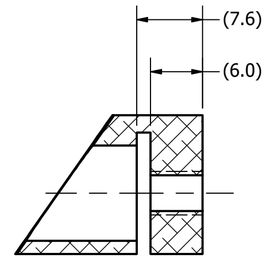




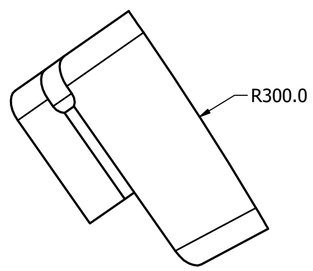
SECTION B-B

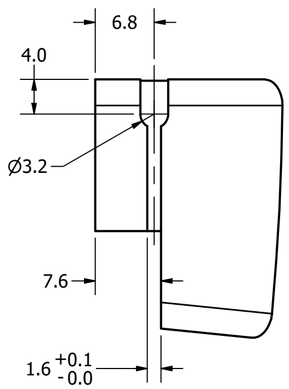






SECTION A-A





PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: jhaefner	3/22/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

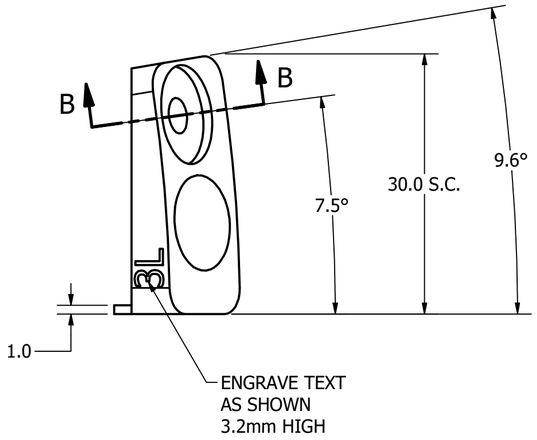
ADAPTOR, RIB 2 TO STERNUM, LEFT

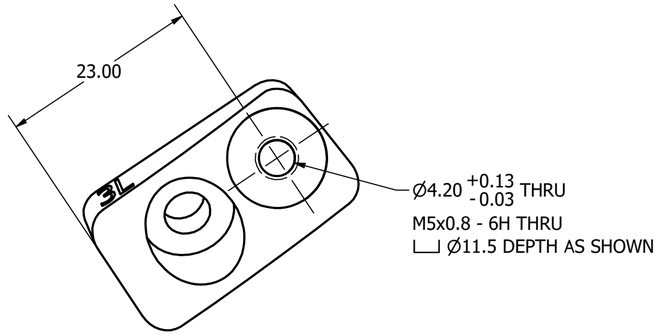
THIRD ANGLE PROJECTION

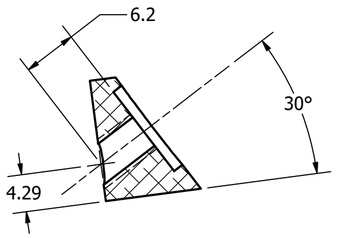
SIZE: A2 | DRAWING NUMBER: 474-3382-1 | REV: 1

SCALE: 2:1 | SHEET: 1 OF 1

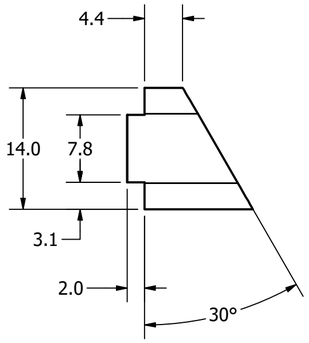
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH	JW	3/22/2016

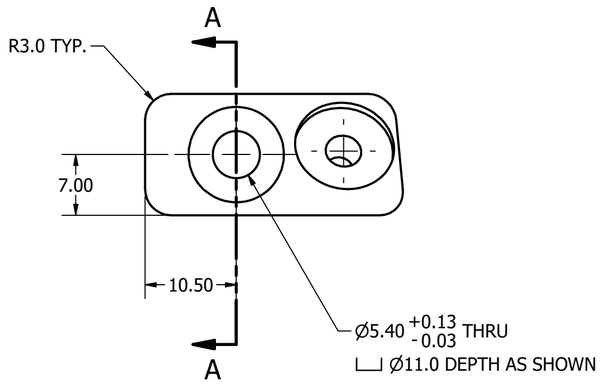


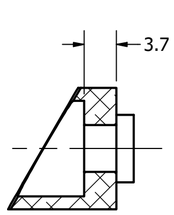




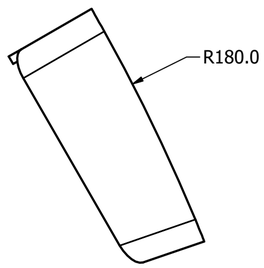
SECTION B-B

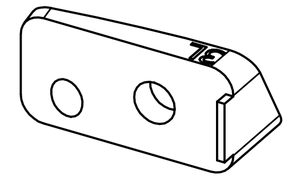


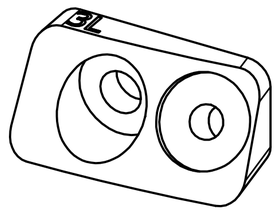




SECTION A-A







PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN jhaefner	3/22/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

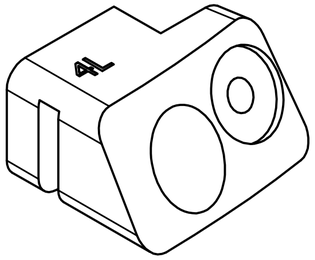
ADAPTOR, RIB 3 TO STERNUM / IRTRACC, LEFT

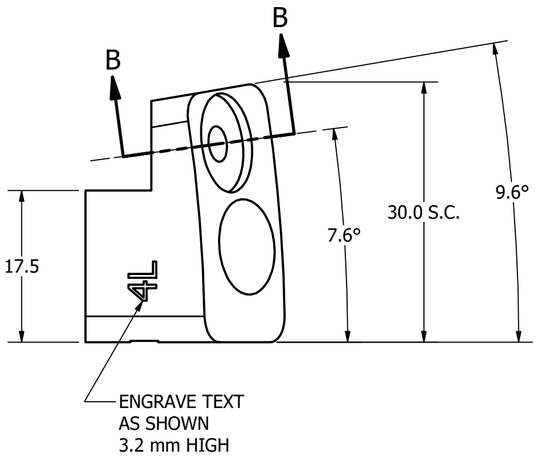
THIRD ANGLE PROJECTION

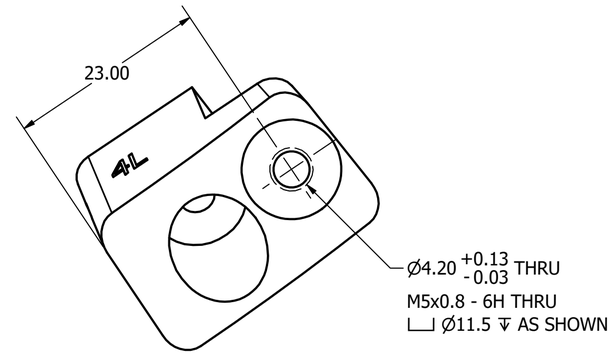
SIZE: A2 | DRAWING NUMBER: 474-3383-1 | REV: 1

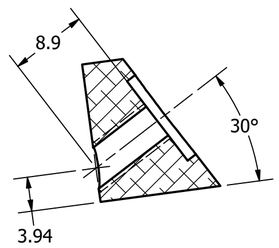
SCALE: 2:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH	JW	3/22/2016

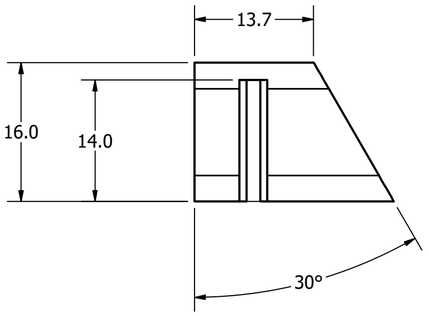


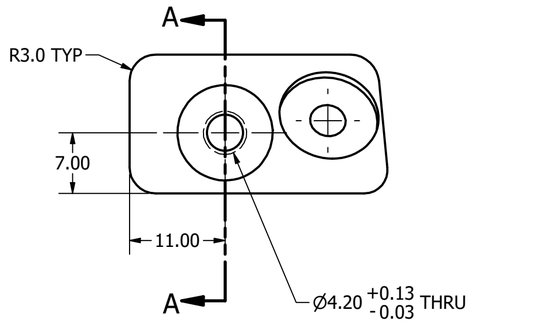


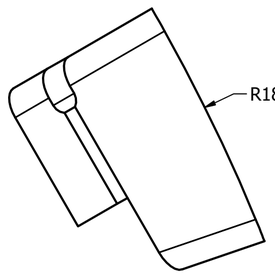


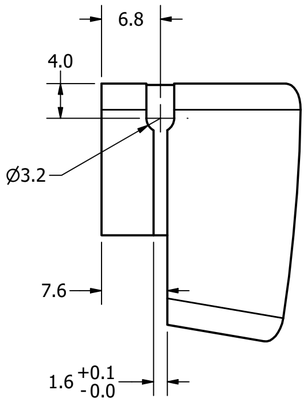


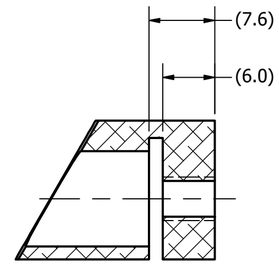
SECTION B-B











SECTION A-A

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ∠ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: jhaefner	3/22/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

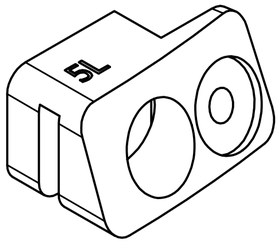
ADAPTOR, RIB 4 TO STERNUM, LEFT

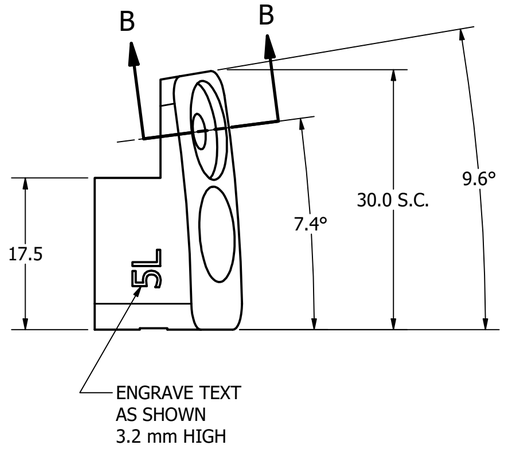
THIRD ANGLE PROJECTION

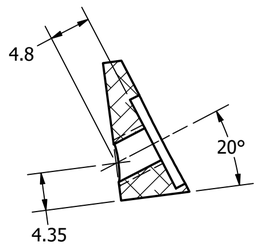
SIZE: A2 | DRAWING NUMBER: 474-3384-1 | REV: 1

SCALE: 2:1 | SHEET: 1 OF 1

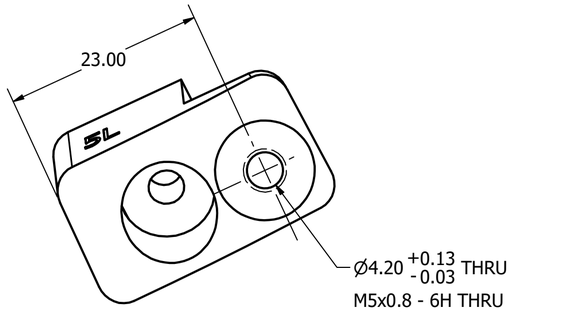
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH	JW	3/23/2016

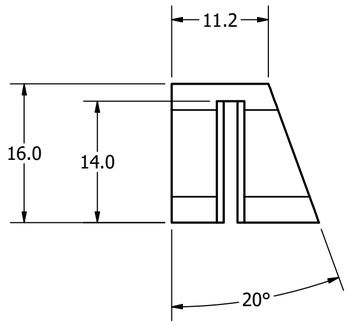


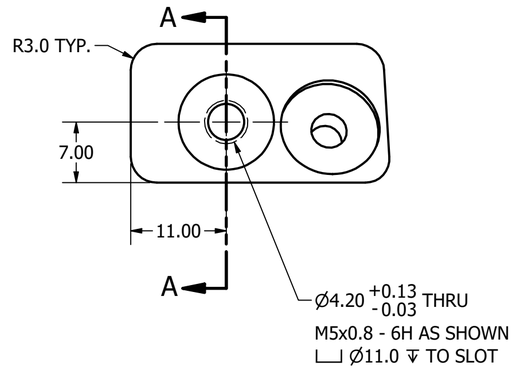


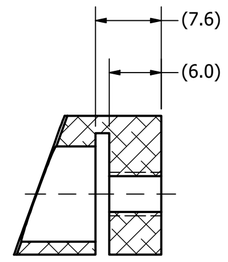


SECTION B-B

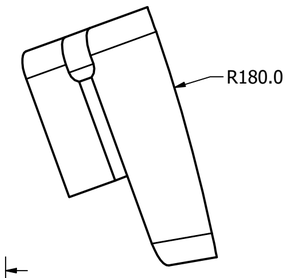


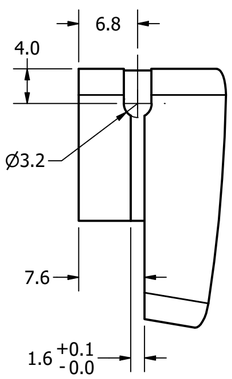






SECTION A-A





PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: jhaefner	3/23/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

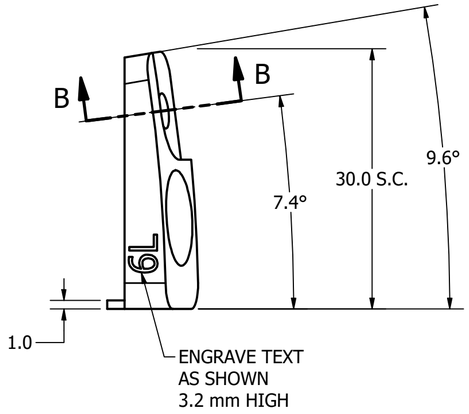
ADAPTOR, RIB 5 TO STERNUM, LEFT

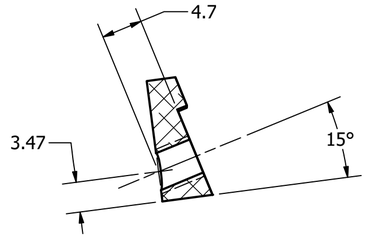
THIRD ANGLE PROJECTION

SIZE: A2 | DRAWING NUMBER: 474-3385-1 | REV: 1

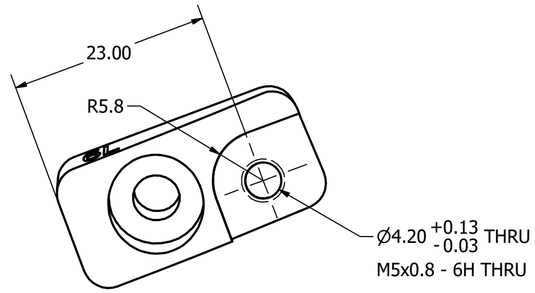
SCALE: 2:1 | SHEET: 1 OF 1

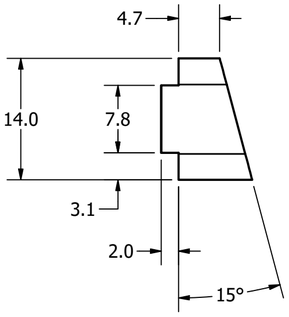
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE TO PROTOTYPE	JH	JW	3/23/2016

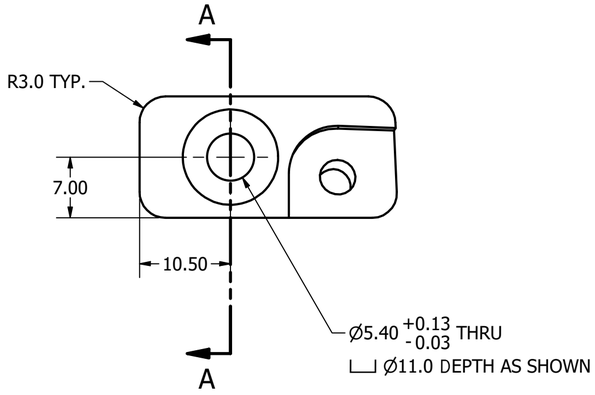


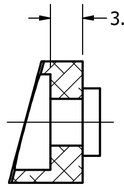


SECTION B-B

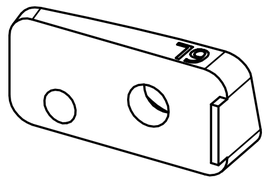


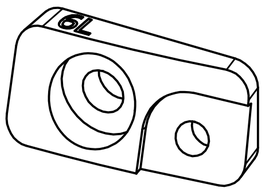


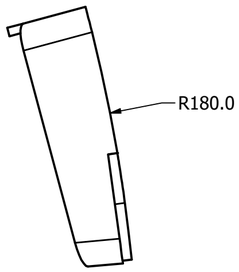




SECTION A-A







PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ∠ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: jhaefner	3/23/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

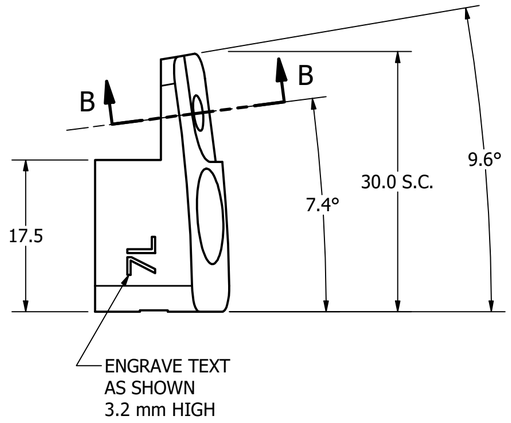
ADAPTOR, RIB 6 TO STERNUM / IRTRACC, LEFT

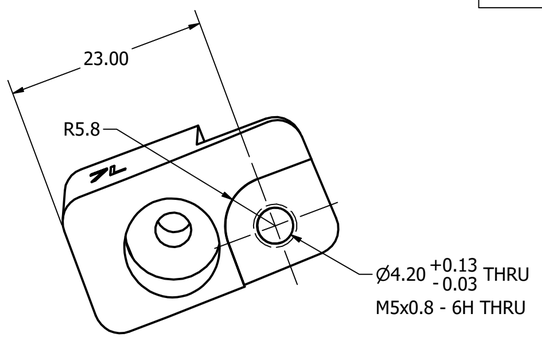
THIRD ANGLE PROJECTION

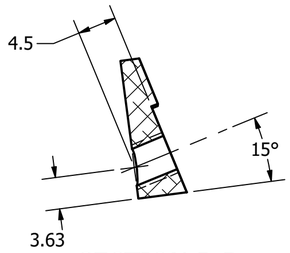
SIZE: A2 | DRAWING NUMBER: 474-3386-1 | REV: 1

SCALE: 2:1 | SHEET: 1 OF 1

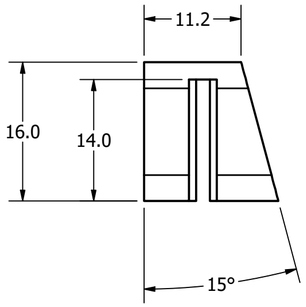
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH	JW	3/23/2016

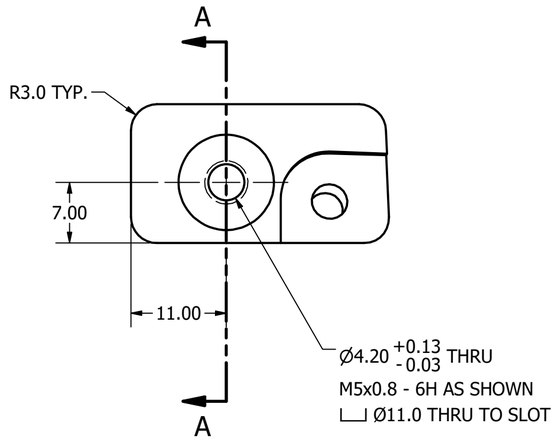


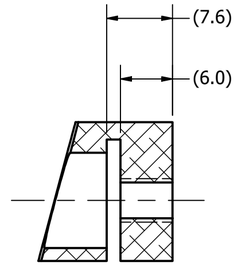




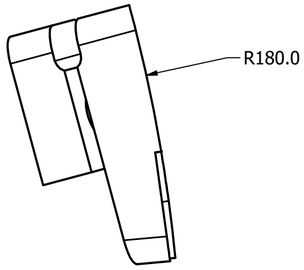
SECTION B-B

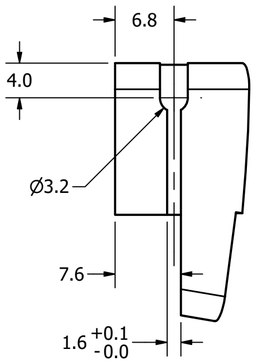






SECTION A-A





PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ∠ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN jhaefner	3/23/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

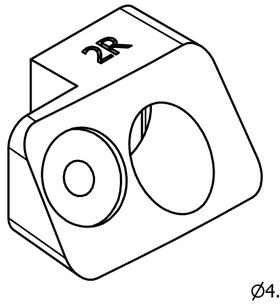
ADAPTOR, RIB 7 TO STERNUM, LEFT

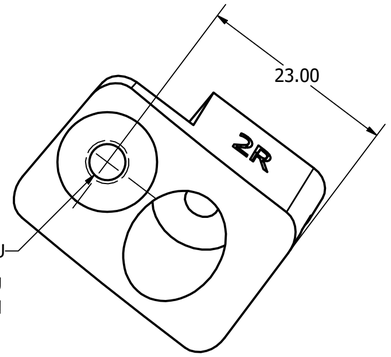
THIRD ANGLE PROJECTION

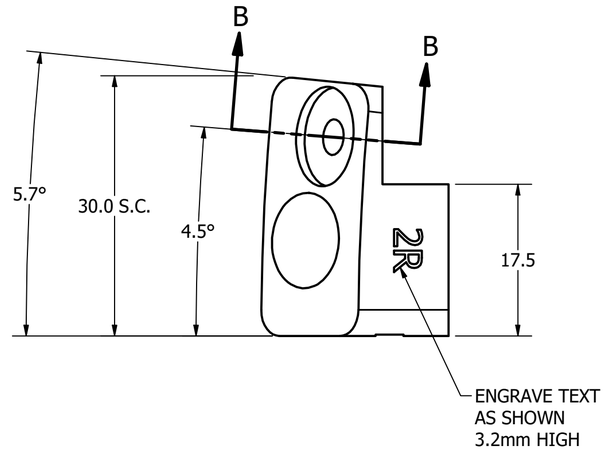
SIZE A2 | DRAWING NUMBER 474-3387-1 | REV 1

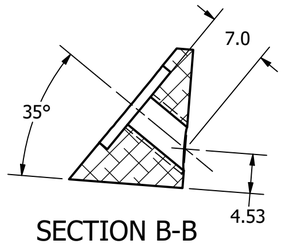
SCALE: 2:1 | SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH	JW	3/23/2016

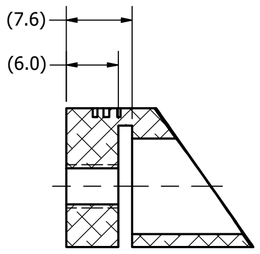




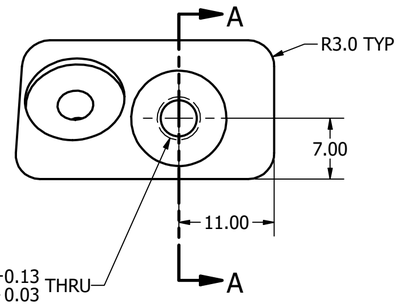


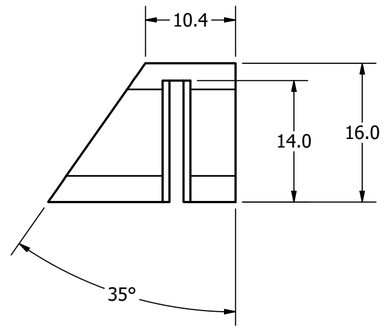


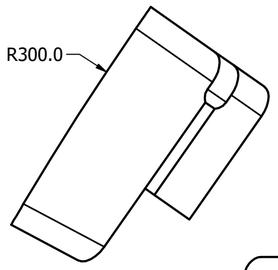
SECTION B-B

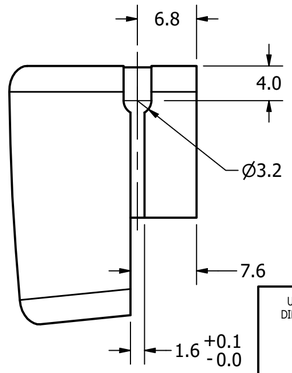


SECTION A-A









PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN jhaefner	3/23/2016
CHECKED	
ENG	
APPROVED	

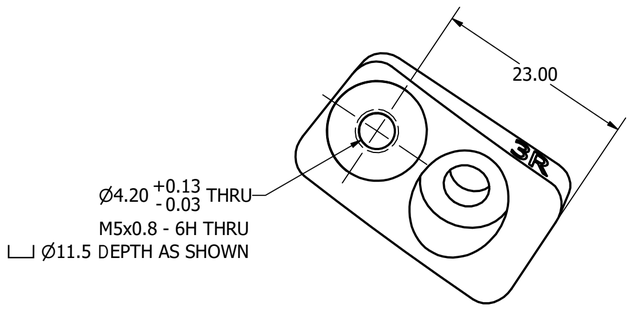
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

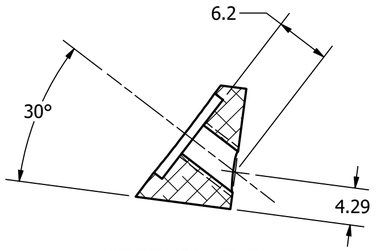
ADAPTOR, RIB 2 TO STERNUM, RIGHT

THIRD ANGLE PROJECTION

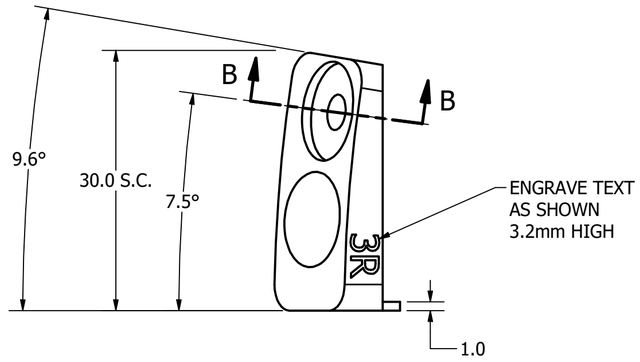
SIZE A2 | DRAWING NUMBER 474-3382-2 | REV 1
SCALE: 2:1 | SHEET 1 OF 1

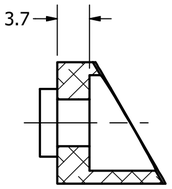
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH	JW	3/24/2016



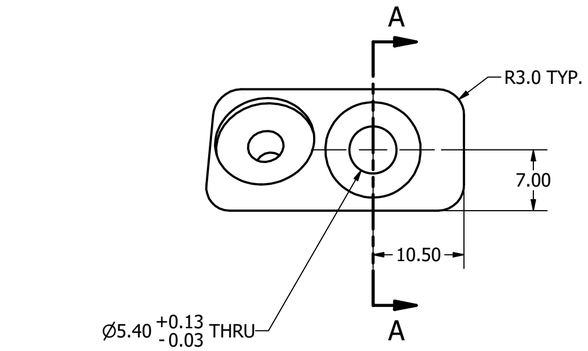


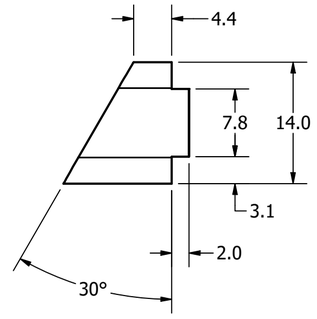
SECTION B-B

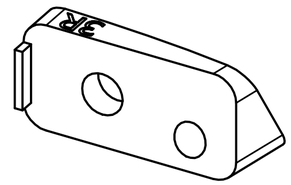


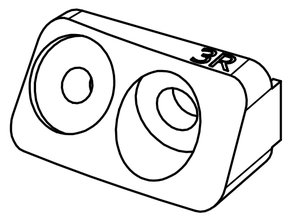


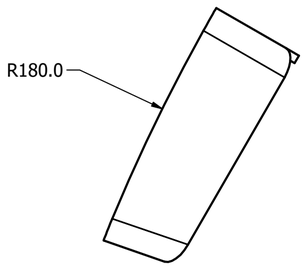
SECTION A-A











PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: jhaefner	3/24/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

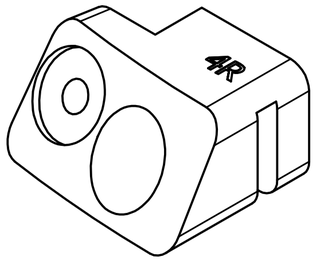
ADAPTOR, RIB 3 TO STERNUM / IRTRACC, RIGHT

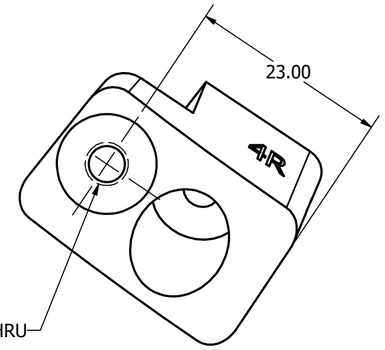
THIRD ANGLE PROJECTION

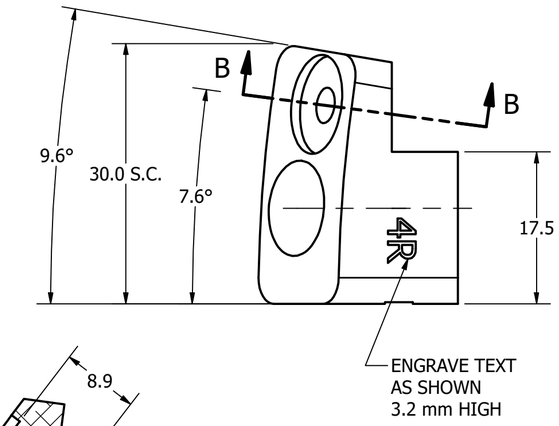
SIZE: A2 | DRAWING NUMBER: 474-3383-2 | REV: 1

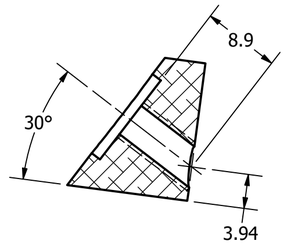
SCALE: 2:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH	JW	3/24/2016

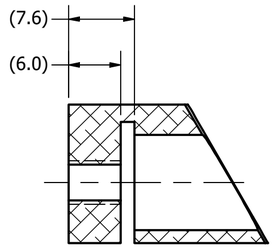




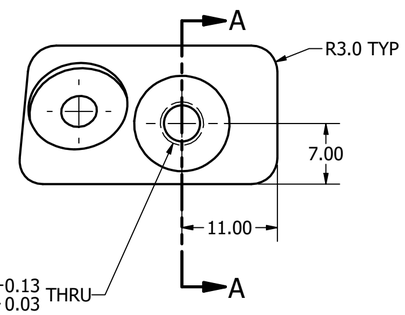


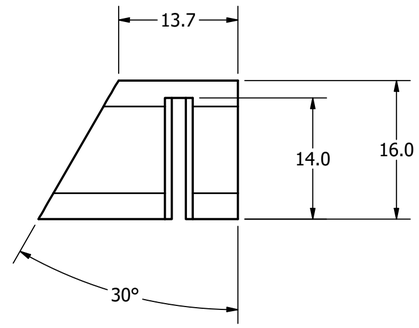


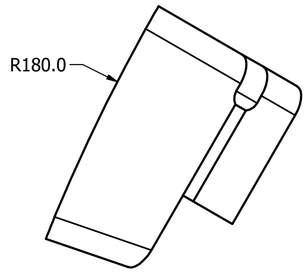
SECTION B-B

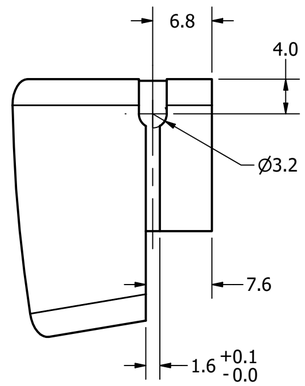


SECTION A-A









PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ∠ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: jhaefner	3/24/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

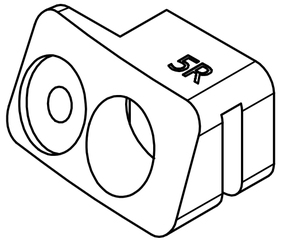
ADAPTOR, RIB 4 TO STERNUM, RIGHT

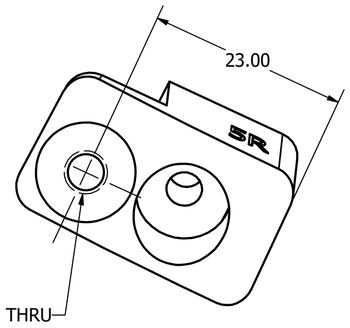
THIRD ANGLE PROJECTION

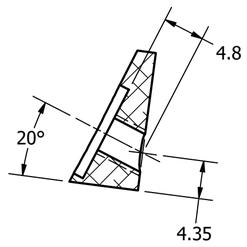
SIZE: A2 | DRAWING NUMBER: 474-3384-2 | REV: 1

SCALE: 2:1 | SHEET: 1 OF 1

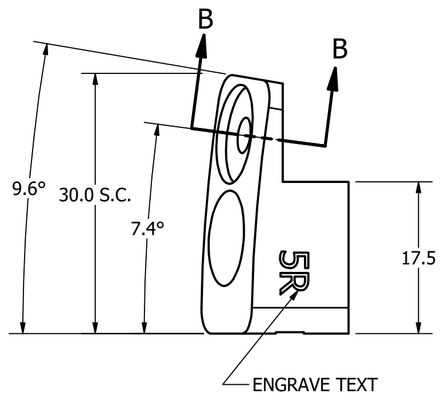
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH	JW	3/24/2016

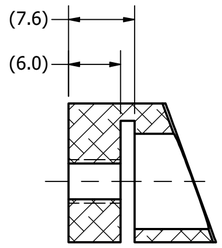




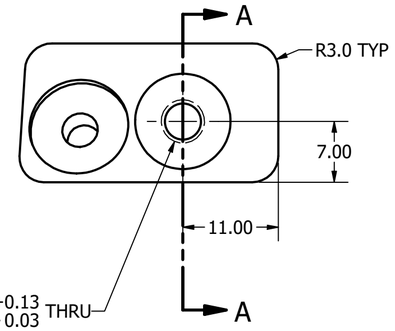


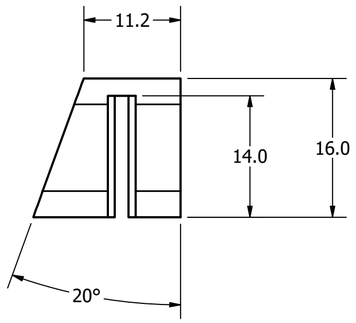
SECTION B-B

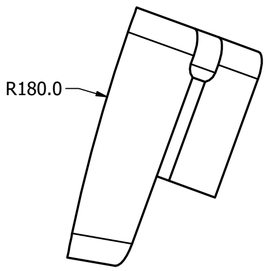


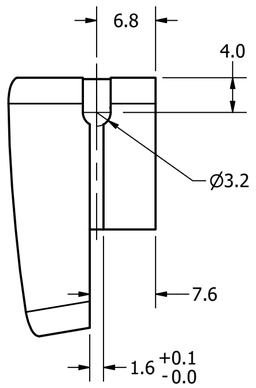


SECTION A-A









PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: jhaefner	3/24/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

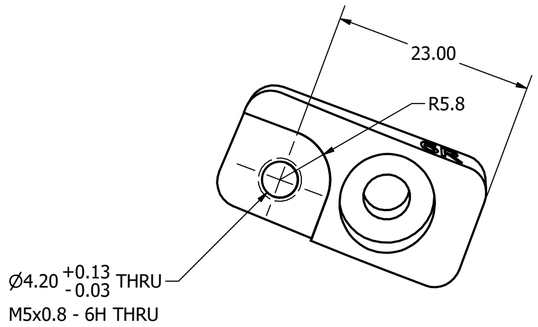
ADAPTOR, RIB 5 TO STERNUM, RIGHT

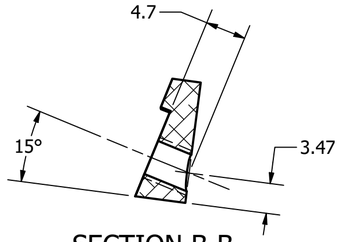
THIRD ANGLE PROJECTION

SIZE: A2 | DRAWING NUMBER: 474-3385-2 | REV: 1

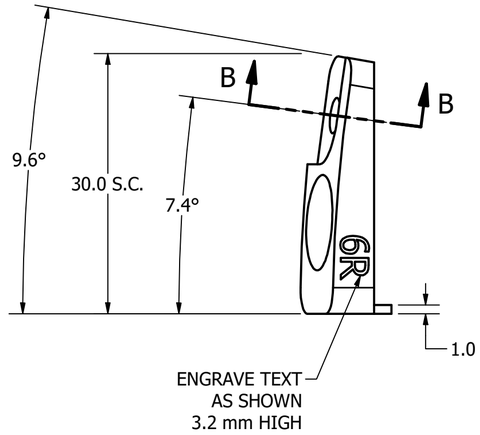
SCALE: 2:1 | SHEET: 1 OF 1

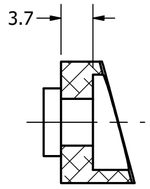
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH	JW	3/24/2016



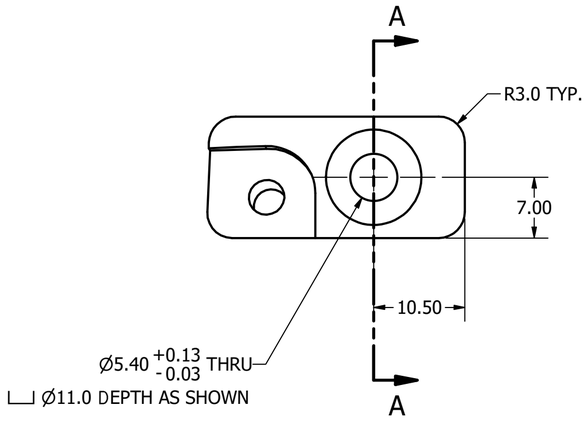


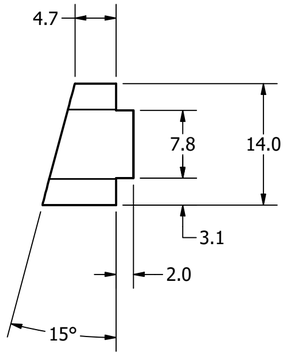
SECTION B-B

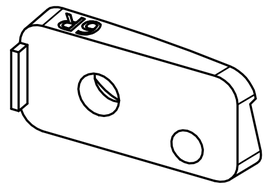


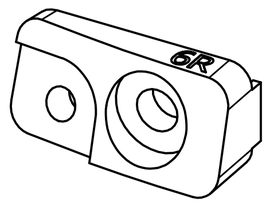


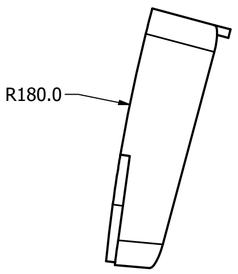
SECTION A-A











PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: jhaefner	3/24/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

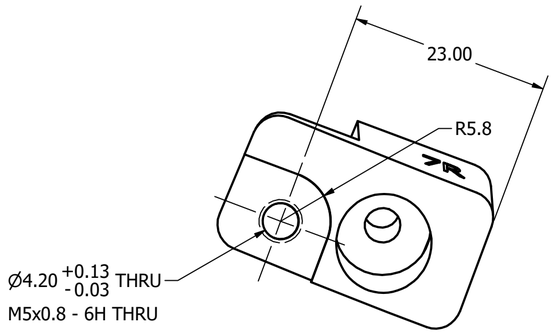
ADAPTOR, RIB 6 TO STERNUM / IRTRACC, RIGHT

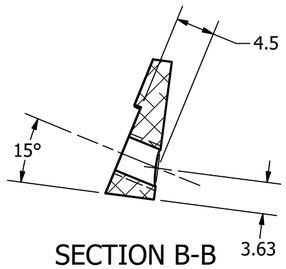
THIRD ANGLE PROJECTION

SIZE: A2 | DRAWING NUMBER: 474-3386-2 | REV: 1

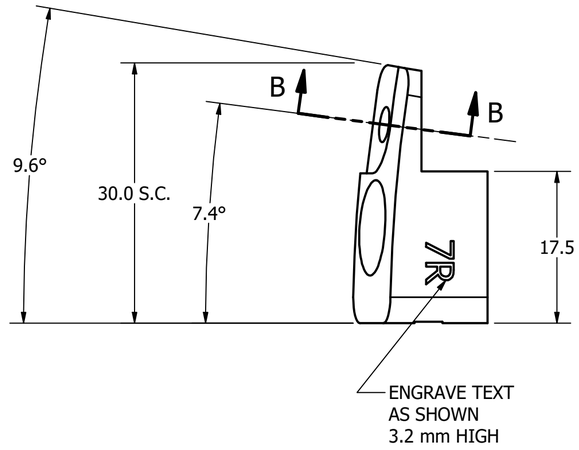
SCALE: 2:1 | SHEET: 1 OF 1

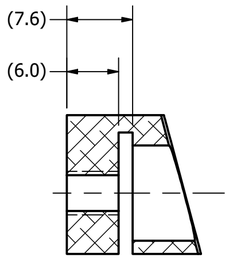
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH	JW	3/24/2016



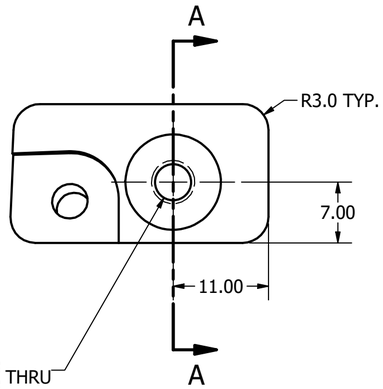


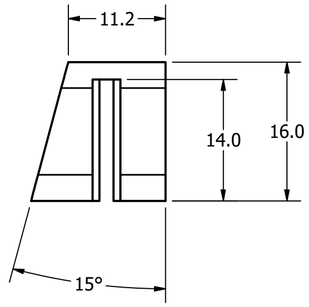
SECTION B-B

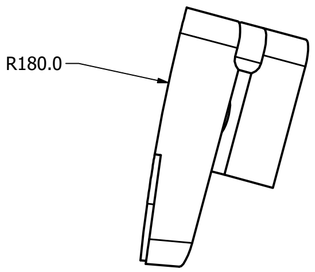


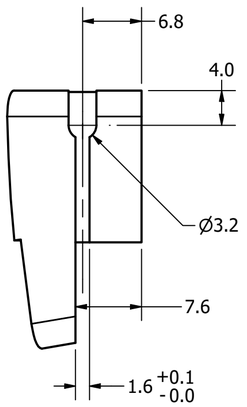


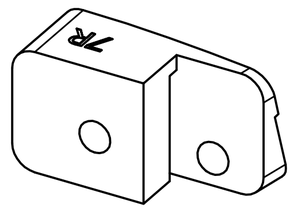
SECTION A-A

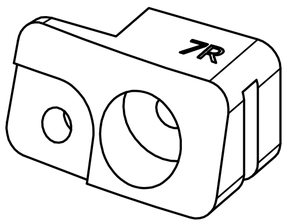












PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED √ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: jhaefner	3/24/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

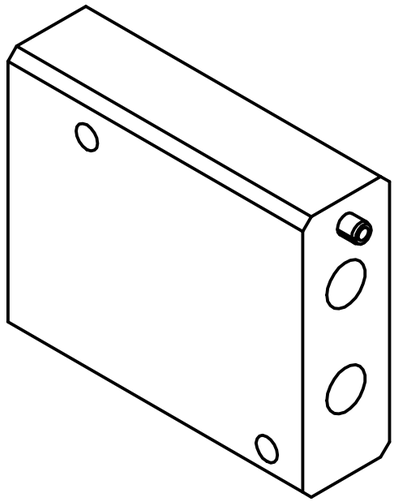
ADAPTOR, RIB 7 TO STERNUM, RIGHT

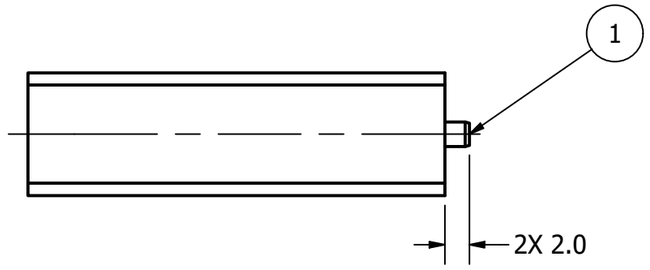
THIRD ANGLE PROJECTION

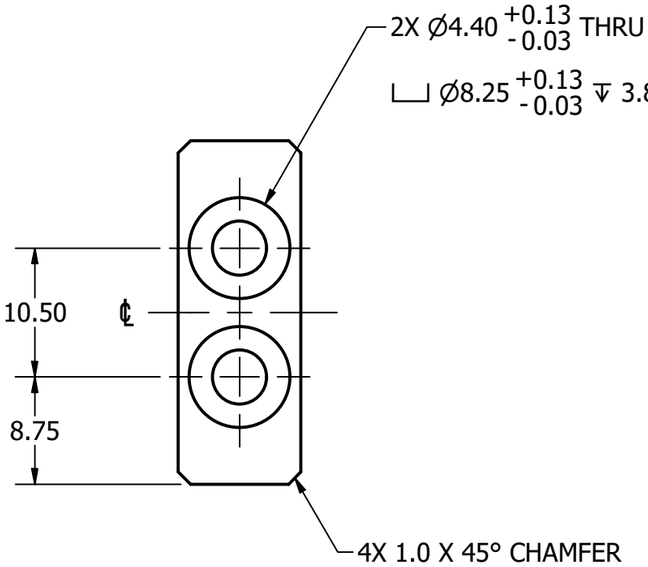
SIZE: A2 | DRAWING NUMBER: 474-3387-2 | REV: 1

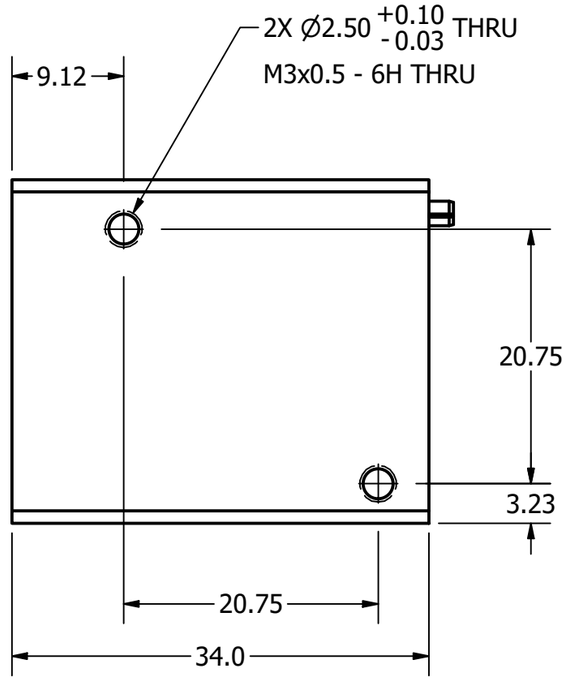
SCALE: 2:1 | SHEET: 1 OF 1

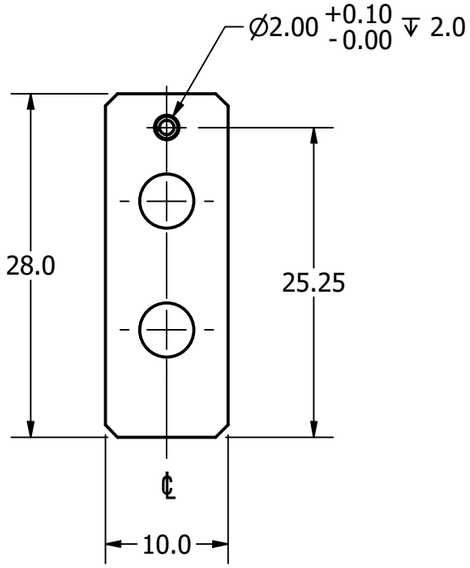
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH	JW	3/28/2016











ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	5000765	M2 X 4 LG. ROLL PIN

PARTS LIST

NOTES:

1. INSTALL ROLL PIN AFTER ANODIZE.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED √ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN jhaefner	3/28/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

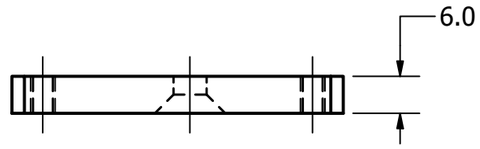
ON BOARD DAS MOUNTING BRACKET, THORAX

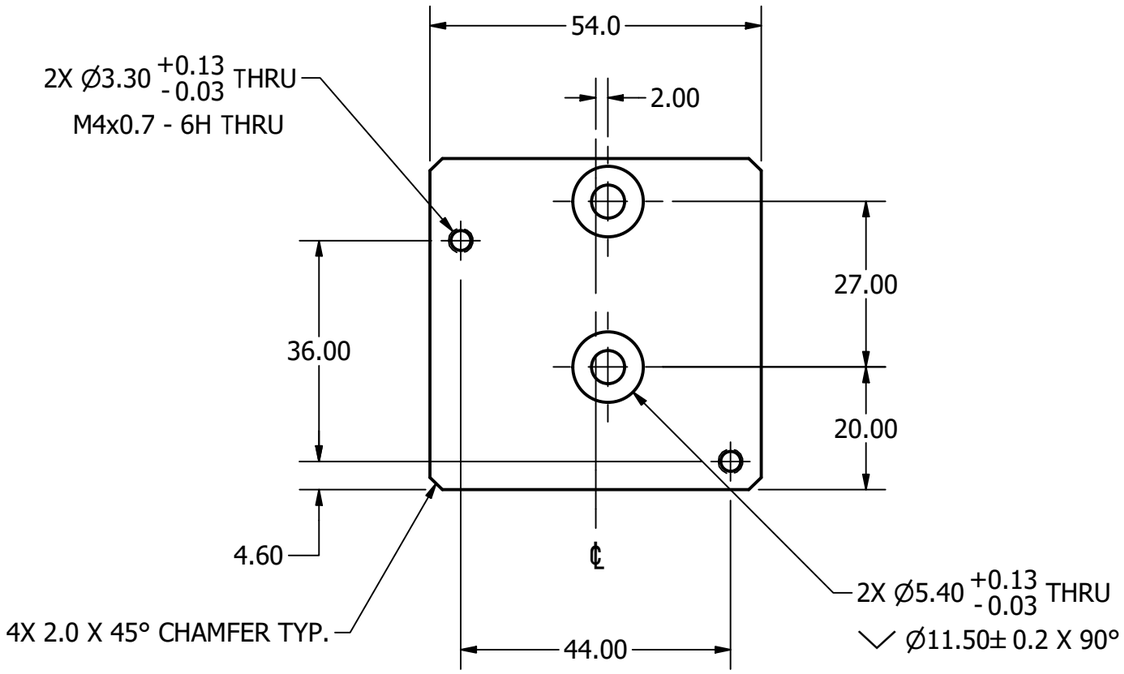
THIRD ANGLE PROJECTION

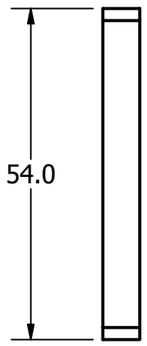
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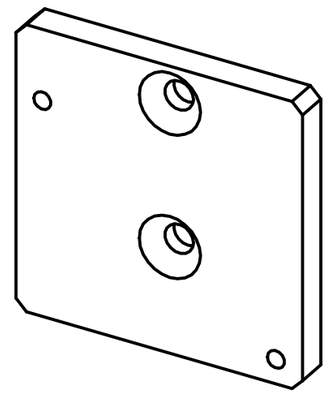
SCALE: 2:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	3/28/2016









PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: ghayden	3/28/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

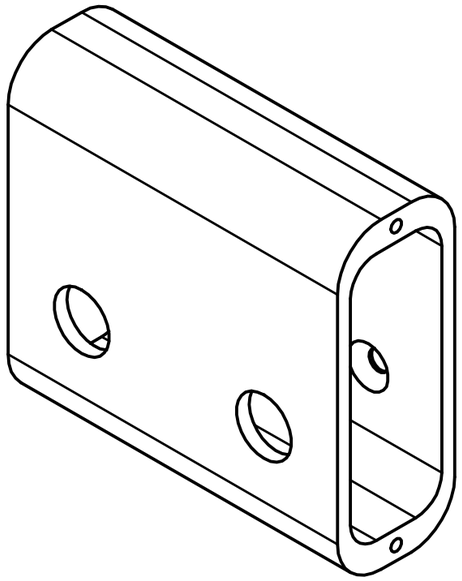
MOUNTING PLATE, ON BOARD DAS DISTRIBUTOR

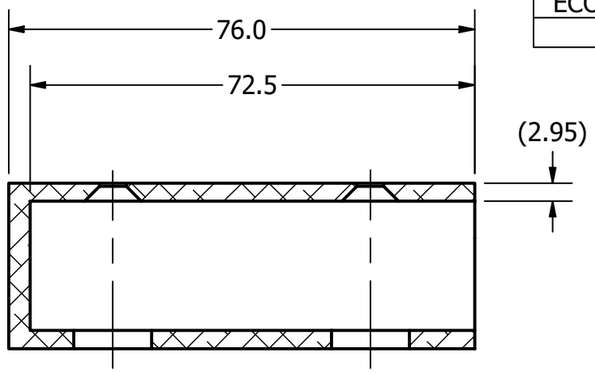
THIRD ANGLE PROJECTION

SIZE: A3 | DRAWING NUMBER: 474-3002 | REV: 1

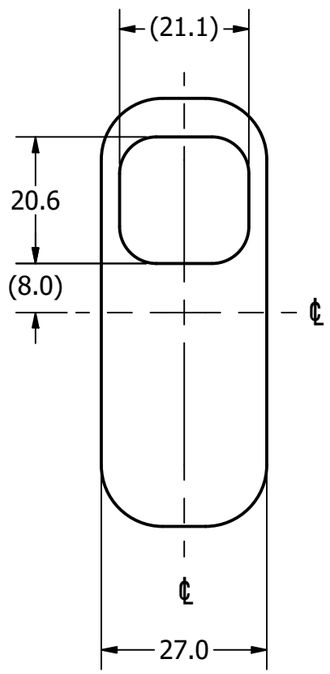
SCALE: 1:1 | SHEET: 1 OF 1

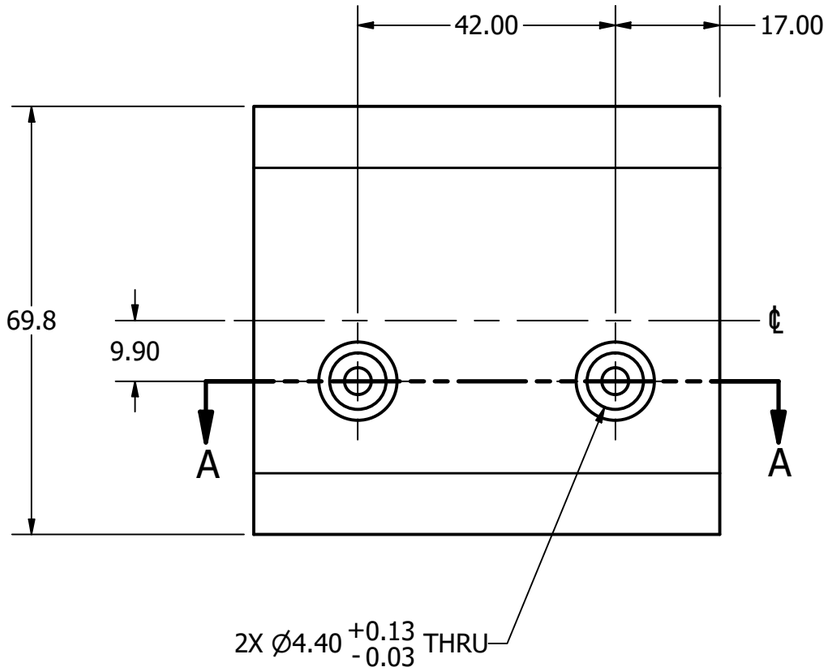
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH	JW	3/28/2016

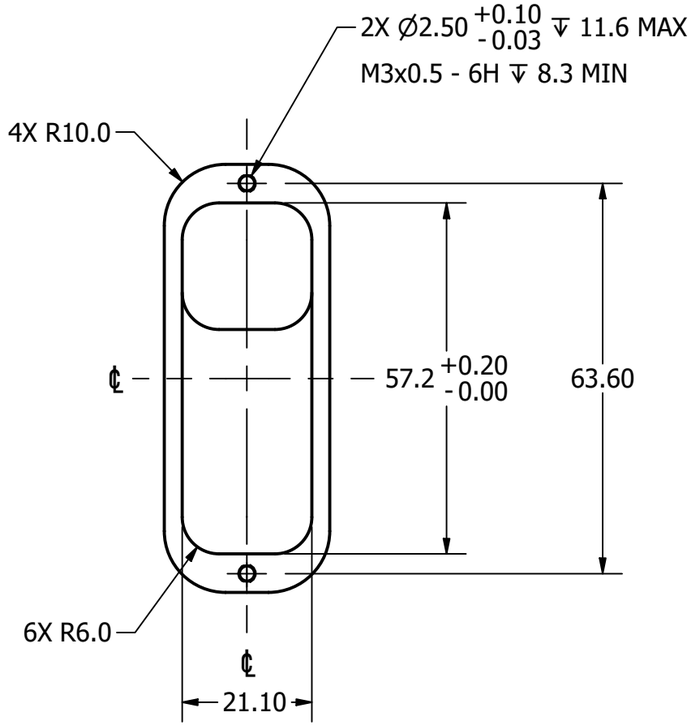




SECTION A-A







NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN jhaefner	3/28/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

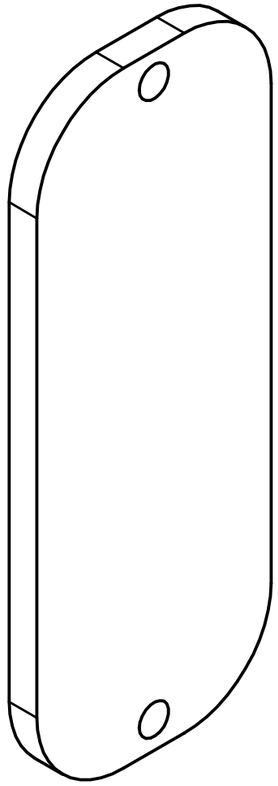
BATTERY HOUSING

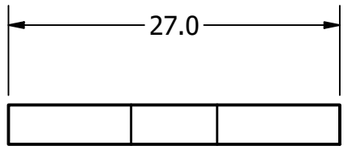
THIRD ANGLE PROJECTION

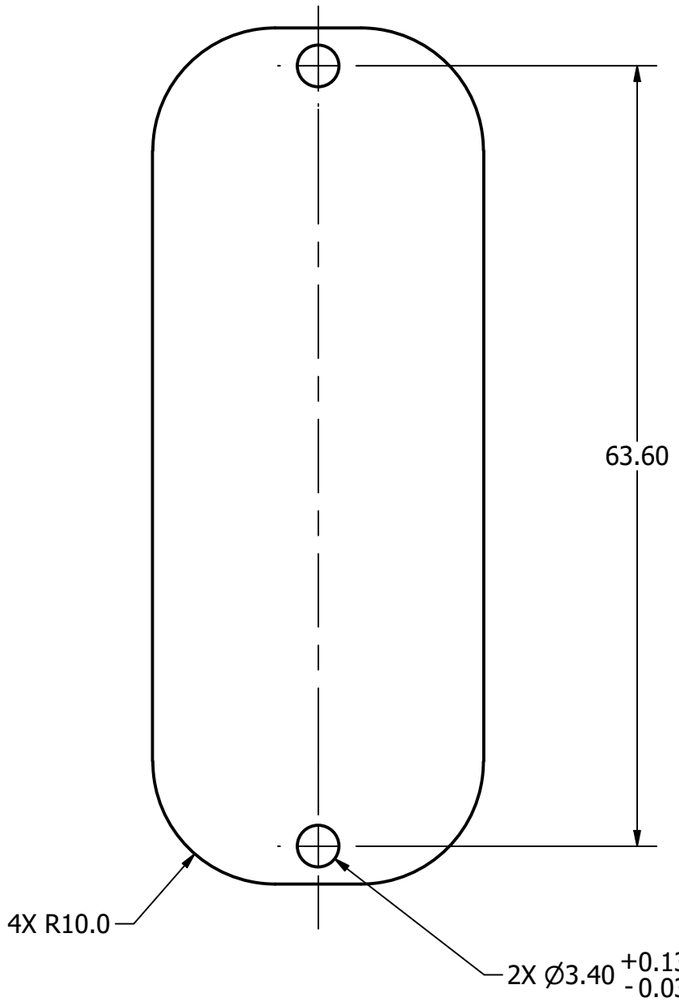
SIZE	DRAWING NUMBER	REV
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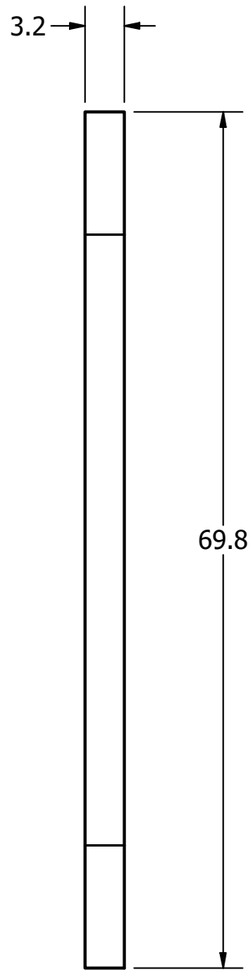
SCALE: 1 : 1 SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH	JW	3/28/2016









PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED √ | ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 6061-T6 ALUMINUM	CHECKED	
HEAT TREAT	ENG	
FINISH: CLEAR ANODIZE	APPROVED	

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: jhaefner	3/28/2016

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

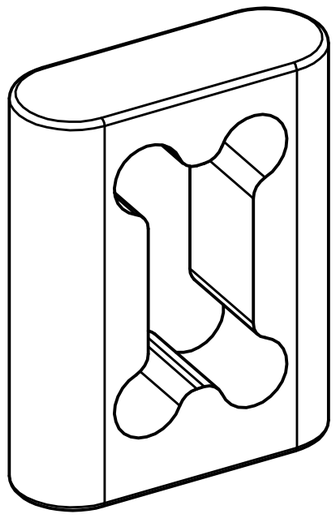
BATTERY COVER

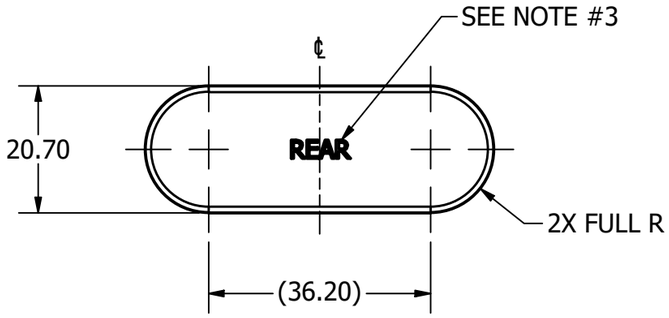
THIRD ANGLE PROJECTION

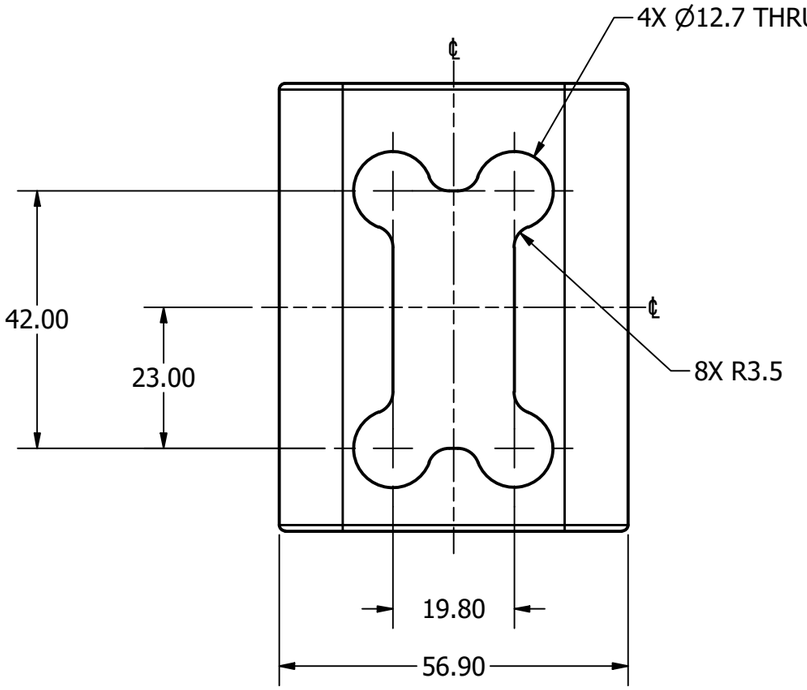
SIZE	DRAWING NUMBER	REV
A3	474-3004	1

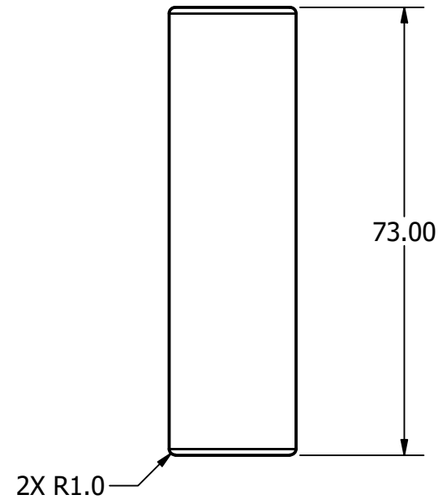
SCALE: 2:1 | SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH	JW	3/28/2016









NOTES:

1. MASS= 145 ±8 grams

2. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

3. ENGRAVE TEXT CENTERED AS SHOWN IN 3mm HIGH CHARACTERS.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 6061-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: jhaefner	3/28/2016
CHECKED:	
ENG:	
APPROVED:	

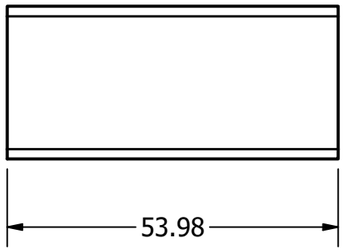
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

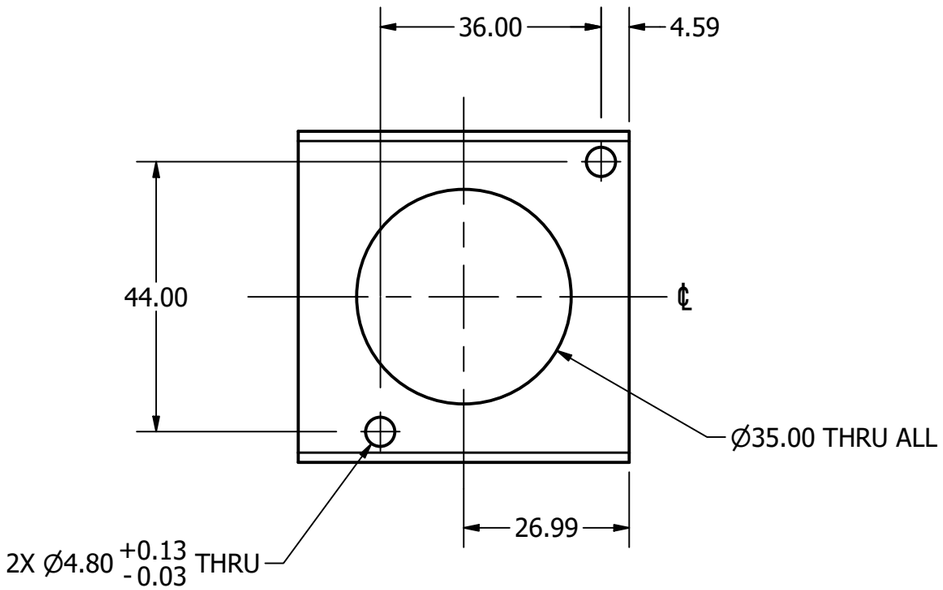
STRUCTURAL REPLACEMENT, BATTERY PACK

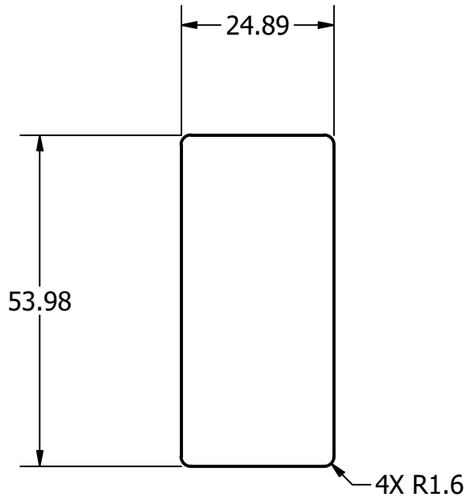
THIRD ANGLE PROJECTION

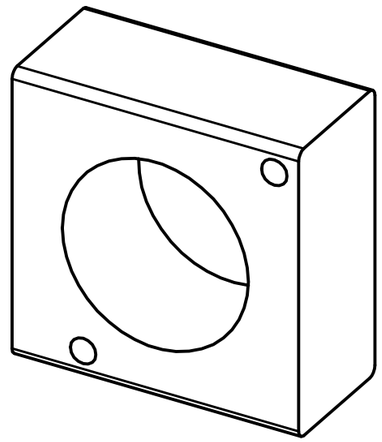
SIZE: A3 | DRAWING NUMBER: 474-3005 | REV: 1
SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	3/28/2016









NOTES:

1. MASS = 134±8 grams

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM	CHECKED	
HEAT TREAT	ENG	
FINISH: CLEAR ANODIZE	APPROVED	

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: ghayden	3/28/2016

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

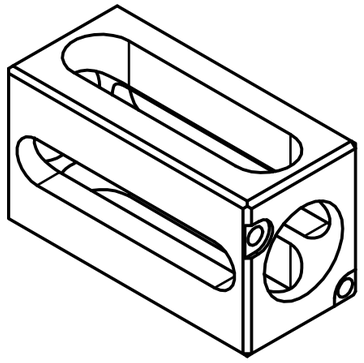
STRUCTURAL REPLACEMENT, ON BOARD DAS DB

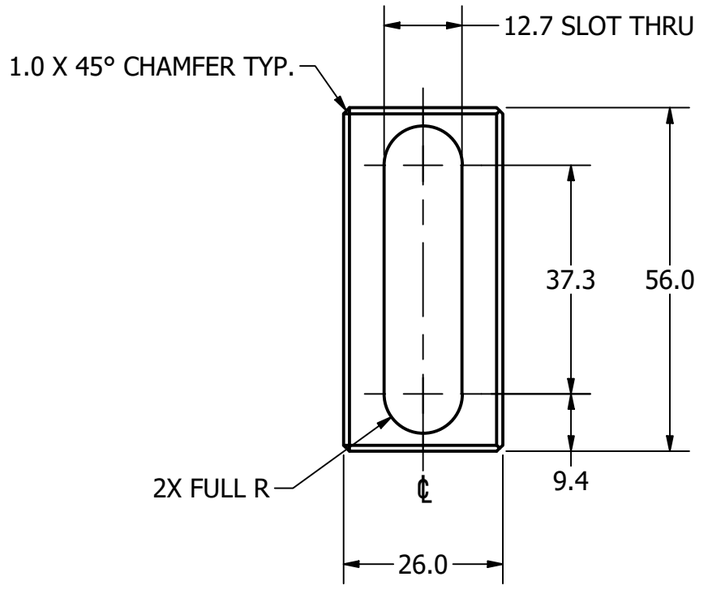
THIRD ANGLE PROJECTION

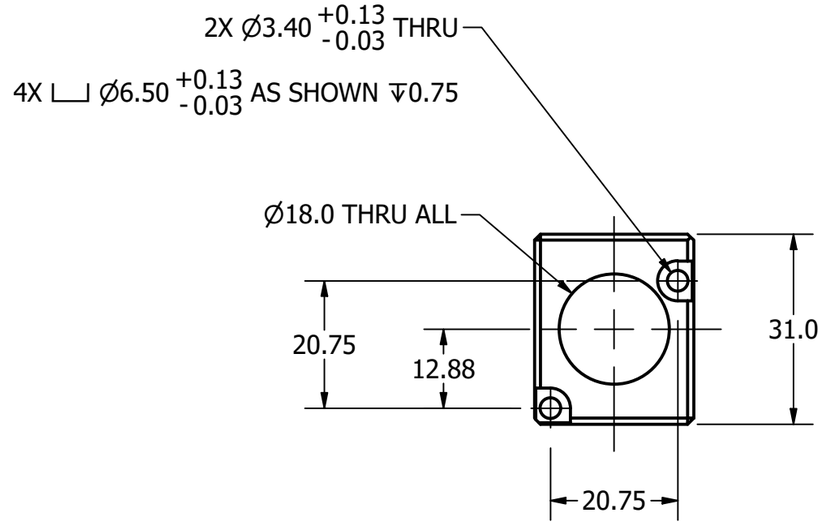
SIZE	DRAWING NUMBER	REV
A3	474-3006	1

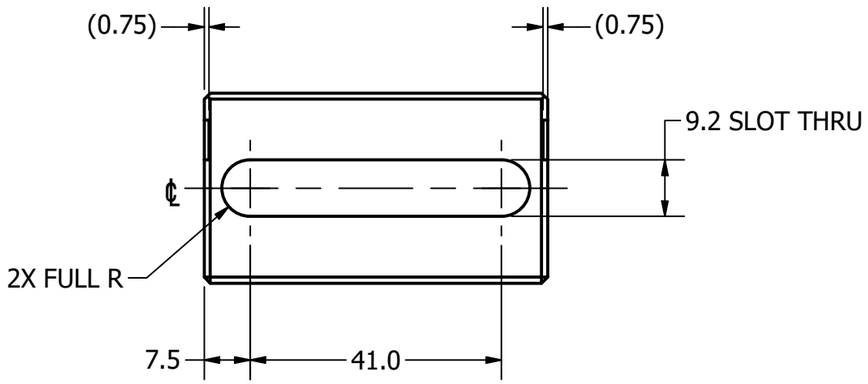
SCALE: 1:1 | SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	3/28/2016









NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.
2. MASS = 133± 10.5 grams

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 1018 STEEL
HEAT TREAT:
FINISH: 0.008mm ELECTROLESS NICKEL PLATE PER SIDE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: ghayden	3/28/2016
CHECKED:	
ENG:	
APPROVED:	

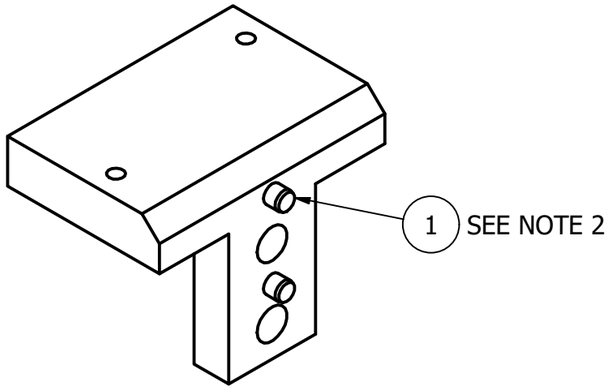
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

ON BOARD DAS STRUCTURAL REPLACEMENT

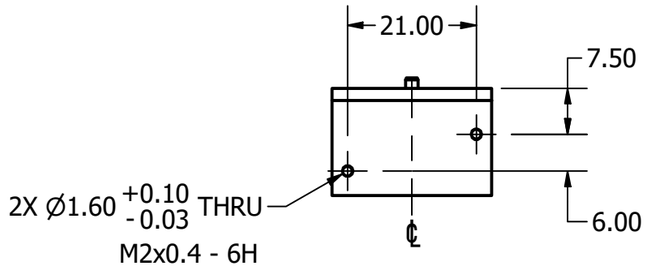
THIRD ANGLE PROJECTION

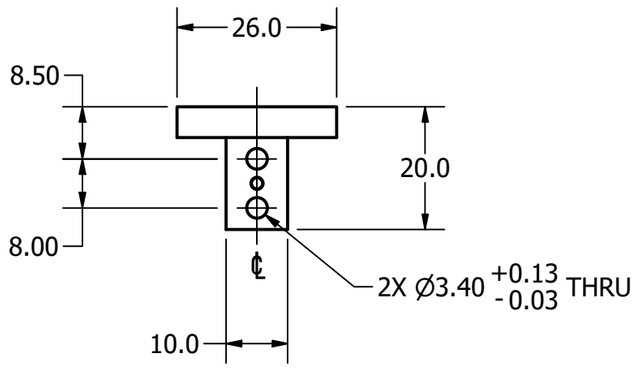
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SCALE: 1:1 | SHEET: 1 OF 1

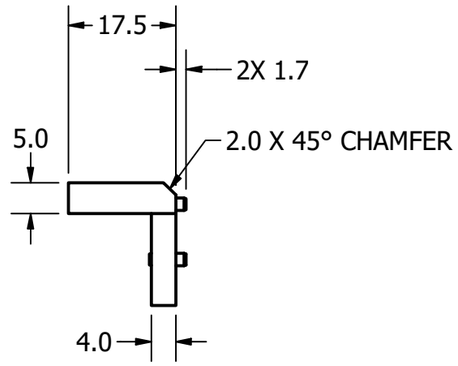
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	4/1/2016

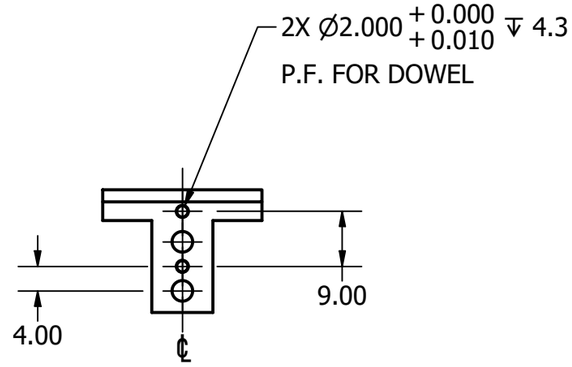


SCALE 2 : 1









NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

2. INSTALL DOWEL PINS AFTER ANODIZE.

ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	5000413	M2 X 6 LG. DOWEL PIN

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

APPROVALS	DATE
DRAWN: ghayden	4/1/2016
CHECKED:	
ENG:	
APPROVED:	

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

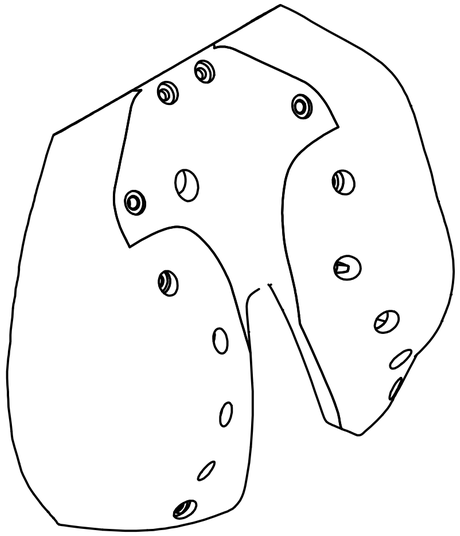
TILT SENSOR MOUNT, THORAX

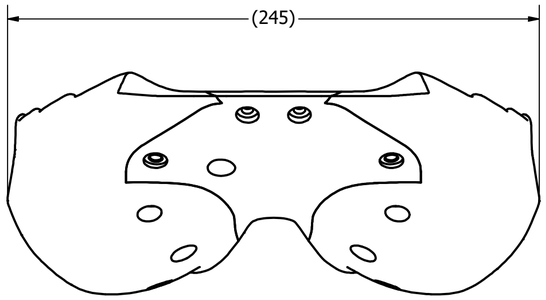
THIRD ANGLE PROJECTION

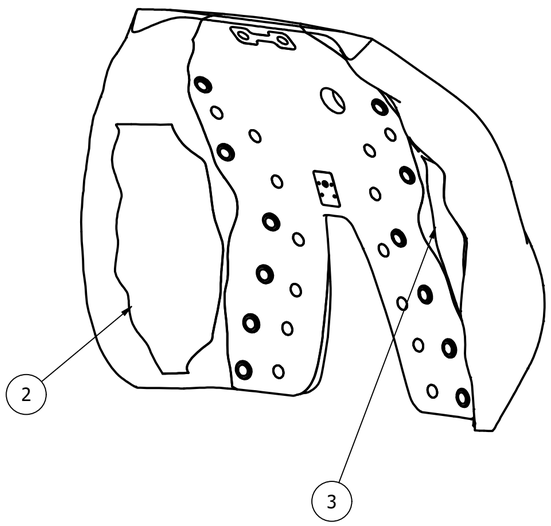
SIZE: A3 | DRAWING NUMBER: 474-3038 | REV: 1

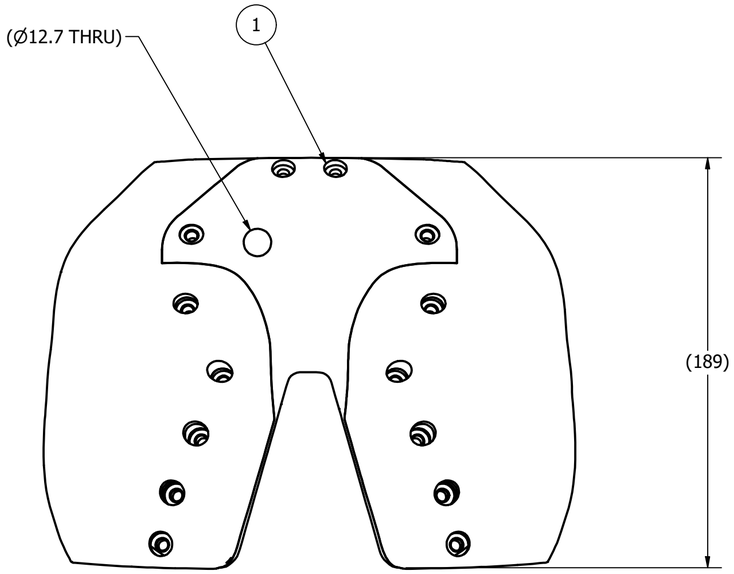
SCALE: 1:1 | SHEET: 1 OF 1

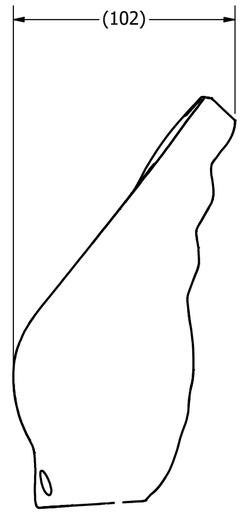
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE TO PROTOTYPE	GCH	JW	4/6/2016











ITEM	QTY	PART NUMBER	DESCRIPTION
3	1	474-3705-2	FOAM, BREAST INSERT RIGHT
2	1	474-3705-1	FOAM, BREAST INSERT LEFT
1	1	474-3706	STERNUM, MOLDED

PARTS LIST

NOTES:
1. MATERIAL: POLYURETHANE
   COLOR: EURO BROWN
   DUROMETER: 30 ±5 SHORE "A"
2. REMOVE ALL MOLD FLASHING
3. ALL MOLD DIMENSION TOLERANCE +1%/-2%
   BUT NO SMALLER THAN 0.5mm
4. NO SPLIT OR DEFECTS ARE ALLOWED
   IN THE MOLDING
5. WEIGHT: 704 GRAMS - NOMINAL

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ∠ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTE #1
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: ghayden	4/6/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

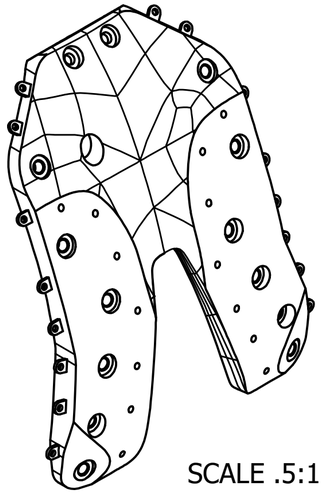
CHEST FLESH-STERNUM, MODLED

THIRD ANGLE PROJECTION

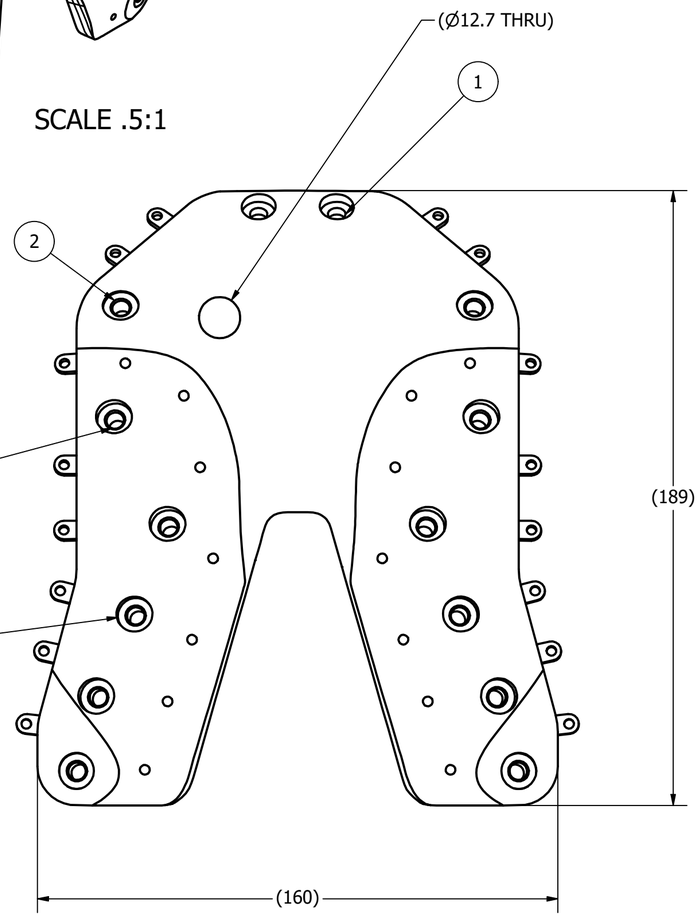
SIZE: A2 | DRAWING NUMBER: 474-3700 | REV: 1

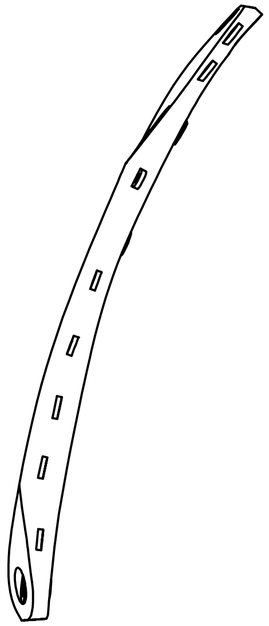
SCALE: .5:1 | SHEET: 1 OF 1

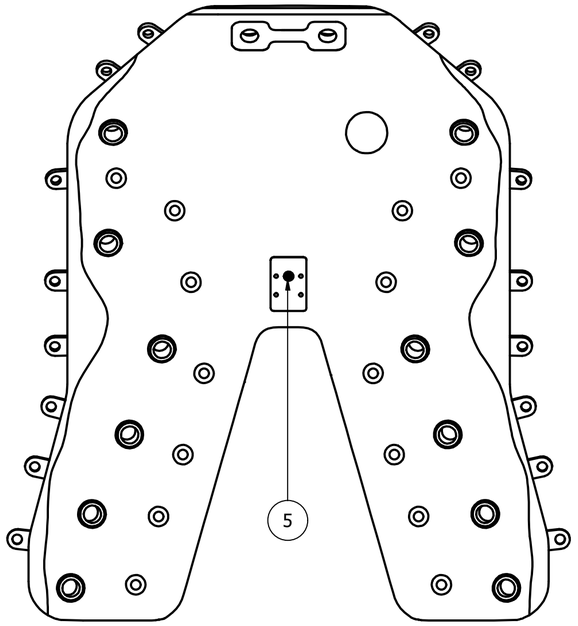
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	4/6/2016



SCALE .5:1







ITEM	QTY	PART NUMBER	DESCRIPTION
5	1	474-3708	STERNUM ACCELEROMETER MOUNT
4	6	474-3703	T-INSERT, M5 THRU HOLE, RIBS 5, 6, 7
3	4	474-3702	T-INSERT, M5 THRU HOLE, RIBS 3, 4
2	2	474-3701	T-INSERT, M5 THRU HOLE, RIB 2
1	1	474-3704	INSERT, STERNUM

PARTS LIST

NOTES:

1. MATERIAL: THERMOSET PLASTIC
   COLOR: EURO BROWN
   DUROMETER: 70-75 SHORE "A"
2. REMOVE ALL MOLD FLASHING
3. ALL MOLD DIMENSION TOLERANCE +1%/-2%
   BUT NO SMALLER THAN 0.5mm
4. NO SPLIT OR DEFECTS ARE ALOWED IN THE MOLDING

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTE #1
HEAT TREAT:
FINISH:

APPROVALS	DATE
DRAWN: ghayden	4/6/2016
CHECKED:	
ENG:	
APPROVED:	

*V*EHICLE *R*ESEARCH and *T*EST *C*ENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

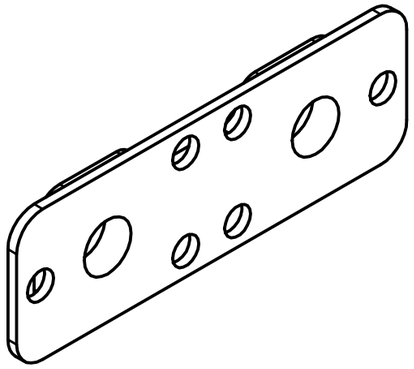
STERNUM, MOLDED

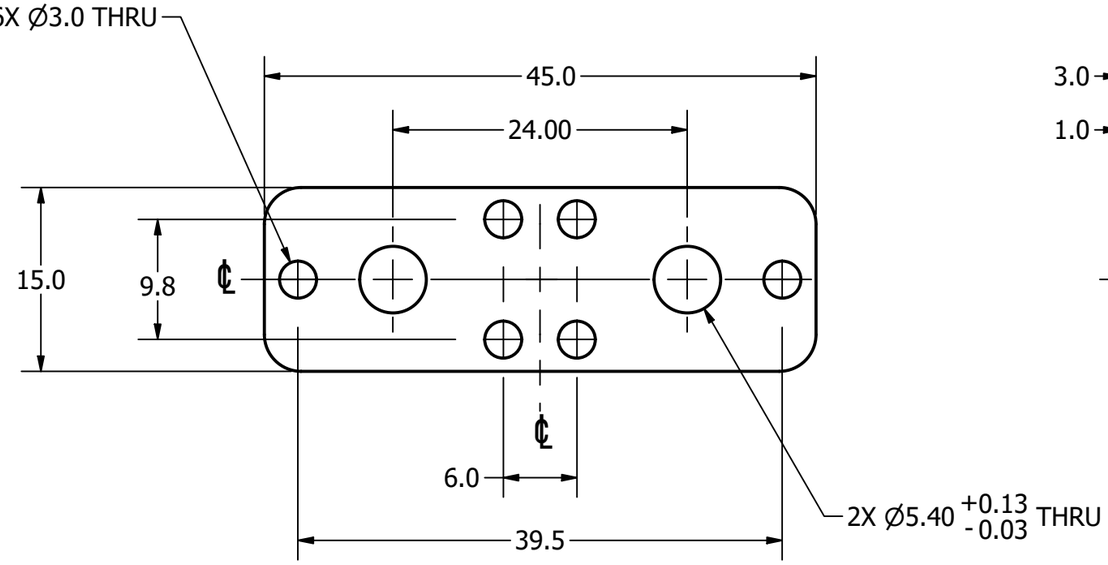
THIRD ANGLE PROJECTION

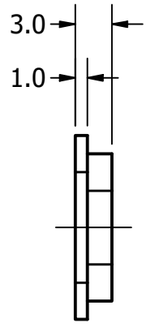
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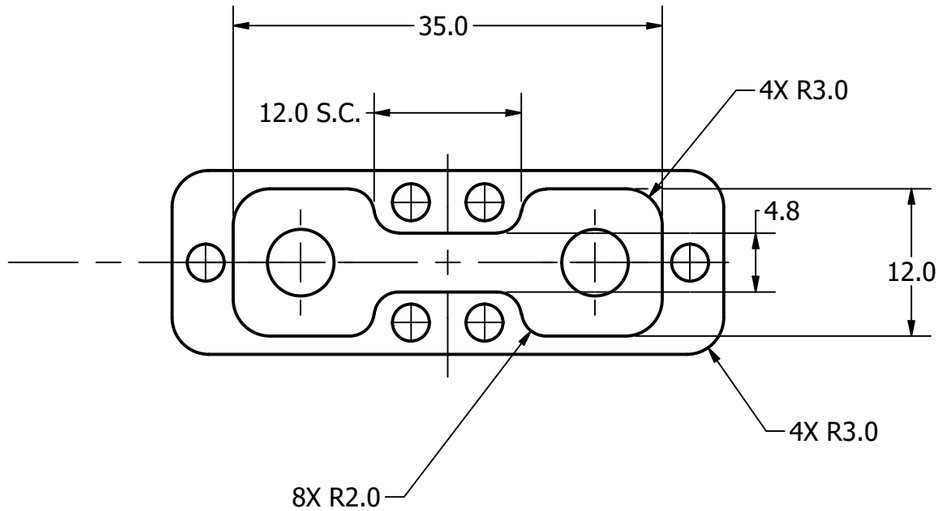
SCALE: .75:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	4/5/2016









NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED √ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 6061-T6 ALUMINUM
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: ghayden	4/5/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

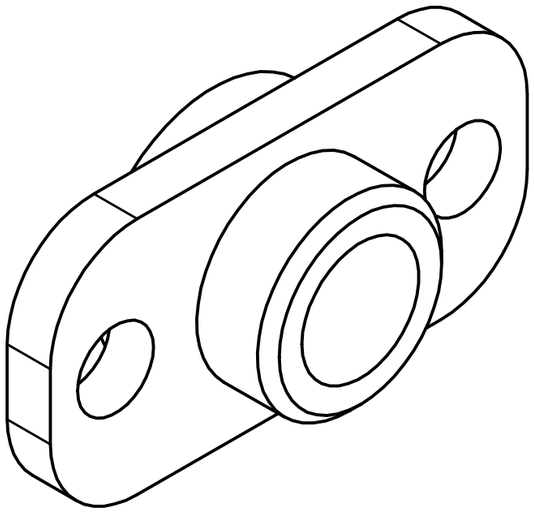
INSERT, STERNUM

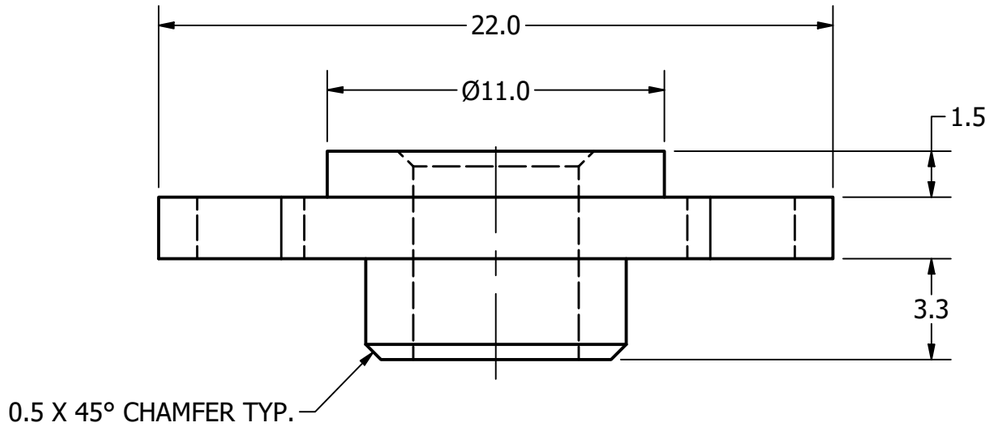
THIRD ANGLE PROJECTION

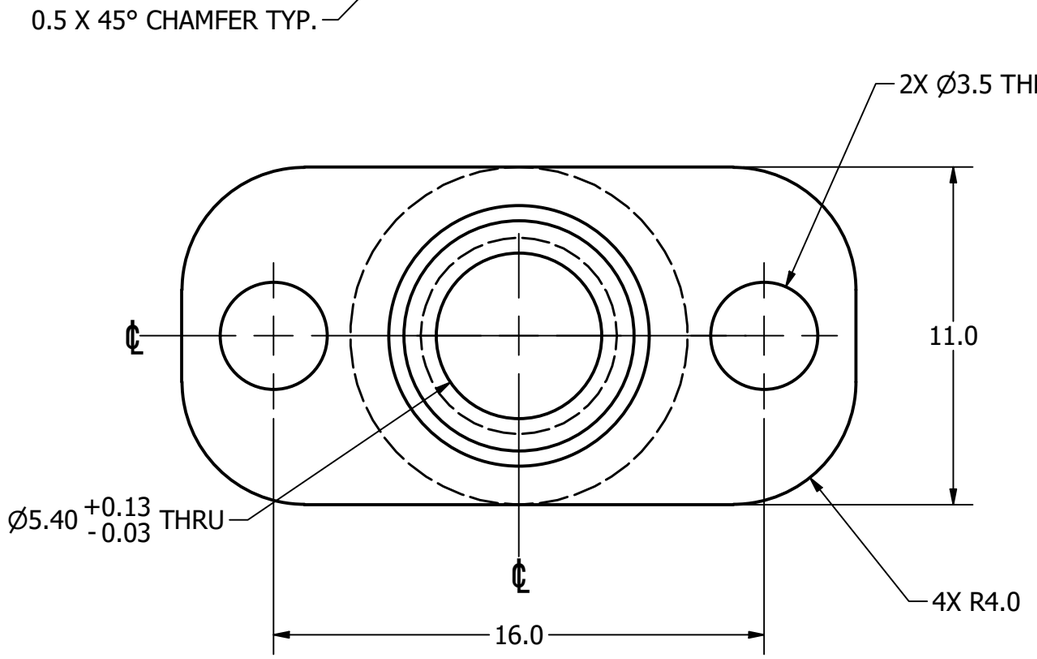
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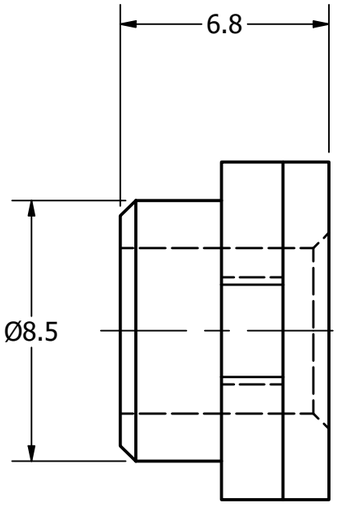
SCALE: 2:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	4/6/2016









NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN ghayden	4/6/2016
CHECKED	
ENG	
APPROVED	

MATERIAL: 6061-T6 ALUMINUM
HEAT TREAT:
FINISH:

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

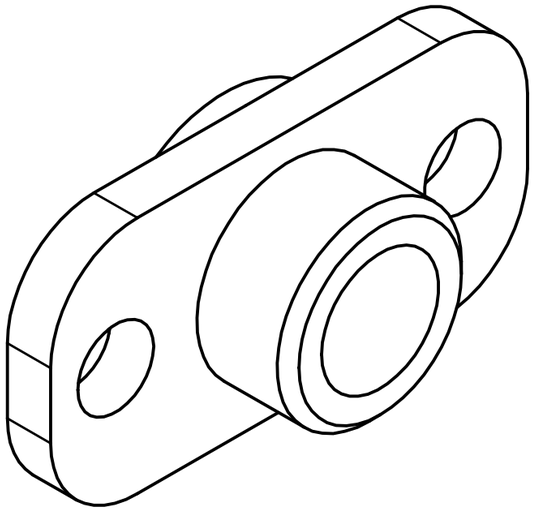
T-INSERT, M5 THRU HOLE, RIB 2

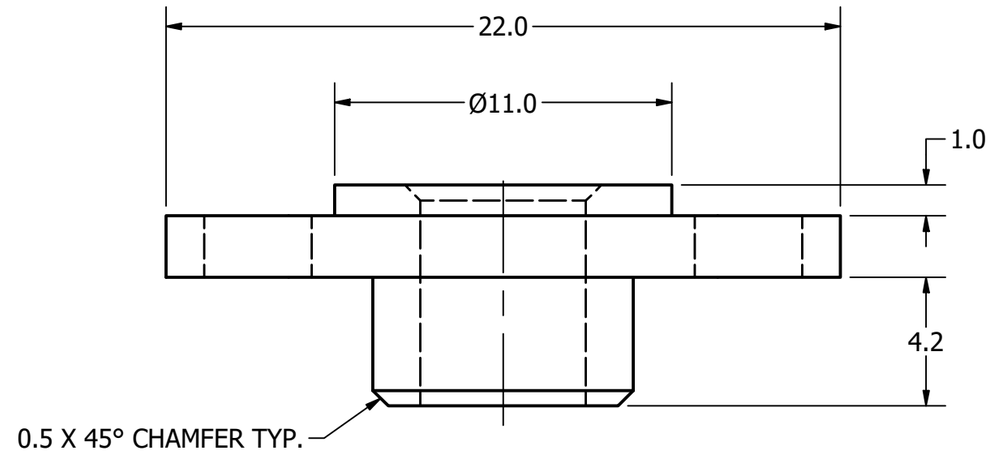
THIRD ANGLE PROJECTION

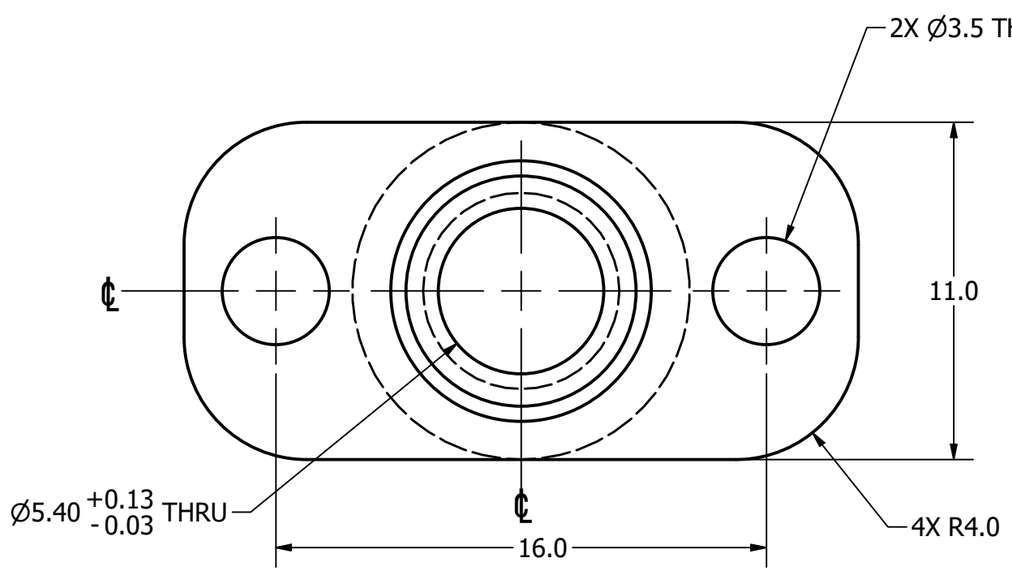
SIZE	DRAWING NUMBER	REV
A3	474-3701	1

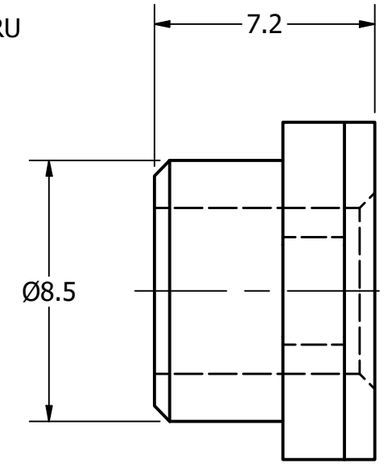
SCALE: 5:1 | SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	4/6/2016









NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 6061-T6 ALUMINUM
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: ghayden	4/6/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

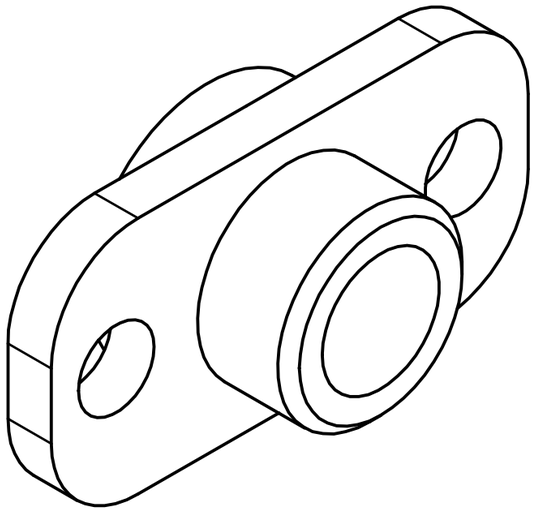
T-INSERT, M5 THRU HOLE, RIBS 3, 4

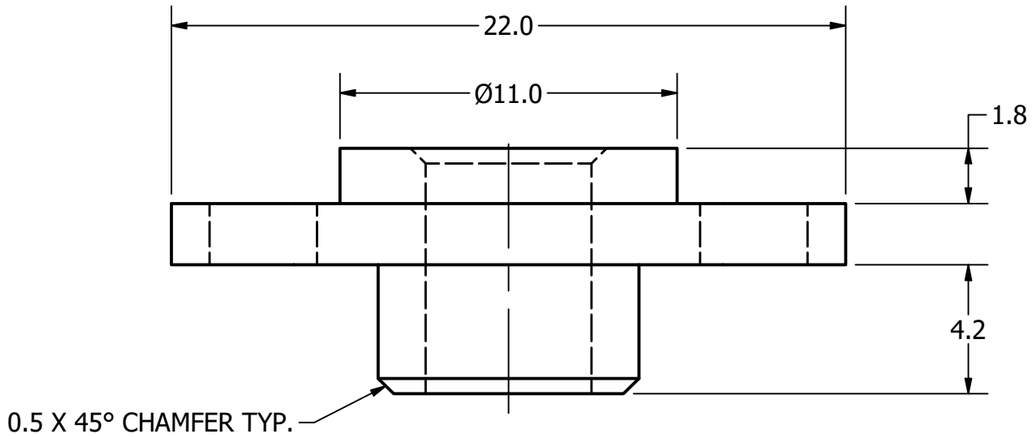
THIRD ANGLE PROJECTION

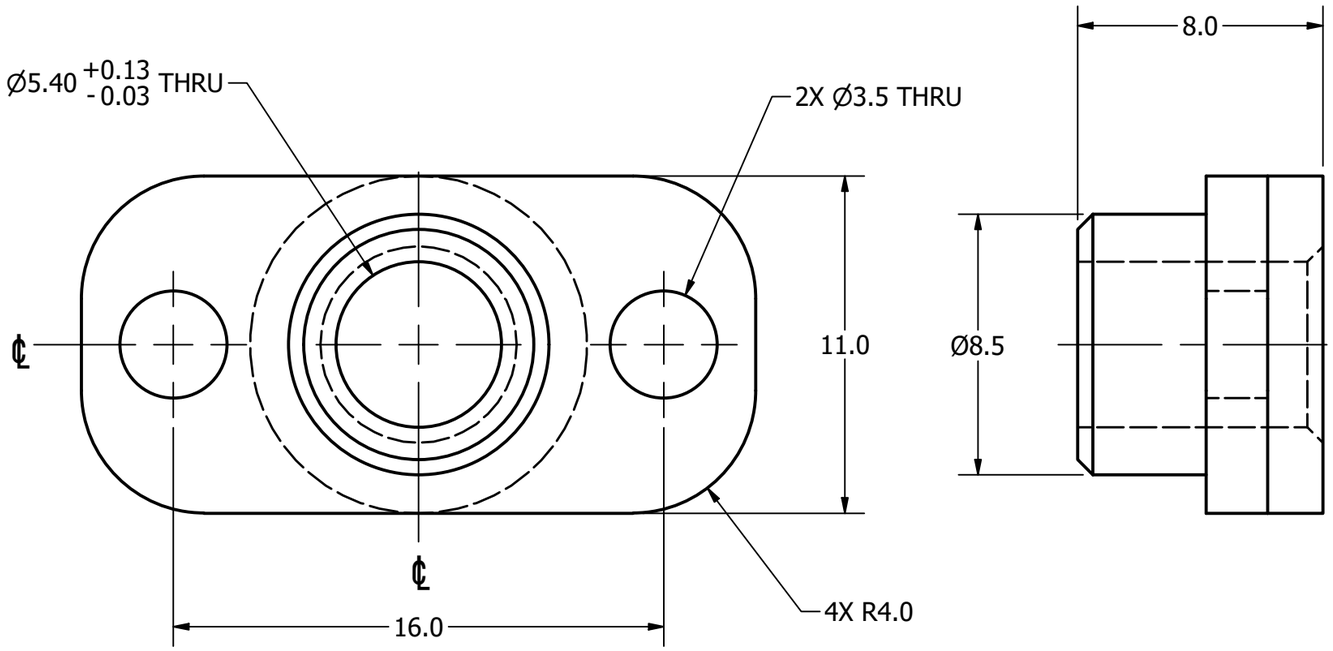
SIZE: A3 | DRAWING NUMBER: 474-3702 | REV: 1

SCALE: 5:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	4/6/2016







NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED 125 µin
ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 6061-T6 ALUMINUM
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: ghayden	4/6/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

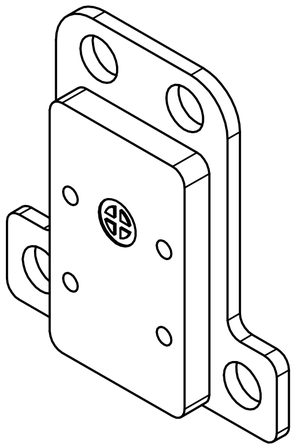
T-INSERT, M5 THRU HOLE, RIBS 5, 6, 7

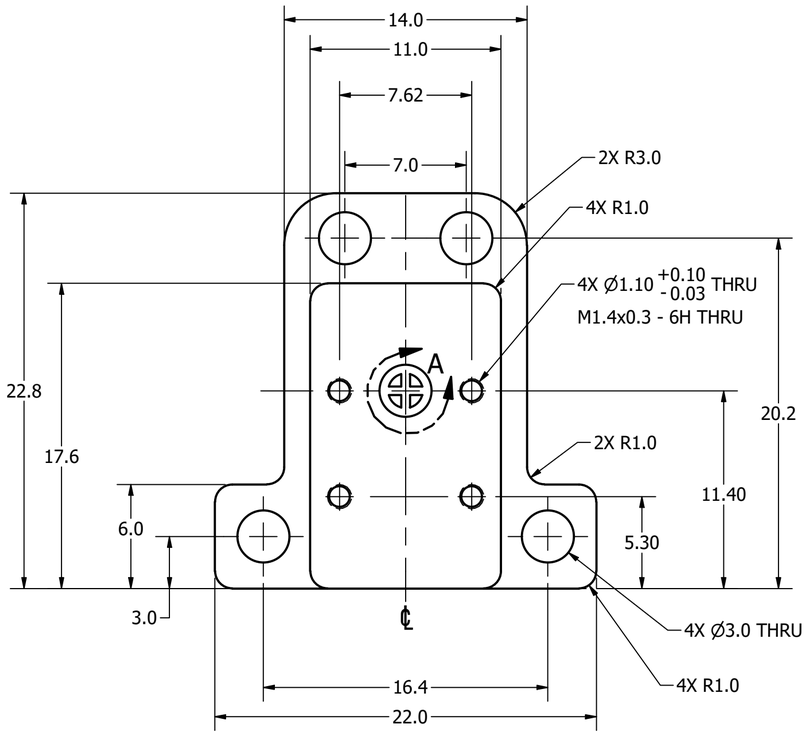
THIRD ANGLE PROJECTION

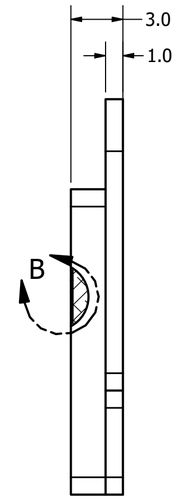
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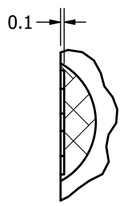
SCALE: 5:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	DJI	JW	4/29/2016

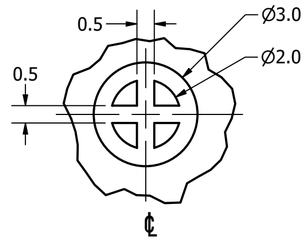








DETAIL B
SCALE 8 : 1



DETAIL A
SCALE 8 : 1

NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: disopi	4/29/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

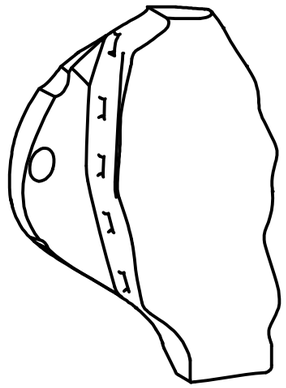
STERNUM ACCELEROMETER MOUNT

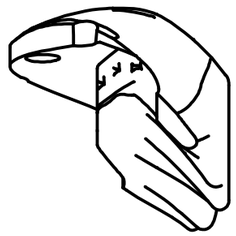
THIRD ANGLE PROJECTION

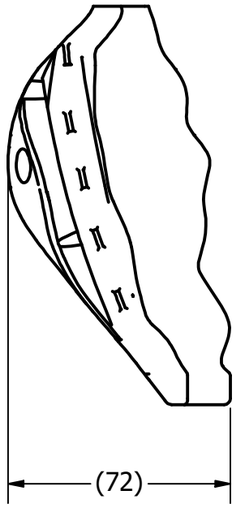
SIZE: A2 | DRAWING NUMBER: 474-3708 | REV: 1

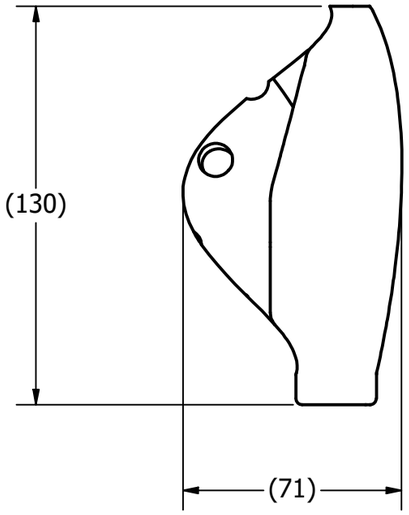
SCALE: 4:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE TO PROTOTYPE	KMSP	KMSP	1/24/18









NOTES:
1. MATERIAL: URETHANE FOAM WITH 0.5mm MAX. POLYMER COATING
2. REMOVE ALL MOLD FLASHING
3. ALL MOLD DIMENSION TOLERANCE +1%/-4%
   BUT NO SMALLER THAN 1mm
4. NO SPLIT OR DEFECTS ARE ALLOWED
   IN THE URETHANE MOLDING
5. WEIGHT: 35±10g

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN: srice	11/21/2017
CHECKED:	
ENG:	
APPROVED:	

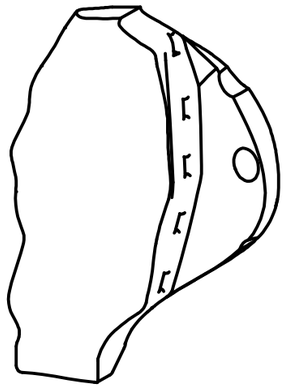
MATERIAL: SEE NOTE #1
HEAT TREAT: N/A
FINISH: N/A

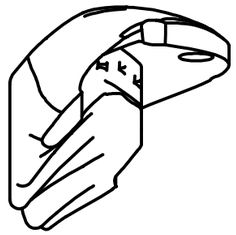
FOAM, BREAST INSERT LEFT

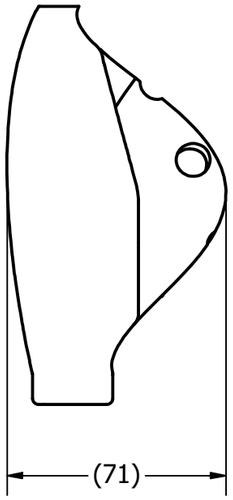
THIRD ANGLE PROJECTION

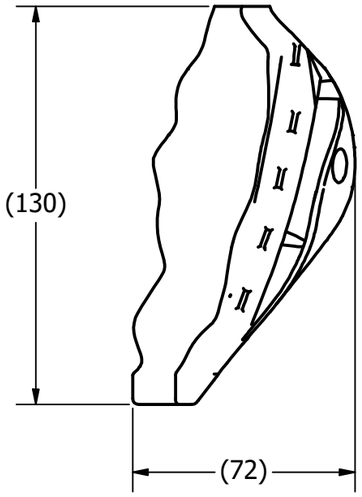
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SCALE: 1/2 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE TO PROTOTYPE	KMSP	KMSP	1/24/18









NOTES:
1. MATERIAL: URETHANE FOAM WITH 0.5mm MAX. POLYMER COATING
2. REMOVE ALL MOLD FLASHING
3. ALL MOLD DIMENSION TOLERANCE +1%/-4%
   BUT NO SMALLER THAN 1mm
4. NO SPLIT OR DEFECTS ARE ALLOWED
   IN THE URETHANE MOLDING
5. WEIGHT: 35±10g

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED √ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTE #1
HEAT TREAT: N/A
FINISH: N/A

*V*EHICLE *R*ESEARCH and *T*EST *C*ENTER

APPROVALS	DATE
DRAWN: srice	11/21/2017
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

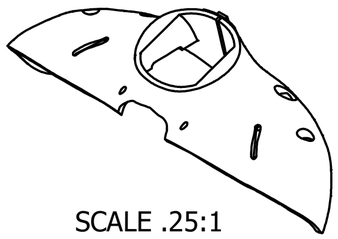
FOAM, BREAST INSERT RIGHT

THIRD ANGLE PROJECTION

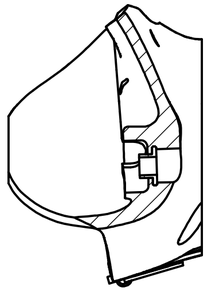
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SCALE: 1/2 | SHEET: 1 OF 1

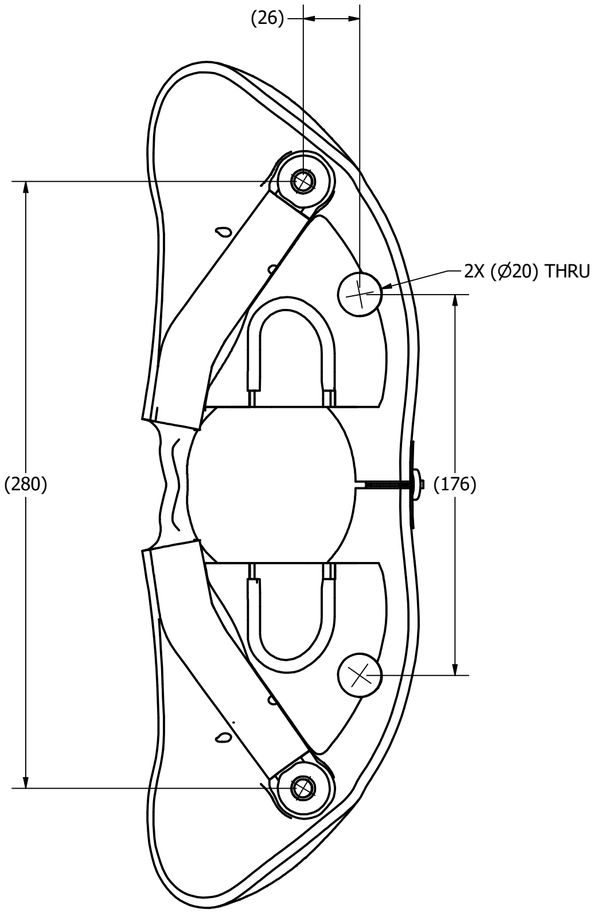
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	DJI	JW	4/29/2016

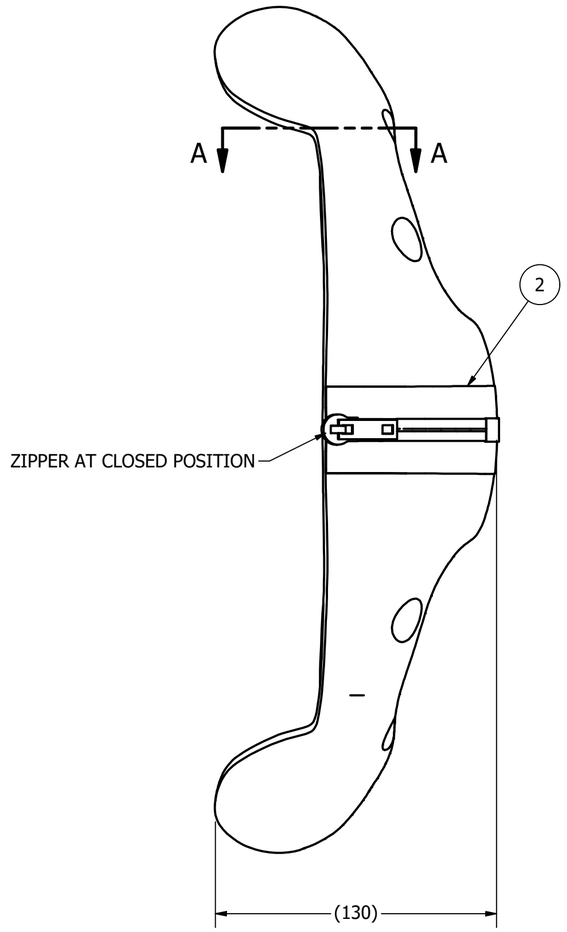


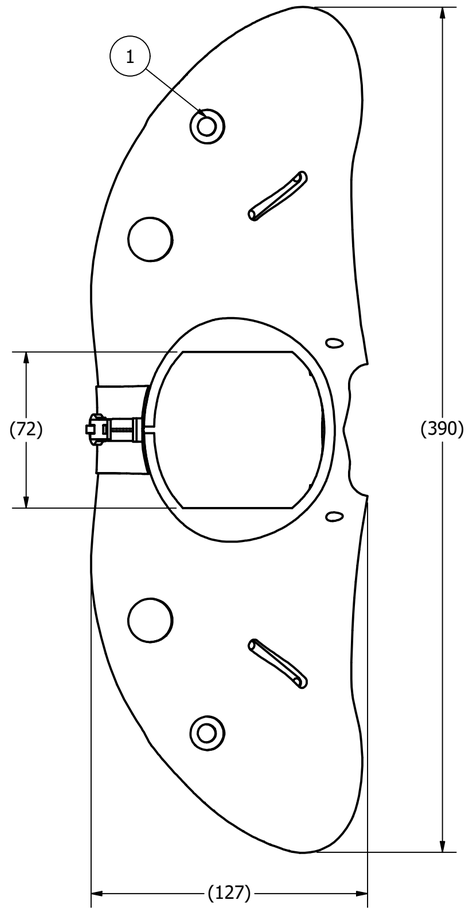
SCALE .25:1



SECTION A-A
SEE NOTE 7







NOTES:
1. MATERIAL: THERMOSET PLASTIC
   COLOR: EURO BROWN
   DUROMETER: 70-75 SHORE "A"

2. REMOVE ALL MOLD FLASHING

3. ALL MOLD DIMENSION TOLERANCE +1%/-2% BUT NO SMALLER THAN 0.5mm

4. NO SPLIT OR DEFECTS ARE ALLOWED IN THE MOLDING

5. BOND ZIPPER TO FLESH AS SHOWN

6. MASS 537 GRAMS ± 16 GRAMS

7. INSTALL BUSHING WITH FLANGE ORIENTED TOWARDS TOP OF SHOULDER

ITEM	QTY	PART NUMBER	DESCRIPTION
2	1	474-3536	ZIPPER ASSEMBLY, SHOULDER PAD
1	2	474-3581	SHOULDER FLESH INSERT

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ∠C ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTE #1
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: disopi	4/29/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

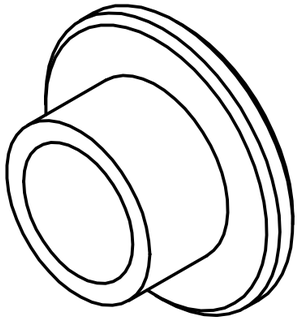
SHOULDER PAD

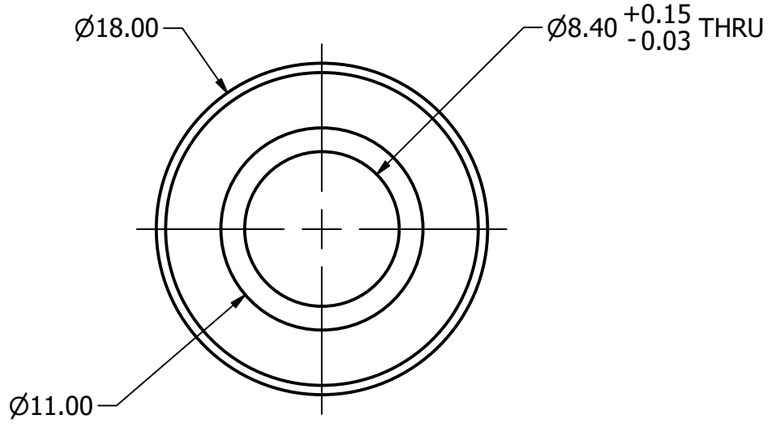
THIRD ANGLE PROJECTION

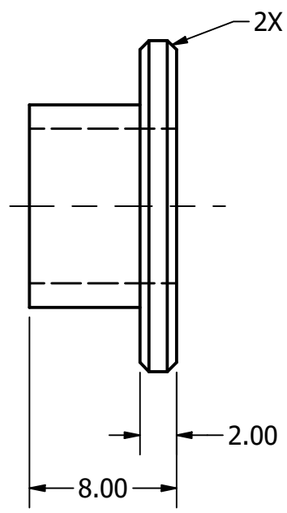
SIZE: A2 | DRAWING NUMBER: 474-3559 | REV: 1

SCALE: .5:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	DJI	JW	4/29/2016







PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 1018 STEEL
HEAT TREAT:
FINISH: 0.008mm ELECTROLESS NICKEL PLATE PER SIDE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: disopi	4/29/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

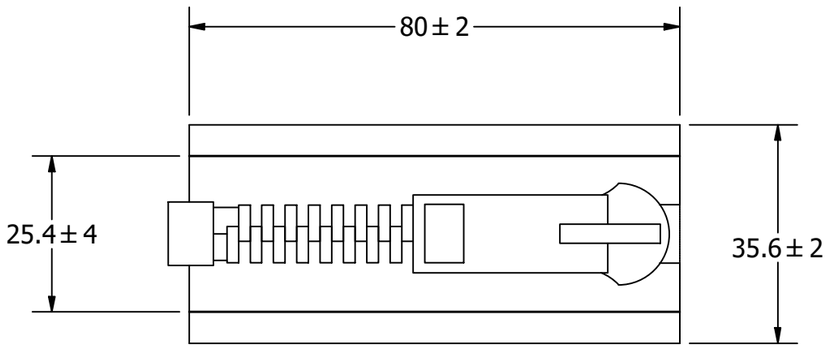
SHOULDER FLESH INSERT

THIRD ANGLE PROJECTION

SIZE	DRAWING NUMBER	REV
A3	474-3581	1

SCALE: 3:1 SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JPM	JW	4/28/2016



NOTES:

1. ALL BLACK #5 ZIPPER.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTES
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: J. MCINNIS	4/28/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

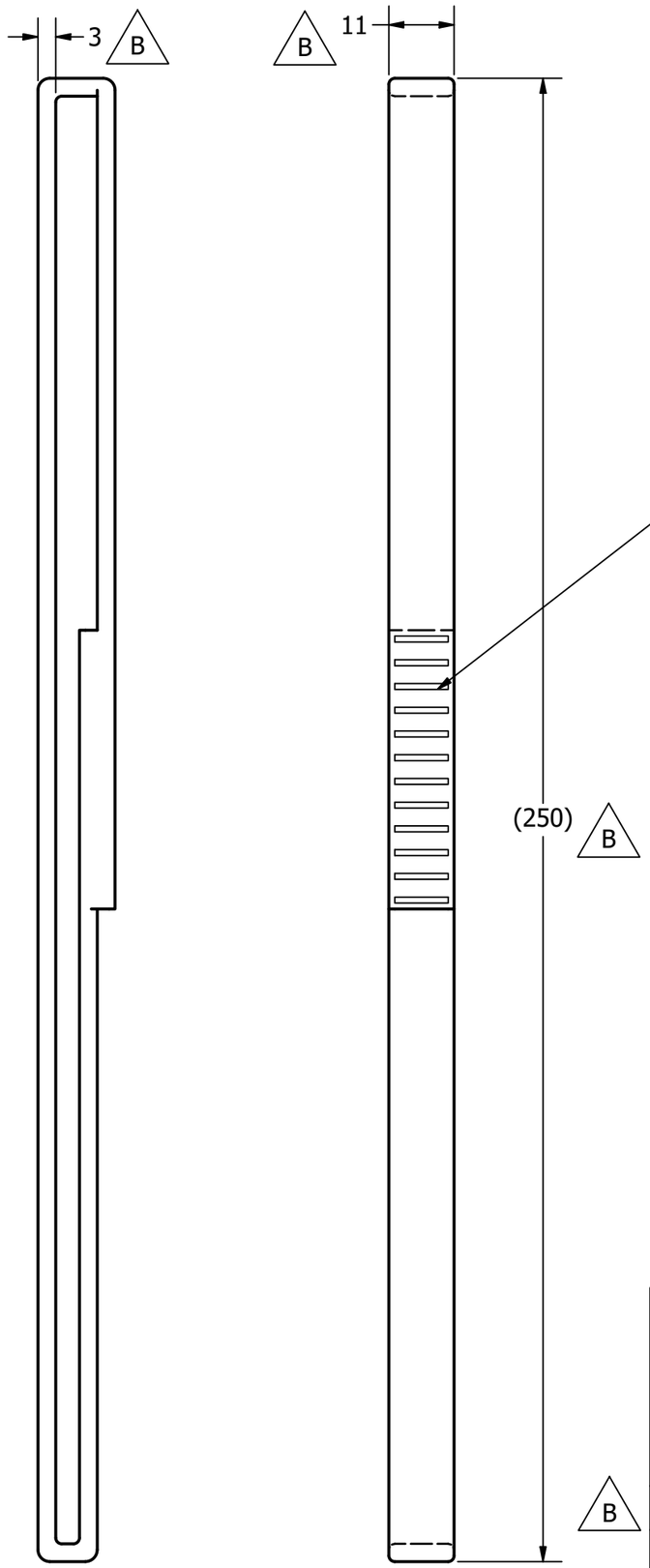
ZIPPER ASSEMBLY, SHOULDER PAD

THIRD ANGLE PROJECTION

SIZE: A3 | DRAWING NUMBER: 474-3536 | REV: 1

SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
73957	A	RELEASE TO PRODUCTION	BTH	BLB	5/22/2015
74089	B	ADDED NOTE 2 AND OVERLAP NOTE; REMOVED REFERENCE DIMS; UPDATED MATERIAL; 11, 15KN WAS 9, 22KN	BTH	BLB	7/20/2015



NOTES:
1. 11mm X 250mm OPEN SLING, 15KN MINIMUM LOAD RATED
2. COLOR: BLUE/WHITE

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ∠ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTES
HEAT TREAT: N/A
FINISH: N/A

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: B. HARRIS	5/22/2015
CHECKED	
ENG	
APPROVED	

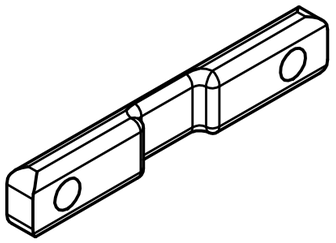
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

THOR LIFT STRAP
THOR-M

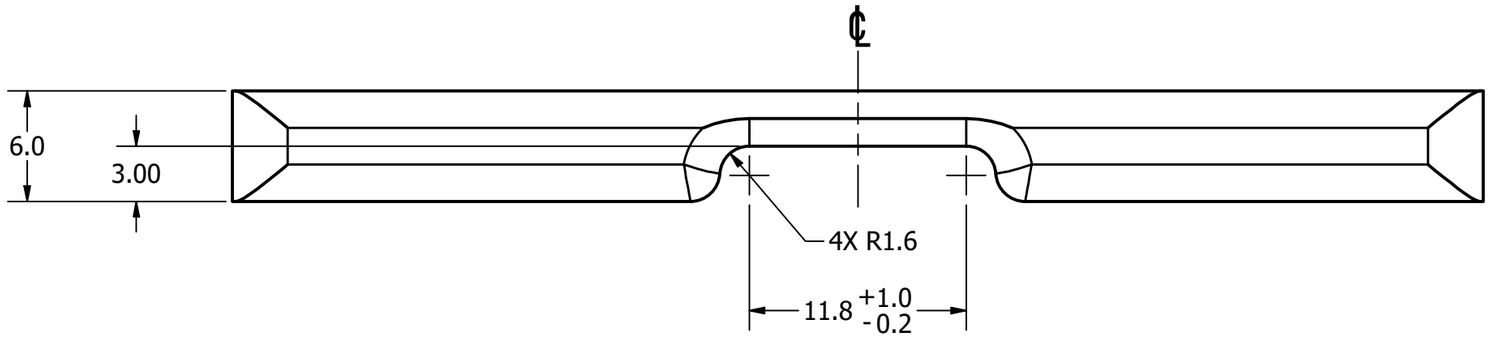
THIRD ANGLE PROJECTION

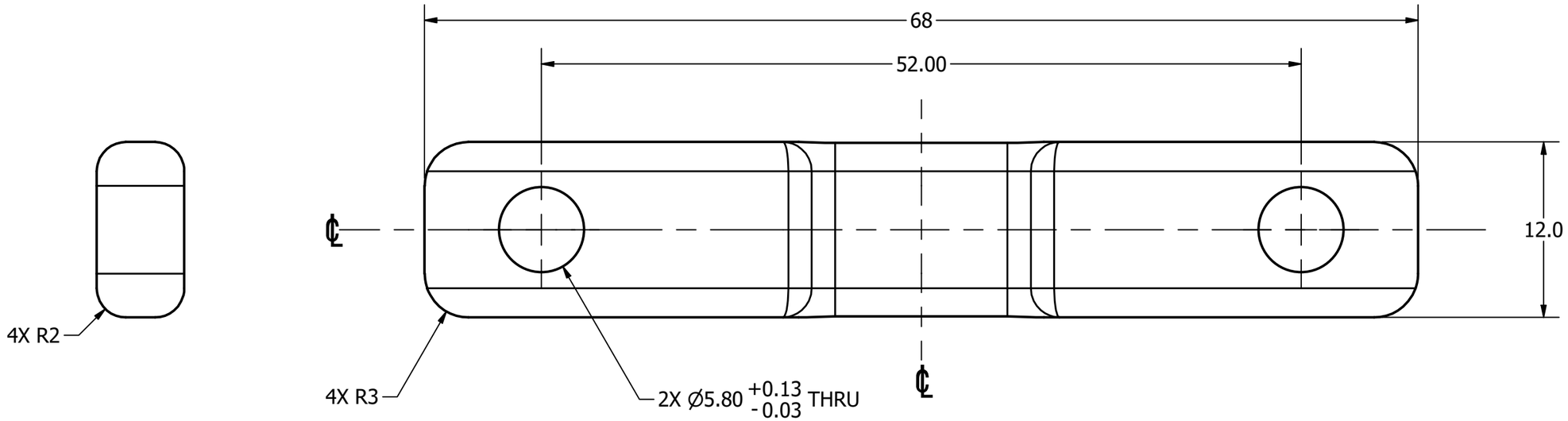
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SCALE: 1 : 1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AB	JW	04/19/2017



SCALE 1 : 1





NOTES:

1. DIMENSIONS ARE SYMMETRICAL ABOUT ℄ UNLESS OTHERWISE NOTED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 1018 STEEL
HEAT TREAT:
FINISH: 0.008mm ELECTROLESS NICKEL PLATE PER SIDE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: jgibbs	3/31/2017
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

LIFTING STRAP BRACKET

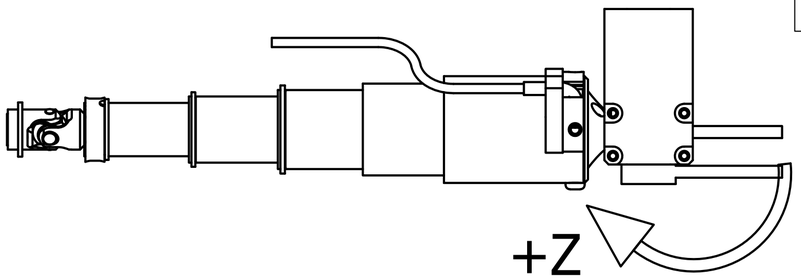
THIRD ANGLE PROJECTION

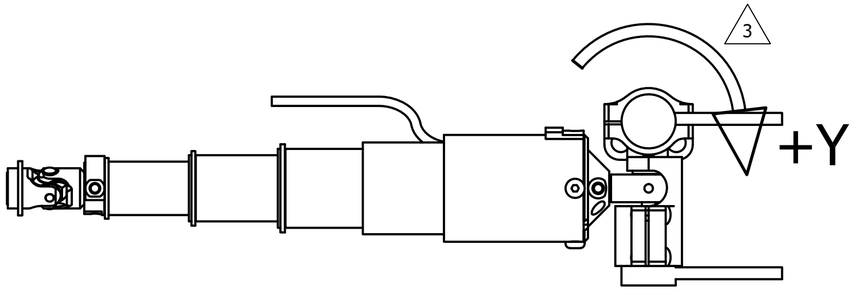
SIZE: A3 | DRAWING NUMBER: 474-3025 | REV: 1

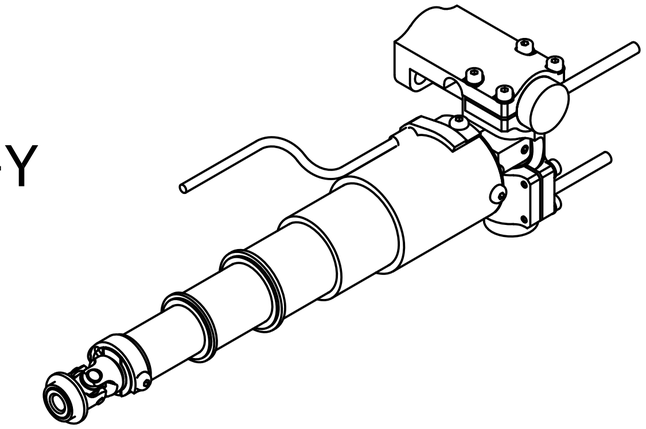
SCALE: 3:1 | SHEET: 1 OF 1

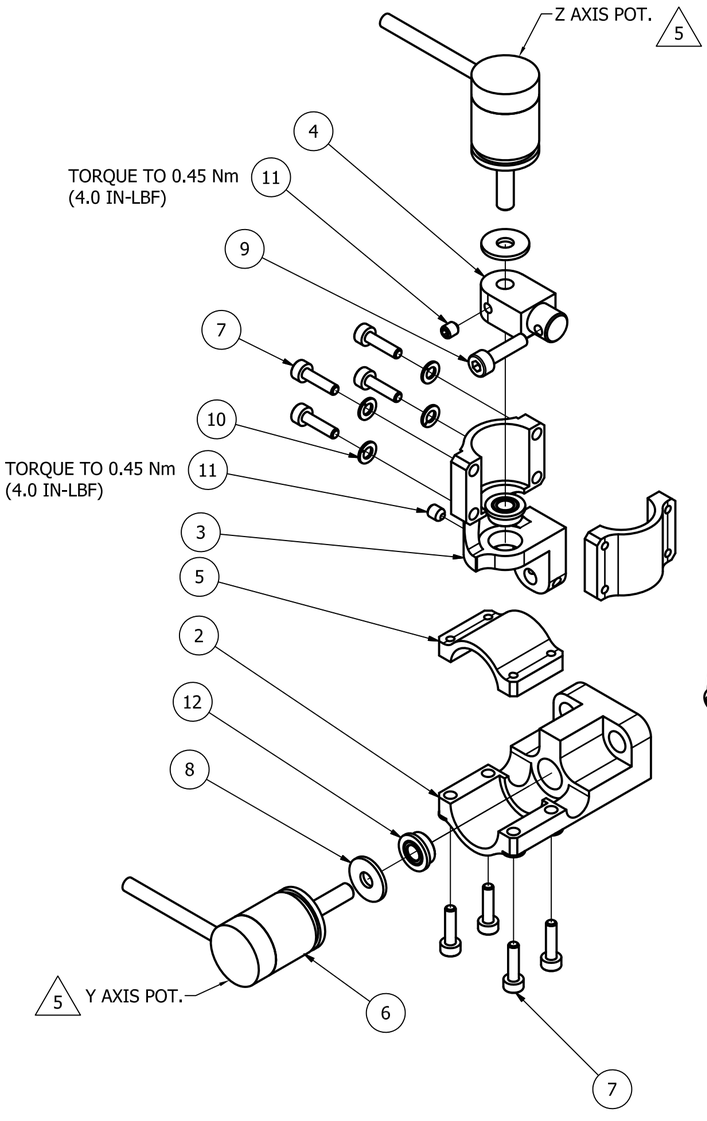
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
75051	1	PROTOTYPE	SKK	CJT	7/14/2016
75468	2	ADDED "-U" TO END OF IH-11620-R4-XXX	SKK	CJT	7/27/2016
76048	3	MADE IR-TRACC USED ONLY FOR UPPER LEFT POSITION; ADDED NOTE AND POLARITY	SKK	JGG	1/16/2017
76618	4	474-3750 & 474-3752 WERE 472-3551 & 472-3552	SKK	JGG	6/7/2017
75993	5	ADD Y AND Z AXIS TO POTS; UPDATE EXIT CABLE DIRECTION; UPDATE POTS TO HAVE CORRECT MODEL OF 9945-XXX-U	AT	DJI	12/14/2017

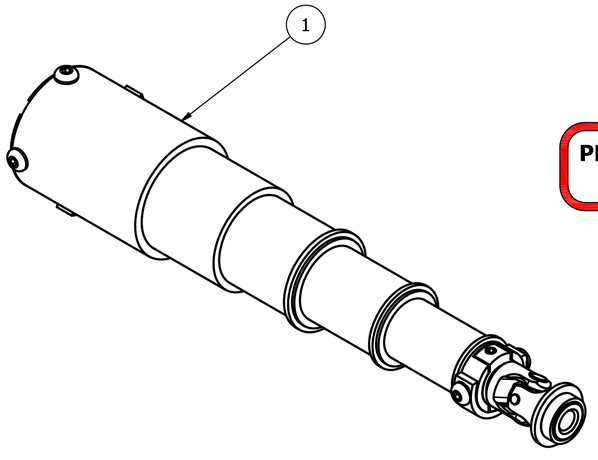
PART NUMBER TABLE			
ASSEMBLY NO.	SENSORS USED	CABLE LENGTH "XXX"	DAS LOCATION
474-3550	SA572-S122 SA572-S114	30 FT [9144 mm]	EXTERNAL











PRELIMINARY DRAWING

R4 DESIGNATION: DEFINES IR-TRACC CALIBRATION INCLUDING TUBES-IN/TUBES-OUT MEASUREMENT.

ITEM	QTY	PART NUMBER	DESCRIPTION
12	2	9002201	FLANGE BEARING (1/4" O.D. x 1/8" I.D.)
11	2	5001359	M2.5 X 0.45 X 3 LG. SSSCP NYLOK
10	8	5001216	M2 SPLIT LOCK WASHER SS
9	1	5000456	M2.5 X 0.45 X 10 LG. SHCS
8	2	5000378	M3 FLAT WASHER LARGE OD SS
7	8	5000083	M2 X 0.4 X 8 LG. SHCS
6	2	SA572-S114	POTENTIOMETER ASSEMBLY; NO CALIBRATION
5	2	472-3554	CLAMP, IRTRACC
4	1	472-3553	ADAPTOR, SERVO/IRTRACC
3	1	474-3752	IR-TRACC ARM MOUNTING BRACKET, UL/LR
2	1	474-3750	IR-TRACC BASE
1	1	SA572-S122	IR-TRACC, THOR 5TH UPPER TORSO

PARTS LIST

5
4
4
2

NOTES:

3 1. 474-3550 AND 474-3580 HAVE THE SAME PART LISTS BUT DIFFERING POLARITIES.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

	APPROVALS	DATE
DRAWN	skantola	4/11/2016
CHECKED		
ENG	CJT	6/20/2018
APPROVED		

MATERIAL
HEAT TREAT: N/A
FINISH: N/A

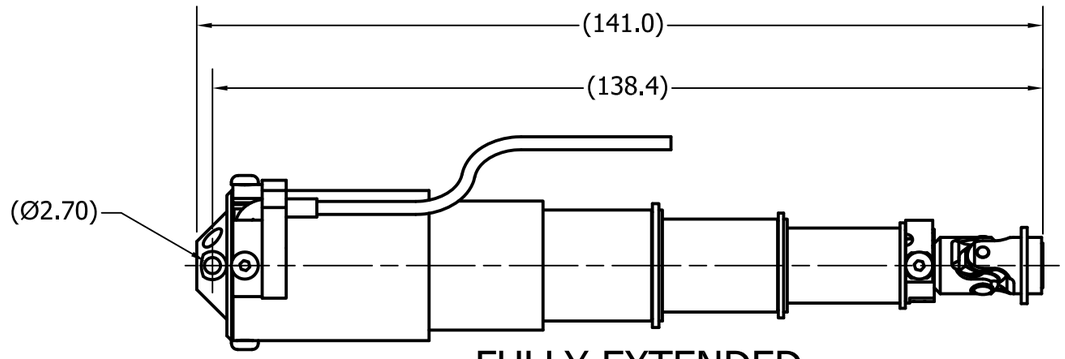
3D IR-TRACC ASSEMBLY, UPPER LEFT

THIRD ANGLE PROJECTION

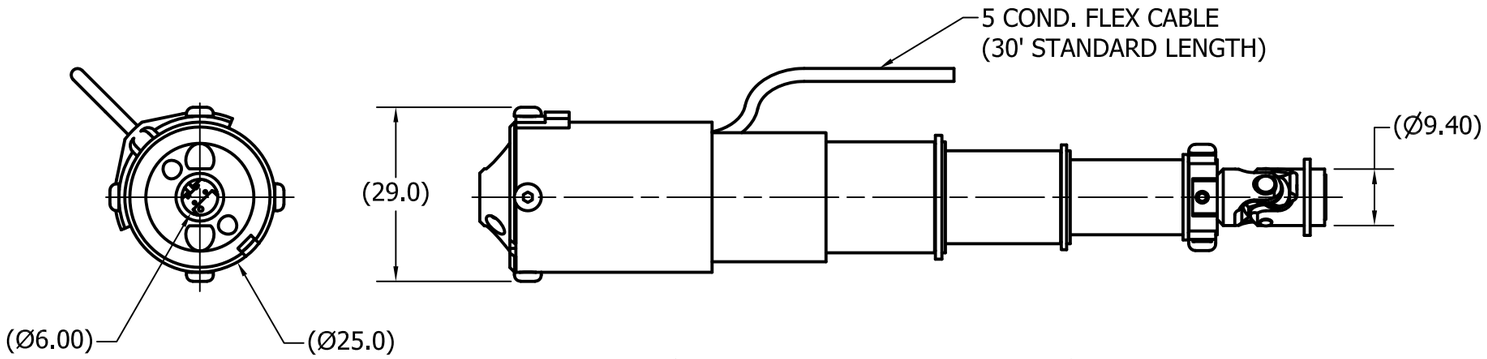
SIZE: A2 | DRAWING NUMBER: 474-3550 | REV: 5

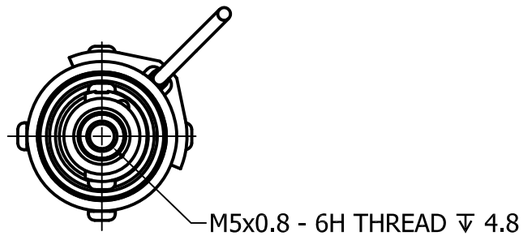
SCALE: NONE | SHEET: 1 OF 1

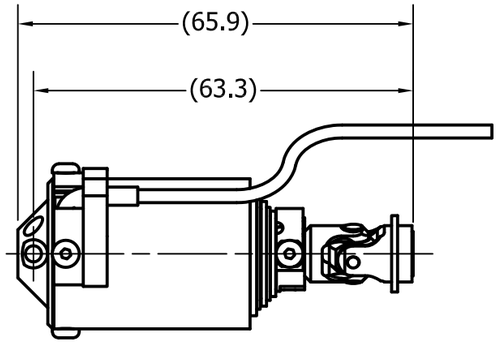
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
75051	1	PROTOTYPE	SKK	CJT	7/14/2016



FULLY EXTENDED







FULLY COMPRESSED

PRELIMINARY DRAWING

LINEARITY SPECIFICATIONS	
MAXIMUM DISPLACEMENT RANGE	65 mm
IR-TRACC LINEARITY	2% F.S.
MAXIMUM ERROR (FROM TUBES IN AND TUBES OUT POSITION)	2% F.S.
MAXIMUM ERROR (DUE TO CROSS-TALK FROM FORCED LATERAL DISPLACEMENT)	±3% F.S.
ELECTRICAL SPECIFICATIONS	
INPUT VOLTAGE	5 VDC @ 20 mA
OUTPUT VOLTAGE FULLY EXTENDED	50 - 70 mV
OUTPUT VOLTAGE FULLY COMPRESSED	0.7 - 1.7 V

NOTES:

1. THIS IS A NON-LINEAR SENSOR. SEE OTHER DOCUMENTATION FOR LINEARIZATION DETAILS.
2. R4 DESIGNATION DEFINES IR-TRACC CALIBRATION INCLUDING TUBES-IN/TUBES-OUT MEASUREMENT.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

	APPROVALS	DATE
DRAWN	skantola	4/11/2016
MATERIAL		
CHECKED		
HEAT TREAT	N/A	
ENG	CJT	7/14/2016
FINISH	N/A	
APPROVED		

IR-TRACC - THOR 5TH

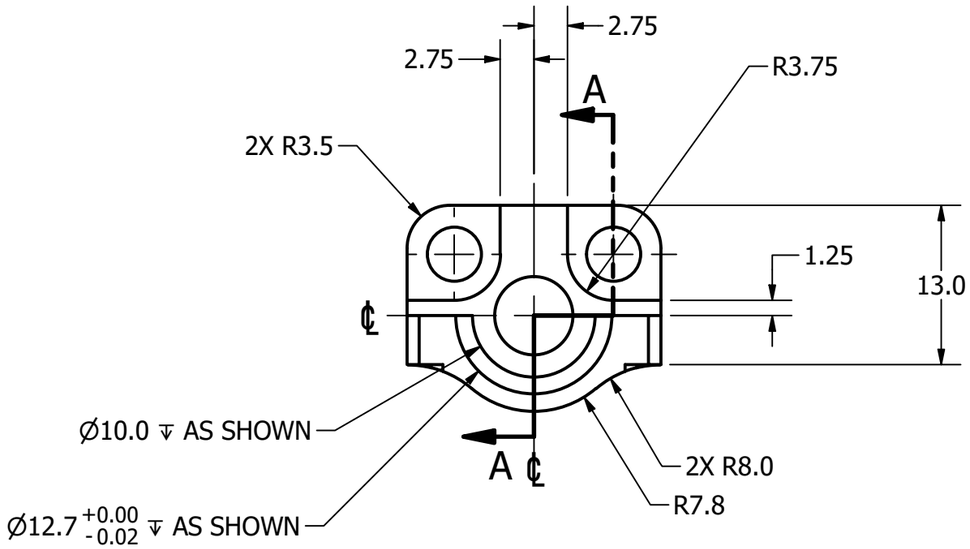
THIRD ANGLE PROJECTION

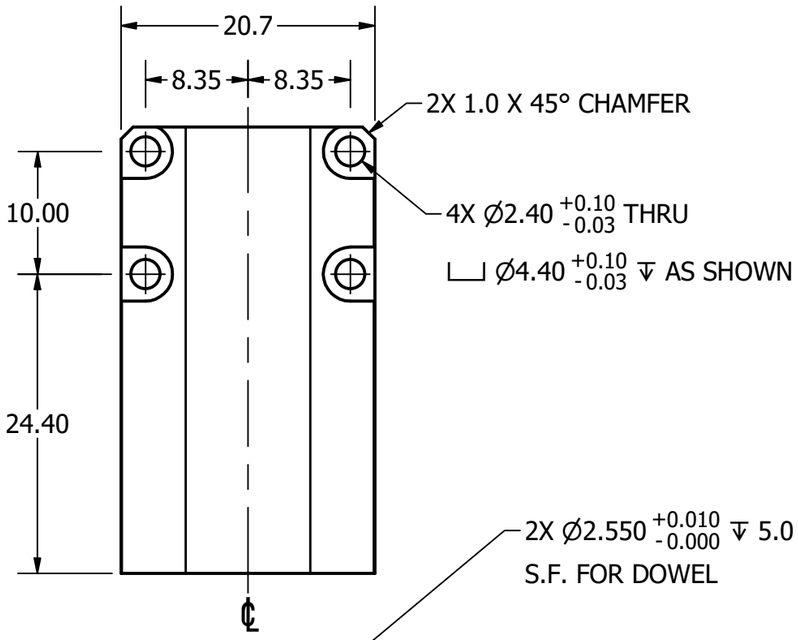
SIZE	DRAWING NUMBER	REV
A3	SA572-S122	1

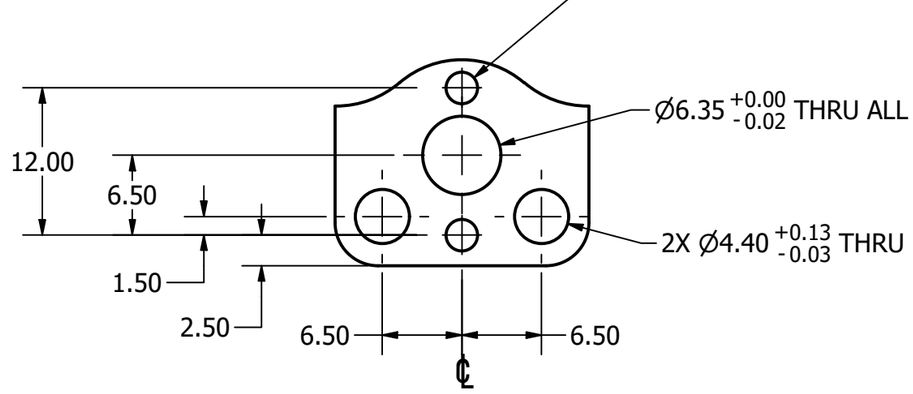
SCALE: 1 : 1

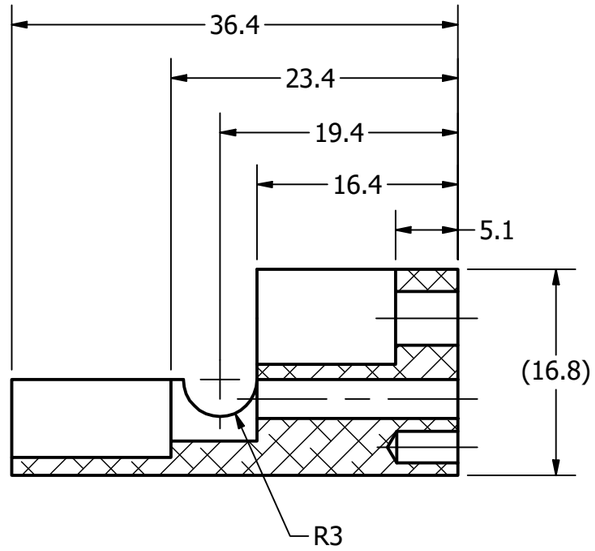
SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	PROTOTYPE	SKK		1/5/18

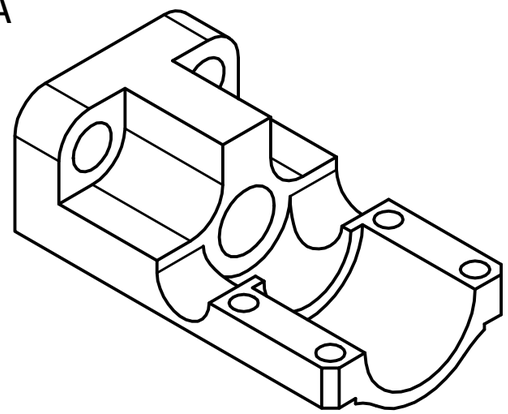








SECTION A-A
SCALE 2 : 1



PRELIMINARY DRAWING

SCALE 2 : 1

NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT: N/A
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN skantola	1/5/2018
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

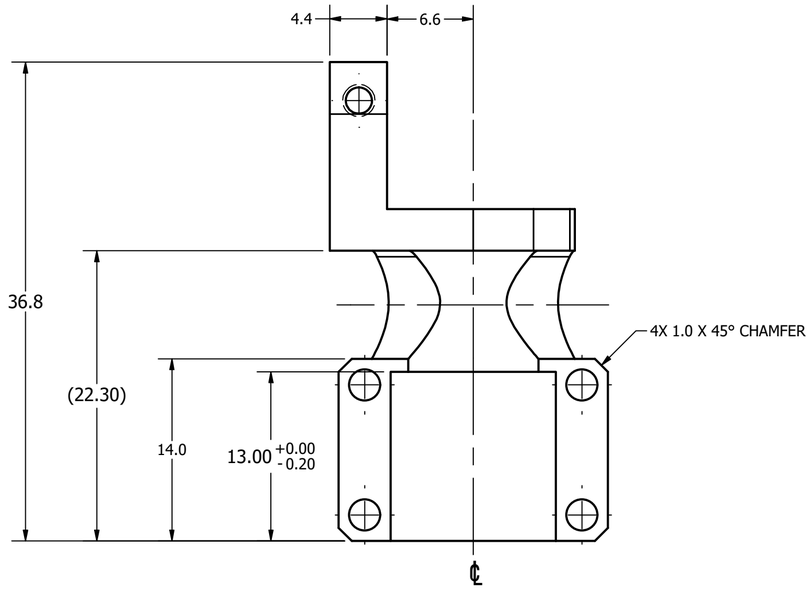
IR-TRACC BASE

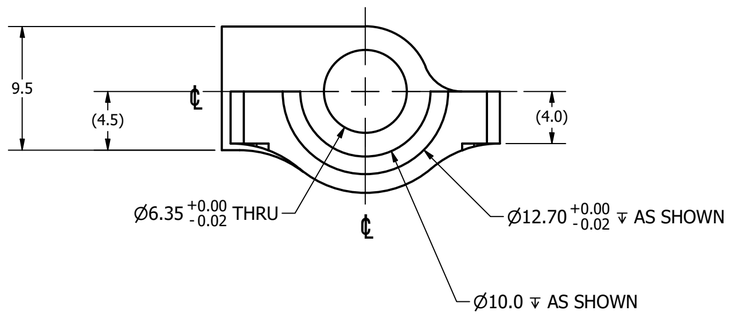
THIRD ANGLE PROJECTION

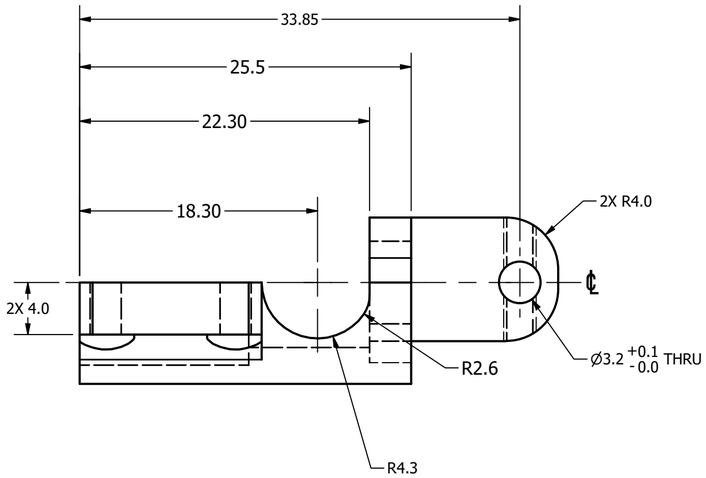
SIZE	DRAWING NUMBER	REV
A3	474-3750	1

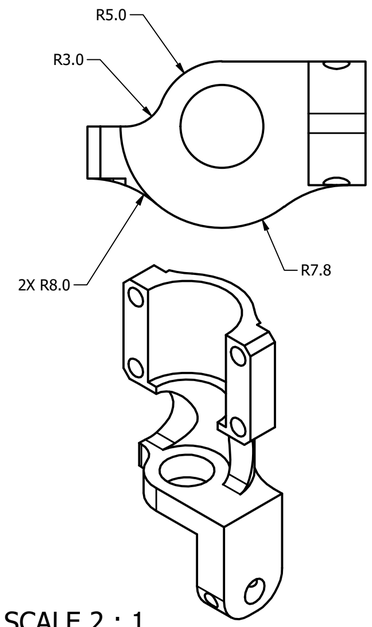
SCALE: 2 : 1 | SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	PROTOTYPE	SKK		1/5/18

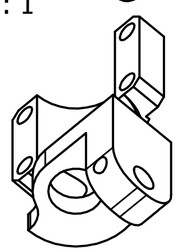


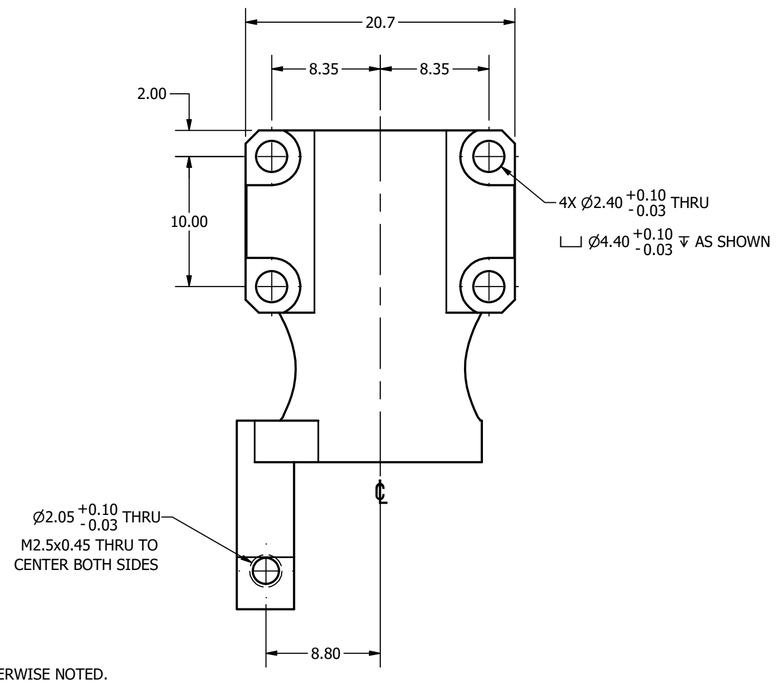






SCALE 2 : 1





NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT: N/A
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: skantola	1/5/2018
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

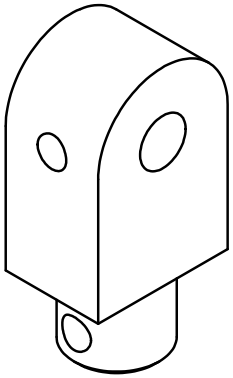
IR-TRACC ARM MOUNTING BRACKET, UL/LR

THIRD ANGLE PROJECTION

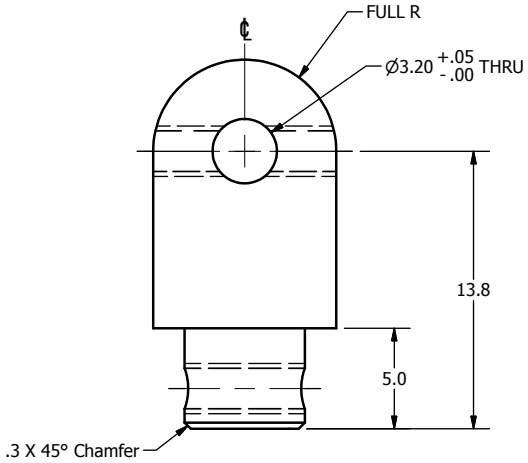
SIZE: A2 | DRAWING NUMBER: 474-3752 | REV: 1

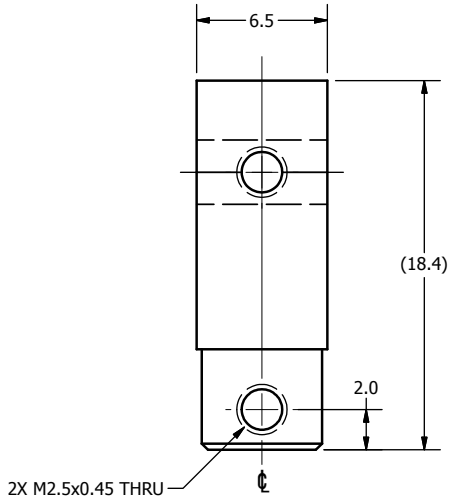
SCALE: 3 : 1 | SHEET: 1 OF 1

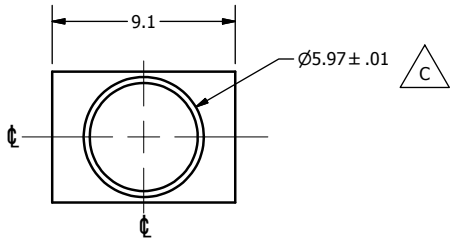
REVISION HISTORY				
ECO#	REV	DESCRIPTION	DATE	BY
	A	RENUMBERED FROM T1IRM115 R01 FOR THOR-M	10/6/2011	BK
	B	REMOVE Ø1.143 THRU HOLE	2/7/2012	BK
	C	Ø5.97±.01 WAS Ø5.80	11/9/2012	BK



SCALE 4.000





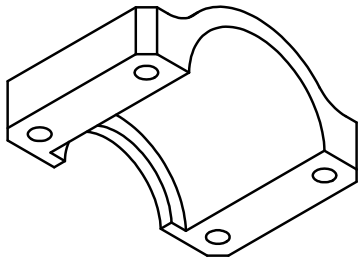


NOTES:

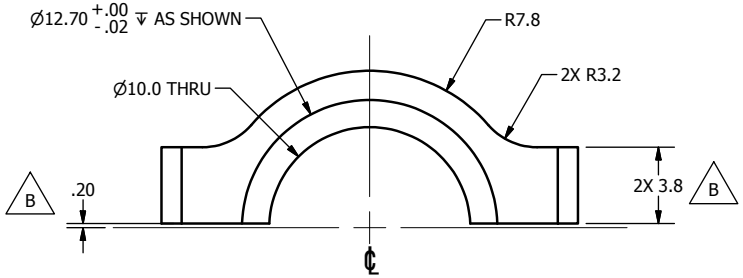
1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

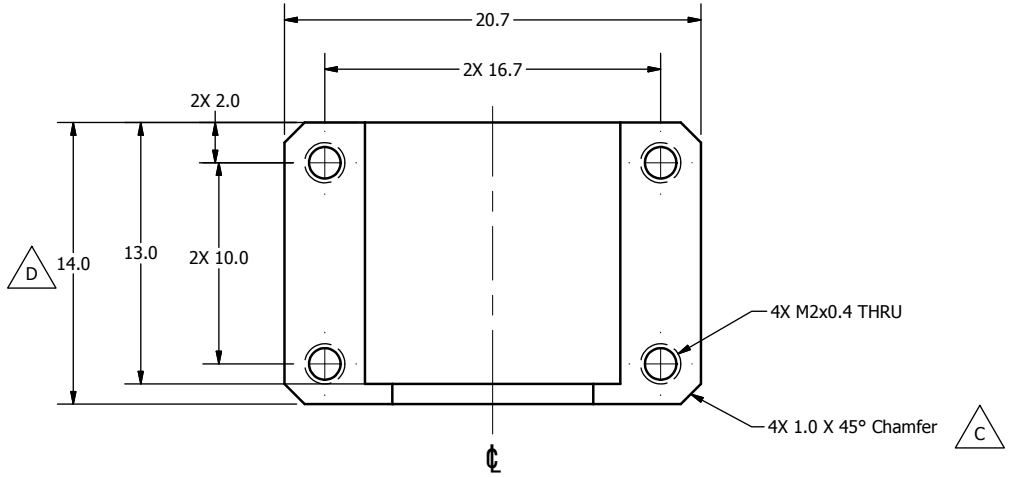
472-3570	1	DO NOT SCALE DRAWING	TOLERANCES	NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION	
472-3560	1	THIRD ANGLE PROJECTION	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS DECIMALS X ±0.5 X.X ±0.2 X.XX ±0.1 X.XXX ±0.01 ANGLES ±0.5° FINISH 1.6		
472-3550	1	PROJECT NO.:	REMOVE BURRS & BREAK SHARP EDGES	DESCRIPTION: ADAPTOR, SERVO/IRTRACC	
NEXT ASSEMBLY	QTY	MATERIAL: 303 STAINLESS STEEL	DRAWN BY: B. KIMES DATE: 10/6/2011		
TOTAL QTY IN DUMMY	3	HEAT TREAT:	CHECKED BY: DATE:	SIZE: A3 SHEET 1 OF 1	DRAWING NO.: 472-3553 REV: C
		FINISH:	ENGINEER: J. WANG DATE: 1/11/2012	SCALE: 4.000	

REVISION HISTORY				
ECO#	REV	DESCRIPTION	DATE	BY
	A	RENUMBERED FROM T1IRM112 R01 FOR THOR-M CHANGE 2.2 DIA. HOLES TO M2 THREADED; REMOVE BURR NOTE; FINISH WAS RED ANODIZE	10/6/2011	BK
	B	REMOVE .20 FROM BOTTOM OF PART; 2X 3.8 WAS 4.0; ADD NEXT ASSY, TOTAL QTY 4 WAS 3	3/15/2012	BK
	C	ADD 4X 1.0 X 45° CHAMFERS	10/11/2012	BK
	D	CORRECT DIMENSIONING ERROR	12/12/2012	BK



SCALE 3.000



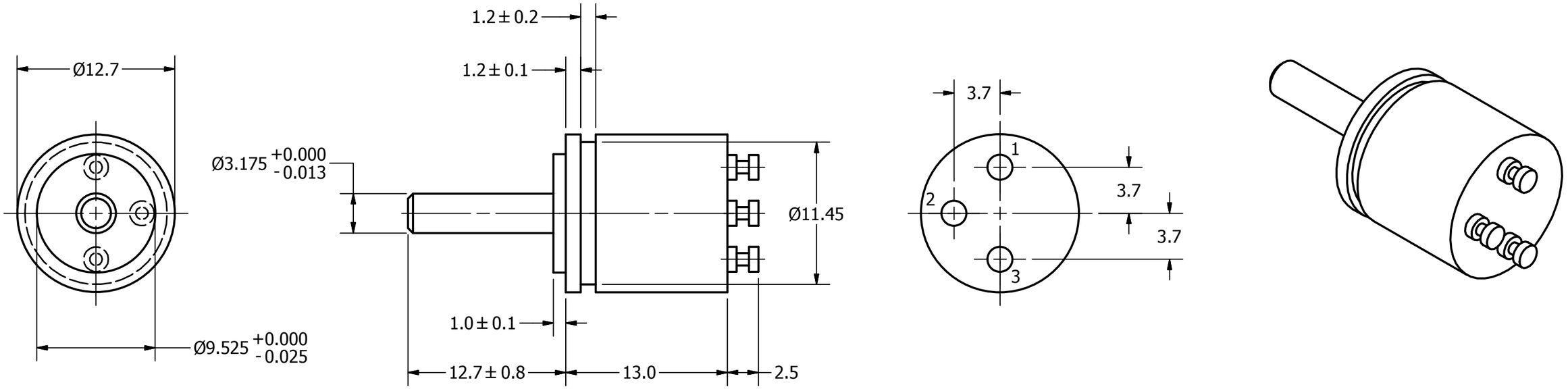


NOTES:

A 1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

472-3580	1	DO NOT SCALE DRAWING	TOLERANCES	NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
472-3570	1	THIRD ANGLE PROJECTION	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS DECIMALS X ±0.5 X.X ±0.2 X.XX ±0.1 X.XXX ±0.01 ANGLES ±0.5° FINISH 1.6 REMOVE BURRS & BREAK SHARP EDGES	
472-3560	1	PROJECT NO.:		DESCRIPTION: CLAMP, IRTRACC
472-3550	1	MATERIAL: 7075-T6 ALUMINUM	DRAWN BY: B. KIMES DATE: 9/7/2012	
NEXT ASSEMBLY	QTY	HEAT TREAT:	CHECKED BY: DATE:	SIZE: A3 SHEET 1 OF 1 DRAWING NO.: 472-3554 REV: D
TOTAL QTY IN DUMMY	4	FINISH: CLEAR ANODIZE	ENGINEER: J. WANG DATE: 1/11/2012	SCALE: 4.000

REVISION HISTORY				
ECO	REV	DESCRIPTION	DATE	BY
	A	INDEPENDENT LINEARITY (TEA) WAS ±0.25%	9/17/2015	DW



SPECIFICATIONS

SHAFT GUIDING:	BALL BEARINGS
A INDEPENDENT LINEARITY (TEA):	±0.5%
OHMIC VALUES:	1000 OHMS
ACTUAL ELECTRICAL ANGLE 330°:	±5%
MAXIMUM POWER RATING @ 70°C:	0.2 WATTS
WEIGHT:	5±2g (LESS CABLES)
OPERATING TEMPERATURE RANGE:	-55°C TO +125°C
MAXIMUM SPEED ROTATION:	600

PIN DESIGNATION

1 = -EXCITATION
2 = +SIGNAL
3 = +EXCITATION

REFERENCE: VISHAY SFERNICE #ECO-50-ESC-102

UNLESS OTHERWISE SPECIFIED:
ALL MACHINED SURFACES 1.60 OR BETTER.

PARTS LIST

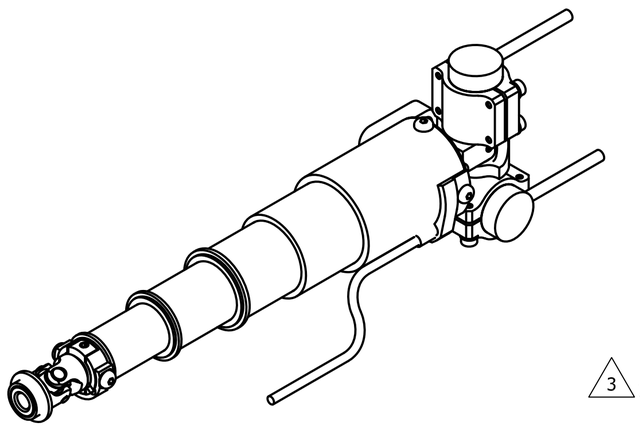
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
TOLERANCES
ANGLES ±.5°
DECIMALS
X ±1 mm
X.X ±0.1 mm
* DO NOT SCALE DRAWING *
THIRD ANGLE PROJECTION

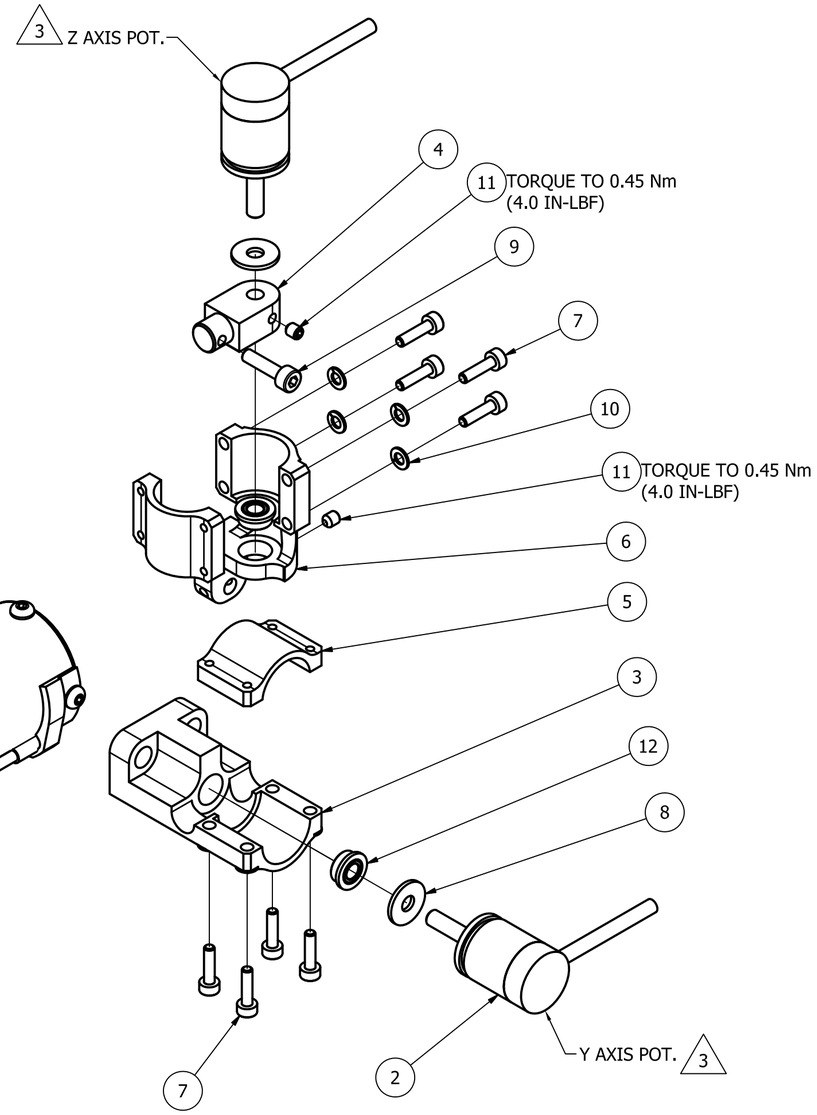
ENGINEERED: C Torchala	DATE: 4/21/2010	MATERIAL:	DEPARTMENT OF TRANSPORTATION NHTSA
DRAWN: C Torchala	DATE: 6/15/2010	FINISH:	
CHECKED: M Salloum	DATE: 8/10/2010	HEAT TREAT:	
DEBUR AND BREAK ALL SHARP EDGES		QTY./ASSEMBLY: 2	DRAWING TITLE: ROTARY POTENTIOMETER
SCALE: 3 : 1	SIZE: A3	REVISION: A	QTY./DUMMY: 4
DRAWING NUMBER: SA572-S114			Page: 1 of 1

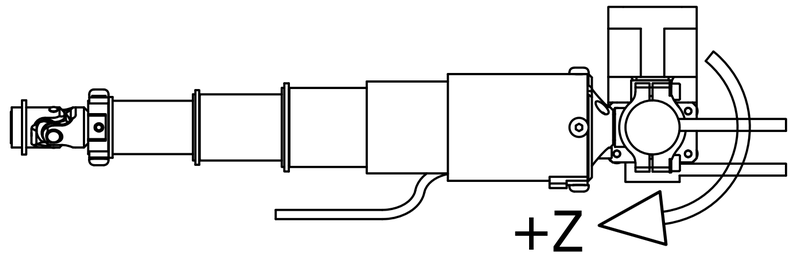
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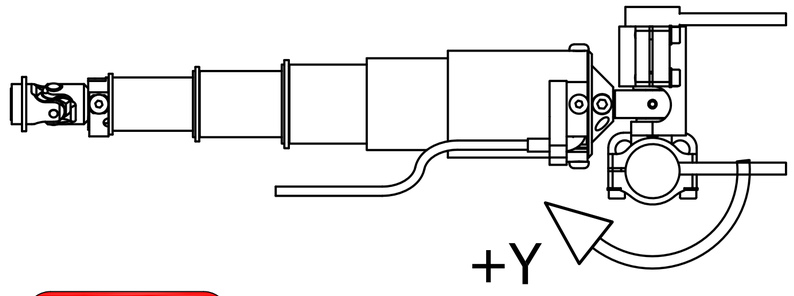
PART NUMBER TABLE			
ASSEMBLY NO.	SENSORS USED	CABLE LENGTH "XXX"	DAS LOCATION
474-3560	IH-11620-R4-30-U 9945-9144-U	30 FT [9144 mm]	EXTERNAL

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
76048	1	PROTOTYPE	SKK	JGG	1/16/2017
76618	2	474-3750 & 474-3751 WERE 472-3551 &472-3562	SKK	JGG	6/7/2017
75993	3	ADD Y AND Z AXIS TO POTS; UPDATE EXIT CABLE DIRECTION; UPDATE POTS TO HAVE CORRECT MODEL 9945-XXX-U	AT	DJI	12/14/2017









PRELIMINARY DRAWING

R4 DESIGNATION: DEFINES IR-TRACC CALIBRATION INCLUDING TUBES-IN/TUBES-OUT MEASUREMENT.

ITEM	QTY	PART NUMBER	DESCRIPTION
12	2	9002201	FLANGE BEARING (1/4" O.D. x 1/8" I.D.)
11	2	5001359	M2.5 X 0.45 X 3 LG. SSSCP NYLOK
10	8	5001216	M2 SPLIT LOCK WASHER SS
9	1	5000456	M2.5 X 0.45 X 10 LG. SHCS
8	2	5000378	M3 FLAT WASHER LARGE OD SS
7	8	5000083	M2 X 0.4 X 8 LG. SHCS
6	1	474-3751	IR-TRACC ARM MOUNTING BRACKET, UR/LL
5	2	472-3554	CLAMP, IRTRACC
4	1	472-3553	ADAPTOR, SERVO/IRTRACC
3	1	474-3750	IR-TRACC BASE
2	2	SA572-S114	POTENTIOMETER ASSEMBLY; NO CALIBRATION
1	1	SA572-S122	IR-TRACC, THOR 5TH UPPER TORSO

2

2

PARTS LIST

NOTES:
1. 474-3580 AND 474-3560 HAVE THE SAME PARTS LIST BUT DIFFERING POLARITIES.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN S. KANTOLA	4/11/2016
CHECKED	
ENG AKM	7/9/2018
APPROVED	

MATERIAL
HEAT TREAT N/A
FINISH N/A

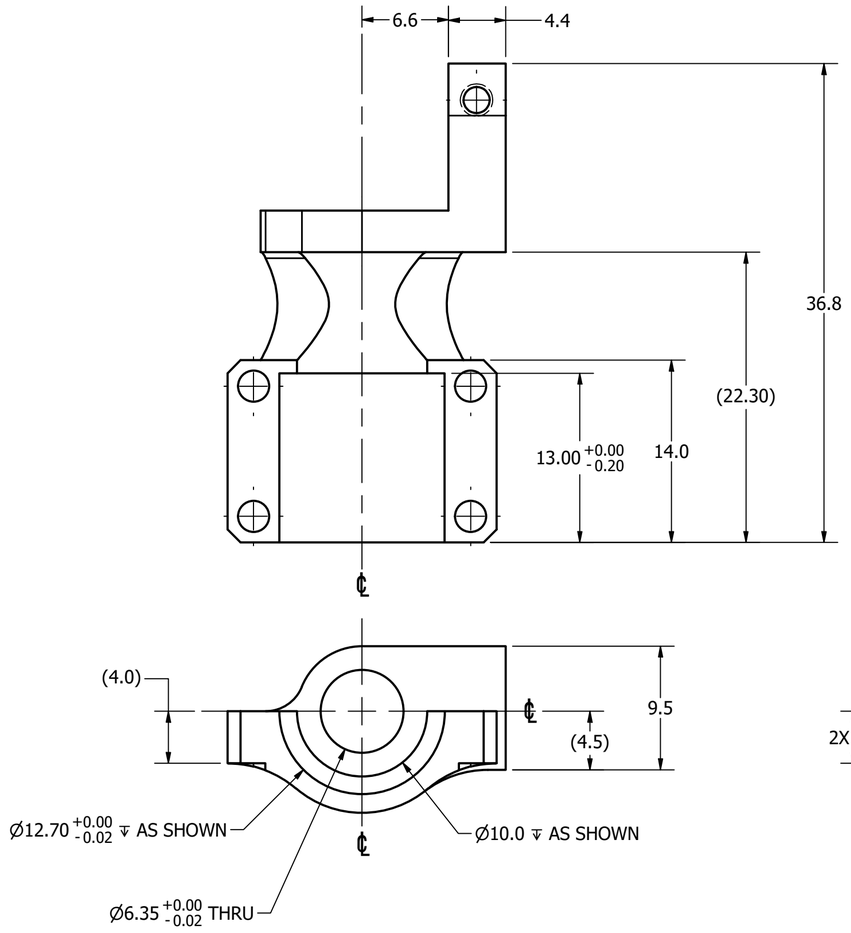
3D IR-TRACC ASSEMBLY, LOWER LEFT

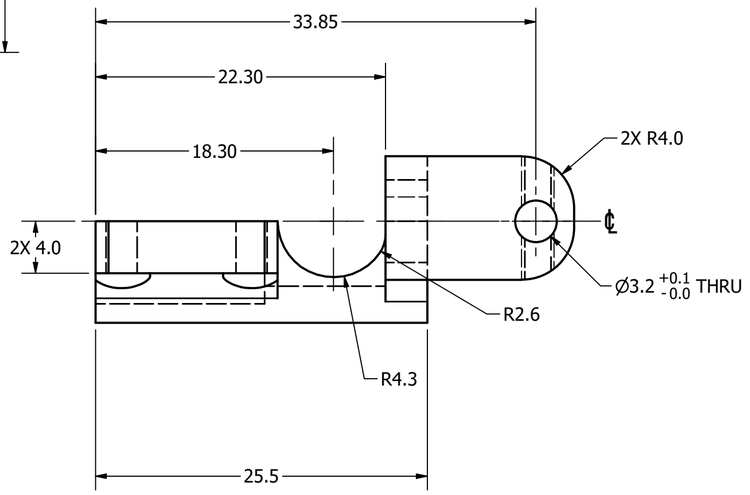
THIRD ANGLE PROJECTION

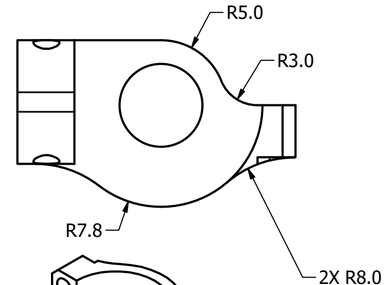
SIZE A2 | DRAWING NUMBER 474-3580 | REV 3

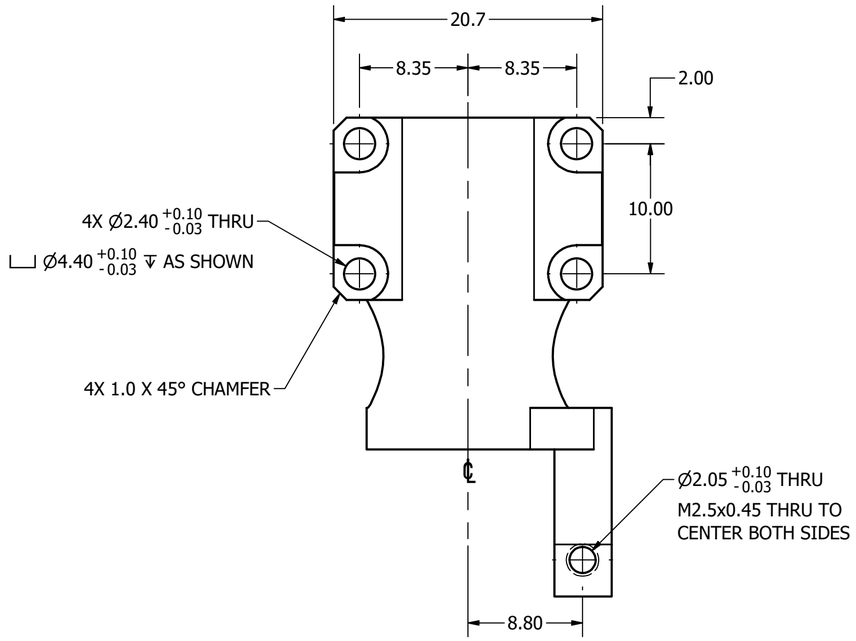
SCALE: 1.000 | SHEET 1 OF 1

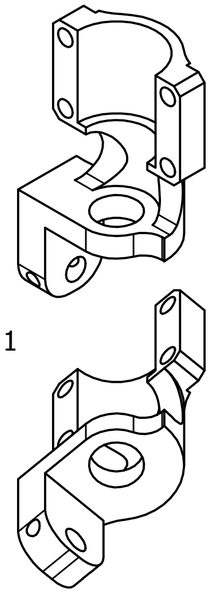
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	PROTOTYPE	SKK		1/5/18











SCALE 2 : 1

PRELIMINARY DRAWING

NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT: N/A
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: skantola	1/5/2018
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

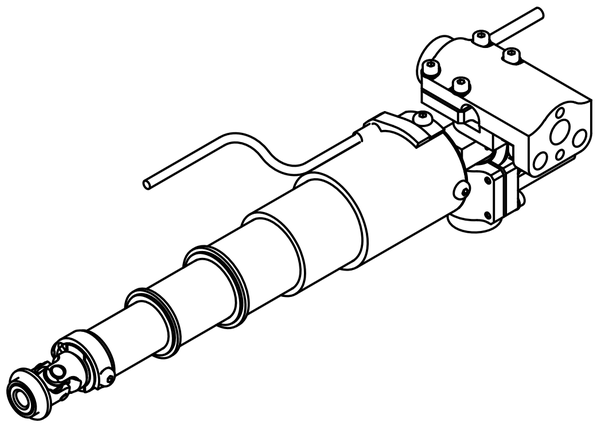
IR-TRACC ARM MOUNTING BRACKET, UR/LL

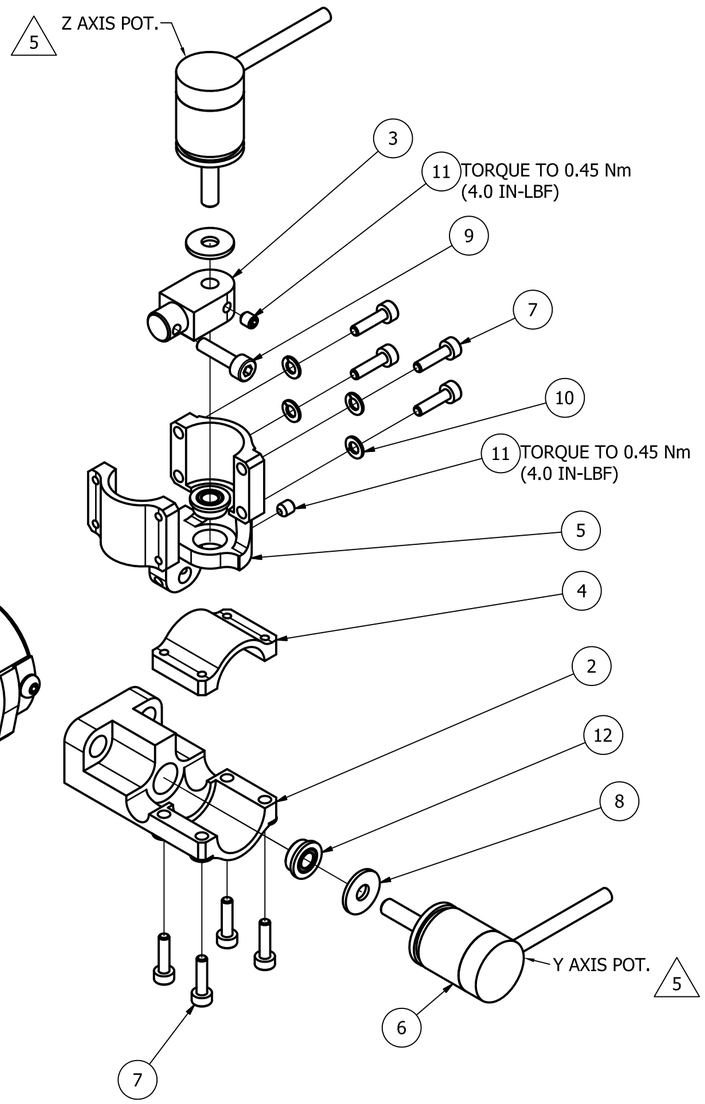
THIRD ANGLE PROJECTION

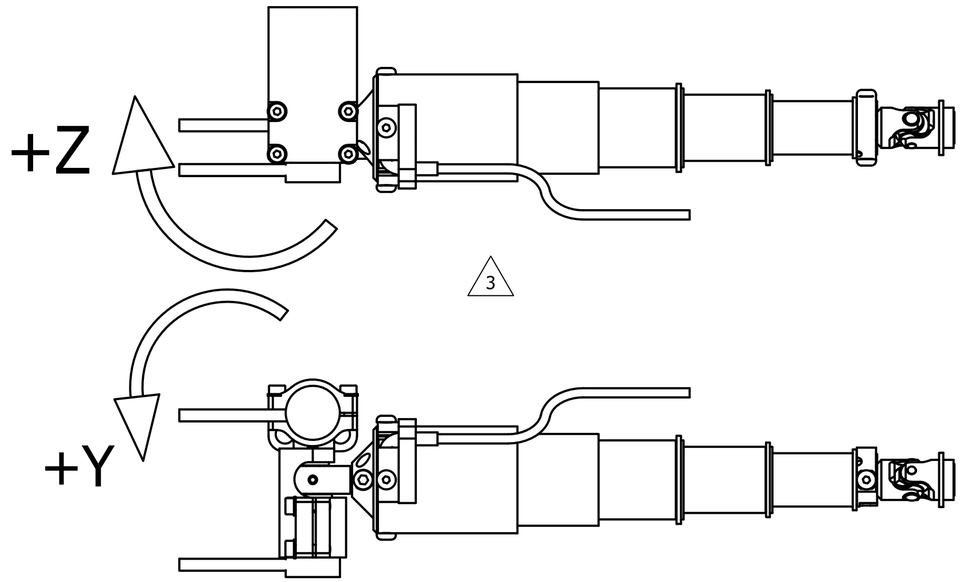
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SCALE: 3 : 1 | SHEET: 1 OF 1

PART NUMBER TABLE			
ASSEMBLY NO.	SENSORS USED	CABLE LENGTH "XXX"	DAS LOCATION
474-3560	SA572-S122 SA572-S114	30 FT [9144 mm]	EXTERNAL

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
75051	1	PROTOTYPE	SKK	CJT	7/14/2016
75468	2	ADDED "-U" TO END OF IH-11620-R4-XXX	SKK	CJT	7/27/2016
76048	3	MADE IR-TRACC USED ONLY FOR UPPER RIGHT POSITION; ADDED NOTE AND POLARITY	SKK	JGG	1/16/2017
76618	4	474-3750 & 474-3751 WERE 472-3551 & 472-3562	SKK	JGG	6/7/2017
75993	5	ADD Y AND Z AXIS TO POTS; UPDATE EXIT CABLE DIRECTION; UPATE POTS TO HAVE CORRECT MODEL OF 9945-XXX-U	AT	DJI	12/14/2017







PRELIMINARY DRAWING

R4 DESIGNATION: DEFINES IR-TRACC CALIBRATION INCLUDING TUBES-IN/TUBES-OUT MEASUREMENT.

ITEM	QTY	PART NUMBER	DESCRIPTION
12	2	9002201	FLANGE BEARING (1/4" O.D. x 1/8" I.D.)
11	2	5001359	M2.5 X 0.45 X 3 LG. SSSCP NYLOK
10	8	5001216	M2 SPLIT LOCK WASHER SS
9	1	5000456	M2.5 X 0.45 X 10 LG. SHCS
8	2	5000378	M3 FLAT WASHER LARGE OD SS
7	8	5000083	M2 X 0.4 X 8 LG. SHCS
6	2	SA572-S114	POTENTIOMETER ASSEMBLY, NO CALIBRATION
5	1	474-3751	IR-TRACC ARM MOUNTING BRACKET, UR/LL
4	2	472-3554	CLAMP, IRTRACC
3	1	472-3553	ADAPTOR, SERVO/IRTRACC
2	1	474-3750	IR-TRACC BASE
1	1	SA572-S122	IR-TRACC, THOR 5TH UPPER TORSO

PARTS LIST

3 **NOTES:**
1. 474-3560 AND 474-3570 HAVE THE SAME PARTS LIST BUT DIFFERING POLARITIES.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN skantola	4/11/2016
CHECKED	
ENG CJT	7/14/2016
APPROVED	

MATERIAL
HEAT TREAT N/A
FINISH N/A

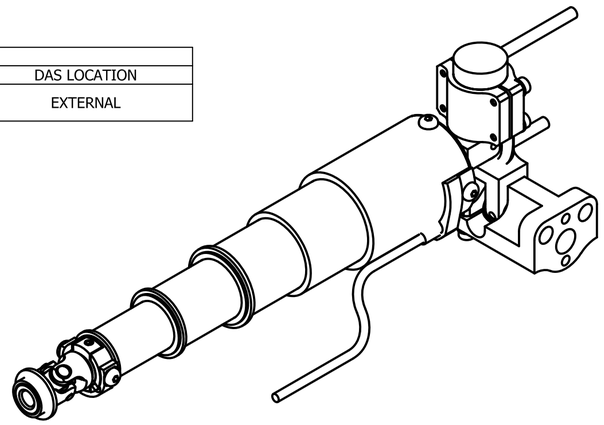
3D IR-TRACC ASSEMBLY, UPPER RIGHT

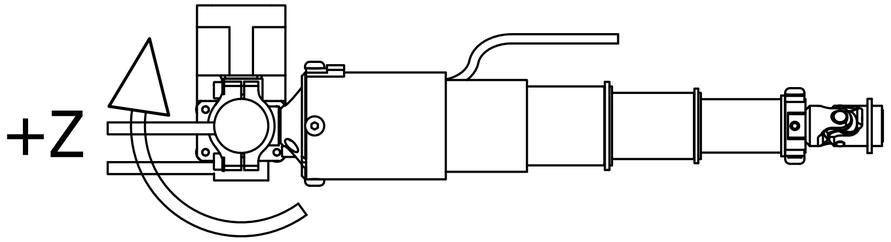
THIRD ANGLE PROJECTION

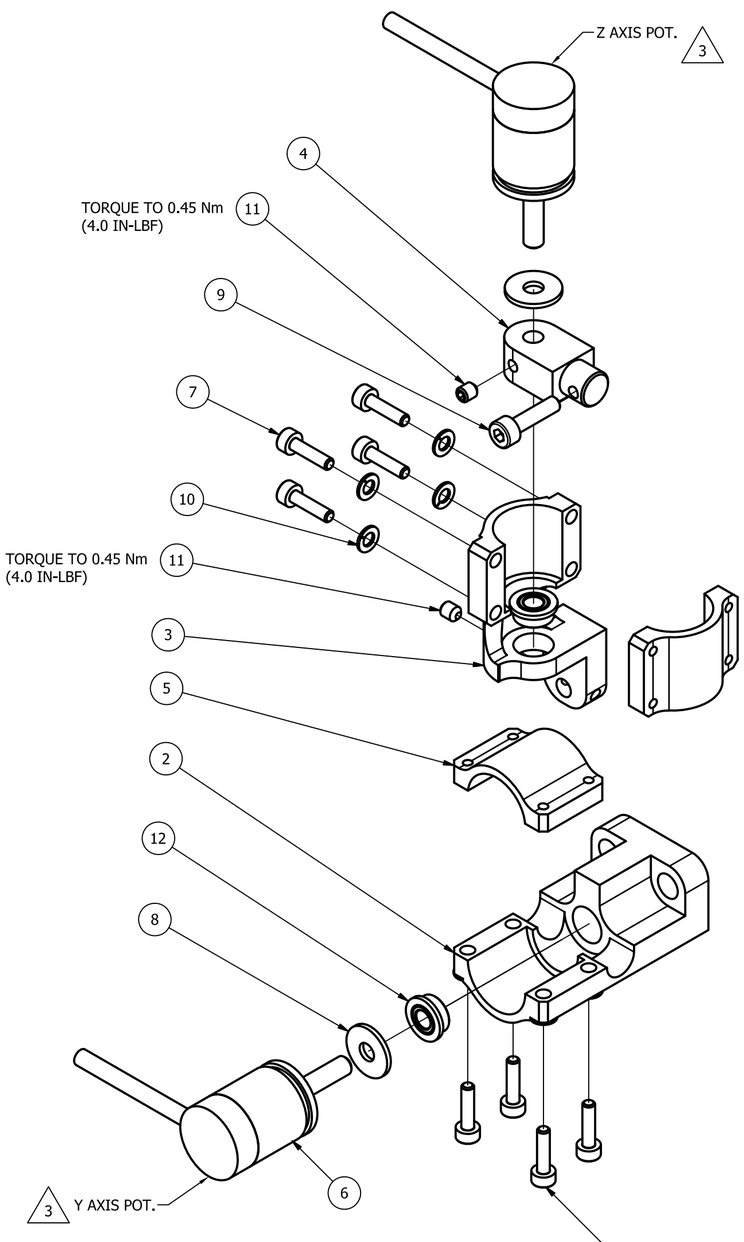
SIZE A2 | DRAWING NUMBER 474-3560 | REV 5
SCALE: NONE | SHEET 1 OF 1

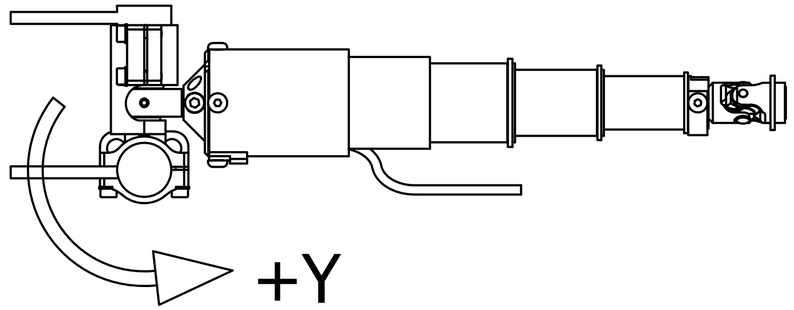
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
76048	1	PROTOTYPE	SKK	JGG	1/16/2017
76618	2	474-3750 & 474-3752 WERE 472-3551 & 472-3552	SKK	JGG	6/7/2017
75993	3	ADD Y AND Z AXIS TO POTS; UPDATE EXIT CABLE DIRECTION; UPDATE POTS MODEL TO HAVE CORRECT 9945-XXX-U	AT	DJI	12/14/2017

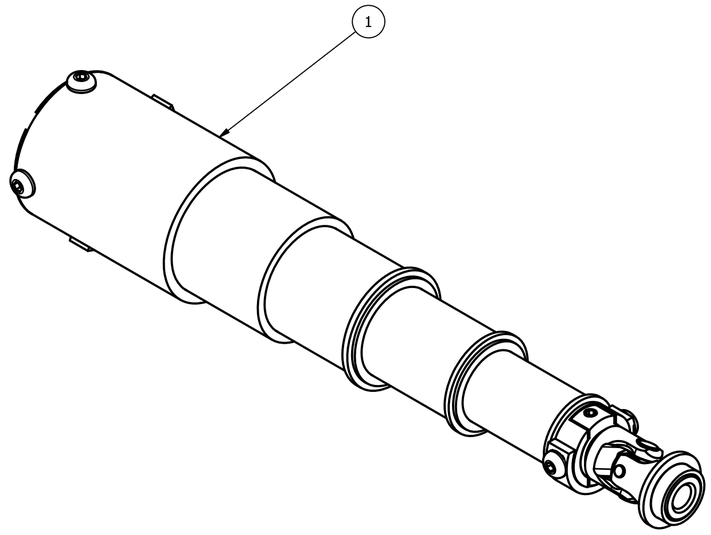
PART NUMBER TABLE			
ASSEMBLY NO.	SENSORS USED	CABLE LENGTH "XXX"	DAS LOCATION
474-3570	IH-11620-R4-30-U 9945-9144-U	30 FT [9144 mm]	EXTERNAL











PRELIMINARY DRAWING

R4 DESIGNATION: DEFINES IR-TRACC CALIBRATION INCLUDING TUBES-IN/TUBES-OUT MEASUREMENT.

ITEM	QTY	PART NUMBER	DESCRIPTION
12	2	9002201	FLANGE BEARING (1/4" O.D. x 1/8" I.D.)
11	2	5001359	M2.5 X 0.45 X 3 LG. SSSCP NYLOK
10	8	5001216	M2 SPLIT LOCK WASHER SS
9	1	5000456	M2.5 X 0.45 X 10 LG. SHCS
8	2	5000378	M3 FLAT WASHER LARGE OD SS
7	8	5000083	M2 X 0.4 X 8 LG. SHCS
6	2	SA572-S114	POTENTIOMETER ASSEMBLY, NO CALIBRATION
5	2	472-3554	CLAMP, IRTRACC
4	1	472-3553	ADAPTOR, SERVO/IRTRACC
3	1	474-3752	IR-TRACC ARM MOUNTING BRACKET, UL/LR
2	1	474-3750	IR-TRACC BASE
1	1	SA572-S122	IR-TRACC, THOR 5TH UPPER TORSO

3
2
2

PARTS LIST

NOTES:
1. 474-3570 AND 474-3550 HAVE THE SAME PART LISTS BUT DIFFERING POLARITIES.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

	APPROVALS	DATE
DRAWN	S. KANTOLA	4/11/2016
CHECKED		
ENG	AKM	7/9/2018
APPROVED		

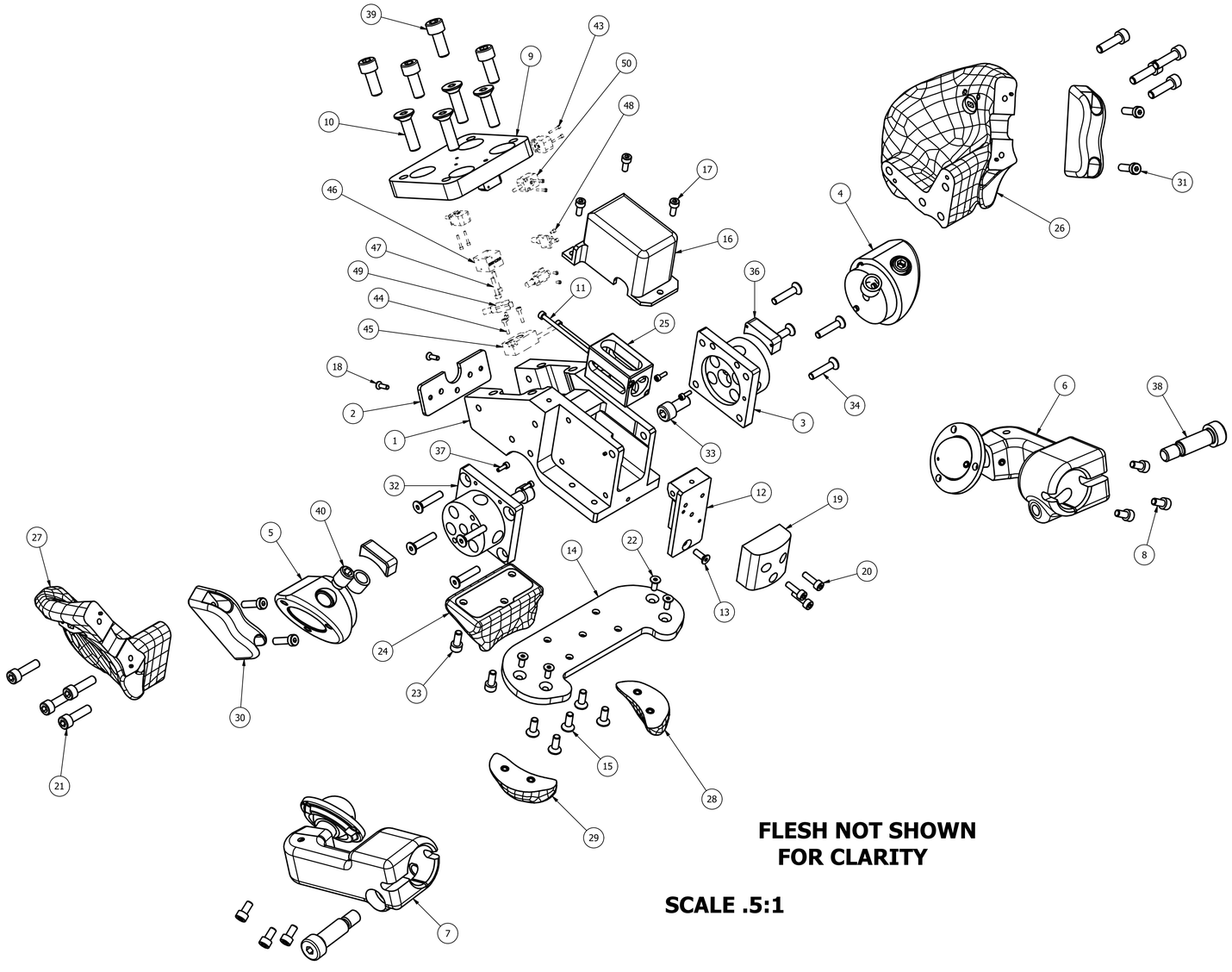
MATERIAL
HEAT TREAT: N/A
FINISH: N/A

3D IR-TRACC ASSEMBLY, LOWER LEFT

THIRD ANGLE PROJECTION

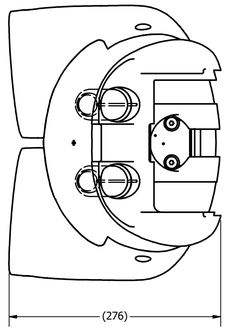
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SCALE: 1.000 | SHEET: 1 OF 1

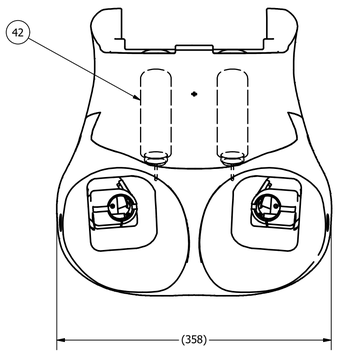
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JPM		12/13/17

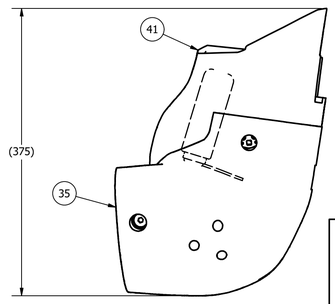


FLESH NOT SHOWN FOR CLARITY

SCALE .5:1







ITEM	QTY	PART NUMBER	DESCRIPTION	
50	3	SA572-S58	ANGULAR RATE SENSOR	(REF)
49	3	SA572-S4	UNIAXIAL PIEZORESISTIVE ACCELEROMETER	(REF)
48	6	5000068	M1.4 X 0.3 X 3 LG. SHCS	(REF)
47	2	5000807	M2.5 X 0.45 X 14 LG. SHCS SS	(REF)
46	1	SA572-S80M	TRI-PACK BLOCK	(REF)
45	1	SA572-S44	TILT SENSOR, DUAL AXIS	(REF)
44	2	5000215	M2 X 0.4 X 10 LG. SHCS	(REF)
43	6	5000912	M1.4 X 0.3 X 10 LG. SHCS	(REF)
42	2	6004707	APTS SENSOR - 40mm DIA. X 125.25 LG.	(REF)
41	1	474-4305	ABDOMEN	
40	2	474-4315	PELVIC PLUNGER ASSEMBLY	
39	4	5000075	M8 X 1.25 X 20 LG. SHCS	
38	2	5000506	M12 X 30 LG. SHSS	
37	4	5000458	M2.5 X 0.45 X 8 LG. SHCS	
36	2	474-4007	STRUCTURAL REPLACEMENT, ACETABULUM LOAD CELL STRAIN RELIEF	
35	1	474-4520	PELVIS FLESH	
34	8	5000394	M5 X 0.8 X 25 LG. FHCS	
33	2	5000209	M8 X 1.25 X 18 LG. SHCS	
32	1	474-4002-2	STRUCTURAL REPLACEMENT, RIGHT ACETABULAR LOAD CELL	
31	4	5000297	M5 X 0.8 X 18 LG. LHCS	
30	2	474-4547	STRUCTURAL REPLACEMENT, ASIS LOAD CELL	
29	1	474-4545-2	ISCHIUM BONE, MOLDED, RIGHT	
28	1	474-4545-1	ISCHIUM BONE, MOLDED, LEFT	
27	1	474-4540-2	ILIAC WING, MACHINED, RIGHT	
26	1	474-4540-1	ILIAC WING, MACHINED, LEFT	
25	1	474-8206	ON BOARD DAS STRUCTURAL REPLACEMENT	
24	1	474-4546	COCCYX, MOLDED	
23	3	5000002	M5 X 0.8 X 12 LG. SHCS	
22	4	5000023	M4 X 0.7 X 10 LG. FHCS	
21	8	5000282	M6 X 1 X 22 LG. SHCS	
20	3	5000459	M4 X 0.7 X 14 LG. SHCS	
19	1	474-4544	PUBIC BONE	
18	2	5000203	M3 X 0.5 X 10 LG. FHCS	
17	3	5000151	M4 X 0.7 X 10 LG. SHCS	
16	1	474-4006	CABLE COVER, PELVIS	
15	5	5000864	M5 X 0.8 X 14 LG. FHCS	
14	1	474-4542	PLATE, ISCHIUM BONE MOUNT	
13	1	5001086	M4 X 0.7 X 12 LG. FHCS	
12	1	474-4005	ON BOARD DAS MOUNTING PLATE, PELVIS	
11	2	5001053	M3 X 0.5 X 50 LG. SHCS	
10	4	5000605	M8 X 1.25 X 30 LG. FHCS	
9	1	474-4004	PLATE, UPPER TORSO TO PELVIS ADAPTOR	
8	6	5000291	M5 X 0.8 X 10 LG. SHCS	
7	1	474-4700-2	FEMUR ASSEMBLY, RIGHT	
6	1	474-4700-1	FEMUR ASSEMBLY, LEFT	
5	1	474-4003-2	FEMUR MOUNTING SOCKET, RIGHT	
4	1	474-4003-1	FEMUR MOUNTING SOCKET, LEFT	
3	1	474-4002-1	STRUCTURAL REPLACEMENT, LEFT ACETABULAR LOAD CELL	
2	1	474-4001	COVER, REAR PELVIC INSTRUMENTATION	
1	1	474-4541	PELVIC BONE, CENTER	

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.2, X.X ±.1, X.XX ±.1
MACHINED ∠ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL
HEAT TREAT
FINISH

APPROVALS	DATE
DRAWN ghayden	12/13/2017
CHECKED	
ENG	
APPROVED	

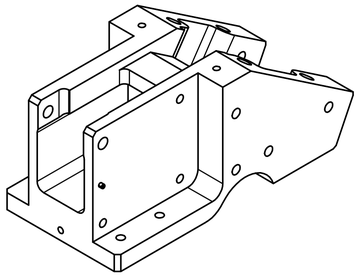
VEHICLE RESEARCH and TEST CENTER

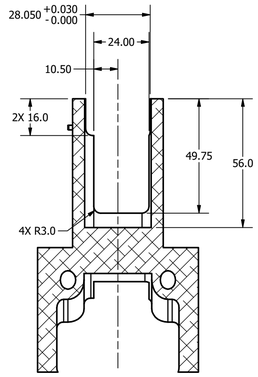
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

PELVIS ASSEMBLY
THOR-05F

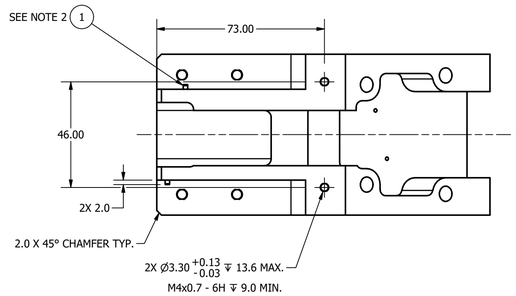
THIRD ANGLE PROJECTION
SIZE A1 | DRAWING NUMBER 474-4000 | REV 1
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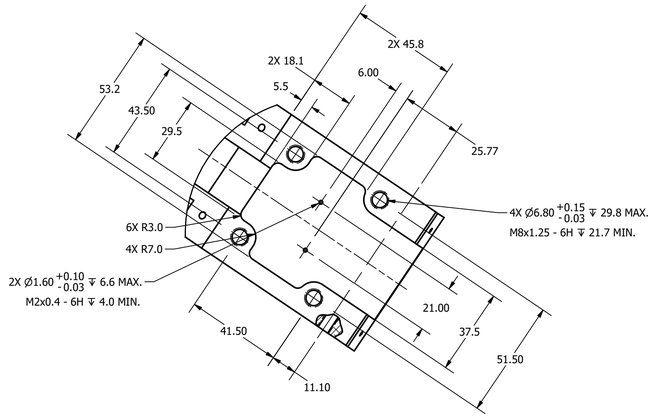
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	11/7/17

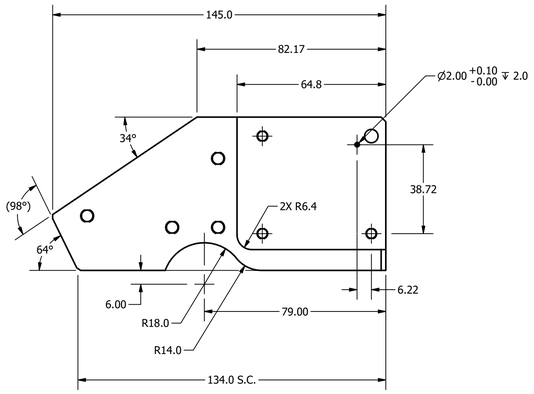


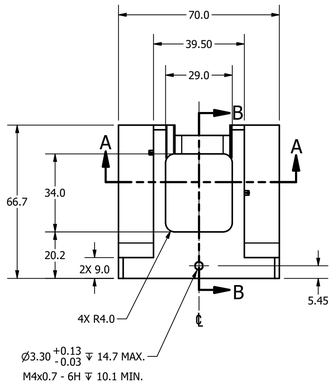


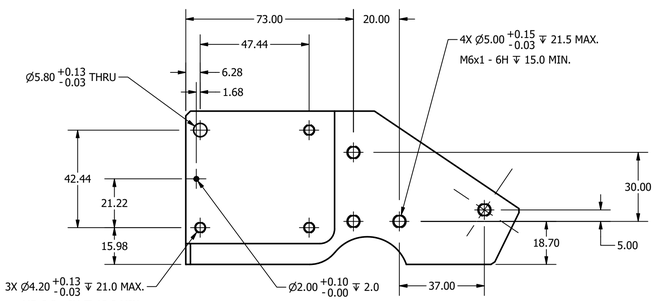
SECTION A-A

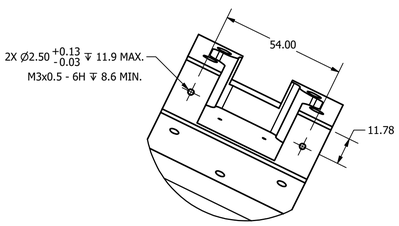


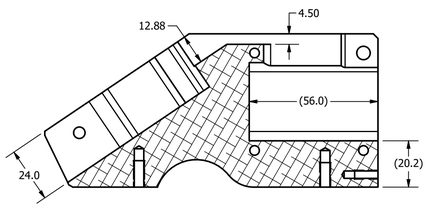




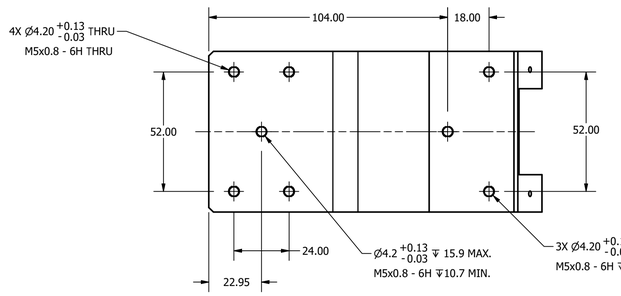








SECTION B-B



NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

2. INSTALL ROLL PIN 5000765 AFTER ANODIZE.

ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	5000765	M2 X 4 LG. ROLL PIN

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL X ±.5 X.X ±.2 X.XX ±.1 | MACHINED ∠ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

PELVIC BONE, CENTER

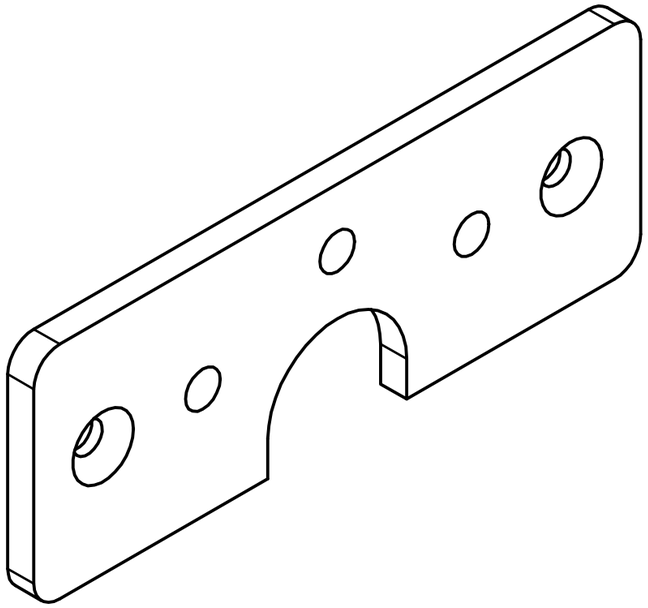
APPROVALS	DATE
DRAWN B. KIMES	11/6/2017
CHECKED	
ENG	
APPROVED	

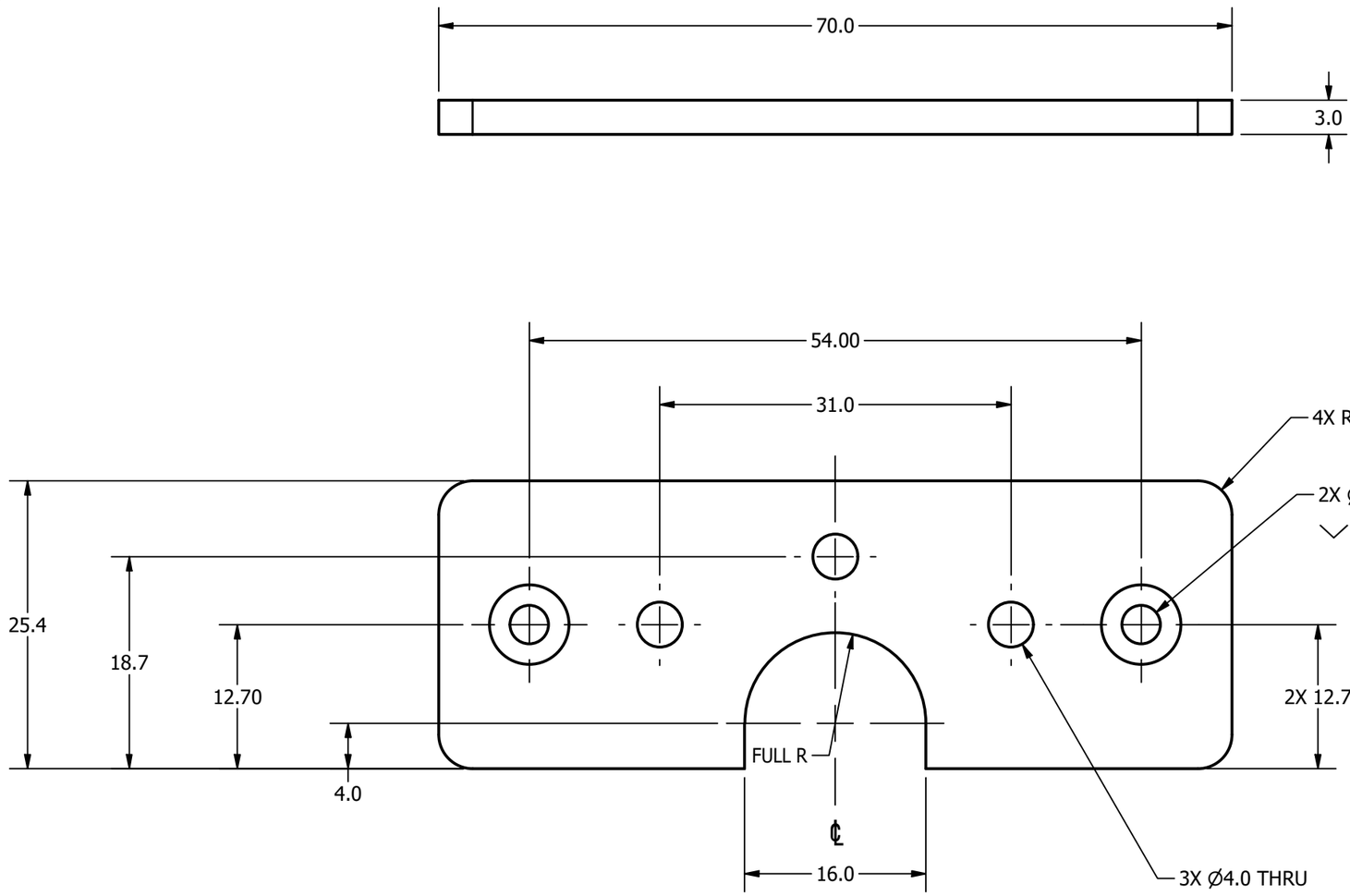
MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

THIRD ANGLE PROJECTION

SIZE: A1 | DRAWING NUMBER: 474-4541 | REV: 1
SCALE: .75:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	11/6/17





NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED √ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 6061-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: B. KIMES	11/6/2017
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

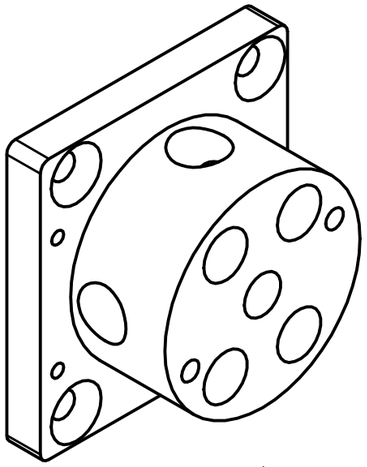
COVER, REAR PELVIC INSTRUMENTATION

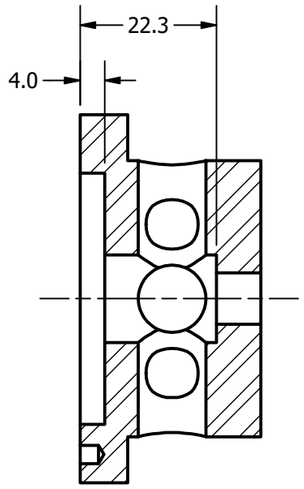
THIRD ANGLE PROJECTION

SIZE	DRAWING NUMBER	REV
A3	474-4001	1

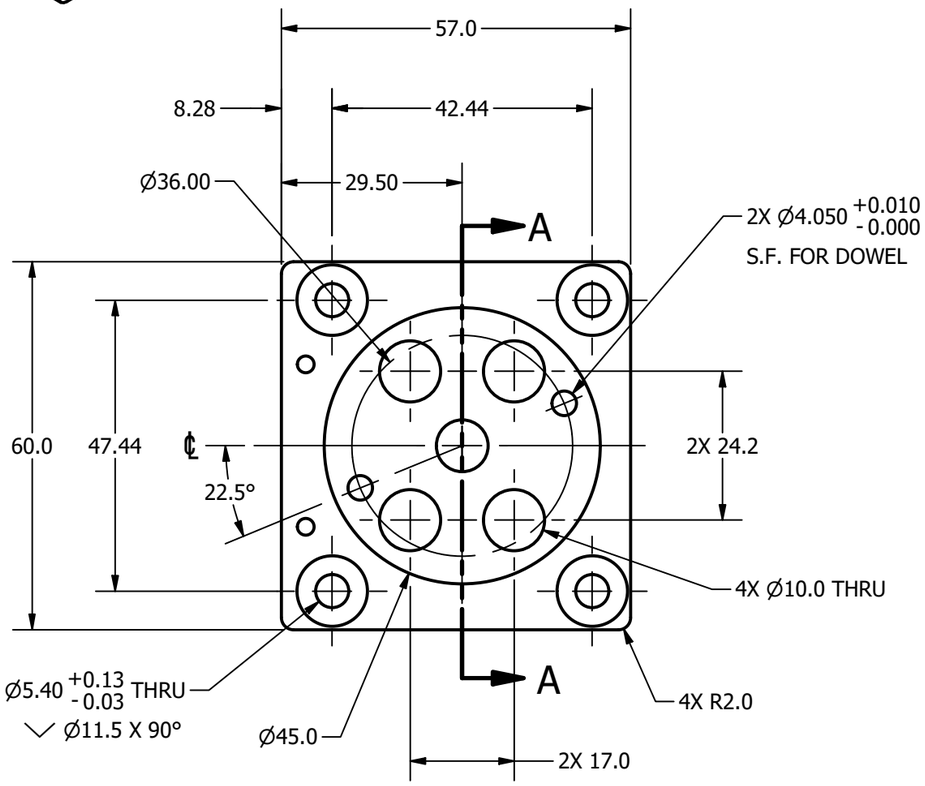
SCALE: 2:1 SHEET: 1 OF 1

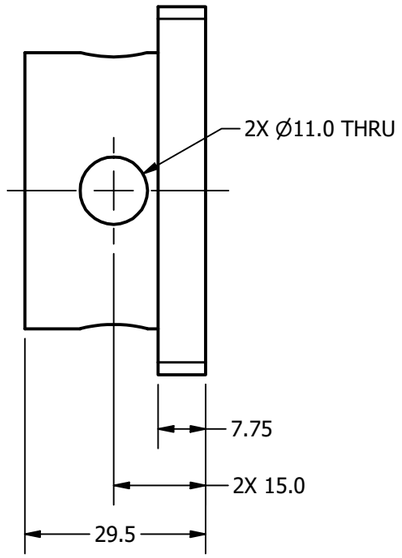
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	11/6/17

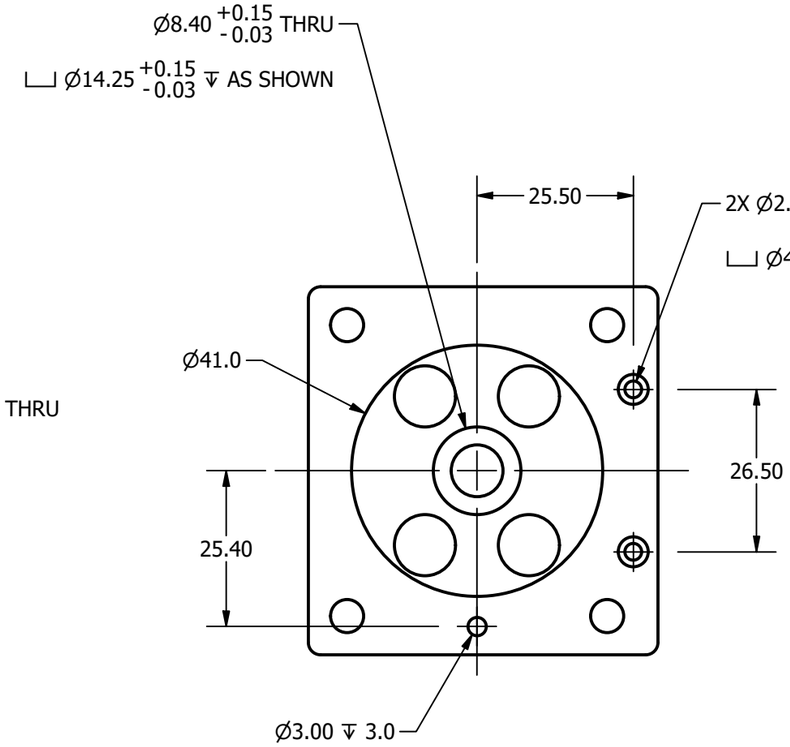




SECTION A-A







NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 1018 STEEL
HEAT TREAT:
FINISH: 0.008mm ELECTROLESS NICKEL PLATE PER SIDE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: B. KIMES	11/6/2017
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

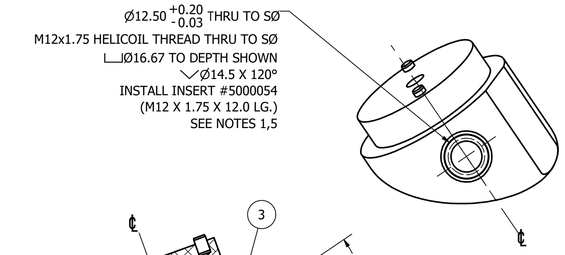
STRUCTURAL REPLACEMENT, LEFT ACETABULAR LOAD CELL

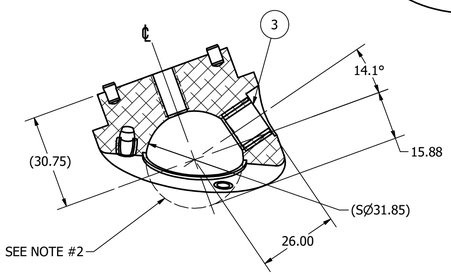
THIRD ANGLE PROJECTION

SIZE: A3 | DRAWING NUMBER: 474-4002-1 | REV: 1

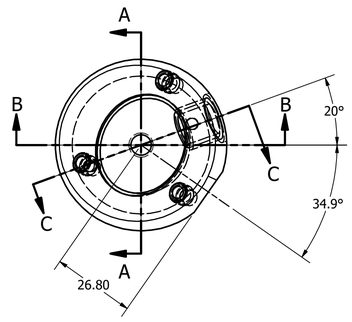
SCALE: 1:1 | SHEET: 1 OF 1

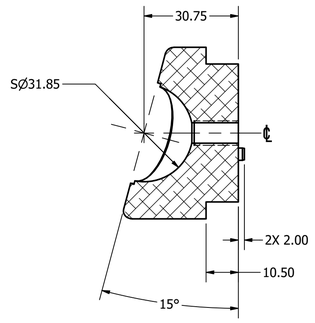
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AB	JW	11/7/17



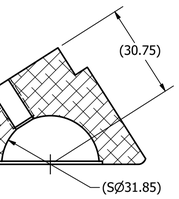


SECTION C-C

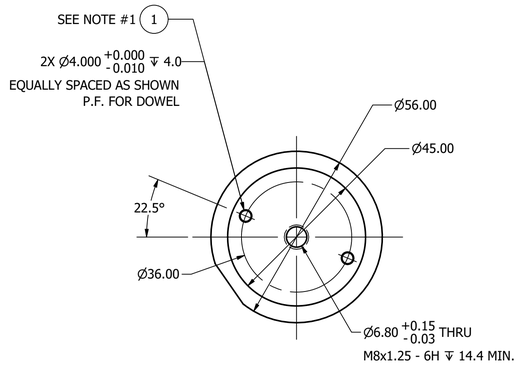


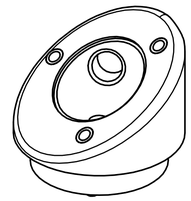


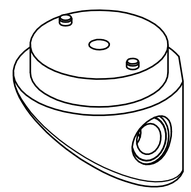
SECTION A-A

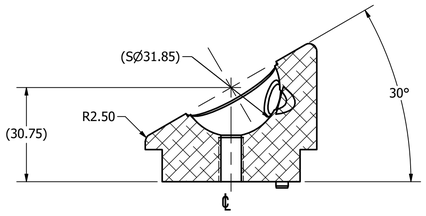


SECTION D-D



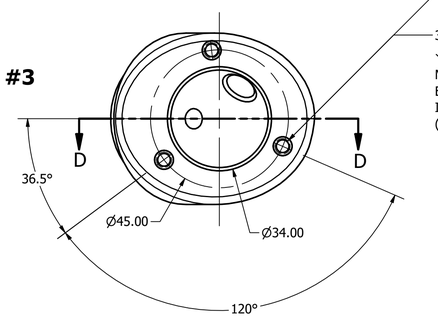


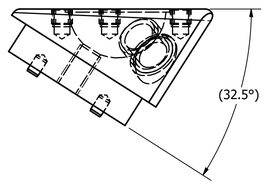




SECTION B-B

SEE NOTE #3





NOTES:

1. INSTALL DOWELS & HELICOILS AFTER CLEAR ANODIZE.
2. CHECK HOLE LOCATION USING 1 1/4" TOOLING BALL.
3. AFTER COMPOUND ANGLE HAS BEEN MACHINED ON PART, PLACE MACHINED FACE SQUARE TO MACHINE & PUT IN TAPPED HOLES.
4. USE CAD DATA FOR INSPECTION.
5. TRIM HELICOIL LENGTH TO 10.5mm PRIOR TO INSTALLING IN HOLE.

ITEM	QTY	PART NUMBER	DESCRIPTION
3	1	5000054	HELICOIL, M12 X 1.75 X 12 LG.
2	3	5000351	HELICOIL, M5 X .8 X 5
1	2	5000680	M4 X 6 LG. DOWEL PIN SS

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMALS X ±.1, X.X ±.2, X.XX ±.1 | MACHINED ∠C ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: A. Barchock	11/6/2017
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

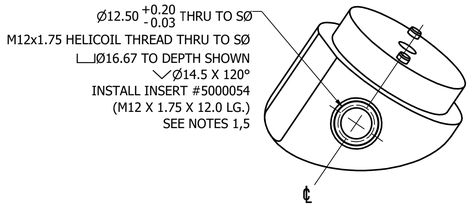
FEMUR MOUNTING SOCKET, LEFT

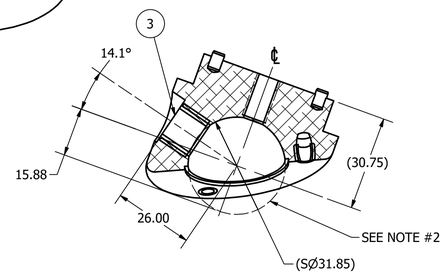
THIRD ANGLE PROJECTION

SIZE: A1 | DRAWING NUMBER: 474-4003-1 | REV: 1

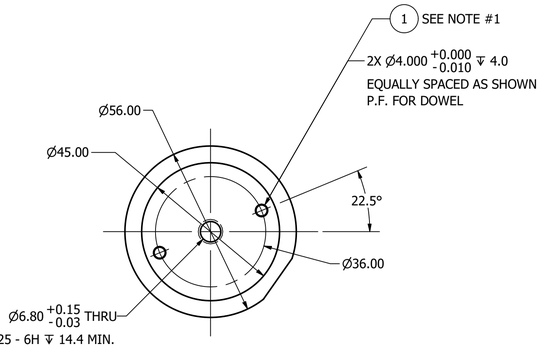
SCALE: 1:1 | SHEET: 1 OF 1

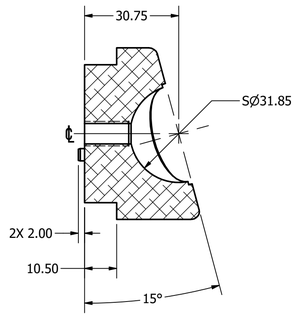
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AB	JW	11/7/17



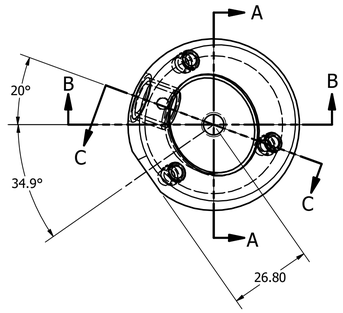


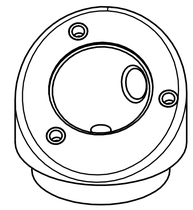
SECTION C-C

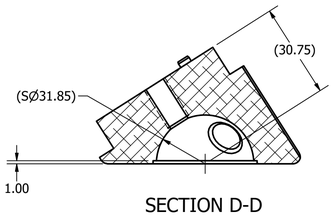




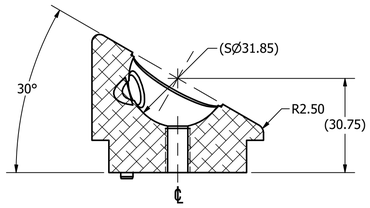
SECTION A-A



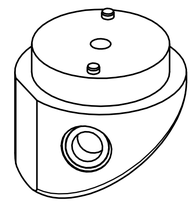




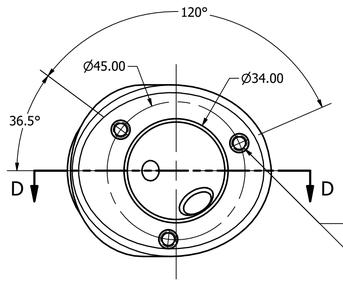
SECTION D-D

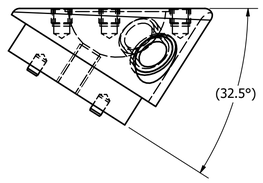


SECTION B-B



SEE NOTE #3





NOTES:

1. INSTALL DOWELS & HELICOILS AFTER CLEAR ANODIZE.
2. CHECK HOLE LOCATION USING 1 1/4" TOOLING BALL.
3. AFTER COMPOUND ANGLE HAS BEEN MACHINED ON PART, PLACE MACHINED FACE SQUARE TO MACHINE & PUT IN TAPPED HOLES.
4. USE CAD DATA FOR INSPECTION.
5. TRIM HELICOIL LENGTH TO 10.5mm PRIOR TO INSTALLING IN HOLE.

ITEM	QTY	PART NUMBER	DESCRIPTION
3	1	5000054	HELICOIL, M12 X 1.75 X 12 LG.
2	3	5000351	HELICOIL, M5 X .8 X 5
1	2	5000680	M4 X 6 LG. DOWEL PIN SS

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.1, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: A. Barchock	11/6/2017
CHECKED:	
ENG:	
APPROVED:	

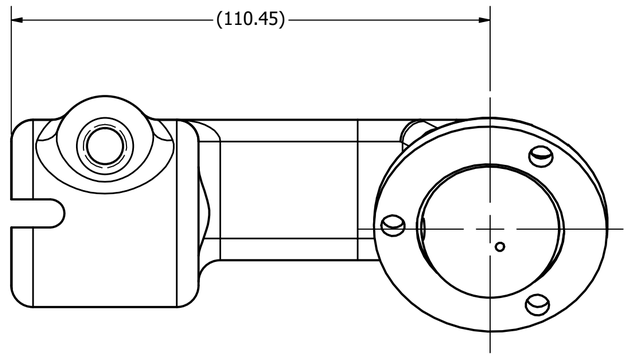
THIRD ANGLE PROJECTION

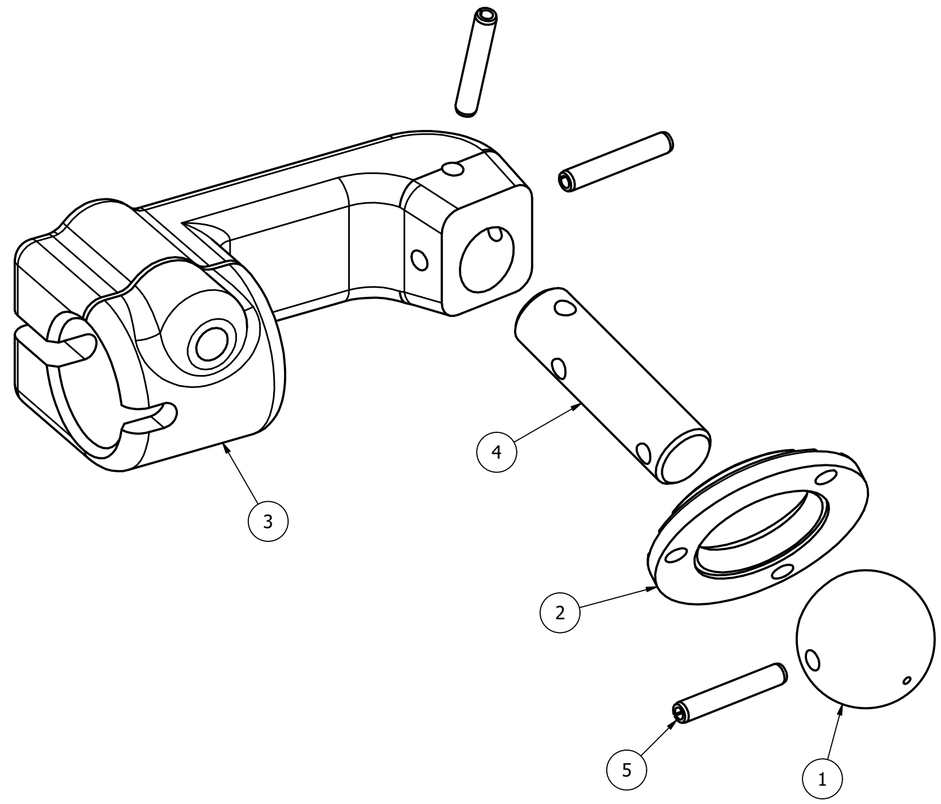
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

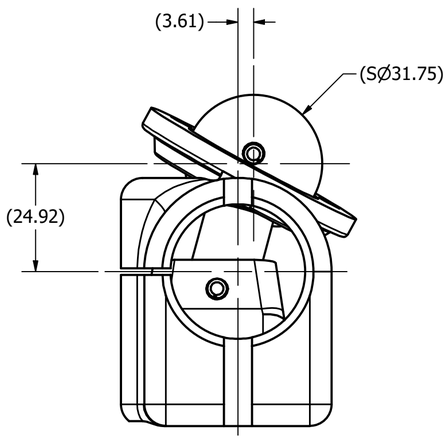
FEMUR MOUNTING SOCKET, RIGHT

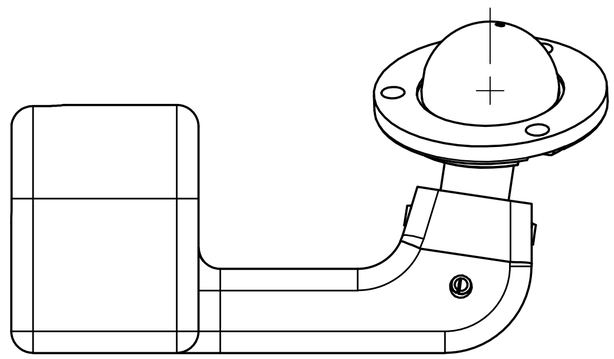
SIZE: A1 | DRAWING NUMBER: 474-4003-2 | REV: 1
SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AB	JW	11/7/17









ITEM	QTY	PART NUMBER	DESCRIPTION
5	3	5000353	M5 X 30 LG. ROLL PIN SS
4	1	474-4704	FEMUR SHAFT
3	1	474-4703-1	FEMUR, LEFT
2	1	474-4702	FEMUR RETAINING FLANGE
1	1	474-4701	FEMUR BALL JOINT

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL
HEAT TREAT
FINISH

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN A. Barchock	11/6/2017
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

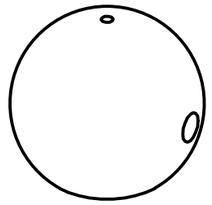
FEMUR ASSEMBLY, LEFT

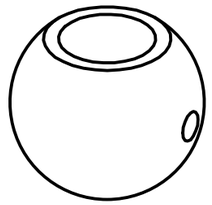
THIRD ANGLE PROJECTION

SIZE A2 | DRAWING NUMBER 474-4700-1 | REV 1

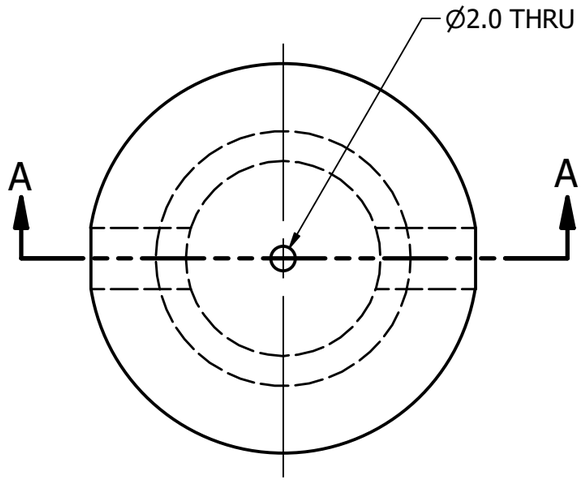
SCALE: 1:1 | SHEET 1 OF 1

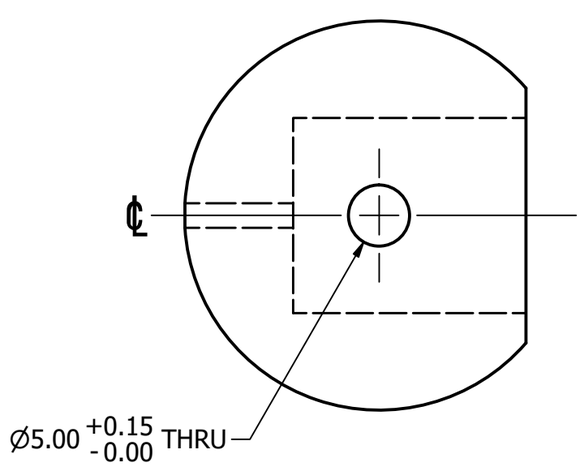
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AB	JW	11/7/17

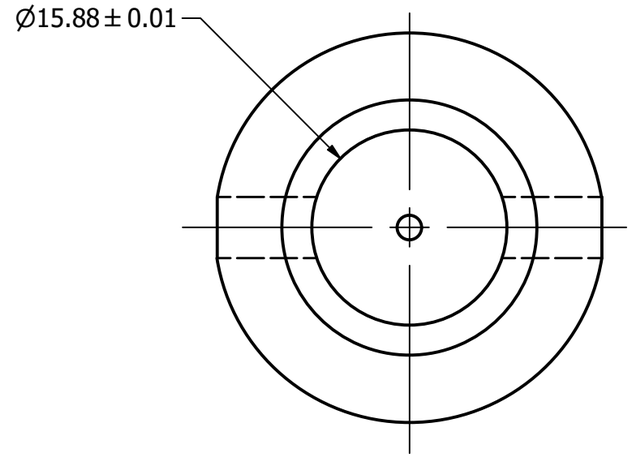


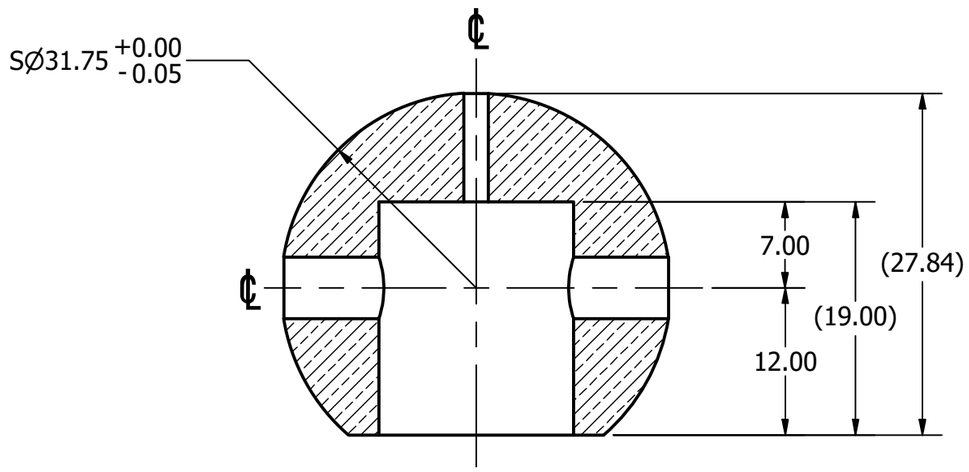


SCALE 1 : 1









SECTION A-A

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: ALUMINUM BRONZE (AMPCO-18)	CHECKED	
HEAT TREAT	ENG	
FINISH	APPROVED	

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: A. Barchock	11/6/2017

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

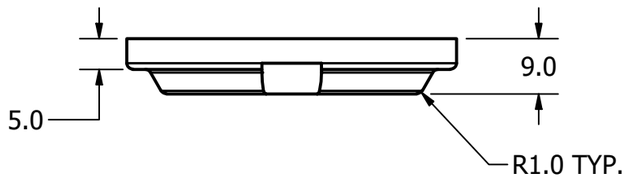
FEMUR BALL JOINT

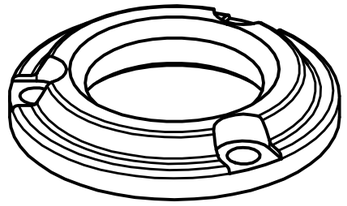
THIRD ANGLE PROJECTION

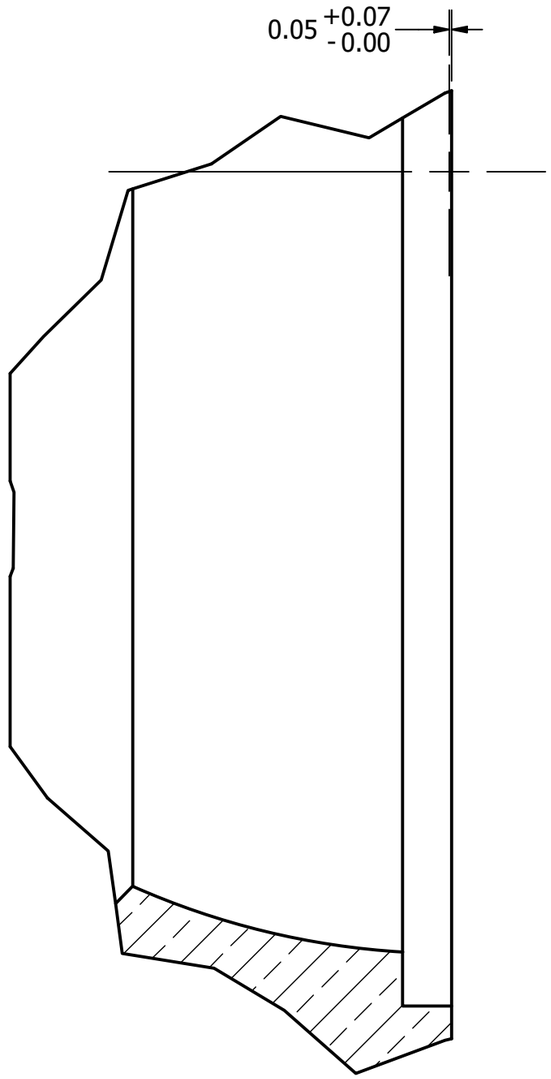
SIZE	DRAWING NUMBER	REV
A3	474-4701	1

SCALE: 2:1 SHEET 1 OF 1

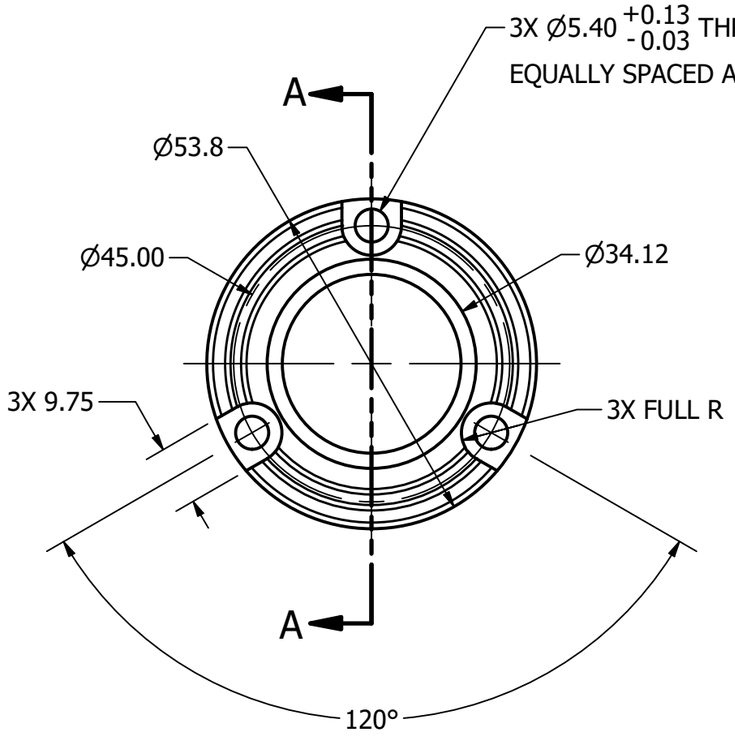
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AB	JW	11/7/17

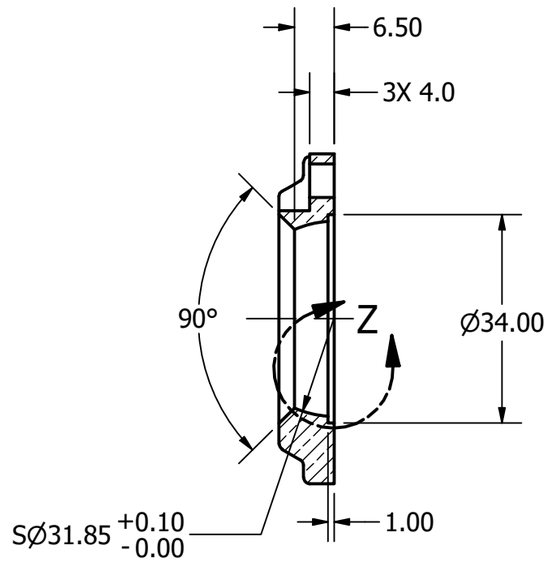






DETAIL Z
SCALE 8 : 1



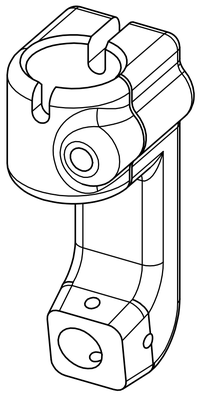


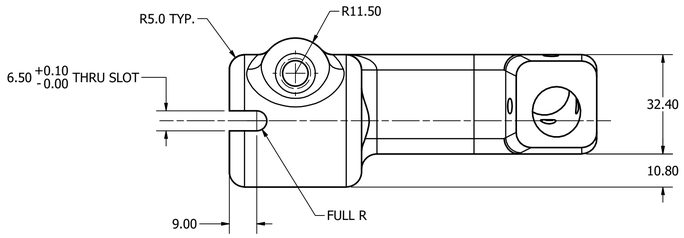
SECTION A-A

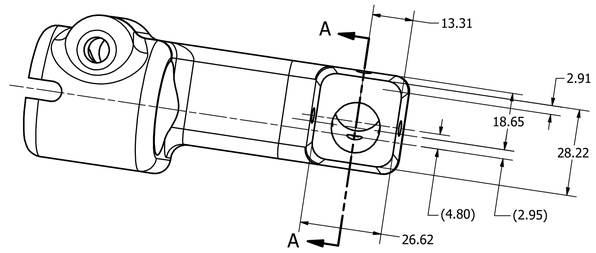
PRELIMINARY DRAWING

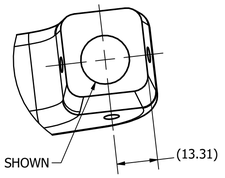
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS TOLERANCES ARE: DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED 125, ANGLES ±.5° ASME Y14.5M - 1994 DO NOT SCALE DRAWING	VEHICLE RESEARCH and TEST CENTER	NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
	APPROVALS / DATE	FEMUR RETAINING FLANGE
MATERIAL: BRONZE 863	DRAWN: A. Barchock 11/6/2017	
HEAT TREAT	CHECKED	
FINISH	ENG	
	APPROVED	
THIRD ANGLE PROJECTION	SIZE: A3 · DRAWING NUMBER: 474-4702 · REV: 1 · SCALE: 1:1 · SHEET: 1 OF 1	

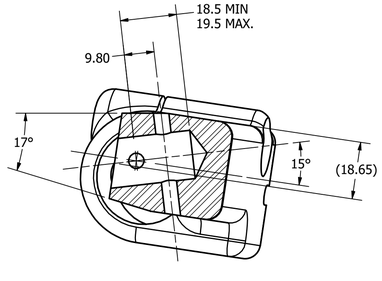
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AB	JW	11/7/17



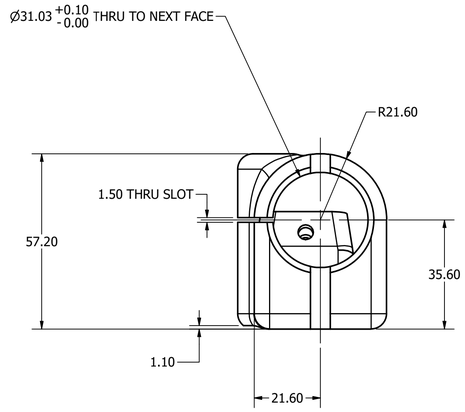


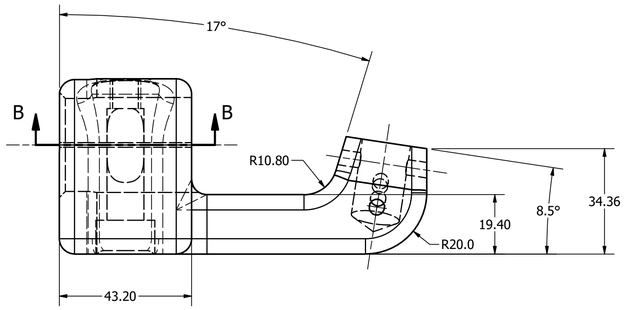


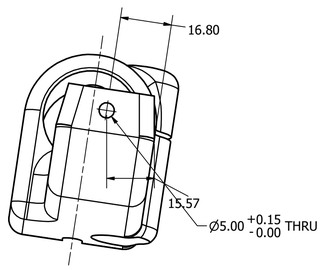


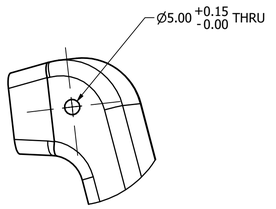


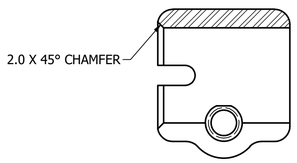
SECTION A-A



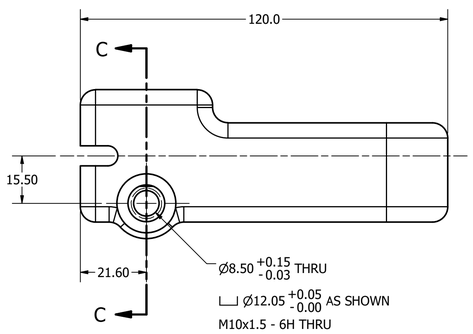


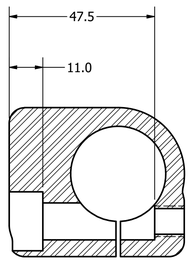






SECTION B-B





SECTION C-C

NOTES:

1. USE CAD DATA FOR INSPECTION.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.2, X.X ±.1, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 4140 STEEL
HEAT TREAT:
FINISH: 0.008mm ELECTROLESS NICKEL PLATE PER SIDE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: A. Barchock	11/6/2017
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

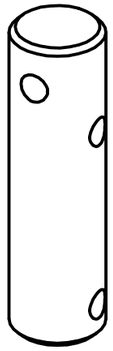
FEMUR, LEFT

THIRD ANGLE PROJECTION

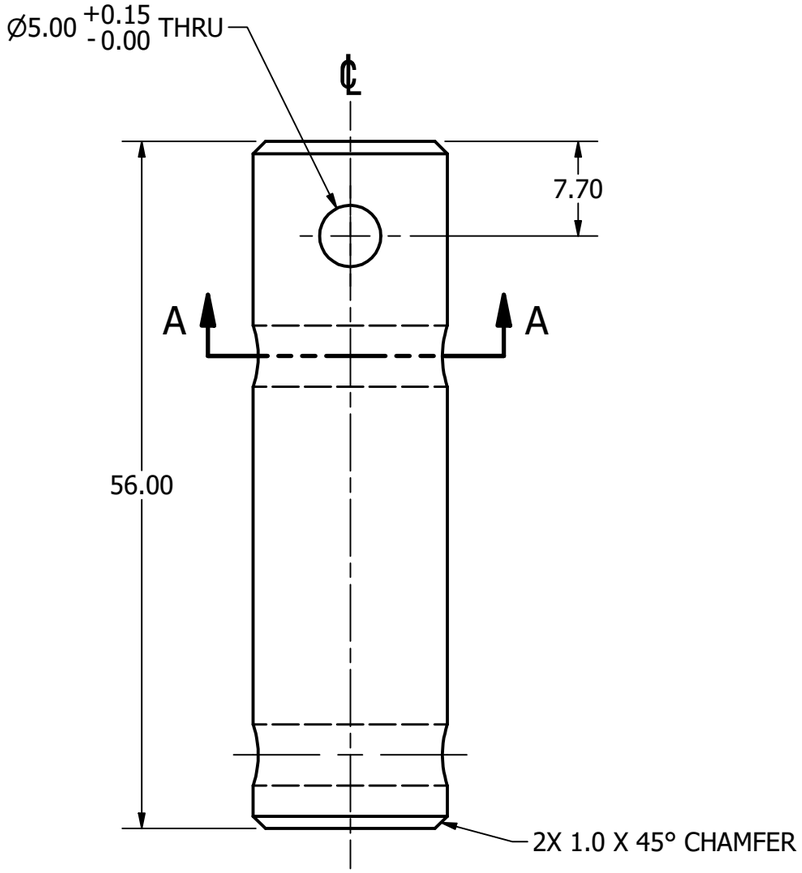
SIZE: A1 | DRAWING NUMBER: 474-4703-1 | REV: 1

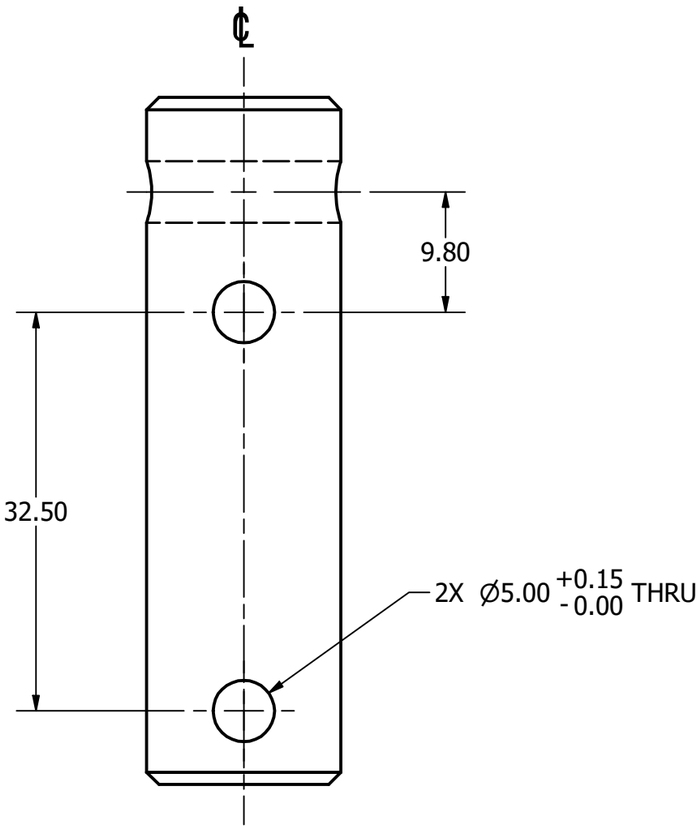
SCALE: 1:1 | SHEET: 1 OF 1

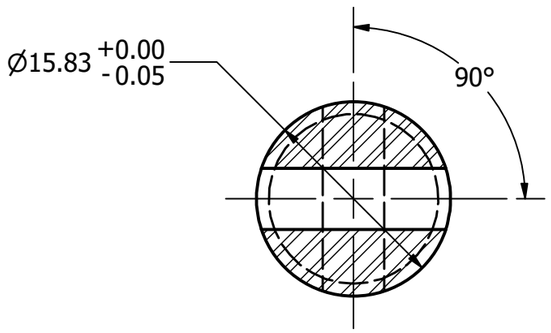
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AB	JW	11/7/17



SCALE 1 : 1







SECTION A-A

NOTES:

1. MATERIAL: 4140 TURNED GROUND AND POLISHED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED $\sqrt{}$ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTES	CHECKED	
HEAT TREAT: Rc 28-32	ENG	
FINISH: 0.008mm ELECTROLESS NICKEL PLATE PER SIDE	APPROVED	

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: A. Barchock	11/6/2017

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

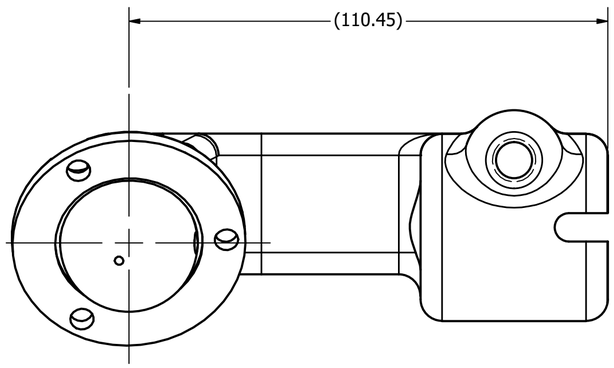
FEMUR SHAFT

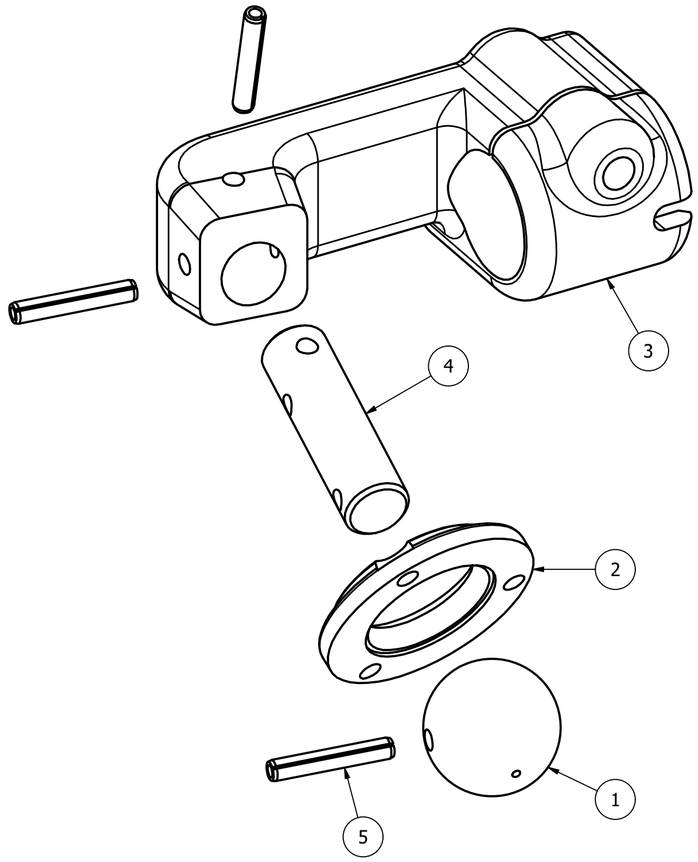
THIRD ANGLE PROJECTION

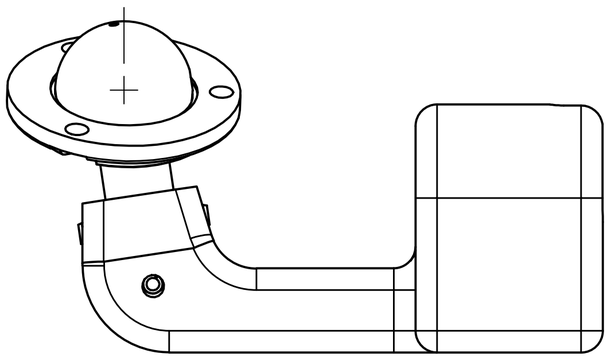
SIZE	DRAWING NUMBER	REV
A3	474-4704	1

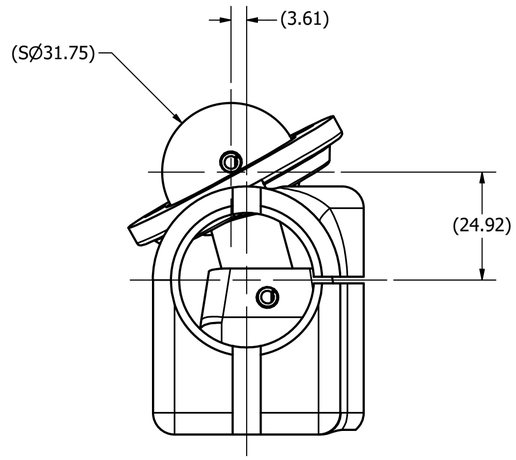
SCALE: 2:1 SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AB	JW	11/7/17









ITEM	QTY	PART NUMBER	DESCRIPTION
5	3	5000353	M5 X 30 LG. ROLL PIN SS
4	1	474-4704	FEMUR SHAFT
3	1	474-4703-2	FEMUR, RIGHT
2	1	474-4702	FEMUR RETAINING FLANGE
1	1	474-4701	FEMUR BALL JOINT

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

FEMUR ASSEMBLY, RIGHT

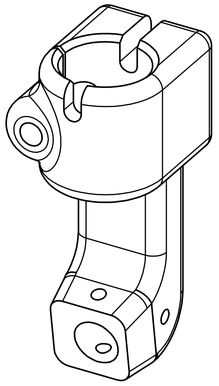
	APPROVALS	DATE
DRAWN	A. Barchock	11/6/2017
MATERIAL		
CHECKED		
HEAT TREAT		
ENG		
FINISH		
APPROVED		

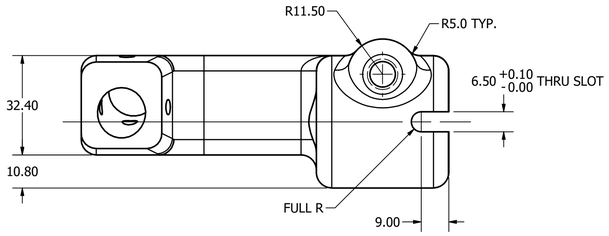
THIRD ANGLE PROJECTION

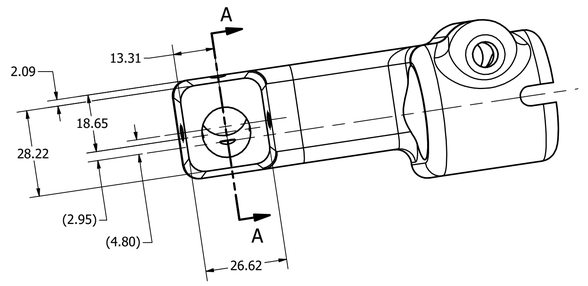
SIZE A2 | DRAWING NUMBER 474-4700-2 | REV 1

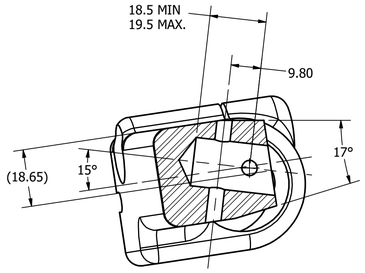
SCALE: 1:1 | SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AB	JW	11/7/17

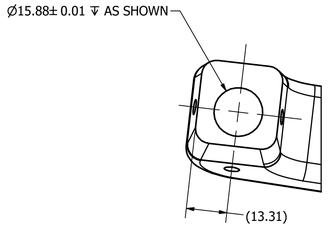


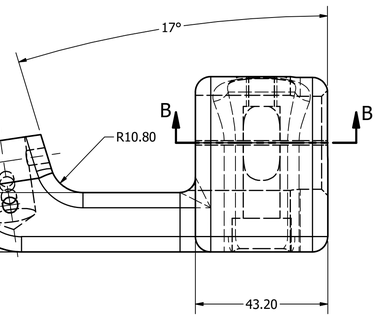


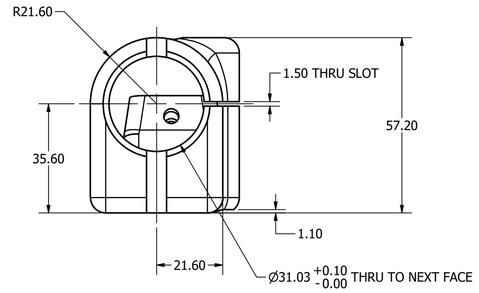


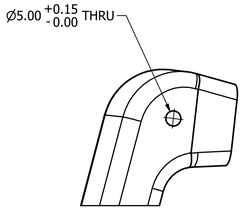


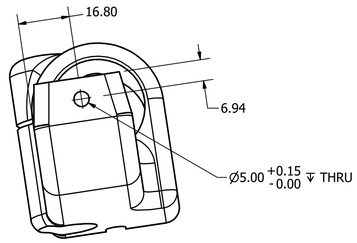
SECTION A-A

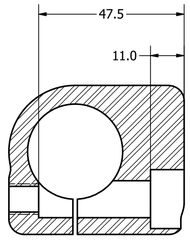




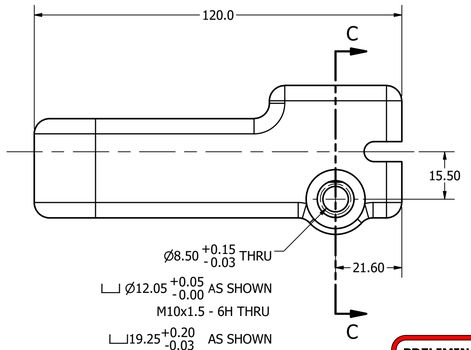


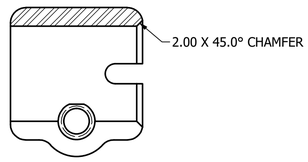






SECTION C-C





SECTION B-B

NOTES:

1. USE CAD DATA FOR INSPECTION.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, .XX ±.2, .XXX ±.1 | MACHINED ∠ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 4140 STEEL
HEAT TREAT:
FINISH: 0.008mm ELECTROLESS NICKEL PLATE PER SIDE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: A. Barchock	11/6/2017
CHECKED:	
ENG:	
APPROVED:	

THIRD ANGLE PROJECTION

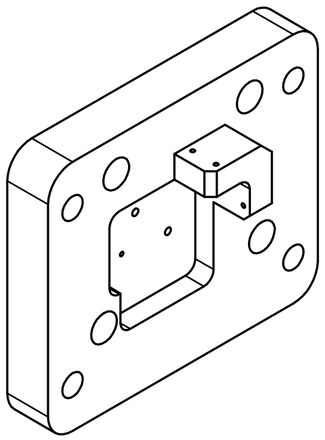
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

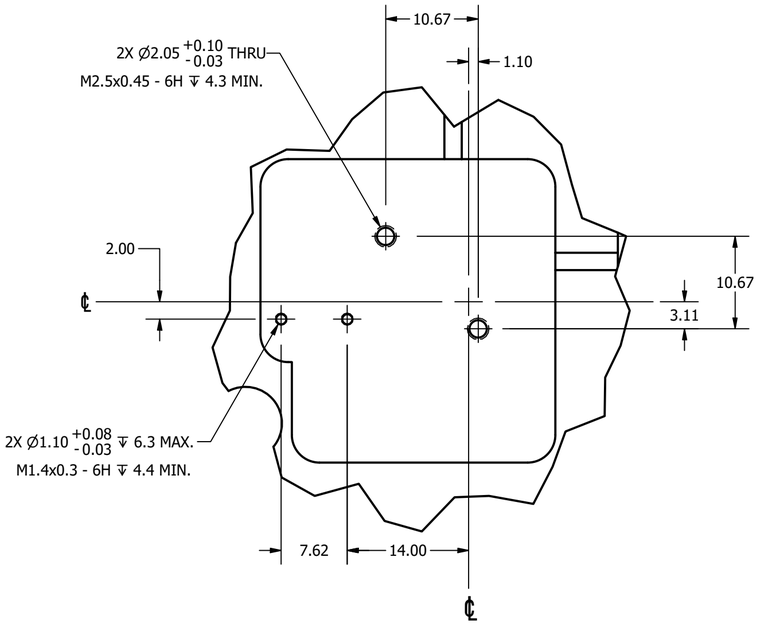
FEMUR, RIGHT

SIZE: A1 | DRAWING NUMBER: 474-4703-2 | REV: 1

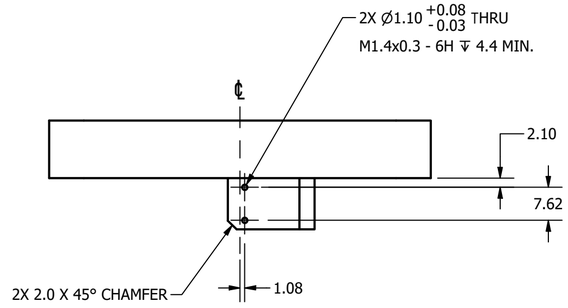
SCALE: 1:1 | SHEET: 1 OF 1

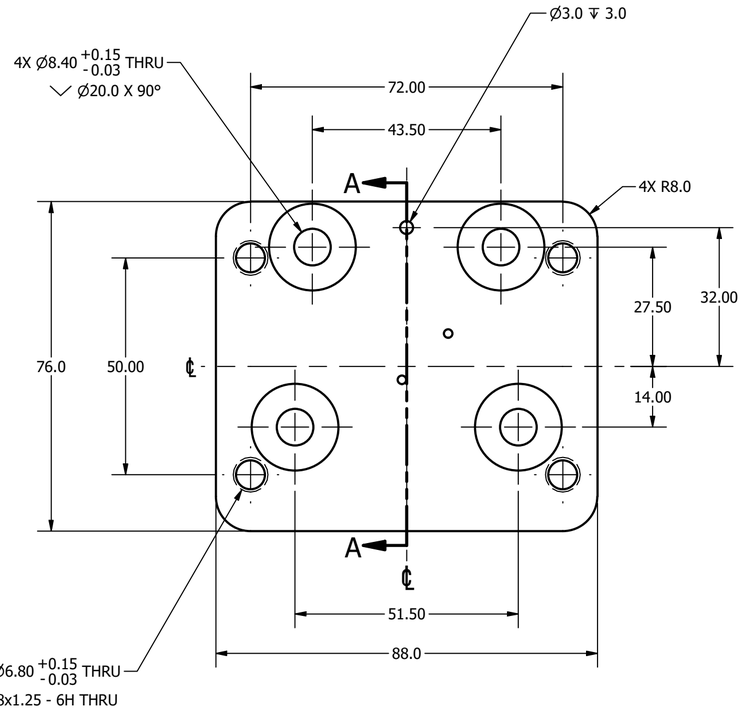
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	11/8/17

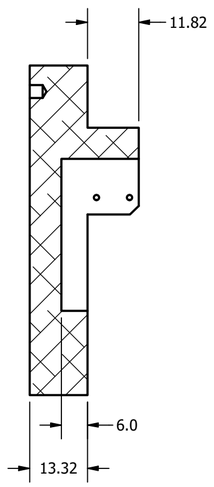




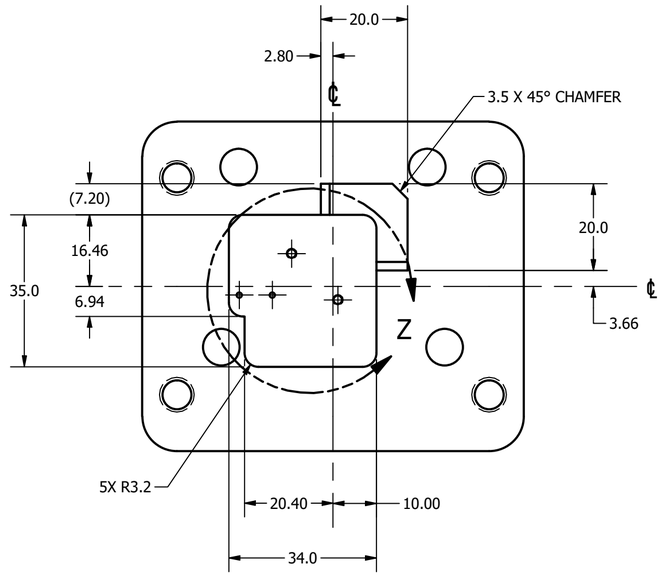
DETAIL Z
SCALE 2 : 1

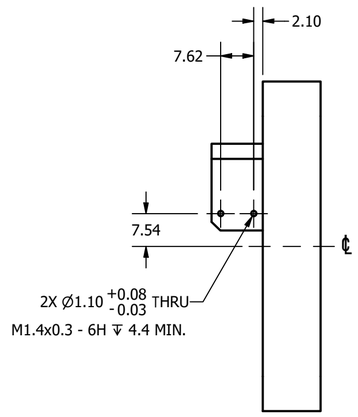






SECTION A-A





NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: B. KIMES	11/6/2017
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

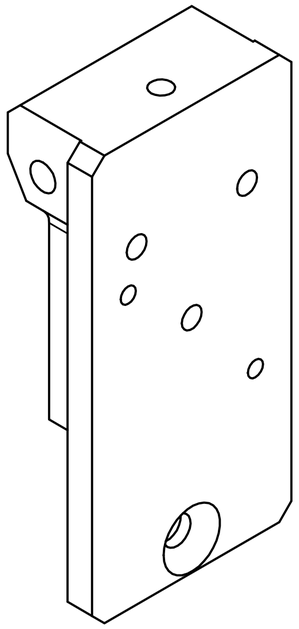
PLATE, UPPER TORSO TO PELVIS ADAPTOR

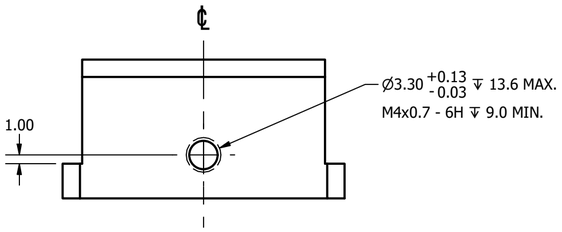
THIRD ANGLE PROJECTION

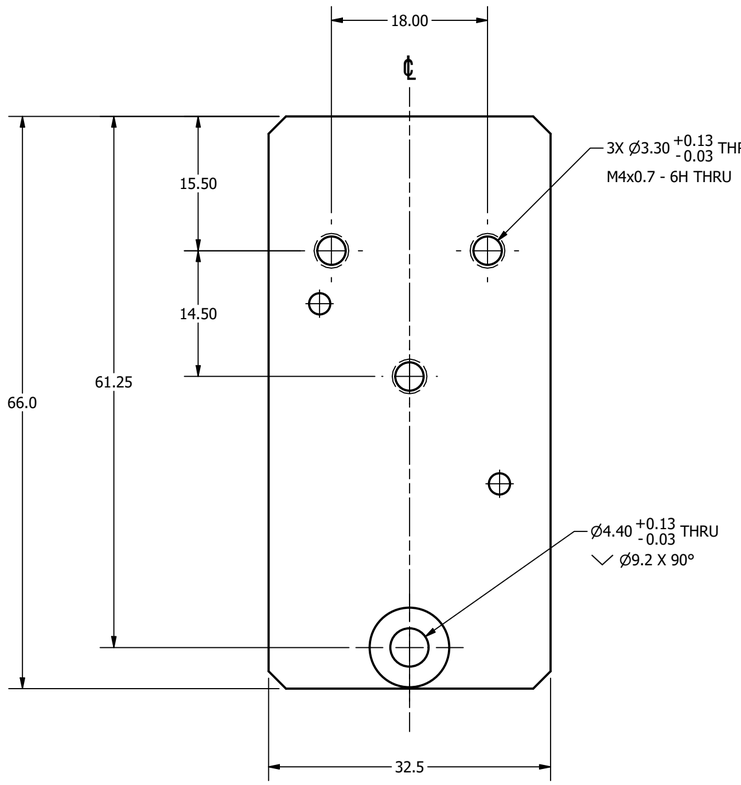
SIZE: A2 | DRAWING NUMBER: 474-4004 | REV: 1

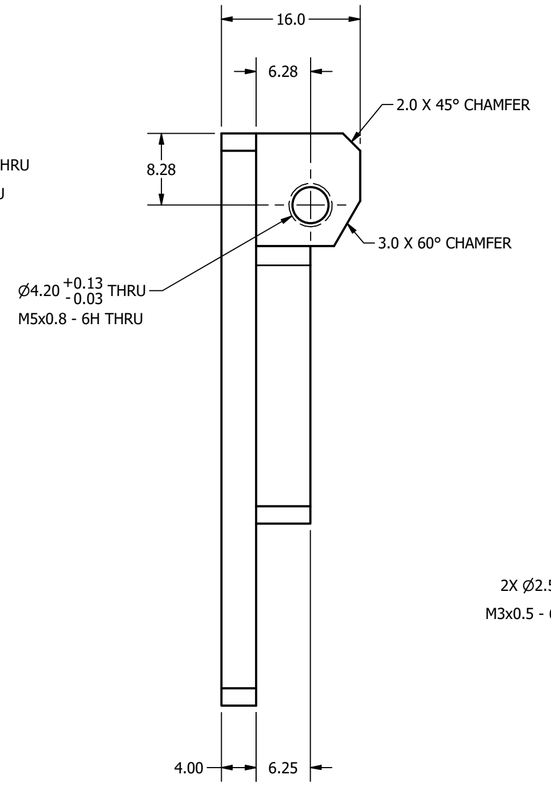
SCALE: 1:1 | SHEET: 1 OF 1

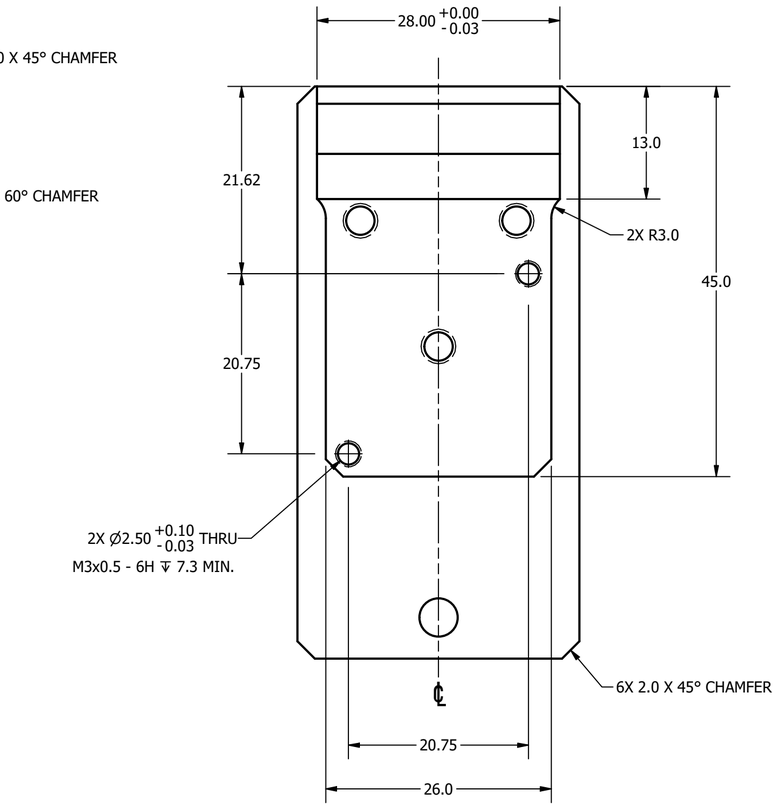
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	11/8/17











NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ∠ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: B. KIMES	11/6/2017
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

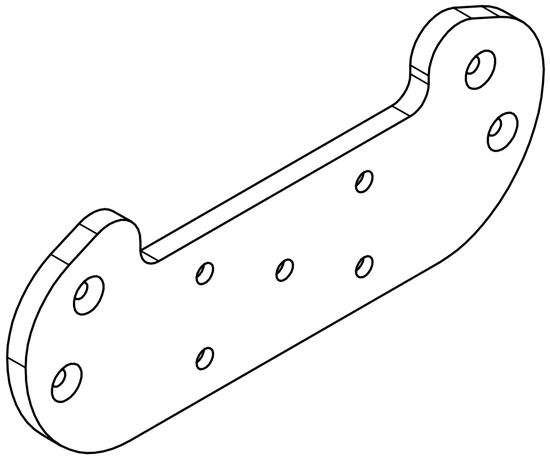
ON BOARD DAS MOUNTING PLATE, PELVIS

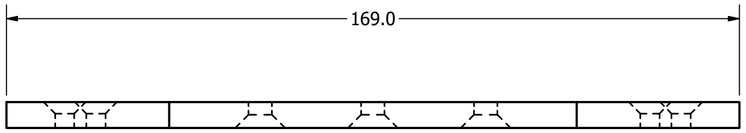
THIRD ANGLE PROJECTION

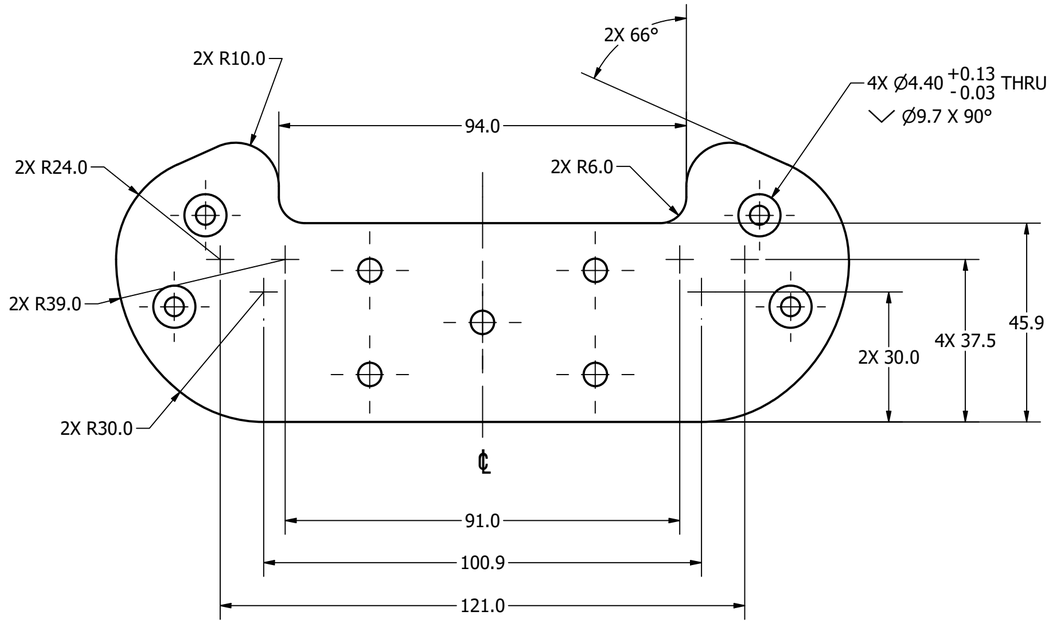
SIZE: A2 | DRAWING NUMBER: 474-4005 | REV: 1

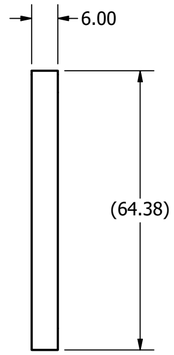
SCALE: 2:1 | SHEET: 1 OF 1

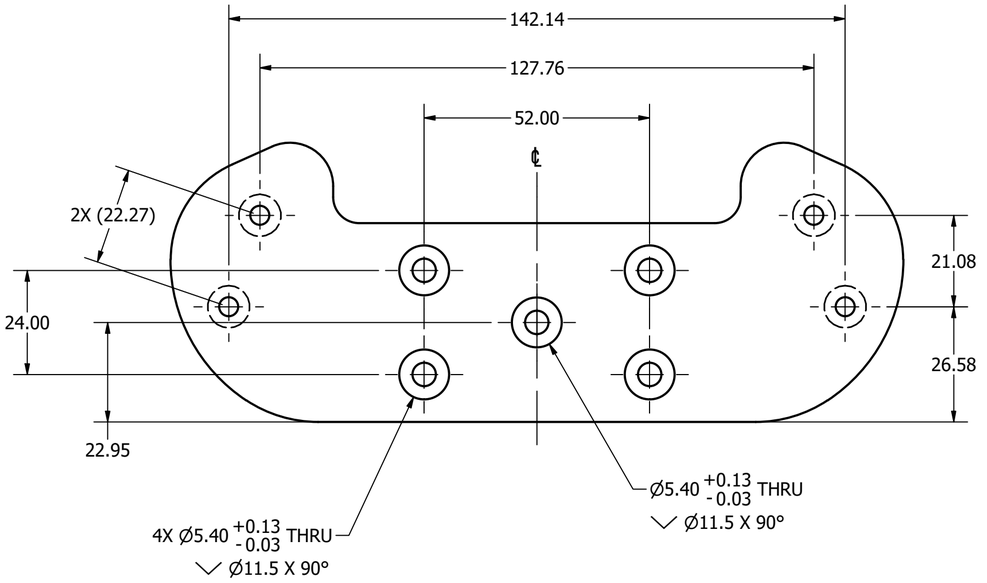
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	11/8/17











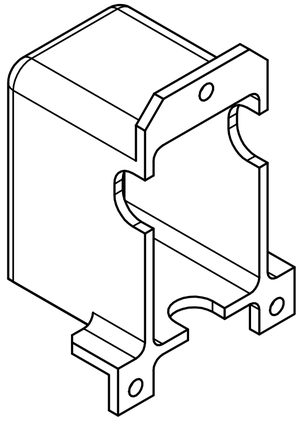
NOTES:

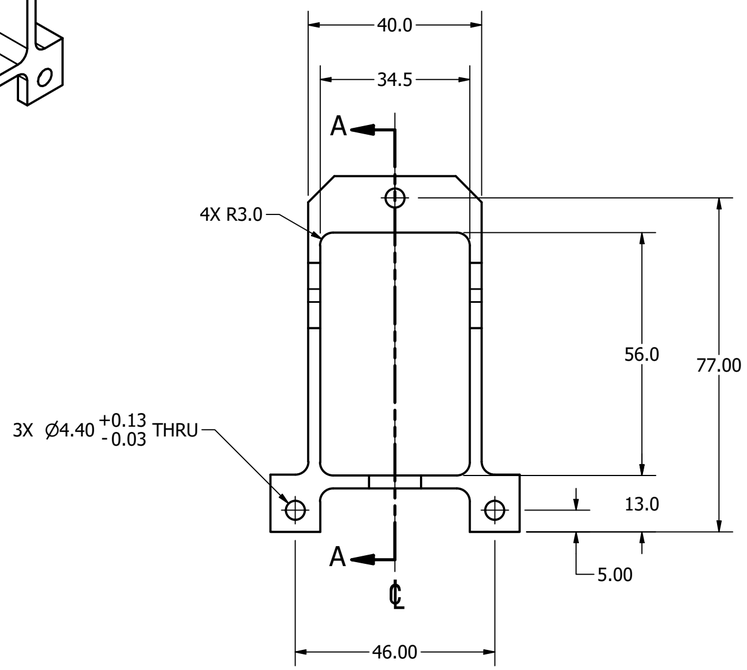
1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

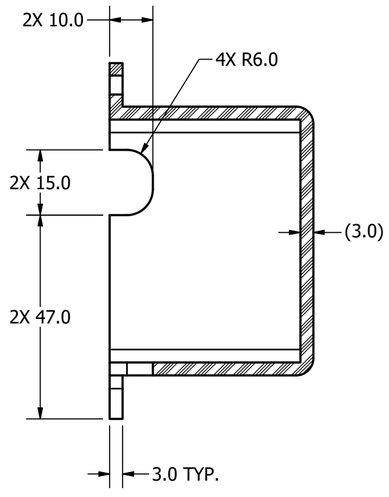
PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS TOLERANCES ARE: DECIMAL: X ±.5, X.X ±.2, X.XX ±.1; MACHINED ∨C; ANGLES ±.5° ASME Y14.5M - 1994 DO NOT SCALE DRAWING	VEHICLE RESEARCH and TEST CENTER		NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
	APPROVALS	DATE	PLATE, ISCHIUM BONE MOUNT
MATERIAL 7075-T6 ALUMINUM	DRAWN ghayden	11/6/2017	
HEAT TREAT	CHECKED		THIRD ANGLE PROJECTION
FINISH CLEAR ANODIZE	ENG		SIZE A2 · DRAWING NUMBER 474-4542 · REV 1
	APPROVED		SCALE: 1:1 · SHEET 1 OF 1

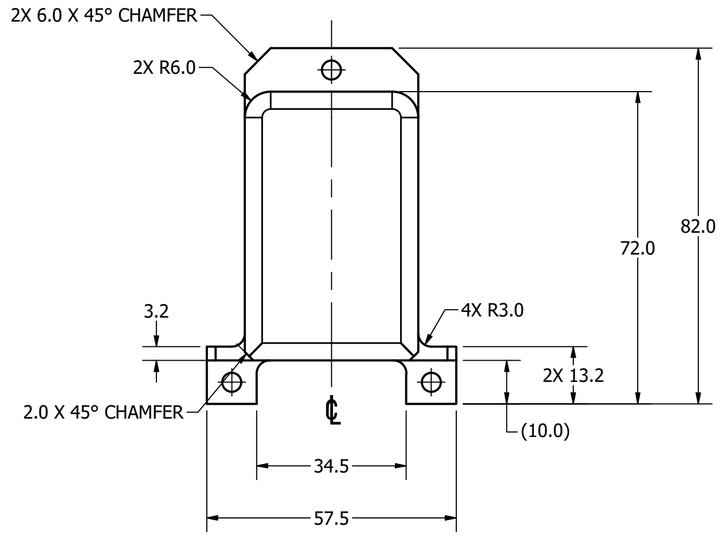
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	DJI	JW	11/8/17

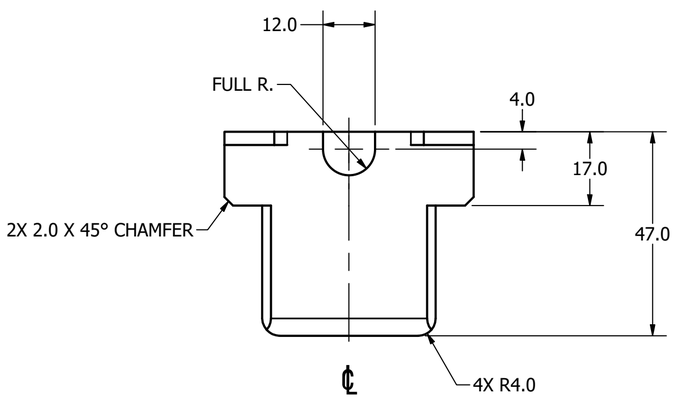






SECTION A-A





NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄ , UNLESS OTHERWISE NOTED

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ∠ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: Nylon-6/6
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: disopi	11/6/2017
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

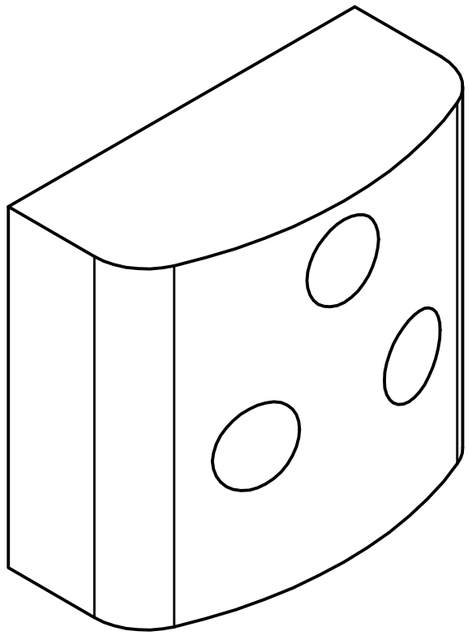
CABLE COVER, PELVIS

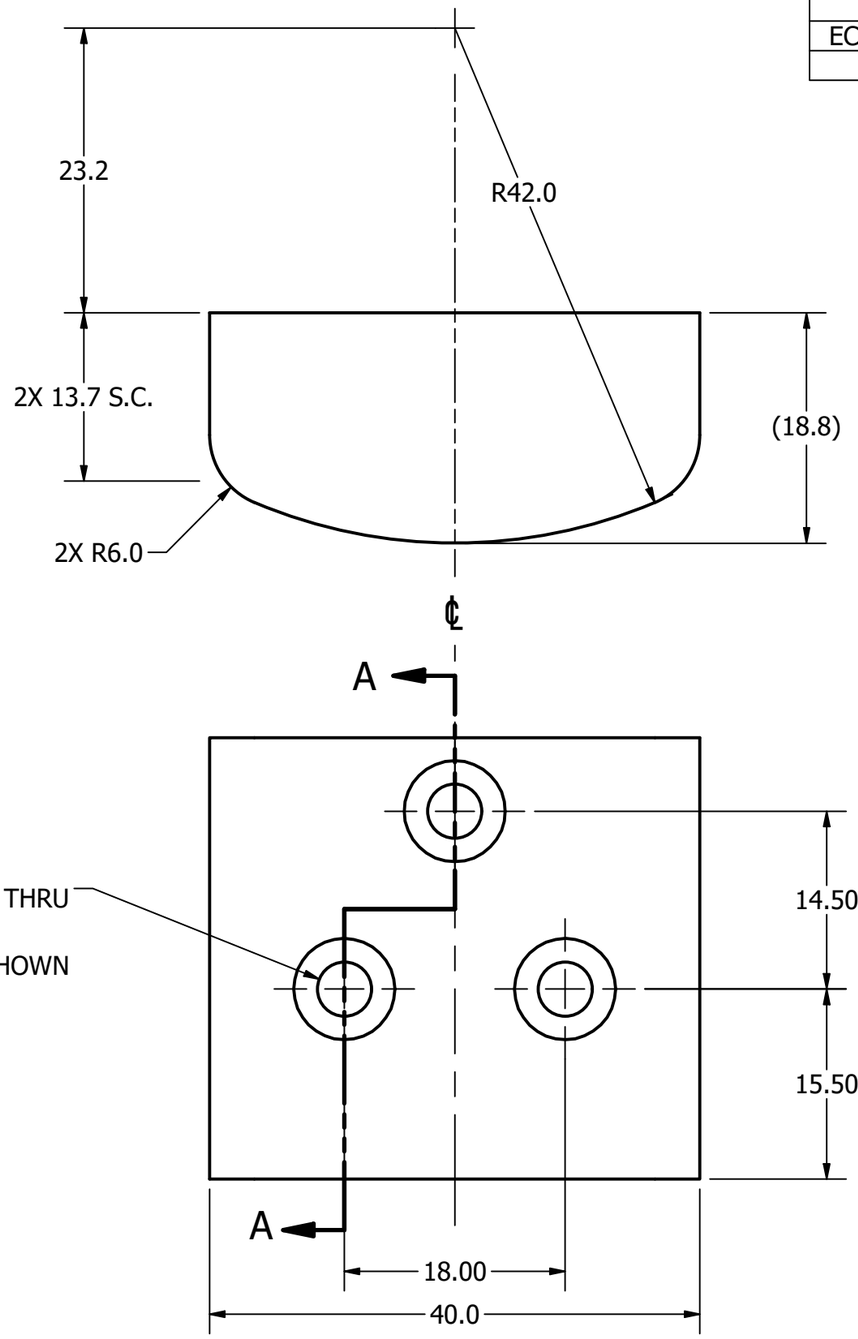
THIRD ANGLE PROJECTION

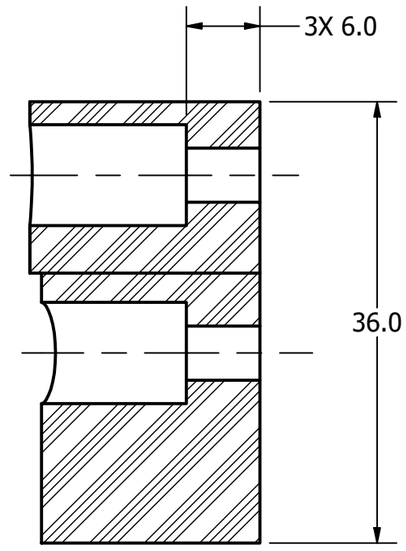
SIZE: A2 | DRAWING NUMBER: 474-4006 | REV: 1

SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	11/8/17







SECTION A-A

NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: ACETAL RESIN, BLACK
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: B. KIMES	11/6/2017
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

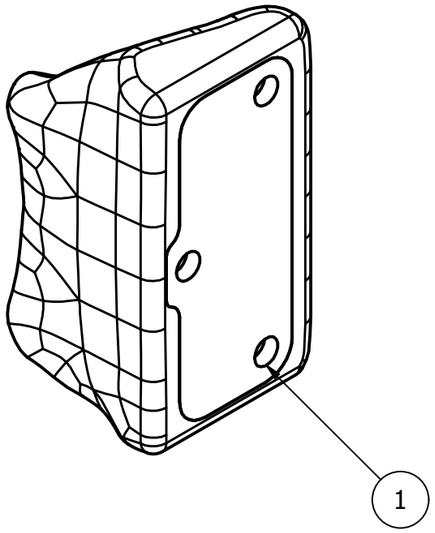
PUBIC BONE

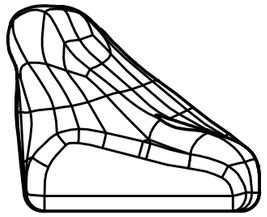
THIRD ANGLE PROJECTION

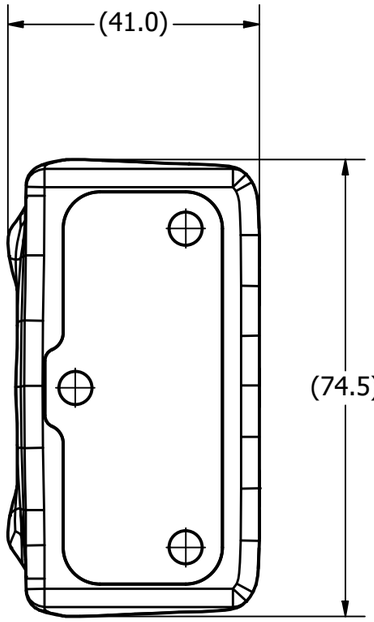
SIZE: A3 | DRAWING NUMBER: 474-4544 | REV: 1

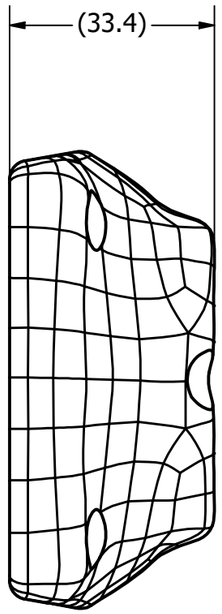
SCALE: 2:1 | SHEET: 1 OF 1

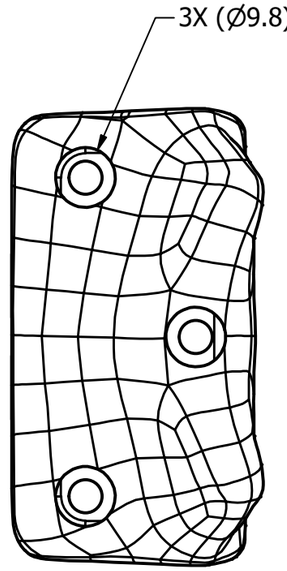
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	11/6/17











NOTES:

1. MATERIAL: POLYURETHANE
   COLOR: EURO BROWN
   DUROMETER: 70±5 SHORE "D"

2. REMOVE ALL MOLD FLASHING

3. ALL MOLD DIMENSION TOLERANCE +1%/-2% BUT NO SMALLER THAN 0.5mm

4. NO SPLIT OR DEFECTS ARE ALLOWED IN THE URETHANE MOLDING

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	474-4543	PLATE, COCCYX MOUNT

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED √ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTE #1
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: ghayden	11/6/2017
CHECKED:	
ENG:	
APPROVED:	

DEPARTMENT OF TRANSPORTATION — UNITED STATES OF AMERICA
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

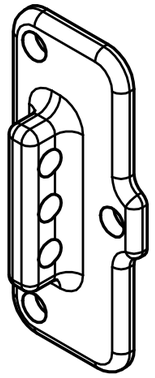
COCCYX, MOLDED

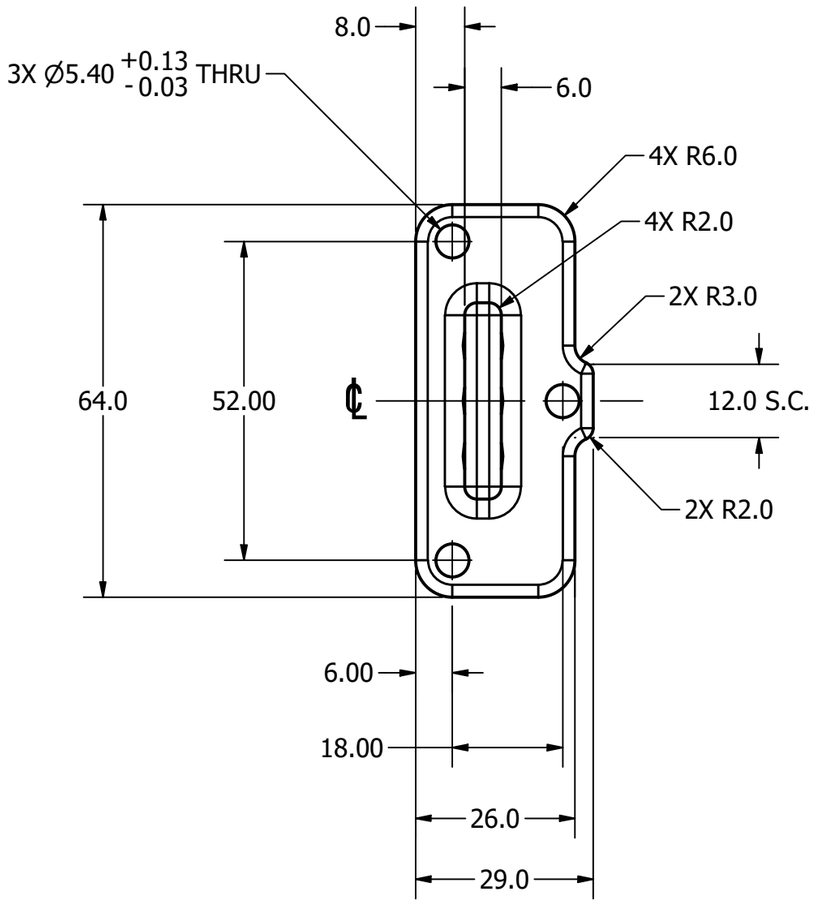
THIRD ANGLE PROJECTION

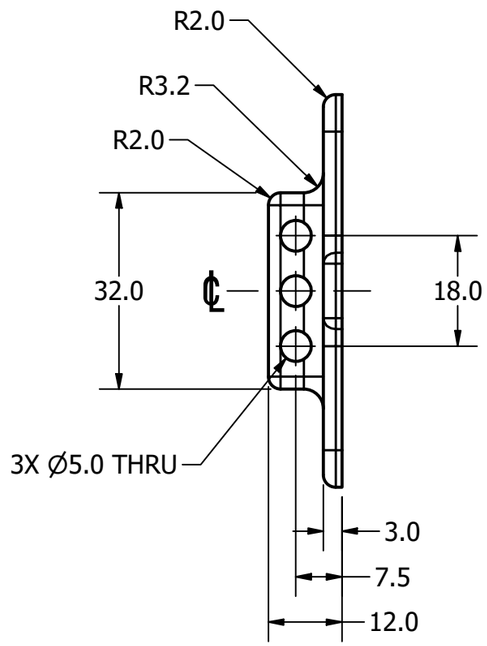
SIZE: A3 | DRAWING NUMBER: 474-4546 | REV: 1

SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	DJI	JW	11/8/17







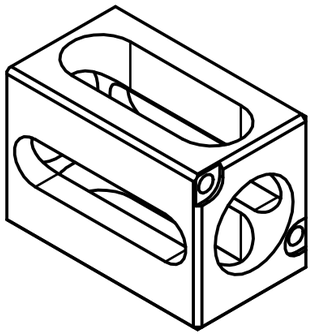
NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

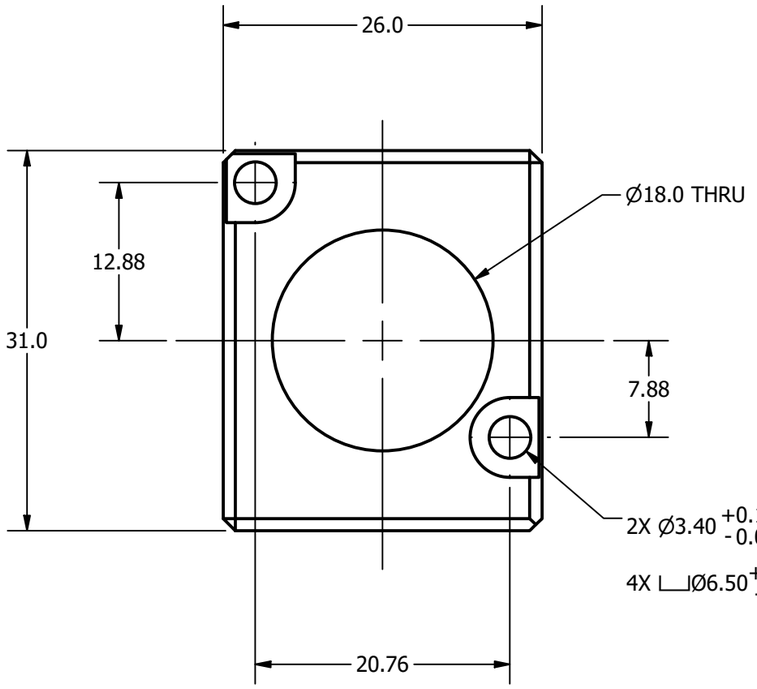
PRELIMINARY DRAWING

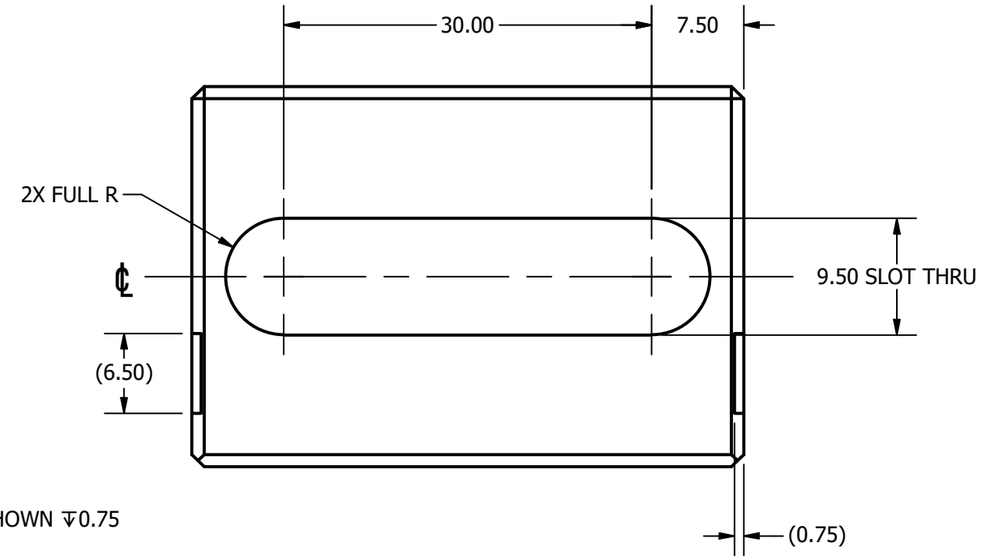
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS TOLERANCES ARE: DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5° ASME Y14.5M - 1994 DO NOT SCALE DRAWING	VEHICLE RESEARCH and TEST CENTER	NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
	APPROVALS / DATE	PLATE, COCCYX MOUNT
	DRAWN: disopi 11/6/2017	
MATERIAL: 7075-T6 ALUMINUM	CHECKED	
HEAT TREAT	ENG	
FINISH: CLEAR ANODIZE	APPROVED	THIRD ANGLE PROJECTION
		SIZE: A3 · DRAWING NUMBER: 474-4543 · REV: 1
		SCALE: 1:1 · SHEET: 1 OF 1

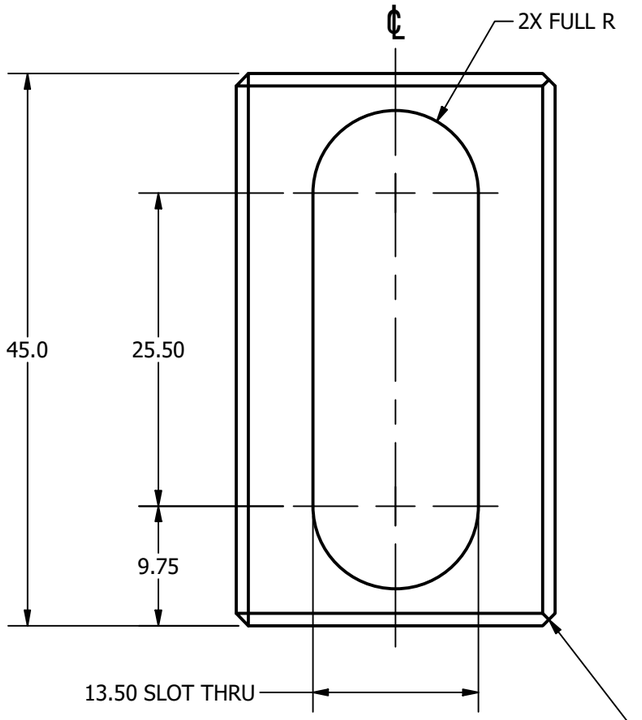
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH		11/8/17



SCALE 1 : 1







PRELIMINARY DRAWING

NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED
2. MASS = 106 grams ± 8.5 grams

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 1018 STEEL
HEAT TREAT:
FINISH: 0.008mm ELECTROLESS NICKEL PLATE PER SIDE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: B. KIMES	11/6/2017
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

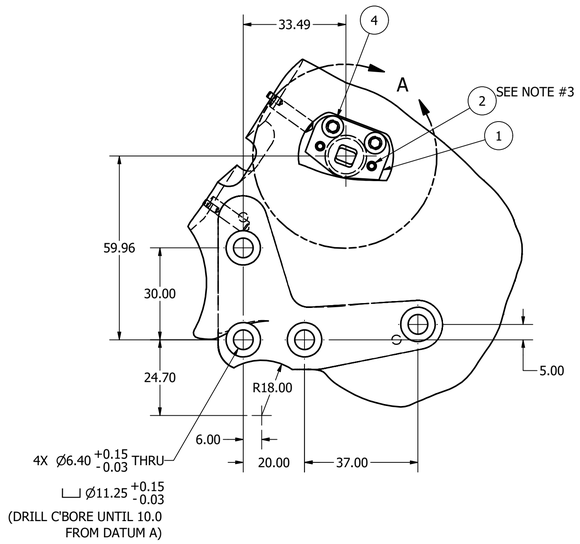
ON BOARD DAS STRUCTURAL REPLACEMENT

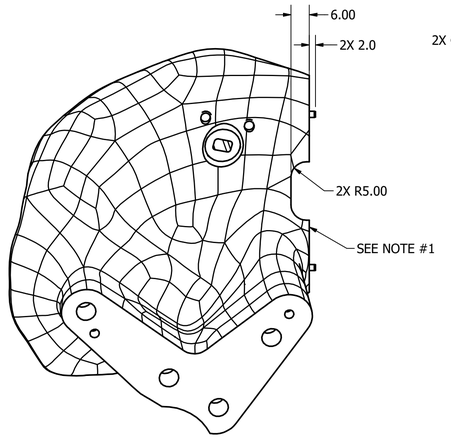
THIRD ANGLE PROJECTION

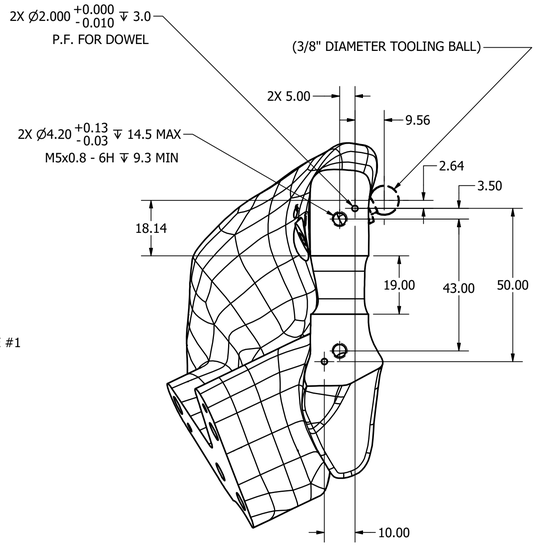
SIZE	DRAWING NUMBER	REV
A3	474-8206	1

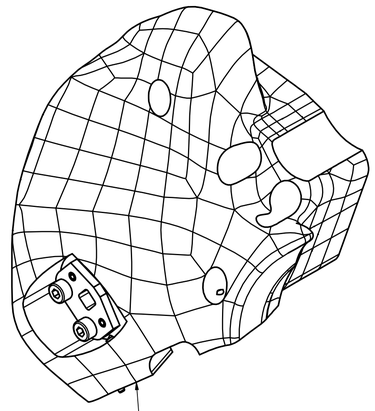
SCALE: 2:1 | SHEET 1 OF 1

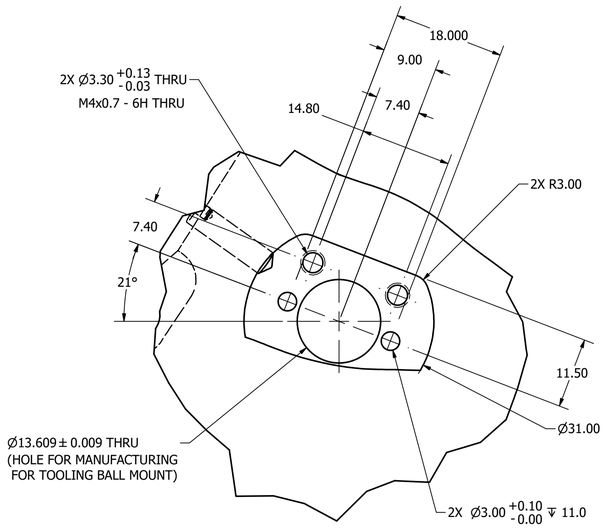
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	DJI		11/8/17



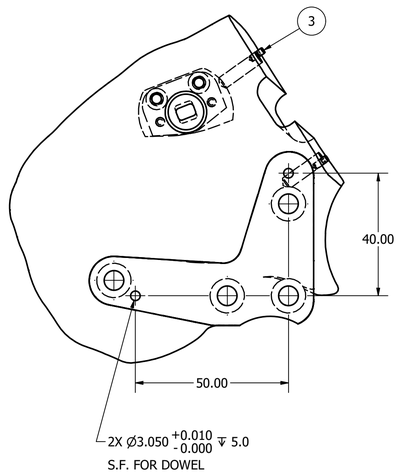


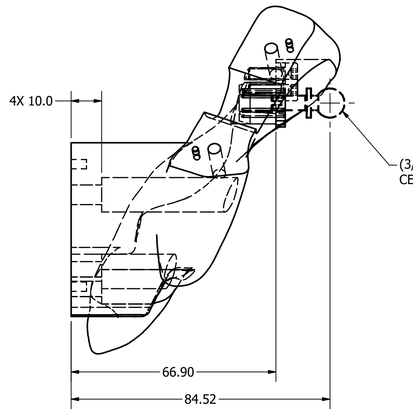






DETAIL A
SCALE 2 : 1
(H-POINT TOOL SOCKET NOT SHOWN)





NOTES:

1. SEE SHEET #2 FOR COMPOUND ANGLE SETUP.
2. ASSEMBLE ITEMS #1 THRU 4 AFTER ANODIZE.
3. ASSEMBLE ROLL PIN 5000196 INTO 474-4548 THEN ENGAGE PINS INTO HOLES ON ILLIAC WING. AFTER PINS ARE ENGAGED INTO HOLES, PRESS FIT 474-4548 FLUSH TO SURFACE.

SEE NOTE #2

ITEM	QTY	PART NUMBER	DESCRIPTION
4	2	5000152	M4 X 0.7 X 12 LG. SHCS
3	2	5001380	M2 X 5 LG. DOWEL PIN
2	2	5000196	M3 X 14 LG. ROLL PIN SS
1	1	474-4548	H-POINT TOOL SOCKET

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.2, X.X ±.1, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: dispi	11/6/2017
CHECKED:	
ENG:	
APPROVED:	

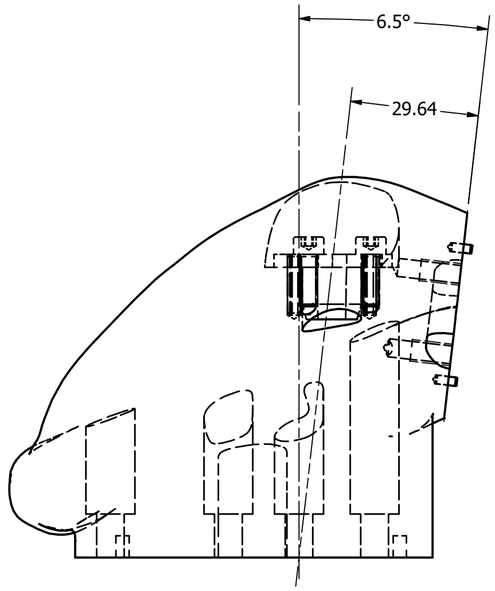
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

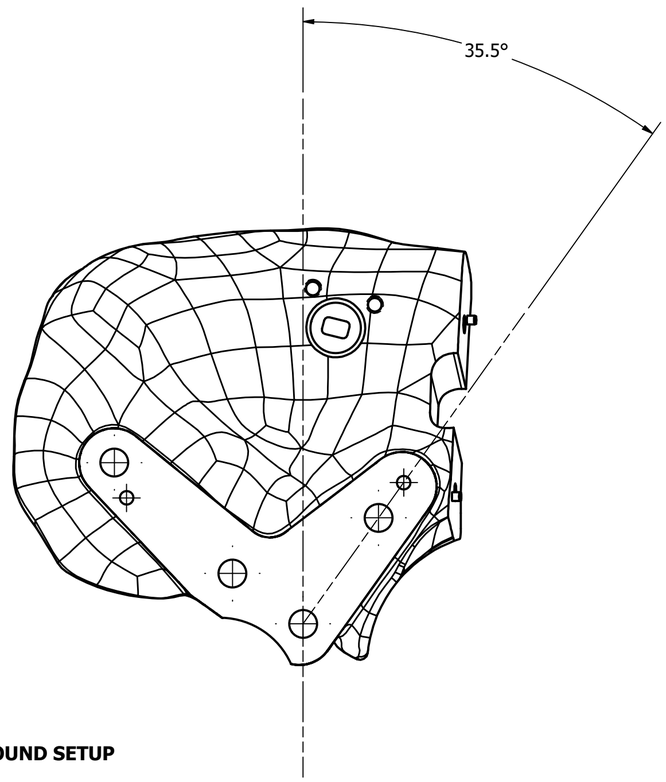
ILIAC WING, MACHINED, LEFT

THIRD ANGLE PROJECTION

SIZE: A1 | DRAWING NUMBER: 474-4540-1 | REV: 1

SCALE: 1:1 | SHEET: 1 OF 2





FOR COMPOUND SETUP

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: disopi	11/6/2017
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

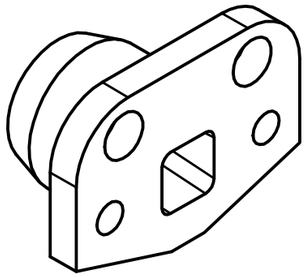
ILIAC WING, MACHINED, LEFT

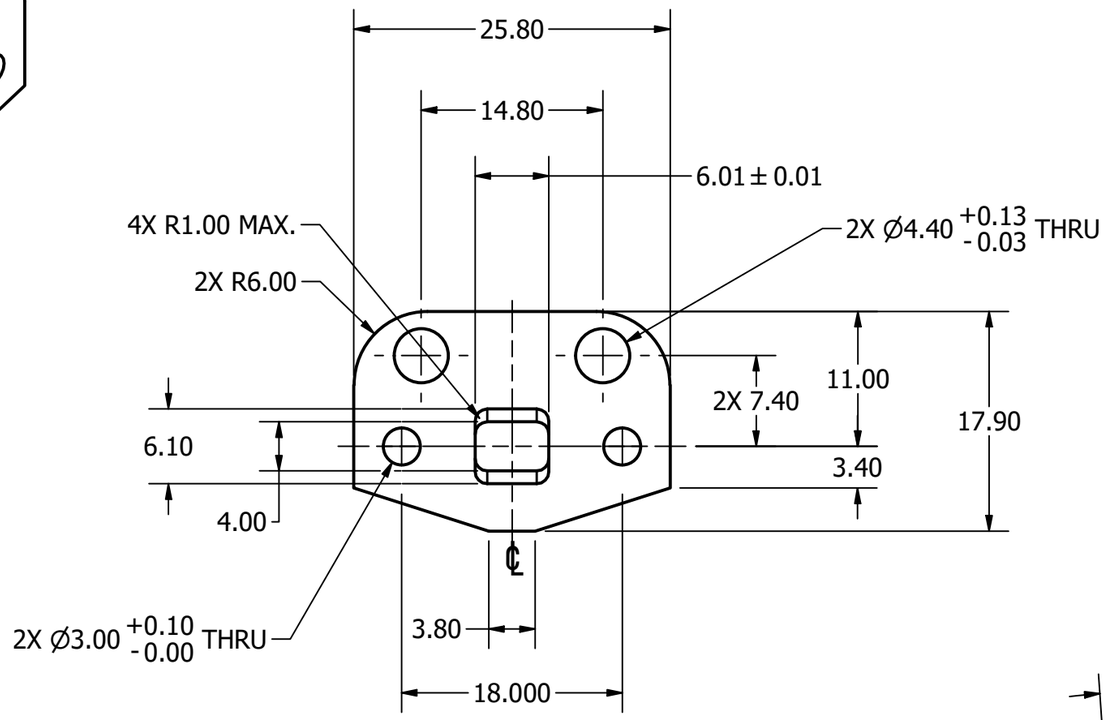
THIRD ANGLE PROJECTION

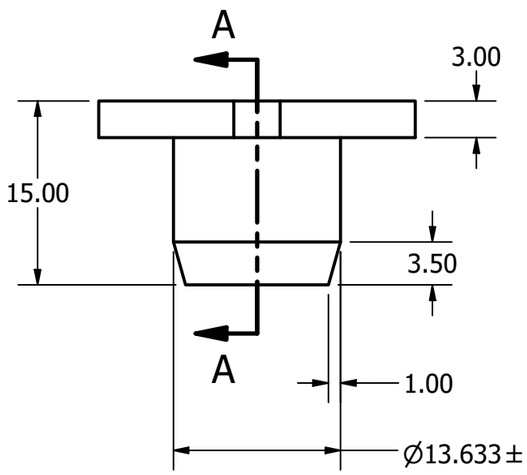
SIZE: A2 | DRAWING NUMBER: 474-4540-1 | REV: 1

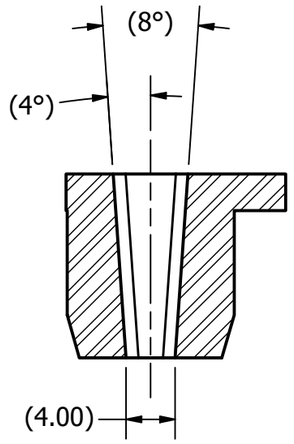
SCALE: 1:1 | SHEET: 2 OF 2

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	DJI	JW	11/8/17









SECTION A-A

NOTES:

1. DIMENSIONS ARE SYMMETRICAL ABOUT ℄ UNLESS OTHERWISE NOTED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 440C STAINLESS STEEL
HEAT TREAT: Rc 50-55
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: disopi	11/6/2017
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

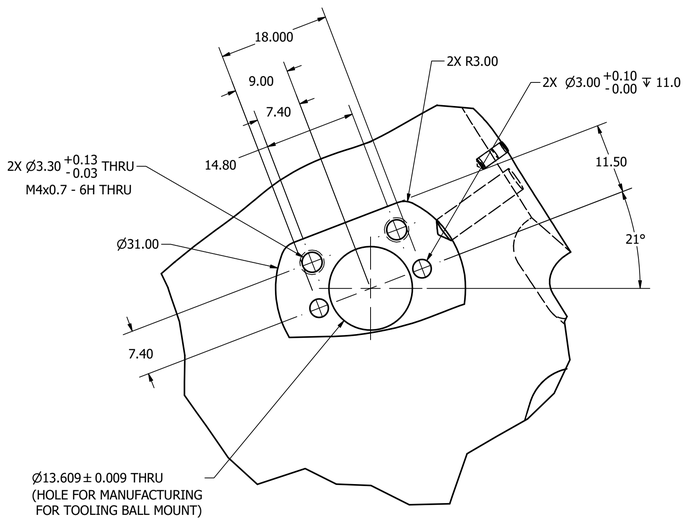
H-POINT TOOL SOCKET

THIRD ANGLE PROJECTION

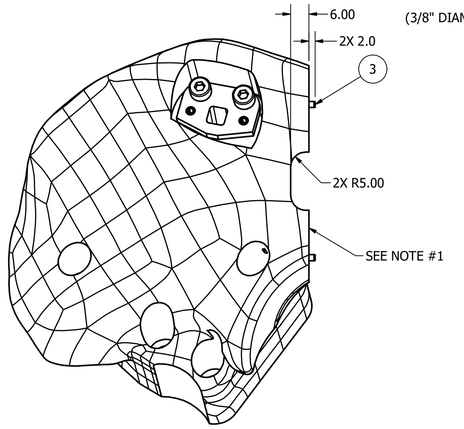
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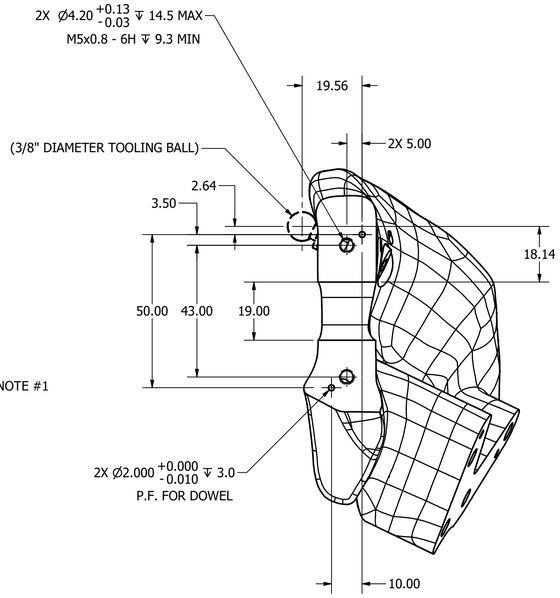
SCALE: 2:1 | SHEET: 1 OF 1

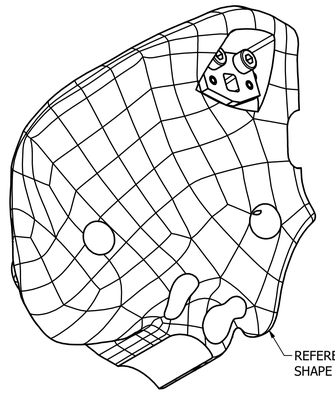
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	DJI		11/10/17

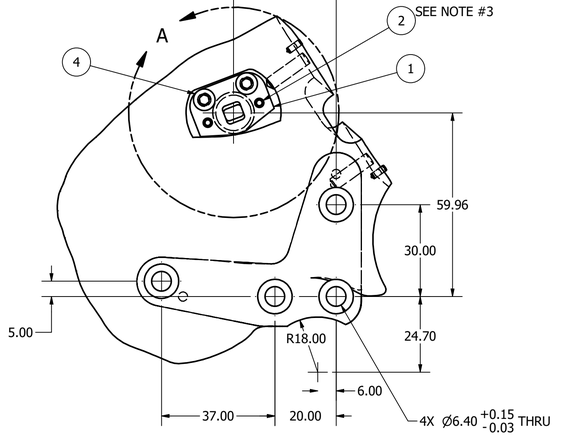


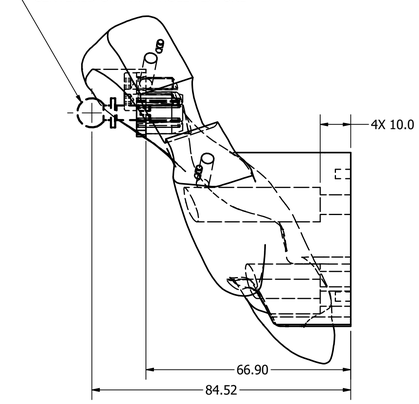
DETAIL A
SCALE 2 : 1
(H-POINT TOOL SOCKET NOT SHOWN)

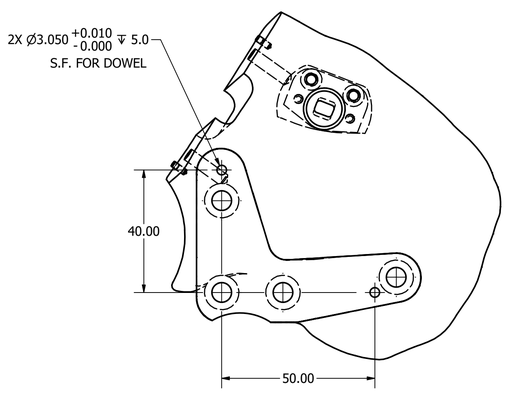












NOTES:

1. SEE SHEET #2 FOR COMPOUND ANGLE SETUP.
2. ASSEMBLE ITEMS #1 THRU 4 AFTER ANODIZE.
3. ASSEMBLE ROLL PIN 5000196 INTO 474-4548 THEN ENGAGE PINS INTO HOLES ON ILLIAC WING. AFTER PINS ARE ENGAGED INTO HOLES, PRESS FIT 474-4548 FLUSH TO SURFACE.

SEE NOTE #2

ITEM	QTY	PART NUMBER	DESCRIPTION
4	2	5000152	M4 X 0.7 X 12 LG. SHCS
3	2	5001380	M2 X 5 LG. DOWEL PIN
2	2	5000196	M3 X 14 LG. ROLL PIN SS
1	1	474-4548	H-POINT TOOL SOCKET

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMALS X ±1 / X.X ±.1 / X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

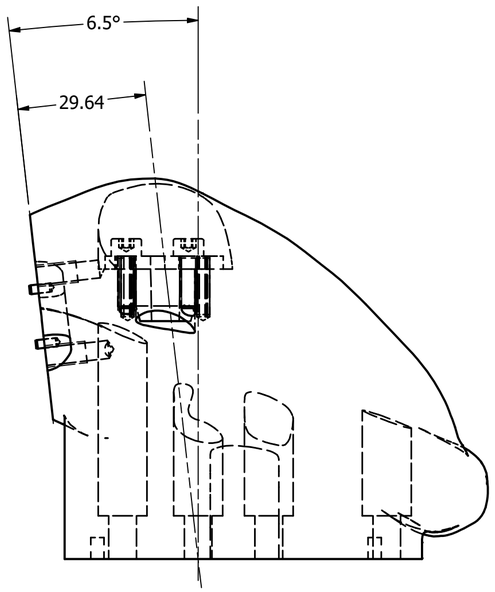
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DRAWN disopi	11/6/2017
CHECKED	
ENG	
APPROVED	

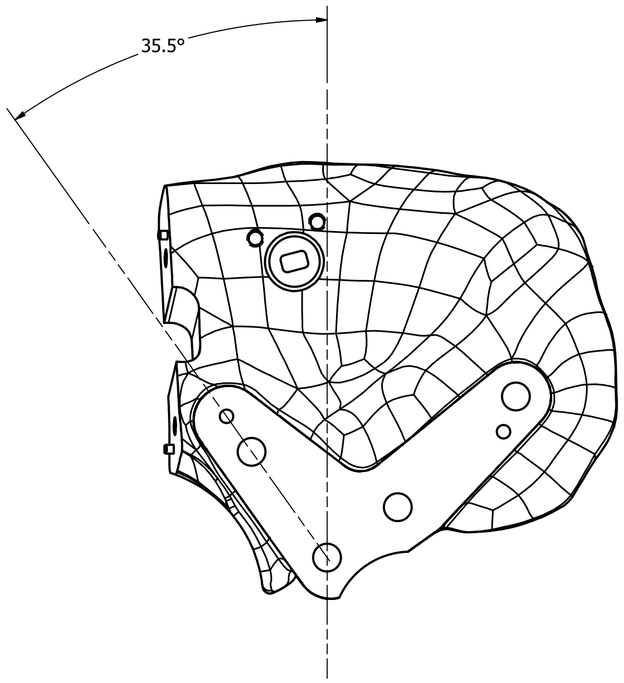
ILIAC WING, MACHINED, RIGHT

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

THIRD ANGLE PROJECTION

SIZE: A1 | DRAWING NUMBER: 474-4540-2 | REV: 1
SCALE: 1:1 | SHEET: 1 OF 2





FOR COMPOUND SETUP

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ∠ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: disopi	11/6/2017
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

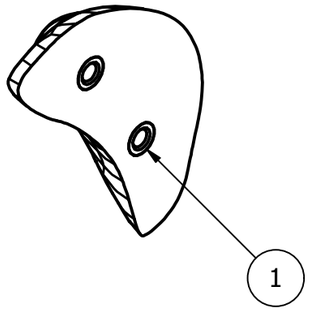
ILIAC WING, MACHINED, RIGHT

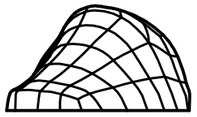
THIRD ANGLE PROJECTION

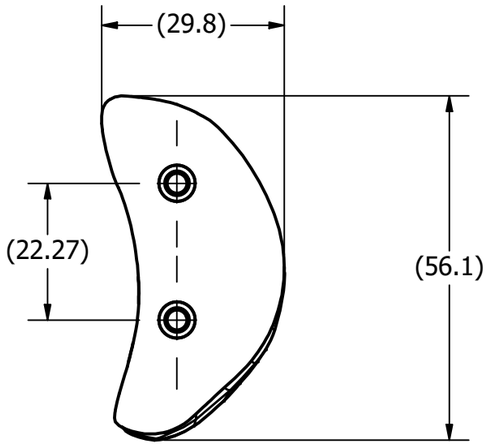
SIZE: A2 | DRAWING NUMBER: 474-4540-2 | REV: 1

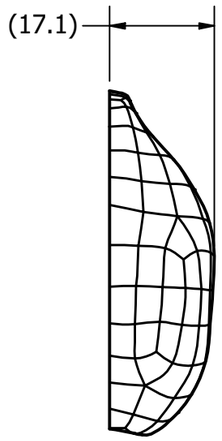
SCALE: 1:1 | SHEET: 2 OF 2

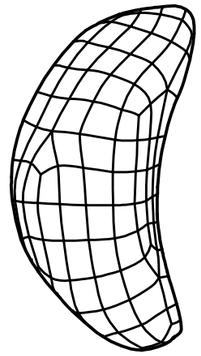
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	11/6/17











ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	5001283	INSERT, M4 X 0.7, BRASS

PARTS LIST

NOTES:

1. MATERIAL: POLYURETHANE
   COLOR: EURO BROWN
   DUROMETER: 70±5 SHORE "D"
2. REMOVE ALL MOLD FLASHING
3. ALL MOLD DIMENSION TOLERANCE +1%/-2% BUT NO SMALLER THAN 0.5mm
4. NO SPLIT OR DEFECTS ARE ALLOWED IN THE URETHANE MOLDING

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ✓ ±.5°
ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN ghayden	11/6/2017
CHECKED	
ENG	
APPROVED	

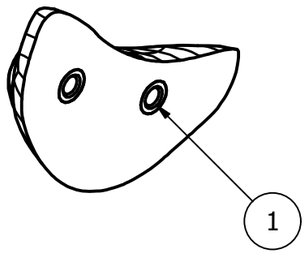
ISCHIUM BONE, MOLDED, LEFT

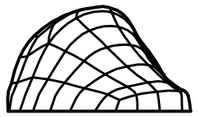
MATERIAL: SEE NOTE #1
HEAT TREAT:
FINISH:

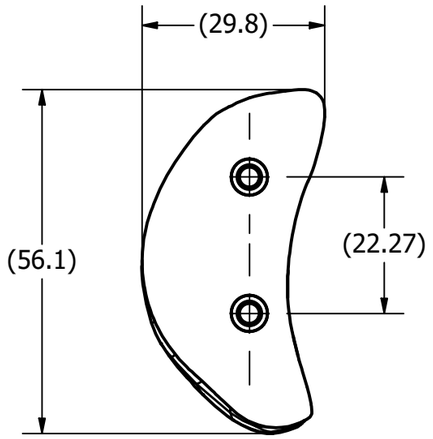
THIRD ANGLE PROJECTION

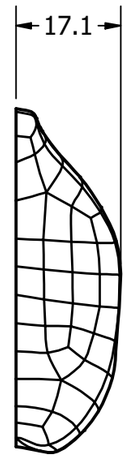
SIZE: A3 | DRAWING NUMBER: 474-4545-1 | REV: 1
SCALE: 1:1 | SHEET: 1 OF 1

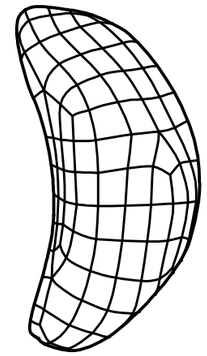
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	11/6/2017











ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	5001283	INSERT, M4 X 0.7, BRASS

PARTS LIST

NOTES:

1. MATERIAL: POLYURETHANE
   COLOR: EURO BROWN
   DUROMETER: 70±5 SHORE "D"

2. REMOVE ALL MOLD FLASHING

3. ALL MOLD DIMENSION TOLERANCE +1%/-2% BUT NO SMALLER THAN 0.5mm

4. NO SPLIT OR DEFECTS ARE ALLOWED IN THE URETHANE MOLDING

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN ghayden	11/6/2017
CHECKED	
ENG	
APPROVED	

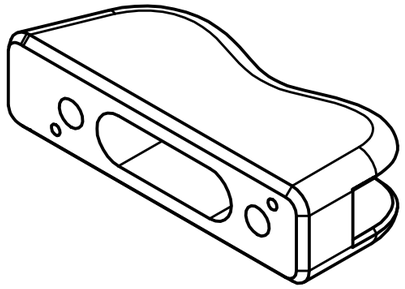
MATERIAL: SEE NOTE #1
HEAT TREAT:
FINISH:

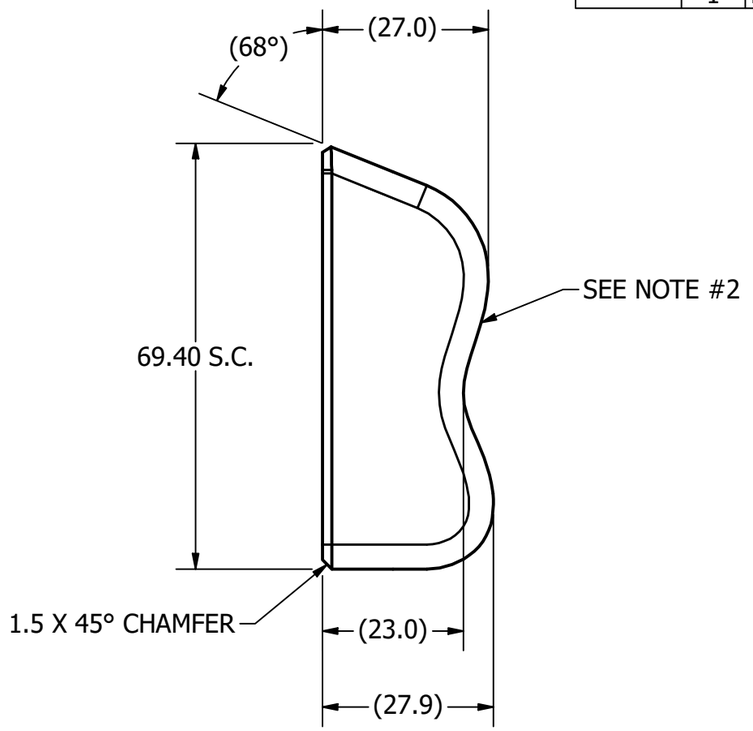
ISCHIUM BONE, MOLDED, RIGHT

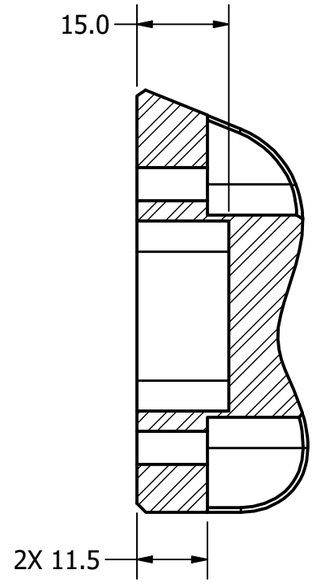
THIRD ANGLE PROJECTION

SIZE: A3 | DRAWING NUMBER: 474-4545-2 | REV: 1
SCALE: 1:1 | SHEET: 1 OF 1

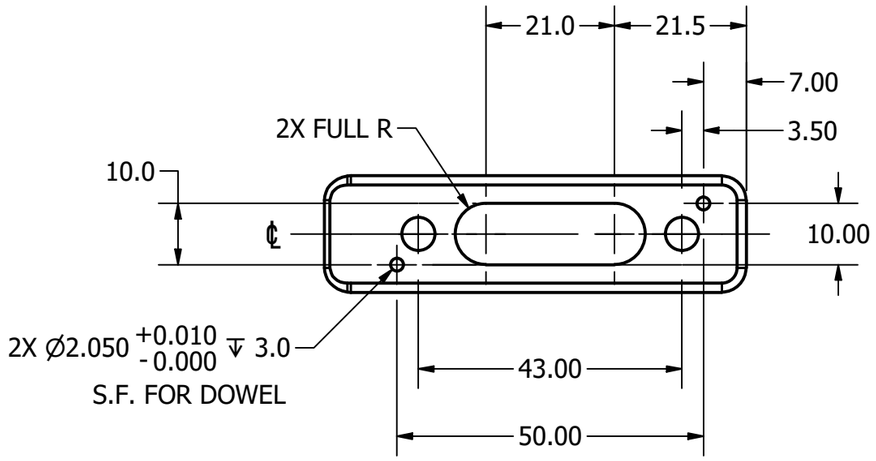
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	11/10/17

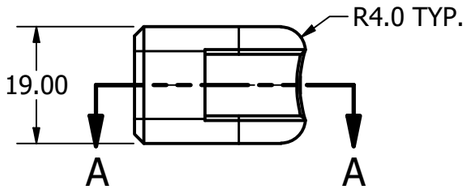


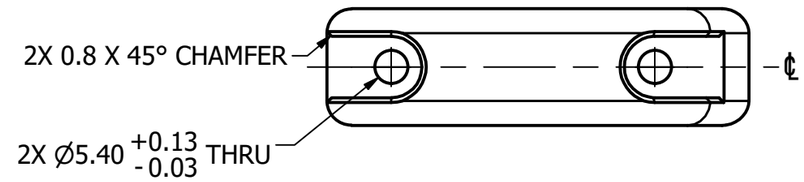




SECTION A-A







10.00 +0.13 -0.03 AS SHOWN

⌅ AS SHOWN IN A-A

NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE SPECIFIED.

2. REFERENCE 3D CAD MODEL FOR PART SHAPE.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ±.5, ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 1018 STEEL
HEAT TREAT:
FINISH: 0.008mm ELECTROLESS NICKEL PLATE PER SIDE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: ghayden	11/6/2017
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

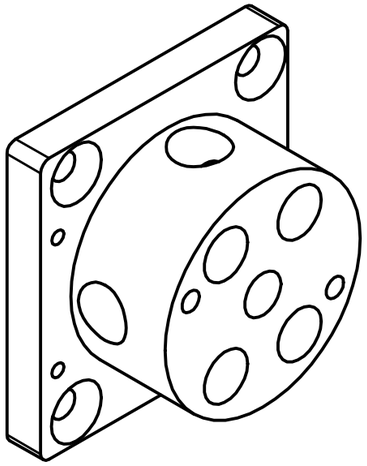
STRUCTURAL REPLACEMENT, ASIS LOAD CELL

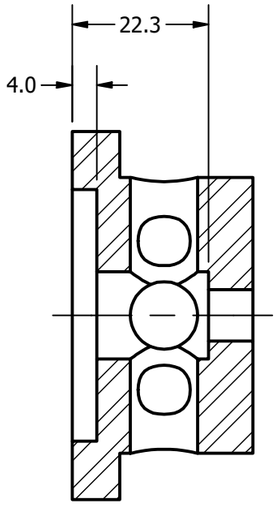
THIRD ANGLE PROJECTION

SIZE: A3 | DRAWING NUMBER: 474-4547 | REV: 1

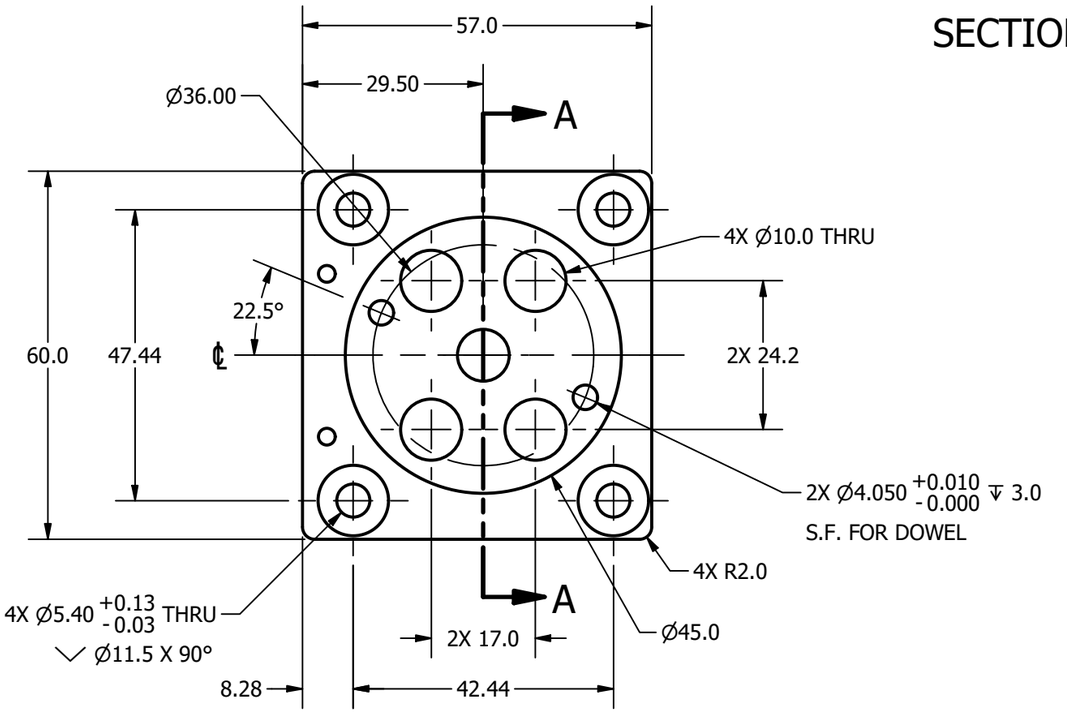
SCALE: 1:1 | SHEET: 1 OF 1

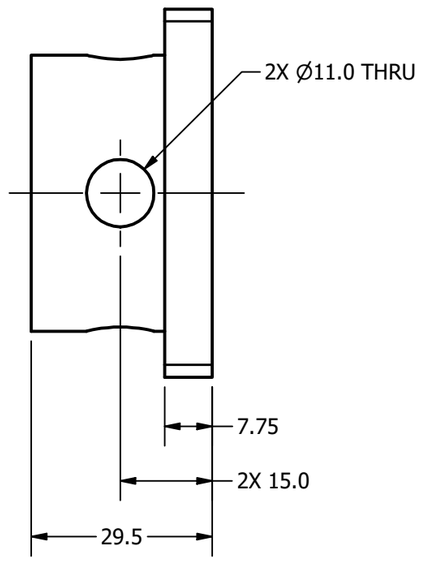
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	11/10/17

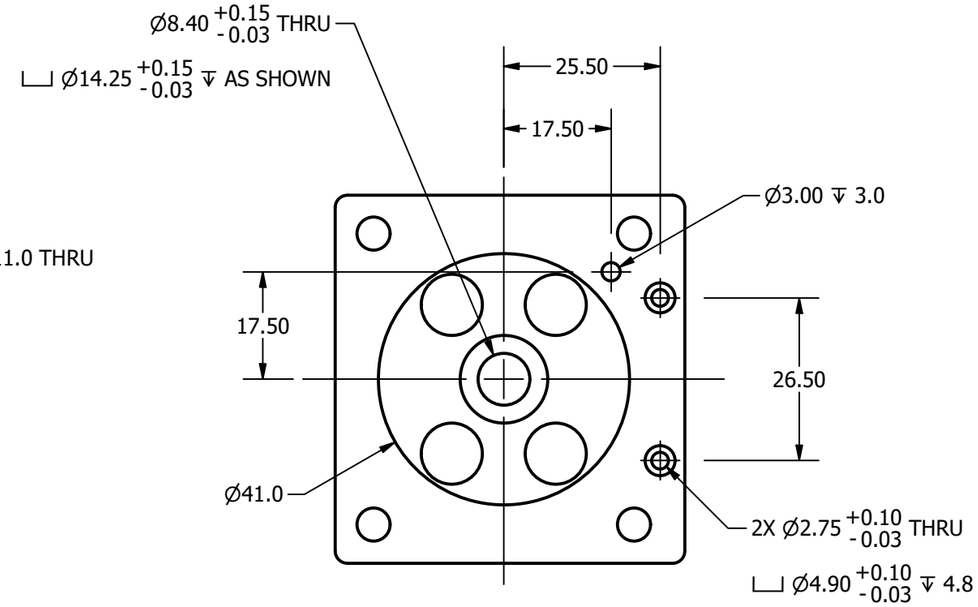




SECTION A-A







NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ∠ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 1018 STEEL
HEAT TREAT:
FINISH: 0.008mm ELECTROLESS NICKEL PLATE PER SIDE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: B. KIMES	11/6/2017
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

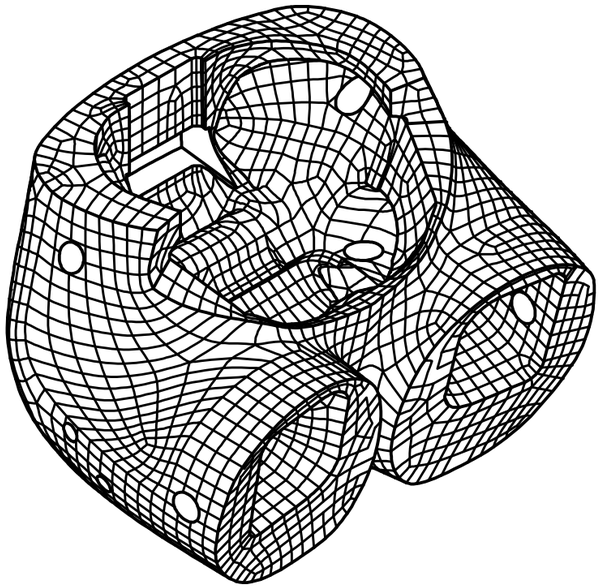
STRUCTURAL REPLACEMENT, RIGHT ACETABULAR LOAD CELL

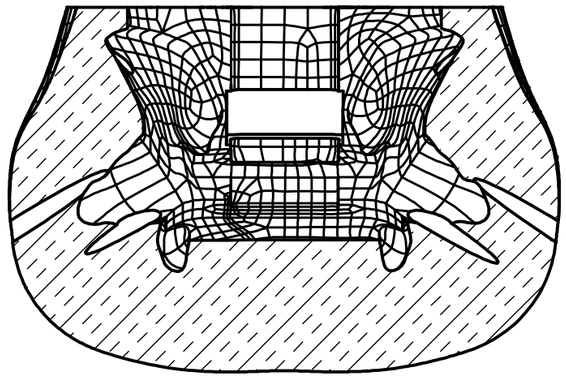
THIRD ANGLE PROJECTION

SIZE	DRAWING NUMBER	REV
A3	474-4002-2	1

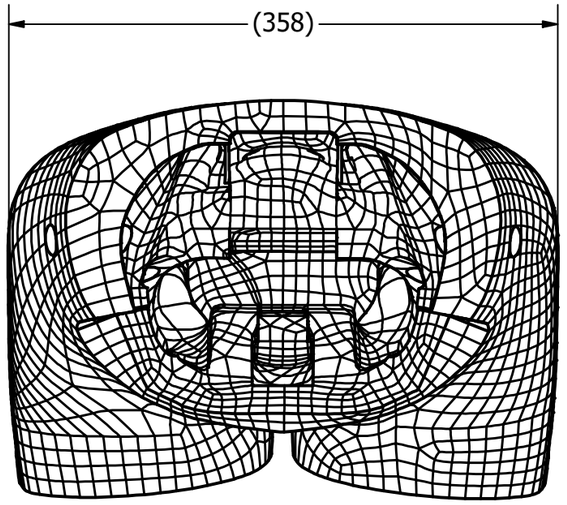
SCALE: 1:1 SHEET 1 OF 1

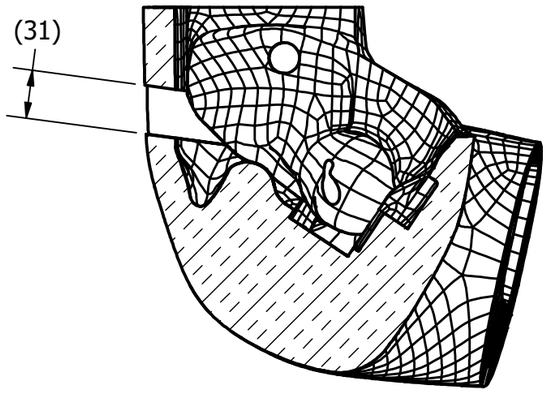
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	11/6/17



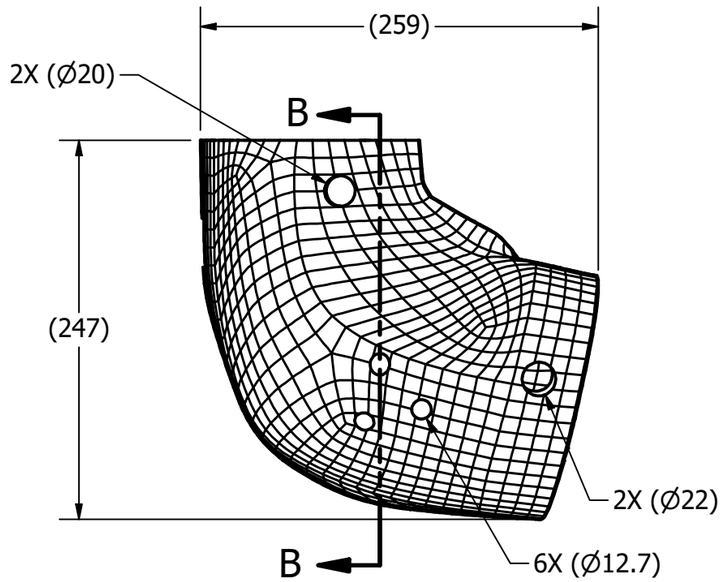


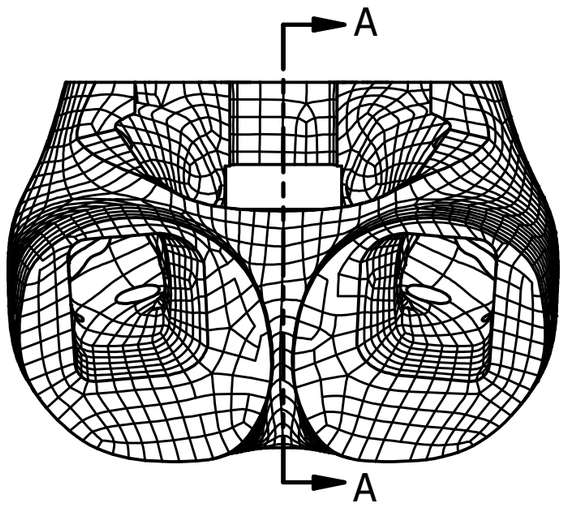
SECTION B-B





SECTION A-A





NOTES:

1. MATERIAL: SKIN: POLYURETHANE
   FOAM: POLYURETHANE

   COLOR: EURO BROWN
   DUROMETER: 30±5 SHORE A

2. REMOVE ALL MOLD FLASHING

3. ALL MOLD DIMENSION TOLERANCE +1%/-2% BUT NO SMALLER THAN 0.5mm

4. MOLDED PART WEIGHT: 4060 GRAMS - NOMINAL

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ±.5° | ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTE 1
HEAT TREAT:
FINISH:

*V*EHICLE *R*ESEARCH and *T*EST *C*ENTER

APPROVALS	DATE
DRAWN: B. KIMES	11/6/2017
CHECKED:	
ENG:	
APPROVED:	

THIRD ANGLE PROJECTION

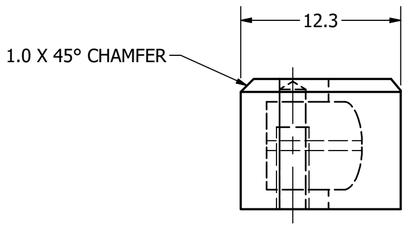
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

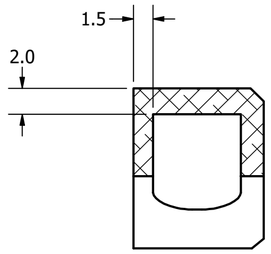
PELVIS FLESH

SIZE: A3 | DRAWING NUMBER: 474-4520 | REV: 1

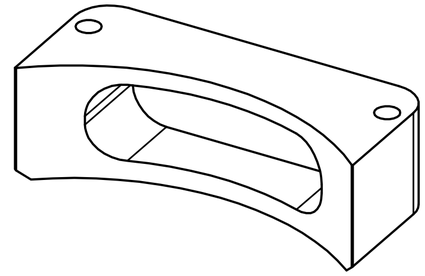
SCALE: .25:1 | SHEET: 1 OF 1

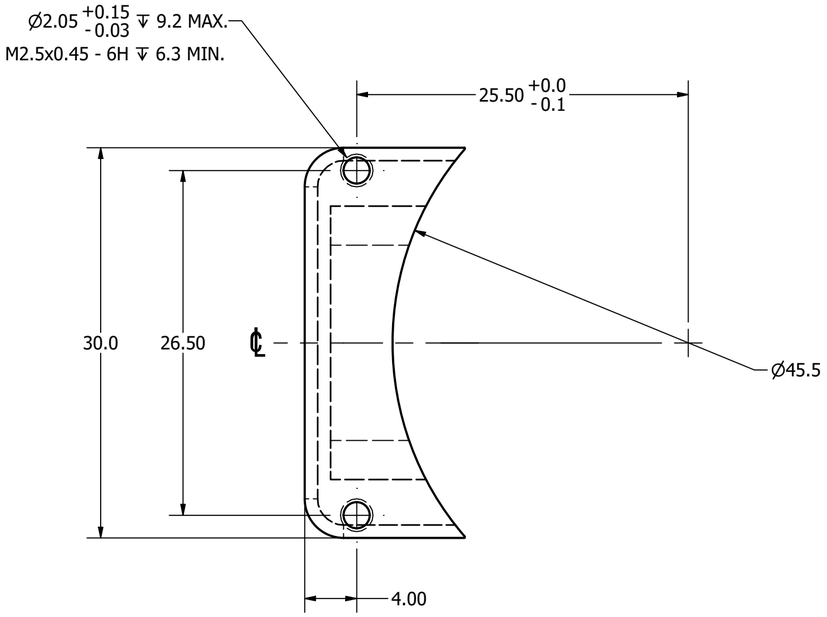
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	11/13/17

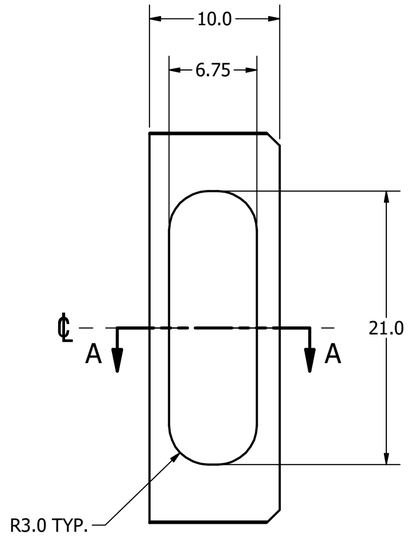




SECTION A-A







NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: ghayden	11/6/2017
CHECKED:	
ENG:	
APPROVED:	

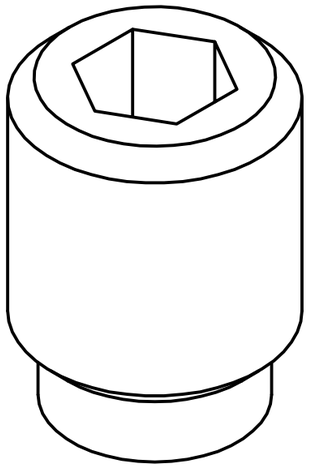
THIRD ANGLE PROJECTION

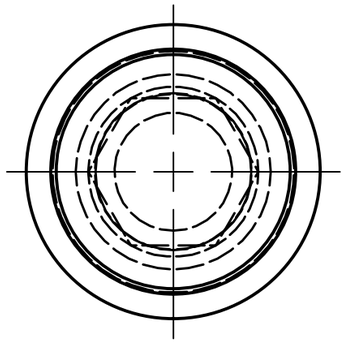
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

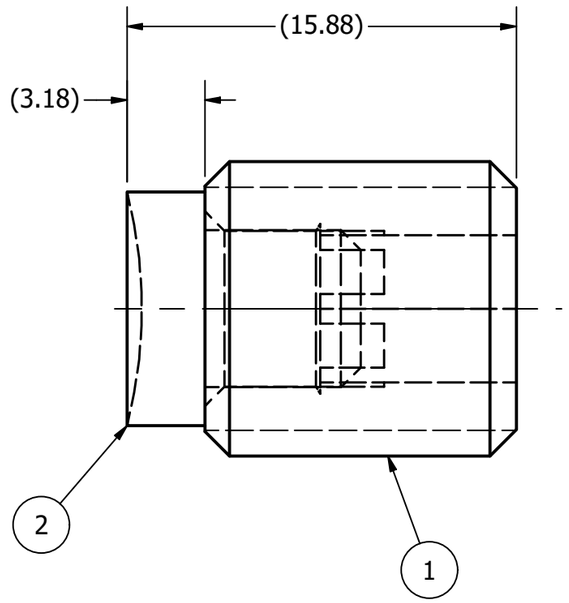
STRUCTURAL REPLACEMENT, ACETABULUM LOAD CELL STRAIN RELIEF

SIZE: A2 | DRAWING NUMBER: 474-4007 | REV: 1
SCALE: 3:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JPM		12/14/17







ITEM	QTY	PART NUMBER	DESCRIPTION
2	1	474-4316	FRICTION INSERT
1	1	474-4317	PELVIC PLUNGER SET SCREW, MODIFIED

PARTS LIST

NOTES:

1. BOND ITEM 2 TO ITEM 1.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED √F
ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN J. MCINNIS	12/14/2017
CHECKED	
ENG	
APPROVED	

MATERIAL
HEAT TREAT
FINISH

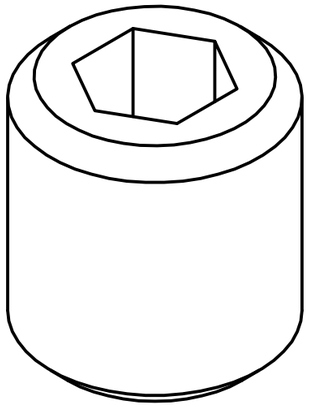
PELVIC PLUNGER ASSEMBLY

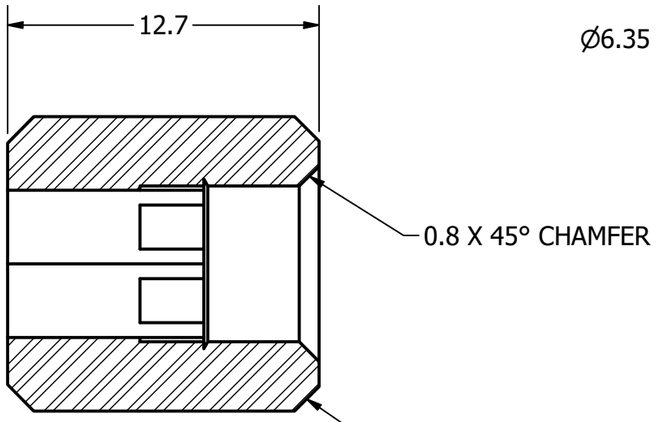
THIRD ANGLE PROJECTION

SIZE A3 | DRAWING NUMBER 474-4315 | REV 1

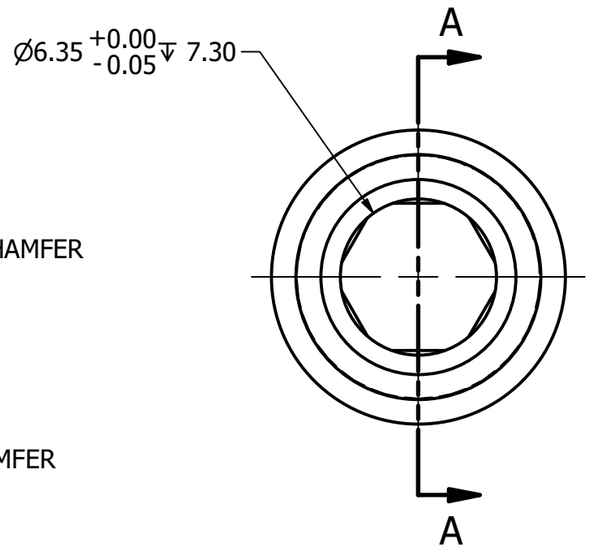
SCALE: 4:1 | SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JPM		12/14/17





SECTION A-A



NOTES:

1. MODIFY PART #5001058 AS SHOWN.
   (M12 X 1.75 X 16LG SSSCP SS)

2. ANNEAL AND BLACK ZINC AFTER MODIFICATIONS.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ±.5°
ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN J. MCINNIS	12/14/2017
CHECKED	
ENG	
APPROVED	

MATERIAL: SEE NOTES
HEAT TREAT: SEE NOTES
FINISH: SEE NOTES

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

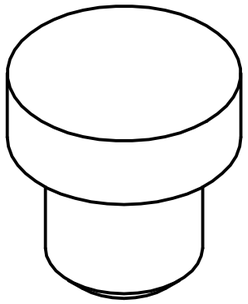
PELVIC PLUNGER SET SCREW, MODIFIED

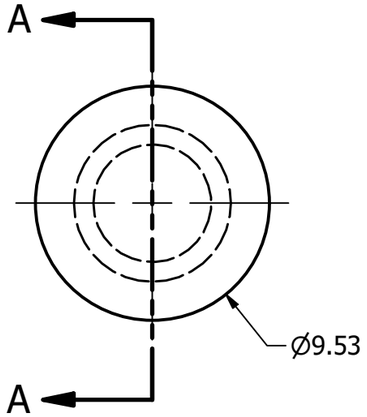
THIRD ANGLE PROJECTION

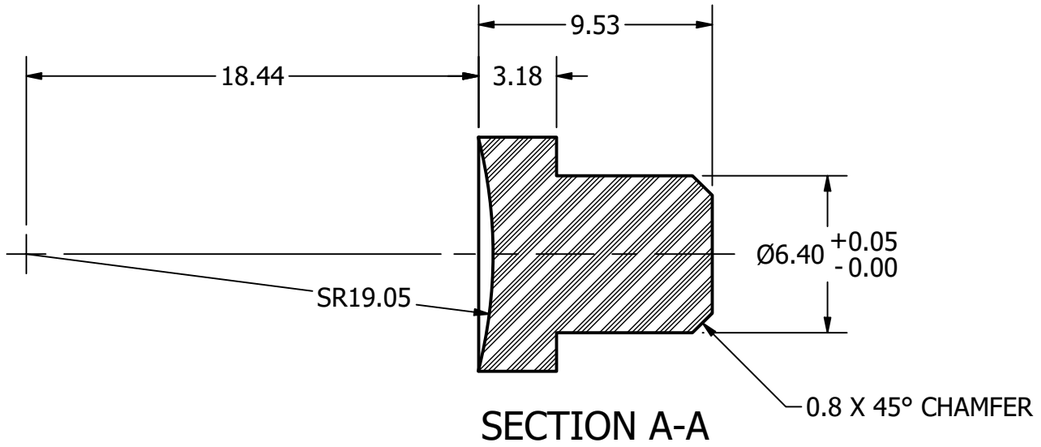
SIZE	DRAWING NUMBER	REV
A3	474-4317	1

SCALE: 4:1 SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JPM		12/14/17







SECTION A-A

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: ACETAL RESIN, WHITE
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: J. MCINNIS	12/14/2017
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

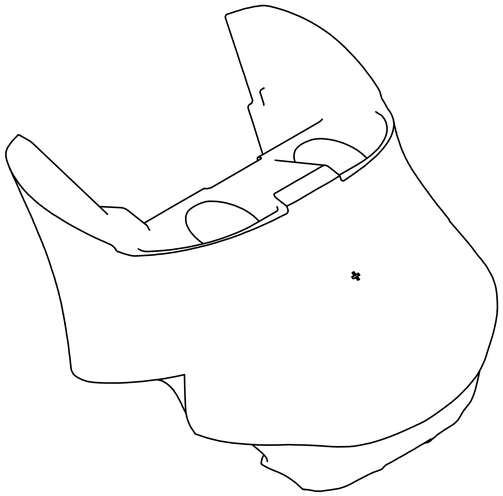
FRICTION INSERT

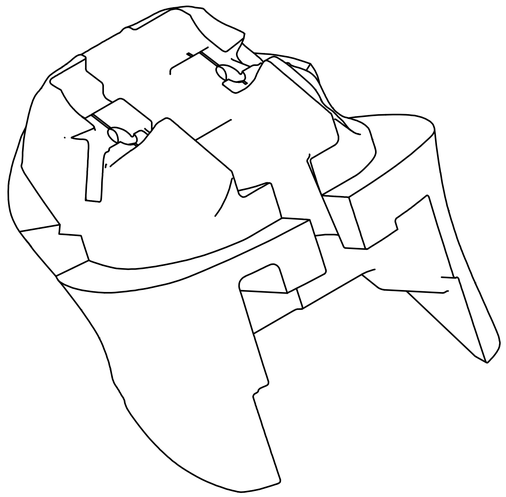
THIRD ANGLE PROJECTION

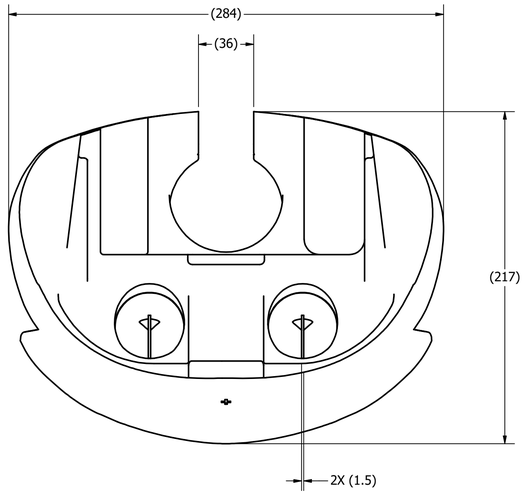
SIZE: A3 | DRAWING NUMBER: 474-4316 | REV: 1

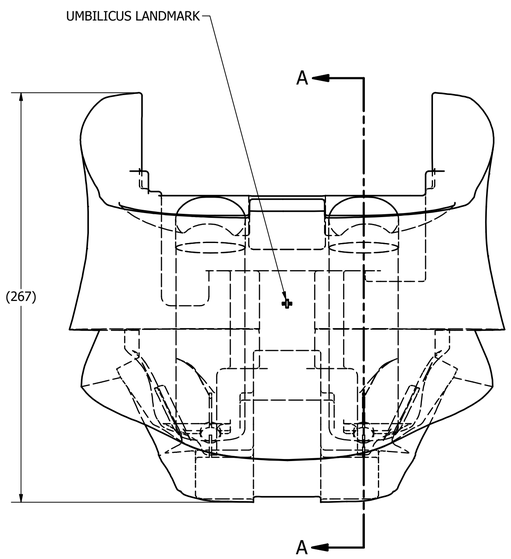
SCALE: 4:1 | SHEET: 1 OF 1

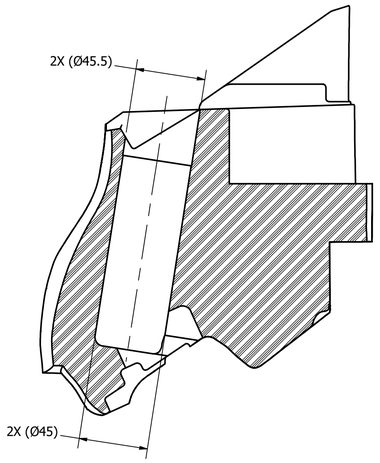
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JPM		12/14/17











SECTION A-A

NOTES:

1. MATERIAL: POLYURETHANE

   COLOR: BROWN

2. REMOVE ALL MOLD FLASHING.

3. ALL MOLD DIMENSION TOLERANCE +1%/-2%
   BUT NO SMALLER THAN 0.5mm.

4. MASS: 665± 20g

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±1, X.X ±.1, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTE #1
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: J. MCINNIS	12/14/2017
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

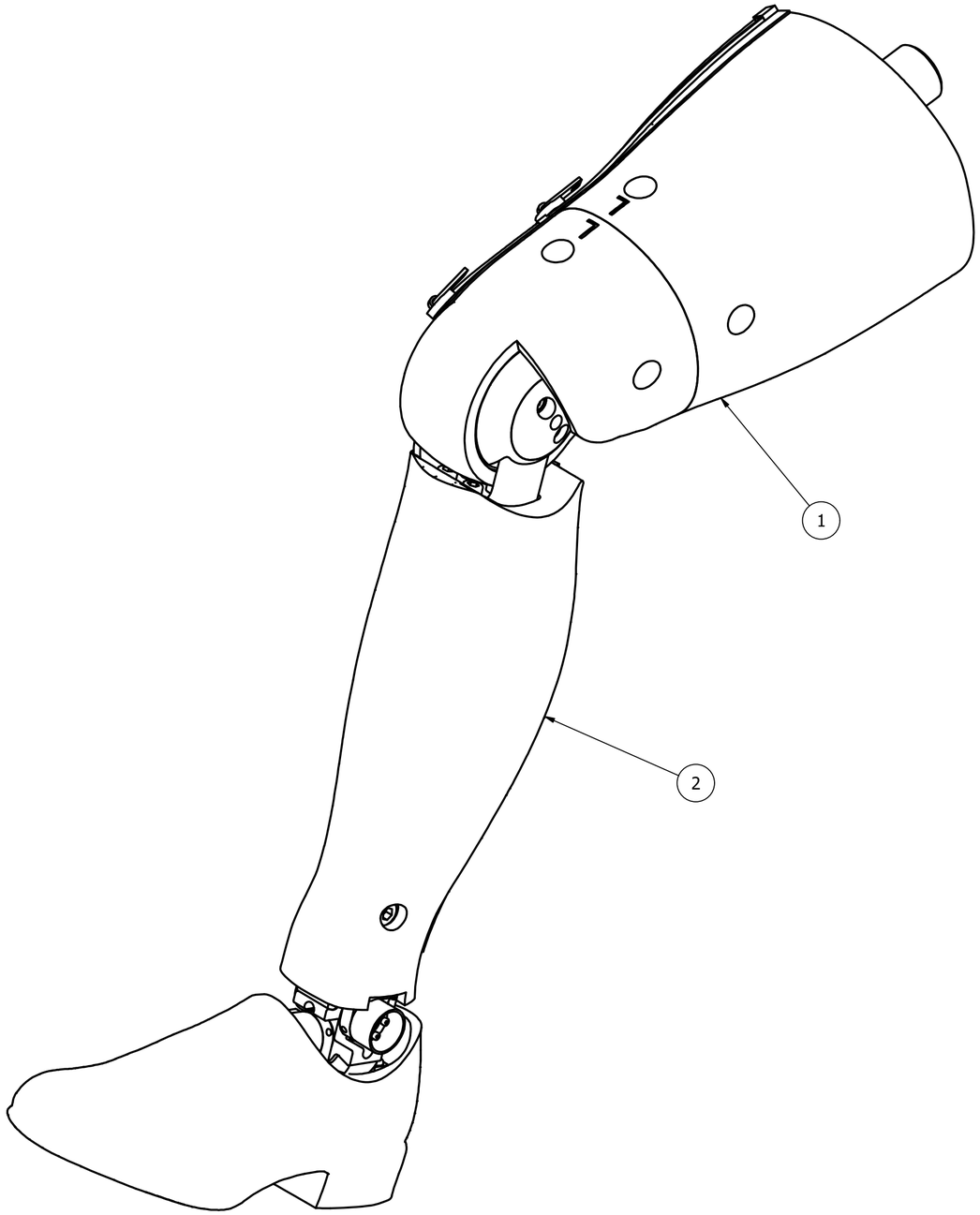
ABDOMEN

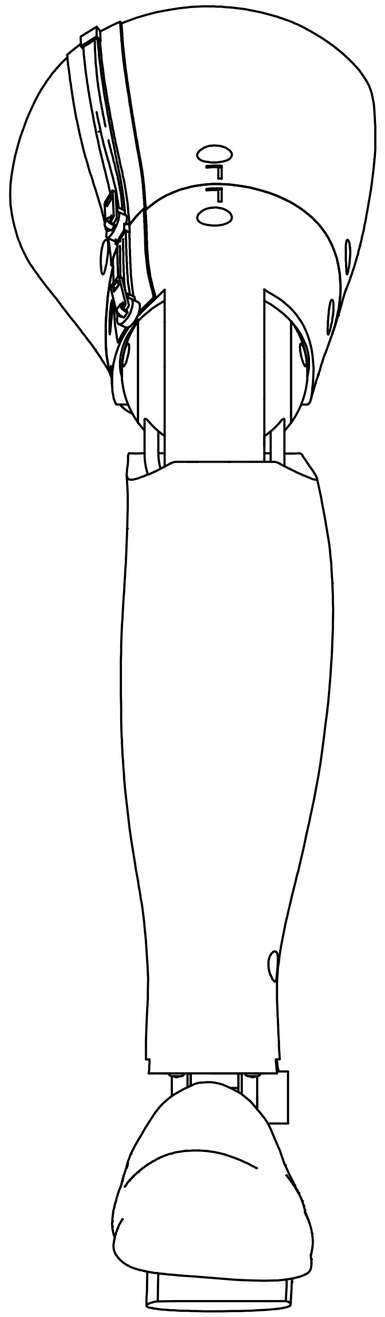
THIRD ANGLE PROJECTION

SIZE: A1 | DRAWING NUMBER: 474-4305 | REV: 1

SCALE: .5:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/14/2016





ITEM	QTY	PART NUMBER	DESCRIPTION
2	1	474-5500-1	LOWER LEG ASSEMBLY, LEFT
1	1	474-5100-1	UPPER LEG ASSEMBLY, LEFT

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL
HEAT TREAT
FINISH

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN B. KIMES	4/14/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

LEG ASSEMBLY, LEFT

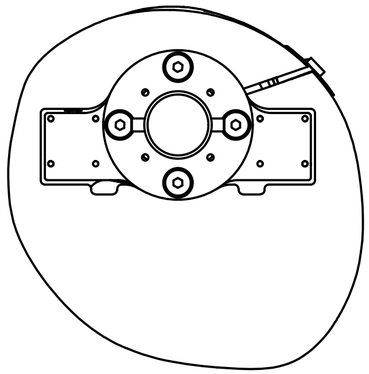
THIRD ANGLE PROJECTION

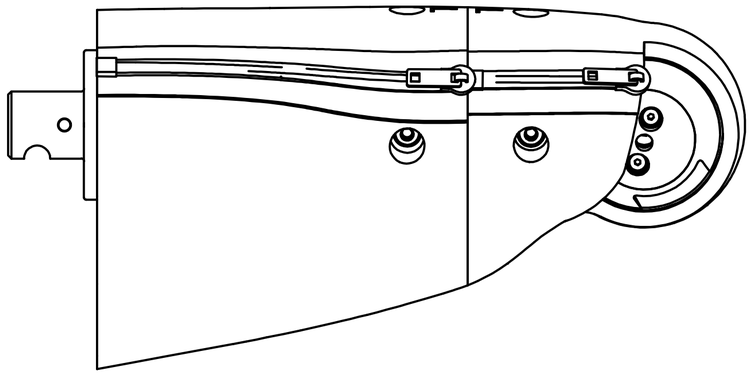
SIZE A2 | DRAWING NUMBER 474-5000-1 | REV 1

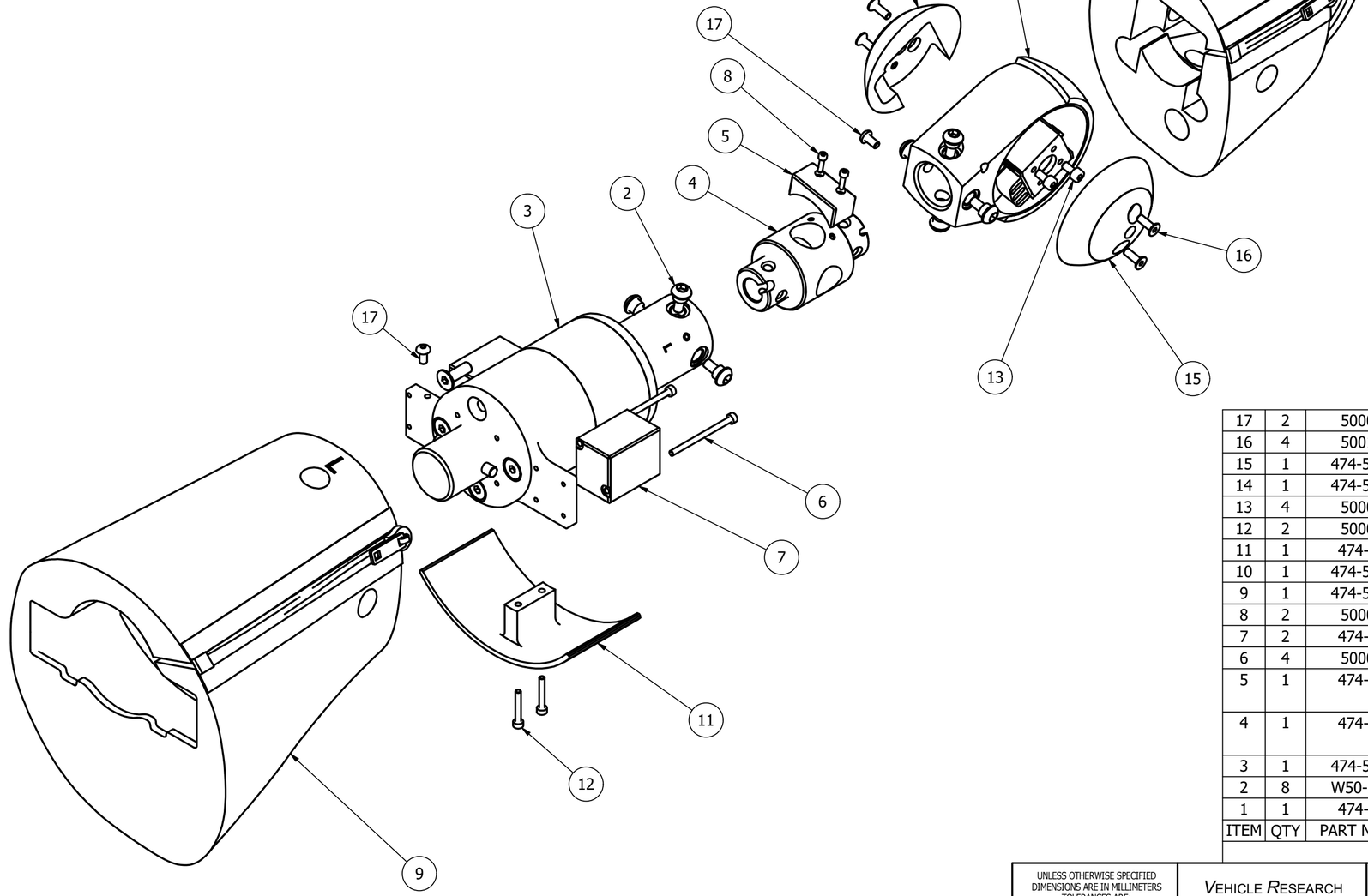
SCALE: .5:1 | SHEET 1 OF 1

PRELIMINARY DRAWING

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	4/12/2016







ITEM	QTY	PART NUMBER	DESCRIPTION
17	2	5000103	M4 X 0.7 X 8 LG. BHCS
16	4	5001086	M4 X 0.7 X 12 LG. FHCS
15	1	474-5301-2	KNEE COVER, RIGHT
14	1	474-5301-1	KNEE COVER, LEFT
13	4	5000989	M4 X 0.7 X 8 LG. SHCS
12	2	5000312	M3 X 0.5 X 20 LG. SHCS
11	1	474-5107	CABLE CONNECTOR GUARD
10	1	474-5320-1	KNEE FLESH, LEFT
9	1	474-5120-1	UPPER LEG FLESH, LEFT
8	2	5000456	M2.5 X 0.45 X 10 LG. SHCS
7	2	474-8205	ON BOARD DAS STRUCTURAL REPLACEMENT
6	4	5000679	M3 X 0.5 X 45 LG. SHCS SS
5	1	474-5102	STRUCTURAL REPLACEMENT, FEMUR LOAD CELL STAIN RELIEF
4	1	474-5101	STRUCTURAL REPLACEMENT, FEMUR LOAD CELL
3	1	474-5160-1	FEMUR ASSEMBLY, LEFT
2	8	W50-61042	MODIFIED BHSS M6 THREAD
1	1	474-5300	KNEE ASSEMBLY

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ∠ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL
HEAT TREAT
FINISH

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN ghayden	4/12/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

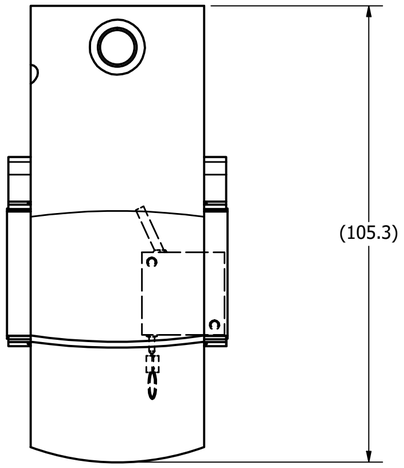
UPPER LEG ASSEMBLY, LEFT

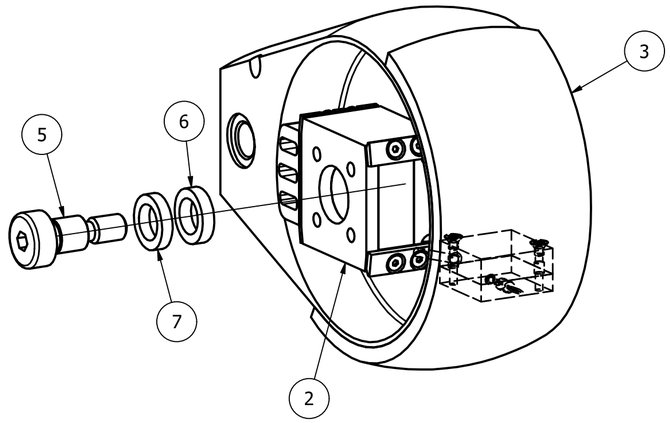
THIRD ANGLE PROJECTION

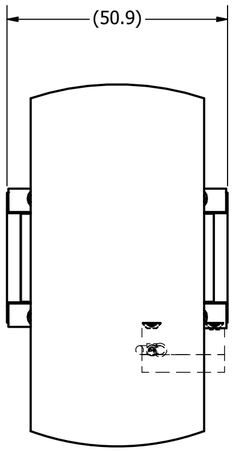
SIZE A2 | DRAWING NUMBER 474-5100-1 | REV 1

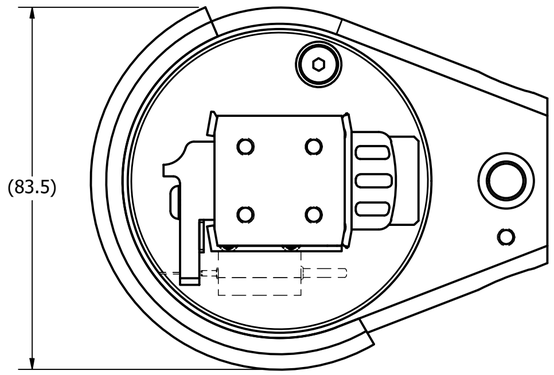
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REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	4/11/2016









ITEM	QTY	PART NUMBER	DESCRIPTION	
10	2	9002185	#2-56 X 1/8 LG. FHMSP SS	(REF)
9	1	SA572-S90	STRING POT, MINI (UNIVERSAL)	(REF)
8	1	5001385	M5 X 10 LG. SHSS	
7	1	474-5317	KNEE BACKUP WASHER	
6	1	474-5316	KNEE COMPRESSION WASHER	
5	1	5000332	M8 X 10 LG. SHSS	
4	1	474-5313	KNEE ROTATION STOP BOOT	
3	1	474-5340	KNEE INSERT	
2	1	474-5380	KNEE SLIDER ASSEMBLY	
1	1	474-5360	KNEE CAP	

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ∠ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL
HEAT TREAT
FINISH

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN ghayden	4/11/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

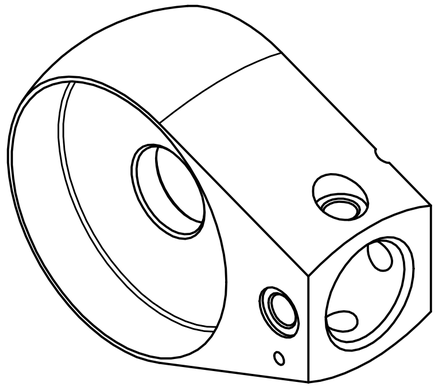
KNEE ASSEMBLY

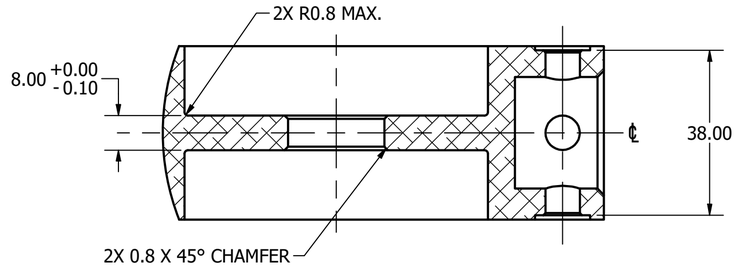
THIRD ANGLE PROJECTION

SIZE A2 | DRAWING NUMBER 474-5300 | REV 1

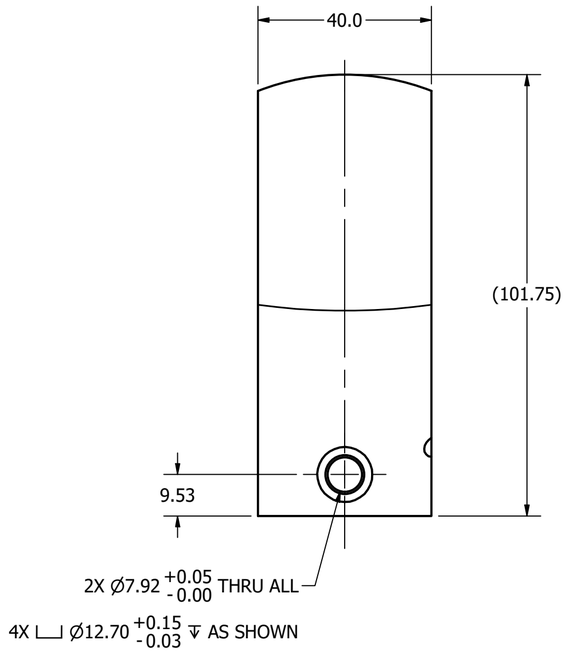
SCALE: 1:1 | SHEET 1 OF 1

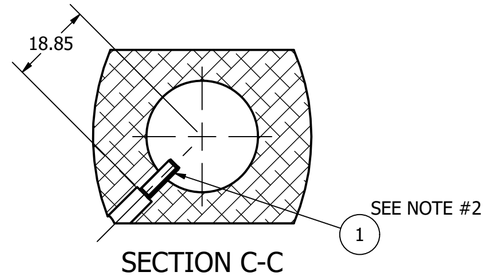
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/11/2016



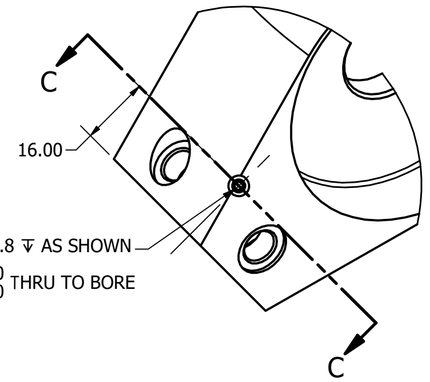


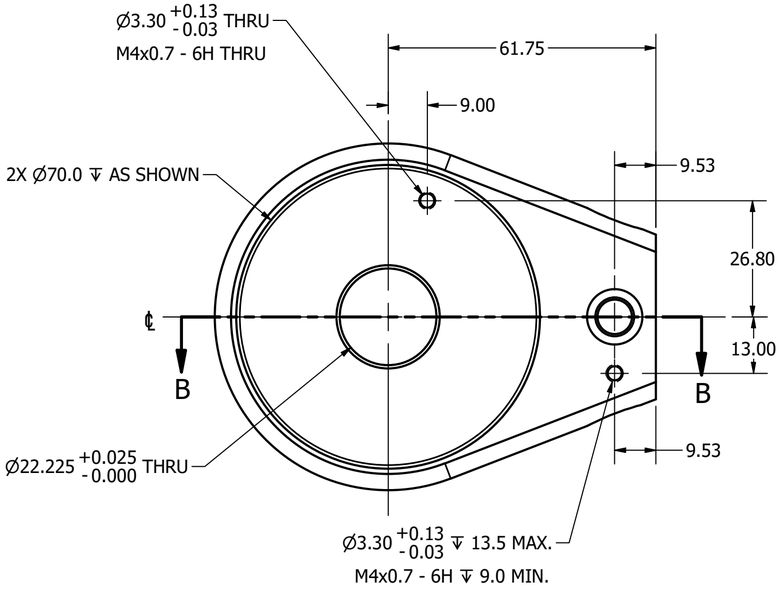
SECTION B-B

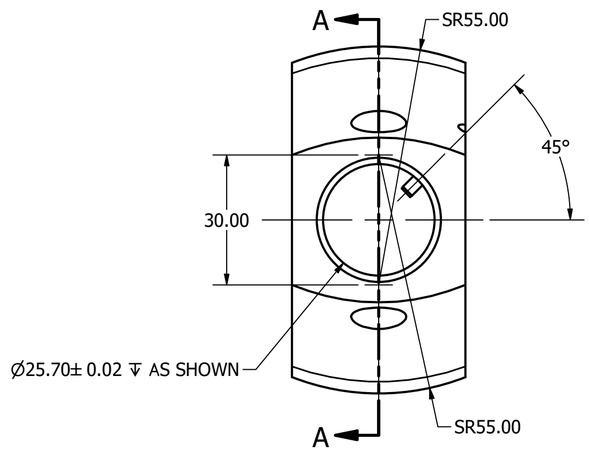


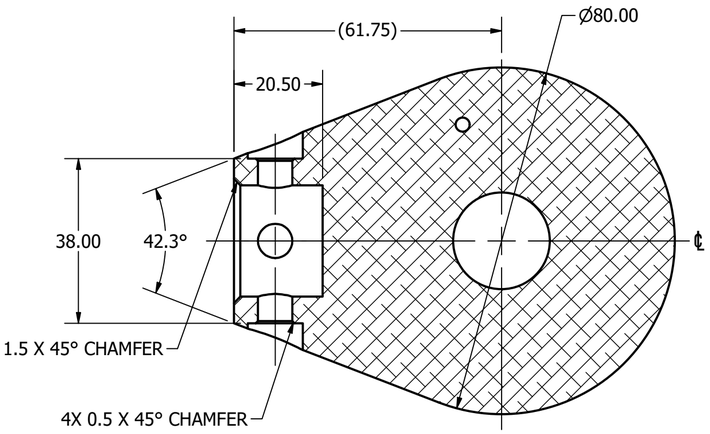


SECTION C-C









SECTION A-A

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	5000199	M3 X 10 LG. ROLL PIN SS

PARTS LIST

NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.
2. INSTALL ROLL PIN AS SHOWN AFTER HARDCOAT.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ∠ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: HARDCOAT ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: B. KIMES	4/11/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

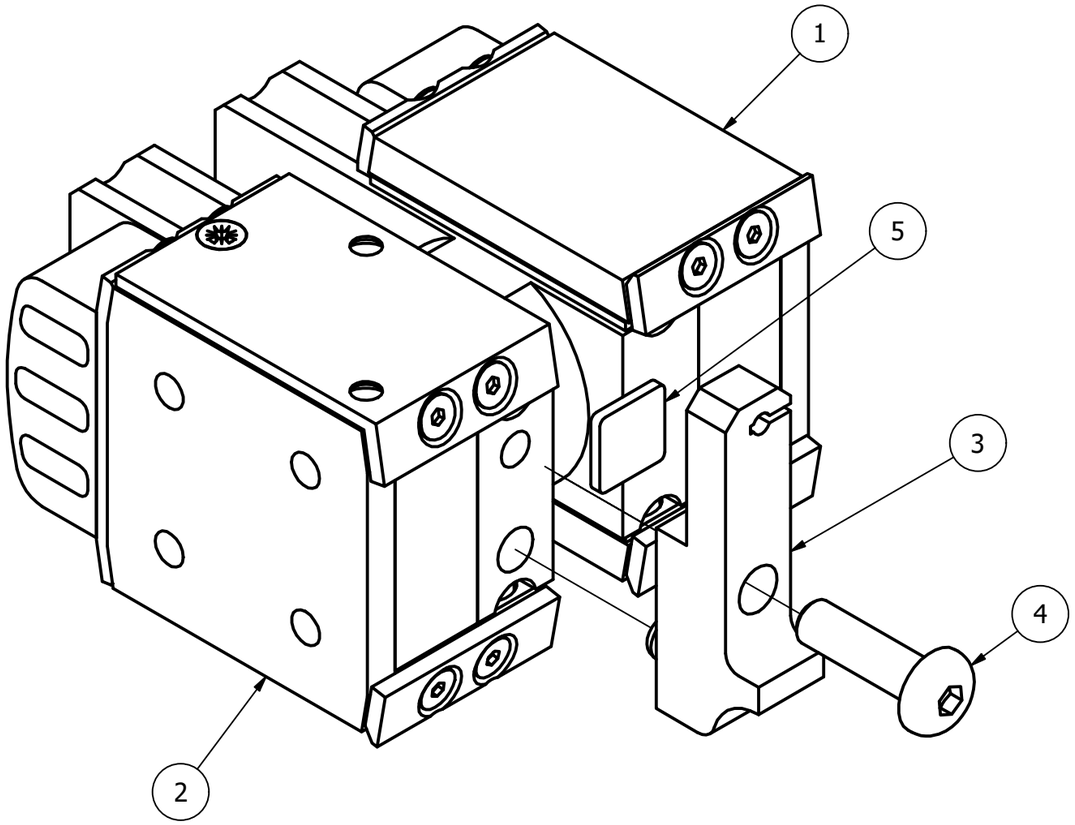
KNEE CAP

THIRD ANGLE PROJECTION

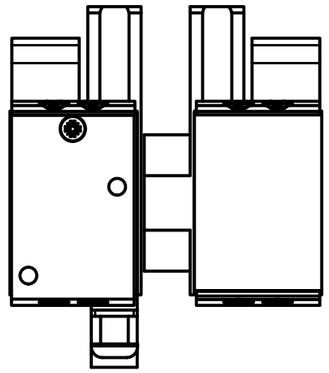
SIZE: A2 | DRAWING NUMBER: 474-5360 | REV: 1

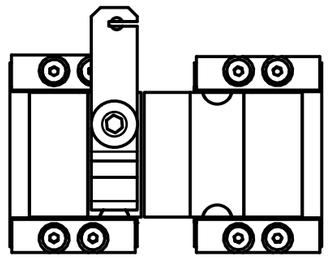
SCALE: 1:1 | SHEET: 1 OF 1

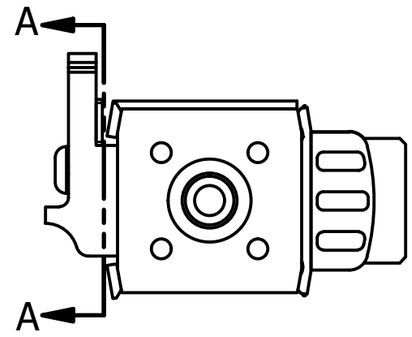
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/13/2016

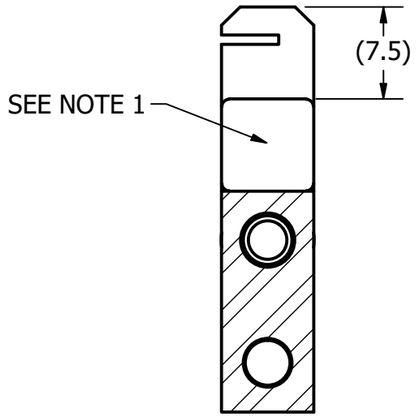


SCALE 2 : 1









SECTION A-A
SCALE 2 : 1

NOTES:

1. BOND BUMPER INTO PLACE AS SHOWN USING INSTANT ADHESIVE.

PRELIMINARY DRAWING

ITEM	QTY	PART NUMBER	DESCRIPTION
5	1	474-5393	KNEE SLIDER RECOIL BUMPER
4	1	5000975	M4 X 0.7 X 14 LG. BHCS
3	1	474-5311	KNEE ROTATION STOP
2	1	474-5381	LEFT KNEE SLIDER UPPER ASSEMBLY
1	1	474-5386	RIGHT KNEE SLIDER UPPER ASSEMBLY

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

KNEE SLIDER ASSEMBLY

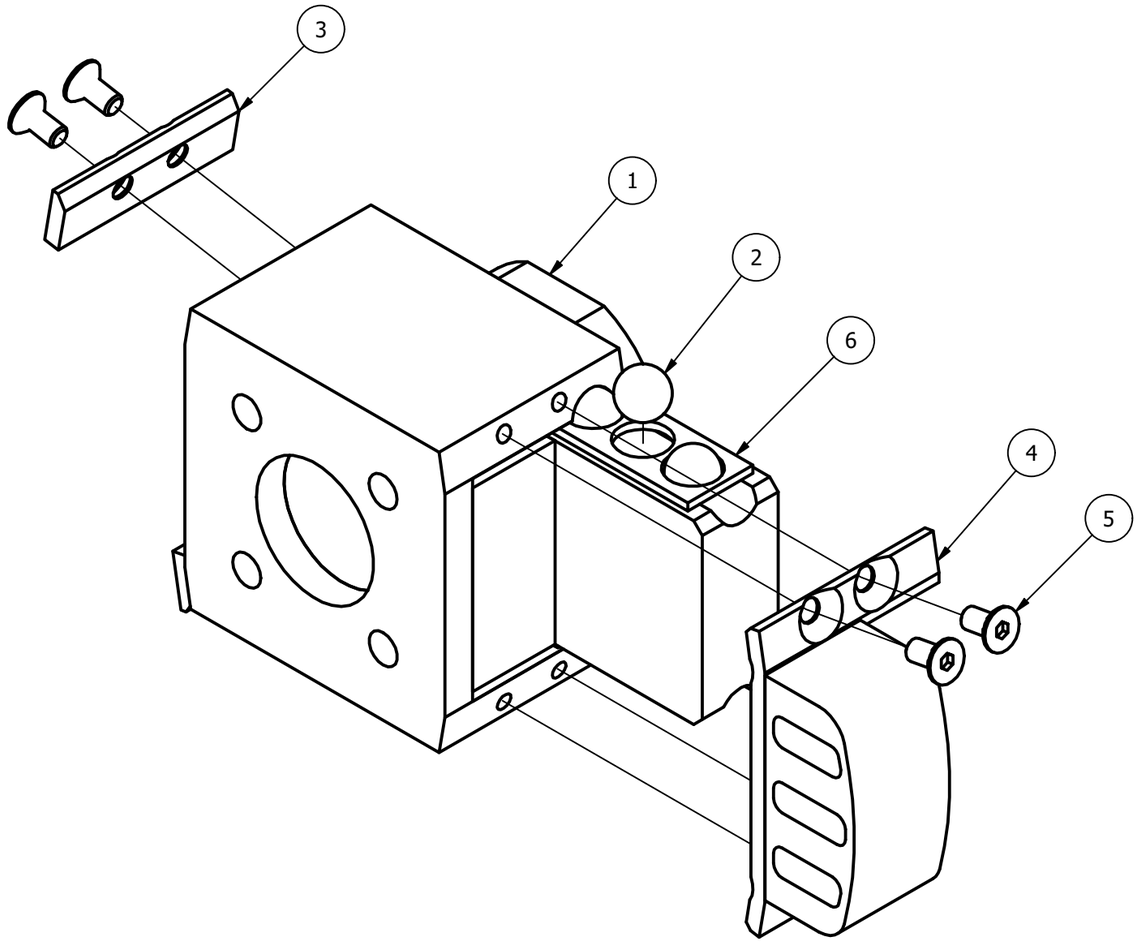
	APPROVALS	DATE
DRAWN	B. KIMES	4/13/2016
MATERIAL		
CHECKED		
HEAT TREAT		
ENG		
FINISH		
APPROVED		

THIRD ANGLE PROJECTION

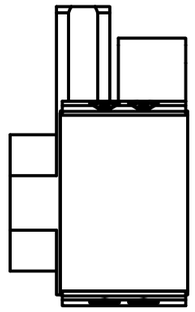
SIZE A3 | DRAWING NUMBER 474-5380 | REV 1

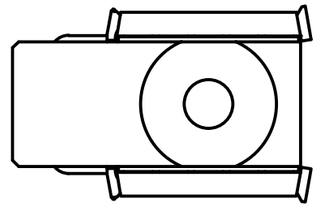
SCALE: 1:1 | SHEET 1 OF 1

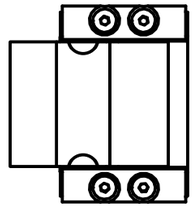
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/12/2016



SCALE 2 : 1







ITEM	QTY	PART NUMBER	DESCRIPTION
6	2	474-5394	BALL BEARING SEPERATOR
5	8	5000595	M2 X 0.4 X 4 LG. FHCS
4	1	474-5389	KNEE SLIDER BUMPER ASSEMBLY
3	2	474-5388	KNEE SLIDER BALL RETAINER
2	10	EX593-19-DN	BALL 3/16" DIA.
1	1	474-5385	RIGHT KNEE SLIDER ASSEMBLY, MOLDED

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ✓ ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

PRELIMINARY DRAWING

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN B. KIMES	4/12/2016
CHECKED	
ENG	
APPROVED	

MATERIAL
HEAT TREAT
FINISH

DEPARTMENT OF TRANSPORTATION UNITED STATES OF AMERICA

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

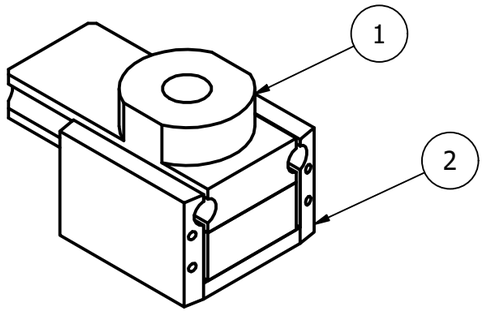
RIGHT KNEE SLIDER UPPER ASSEMBLY

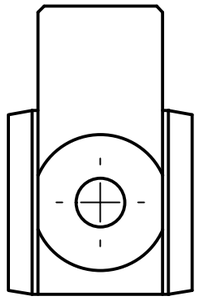
THIRD ANGLE PROJECTION

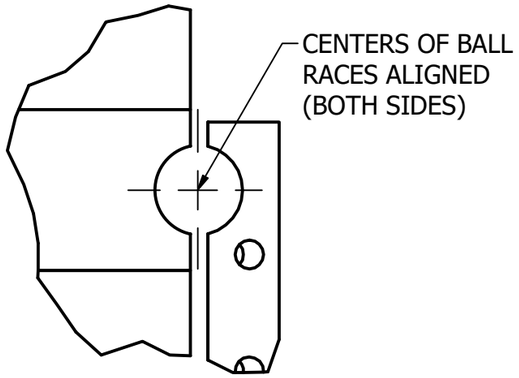
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SCALE: 1:1 | SHEET 1 OF 1

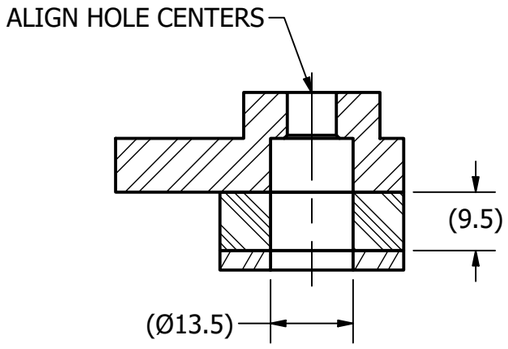
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/12/2016



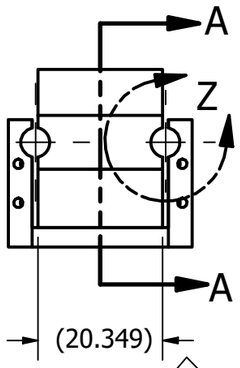


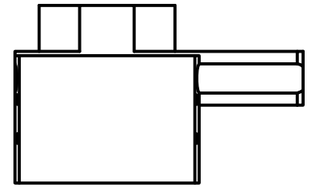


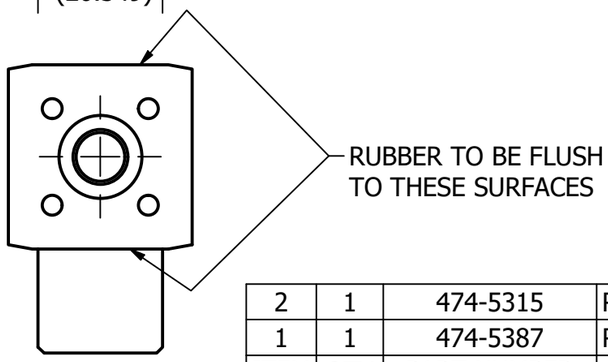
DETAIL Z
SCALE 3 : 1



SECTION A-A







ITEM	QTY	PART NUMBER	DESCRIPTION
2	1	474-5315	RIGHT KNEE SLIDER HOUSING
1	1	474-5387	RIGHT BALL BEARING TRACK

PARTS LIST

NOTES:

1. MATERIAL: NATURAL RUBBER
   COLOR: BLACK
   DUROMETER: 30-35 SHORE "A"
2. ADJUST DUROMETER FOR DYNAMIC PERFORMANCE.
3. REMOVE ALL MOLD FLASHING.
4. NO SPLIT OR DEFECTS ARE ALLOWED IN THE RUBBER MOLDING.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTES
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: B. KIMES	4/12/2016
CHECKED:	
ENG:	
APPROVED:	

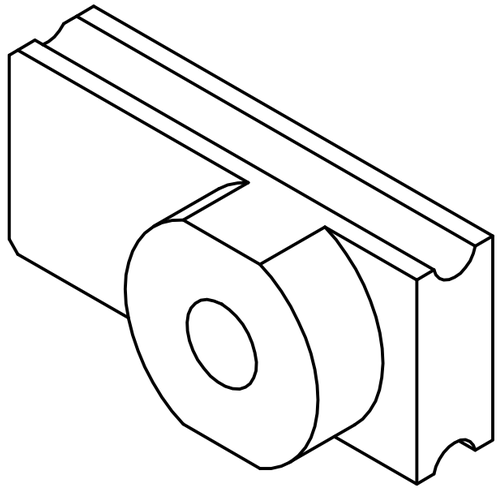
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

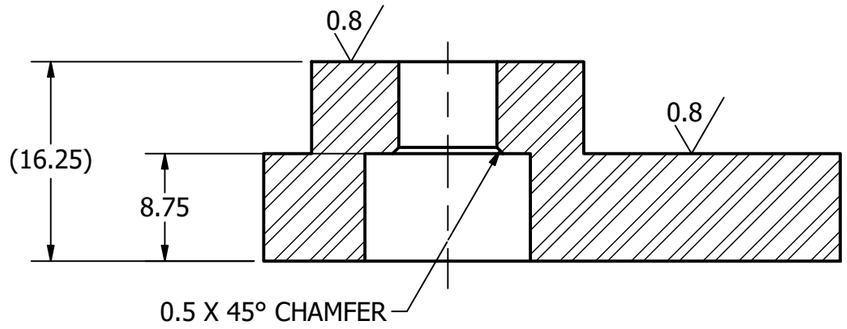
RIGHT KNEE SLIDER ASSEMBLY, MOLDED

THIRD ANGLE PROJECTION

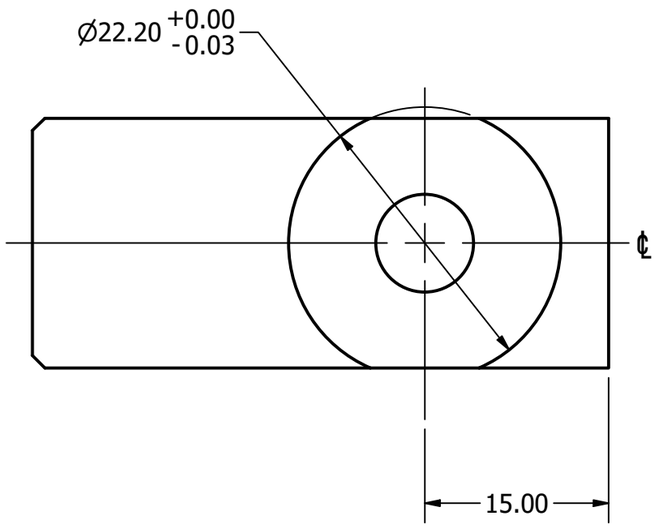
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SCALE: 1:1 | SHEET: 1 OF 1

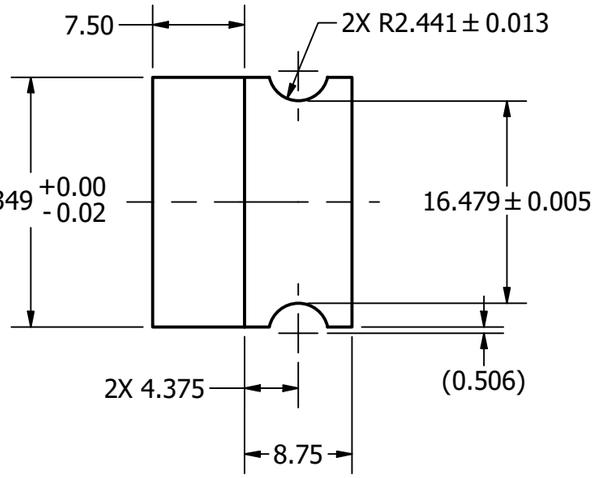
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/11/2016

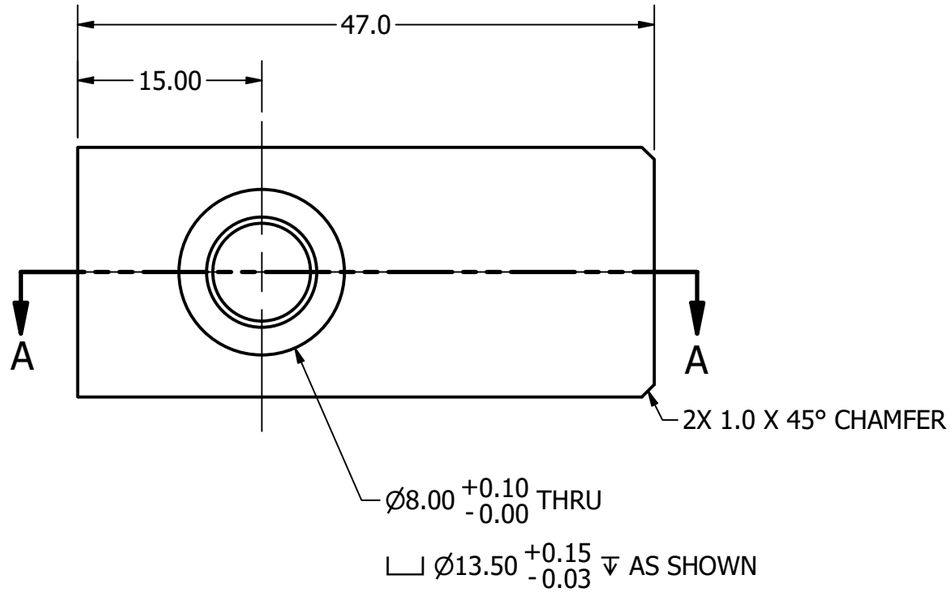




SECTION A-A







NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

2. HEAT TREAT:
   - MASK ENTIRE PART EXCEPT THE PATHWAYS
   - CARBURIZE PART @ 1700°F FOR 6 HOURS
   - FURNACE COOL, DO NOT QUENCH
   - REHARDEN @ 1520°F AND OIL QUENCH
   - TEMPER @ 350°F FOR 2 HOURS
   - SURFACE HARDNESS IN PATHWAYS SHOULD BE Rc 60-65

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: B. KIMES	4/11/2016
CHECKED	
ENG	
APPROVED	

MATERIAL: 4140 STEEL
HEAT TREAT:
FINISH: SATIN FLASH CHROME

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

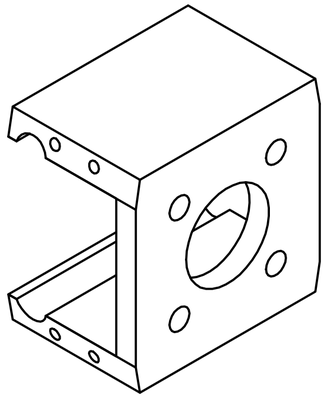
RIGHT BALL BEARING TRACK

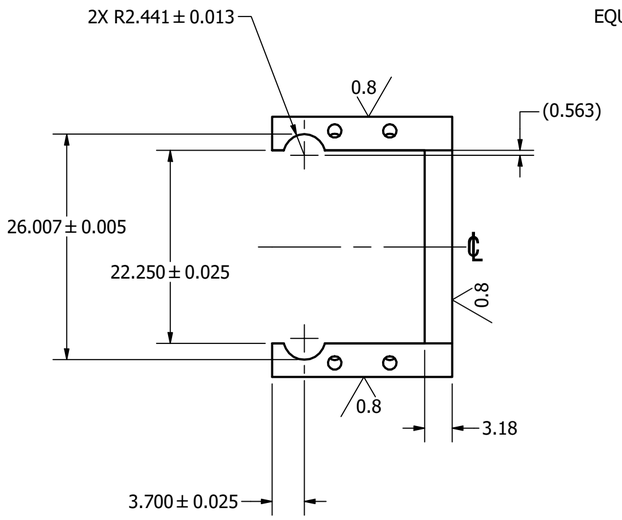
THIRD ANGLE PROJECTION

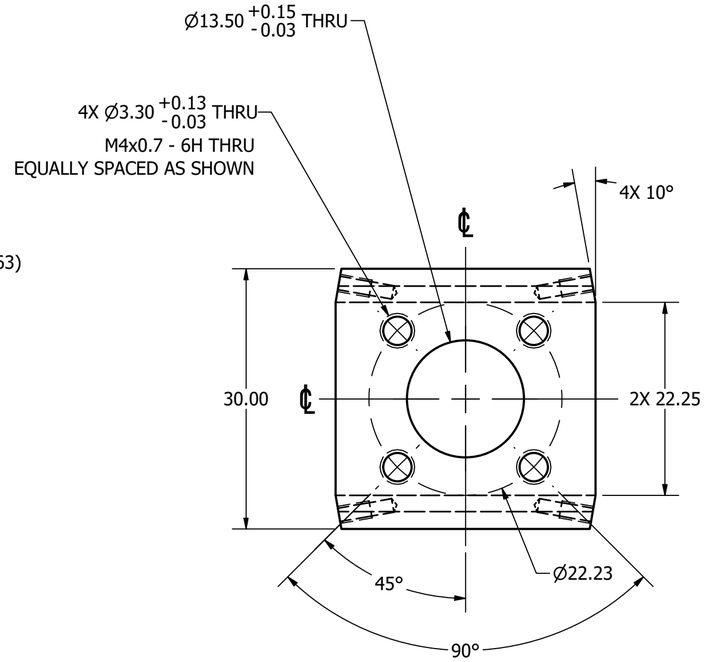
SIZE	DRAWING NUMBER	REV
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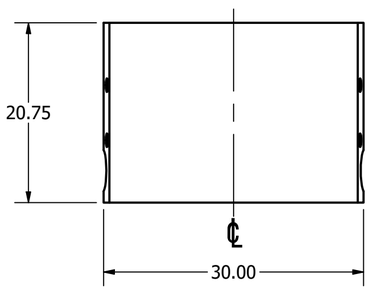
SCALE: 2:1
SHEET 1 OF 1

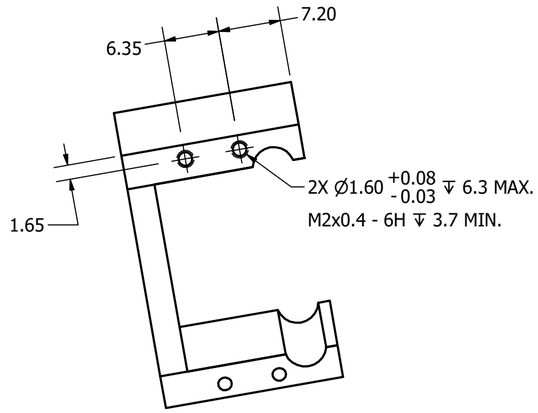
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/11/2016



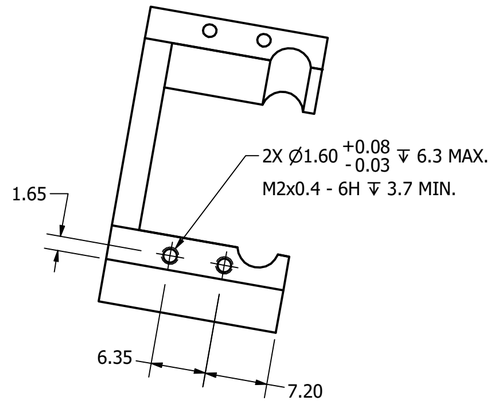








2X ON 10° FACE



2X ON 10° FACE

NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

2. HEAT TREAT:
   - MASK ENTIRE PART EXCEPT THE PATHWAYS
   - CARBURIZE PART @ 1700°F FOR 6 HOURS
   - FURNACE COOL, DO NOT QUENCH
   - REHARDEN @ 1520°F AND OIL QUENCH
   - TEMPER @ 350°F FOR 2 HOURS
   - SURFACE HARDNESS IN PATHWAYS SHOULD BE Rc 60-65

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 4140 STEEL
HEAT TREAT:
FINISH: SATIN FLASH CHROME

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: B. KIMES	4/12/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

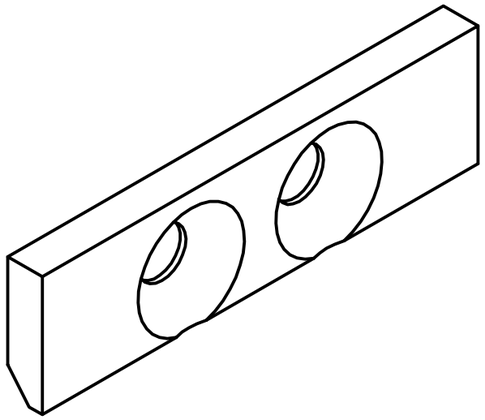
RIGHT KNEE SLIDER HOUSING

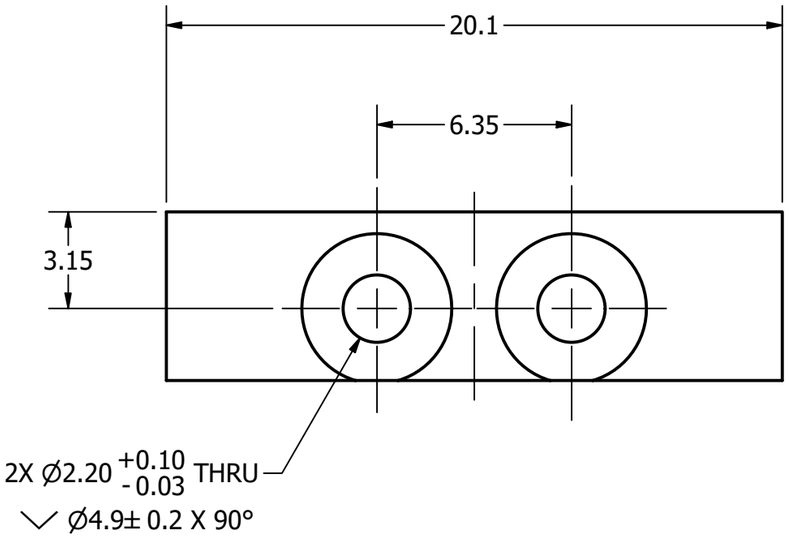
THIRD ANGLE PROJECTION

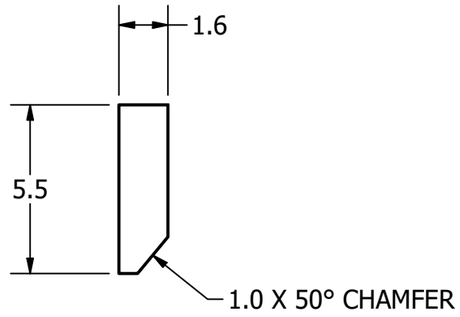
SIZE: A2 | DRAWING NUMBER: 474-5315 | REV: 1

SCALE: 2:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/12/2016







PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 1018 STEEL
HEAT TREAT:
FINISH: 0.008mm ELECTROLESS NICKEL PLATE PER SIDE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: B. KIMES	4/12/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

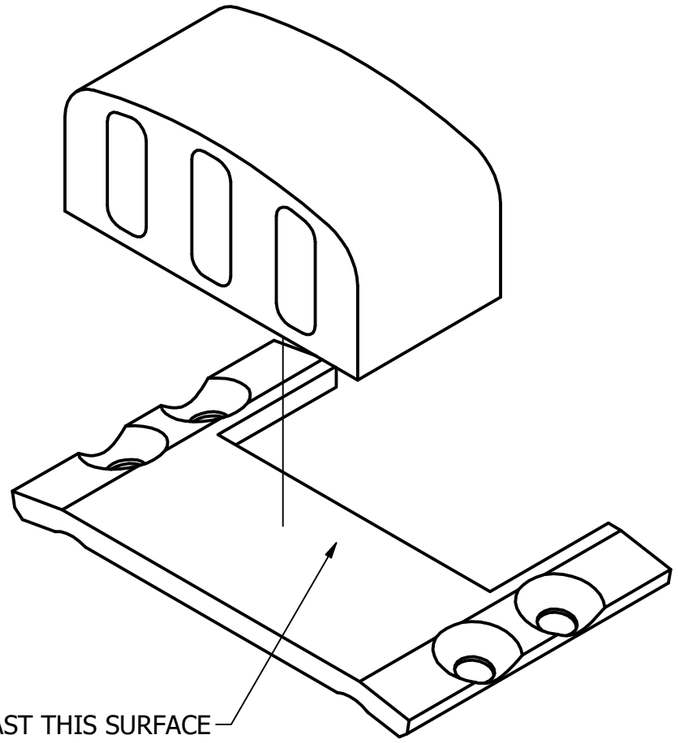
KNEE SLIDER BALL RETAINER

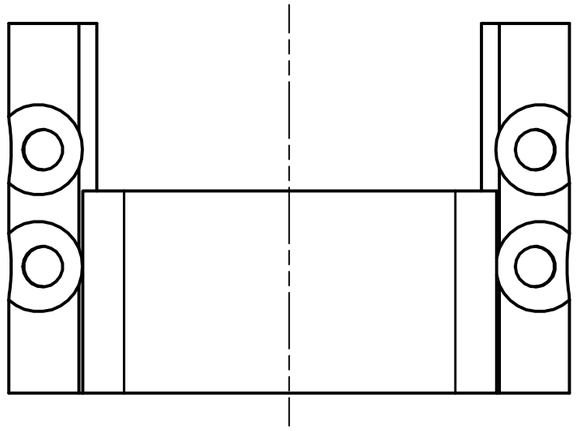
THIRD ANGLE PROJECTION

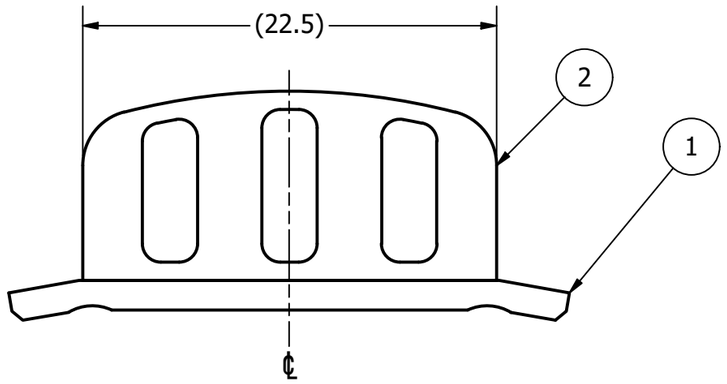
SIZE: A3 | DRAWING NUMBER: 474-5388 | REV: 1

SCALE: 5:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/12/2016







ITEM	QTY	PART NUMBER	DESCRIPTION
2	1	474-5390	KNEE SLIDER BUMPER
1	1	474-5318	KNEE SLIDER BUMPER MOUNT

PARTS LIST

NOTES:

1. BOND ITEM 2 TO ITEM 1, AS SHOWN, USING CYANOACRYLATE OR EQUIVALENT.
2. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED 1.6 | ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL
HEAT TREAT
FINISH

APPROVALS	DATE
DRAWN B. KIMES	4/12/2016
CHECKED	
ENG	
APPROVED	

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

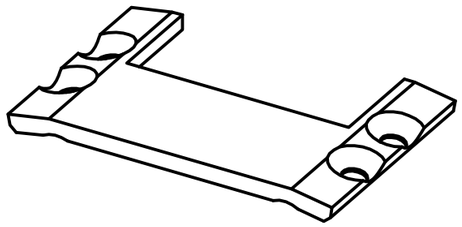
KNEE SLIDER BUMPER ASSEMBLY

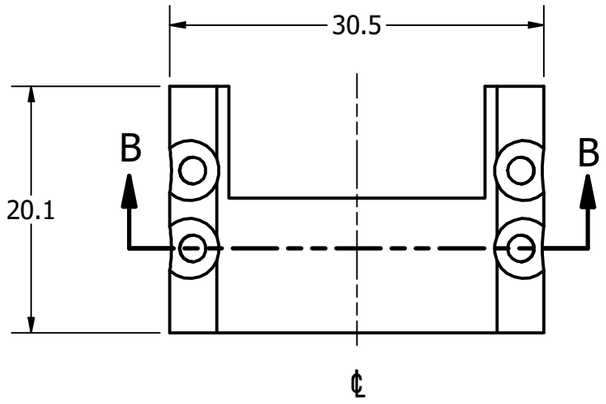
THIRD ANGLE PROJECTION

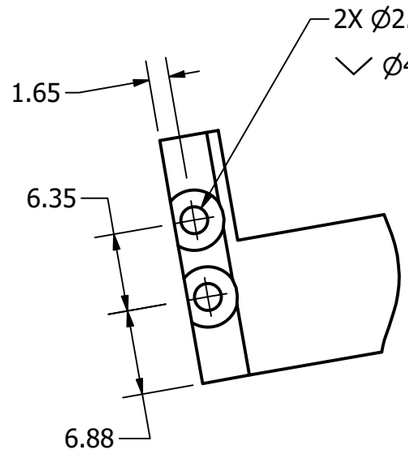
SIZE A3 | DRAWING NUMBER 474-5389 | REV 1

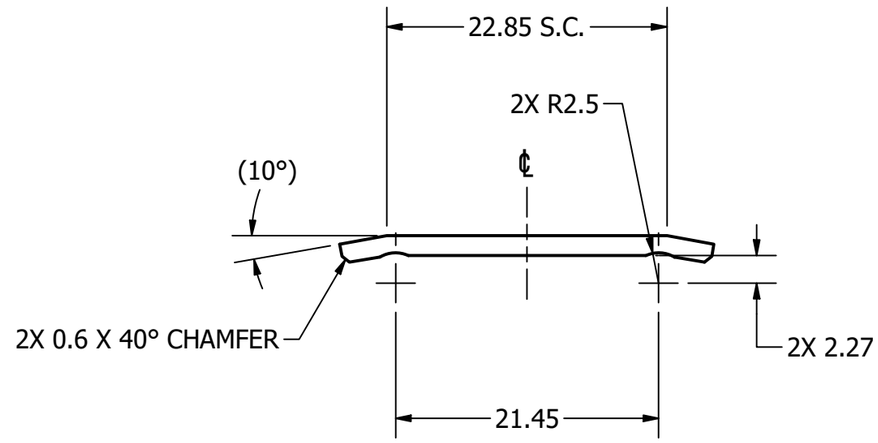
SCALE: 3:1 | SHEET 1 OF 1

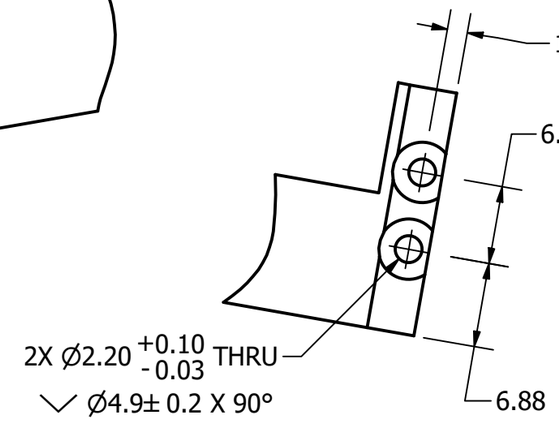
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/12/2016

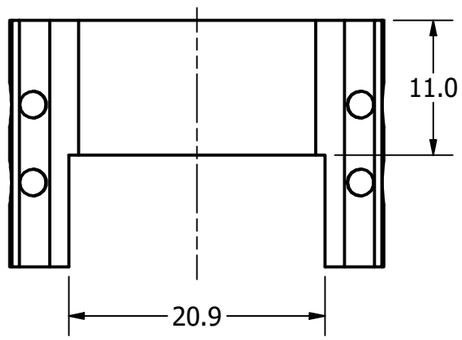


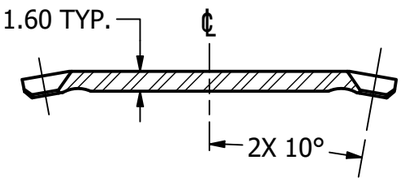












SECTION B-B

NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 4140 STEEL
HEAT TREAT:
FINISH: 0.008mm ELECTROLESS NICKEL PLATE PER SIDE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: B. KIMES	4/12/2016
CHECKED:	
ENG:	
APPROVED:	

DEPARTMENT OF TRANSPORTATION UNITED STATES OF AMERICA

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

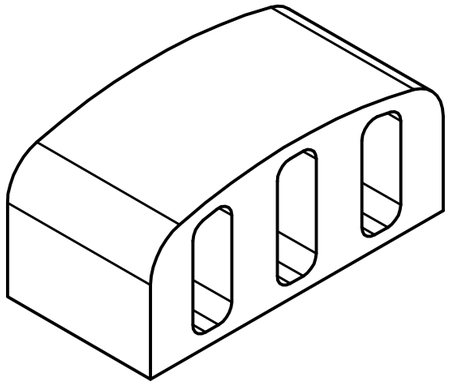
KNEE SLIDER BUMPER MOUNT

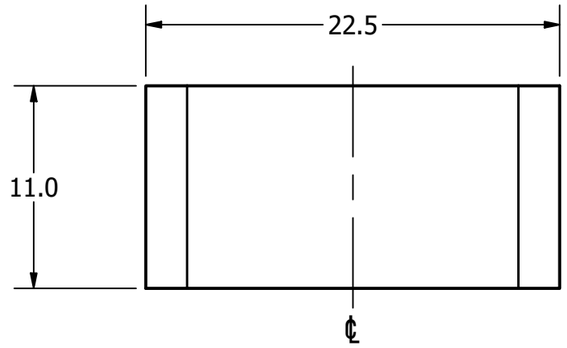
THIRD ANGLE PROJECTION

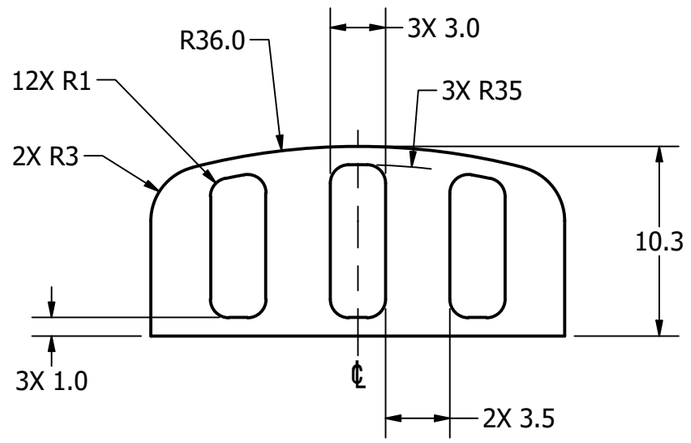
SIZE	DRAWING NUMBER	REV
A3	474-5318	1

SCALE: 2:1 SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/12/2016







NOTES:

1. MATERIAL: MBCA
   STIFFNESS CAN BE ADJUSTED TO MEET DYNAMIC TEST CORRIDORS
2. REMOVE ALL MOLD FLASHING.
3. ALL MOLD DIMENSION TOLERANCE +1%/-2% BUT NO SMALLER THAN 0.5mm.
4. NO SPLIT OR DEFECTS ARE ALLOWED IN THE POLYURETHANE MOLDING.
5. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED √ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTE #1
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: B. KIMES	4/12/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

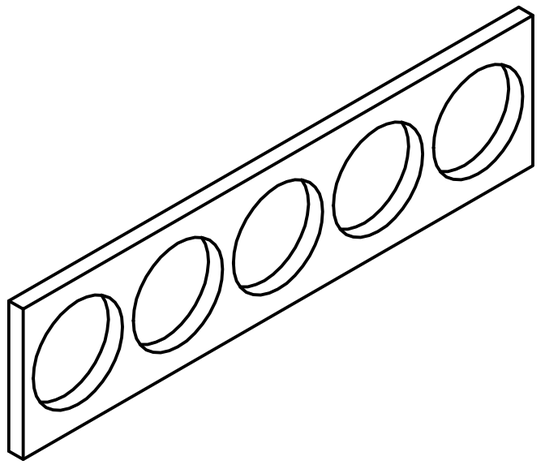
KNEE SLIDER BUMPER

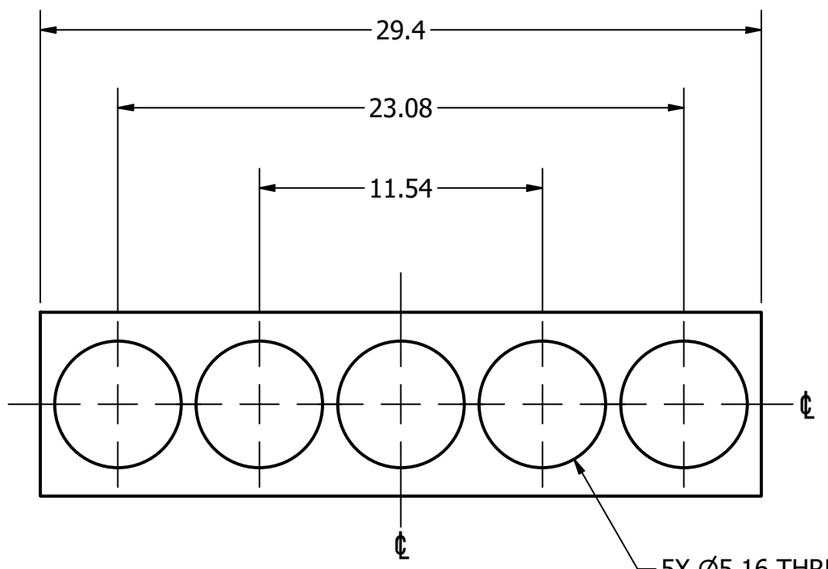
THIRD ANGLE PROJECTION

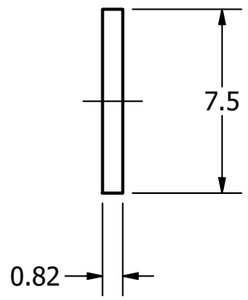
SIZE: A3 | DRAWING NUMBER: 474-5390 | REV: 1

SCALE: 3:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/12/2016







NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL:	MACHINED
X ±.5	√
X.X ±.2	ANGLES
X.XX ±.1	±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN B. KIMES	4/12/2016
CHECKED	
ENG	
APPROVED	

MATERIAL: PHOSPHOR BRONZE
HEAT TREAT:
FINISH:

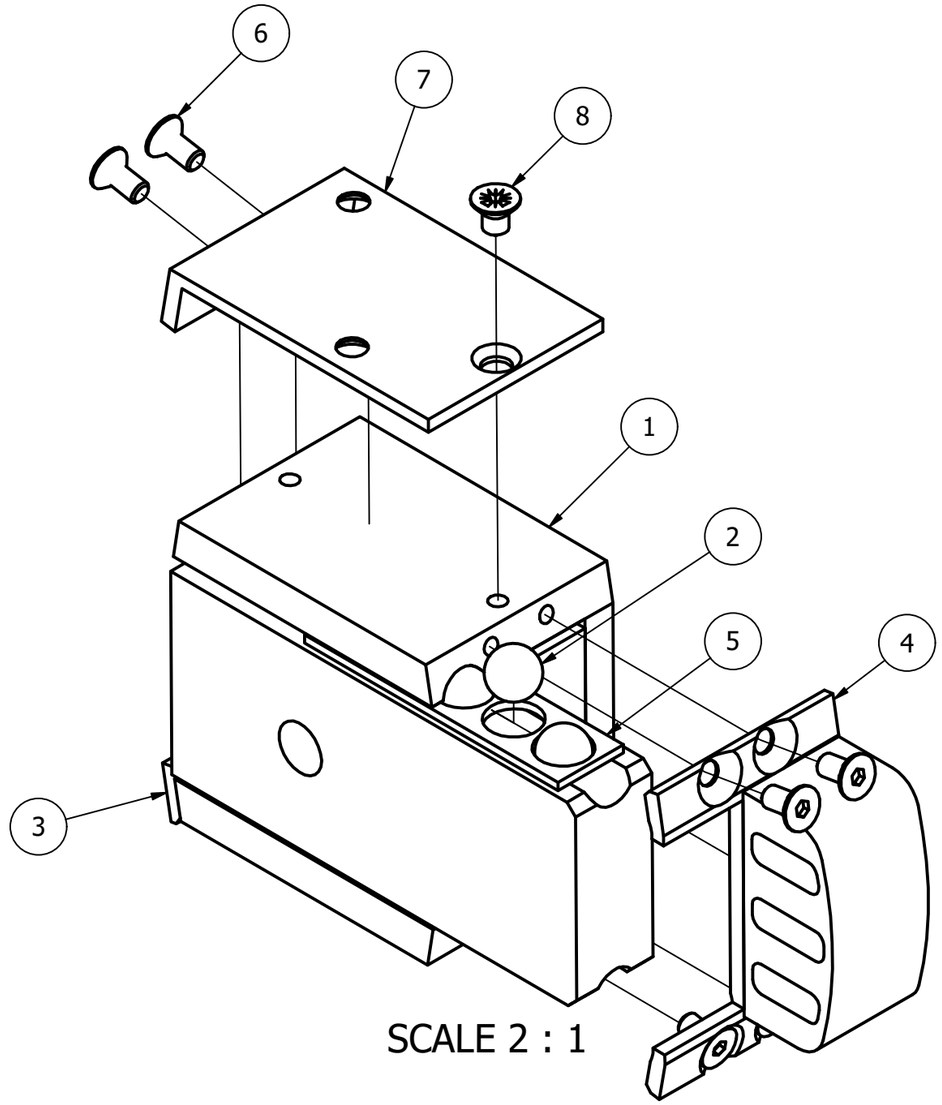
BALL BEARING SEPERATOR

THIRD ANGLE PROJECTION

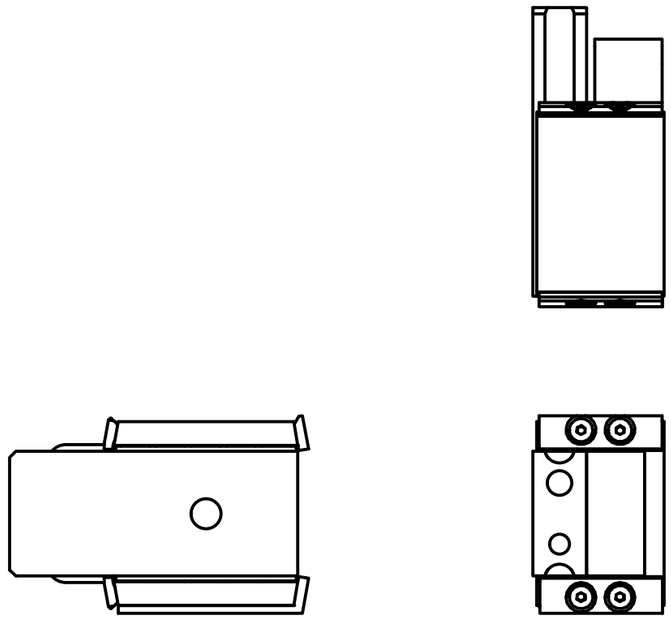
SIZE: A3 | DRAWING NUMBER: 474-5394 | REV: 1

SCALE: 4:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/13/2016



SCALE 2 : 1



ITEM	QTY	PART NUMBER	DESCRIPTION
8	1	9002185	#2-56 X 1/8 LG. FHMSP SS
7	1	474-5895	BRACKET, STRING POT
6	8	5000595	M2 X 0.4 X 4 LG. FHCS
5	2	474-5394	BALL BEARING SEPERATOR
4	1	474-5389	KNEE SLIDER BUMPER ASSEMBLY
3	1	474-5388	KNEE SLIDER BALL RETAINER
2	10	EX593-19-DN	BALL 3/16" DIA.
1	1	474-5382	LEFT KNEE SLIDER ASSEMBLY, MOLDED

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN B. KIMES	4/13/2016
CHECKED	
ENG	
APPROVED	

MATERIAL
HEAT TREAT
FINISH

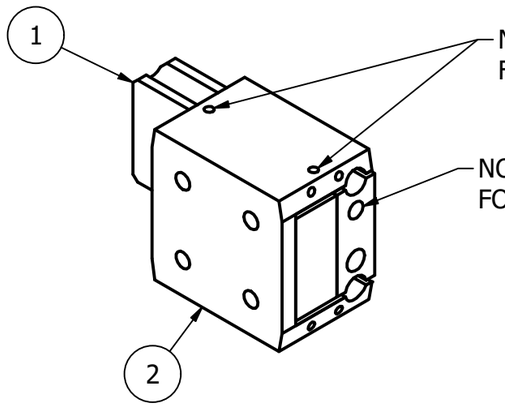
LEFT KNEE SLIDER UPPER ASSEMBLY

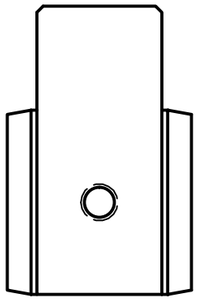
THIRD ANGLE PROJECTION

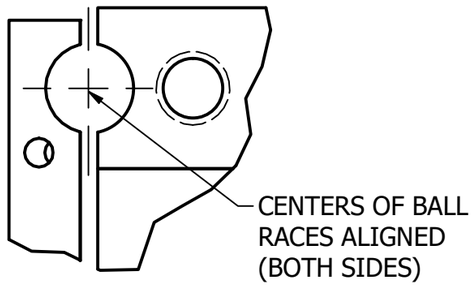
SIZE A3 | DRAWING NUMBER 474-5381 | REV 1

SCALE: 1:1 | SHEET 1 OF 1

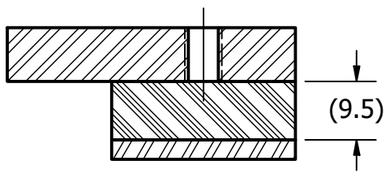
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/13/2016



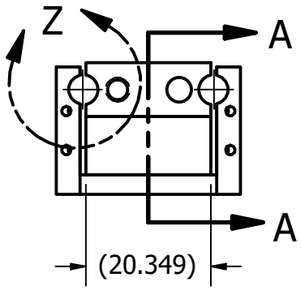


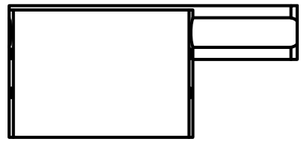


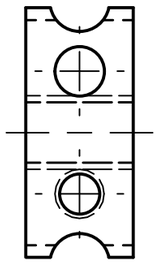
DETAIL Z
SCALE 3 : 1

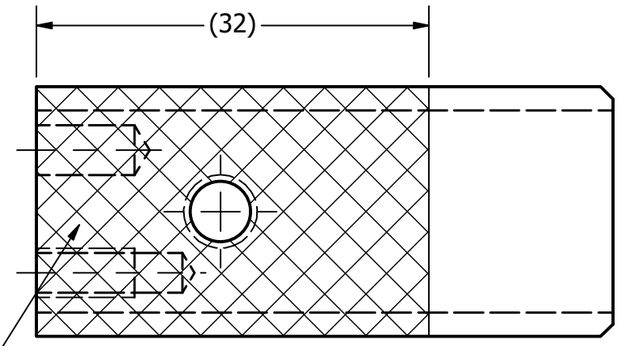


SECTION A-A



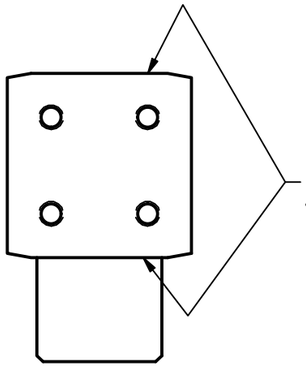






DETAIL VIEW OF 474-5384
SCALE 2 : 1

PREPARE SURFACE SHOWN REPRESENTED BY HATCHED AREA
FOR BONDING RUBBER TO 474-5384



NOTES:

1. MATERIAL: NATURAL RUBBER
   COLOR: BLACK
   DUROMETER: 30-35 SHORE "A"

2. ADJUST DUROMETER FOR DYNAMIC PERFORMANCE.

3. REMOVE ALL MOLD FLASHING.

4. NO SPLIT OR DEFECTS ARE ALLOWED IN THE RUBBER MOLDING.

PRELIMINARY DRAWING

ITEM	QTY	PART NUMBER	DESCRIPTION
2	1	474-5314	LEFT KNEE SLIDER HOUSING
1	1	474-5384	LEFT BALL BEARING TRACK

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTES
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: B. KIMES	4/13/2016
CHECKED:	
ENG:	
APPROVED:	

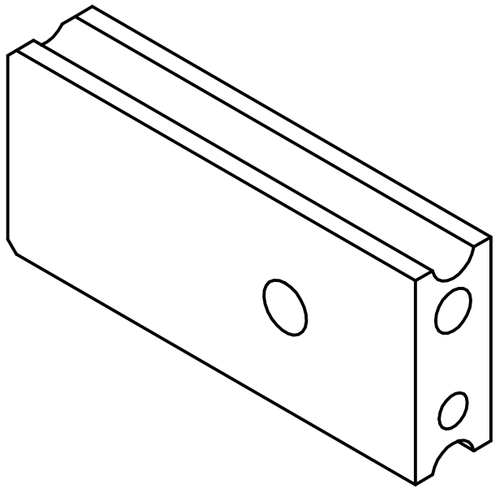
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

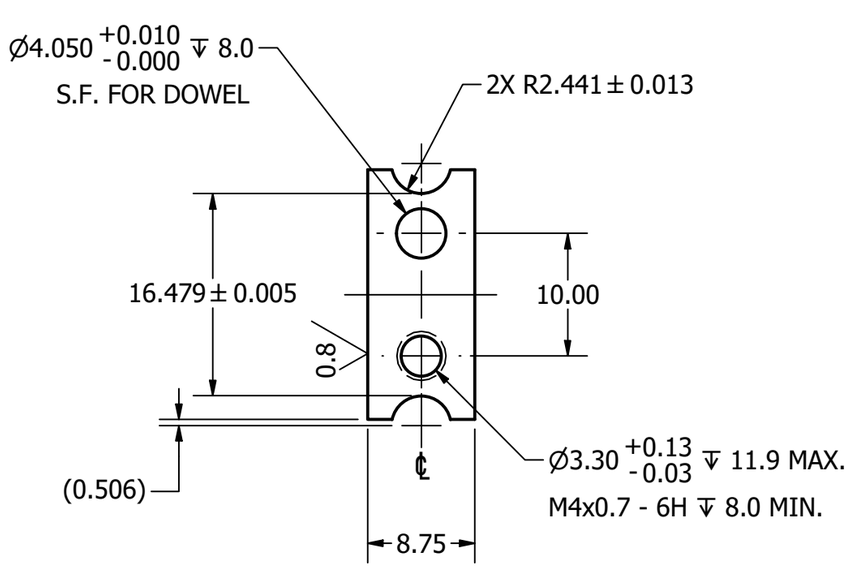
LEFT KNEE SLIDER ASSEMBLY, MOLDED

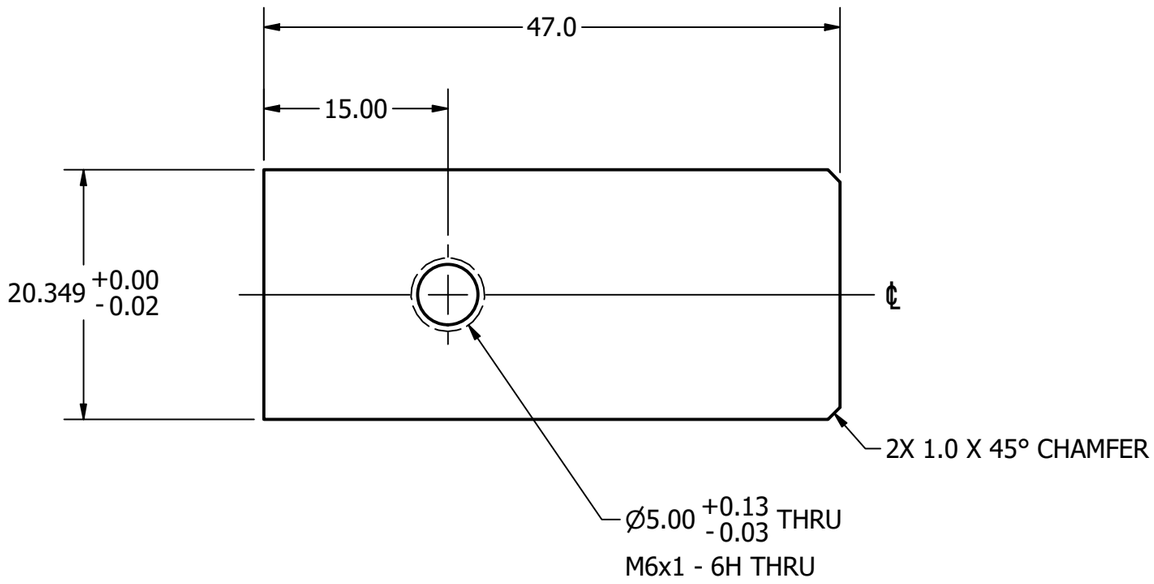
THIRD ANGLE PROJECTION

SIZE: A3 | DRAWING NUMBER: 474-5382 | REV: 1
SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/12/2016







NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

2. HEAT TREAT:
   - MASK ENTIRE PART EXCEPT THE PATHWAYS
   - CARBURIZE PART @ 1700°F FOR 6 HOURS
   - FURNACE COOL, DO NOT QUENCH
   - REHARDEN @ 1520°F AND OIL QUENCH
   - TEMPER @ 350°F FOR 2 HOURS
   - SURFACE HARDNESS IN PATHWAYS SHOULD BE Rc 60-65

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED √C
ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 4140 STEEL
HEAT TREAT:
FINISH: SATIN FLASH CHROME

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: B. KIMES	4/12/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

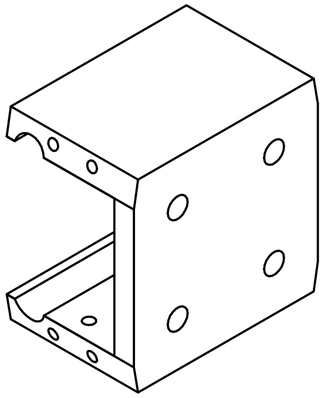
LEFT BALL BEARING TRACK

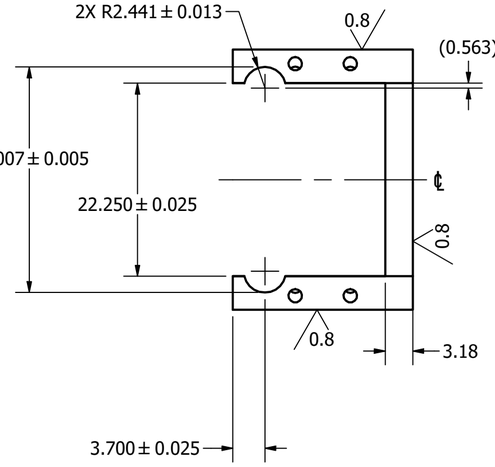
THIRD ANGLE PROJECTION

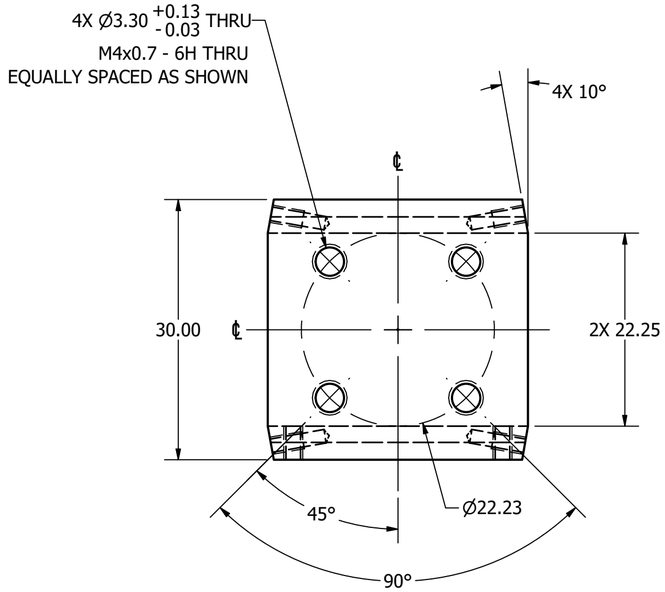
SIZE: A3 | DRAWING NUMBER: 474-5384 | REV: 1

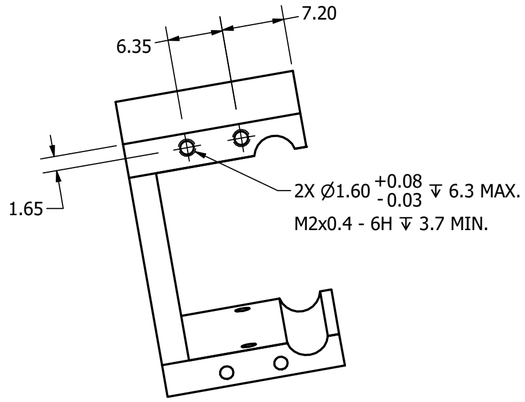
SCALE: 2:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/12/2016

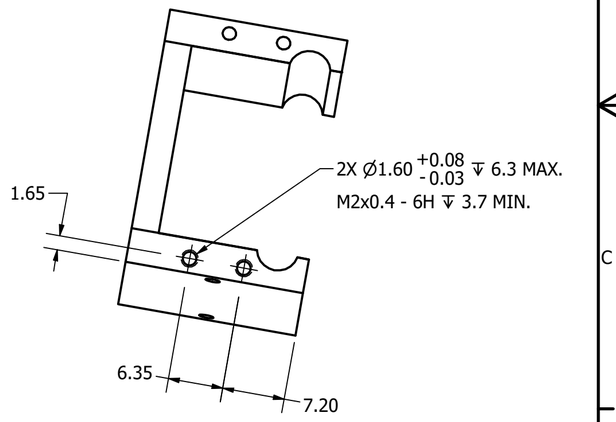




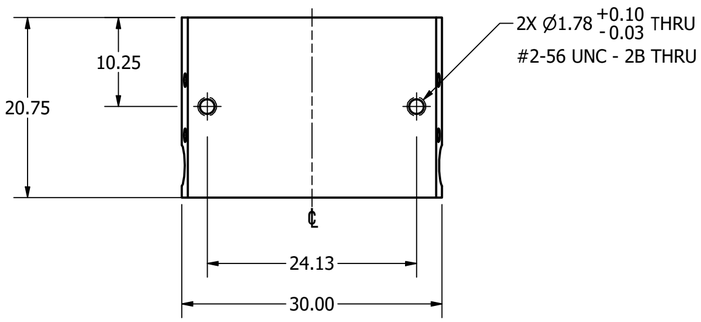




2X ON 10° FACE



2X ON 10° FACE



NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

2. HEAT TREAT:
   - MASK ENTIRE PART EXCEPT THE PATHWAYS
   - CARBURIZE PART @ 1700°F FOR 6 HOURS
   - FURNACE COOL, DO NOT QUENCH
   - REHARDEN @ 1520°F AND OIL QUENCH
   - TEMPER @ 350°F FOR 2 HOURS
   - SURFACE HARDNESS IN PATHWAYS SHOULD BE Rc 60-65

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 4140 STEEL
HEAT TREAT:
FINISH: SATIN FLASH CHROME

*V*EHICLE *R*ESEARCH and *T*EST *C*ENTER

APPROVALS	DATE
DRAWN: B. KIMES	4/12/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

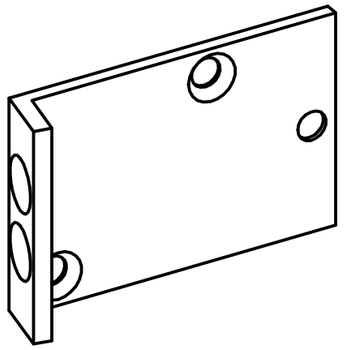
LEFT KNEE SLIDER HOUSING

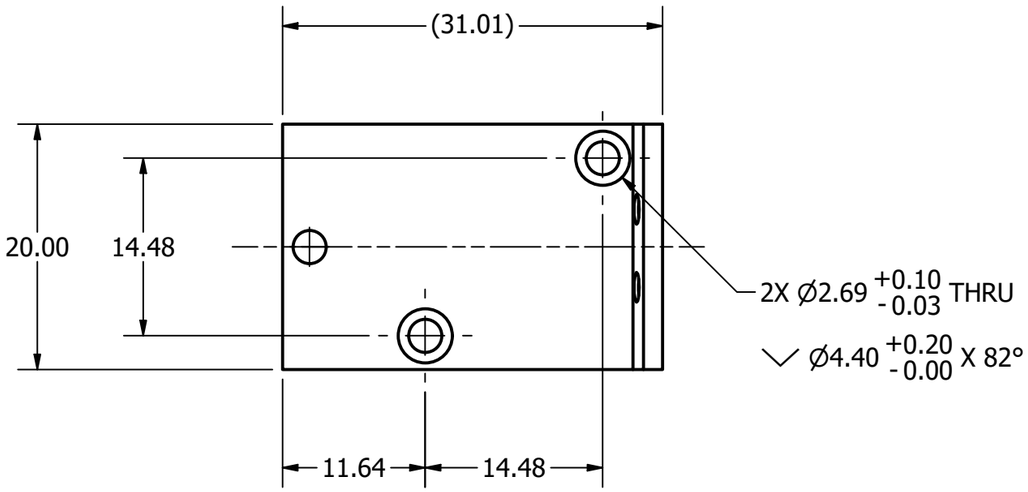
THIRD ANGLE PROJECTION

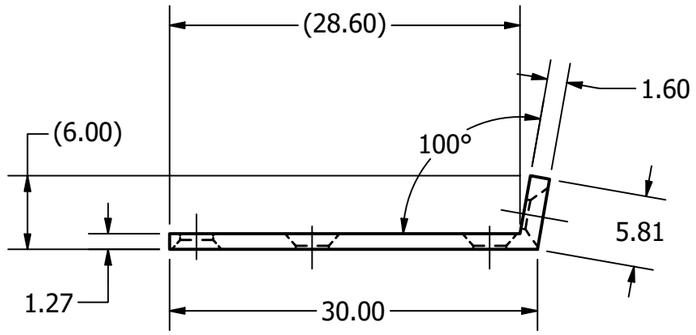
SIZE: A2 | DRAWING NUMBER: 474-5314 | REV: 1

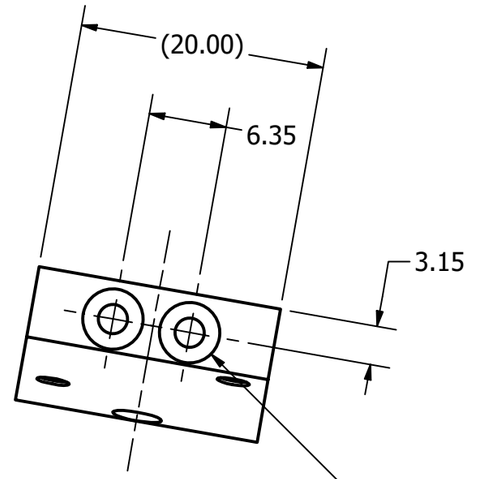
SCALE: 2:1 | SHEET: 1 OF 1

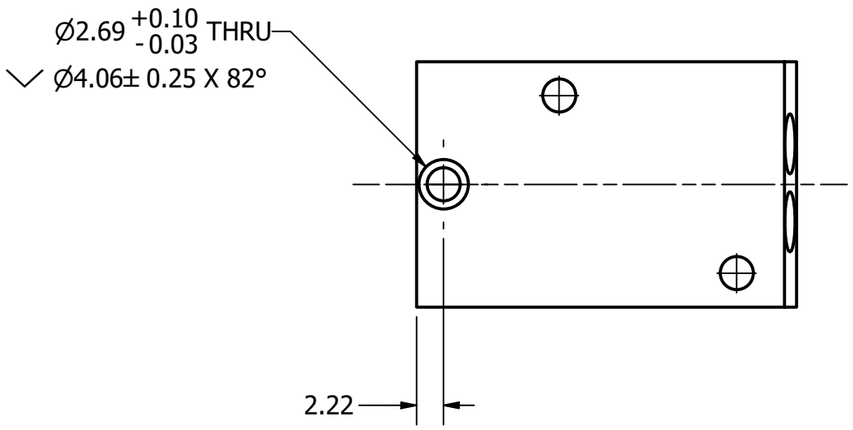
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AB	JW	03/09/2017











PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: A. Barchock	3/9/2017
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

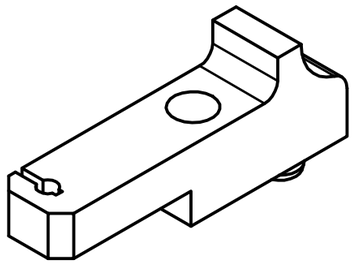
BRACKET, STRING POT

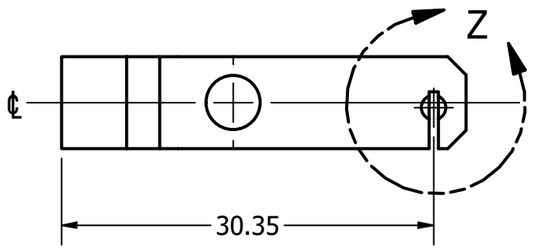
THIRD ANGLE PROJECTION

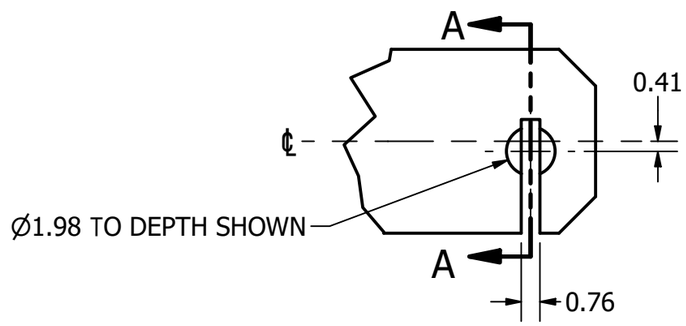
SIZE: A3 | DRAWING NUMBER: 474-5895 | REV: 1

SCALE: 2:1 | SHEET: 1 OF 1

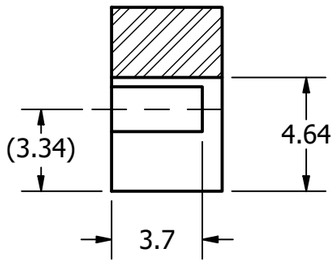
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/13/2016



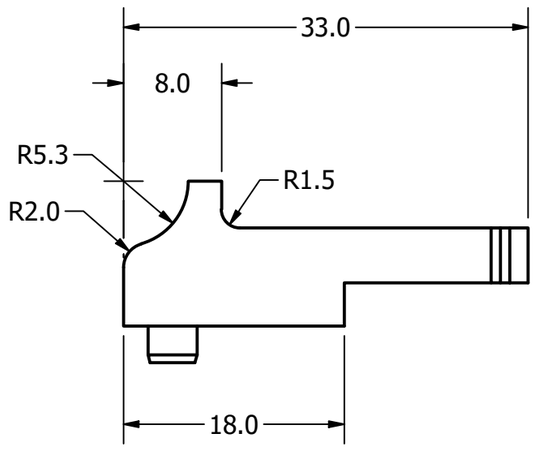


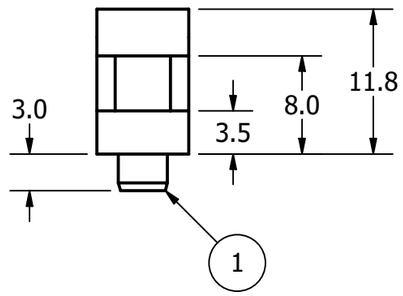


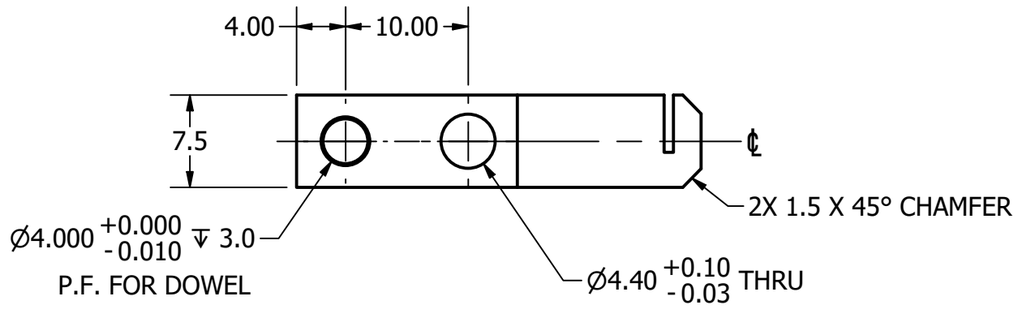
DETAIL Z
SCALE 4 : 1



SECTION A-A
SCALE 4 : 1







ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	5000680	M4 X 6 LG. DOWEL PIN SS

PARTS LIST

NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 416 STAINLESS STEEL
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: B. KIMES	4/13/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

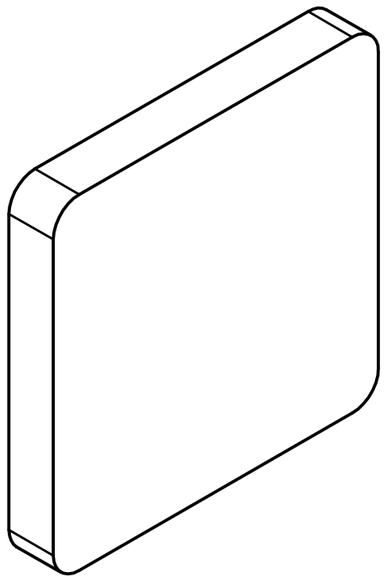
KNEE ROTATION STOP

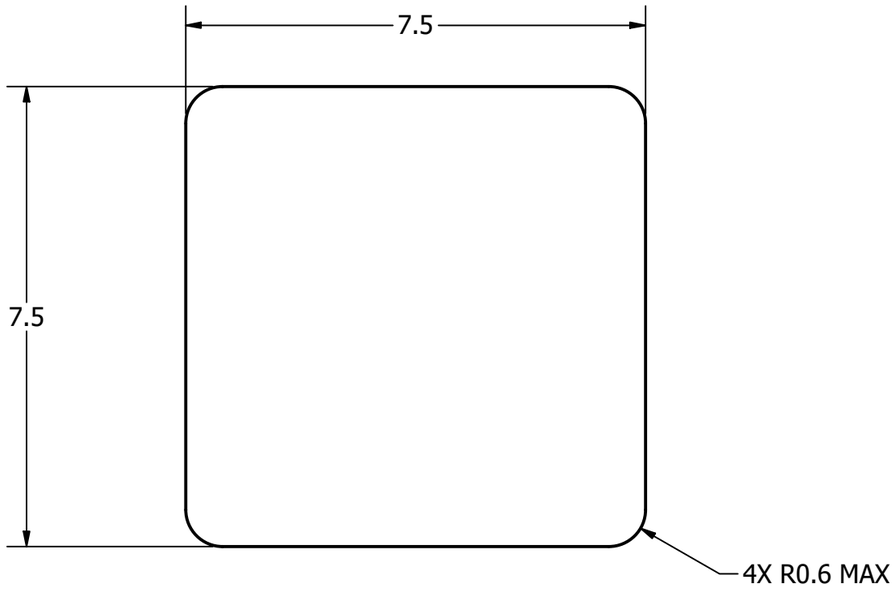
THIRD ANGLE PROJECTION

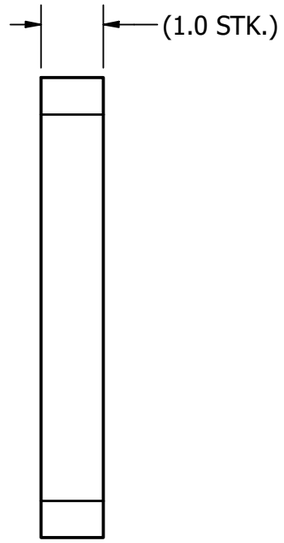
SIZE: A3 | DRAWING NUMBER: 474-5311 | REV: 1

SCALE: 2:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/13/2016







NOTES:

1. MAKE FROM 8004865 (.04" THICK NATURAL RUBBER SHEET).

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTES
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: B. KIMES	4/13/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

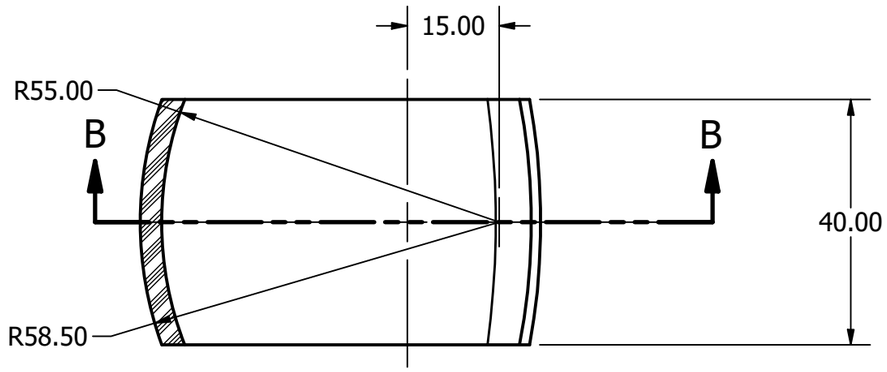
KNEE SLIDER RECOIL BUMPER

THIRD ANGLE PROJECTION

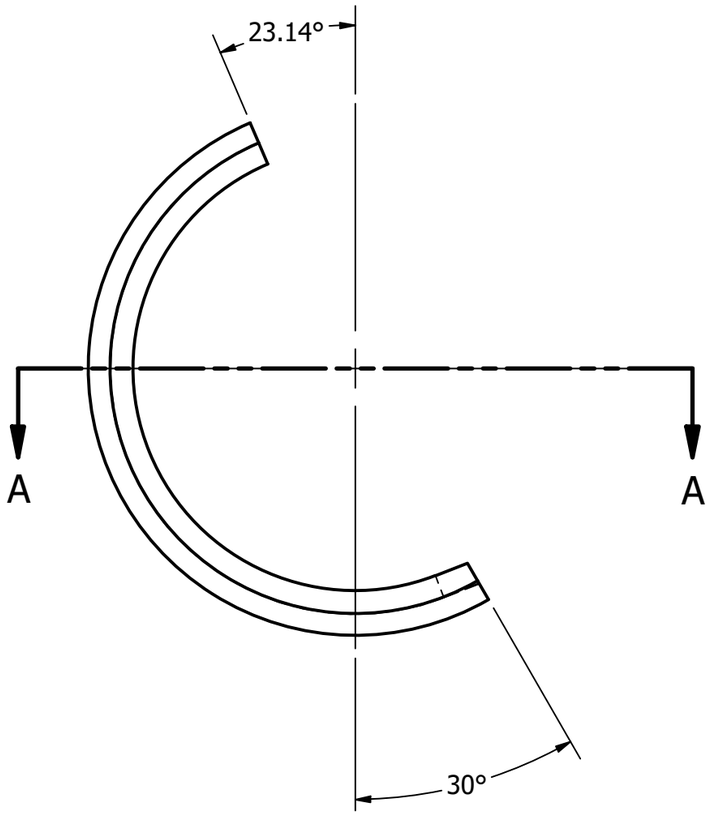
SIZE	DRAWING NUMBER	REV
A3	474-5393	1

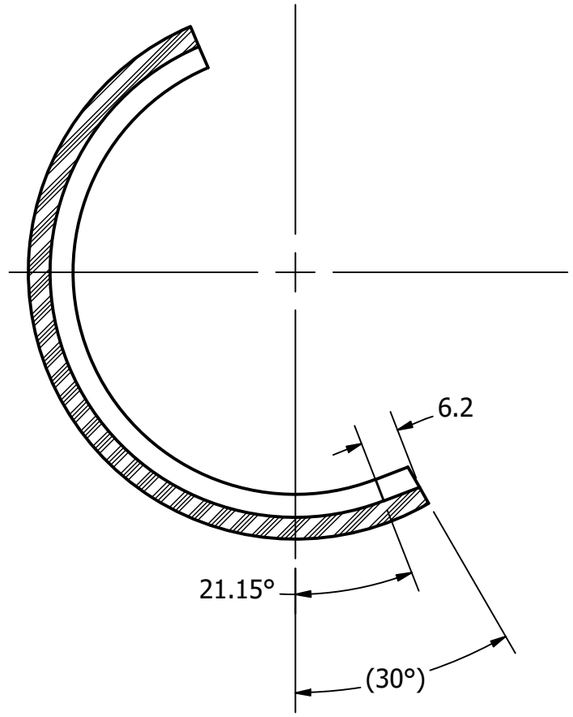
SCALE: 10:1 SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JPM	JW	4/11/2016

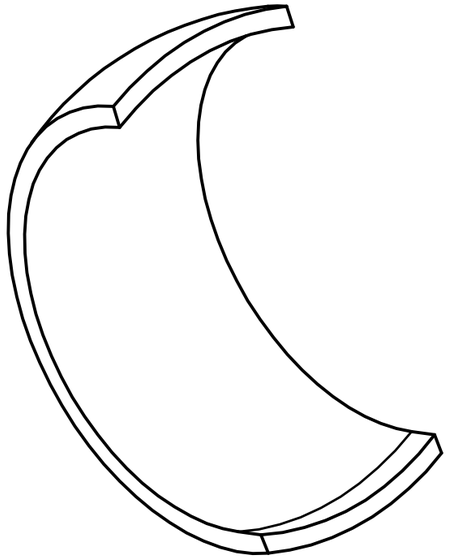


SECTION A-A





SECTION B-B



NOTES:
1. MATERIAL: BUTYL RUBBER
   COLOR: BLACK
   DUROMETER: 45 ±5 SHORE "A"
2. REMOVE ALL MOLD FLASHING.
3. ALL MOLD DIMENSION TOLERANCE +1%/-2%
   BUT NO SMALLER THAN 0.5mm.
4. NO SPLIT OR DEFECTS ARE ALLOWED
   IN THE RUBBER MOLDING.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ±.5°, ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN: J. MCINNIS	4/11/2016
CHECKED	
ENG	
APPROVED	

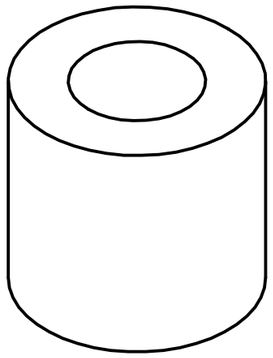
MATERIAL: SEE NOTE #1
HEAT TREAT
FINISH

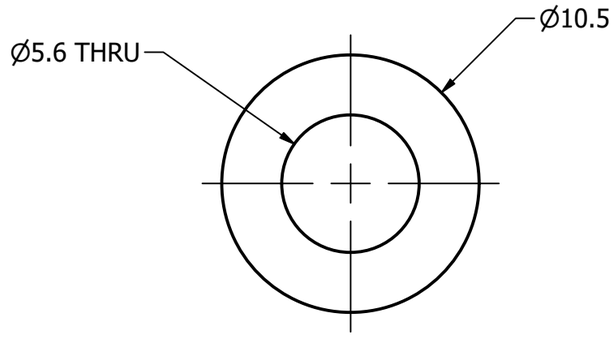
KNEE INSERT

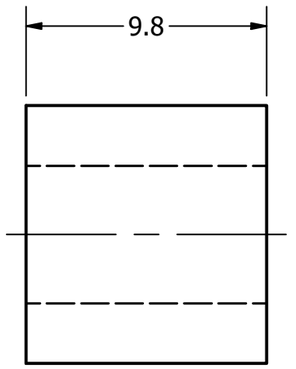
THIRD ANGLE PROJECTION

SIZE: A3 | DRAWING NUMBER: 474-5340 | REV: 1
SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JPM	JW	4/11/16







NOTES:

1. MATERIAL: NATURAL RUBBER
   COLOR: BLACK
   DUROMETER: 70±5 SHORE "A"

2. REMOVE ALL MOLD FLASHING.

3. ALL MOLD DIMENSION TOLERANCE +1%/-2% BUT NO SMALLER THAN 0.5mm.

4. NO SPLIT OR DEFECTS ARE ALLOWED IN THE RUBBER MOLDING.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTE #1
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: J. MCINNIS	4/11/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

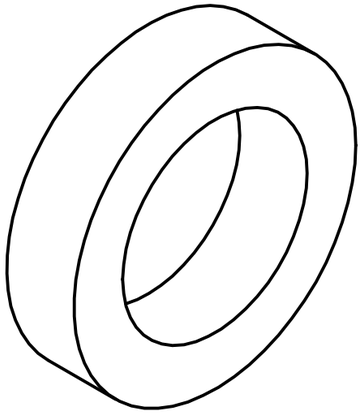
KNEE ROTATION STOP BOOT

THIRD ANGLE PROJECTION

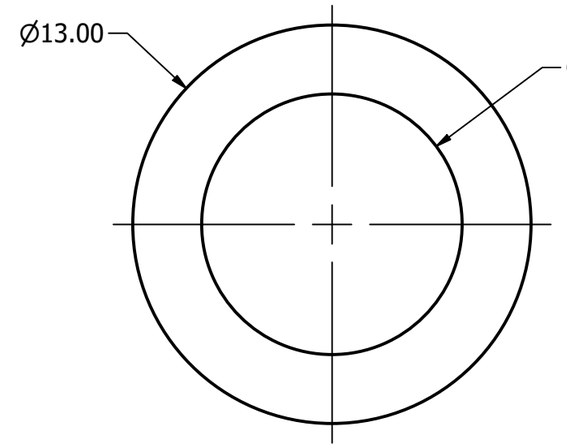
SIZE: A3 | DRAWING NUMBER: 474-5313 | REV: 1

SCALE: 4:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH		11/14/17







NOTES:

1. MATERIAL: URETHANE
   DUROMETER: 95±5 SHORE "A"

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTE #1
HEAT TREAT:
FINISH:

	APPROVALS	DATE
DRAWN	ghayden	4/11/2016
CHECKED		
ENG		
APPROVED		

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

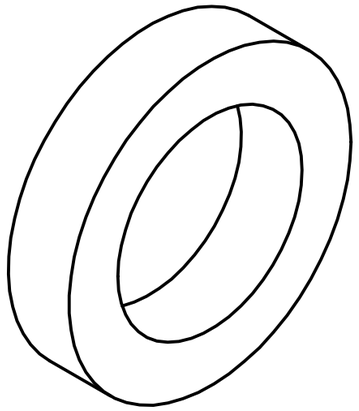
KNEE COMPRESSION WASHER

THIRD ANGLE PROJECTION

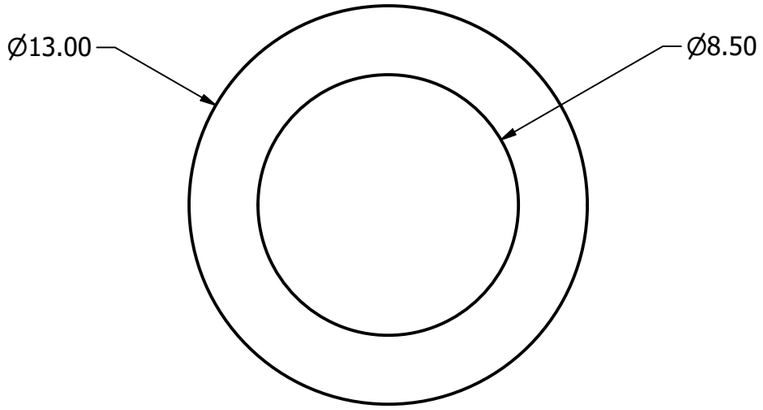
SIZE: A3 | DRAWING NUMBER: 474-5316 | REV: 1

SCALE: 5:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	4/11/2016







PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED √ ±.5
ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 304 STAINLESS STEEL
HEAT TREAT:
FINISH:

*V*EHICLE *R*ESEARCH and *T*EST *C*ENTER

APPROVALS	DATE
DRAWN: ghayden	4/11/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

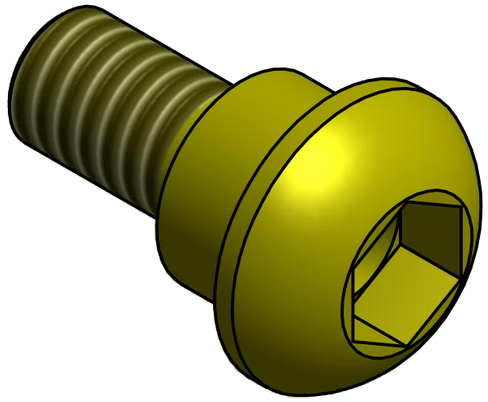
KNEE BACKUP WASHER

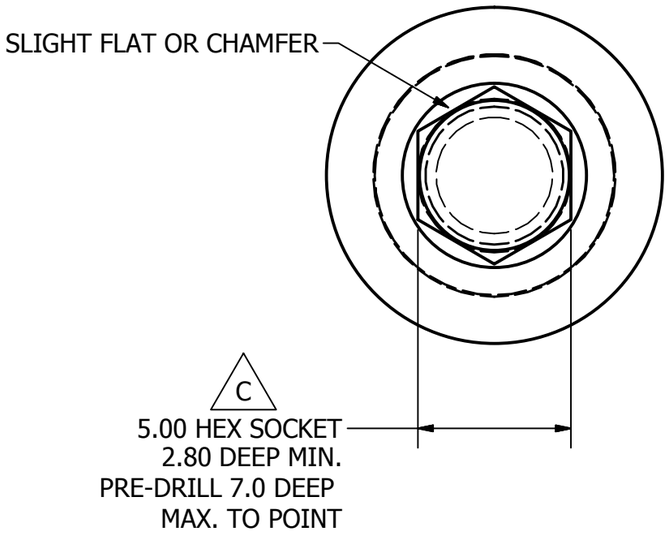
THIRD ANGLE PROJECTION

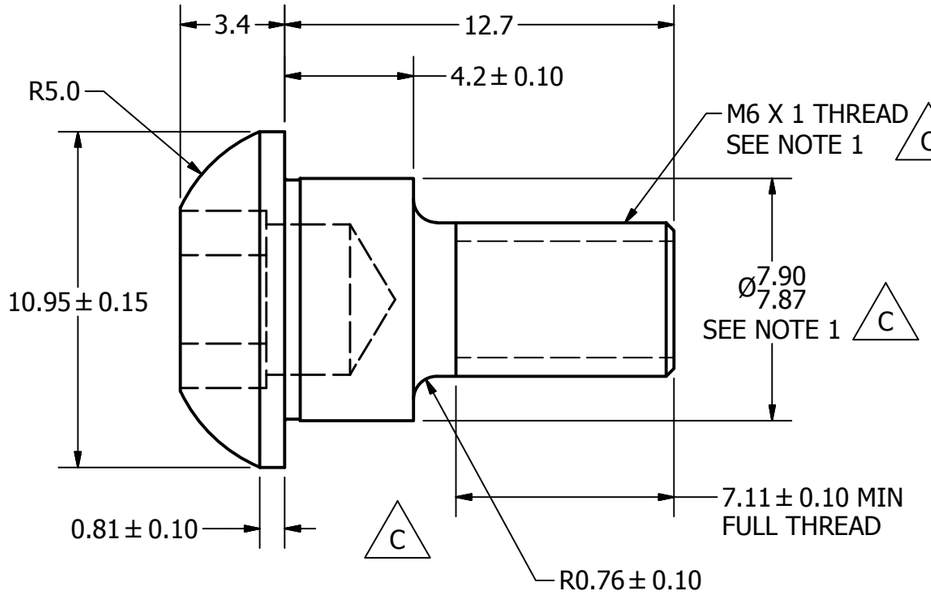
SIZE: A3 | DRAWING NUMBER: 474-5317 | REV: 1

SCALE: 5:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	A	RELEASE TO PRODUCTION	SP	JWANG	5/24/05
5708	B	CHANGE APPLICATION QTY FROM 16 TO 4	RN		10/31/05
70730	C	REDRAWN IN INVENTOR. .25 RADIUS WAS MIN. UNDERCUT. 2.80 DEEP MIN WAS 3.5 DEEP MIN. ADD REF TO CONCENTRICITY NOTE. REMOVE 'USED ON' TABLE, SCALE WAS 4 : 1, DISCONTINUE DN/FT TITLE BLOCK DRAWINGS, RE-RELEASE AS HUMANETICS TITLE BLOCK, NO DN/FT SUFFIX (THIS DWG WAS FT)	GMB		1/14/2013





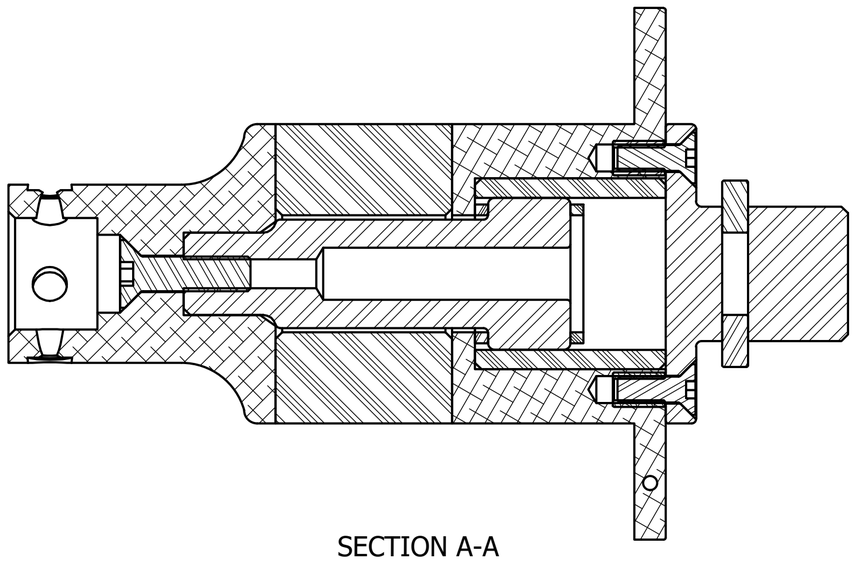


NOTES:

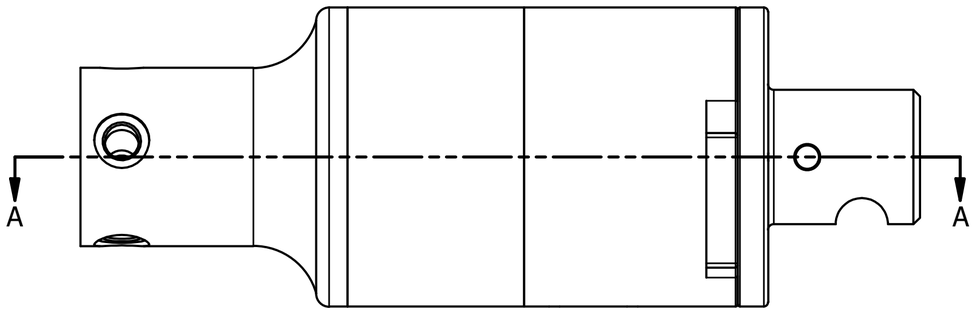
1. SHOULDER TO BE CONCENTRIC TO AXIS OF THREAD WITHIN .02 MM TOTAL INDICATOR READING.
2. REMOVE BURRS AND BREAK SHARP EDGES
3. FINISH: .002 - .008 ZINC PER SIDE YELLOW DICHROMATE
4. DIMENSONAL LIMITS AND THREAD SIZES APPLY AFTER FINISH

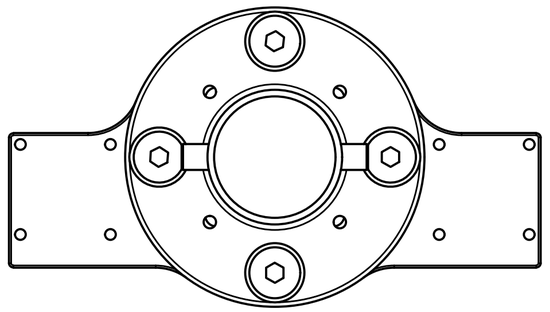
DO NOT SCALE DRAWING THIRD ANGLE PROJECTION	TOLERANCES UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES DECIMALS ANGLES FINISH X.X ± 0.1 ± 1° 125 X.XX ± 0.01 X.XXX ± 0.005 FRACTIONS ±1/64 REMOVE BURRS & BREAK SHARP EDGES	NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION	
PROJECT NO.:		DESCRIPTION: MODIFIED BHSS M6 THREAD	
MATERIAL: 4140 STEEL	DRAWN BY: gbrock / DATE: 1/14/2013		
HEAT TREAT: Rc 36-42	CHECKED BY: / DATE:	SIZE: A3 / SHEET: 1 OF 1 / DRAWING NO.: W50-61042 / REV: C	
FINISH: SEE NOTES	ENGINEER: J. WANG / DATE: 11/9/2005	SCALE: 5 : 1	

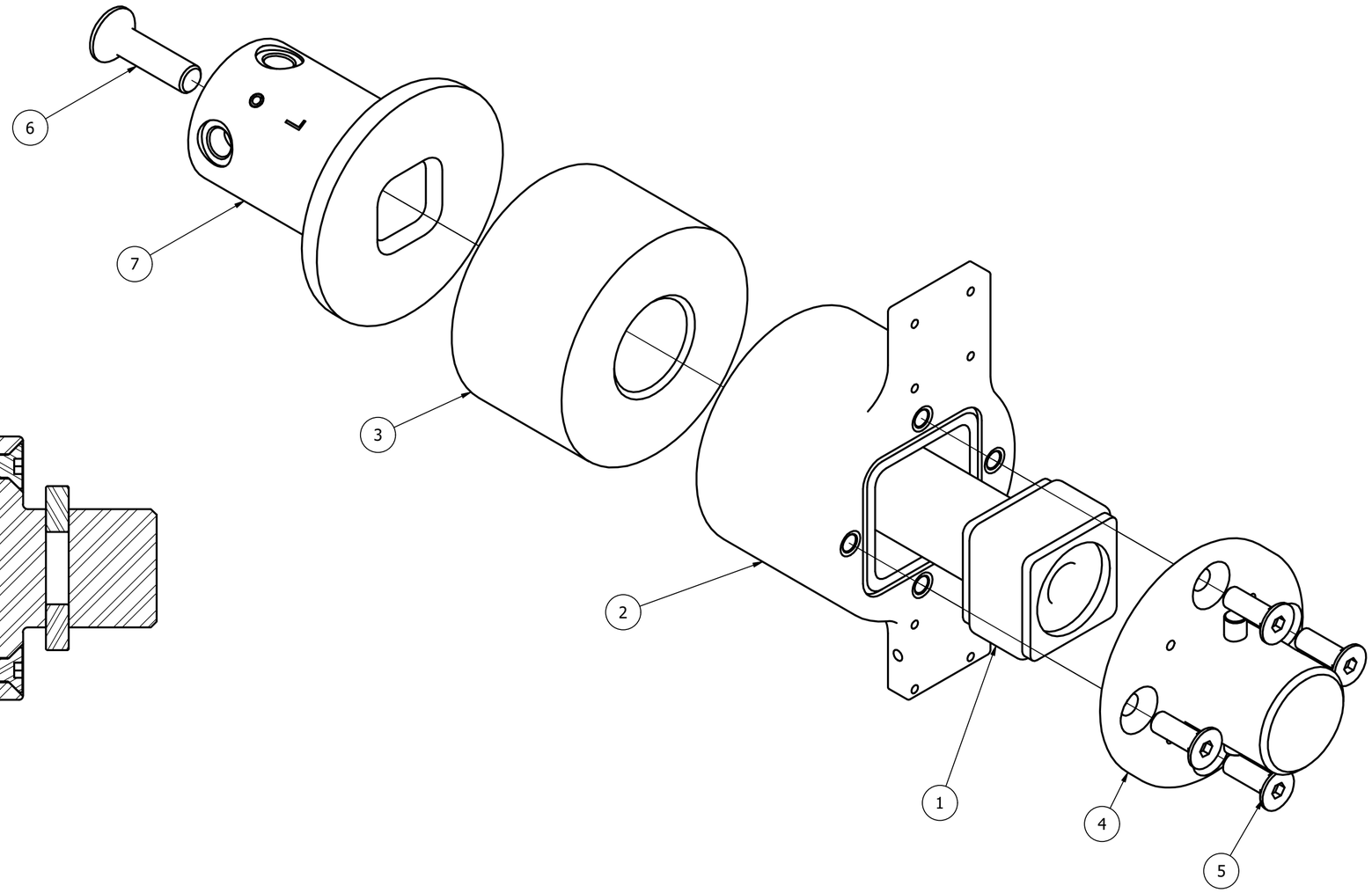
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/8/2016



SECTION A-A







ITEM	QTY	PART NUMBER	DESCRIPTION
7	1	474-5168-1	FEMUR END CAP, LEFT
6	1	5000605	M8 X 1.25 X 30 LG. FHCS
5	4	5000108	M6 X 1 X 18 LG. FHCS
4	1	474-5161	FEMUR ATTACHMENT PLATE
3	1	474-5162	FEMUR RUBBER
2	1	474-5164	FEMUR BUSHING ASSEMBLY
1	1	474-5166	FEMUR PLUNGER ASSEMBLY

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN B. KIMES	4/8/2016
MATERIAL	
CHECKED	
HEAT TREAT	
ENG	
FINISH	
APPROVED	

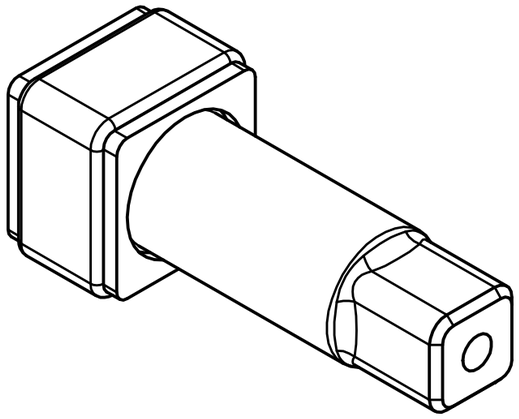
FEMUR ASSEMBLY, LEFT

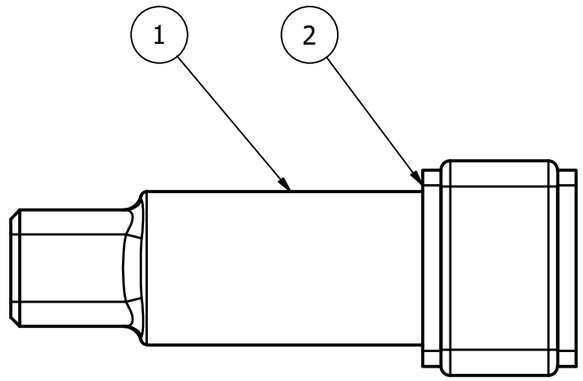
THIRD ANGLE PROJECTION

SIZE A2 | DRAWING NUMBER 474-5160-1 | REV 1

SCALE: 1:1 | SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/7/2016





ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	474-5171	FEMUR PLUNGER
2	2	474-5167	END STOP

PARTS LIST

NOTES:

1. BOND (2X) ITEM 2 TO ITEM 1.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN B. KIMES	4/7/2016
CHECKED	
ENG	
APPROVED	

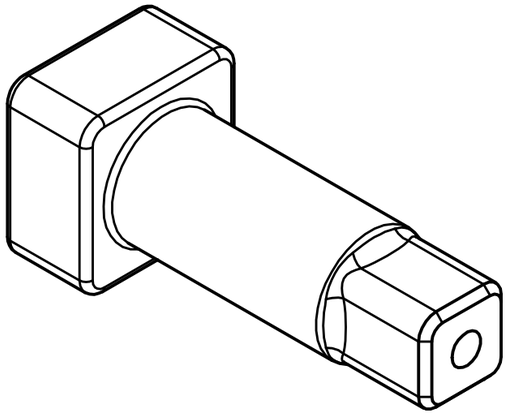
MATERIAL
HEAT TREAT
FINISH

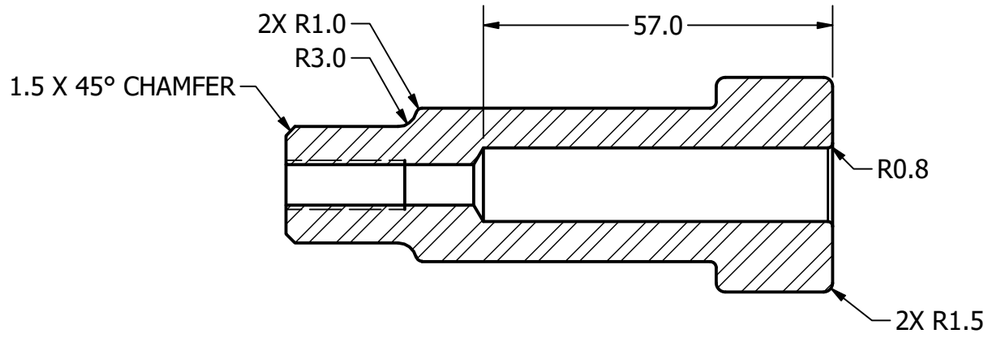
FEMUR PLUNGER ASSEMBLY

THIRD ANGLE PROJECTION

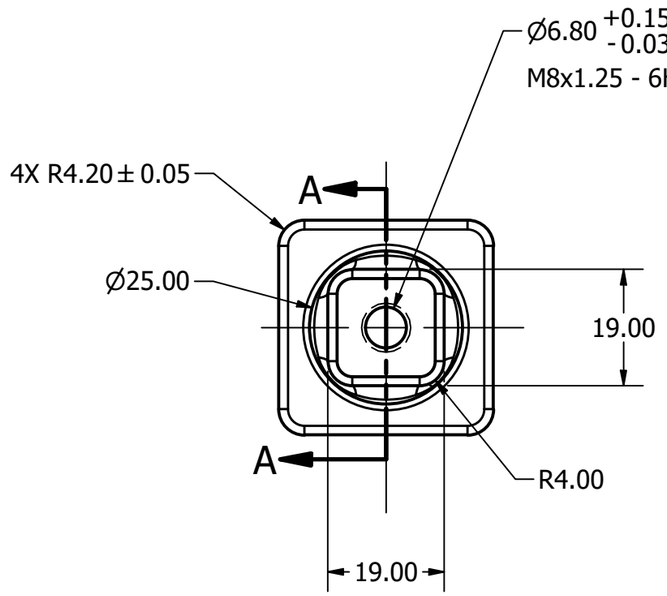
SIZE A3 | DRAWING NUMBER 474-5166 | REV 1
SCALE: 1:1 | SHEET 1 OF 1

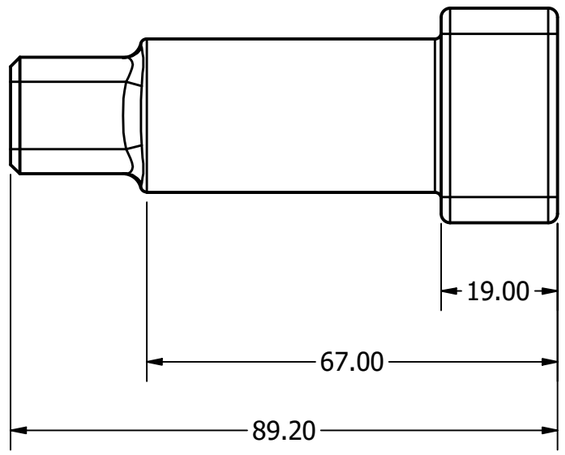
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/7/2016

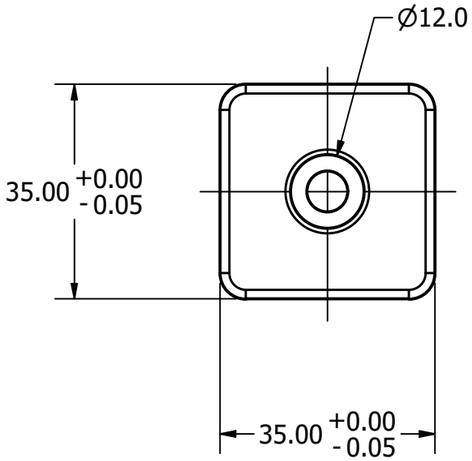




SECTION A-A







NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ↧ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 4140 STEEL
HEAT TREAT: RC 44-48
FINISH: 0.008mm ELECTROLESS NICKEL PLATE PER SIDE

APPROVALS	DATE
DRAWN: B. KIMES	4/7/2016
CHECKED	
ENG	
APPROVED	

VEHICLE RESEARCH and TEST CENTER

DEPARTMENT OF TRANSPORTATION UNITED STATES OF AMERICA

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

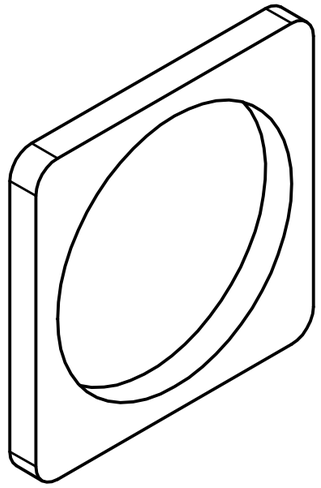
FEMUR PLUNGER

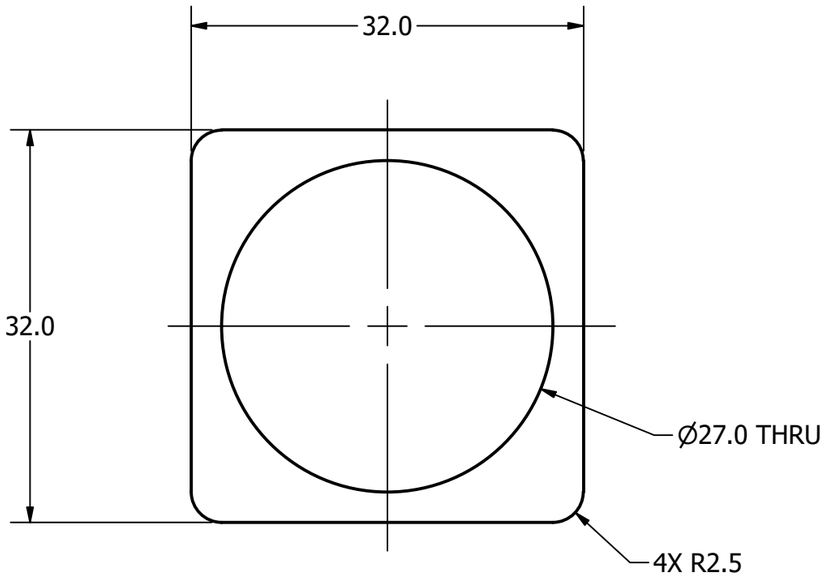
THIRD ANGLE PROJECTION

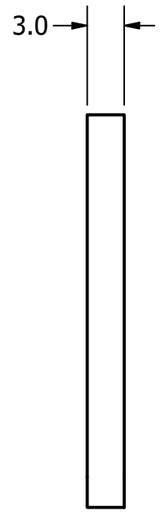
SIZE: A3 | DRAWING NUMBER: 474-5171 | REV: 1

SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/7/2016







NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: URETHANE 80A
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: B. KIMES	4/7/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

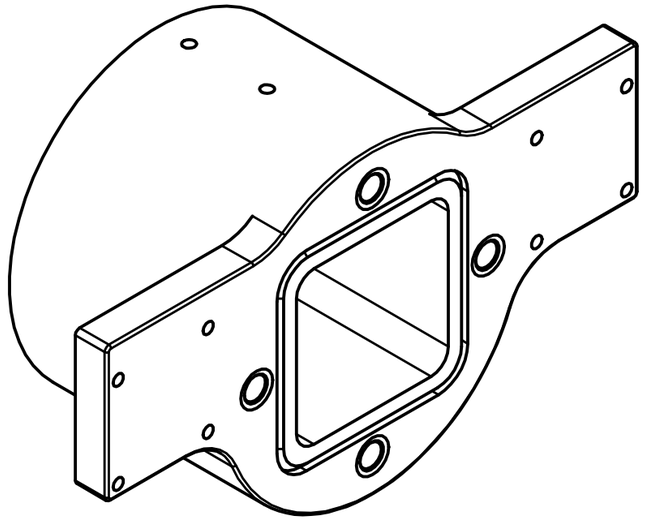
END STOP

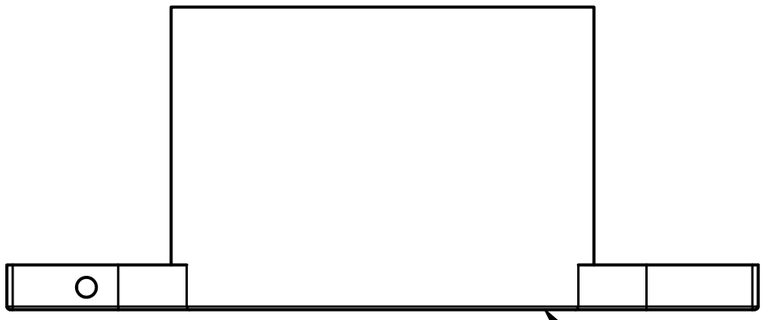
THIRD ANGLE PROJECTION

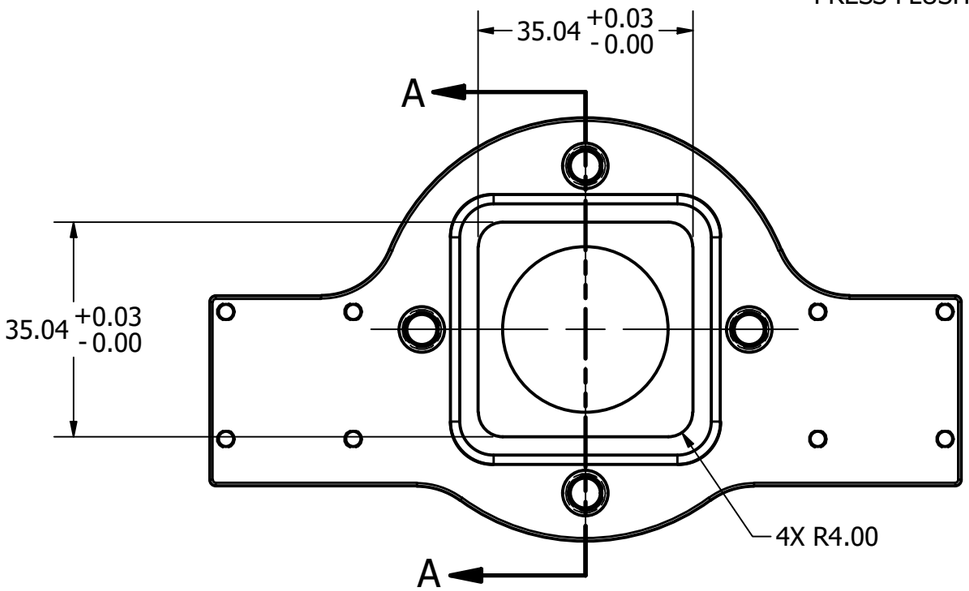
SIZE: A3 | DRAWING NUMBER: 474-5167 | REV: 1

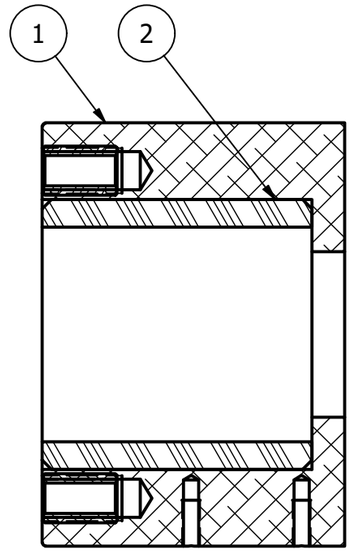
SCALE: 2:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/7/2016









SECTION A-A

ITEM	QTY	PART NUMBER	DESCRIPTION
2	1	474-5163	FEMUR BUSHING
1	1	474-5165	FEMUR CUP

PARTS LIST

NOTES:

1. PRESS 474-5163 INTO 474-5165 BOND ITEM 1 TO ITEM 2 THEN MACHINE AS SHOWN.
2. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN B. KIMES	4/7/2016
MATERIAL	
CHECKED	
HEAT TREAT	
ENG	
FINISH	
APPROVED	

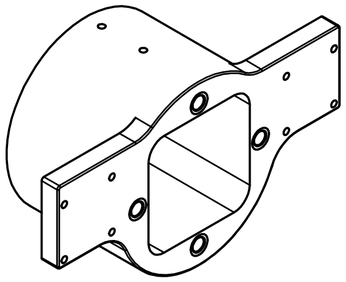
FEMUR BUSHING ASSEMBLY

THIRD ANGLE PROJECTION

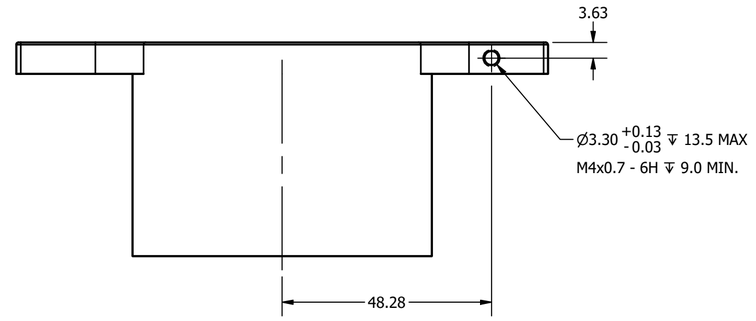
SIZE A3 | DRAWING NUMBER 474-5164 | REV 1

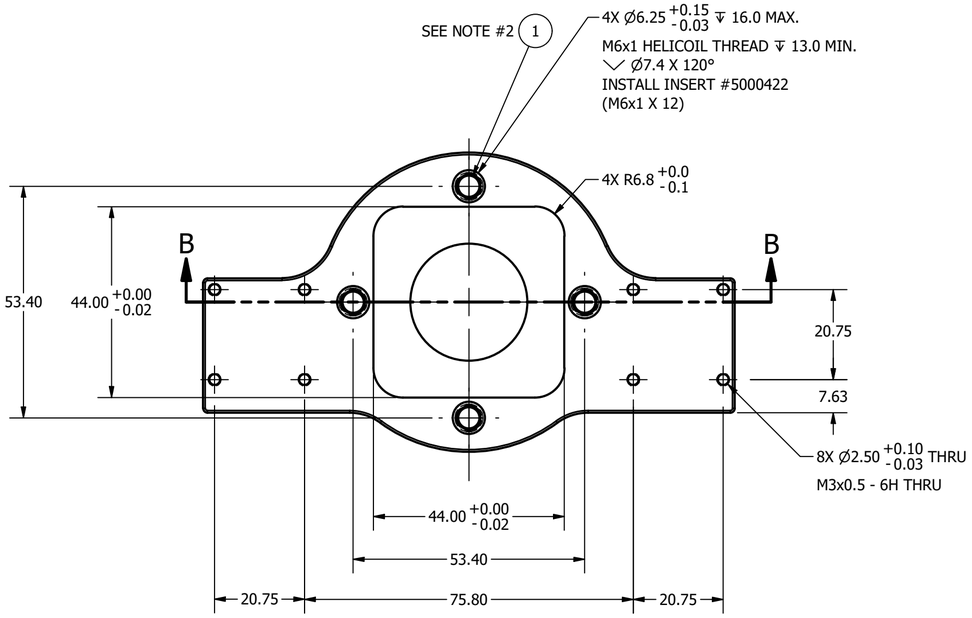
SCALE: 1:1 | SHEET 1 OF 1

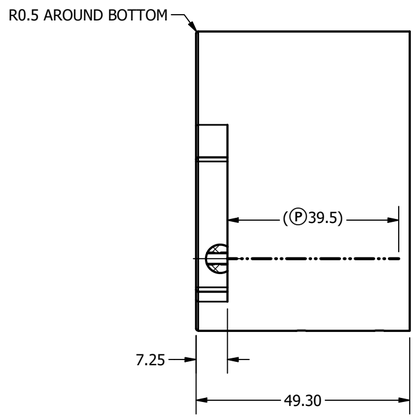
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/7/2016

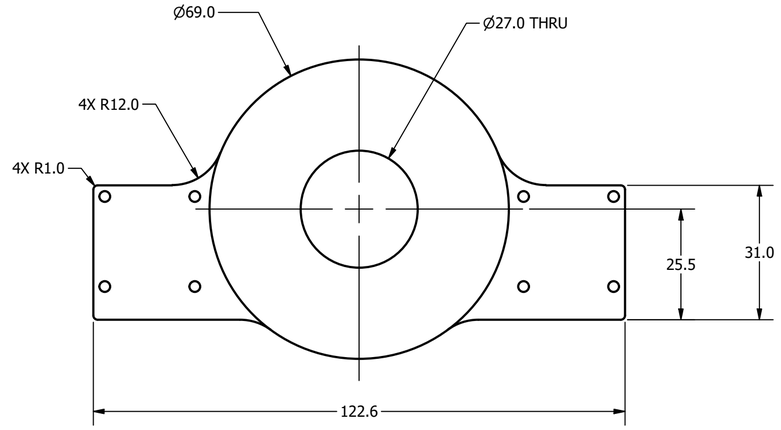


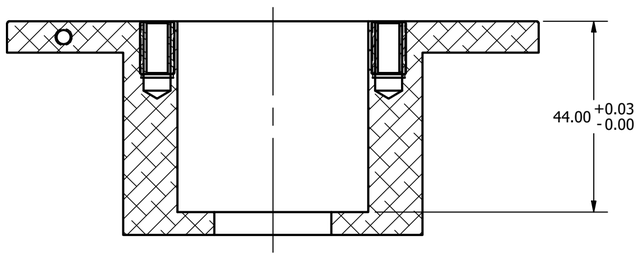
SCALE .75



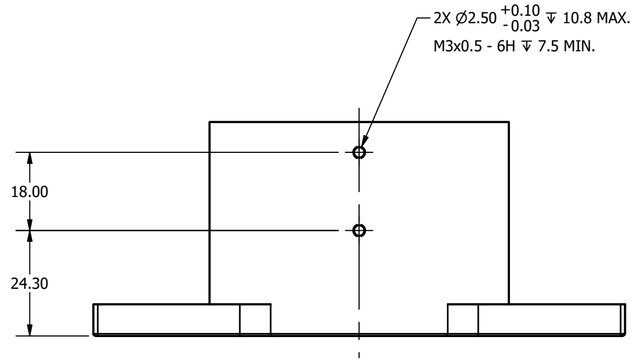








SECTION B-B



ITEM	QTY	PART NUMBER	DESCRIPTION
1	4	5000422	HELICOIL, M6 X 1 X 12

PARTS LIST

NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.
2. INSTALL HELICOILS AFTER ANODIZE.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

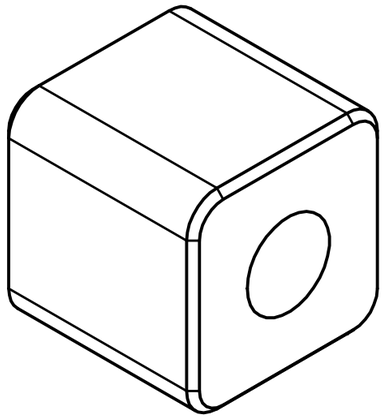
APPROVALS	DATE
DRAWN: B. KIMES	4/7/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

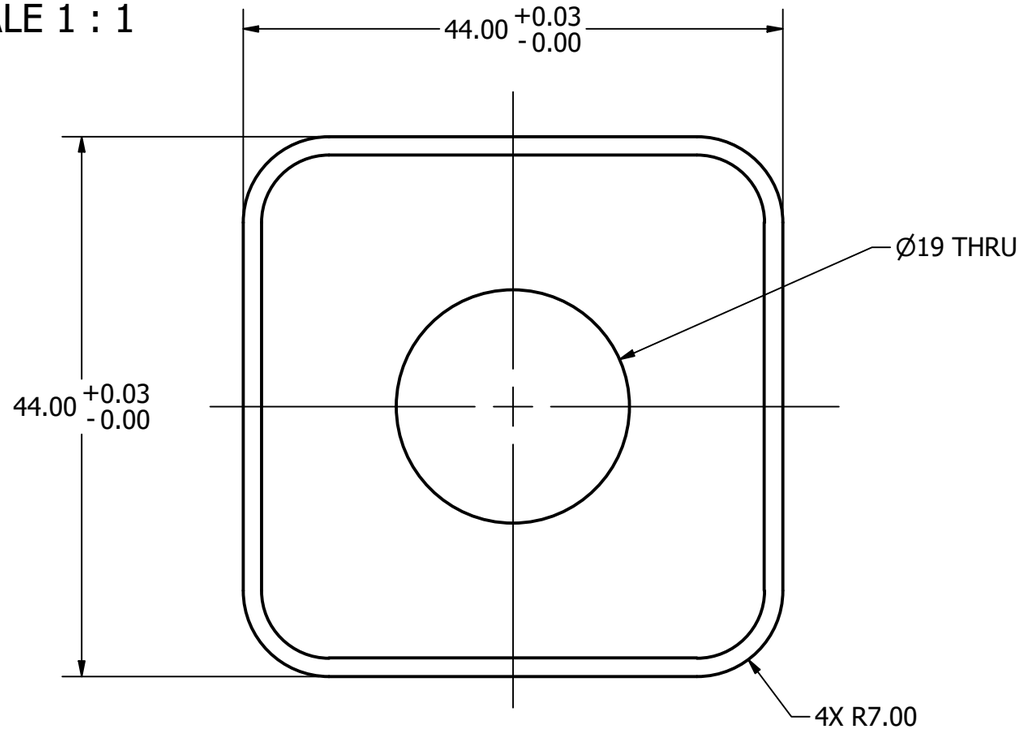
FEMUR CUP

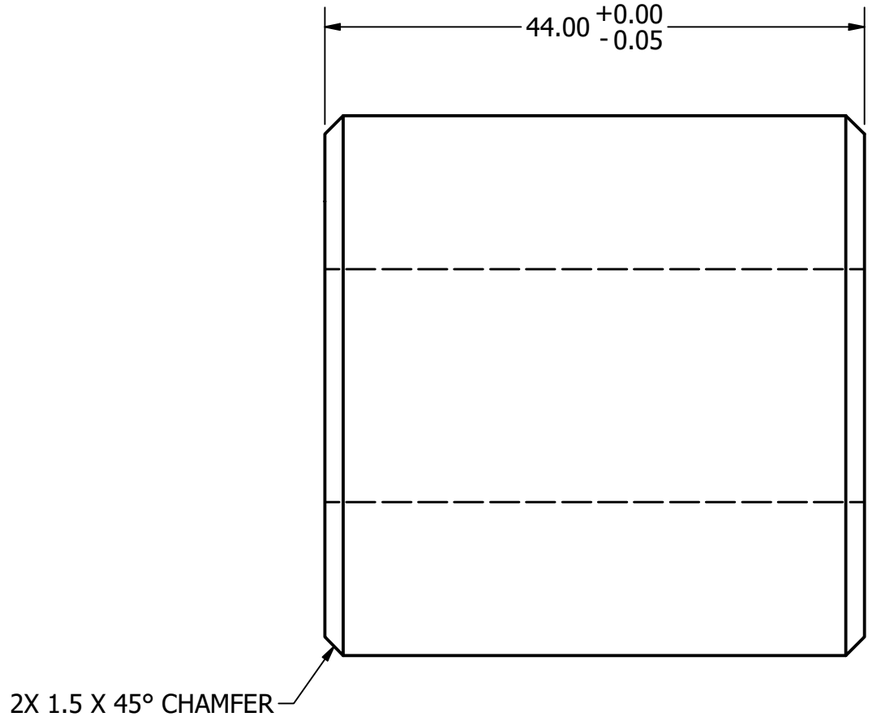
THIRD ANGLE PROJECTION
SIZE: A2
DRAWING NUMBER: 474-5165
REV: 1
SCALE: 1:1
SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/7/2016



SCALE 1 : 1





NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN B. KIMES	4/7/2016
CHECKED	
ENG	
APPROVED	

MATERIAL: PTFE
HEAT TREAT:
FINISH:

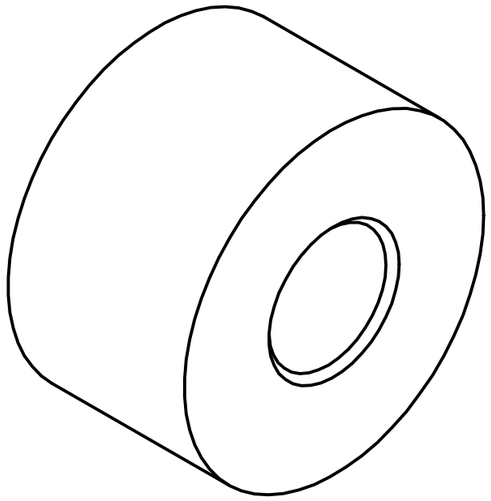
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

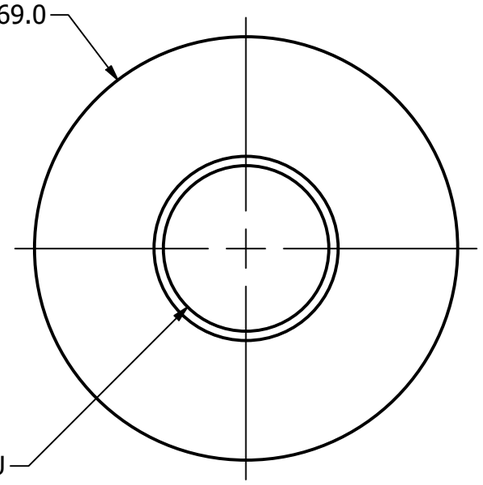
FEMUR BUSHING

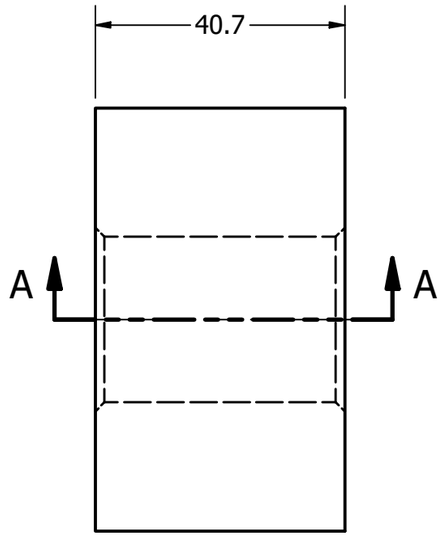
THIRD ANGLE PROJECTION

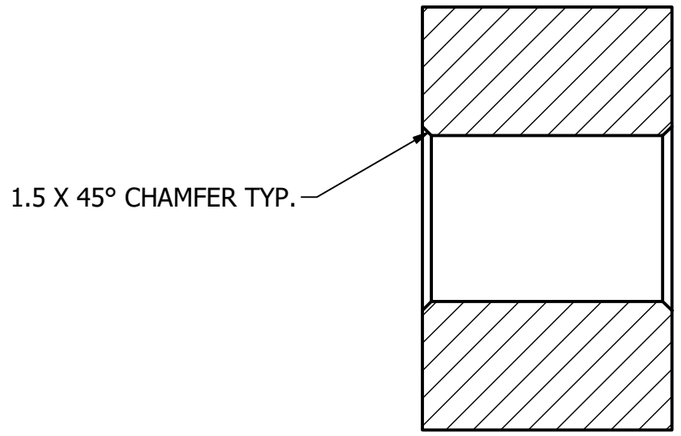
SIZE: A3 | DRAWING NUMBER: 474-5163 | REV: 1
SCALE: 2:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/7/2016









SECTION A-A

NOTES:

1. MATERIAL: NATURAL RUBBER
   COLOR: BLACK
   DUROMETER: 60 ±5 SHORE "A"
   ADJUST TO MEET DYNAMIC PERFORMANCE

2. REMOVE ALL MOLD FLASHING

3. MOLD DIMENSION TOLERANCE +1%/-2% BUT NO SMALLER THAN 0.5mm

4. NO SPLIT OR DEFECTS ARE ALLOWED IN THE RUBBER MOLDING

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED √ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTES
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: B. KIMES	4/7/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

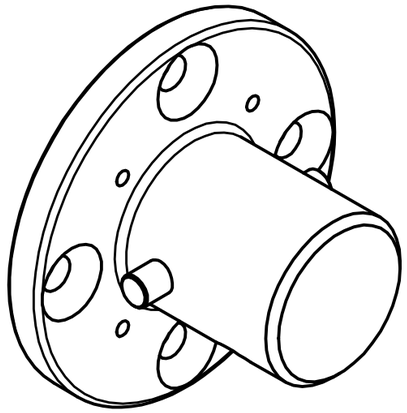
FEMUR RUBBER

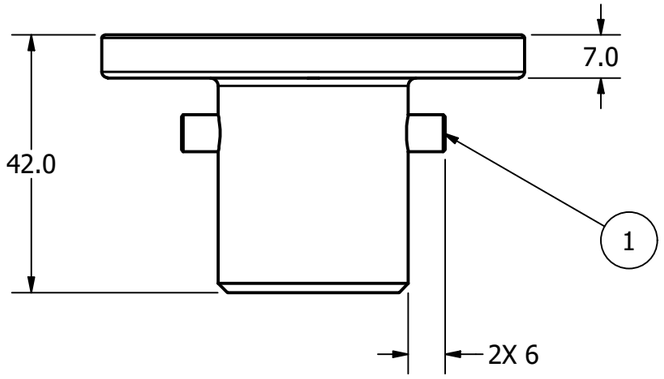
THIRD ANGLE PROJECTION

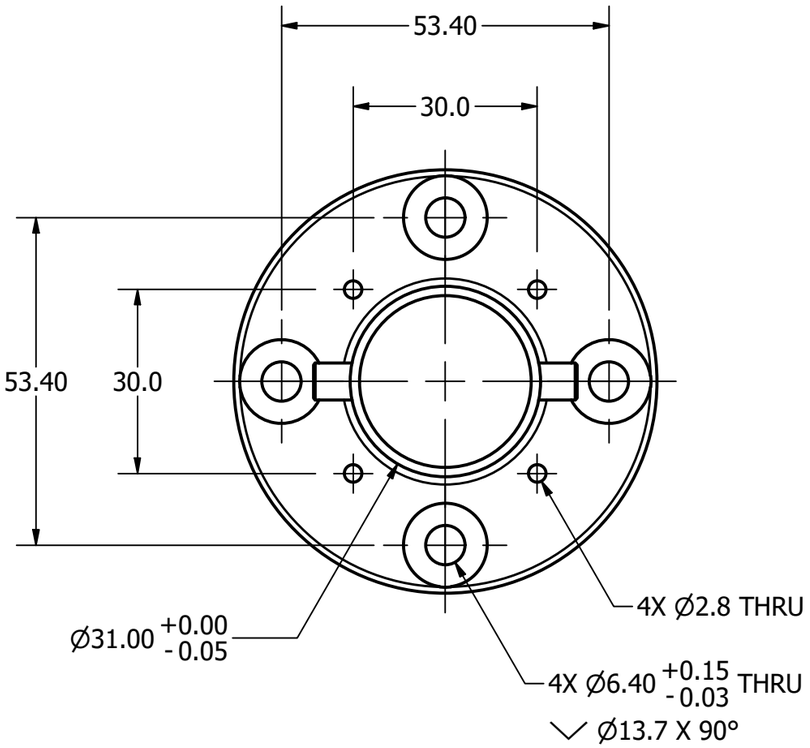
SIZE	DRAWING NUMBER	REV
A3	474-5162	1

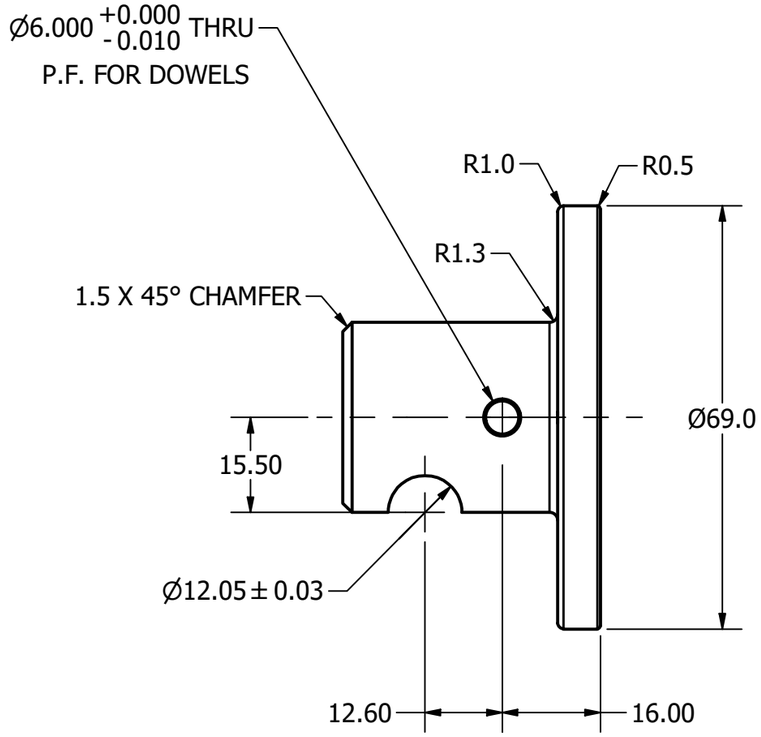
SCALE: 1:1 SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/8/2016









ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	5000433	PIN, DOWEL M6 X 12 mm

PARTS LIST

NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.
2. INSTALL DOWEL PINS AFTER PLATING.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED √ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 4140 STEEL
HEAT TREAT:
FINISH: 0.008mm ELECTROLESS NICKEL PLATE PER SIDE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: B. KIMES	4/8/2016
CHECKED:	
ENG:	
APPROVED:	

DEPARTMENT OF TRANSPORTATION UNITED STATES OF AMERICA

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

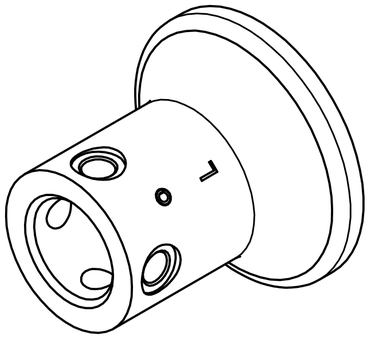
FEMUR ATTACHMENT PLATE

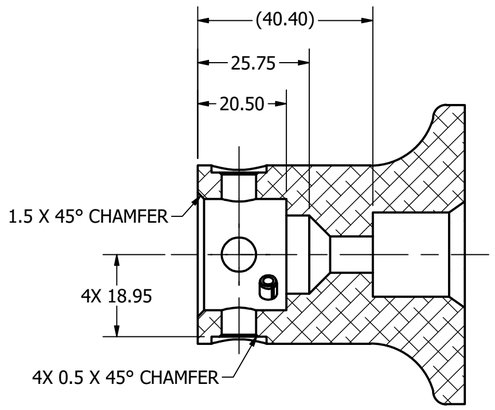
THIRD ANGLE PROJECTION

SIZE: A3 | DRAWING NUMBER: 474-5161 | REV: 1

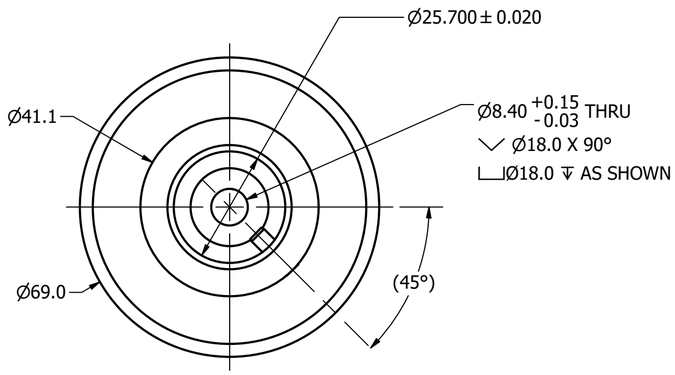
SCALE: 1:1 | SHEET: 1 OF 1

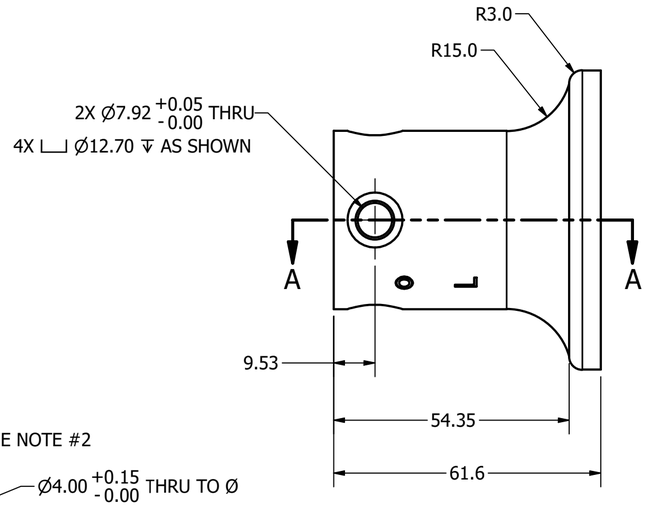
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
75049	1	RELEASE FOR PROTOTYPE	BK	JW	4/7/2016

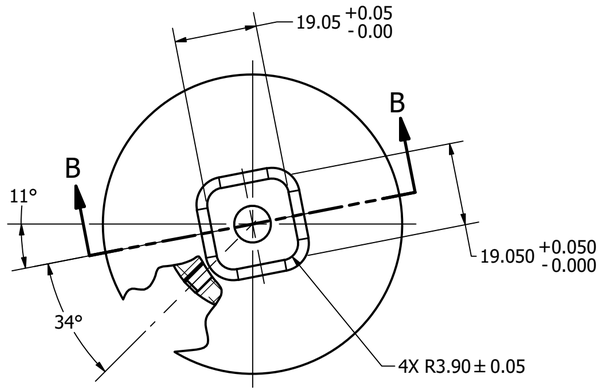


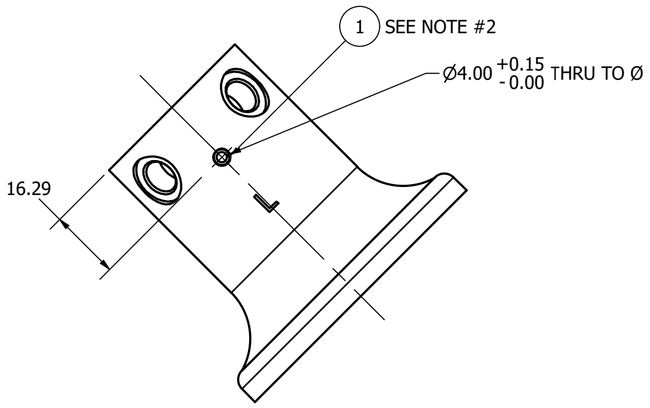


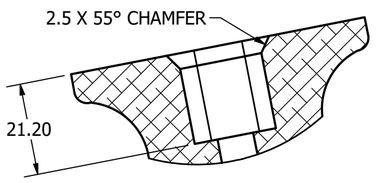
SECTION A-A











SECTION B-B

NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

2. INSTALL ROLL PIN FLUSH TO OUTSIDE SUFACE AFTER ANODIZE.

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	5000205	M4 X 12 LG. ROLL PIN SS

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

	APPROVALS	DATE
DRAWN	B. KIMES	4/7/2016
CHECKED		
ENG		
APPROVED		

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

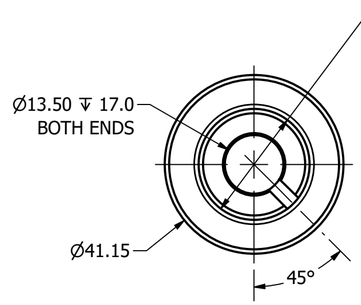
FEMUR END CAP, LEFT

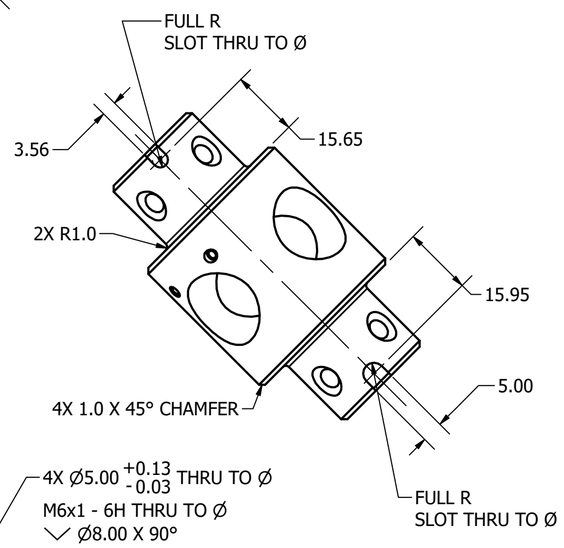
THIRD ANGLE PROJECTION

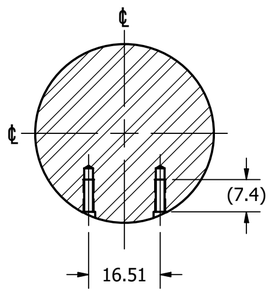
SIZE: A2 | DRAWING NUMBER: 474-5168-1 | REV: 1
SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/8/2016

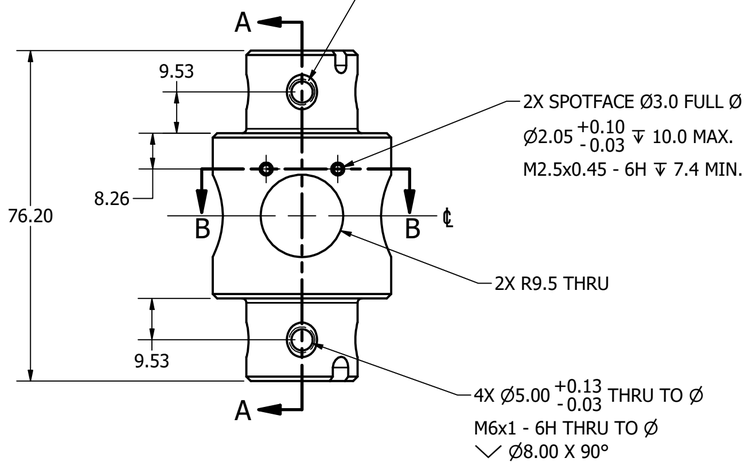


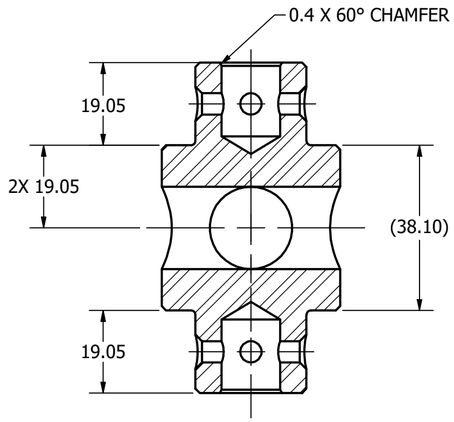




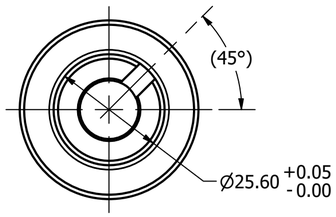


SECTION B-B





SECTION A-A



NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 1018 STEEL
HEAT TREAT:
FINISH: 0.008mm ELECTROLESS NICKEL PLATE PER SIDE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN B. KIMES	4/8/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

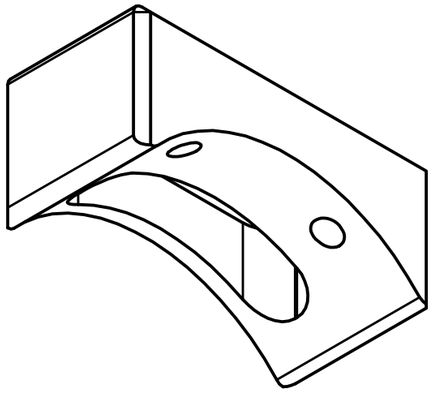
STRUCTURAL REPLACEMENT, FEMUR LOAD CELL

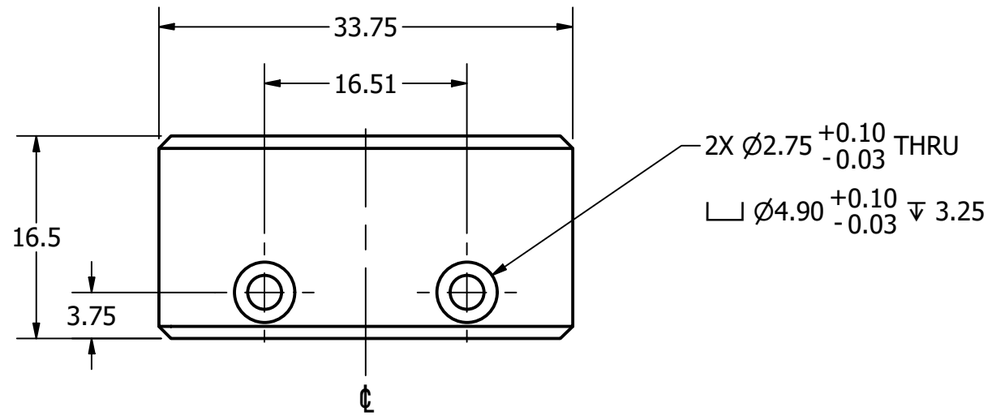
THIRD ANGLE PROJECTION

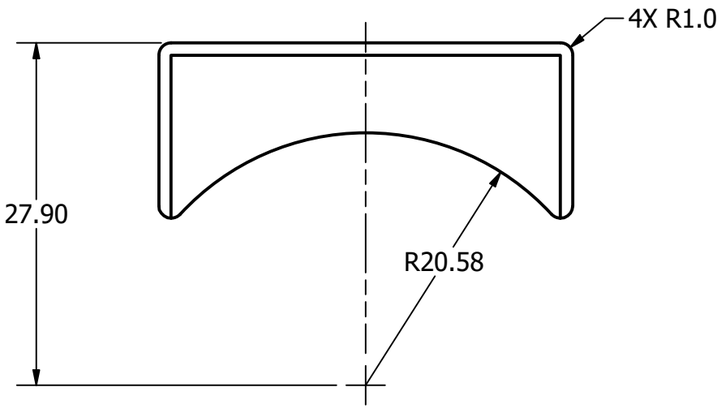
SIZE: A2 | DRAWING NUMBER: 474-5101 | REV: 1

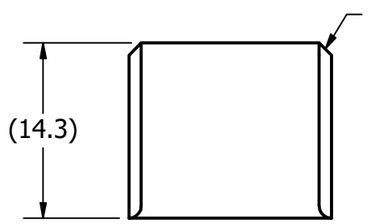
SCALE: 1:1 | SHEET: 1 OF 1

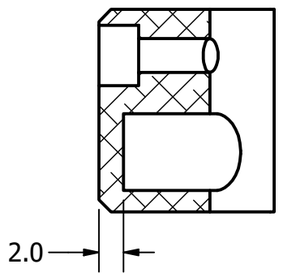
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/11/2016



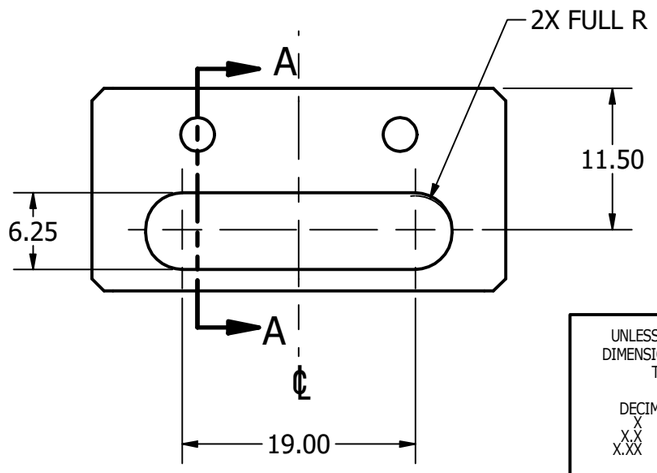








SECTION A-A



NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

*V*EHICLE *R*ESEARCH and *T*EST *C*ENTER

APPROVALS	DATE
DRAWN: B. KIMES	4/11/2016
CHECKED	
ENG	
APPROVED	

MATERIAL: 2024-T4 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

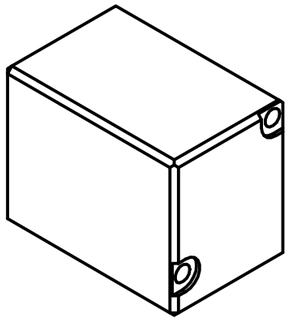
STRUCTURAL REPLACEMENT, FEMUR LOAD CELL STAIN RELIEF

THIRD ANGLE PROJECTION

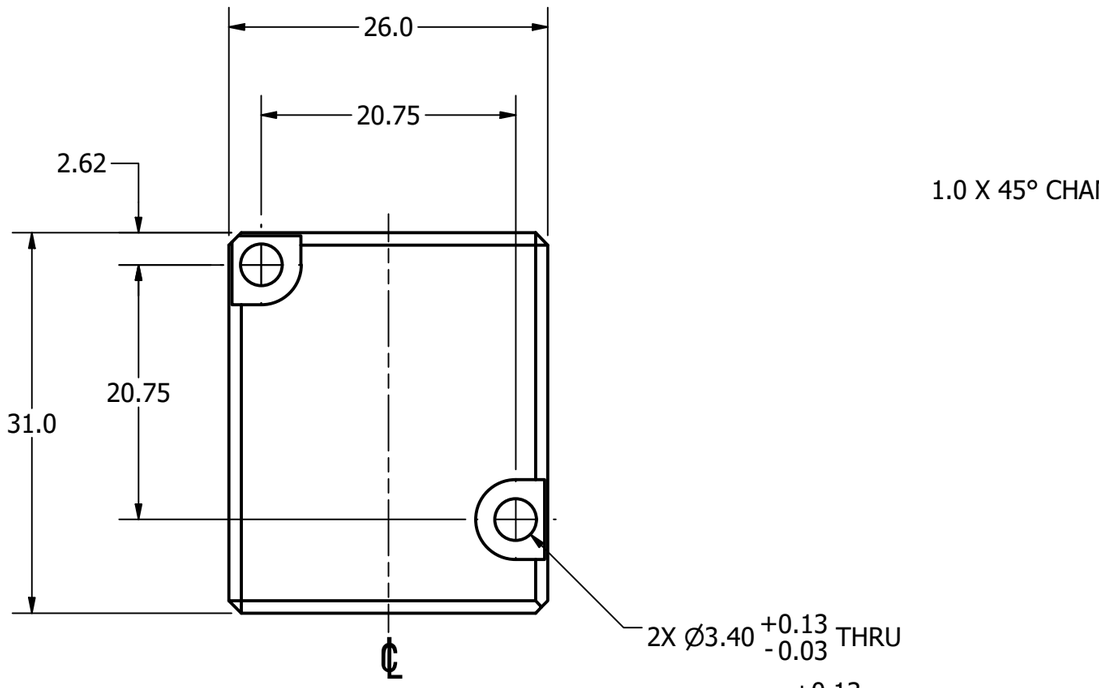
SIZE	DRAWING NUMBER	REV
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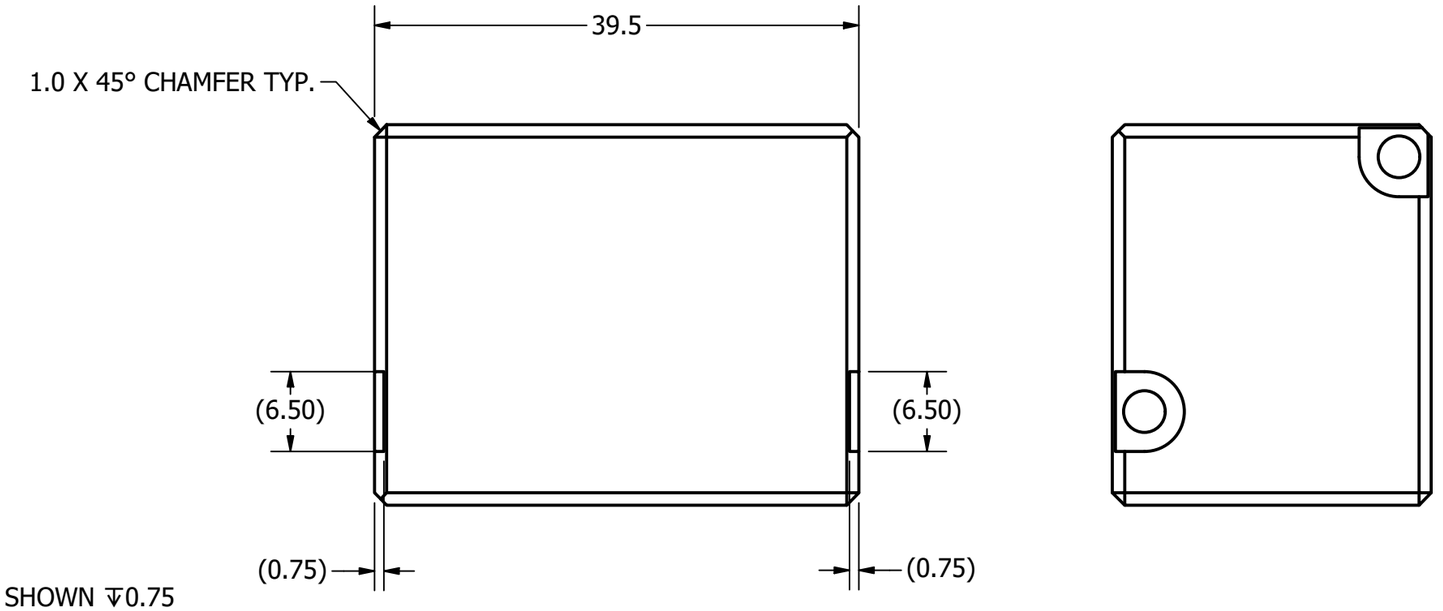
SCALE: 2:1 SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JPM		12/7/17



SCALE 1 : 1





NOTES:

1. DIMENSIONS ARE SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

2. MASS = 87± 7.5 grams

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM	CHECKED	
HEAT TREAT	ENG	
FINISH: CLEAR ANODIZE	APPROVED	

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: B. KIMES	12/7/2017

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

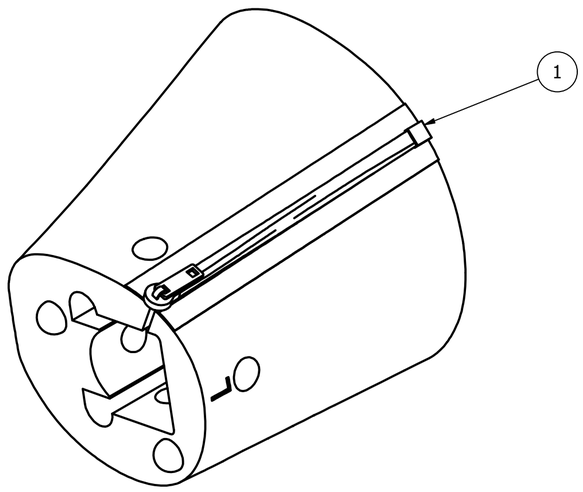
ON BOARD DAS STRUCTURAL REPLACEMENT

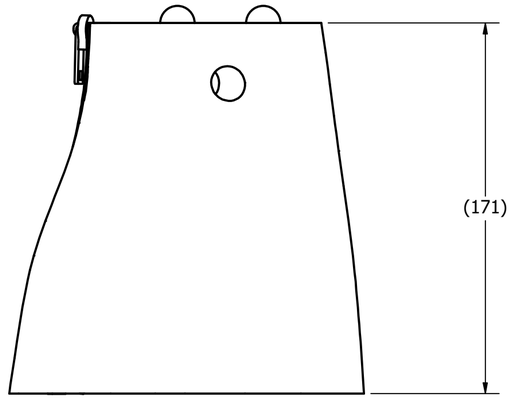
THIRD ANGLE PROJECTION

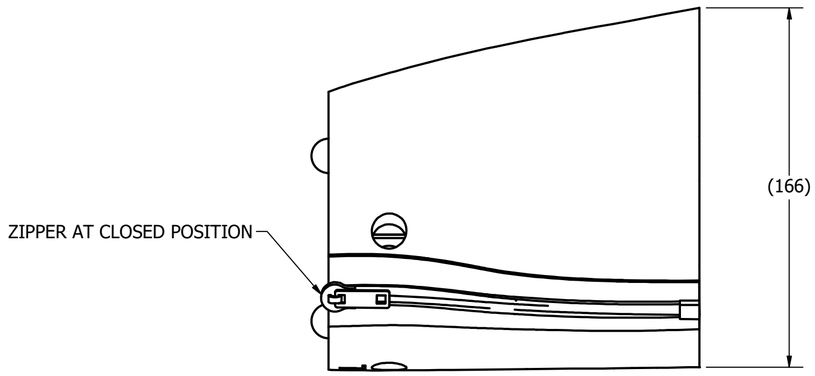
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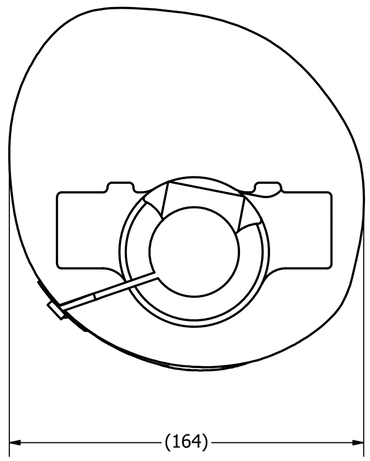
SCALE:	SHEET
2:1	1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	4/11/2016









NOTES:

1. MATERIAL: SKIN: POLYURETHANE
   FOAM: POLYURETHANE

   COLOR: EURO BROWN
   DUROMETER: 30±5 SHORE A

2. REMOVE ALL MOLD FLASHING

3. ALL MOLD DIMENSION TOLERANCE +1%/-2% BUT NO SMALLER THAN 0.5mm

4. BOND ZIPPER TO FLESH AS SHOWN.

5. WEIGHT: 1151 GRAMS - NOMINAL

PRELIMINARY DRAWING

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	474-5121	ZIPPER ASSEMBLY, UPPER LEG

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ∠ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTE #1
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: ghayden	4/11/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

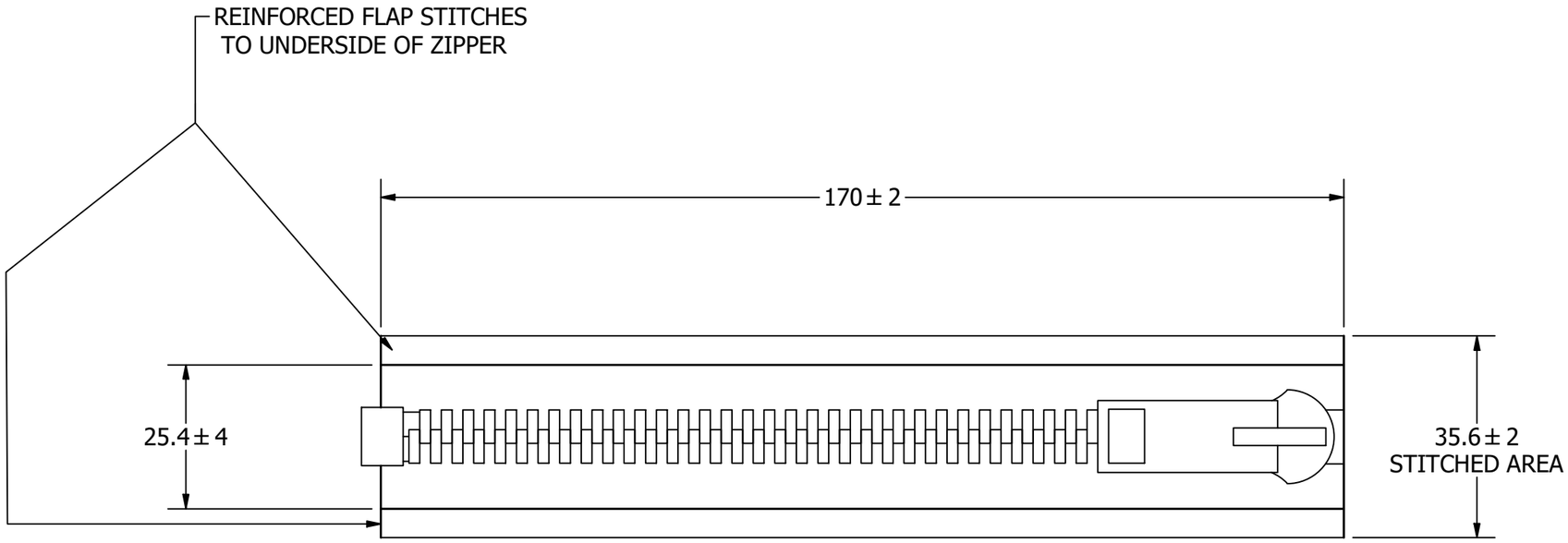
UPPER LEG FLESH, LEFT

THIRD ANGLE PROJECTION

SIZE: A2 | DRAWING NUMBER: 474-5120-1 | REV: 1

SCALE: .5:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JPM	JW	4/8/16



NOTES:

1. ALL BLACK #5 ZIPPER.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED √ ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTES	CHECKED	
HEAT TREAT	ENG	
FINISH	APPROVED	

*V*EHICLE *R*ESEARCH and *T*EST *C*ENTER

APPROVALS	DATE
DRAWN: J. MCINNIS	4/8/2016

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

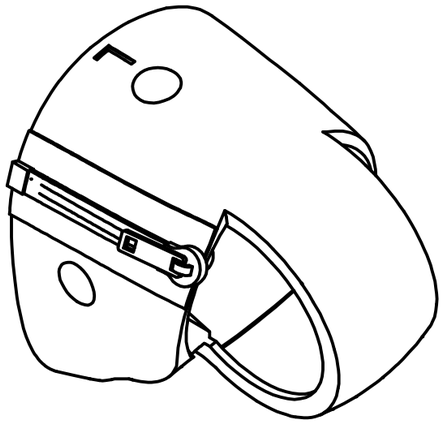
ZIPPER ASSEMBLY, UPPER LEG

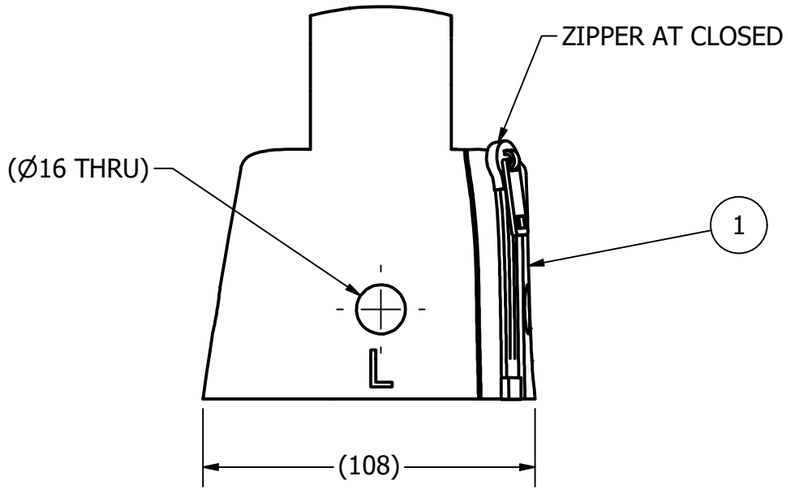
THIRD ANGLE PROJECTION

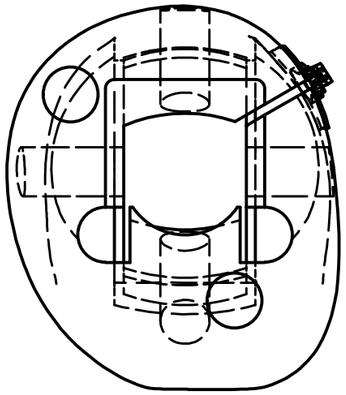
SIZE	DRAWING NUMBER	REV
A3	474-5121	1

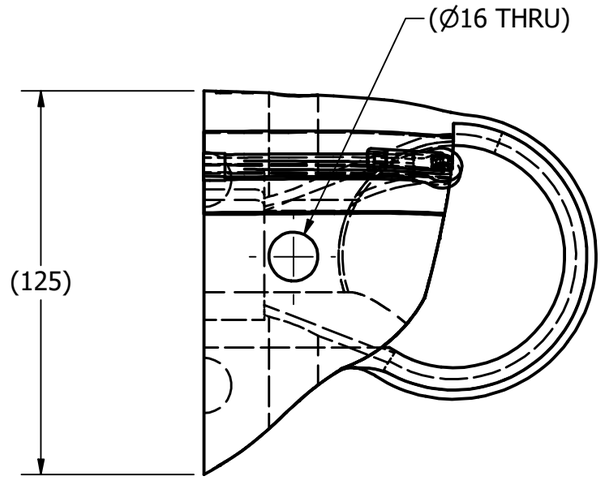
SCALE: 1:1 SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	4/11/2016









NOTES:

1. MATERIAL: SKIN: POLYURETHANE
   FOAM: POLYURETHANE

   COLOR: EURO BROWN
   DUROMETER: 30±5 SHORE A

2. REMOVE ALL MOLD FLASHING

3. ALL MOLD DIMENSION TOLERANCE +1%/-2% BUT NO SMALLER THAN 0.5mm

4. BOND ZIPPER TO FLESH AS SHOWN.

5. WEIGHT: 305 GRAMS - NOMINAL

PRELIMINARY DRAWING

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	474-5324	ZIPPER ASSEMBLY, KNEE

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

KNEE FLESH, LEFT

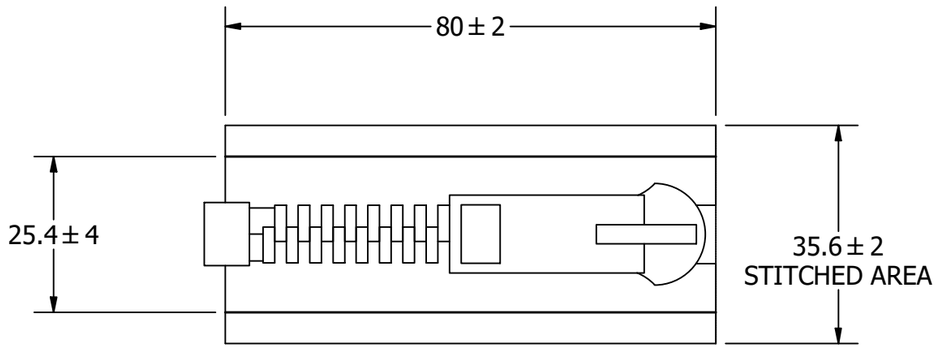
APPROVALS	DATE
DRAWN ghayden	4/11/2016
CHECKED	
ENG	
APPROVED	

MATERIAL: SEE NOTE #1
HEAT TREAT:
FINISH:

THIRD ANGLE PROJECTION

SIZE: A3 | DRAWING NUMBER: 474-5320-1 | REV: 1
SCALE: .5:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JPM	JW	4/8/16



NOTES:

1. ALL BLACK #5 ZIPPER.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTES
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: J. MCINNIS	4/8/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

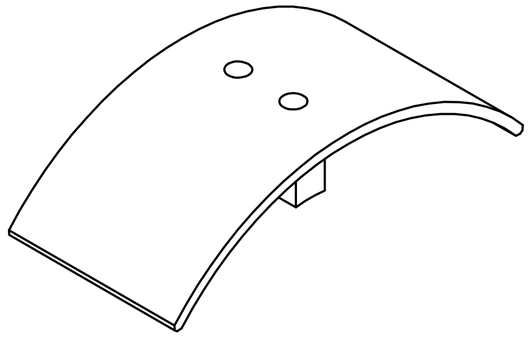
ZIPPER ASSEMBLY, KNEE

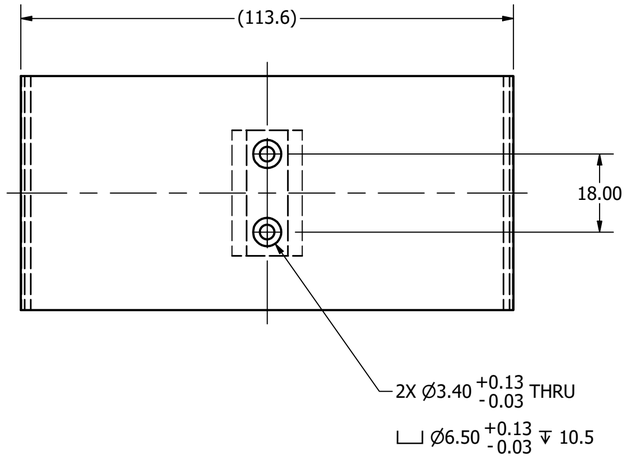
THIRD ANGLE PROJECTION

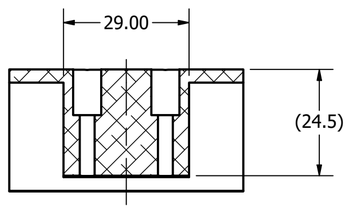
SIZE: A3 | DRAWING NUMBER: 474-5324 | REV: 1

SCALE: 1:1 | SHEET: 1 OF 1

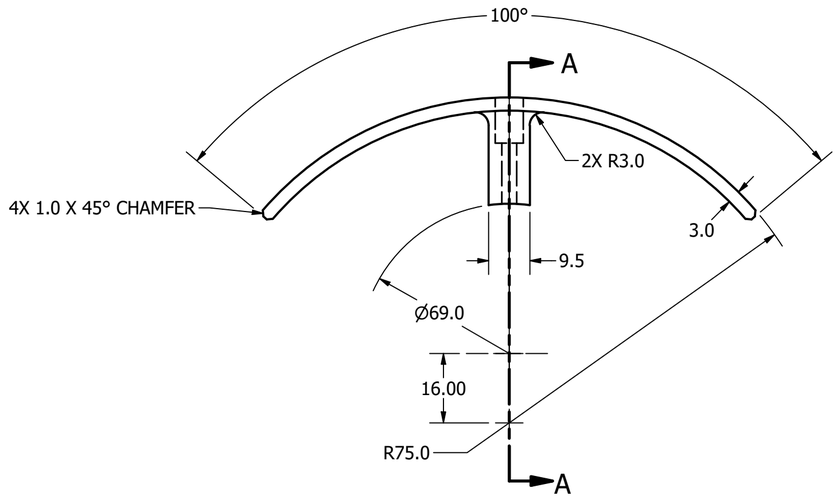
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	4/11/2016

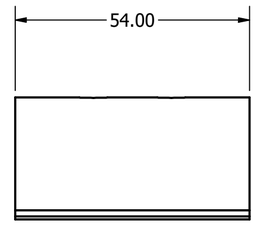






SECTION A-A





NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: ghayden	4/11/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

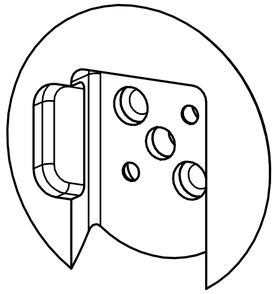
CABLE CONNECTOR GUARD

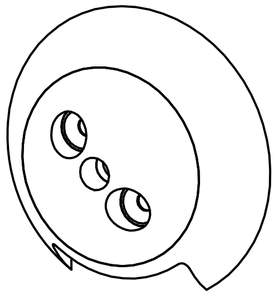
THIRD ANGLE PROJECTION

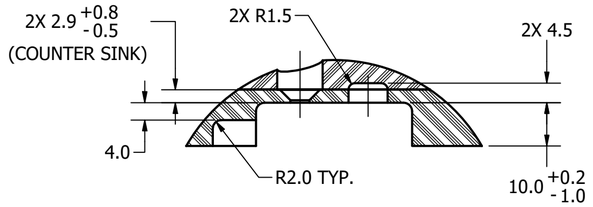
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SCALE: 1:1 | SHEET: 1 OF 1

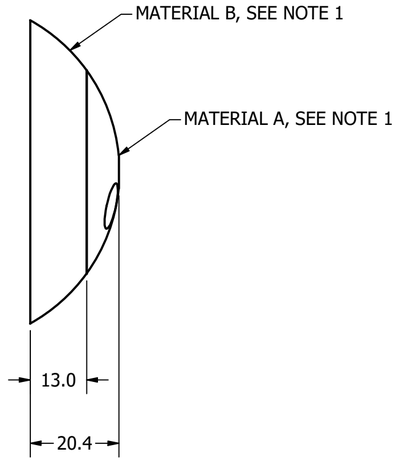
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	4/12/2016

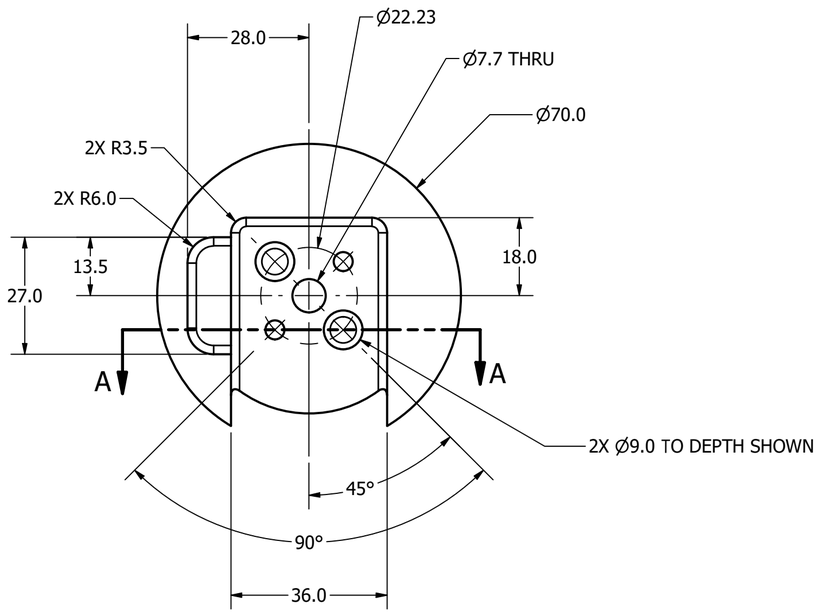


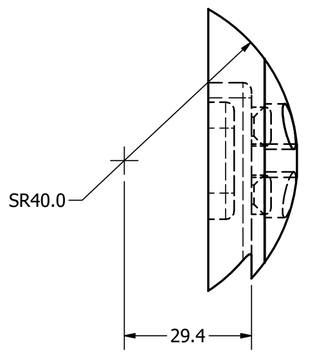


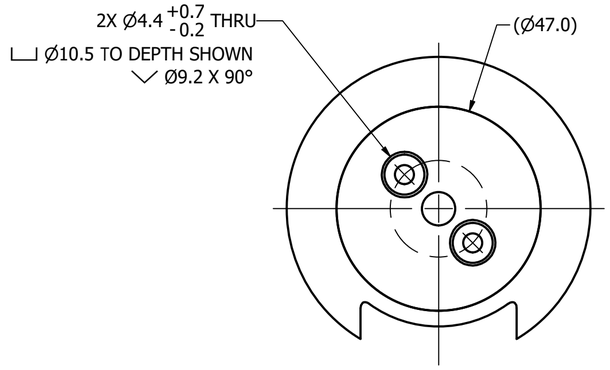


SECTION A-A









NOTES:

1. MATERIAL A: URETHANE 37±5 SHORE "A"
   MATERIAL B: URETHANE 65±5 SHORE "D"

2. REMOVE ALL MOLD FLASHING

3. ALL MOLD DIMENSION TOLERANCE +1%/-2% BUT NO SMALLER THAN 0.5mm

4. NO SPLIT OR DEFECTS ARE ALLOWED IN THE URETHANE MOLDING

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ∠ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTE #1
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: ghayden	4/12/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

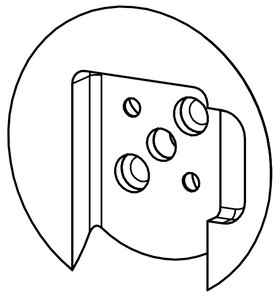
KNEE COVER, LEFT

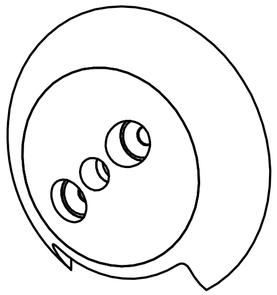
THIRD ANGLE PROJECTION

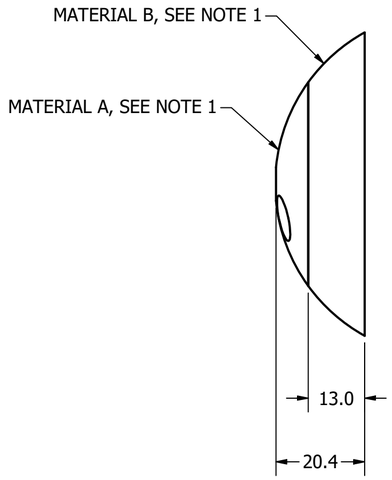
SIZE: A2 | DRAWING NUMBER: 474-5301-1 | REV: 1

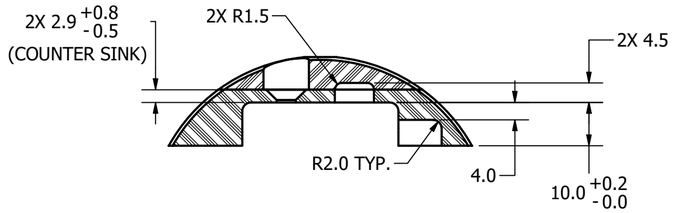
SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	4/12/2016

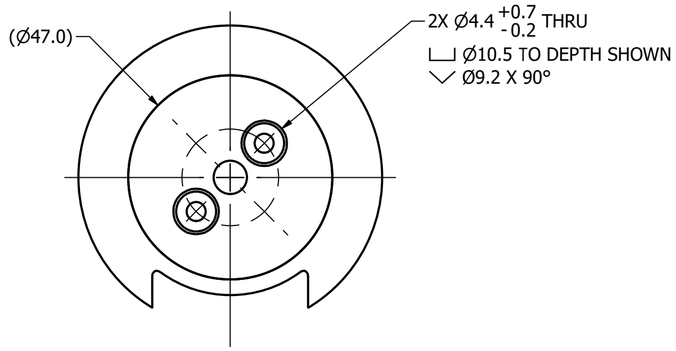


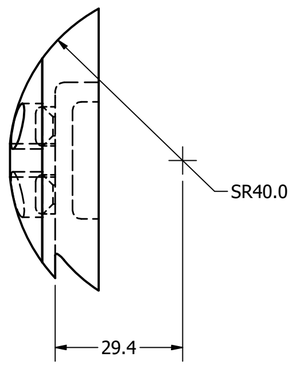


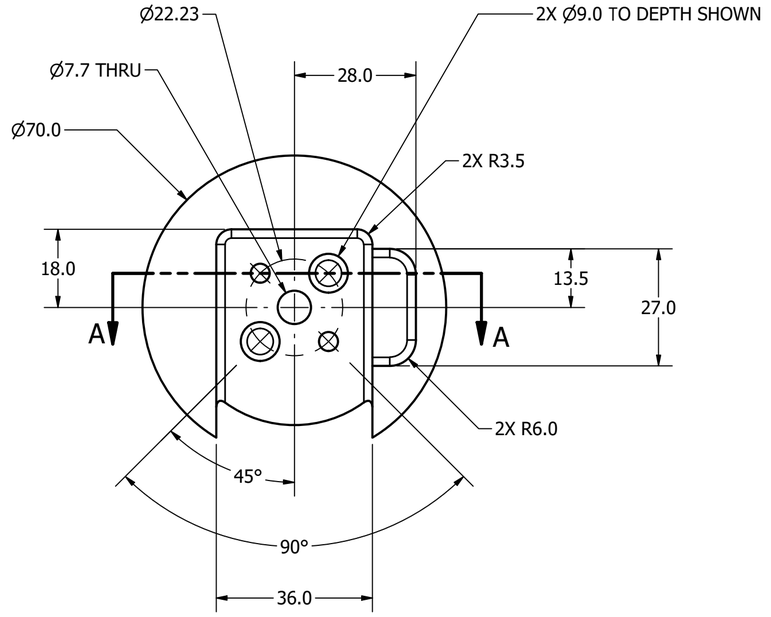




SECTION A-A







NOTES:

1. MATERIAL A: URETHANE 37±5 SHORE "A"
   MATERIAL B: URETHANE 65±5 SHORE "D"

2. REMOVE ALL MOLD FLASHING

3. ALL MOLD DIMENSION TOLERANCE +1%/-2% BUT NO SMALLER THAN 0.5mm

4. NO SPLIT OR DEFECTS ARE ALLOWED IN THE URETHANE MOLDING

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED SURFACE ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTE #1
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: ghayden	4/12/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

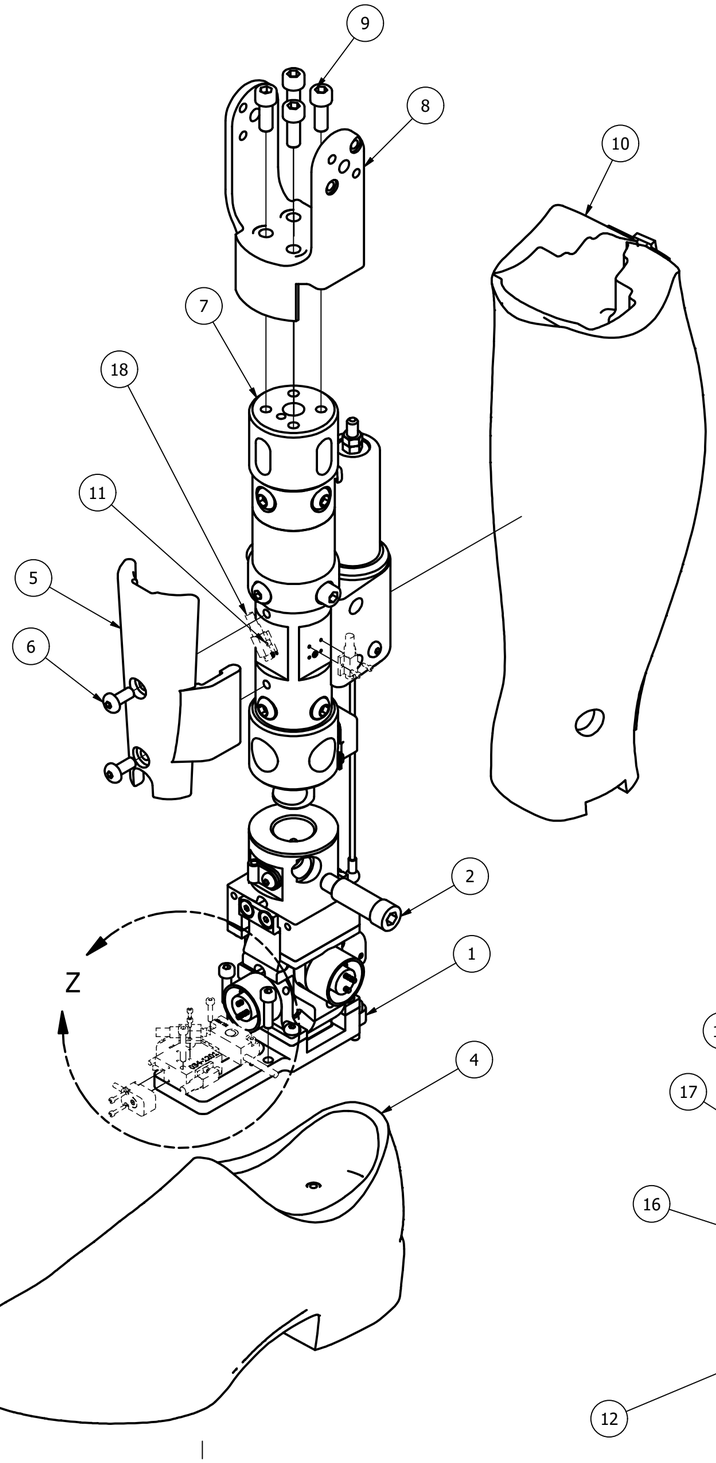
KNEE COVER, RIGHT

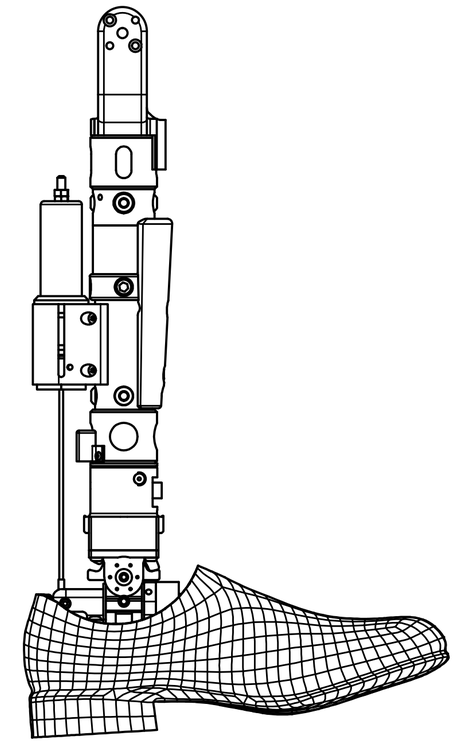
THIRD ANGLE PROJECTION

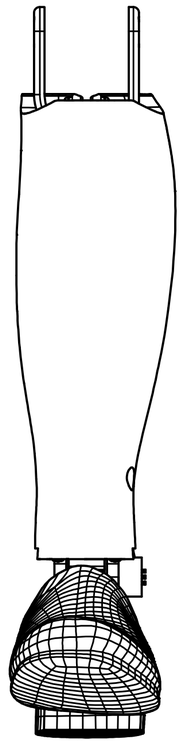
SIZE: A2 | DRAWING NUMBER: 474-5301-2 | REV: 1

SCALE: 1:1 | SHEET: 1 OF 1

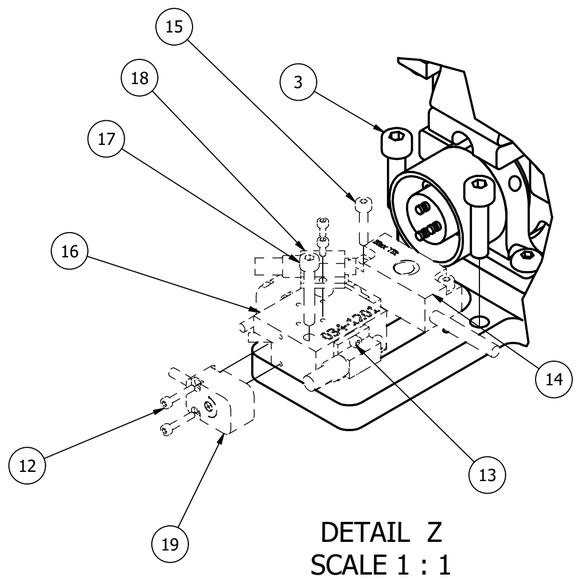
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/14/2016







FLESH NOT SHOWN
FOR CLARITY



DETAIL Z
SCALE 1 : 1

ITEM	QTY	PART NUMBER	DESCRIPTION	
19	3	SA572-S58	ANGULAR RATE SENSOR	(REF)
18	5	SA572-S4	UNIAXIAL PIEZORESISTIVE ACCELEROMETER	(REF)
17	2	5000069	M2.5 X 0.45 X 16 LG. SHCS	(REF)
16	1	SA572-S87	6 AXIS ACCEL/ARS MOUNT, (7264-2000), HEAD & PELVIS, Q DUMMIES	(REF)
15	2	5000215	M2 X 0.4 X 10 LG. SHCS	(REF)
14	1	SA572-S44	TILT SENSOR, DUAL AXIS	(REF)
13	6	5000068	M1.4 X 0.3 X 3 LG. SHCS	(REF)
12	6	5000727	M1.4 X 0.3 X 8 LG. SHCS	(REF)
11	4	5000375	M1.4 X 0.3 X 4 LG. SHCS	(REF)
10	1	474-5520-1	LOWER LEG FLESH, LEFT	
9	4	5000081	M6 X 1 X 16 LG. SHCS	
8	1	474-5517-1	KNEE CLEVIS, LEFT	
7	1	474-5507-1	TIBIA ASSEMBLY, LEFT	
6	2	5000654	M5 X 0.8 X 12 LG. BHCS	
5	1	474-5518-1	SHIN GUARD, MOLDED, LEFT	
4	1	474-5903-1	MOLDED SHOE ASSEMBLY, LEFT	
3	4	5000025	M4 X 0.7 X 16 LG. SHCS	
2	1	472-7563	BOLT & SLEEVE ASSEMBLY-ANKLE	
1	1	474-5800-1	ANKLE ASSEMBLY, LEFT	

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED √ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL
HEAT TREAT
FINISH

PRELIMINARY DRAWING

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN B. KIMES	4/14/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

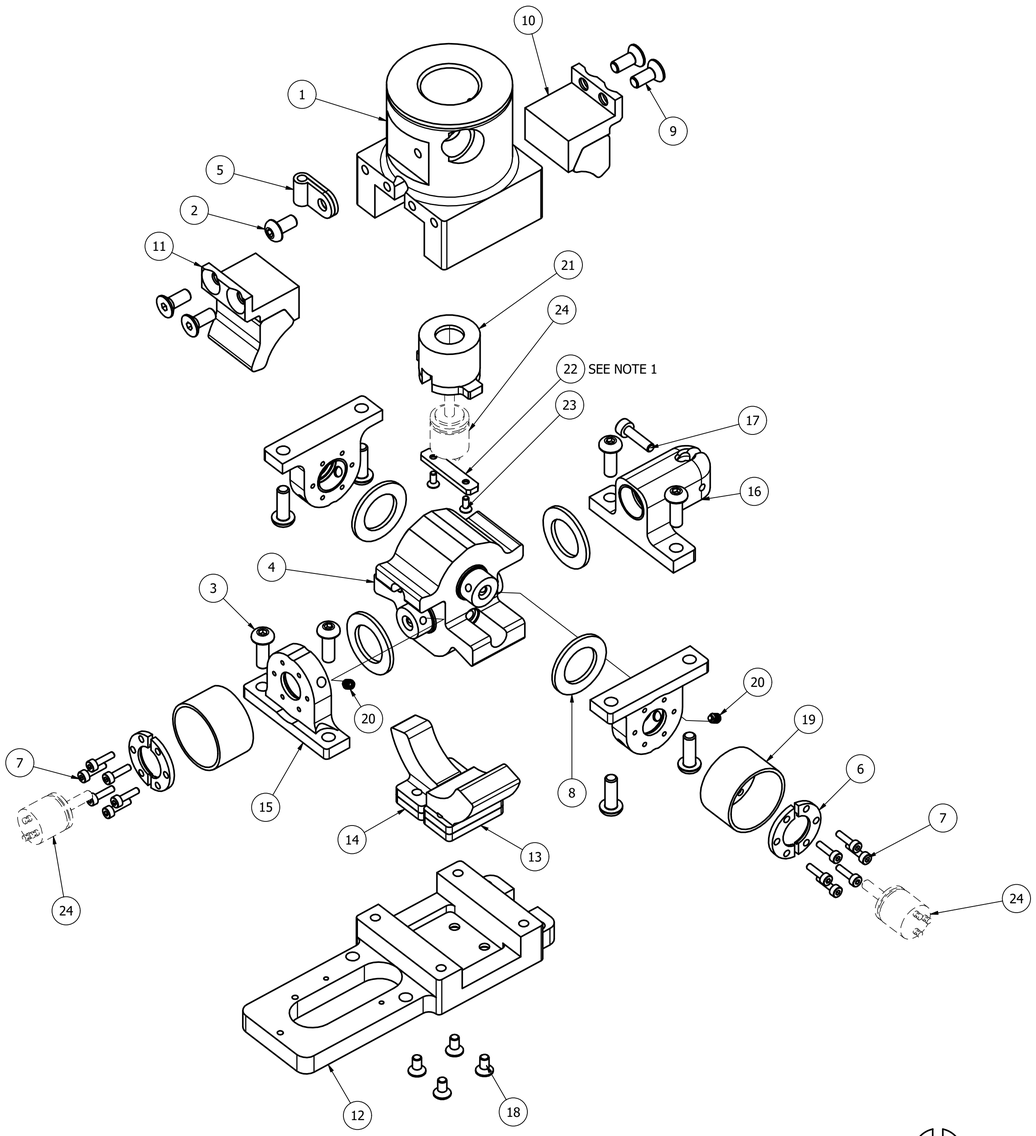
LOWER LEG ASSEMBLY, LEFT

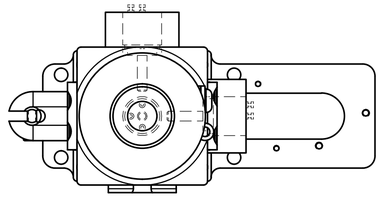
THIRD ANGLE PROJECTION

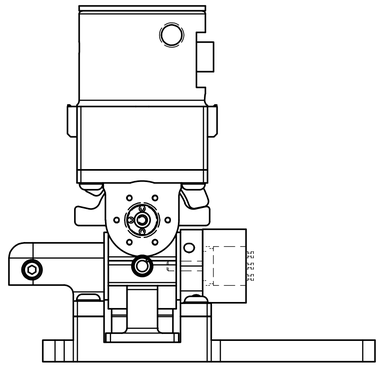
SIZE A2 | DRAWING NUMBER 474-5500-1 | REV 1

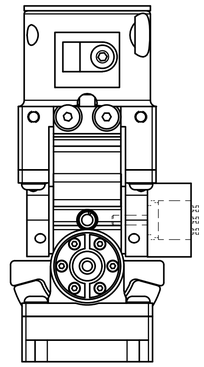
SCALE: .5:1 | SHEET 1 OF 1

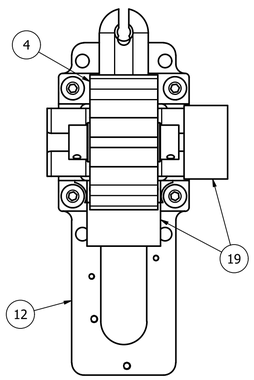
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AB	JW	10/25/16
	2	ADDED CLARIFICATION TO SINGLE FLAT NOTE; 5000098 WAS 5000116	AB	KMSP	11/29/2018

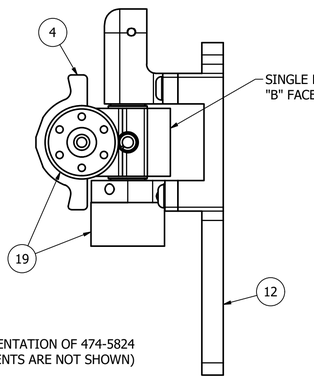












NOTE ORIENTATION OF 474-5824
(SOME COMPONENTS ARE NOT SHOWN)

ITEM	QTY	PART NUMBER	DESCRIPTION	
24	3	SA572-S114	ROTARY POTENTIOMETER	(REF)
23	2	5000753	M2 X 0.4 X 5 LG. FHCS	
22	1	474-5832	POTENTIOMETER CLAMP	
21	1	474-5831	POTENTIOMETER INNER MOUNT	
20	2	9010447	M3 X 0.5 X 3 LG. SSSNP	
19	2	474-5825	POTENTIOMETER CAP	
18	4	5000098	M3 X 0.5 X 6 LG. FHCS	
17	1	5001103	M3 X 0.5 X 12 LG. SHCS	
16	1	474-5828	ACHILLES CABLE RETAINER	
15	3	474-5826	PLATE, ANKLE BUSHING	
14	1	474-5816	INVERSION STOP ASSEMBLY	
13	1	474-5813	EVERSION STOP ASSEMBLY	
12	1	474-5806-1	LOWER ANKLE PLATE, LEFT	
11	1	474-5807	DORSI STOP ASSEMBLY	
10	1	474-5810	PLANTAR STOP ASSEMBLY	
9	4	5000023	M4 X 0.7 X 10 LG. FHCS	
8	4	474-5720	ANKLE THRUST WASHER	
7	12	5000083	M2 X 0.4 X 8 LG. SHCS	
6	2	472-7581	POTENTIOMETER CLAMP	
5	1	9005135	CLAMP, NYLON LOOP	
4	1	474-5824	ANKLE CENTER BLOCK ASSEMBLY	
3	8	5000005	M4 X 0.7 X 12 LG. BHCS	
2	1	5000103	M4 X 0.7 X 8 LG. BHCS	
1	1	474-5820-1	UPPER ANKLE ADAPTOR, LEFT	

PARTS LIST

NOTES:

1. CLAMP SECURES POTENTIOMETER FROM MOVING IN ANY DIRECTION.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.2, X.X ±.1, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

	APPROVALS	DATE
DRAWN	A. Barchock	10/25/2016
MATERIAL	CHECKED	
HEAT TREAT	ENG	
FINISH	APPROVED	

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

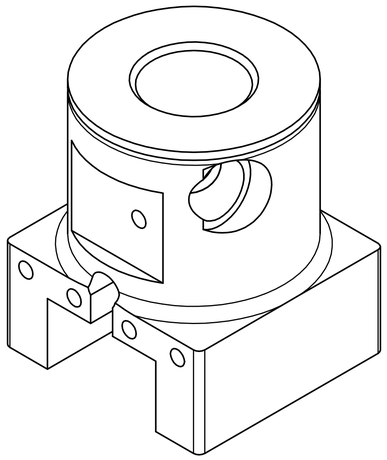
ANKLE ASSEMBLY, LEFT

THIRD ANGLE PROJECTION

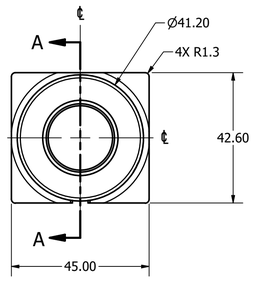
SIZE A1 | DRAWING NUMBER 474-5800-1 | REV 2

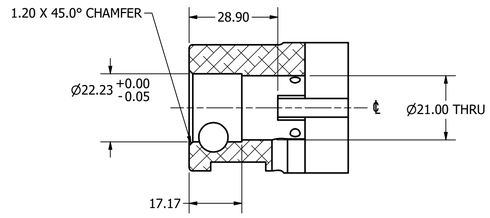
SCALE: 1:1 | SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AT	JW	11/27/17

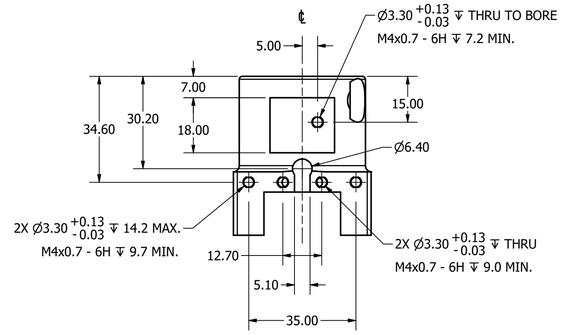


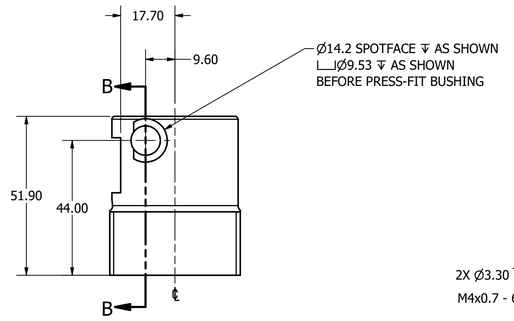
SCALE 2 : 1

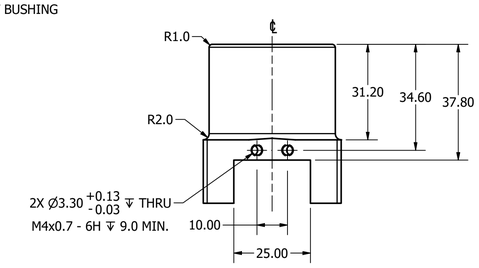


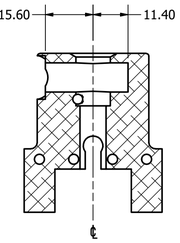


SECTION A-A

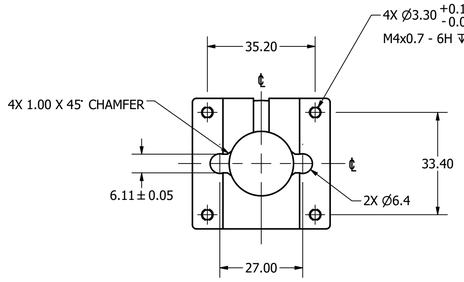




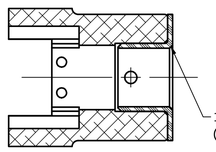




SECTION B-B

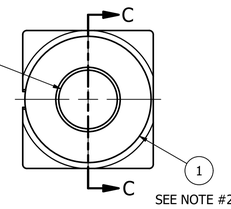


AFTER PRESS FIT BUSHING

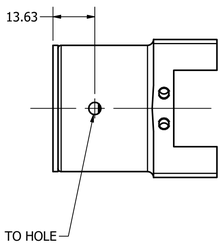


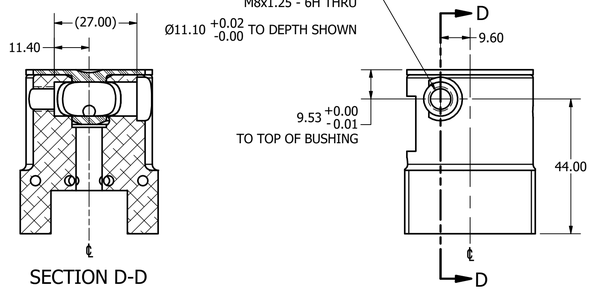
1.00 X 45° CHAMFER (BUSHING)

SECTION C-C



SEE NOTE #2





SECTION D-D

NOTES:

1. DIMENSIONS ARE SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

2. INSTALL THRUST BUSHING 474-5707 AFTER ANODIZE WITH EPOXY ADHESIVE.

PRELIMINARY DRAWING

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	474-5707	THRUST BUSHING

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: .X ±.2, .XX ±.1, .XXX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: A.TOMICH	7/10/2017
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

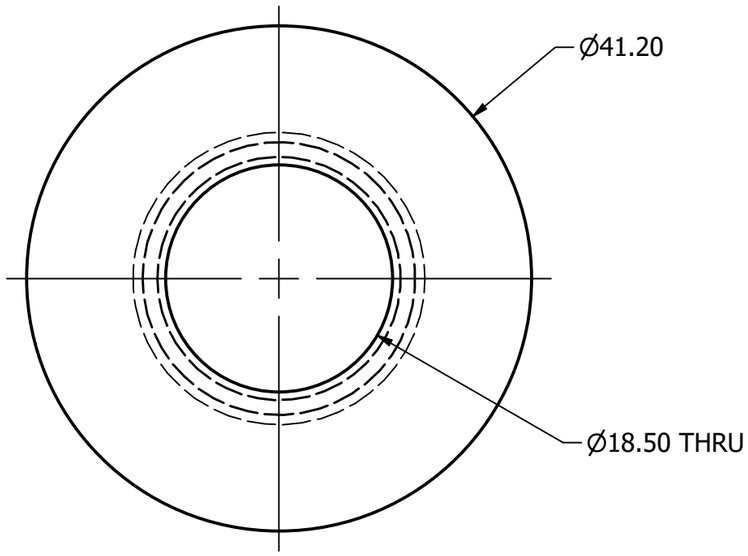
UPPER ANKLE ADAPTOR, LEFT

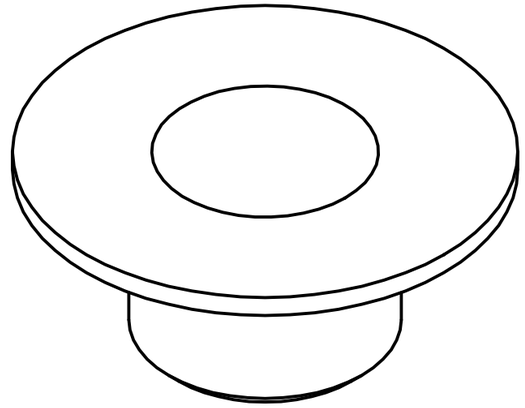
THIRD ANGLE PROJECTION

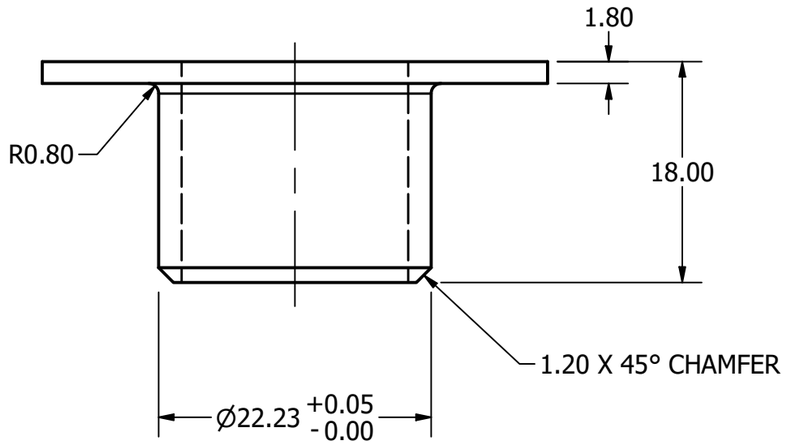
SIZE: A1 | DRAWING NUMBER: 474-5820-1 | REV: 1

SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JPM		4/11/16







PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ±.5°
ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: ACETAL RESIN, WHITE
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: J. MCINNIS	4/11/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

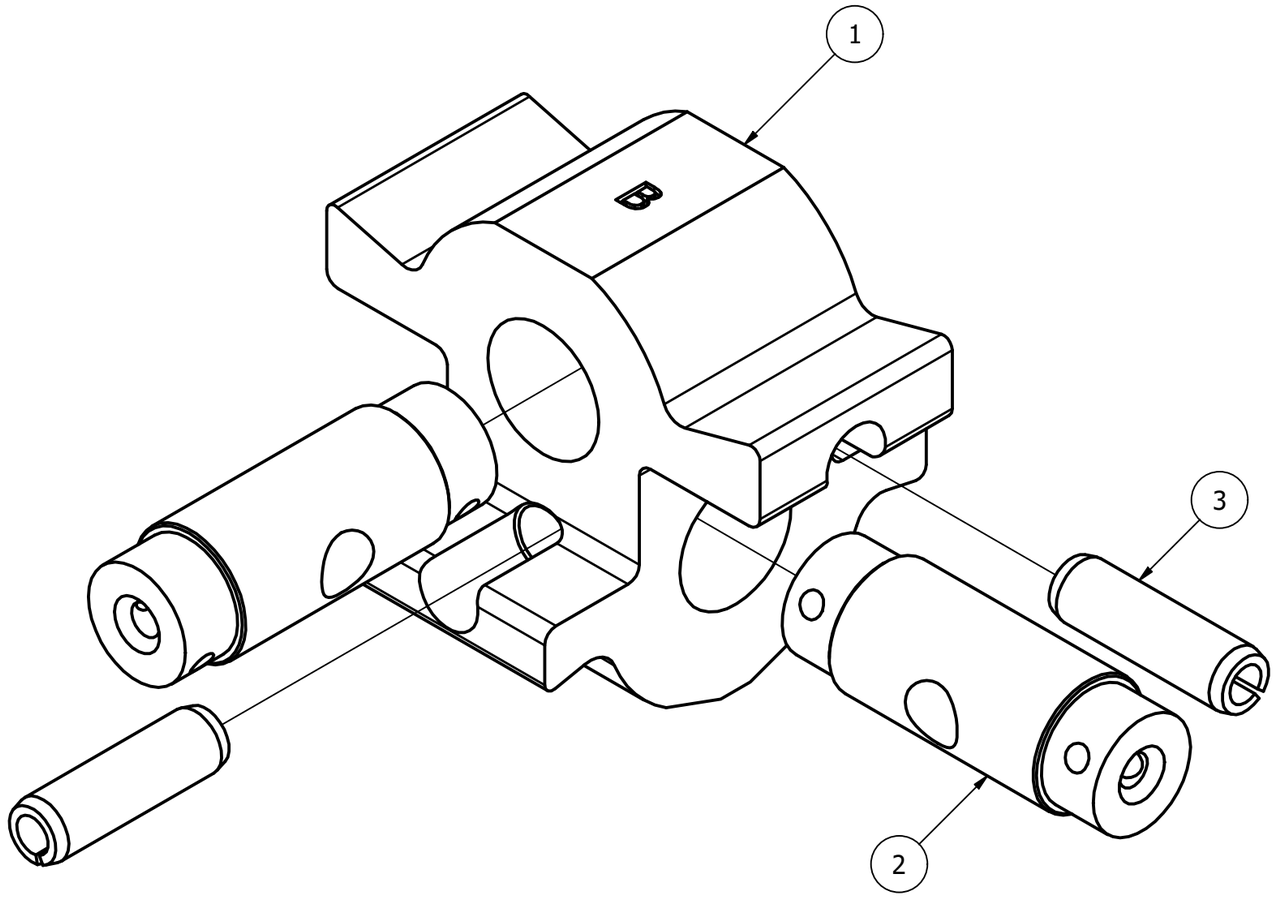
THRUST BUSHING

THIRD ANGLE PROJECTION

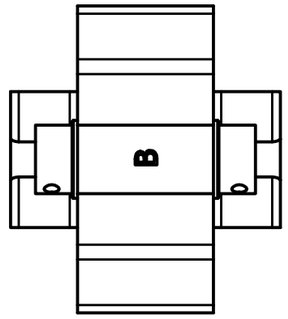
SIZE: A3 | DRAWING NUMBER: 474-5707 | REV: 1

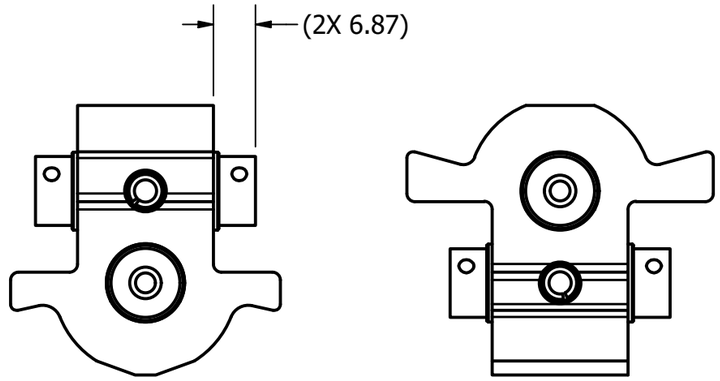
SCALE: 2:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AT	JW	7/10/2017



SCALE 2 : 1





ITEM	QTY	PART NUMBER	DESCRIPTION
3	2	5000822	M6 X 20 LG. ROLL PIN
2	2	474-5823	ANKLE TORQUE SHAFT
1	1	474-5804	ANKLE CENTER BLOCK

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN A.TOMICH	7/10/2017
MATERIAL	
CHECKED	
HEAT TREAT	
ENG	
FINISH	
APPROVED	

ANKLE CENTER BLOCK ASSEMBLY

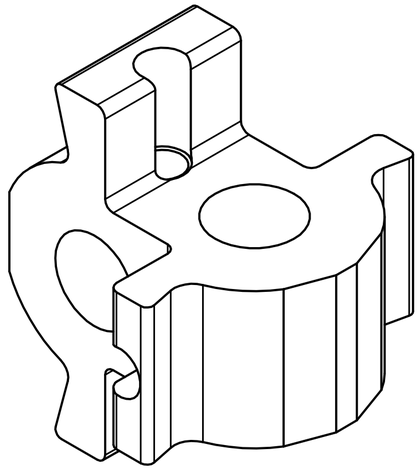
THIRD ANGLE PROJECTION

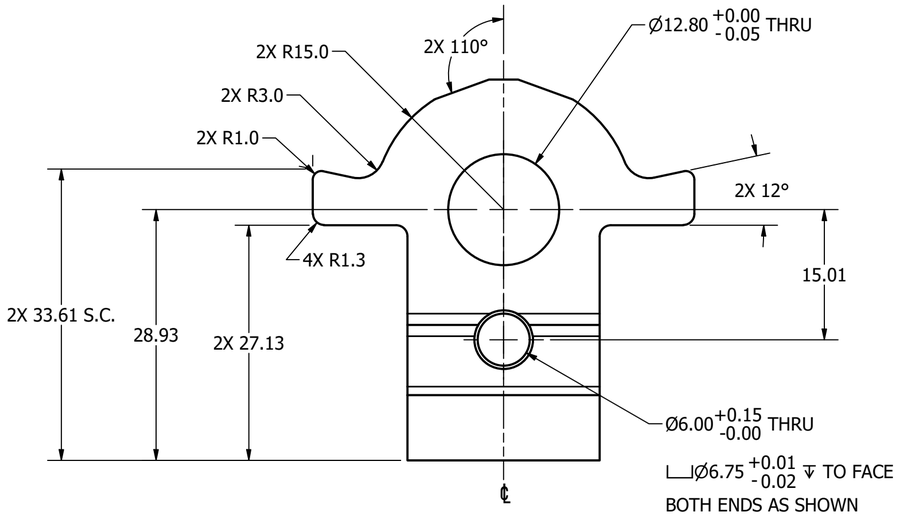
SIZE A3 | DRAWING NUMBER 474-5824 | REV 1

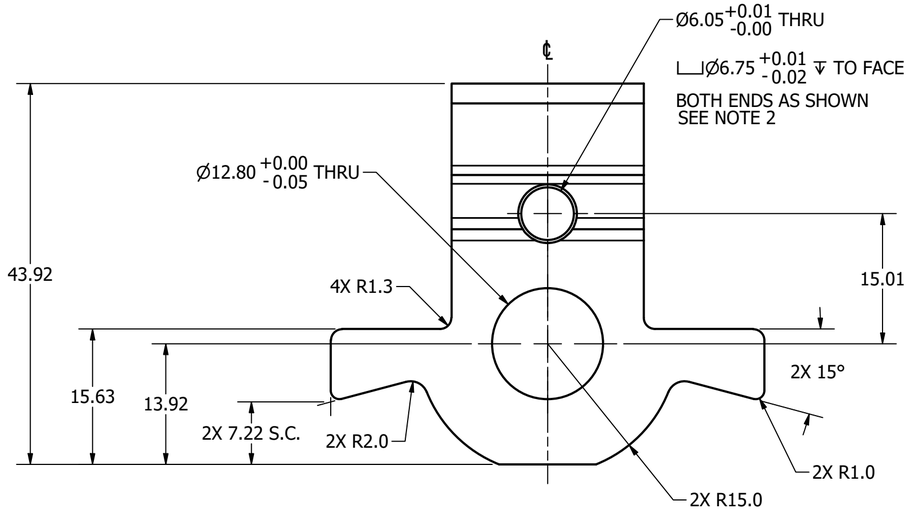
SCALE: 1:1 | SHEET 1 OF 1

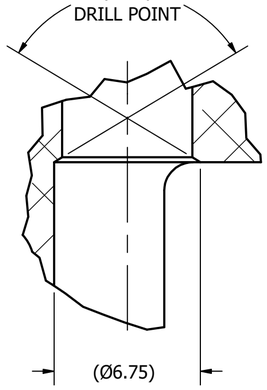
PRELIMINARY DRAWING

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOYTPE	BK	JW	10/25/2016

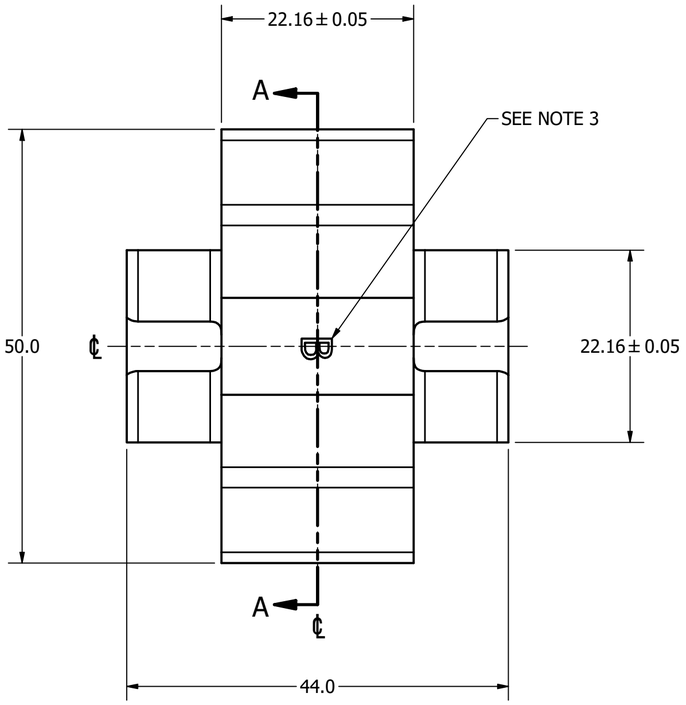


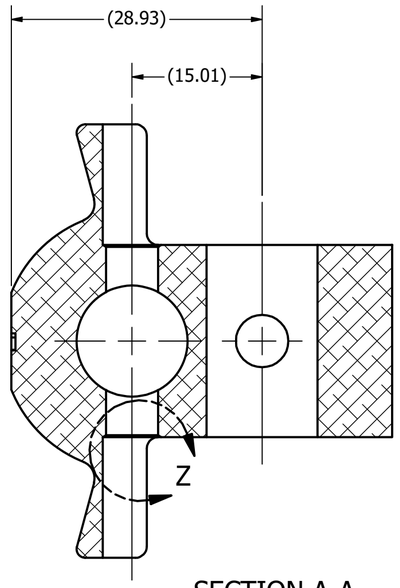






DETAIL Z
4 PLACES
SCALE 5 : 1





SECTION A-A

NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.
2. THIS HOLE IS PURPOSELY SIZED AS A SLIP FIT.
3. STAMP OR ETCH TEXT 5mm TALL WHERE SHOWN.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL	6061-T6 ALUMINUM	
HEAT TREAT	N/A	
FINISH	CLEAR ANODIZE	

APPROVALS	DATE
DRAWN: B. KIMES	10/25/2016
CHECKED	
ENG	
APPROVED	

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

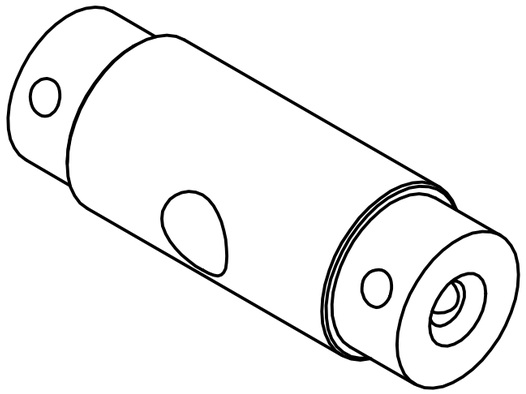
ANKLE CENTER BLOCK

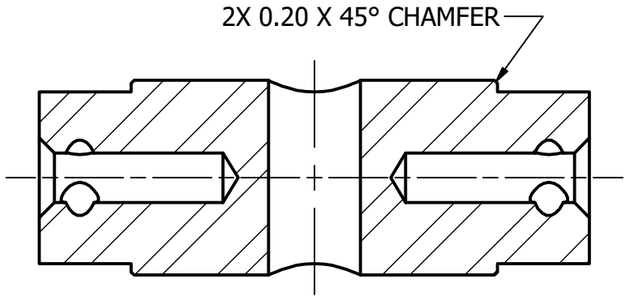
THIRD ANGLE PROJECTION

SIZE	DRAWING NUMBER	REV
A2	474-5804	1

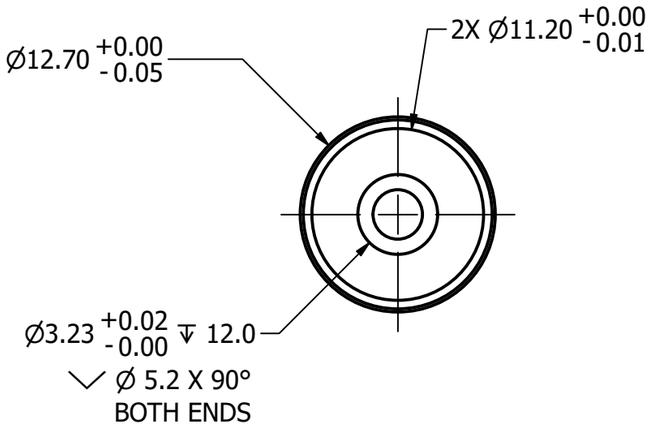
SCALE: 2:1 | SHEET: 1 OF 1

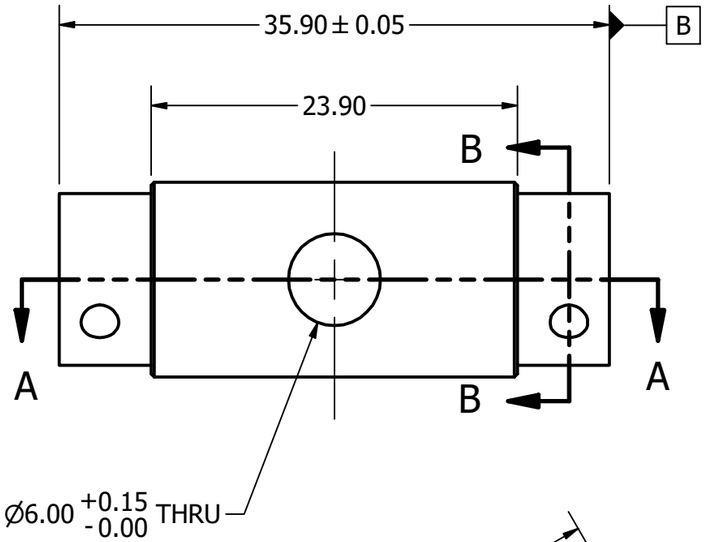
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AT	JW	7/10/2017

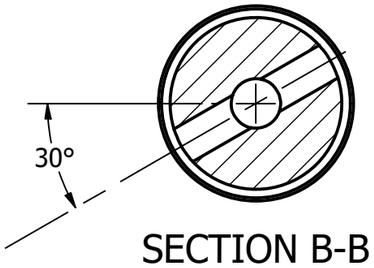




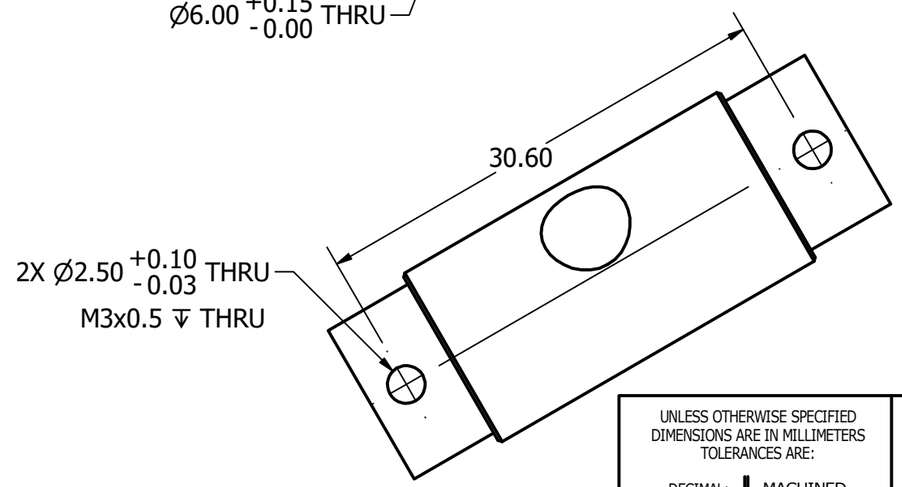
SECTION A-A







SECTION B-B



NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

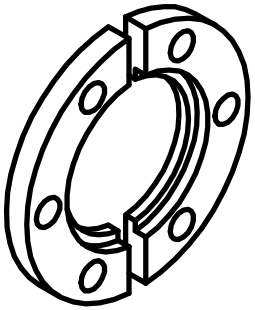
	APPROVALS	DATE
DRAWN	A.TOMICH	7/10/2017
CHECKED		
ENG		
APPROVED		

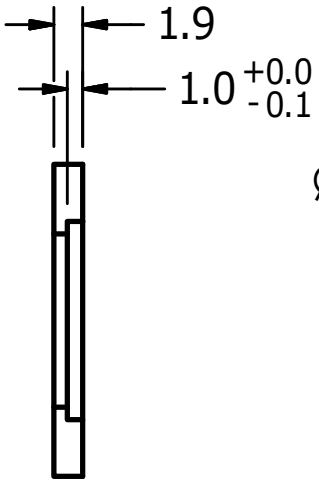
MATERIAL: 440C STAINLESS STEEL
HEAT TREAT: Rc 57-61
FINISH:

ANKLE TORQUE SHAFT

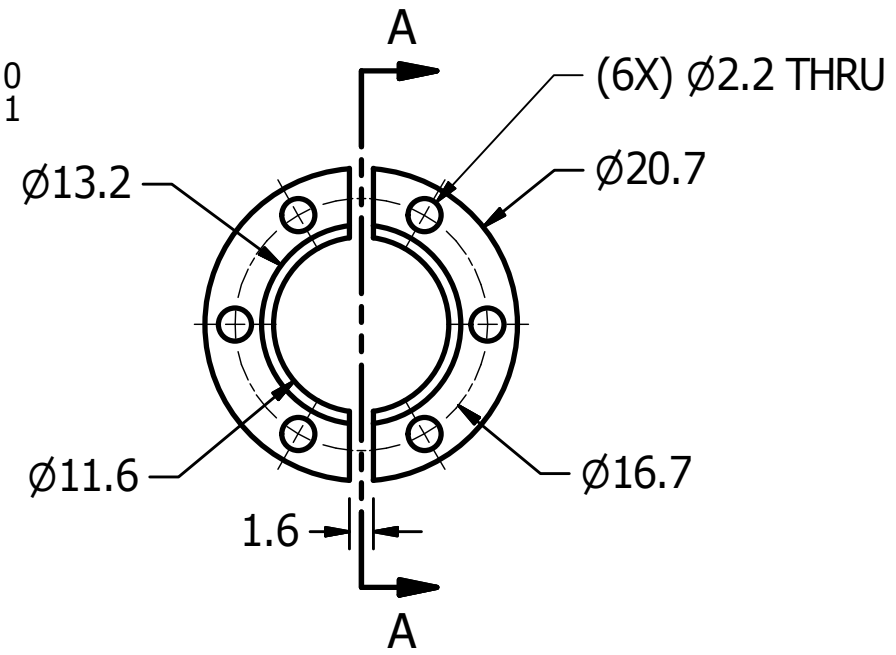
THIRD ANGLE PROJECTION

SIZE: A3 | DRAWING NUMBER: 474-5823 | REV: 1
SCALE: 2.5:1 | SHEET: 1 OF 1





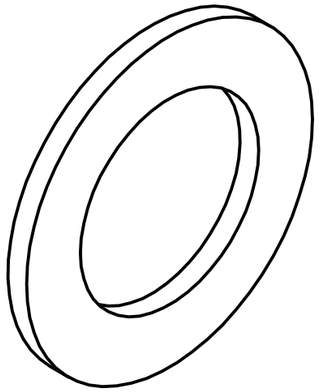
SECTION A-A
SCALE 2 : 1

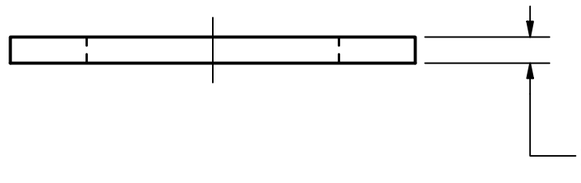


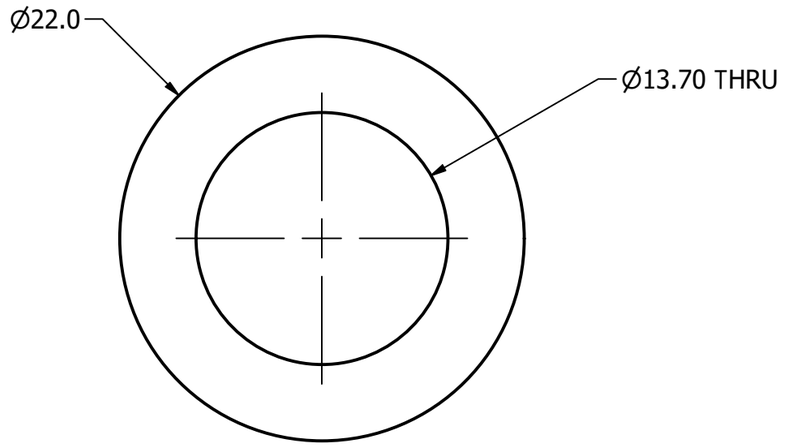
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS TOLERANCES ARE: DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 || MACHINED 1.6, ANGLES ±.5° ASME Y14.5M - 1994 DO NOT SCALE DRAWING	***V***EHICLE ***R***ESEARCH and ***T***EST ***C***ENTER	NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
	APPROVALS / DATE	POTENTIOMETER CLAMP
	DRAWN: JIM CLEVENGER / 7/22/2015	THOR-50M
MATERIAL: Aluminum 6061	CHECKED	
HEAT TREAT	ENG	SIZE: A — DRAWING NUMBER: 472-7581 — REV
FINISH: BLUE ANODIZE	APPROVED	THIRD ANGLE PROJECTION — SCALE: 2:1 — SHEET: 1 OF 1

472-7581 Clamp, Potentiometer.ipt

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH		4/12/2016







PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED 125
ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL	HEAT TREAT	FINISH
Nylon-6/6	N/A	N/A

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN jhaefner	4/12/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

ANKLE THRUST WASHER

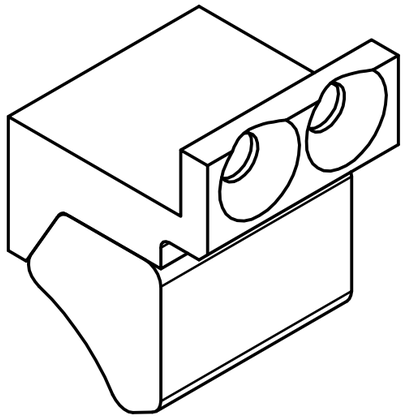
THIRD ANGLE PROJECTION

SIZE	DRAWING NUMBER	REV
A3	474-5720	1

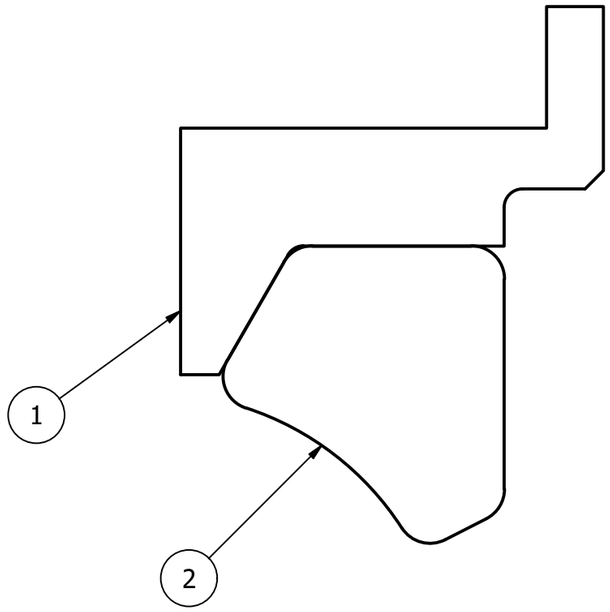
SCALE: 3:1

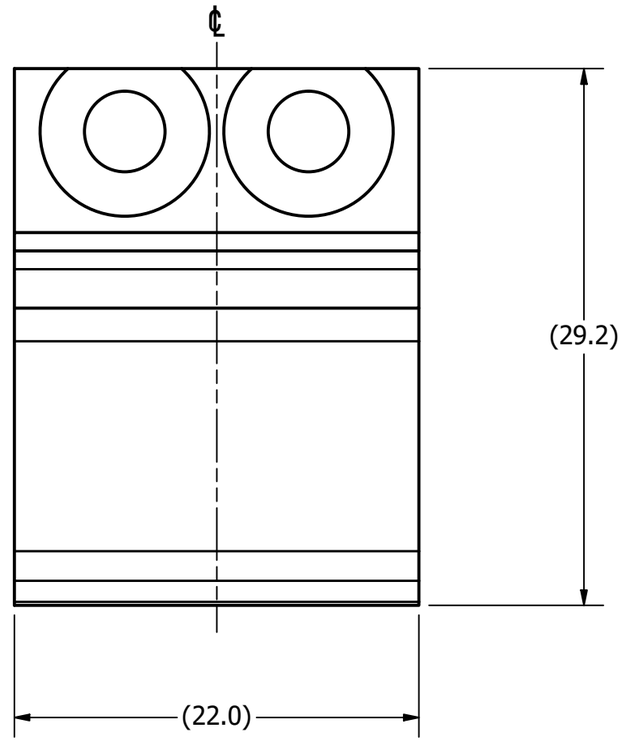
SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JPM	JW	10/26/16



SCALE 2 : 1





NOTES:

1. SANDBLAST ITEM 1 & CLEAN WITH MEK.
2. ABRADE ITEM 2 WITH SANDPAPER & CLEAN WITH MEK & ALCOHOL.
3. BOND PARTS UNDER PRESSURE USING LORD 305 EPOXY ADHESIVE OR EQUIVALENT.

ITEM	QTY	PART NUMBER	DESCRIPTION
2	1	474-5812	PLANTAR STOP
1	1	474-5811	PLANTAR STOP BRACKET

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

	APPROVALS	DATE
DRAWN	J. MCINNIS	8/9/2016
MATERIAL		
HEAT TREAT		
FINISH		
CHECKED		
ENG		
APPROVED		

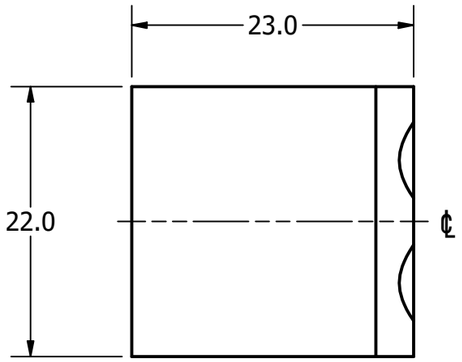
PLANTAR STOP ASSEMBLY

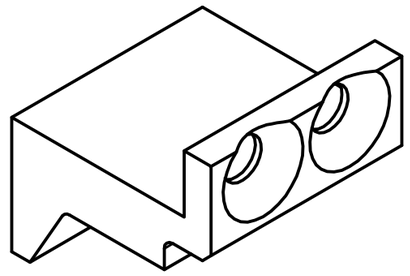
THIRD ANGLE PROJECTION

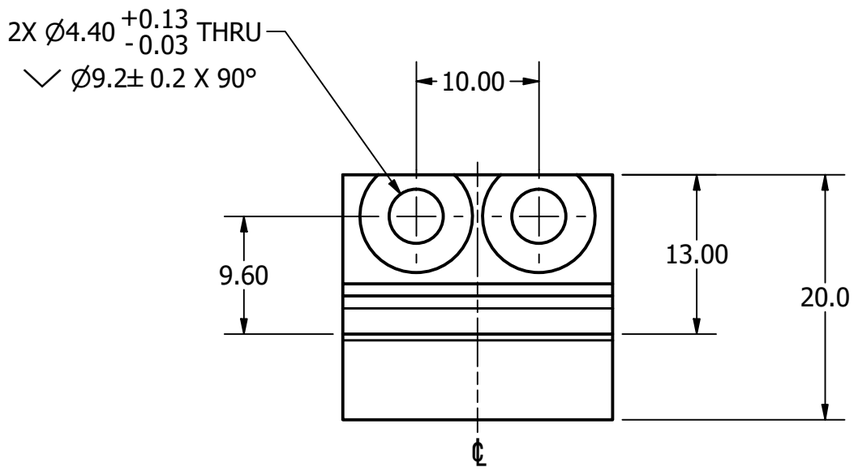
SIZE A3 | DRAWING NUMBER 474-5810 | REV 1

SCALE: 3:1 | SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JPM	JW	10/19/16







NOTES:

1. DIMENSIONS ARE SYMMETRIC ABOUT ℄, UNLESS OTHERWISE SPECIFIED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED √, ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

	APPROVALS	DATE
DRAWN	J. MCINNIS	10/10/2016
CHECKED		
ENG		
APPROVED		

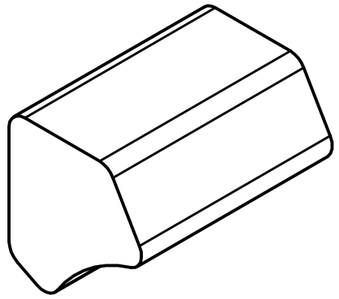
MATERIAL: 6061-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

PLANTAR STOP BRACKET

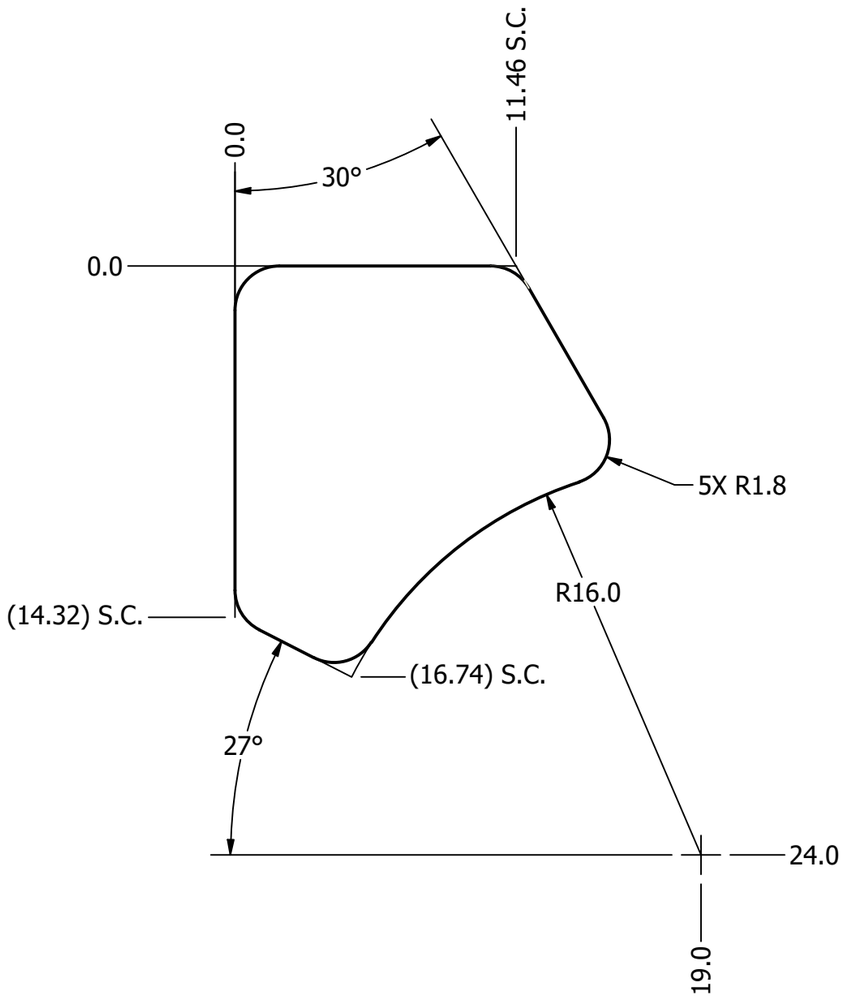
THIRD ANGLE PROJECTION

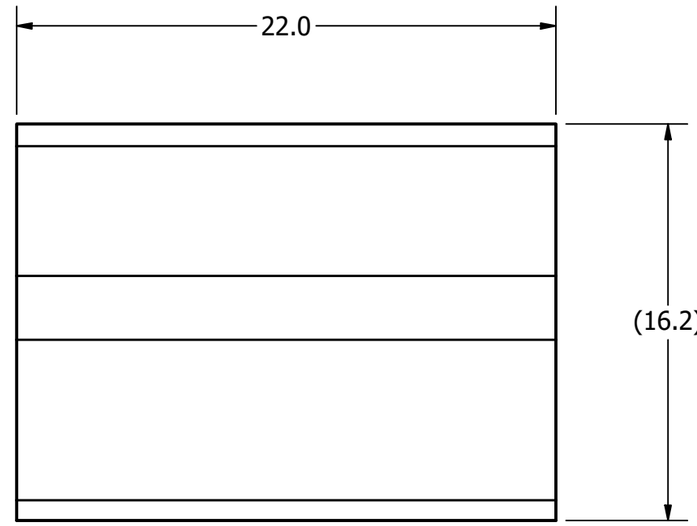
SIZE: A3 | DRAWING NUMBER: 474-5811 | REV: 1
SCALE: 2:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	10/19/2016



SCALE 2 : 1





NOTES:

1. MATERIAL: NATURAL RUBBER
   COLOR: BLACK
   DUROMETER: 81 ± 5 SHORE "A"
2. REMOVE ALL MOLD FLASHING
3. ALL MOLD DIMENSION TOLERANCE +1%/-2%
   BUT NO SMALLER THAN 0.5mm, UNLESS OTHERWISE NOTED.
4. NO SPLIT OR DEFECTS ARE ALLOWED IN THE RUBBER MOLDING
5. ALL SPECIFICATIONS MAY BE SUPERCEDED BY DYNAMIC TEST RESULTS.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTE #1
HEAT TREAT:
FINISH:

*V*EHICLE *R*ESEARCH and *T*EST *C*ENTER

APPROVALS	DATE
DRAWN: J. MCINNIS	8/9/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

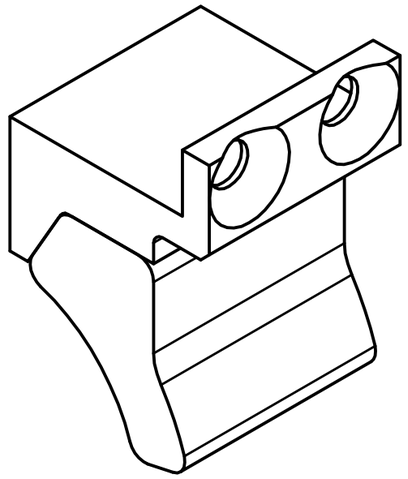
PLANTAR STOP

THIRD ANGLE PROJECTION

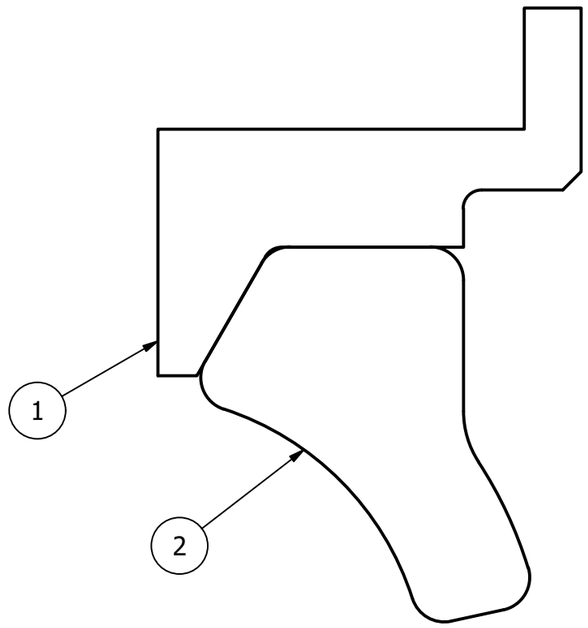
SIZE: A3 | DRAWING NUMBER: 474-5812 | REV: 1

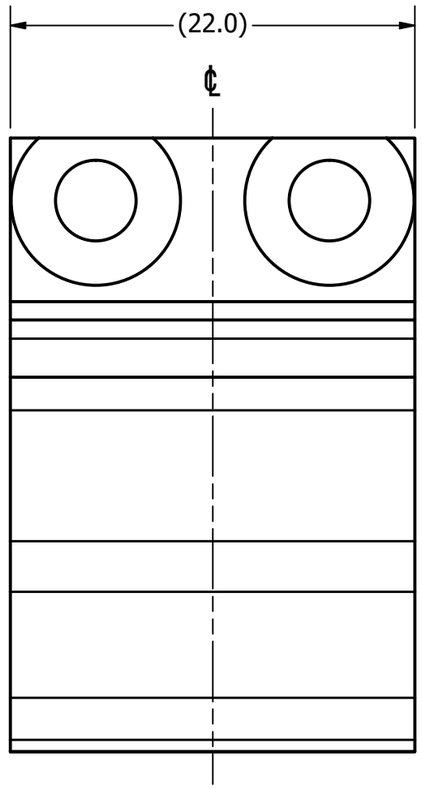
SCALE: 4:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	10/19/2016



SCALE 2 : 1





NOTES:

1. SANDBLAST ITEM 1 & CLEAN WITH MEK.
2. ABRADE ITEM 2 WITH SANDPAPER & CLEAN WITH MEK & ALCOHOL.
3. BOND PARTS UNDER PRESSURE USING LORD 305 EPOXY ADHESIVE OR EQUIVALENT.

ITEM	QTY	PART NUMBER	DESCRIPTION
2	1	474-5809	DORSI STOP
1	1	474-5808	DORSI STOP BRACKET

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED √F
ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

DORSI STOP ASSEMBLY

	APPROVALS	DATE
DRAWN	B. KIMES	10/19/2016
MATERIAL		
CHECKED		
HEAT TREAT		
ENG		
FINISH		
APPROVED		

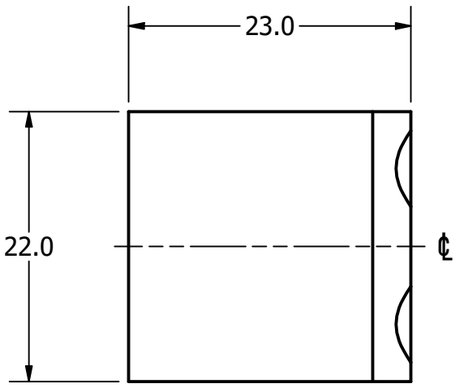
PRELIMINARY DRAWING

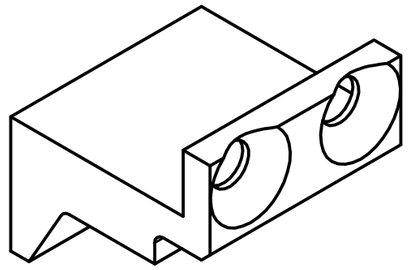
THIRD ANGLE PROJECTION

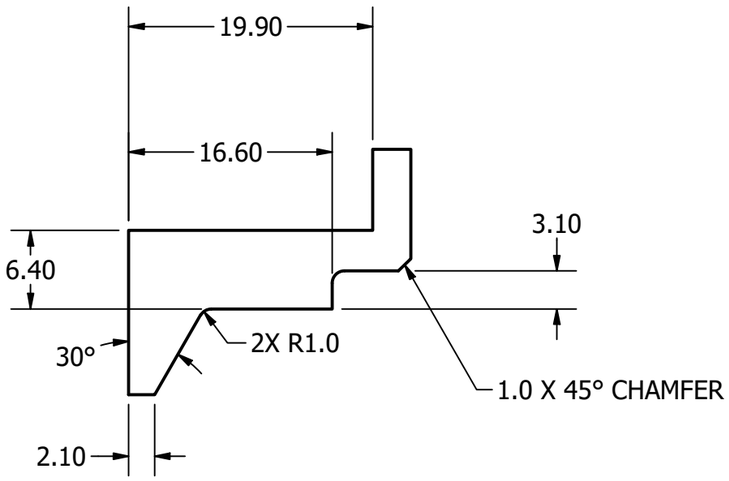
SIZE A3 | DRAWING NUMBER 474-5807 | REV 1

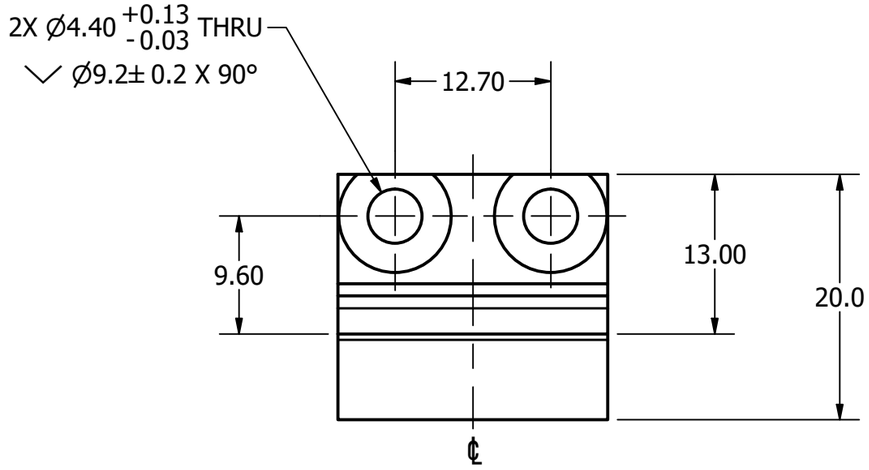
SCALE: 3:1 | SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JPM	JW	10/26/16









NOTES:

1. DIMENSIONS ARE SYMMETRIC ABOUT ℄, UNLESS OTHERWISE SPECIFIED

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED √ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

DORSI STOP BRACKET

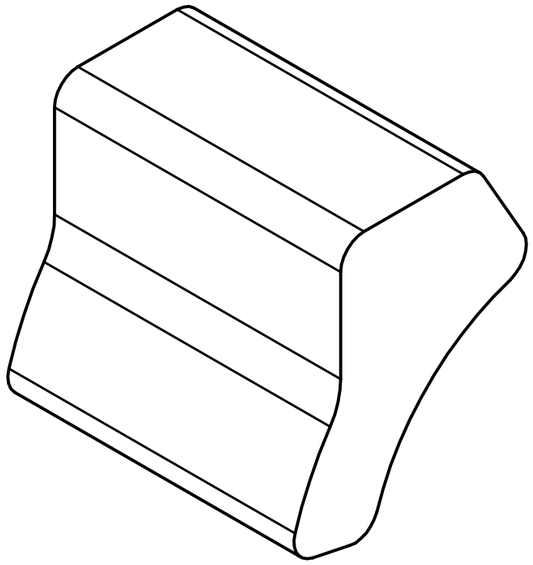
	APPROVALS	DATE
DRAWN	J. MCINNIS	8/9/2016
CHECKED		
ENG		
APPROVED		

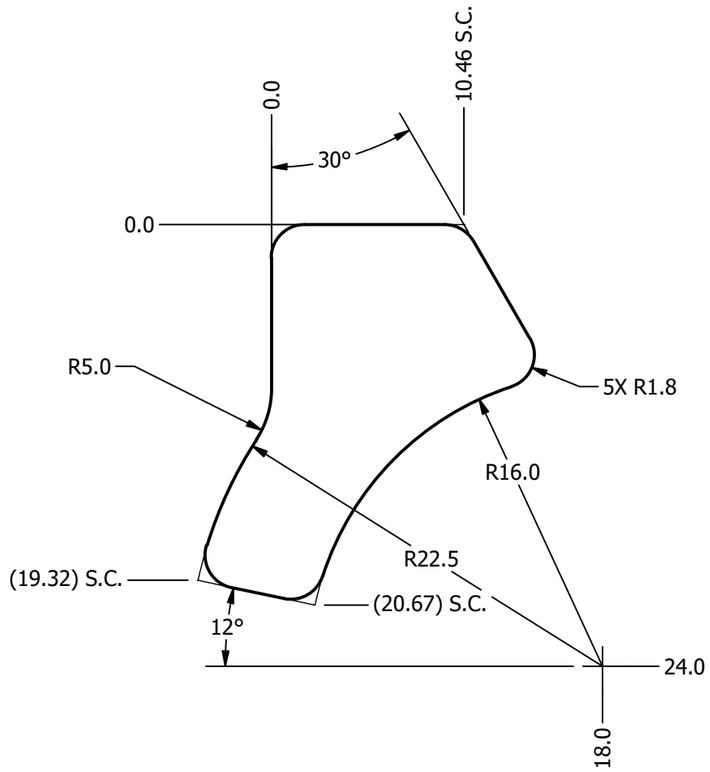
MATERIAL: 6061-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

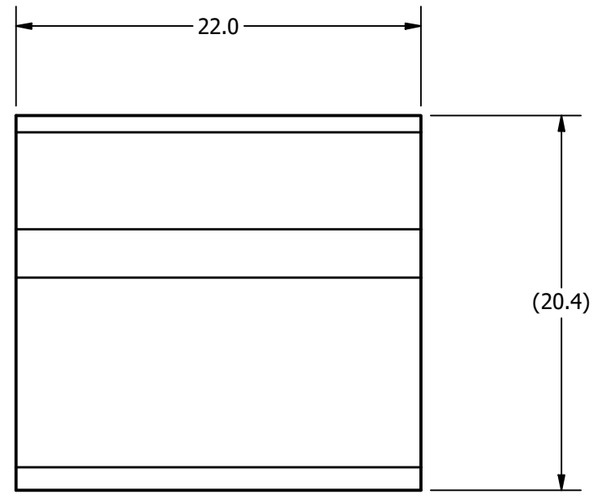
THIRD ANGLE PROJECTION

SIZE: A3 | DRAWING NUMBER: 474-5808 | REV: 1
SCALE: 2:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	10/19/2016







NOTES:

1. MATERIAL: NATURAL RUBBER
   COLOR: BLACK
   DUROMETER: 81±5 SHORE "A"

2. REMOVE ALL MOLD FLASHING

3. ALL MOLD DIMENSION TOLERANCE +1%/-2%
   BUT NO SMALLER THAN 0.5mm, UNLESS OTHERWISE NOTED.

4. NO SPLIT OR DEFECTS ARE ALLOWED IN THE RUBBER MOLDING

5. ALL SPECIFICATIONS MAY BE SUPERCEDED BY DYNAMIC TEST RESULTS.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED √
ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTE #1
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: B. KIMES	10/19/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

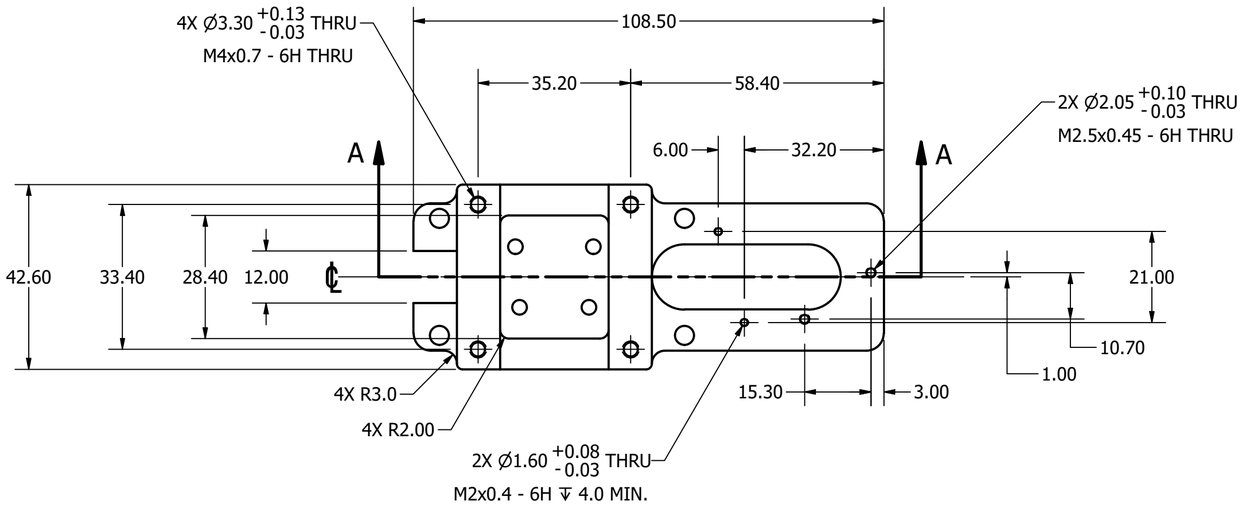
DORSI STOP

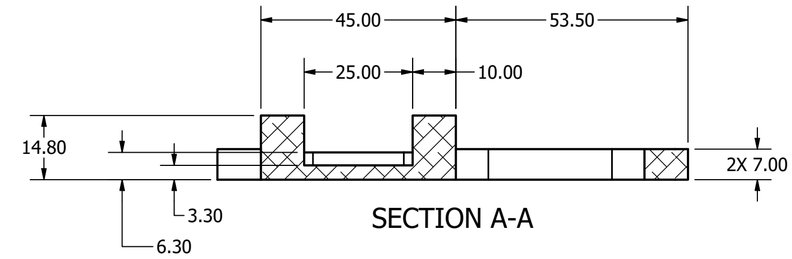
THIRD ANGLE PROJECTION

SIZE: A3 | DRAWING NUMBER: 474-5809 | REV: 1

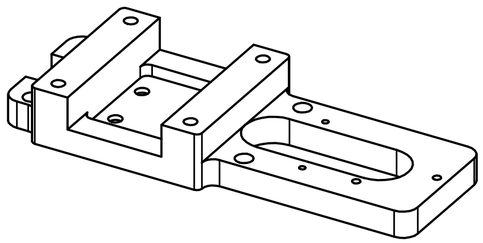
SCALE: 3:1 | SHEET: 1 OF 1

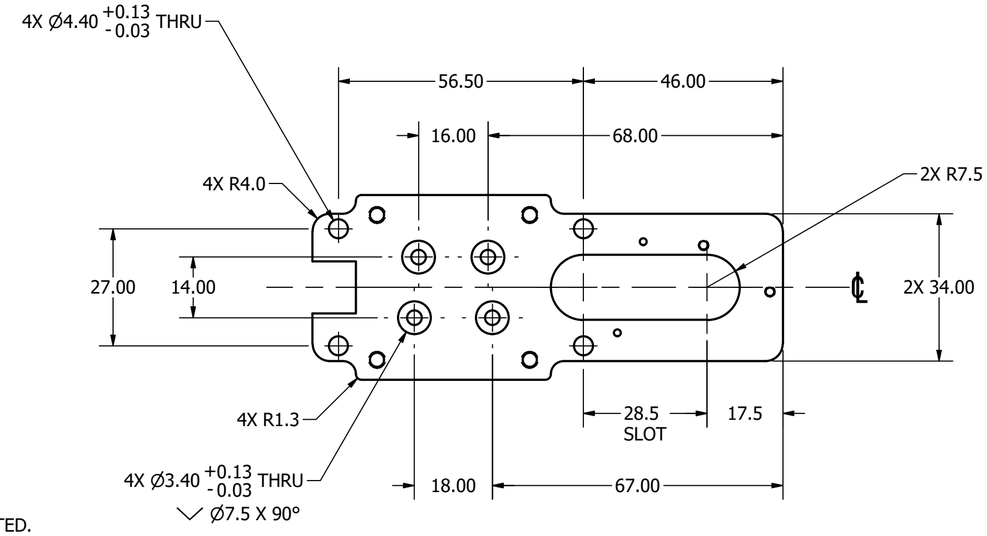
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AB	JW	10/24/16





SECTION A-A





NOTES:

1. DIMENSIONS SYMMETRICAL ABOUT ℄ UNLESS OTHERWISE NOTED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT: N/A
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: A. Barchock	10/24/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

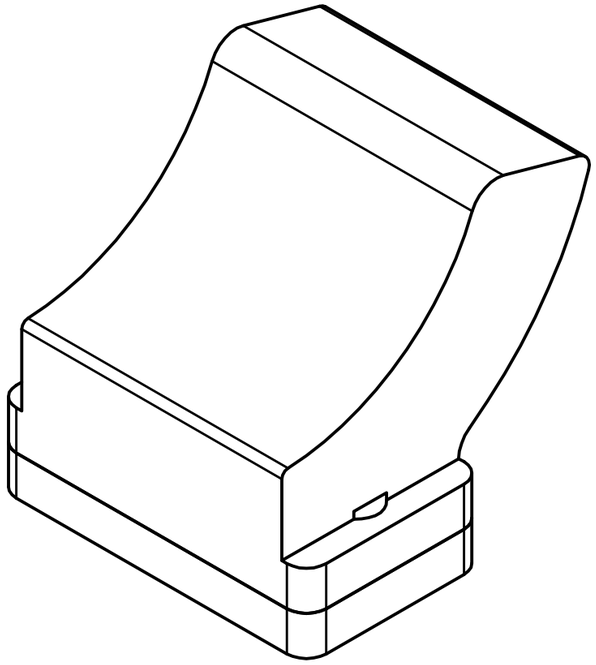
LOWER ANKLE PLATE, LEFT

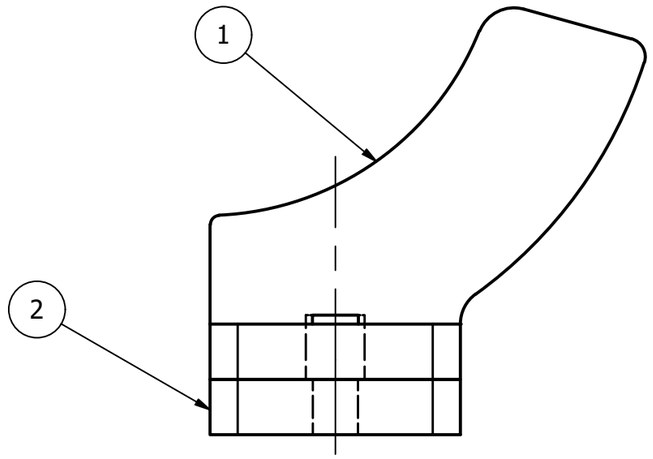
THIRD ANGLE PROJECTION

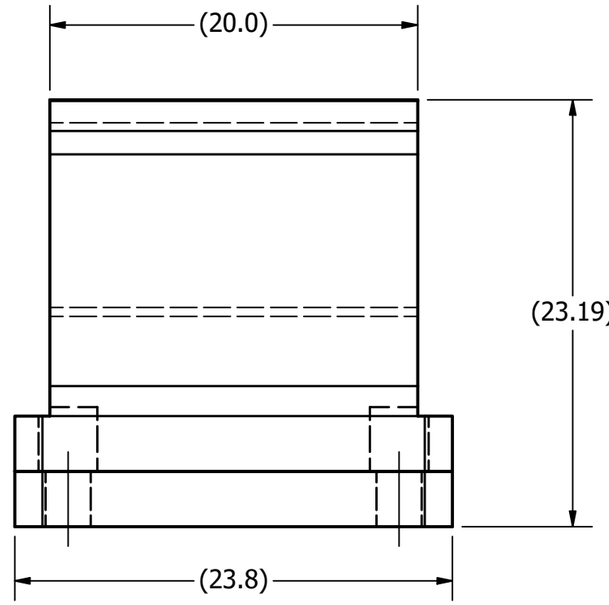
SIZE: A2 | DRAWING NUMBER: 474-5806-1 | REV: 1

SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE TO PROTOTYPE	GCH	JW	10/24/2016







NOTES:

1. SANDBLAST ITEM 2 & CLEAN WITH MEK.
2. ABRADE ITEM 1 WITH SANDPAPER & CLEAN WITH MEK & ALCOHOL.
3. BOND PARTS UNDER PRESSURE USING LORD 305 EPOXY ADHESIVE OR EQUIVALENT.

ITEM	QTY	PART NUMBER	DESCRIPTION
2	1	474-5814	EVERSION STOP BRACKET
1	1	474-5815	EVERSION STOP

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ±√ | ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

EVERSION STOP ASSEMBLY

APPROVALS	DATE
DRAWN: ghayden	10/24/2016
CHECKED	
ENG	
APPROVED	

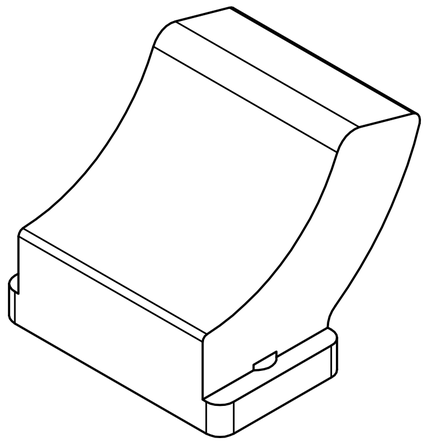
MATERIAL
HEAT TREAT
FINISH

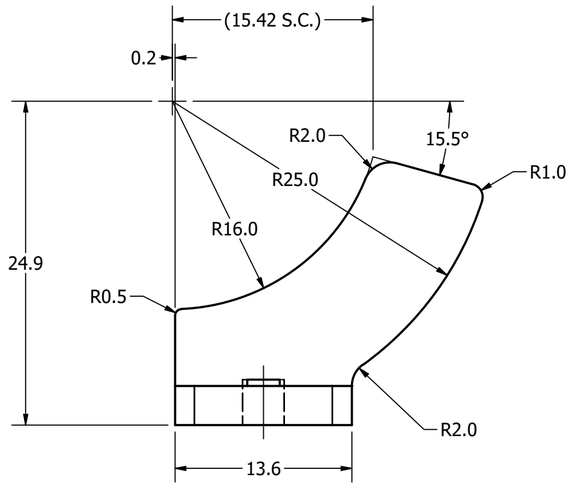
PRELIMINARY DRAWING

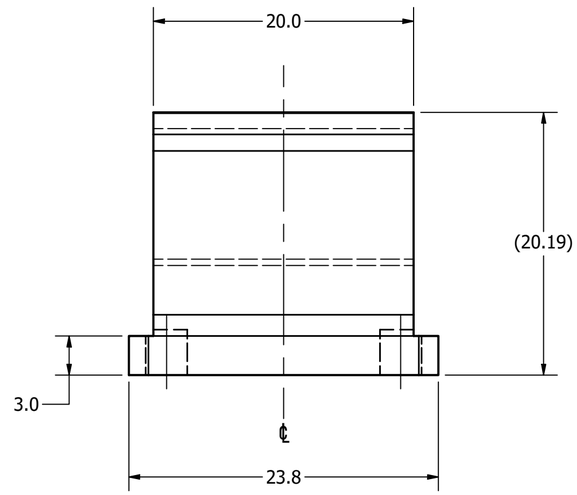
THIRD ANGLE PROJECTION

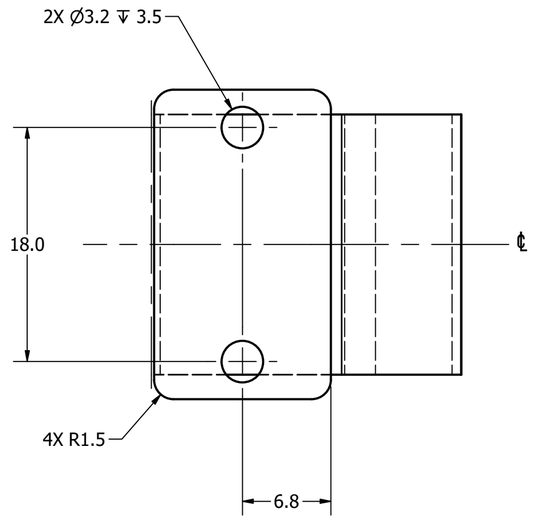
SIZE: A3 | DRAWING NUMBER: 474-5813 | REV: 1
SCALE: 3:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE TO PROTOTYPE	GCH	JW	10/20/2016









NOTES:
1. MATERIAL: NATURAL RUBBER
   COLOR: BLACK
   DUROMETER: 76 ±5 SHORE "A"
2. REMOVE ALL MOLD FLASHING
3. ALL MOLD DIMENSION TOLERANCE +1%/-2%
   BUT NO SMALLER THAN 0.5mm, UNLESS OTHERWISE NOTED.
4. NO SPLIT OR DEFECTS ARE ALLOWED
   IN THE RUBBER MOLDING
5. DIMENSIONS ARE SYMMETRICAL ABOUT ℄, UNLESS OTHERWISE SPECIFIED.
6. ALL SPECIFICATIONS MAY BE SUPERCEDED BY DYNAMIC TEST RESULTS.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ∢C ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTE #1
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: ghayden	10/20/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

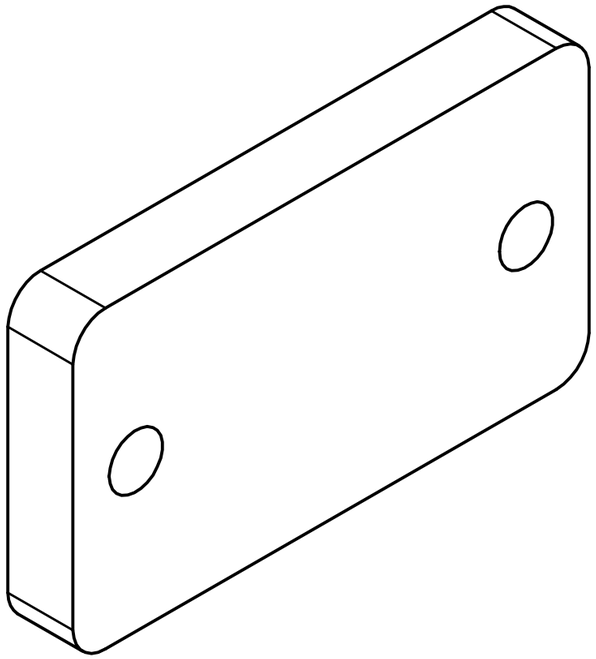
EVERSION STOP

THIRD ANGLE PROJECTION

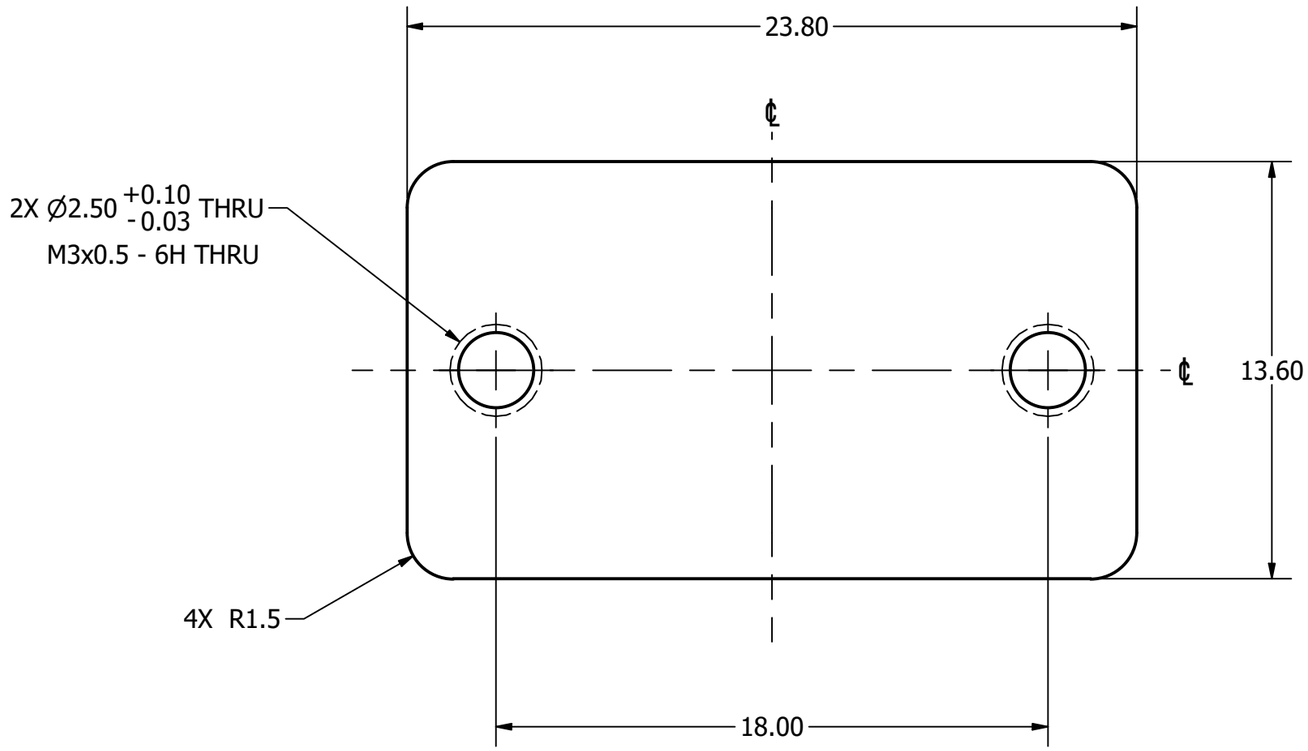
SIZE: A2 | DRAWING NUMBER: 474-5815 | REV: 1

SCALE: 3:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE TO PROTOTYPE	GCH	JW	10/21/2016







NOTES:

1. DIMENSIONS ARE SYMMETRICAL ABOUT ℄, UNLESS OTHERWISE SPECIFIED

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

EVERSION STOP BRACKET

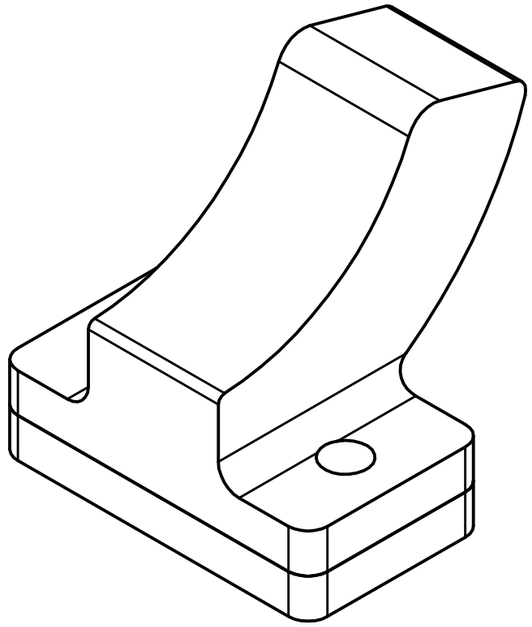
APPROVALS	DATE
DRAWN ghayden	10/21/2016
CHECKED	
ENG	
APPROVED	

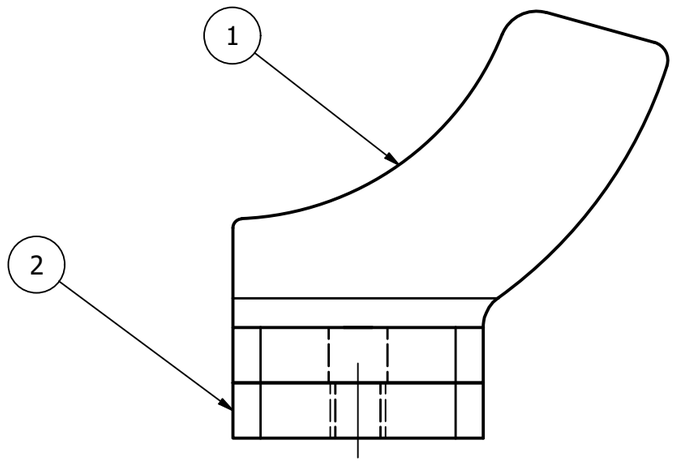
MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

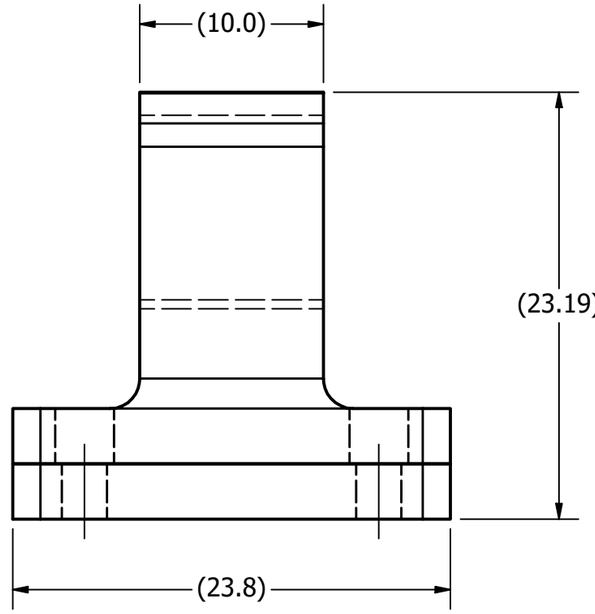
THIRD ANGLE PROJECTION

SIZE: A3 | DRAWING NUMBER: 474-5814 | REV: 1
SCALE: 5:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE TO PROTOTYPE	GCH	JW	10/24/2016







ITEM	QTY	PART NUMBER	DESCRIPTION
2	1	474-5817	INVERSION STOP BRACKET
1	1	474-5818	INVERSION STOP

PARTS LIST

NOTES:

1. SANDBLAST ITEM 1 & CLEAN WITH MEK.
2. ABRADE ITEM 2 WITH SANDPAPER & CLEAN WITH MEK & ALCOHOL.
3. BOND PARTS UNDER PRESSURE USING LORD 305 EPOXY ADHESIVE OR EQUIVALENT.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN ghayden	10/24/2016
CHECKED	
ENG	
APPROVED	

MATERIAL
HEAT TREAT
FINISH

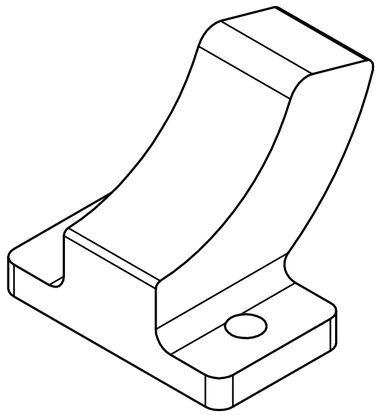
INVERSION STOP ASSEMBLY

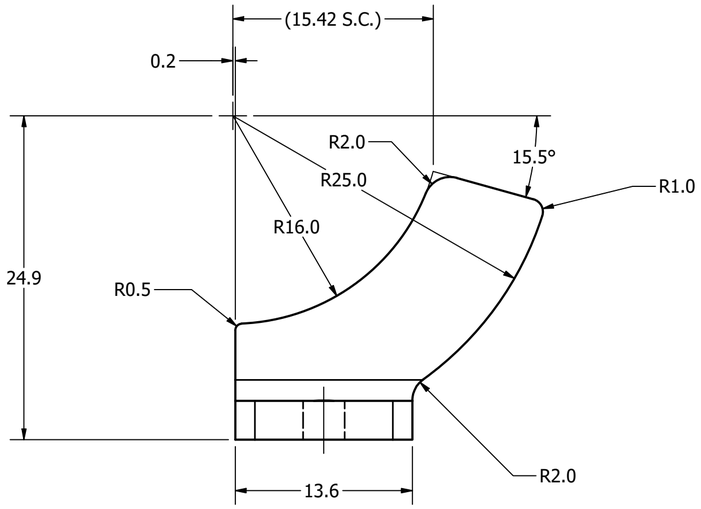
THIRD ANGLE PROJECTION

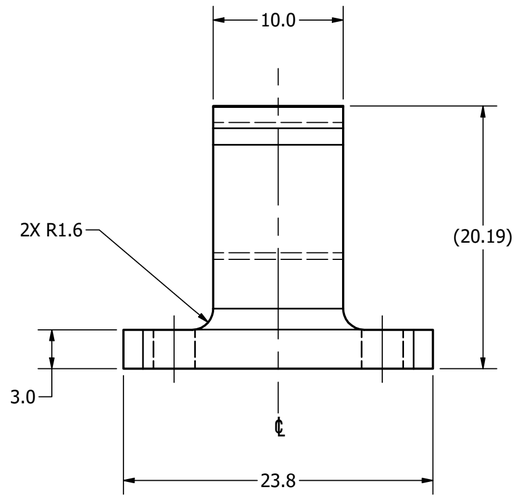
SIZE A3 | DRAWING NUMBER 474-5816 | REV 1

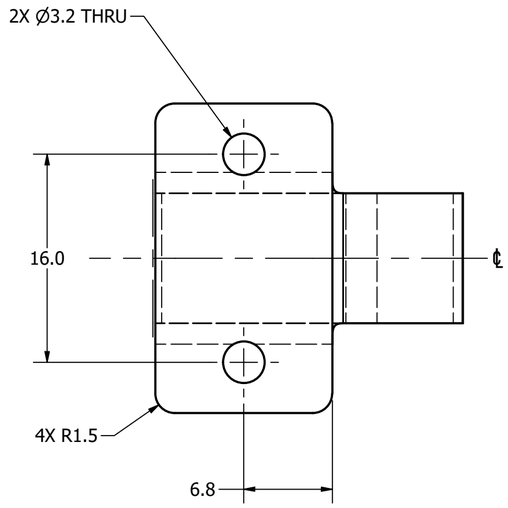
SCALE: 3:1 | SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE TO PROTOTYPE	GCH	JW	10/24/2016









NOTES:
1. MATERIAL: NATURAL RUBBER
   COLOR: BLACK
   DUROMETER: 61± 5 SHORE "A"
2. REMOVE ALL MOLD FLASHING
3. ALL MOLD DIMENSION TOLERANCE +1%/-2%
   BUT NO SMALLER THAN 0.5mm, UNLES OTHERWISE NOTED.
4. NO SPLIT OR DEFECTS ARE ALLOWED
   IN THE RUBBER MOLDING
5. DIMENSIONS ARE SYMMETRICAL ABOUT ℄, UNLESS OTHERWISE SPECIFIED
6. ALL SPECIFICATIONS MAY BE SUPERCEDED BY DYNAMIC TEST RESULTS.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED √ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTE #1
HEAT TREAT:
FINISH:

	APPROVALS	DATE
DRAWN	ghayden	10/24/2016
CHECKED		
ENG		
APPROVED		

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

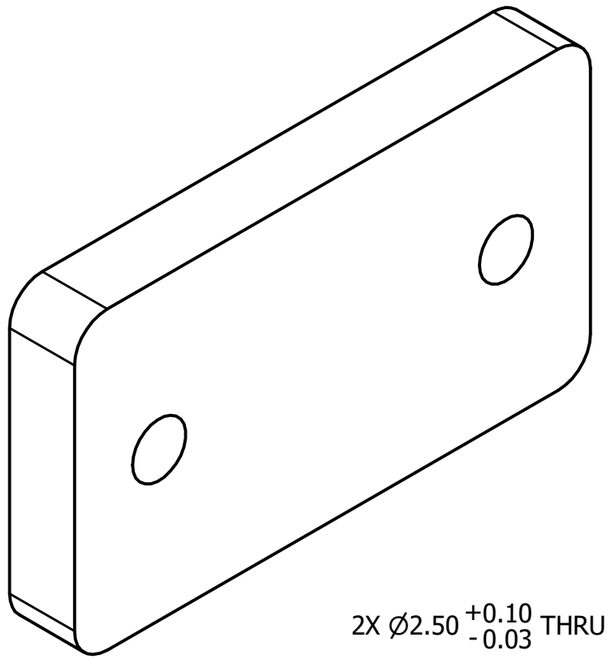
INVERSION STOP

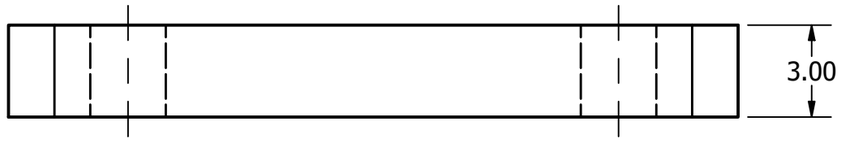
THIRD ANGLE PROJECTION

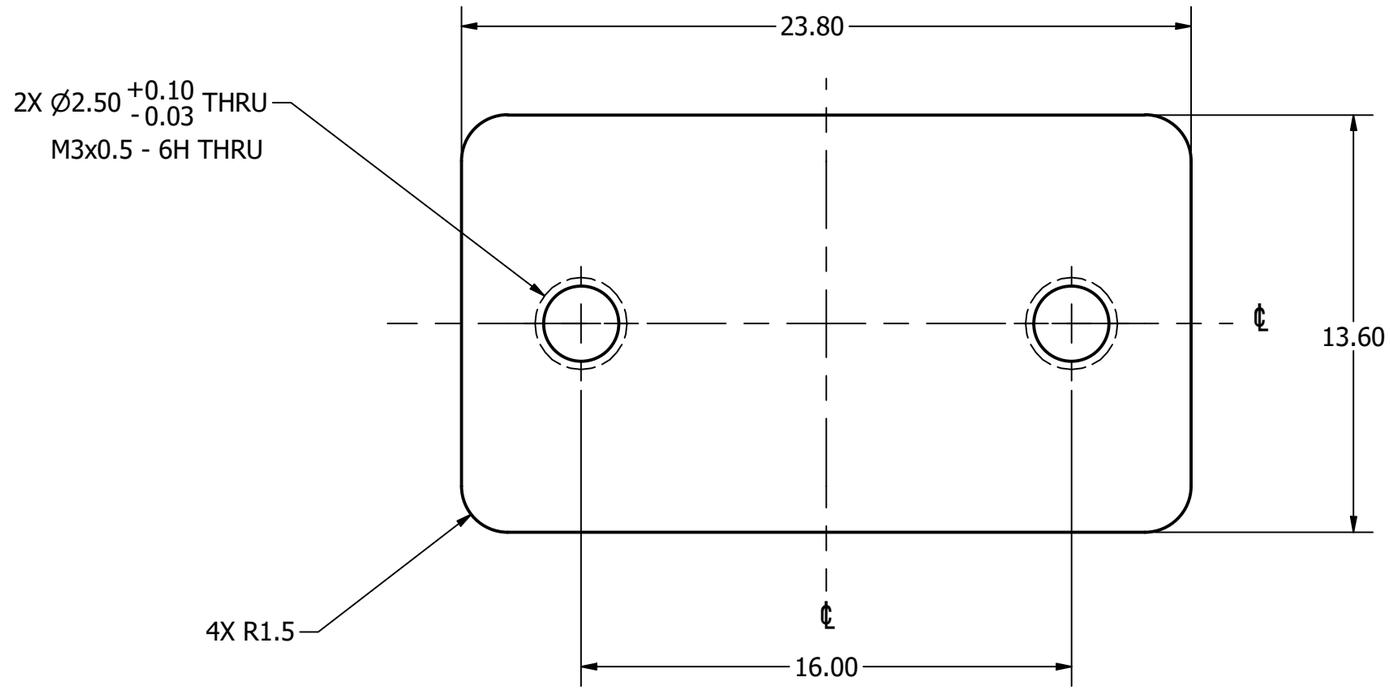
SIZE: A2 | DRAWING NUMBER: 474-5818 | REV: 1

SCALE: 3:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE TO PROTOTYPE	GCH	JW	10/24/2016







NOTES:

1. DIMENSIONS ARE SYMMETRICAL ABOUT ℄, UNLESS OTHERWISE SPECIFIED

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: ghayden	10/24/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

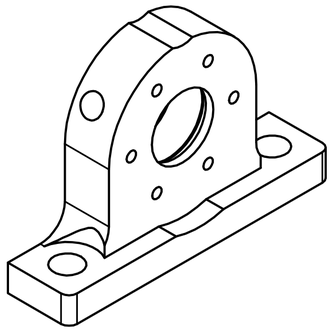
INVERSION STOP BRACKET

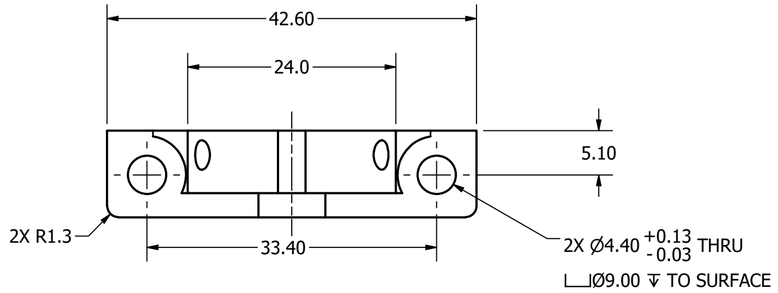
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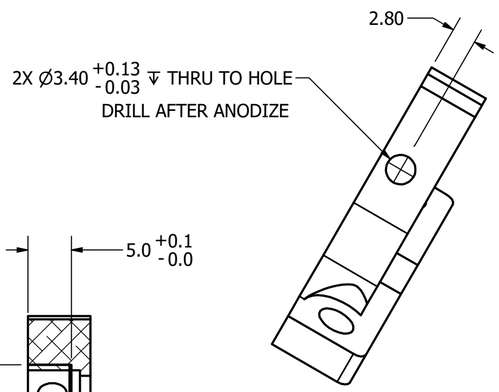
SIZE: A3 | DRAWING NUMBER: 474-5817 | REV: 1

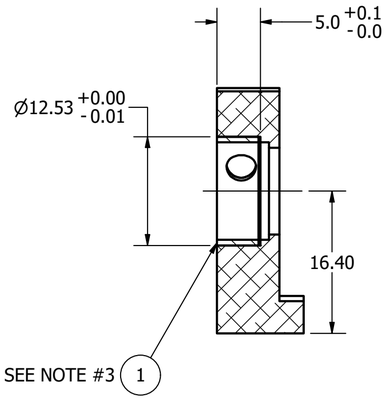
SCALE: 5:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AT	JW	7/7/2017

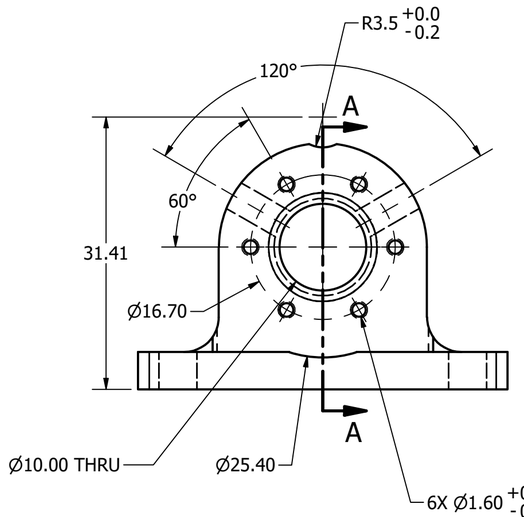


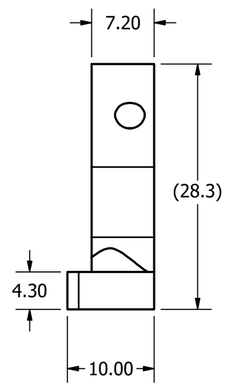


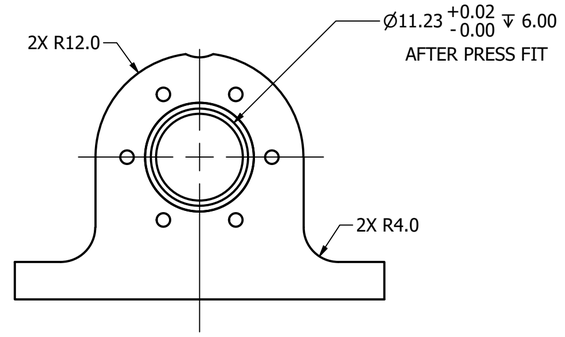




SECTION A-A







NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.
2. PRESS IN BEARING 474-5827 AFTER ANODIZE.
3. INSTALL BEARING FLUSH TO BOTTOM SURFACE OF HOLE, AS SHOWN.

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	474-5827	SLEEVE BEARING

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN A.TOMICH	7/7/2017
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

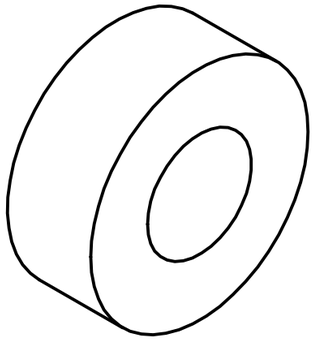
PLATE, ANKLE BUSHING

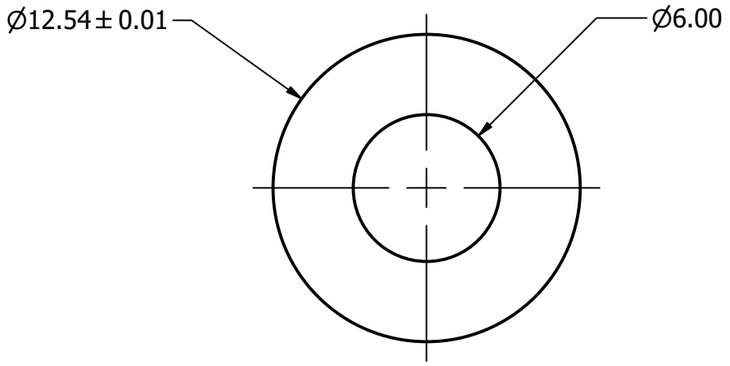
THIRD ANGLE PROJECTION

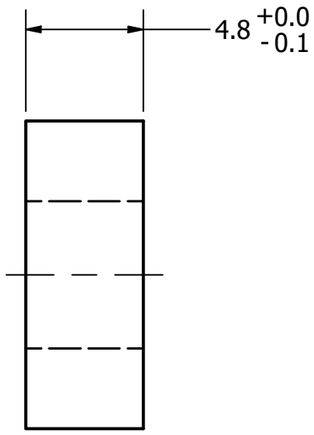
SIZE: A2 | DRAWING NUMBER: 474-5826 | REV: 1

SCALE: 2:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AT	JW	7/7/2017







PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL:
X ±.5
X.X ±.2
X.XX ±.1

MACHINED 16
ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN: atomich	7/7/2017
CHECKED:	
ENG:	
APPROVED:	

MATERIAL: Bronze, Soft Tin
HEAT TREAT:
FINISH:

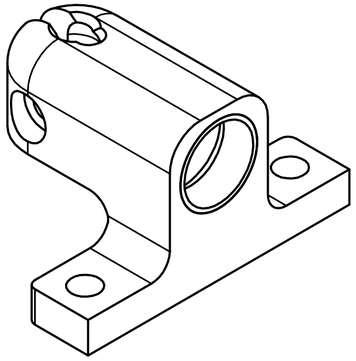
SLEEVE BEARING

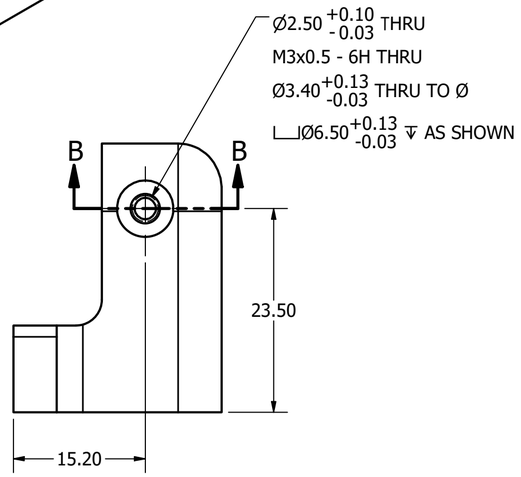
THIRD ANGLE PROJECTION

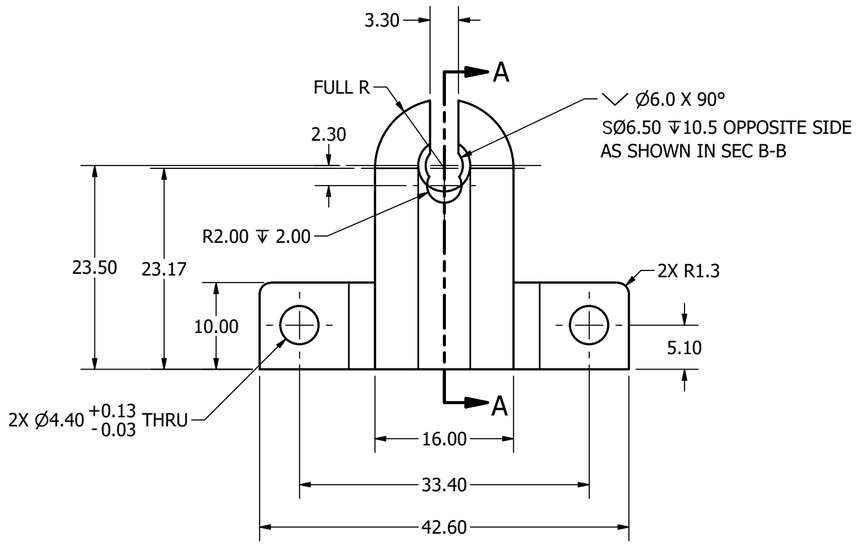
SIZE: A3 | DRAWING NUMBER: 474-5827 | REV: 1

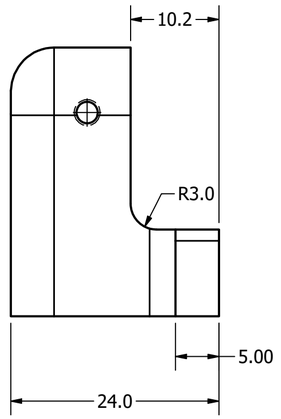
SCALE: 4:1 | SHEET: 1 OF 1

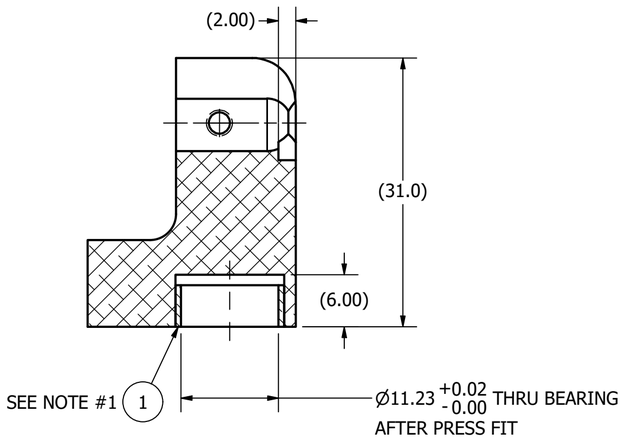
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AT	JW	7/7/2017



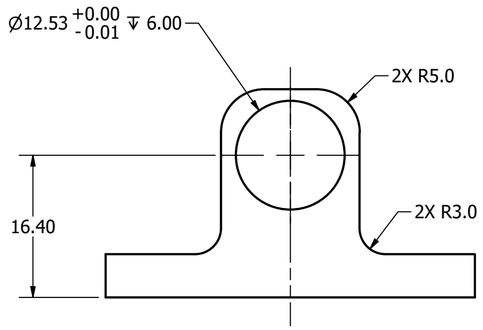




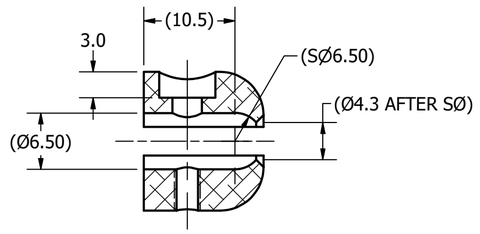




SECTION A-A



BEARING NOT SHOWN



SECTION B-B

NOTES:

1. PRESS IN BEARING FLUSH TO DATUM C , AFTER ANODIZE.
2. DIMENSIONS SYMMETRIC ABOUT ℄ , UNLESS OTHERWISE NOTED.

PRELIMINARY DRAWING

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	474-5827	SLEEVE BEARING

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ∢C ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN A.TOMICH	7/7/2017
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

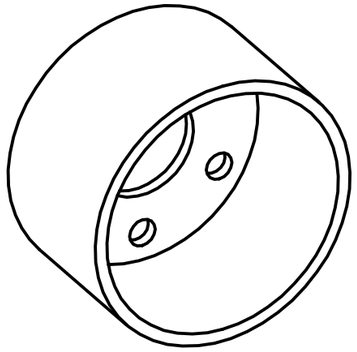
ACHILLES CABLE RETAINER

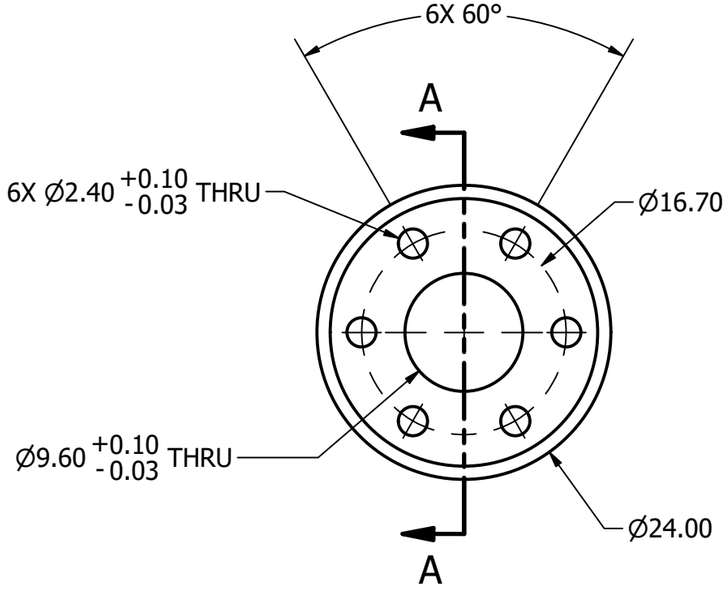
THIRD ANGLE PROJECTION

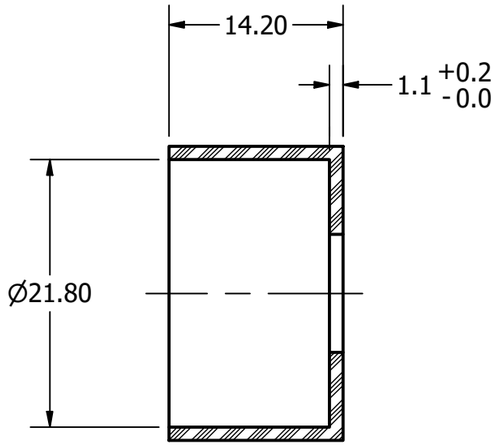
SIZE: A2 | DRAWING NUMBER: 474-5828 | REV: 1

SCALE: 2:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JPM	JW	7/6/17







SECTION A-A

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: ACETAL RESIN, WHITE
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: J. MCINNIS	7/6/2017
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

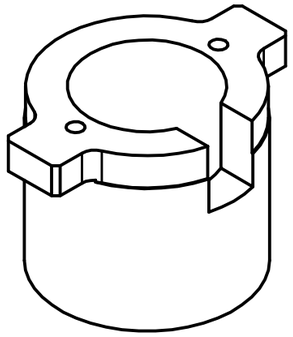
POTENTIOMETER CAP

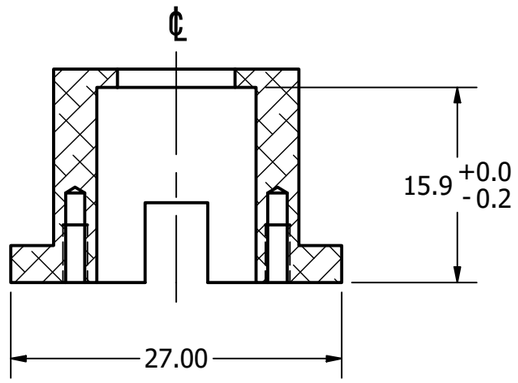
THIRD ANGLE PROJECTION

SIZE: A3 | DRAWING NUMBER: 474-5825 | REV: 1

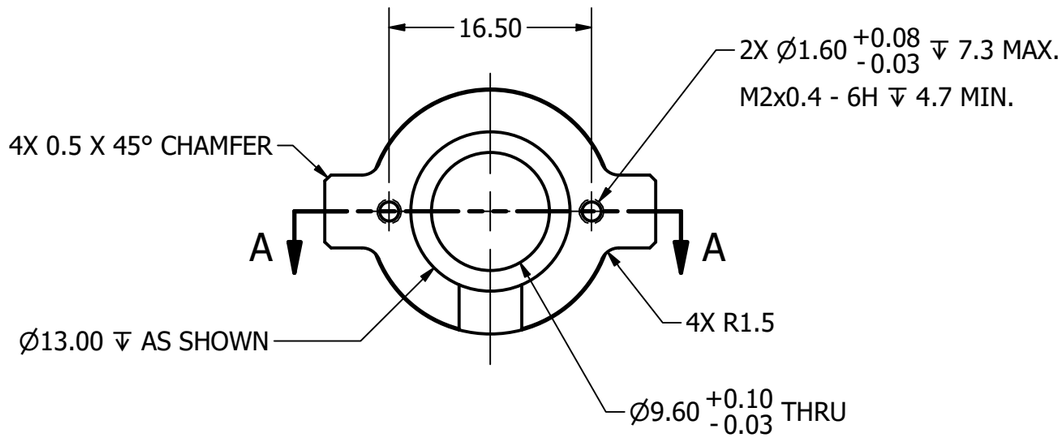
SCALE: 2:1 | SHEET: 1 OF 1

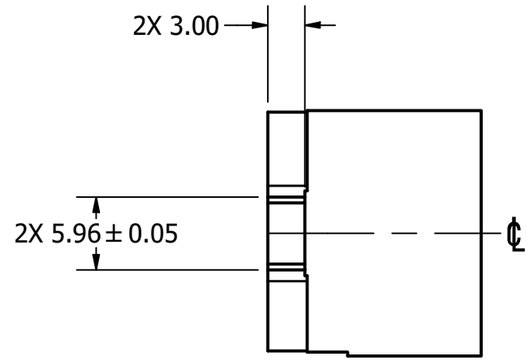
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK		11/27/17

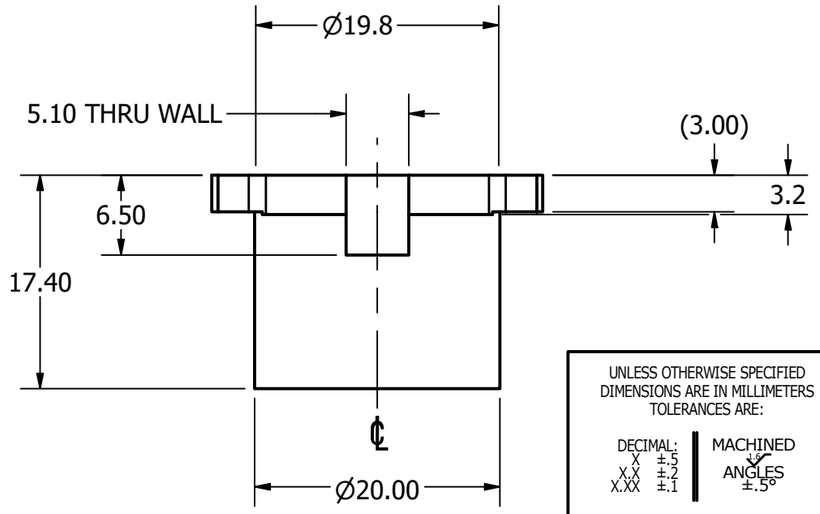




SECTION A-A







PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED √ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN: B. KIMES	10/31/2017
CHECKED	
ENG	
APPROVED	

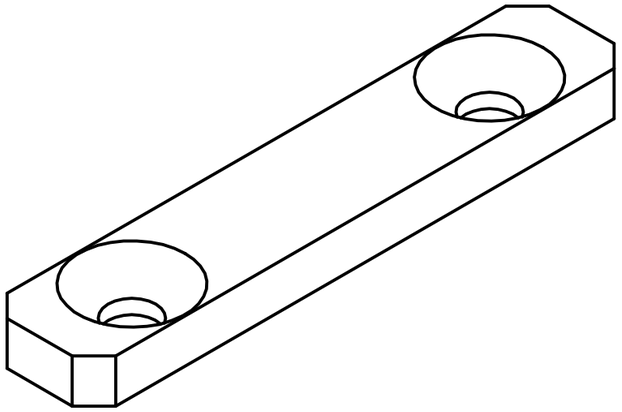
POTENTIOMETER INNER MOUNT

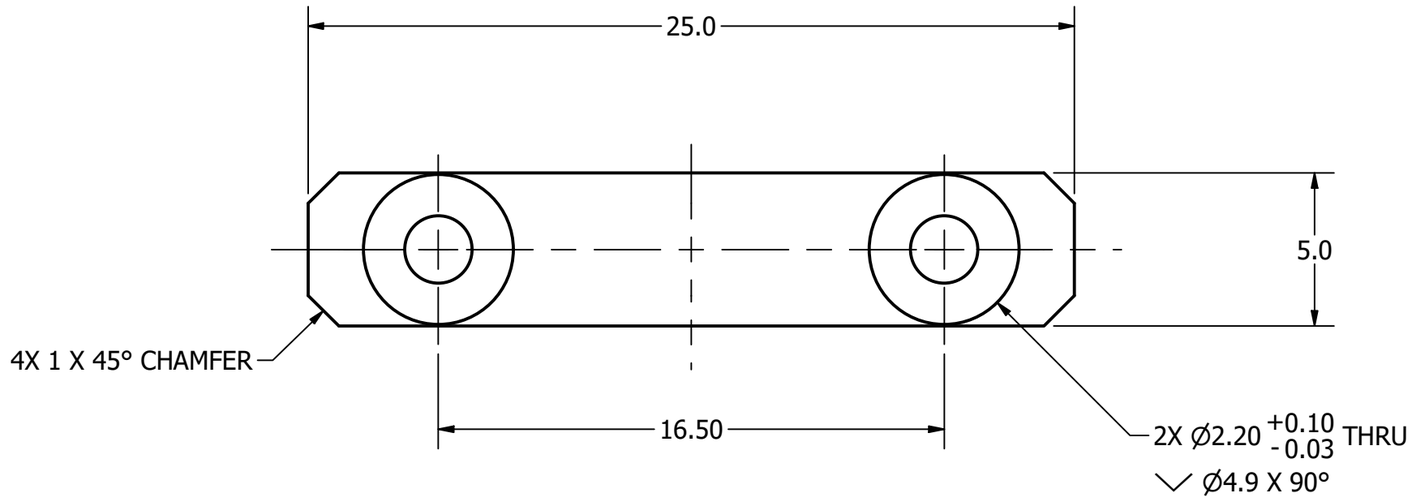
MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

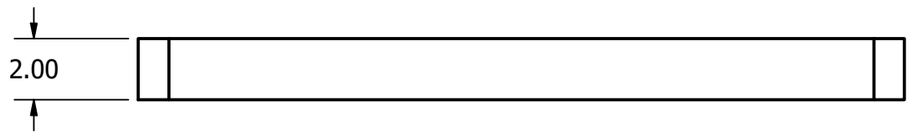
THIRD ANGLE PROJECTION

SIZE: A3 | DRAWING NUMBER: 474-5831 | REV: 1
SCALE: 2:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	10/31/2017







PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: B. KIMES	10/31/2017
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

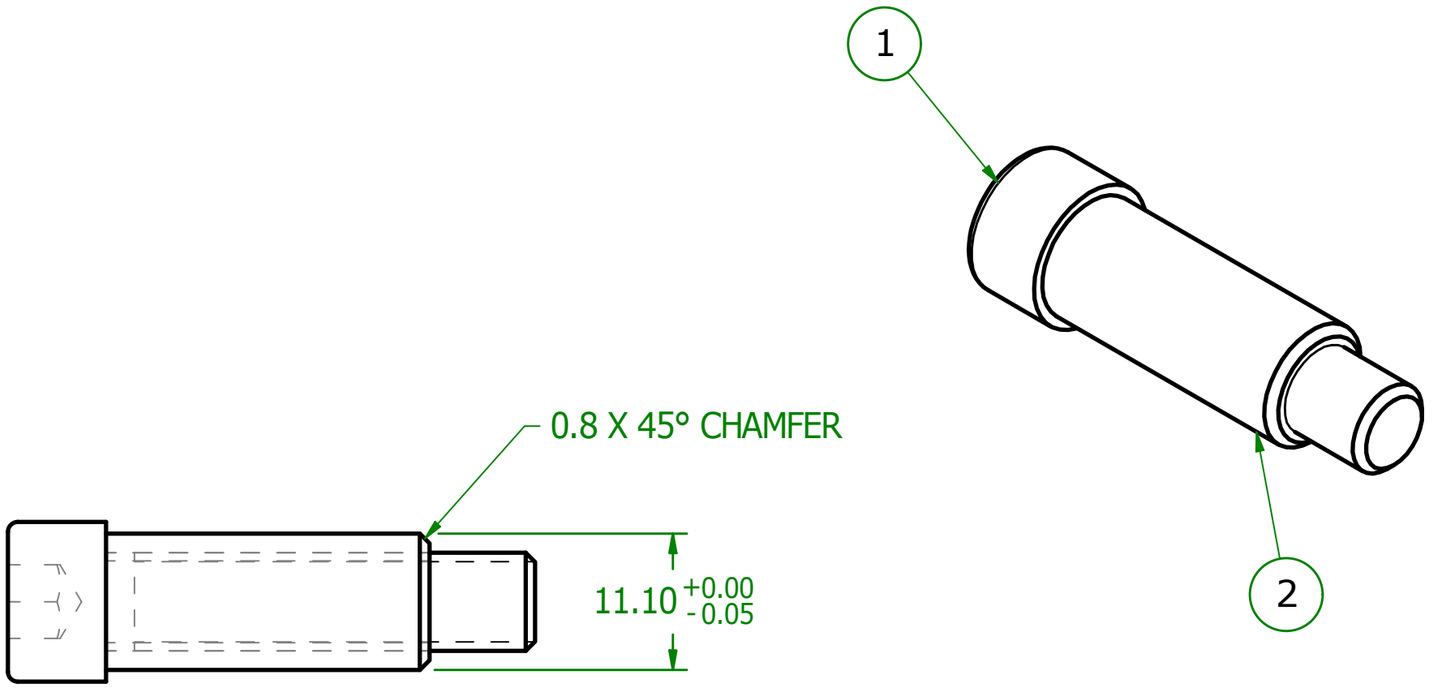
POTENTIOMETER CLAMP

THIRD ANGLE PROJECTION

SIZE: A3 | DRAWING NUMBER: 474-5832 | REV: 1

SCALE: 5:1 | SHEET: 1 OF 1

REVISION HISTORY				
ECO	REV	DESCRIPTION	DATE	BY
E00609	B	REDRAWN IN INVENTOR	7/23/2007	KSG
E00609	C	CHANGE TO METRIC SCREW	10/6/2008	BLW
E00609	D	CHANGED TO METRIC DIMENSIONING	12/4/2008	BLW
	E	IN TITLE BLOCK THOR-50M WAS THOR M	7/23/2018	DW



ITEM	QTY	PART NUMBER	DESCRIPTION
2	1	472-7564	SLEEVE, BOLT - ANKLE
1	1	9010164	SCREW, SHCS M8-1.25 x 35

PARTS LIST

UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES.
2. REMOVE OIL FROM ITEM 2 WITH SOLVENT.
3. APPLY LOCTITE 262 TO THREADS AND ASSEMBLY ITEMS 1 & 2.
4. MACHINE OD AND CHAMFER AS NOTED.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED 1.6 | ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL
HEAT TREAT: N/A
FINISH: N/A

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: B. WADE	12/4/2008
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

BOLT & SLEEVE ASSEMBLY, ANKLE
THOR-50M

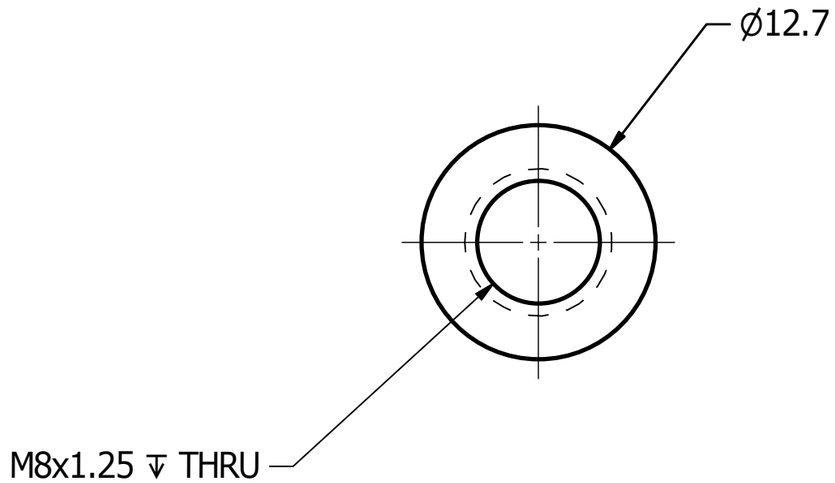
THIRD ANGLE PROJECTION

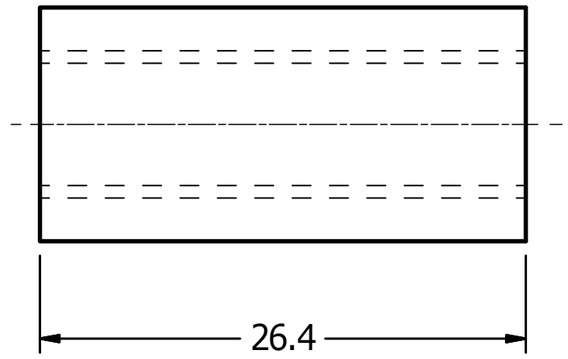
SIZE	DRAWING NUMBER	REV
A3	472-7563	E

SCALE: 2:1 | SHEET: 1 OF 1

472-7563 Ankle Bolt Assy.iam

REVISION HISTORY				
ECO	REV	DESCRIPTION	DATE	BY
E00609	B	REDRAWN IN INVENTOR	7/23/2007	KSG
E00609	C	REDIM FOR METRIC HARDWARE	10/6/2008	BLW
E00609	D	CHANGE TO METRIC DIMENSIONING	12/4/2008	BLW





UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED 1.6
ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: Delrin, White
HEAT TREAT: N/A
FINISH: N/A

VEHICLE ***R***ESEARCH and ***T***EST ***C***ENTER

APPROVALS	DATE
DRAWN B. WADE	12/4/2008
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

SLEEVE, BOLT - ANKLE

THOR-50M

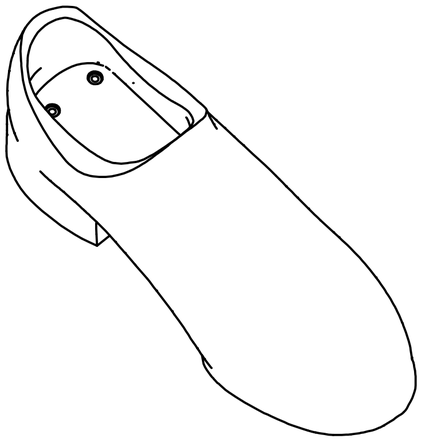
THIRD ANGLE PROJECTION

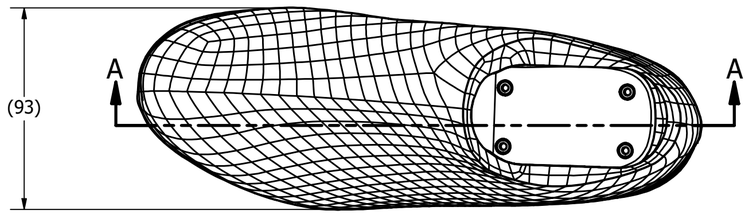
SIZE: A3 | DRAWING NUMBER: 472-7564 | REV: D

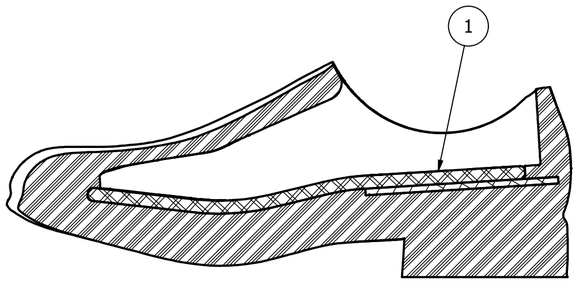
SCALE: 3:1 | SHEET: 1 OF 1

472-7564 Ankle Bolt Sleeve.ipt

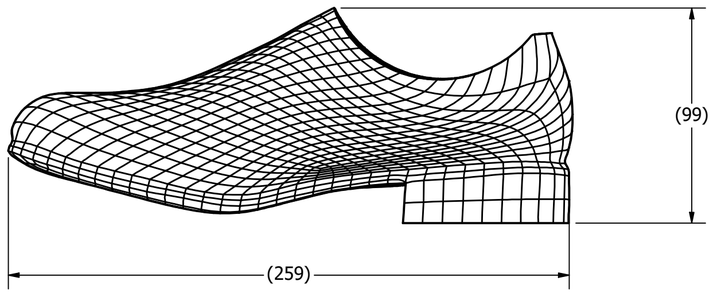
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/13/2016







SECTION A-A



NOTES:

1. MATERIAL: THERMOSET PLASTIC
   COLOR: BLACK
   DUROMETER: 70-75 SHORE "A", CAN BE ADJUSTED TO MEET THE PERFORMANCE REQUIREMENT.

2. REMOVE ALL MOLD FLASHING.

3. ALL MOLD DIMENSION TOLERANCE +1%/-2% BUT NO SMALLER THAN 0.5mm.

4. NO SPLIT OR DEFECTS ARE ALLOWED IN THE MOLDING.

5. WEIGHT: 1013±30g

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	474-5906-1	LAMINATED SOLE PLATE ASSY, LEFT

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ∠ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTE 1
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: B. KIMES	4/13/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

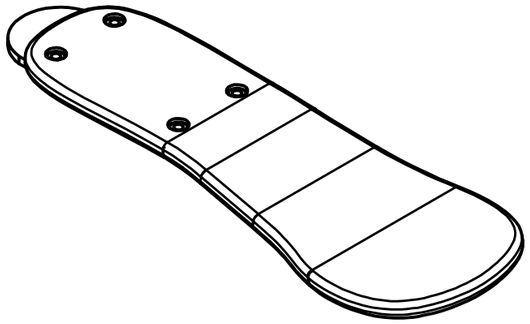
MOLDED SHOE ASSEMBLY, LEFT

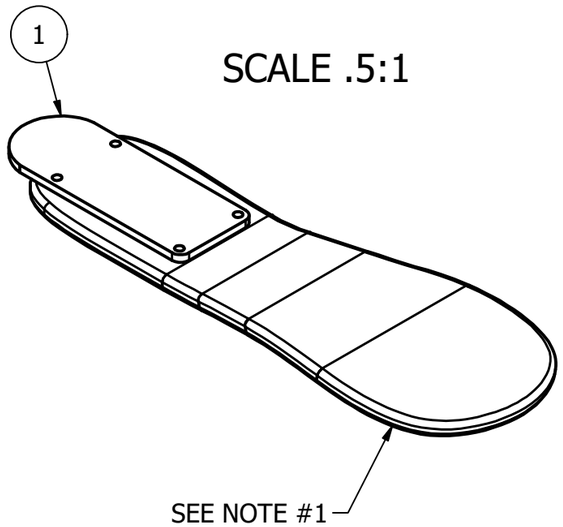
THIRD ANGLE PROJECTION

SIZE: A2 | DRAWING NUMBER: 474-5903-1 | REV: 1

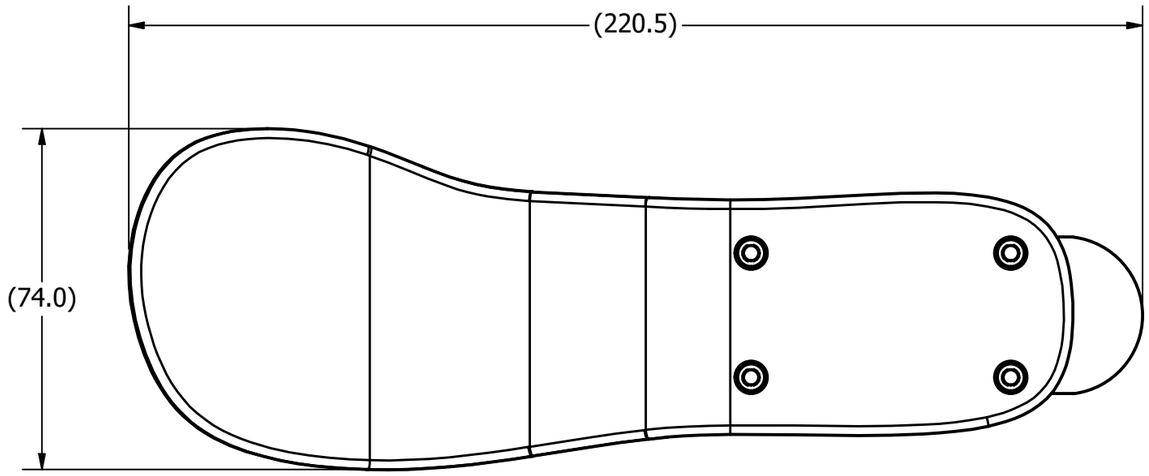
SCALE: .5:1 | SHEET: 1 OF 1

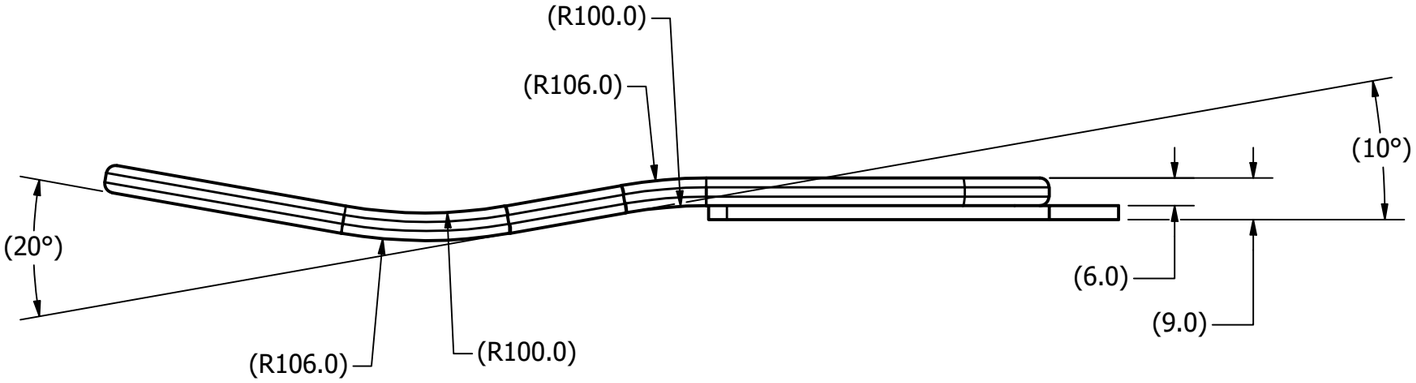
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AB	JW	10/04/2017





SCALE .5:1





NOTES:

1. CARBON FIBER LAMINATES

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	474-5902	BACKING PLATE, SOLE PLATE

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN A. Barchock	10/4/2017
CHECKED	
ENG	
APPROVED	

MATERIAL
HEAT TREAT
FINISH

PRELIMINARY DRAWING

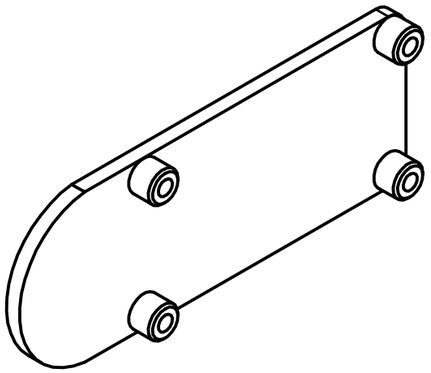
LAMINATED SOLE PLATE ASSY, LEFT

THIRD ANGLE PROJECTION

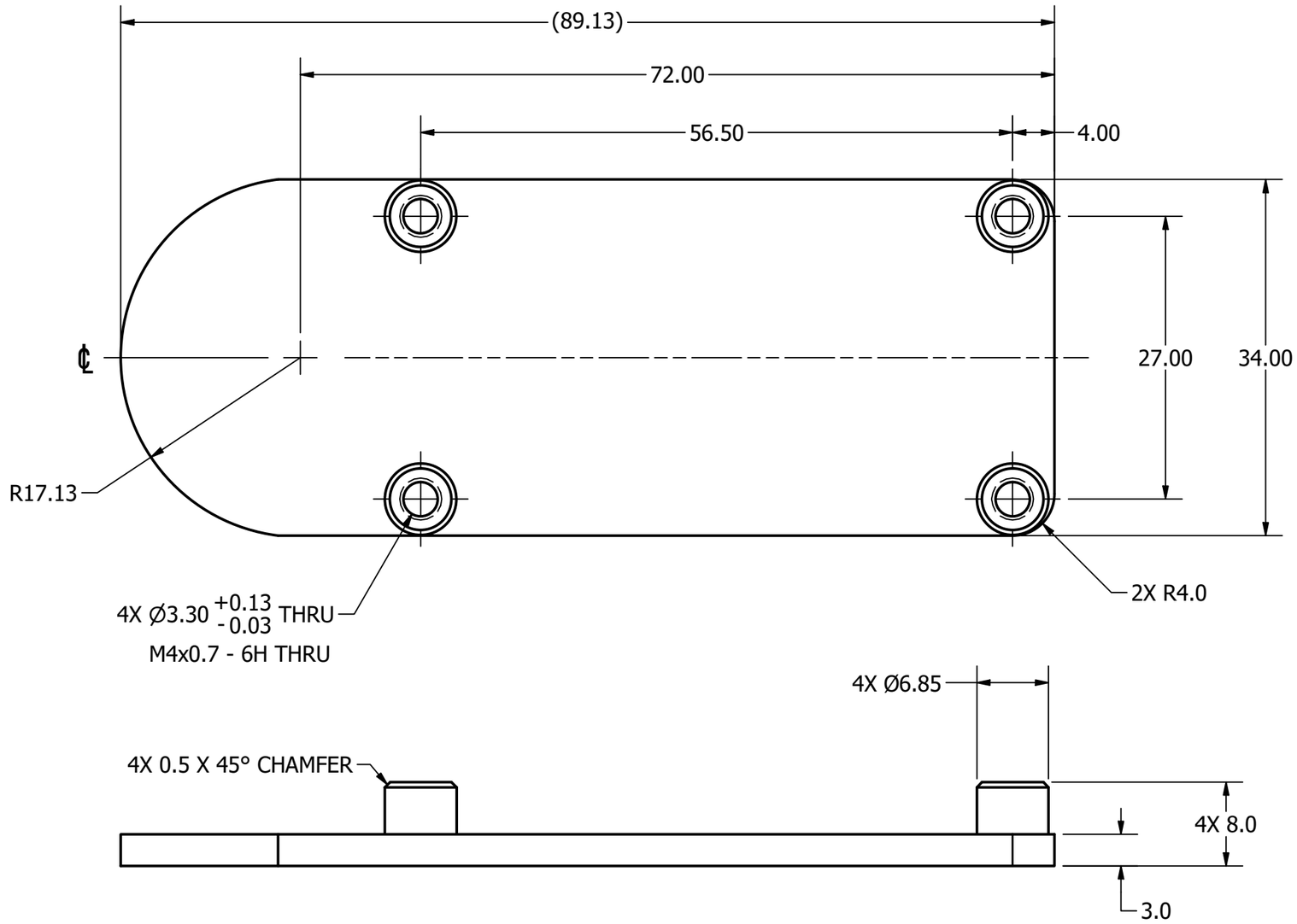
SIZE A3 | DRAWING NUMBER 474-5906-1 | REV 1

SCALE: .75:1 | SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/13/2016



SCALE 1 : 1



NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL	7075-T6 ALUMINUM	
HEAT TREAT		
FINISH	CLEAR ANODIZE	

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN B. KIMES	4/13/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

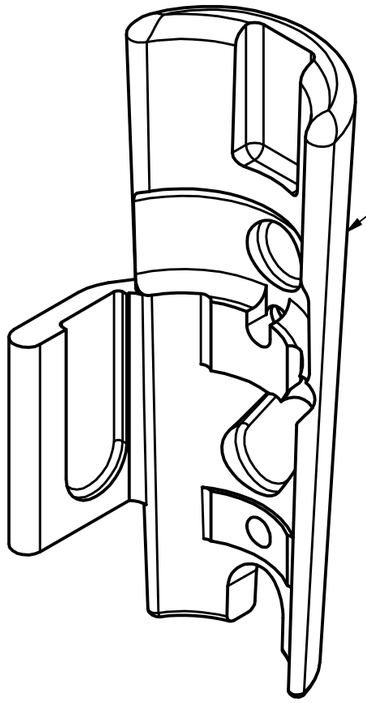
BACKING PLATE, SOLE PLATE

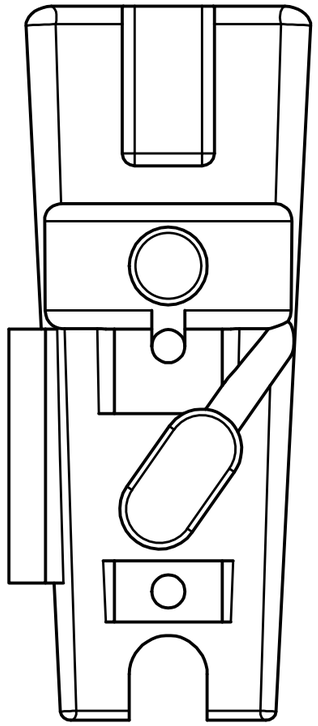
THIRD ANGLE PROJECTION

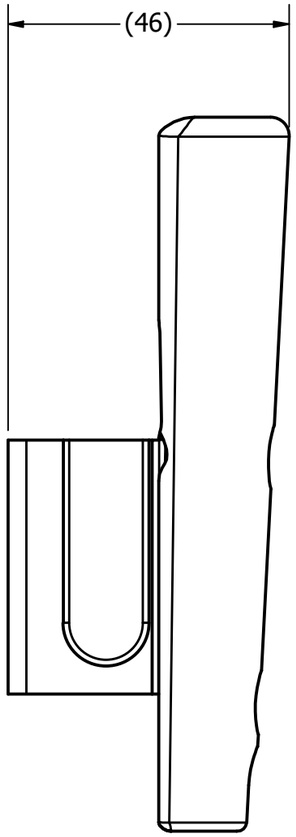
SIZE	DRAWING NUMBER	REV
A3	474-5902	1

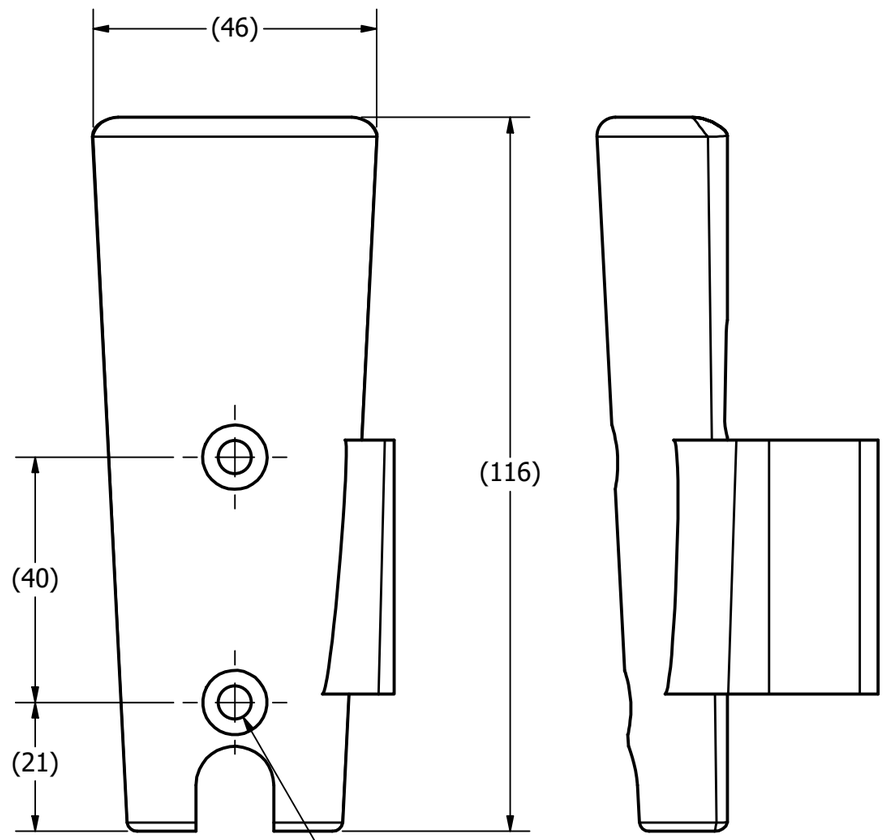
SCALE: 2:1 SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/13/2016









NOTES:

1. MATERIAL: POLYURETHANE
   COLOR: BLACK
   DUROMETER: 84±5 SHORE "D"

2. REMOVE ALL MOLD FLASHING.

3. ALL MOLD DIMENSION TOLERANCE +1%/-2% BUT NO SMALLER THAN 0.5mm.

4. NO SPLIT OR DEFECTS ARE ALLOWED IN THE URETHANE MOLDING.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTES
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: B. KIMES	4/13/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

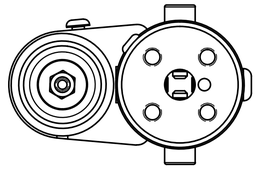
SHIN GUARD, MOLDED, LEFT

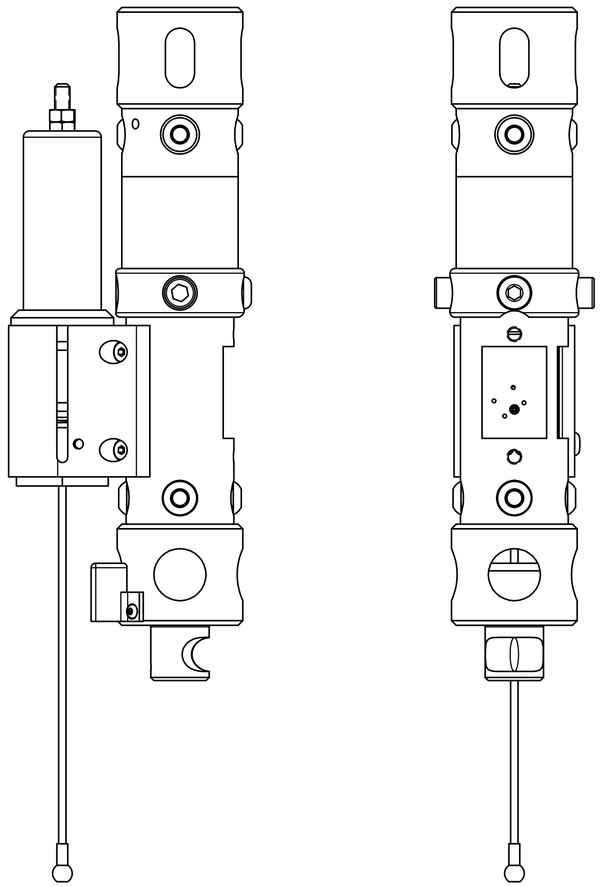
THIRD ANGLE PROJECTION

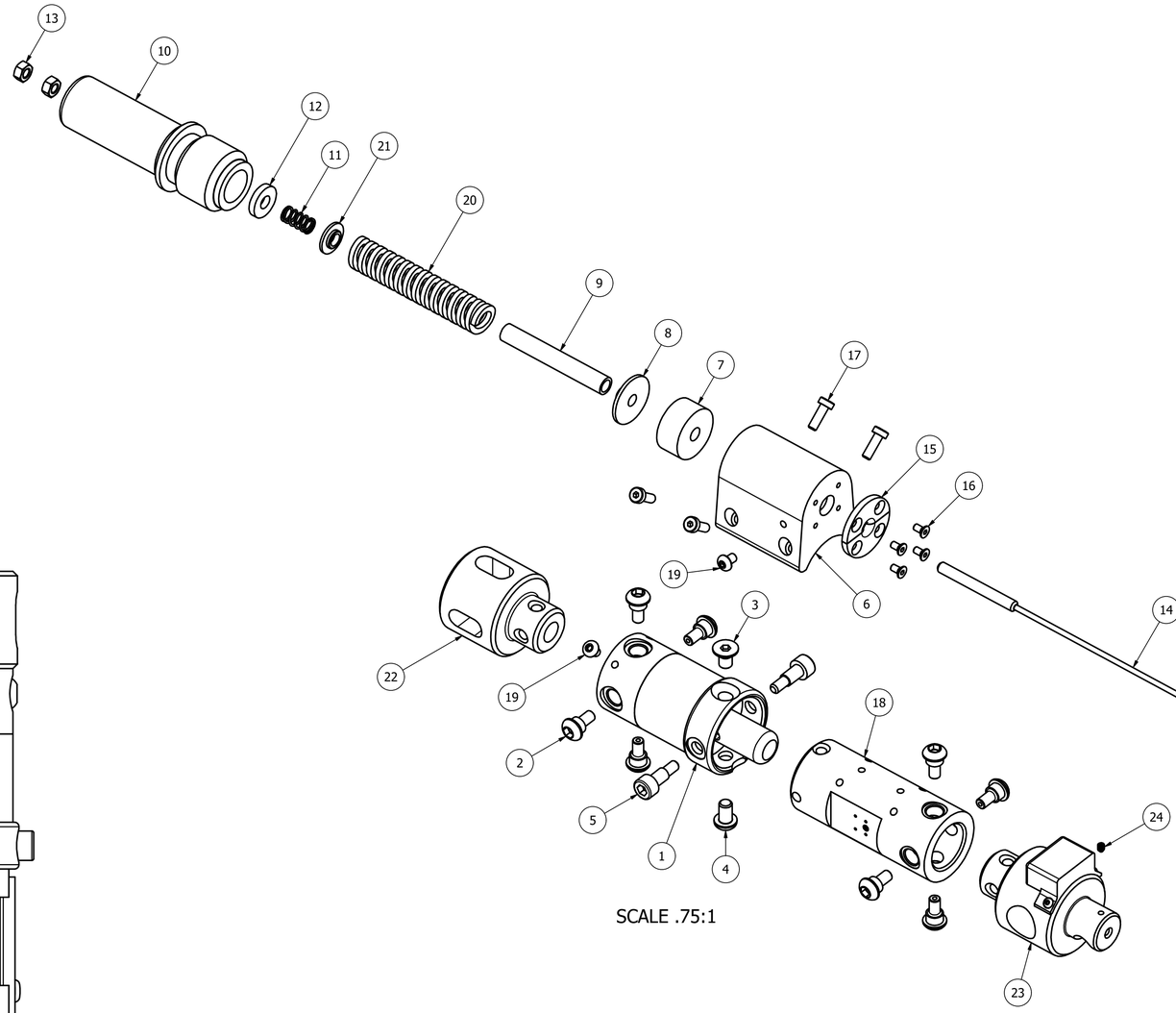
SIZE: A3 | DRAWING NUMBER: 474-5518-1 | REV: 1

SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH	JW	4/11/2016







SCALE .75:1

ITEM	QTY	PART NUMBER	DESCRIPTION
24	1	9010447	M3 X 0.5 X 3 LG. SSSNP
23	1	474-5822	STRUCTURAL REPLACEMENT, LOWER TIBIA LOAD CELL ASS'Y
22	1	474-5550	STRUCTURAL REPLACEMENT, UPPER TIBIA LOAD CELL
21	1	474-2322	SPRING BUSHING
20	1	474-2925	SPRING, FRONT
19	2	5001075	M4 X 0.7 X 6 LG. BHCS
18	1	474-5540-1	LOWER TIBIA SHAFT, LEFT
17	4	5001054	M4 X 0.7 X 12 LG. LHCS
16	4	5000098	M3 X 0.5 X 6 LG. FHCS
15	2	474-5531	ACHILLES CABLE EYELET GUIDE
14	1	474-5530	ACHILLES CABLE
13	2	5000515	M5 X 0.8 HEX NUT ZINC
12	1	474-5529	PRIMARY LOAD WASHER
11	1	6005232	SPRING COMPRESSION .295 X .032 X .551 SS
10	1	474-5525	UPPER ACHILLES SPRING HOUSING
9	1	474-5513	ACHILLES SPRING DAMPING TUBE
8	1	474-5526	SPRING CAP, BOTTOM
7	1	472-7359	MOCK ACHILLES LOAD CELL
6	1	474-5504	LOWER ACHILLES SPRING HOUSING
5	2	474-5512	TIBIA PLUNGER PIN, MODIFIED M6 SHCS
4	1	5000891	M6 X 1 X 10 LG. BHCS
3	1	5000204	M6 X 1 X 10 LG. FHCS
2	8	W50-61042	MODIFIED BHSS M6 THREAD
1	1	474-5508	TIBIA COMPLIANT ELEMENT ASSEMBLY

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMALS: X ±.1, X.X ±.2, X.XX ±.1 | MACHINED 4C ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL
HEAT TREAT
FINISH

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: jhaefner	4/11/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

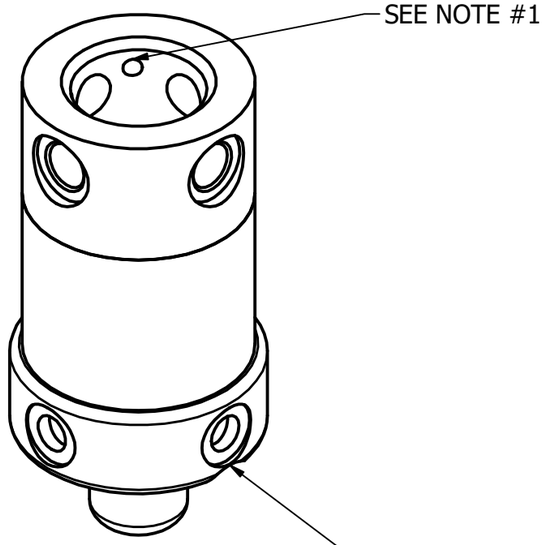
TIBIA ASSEMBLY, LEFT

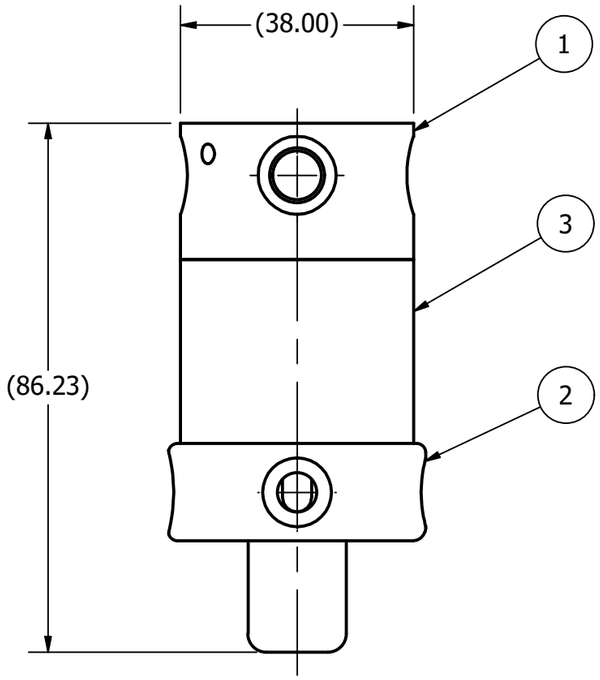
THIRD ANGLE PROJECTION

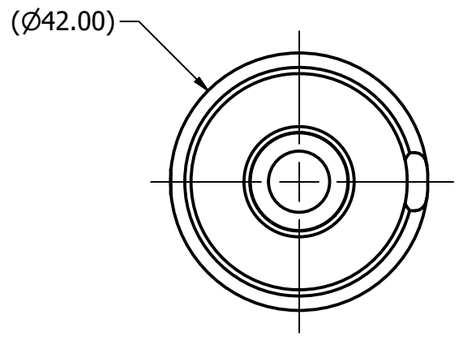
SIZE: A1 | DRAWING NUMBER: 474-5507-1 | REV: 1

SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	DJI	JW	4/8/2016







NOTES:

1. BOND ASSEMBLY WITH LORD 305 ADHESIVE OR EQUIVALENT.
2. METAL AND RUBBER SURFCES MUST BE SANDBLASTED & CLEANED WITH SOLVENT PRIOR TO BONDING
3. HOLES IN ITEM 1 MUST HAVE SAME ANGULAR ORIENTATION ABOUT CENTER AXIS AS HOLES IN ITEM 2. USE FEATURES FOR ORIENTATION REF.

ITEM	QTY	PART NUMBER	DESCRIPTION
3	1	474-5511	TIBIA COMPLIANT ELEMENT BUSHING
2	1	474-5510	TIBIA COMPLIANT ELEMENT FLANGE
1	1	474-5509	TIBIA COMPLIANT ELEMENT PLUNGER

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL
HEAT TREAT
FINISH

APPROVALS	DATE
DRAWN: disopi	4/8/2016
CHECKED	
ENG	
APPROVED	

VEHICLE RESEARCH and TEST CENTER

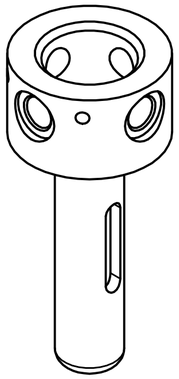
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

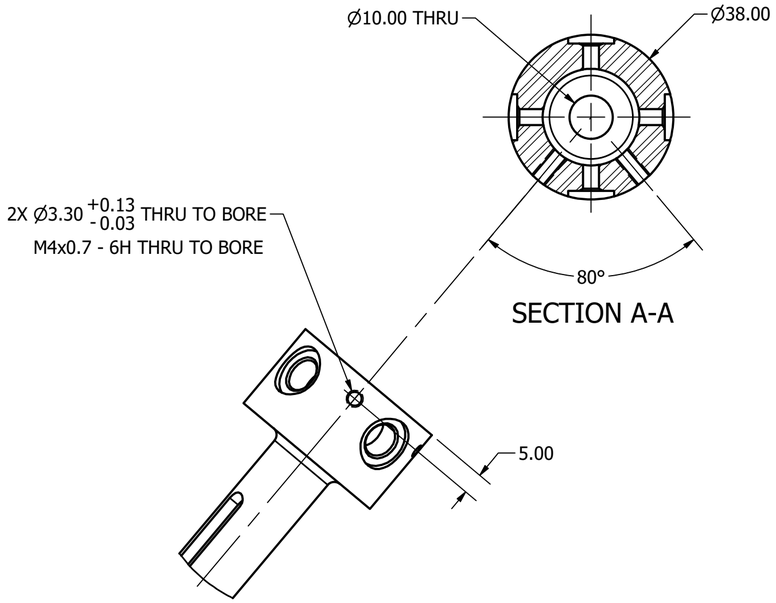
TIBIA COMPLIANT ELEMENT ASSEMBLY

THIRD ANGLE PROJECTION

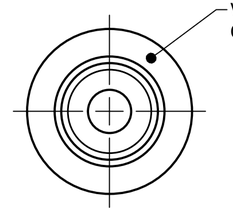
SIZE: A3 | DRAWING NUMBER: 474-5508 | REV: 1
SCALE: 1:1 | SHEET: 1 OF 1

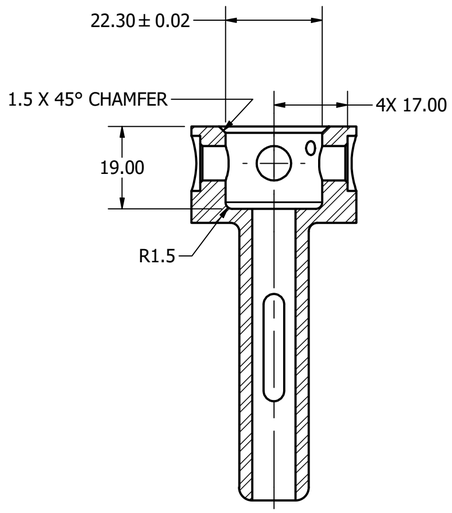
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	DJI	JW	4/8/2016



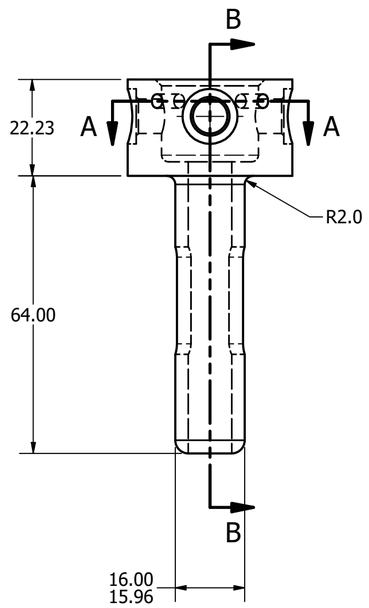


SECTION A-A





SECTION B-B



UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 440C STAINLESS STEEL
HEAT TREAT: Rc 52-62
FINISH:

PRELIMINARY DRAWING

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: disopi	4/8/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

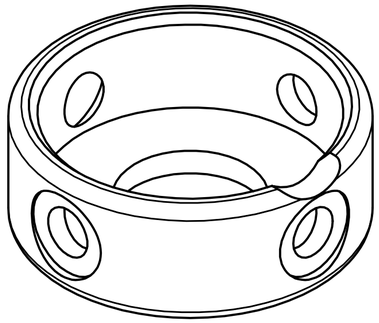
TIBIA COMPLIANT ELEMENT PLUNGER

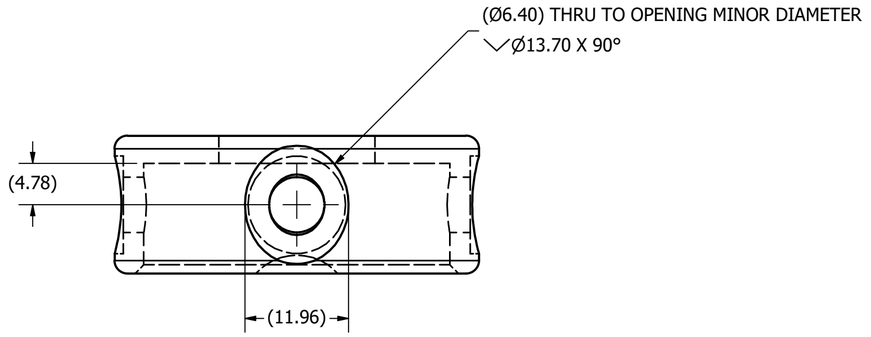
THIRD ANGLE PROJECTION

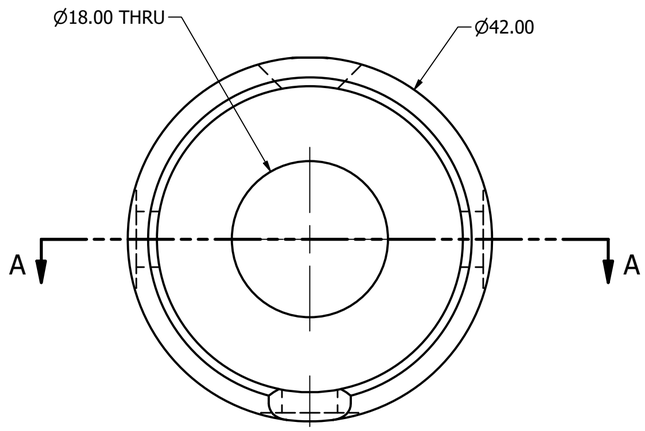
SIZE: A2 | DRAWING NUMBER: 474-5509 | REV: 1

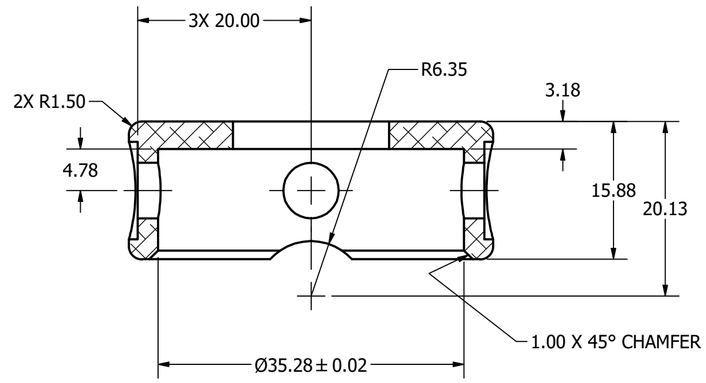
SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	DJI		4/7/2016

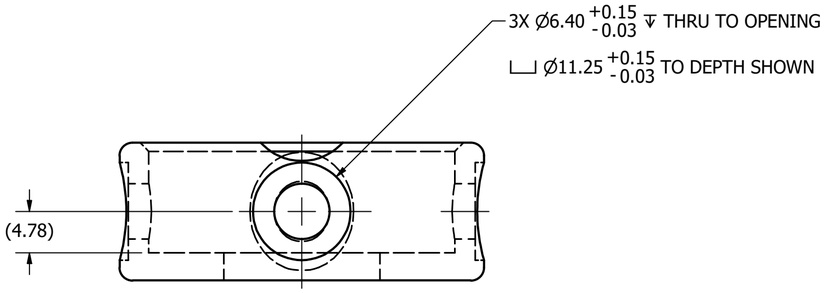








SECTION A-A



PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ∠ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 6061-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: disopi	4/7/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

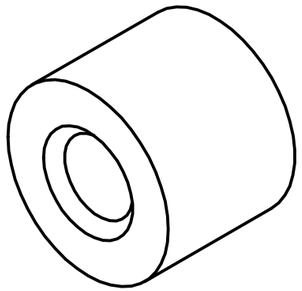
TIBIA COMPLIANT ELEMENT FLANGE

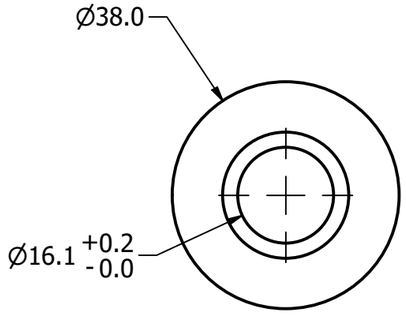
THIRD ANGLE PROJECTION

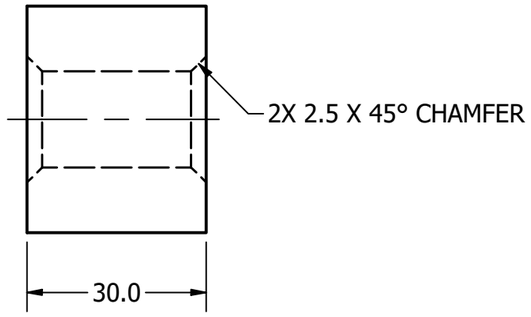
SIZE: A2 | DRAWING NUMBER: 474-5510 | REV: 1

SCALE: 2:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	DJI	JW	4/7/2016







PRELIMINARY DRAWING

NOTES:
1. MATERIAL: NATURAL RUBBER
   COLOR: BLACK
   DUROMETER: 41 ±5 SHORE "A"
2. REMOVE ALL MOLD FLASHING
3. ALL MOLD DIMENSION TOLERANCE +1%/-2%
   BUT NO SMALLER THAN 0.5mm, UNLESS OTHERWISE NOTED.
4. NO SPLIT OR DEFECTS ARE ALLOWED
   IN THE RUBBER MOLDING
5. ALL SPECIFICATIONS MAY BE SUPERCEDED BY DYNAMIC TEST RESULTS.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED √1.6 | ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTE #1
HEAT TREAT:
FINISH:

*V*EHICLE *R*ESEARCH and *T*EST *C*ENTER

APPROVALS	DATE
DRAWN: disopi	4/7/2016
CHECKED:	
ENG:	
APPROVED:	

DEPARTMENT OF TRANSPORTATION UNITED STATES OF AMERICA

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

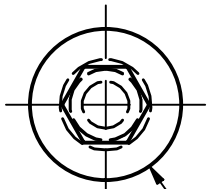
TIBIA COMPLIANT ELEMENT BUSHING

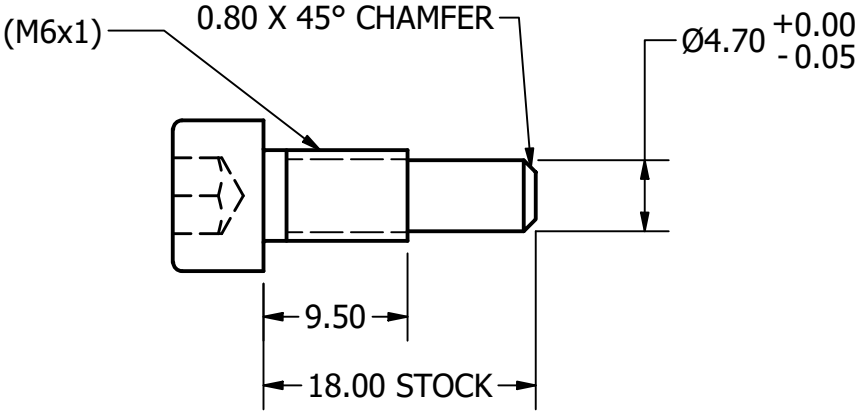
THIRD ANGLE PROJECTION

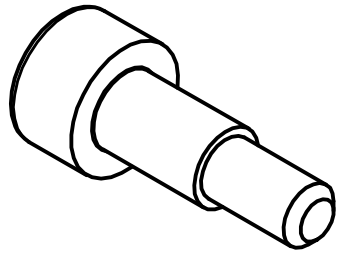
SIZE	DRAWING NUMBER	REV
B	474-5511	1

SCALE: 1:1 | SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	DJI	JW	4/8/2016







NOTES:

1. MODIFY PART #5000285 AS SHOWN
   (M6 X 1 X 18 SHCS)

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ±.5 | ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN: disopi	4/8/2016
CHECKED	
ENG	
APPROVED	

MATERIAL: SEE NOTES
HEAT TREAT
FINISH

TIBIA PLUNGER PIN, MODIFIED M6 SHCS

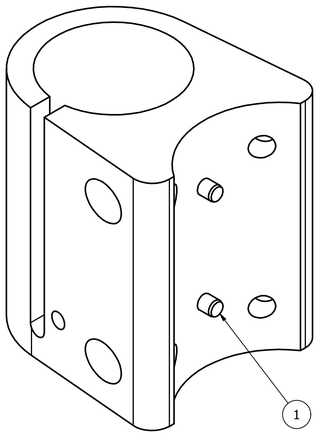
THIRD ANGLE PROJECTION

SIZE	DRAWING NUMBER	REV
A4	474-5512	1

SCALE: 2:1

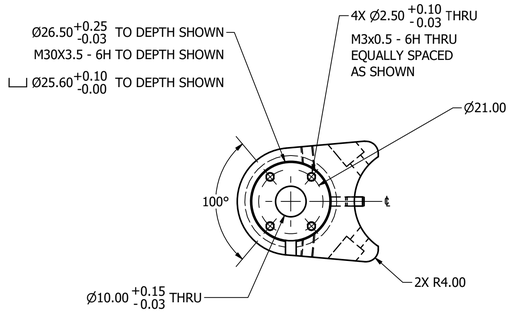
SHEET 1 OF 1

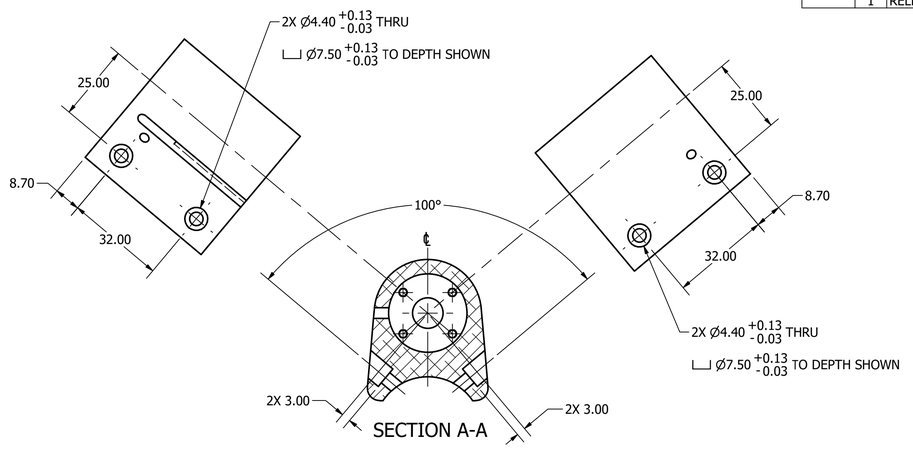
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH	JW	4/8/2016

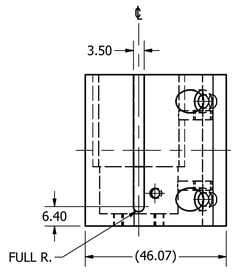


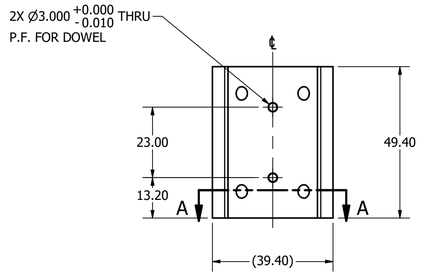
SEE NOTE #2

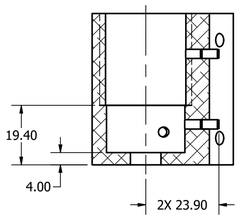
SCALE 2: 1











SECTION B-B

NOTES:

1. ALL DIMENSIONS SYMMETRICAL ABOUT ℄ UNLESS OTHERWISE NOTED.

2. INSTALL DOWEL PINS AFTER ANODIZE.

ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	5000385	M3 X 6 LG. DOWEL PIN

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.2, .X ±.1, .XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT: N/A
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: jhaefner	4/8/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

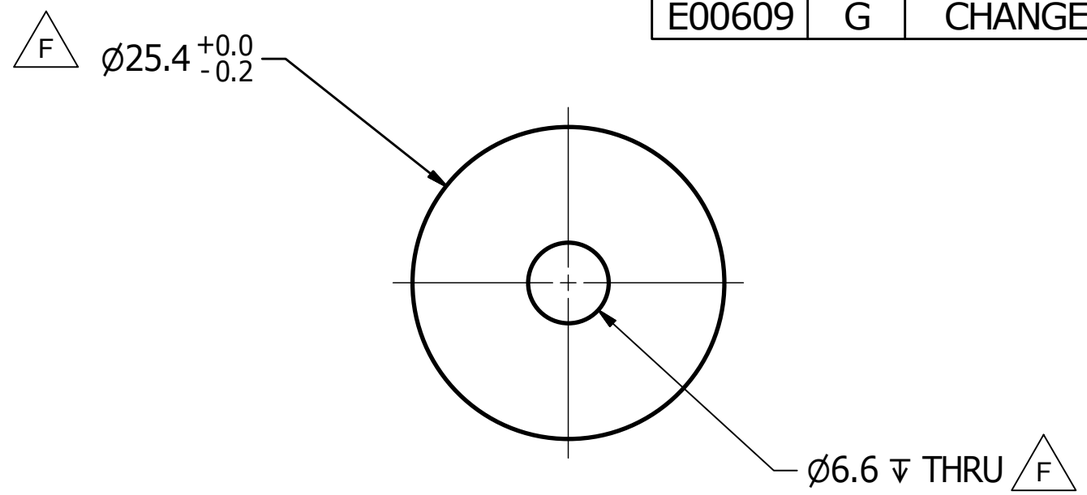
LOWER ACHILLES SPRING HOUSING

THIRD ANGLE PROJECTION

SIZE: A1 | DRAWING NUMBER: 474-5504 | REV: 1

SCALE: 1:1 | SHEET: 1 OF 1

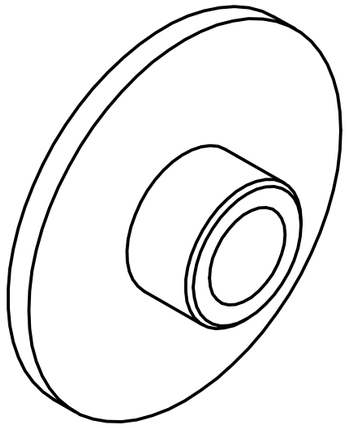
REVISION HISTORY				
ECO	REV	DESCRIPTION	DATE	BY
E00609	E	REDRAWN IN INVENTOR	7/19/2007	KSG
8288	F	1.000 WAS .850, .261 WAS .25, .475 WAS .350	6/26/2008	TF
E00609	G	CHANGE TO METRIC DIMENSIONING	12/1/2008	BLW

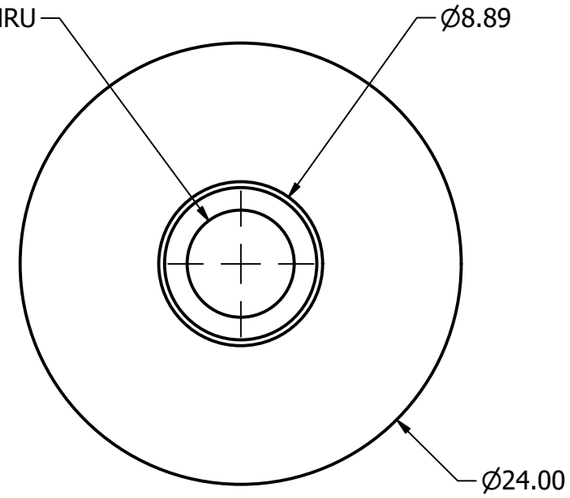


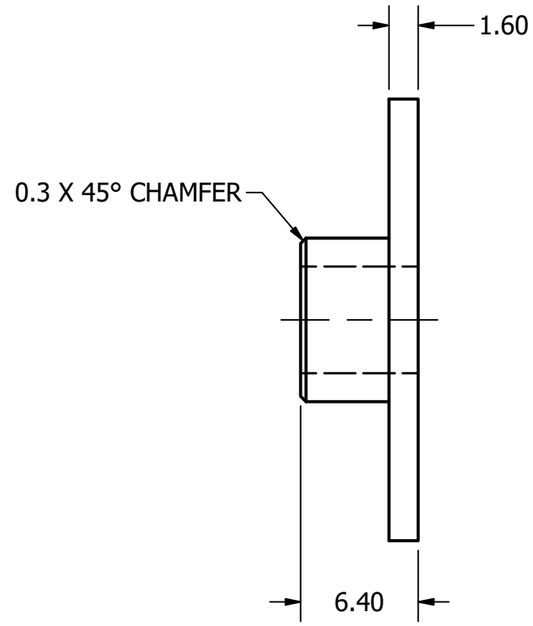
UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS TOLERANCES ARE: DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 || MACHINED 1.6 ANGLES ±.5° ASME Y14.5M - 1994 DO NOT SCALE DRAWING	***V***EHICLE ***R***ESEARCH and ***T***EST ***C***ENTER	NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
	APPROVALS / DATE	ACHILLES LOAD CELL BLANK
	DRAWN B. WADE 12/1/2008	THOR-50M
MATERIAL Aluminum 6061-T6	CHECKED TMV 12/10/2008	SIZE A3 | DRAWING NUMBER 472-7359 | REV G
HEAT TREAT N/A	ENG	
FINISH BLUE ANODIZE	APPROVED	THIRD ANGLE PROJECTION | SCALE: 2:1 | SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH		4/8/2016







PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED √
ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 440C STAINLESS STEEL
HEAT TREAT: Rc57±5
FINISH: N/A

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: jhaefner	4/8/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

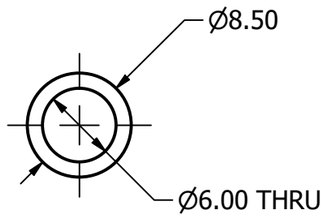
SPRING CAP, BOTTOM

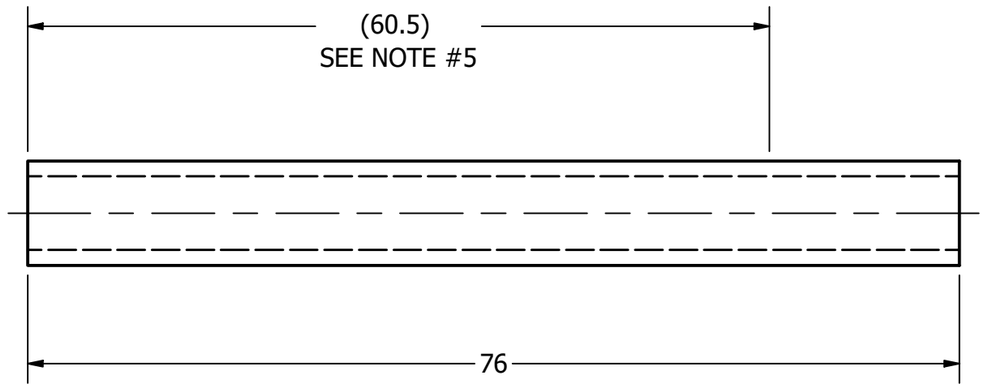
THIRD ANGLE PROJECTION

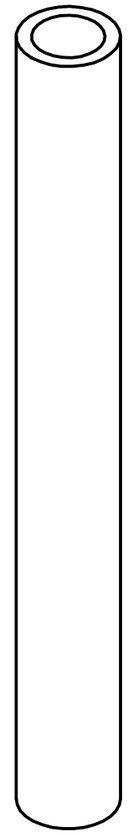
SIZE: A3 | DRAWING NUMBER: 474-5526 | REV: 1

SCALE: 3:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH		4/11/2016







NOTES:
1. MATERIAL: NEOPRENE RUBBER
   COLOR: BLACK
   DUROMETER: 60 ±5 SHORE "A"
2. REMOVE ALL MOLD FLASHING
3. ALL MOLD DIMENSION TOLERANCE +1%/-2%
   BUT NO SMALLER THAN 0.5mm
4. NO SPLIT OR DEFECTS ARE ALLOWED
   IN THE RUBBER MOLDING
5. CUT TO 60.5mm. IT CAN BE ADJUSTED TO MEET THE
   PERFORMANCE REQUIREMENTS.
6. USE SAME MOLD AS 474-2323 TO MOLD THIS PART.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN: jhaefner	4/11/2016
CHECKED:	
ENG:	
APPROVED:	

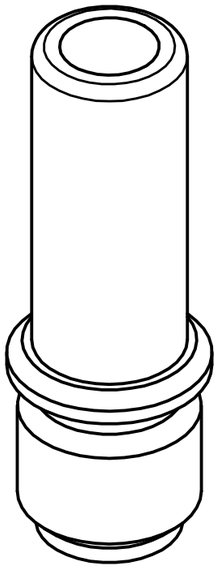
MATERIAL: SEE NOTE #1
HEAT TREAT: N/A
FINISH: N/A

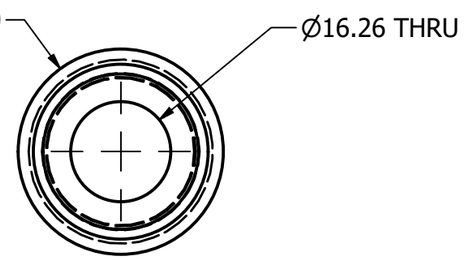
ACHILLES SPRING DAMPING TUBE

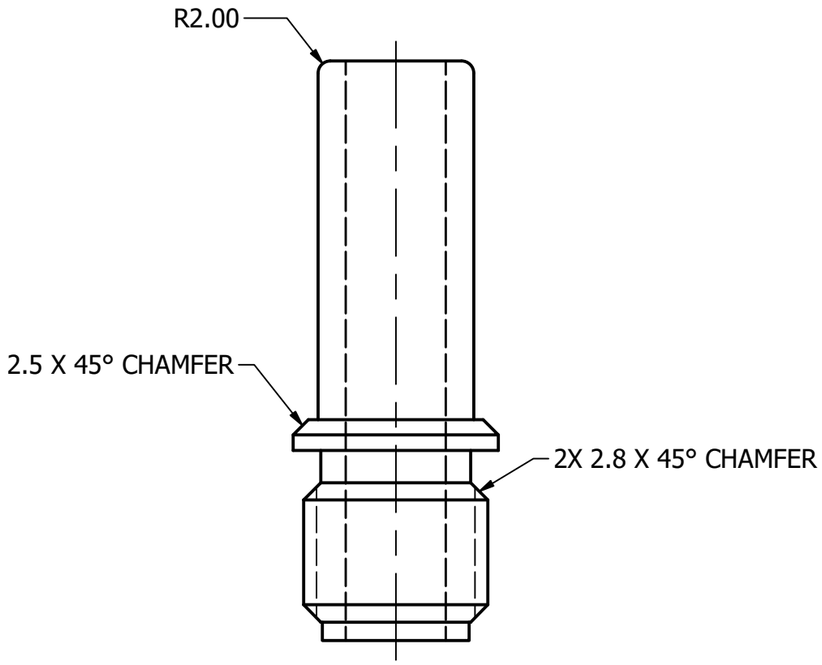
THIRD ANGLE PROJECTION

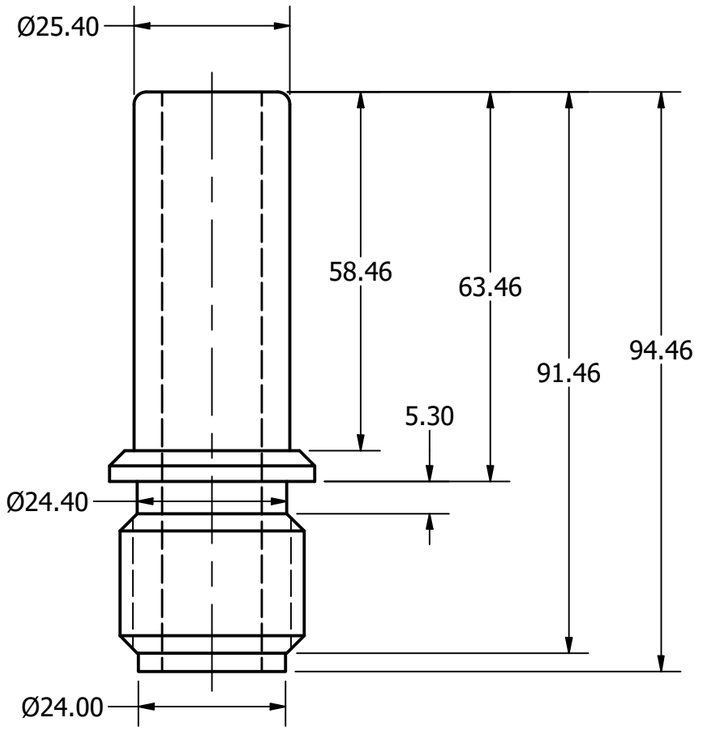
SIZE: A3 | DRAWING NUMBER: 474-5513 | REV: 1
SCALE: 5:1 | SHEET: 1 OF 1

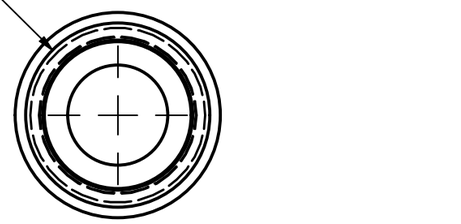
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH		4/11/2016











PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED √C
ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

	APPROVALS	DATE
DRAWN	jhaefner	4/11/2016
CHECKED		
ENG		
APPROVED		

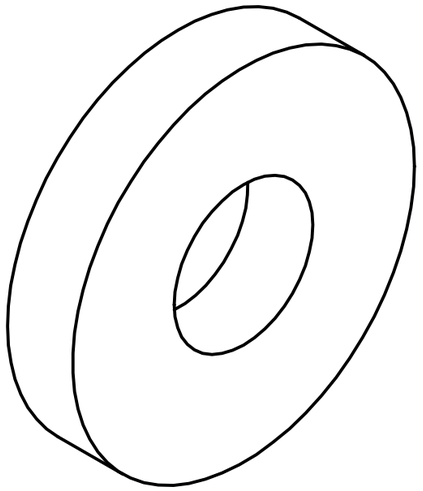
MATERIAL: 6061-T6 ALUMINUM
HEAT TREAT: N/A
FINISH: CLEAR ANODIZE

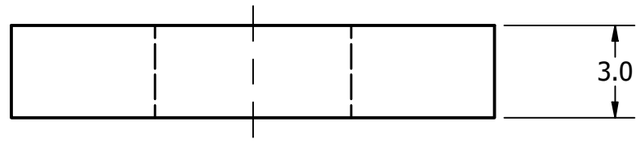
UPPER ACHILLES SPRING HOUSING

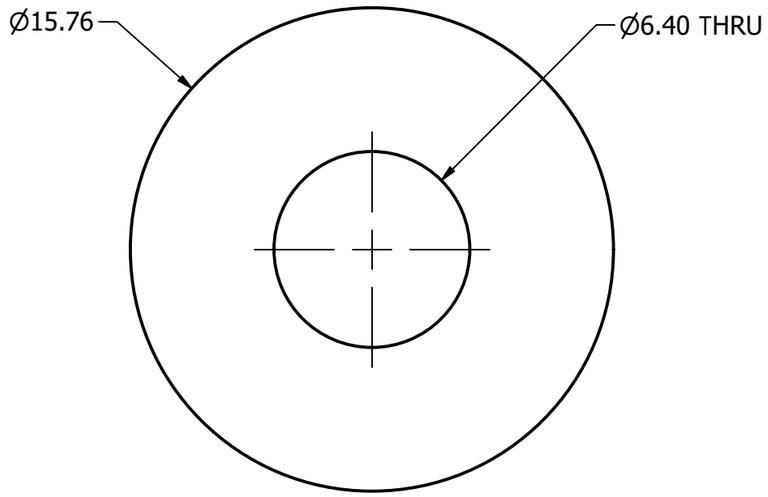
THIRD ANGLE PROJECTION

SIZE: A3 | DRAWING NUMBER: 474-5525 | REV: 1
SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH		4/11/2016







NOTES:

1. MATERIAL: ACETAL RESIN, WHITE OR EQUIVALENT.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTES	CHECKED	
HEAT TREAT: N/A	ENG	
FINISH: N/A	APPROVED	

*V*EHICLE *R*ESEARCH and *T*EST *C*ENTER

APPROVALS	DATE
DRAWN: jhaefner	4/11/2016

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

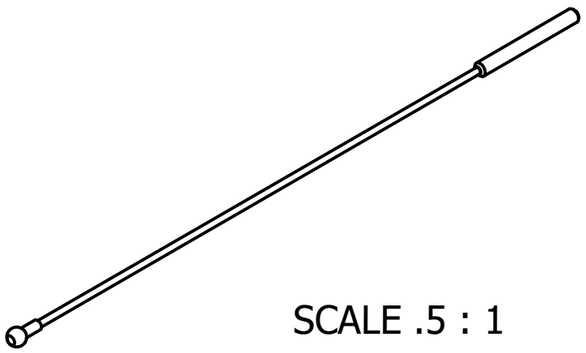
PRIMARY LOAD WASHER

THIRD ANGLE PROJECTION

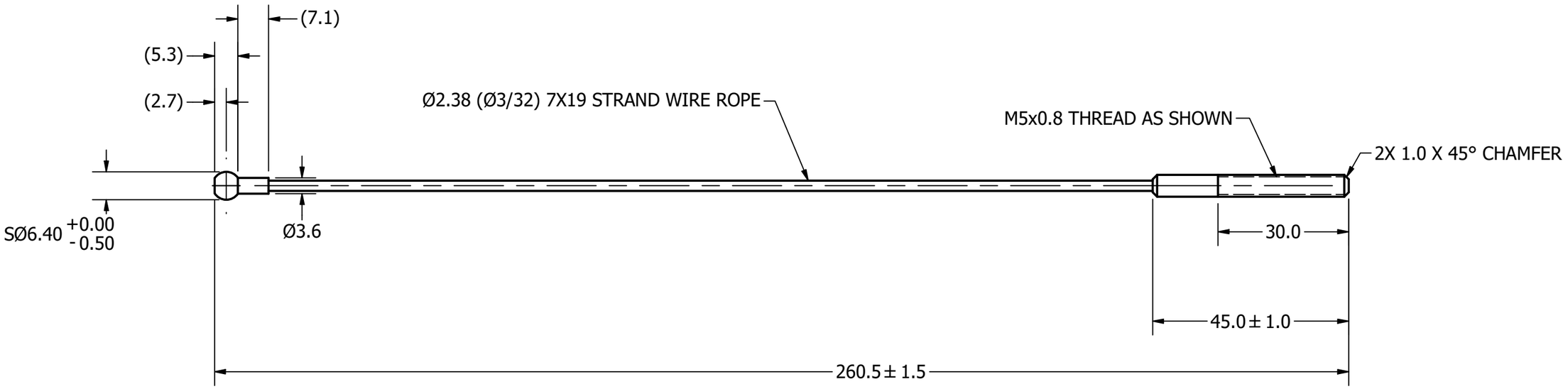
SIZE	DRAWING NUMBER	REV
A3	474-5529	1

SCALE: 5:1 SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH	JW	4/11/2016



SCALE .5 : 1



NOTES:
1. DIMENSIONS SHOWN ARE AFTER SWAGING AND MACHINING.

2. TENSILE STRENGTH OF CABLE ASSEMBLY: 920LBS.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED √, ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN jhaefner	4/11/2016
CHECKED	
ENG	
APPROVED	

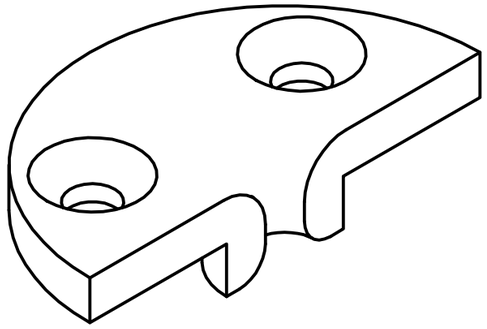
MATERIAL
HEAT TREAT
FINISH

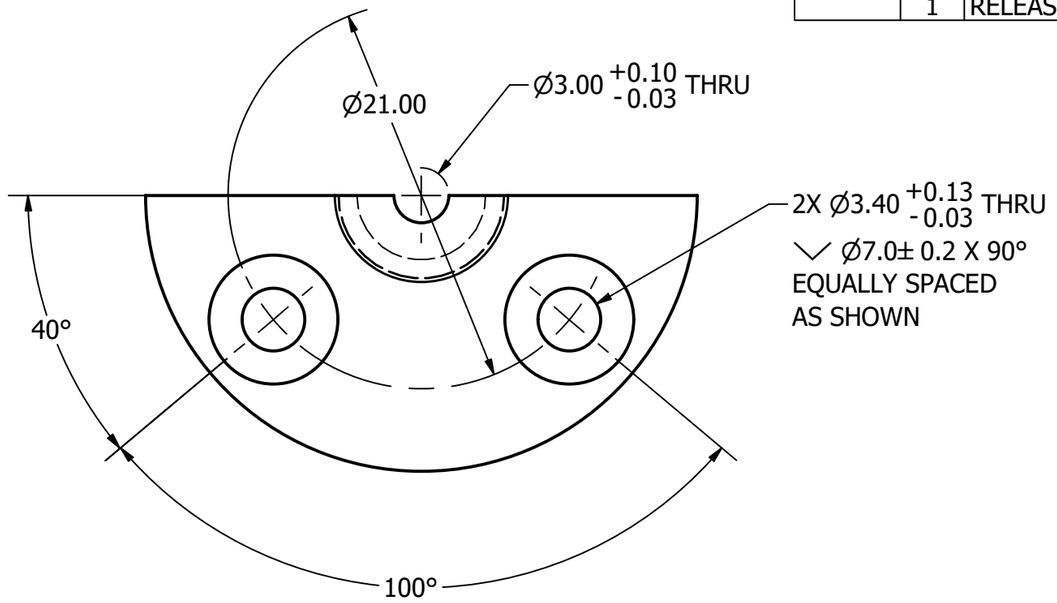
ACHILLES CABLE

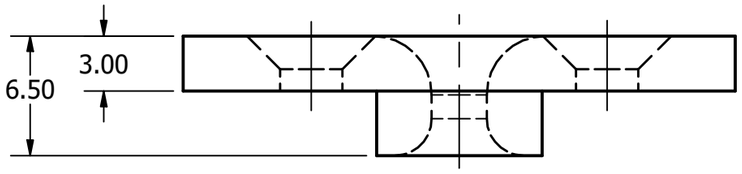
THIRD ANGLE PROJECTION

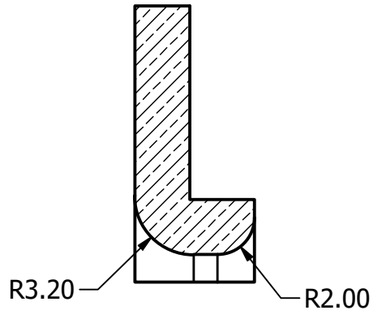
SIZE A3 | DRAWING NUMBER 474-5530 | REV 1
SCALE: 1:1 | SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH		4/11/2016

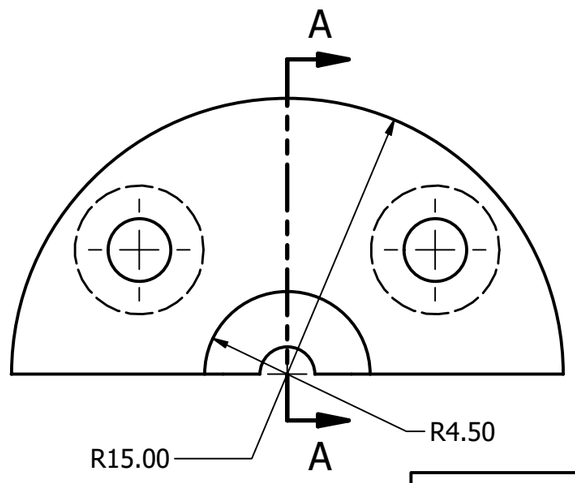








SECTION A-A



PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: ALUMINUM BRONZE	CHECKED	
HEAT TREAT: N/A	ENG	
FINISH: N/A	APPROVED	

*V*EHICLE *R*ESEARCH and *T*EST *C*ENTER

APPROVALS	DATE
DRAWN: jhaefner	4/11/2016

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

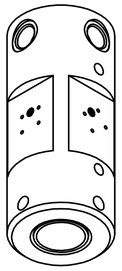
ACHILLES CABLE EYELET GUIDE

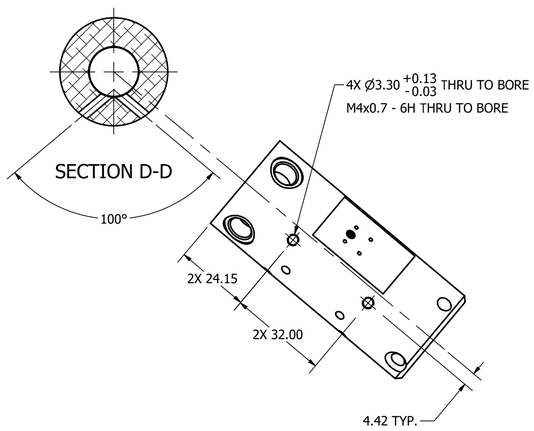
THIRD ANGLE PROJECTION

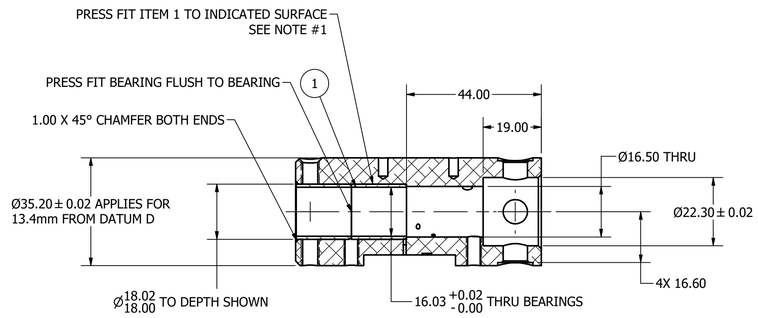
SIZE	DRAWING NUMBER	REV
A3	474-5531	1

SCALE:	SHEET
3:1	1 OF 1

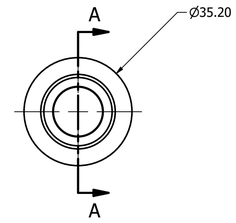
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	DJI	JW	4/8/2016

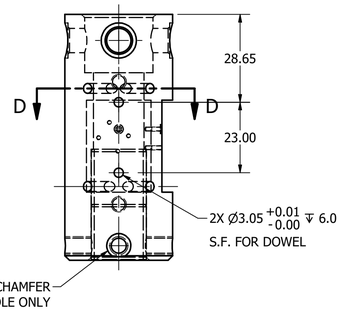


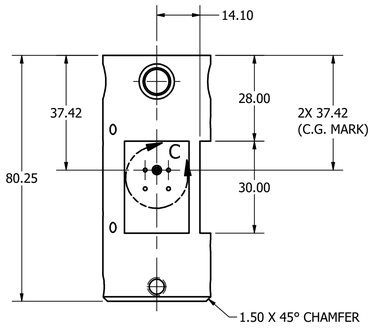


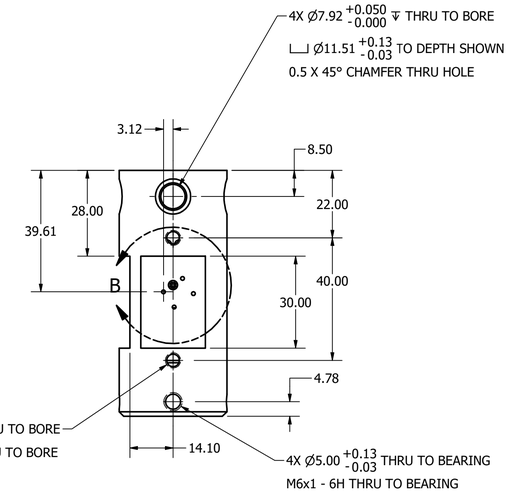


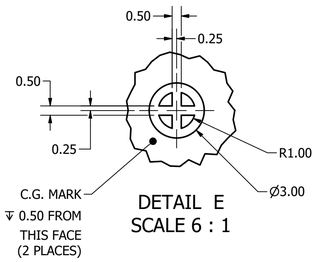
SECTION A-A



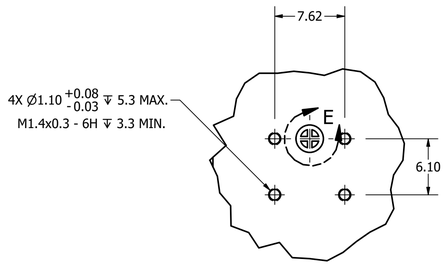




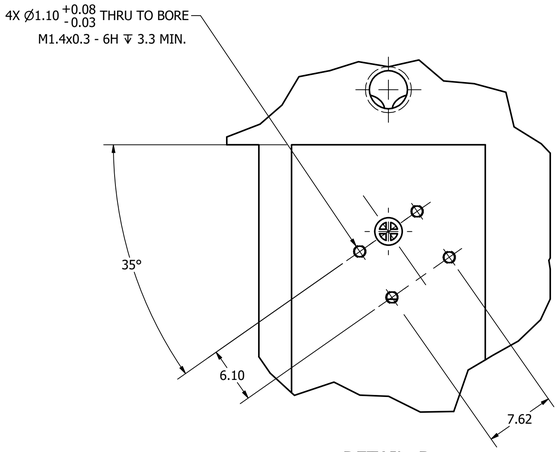




DETAIL E
SCALE 6 : 1



DETAIL C
SCALE 3 : 1



DETAIL B
SCALE 3 : 1

NOTES:

1. INSTALL SLEEVE BEARINGS AFTER ANODIZE.

ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	6005238	BEARING, SLEEVE, 18mm OD X 14mm ID X 18mm LG (JSM-1418-18)

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.1, .XX ±.2, .XXX ±.1
MACHINED ∠C ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: disopi	4/8/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

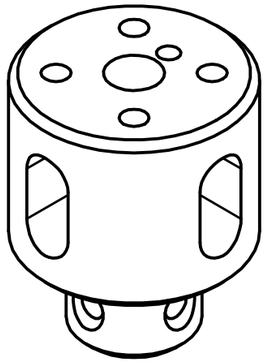
LOWER TIBIA SHAFT, LEFT

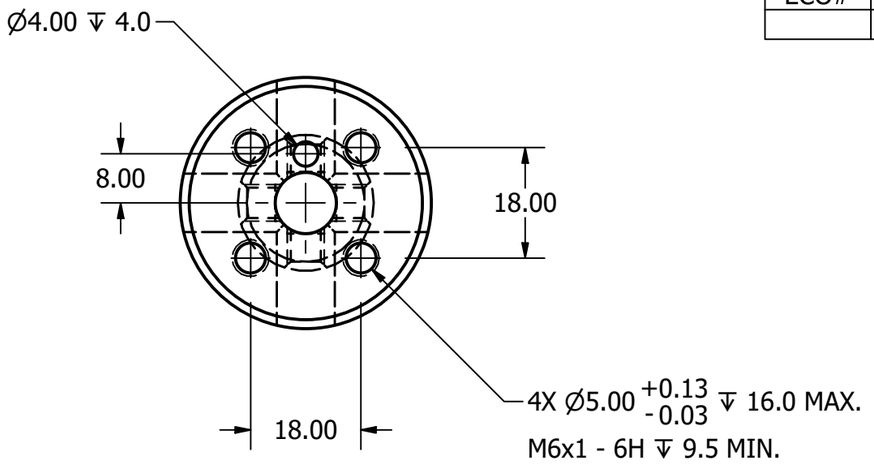
THIRD ANGLE PROJECTION

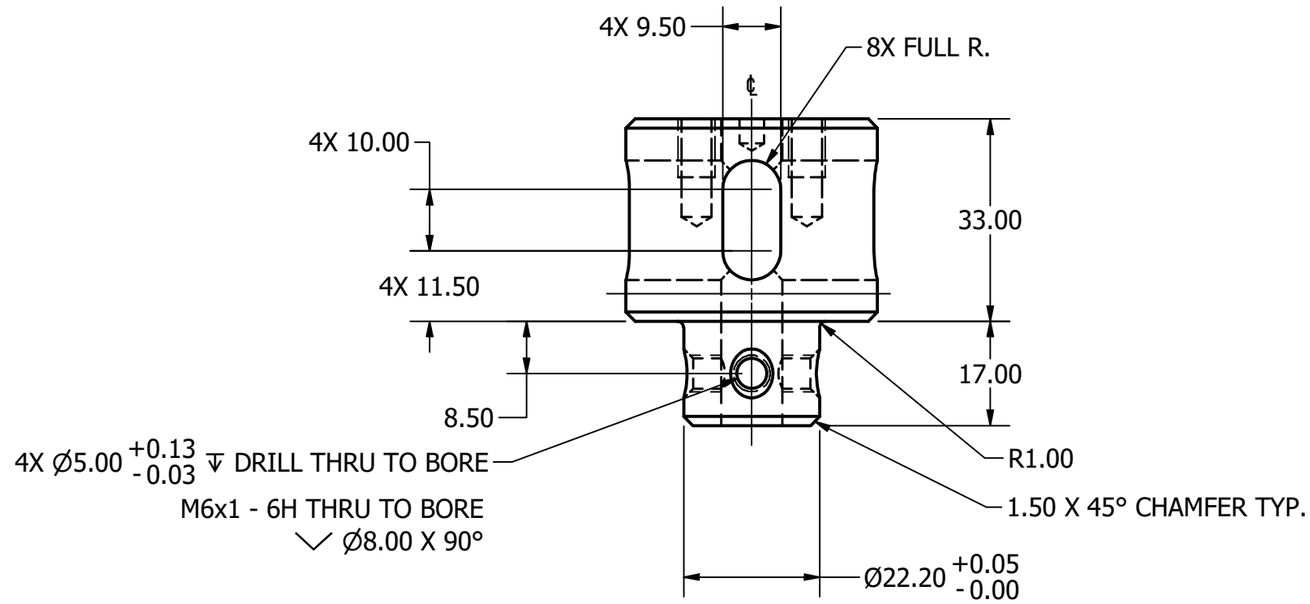
SIZE: A1 | DRAWING NUMBER: 474-5540-1 | REV: 1

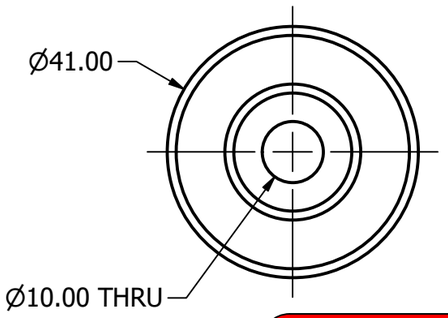
SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AB	JW	08/25/2017









NOTES:

1. DIMENSIONS ARE SYMMETRICAL ABOUT ℄ UNLESS OTHERWISE NOTED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ±1°
ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 4140 STEEL
HEAT TREAT:
FINISH: 0.008mm ELECTROLESS NICKEL PLATE PER SIDE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: disopi	8/25/2017
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

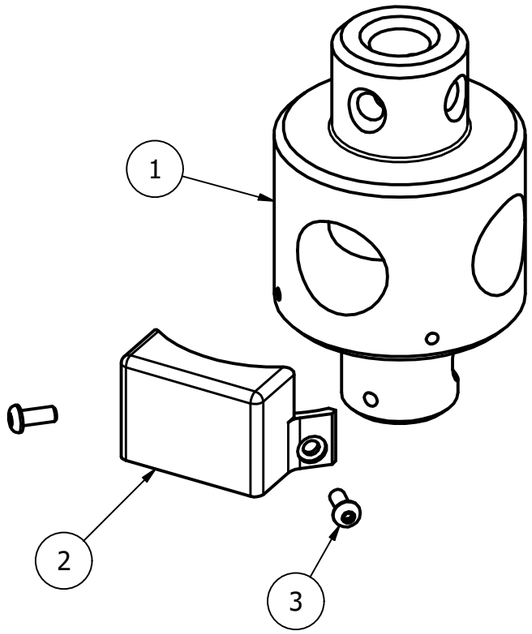
STRUCTURAL REPLACEMENT, UPPER TIBIA LOAD CELL

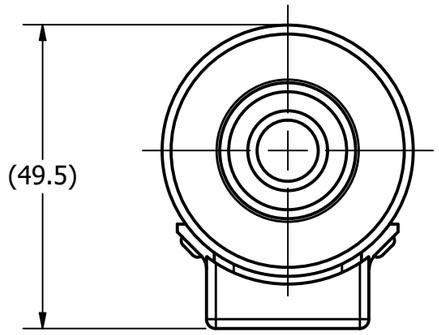
THIRD ANGLE PROJECTION

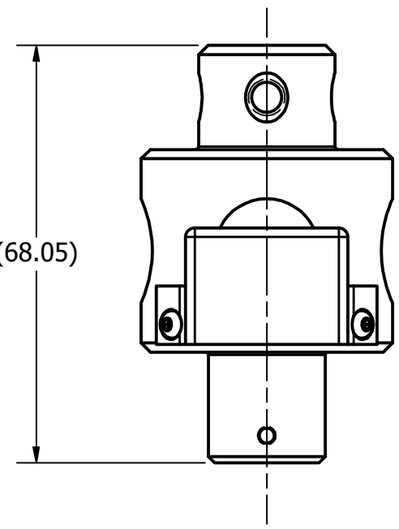
SIZE: A3 | DRAWING NUMBER: 474-5550 | REV: 1

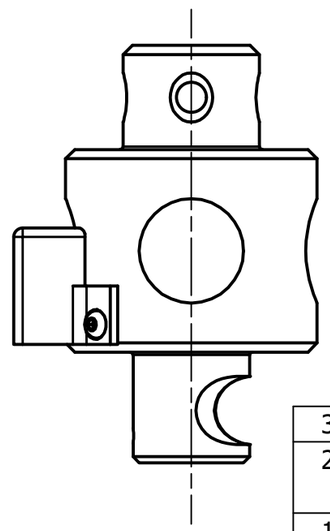
SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AT	JW	7/10/2017









3	2	5000244	M2.5 X 0.45 X 6 LG. BHCS
2	1	474-5829	STRUCTURAL REPLACEMENT, LOWER TIBIA LOAD CELL STRAIN RELIEF
1	1	474-5821	STRUCTURAL REPLACEMENT, LOWER TIBIA LOAD CELL
ITEM	QTY	PART NUMBER	DESCRIPTION

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

	APPROVALS	DATE
DRAWN	A.TOMICH	7/10/2017
MATERIAL		
CHECKED		
HEAT TREAT		
ENG		
FINISH		
APPROVED		

STRUCTURAL REPLACEMENT, LOWER TIBIA LOAD CELL ASS'Y

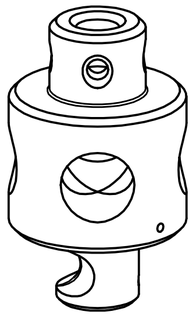
THIRD ANGLE PROJECTION

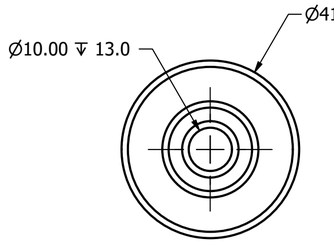
SIZE	DRAWING NUMBER	REV
A3	474-5822	1

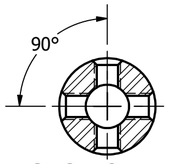
SCALE: 1:1

SHEET 1 OF 1

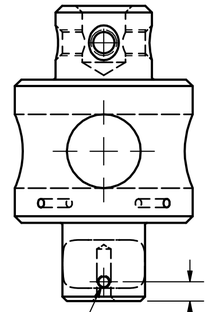
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AT	JW	7/10/2017

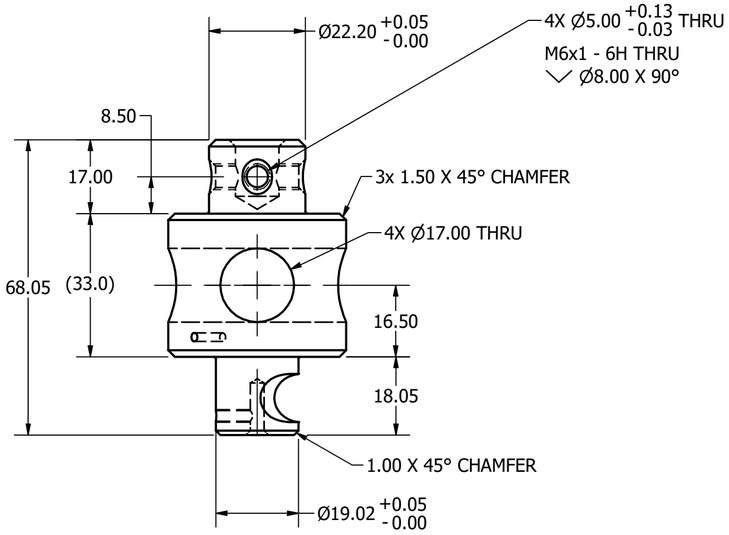


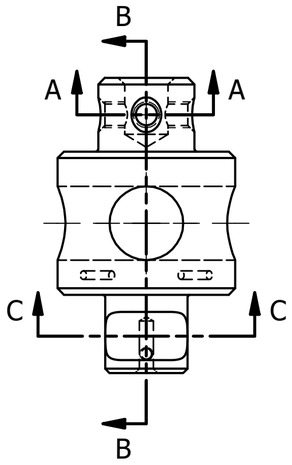


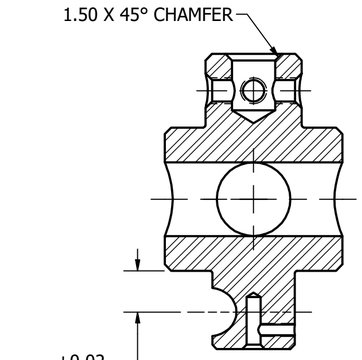


SECTION A-A

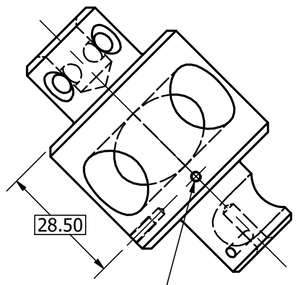


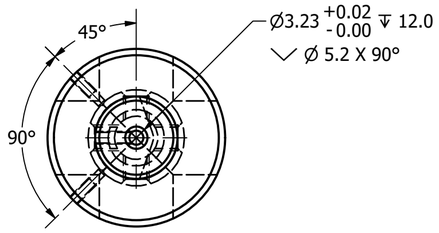


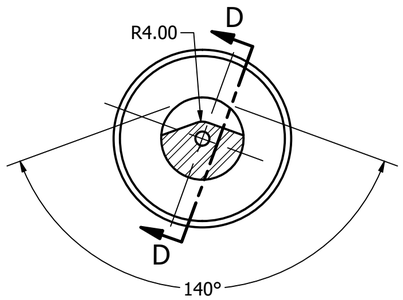




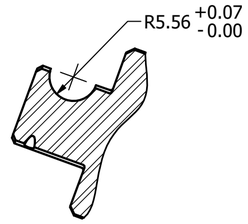
SECTION B-B







SECTION C-C



SECTION D-D

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 4140 STEEL
HEAT TREAT:
FINISH: 0.008mm ELECTROLESS NICKEL PLATE PER SIDE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: atomich	7/10/2017
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

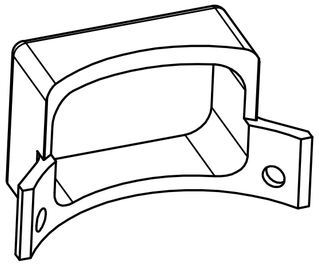
STRUCTURAL REPLACEMENT, LOWER TIBIA LOAD CELL

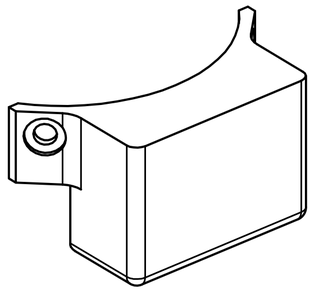
THIRD ANGLE PROJECTION

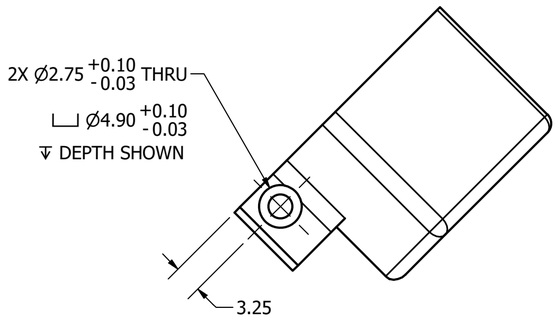
SIZE: A2 | DRAWING NUMBER: 474-5821 | REV: 1

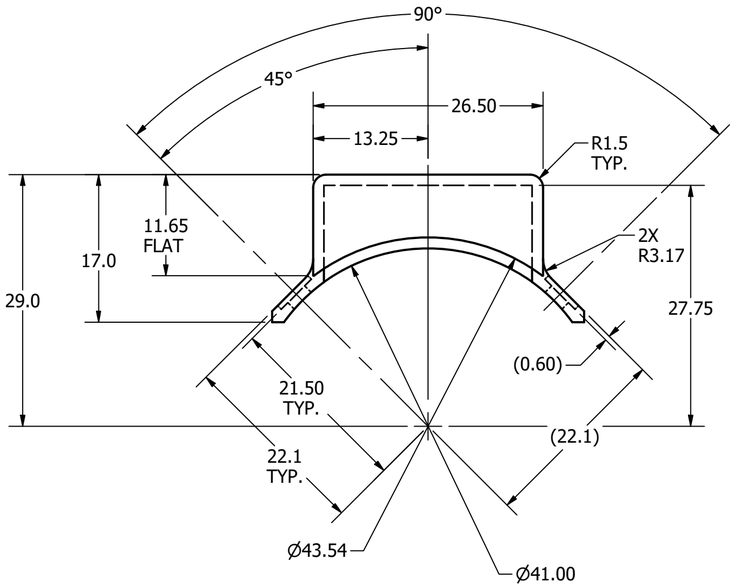
SCALE: 1:1 | SHEET: 1 OF 1

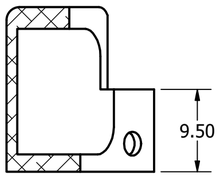
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AB	JW	08/24/2017



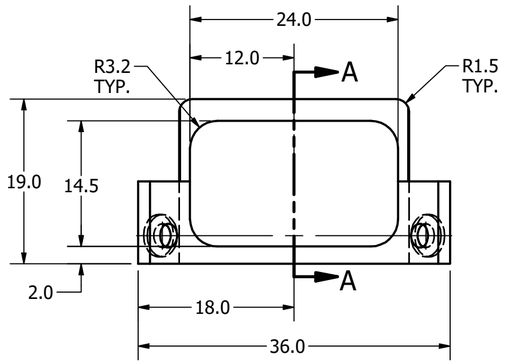








SECTION A-A



PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 6061-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: A. Barchock	8/24/2017
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

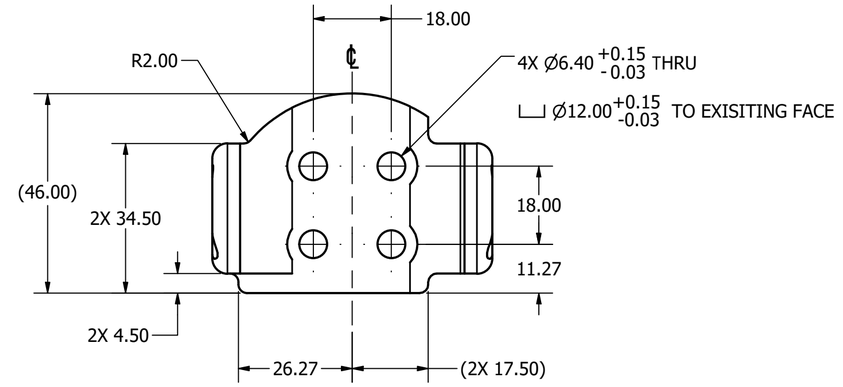
STRUCTURAL REPLACEMENT, LOWER TIBIA LOAD CELL STRAIN RELIEF

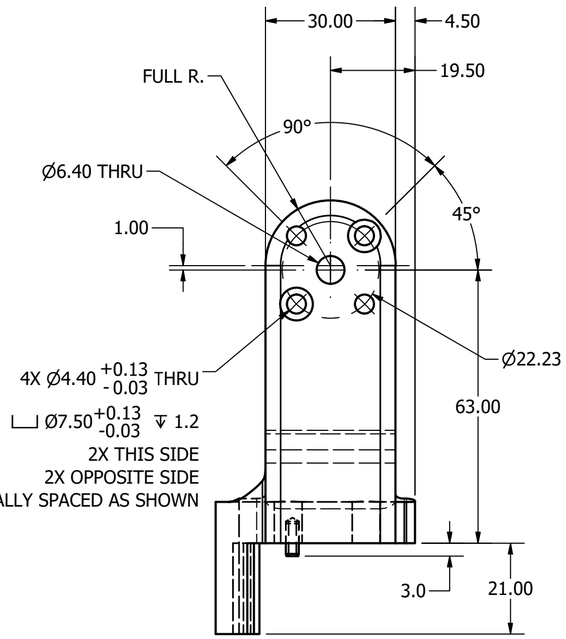
THIRD ANGLE PROJECTION

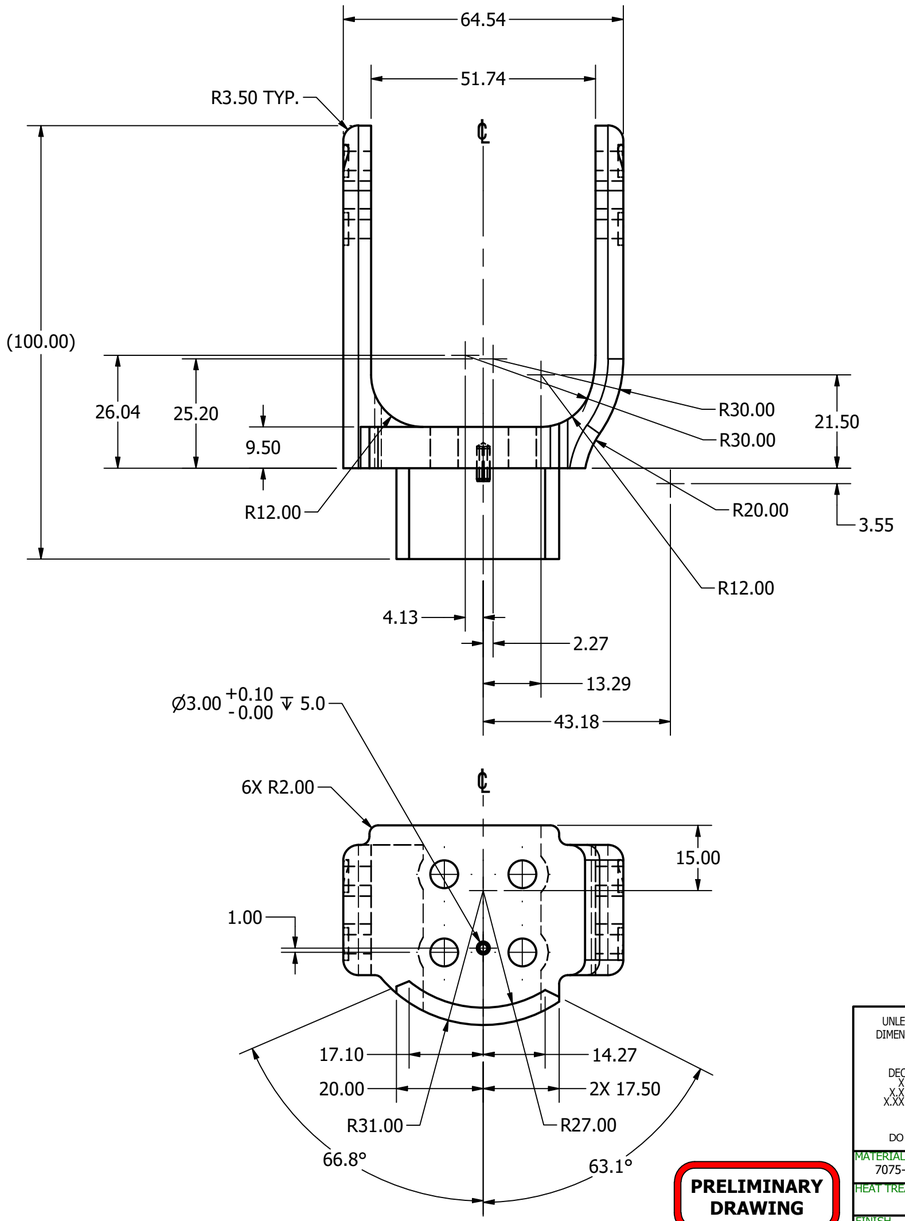
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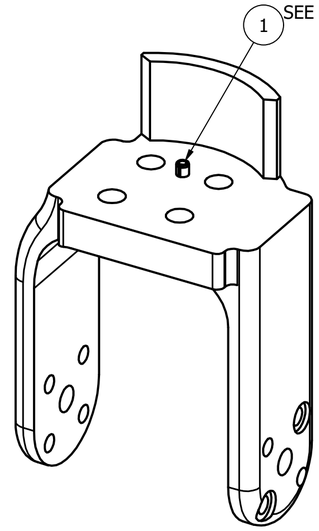
SCALE: 2 : 1 | SHEET: 1 OF 1

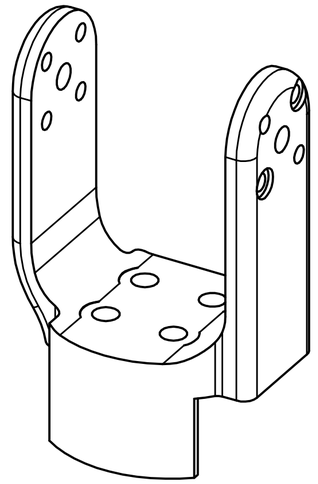
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	DJI	JW	4/12/2016











NOTES:

1. DIMENSIONS ARE SYMMETRICAL ABOUT ℄ UNLESS OTHERWISE NOTED.
2. INSTALL ROLL PIN AFTER ANODIZE.

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	5000195	M3 X 8 LG. ROLL PIN SS

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.1, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: disopi	4/12/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

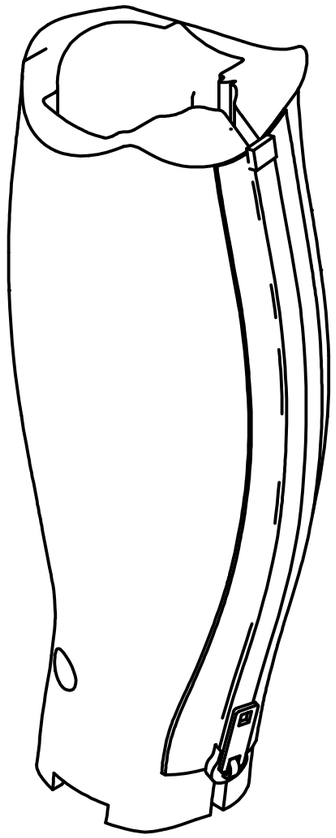
KNEE CLEVIS, LEFT

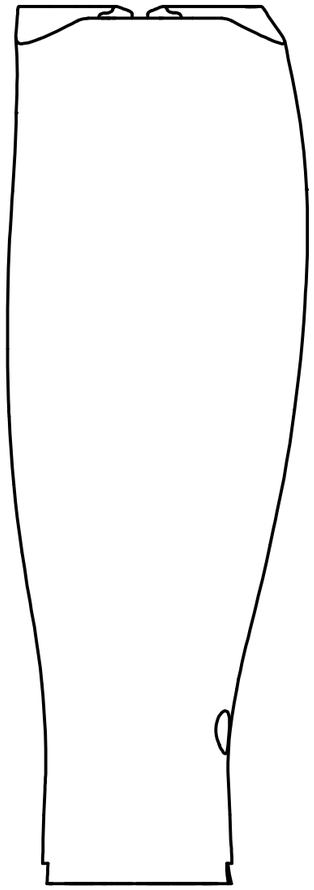
THIRD ANGLE PROJECTION

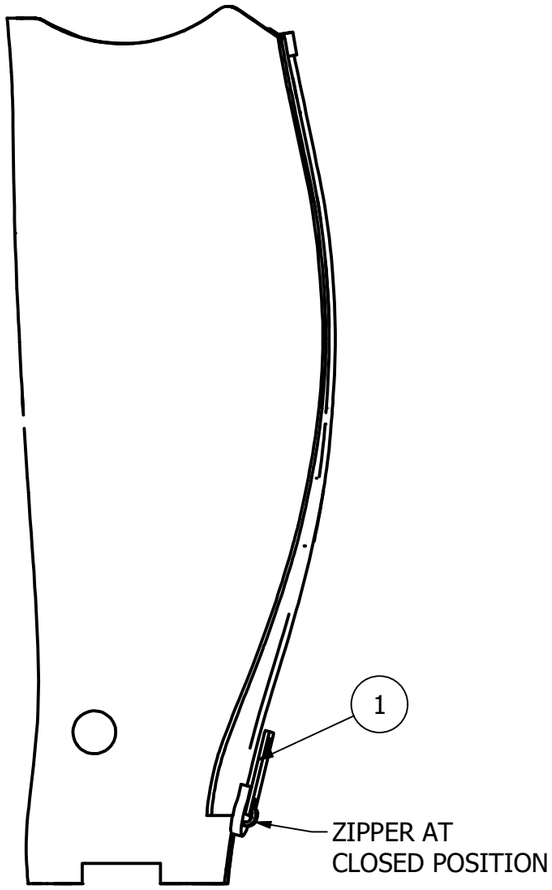
SIZE: A2 | DRAWING NUMBER: 474-5517-1 | REV: 1

SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/13/2016







NOTES:

1. MATERIAL: SKIN: POLYURETHANE
   FOAM: POLYURETHANE

   COLOR: EURO BROWN
   DUROMETER: 30±5 SHORE A

2. REMOVE ALL MOLD FLASHING

3. ALL MOLD DIMENSION TOLERANCE +1%/-2%
   BUT NO SMALLER THAN 0.5mm, UNLESS OTHERWISE NOTED.

4. NO SPLIT OR DEFECTS ARE ALLOWED IN THE POLYURETHANE MOLDING

5. GLUE ZIPPER ASSEMBLY TO FLESH AS SHOWN.

6. WEIGHT: 488±15g

PRELIMINARY DRAWING

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	474-5521	ZIPPER ASSEMBLY, LOWER LEG

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTE #1
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: B. KIMES	4/13/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

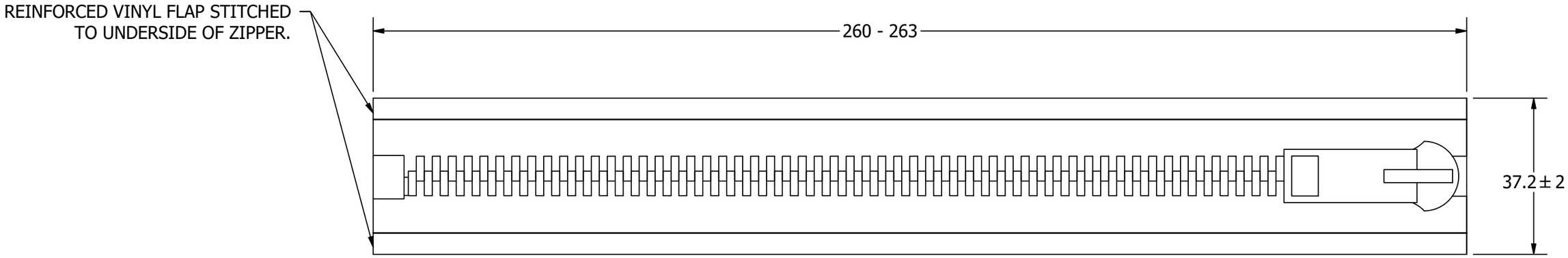
LOWER LEG FLESH, LEFT

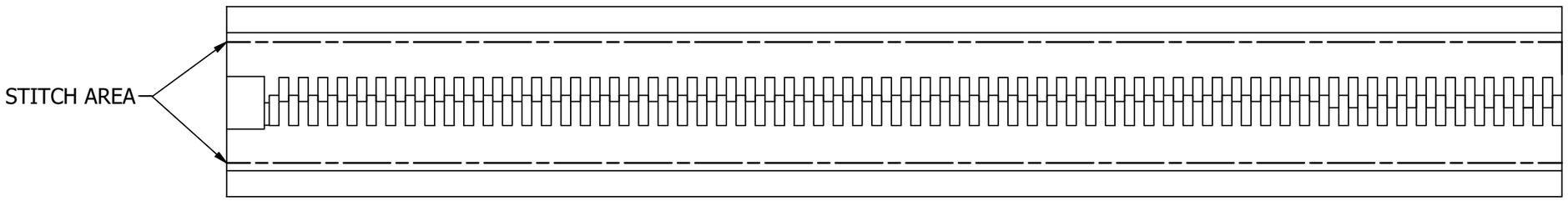
THIRD ANGLE PROJECTION

SIZE: A3 | DRAWING NUMBER: 474-5520-1 | REV: 1

SCALE: .5:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JPM		11/16/17





NOTES:

1. ALL BLACK #5 ZIPPER (YKK), 11 INCHES LONG.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ±.5°
ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTES
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: J. MCINNIS	4/8/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

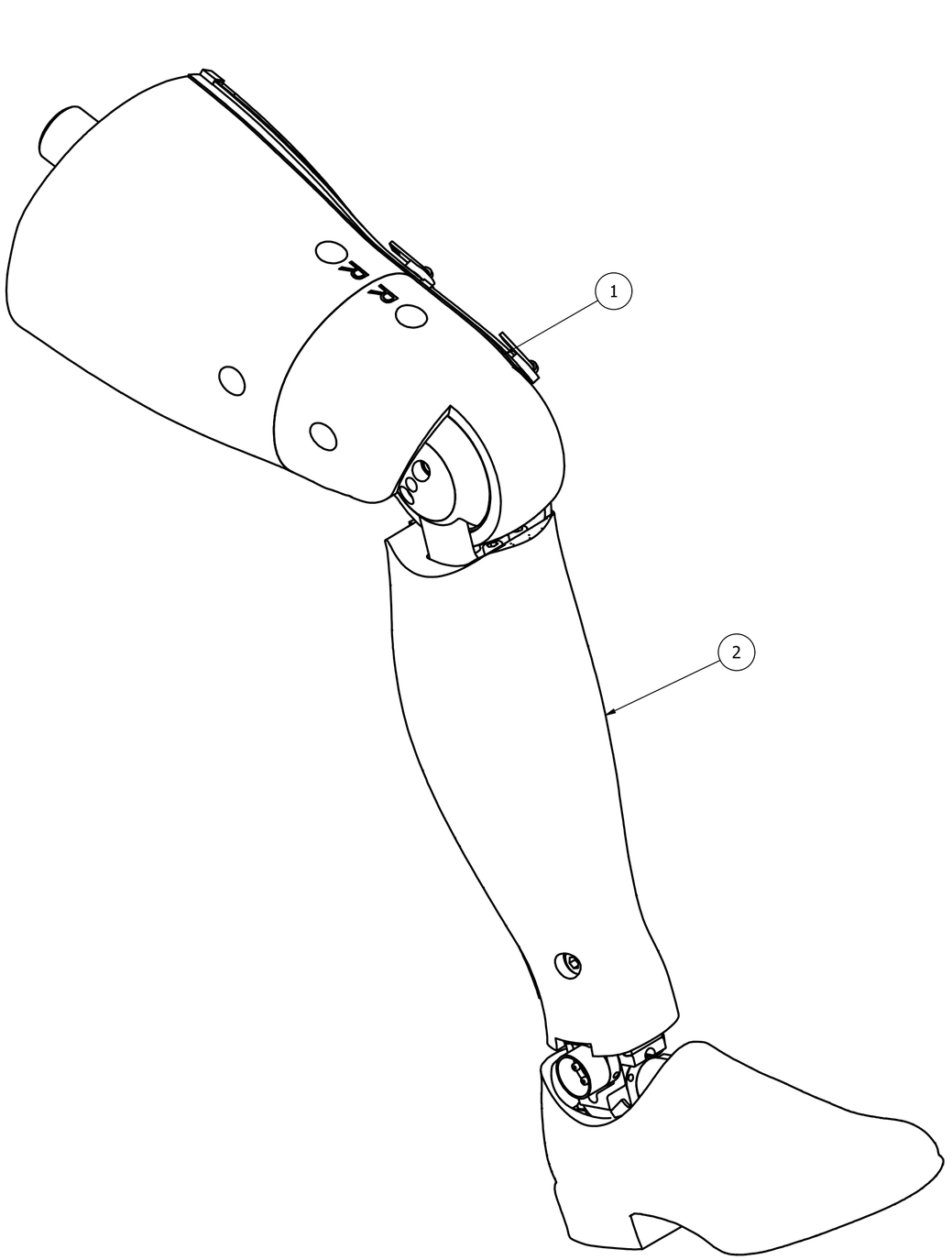
ZIPPER ASSEMBLY, LOWER LEG

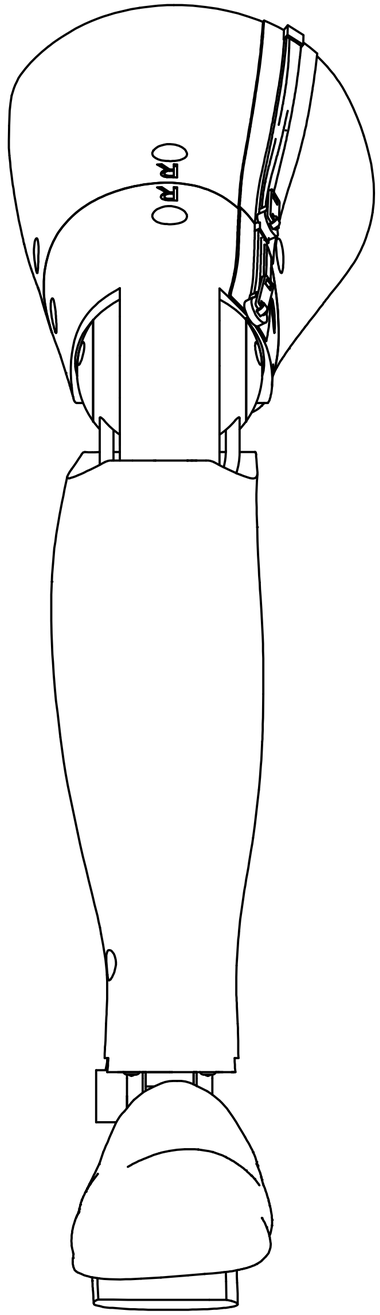
THIRD ANGLE PROJECTION

SIZE	DRAWING NUMBER	REV
A3	474-5521	1

SCALE: 1:1 SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/14/2016





ITEM	QTY	PART NUMBER	DESCRIPTION
2	1	474-5500-2	LOWER LEG ASSEMBLY, RIGHT
1	1	474-5100-2	UPPER LEG ASSEMBLY, RIGHT

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ∠C ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN B. KIMES	4/14/2016
CHECKED	
ENG	
APPROVED	

MATERIAL
HEAT TREAT
FINISH

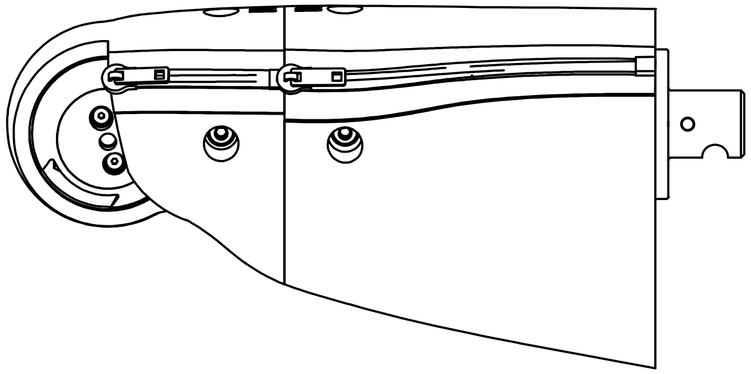
LEG ASSEMBLY, RIGHT

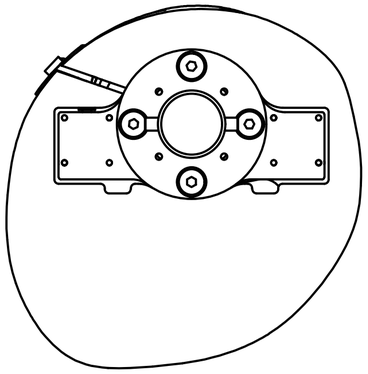
THIRD ANGLE PROJECTION

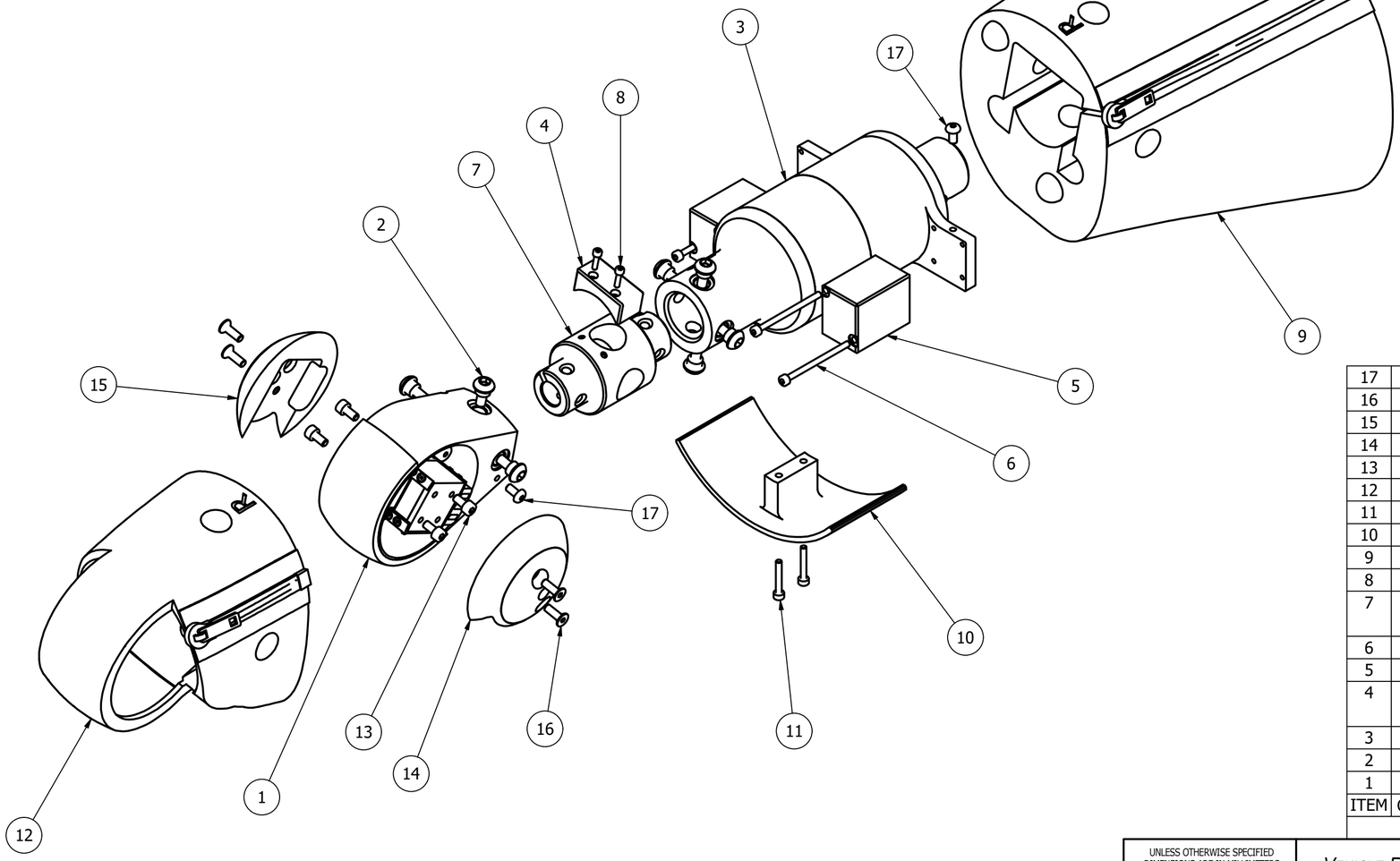
SIZE A2 | DRAWING NUMBER 474-5000-2 | REV 1
SCALE: .5:1 | SHEET 1 OF 1

PRELIMINARY DRAWING

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	4/12/2016







ITEM	QTY	PART NUMBER	DESCRIPTION
17	2	5000103	M4 X 0.7 X 8 LG. BHCS
16	4	5001086	M4 X 0.7 X 12 LG. FHCS
15	1	474-5301-2	KNEE COVER, RIGHT
14	1	474-5301-1	KNEE COVER, LEFT
13	4	5000989	M4 X 0.7 X 8 LG. SHCS
12	1	474-5320-2	KNEE FLESH, RIGHT
11	2	5000312	M3 X 0.5 X 20 LG. SHCS
10	1	474-5107	CABLE CONNECTOR GUARD
9	1	474-5120-2	UPPER LEG FLESH, RIGHT
8	2	5000456	M2.5 X 0.45 X 10 LG. SHCS
7	1	474-5101	STRUCTURAL REPLACEMENT, FEMUR LOAD CELL
6	4	5000679	M3 X 0.5 X 45 LG. SHCS SS
5	2	474-8205	ON BOARD DAS STRUCTURAL REPLACEMENT
4	1	474-5102	STRUCTURAL REPLACEMENT, FEMUR LOAD CELL STAIN RELIEF
3	1	474-5160-2	FEMUR ASSEMBLY, RIGHT
2	8	W50-61042	MODIFIED BHSS M6 THREAD
1	1	474-5300	KNEE ASSEMBLY

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN ghayden	4/12/2016
CHECKED	
ENG	
APPROVED	

MATERIAL
HEAT TREAT
FINISH

PRELIMINARY DRAWING

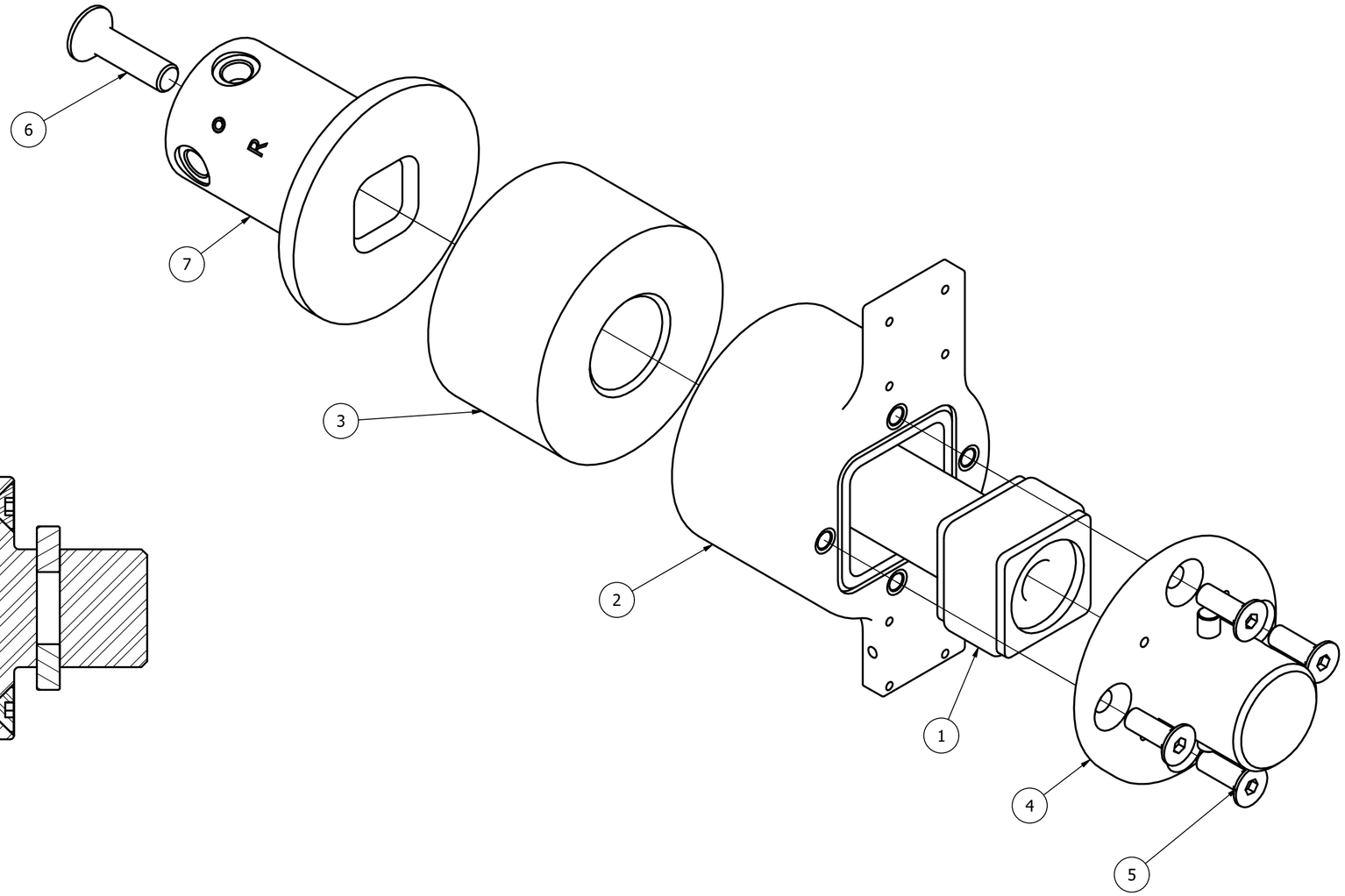
UPPER LEG ASSEMBLY, RIGHT

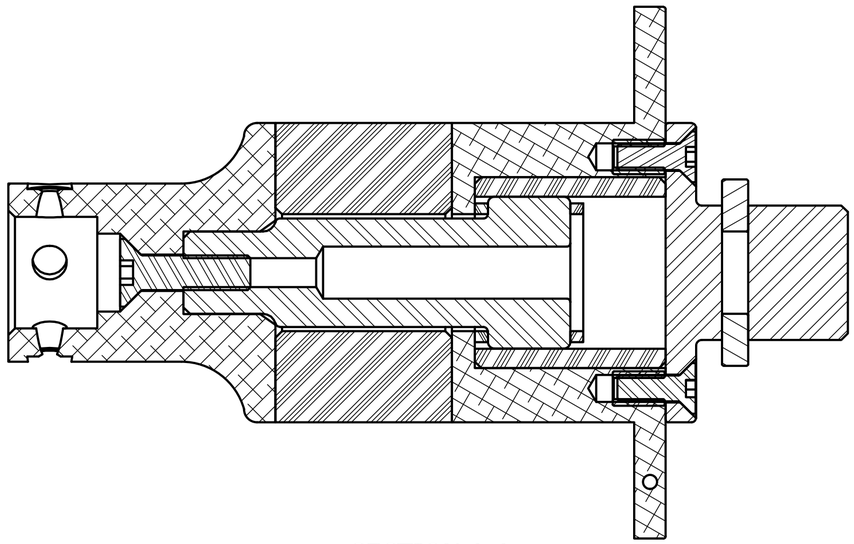
THIRD ANGLE PROJECTION

SIZE A2 | DRAWING NUMBER 474-5100-2 | REV 1

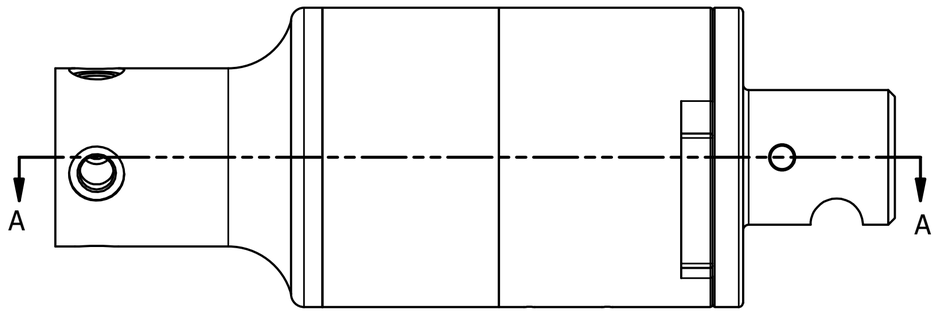
SCALE: .5:1 | SHEET 1 OF 1

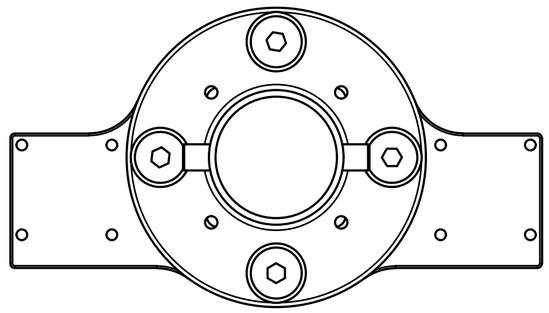
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/8/2016





SECTION A-A





ITEM	QTY	PART NUMBER	DESCRIPTION
7	1	474-5168-2	FEMUR END CAP, RIGHT
6	1	5000605	M8 X 1.25 X 30 LG. FHCS
5	4	5000108	M6 X 1 X 18 LG. FHCS
4	1	474-5161	FEMUR ATTACHMENT PLATE
3	1	474-5162	FEMUR RUBBER
2	1	474-5164	FEMUR BUSHING ASSEMBLY
1	1	474-5166	FEMUR PLUNGER ASSEMBLY

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED X.X, ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

APPROVALS	DATE
DRAWN: B. KIMES	4/8/2016
CHECKED	
ENG	
APPROVED	

MATERIAL
HEAT TREAT
FINISH

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

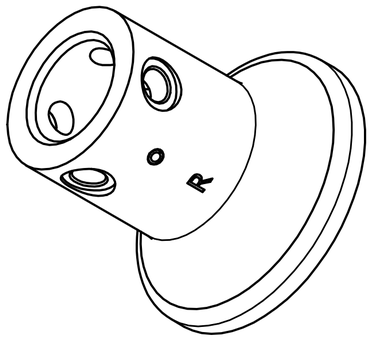
FEMUR ASSEMBLY, RIGHT

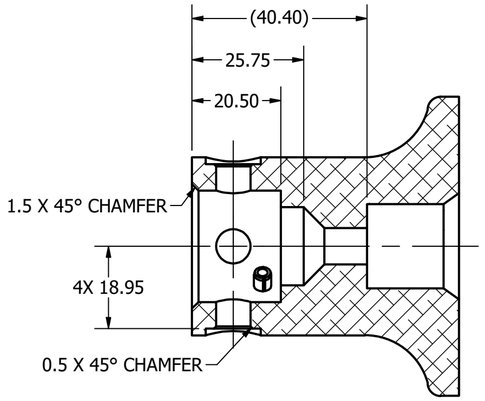
THIRD ANGLE PROJECTION

SIZE: A2 | DRAWING NUMBER: 474-5160-2 | REV: 1

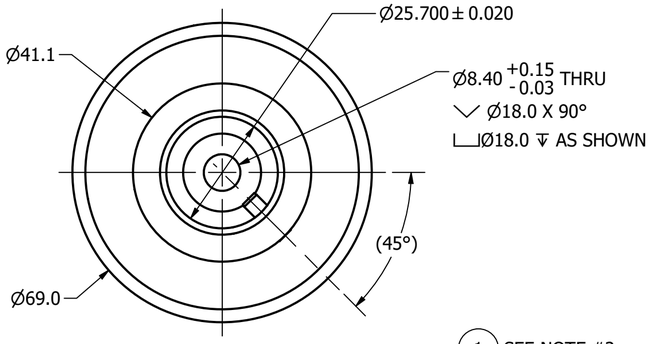
SCALE: 1:1 | SHEET: 1 OF 1

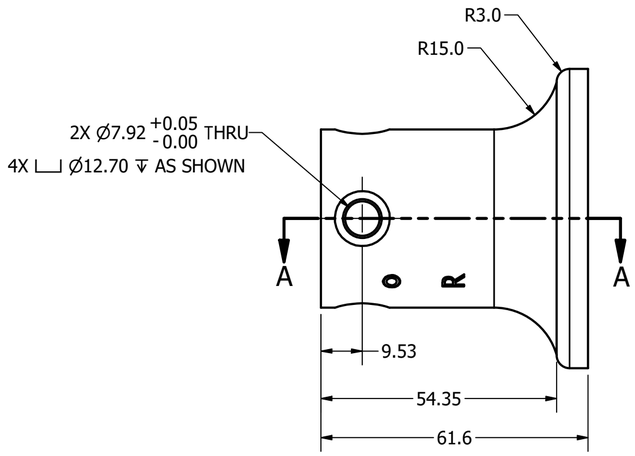
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/7/2016

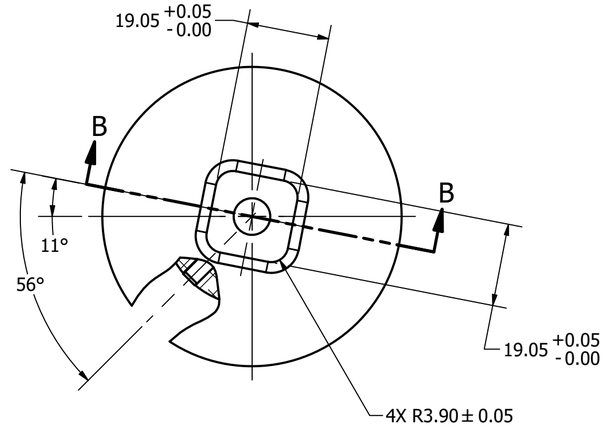


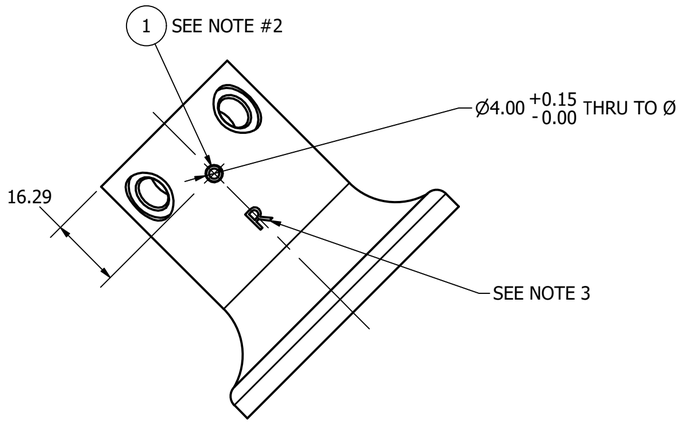


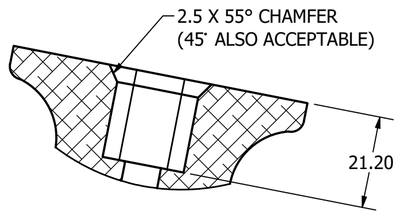
SECTION A-A











SECTION B-B

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	5000205	M4 X 12 LG. ROLL PIN SS

PARTS LIST

NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.
2. INSTALL ROLL PIN FLUSH TO OUTSIDE SURFACE AFTER ANODIZE.
3. ENGRAVE "R" PER SHOWN.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: B. KIMES	4/7/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

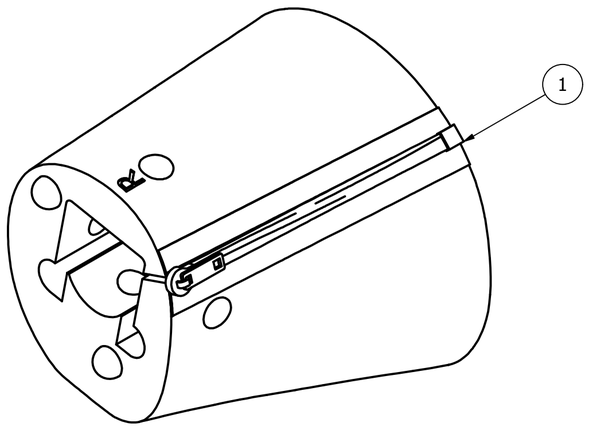
FEMUR END CAP, RIGHT

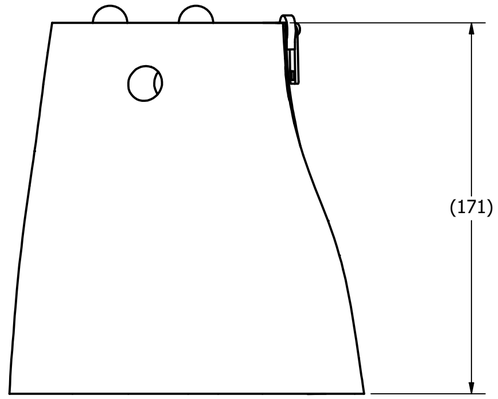
THIRD ANGLE PROJECTION

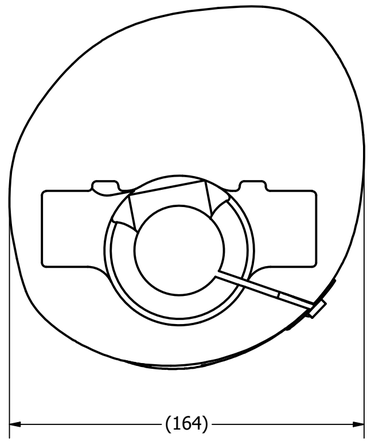
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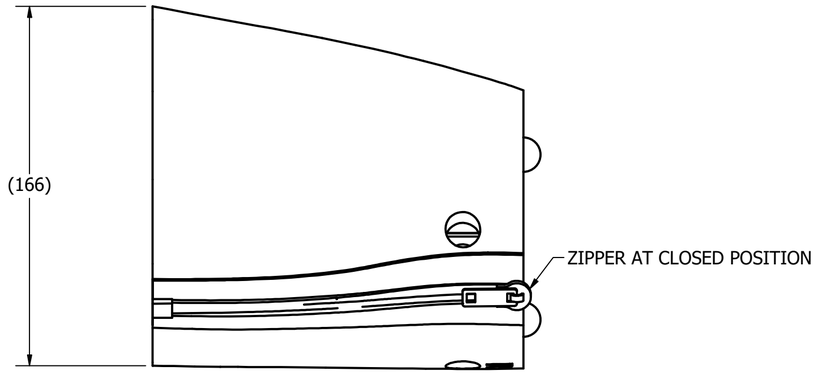
SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	4/11/2016









NOTES:

1. MATERIAL: SKIN: POLYURETHANE
   FOAM: POLYURETHANE

   COLOR: EURO BROWN
   DUROMETER: 30±5 SHORE A

2. REMOVE ALL MOLD FLASHING

3. ALL MOLD DIMENSION TOLERANCE +1%/-2% BUT NO SMALLER THAN 0.5mm

4. BOND ZIPPER TO FLESH AS SHOWN.

5. WEIGHT: 1151 GRAMS - NOMINAL

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	474-5121	ZIPPER ASSEMBLY, UPPER LEG

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ∠ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTE #1
HEAT TREAT:
FINISH:

APPROVALS	DATE
DRAWN: ghayden	4/11/2016
CHECKED:	
ENG:	
APPROVED:	

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

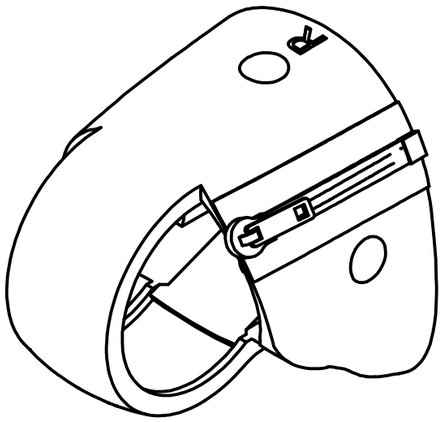
UPPER LEG FLESH, RIGHT

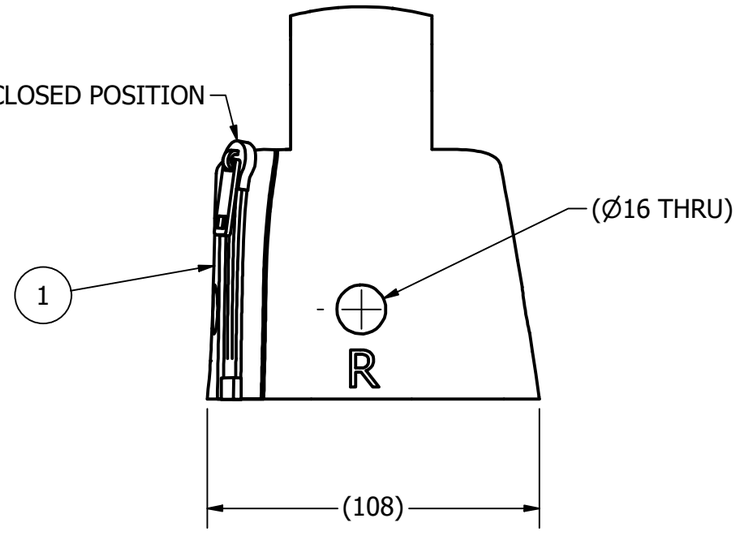
THIRD ANGLE PROJECTION

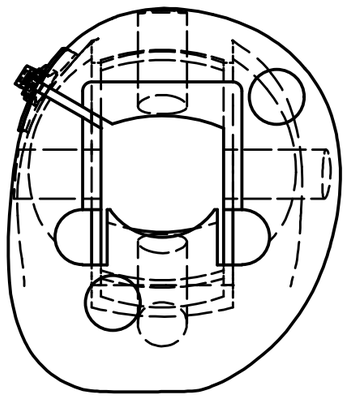
SIZE: A2 | DRAWING NUMBER: 474-5120-2 | REV: 1

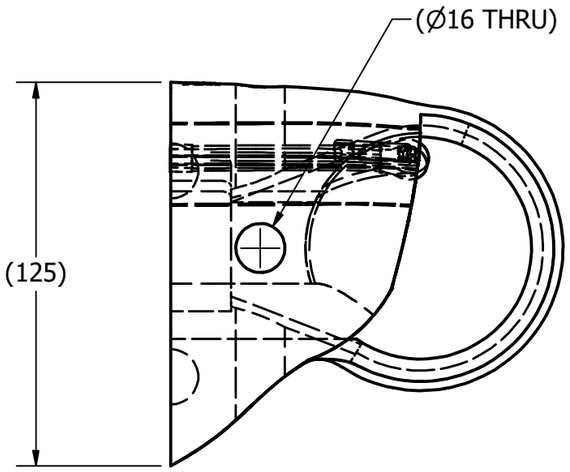
SCALE: .5:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	4/11/2016









NOTES:

1. MATERIAL: SKIN: POLYURETHANE
   FOAM: POLYURETHANE

   COLOR: EURO BROWN
   DUROMETER: 30±5 SHORE A

2. REMOVE ALL MOLD FLASHING

3. ALL MOLD DIMENSION TOLERANCE +1%/-2% BUT NO SMALLER THAN 0.5mm

4. BOND ZIPPER TO FLESH AS SHOWN.

5. WEIGHT: 305 GRAMS - NOMINAL

PRELIMINARY DRAWING

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	474-5324	ZIPPER ASSEMBLY, KNEE

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

KNEE FLESH, RIGHT

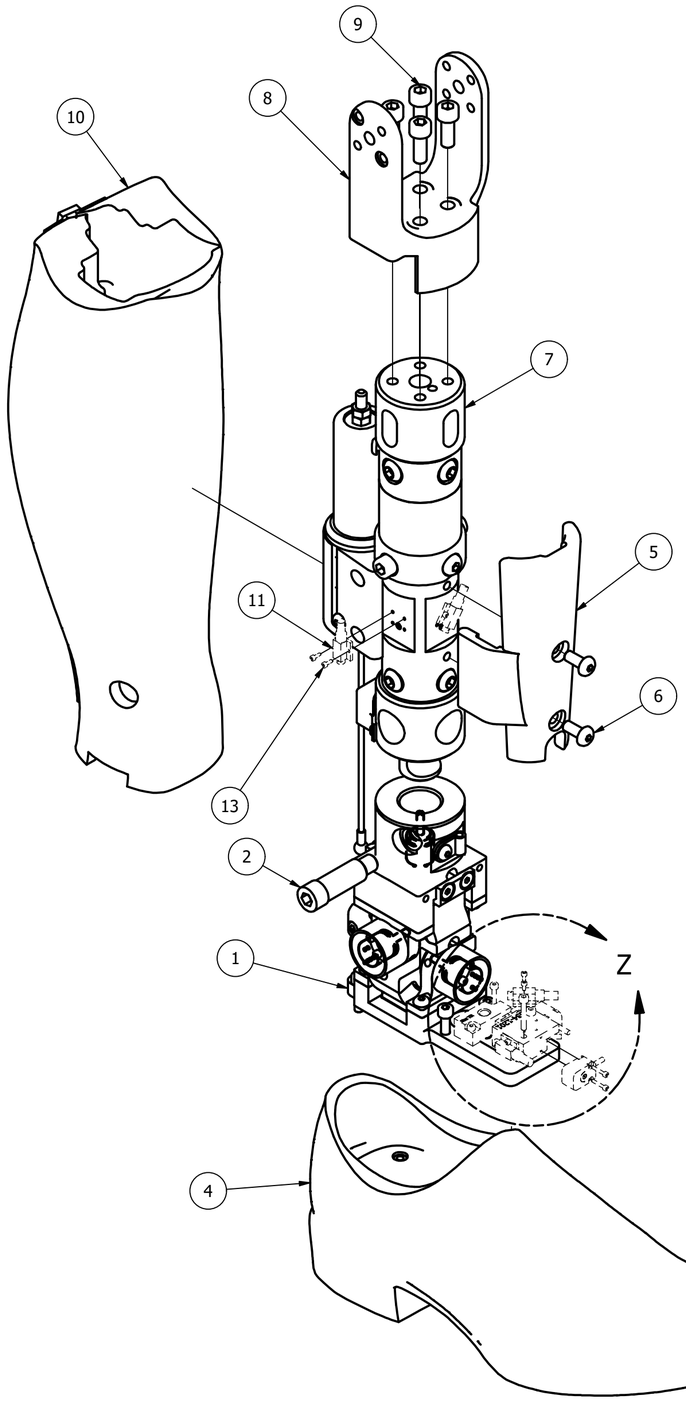
APPROVALS	DATE
DRAWN: ghayden	4/11/2016
CHECKED	
ENG	
APPROVED	

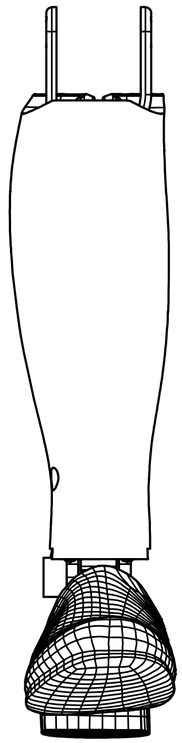
MATERIAL: SEE NOTE #1
HEAT TREAT:
FINISH:

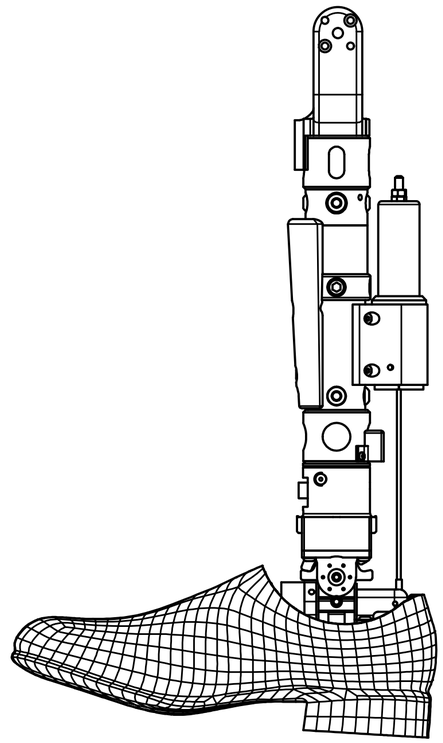
THIRD ANGLE PROJECTION

SIZE: A3 | DRAWING NUMBER: 474-5320-2 | REV: 1
SCALE: .5:1 | SHEET: 1 OF 1

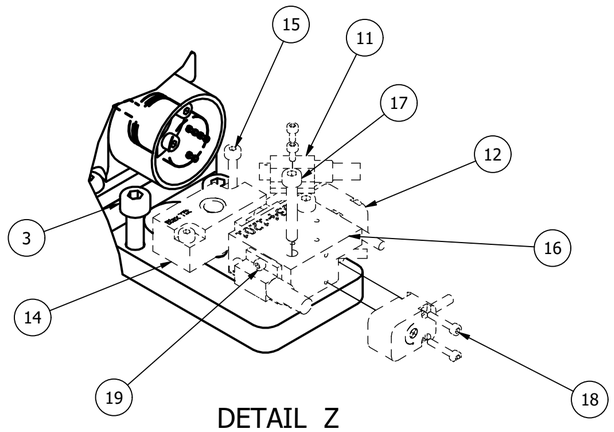
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/14/2016







FLESH NOT SHOWN
FOR CLARITY



DETAIL Z
SCALE 1 : 1

ITEM	QTY	PART NUMBER	DESCRIPTION	
19	6	5000068	M1.4 X 0.3 X 3 LG. SHCS	(REF)
18	6	5000727	M1.4 X 0.3 X 8 LG. SHCS	(REF)
17	2	5000069	M2.5 X 0.45 X 16 LG. SHCS	(REF)
16	1	SA572-S87	6 AXIS ACCEL/ARS MOUNT, (7264-2000), HEAD & PELVIS, Q DUMMIES	(REF)
15	2	5000215	M2 X 0.4 X 10 LG. SHCS	(REF)
14	1	SA572-S44	TILT SENSOR, DUAL AXIS	(REF)
13	4	5000375	M1.4 X 0.3 X 4 LG. SHCS	(REF)
12	3	SA572-S58	ANGULAR RATE SENSOR	(REF)
11	5	SA572-S4	UNIAXIAL PIEZORESISTIVE ACCELEROMETER	(REF)
10	1	474-5520-2	LOWER LEG FLESH, RIGHT	
9	4	5000081	M6 X 1 X 16 LG. SHCS	
8	1	474-5517-2	KNEE CLEVIS, RIGHT	
7	1	474-5507-2	TIBIA ASSEMBLY, RIGHT	
6	2	5000654	M5 X 0.8 X 12 LG. BHCS	
5	1	474-5518-2	SHIN GUARD, MOLDED, RIGHT	
4	1	474-5903-2	MOLDED SHOE ASSEMBLY, RIGHT	
3	4	5000025	M4 X 0.7 X 16 LG. SHCS	
2	1	472-7563	BOLT & SLEEVE ASSEMBLY-ANKLE	
1	1	474-5800-2	ANKLE ASSEMBLY, RIGHT	

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL
HEAT TREAT
FINISH

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN B. KIMES	4/14/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

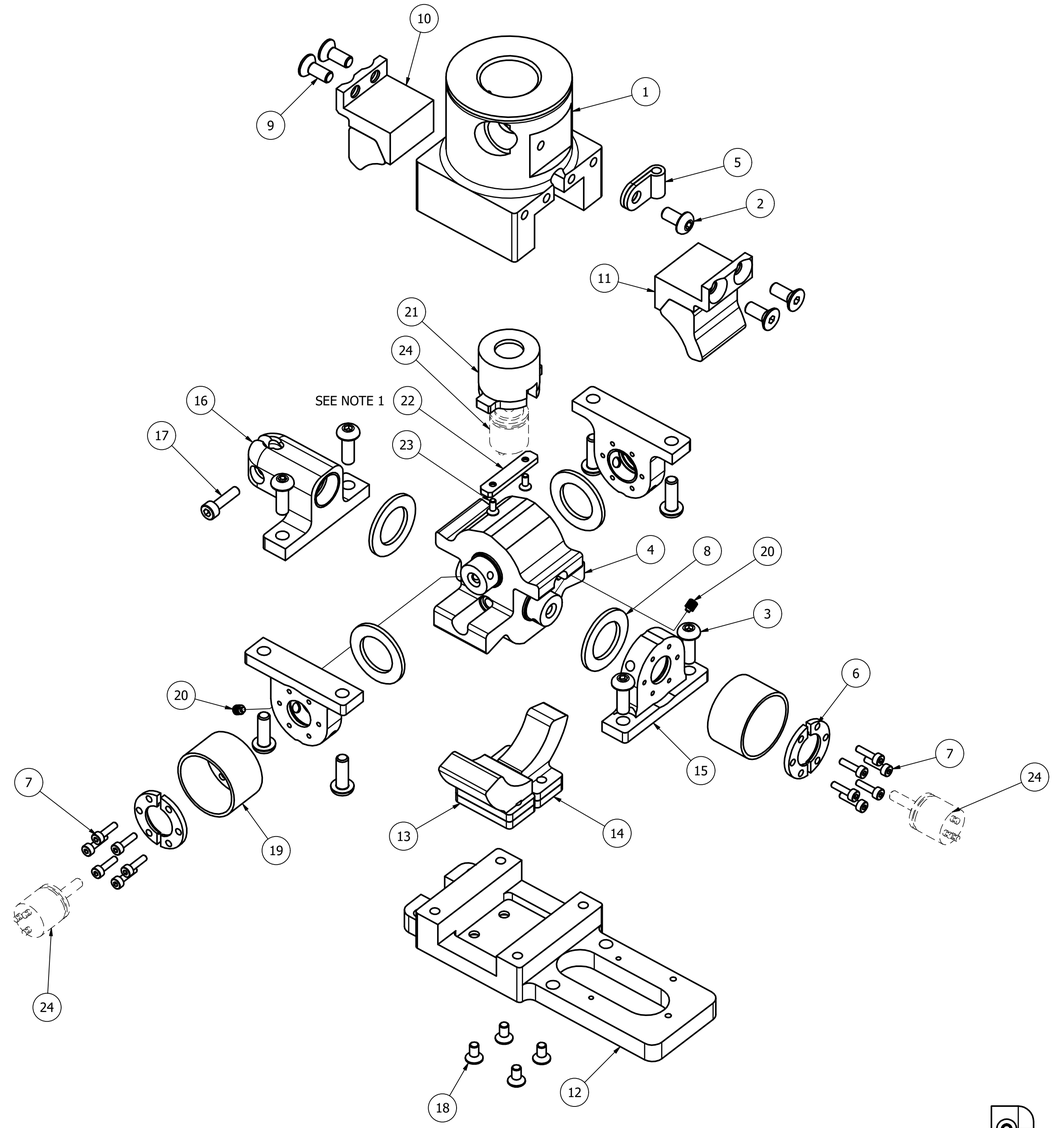
LOWER LEG ASSEMBLY, RIGHT

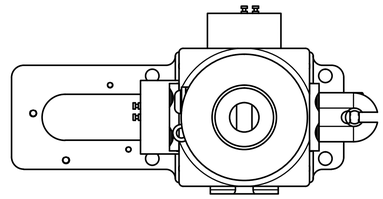
THIRD ANGLE PROJECTION

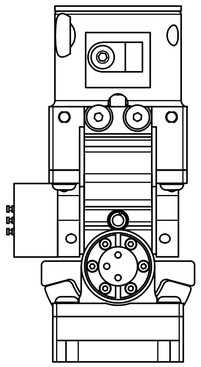
SIZE A2 | DRAWING NUMBER 474-5500-2 | REV 1

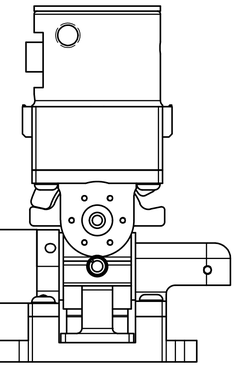
SCALE: .5:1 | SHEET 1 OF 1

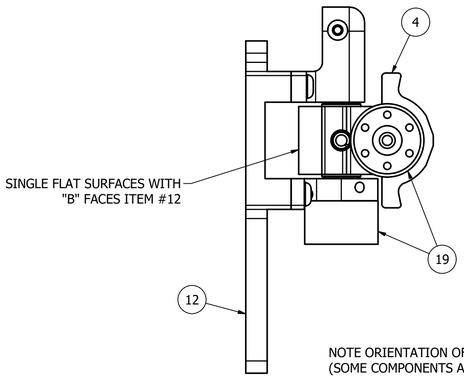
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AB	JW	10/26/16
	2	ADDED CLARIFICATION TO SINGLE FLAT NOTE; 5000098 WAS 5000116	AB	KMSP	11/29/2018



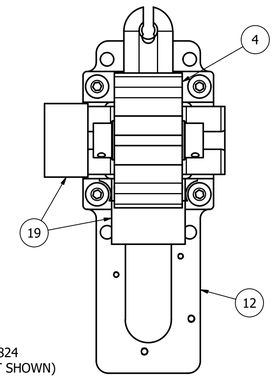








NOTE ORIENTATION OF 474-5824
(SOME COMPONENTS ARE NOT SHOWN)



ITEM	QTY	PART NUMBER	DESCRIPTION	
24	3	SA572-S114	ROTARY POTENTIOMETER	(REF)
23	2	5000753	M2 X 0.4 X 5 LG. FHCS	
22	1	474-5832	POTENTIOMETER CLAMP	
21	1	474-5831	POTENTIOMETER INNER MOUNT	
20	2	9010447	M3 X 0.5 X 3 LG. SSSNP	
19	2	474-5825	POTENTIOMETER CAP	
18	4	5000098	M3 X 0.5 X 6 LG. FHCS	
17	1	5001103	M3 X 0.5 X 12 LG. SHCS	
16	1	474-5828	ACHILLES CABLE RETAINER	
15	3	474-5826	PLATE, ANKLE BUSHING	
14	1	474-5816	INVERSION STOP ASSEMBLY	
13	1	474-5813	EVERSION STOP ASSEMBLY	
12	1	474-5806-2	LOWER ANKLE PLATE, RIGHT	
11	1	474-5807	DORSI STOP ASSEMBLY	
10	1	474-5810	PLANTAR STOP ASSEMBLY	
9	4	5000023	M4 X 0.7 X 10 LG. FHCS	
8	4	474-5720	ANKLE THRUST WASHER	
7	12	5000083	M2 X 0.4 X 8 LG. SHCS	
6	2	472-7581	POTENTIOMETER CLAMP	
5	1	9005135	CLAMP, NYLON LOOP	
4	1	474-5824	ANKLE CENTER BLOCK ASSEMBLY	
3	8	5000005	M4 X 0.7 X 12 LG. BHCS	
2	1	5000103	M4 X 0.7 X 8 LG. BHCS	
1	1	474-5820-2	UPPER ANKLE ADAPTOR, RIGHT	

PARTS LIST

NOTES:

1. CLAMP SECURES POTENTIOMETER FROM MOVING IN ANY DIRECTION.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMALS: X ±.1, X.X ±.2, X.XX ±.1
MACHINED ∠ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN: A. Barchock	10/26/2016
CHECKED:	
ENG:	
APPROVED:	

MATERIAL:
HEAT TREAT:
FINISH:

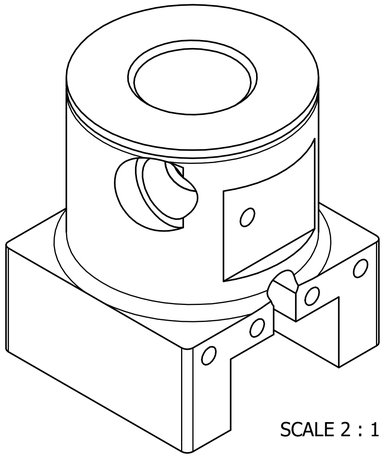
ANKLE ASSEMBLY, RIGHT

THIRD ANGLE PROJECTION

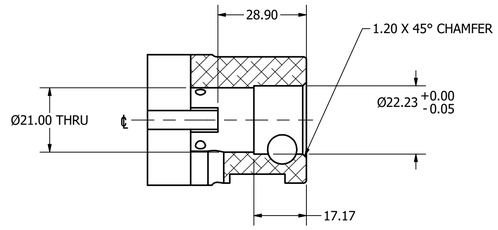
SIZE: A1 | DRAWING NUMBER: 474-5800-2 | REV: 2

SCALE: 1:1 | SHEET: 1 OF 1

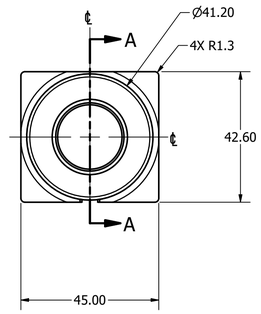
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AT	JW	11/27/17

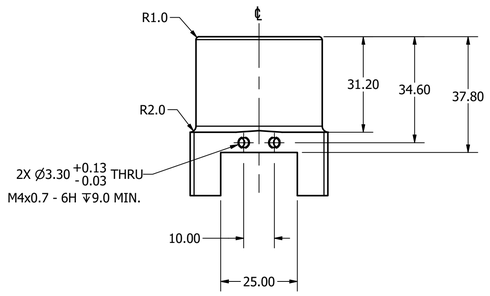


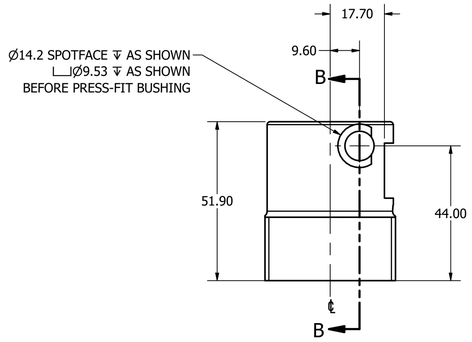
SCALE 2 : 1

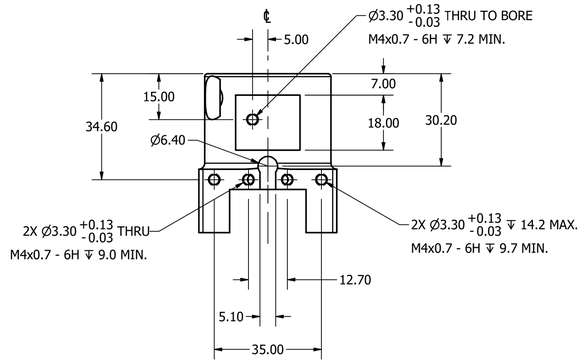


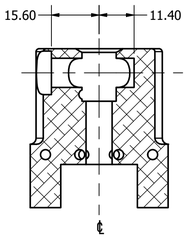
SECTION A-A





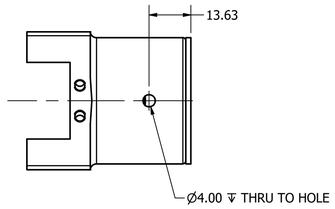


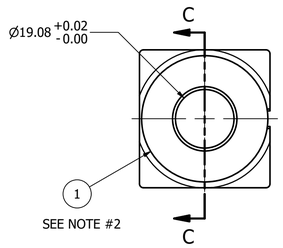


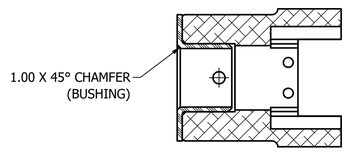


SECTION B-B

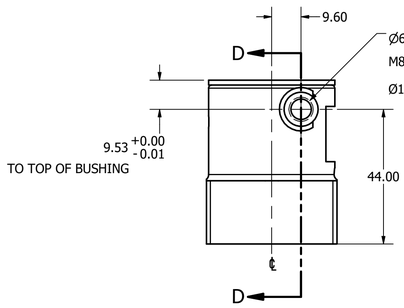
AFTER PRESS FIT BUSHING

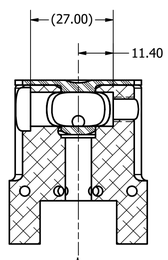




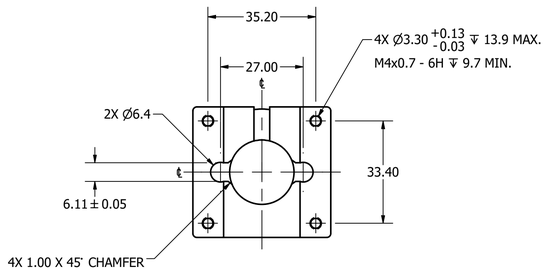


SECTION C-C





SECTION D-D



NOTES:

1. DIMENSIONS ARE SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

2. INSTALL THRUST BUSHING 474-5707 AFTER ANODIZE WITH EPOXY ADHESIVE.

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	474-5707	THRUST BUSHING

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: .X ±.2, .XX ±.1, .XXX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN A.TOMICH	7/10/2017
CHECKED	
ENG	
APPROVED	

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

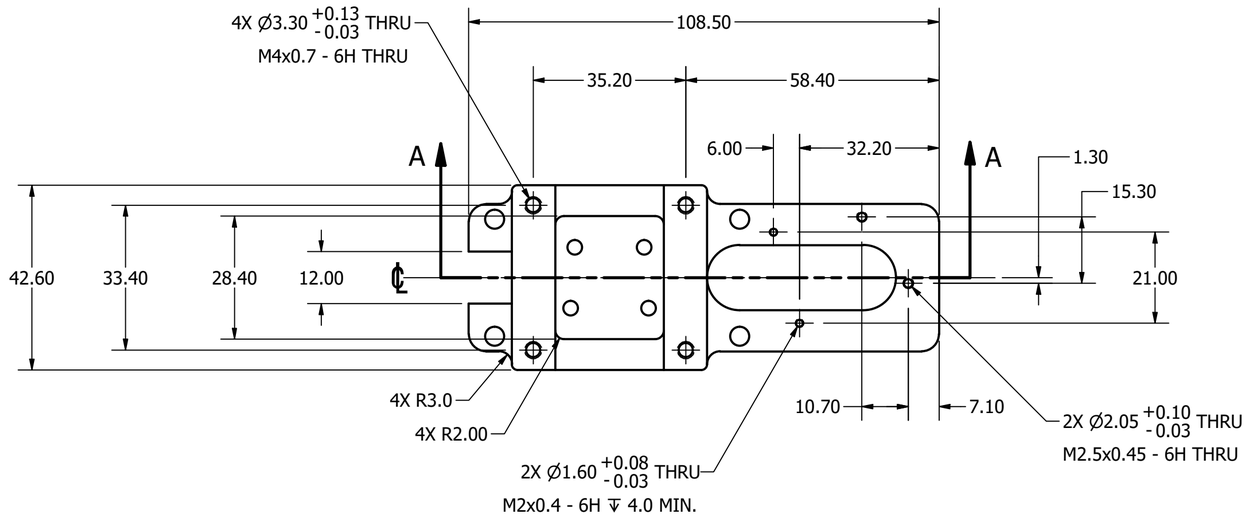
UPPER ANKLE ADAPTOR, RIGHT

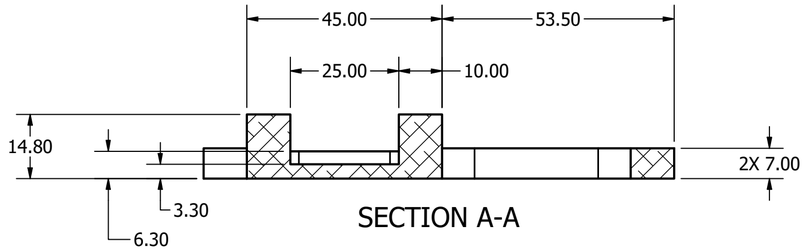
THIRD ANGLE PROJECTION

SIZE A1 | DRAWING NUMBER 474-5820-2 | REV 1

SCALE: 1:1 | SHEET 1 OF 1

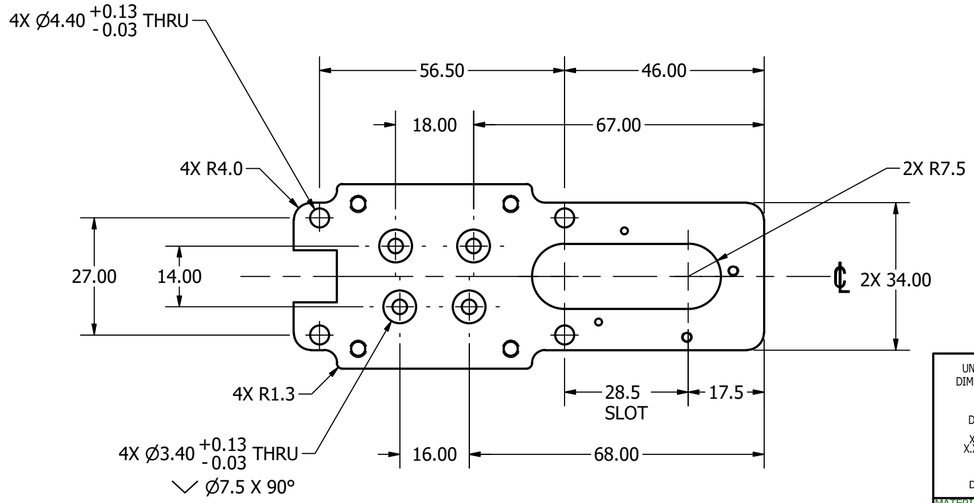
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AB	JW	10/25/16





SECTION A-A





NOTES:

1. DIMENSIONS SYMMETRICAL ABOUT ℄ UNLESS OTHERWISE NOTED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT: N/A
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: A. Barchock	10/25/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

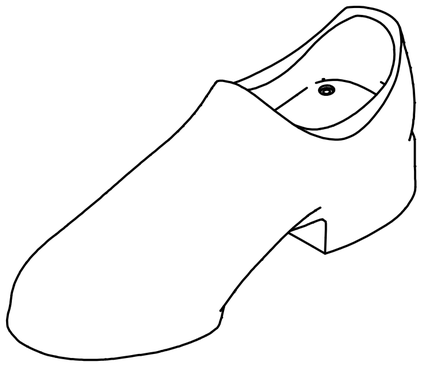
LOWER ANKLE PLATE, RIGHT

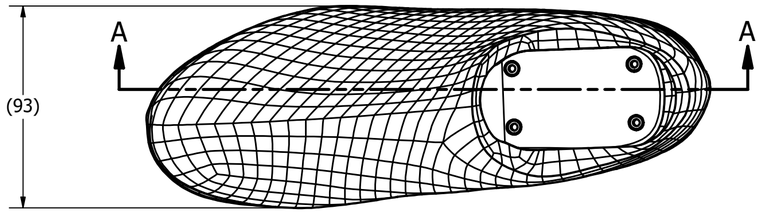
THIRD ANGLE PROJECTION

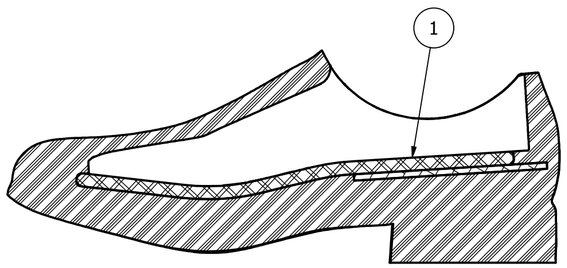
SIZE: A2 | DRAWING NUMBER: 474-5806-2 | REV: 1

SCALE: 1:1 | SHEET: 1 OF 1

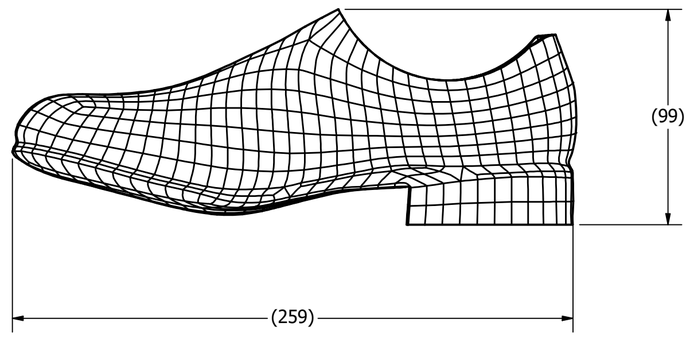
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/13/2016







SECTION A-A



NOTES:

1. MATERIAL: THERMOSET PLASTIC
   COLOR: BLACK
   DUROMETER: 70-75 SHORE "A", CAN BE ADJUSTED TO MEET THE PERFORMANCE REQUIREMENT.

2. REMOVE ALL MOLD FLASHING.

3. ALL MOLD DIMENSION TOLERANCE +1%/-2% BUT NO SMALLER THAN 0.5mm.

4. NO SPLIT OR DEFECTS ARE ALLOWED IN THE MOLDING.

5. WEIGHT: 1013±30g

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	474-5906-2	LAMINATED SOLE PLATE ASSY, RIGHT

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTE 1
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: B. KIMES	4/13/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

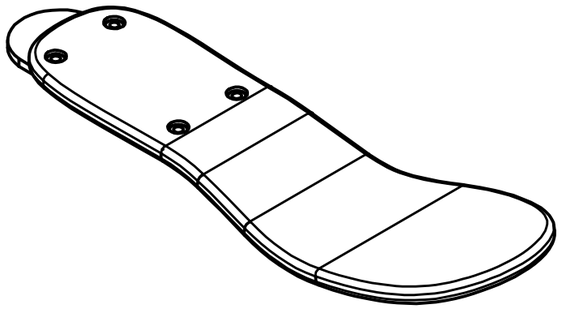
MOLDED SHOE ASSEMBLY, RIGHT

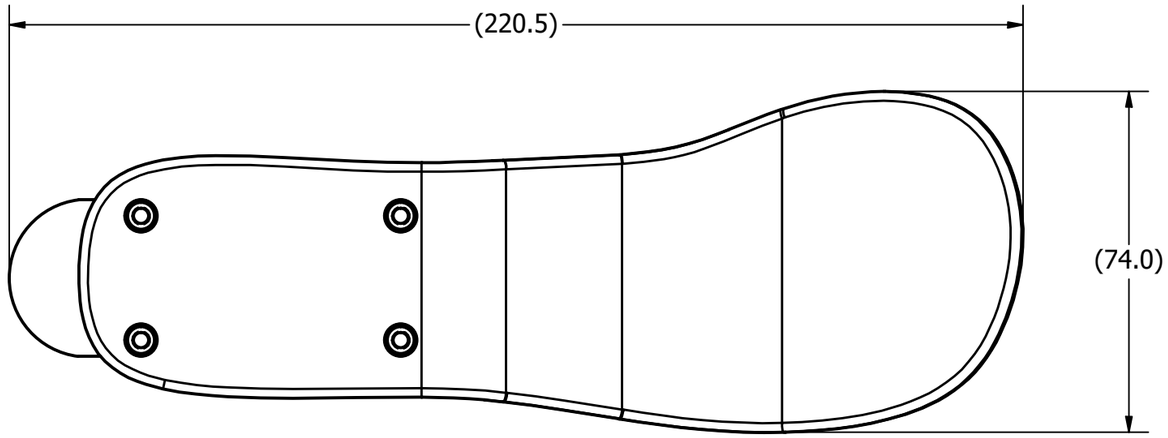
THIRD ANGLE PROJECTION

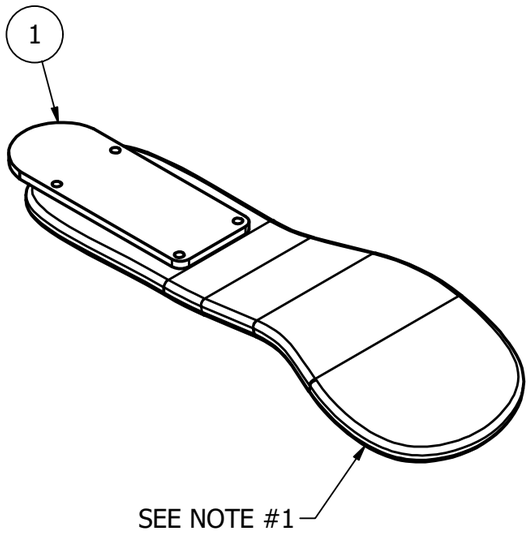
SIZE: A2 | DRAWING NUMBER: 474-5903-2 | REV: 1

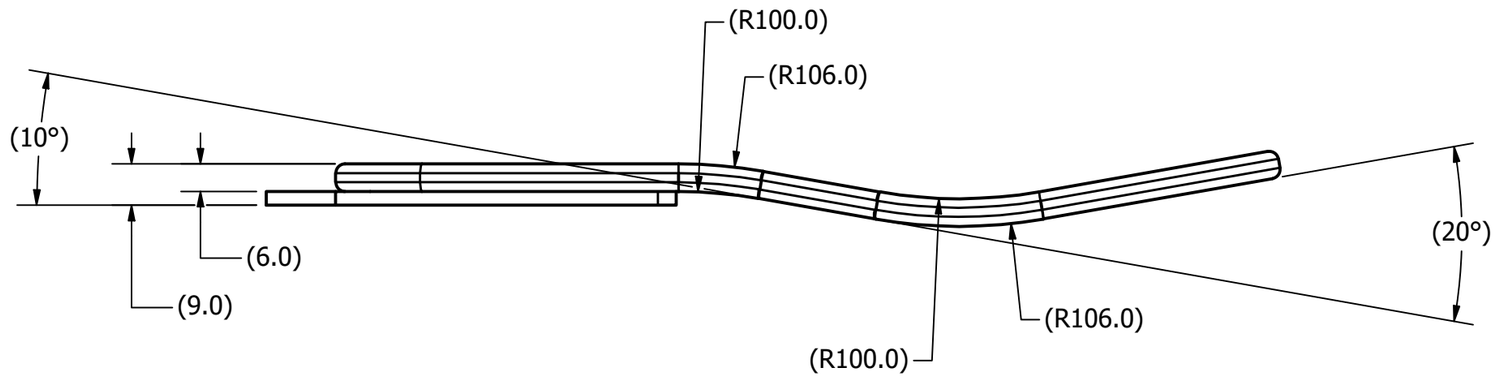
SCALE: .5:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AB	JW	10/04/2017









NOTES:

1. CARBON FIBER LAMINATES

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	474-5902	BACKING PLATE, SOLE PLATE

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ±√ | ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN: A. Barchock	10/4/2017
CHECKED	
ENG	
APPROVED	

MATERIAL
HEAT TREAT
FINISH

LAMINATED SOLE PLATE ASSY, RIGHT

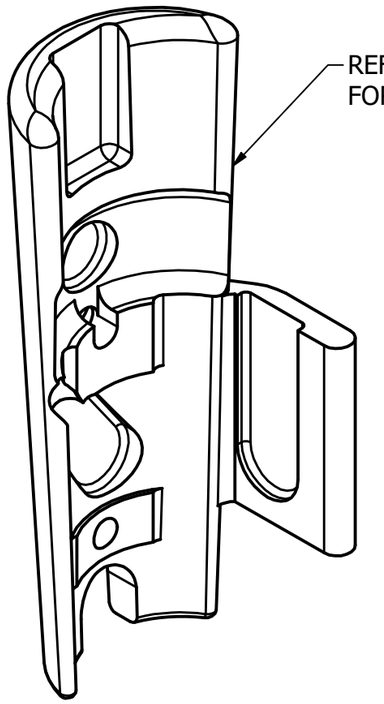
THIRD ANGLE PROJECTION

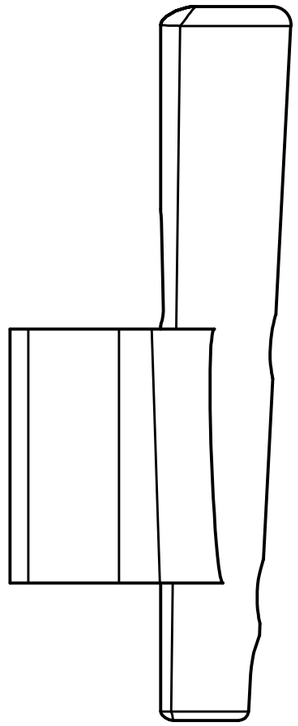
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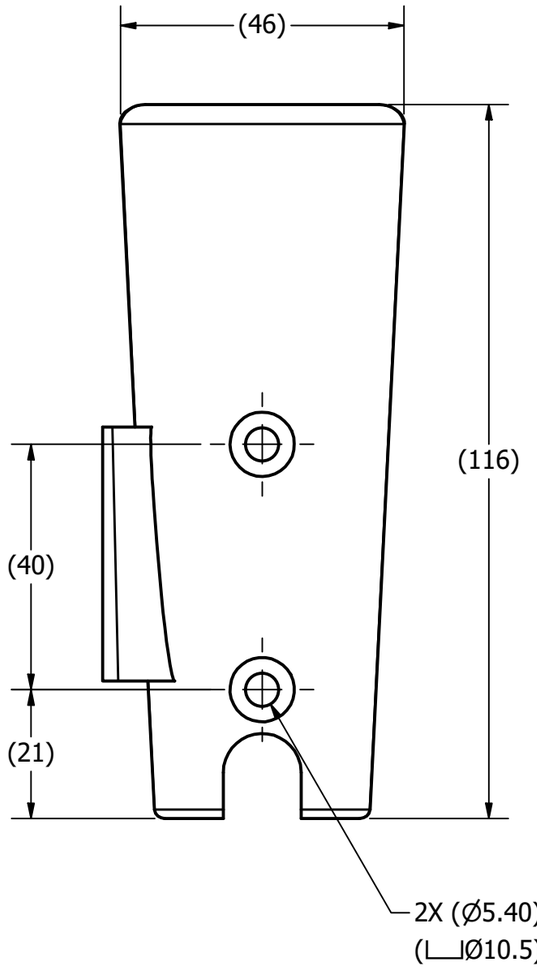
SCALE: .75:1 | SHEET: 1 OF 1

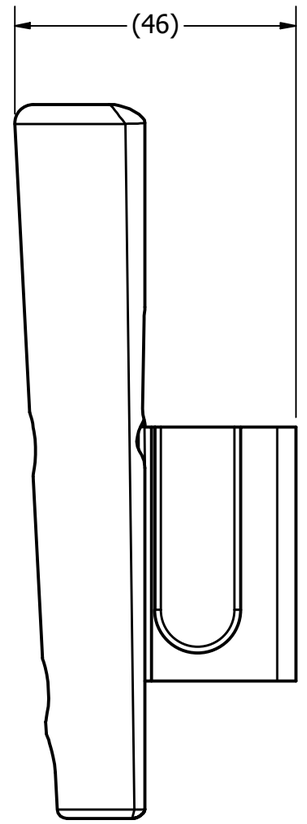
PRELIMINARY DRAWING

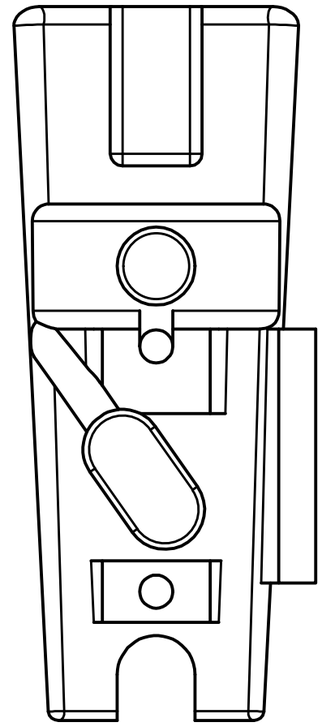
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/13/2016











NOTES:

1. MATERIAL: POLYURETHANE
   COLOR: BLACK
   DUROMETER: 84±5 SHORE "D"

2. REMOVE ALL MOLD FLASHING.

3. ALL MOLD DIMENSION TOLERANCE +1%/-2% BUT NO SMALLER THAN 0.5mm.

4. NO SPLIT OR DEFECTS ARE ALLOWED IN THE URETHANE MOLDING.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED √ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTES
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: B. KIMES	4/12/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

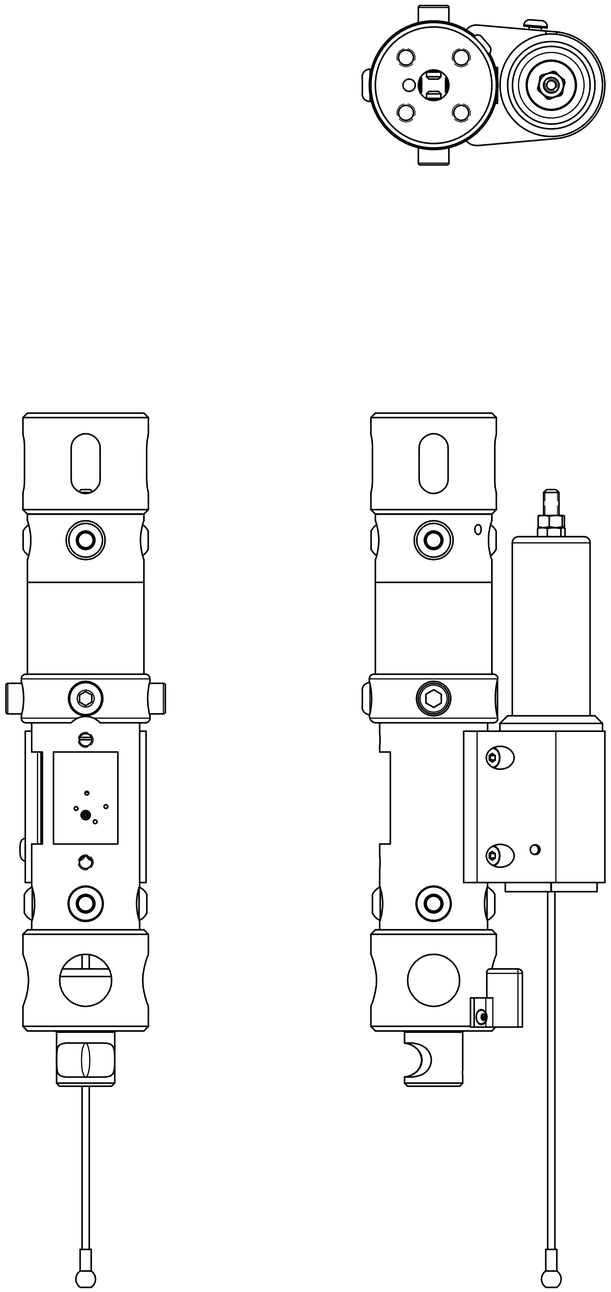
SHIN GUARD, MOLDED, RIGHT

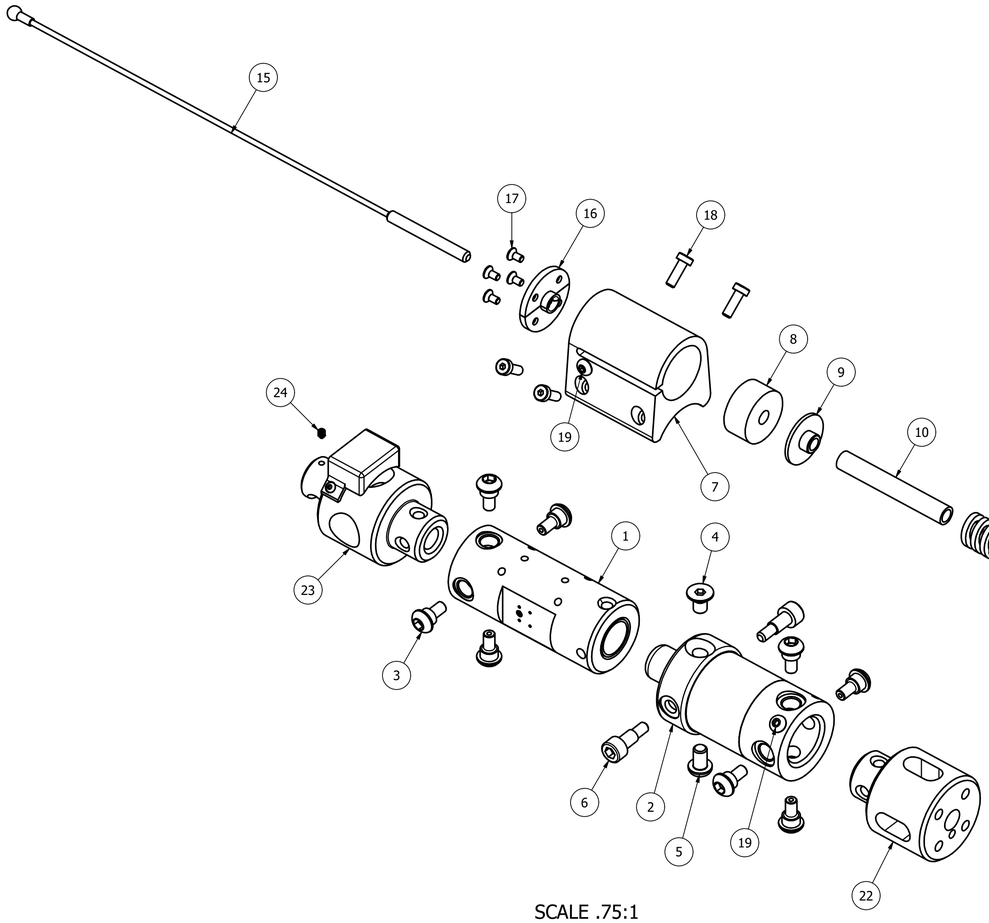
THIRD ANGLE PROJECTION

SIZE: A3 | DRAWING NUMBER: 474-5518-2 | REV: 1

SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH	JW	4/12/2016





SCALE .75:1

ITEM	QTY	PART NUMBER	DESCRIPTION
24	1	9010447	M3 X 0.5 X 3 LG. SSSNP
23	1	474-5822	STRUCTURAL REPLACEMENT, LOWER TIBIA LOAD CELL ASS'Y
22	1	474-5550	STRUCTURAL REPLACEMENT, UPPER TIBIA LOAD CELL
21	1	474-2322	SPRING BUSHING
20	1	474-2925	SPRING, FRONT
19	2	5001075	M4 X 0.7 X 6 LG. BHCS
18	4	5001054	M4 X 0.7 X 12 LG. LHCS
17	4	5000098	M3 X 0.5 X 6 LG. FHCS
16	2	474-5531	ACHILLES CABLE EYELET GUIDE
15	1	474-5530	ACHILLES CABLE
14	2	5000515	M5 X 0.8 HEX NUT ZINC
13	1	474-5529	PRIMARY LOAD WASHER
12	1	6005232	SPRING COMPRESSION .295 X .032 X .551 SS
11	1	474-5525	UPPER ACHILLES SPRING HOUSING
10	1	474-5513	ACHILLES SPRING DAMPING TUBE
9	1	474-5526	SPRING CAP, BOTTOM
8	1	472-7359	MOCK ACHILLES LOAD CELL
7	1	474-5504	LOWER ACHILLES SPRING HOUSING
6	2	474-5512	TIBIA PLUNGER PIN, MODIFIED M6 SHCS
5	1	5000891	M6 X 1 X 10 LG. BHCS
4	1	5000204	M6 X 1 X 10 LG. FHCS
3	8	W50-61042	MODIFIED BHSS M6 THREAD
2	1	474-5508	TIBIA COMPLIANT ELEMENT ASSEMBLY
1	1	474-5540-2	LOWER TIBIA SHAFT, RIGHT

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL X ±.2, X.X ±.1, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN jhaefner	4/12/2016
MATERIAL	
CHECKED	
HEAT TREAT	
ENG	
FINISH	
APPROVED	

TIBIA ASSEMBLY, RIGHT

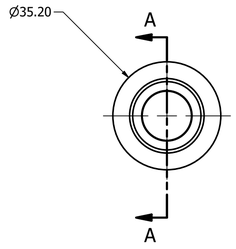
PRELIMINARY DRAWING

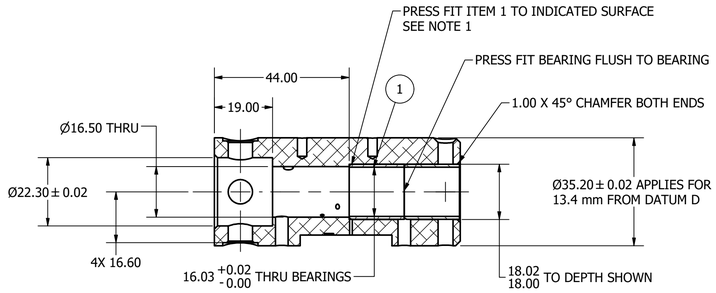
THIRD ANGLE PROJECTION

SIZE A1 | DRAWING NUMBER 474-5507-2 | REV 1

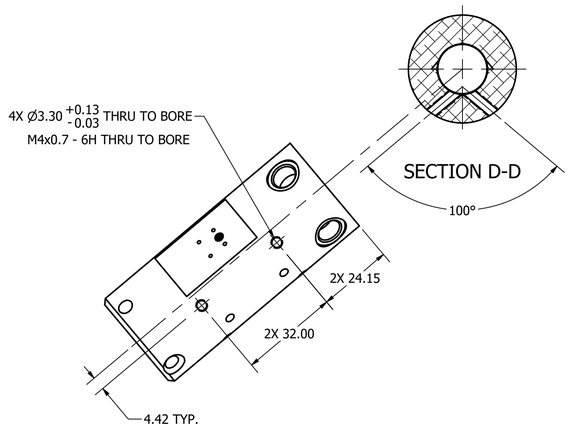
SCALE: 1:1 | SHEET 1 OF 1

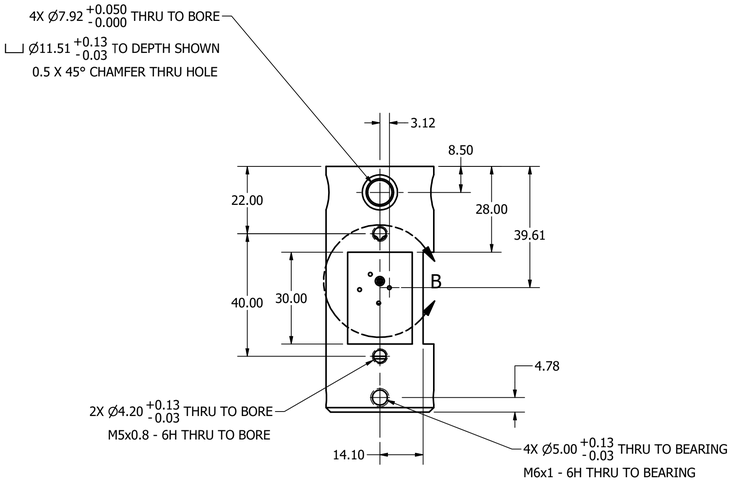
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	DJI	JW	4/8/2016

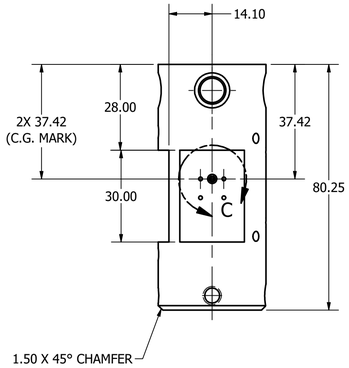


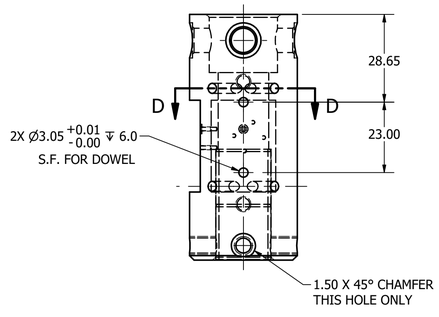


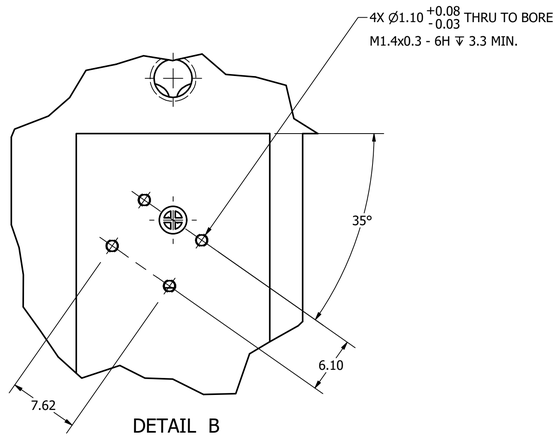
SECTION A-A



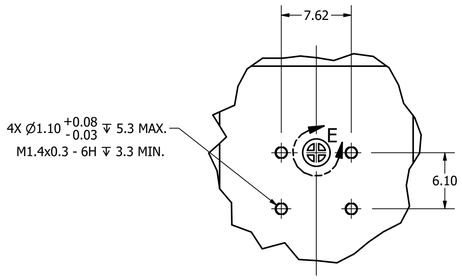




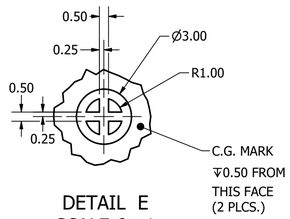




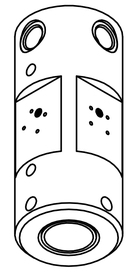
DETAIL B
SCALE 3 : 1



DETAIL C
SCALE 3 : 1



DETAIL E
SCALE 6 : 1



ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	6005238	BEARING, SLEEVE, 18mm OD X 14mm ID X 18mm LG (JSM-1418-18)

PARTS LIST

NOTES:

1. INSTALL SLEEVE BEARINGS AFTER ANODIZE.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.2, .X ±.2, .XX ±.1, .XXX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: dispoi	4/8/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

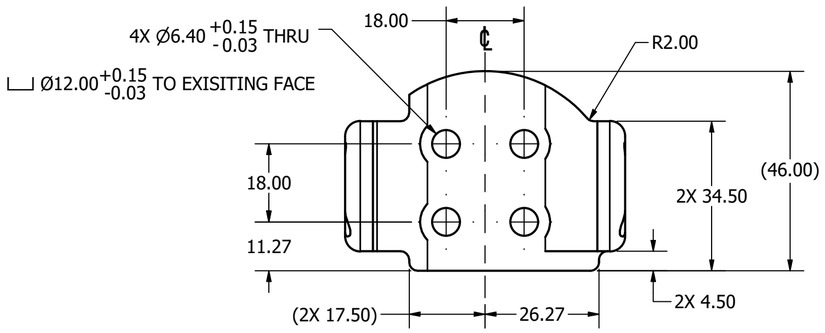
LOWER TIBIA SHAFT, RIGHT

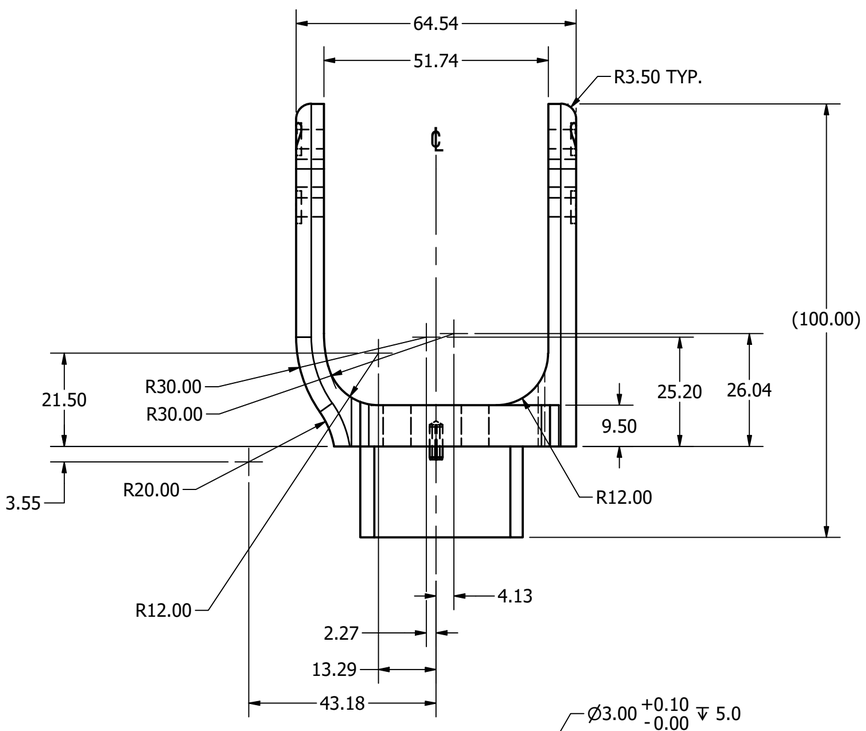
THIRD ANGLE PROJECTION

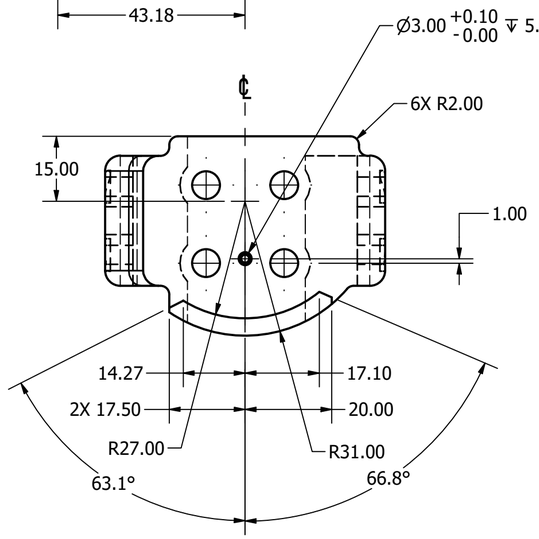
SIZE: A1 | DRAWING NUMBER: 474-5540-2 | REV: 1

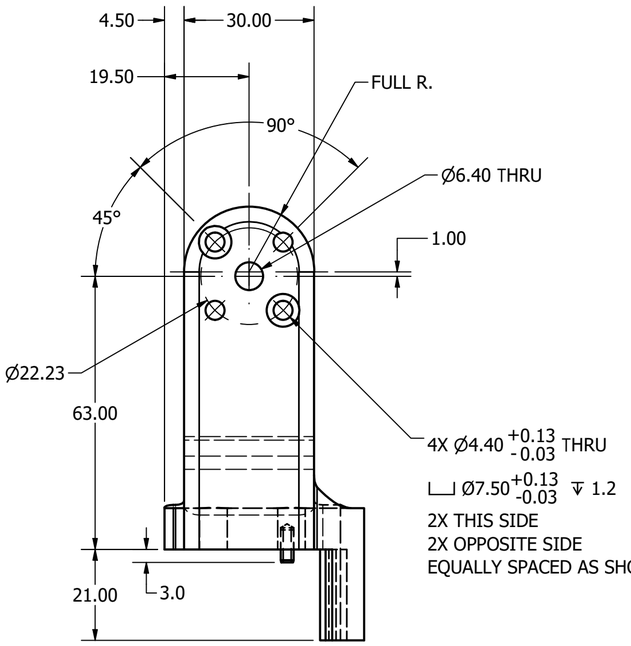
SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	DJI	JW	4/12/2016

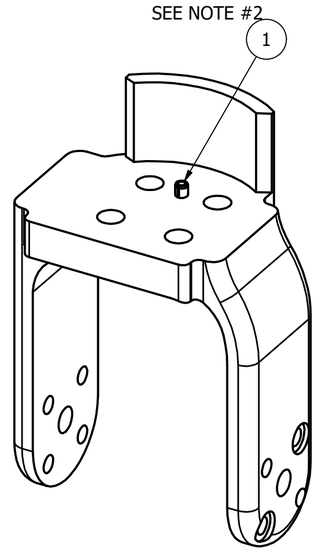


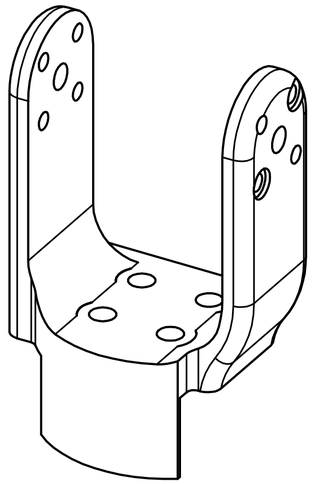






4X Ø4.40 +0.13 -0.03 THRU
⌴ Ø7.50 +0.13 -0.03 ↧ 1.2
2X THIS SIDE
2X OPPOSITE SIDE
EQUALLY SPACED AS SHOWN





ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	5000195	M3 X 8 LG. ROLL PIN SS

PARTS LIST

NOTES:

1. DIMENSIONS ARE SYMMETRICAL ABOUT ℄ UNLESS OTHERWISE NOTED.
2. INSTALL ROLL PIN AFTER ANODIZE.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: disopi	4/12/2016
CHECKED:	
ENG:	
APPROVED:	

U.S. DEPARTMENT OF TRANSPORTATION — NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

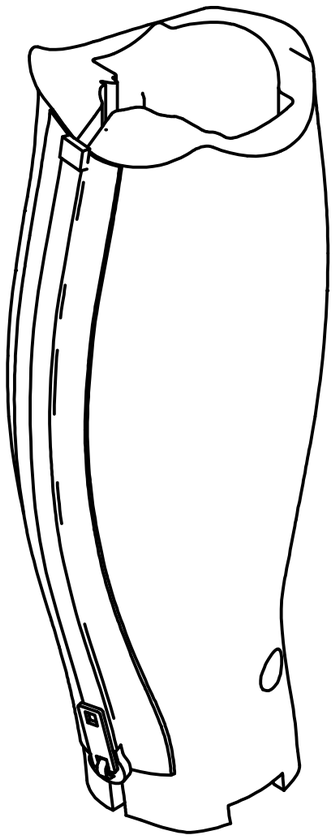
KNEE CLEVIS, RIGHT

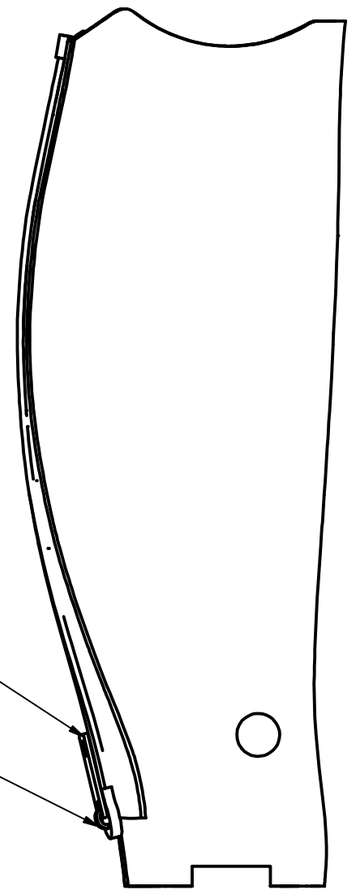
THIRD ANGLE PROJECTION

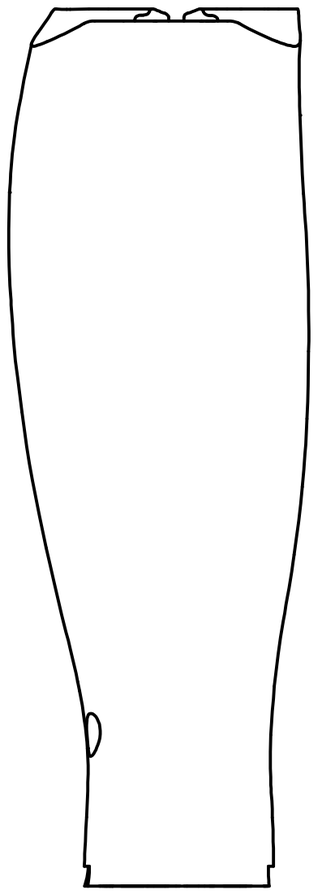
SIZE: A2 | DRAWING NUMBER: 474-5517-2 | REV: 1

SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	4/13/2016







NOTES:

1. MATERIAL: SKIN: POLYURETHANE
   FOAM: POLYURETHANE

   COLOR: EURO BROWN
   DUROMETER: 30±5 SHORE A

2. REMOVE ALL MOLD FLASHING

3. ALL MOLD DIMENSION TOLERANCE +1%/-2%
   BUT NO SMALLER THAN 0.5mm, UNLESS OTHERWISE NOTED.

4. NO SPLIT OR DEFECTS ARE ALLOWED IN THE POLYURETHANE MOLDING

5. GLUE ZIPPER ASSEMBLY TO FLESH AS SHOWN.

6. WEIGHT: 488±15g

PRELIMINARY DRAWING

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	474-5521	ZIPPER ASSEMBLY, LOWER LEG

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTE #1
HEAT TREAT:
FINISH:

*V*EHICLE *R*ESEARCH and *T*EST *C*ENTER

APPROVALS	DATE
DRAWN: B. KIMES	4/13/2016
CHECKED:	
ENG:	
APPROVED:	

DEPARTMENT OF TRANSPORTATION — UNITED STATES OF AMERICA

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

LOWER LEG FLESH, RIGHT

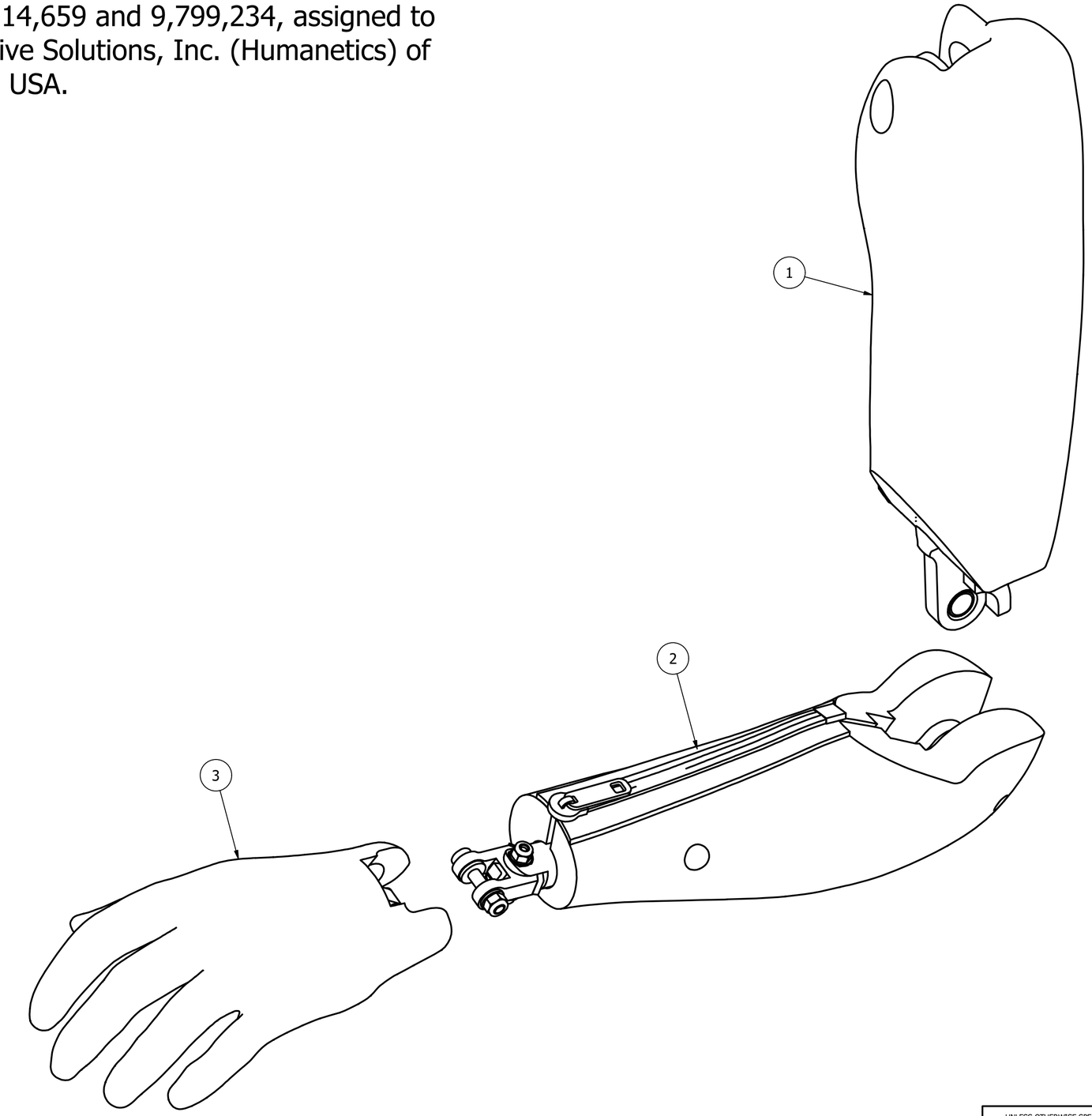
THIRD ANGLE PROJECTION

SIZE: A3 | DRAWING NUMBER: 474-5520-2 | REV: 1

SCALE: .5:1 | SHEET: 1 OF 1

Please note that portions of these drawings are covered by U.S. Patent Nos. 9,514,659 and 9,799,234, assigned to Humanetics Innovative Solutions, Inc. (Humanetics) of Plymouth, Michigan, USA.

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE TO PROTOTYPE	AB	JW	05/06/16
	2	ADDED PATENT INFORMATION	AT	JW	7/12/2018



ITEM	QTY	PART NUMBER	DESCRIPTION
3	1	474-6900-1	HAND, MOLDED, LEFT
2	1	474-6500-1	LOWER ARM ASSEMBLY, LEFT
1	1	474-6100-1	UPPER ARM ASSEMBLY, LEFT

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ∠C ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN A. Barchock	5/6/2016
CHECKED	
ENG	
APPROVED	

MATERIAL
HEAT TREAT
FINISH

PRELIMINARY DRAWING

LEFT ARM ASSEMBLY

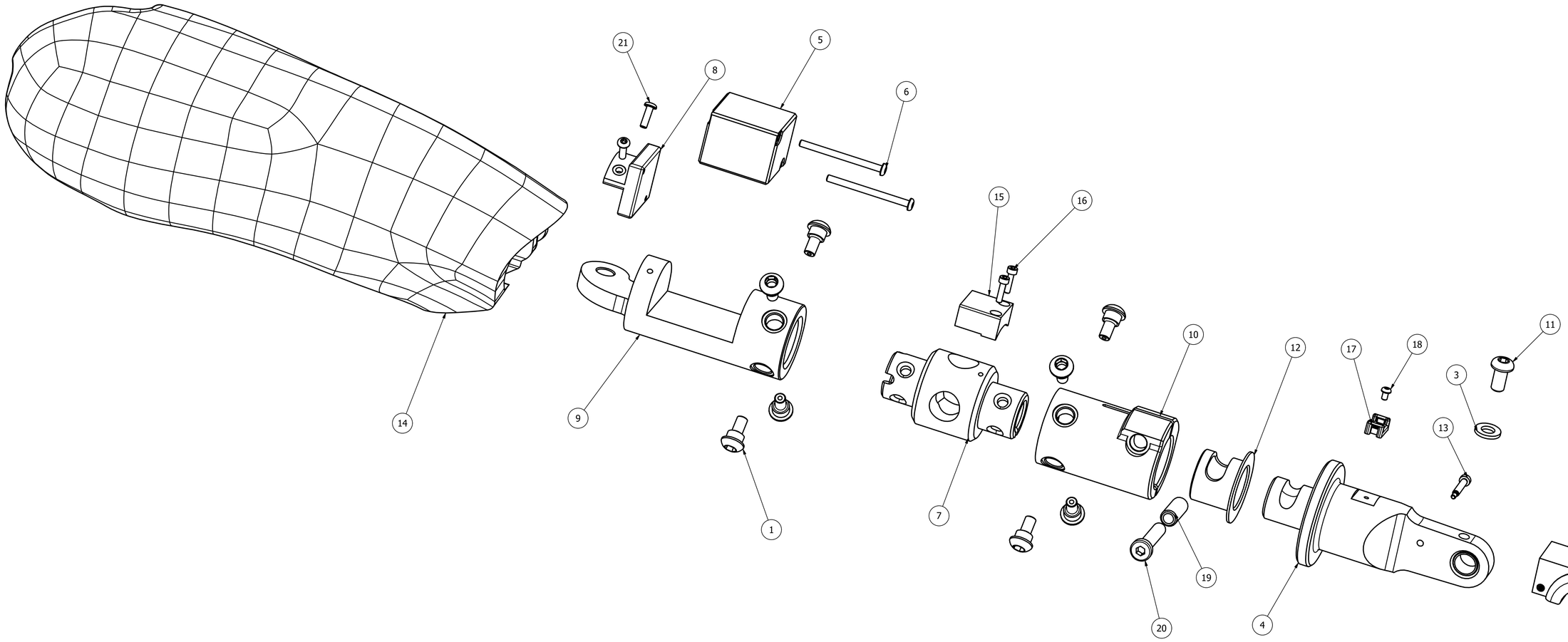
THIRD ANGLE PROJECTION

SIZE A2 | DRAWING NUMBER 474-6000-1 | REV 2

SCALE: .75:1 | SHEET 1 OF 1

Please note that portions of these drawings are covered by U.S. Patent Nos. 9,514,659 and 9,799,234, assigned to Humanetics Innovative Solutions, Inc. (Humanetics) of Plymouth, Michigan, USA.

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH		3/10/2016
	2	ADDED PATENT INFORMATION	AT	JW	7/12/2018



ITEM	QTY	PART NUMBER	DESCRIPTION
21	2	5001074	M3 X 0.5 X 10 LG. BHCS
20	1	5001443	M6 X 1 X 30 LG. LHCS
19	1	474-6111	SLEEVE, ARM BOLT
18	1	5001305	M2.5 X 0.45 X 4 LG. BHCS
17	1	6002036	CABLE TIE MOUNT, #4 SCREW
16	2	5000456	M2.5 X 0.45 X 10 LG. SHCS
15	1	474-6113	STRUCTURAL REPLACEMENT, CONNECTOR BLOCK
14	1	474-6120-1	UPPER ARM FLESH, LEFT
13	1	5001372	3 X 14 LG. PREC. SHSS SS
12	1	474-6121	ARM ROTATION BUSHING
11	1	5000356	M6 X 1 X 12 LG. BHCS
10	1	474-6112	UPPER ARM LOAD CELL ADAPTER
9	1	474-6110-1	DISTAL UPPER ARM TUBE, LEFT
8	1	474-6118	UPPER ARM ON BOARD DAS BRACKET
7	1	474-6106	STRUCTURAL REPLACEMENT, UPPER-LOWER ARM LOAD CELL
6	2	5001343	M3 X 0.5 X 40 LG. BHCS SS
5	1	474-8204	ON BOARD DAS STRUCTURAL REPLACEMENT
4	1	474-6115-1	DISTAL UPPER ARM TUBE ASSEMBLY, LEFT
3	1	6003562	M6 FLAT WASHER PLAIN NYLON
2	1	474-6116	ELBOW FRICTION PLATE
1	8	W50-61042	MODIFIED BHSS M6 THREAD

PARTS LIST

NOTES:

1.BOND 5001443 AND 474-6111.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS TOLERANCES ARE:
DECIMAL: X ±.2, X.X ±.1, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN ghayden	11/13/2017
CHECKED	
ENG	
APPROVED	

MATERIAL
HEAT TREAT
FINISH

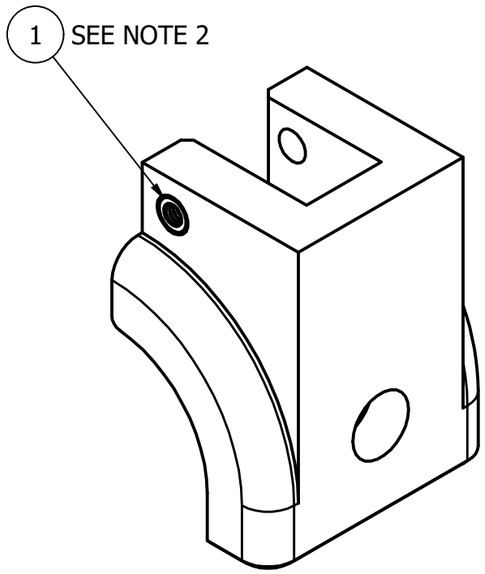
UPPER ARM ASSEMBLY, LEFT

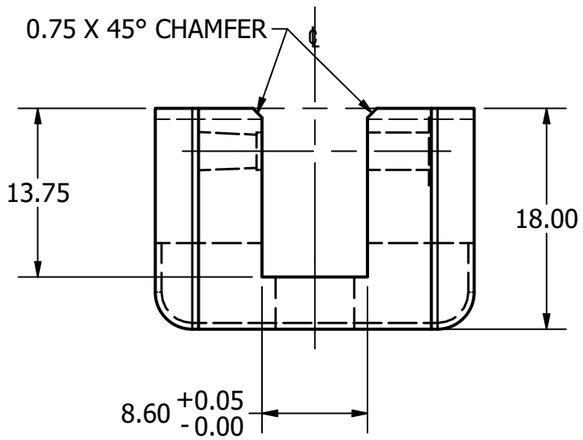
THIRD ANGLE PROJECTION

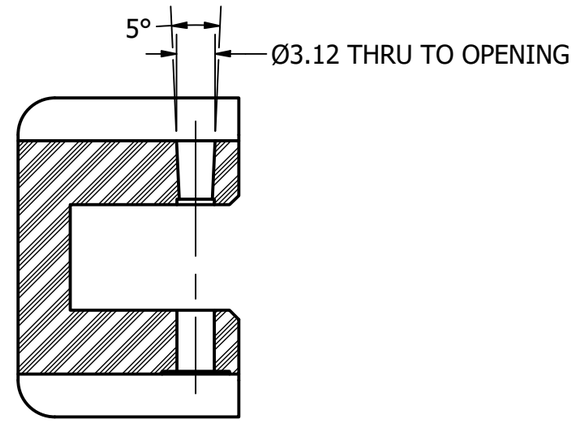
SIZE A1 | DRAWING NUMBER 474-6100-1 | REV 2

SCALE: 1:1 | SHEET 1 OF 1

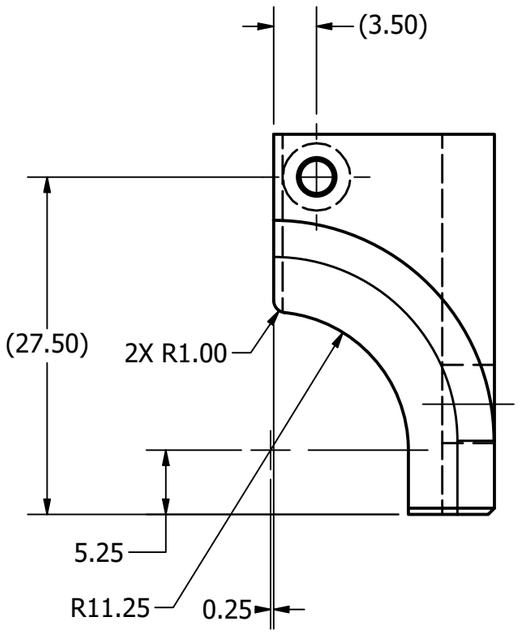
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH		11/13/17

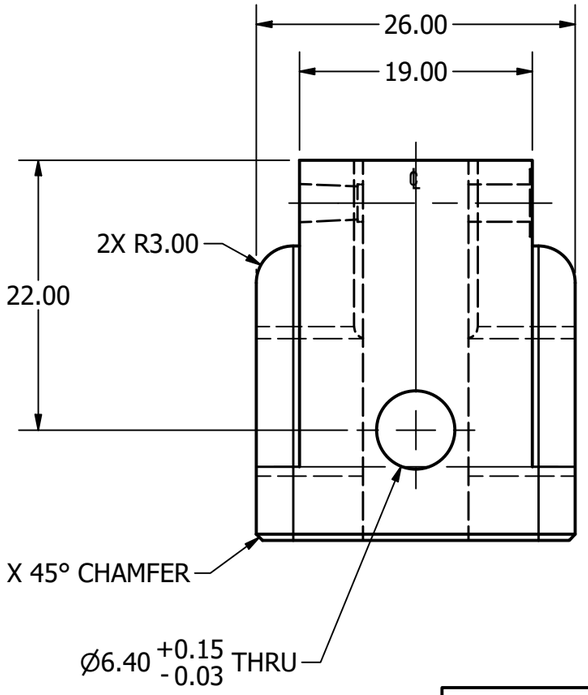


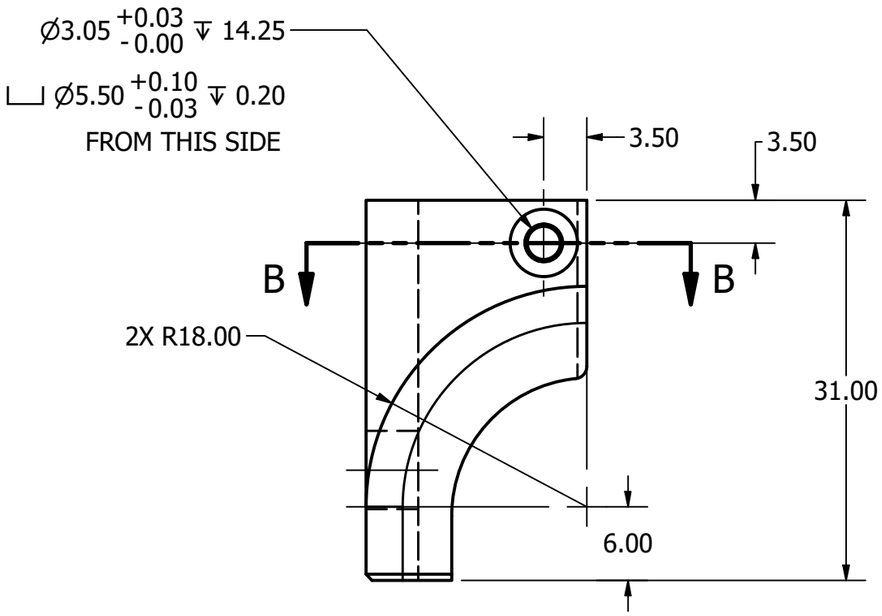




SECTION B-B







ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	5001371	INSERT, M2X 0.4 X 4.8 (THERMOSET)

PARTS LIST

PRELIMINARY DRAWING

NOTES:

1. UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE SYMMETRICAL ABOUT ℄.

2. INSTALL INSERT INTO TAPERED HOLE WITH A SOLDERING IRON INSTALLATION TIP AS RECOMMENDED BY SUPPLIER.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN ghayden	11/13/2017
CHECKED	
ENG	
APPROVED	

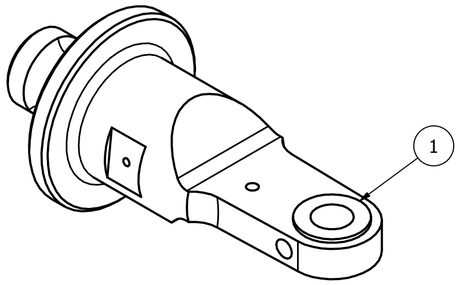
ELBOW FRICTION PLATE

MATERIAL: Nylon-6/6
HEAT TREAT:
FINISH:

THIRD ANGLE PROJECTION

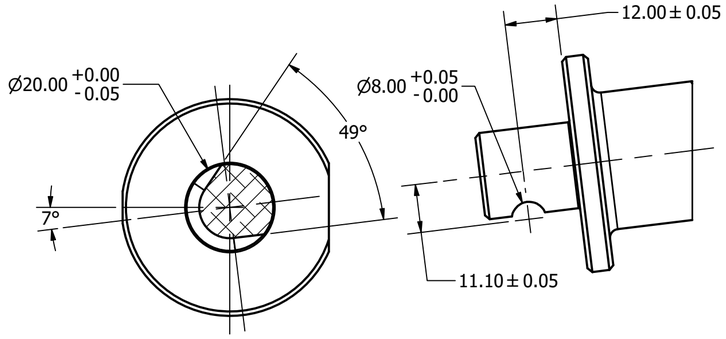
SIZE: A3 | DRAWING NUMBER: 474-6116 | REV: 1
SCALE: 2:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	11/13/17

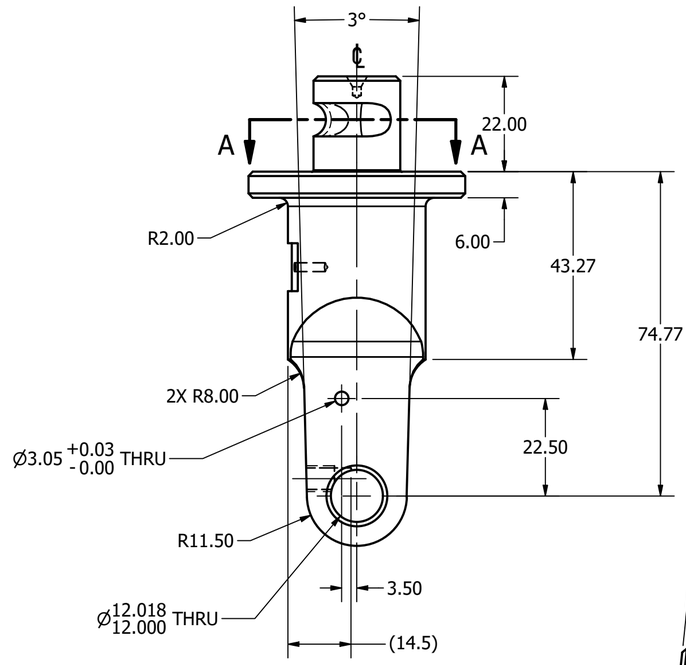


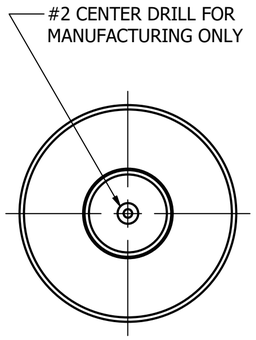


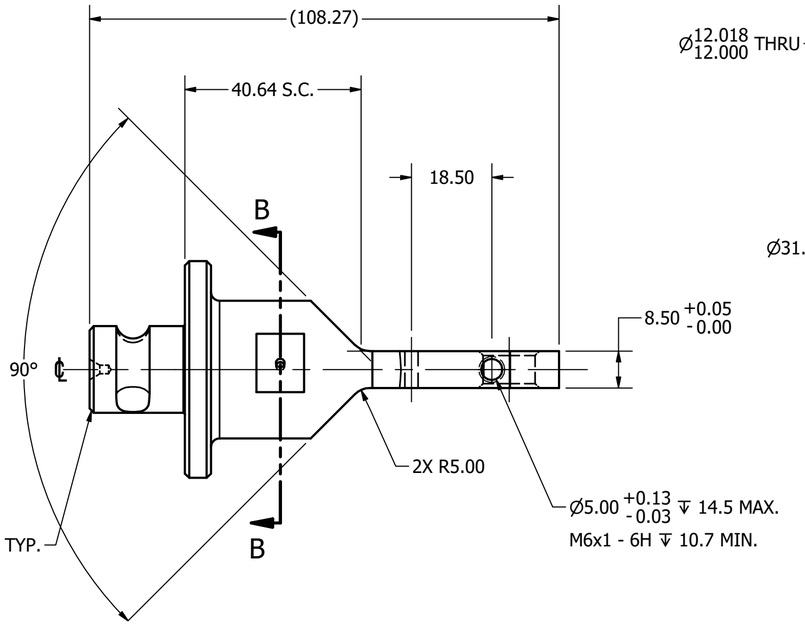
SECTION C-C

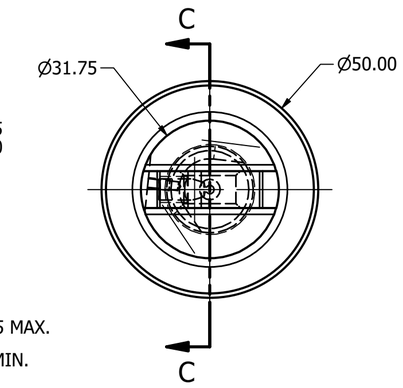


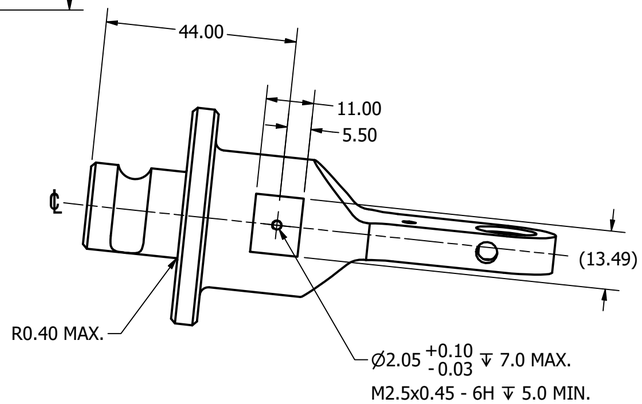
SECTION A-A

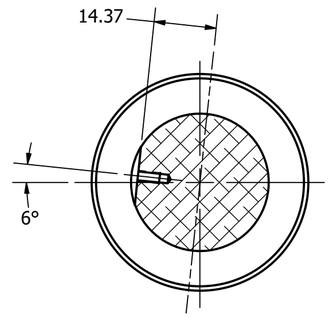












SECTION B-B

NOTES:

1. INSTALL BEARING AFTER ANODIZE.
2. UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE SYMMETRICAL ABOUT ℄.

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	6004600	BEARING, FLANGE, 12mm OD X 10mm ID X 9mm LG

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN ghayden	11/13/2017
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

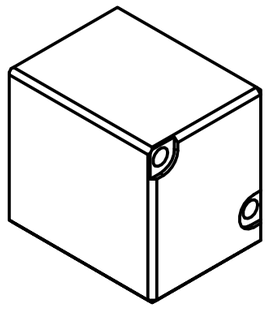
DISTAL UPPER ARM TUBE ASSEMBLY, LEFT

THIRD ANGLE PROJECTION

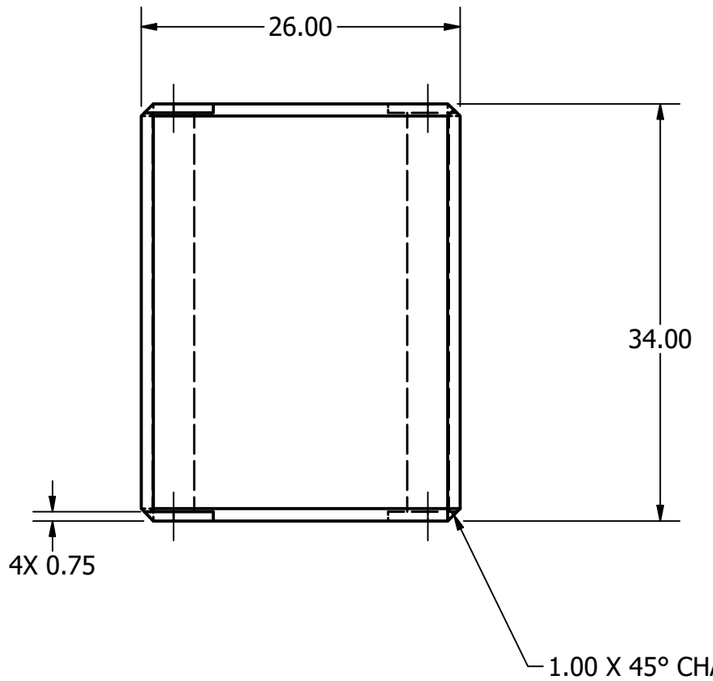
SIZE A2 | DRAWING NUMBER 474-6115-1 | REV 1

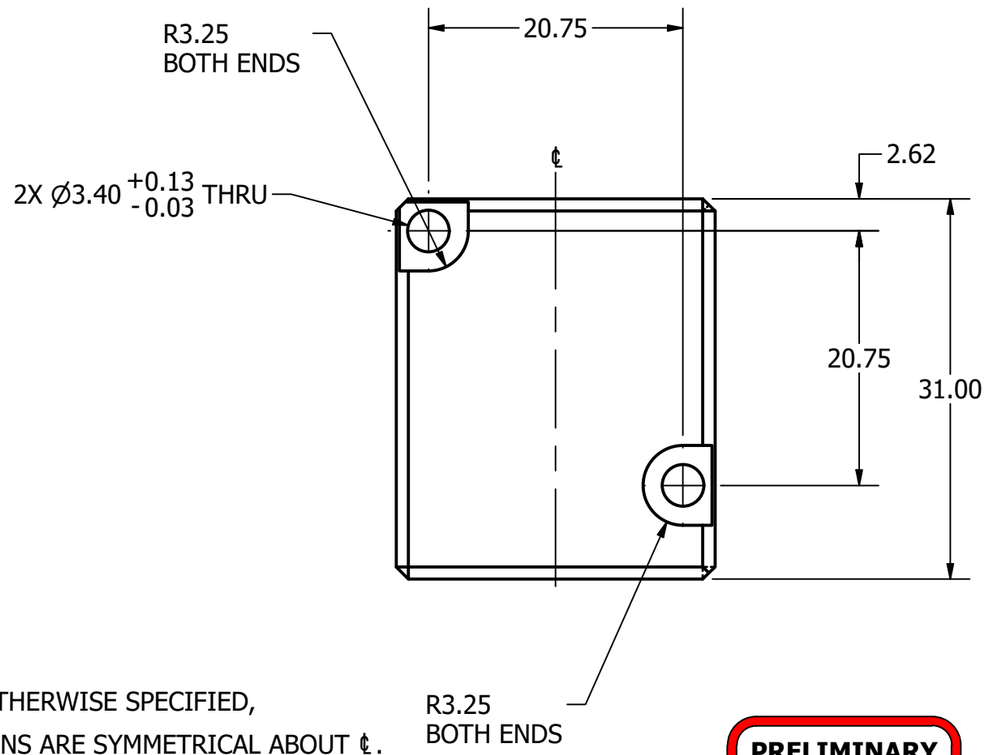
SCALE: 1:1 | SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH		11/13/17



SCALE 1 : 1





NOTES:

1. UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE SYMMETRICAL ABOUT ℄.
2. MASS = 75 grams ± 6.5 grams

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: ghayden	11/13/2017
CHECKED:	
ENG:	
APPROVED:	

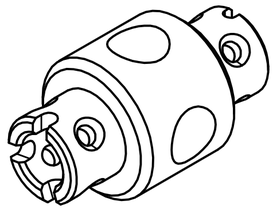
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

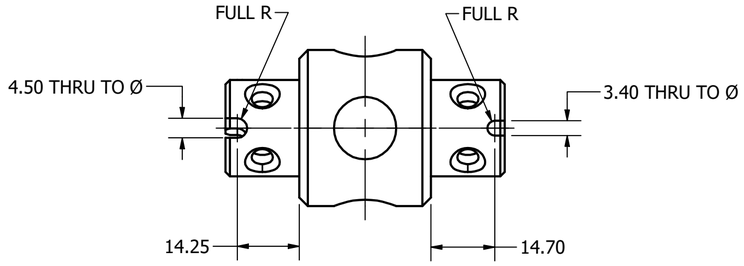
ON BOARD DAS STRUCTURAL REPLACEMENT

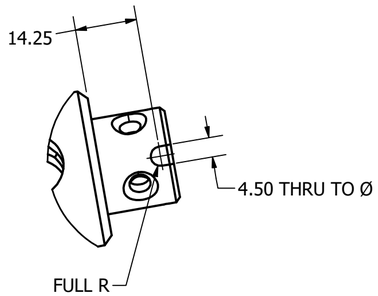
THIRD ANGLE PROJECTION

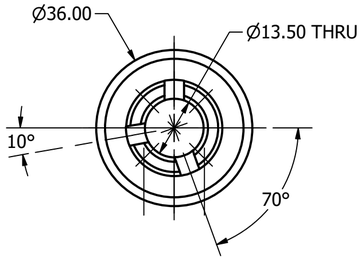
SIZE: A3 | DRAWING NUMBER: 474-8204 | REV: 1
SCALE: 2:1 | SHEET: 1 OF 1

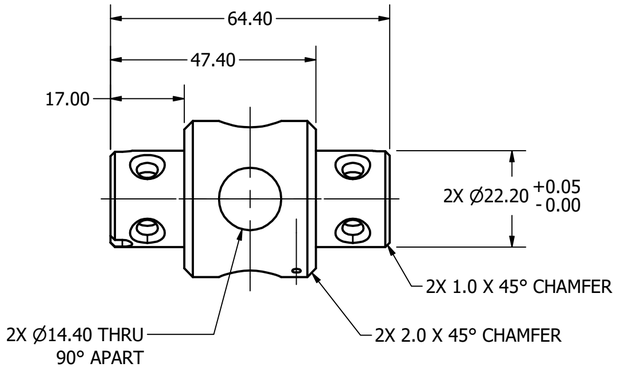
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH		11/13/17

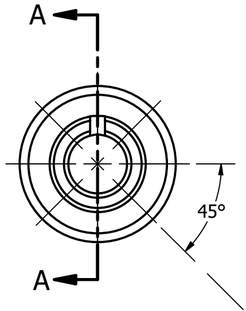


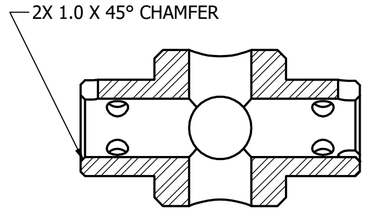




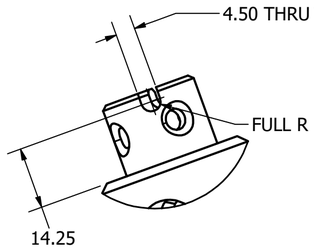


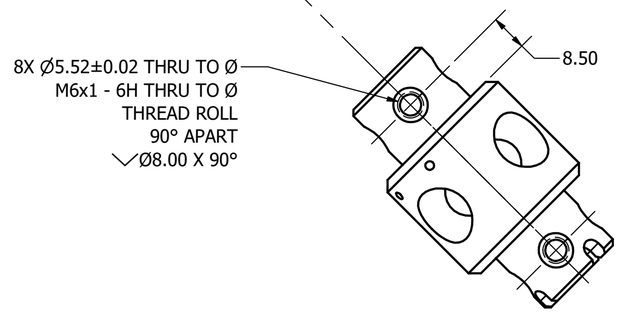


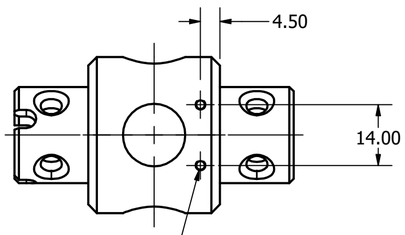




SECTION A-A







PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 1018 STEEL
HEAT TREAT:
FINISH: 0.008mm ELECTROLESS NICKEL PLATE PER SIDE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: ghayden	11/13/2017
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

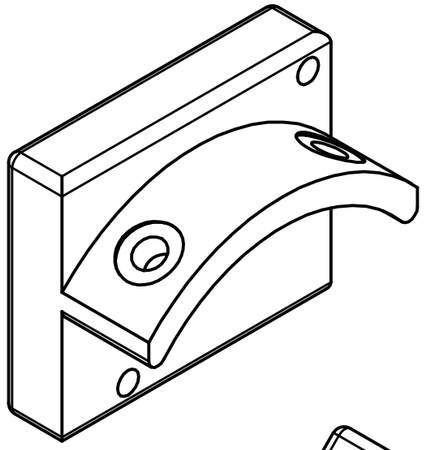
STRUCTURAL REPLACEMENT, UPPER-LOWER ARM LOAD CELL

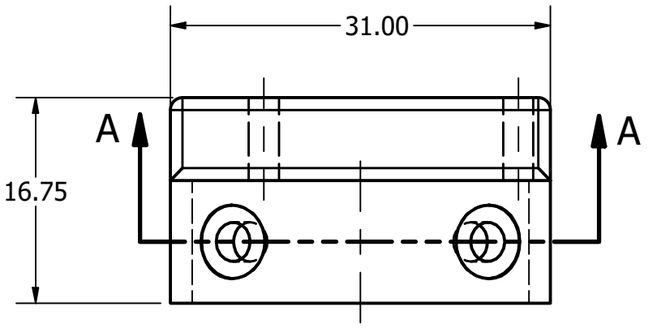
THIRD ANGLE PROJECTION

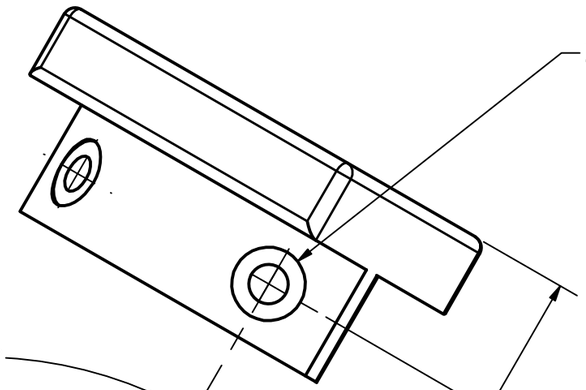
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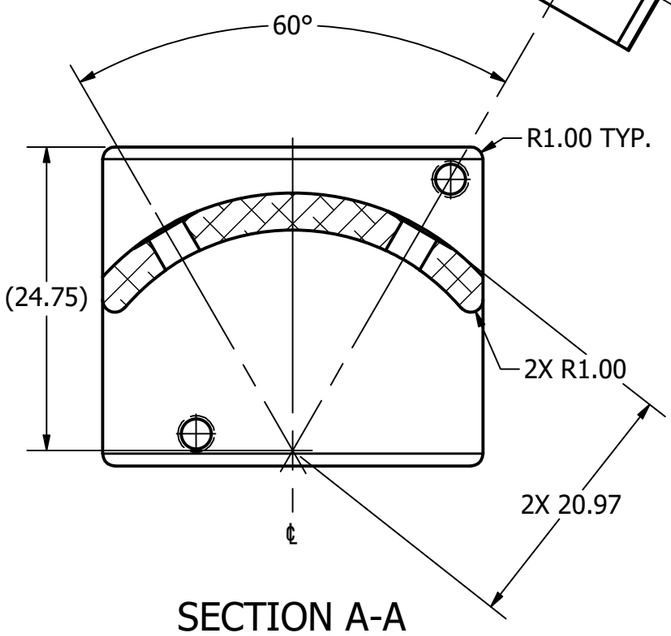
SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH		11/13/17

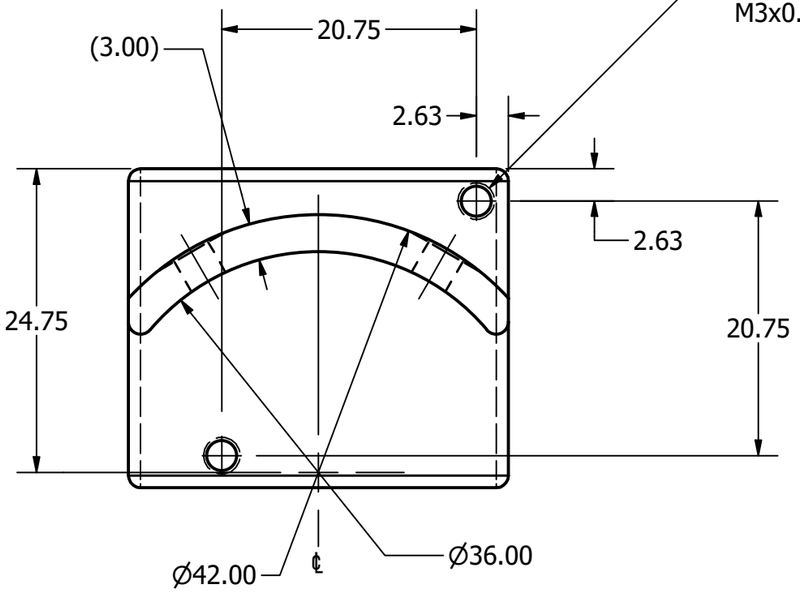


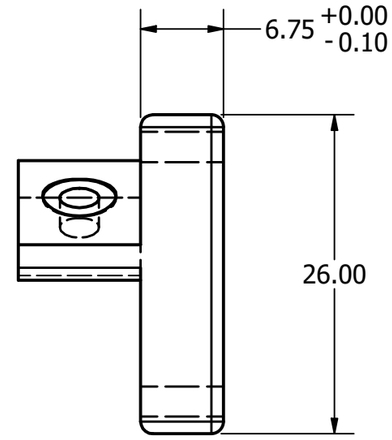






SECTION A-A





NOTES:

1.UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE SYMMETRICAL ABOUT ℄.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED √ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN ghayden	11/13/2017
CHECKED	
ENG	
APPROVED	

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

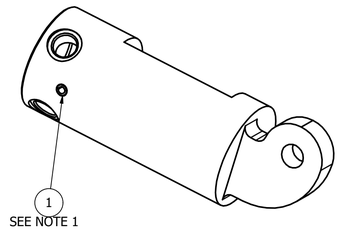
UPPER ARM ON BOARD DAS BRACKET

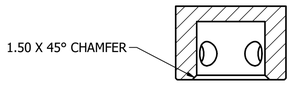
THIRD ANGLE PROJECTION

SIZE	DRAWING NUMBER	REV
A3	474-6118	1

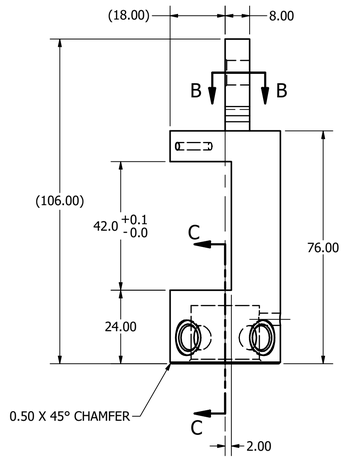
SCALE: 2:1 SHEET 1 OF 1

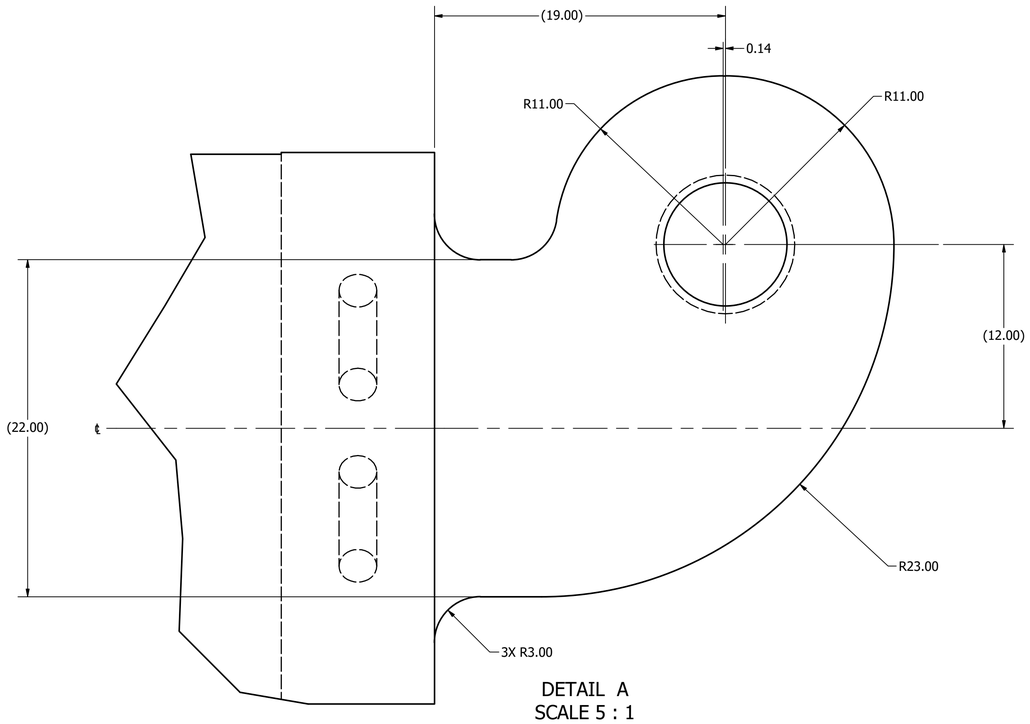
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH		11/14/17



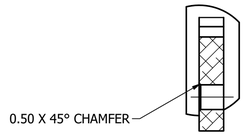


SECTION C-C

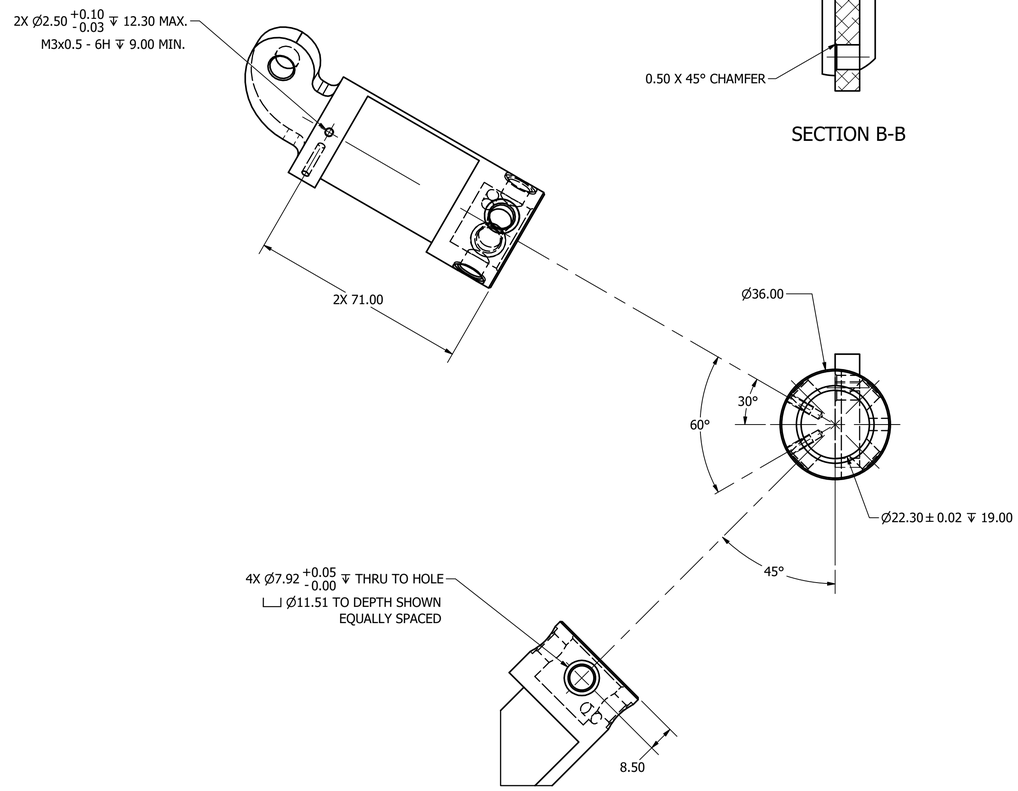


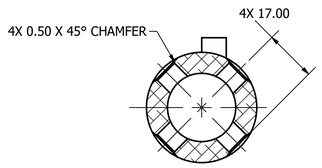


DETAIL A
SCALE 5 : 1

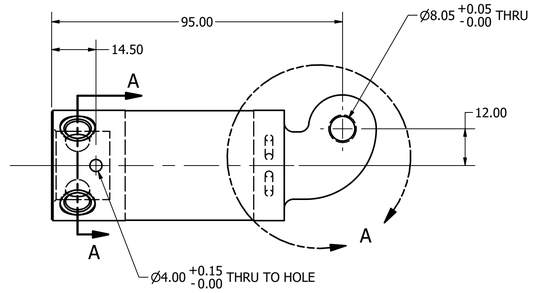


SECTION B-B





SECTION A-A



NOTES:

1. INSTALL FLUSH TO OUTSIDE SURFACE AFTER ANODIZE.
2. UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE SYMMETRICAL ABOUT ℄.

PRELIMINARY DRAWING

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	5000182	M4 X 10 LG. ROLL PIN

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL X ±.1, .XX ±.2, .XXX ±.1 | MACHINED ∠C ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

APPROVALS	DATE
DRAWN ghayden	11/13/2017
CHECKED	
ENG	
APPROVED	

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

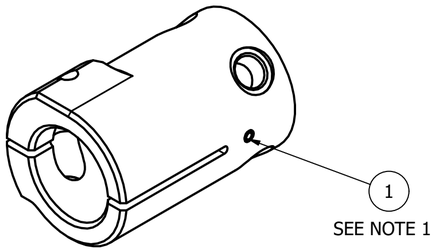
DISTAL UPPER ARM TUBE, LEFT

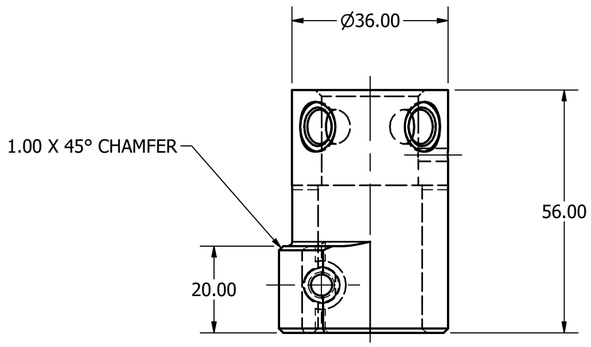
THIRD ANGLE PROJECTION

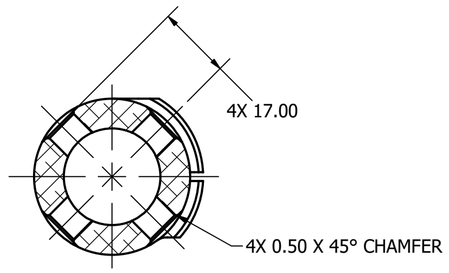
SIZE A1 | DRAWING NUMBER 474-6110-1 | REV 1

SCALE: 1:1 | SHEET 1 OF 1

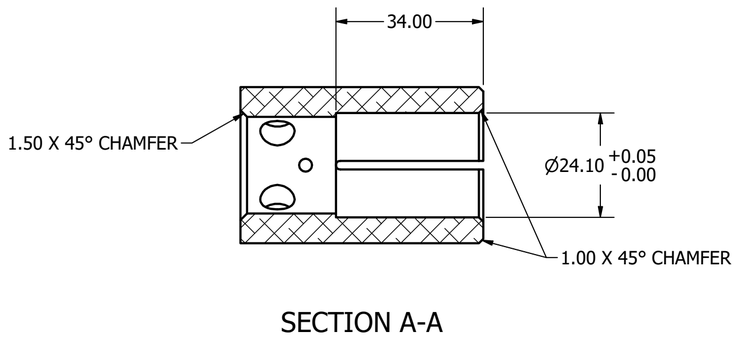
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH		11/14/17



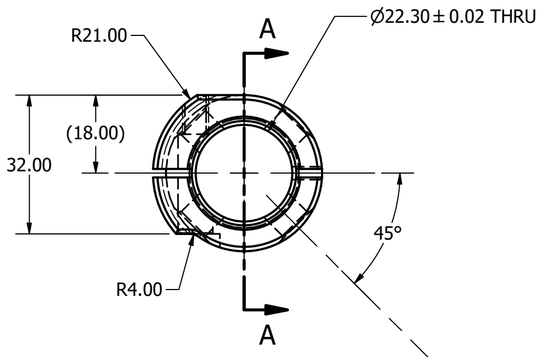


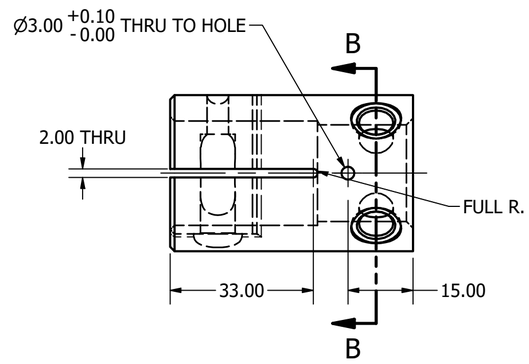


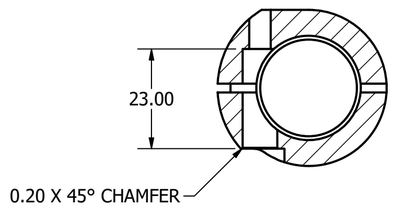
SECTION B-B



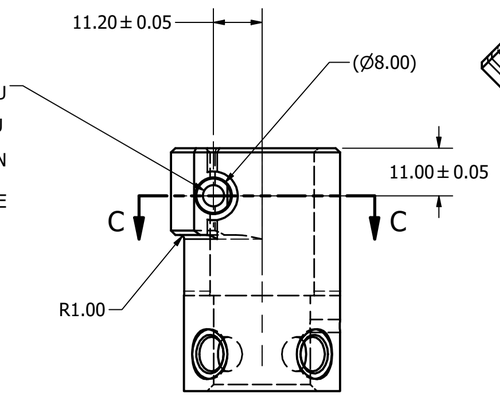
SECTION A-A

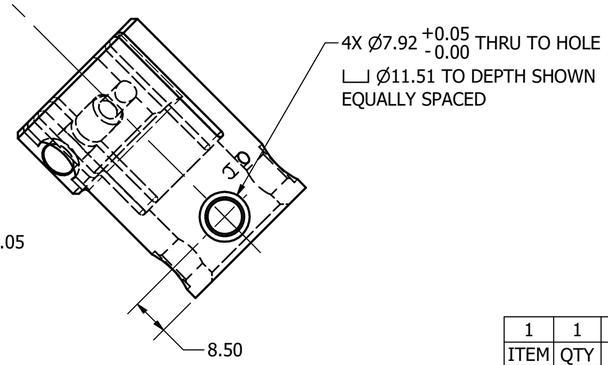






SECTION C-C





NOTES:

1. INSTALL FLUSH TO OUTSIDE SURFACE AFTER ANODIZE.

PRELIMINARY DRAWING

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	5000199	M3 X 10 LG. ROLL PIN SS

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ∠ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN ghayden	11/13/2017
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

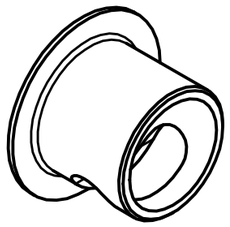
UPPER ARM LOAD CELL ADAPTER

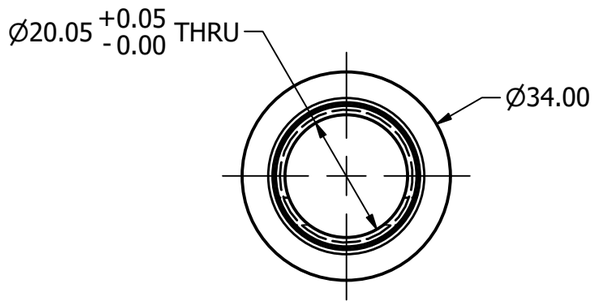
THIRD ANGLE PROJECTION

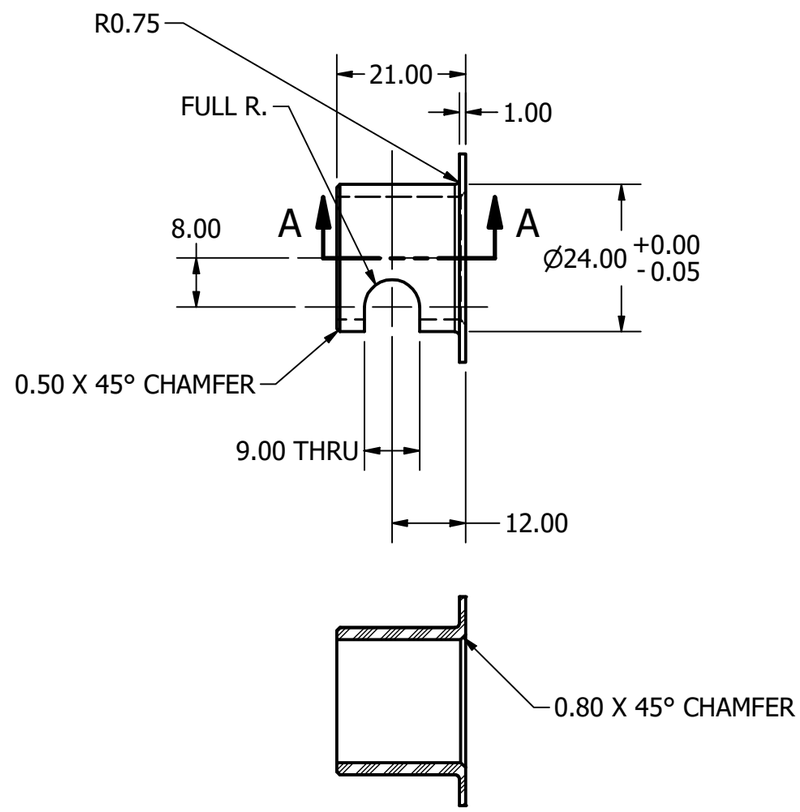
SIZE: A2 | DRAWING NUMBER: 474-6112 | REV: 1

SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH		11/14/17







SECTION A-A

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ±.5°
ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: Acetal Resin, Black
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: ghayden	11/13/2017
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

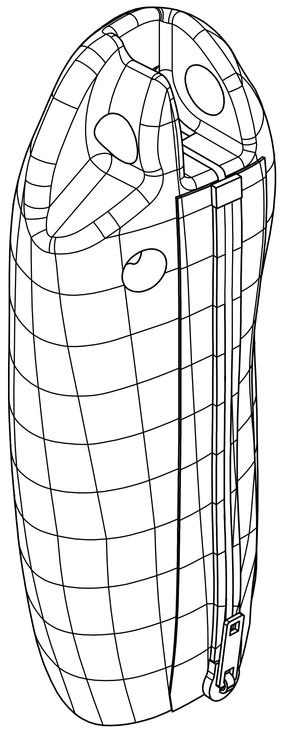
ARM ROTATION BUSHING

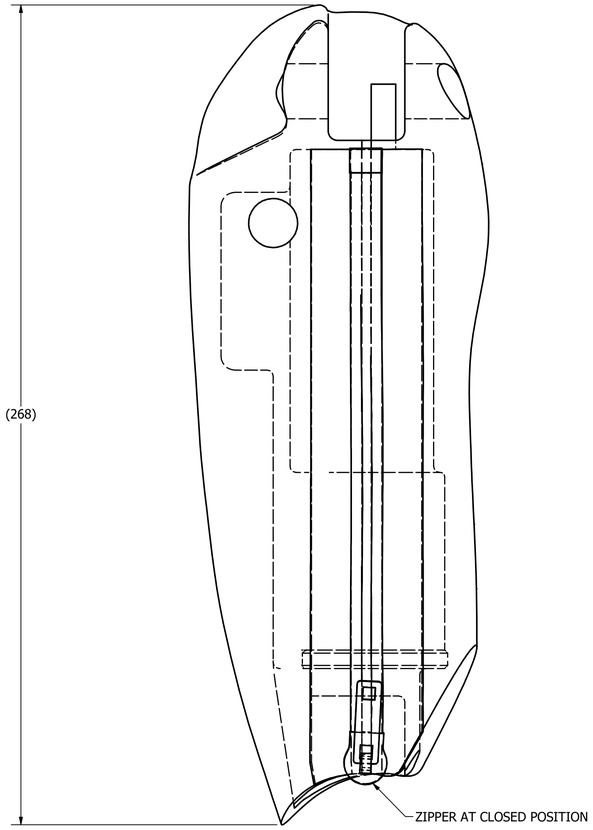
THIRD ANGLE PROJECTION

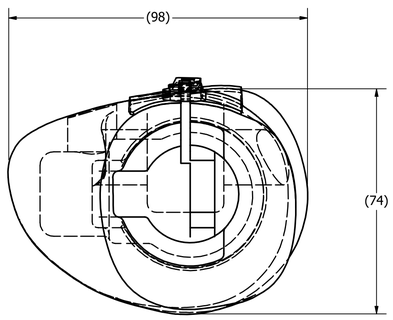
SIZE: A3 | DRAWING NUMBER: 474-6121 | REV: 1

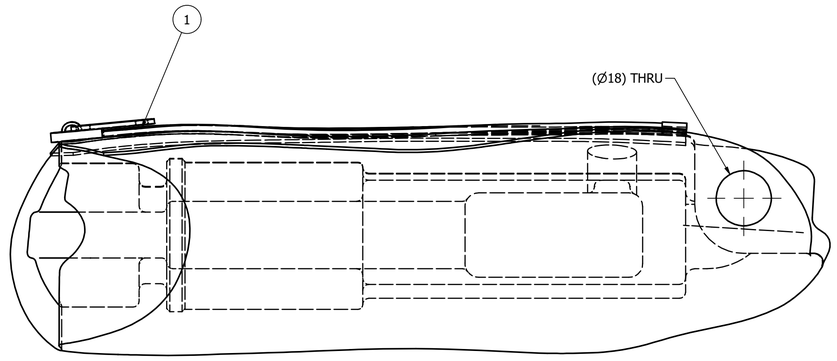
SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	11/14/17









NOTES:

1. MATERIAL: SKIN: POLYURETHANE
   FOAM: POLYURETHANE

   COLOR: EURO BROWN
   DUROMETER: 30±5 SHORE A

2. REMOVE ALL MOLD FLASHING

3. ALL MOLD DIMENSION TOLERANCE +1%/-4% BUT NO SMALLER THAN 1mm

4. WEIGHT: 460 GRAMS - NOMINAL

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	474-6122	ZIPPER ASSEMBLY, UPPER ARM

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL X ±.5, X.X ±.1, X.XX ±.1 | MACHINED ANGLES ±1.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTE #1
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: ghayden	11/13/2017
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

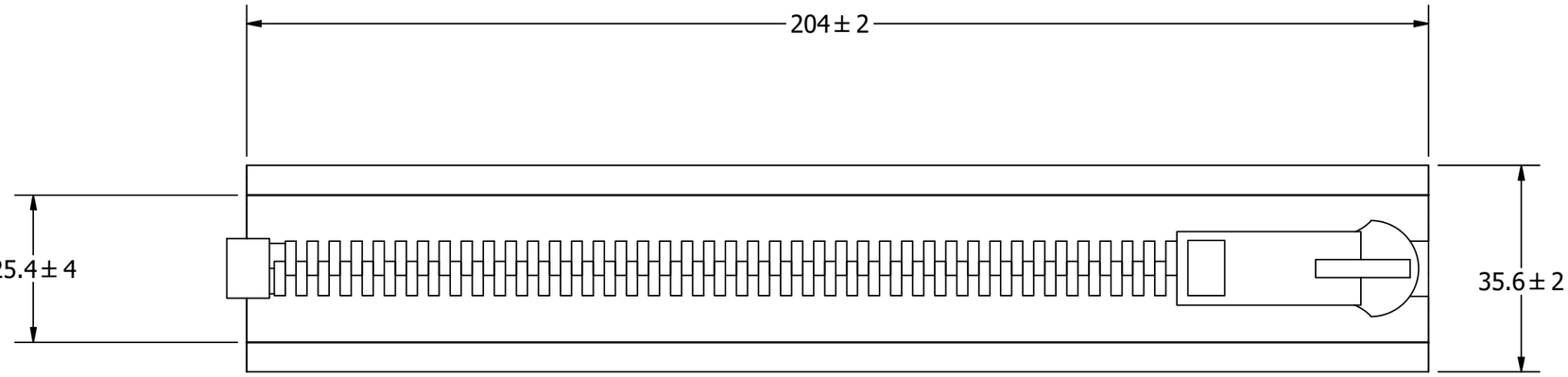
UPPER ARM FLESH, LEFT

THIRD ANGLE PROJECTION

SIZE: A1 | DRAWING NUMBER: 474-6120-1 | REV: 1

SCALE: 1:1 | SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	11/14/17



NOTES:

1. ALL BLACK #5 ZIPPER.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED √ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTES
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: jmcinnis	11/14/2017
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

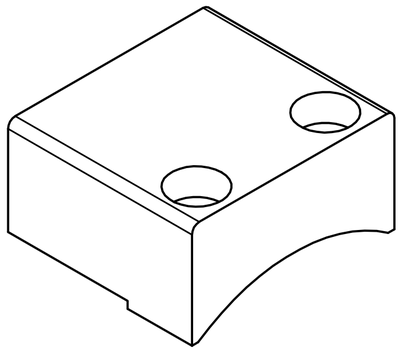
ZIPPER ASSEMBLY, UPPER ARM

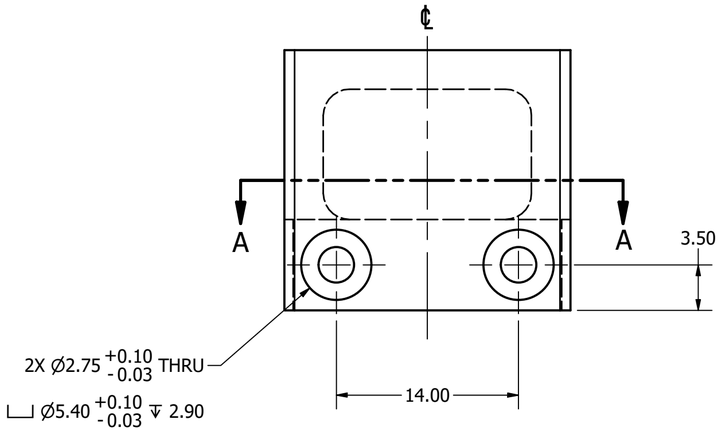
THIRD ANGLE PROJECTION

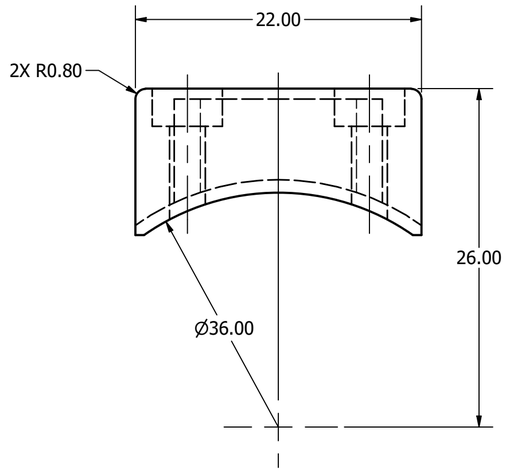
SIZE: A3 | DRAWING NUMBER: 474-6122 | REV: 1

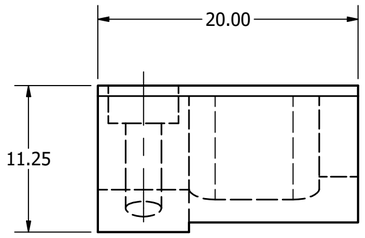
SCALE: 1:1 | SHEET: 1 OF 1

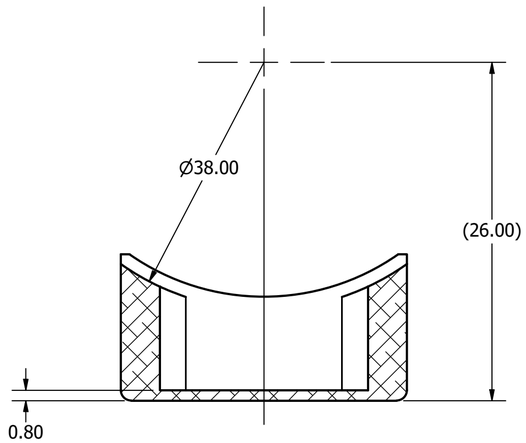
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH		11/14/17



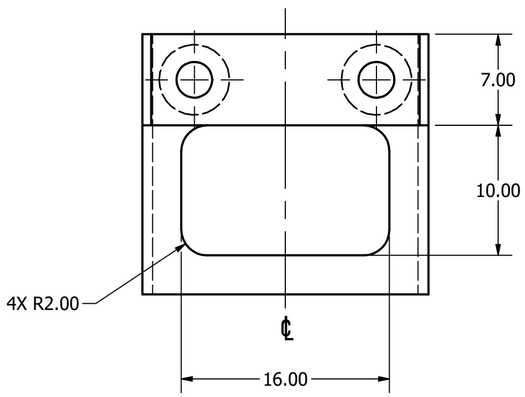








SECTION A-A



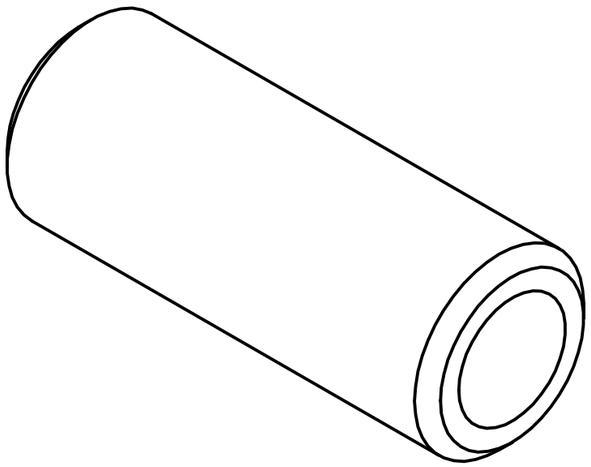
NOTES:

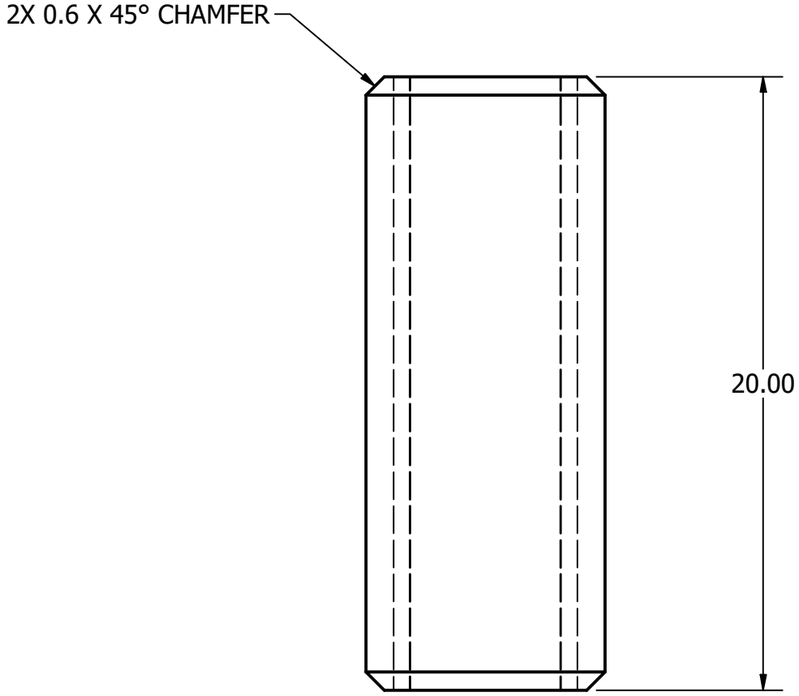
1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

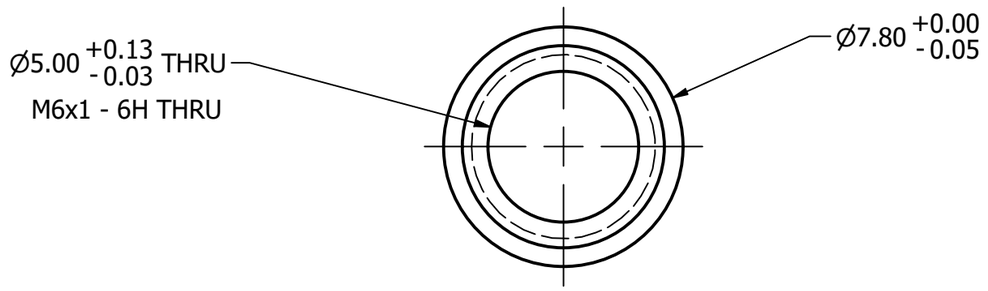
PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS TOLERANCES ARE: DECIMAL: X ±.5, X.X ±.2, X.XX ±.1; MACHINED ANGLES ±.5° ASME Y14.5M - 1994 DO NOT SCALE DRAWING	VEHICLE RESEARCH and TEST CENTER		NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
	APPROVALS	DATE	STRUCTURAL REPLACEMENT, CONNECTOR BLOCK
MATERIAL: 6061-T6 ALUMINUM	DRAWN: ghayden	11/13/2017	
HEAT TREAT	CHECKED		
FINISH: CLEAR ANODIZE	ENG		
	APPROVED		
THIRD ANGLE PROJECTION	SIZE: A2	DRAWING NUMBER: 474-6113	REV: 1
	SCALE: 3:1	SHEET: 1 OF 1	

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE TO PROTOTYPE	GCH		11/14/17







PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: Acetal Resin, White
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: ghayden	11/13/2017
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

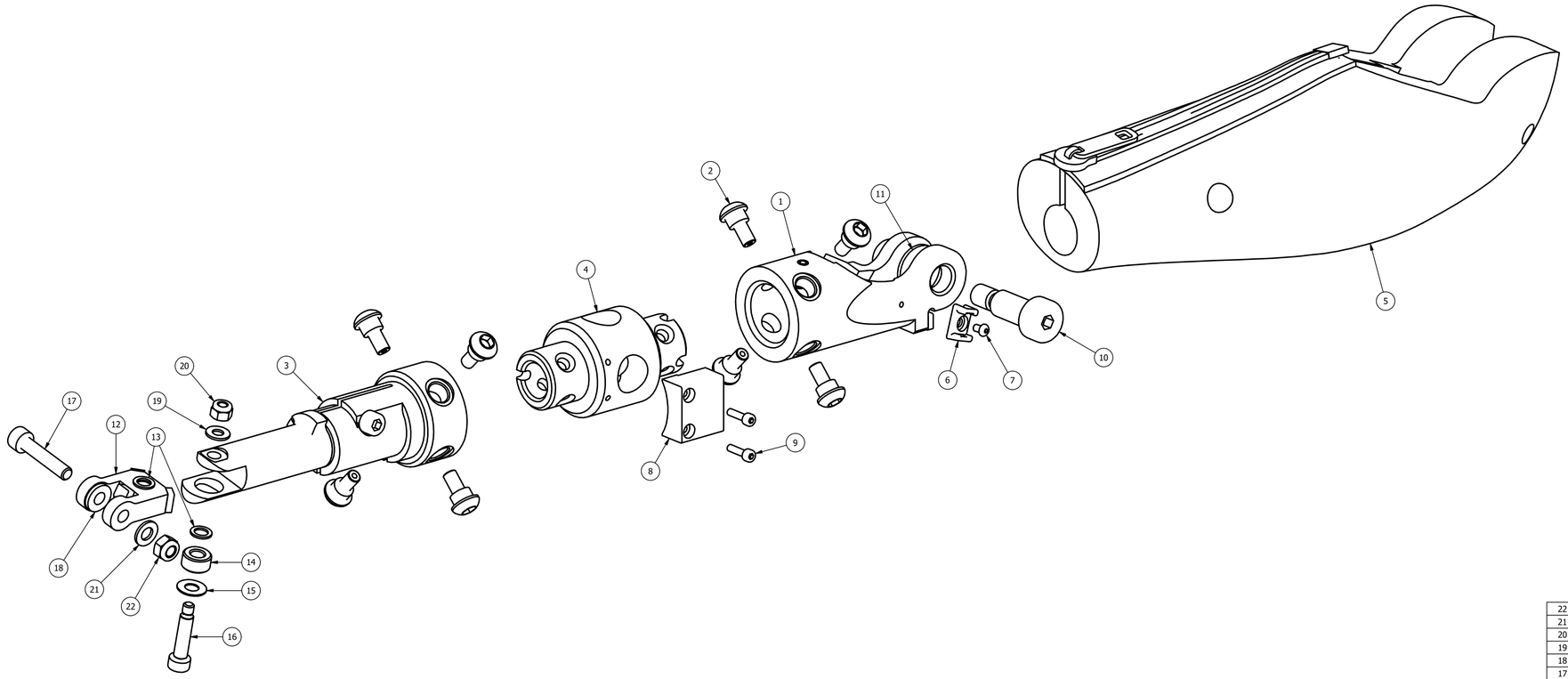
SLEEVE, ARM BOLT

THIRD ANGLE PROJECTION

SIZE: A3 | DRAWING NUMBER: 474-6111 | REV: 1

SCALE: 5:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AB	JW	05/06/16



ITEM	QTY	PART NUMBER	DESCRIPTION
22	1	5000522	M5 X 0.8 HEX LOCK NUT ZINC
21	1	5000566	M5 FLAT WASHER PLAIN ZINC
20	1	5000290	M4 X 0.7 HEX LOCK NUT ZINC
19	1	5000155	M4 FLAT WASHER PLAIN ZINC
18	1	6004820	BEARING, FLANGED 8mm OD X 5mm ID X 5mm LG
17	1	5000721	M5 X 0.8 X 25 LG. SHCS
16	1	5001483	M5 X 18 LG. SHSS SS
15	1	5001374	M5 WAVE WASHER SS
14	1	474-6705	WRIST INSERT
13	2	474-6706	WRIST WASHER
12	1	474-6707-1	WRIST ROTATOR CLEVIS, LEFT
11	1	474-6502	WASHER, UPPER-LOWER ARM
10	1	5001162	M10 X 20 LG. SHSS
9	2	5000456	M2.5 X 0.45 X 10 LG. SHCS
8	1	474-6113	STRUCTURAL REPLACEMENT, CONNECTOR BLOCK
7	1	5001305	M2.5 X 0.45 X 4 LG. BHCS
6	1	6002036	CABLE TIE MOUNT, #4 SCREW
5	1	474-6520-1	LOWER ARM FLESH, LEFT
4	1	474-6106	STRUCTURAL REPLACEMENT, UPPER-LOWER ARM LOAD CELL
3	1	474-6700-1	LOWER ARM AND WRIST ASSEMBLY, LEFT
2	8	W50-61042	MODIFIED BHSS M6 THREAD
1	1	474-6501-1	PROXIMAL LOWER ARM TUBE, LEFT

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.2, X.X ±.1, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

LOWER ARM ASSEMBLY, LEFT

	APPROVALS	DATE
DRAWN	A. Barchock	5/6/2016
CHECKED		
ENG		
APPROVED		

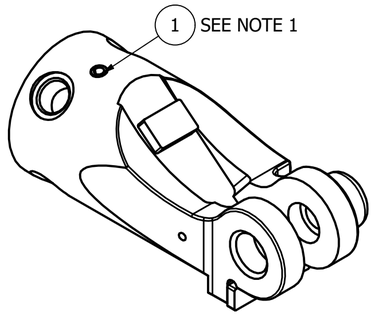
MATERIAL
HEAT TREAT
FINISH

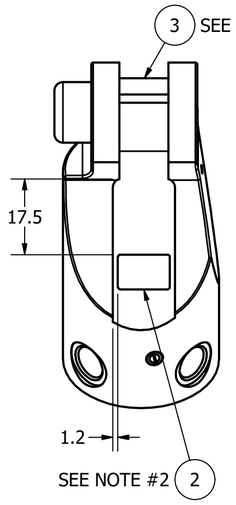
THIRD ANGLE PROJECTION

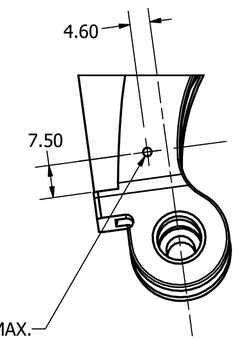
SIZE A1 | DRAWING NUMBER 474-6500-1 | REV 1

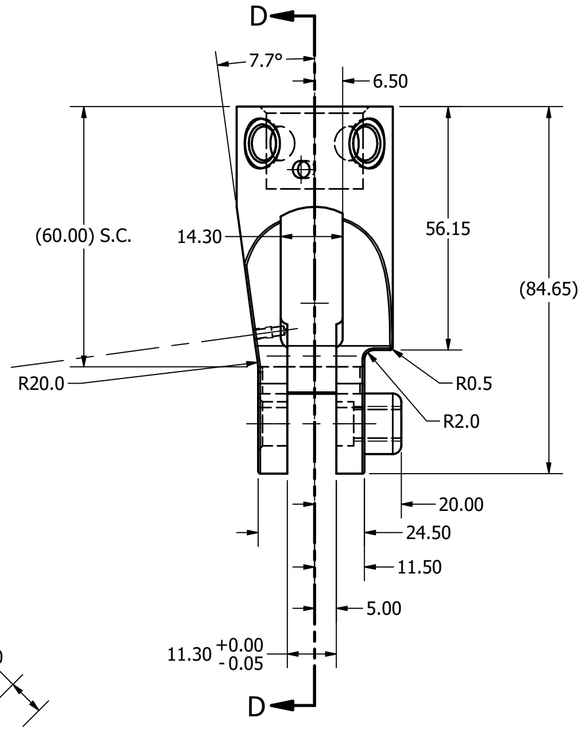
SCALE: 1:1 | SHEET 1 OF 1

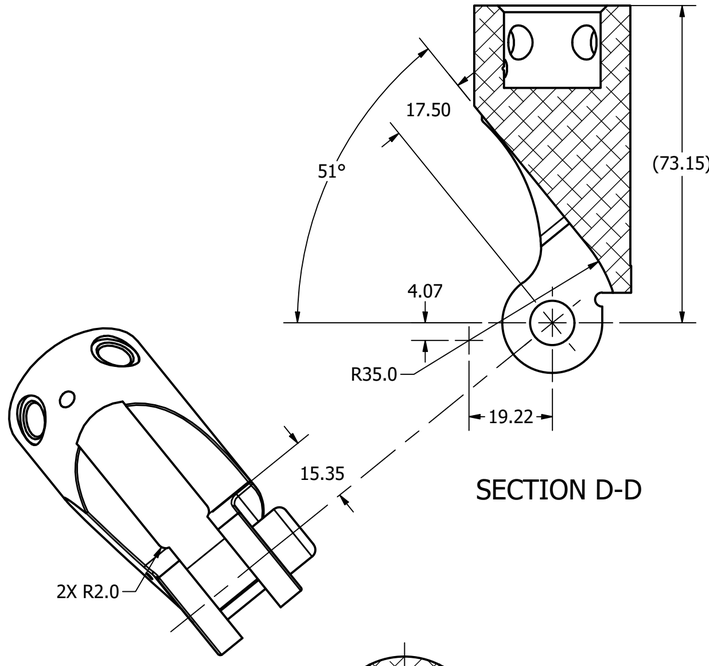
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	3/9/2016



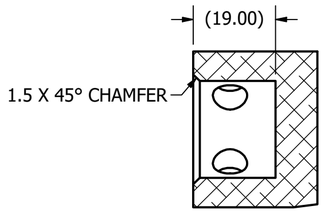




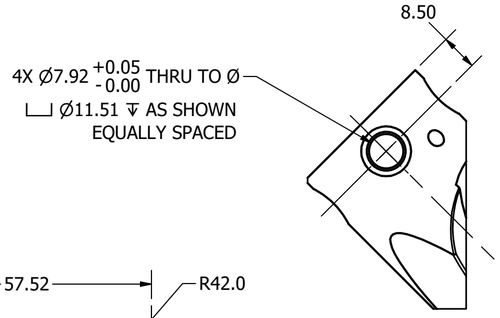


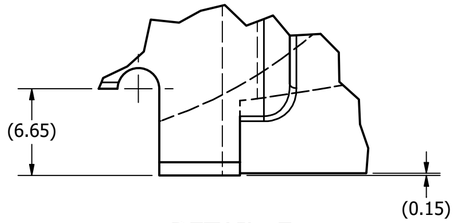


SECTION D-D

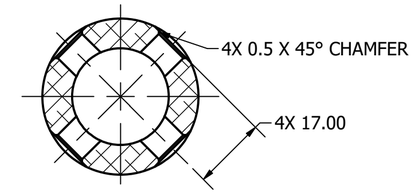


SECTION B-B

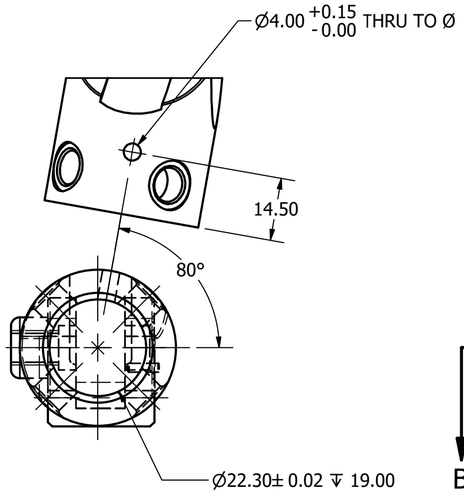


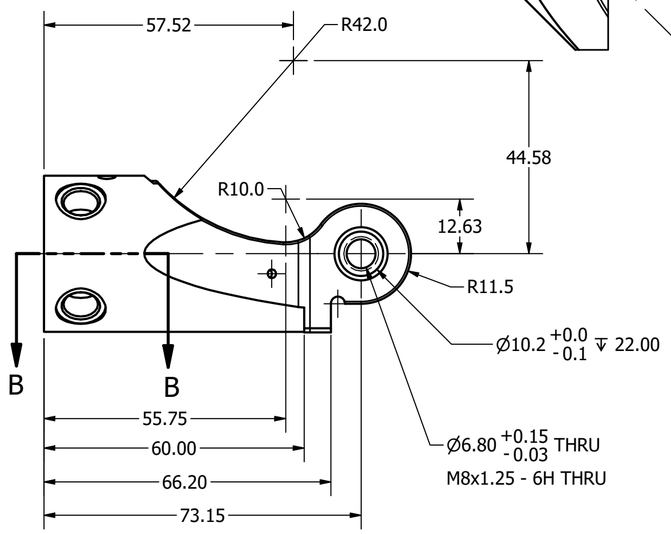


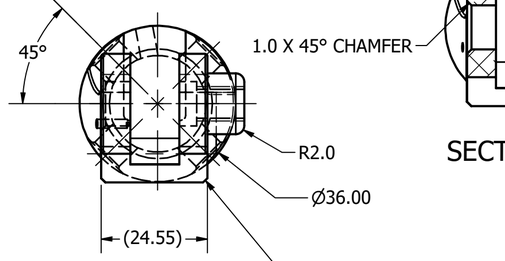
DETAIL E
SCALE 3 : 1

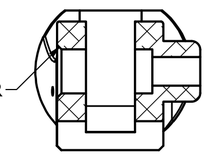


SECTION A-A

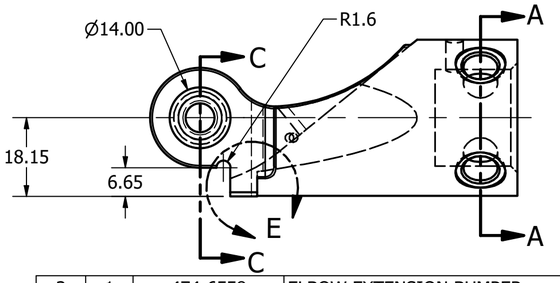








SECTION C-C



ITEM	QTY	PART NUMBER	DESCRIPTION
3	1	474-6558	ELBOW EXTENSION BUMPER
2	1	474-6559	ELBOW FLEXION BUMPER
1	1	5000182	M4 X 10 LG. ROLL PIN

PARTS LIST

NOTES:

1. INSTALL FLUSH TO OUTSIDE SURFACE AFTER ANODIZE.
2. PREPARE FACES AND ATTACH BUMPERS WITH ADHESIVE WHERE SHOWN.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ∠C ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: ghayden	3/9/2016
CHECKED:	
ENG:	
APPROVED:	

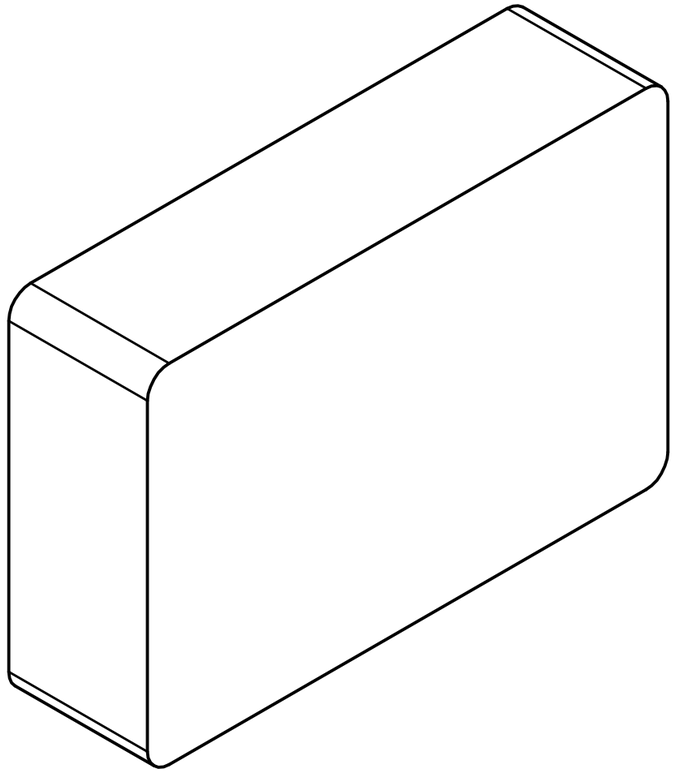
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

PROXIMAL LOWER ARM TUBE, LEFT

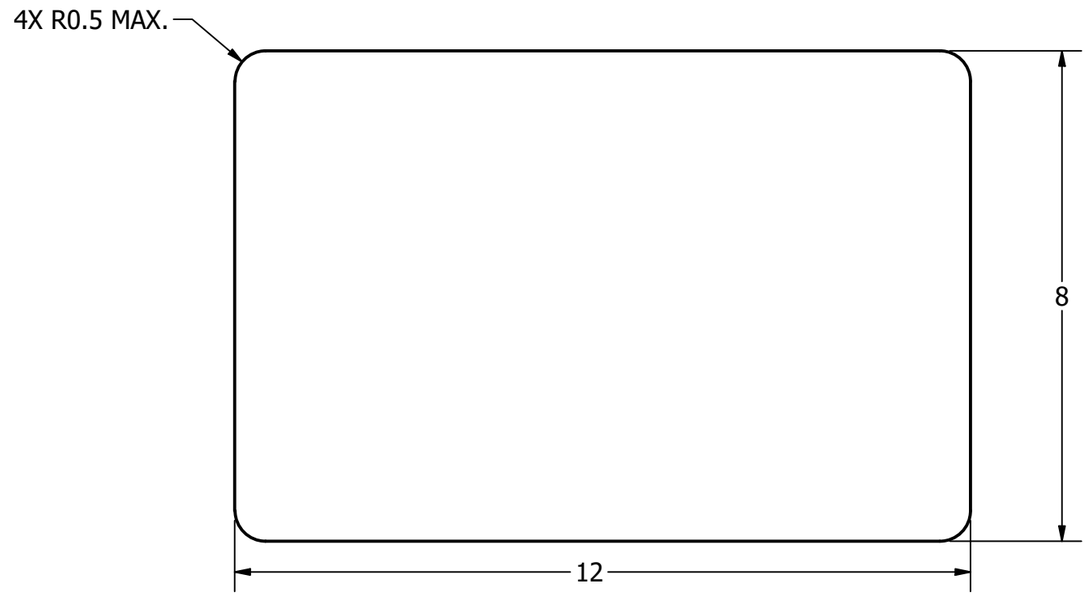
THIRD ANGLE PROJECTION

SIZE: A2 | DRAWING NUMBER: 474-6501-1 | REV: 1
SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE TO PROTOTYPE	GCH		2/25/2016







NOTES:

1. MATERIAL: NATURAL RUBBER
   COLOR: BLACK
   DUROMETER: 55 ±10 SHORE "A"
2. REMOVE ALL MOLD FLASHING
3. ALL MOLD DIMENSION TOLERANCE
   +1%/-2% BUT NO SMALLER THAN 0.5mm.
4. NO SPLIT OR DEFECTS ARE ALLOWED IN THE
   RUBBER MOLDING

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ±.5, ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTES
HEAT TREAT:
FINISH:

APPROVALS	DATE
DRAWN: ghayden	2/25/2016
CHECKED:	
ENG:	
APPROVED:	

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

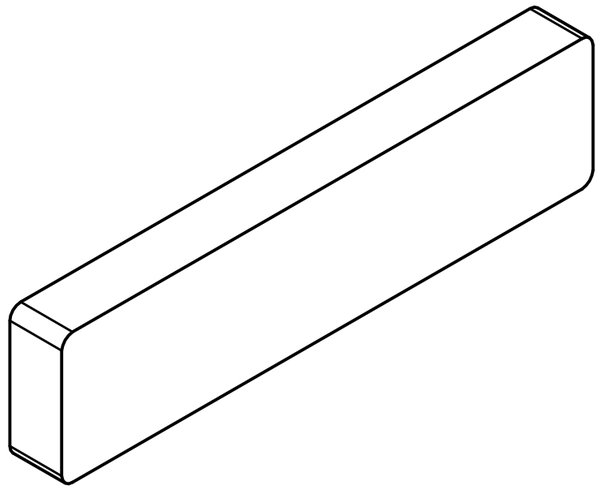
ELBOW FLEXION BUMPER

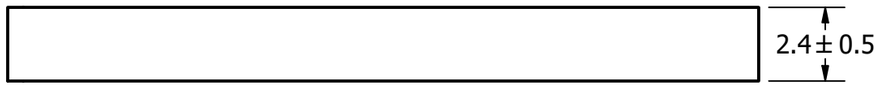
THIRD ANGLE PROJECTION

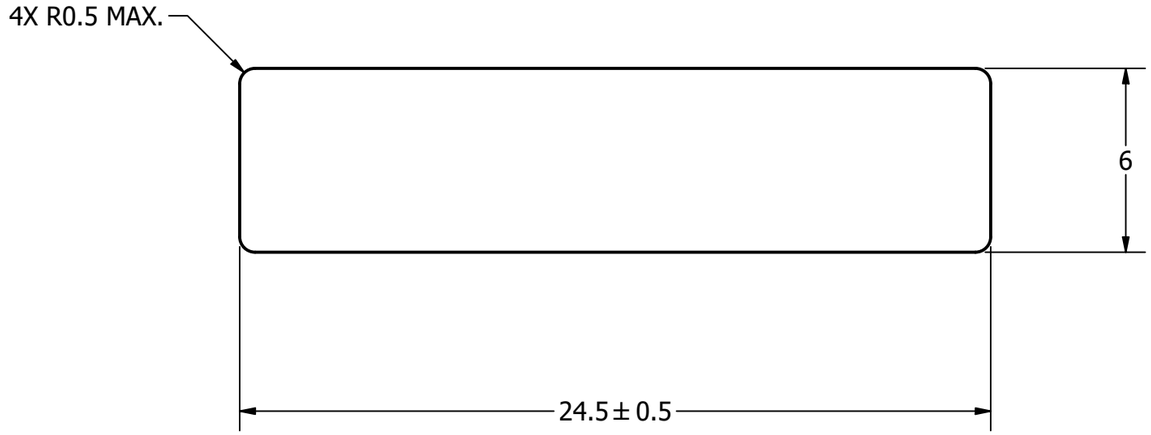
SIZE: A3 | DRAWING NUMBER: 474-6559 | REV: 1

SCALE: 10:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE TO PROTOTYPE	GCH		2/25/2016







NOTES:

1. MATERIAL: NATURAL RUBBER
   COLOR: BLACK
   DUROMETER: 55 ±10 SHORE "A"
2. REMOVE ALL MOLD FLASHING
3. ALL MOLD DIMENSION TOLERANCE
   +1%/-2% BUT NO SMALLER
   THAN 0.5mm.
4. NO SPLIT OR DEFECTS ARE ALLOWED
   IN THE RUBBER MOLDING.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ±.5, ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTES
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: ghayden	2/25/2016
CHECKED:	
ENG:	
APPROVED:	

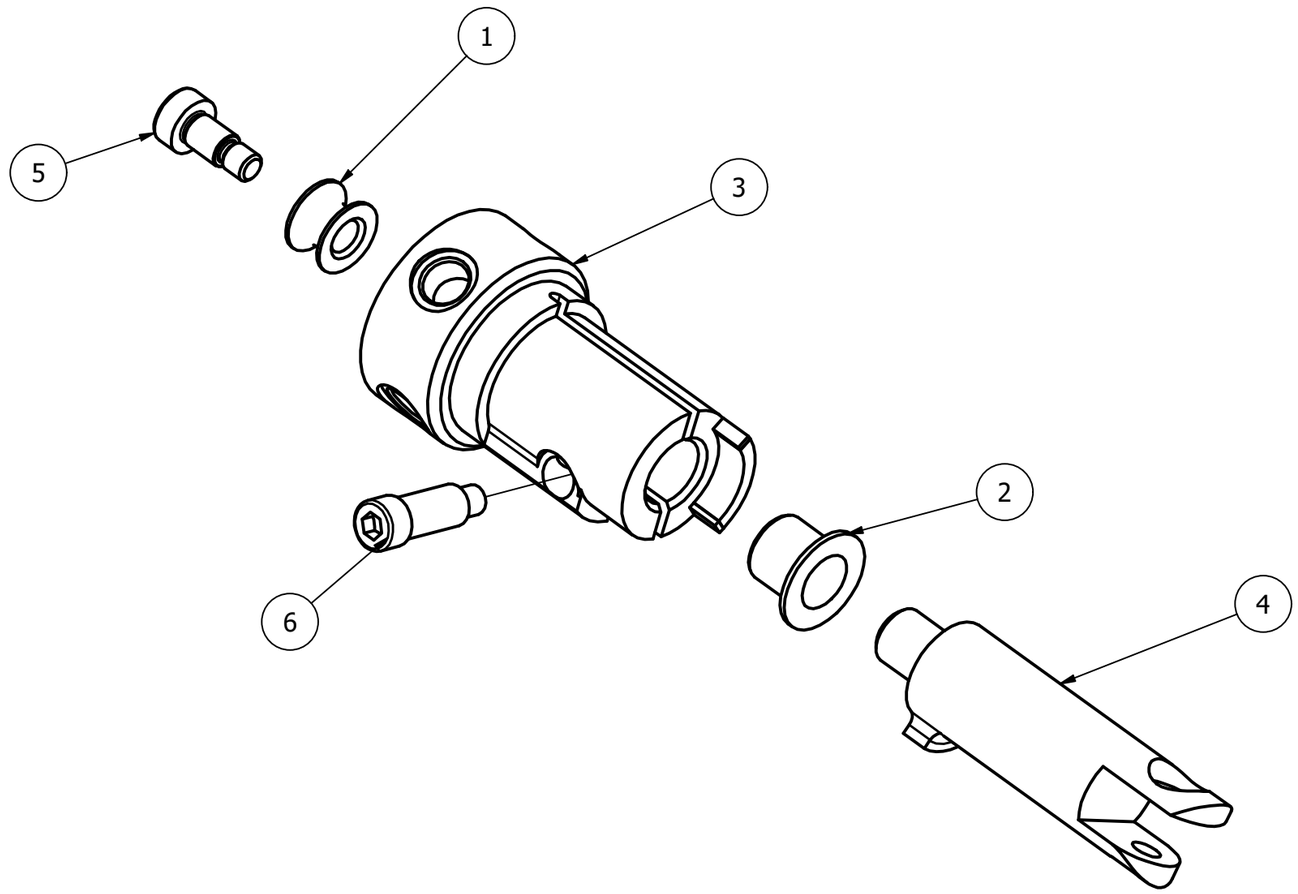
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

ELBOW EXTENSION BUMPER

THIRD ANGLE PROJECTION

SIZE: A3 | DRAWING NUMBER: 474-6558 | REV: 1
SCALE: 5:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCG	JW	3/7/2016



ITEM	QTY	PART NUMBER	DESCRIPTION
6	1	474-6704	DISTAL LOWER ARM BOLT ASSEMBLY
5	1	5000922	M6 X 8 LG. SHSS SS
4	1	474-6702-1	WRIST INSERT, LEFT
3	1	474-6701-1	DISTAL LOWER ARM TUBE, LEFT
2	1	6004601	BEARING, FLANGE, 12mm OD X 10mm ID X 12mm LG
1	1	474-6553	WRIST ROTATION GUIDE

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN ghayden	3/7/2016
CHECKED	
ENG	
APPROVED	

MATERIAL
HEAT TREAT
FINISH

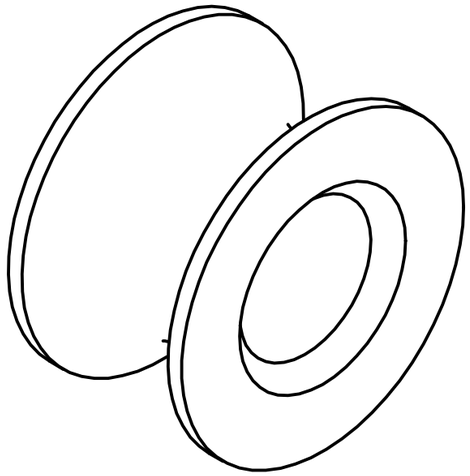
LOWER ARM AND WRIST ASSEMBLY, LEFT

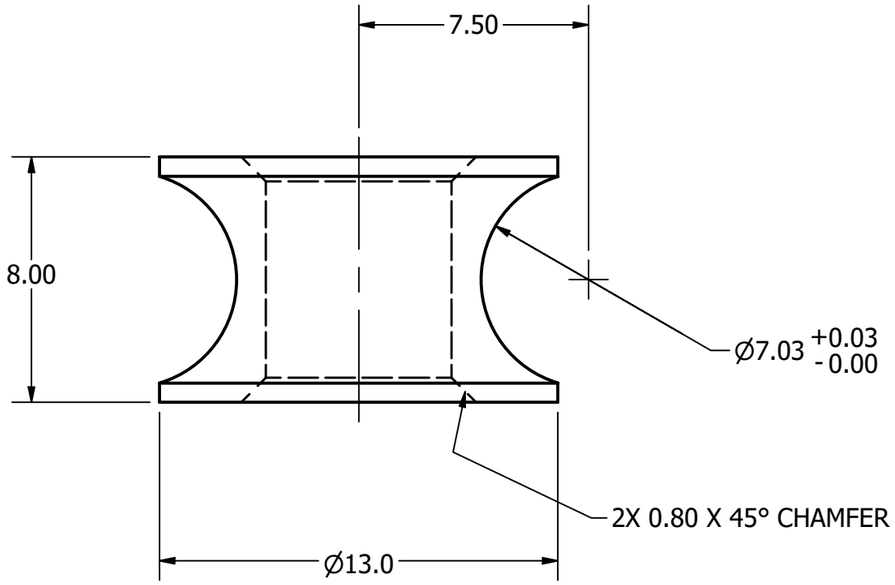
THIRD ANGLE PROJECTION

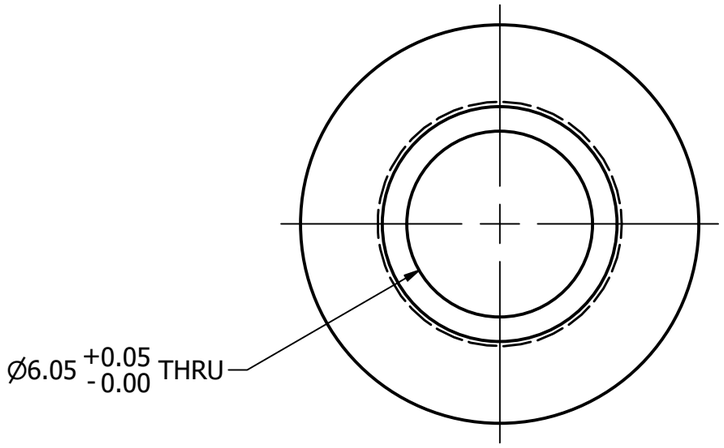
SIZE A3 | DRAWING NUMBER 474-6700-1 | REV 1

SCALE: 1:1 | SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE TO PROTOTYPE	GCH		2/26/2016







PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED √F | ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 304 STAINLESS STEEL
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: ghayden	2/26/2016
CHECKED:	
ENG:	
APPROVED:	

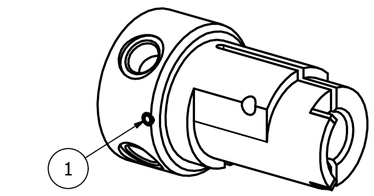
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

WRIST ROTATION GUIDE

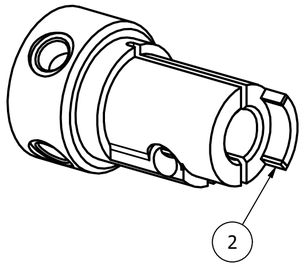
THIRD ANGLE PROJECTION

SIZE: A3 | DRAWING NUMBER: 474-6553 | REV: 1
SCALE: 5:1 | SHEET: 1 OF 1

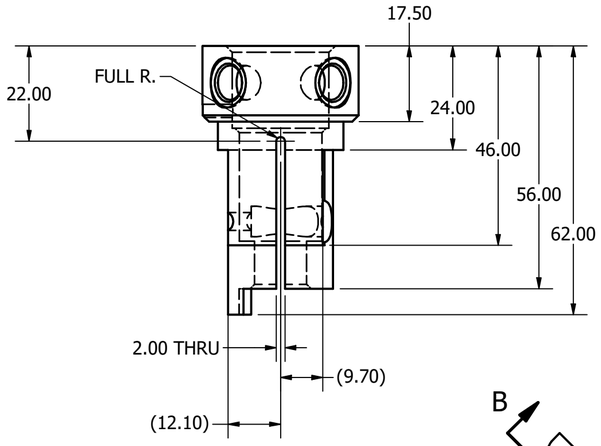
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	3/9/2016

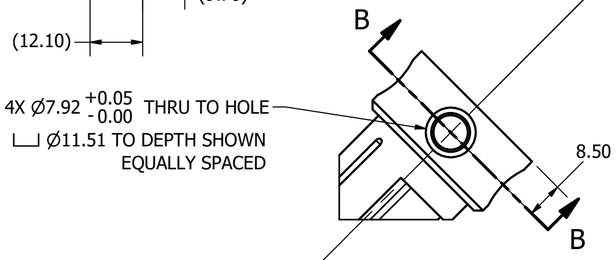


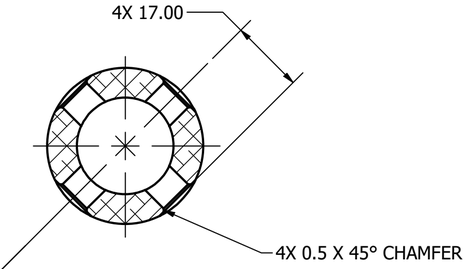
SEE NOTE #1



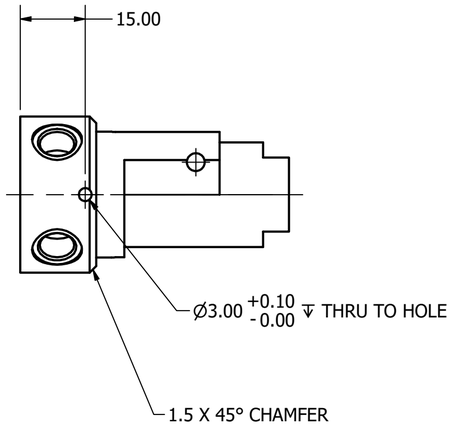
SEE NOTE #2

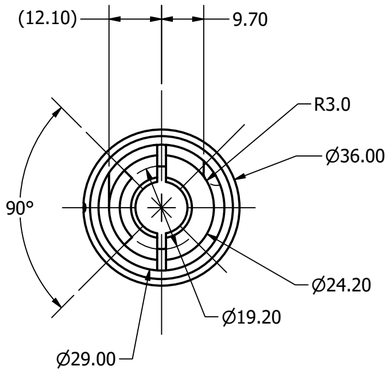


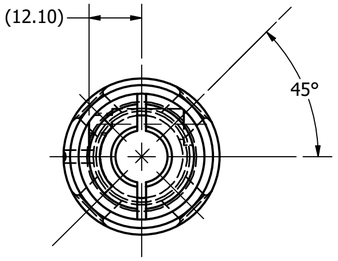


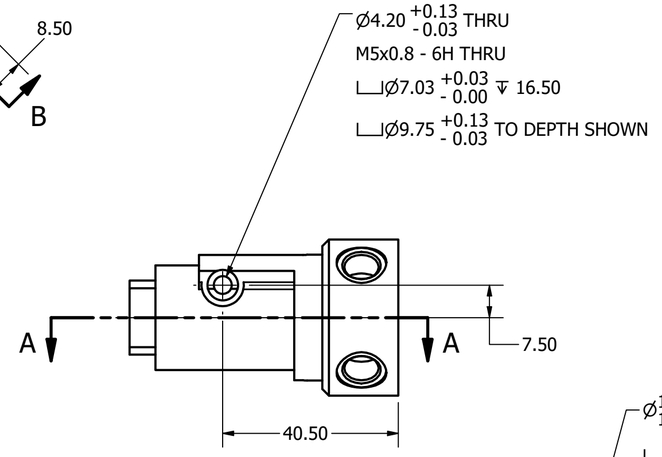


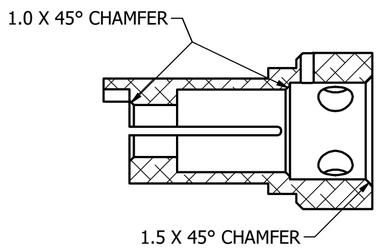
SECTION B-B

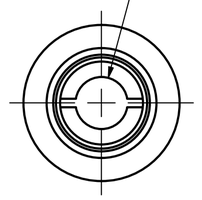












SECTION A-A

ITEM	QTY	PART NUMBER	DESCRIPTION
2	2	474-6557	WRIST ROTATION BUMPER
1	1	5000199	M3 X 10 LG. ROLL PIN SS

PARTS LIST

NOTES:

1. INSTALL FLUSH TO OUTSIDE SURFACE AFTER ANODIZE.
2. BOND 474-6557 TO SURFACE AS SHOWN.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

APPROVALS	DATE
DRAWN: ghayden	3/9/2016
CHECKED	
ENG	
APPROVED	

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

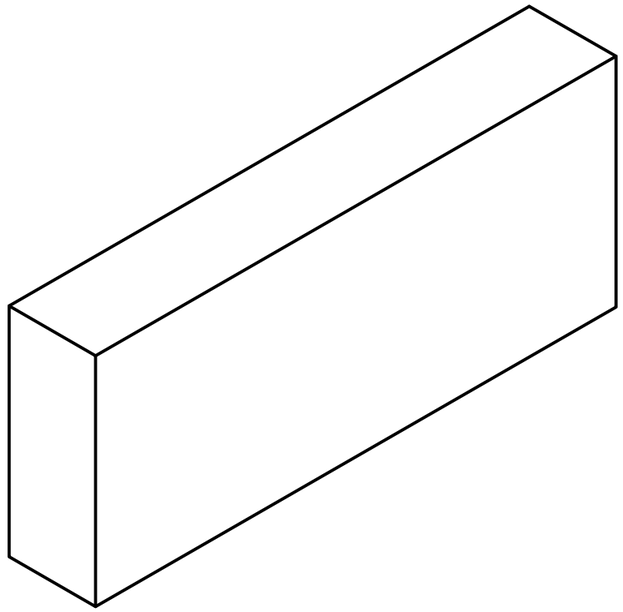
DISTAL LOWER ARM TUBE, LEFT

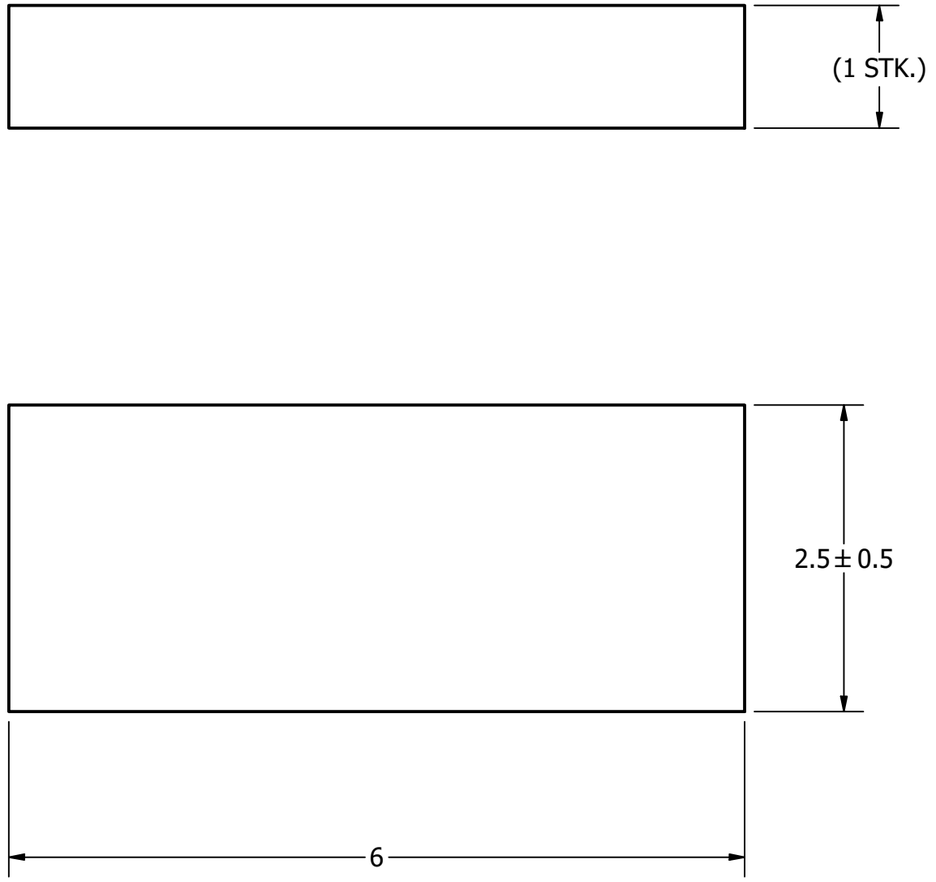
THIRD ANGLE PROJECTION

SIZE: A2 | DRAWING NUMBER: 474-6701-1 | REV: 1

SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE TO PROTOTYPE	GCH		2/25/2016





NOTES:

1. MATERIAL: 1mm THICK NEOPRENE RUBBER
   COLOR: BLACK
   DUROMETER: 60 ±5 SHORE "A"

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED √ | ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTES
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: ghayden	2/25/2017
CHECKED:	
ENG:	
APPROVED:	

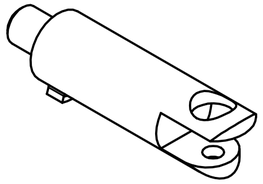
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

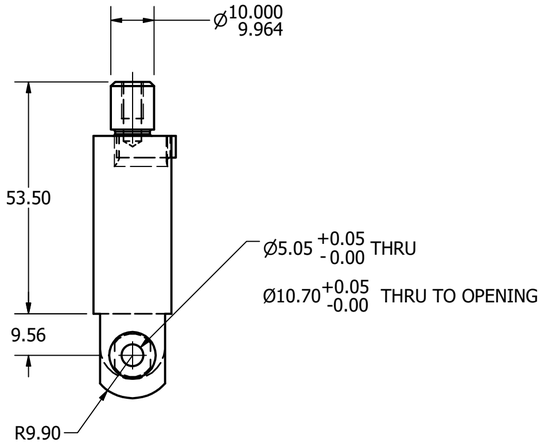
WRIST ROTATION BUMPER

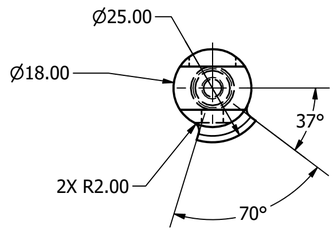
THIRD ANGLE PROJECTION

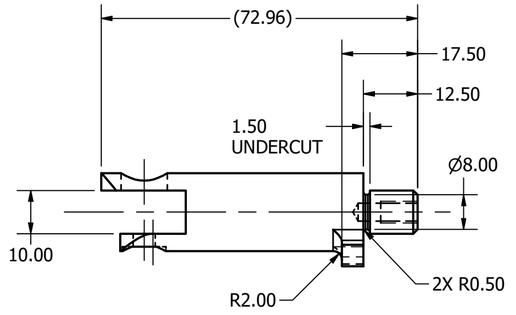
SIZE: A3 | DRAWING NUMBER: 474-6557 | REV: 1
SCALE: 20:1 | SHEET: 1 OF 1

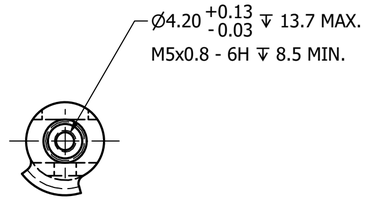
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE TO PROTOTYPE	GCH	JW	3/3/2016

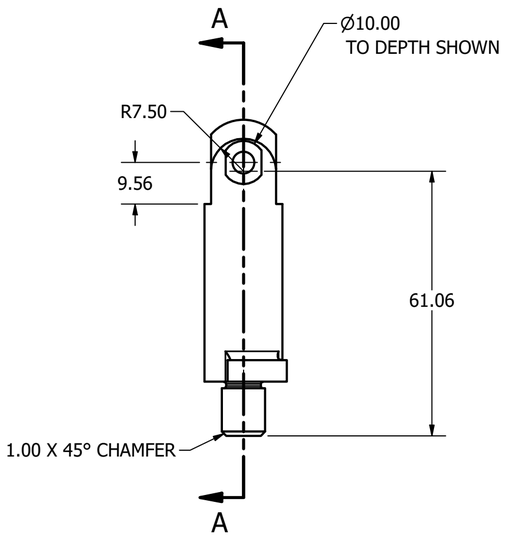


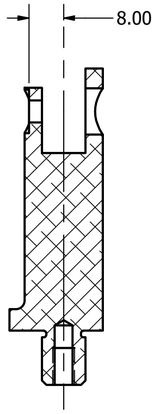












SECTION A-A

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: ghayden	3/3/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

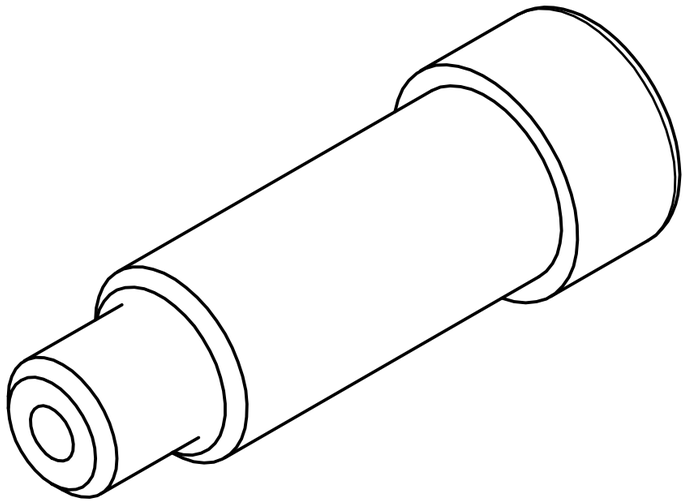
WRIST INSERT, LEFT

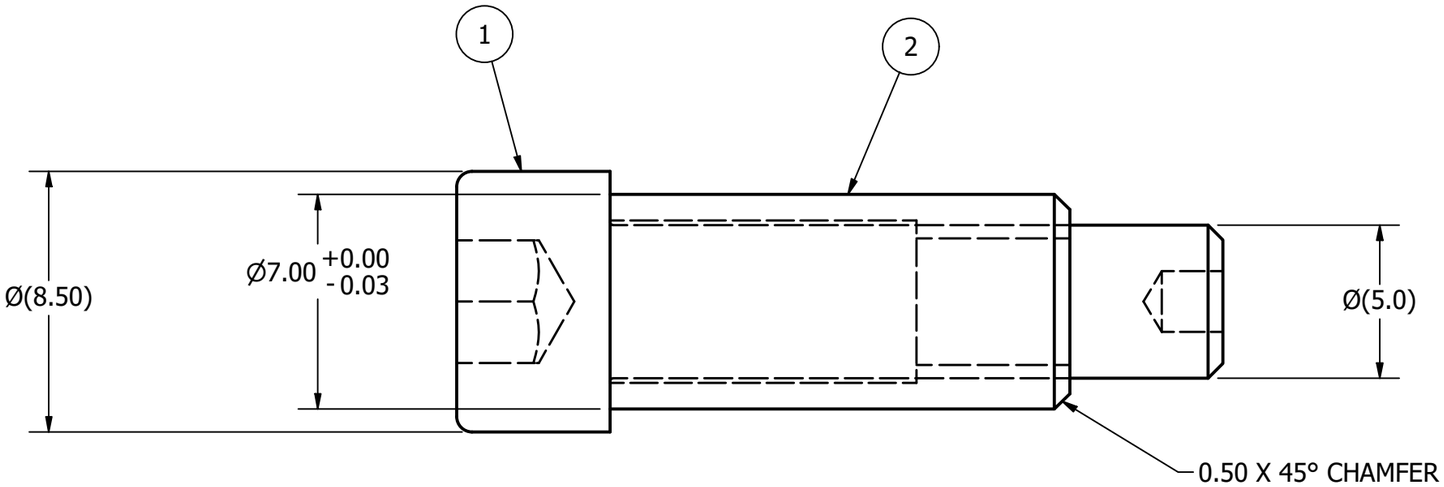
THIRD ANGLE PROJECTION

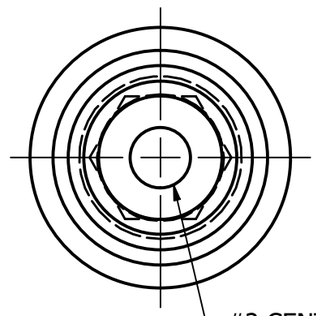
SIZE: A2 | DRAWING NUMBER: 474-6702-1 | REV: 1

SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
75047	1	RELEASE TO PROTOTYPE	GCH		2/25/2016







ITEM	QTY	PART NUMBER	DESCRIPTION
2	1	474-6703	SLEEVE
1	1	5000371	M5 X 0.8 X 20 LG. SHCS

PARTS LIST

NOTES:

1. MACHINE Ø7.00 AFTER USING THREAD LOCKER TO BOND ITEM 2 (474-6703) TO ITEM 1 (5000371)

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN ghayden	2/25/2016
CHECKED	
ENG	
APPROVED	

MATERIAL
HEAT TREAT
FINISH

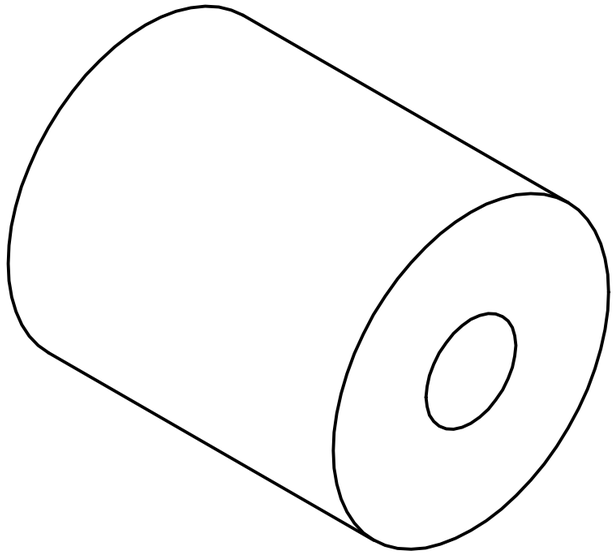
DISTAL LOWER ARM BOLT ASSEMBLY

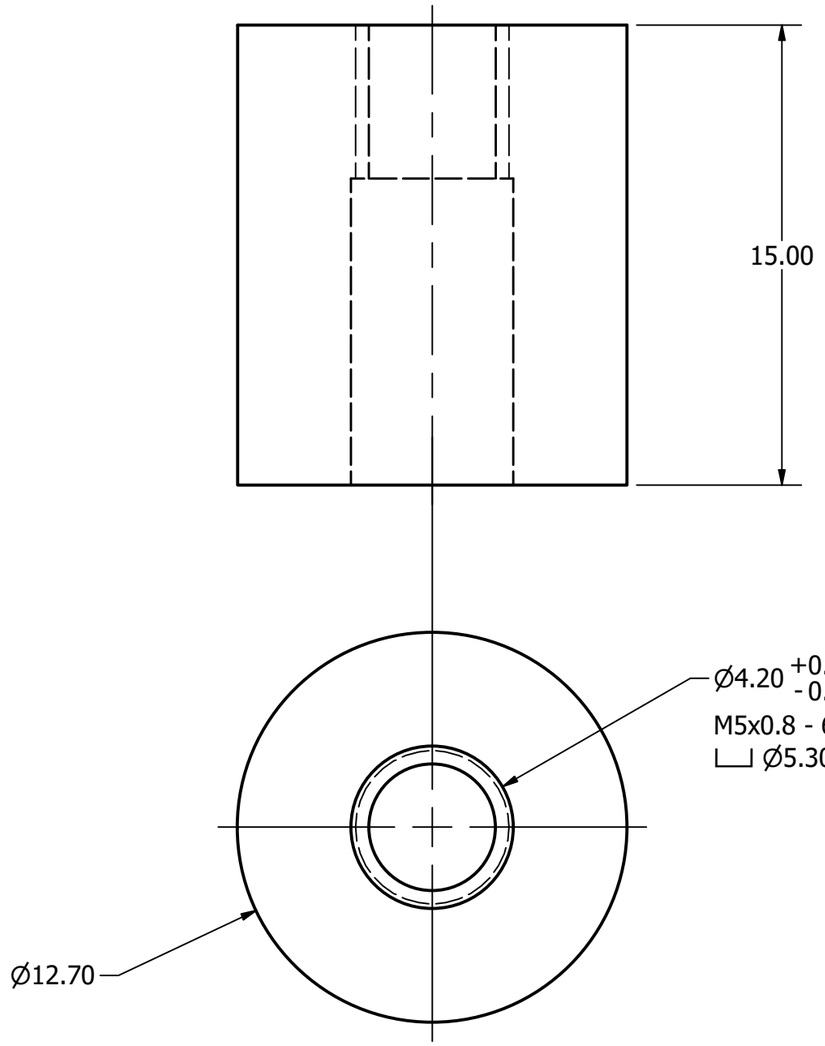
THIRD ANGLE PROJECTION

SIZE A3 | DRAWING NUMBER 474-6704 | REV 1

SCALE: 5:1 | SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE TO PROTOTYPE	GCH		2/25/2016





PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ±.5° | ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: ACETAL RESIN, WHITE
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: ghayden	2/25/2016
CHECKED:	
ENG:	
APPROVED:	

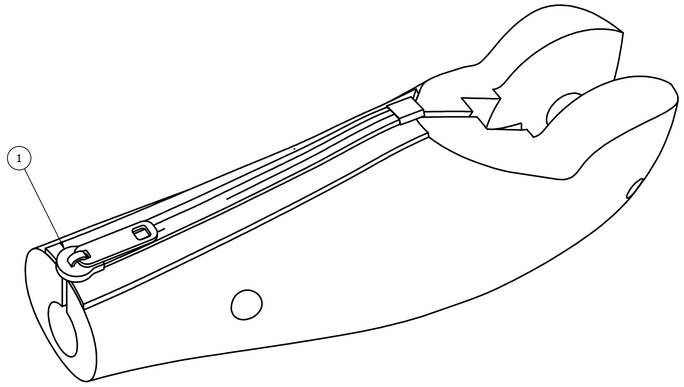
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

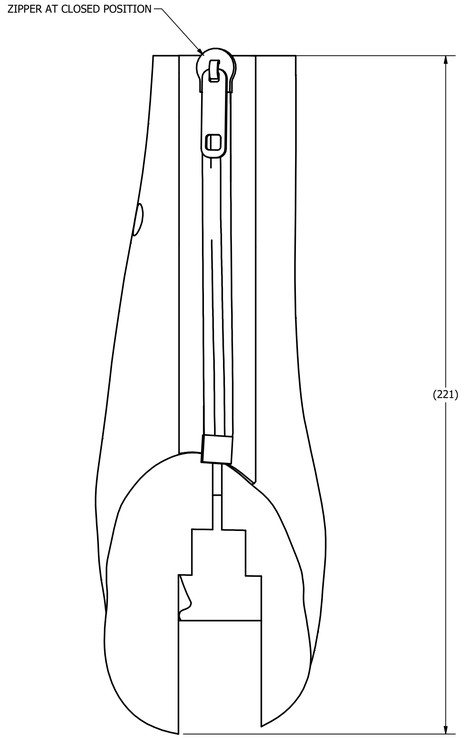
SLEEVE

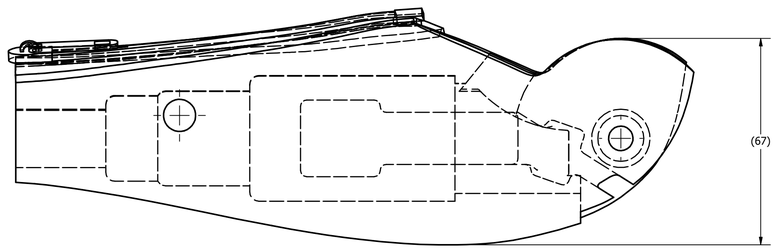
THIRD ANGLE PROJECTION

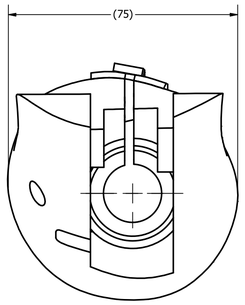
SIZE: A3 | DRAWING NUMBER: 474-6703 | REV: 1
SCALE: 5:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE TO PROTOTYPE	GCH	JW	3/8/2016









NOTES:

1. MATERIAL: SKIN: POLYURETHANE
   FOAM: POLYURETHANE

   COLOR: EURO BROWN
   DUROMETER: 30±5 SHORE A

2. REMOVE ALL MOLD FLASHING

3. ALL MOULD DIMENSION TOLERANCE +1%/-4% BUT NO SMALLER THAN 1mm

4. WEIGHT: 375 GRAMS - NOMINAL

PRELIMINARY DRAWING

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	474-6521	ZIPPER ASSEMBLY, LOWER ARM

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.2, X.X ±.1, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTE #1
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: ghayden	3/8/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

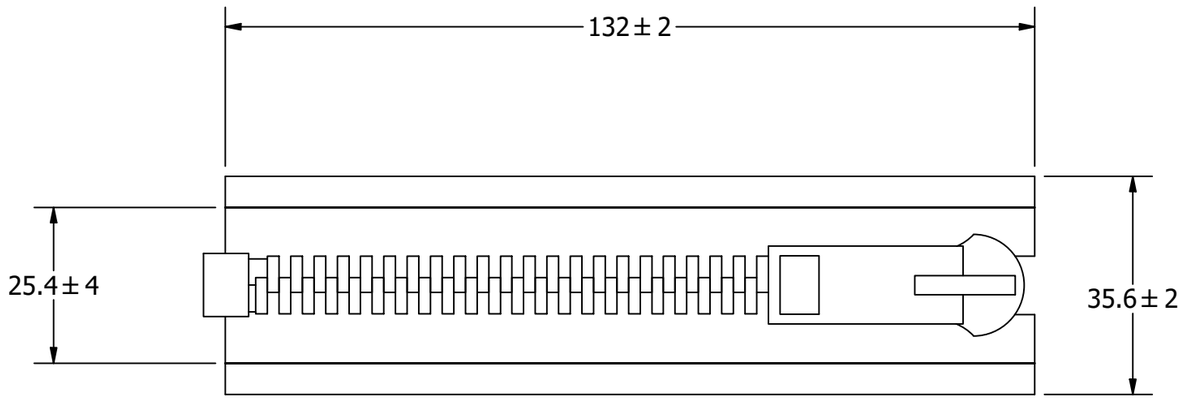
LOWER ARM FLESH, LEFT

THIRD ANGLE PROJECTION

SIZE: A1 | DRAWING NUMBER: 474-6520-1 | REV: 1

SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE TO PROTOTYPE	GCH	JW	3/8/2016



NOTES:

1. ALL BLACK #5 ZIPPER.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED
ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTES
HEAT TREAT:
FINISH:

*V*EHICLE *R*ESEARCH and *T*EST *C*ENTER

APPROVALS	DATE
DRAWN: jmcinnis	3/8/2016
CHECKED:	
ENG:	
APPROVED:	

DEPARTMENT OF TRANSPORTATION UNITED STATES OF AMERICA

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

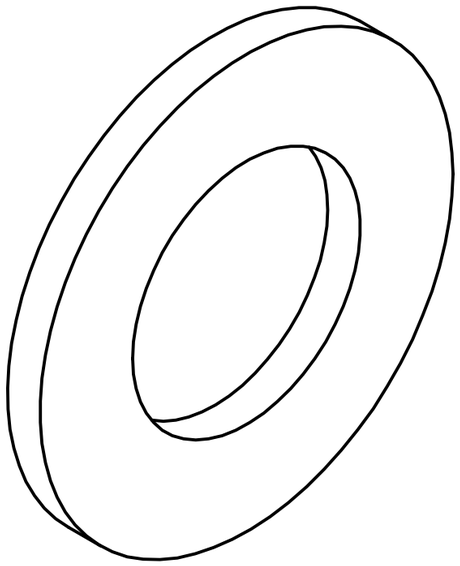
ZIPPER ASSEMBLY, LOWER ARM

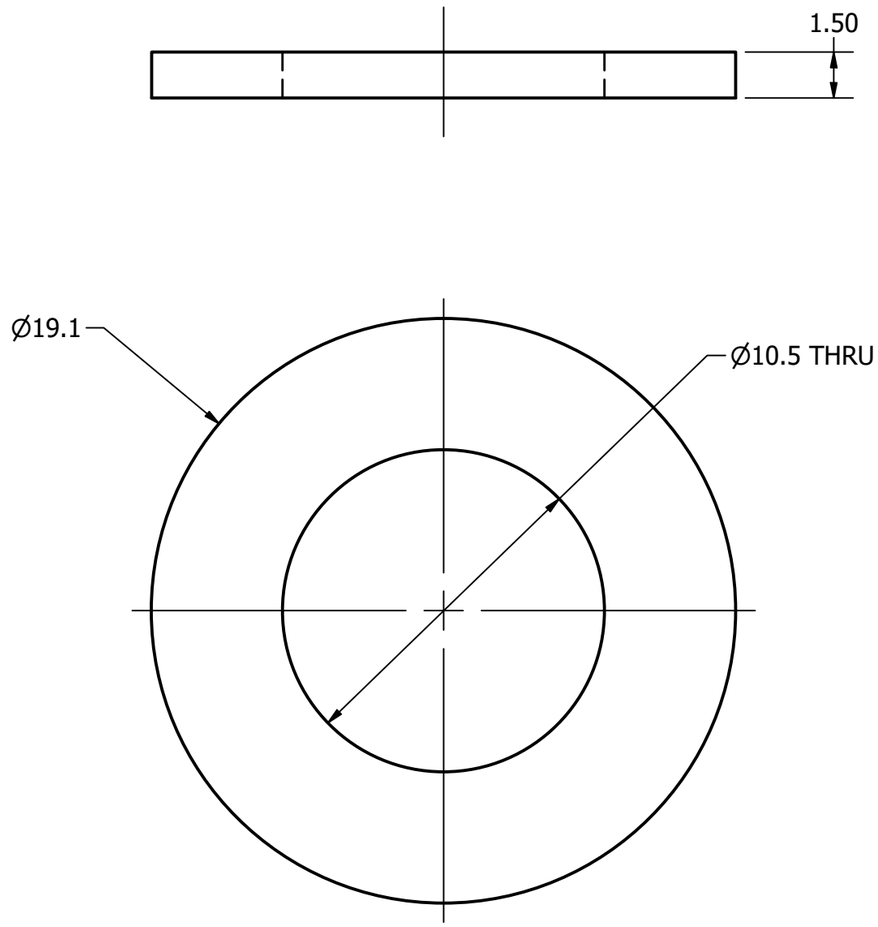
THIRD ANGLE PROJECTION

SIZE: A3 | DRAWING NUMBER: 474-6521 | REV: 1

SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE TO PROTOTYPE	GCH		2/26/2016





PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: TEFLON
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: ghayden	2/26/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

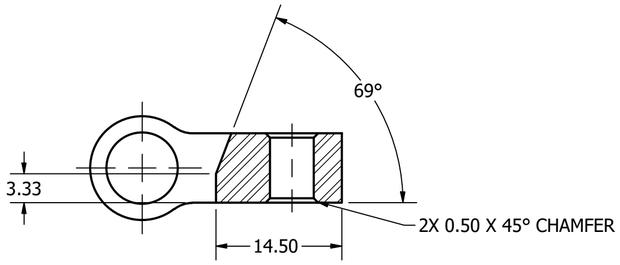
WASHER, UPPER-LOWER ARM

THIRD ANGLE PROJECTION

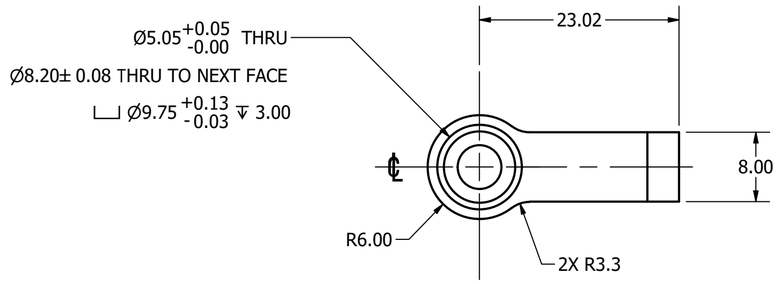
SIZE: A3 | DRAWING NUMBER: 474-6502 | REV: 1

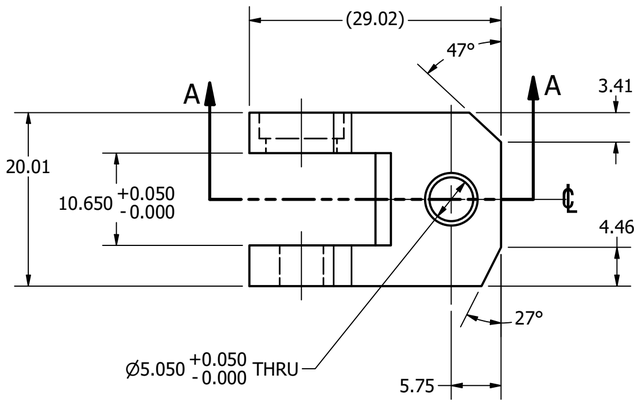
SCALE: 5:1 | SHEET: 1 OF 1

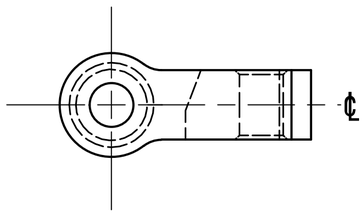
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AB	JW	05/05/16

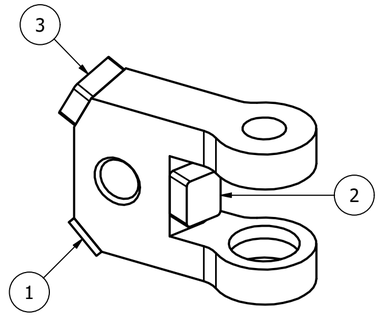


SECTION A-A









SEE NOTE #3 FOR
ITEMS #1 THRU 3

ITEM	QTY	PART NUMBER	DESCRIPTION
3	1	474-6901	WRIST BUMPER
2	1	474-6723	WRIST BUMPER - EXTENSION
1	1	474-6721	WRIST BUMPER - RADIUS

PARTS LIST

NOTES:

1. DIMENSIONS ARE SYMMETRICAL ABOUT ℄ UNLESS OTHERWISE SPECIFIED.
2. BUMPERS REMOVED FROM SOME VIEWS FOR CLARITY.
3. PREP FACES & ATTACH BUMPERS WITH ADHESIVE CENTRAL TO ATTACHMENT FACES AFTER PLATING.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 4140 STEEL
HEAT TREAT: Rc 28-32
FINISH: 0.008mm ELECTROLESS NICKEL PLATE PER SIDE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: A. Barchock	5/5/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

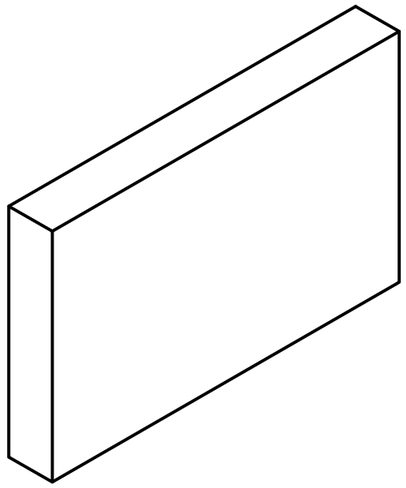
WRIST ROTATOR CLEVIS, LEFT

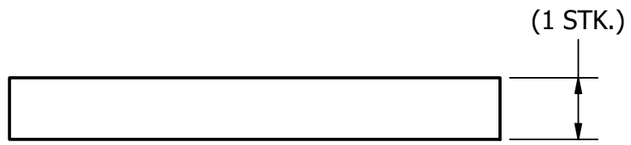
THIRD ANGLE PROJECTION

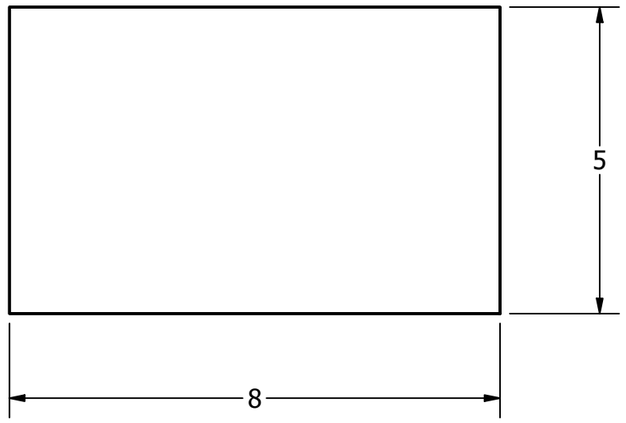
SIZE: A2 | DRAWING NUMBER: 474-6707-1 | REV: 1

SCALE: 2:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE TO PROTOTYPE	GCH		2/25/2016







NOTES:

1. MATERIAL: 1mm THICK NEOPRENE RUBBER
   COLOR: BLACK
   DUROMETER: 60 ±5 SHORE "A"

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ±.5 | ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTES
HEAT TREAT:
FINISH:

APPROVALS	DATE
DRAWN: ghayden	2/25/2016
CHECKED:	
ENG:	
APPROVED:	

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

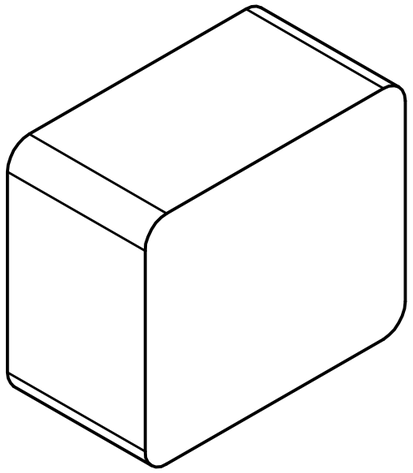
WRIST BUMPER - RADIUS

THIRD ANGLE PROJECTION

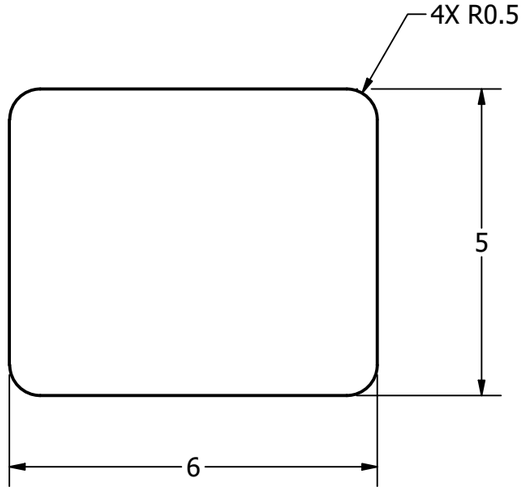
SIZE: A3 | DRAWING NUMBER: 474-6721 | REV: 1

SCALE: 10:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE TO PROTOTYPE	GCH		2/25/2016







NOTES:

1. MATERIAL: NATURAL RUBBER
   COLOR: BLACK
   DUROMETER: 55 ±10 SHORE "A"
2. REMOVE ALL MOLD FLASHING
3. ALL MOULD DIMENSION TOLERANCE +1%/-2%
   BUT NO SMALLER THAN 0.5mm
4. NO SPLIT OR DEFECTS ARE ALLOWED
   IN THE RUBBER MOLDING

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTES
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: ghayden	2/25/2016
CHECKED:	
ENG:	
APPROVED:	

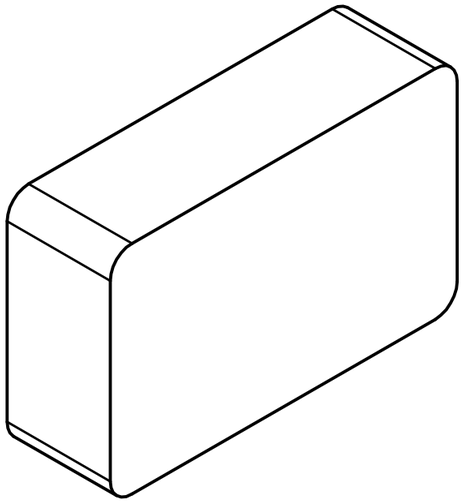
THIRD ANGLE PROJECTION

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

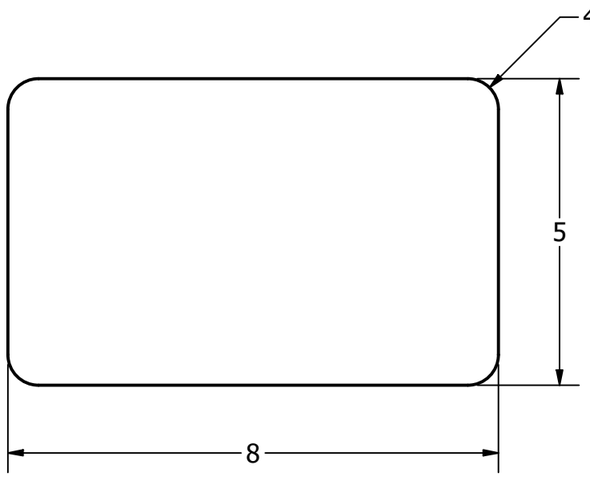
WRIST BUMPER - EXTENSION

SIZE: A3 | DRAWING NUMBER: 474-6723 | REV: 1
SCALE: 10:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE TO PROTOTYPE	GCH		2/25/2016







NOTES:

1. MATERIAL: NATURAL RUBBER
   COLOR: BLACK
   DUROMETER: 55 ±10 SHORE "A"
2. REMOVE ALL MOLD FLASHING
3. ALL MOULD DIMENSION TOLERANCE +1%/-2%
   BUT NO SMALLER THAN 0.5mm
4. NO SPLIT OR DEFECTS ARE ALLOWED
   IN THE RUBBER MOLDING

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTES
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: ghayden	2/25/2016
CHECKED:	
ENG:	
APPROVED:	

DEPARTMENT OF TRANSPORTATION UNITED STATES OF AMERICA

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

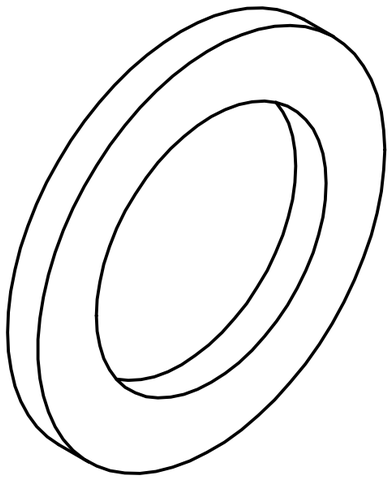
WRIST BUMPER

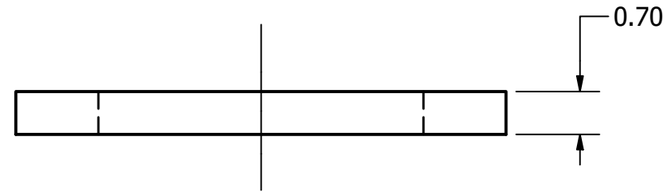
THIRD ANGLE PROJECTION

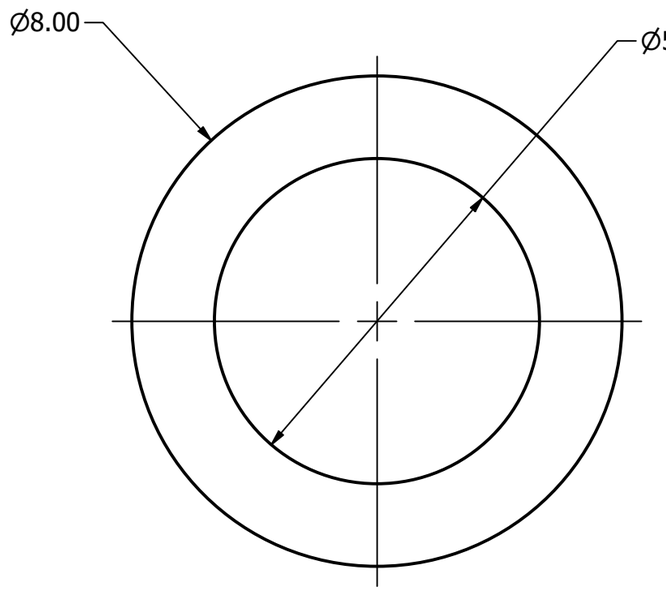
SIZE: A3 | DRAWING NUMBER: 474-6901 | REV: 1

SCALE: 10:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE TO PROTOTYPE	GCH		11/13/2017







PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

*V*EHICLE *R*ESEARCH and *T*EST *C*ENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

WRIST WASHER

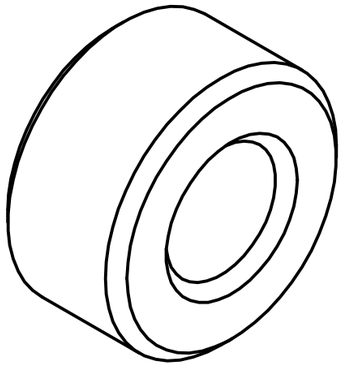
	APPROVALS	DATE
DRAWN	ghayden	2/25/2016
CHECKED		
ENG		
APPROVED		

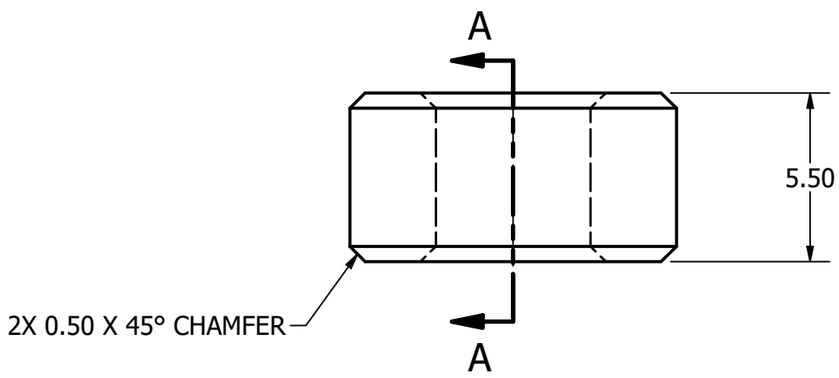
MATERIAL: ACETAL RESIN, BLACK
HEAT TREAT:
FINISH:

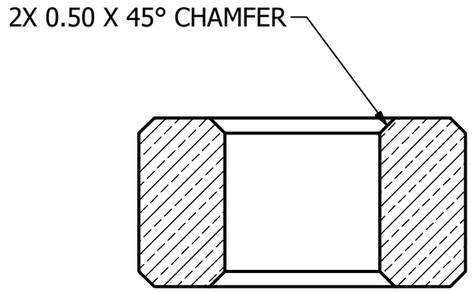
THIRD ANGLE PROJECTION

SIZE: A3 | DRAWING NUMBER: 474-6706 | REV: 1
SCALE: 10:1 | SHEET: 1 OF 1

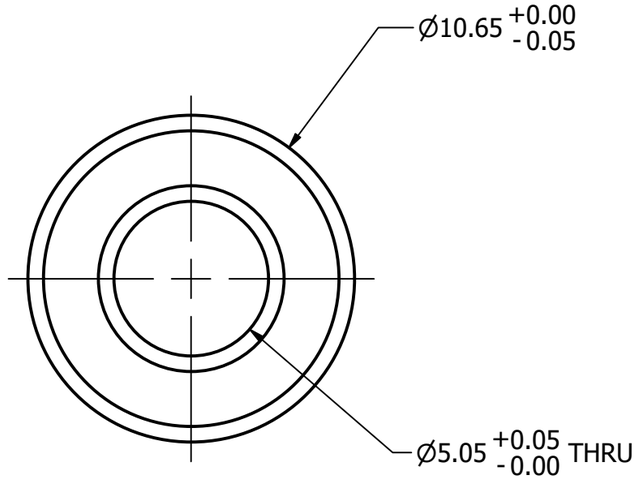
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE TO PROTOTYPE	GCH		2/25/2016







SECTION A-A



PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: Brass, Soft Yellow
HEAT TREAT:
FINISH:

*V*EHICLE *R*ESEARCH and *T*EST *C*ENTER

APPROVALS	DATE
DRAWN: ghayden	2/25/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

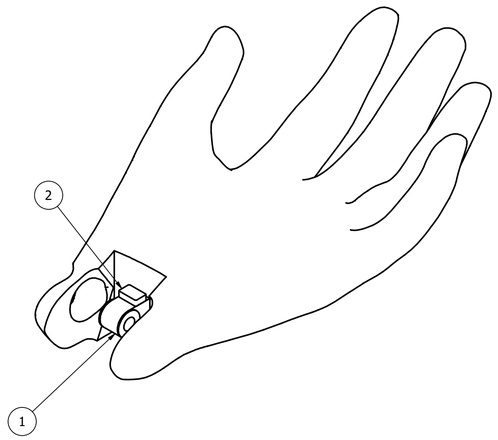
WRIST INSERT

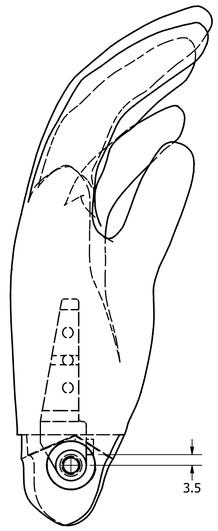
THIRD ANGLE PROJECTION

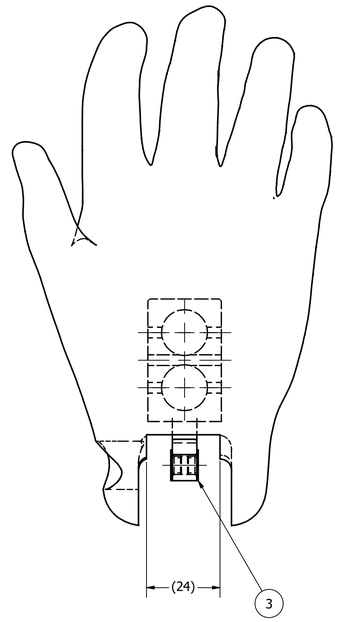
SIZE: A3 | DRAWING NUMBER: 474-6705 | REV: 1

SCALE: 5:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	3/1/2016







NOTES:

1. MATERIAL: POLYURETHANE
   COLOR: EURO BROWN
   DUROMETER: 50 ±5 SHORE "A"
2. REMOVE ALL MOLD FLASHING
3. ALL MOLD DIMENSION TOLERANCE +1%/-2%
   BUT NO SMALLER THAN 0.5mm
4. USE MOLD 880105-722-DN LEFT HAND MOLD
5. BOND ITEM 2 TO ITEM 1 WHERE SHOWN
6. WEIGHT: 262 GRAMS ± 8 GRAMS

ITEM	QTY	PART NUMBER	DESCRIPTION
3	2	6004819	BEARING, FLANGED 6mm OD X 5mm ID X 3.5mm LG
2	1	474-6901	WRIST BUMPER
1	1	474-6912	HAND BONE

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.2, X.X ±.1, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTE #1
HEAT TREAT:
FINISH:

	APPROVALS	DATE
DRAWN	ghayden	3/1/2016
CHECKED		
ENG		
APPROVED		

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

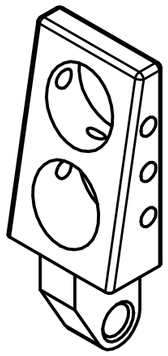
HAND, MOLDED, LEFT

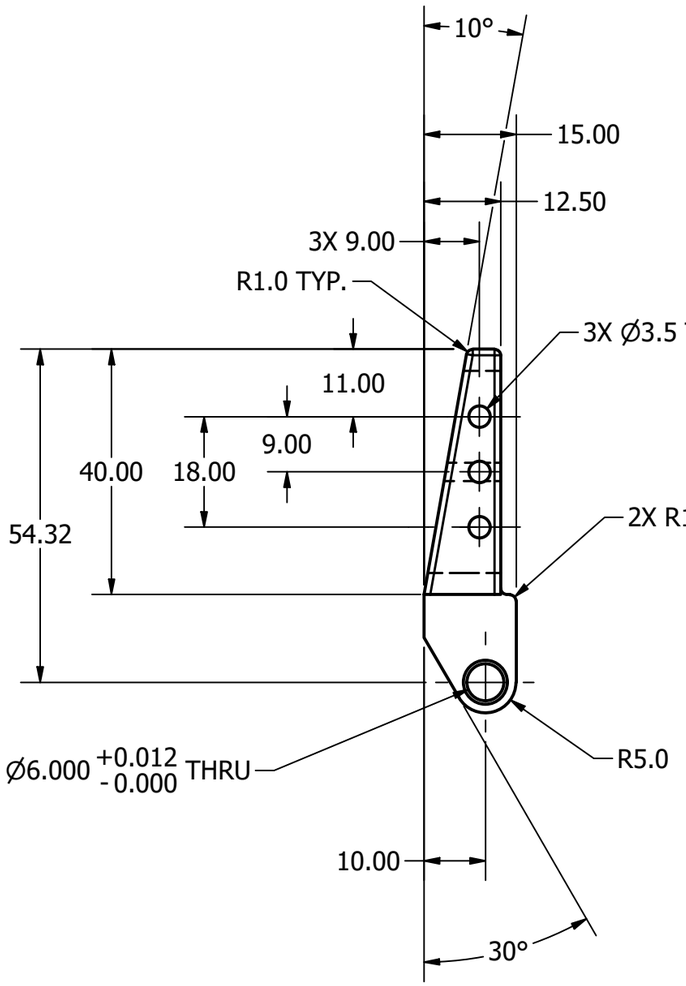
THIRD ANGLE PROJECTION

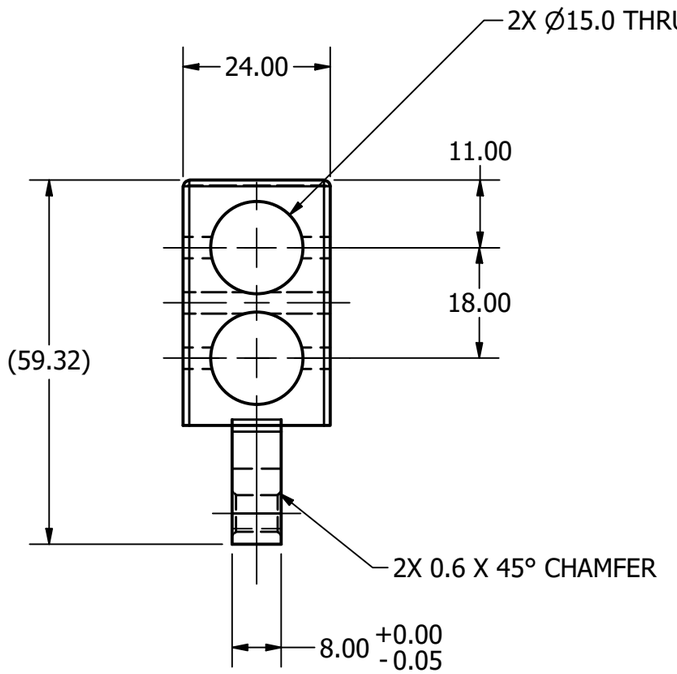
SIZE: A1 | DRAWING NUMBER: 474-6900-1 | REV: 1

SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH		2/29/2016







NOTES:

1. UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE SYMMETRICAL ABOUT ℄

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED 1.6 | ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 6061-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: ghayden	2/29/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

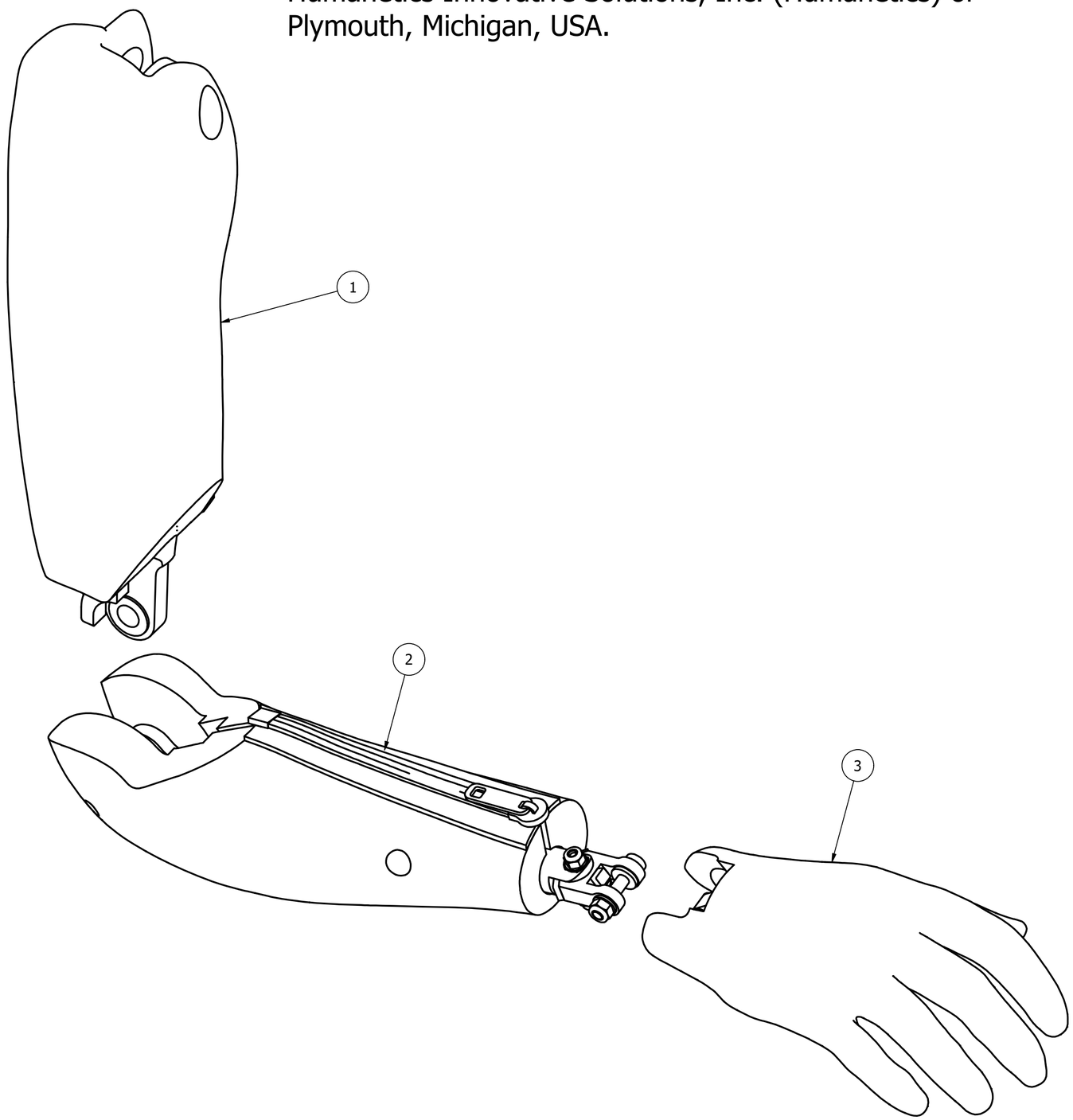
HAND BONE

THIRD ANGLE PROJECTION

SIZE: A3 | DRAWING NUMBER: 474-6912 | REV: 1
SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE TO PROTOTYPE	AB	JW	05/06/16
	2	ADDED PATENT INFORMATION	AT	JW	7/12/2018

Please note that portions of these drawings are covered by U.S. Patent Nos. 9,514,659 and 9,799,234, assigned to Humanetics Innovative Solutions, Inc. (Humanetics) of Plymouth, Michigan, USA.



ITEM	QTY	PART NUMBER	DESCRIPTION
3	1	474-6900-2	HAND, MOLDED, RIGHT
2	1	474-6500-2	LOWER ARM ASSEMBLY, RIGHT
1	1	474-6100-2	UPPER ARM ASSEMBLY, RIGHT

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED √ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL
HEAT TREAT
FINISH

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN A. Barchock	5/6/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

RIGHT ARM ASSEMBLY

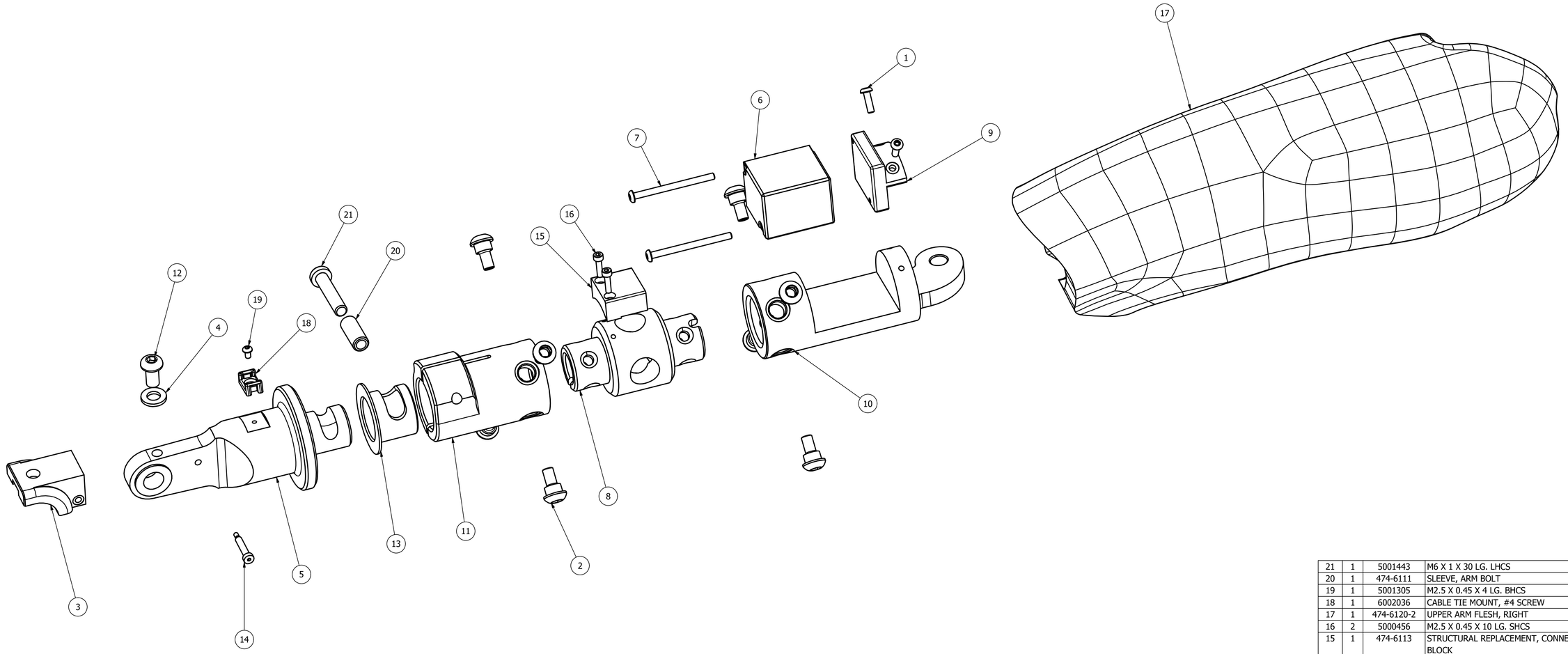
THIRD ANGLE PROJECTION

SIZE A2 | DRAWING NUMBER 474-6000-2 | REV 2

SCALE: .75:1 | SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH		11/15/17
	2	ADDED PATENT INFORMATION	AT	JW	7/12/2018

Please note that portions of these drawings are covered by U.S. Patent Nos. 9,514,659 and 9,799,234, assigned to Humanetics Innovative Solutions, Inc. (Humanetics) of Plymouth, Michigan, USA.



ITEM	QTY	PART NUMBER	DESCRIPTION
21	1	5001443	M6 X 1 X 30 LG. LHCS
20	1	474-6111	SLEEVE, ARM BOLT
19	1	5001305	M2.5 X 0.45 X 4 LG. BHCS
18	1	6002036	CABLE TIE MOUNT, #4 SCREW
17	1	474-6120-2	UPPER ARM FLESH, RIGHT
16	2	5000456	M2.5 X 0.45 X 10 LG. SHCS
15	1	474-6113	STRUCTURAL REPLACEMENT, CONNECTOR BLOCK
14	1	5001372	3 X 14 LG. PREC. SHSS SS
13	1	474-6121	ARM ROTATION BUSHING
12	1	5000356	M6 X 1 X 12 LG. BHCS
11	1	474-6112	UPPER ARM LOAD CELL ADAPTER
10	1	474-6110-2	DISTAL UPPER ARM TUBE, RIGHT
9	1	474-6118	UPPER ARM ON BOARD DAS BRACKET
8	1	474-6106	STRUCTURAL REPLACEMENT, UPPER-LOWER ARM LOAD CELL
7	2	5001343	M3 X 0.5 X 40 LG. BHCS SS
6	1	474-8204	ON BOARD DAS STRUCTURAL REPLACEMENT
5	1	474-6115-2	DISTAL UPPER ARM TUBE ASSEMBLY, RIGHT
4	1	6003562	M6 FLAT WASHER PLAIN NYLON
3	1	474-6116	ELBOW FRICTION PLATE
2	8	W50-61042	MODIFIED BHSS M6 THREAD
1	2	5001074	M3 X 0.5 X 10 LG. BHCS

PARTS LIST

NOTES:

1. BOND 474-6111 TO 5001443.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.2, .XX ±.1, .XXX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

	APPROVALS	DATE
DRAWN	ghayden	11/13/2017
MATERIAL		
HEAT TREAT		
FINISH		
CHECKED		
ENG		
APPROVED		

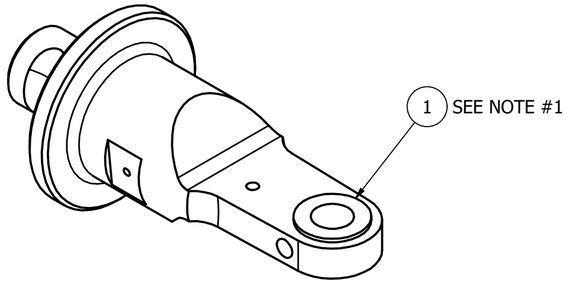
UPPER ARM ASSEMBLY, RIGHT

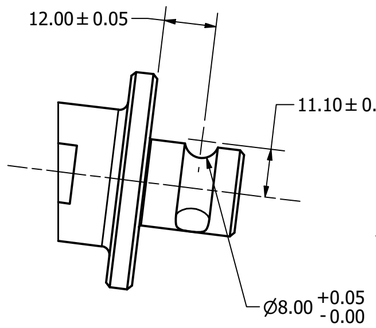
THIRD ANGLE PROJECTION

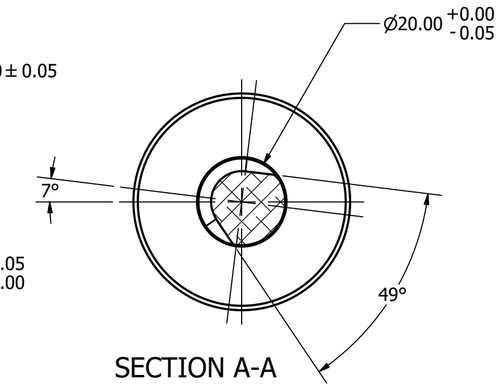
SIZE A1 | DRAWING NUMBER 474-6100-2 | REV 2

SCALE: 1:1 | SHEET 1 OF 1

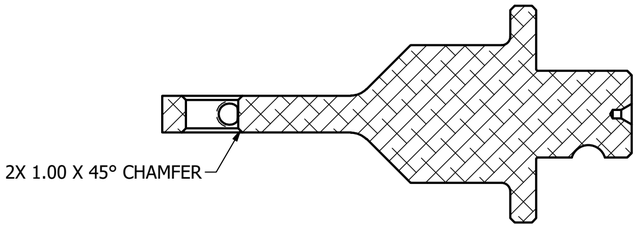
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AB	JW	11/15/17



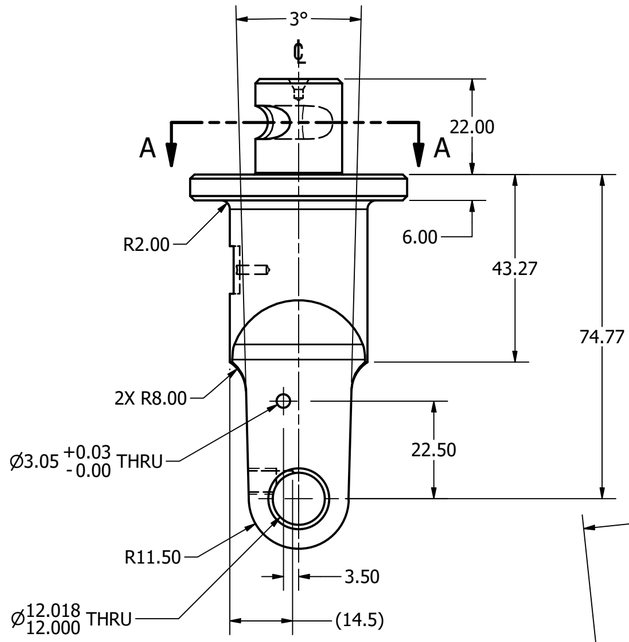


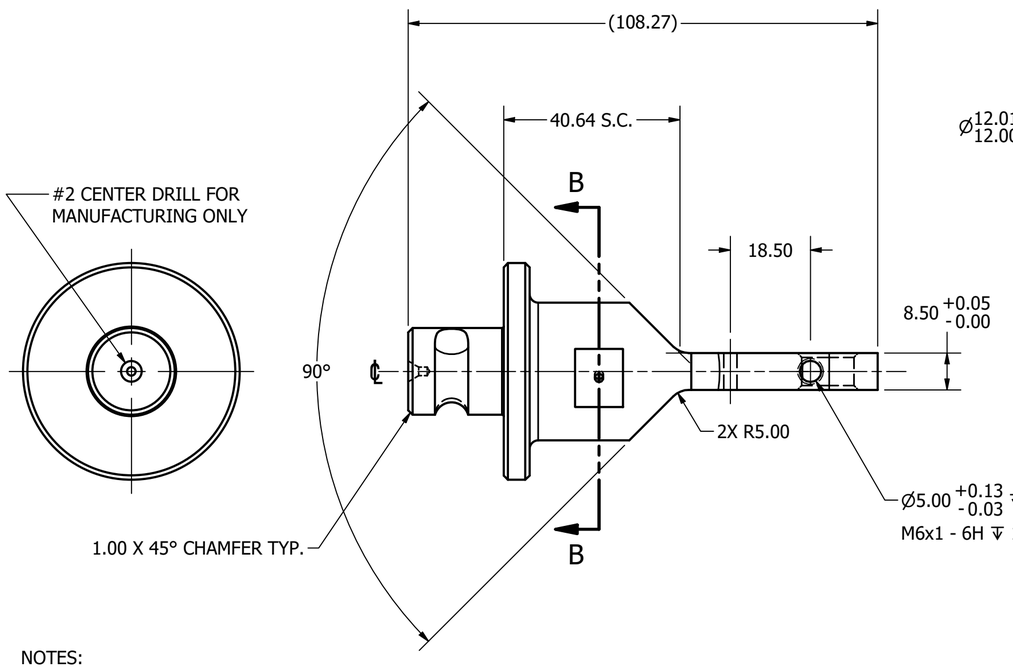


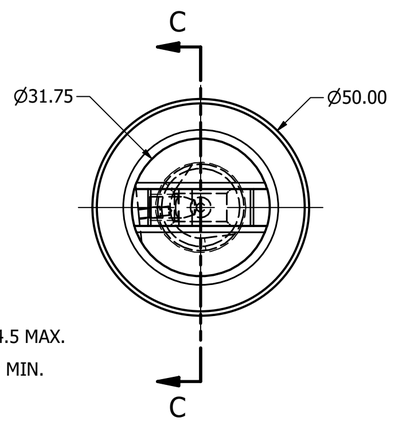
SECTION A-A

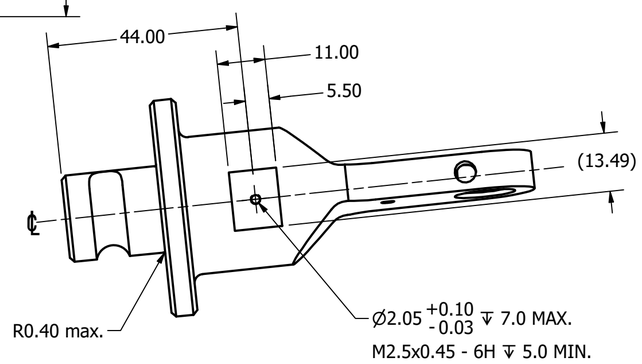


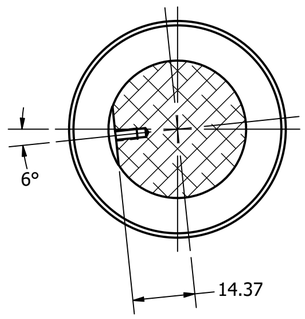
SECTION C-C











SECTION B-B

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	6004600	BEARING, FLANGE, 12mm OD X 10mm ID X 9mm LG

PARTS LIST

NOTES:

1. INSTALL BEARING AFTER ANODIZE.
2. DIMENSIONS ARE SYMMETRICAL ABOUT ℄ UNLESS OTHERWISE NOTED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ∠ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: A. Barchock	11/13/2017
CHECKED:	
ENG:	
APPROVED:	

U.S. DEPARTMENT OF TRANSPORTATION — NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

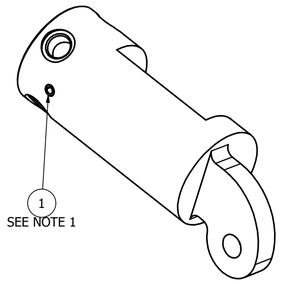
DISTAL UPPER ARM TUBE ASSEMBLY, RIGHT

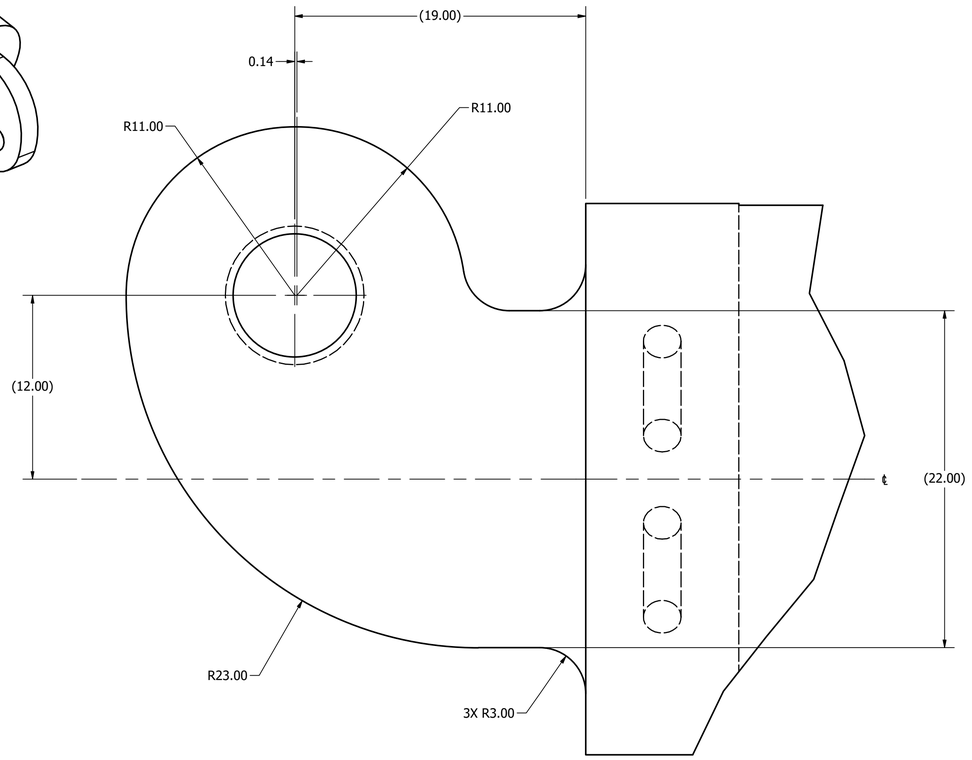
THIRD ANGLE PROJECTION

SIZE	DRAWING NUMBER	REV
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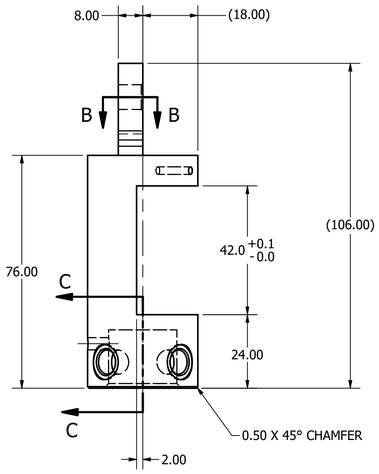
SCALE: 1:1 SHEET 1 OF 1

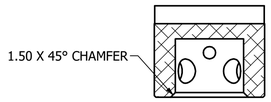
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH		11/15/17



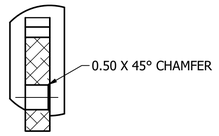


DETAIL A
SCALE 5 : 1

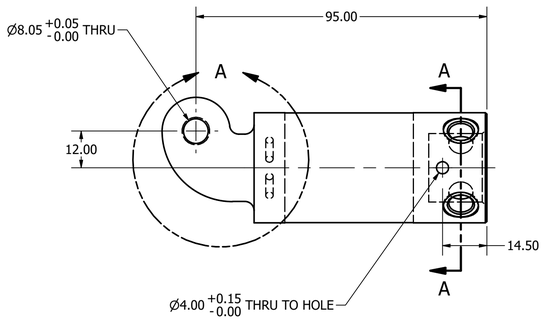


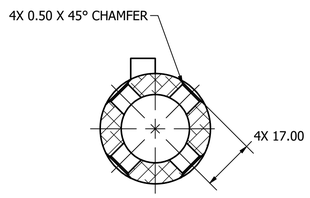


SECTION C-C

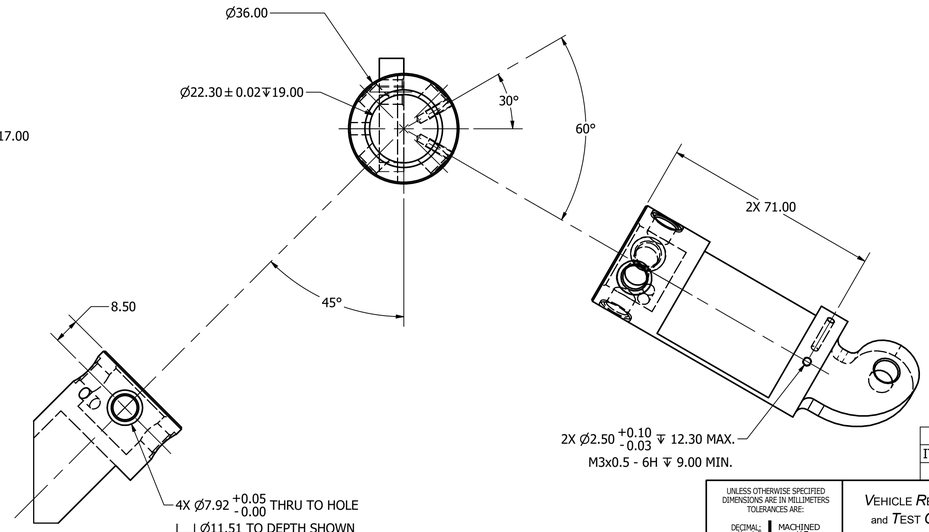


SECTION B-B





SECTION A-A



NOTES:

1. INSTALL FLUSH TO OUTSIDE SURFACE AFTER ANODIZE.

2. UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE SYMMETRICAL ABOUT ℄.

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	5000182	M4 X 10 LG. ROLL PIN

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL X ±.1, XX ±.2, XXX ±.1 | MACHINED ∠ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: ghayden	11/13/2017
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

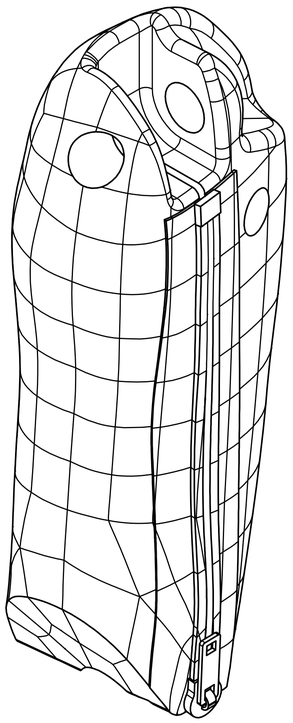
DISTAL UPPER ARM TUBE, RIGHT

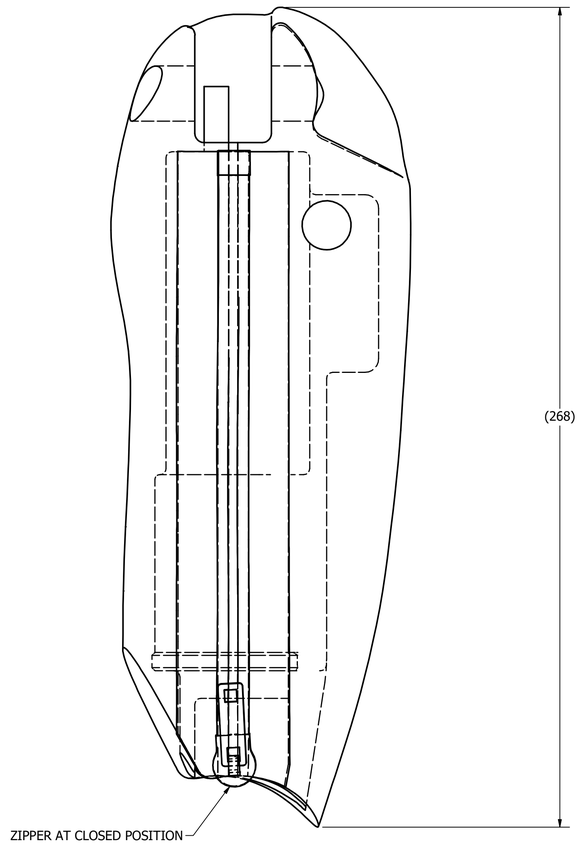
THIRD ANGLE PROJECTION

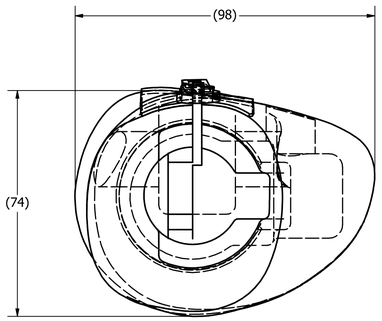
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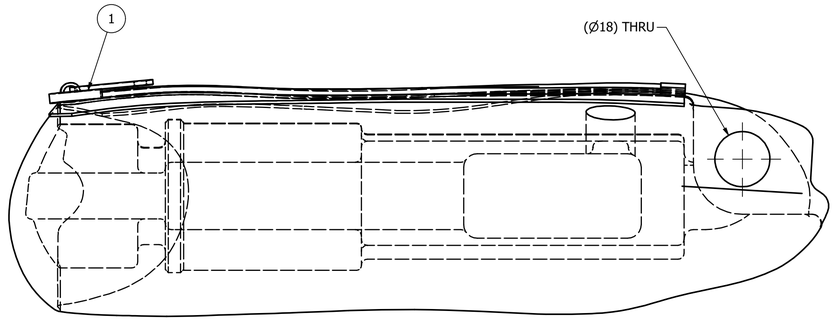
SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	11/15/17









NOTES:

1. MATERIAL: SKIN: POLYURETHANE
   FOAM: POLYURETHANE

   COLOR: EURO BROWN
   DUROMETER: 30±5 SHORE A

2. REMOVE ALL MOLD FLASHING

3. ALL MOLD DIMENSION TOLERANCE +1%/-4% BUT NO SMALLER THAN 1mm

4. WEIGHT: 460 GRAMS - NOMINAL

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	474-6122	ZIPPER ASSEMBLY, UPPER ARM

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMALS X ±1, XX ±.1, XXX ±.1
MACHINED ∠ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTE #1
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: ghayden	11/13/2017
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

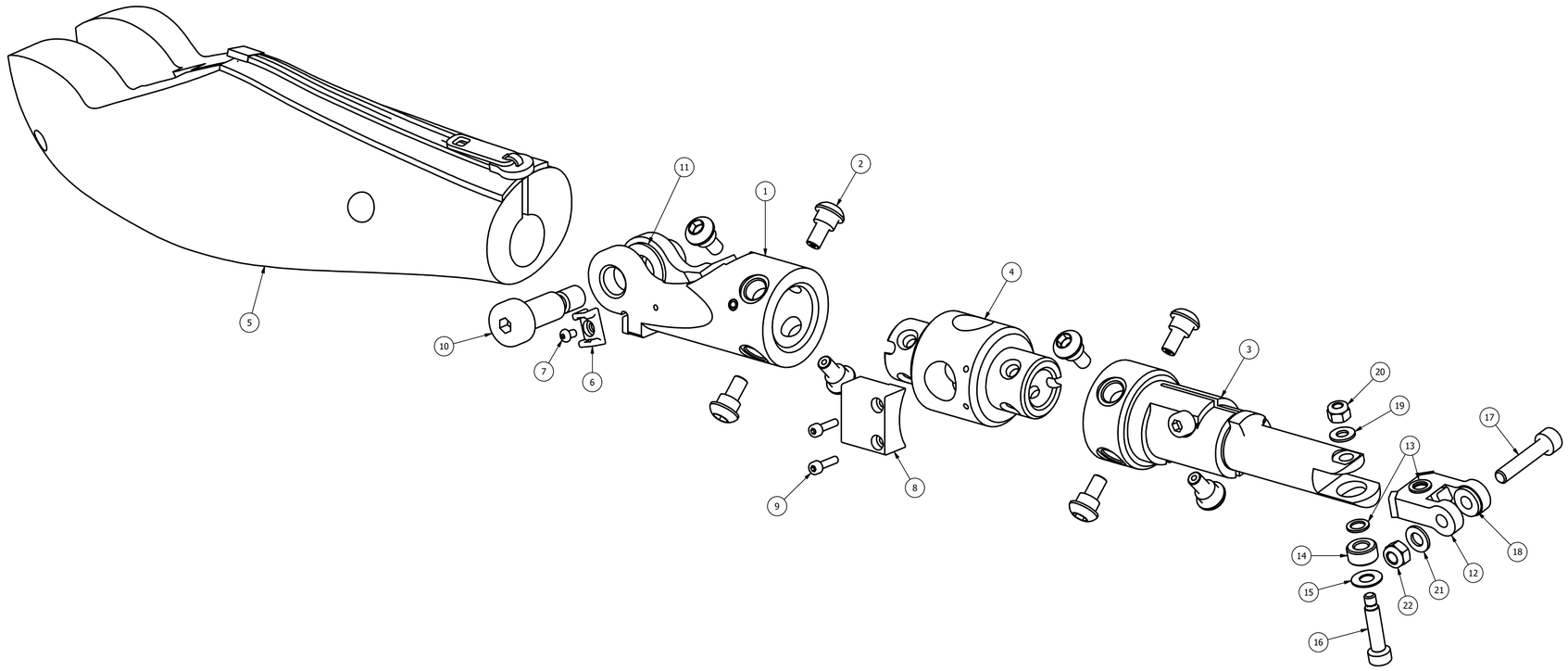
UPPER ARM FLESH, RIGHT

THIRD ANGLE PROJECTION

SIZE: A1 | DRAWING NUMBER: 474-6120-2 | REV: 1

SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AB	JW	05/06/16



ITEM	QTY	PART NUMBER	DESCRIPTION
			PARTS LIST
22	1	5000522	M5 X 0.8 HEX LOCK NUT ZINC
21	1	5000566	M5 FLAT WASHER PLAIN ZINC
20	1	5000290	M4 X 0.7 HEX LOCK NUT ZINC
19	1	5000155	M4 FLAT WASHER PLAIN ZINC
18	1	6004820	BEARING, FLANGED 8mm OD X 5mm ID X 5mm LG
17	1	5000721	M5 X 0.8 X 25 LG. SHCS
16	1	5001483	M5 X 18 LG. SHSS SS
15	1	5001374	M5 WAVE WASHER SS
14	1	474-6705	WRIST INSERT
13	2	474-6706	WRIST WASHER
12	1	474-6707-2	WRIST ROTATOR CLEVIS, RIGHT
11	1	474-6502	WASHER, UPPER-LOWER ARM
10	1	5001162	M10 X 20 LG. SHSS
9	2	5000456	M2.5 X 0.45 X 10 LG. SHCS
8	1	474-6113	STRUCTURAL REPLACEMENT, CONNECTOR BLOCK
7	1	5001305	M2.5 X 0.45 X 4 LG. BHCS
6	1	6002036	CABLE TIE MOUNT, #4 SCREW
5	1	474-6520-2	LOWER ARM FLESH, RIGHT
4	1	474-6106	STRUCTURAL REPLACEMENT, UPPER-LOWER ARM LOAD CELL
3	1	474-6700-2	LOWER ARM AND WRIST ASSEMBLY, RIGHT
2	8	W50-61042	MODIFIED BHSS M6 THREAD
1	1	474-6501-2	PROXIMAL LOWER ARM TUBE, RIGHT

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.2, X.X ±.1, X.XX ±.1
MACHINED ∠ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL
HEAT TREAT
FINISH

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN A. Barchock	5/6/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

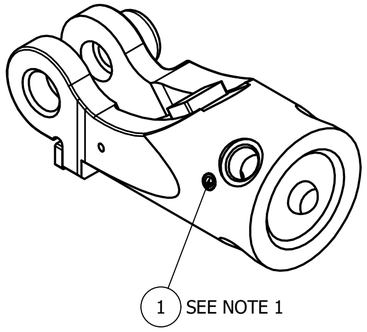
LOWER ARM ASSEMBLY, RIGHT

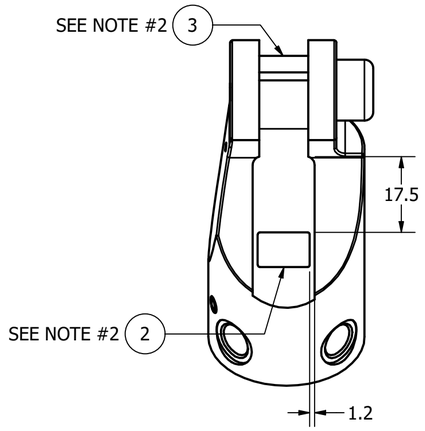
THIRD ANGLE PROJECTION

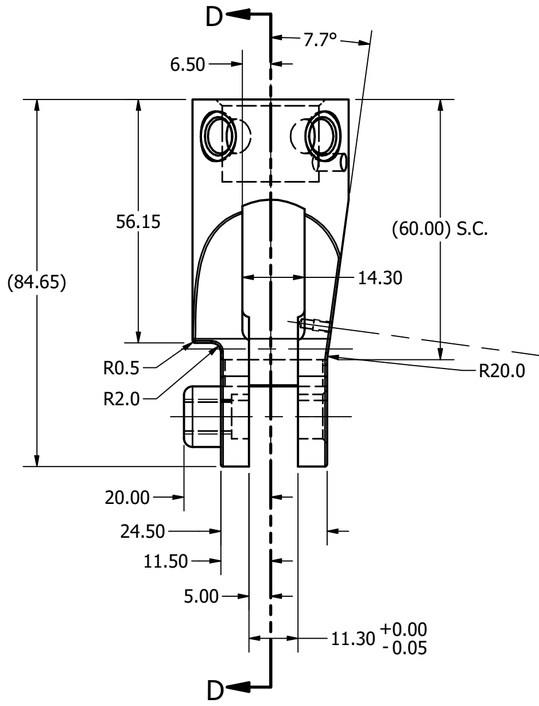
SIZE A1 | DRAWING NUMBER 474-6500-2 | REV 1

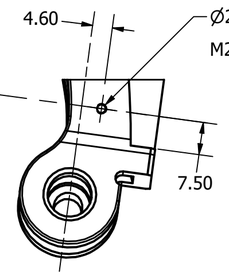
SCALE: 1:1 | SHEET 1 OF 1

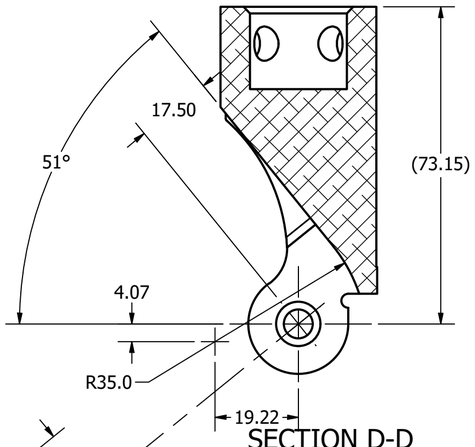
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	3/9/2016



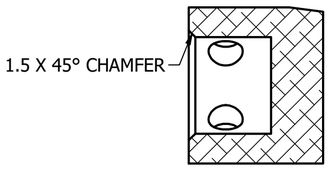




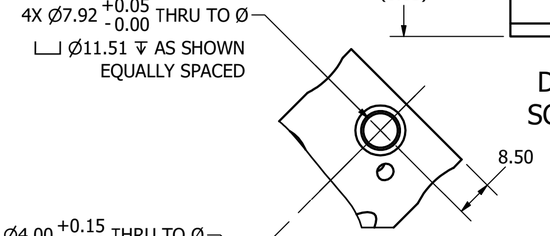


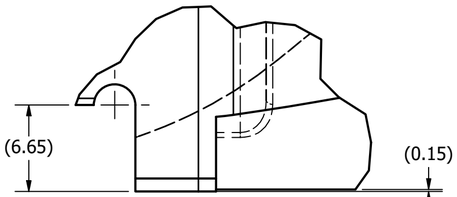


SECTION D-D

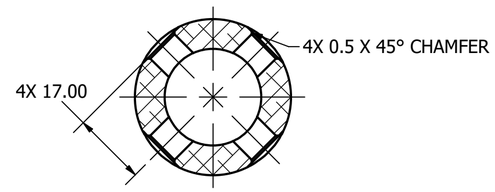


SECTION B-B

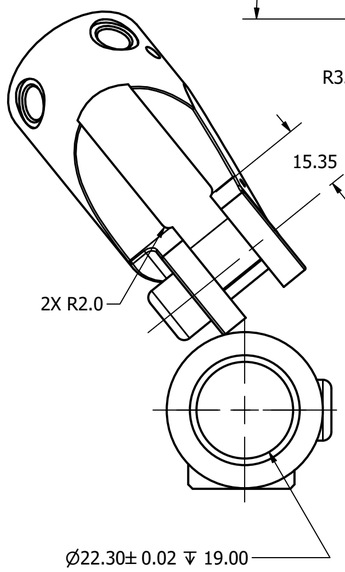


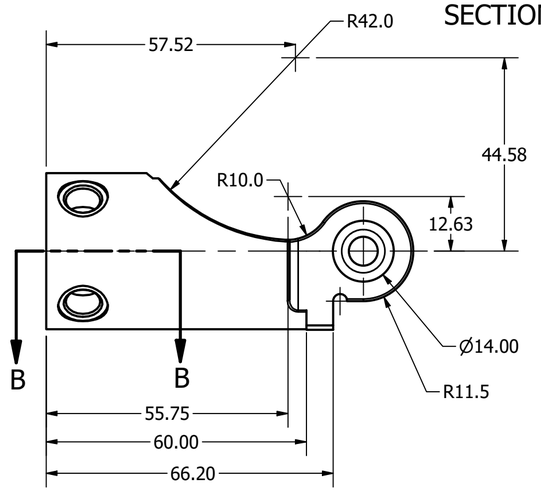


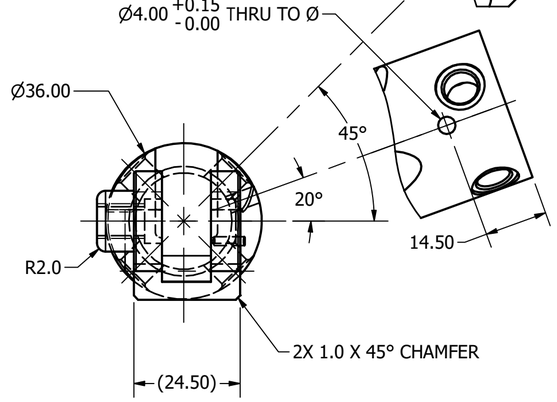
DETAIL E
SCALE 3 : 1

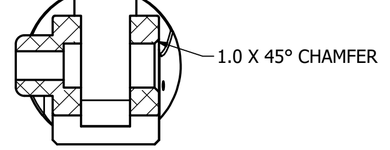


SECTION A-A

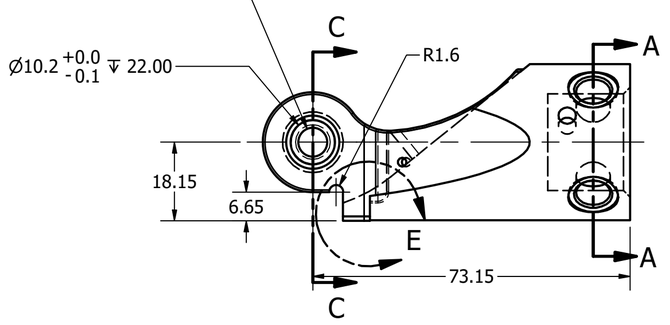








SECTION C-C



ITEM	QTY	PART NUMBER	DESCRIPTION
3	1	474-6558	ELBOW EXTENSION BUMPER
2	1	474-6559	ELBOW FLEXION BUMPER
1	1	5000182	M4 X 10 LG. ROLL PIN

PARTS LIST

NOTES:

1. INSTALL FLUSH TO OUTSIDE SURFACE AFTER ANODIZE.
2. PREPARE FACES AND ATTACH BUMPERS WITH ADHESIVE WHERE SHOWN.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ▽ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: ghayden	3/9/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

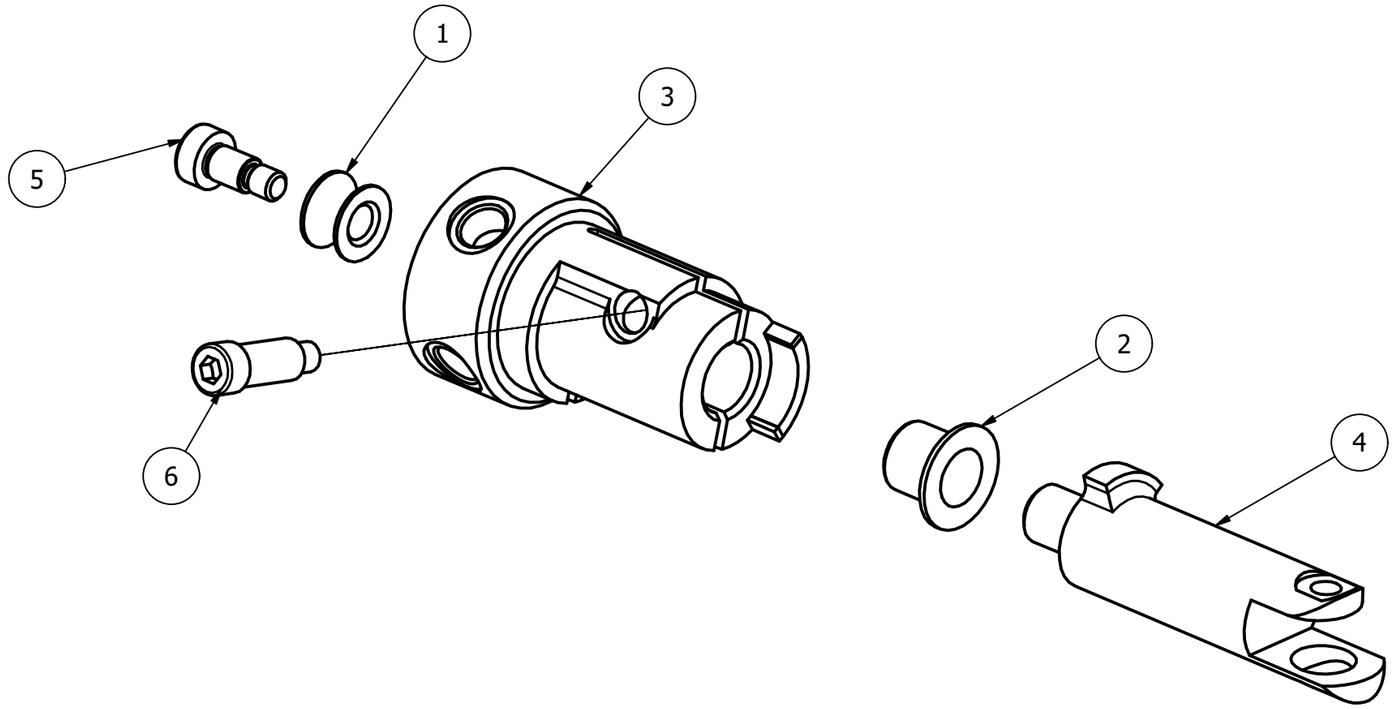
PROXIMAL LOWER ARM TUBE, RIGHT

THIRD ANGLE PROJECTION

SIZE: A2 | DRAWING NUMBER: 474-6501-2 | REV: 1

SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PRODUCTION	GCH	JW	3/7/2016



ITEM	QTY	PART NUMBER	DESCRIPTION
6	1	474-6704	DISTAL LOWER ARM BOLT ASSEMBLY
5	1	5000922	M6 X 8 LG. SHSS SS
4	1	474-6702-2	WRIST INSERT, RIGHT
3	1	474-6701-2	DISTAL LOWER ARM TUBE, RIGHT
2	1	6004601	BEARING, FLANGE, 12mm OD X 10mm ID X 12mm LG
1	1	474-6553	WRIST ROTATION GUIDE

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

APPROVALS	DATE
DRAWN ghayden	3/7/2016
CHECKED	
ENG	
APPROVED	

MATERIAL
HEAT TREAT
FINISH

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

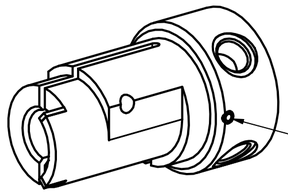
LOWER ARM AND WRIST ASSEMBLY, RIGHT

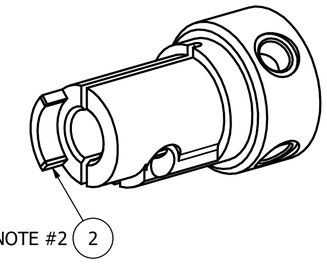
THIRD ANGLE PROJECTION

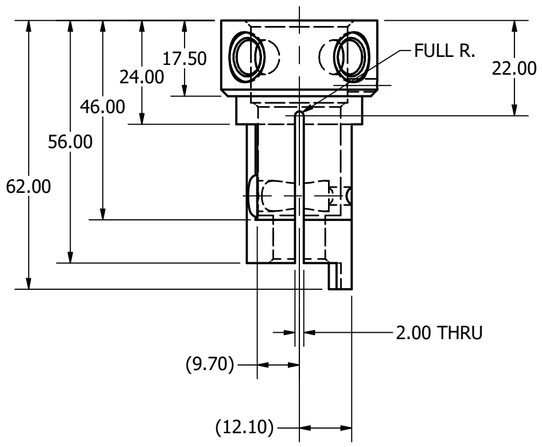
SIZE A3 | DRAWING NUMBER 474-6700-2 | REV 1

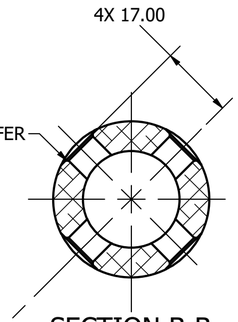
SCALE: 1:1 | SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE TO PROTOTYPE	GCH	JW	3/10/2016

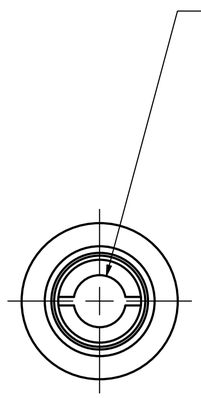


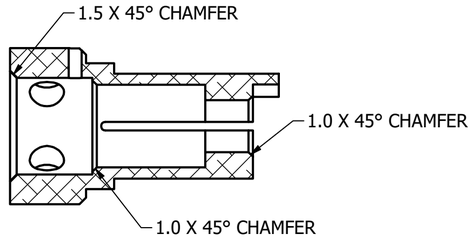


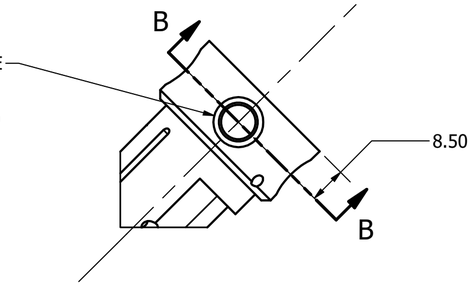




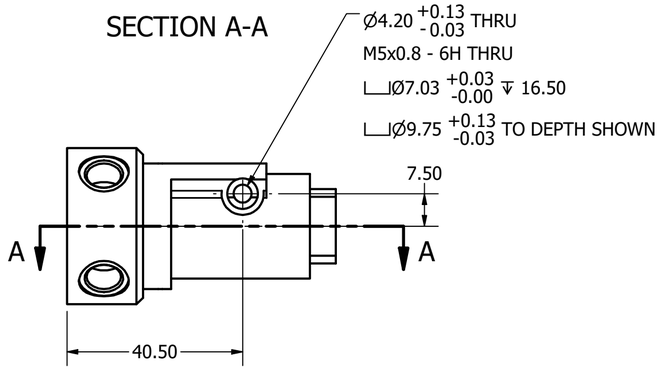
SECTION B-B

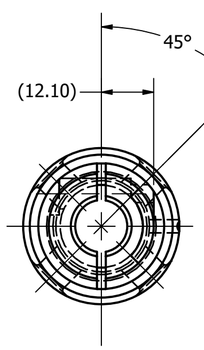


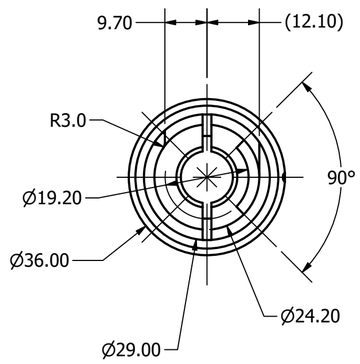


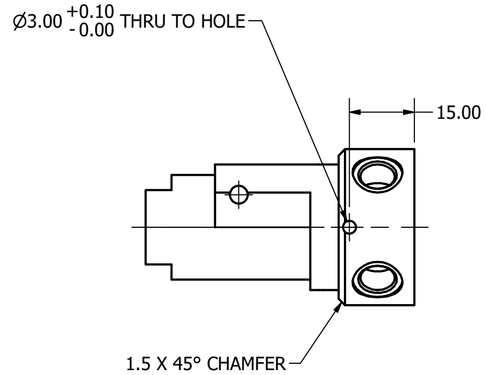


SECTION A-A









ITEM	QTY	PART NUMBER	DESCRIPTION
2	2	474-6557	WRIST ROTATION BUMPER
1	1	5000199	M3 X 10 LG. ROLL PIN SS

PARTS LIST

NOTES:

1. INSTALL FLUSH TO OUTSIDE SURFACE AFTER ANODIZE.
2. BOND 474-6557 TO SURFACE AS SHOWN.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075 T-6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

APPROVALS	DATE
DRAWN ghayden	3/10/2016
CHECKED	
ENG	
APPROVED	

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

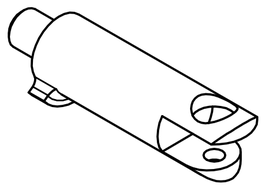
DISTAL LOWER ARM TUBE, RIGHT

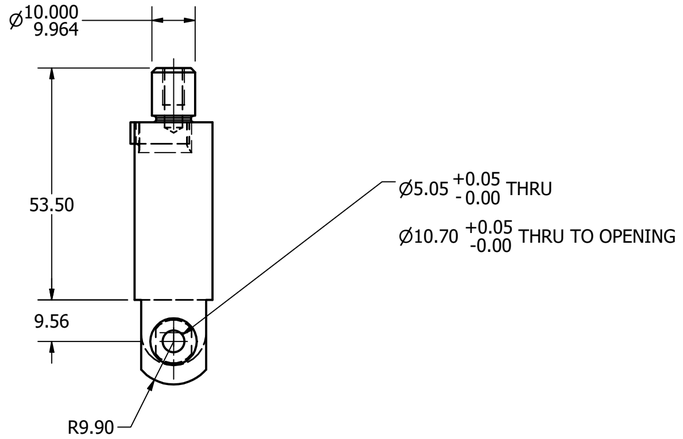
THIRD ANGLE PROJECTION

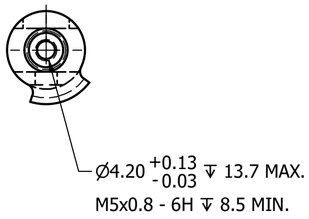
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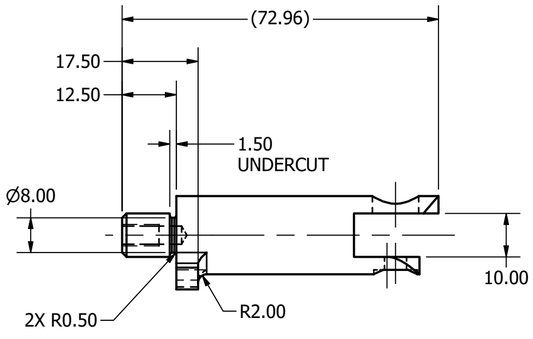
SCALE: 1:1 | SHEET: 1 OF 1

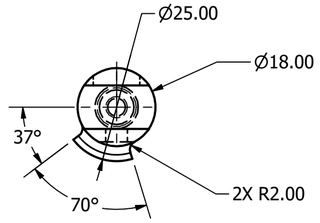
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
75047	1	RELEASE TO PROTOTYPE	GCH	JW	3/7/2016

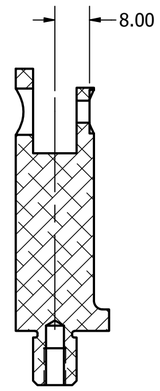




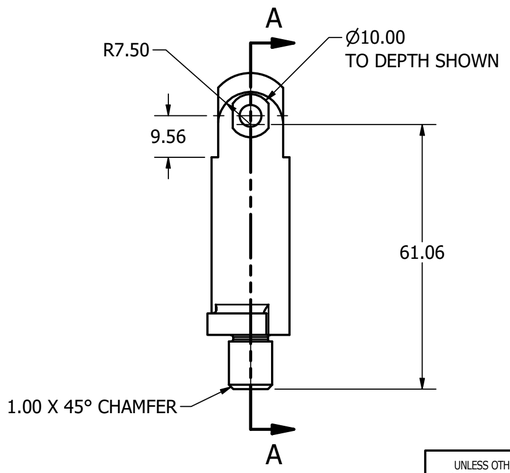








SECTION A-A



PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: ghayden	3/7/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

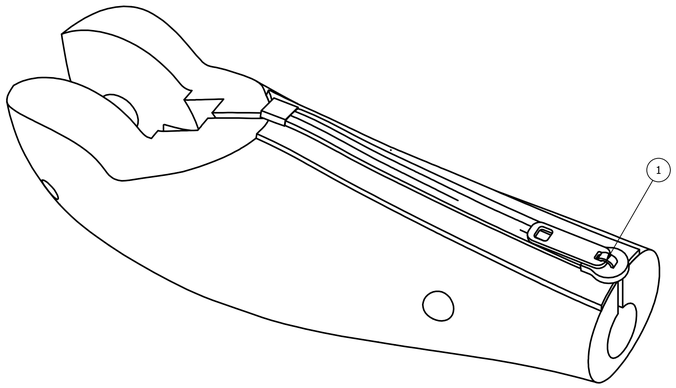
WRIST INSERT, RIGHT

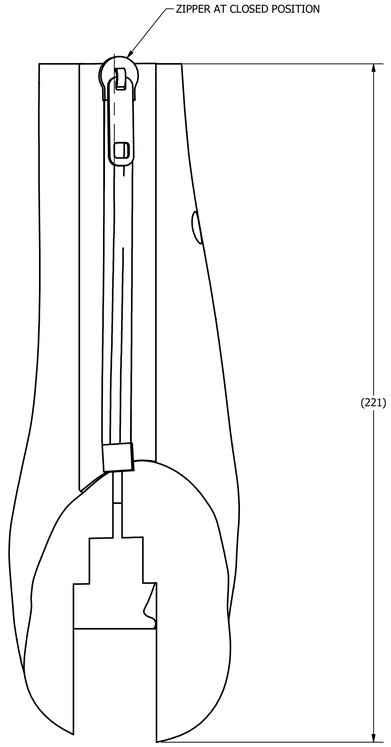
THIRD ANGLE PROJECTION

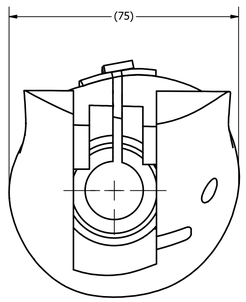
SIZE: A2 | DRAWING NUMBER: 474-6702-2 | REV: 1

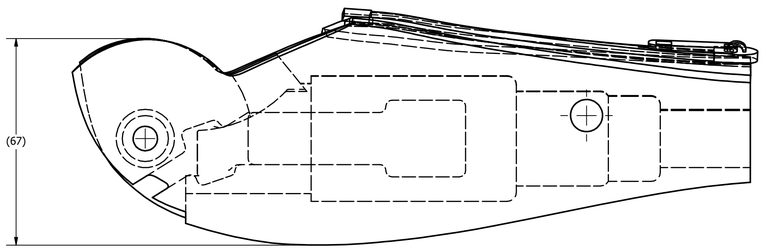
SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE TO PROTOTYPE	GCH	JW	3/8/2016









NOTES:

1. MATERIAL: SKIN: POLYURETHANE
   FOAM: POLYURETHANE

   COLOR: EURO BROWN
   DUROMETER: 30±5 SHORE A

2. REMOVE ALL MOLD FLASHING

3. ALL MOULD DIMENSION TOLERANCE +1%/-4% BUT NO SMALLER THAN 1mm

4. WEIGHT: 375 GRAMS - NOMINAL

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	474-6521	ZIPPER ASSEMBLY, LOWER ARM

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.2, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTE #1
HEAT TREAT
FINISH

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN ghayden	3/8/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

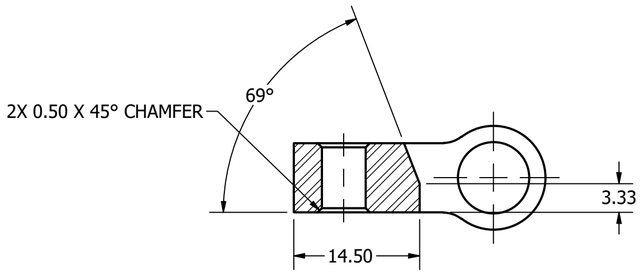
LOWER ARM FLESH, RIGHT

THIRD ANGLE PROJECTION

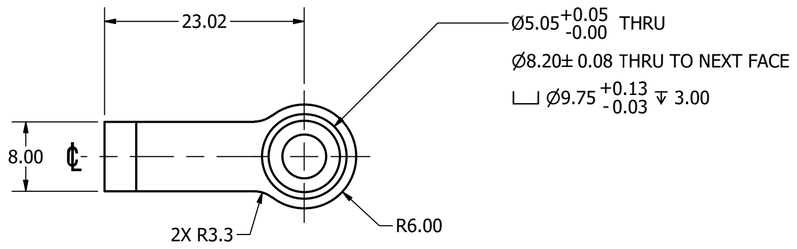
SIZE A1 | DRAWING NUMBER 474-6520-2 | REV 1

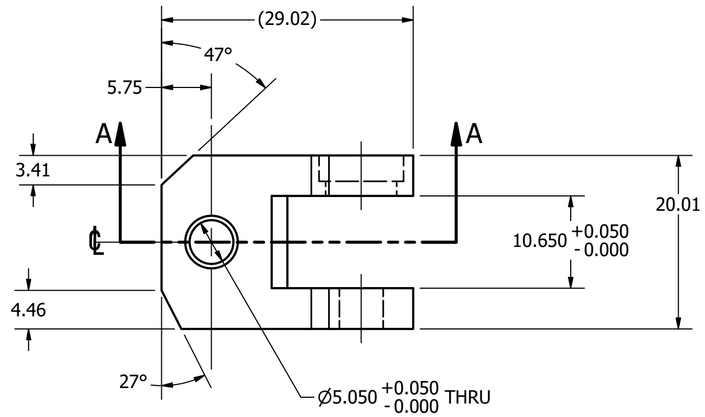
SCALE: 1:1 | SHEET 1 OF 1

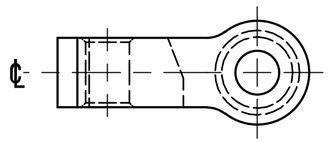
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AB	JW	05/05/16

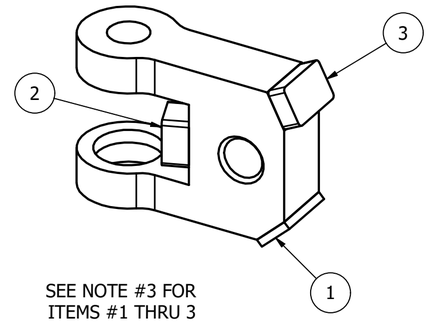


SECTION A-A









SEE NOTE #3 FOR
ITEMS #1 THRU 3

NOTES:

1. DIMENSIONS ARE SYMMETRICAL ABOUT ℄ UNLESS OTHERWISE SPECIFIED.
2. BUMPERS REMOVED FROM SOME VIEWS FOR CLARITY.
3. PREP FACES & ATTACH BUMPERS WITH ADHESIVE CENTRAL TO ATTACHMENT FACES AFTER PLATING.

ITEM	QTY	PART NUMBER	DESCRIPTION
3	1	474-6901	WRIST BUMPER
2	1	474-6723	WRIST BUMPER - EXTENSION
1	1	474-6721	WRIST BUMPER - RADIUS

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 4140 STEEL
HEAT TREAT: Rc 28-32
FINISH: 0.008mm ELECTROLESS NICKEL PLATE PER SIDE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: A. Barchock	5/5/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

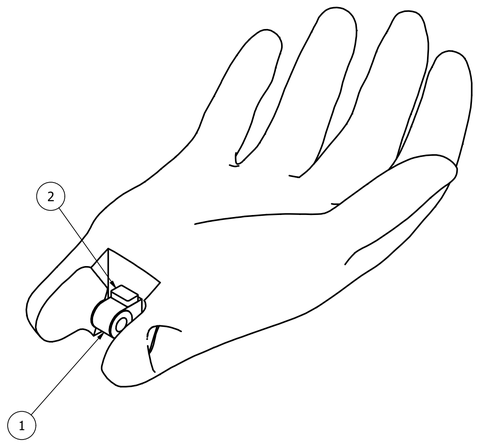
WRIST ROTATOR CLEVIS, RIGHT

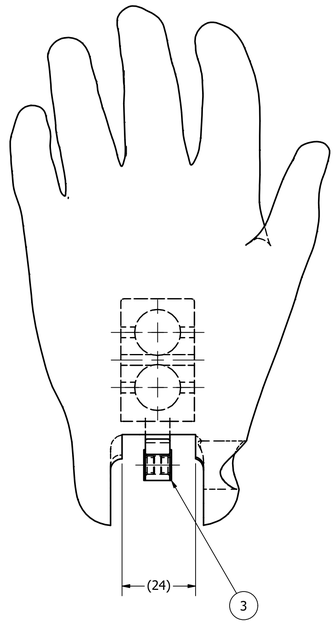
THIRD ANGLE PROJECTION

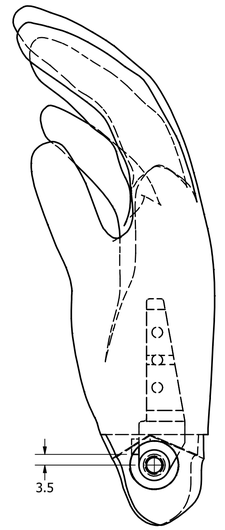
SIZE: A2 | DRAWING NUMBER: 474-6707-2 | REV: 1

SCALE: 2:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	GCH	JW	3/1/2016







NOTES:

1. MATERIAL: POLYURETHANE
   COLOR: EURO BROWN
   DUROMETER: 50 ±5 SHORE "A"
2. REMOVE ALL MOLD FLASHING
3. ALL MOLD DIMENSION TOLERANCE +1%/-2%
   BUT NO SMALLER THAN 0.5mm
4. USE MOLD 880105-723-DN RIGHT HAND MOLD
5. BOND ITEM 2 TO ITEM 1 WHERE SHOWN
6. WEIGHT: 262 GRAMS ± 8 GRAMS

ITEM	QTY	PART NUMBER	DESCRIPTION
3	2	6004819	BEARING, FLANGED 6mm OD X 5mm ID X 3.5mm LG
2	1	474-6901	WRIST BUMPER
1	1	474-6912	HAND BONE

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.1, .X ±.2, .XX ±.1, .XXX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTE #1
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: ghayden	3/1/2016
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

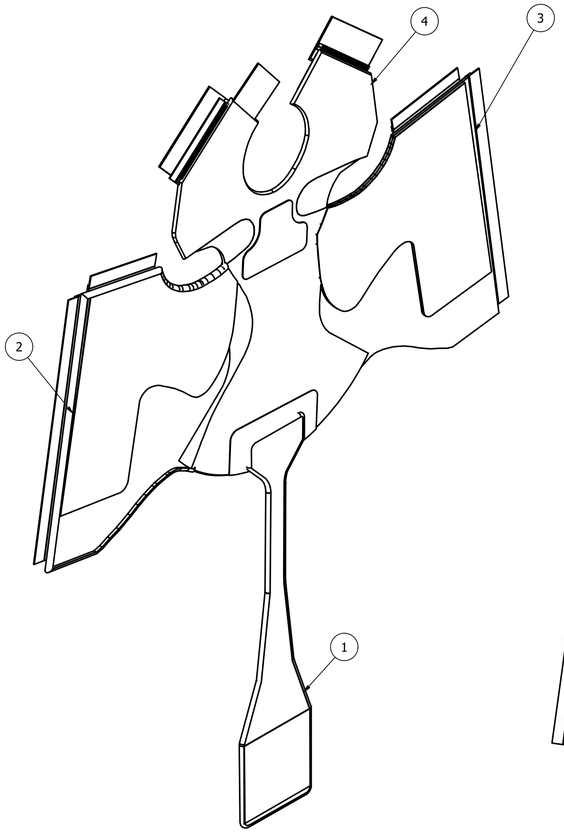
HAND, MOLDED, RIGHT

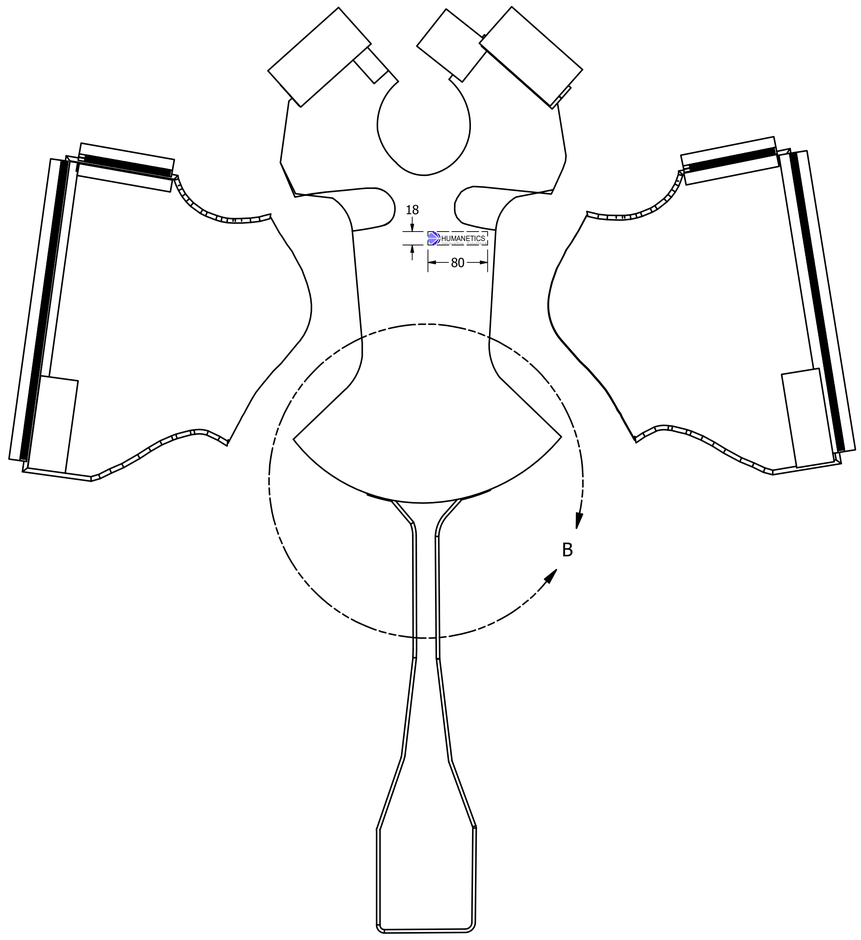
THIRD ANGLE PROJECTION

SIZE: A1 | DRAWING NUMBER: 474-6900-2 | REV: 1

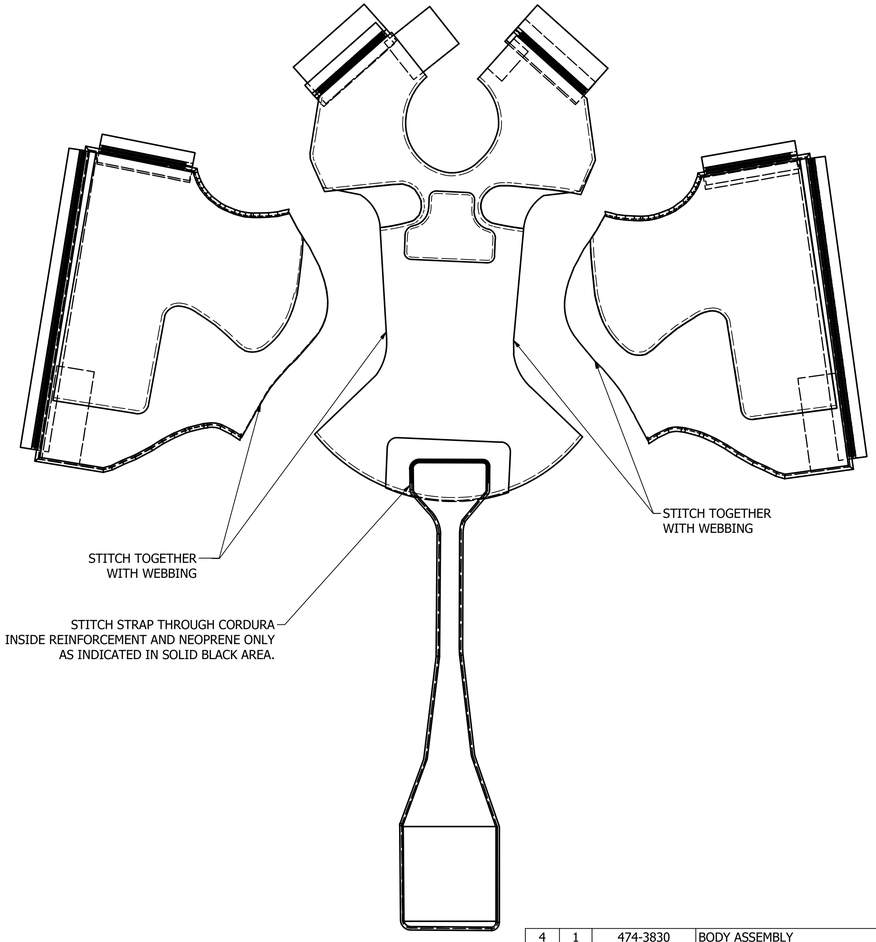
SCALE: 1:1 | SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	PROTOTYPE RELEASE	AT	JW	5/3/2017

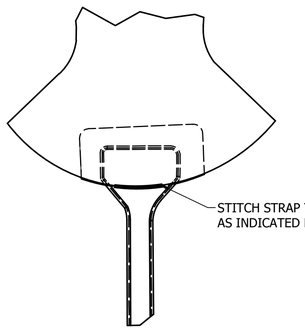




OUTSIDE VIEW



INSIDE VIEW



DETAIL B
SCALE 1 / 4

ITEM	QTY	PART NUMBER	DESCRIPTION
4	1	474-3830	BODY ASSEMBLY
3	1	474-3820-2	RIGHT SIDE ASSEMBLY
2	1	474-3820-1	LEFT SIDE ASSEMBLY
1	1	474-3810	STRAP

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL
HEAT TREAT
FINISH

APPROVALS	DATE
DRAWN atomich	5/3/2017
CHECKED	
ENG	
APPROVED	

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

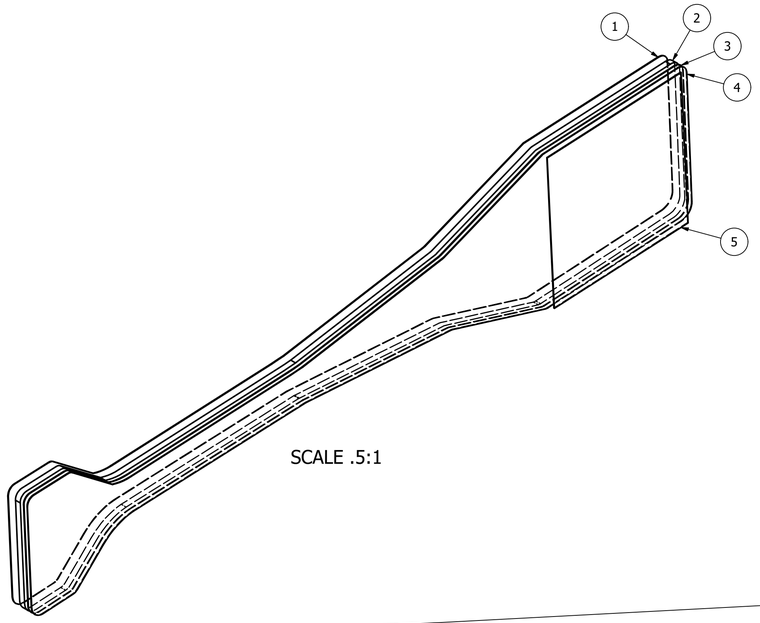
THOR-05F JACKET

THIRD ANGLE PROJECTION

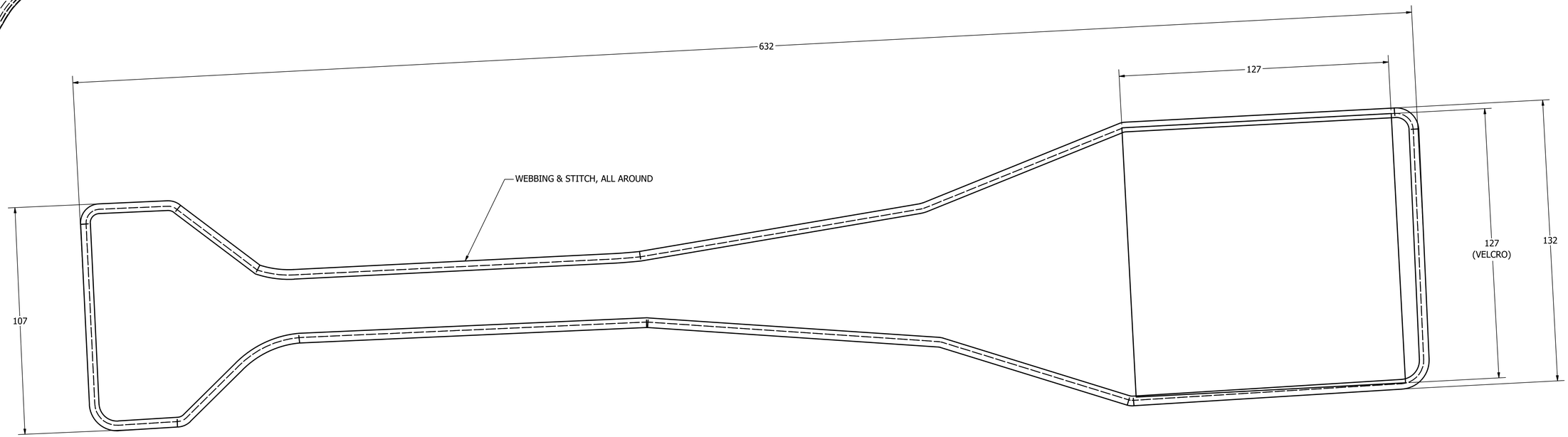
SIZE D | DRAWING NUMBER 474-3800 | REV 1

SCALE: .25:1 | SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AT	JW	5/1/2017



SCALE .5:1



NOTES:

1. MATERIAL STACKING ORDER:
   1. CORDURA CANVAS
   2. NEOPRENE FOAM 5mm THICK
   3. VINYL
   4. CORDURA CANVAS
   5. LOOP VELCRO

2. ± 3MM APPLY TO ALL DIMENSIONS UNLESS OTHERWISE SPECIFIED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: atomich	5/1/2017
CHECKED	
ENG	
APPROVED	

MATERIAL: SEE NOTE 1
HEAT TREAT
FINISH

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

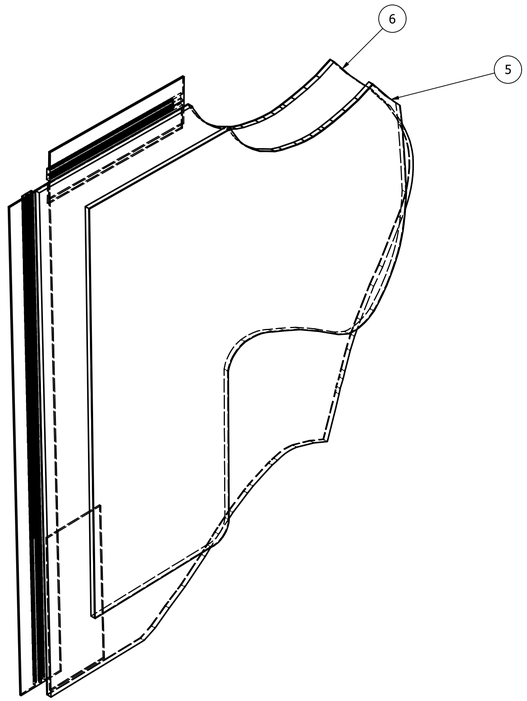
STRAP

THIRD ANGLE PROJECTION

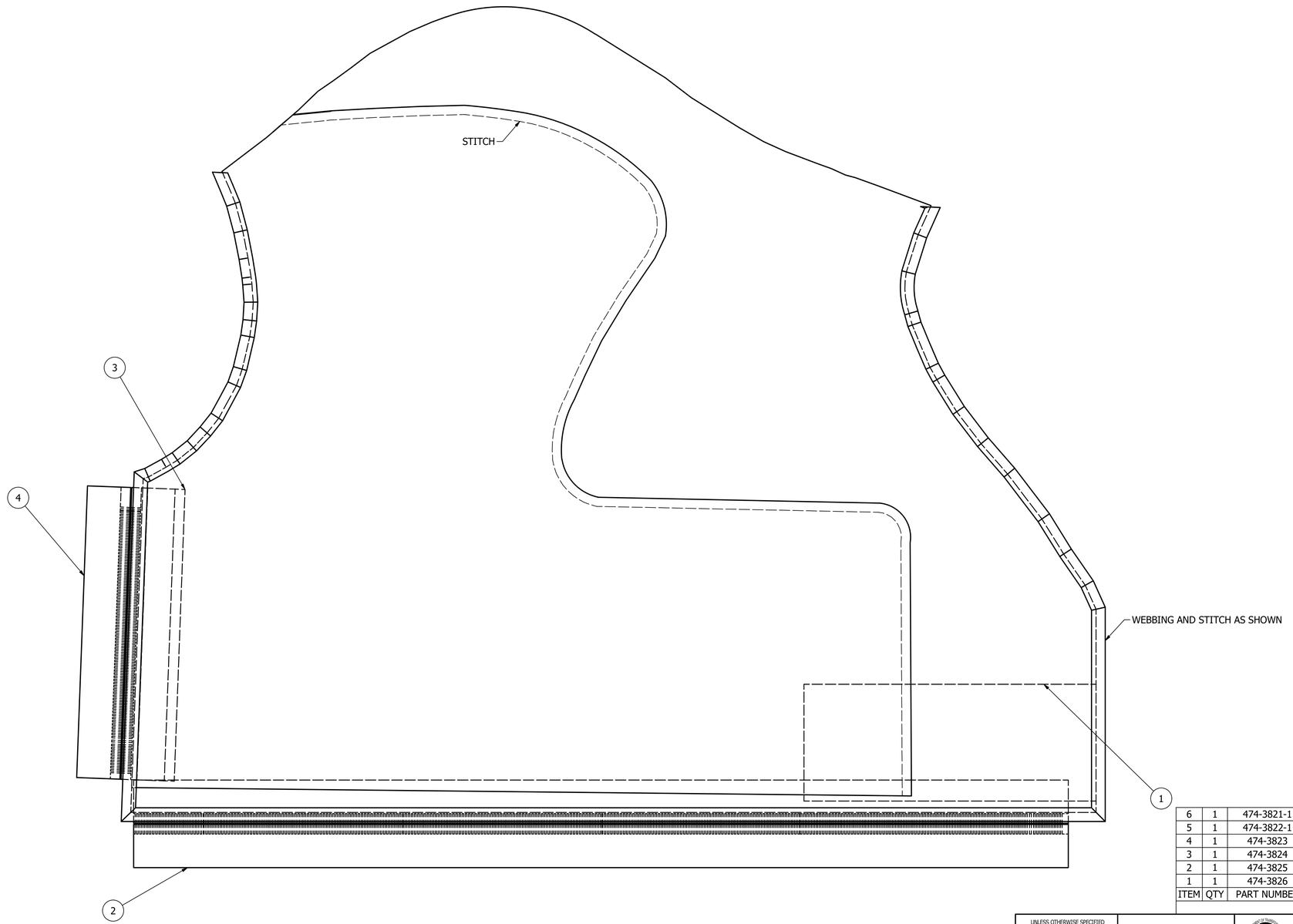
SIZE	DRAWING NUMBER	REV
D	474-3810	1

SCALE: 1:1 SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AT	JW	5/3/2017



SCALE .5:1



ITEM	QTY	PART NUMBER	DESCRIPTION
6	1	474-3821-1	SIDE PANEL
5	1	474-3822-1	SIDE PAD
4	1	474-3823	ZIPPER SHOULDER 5"
3	1	474-3824	VELCRO FRONT SHOULDER HOOK
2	1	474-3825	ZIPPER FRONT 16"
1	1	474-3826	VELCRO FRONT BOTTOM LOOP

PARTS LIST

NOTES:

1. ALL PARTS ARE STITCHED TOGETHER AS SHOWN

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED SURFACE ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL
HEAT TREAT
FINISH

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN atomich	5/3/2017
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

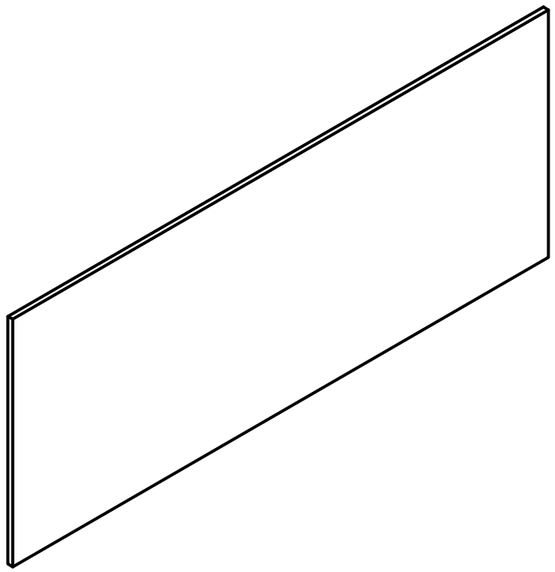
LEFT SIDE ASSEMBLY

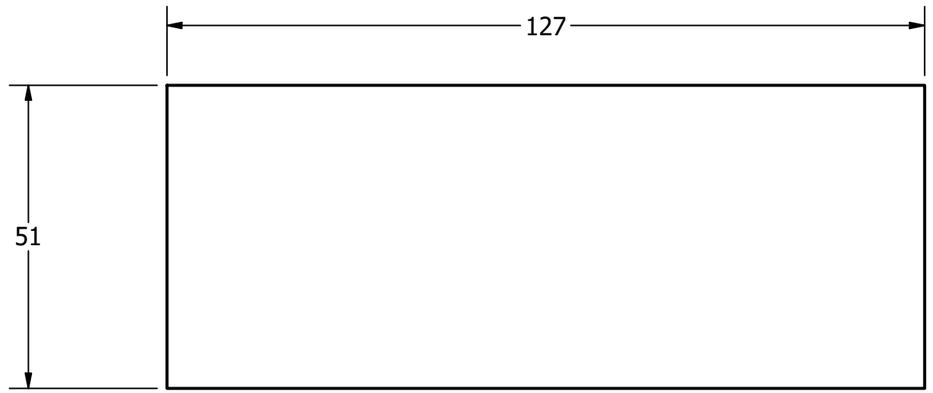
THIRD ANGLE PROJECTION

SIZE D | DRAWING NUMBER 474-3820-1 | REV 1

SCALE: 1:1 | SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AT	JW	5/3/2017





NOTES:

1. MATERIAL: LOOP VELCRO

2. ± 3mm APPY TO ALL DIMENSIONS UNLESS OTHERWISE SPECIFIED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED √1.6 | ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTE 1
HEAT TREAT:
FINISH:

*V*EHICLE *R*ESEARCH and *T*EST *C*ENTER

APPROVALS	DATE
DRAWN: atomich	5/3/2017
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

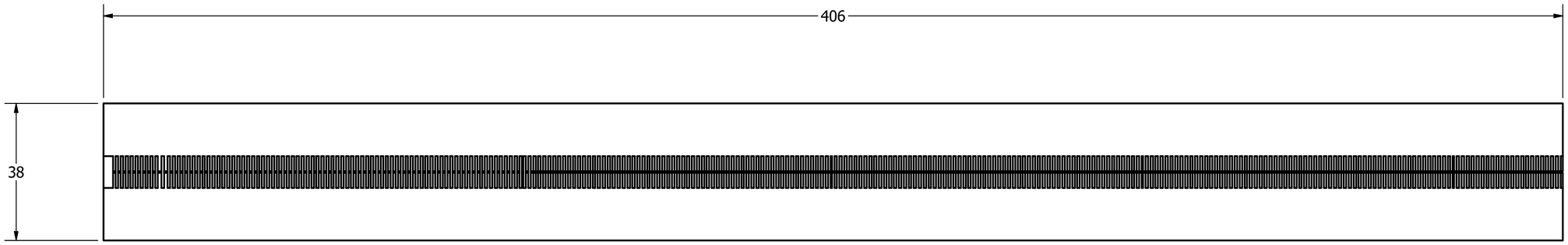
VELCRO FRONT BOTTOM LOOP

THIRD ANGLE PROJECTION

SIZE	DRAWING NUMBER	REV
B	474-3826	1

SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AT	JW	5/3/2017



NOTES:

1. ± 3mm APPY TO ALL DIMENSIONS UNLESS OTHERWISE SPECIFIED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

*V*EHICLE *R*ESEARCH and *T*EST *C*ENTER

APPROVALS	DATE
DRAWN: atomich	5/3/2017
CHECKED	
ENG	
APPROVED	

MATERIAL
HEAT TREAT
FINISH

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

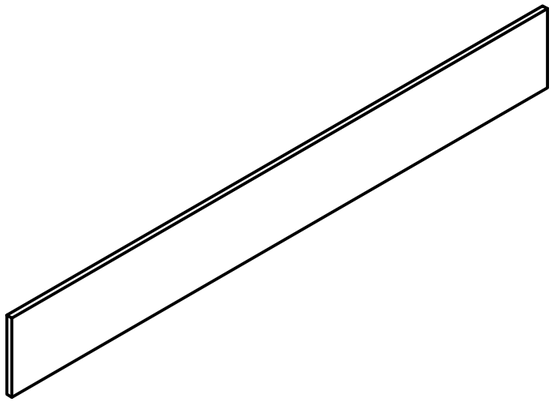
ZIPPER FRONT 16"

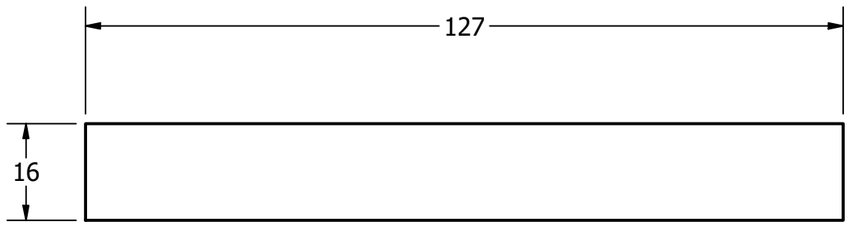
THIRD ANGLE PROJECTION

SIZE	DRAWING NUMBER	REV
C	474-3825	1

SCALE: 1:1 SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AT	JW	5/3/2017





NOTES:

1. MATERIAL: HOOK VELCRO

2. ± 3mm APPY TO ALL DIMENSIONS UNLESS OTHERWISE SPECIFIED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED & ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL	SEE NOTE 1
HEAT TREAT	
FINISH	

*V*EHICLE *R*ESEARCH and *T*EST *C*ENTER

APPROVALS	DATE
DRAWN atomich	5/3/2017
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

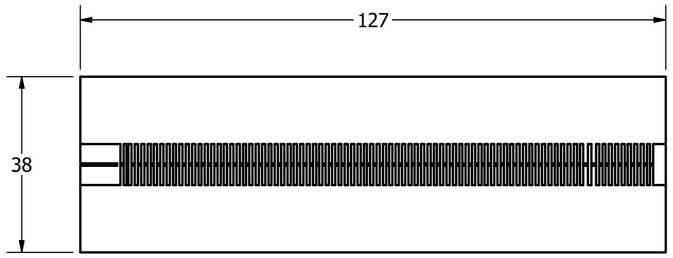
VELCRO FRONT SHOULDER HOOK

THIRD ANGLE PROJECTION

SIZE	DRAWING NUMBER	REV
B	474-3824	1

SCALE: 1:1 | SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AT	JW	5/3/2017



NOTES:

1. ± 3mm APPY TO ALL DIMENSIONS UNLESS OTHERWISE SPECIFIED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL
HEAT TREAT
FINISH

APPROVALS	DATE
DRAWN atomich	5/3/2017
CHECKED	
ENG	
APPROVED	

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

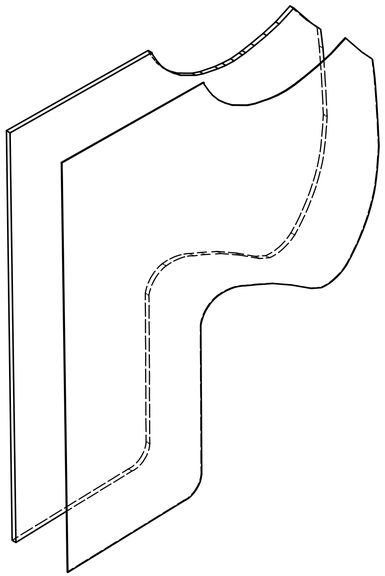
ZIPPER SHOULDER 5"

THIRD ANGLE PROJECTION

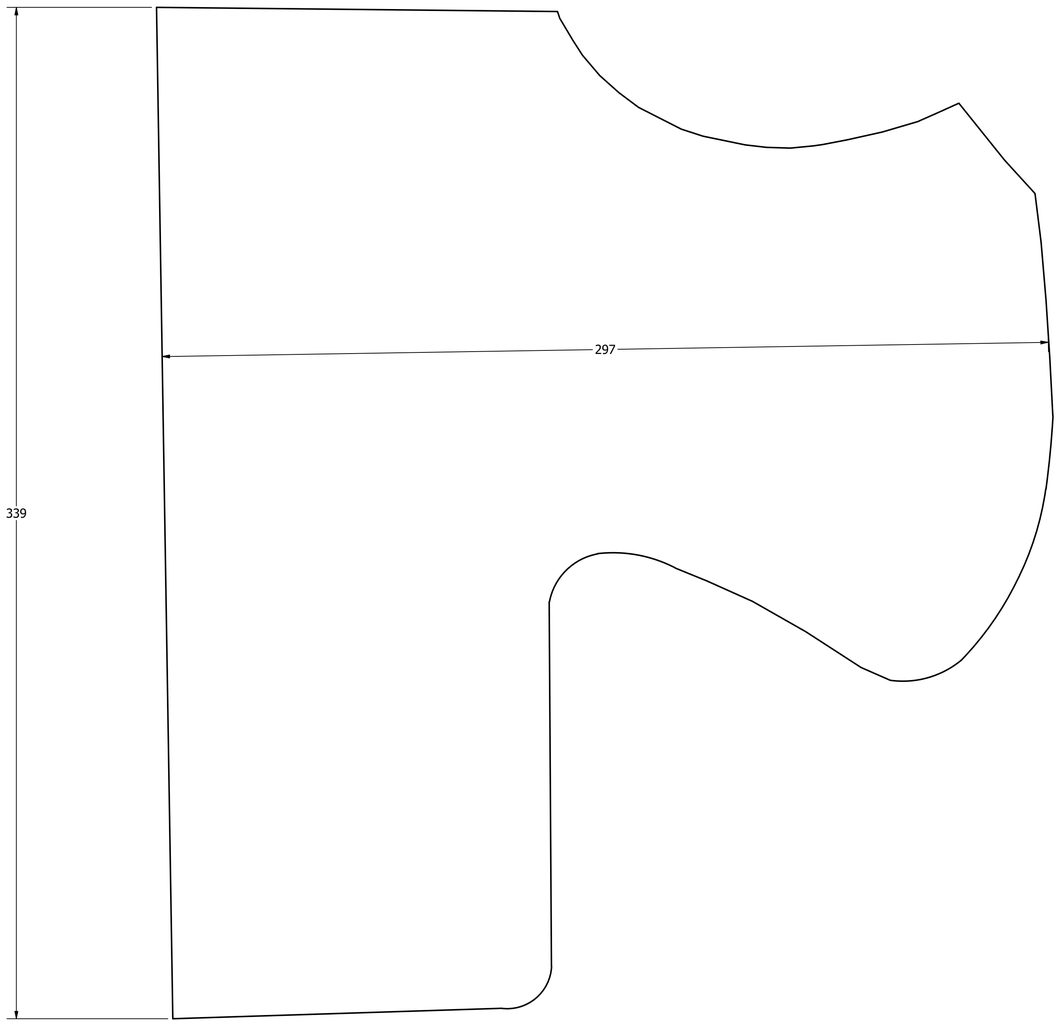
SIZE C | DRAWING NUMBER 474-3823 | REV 1

SCALE: 1:1 | SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AT	JW	5/3/2017



SCALE .5:1



NOTES:

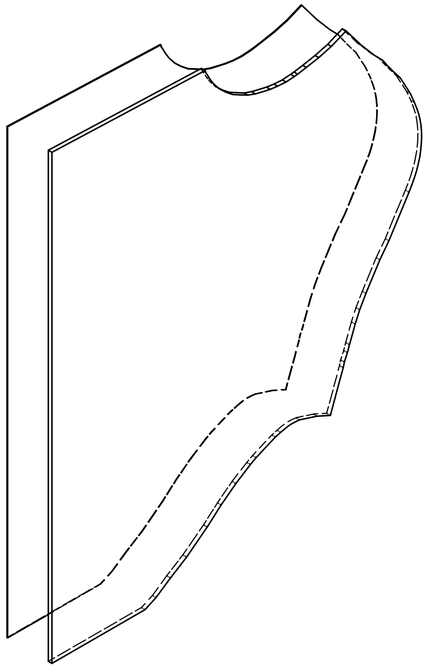
1. MATERIALS STACKING ORDER: NEOPRENE FOAM 5mm THICK
   CORDURA CANVAS

2. ± 3mm APPLY TO ALL DIMENSIONS UNLESS OTHERWISE SPECIFIED.

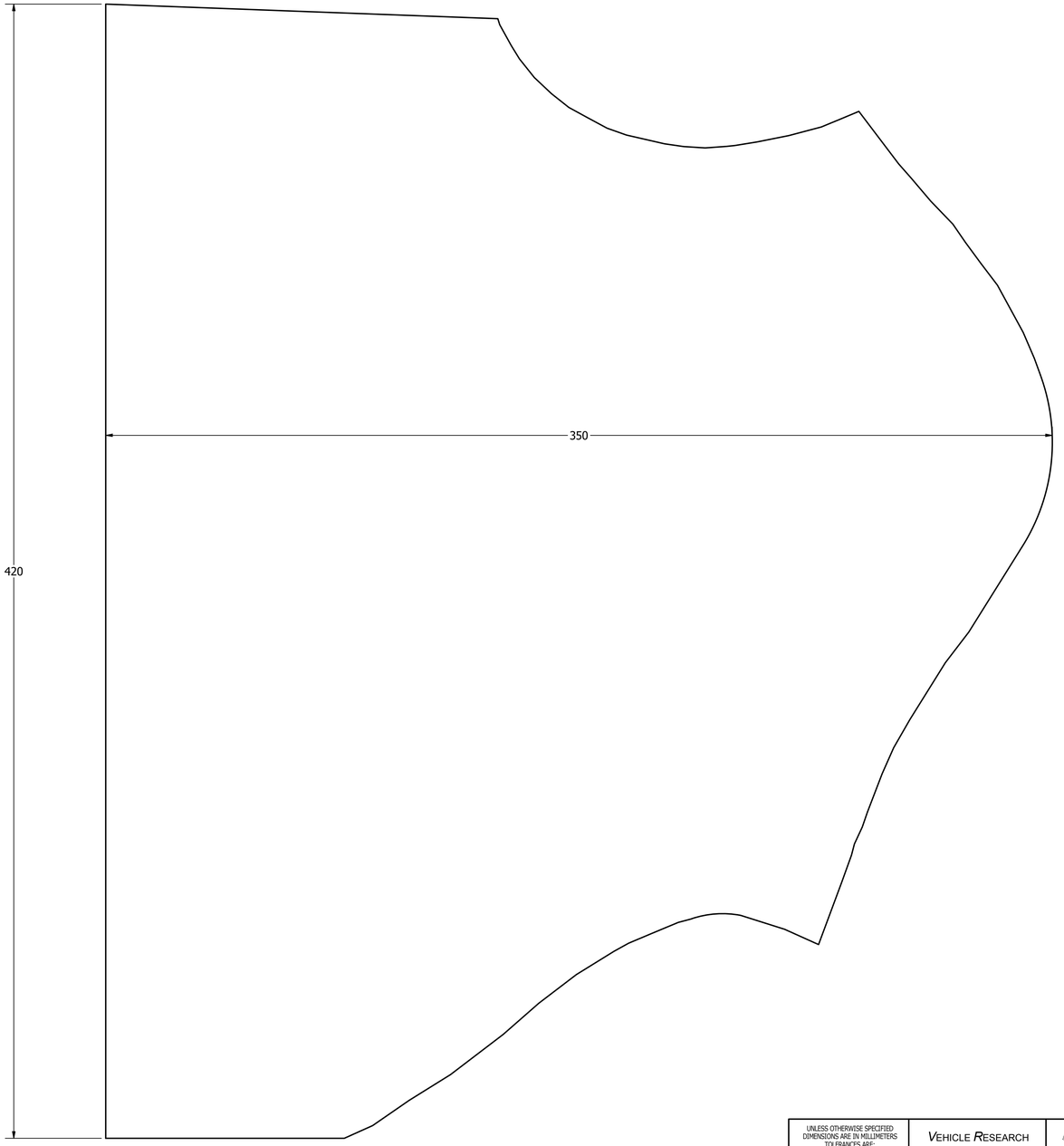
PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS TOLERANCES ARE: DECIMAL: X ±.2, X.X ±.2, X.XX ±.1; MACHINED ☑, ANGLES ±.5°. ASME Y14.5M - 1994. DO NOT SCALE DRAWING	VEHICLE RESEARCH and TEST CENTER	NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
	APPROVALS / DATE	SIDE PAD
DRAWN: atomich	5/3/2017	
MATERIAL: SEE NOTE 1	CHECKED	SIZE: D; DRAWING NUMBER: 474-3822-1; REV: 1
HEAT TREAT	ENG	
FINISH	APPROVED	THIRD ANGLE PROJECTION; SCALE: 1:1; SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AT	JW	5/3/2017



SCALE .5:1



NOTES:

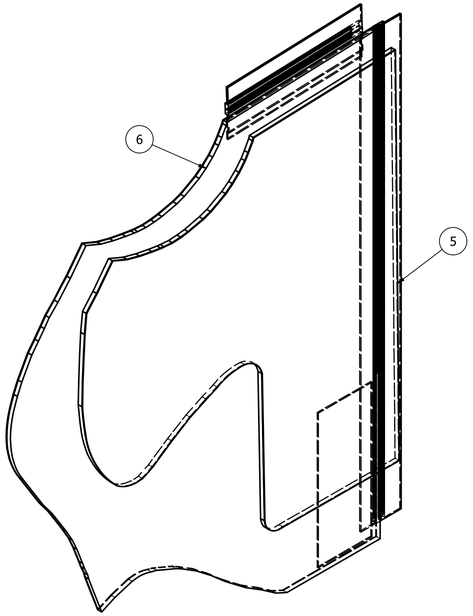
1. MATERIALS STACKING ORDER: CORDURA CANVAS
   NEOPRENE FOAM 5mm THICK

2. ± 3mm APPLY TO ALL DIMENSIONS UNLESS OTHERWISE SPECIFIED.

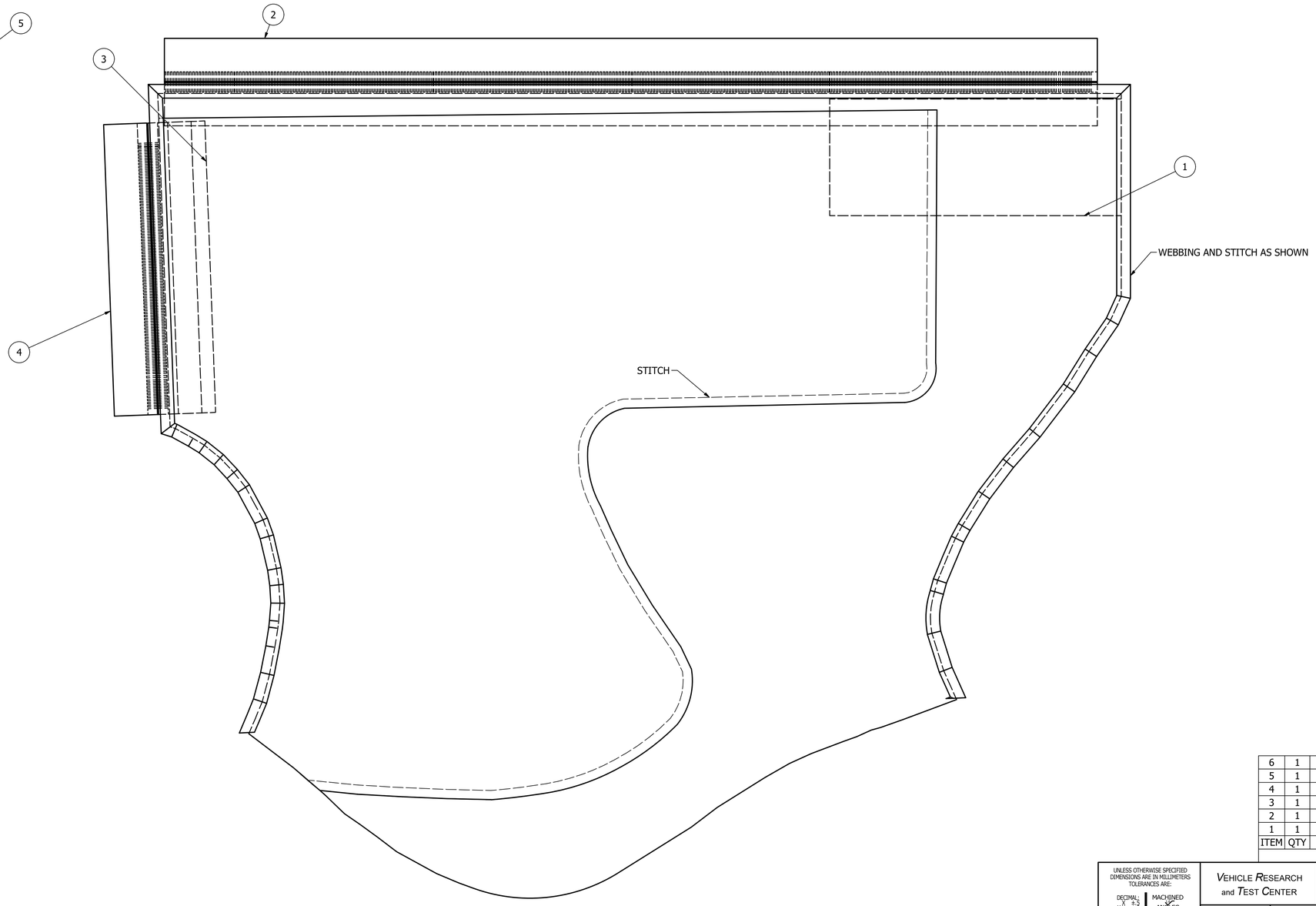
PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS TOLERANCES ARE: DECIMAL: X ±.5, .X ±.2, .XX ±.1; MACHINED ANGLES ±.5° ASME Y14.5M - 1994 DO NOT SCALE DRAWING	VEHICLE RESEARCH and TEST CENTER	NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
	APPROVALS / DATE	SIDE PANEL
MATERIAL: SEE NOTE 1	DRAWN: atomich 5/3/2017	
HEAT TREAT	CHECKED	
FINISH	ENG'G	
	APPROVED	THIRD ANGLE PROJECTION
	SIZE: D	DRAWING NUMBER: 474-3821-1 REV: 1
	SCALE: 1:1	SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AT	JW	5/4/2017



SCALE .5:1



ITEM	QTY	PART NUMBER	DESCRIPTION
6	1	474-3821-2	SIDE PANEL
5	1	474-3822-2	SIDE PAD
4	1	474-3823	ZIPPER SHOULDER 5"
3	1	474-3824	VELCRO FRONT SHOULDER HOOK
2	1	474-3825	ZIPPER FRONT 16"
1	1	474-3826	VELCRO FRONT BOTTOM LOOP

PARTS LIST

NOTES:

1. ALL PARTS ARE STITCHED TOGETHER AS SHOWN.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL
HEAT TREAT
FINISH

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN atomich	5/4/2017
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

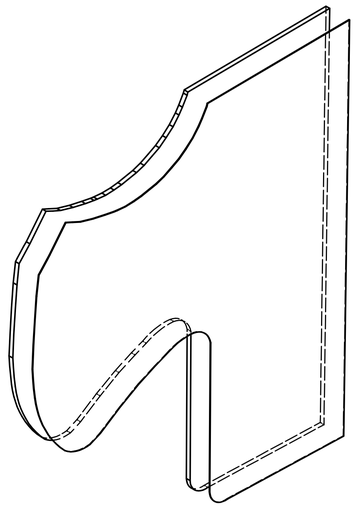
RIGHT SIDE ASSEMBLY

THIRD ANGLE PROJECTION

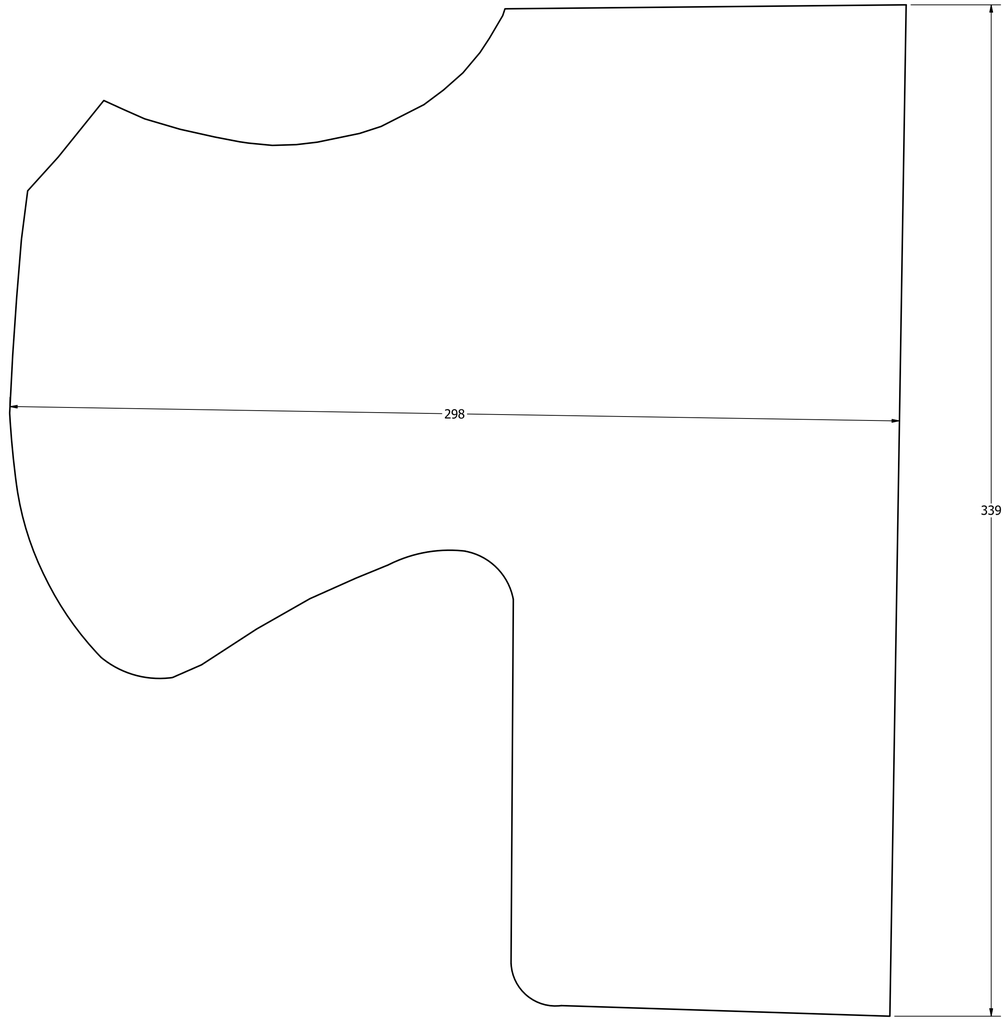
SIZE D | DRAWING NUMBER 474-3820-2 | REV 1

SCALE: 1:1 | SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AT	JW	5/2/2017



SCALE .5:1



NOTES:

1. MATERIALS: NEOPRENE FOAM 5mm THICK
   CORDURA CANVAS

2. ± 3mm APPLY TO ALL DIMENSIONS UNLESS OTHERWISE SPECIFIED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTE 1
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: atomich	5/2/2017
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

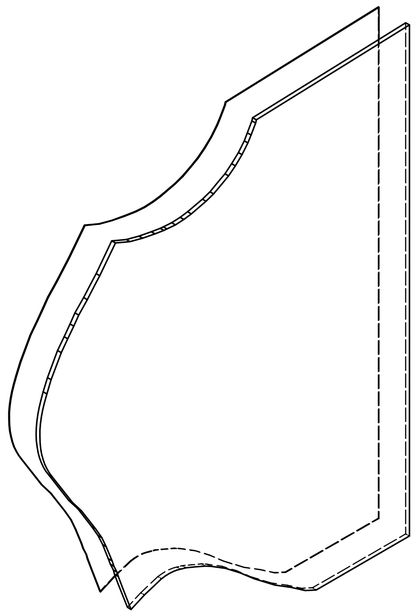
SIDE PAD

THIRD ANGLE PROJECTION

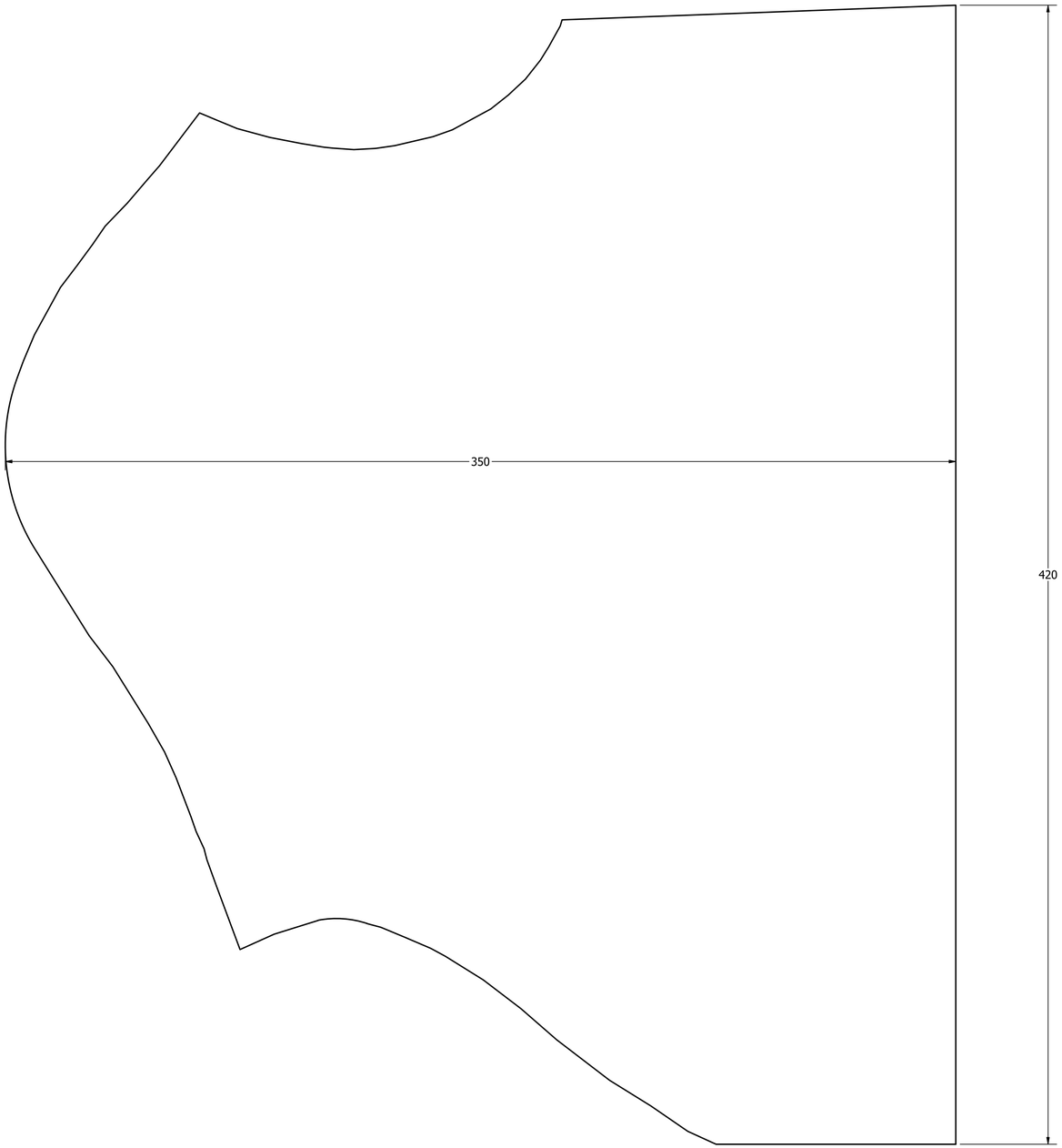
SIZE	DRAWING NUMBER	REV
D	474-3822-2	1

SCALE: 1:1 SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AT	JW	5/2/2017



SCALE .5:1



NOTES:

1. MATERIALS STACKING ORDER: CORDURA CANVAS
   NEOPRENE FOAM 5mm THICK

2. ± 3mm APPLY TO ALL DIMENSIONS UNLESS OTHERWISE SPECIFIED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.2, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTE 1
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: atomich	5/2/2017
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

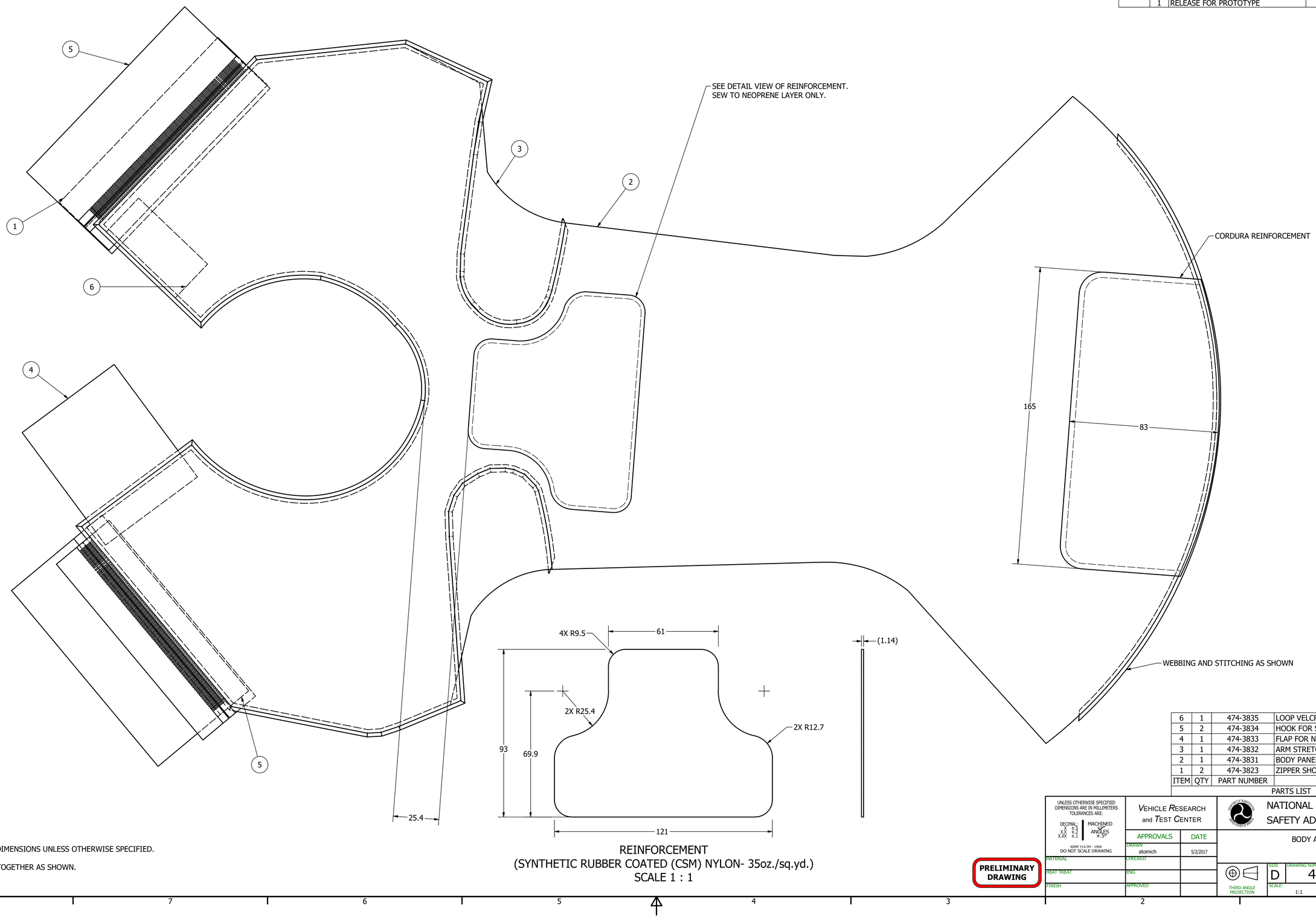
SIDE PANEL

THIRD ANGLE PROJECTION

SIZE	DRAWING NUMBER	REV
D	474-3821-2	1

SCALE: 1:1 SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AT	JW	5/2/2017



REINFORCEMENT
(SYNTHETIC RUBBER COATED (CSM) NYLON- 35oz./sq.yd.)
SCALE 1 : 1

ITEM	QTY	PART NUMBER	DESCRIPTION
6	1	474-3835	LOOP VELCRO FRONT NECK
5	2	474-3834	HOOK FOR SHOULDERS
4	1	474-3833	FLAP FOR NECK
3	1	474-3832	ARM STRETCH
2	1	474-3831	BODY PANELS
1	2	474-3823	ZIPPER SHOULDER 5"

PARTS LIST

NOTES:

1. ± 3mm APPLY TO ALL DIMENSIONS UNLESS OTHERWISE SPECIFIED.

2. PARTS ARE STITCHED TOGETHER AS SHOWN.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, XX ±.2, XXX ±.1 | MACHINED ∠ ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

BODY ASSEMBLY

	APPROVALS	DATE
DRAWN	atomich	5/2/2017
CHECKED		
ENG		
APPROVED		

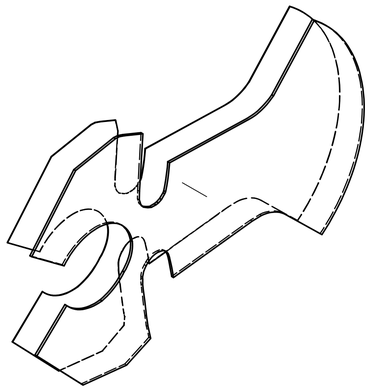
MATERIAL
HEAT TREAT
FINISH

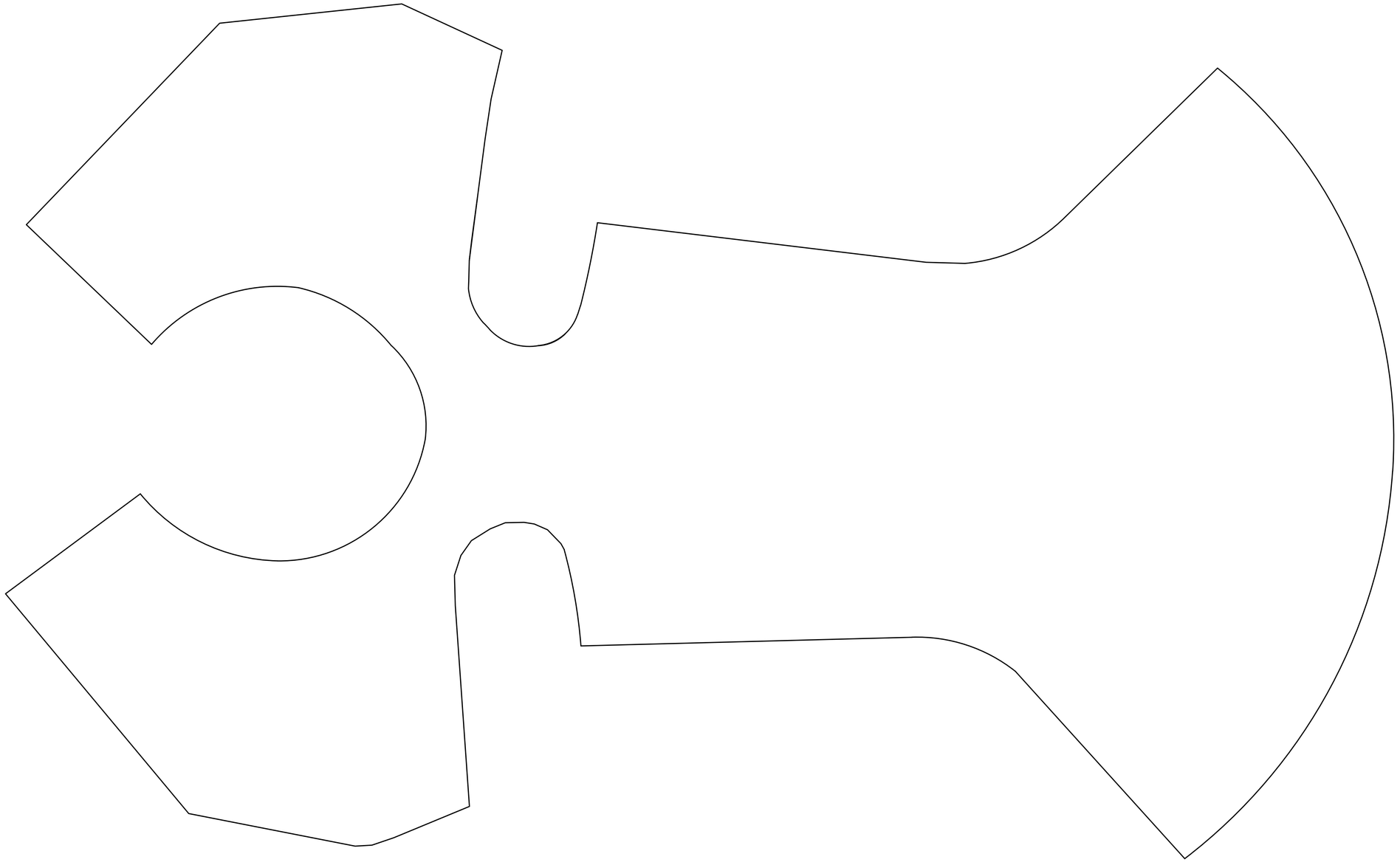
THIRD ANGLE PROJECTION

SIZE D | DRAWING NUMBER 474-3830 | REV 1

SCALE: 1:1 | SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AT	JW	5/3/2017





NOTES:

1. MATERIALS STACKING ORDER: 1. CORDURA CANVAS
   2. NEOPRENE FOAM 5mm THICK

2. ± 3mm APPLY TO ALL DIMENSIONS UNLESS OTHERWISE SPECIFIED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±1, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±1.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTE 1
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

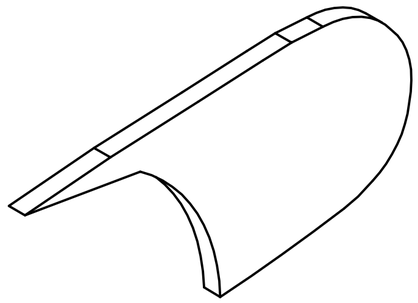
APPROVALS	DATE
DRAWN: atomich	5/3/2017
CHECKED:	
ENG:	
APPROVED:	

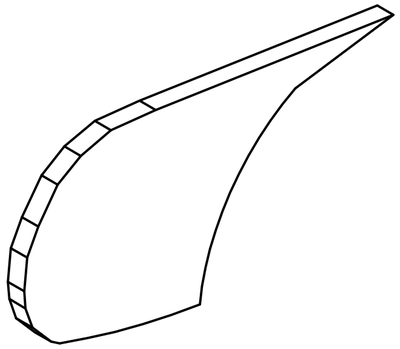
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

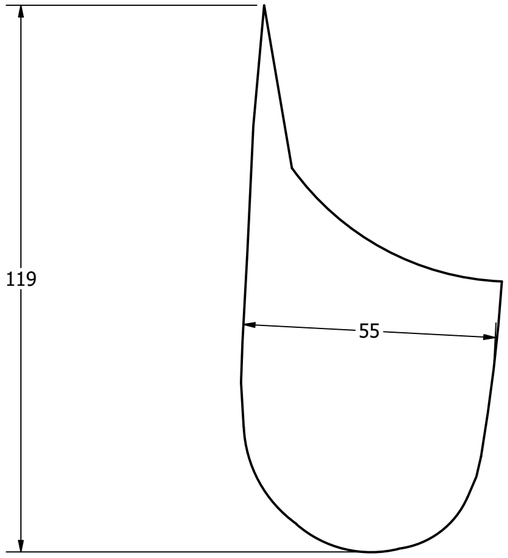
BODY PANELS

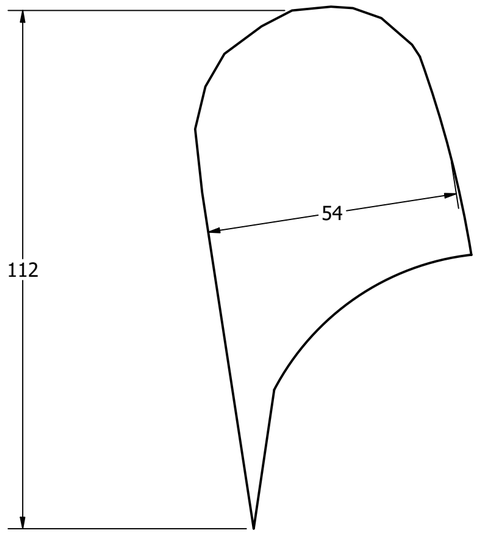
THIRD ANGLE PROJECTION | SIZE: D | DRAWING NUMBER: 474-3831 | REV: 1 | SCALE: 1:1 | SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AT	JW	5/2/2017









NOTES:

1. MATERIAL: NEOPRENE FOAM 5mm THICK

2. ± 3mm APPLY TO ALL DIMENSIONS UNLESS OTHERWISE SPECIFIED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTE 1
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: atomich	5/2/2017
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

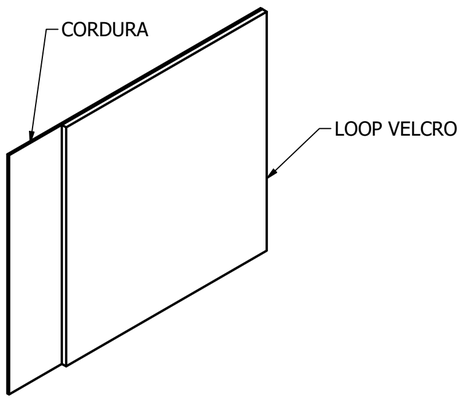
ARM STRETCH

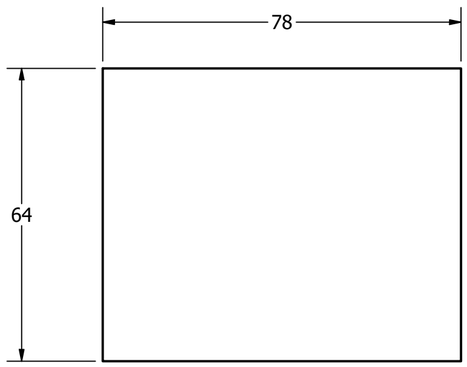
THIRD ANGLE PROJECTION

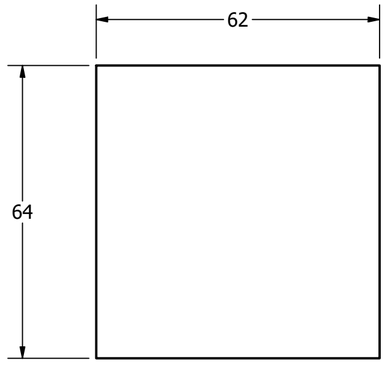
SIZE: C | DRAWING NUMBER: 474-3832 | REV: 1

SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE TO PROTOTYPE	AT	JW	5/2/2017







NOTES:

1. MATERIAL STACK: 1. CORDURA
   2. LOOP VELCRO

2. ± 3mm APPLY TO ALL DIMENSIONS UNLESS OTHERWISE SPECIFIED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTE 1
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: atomich	5/2/2017
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

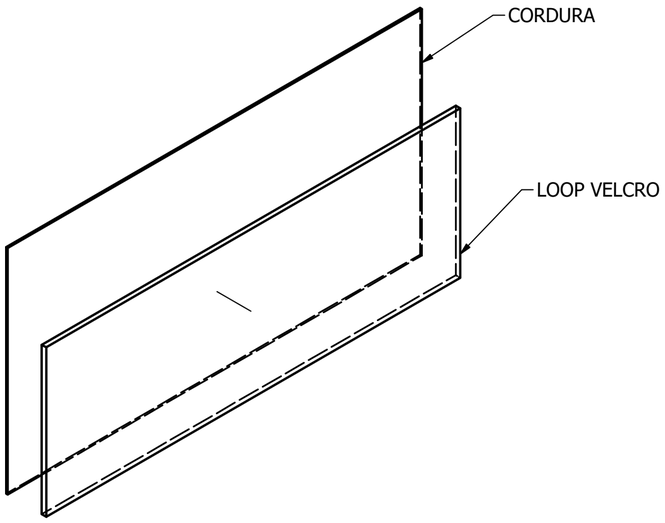
FLAP FOR NECK

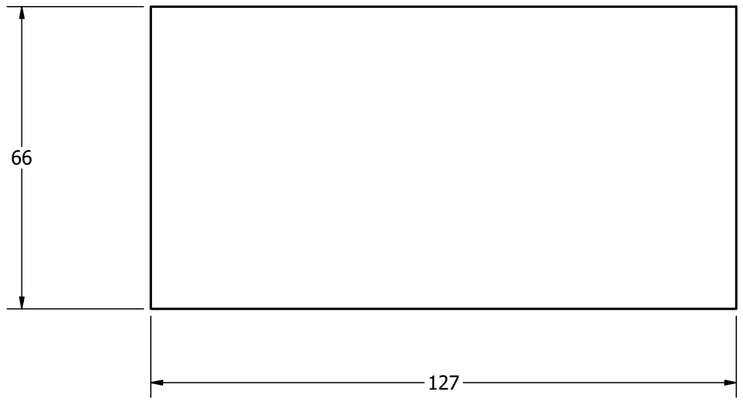
THIRD ANGLE PROJECTION

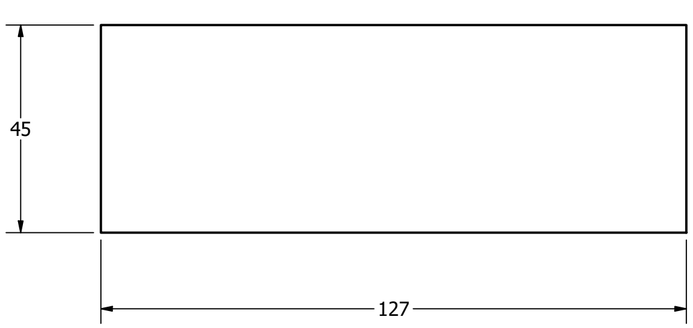
SIZE: C | DRAWING NUMBER: 474-3833 | REV: 1

SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AT	JW	5/2/2017







NOTES:

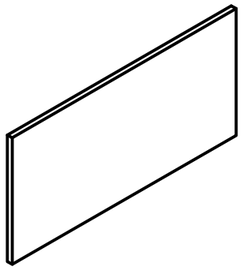
1. MATERIAL STACK: 1. CORDURA
   2. LOOP VELCRO

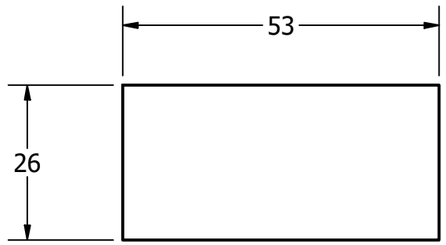
2. ± 3mm APPLY TO ALL DIMENSIONS UNLESS OTHERWISE SPECIFIED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS TOLERANCES ARE: DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5° ASME Y14.5M - 1994 DO NOT SCALE DRAWING	VEHICLE RESEARCH and TEST CENTER	NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
	APPROVALS / DATE	HOOK FOR SHOULDERS
DRAWN: atomich	5/2/2017	
MATERIAL: SEE NOTE 1	CHECKED	
HEAT TREAT	ENG	
FINISH	APPROVED	
THIRD ANGLE PROJECTION	SIZE: C / DRAWING NUMBER: 474-3834 / REV: 1 / SCALE: 1:1 / SHEET: 1 OF 1	

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	AT	JW	5/4/2017





NOTES:

1. MATERIAL: HOOK VELCRO.

2. ± 3mm APPLY TO ALL DIMENSIONS UNLESS OTHERWISE SPECIFIED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED & ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: SEE NOTE 1
HEAT TREAT:
FINISH:

*V*EHICLE *R*ESEARCH and *T*EST *C*ENTER

APPROVALS	DATE
DRAWN: atomich	5/4/2017
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

LOOP VELCRO FRONT NECK

THIRD ANGLE PROJECTION

SIZE: B | DRAWING NUMBER: 474-3835 | REV: 1

SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JPM	JW	12/5/17

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	10-474-0001	LEFT H-POINT ASSEMBLY
2	1	10-474-0002	RIGHT H-POINT ASSEMBLY
3	2	5000093	M6 x 1 LOCK NUT (SEE NOTE 1)
4	2	5000486	M8 x 1.25 LOCK NUT (SEE NOTE 1)

NOTES:

1. ADDITIONAL LOCK NUTS FOR THE SHOULDERS.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN J. MCINNIS	12/5/2017
MATERIAL	
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HEAT TREAT	
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FINISH	
APPROVED	

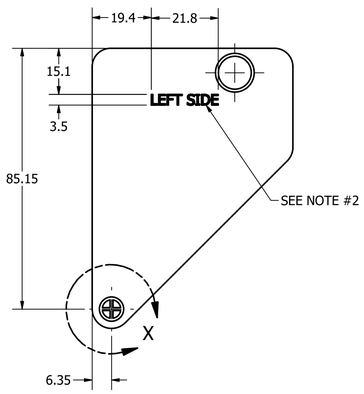
THOR-05F TOOLKIT

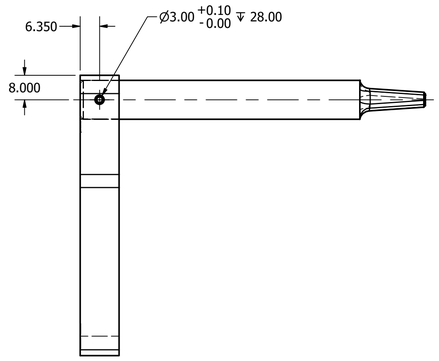
THIRD ANGLE PROJECTION

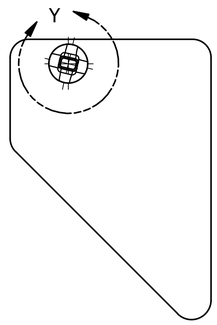
SIZE A3 | DRAWING NUMBER 474-TOOLKIT | REV 1

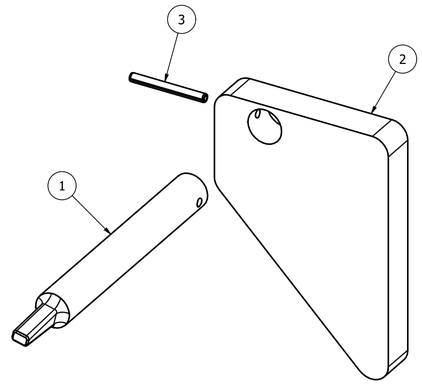
SCALE: N/A | SHEET 1 OF 1

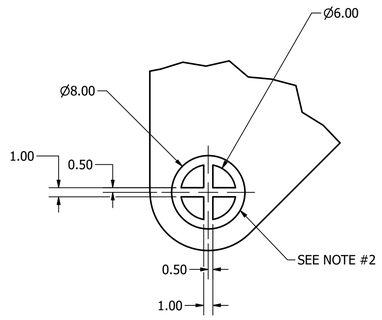
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASED FOR PROTOTYPE	JPM		12/6/17



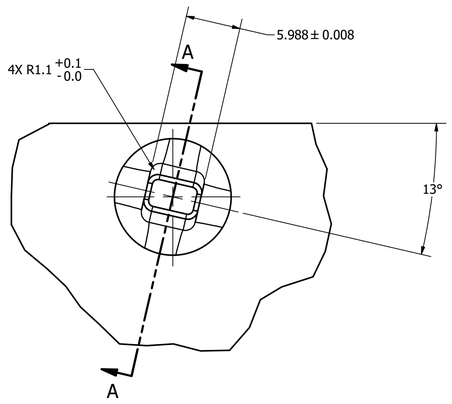




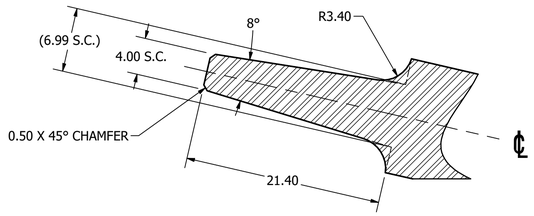




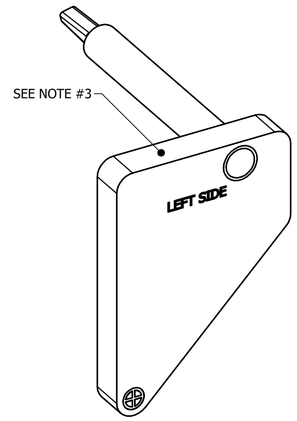
DETAIL X
SCALE 3 : 1



DETAIL Y
SCALE 3 : 1



SECTION A-A
SCALE 3 : 1



ITEM	QTY	PART NUMBER	DESCRIPTION
3	1	5000269	M3 X 28 LG. ROLL PIN
2	1	10-474-0003	H-POINT PLATE
1	1	10-474-0004	H-POINT SHAFT

PARTS LIST

NOTES:

1. DIMENSIONS ARE SYMMETRICAL ABOUT ℄ UNLESS OTHERWISE NOTED.
2. ENGRAVE PLATE WHERE SHOWN 0.1mm DEEP.
3. PELVIS ANGLE SURFACE.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.2, .XX ±.1, .XXX ±.1 | MACHINED ∠C ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL
HEAT TREAT
FINISH

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN A. Barchock	12/5/2017
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

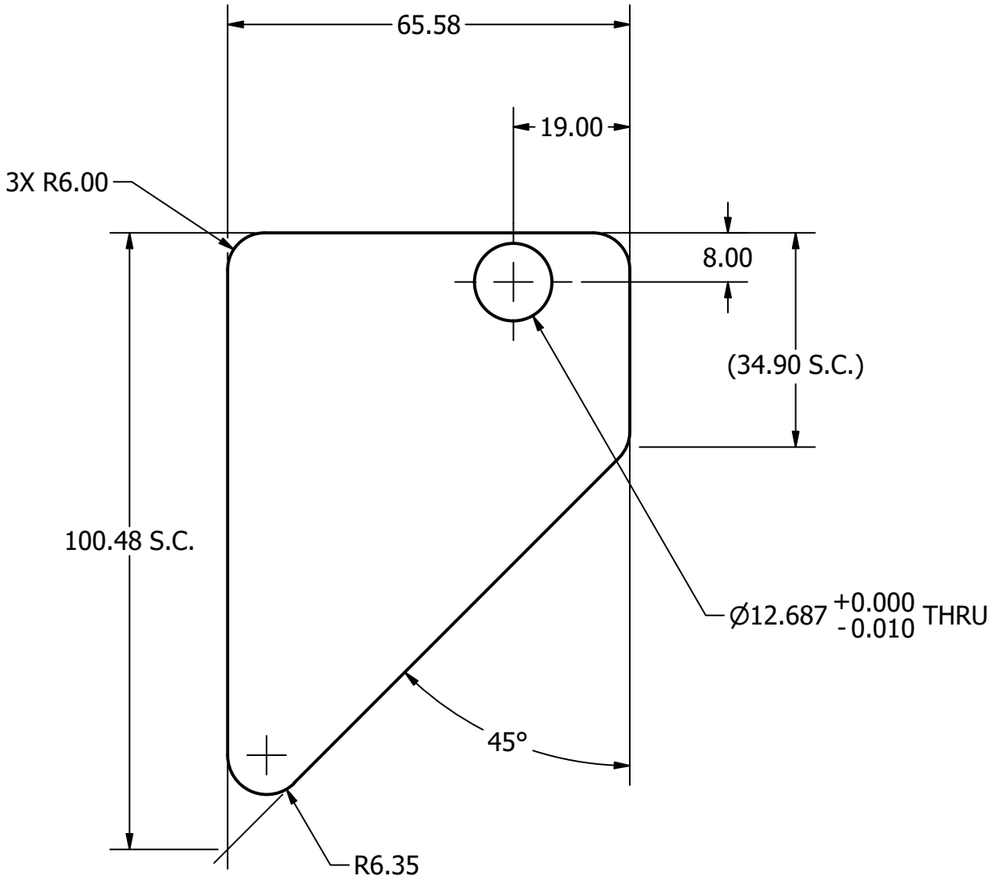
LEFT H-POINT ASSEMBLY

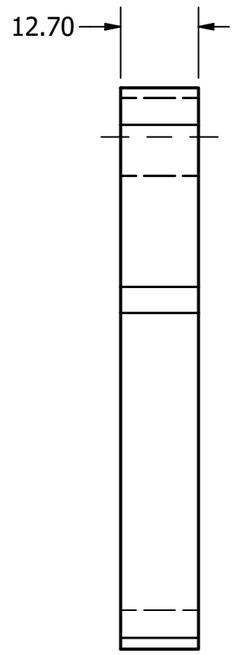
THIRD ANGLE PROJECTION

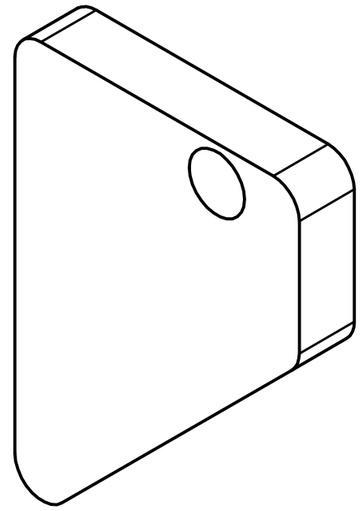
SIZE A1 | DRAWING NUMBER 10-474-0001 | REV 1

SCALE: 1:1 | SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JPM		12/6/17







PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: J. MCINNIS	12/5/2017
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

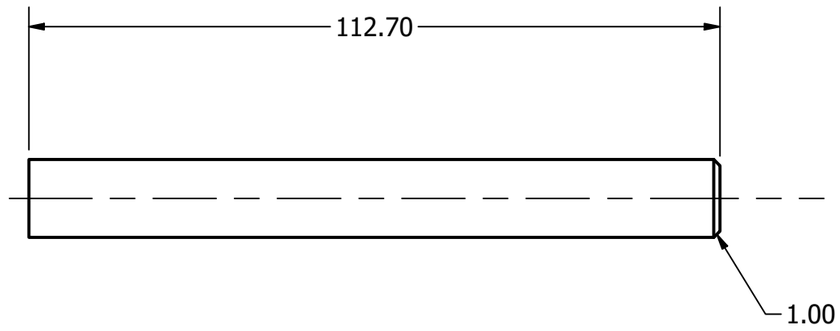
H-POINT PLATE

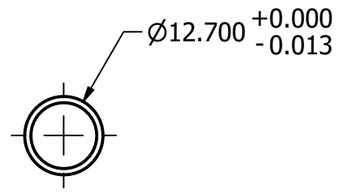
THIRD ANGLE PROJECTION

SIZE: A3 | DRAWING NUMBER: 10-474-0003 | REV: 1

SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JPM		12/6/17







PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED SURFACES
ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL	303 STAINLESS STEEL
HEAT TREAT	
FINISH	

*V*EHICLE *R*ESEARCH and *T*EST *C*ENTER

APPROVALS	DATE
DRAWN J. MCINNIS	12/5/2017
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

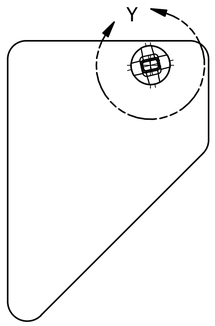
H-POINT SHAFT

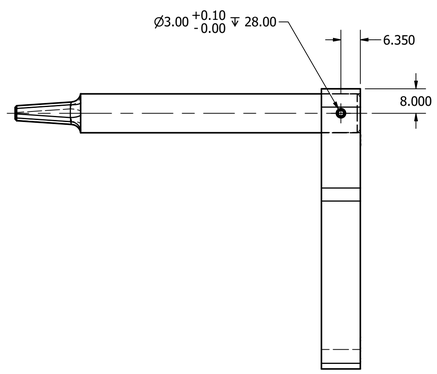
THIRD ANGLE PROJECTION

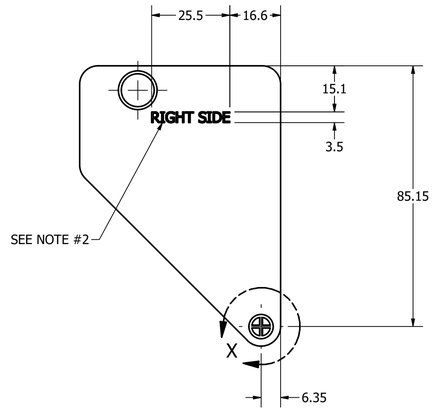
SIZE	DRAWING NUMBER	REV
A3	10-474-0004	1

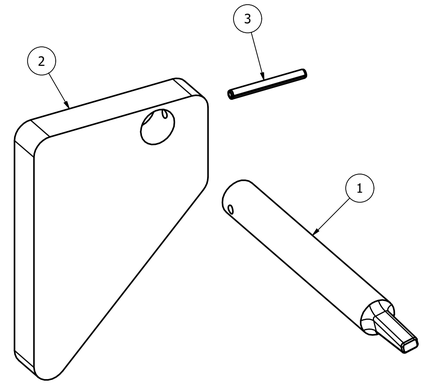
SCALE: 1:1 SHEET 1 OF 1

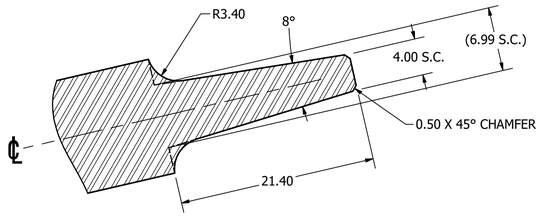
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JPM		12/7/17



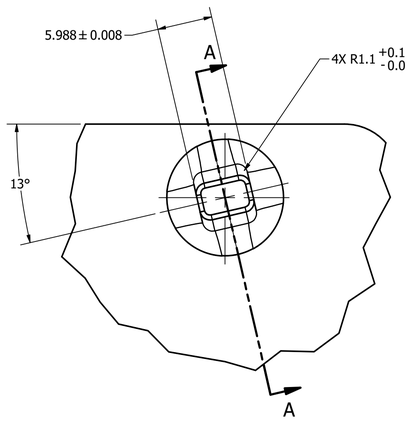




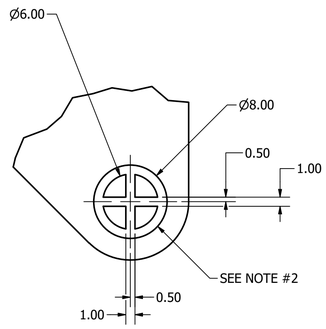




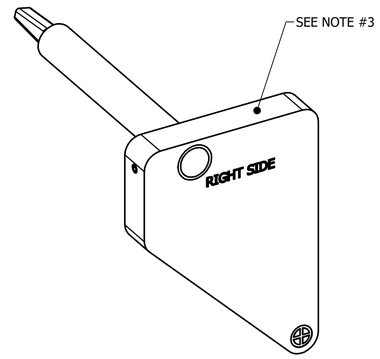
SECTION A-A
SCALE 3 : 1



DETAIL Y
SCALE 3 : 1



DETAIL X
SCALE 3 : 1



NOTES:

1. DIMENSIONS ARE SYMMETRICAL ABOUT ℄ UNLESS OTHERWISE NOTED.
2. ENGRAVE PLATE WHERE SHOWN 0.1mm DEEP.
3. PELVIS ANGLE SURFACE.

ITEM	QTY	PART NUMBER	DESCRIPTION
3	1	5000269	M3 X 28 LG. ROLL PIN
2	1	10-474-0003	H-POINT PLATE
1	1	10-474-0004	H-POINT SHAFT

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMALS: X ±.2, X.X ±.1, X.XX ±.1
MACHINED ∠C ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL
HEAT TREAT
FINISH

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN A. Barchock	12/5/2017
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

RIGHT H-POINT ASSEMBLY

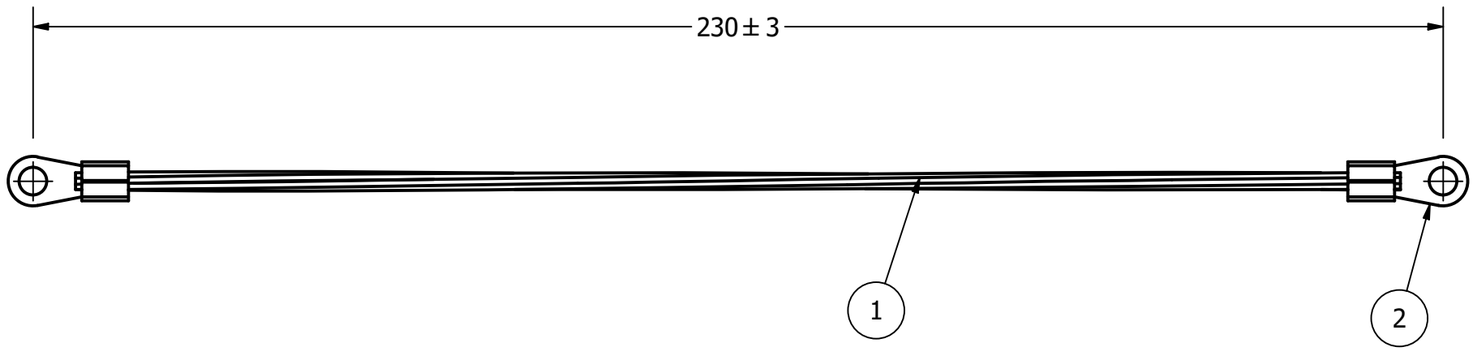
THIRD ANGLE PROJECTION

SIZE A1 | DRAWING NUMBER 10-474-0002 | REV 1

SCALE: 1:1 | SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	5/11/2016





ITEM	QTY	PART NUMBER	DESCRIPTION
2	2	6002978	METRIC RING TERMINAL M4 NON-INSULATED
1	1	6002273	BRAID, TINNED COPPER TUBULAR 1/8"

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED √ | ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

PRELIMINARY DRAWING

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN B. KIMES	5/11/2016
CHECKED	
ENG	
APPROVED	

MATERIAL
HEAT TREAT
FINISH

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

GROUND CABLE, HEAD/NECK

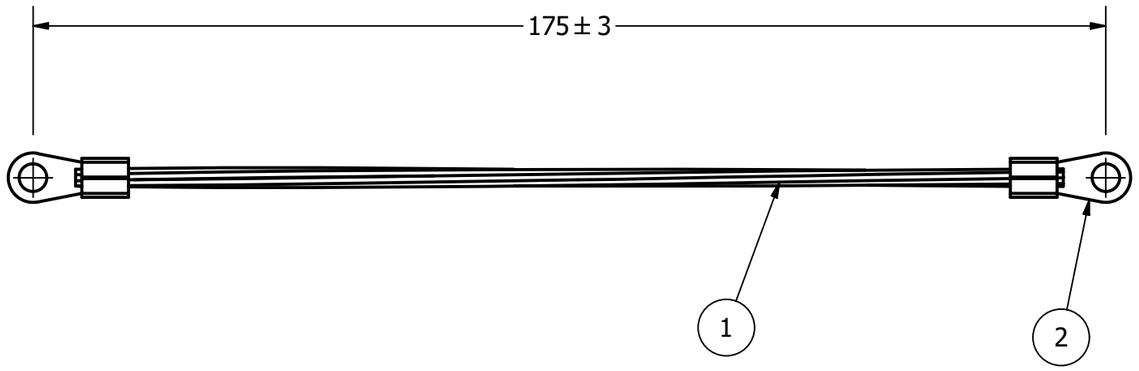
THIRD ANGLE PROJECTION

SIZE A3 | DRAWING NUMBER 474-01AB | REV 1

SCALE: 1:1 | SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	5/11/2016





ITEM	QTY	PART NUMBER	DESCRIPTION
2	2	6002978	METRIC RING TERMINAL M4 NON-INSULATED
1	1	6002273	BRAID, TINNED COPPER TUBULAR 1/8"

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ±.5° | ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

PRELIMINARY DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN B. KIMES	5/11/2016
CHECKED	
ENG	
APPROVED	

MATERIAL
HEAT TREAT
FINISH

GROUND CABLE, THORAX

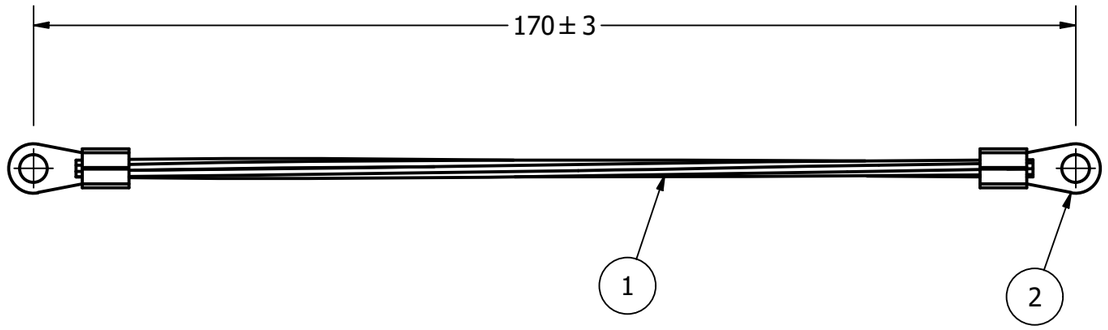
THIRD ANGLE PROJECTION

SIZE A3 | DRAWING NUMBER 474-02AB | REV 1

SCALE: 1:1 | SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	5/11/2016





ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	6002273	BRAID, TINNED COPPER TUBULAR 1/8"
2	2	6002978	METRIC RING TERMINAL M4 NON-INSULATED

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ±.5°
ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

PRELIMINARY DRAWING

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN B. KIMES	5/11/2016
CHECKED	
ENG	
APPROVED	

MATERIAL
HEAT TREAT
FINISH

DEPARTMENT OF TRANSPORTATION UNITED STATES OF AMERICA

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

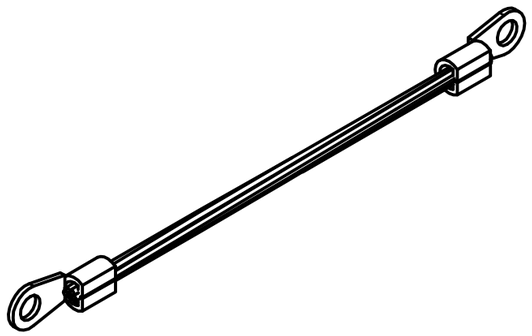
GROUND CABLE, LUMBAR

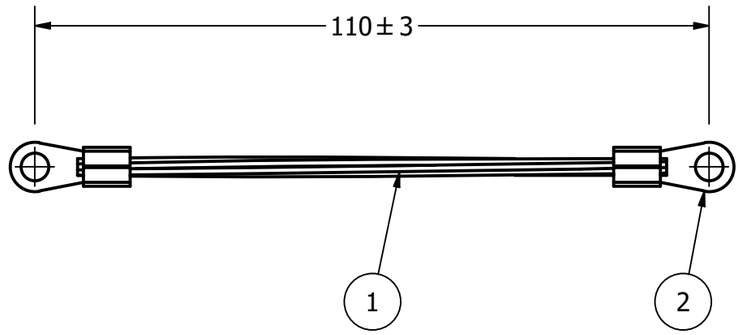
THIRD ANGLE PROJECTION

SIZE A3 | DRAWING NUMBER 474-03AB | REV 1

SCALE: 1:1 | SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	5/11/2016





ITEM	QTY	PART NUMBER	DESCRIPTION
2	2	6002978	METRIC RING TERMINAL M4 NON-INSULATED
1	1	6002273	BRAID, TINNED COPPER TUBULAR 1/8"

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

GROUND CABLE, LOWER LEG

APPROVALS	DATE
DRAWN: B. KIMES	5/11/2016
CHECKED	
ENG	
APPROVED	

MATERIAL
HEAT TREAT
FINISH

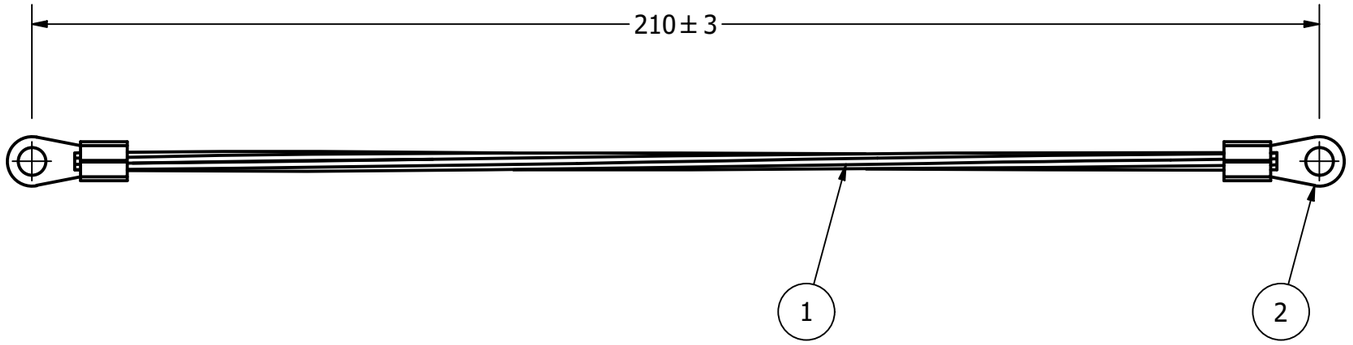
THIRD ANGLE PROJECTION

SIZE: A3 | DRAWING NUMBER: 474-04AB | REV: 1

SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	5/11/2016





ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	6002273	BRAID, TINNED COPPER TUBULAR 1/8"
2	2	6002978	METRIC RING TERMINAL M4 NON-INSULATED

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN: B. KIMES	5/11/2016
MATERIAL	
CHECKED	
HEAT TREAT	
ENG	
FINISH	
APPROVED	

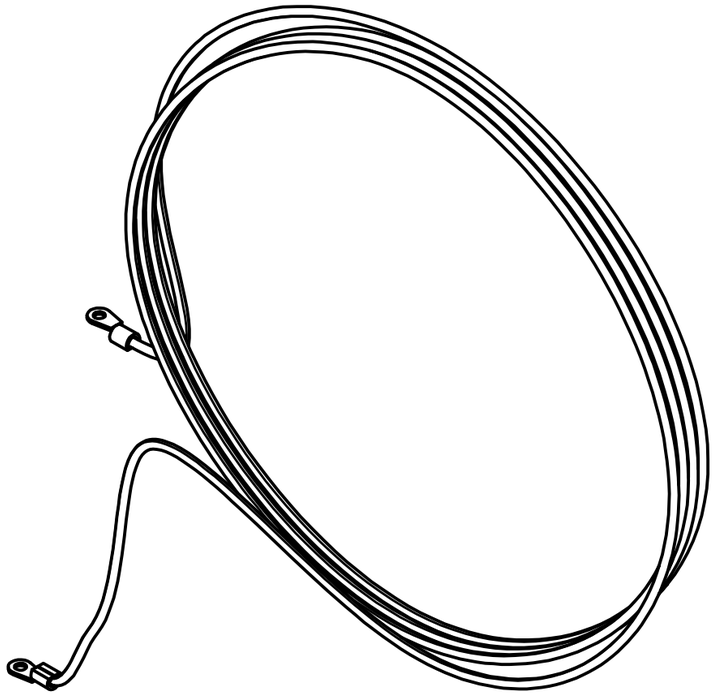
GROUND CABLE, UPPER LEG

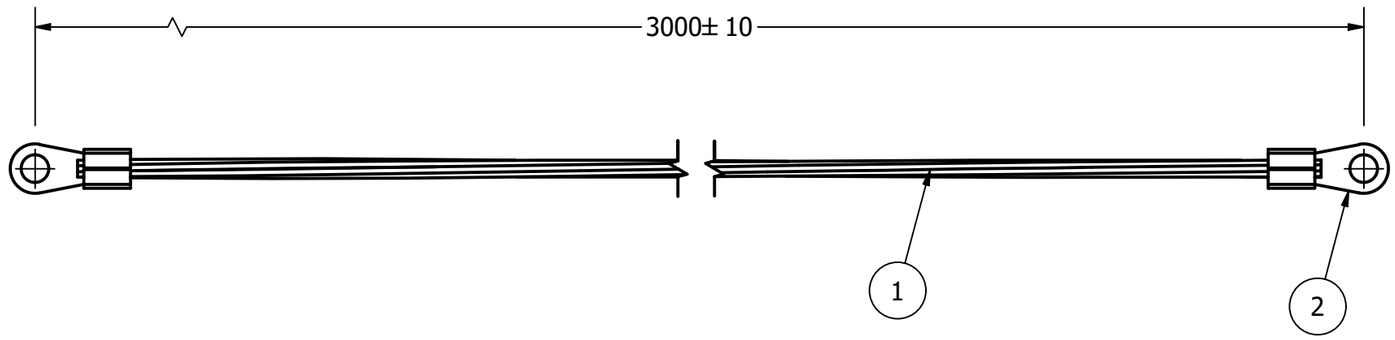
THIRD ANGLE PROJECTION

SIZE: A3 | DRAWING NUMBER: 474-05AB | REV: 1

SCALE: 1:1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	5/18/2016





ITEM	QTY	PART NUMBER	DESCRIPTION
2	2	6002978	METRIC RING TERMINAL M4 NON-INSULATED
1	1	6002273	BRAID, TINNED COPPER TUBULAR 1/8"

PARTS LIST

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN B. KIMES	5/18/2016
CHECKED	
ENG	
APPROVED	

MATERIAL
HEAT TREAT
FINISH

GROUND CABLE, EXIT

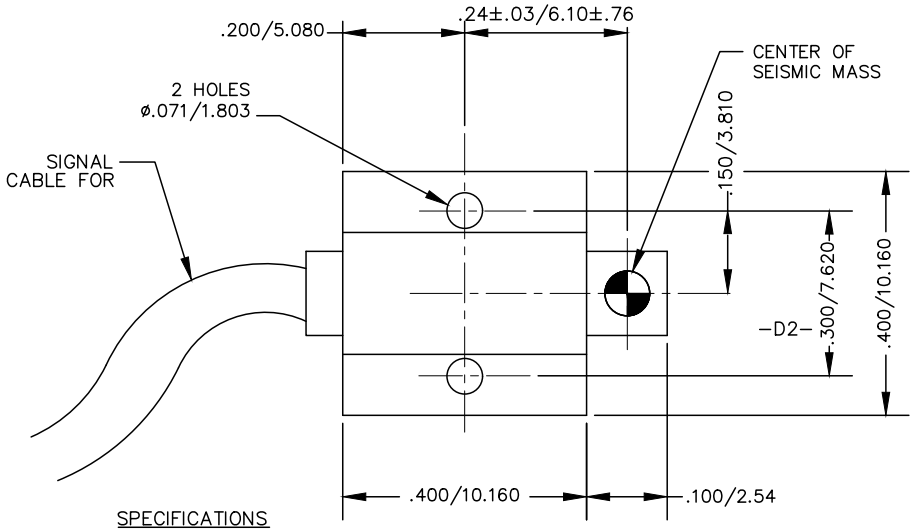
THIRD ANGLE PROJECTION

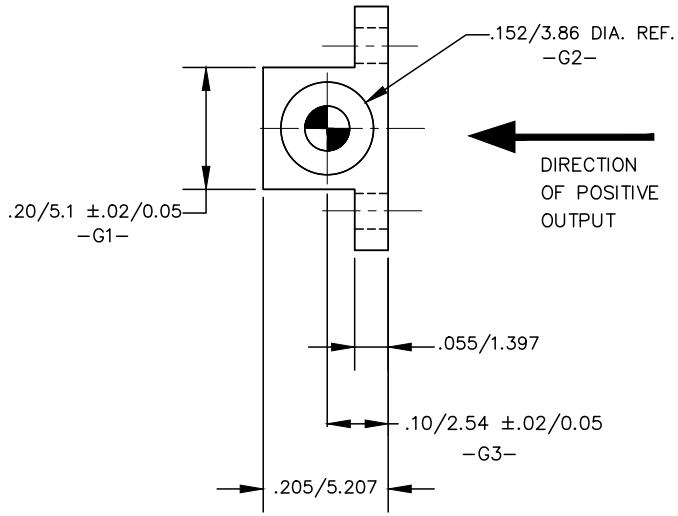
SIZE A3 | DRAWING NUMBER 474-06AB | REV 1

SCALE: 1:1 | SHEET 1 OF 1

REVISION RECORD

ITEM NO.	BY	DATE	DESCRIPTION
–G1–	DMW	10/3/2017	DIMENSION .20/5.0 ++P.02/0.05 WAS .02/0.05
–G2–			DIMENSION .152/3.86 DIA. REF. WAS .152/3.86 DIA.
–G3–			DIMENSION .10/2.54 ±.02/0.05 WAS .10/2.54
–G4–			SENSITIVITY WAS .20 mV/g MIN.
–G5–			DAMPING RATIO WAS UNDAMPED (.005)
–G6–			NON–LINEARITY & HYSTERESIS WAS ±2% MAX.
–G7–			ZERO OFFSET WAS ±25 mV
–G8–			EXCITATION WAS 10V DC
–G9–			THERMAL SENSITIVITY SHIFT WAS THERMAL SENSITIVITY –5% Typ. AT 0° F TO 150° F
–G10–			ADDED THERMAL ZERO SHIFT
–G11–			TEMPERATURE EXPOSURE – OPERATING 0° F TO +150° F [–18° C TO +66° C]
–G12–			MASS ≤1.4 GRAM (WITHOUT CABLE) WAS WEIGHT 1 gram (WITHOUT CABLE)





SPECIFICATIONS

	RANGE	±2000 g
–G4–	SENSITIVITY	0.20 mV/g TYP. AT 100Hz, 10g PEAK AT 10Vdc
	MOUNTED RESONANCE FREQUENCY	22,000 Hz.
	SIGNAL OUTPUT MUST BE COMPATIBLE AND RECORDABLE IN A DATA CHANNEL AS DEFINED BY SAE J211	
–G5–	DAMPING RATIO	0.005
	TRANSVERSE SENSITIVITY	±1% MAX.
–G6–	NON–LINEARITY & HYSTERESIS	±2% MAX.OF READING, TO FULL RANGE
–G7–	ZERO OFFSET	50 mV MAX.
–G8–	EXCITATION	2 to 10 Vdc
–G9–	THERMAL SENSITIVITY SHIFT	MAX. –0.10%/°C TYP. FROM 0°F TO +150° F
–G10–	THERMAL ZERO SHIFT	FROM 0° F TO +150°(–18°C TO +66°C), REF. 75° F (24°C)
–G11–	TEMPERATURE EXPOSURE OPERATING	0° F TO +150° F [–18° C TO +66° C]
–G12–	MASS	≤1.4 GRAM (WITHOUT CABLES)
	HUMIDITY	SEALED

UNITS ARE in/mm

TOLERANCES ARE: *

DECIMALS ANGLES
.X ±0.1/2.5 + 0.5°
.XX ±0.01/.25
.XXX ±0.005/.127
* unless otherwise noted

MATERIAL:

SCALE NONE

APPROVALS	DATE
DRAWN GTE	3/5/98
CHECKED	
ENG J McF H.P.	

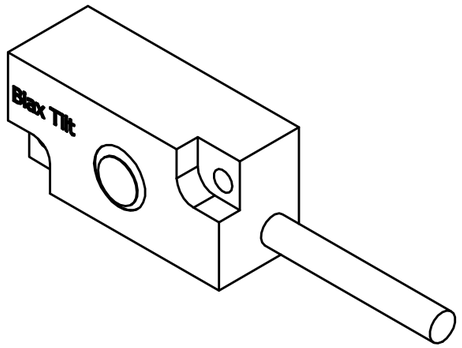
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

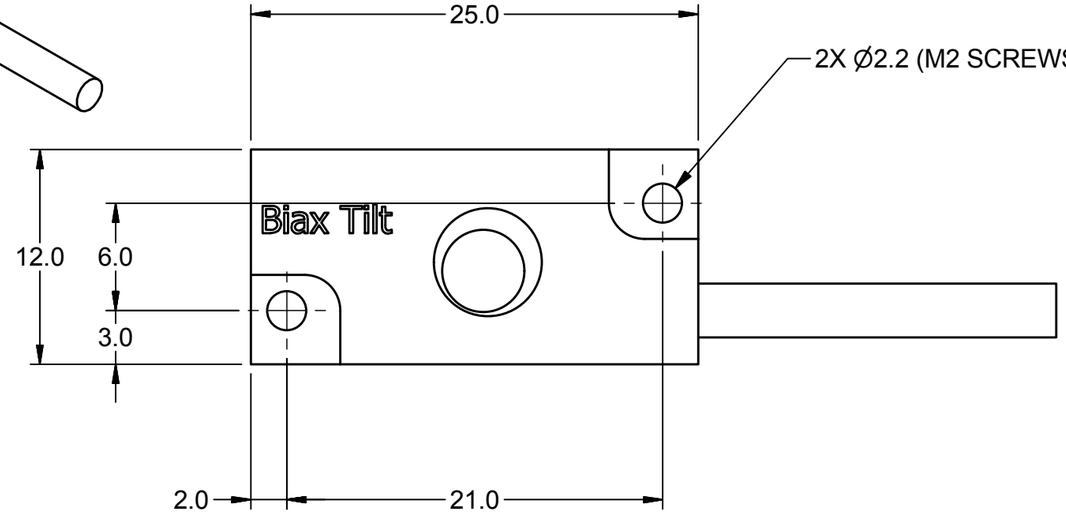
UNIAXIAL PIEZORESISTIVE ACCELEROMETER

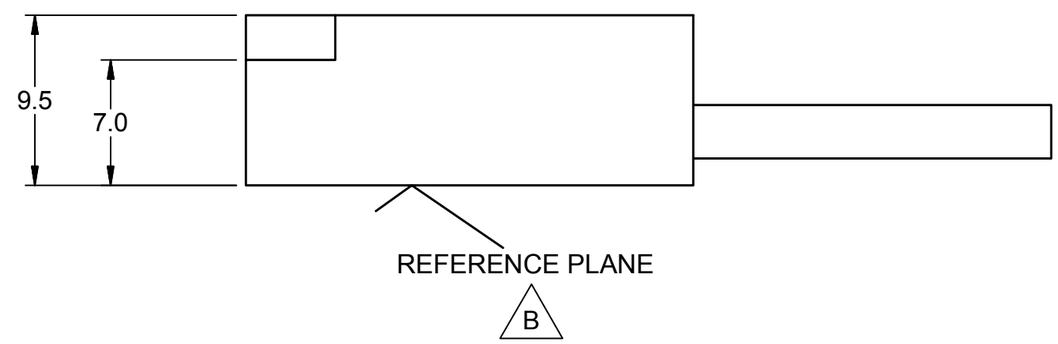
HYBRID III DUMMY FAMILY

SIZE	DRAWING NUMBER	REV
A	SA572–S4	G

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	A	SPEC RELEASE	BK	JW	5/13/2013
	B	ADDED NONLINEARITY TO TILT SENSOR SPECIFICATIONS AND REFERANCE PLANE TO FRONT VIEW	DW		5/25/2016







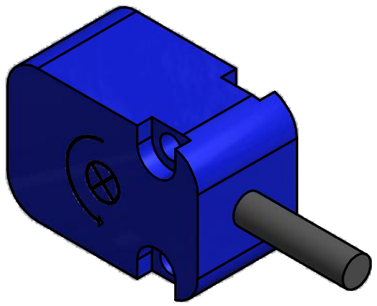
TILT SENSOR SPECIFICATION:

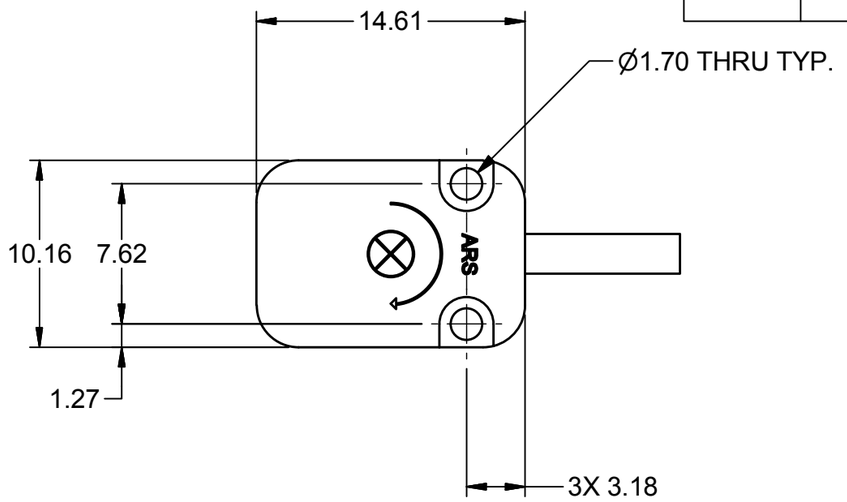
MASS: 5g
RANGE: ±80°
RESOLUTION: 0.1°
B NONLINEARITY: +/- 0.2° OR +/- 1% READING
ACCURACY: ±0.5°
SUPPLY VOLTAGE 5 V
POWER CONSUMPTION: 6 mA

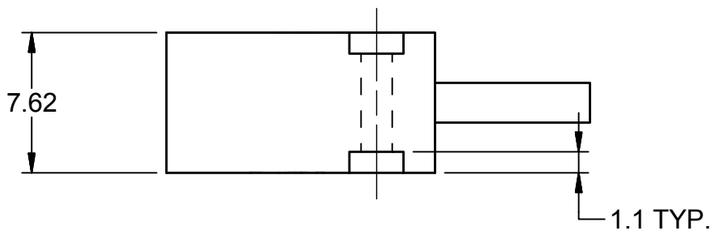
DO NOT SCALE DRAWING THIRD ANGLE PROJECTION	TOLERANCES UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS DECIMALS: X ±0.5, X.X ±0.2, X.XX ±0.1, X.XXX ±0.01 ANGLES ±0.5 FINISH 1.6 REMOVE BURRS & BREAK SHARP EDGES	NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
PROJECT NO.:		DESCRIPTION: TILT SENSOR, DUAL AXIS
MATERIAL:	DRAWN BY: B. KIMES DATE: 11/29/2012	
HEAT TREAT:	CHECKED BY: DATE:	SIZE: B SHEET: 1 OF 1 DRAWING NO.: SA572-S44 REV: B SCALE: 3.000
FINISH:		

SA572-S44.ipt

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	A	RELEASED TO PRODUCTION	AB		04/30/2013
	B	ADDED NHTSA TITLE BLOCK, ADDED AXIS OF ROTATION SYMBOL	DW		5/21/2014
	C	MASS WAS 3g; BANDWITH WAS 0-300 Hz OR 0-2000 Hz (DC RESPONSE); NOISE WAS <1.5% DEG/SEC √Hz; CURRENT WAS 6mA NOMINAL; ADDED PERFORMANCE SPECIFICATIONS	DW		3/31/2016







Test Procedure:
1) Mount the ARS unit to the shock anvil such that the axis of rotation of ARS is parallel to the axis of the imparted shock pulse.

2) Subject ARS to linear acceleration haversine pulse with peak between 500g and 550g and a pulse width less than 3.5ms, measured at 10% of peak acceleration, when filtered at SAE Class 1000.

3)Record ARS output and filter at SAE Class 180.

Performance requirements:
ARS output should be within ±100 deg/second.

SPECIFICATIONS:

C	MASS:	2.2g
	RANGE:	±18000 DEG/SEC
	BANDWIDTH:	0-2000 Hz (DC RESPONSE)
	NOISE:	<0.35% (RMS FULL SCALE)
	EXCITATION:	4.9-14.0 VDC
	CURRENT:	4mA NOMINAL
	ZERO OUTPUT:	±200mV
	FULL SCALE OUTPUT:	±2V NOMINAL

PERFORMANCE:

C	CROSS AXIS SENSITIVITY:	<1.0%
	NON-LINEARITY:	<0.5% FULL SCALE
	INFLUENCE OF LINEAR ACCELERATION:	<0.1 DEG/SEC/G TYPICAL
	THERMAL DRIFT:	-40 TP +80C
	ZERO:	±5 DEG/SEC
	SENSITIVITY:	±2%

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: ANGLES: MACHINED:
X ±.5 ±.5°
X.X ±.2
X.XX ±.1
X.XXX ±.01
ASME Y14.5M – 1994
DO NOT SCALE DRAWING

MATERIAL
HEAT TREAT
FINISH

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN abarchock	5/1/2013
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

ANGULAR RATE SENSOR–18K

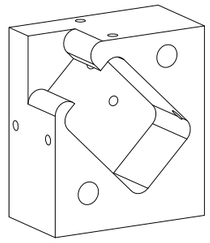
INSTRUMENTATION

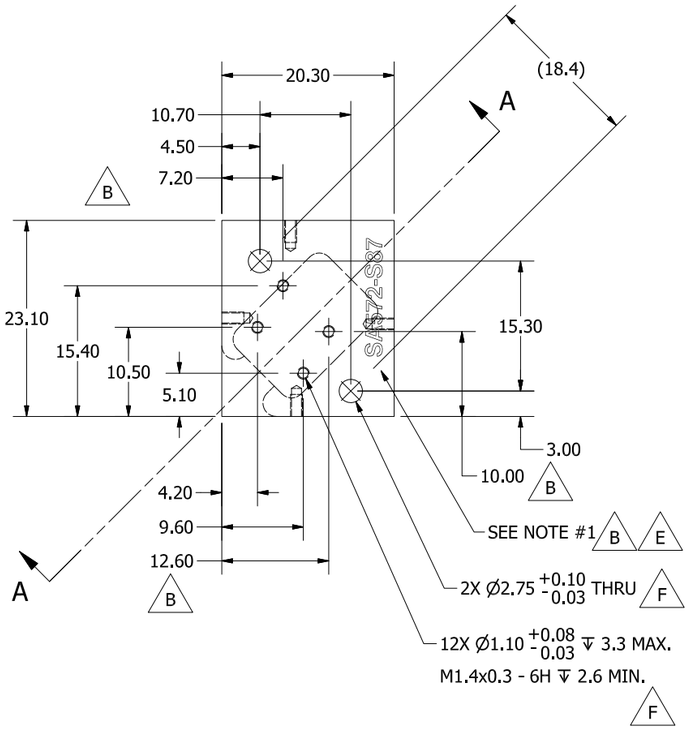
SIZE A3 | DRAWING NUMBER SA572–S58 | REV C

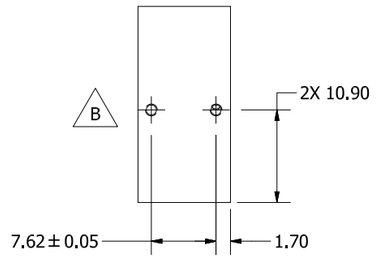
SCALE: 3:1 | SHEET 1 OF 1

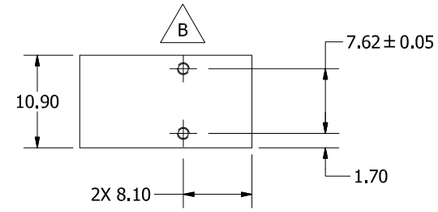
ARS Sensor.ipt

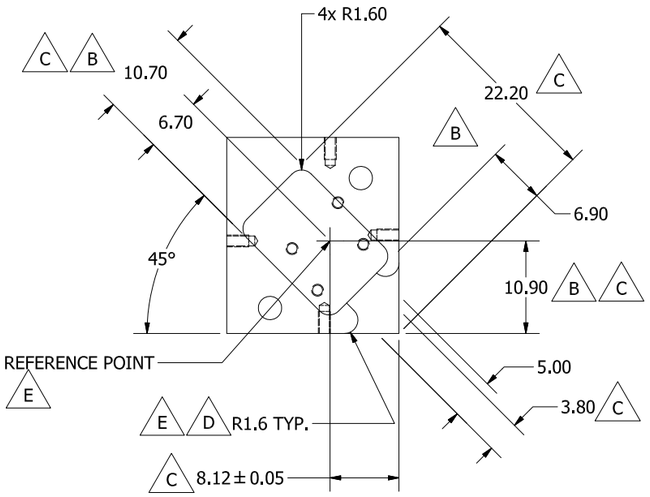
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
75659	A	RELEASE TO PRODUCTION	LP		6-15-07
76752	B	REMOVED NOTE TO STAMP "A" FOR ACCELEROMETERS & "B" FOR SENSORS; SEE NOTE #2 WAS #3; REDIMENSIONED TAP HOLES & POCKET TO CORNER OF SLOT	MT		7-7-09
77338	C	10.90 & 8.12±0.05 WAS 9.80 & 10.70; 3.80 WAS 2.50; 22.20 WAS 22.10; REMOVED 2X 5.33±0.05; ADDED 10.70 & 6.70	MT		10-26-09
77591	D	ADD R.1.59±0.05 * 2	FINK		1/11/11
72396	E	REDRAWN IN INVENTOR; MACHINING REFERENCE POINT WAS CENTER OF POCKET; REMOVE NOTE #1; NOTE #1 WAS NOTE #2; SEE NOTE #1 WAS SEE NOTE #2; 7075-T6 ALUMINUM WAS 7076-T6 ALUMINUM; R1.6 WAS R1.59	AB		02/14/14
74658	F	UPDATED HOLE CALLOUTS PER CURRENT STANDARDS	GCH		01/11/2016
74658	G	REGULATION RELEASE, PART NO. WAS 034-1201	AB/JHC		01/12/16

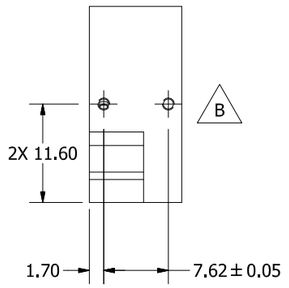


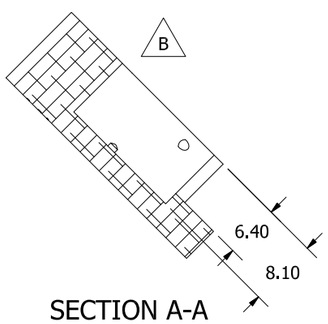




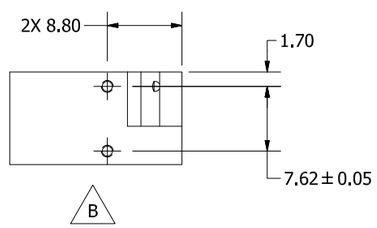








SECTION A-A



E B NOTES:

1. ETCH PART NUMBER WHERE SHOWN.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH:

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: B. KIMES	14-Jun-07
CHECKED:	
ENG:	
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

6 AXIS ACCEL/ARS MOUNT, (7264-2000), HEAD & PELVIS, Q DUMMIES

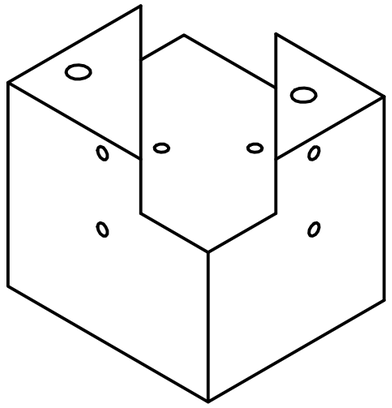
E

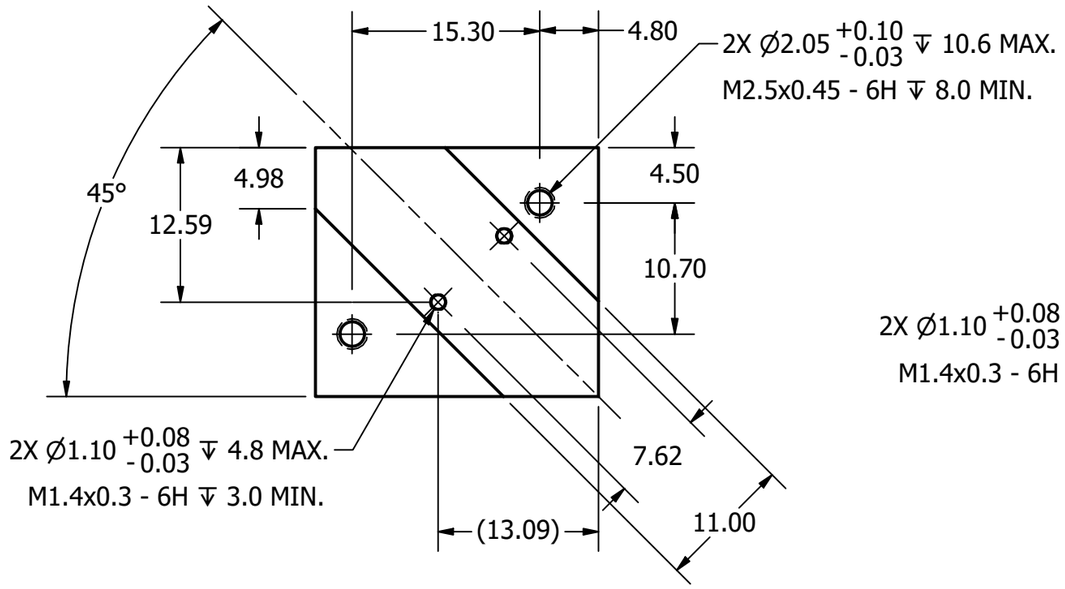
THIRD ANGLE PROJECTION

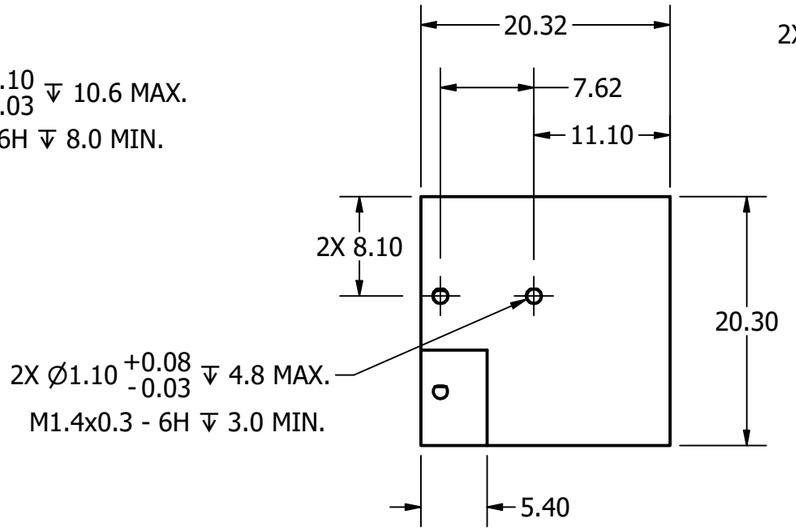
SIZE: A2 | DRAWING NUMBER: SA572-S87 | REV: G

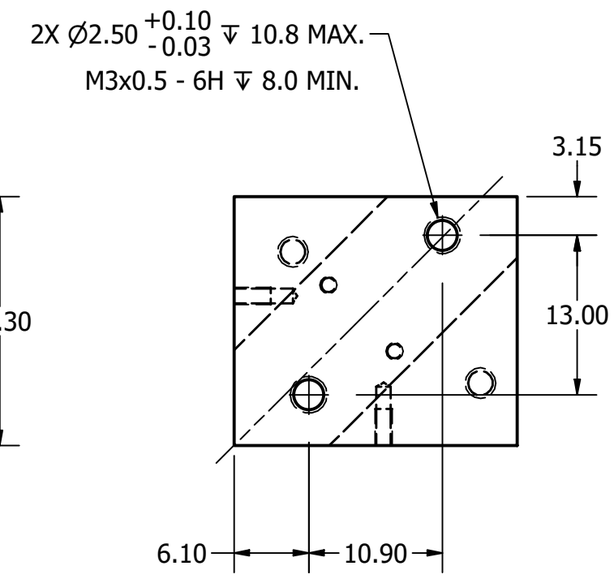
SCALE: 2:1 | SHEET: 1 OF 1

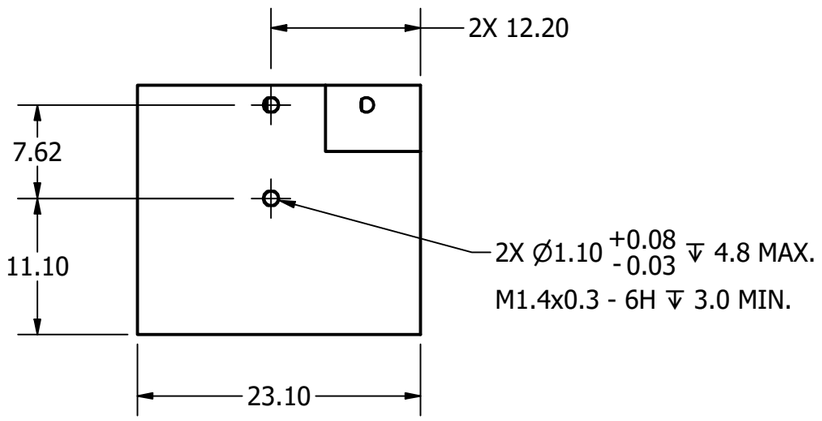
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	BK	JW	10/18/2017











NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED √ | ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: B. KIMES	4/1/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

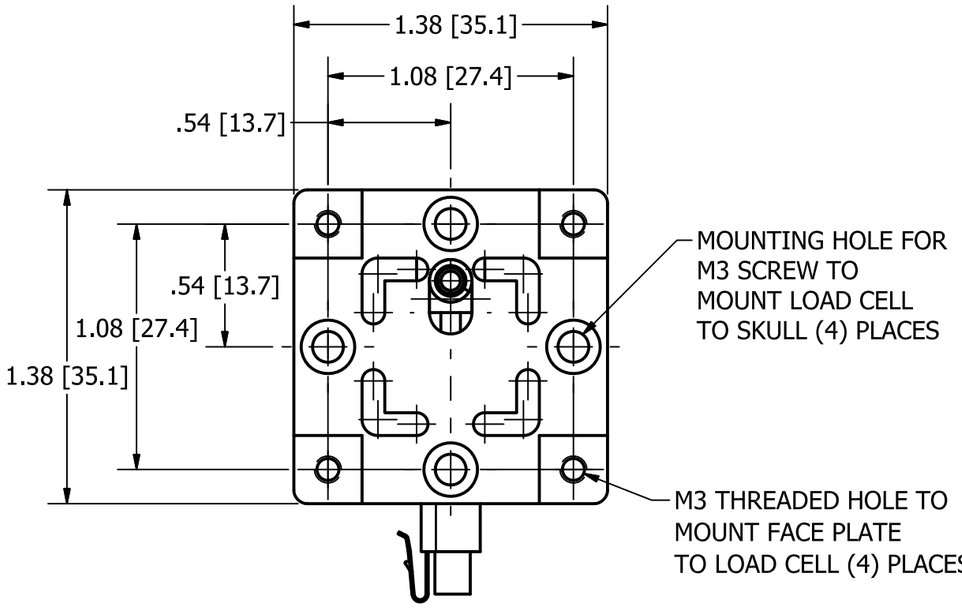
ACCEL MOUNT, (7264C)
THOR-05F

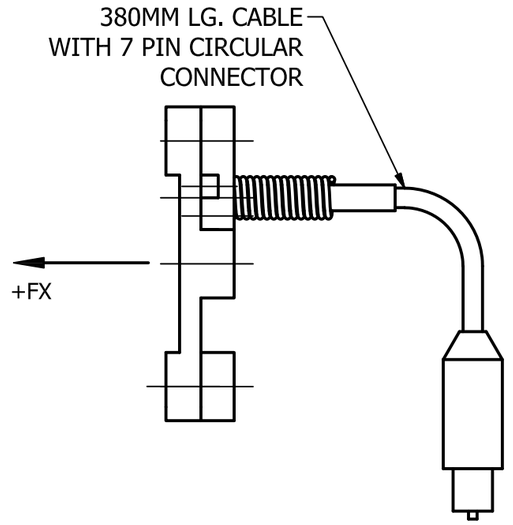
THIRD ANGLE PROJECTION

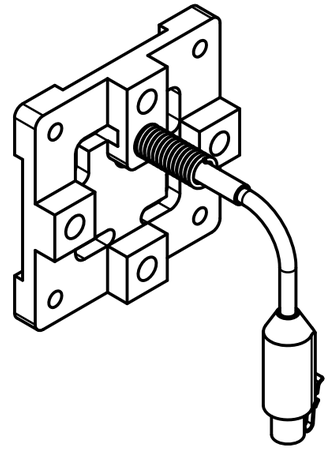
SIZE	DRAWING NUMBER	REV
A3	SA572-S167	1

SCALE: 2:1 | SHEET 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R	DATE
N/A	A	RELEASE TO PRODUCTION	M.FINK	CRM	7/27/2011







PRELIMINARY DRAWING

SPECIFICATIONS				
AXIS	CAPACITY (METRIC)	CAPACITY (ENGISH)	OUTPUT	BRIDGE RESISTANCE
FX	4.45 KN	1000 LBF.	1.3 mV/V	350

NON-LINEARITY	< 1% OF FULL SCALE
HYSTERESIS	< 1% OF FULL SCALE
EXCITATION	10 VDC NOMINAL 15 VDC MAX.
POLARITY	CONFORMS TO S.A.E. J-211
MASS	26 GRAMS ~ LESS CABLE

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN L. BENFANT	7/5/2018
CHECKED	
ENG	
APPROVED	

MATERIAL

HEAT TREAT: N/A

FINISH: N/A

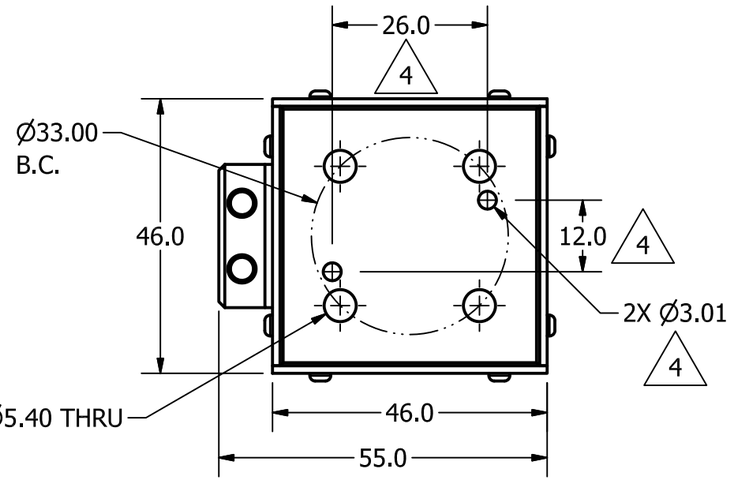
FACE LOAD CELL ASSEMBLY

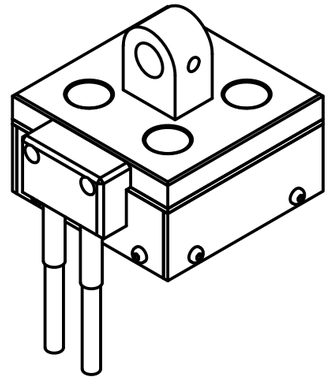
THIRD ANGLE PROJECTION

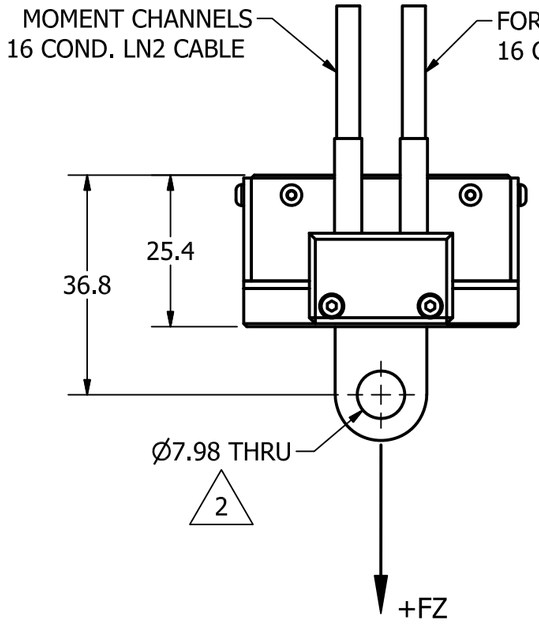
SIZE: B | DRAWING NUMBER: SA572-S161 | REV: A

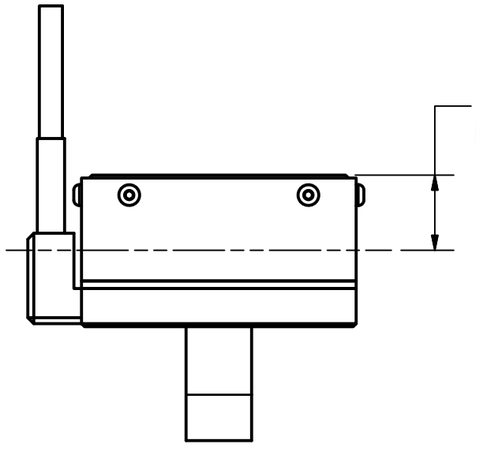
SCALE: NONE | SHEET: 1 OF 1

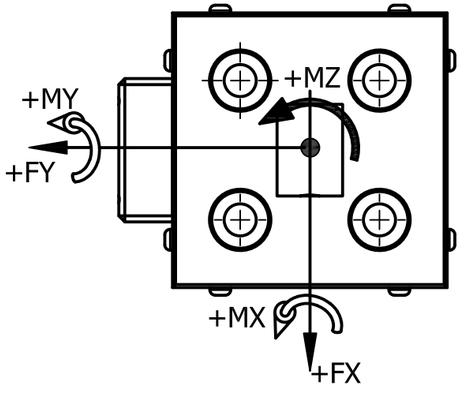
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
75200	1	PROTOTYPE	LB	L BENFANT	5/26/2016
75897	2	FX & FY OUTPUTS WERE 2.0mV/V; MZ OUTPUT WAS 2.7mV/V; MZ BRIDGE RESISTANCE WAS 350 OHMS; UPDATE VIEWS TO DEPCIT SENSOR CHANGES; Ø7.98 WAS Ø8.00	LB	L. BENFANT	2/8/2017
80198	3	FX & FY OUTPUT 2.4 WAS 1.2 mV/V	LB	TORCH	3/12/2018
80349	4	UPDATE VIEWS TO DEPCIT 3.01 HOLES	LB	L. BENFANT	3/20/2018











SPECIFICATIONS				
AXIS	CAPACITY (METRIC)	CAPACITY (ENGLISH)	OUTPUT	BRIDGE RESISTANCE
FX	6.7 kN	1506.2 LBF	2.4 mV/V	350 OHMS
FY	6.7 kN	1506.2 LBF	2.4 mV/V	350 OHMS
FZ	10.0 kN	2248.1 LBF	1.1 mV/V	700 OHMS
MX	210 Nm	1858.6 IN-LBF	1.9 mV/V	350 OHMS
MY	210 Nm	1858.6 IN-LBF	1.9 mV/V	350 OHMS
MZ	135 Nm	1194.8 IN-LBF	2.0 mV/V	700 OHMS

NON-LINEARITY	< 1% OF FULL SCALE
HYSTERESIS	< 1% OF FULL SCALE
CROSSTALK	< 5% OF FULL SCALE
EXCITATION	10 VDC NOMINAL, 15 VDC MAX.
POLARITY	CONFORMS TO SAE J-211
MASS	231g (0.5 LBS) LESS CABLES

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL
HEAT TREAT: N/A
FINISH: N/A

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: L. BENFANT	5/26/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

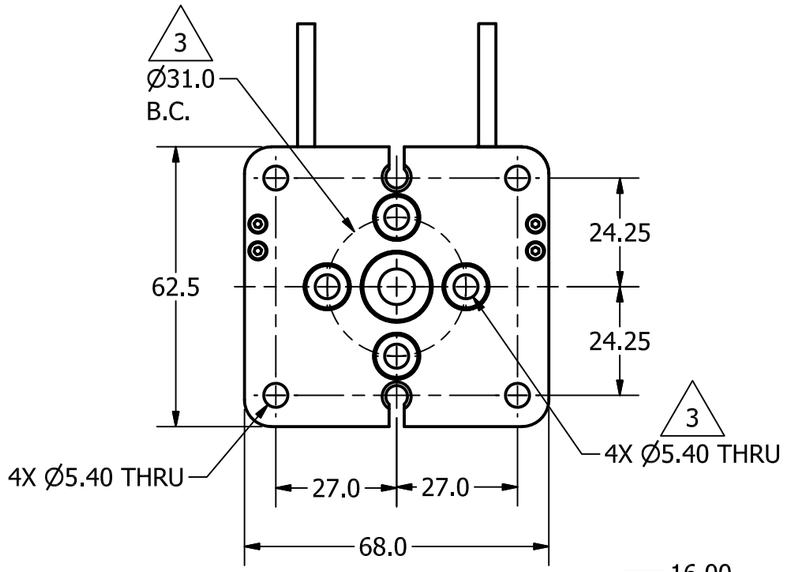
LOAD CELL, UPPER NECK, NHTSA

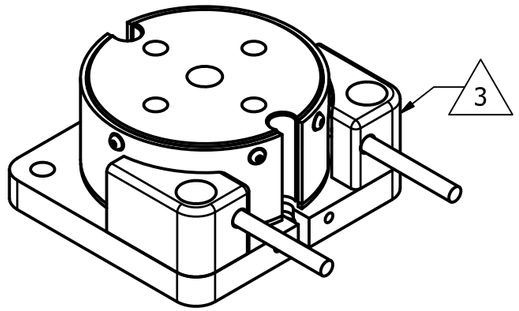
THIRD ANGLE PROJECTION

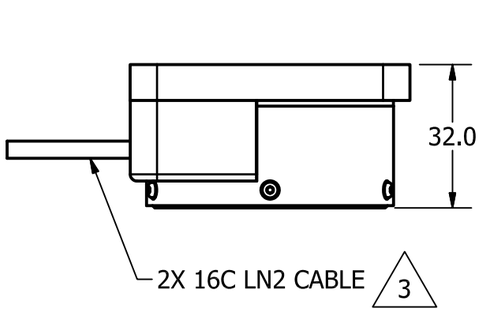
SIZE: B | DRAWING NUMBER: SA572-S105 | REV: 4

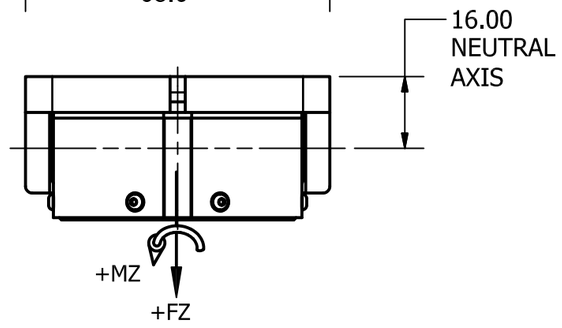
SCALE: 1 : 1 | SHEET: 1 OF 1

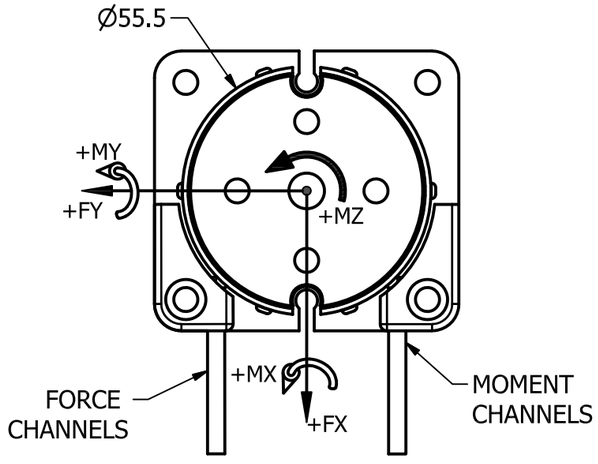
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
75200	1	PROTOTYPE	LB	RAB	5/9/16
76147	2	ADD BRIDGE RESISTANCES; FX AND FY BRIDGE OUTPUTS WERE 2.2mV/V	LB	RAB	2/8/17
80182	3	UPDATE VIEWS TO SHOW NEW STRAIN RELIEF; ADDED 31.0 DIA. B.C. & 4X 5.40 DIA; ADDED LN2 CABLE CALL OUT	LB	RAB	2/28/2018











SPECIFICATIONS				
CH.	CAPACITY (METRIC)	CAPACITY (ENGLISH)	OUTPUT	BRIDGE RESISTANCE
Fx	10 kN	2248.1 LBF	2.3 mV/V	350 OHMS
Fy	10 kN	2248.1 LBF	2.3 mV/V	350 OHMS
Fz	12 kN	2697.7 LBF	1.1 mV/V	700 OHMS
Mx	300 Nm	2655.2 IN-LBF	1.4 mV/V	700 OHMS
My	300 Nm	2655.2 IN-LBF	1.4 mV/V	700 OHMS
Mz	200 Nm	1770.1 IN-LBF	1.5 mV/V	350 OHMS
NON-LINEARITY	< 1% OF FULL SCALE			
HYSTERESIS	< 1% OF FULL SCALE			
CROSSTALK	< 5% OF FULL SCALE			
EXCITATION	10 VDC NOMINAL, 15 VDC MAX.			
POLARITY	CONFORMS TO S.A.E. J-211			
MASS	396g (0.87 LBS) LESS CABLES			

2

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

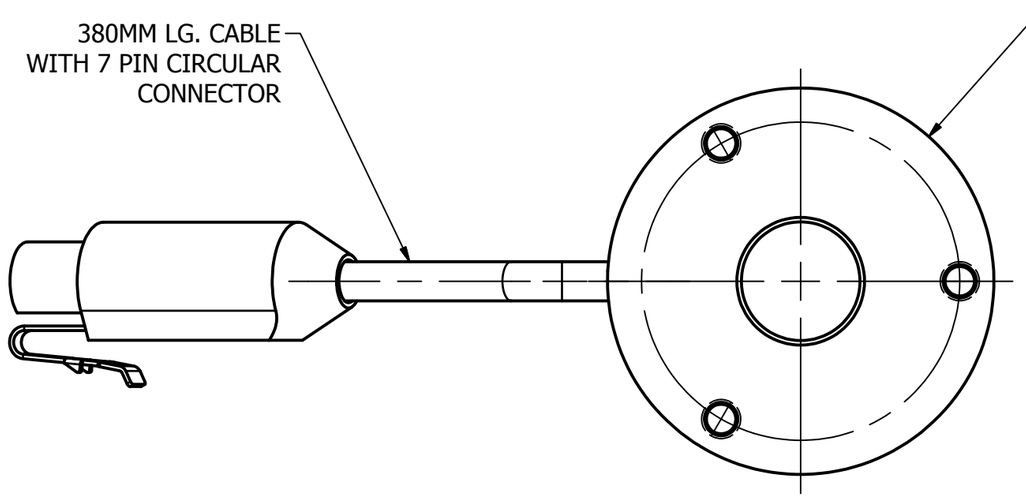
APPROVALS	DATE
DRAWN L. BENFANT	3/14/2018
MATERIAL	
CHECKED	
HEAT TREAT	
ENG	
FINISH	
APPROVED	

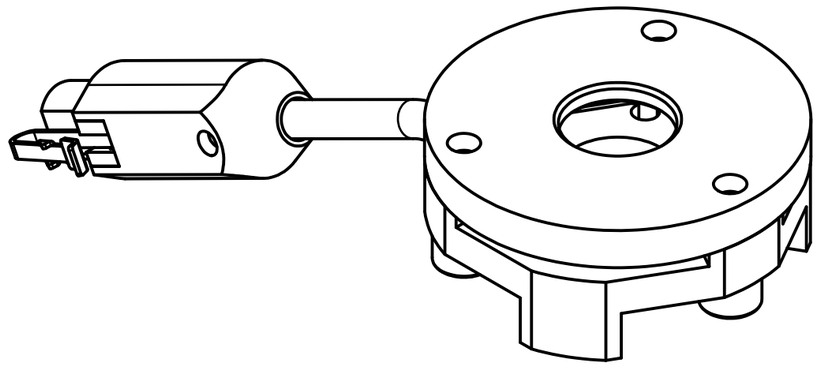
LOAD CELL, LOWER NECK, THOR 5TH

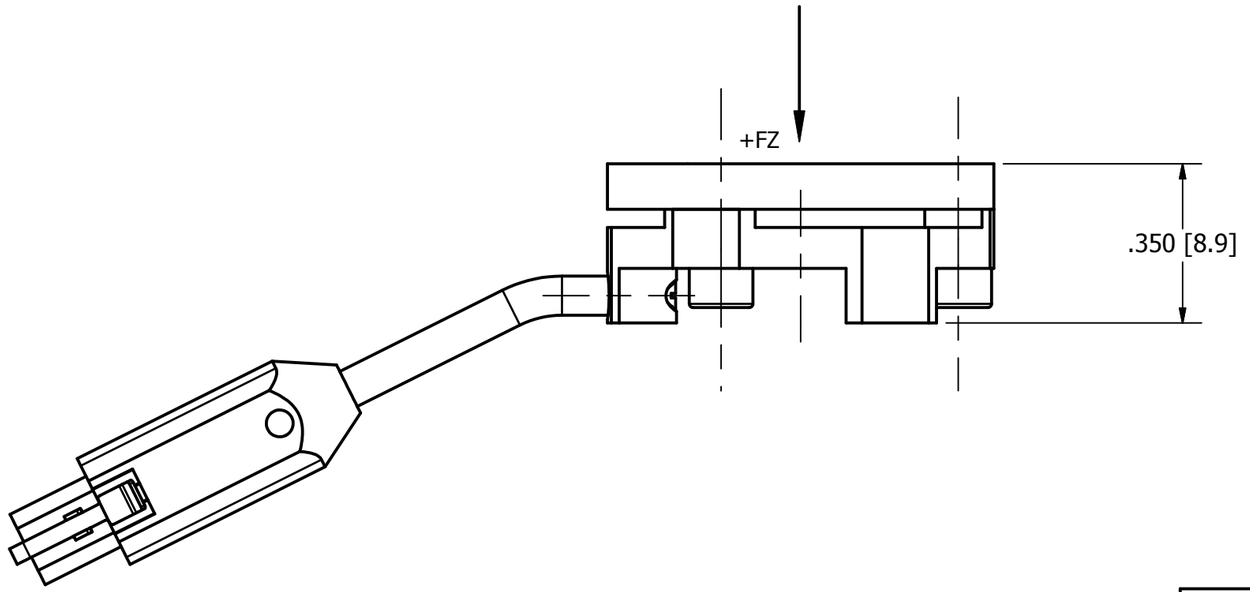
THIRD ANGLE PROJECTION

SIZE B | DRAWING NUMBER SA572-S106 | REV 3

SCALE: .75 : 1 | SHEET 1 OF 1







SPECIFICATIONS				
AXIS	CAPACITY (METRIC)	CAPACITY (ENGISH)	OUTPUT	BRIDGE RESISTANCE
FZ	4.45 KN	1000 LBF.	2.3 mV/V	1050 OHM

NON-LINEARITY	< 1% OF FULL SCALE
HYSTERESIS	< 1% OF FULL SCALE
EXCITATION	10 VDC NOMINAL 15 VDC MAX.
POLARITY	CONFORMS TO S.A.E. J-211
MASS	15 GRAMS ~ LESS CABLE

DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION

TOLERANCES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MILLIMETERS

DECIMALS	ANGLES	FINISH
X ± 0.5	± 0.5°	1.6
X.X ± 0.2		
X.XX ± 0.1		
X.XXX ± 0.01		

REMOVE BURRS & BREAK SHARP EDGES

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

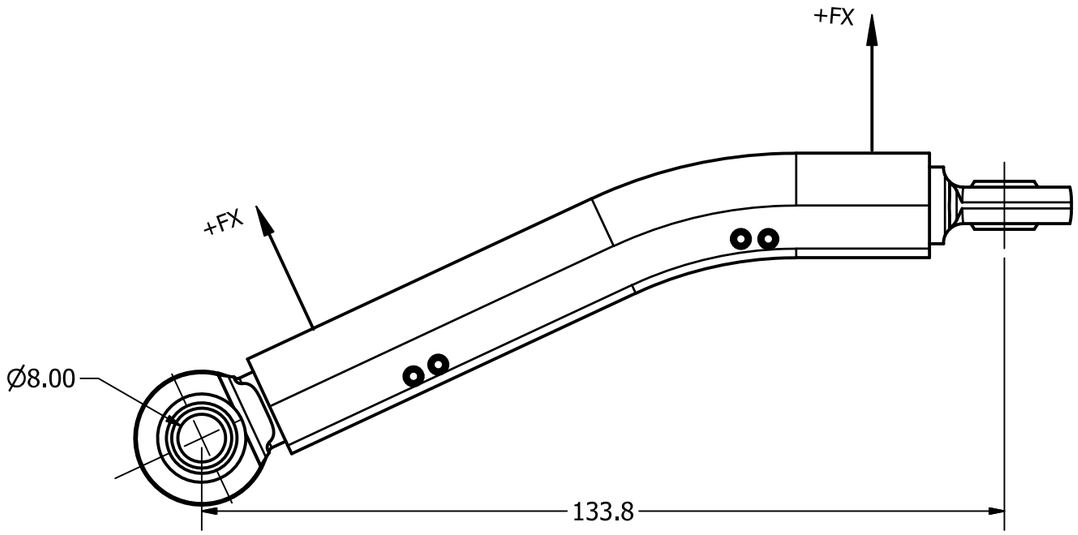
PROJECT NO.:			
MATERIAL:	DRAWN BY: M.FINK	DATE: 8/11/2011	
HEAT TREAT:	CHECKED BY: CJT	DATE: 7/3/2012	
FINISH:	ENGINEER: M.FINK	DATE: 7/3/12	

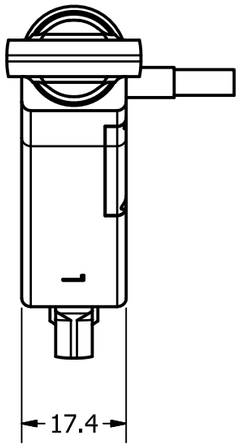
NEXT ASSEMBLY	QTY
TOTAL QTY IN DUMMY	2

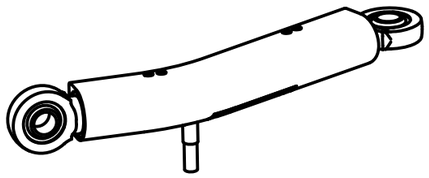
DESCRIPTION: Ø .850 SKULL SPRING LOAD CELL THOR (METRIC)

SIZE: B | SHEET: 1 OF 1 | SCALE: 3:1 | DRAWING NO.: SA572-S112 | REV: A

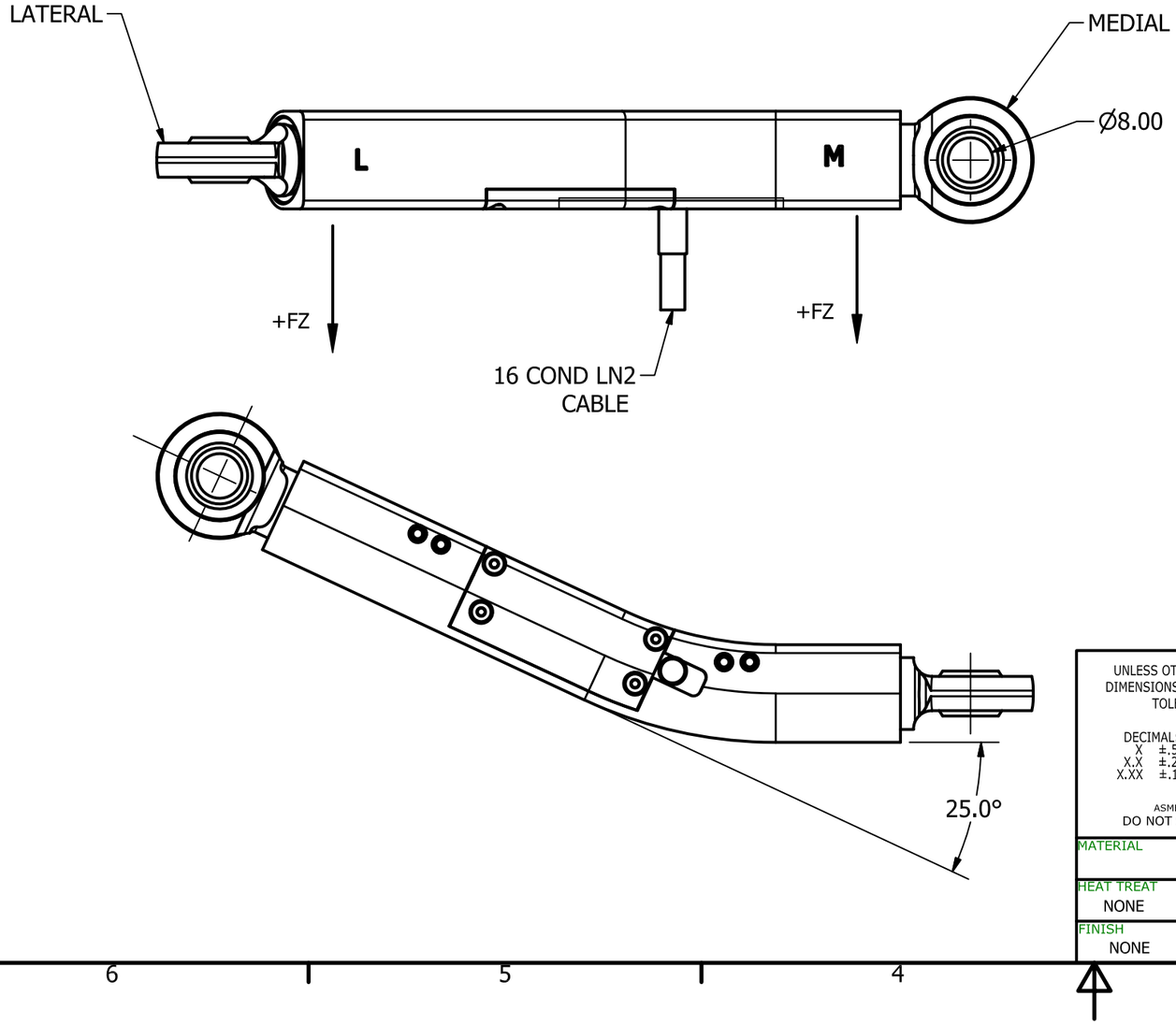
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
75360	1	PROTOTYPE	LB	L. BENFANT	7/1/2016
76910	2	UPDATED COVER	LB	TORCH	8/30/2017







SCALE .5: 1



SPECIFICATIONS (MEDIAL)				
CH.	CAPACITY (METRIC)	CAPACITY (ENGLISH)	OUTPUT	BRIDGE RESISTANCE
FX	2.00 kN	450 LBS.	1.0 mV/V	350 OHMS
FZ	2.00 kN	450 LBS.	1.0 mV/V	350 OHMS
SPECIFICATIONS (LATERAL)				
CH.	CAPACITY (METRIC)	CAPACITY (ENGLISH)	OUTPUT	BRIDGE RESISTANCE
FX	2.00 kN	450 LBS.	1.0 mV/V	350 OHMS
FZ	2.00 kN	450 LBS.	1.0 mV/V	350 OHMS

NON-LINEARITY	< 1% OF FULL SCALE
HYSTERESIS	< 1% OF FULL SCALE
CROSSTALK	< 5% OF FULL SCALE
EXCITATION	10 VDC NOMINAL 15 VDC MAX.
POLARITY	CONFORMS TO S.A.E. J-211
MASS	219 g (.48 LBS) LESS CABLE

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN L. BENFANT	3/14/2018
CHECKED	
ENG	
APPROVED	

MATERIAL

HEAT TREAT: NONE

FINISH: NONE

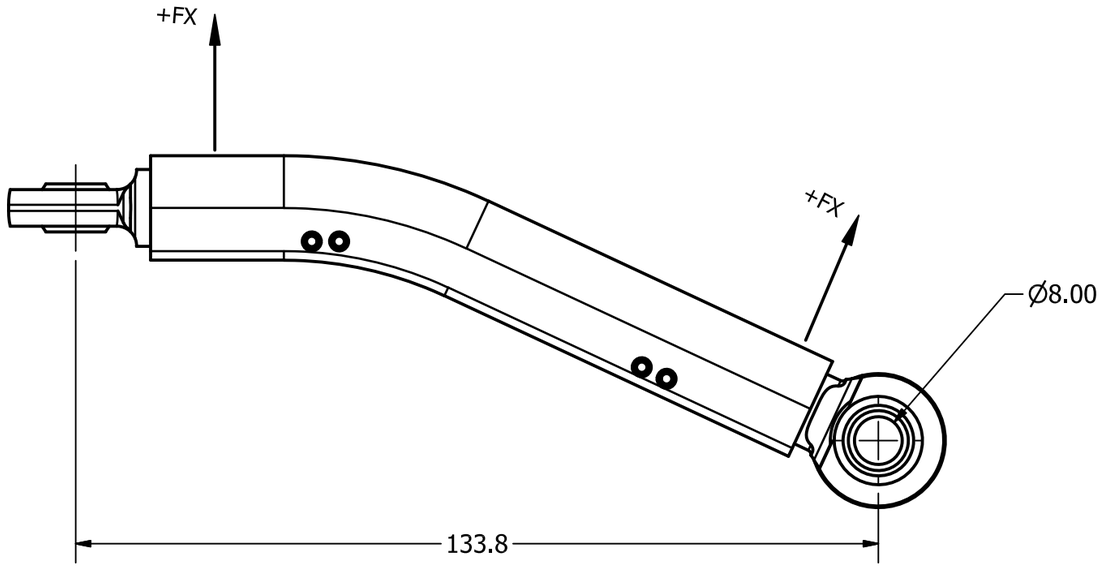
LOAD CELL, CLAVICLE, LEFT

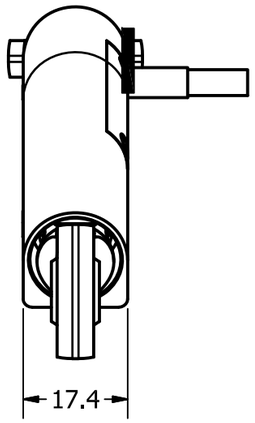
THIRD ANGLE PROJECTION

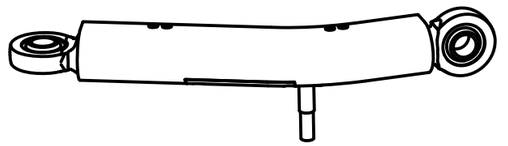
SIZE: A3 | DRAWING NUMBER: SA572-S165 | REV: 2

SCALE: 1:1 | SHEET: 1 OF 1

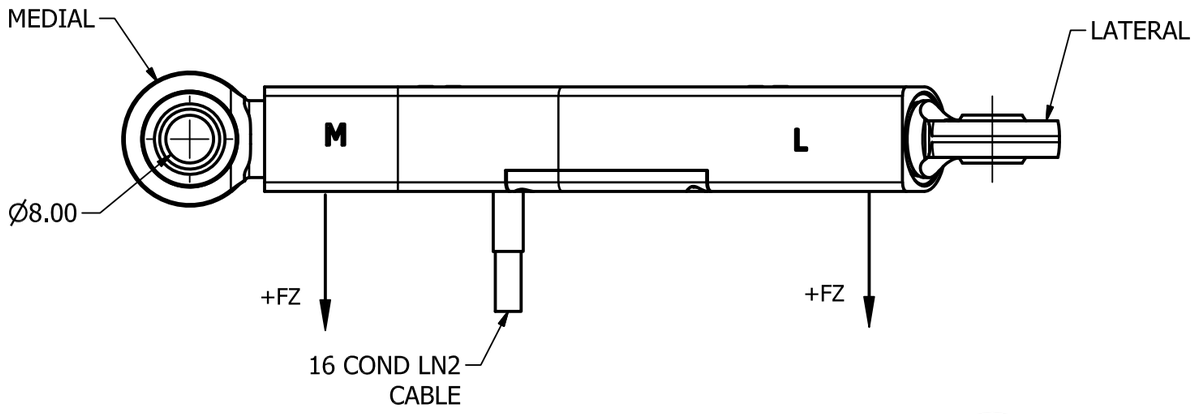
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
75360	1	PROTOTYPE	LB	L. BENFANT	7/1/2016
76910	2	UPDATED COVER	LB	TORCH	8/30/2017

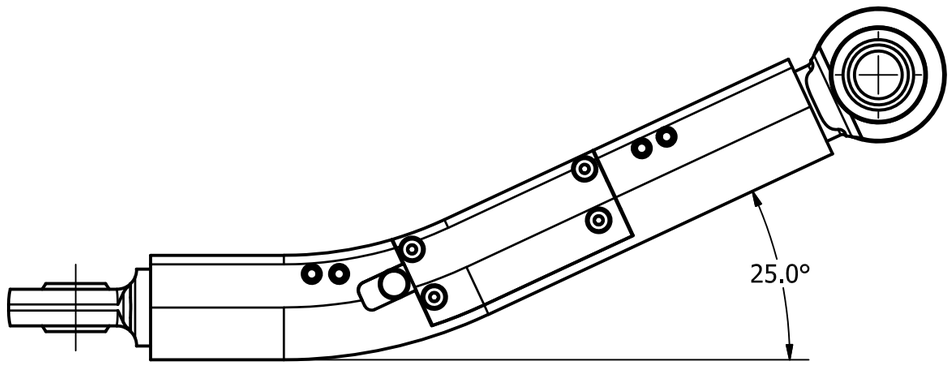






SCALE .5 : 1





SPECIFICATIONS (MEDIAL)				
CH.	CAPACITY (METRIC)	CAPACITY (ENGLISH)	OUTPUT	BRIDGE RESISTANCE
FX	2.00 kN	450 LBS.	1.0 mV/V	350 OHMS
FZ	2.00 kN	450 LBS.	1.0 mV/V	350 OHMS
SPECIFICATIONS (LATERAL)				
CH.	CAPACITY (METRIC)	CAPACITY (ENGLISH)	OUTPUT	BRIDGE RESISTANCE
FX	2.00 kN	450 LBS.	1.0 mV/V	350 OHMS
FZ	2.00 kN	450 LBS.	1.0 mV/V	350 OHMS
NON-LINEARITY	< 1% OF FULL SCALE			
HYSTERESIS	< 1% OF FULL SCALE			
CROSSTALK	< 5% OF FULL SCALE			
EXCITATION	10 VDC NOMINAL 15 VDC MAX.			
POLARITY	CONFORMS TO S.A.E. J-211			
MASS	219 g (.48 LBS) LESS CABLE			

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN: L. BENFANT	3/14/2018
CHECKED	
ENG	
APPROVED	

MATERIAL

HEAT TREAT: NONE

FINISH: NONE

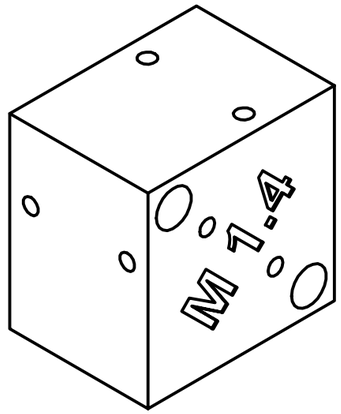
LOAD CELL, CLAVICLE, RIGHT

THIRD ANGLE PROJECTION

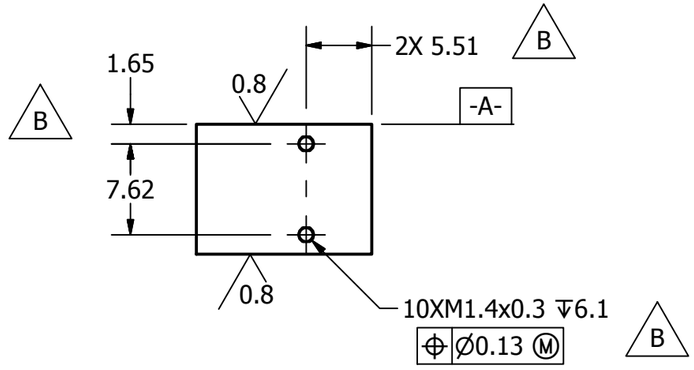
SIZE: A3 | DRAWING NUMBER: SA572-S166 | REV: 2

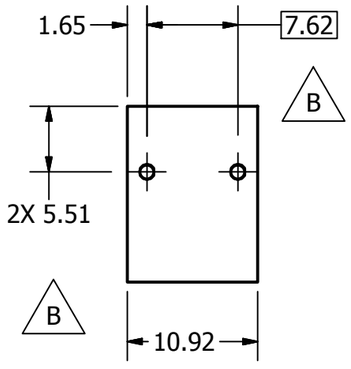
SCALE: 1:1 | SHEET: 1 OF 1

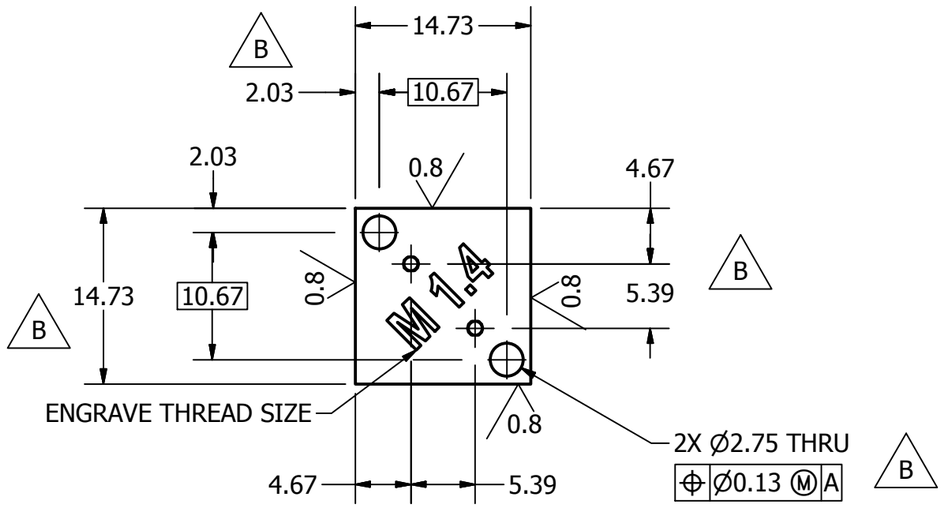
REVISION HISTORY				
ECO #	REV	DESCRIPTION	DATE	BY
	A	RENUMBERED FROM T1INM130 AND CONVERTED TO METRIC FOR THOR-M	9/1/2011	KHS
	B	ADD TOLERANCE TO HOLES; ADD DATUM A; 10.92 WAS 10.9, 14.73 WAS 14.7, 2.03 WAS 2.0. 1.65 WAS 1.7, 4.67 WAS 4.7; ADD BASIC DIMENSION FOR HOLE SPANS; ADD FINISH MARKS; M1.4 TAP WAS THRU, ADD VIEWS AND DIMENSIONS FOR HOLES	12/21/2012	BK

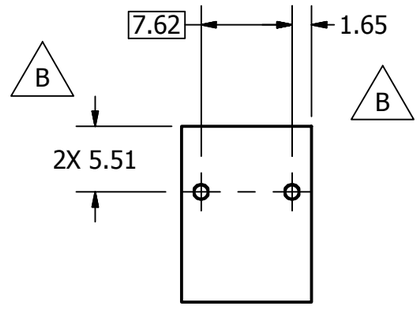


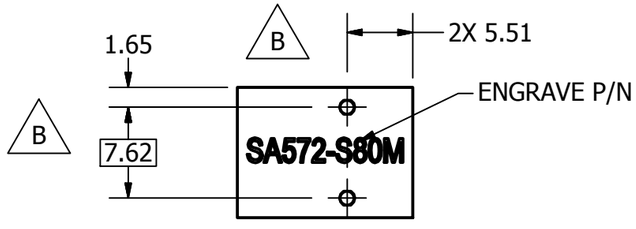
SCALE 3.000







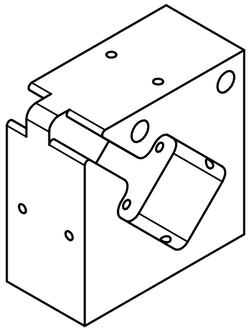


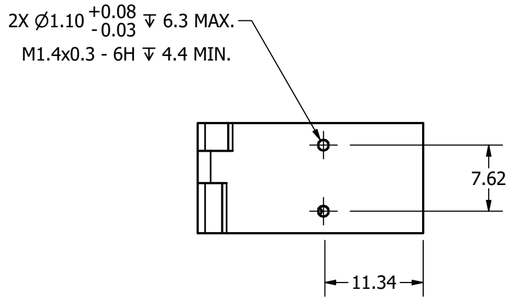


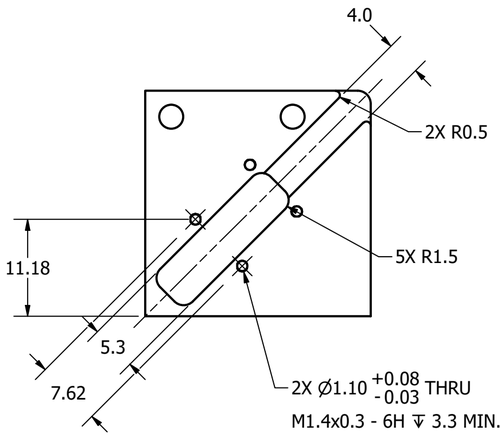
DO NOT SCALE DRAWING	TOLERANCES	NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION	
THIRD ANGLE PROJECTION	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS DECIMALS X ±0.5 X.X ±0.2 X.XX ±0.1 X.XXX ±0.01 ANGLES ±0.5° FINISH 1.6	DESCRIPTION: S4 TRIAXIAL ACCELEROMETER MOUNTING BLOCK METRIC	
PROJECT NO.:	REMOVE BURRS & BREAK SHARP EDGES		
MATERIAL: Aluminum-7075-T6	DRAWN BY: KHS — DATE: 9/1/2011		
HEAT TREAT:	CHECKED BY: TMV — DATE: 9/9/2011	SIZE: B — SHEET: 1 OF 1 — DRAWING NO.: SA572-S80M — REV: B	
FINISH: CLEAR ANODIZE	ENGINEER: J. WANG — DATE: 1/18/2012	SCALE: 2:1	

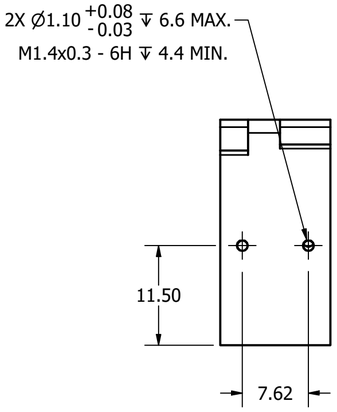
SA572-S80M.ipt

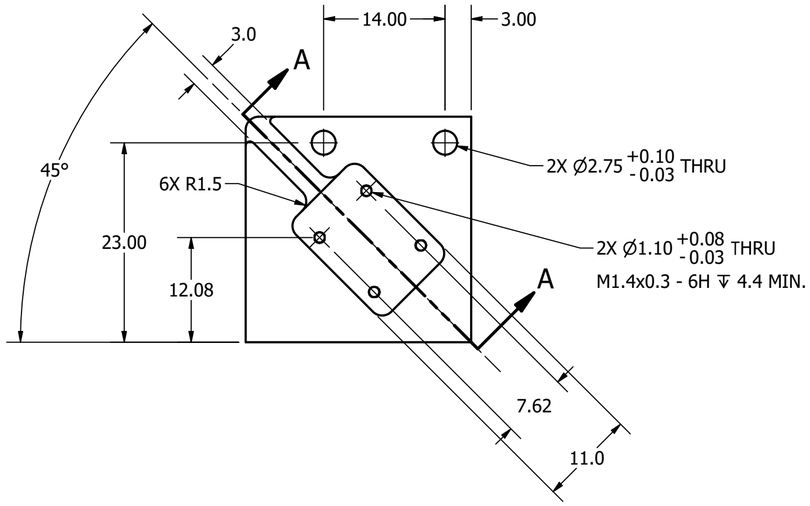
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE FOR PROTOTYPE	JH	JW	3/28/2016

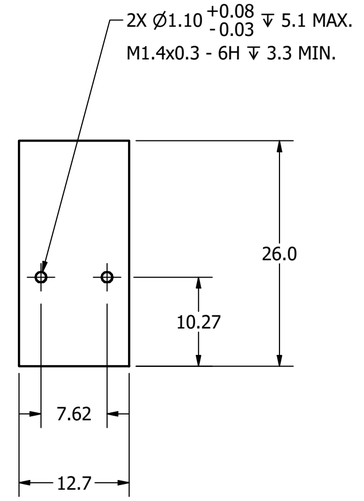


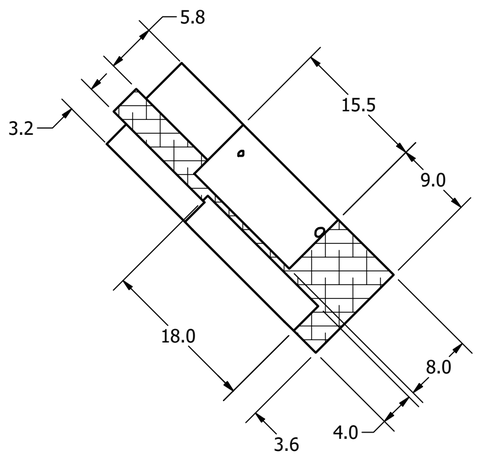




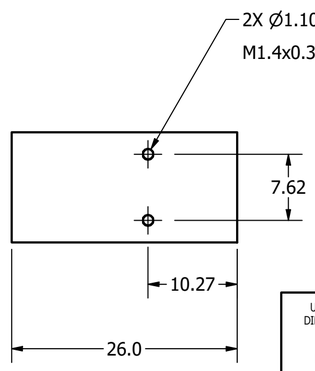








SECTION A-A



NOTES:

1. DIMENSIONS SYMMETRIC ABOUT ℄, UNLESS OTHERWISE NOTED.

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: 7075-T6 ALUMINUM
HEAT TREAT:
FINISH: CLEAR ANODIZE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN jhaefner	3/28/2016
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

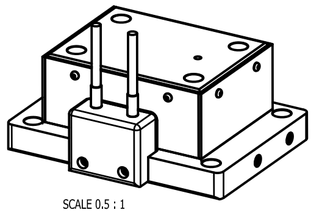
MOUNT, 7264C / ARS-1500

THIRD ANGLE PROJECTION

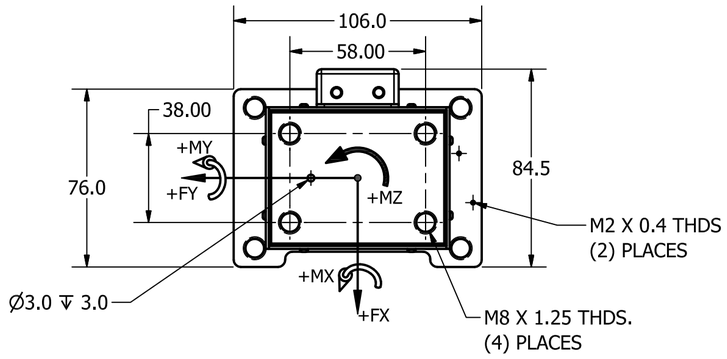
SIZE	DRAWING NUMBER	REV
A2	SA572-S169	1

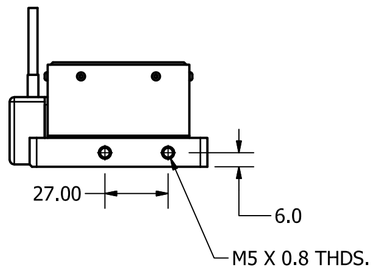
SCALE: 2:1 SHEET 1 OF 1

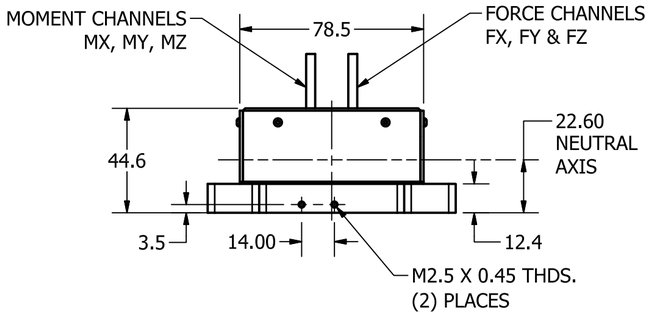
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
75080	1	PROTOTYPE	LB	L BENFANT	4/12/16
75808	2	UPDATE VIEWS TO SHOWN SENSOR UPDATE	LB	RAB	11/3/16
76091	3	MX & MY BRIDGE RES WAS 350 OHMS	SKK	JGG	3/24/2017

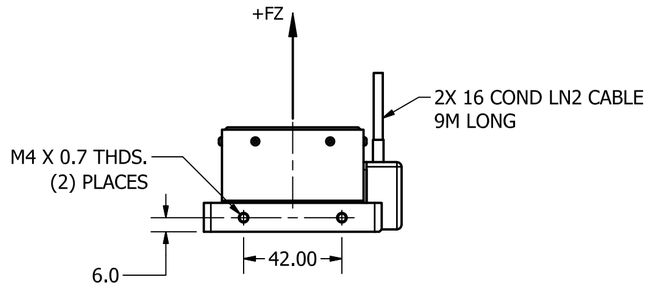


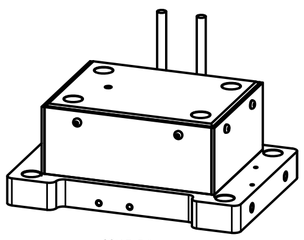
SCALE 0.5 : 1



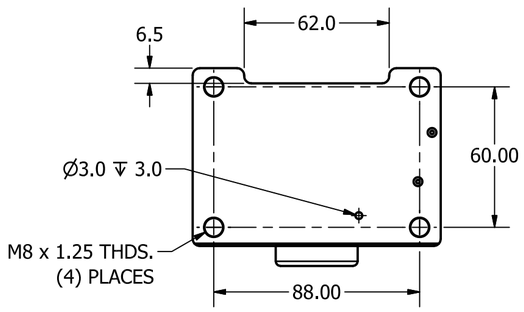








SCALE .5:1



SPECIFICATIONS				
CH.	CAPACITY (METRIC)	CAPACITY (ENGLISH)	OUTPUT	BRIDGE RESISTANCE
FX	13 kN	2922.5 LBF	2.0 mV/V	350 OHMS
FY	13 kN	2922.5 LBF	2.0 mV/V	350 OHMS
FZ	13 kN	2922.5 LBF	1.1 mV/V	700 OHMS
MX	560 Nm	4956.4 IN-LBF	2.1 mV/V	700 OHMS
MY	560 Nm	4956.4 IN-LBF	2.1 mV/V	700 OHMS
MZ	280 Nm	2478.2 IN-LBF	1.4 mV/V	350 OHMS
NON-LINEARITY	< 1% OF FULL SCALE			
HYSTERESIS	< 1% OF FULL SCALE			
CROSSTALK	< 5% OF FULL SCALE			
EXCITATION	10 VDC NOMINAL, 15 VDC MAX.			
POLARITY	CONFORMS TO S.A.E. J-211			
MASS	498 g (1.1 LBS) LESS CABLES			

3

3

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL

HEAT TREAT: NONE

FINISH: NONE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN L. BENFANT	3/14/2018
CHECKED	
ENG L. BENFANT	4/12/2016
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

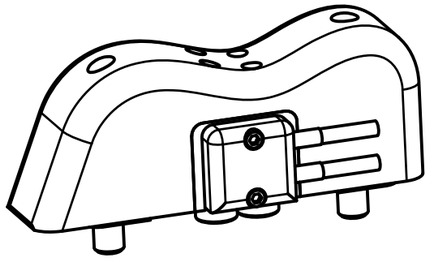
LOAD CELL, THORACIC SPINE, THOR 5TH

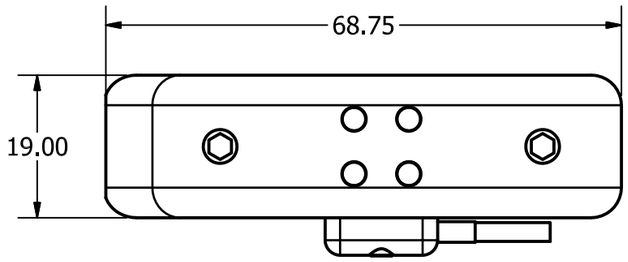
THIRD ANGLE PROJECTION

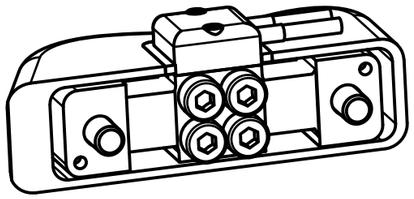
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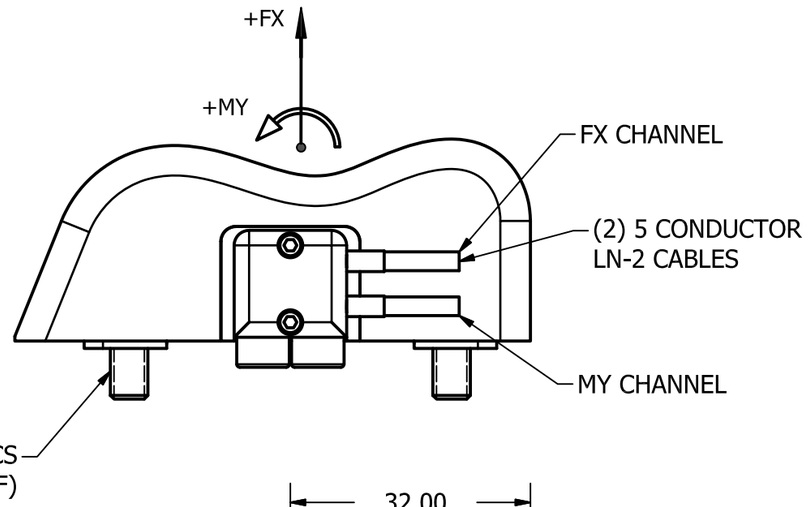
SCALE: 0.5:1 | SHEET: 1 OF 1

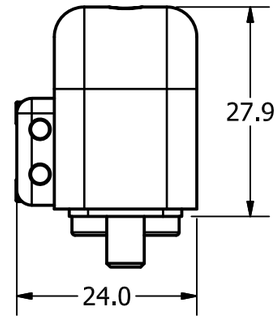
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
74841	1	PROTOTYPE	LB	BENFANT	1/28/2016
75846	2	UPDATED TO LATEST STANDARDS; ADDED TORQUE SPEC	CJT	SKK	4/12/2017

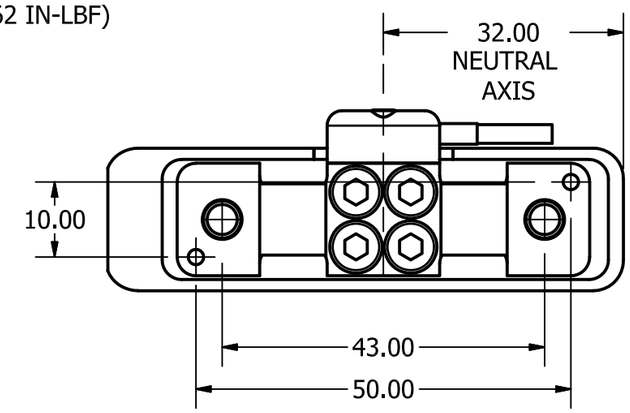












PRELIMINARY DRAWING

SPECIFICATIONS				
AXIS	CAPACITY (METRIC)	CAPACITY (ENGLISH)	OUTPUT	BRIDGE RESISTANCE
FX	13.00 kN	2922.52 LBF.	2.6 mV/V	350 OHM
MY	200.00 Nm	1770.15 IN-LBF.	2.4 mV/V	700 OHM
NON-LINEARITY	< 2.5% OF FULL SCALE			
HYSTERESIS	< 2.5% OF FULL SCALE			
CROSSTALK	< 5.0% OF FULL SCALE			
EXCITATION	10 VDC NOMINAL, 15 VDC MAXIMUM			
POLARITY	CONFORMS TO SAE J-211			
MASS	175 g (.385 LBS) LESS CABLES			

THE MODEL IH-11490J A.S.I.S. LOAD CELL IS DESIGNED TO PROVIDE A MEASUREMENT OF THE FORCE OF A LAP BELT AGAINST THE ILIAC SPINE OF THE PELVIS. THIS FORCE IS MEASURED AS FX AND IS INSENSITIVE TO THE POSITION OF THE BELT ON THE ILIAC. THE CHANNEL MY IS DESIGNED TO PROVIDE AN INDICATION OF THE POSITION OF THE BELT ON THE ILIAC. A READING OF ZERO OUTPUT WOULD OCCUR IF THE CENTER OF PRESSURE OF THE BELT IS ON THE LOAD CELL NEUTRAL AXIS. IF THE BELT IS ABOVE THE NEUTRAL AXIS A POSITIVE MOMENT READING WOULD OCCUR, AND A BELT POSITIONED BELOW THE NEUTRAL AXIS WOULD PRODUCE A NEGATIVE BENDING MOMENT OUTPUT.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

*V*EHICLE *R*ESEARCH and *T*EST *C*ENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN: L. BENFANT	3/14/2018
CHECKED	
ENG	
APPROVED	

MATERIAL
HEAT TREAT: N/A
FINISH: N/A

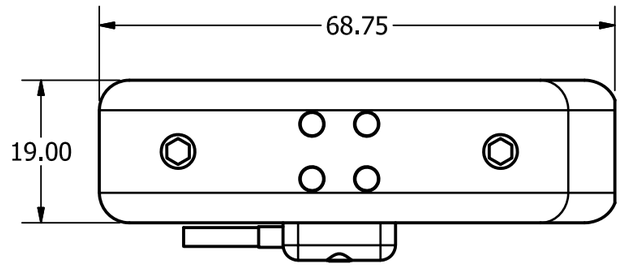
LOAD CELL, ASIS, LEFT

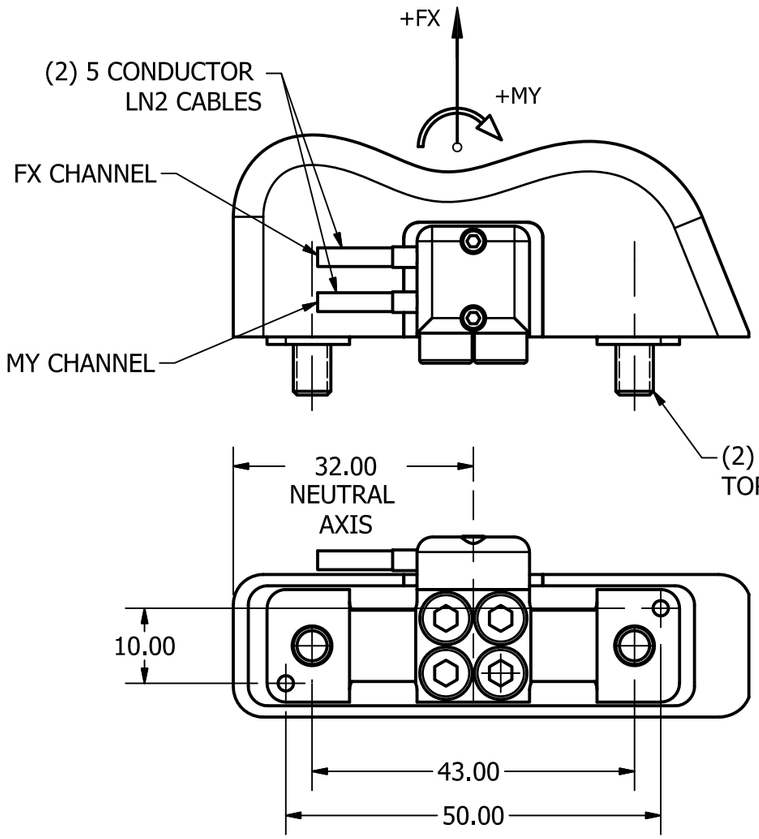
THIRD ANGLE PROJECTION

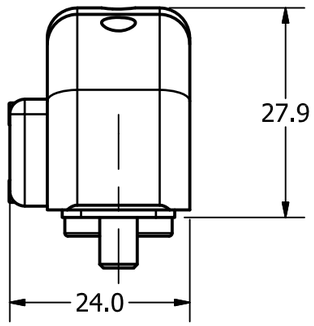
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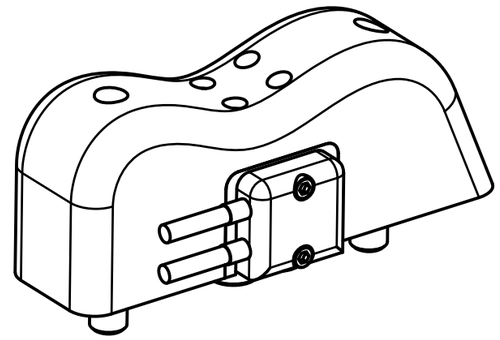
SCALE: 1.25 : 1 | SHEET: 1 OF 1

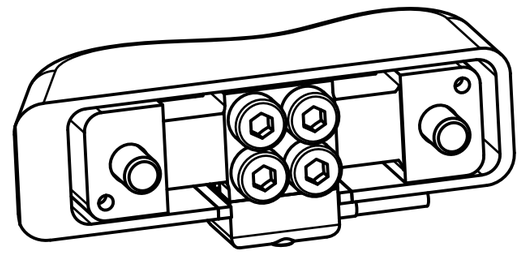
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
74841	1	PROTOTYPE	LB	BENFANT	2/1/2016
75846	2	UPDATED TO LATEST STANDARDS; ADDED TORQUE SPEC	CJT	SKK	4/12/2017











SPECIFICATIONS				
AXIS	CAPACITY (METRIC)	CAPACITY (ENGLISH)	OUTPUT	BRIDGE RESISTANCE
FX	13.00 kN	2922.52 LBF	2.6 mV/V	350 OHM
MY	200.00 Nm	1770.15 IN-LBF	2.4 mV/V	700 OHM
NON-LINEARITY	< 2.5% OF FULL SCALE			
HYSTERESIS	< 2.5% OF FULL SCALE			
CROSSTALK	< 5.0% OF FULL SCALE			
EXCITATION	10 VDC NOMINAL, 15 VDC MAXIMUM			
POLARITY	CONFORMS TO SAE J-211			
MASS	175 g (.385 LBS) LESS CABLES			

PRELIMINARY DRAWING

THE MODEL IH-11500J A.S.I.S. LOAD CELL IS DESIGNED TO PROVIDE A MEASUREMENT OF THE FORCE OF A LAP BELT AGAINST THE ILIAC SPINE OF THE PELVIS. THIS FORCE IS MEASURED AS FX AND IS INSENSITIVE TO THE POSITION OF THE BELT ON THE ILIAC. THE CHANNEL MY IS DESIGNED TO PROVIDE AN INDICATION OF THE POSITION OF THE BELT ON THE ILIAC. A READING OF ZERO OUTPUT WOULD OCCUR IF THE CENTER OF PRESSURE OF THE BELT IS ON THE LOAD CELL NEUTRAL AXIS. IF THE BELT IS ABOVE THE NEUTRAL AXIS A POSITIVE MOMENT READING WOULD OCCUR, AND A BELT POSITIONED BELOW THE NEUTRAL AXIS WOULD PRODUCE A NEGATIVE BENDING MOMENT OUTPUT.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL
HEAT TREAT: N/A
FINISH: N/A

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: L. BENFANT	3/14/2018
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

LOAD CELL, ASIS, RIGHT

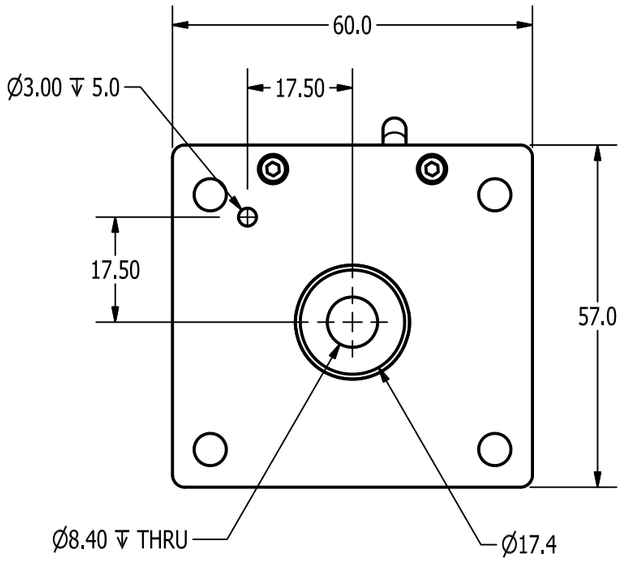
THIRD ANGLE PROJECTION

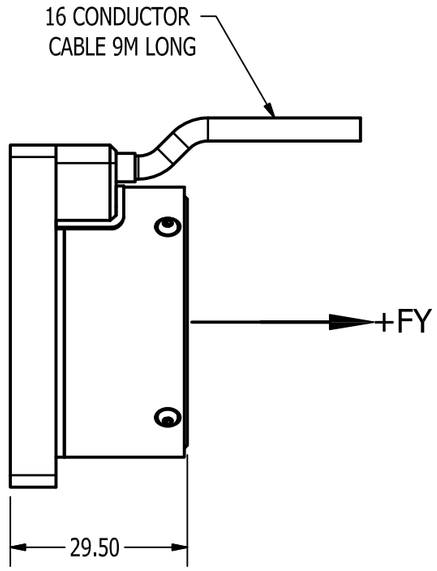
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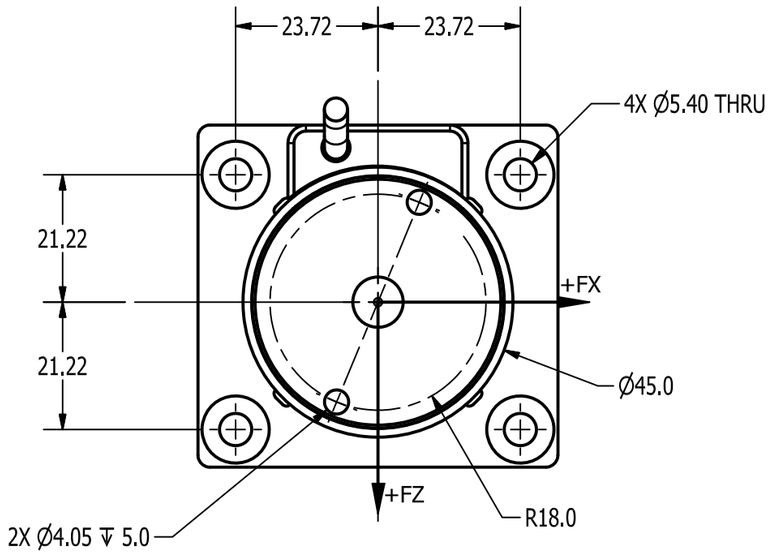
SCALE: 1.25 : 1

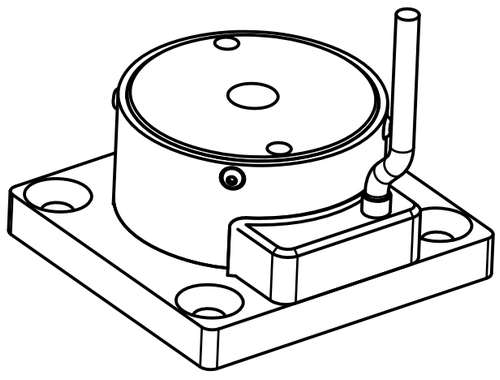
SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
75007	1	PROTOTYPE	L.B.	L. BENFANT	4/1/2016
76888	2	UPDATED TO MATCH REVS	SKK	CJT	9/1/2017









PRELIMINARY DRAWING

SPECIFICATIONS				
AXIS	CAPACITY (METRIC)	CAPACITY (ENGLISH)	OUTPUT	BRIDGE RESISTANCE
FX	13.00 kN	2922.5 LBF	2.8 mV/V	350 OHMS
FY	10.00 kN	2248.1 LBF	0.9 mV/V	700 OHMS
FZ	9.00 kN	2023.3 LBF	1.9 mV/V	350 OHMS
NON-LINEARITY	< 1% OF FULL SCALE			
HYSTERESIS	< 1% OF FULL SCALE			
CROSSTALK	< 5% OF FULL SCALE			
EXCITATION	10 VDC NOMINAL 15 VDC MAX.			
POLARITY	CONFORMS TO SAE J-211			
MASS	299g (.66 LB) LESS CABLE			

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL

HEAT TREAT: N/A

FINISH: N/A

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: L. BENFANT	3/14/2018
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

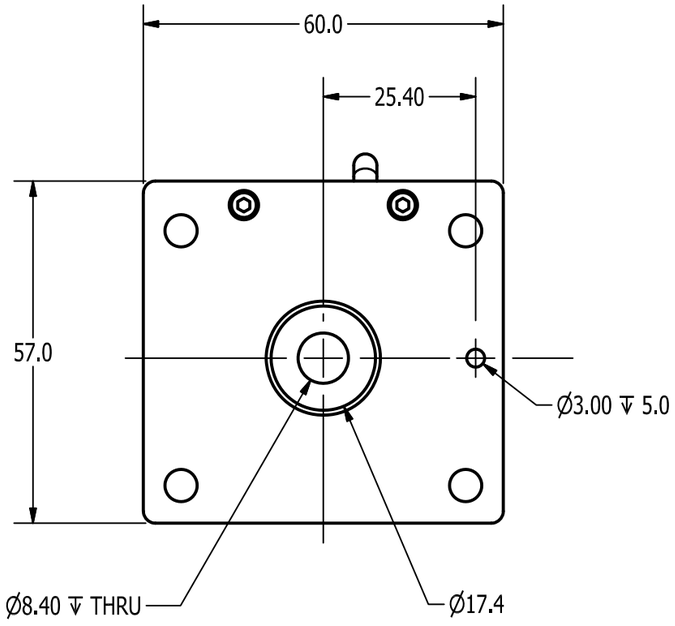
ACETABULUM LOAD CELL,RIGHT

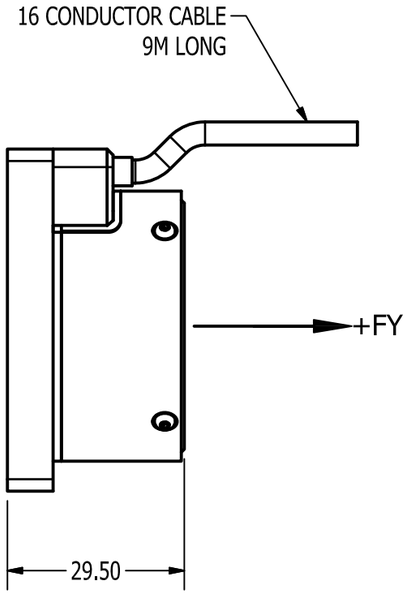
THIRD ANGLE PROJECTION

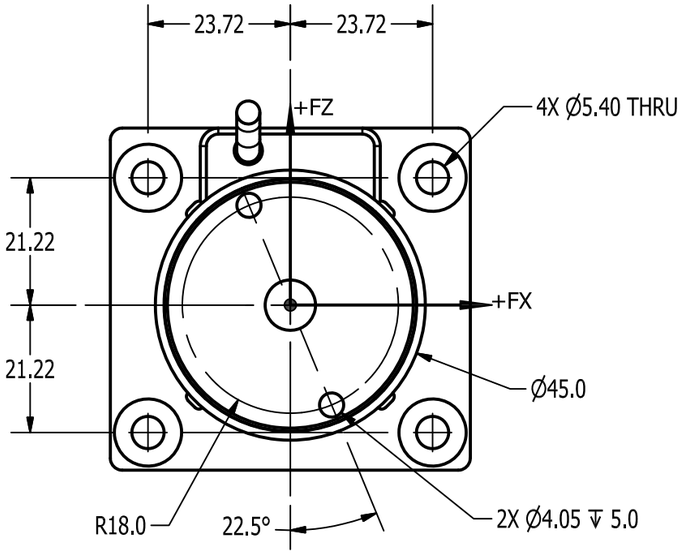
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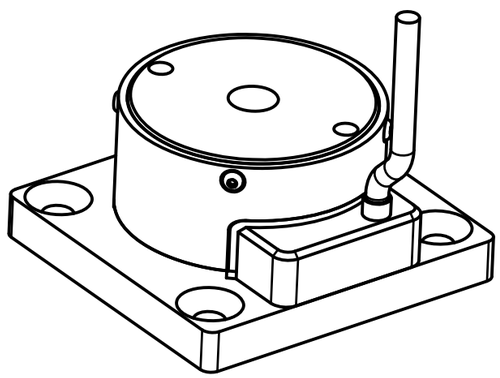
SCALE: 1 : 1 | SHEET: 1 OF 1

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
75007	1	PROTOTYPE	L.B.	L. BENFANT	2/10/2016
76888	2	UPDATED TO MATCH REVS	SKK	CJT	9/1/2017









SPECIFICATIONS				
AXIS	CAPACITY (METRIC)	CAPACITY (ENGLISH)	OUTPUT	BRIDGE RESISTANCE
FX	13.00 kN	2922.5 LBF	2.8 mV/V	350 OHMS
FY	10.00 kN	2248.1 LBF	0.9 mV/V	700 OHMS
FZ	9.00 kN	2023.3 LBF	1.9 mV/V	350 OHMS
NON-LINEARITY	< 1% OF FULL SCALE			
HYSTERESIS	< 1% OF FULL SCALE			
CROSSTALK	< 5% OF FULL SCALE			
EXCITATION	10 VDC NOMINAL 15 VDC MAX.			
POLARITY	CONFORMS TO SAE J-211			
MASS	299g (.66 LB) LESS CABLE			

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED 16 ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL
HEAT TREAT: NONE
FINISH: NONE

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: L. BENFANT	3/14/2018
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

ACETABULUM LOAD CELL, LEFT

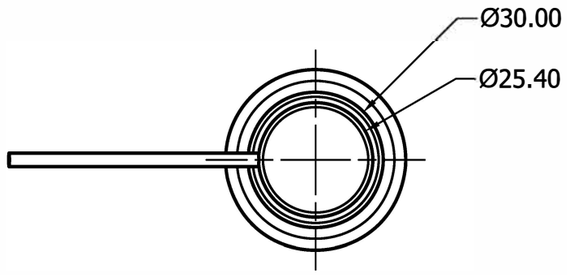
THIRD ANGLE PROJECTION

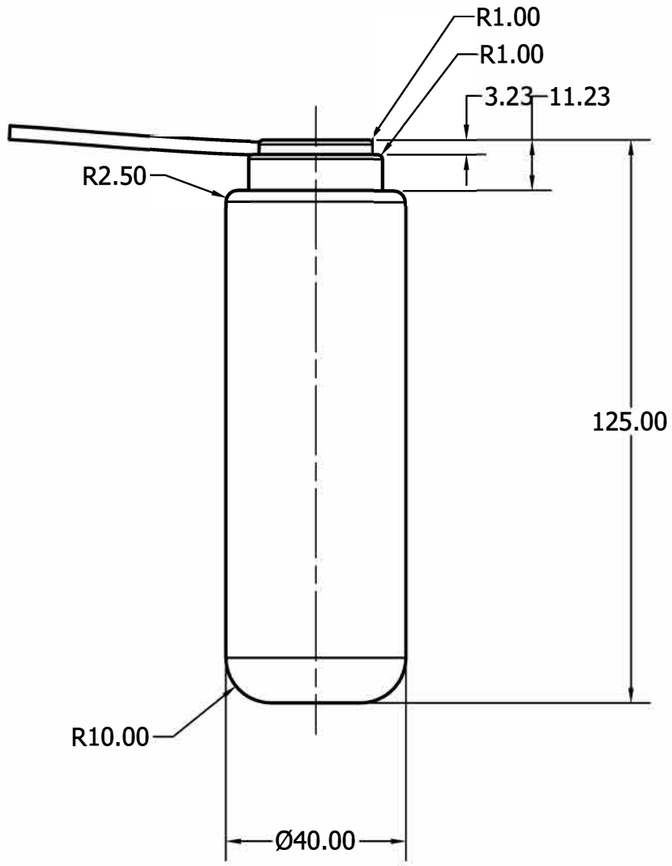
SIZE: A3 | DRAWING NUMBER: SA572-S109 | REV: 2

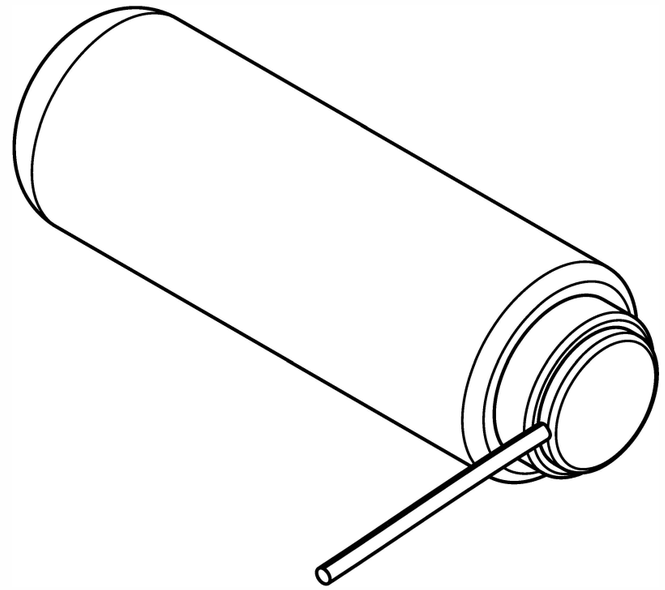
SCALE: 1 : 1 | SHEET: 1 OF 1

P1ease note that portions of these drawings are covered by U.S. Patent No. 9,243,966, assigned to Institut Francais Des Sciences Et Techno1ogies Des Transports (IFSTTAR) of Champs sur Marne, France.

REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
	1	RELEASE AS PROTOTYPE	AKM	AKM	7/5/2018







PRELIMINARY DRAWING

SPECIFICATIONS:

MASS: 160 ± 10 g
RANGE: 10 bar
NOISE: 0.35% OF FULL SCALE
EXCITATION: 2.5 - 10 VDC
OUTPUT SENSITIVITY: 14 mV/V/bar

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED 16 ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL: PRESSURE SENSOR
HEAT TREAT: N/A
FINISH: N/A

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN: AKM	7/5/2018
CHECKED:	
ENG: AKM	7/5/2018
APPROVED:	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

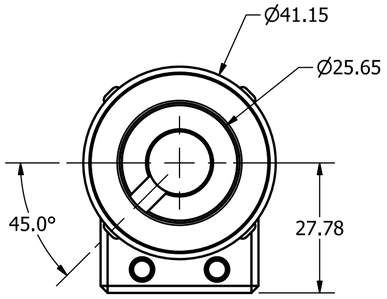
APTS SENSOR - THOR 5TH

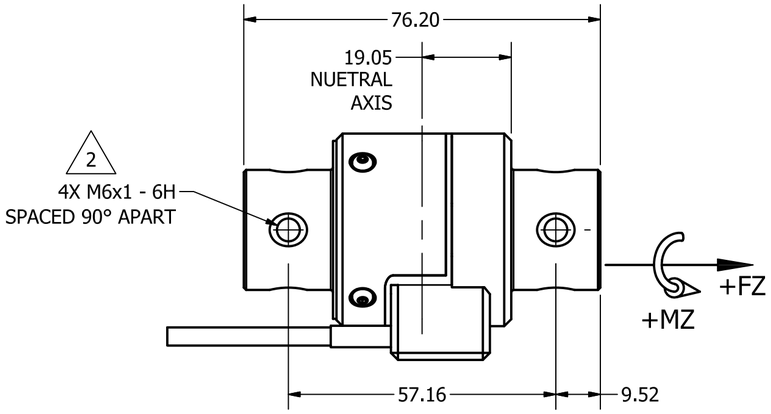
THIRD ANGLE PROJECTION

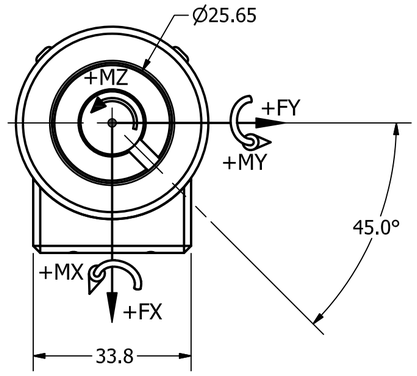
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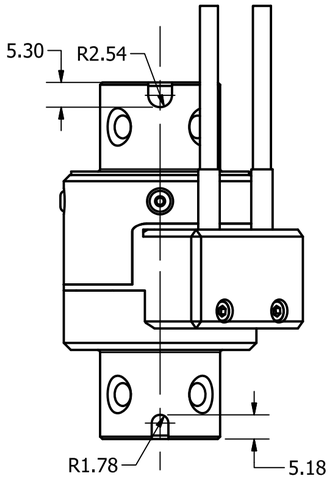
SCALE: | SHEET: 1 OF 1

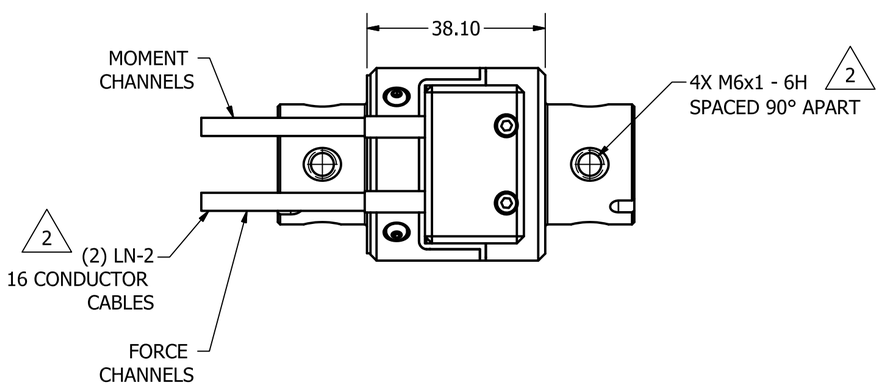
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
74843	1	PROTOTYPE	LB	LB	2/5/16
75845	2	FX & FY OUTPUTS WERE 1.7 mV/V; MZ OUTPUT WAS 2.2 mV/V; ADDED M6 HOLE CALLOUTS; REMOVED 27.8 DIM; REMOVED "9M" FROM CABLE CALL OUT;	LB	LB	9/18/2017

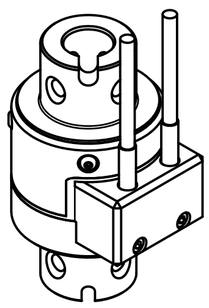












SPECIFICATIONS				
AXIS	CAPACITY (METRIC)	CAPACITY (ENGLISH)	OUTPUT	BRIDGE RESISTANCE
FX	9 kN	2,023 LBF	1.8 mV/V	350 OHMS
FY	9 kN	2,023 LBF	1.8 mV/V	350 OHMS
FZ	13.5 kN	3,035 LBF	1.1 mV/V	700 OHMS
MX	225 Nm	1991 IN-LBF	1.9 mV/V	350 OHMS
MY	225 Nm	1991 IN-LBF	1.9 mV/V	350 OHMS
MZ	170 Nm	1,505 IN-LBF	2.6 mV/V	700 OHMS
NON-LINEARITY	< 1% OF FULL SCALE			
HYSTERESIS	< 1% OF FULL SCALE			
CROSSTALK	< 5% OF FULL SCALE			
EXCITATION	10 VDC NOMINAL, 15 VDC MAX.			
POLARITY	CONFORMS TO S.A.E. J-211			
MASS	385g [0.848 LBS] LESS CABLES			

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1
MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

MATERIAL
HEAT TREAT
FINISH

VEHICLE RESEARCH and TEST CENTER

APPROVALS	DATE
DRAWN L. BENFANT	3/14/2018
CHECKED	
ENG	
APPROVED	

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

LOAD CELL, FEMUR, THOR 5TH

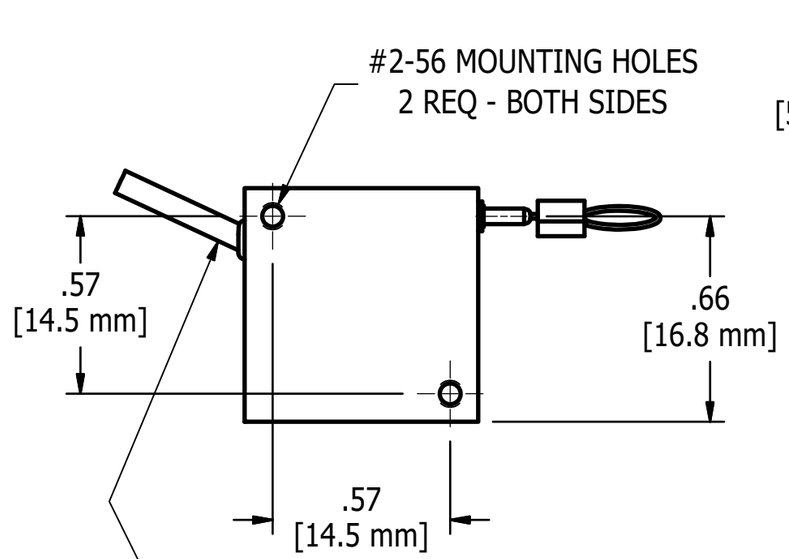
THIRD ANGLE PROJECTION

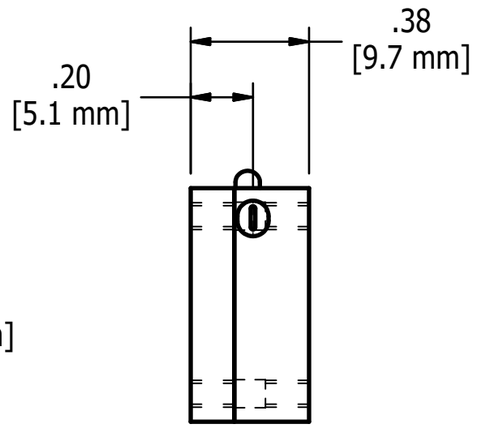
SIZE C | DRAWING NUMBER SA572-S63 | REV 2

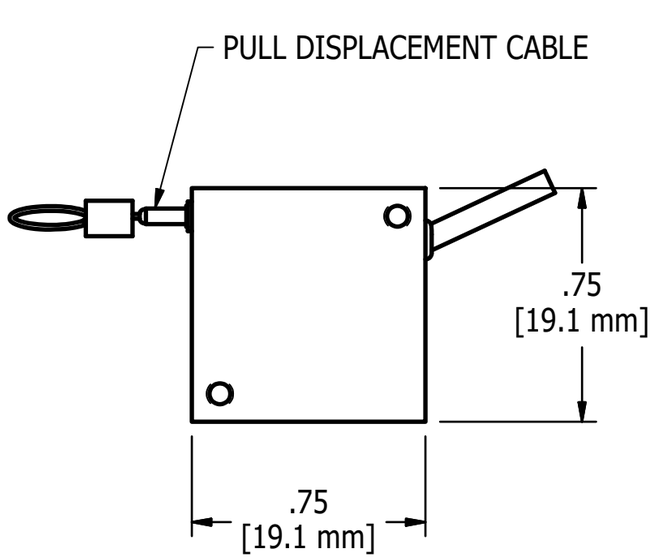
SCALE: 1:1 | SHEET 1 OF 1

POTENTIOMETER TYPE 1-TURN, PRECISION, CONDUCTIVE PLASTIC
RESISTANCE: 5K ohms ±10%
OUTPUT SIGNAL: ANALOG SIGNAL FROM 0 TO SUPPLY VOLTAGE (VOLTAGE DIVIDER CIRCUIT)
INDEPENDENT LINEARITY ERROR: ±1.0% MAX. PER VRCI-P-100A
OUTPUT SMOOTHNESS: 0.1% MAX.
NORMAL MASS: 0.5 oz. (15.0g)
CABLE TRAVEL: 1.5" (38mm) MAXIMUM TRAVEL
ELECTRICAL CONNECTION:

BLACK: INPUT, V+
WHITE: OUTPUT, SIGNAL, S+
RED: GROUND, COMMON, V-,S-



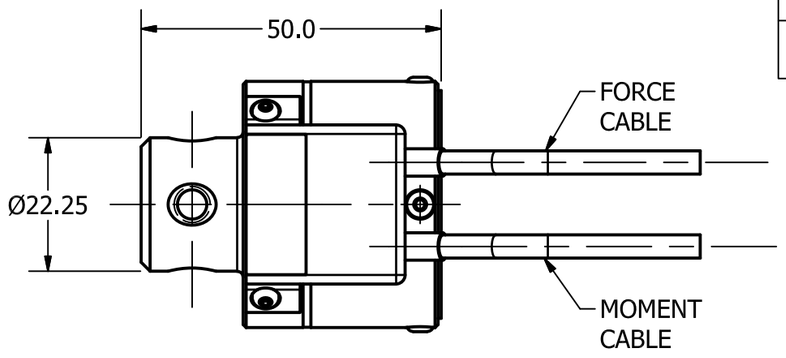


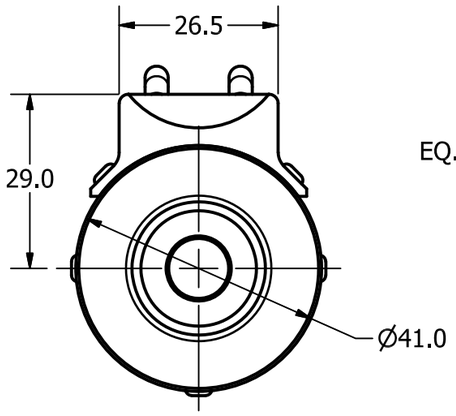


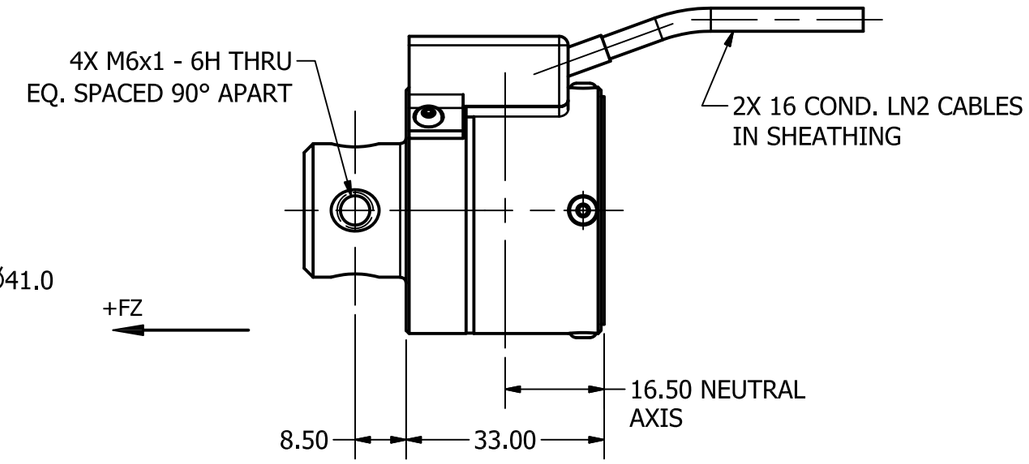
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS TOLERANCES ARE: DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED 1.6 | ANGLES ±.5° ASME Y14.5M - 1994 **DO NOT SCALE DRAWING**	*V*EHICLE *R*ESEARCH and *T*EST *C*ENTER	**NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION**
	APPROVALS / DATE	STRING POT, MINI (UNIVERSAL)
	DRAWN: JIM CLEVENGER — 7/10/2019	
MATERIAL	CHECKED	
HEAT TREAT	ENG	
FINISH	APPROVED	
THIRD ANGLE PROJECTION	SIZE: A3 — DRAWING NUMBER: SA572-S90 — REV	
	SCALE: 2 : 1 — SHEET: 1 OF 1	

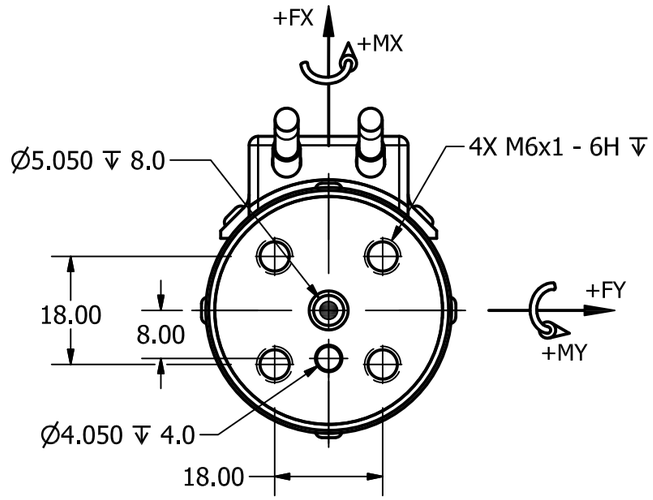
SA572-S90.iam

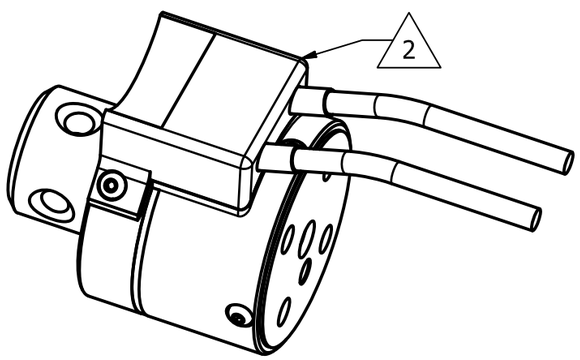
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
76404	1	PROTOTYPE	CJT	JGG	4/7/2017
76813	2	UPDATE VIEWS TO DEPICT NEW STRAIN RELIEF	LB	CJT	7/17/2017











SPECIFICATIONS				
CH.	CAPACITY (METRIC)	CAPACITY (ENGLISH)	OUTPUT	BRIDGE RESISTANCE
FX	10.00 kN	2248.09 LBF	1.5 mV/V	350 OHMS
FY	10.00 kN	2248.09 LBF	1.5 mV/V	350 OHMS
FZ	12.00 kN	2697.71 LBF	1.0 mV/V	700 OHMS
MX	340.00 Nm	3009.25 IN-LBF	2.6 mV/V	350 OHMS
MY	340.00 Nm	3009.25 IN-LBF	2.6 mV/V	350 OHMS

NON-LINEARITY	< 1% OF FULL SCALE
HYSTERESIS	< 1% OF FULL SCALE
CROSSTALK	< 5% OF FULL SCALE
EXCITATION	10 VDC NOMINAL 15 VDC MAX.
POLARITY	CONFORMS TO SAE J-211
MASS	230 g (.51 LB) LESS CABLES

PRELIMINARY DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:

DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED 1.6 | ANGLES ±.5°

ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN CJT	3/14/2018
CHECKED	
ENG	
APPROVED	

MATERIAL
HEAT TREAT N/A
FINISH N/A

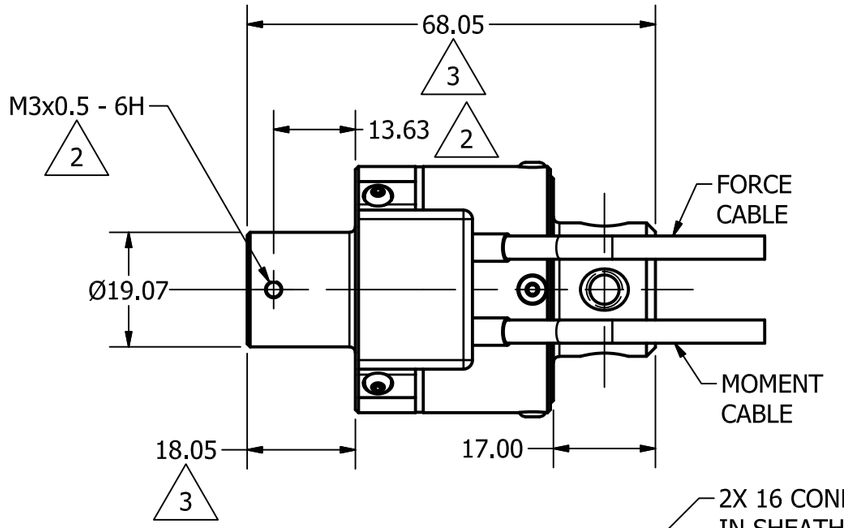
5X UPPER TIBIA LOAD CELL

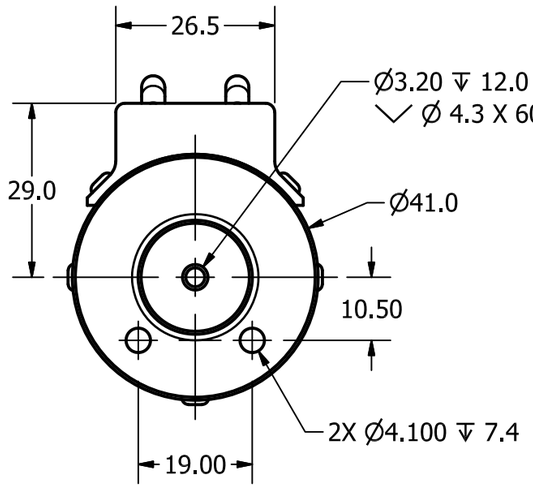
THIRD ANGLE PROJECTION

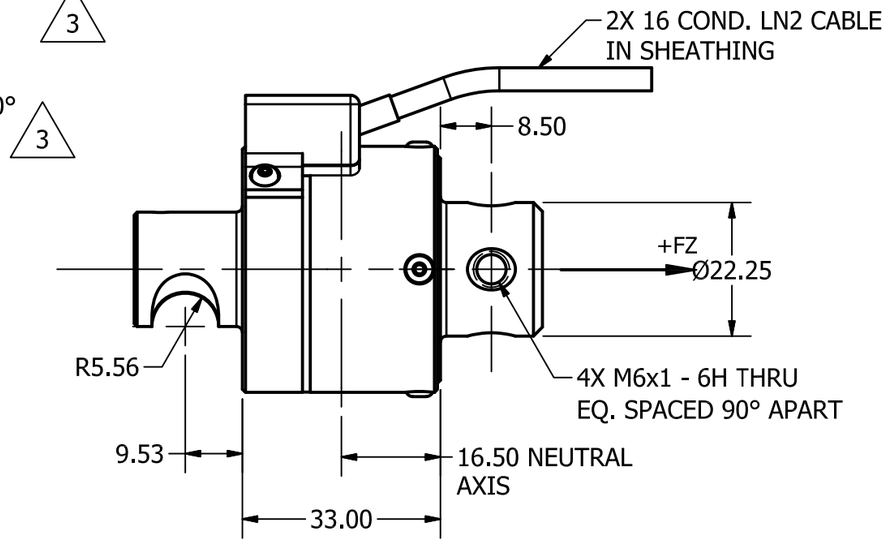
SIZE A3 | DRAWING NUMBER SA572-S103 | REV 2

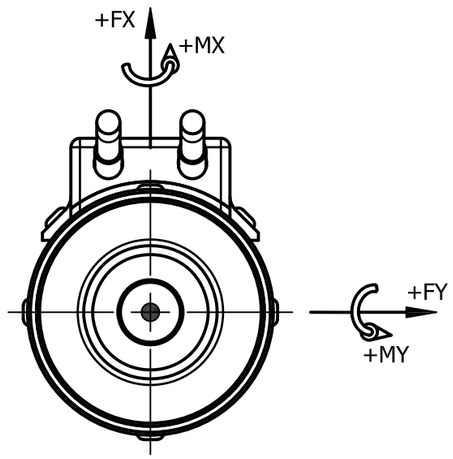
SCALE: 1.25 : 1 | SHEET 1 OF 1

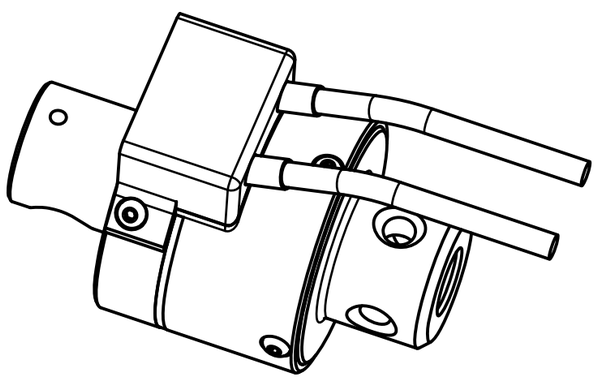
REVISION HISTORY					
ECO#	REV	DESCRIPTION	BY	ENG'R.	DATE
76406	1	PROTOTYPE	CJT	SKK	4/19/2017
76786	2	ADD M3 X 0.5 HOLE & 13.63	L.B.	TORCH	7/12/2017
80000	3	REMOVED MAGNET FROM ASSEMBLY & UPDATED VIEWS; 68.05 WAS 69.25; 18.05 WAS 21.25; ADDED Ø3.20	L.B.	CJT	11/29/2017











PRELIMINARY DRAWING

SPECIFICATIONS				
AXIS	CAPACITY (METRIC)	CAPACITY (ENGLISH)	OUTPUT	BRIDGE RESISTANCE
FX	10.00 kN	2248.09 LBF	1.5 mV/V	350 OHMS
FY	10.00 kN	2248.09 LBF	1.5 mV/V	350 OHMS
FZ	12.00 kN	2697.71 LBF	1.1 mV/V	700 OHMS
MX	340.00 Nm	3009.25 IN-LBF	2.6 mV/V	350 OHMS
MY	340.00 Nm	3009.25 IN-LBF	2.6 mV/V	350 OHMS
NON-LINEARITY	< 1% OF FULL SCALE			
HYSTERESIS	< 1% OF FULL SCALE			
CROSSTALK	< 5% OF FULL SCALE			
EXCITATION	10 VDC NOMINAL 15 VDC MAX.			
POLARITY	CONFORMS TO SAE J-211			
MASS	300 g (.66 LB) LESS CABLES			

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS
TOLERANCES ARE:
DECIMAL: X ±.5, X.X ±.2, X.XX ±.1 | MACHINED ANGLES ±.5°
ASME Y14.5M - 1994
DO NOT SCALE DRAWING

VEHICLE RESEARCH and TEST CENTER

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

APPROVALS	DATE
DRAWN CJT	3/14/2018
CHECKED	
ENG	
APPROVED	

MATERIAL
HEAT TREAT N/A
FINISH N/A

5X LOWER TIBIA LOAD CELL

THIRD ANGLE PROJECTION

SIZE A3 | DRAWING NUMBER SA572-S104 | REV 3

SCALE: 1 : 1 | SHEET 1 OF 1