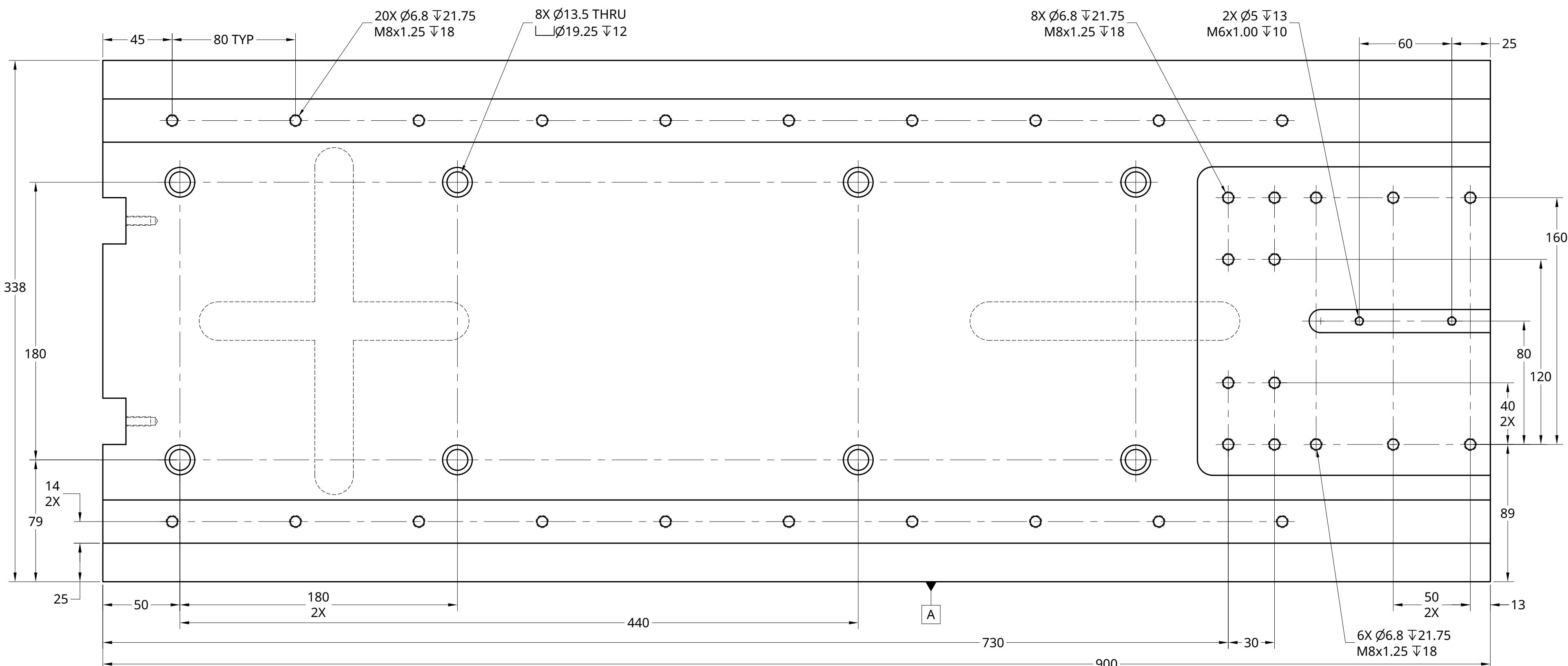


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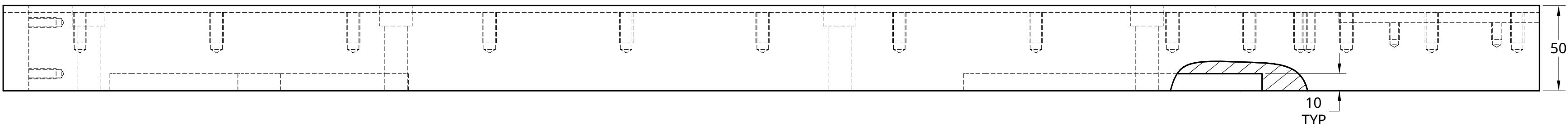


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UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES XX = ±0. XXX = ±0.00 XXXX = ±0.000		NAME	DATE
DRAWN	BRIAN BRADY	10/16/2019	
CHECKED			
APPROVED			
DO NOT SCALE DRAWING			
BREAK ALL SHARP EDGES AND REMOVE BURRS			
THIRD ANGLE PROJECTION	MATERIAL	VOLUME	
(Cone icon)	STEEL 8620	14566452 mm ³	
SCALE 1:2	WEIGHT 114,347 kg	SHEET 1 of 20	REV.

Ferris State University
DRILL UNIT
MAIN ASSEMBLY DETAILS
BASE PLATE
SIZE C DWG NO. BR-549-C-001

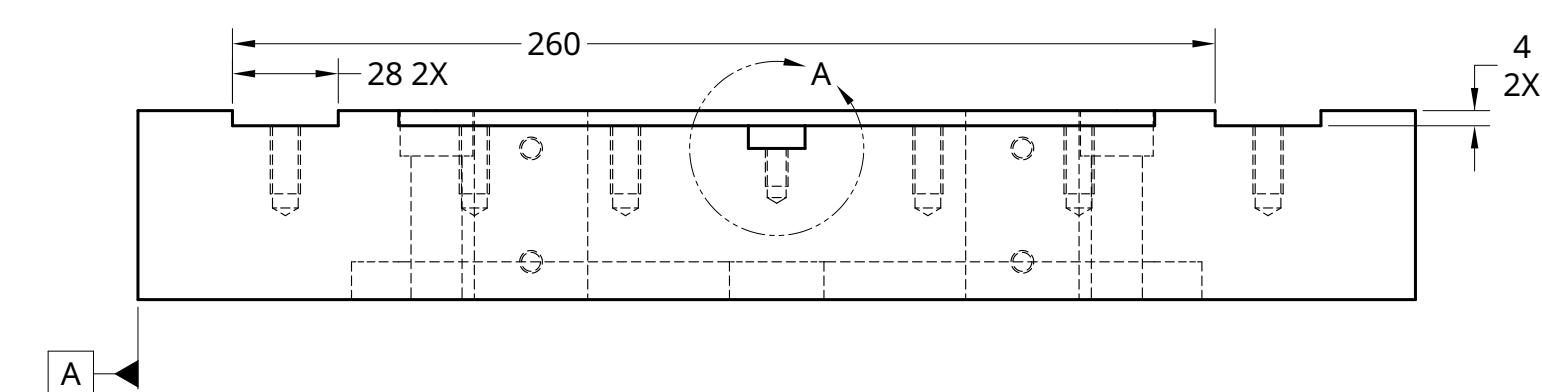
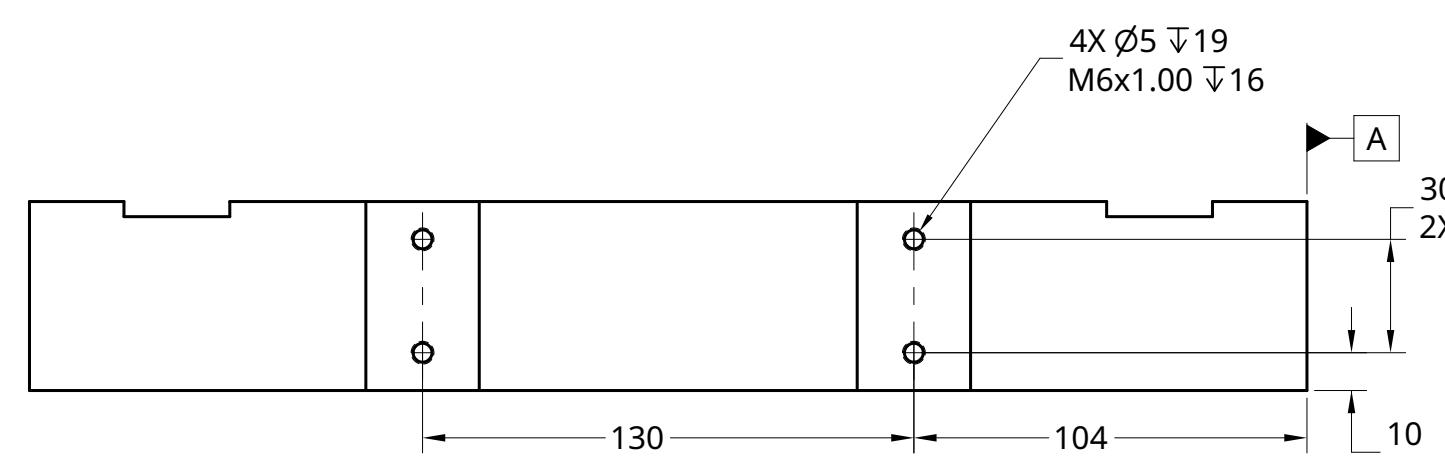
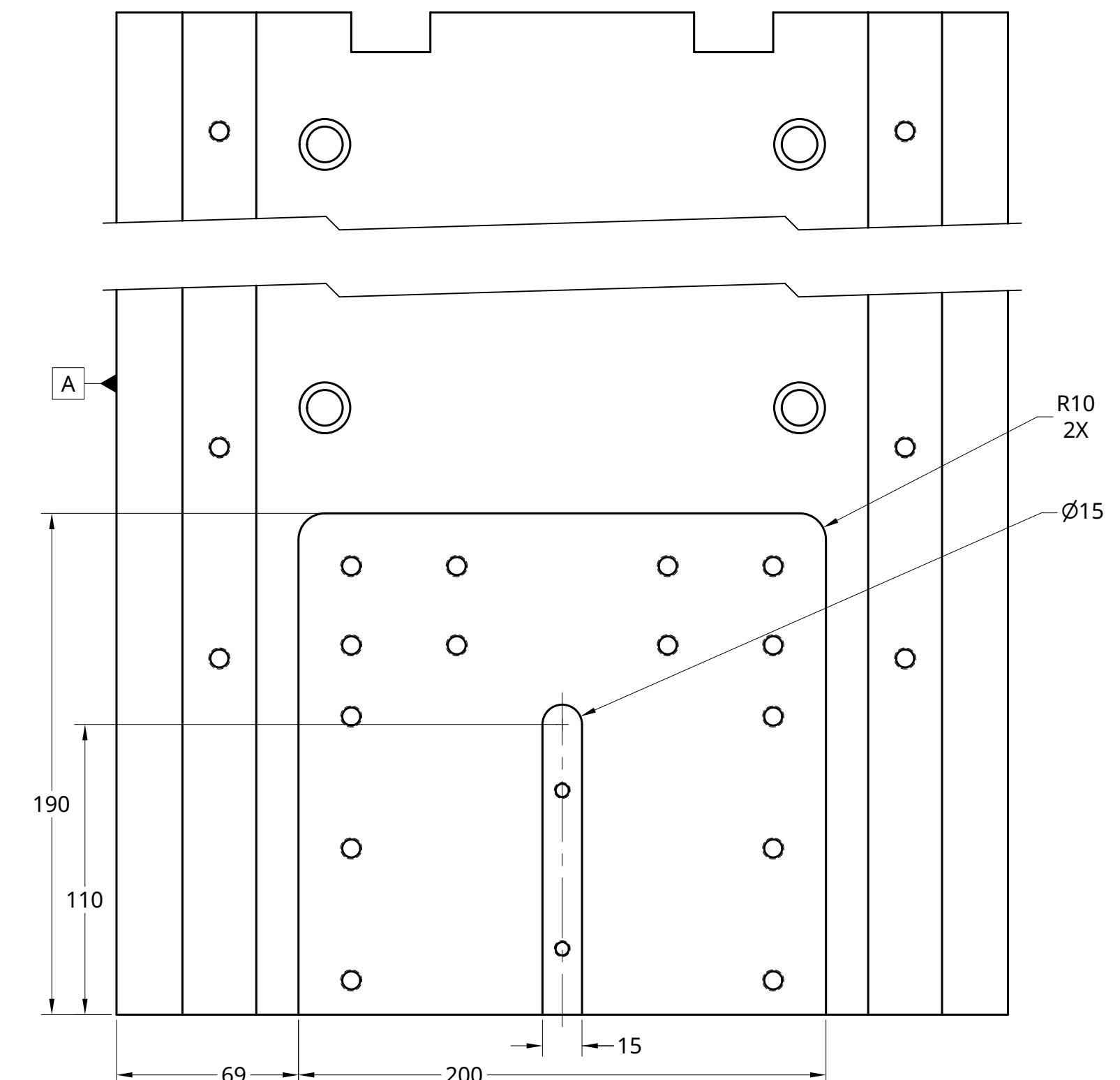
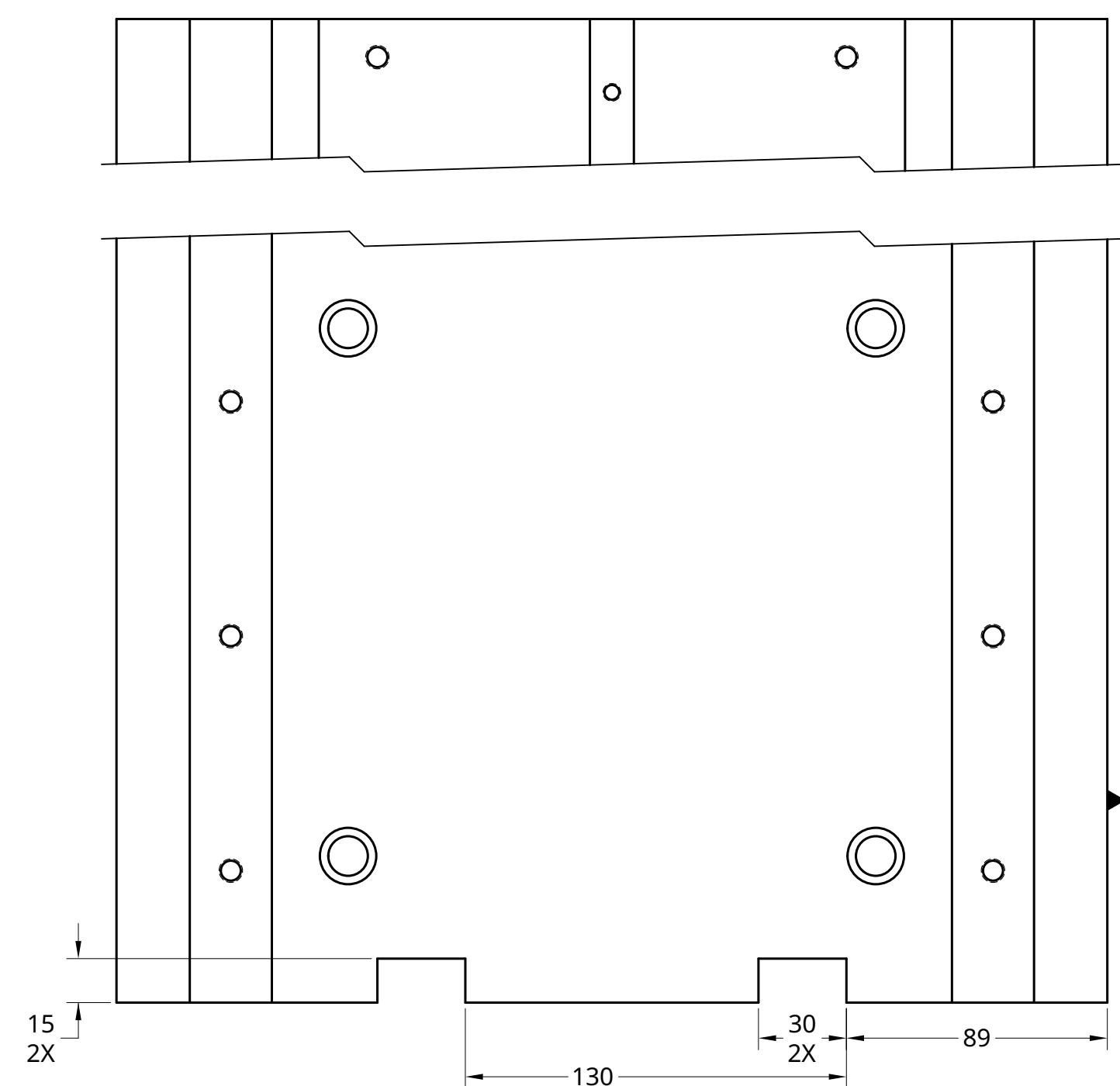
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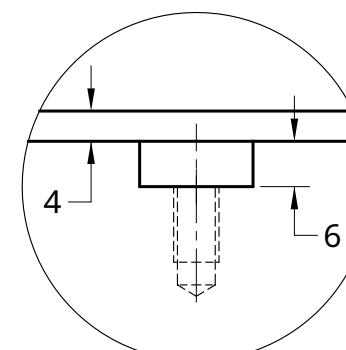
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LEFT VIEW

DETAIL A
SCALE 1:1

RIGHT VIEW

UNLESS OTHERWISE SPECIFIED, .XX ± .0-. .XXX ± .00-. .XXXX ± .000-		NAME	DATE
DRAWN	BRIAN BRADY	10/16/2019	
CHECKED			
APPROVED			
DO NOT SCALE DRAWING			
BREAK ALL SHARP EDGES AND REMOVE BURRS			
THIRD ANGLE PROJECTION	MATERIAL	VOLUME	
(Cone icon)	STEEL 8620	14566452 mm ³	
SCALE	1:2	WEIGHT	114.347 kg
DWG NO.	BR-549-C-001	REV.	
SHEET	2 of 20		

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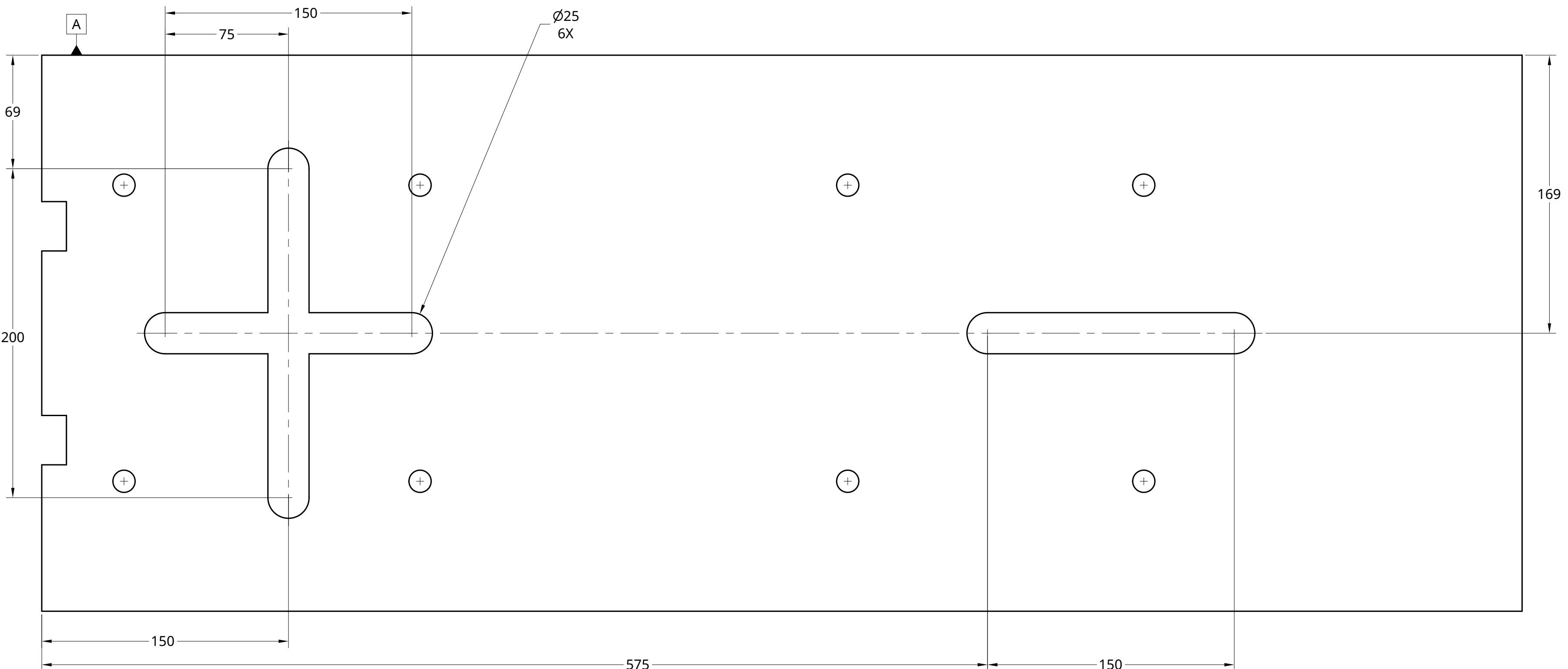
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UNLESS OTHERWISE SPECIFIED, .XX ± .D. .XXX ± .00. .XXXX ± .0000.		NAME DRAWN BRIAN BRADY	DATE 10/16/2019
ANGULAR ± ° FRCTIONAL ± †		CHECKED	
SURFACE FINISH ✓		APPROVED	
DO NOT SCALE DRAWING			
BREAK ALL SHARP EDGES AND REMOVE BURRS			
THIRD ANGLE PROJECTION		MATERIAL STEEL 8620	VOLUME 14566452 mm³
		SCALE 1:2	WEIGHT 114.347 kg
SIZE C		DWG NO. BR-549-C-001	REV.
			SHEET 3 of 20

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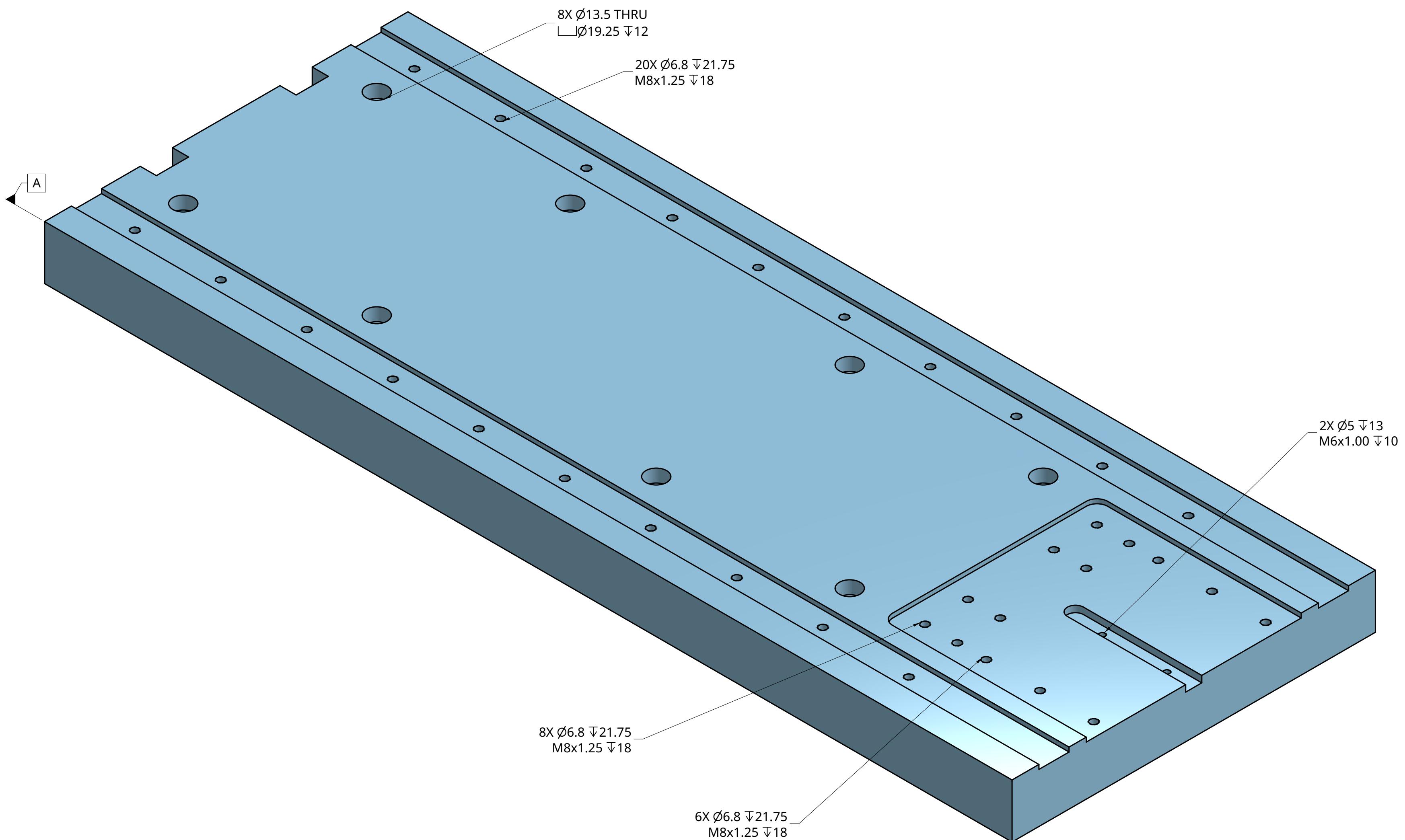
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UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES XX = ±0. XXX = ±.00. XXXX = ±.000. SURFACE FINISH		NAME DRAWN CHECKED APPROVED	DATE 10/16/2019
DO NOT SCALE DRAWING BREAK ALL SHARP EDGES AND REMOVE BURRS			
THIRD ANGLE PROJECTION		MATERIAL STEEL 8620	VOLUME 14566452 mm ³
SIZE C	DWG NO. BR-549-C-001	REV.	
SCALE 1:2	WEIGHT 114.347 kg	SHEET 4 of 20	

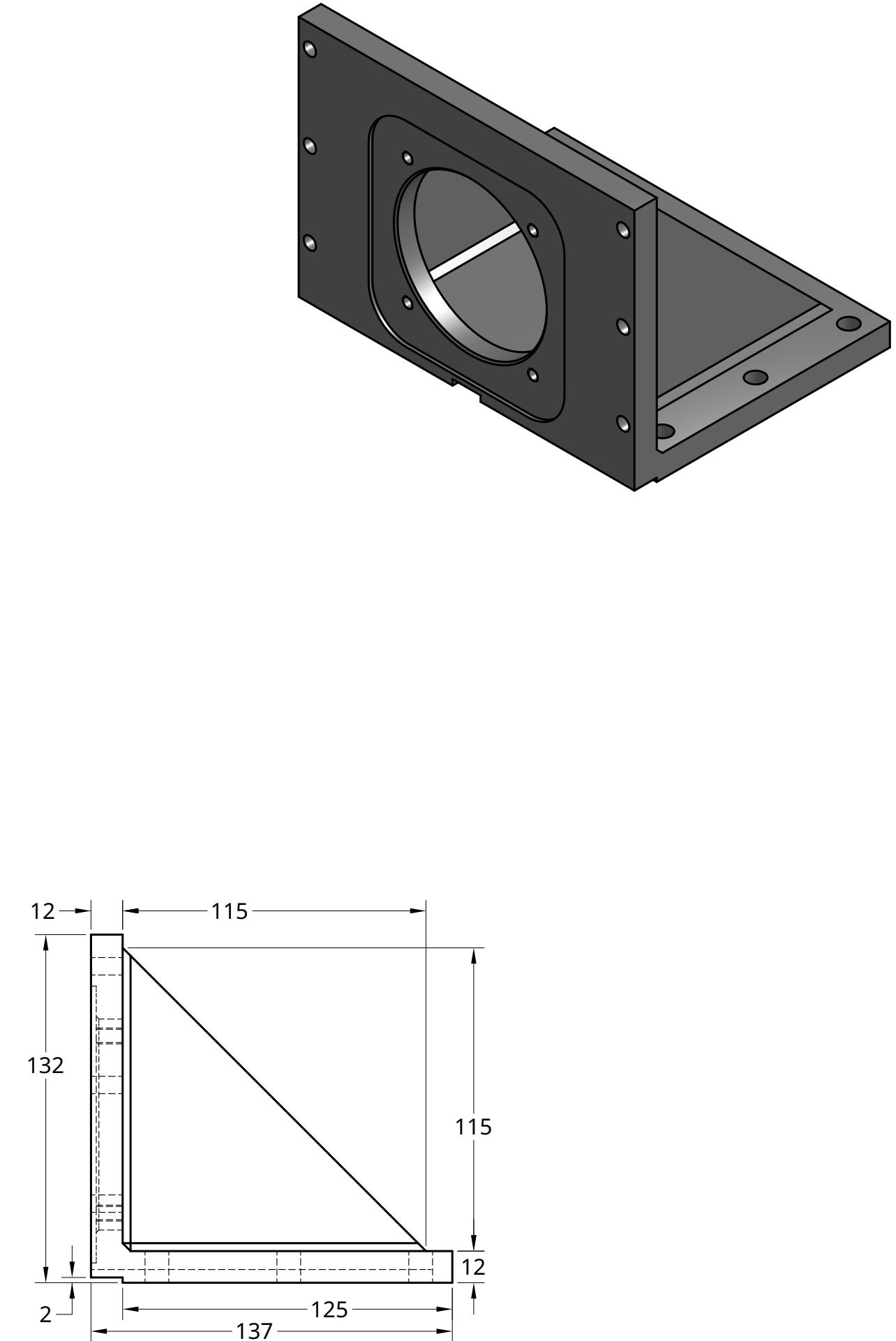
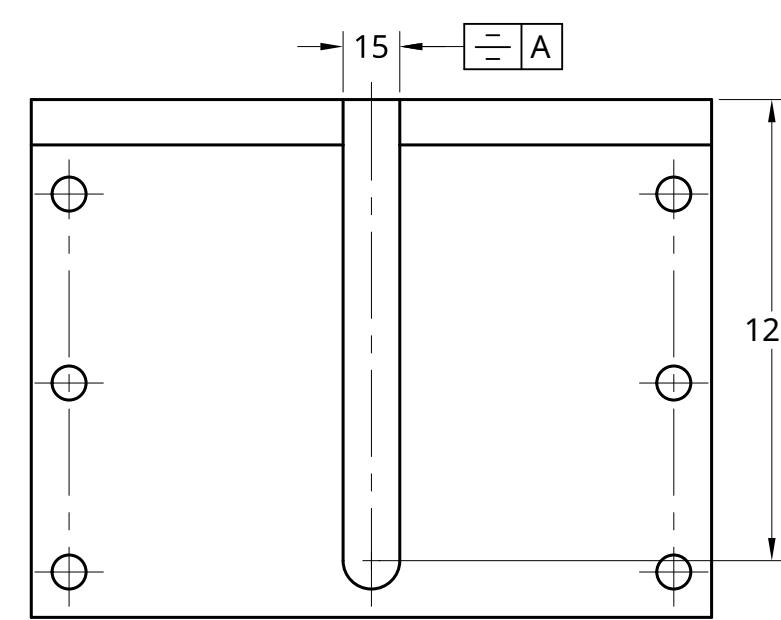
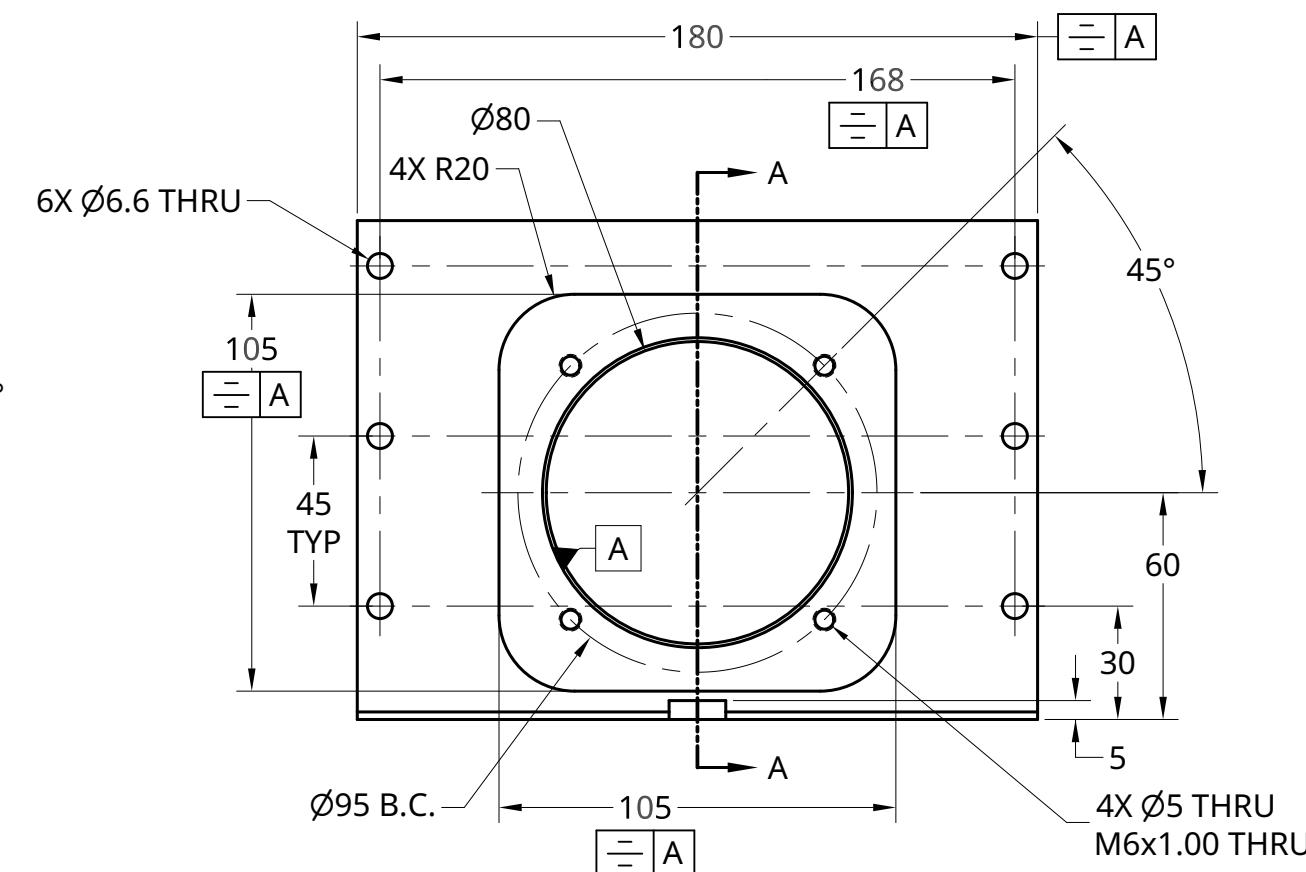
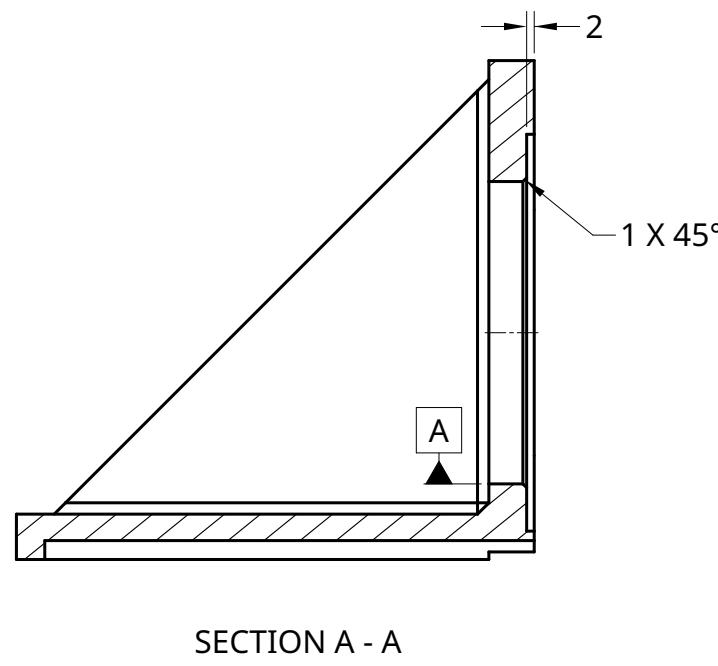
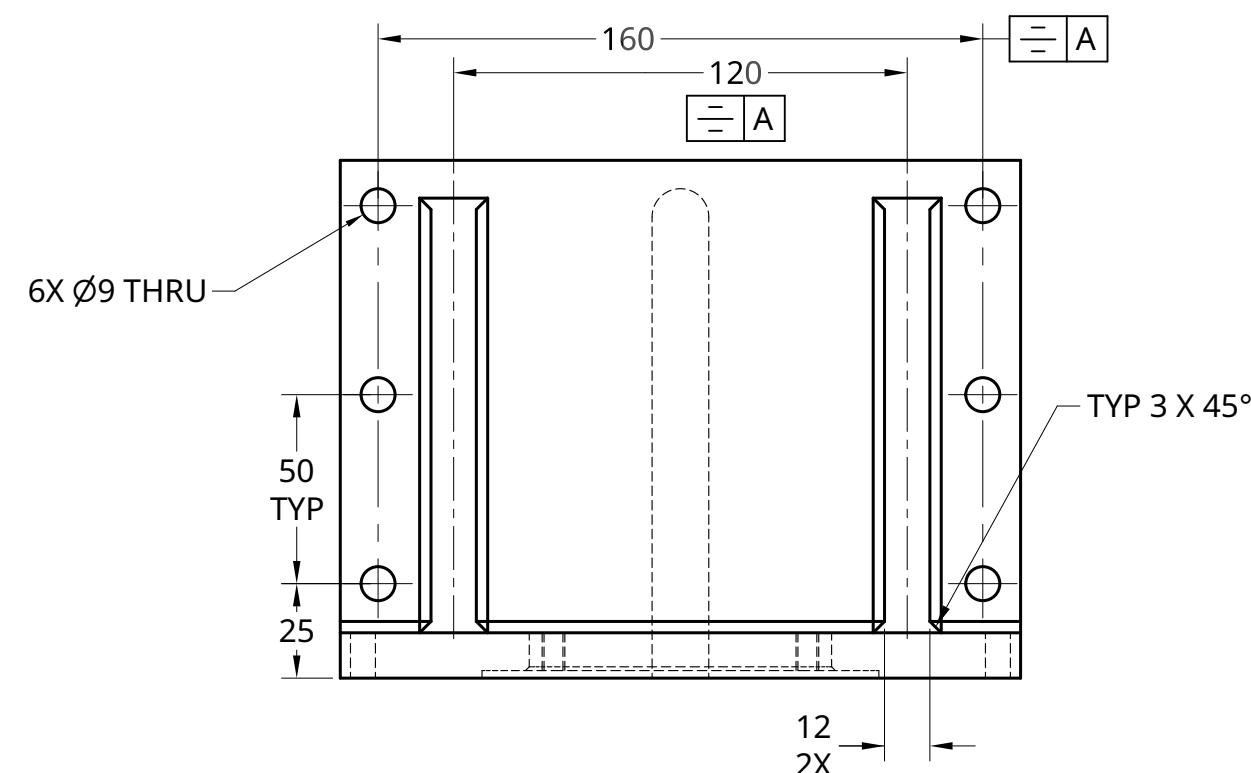
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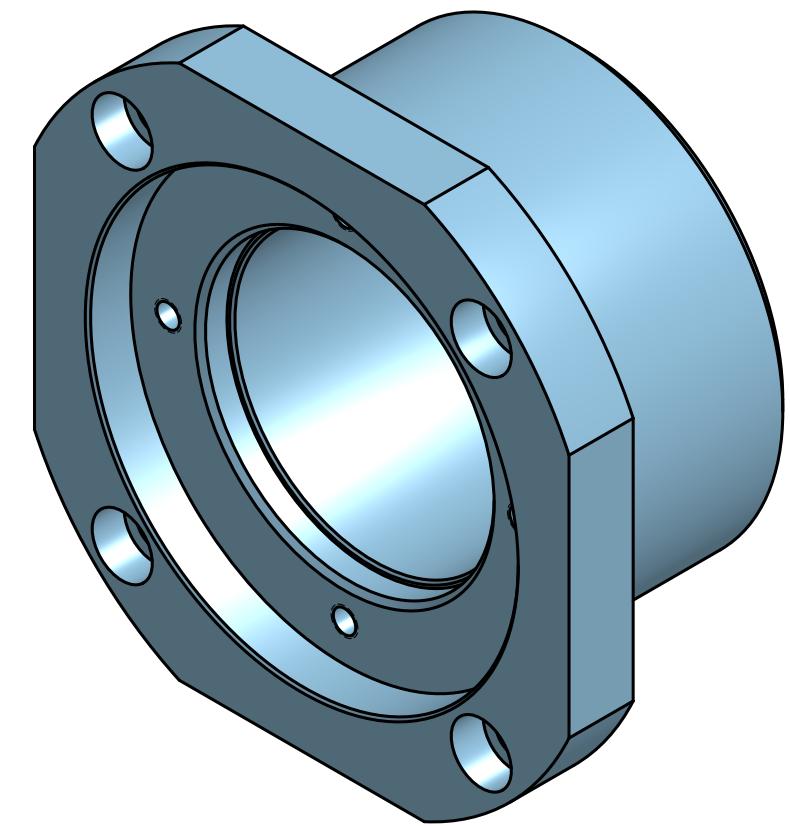
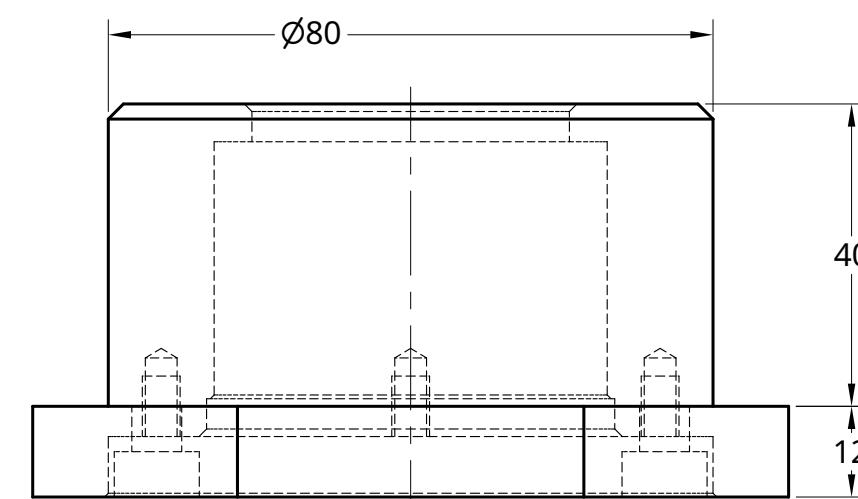
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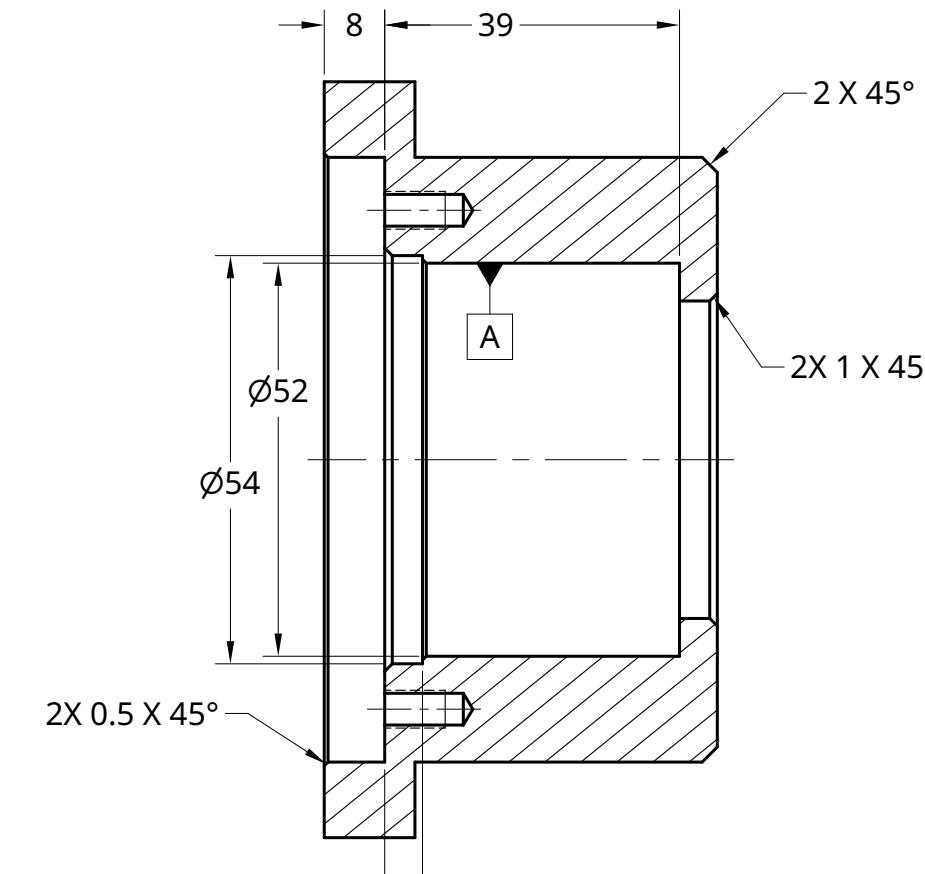
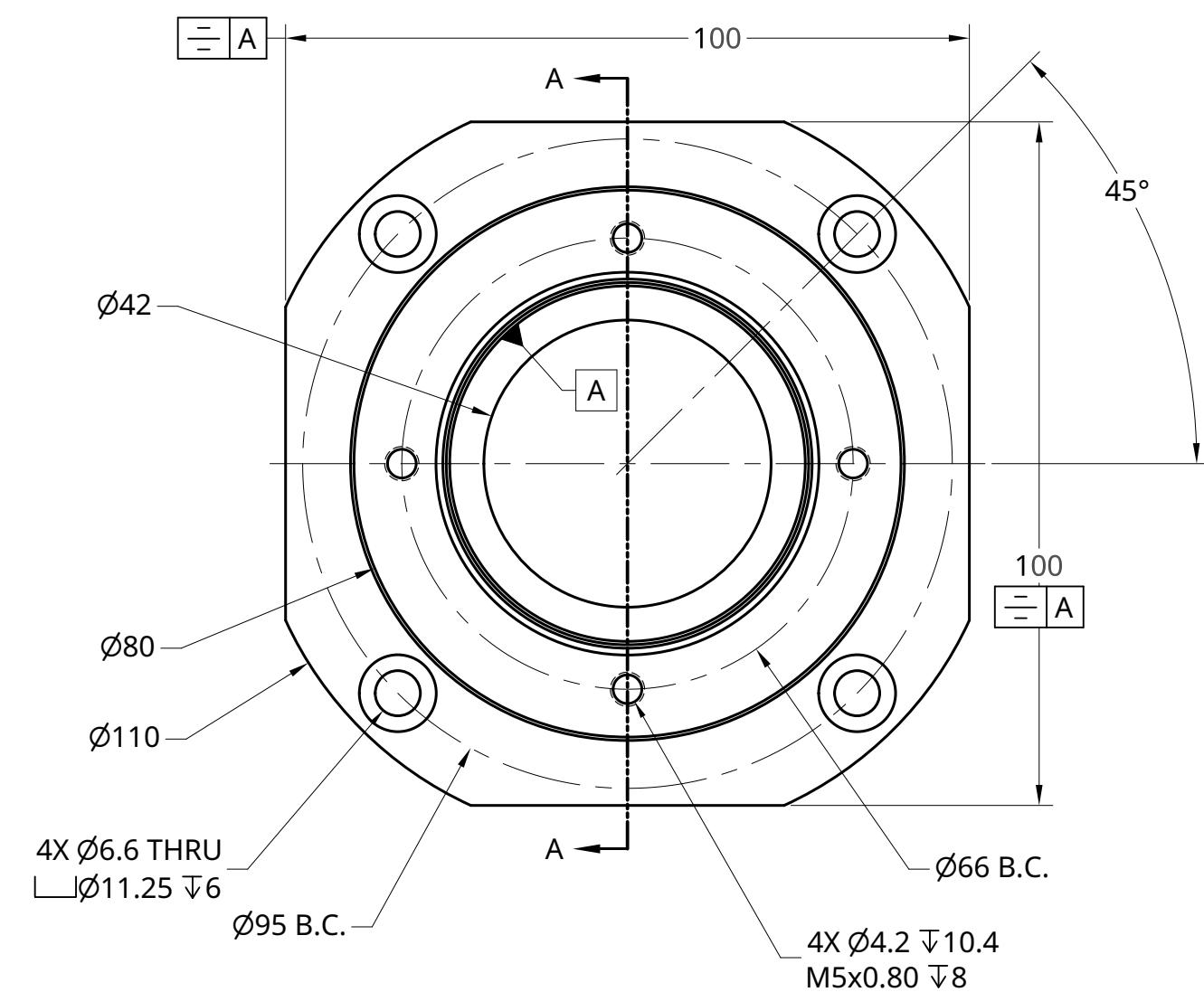
UNLESS OTHERWISE SPECIFIED, .XX ± .0-. .XXX ± .00-. .XXXX ± .0000- ANGULAR ± ° FRACTIONAL ± #				NAME DRAWN BRIAN BRADY CHECKED APPROVED	DATE 10/16/2019
SURFACE FINISH ✓					
DO NOT SCALE DRAWING BREAK ALL SHARP EDGES AND REMOVE BURRS					
THIRD ANGLE PROJECTION				MATERIAL STEEL 1020	VOLUME 625418 mm³
SCALE 1:2	WEIGHT 4.922 kg	SHEET 5 of 20	REV.		

Ferris State University
 DRILL UNIT
 MAIN ASSEMBLY DETAILS
 BALL SCREW SUPPORT BRACKET
 SIZE C DWG NO. BR-549-C-002
 REV.

D



C



SECTION A - A

A

Ferris State University		
DRILL UNIT MAIN ASSEMBLY DETAILS BALL SCREW BEARING HOUSING		
SIZE	DWG NO.	REV.
C	BR-549-C-003	
SCALE 1:1	WEIGHT 1.353 kg	Sheet 6 of 20

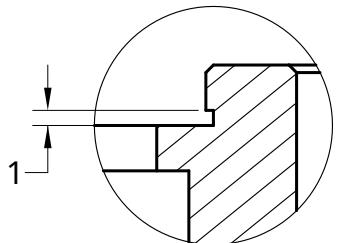
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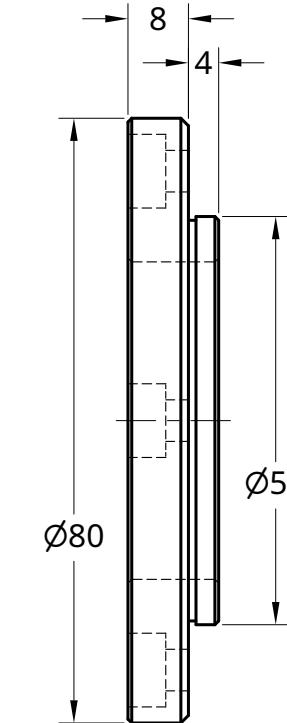
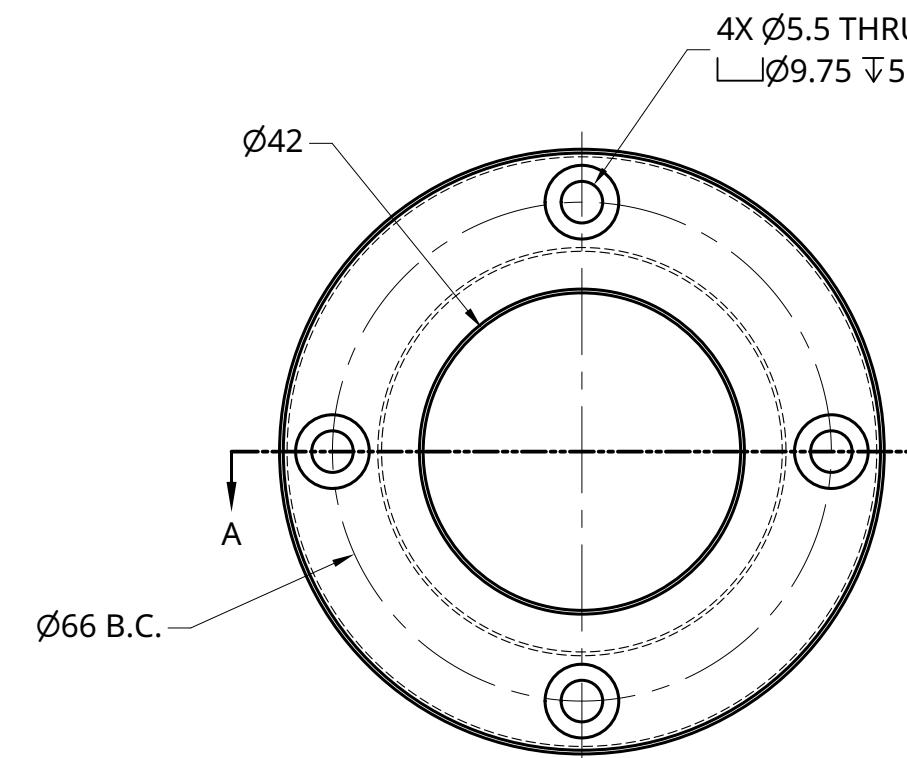
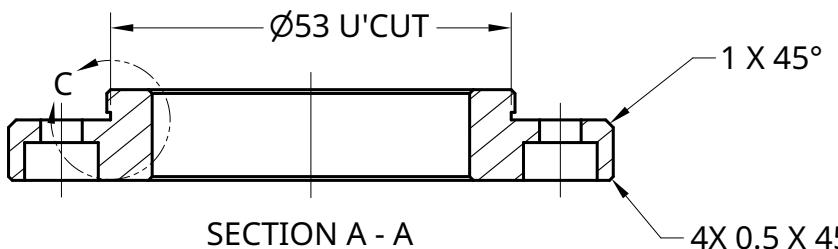
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DETAIL C
SCALE 2:1



UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES .XX = ±.0- .XXX = ±.00- .XXXX = ±.000-		NAME	DATE
SURFACE FINISH	BRIAN BRADY	10/16/2019	
DO NOT SCALE DRAWING			TITLE
BREAK ALL SHARP EDGES AND REMOVE BURRS			DRILL UNIT
THIRD ANGLE PROJECTION	MATERIAL	VOLUME	MAIN ASSEMBLY DETAILS
	STEEL 4130	30675 mm ³	BALL SCREW BEARING CAP
	REV.		
SCALE	1:1	WEIGHT	0.241 kg
		SHEET	7 of 20

Ferris State University

DRILL UNIT
MAIN ASSEMBLY DETAILS
BALL SCREW BEARING CAP

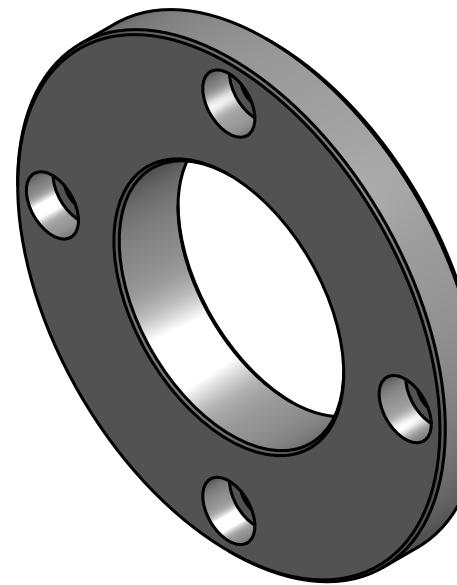
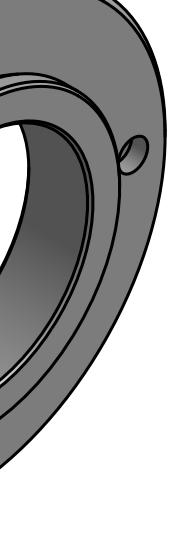
BR-549-C-004

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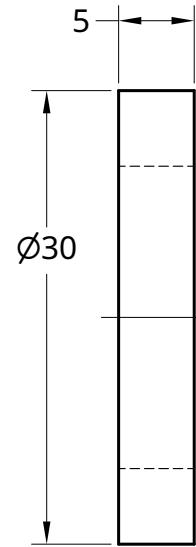
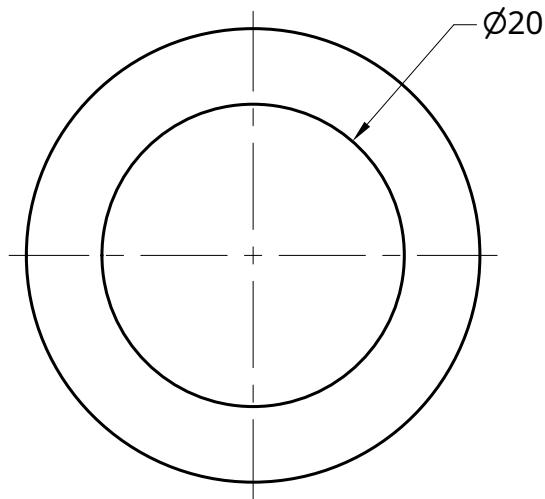
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UNLESS OTHERWISE SPECIFIED,
DIMENSIONS ARE IN INCHES

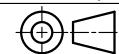
.XX = ±.0-
.XXX = ±.00-
.XXXX = ±.000-

SURFACE FINISH ✓

DO NOT SCALE DRAWING

BREAK ALL SHARP EDGES AND
REMOVE BURRS

THIRD ANGLE PROJECTION



DRAWN

CHECKED

APPROVED

NAME

BRIAN BRADY

DATE

10/16/2019

Ferris State University

DRILL UNIT
MAIN ASSEMBLY DETAILS
BALL SCREW BEARING SPACER

SIZE

A

DWG NO.

BR-549-C-005

REV.

MATERIAL

VOLUME

1963 mm³

SCALE

2:1

WEIGHT

0.015 kg

SHEET

8 of 20

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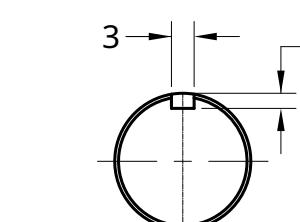
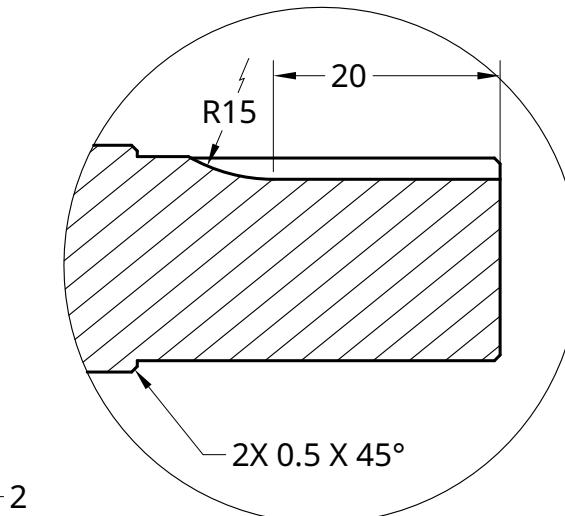
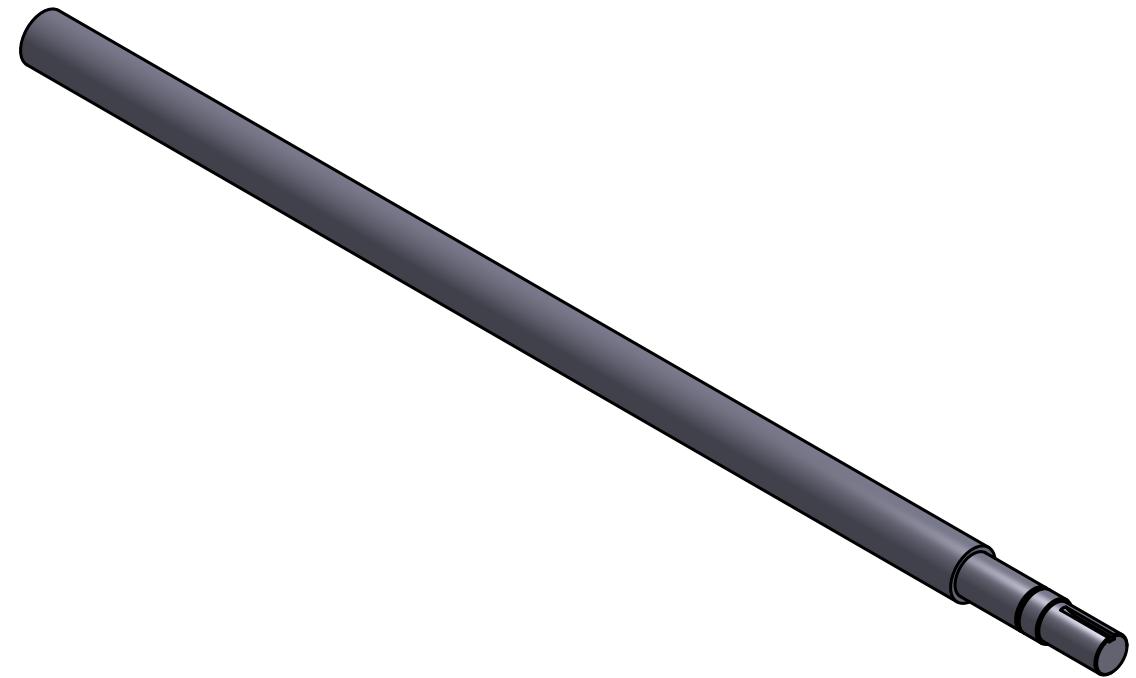
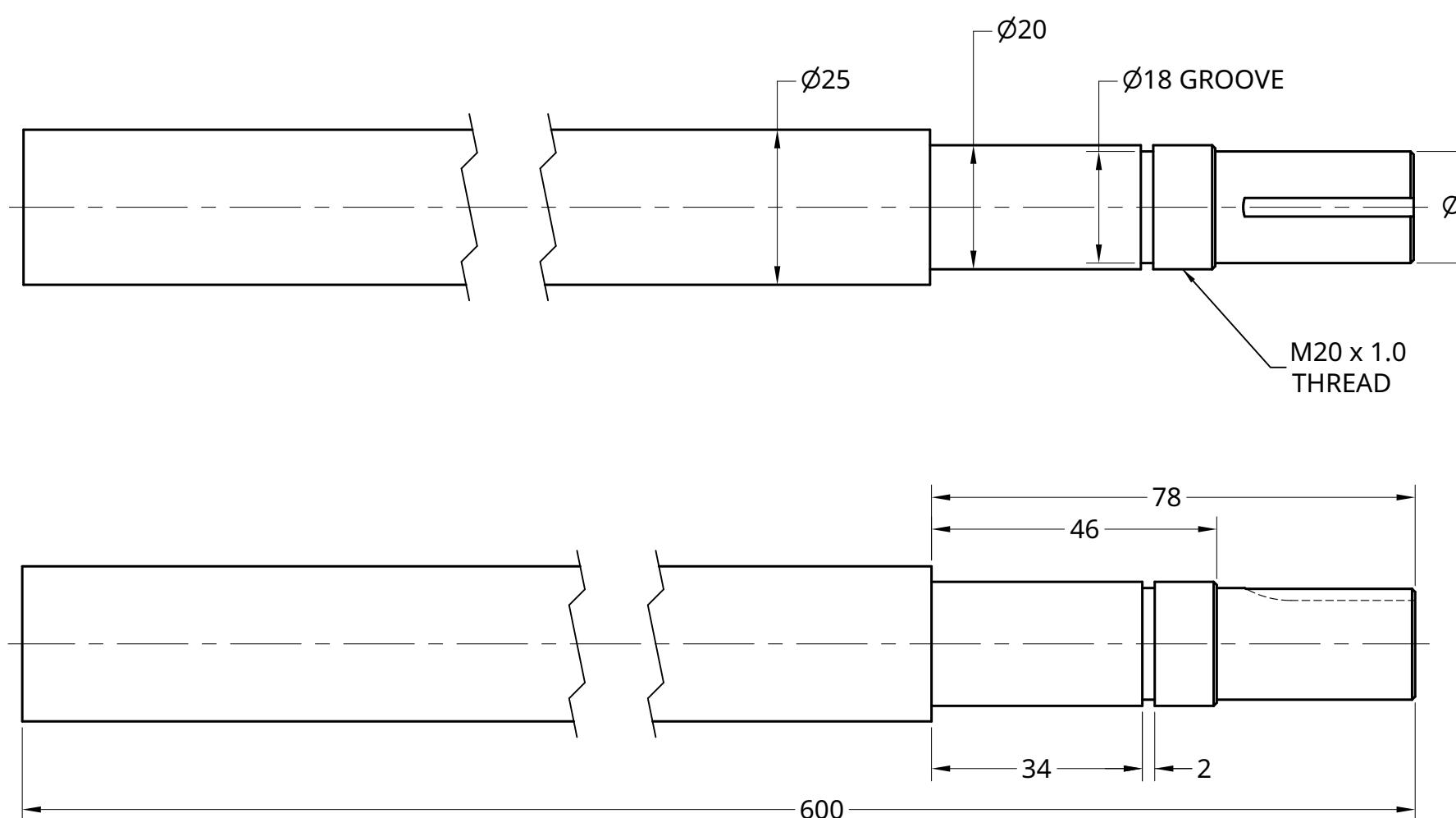
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UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES .XX = ±.0-. .XXX = ±.00-. .XXXX = ±.000-		NAME DRAWN BRIAN BRADY CHECKED APPROVED	DATE 10/16/2019
SURFACE FINISH ✓		ANGULAR = ± ° FRACTIONAL = ±	TITLE
DO NOT SCALE DRAWING		BREAK ALL SHARP EDGES AND REMOVE BURRS	DRILL UNIT MAIN ASSEMBLY DETAILS BALL SCREW - ALTERED
THIRD ANGLE PROJECTION		MATERIAL STEEL 8620	VOLUME 278550 mm ³
		SIZE B	DWG NO. BR-549-C-006
SCALE 1:1		WEIGHT 2.187 kg	REV. 9 of 20

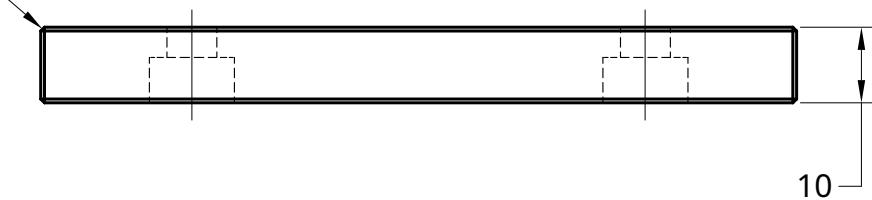
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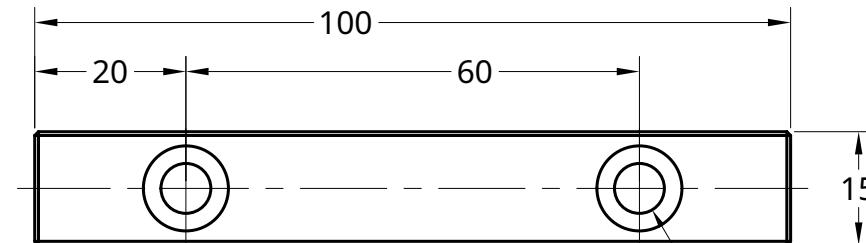
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0.5 X 45°
ALL EDGES

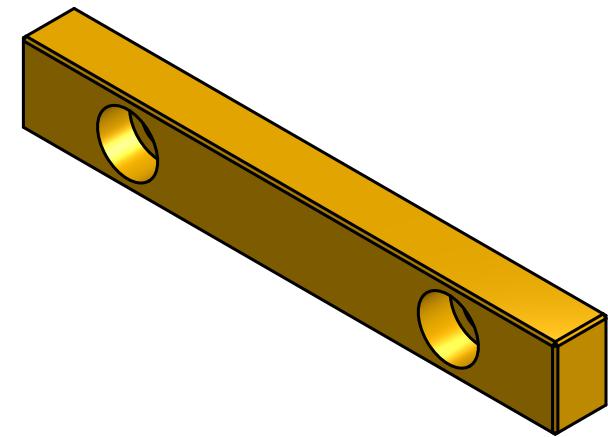


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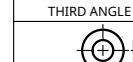
2X $\varnothing 6.6$ THRU
 $\varnothing 11.25 \downarrow 6$



UNLESS OTHERWISE SPECIFIED,
DIMENSIONS ARE IN INCHES

XX = ±.0-
 XXX = ±.00-
 XXXX = ±.000-
 SURFACE FINISH ✓

DO NOT SCALE DRAWING

BREAK ALL SHARP EDGES AND
REMOVE BURRS

DRAWN
BRIAN BRADY

NAME
BRIAN BRADY

DATE
10/16/2019

CHECKED

APPROVED

TITLE

Ferris State University
 DRILL UNIT
 MAIN ASSEMBLY DETAILS
 15 X 10 X 100 KEY

SIZE
A

DWG NO.

BR-549-C-007

REV.

MATERIAL
STEEL 4130
VOLUME
13472 mm³

SCALE
1:1WEIGHT
0.106 kgSHEET
10 of 20

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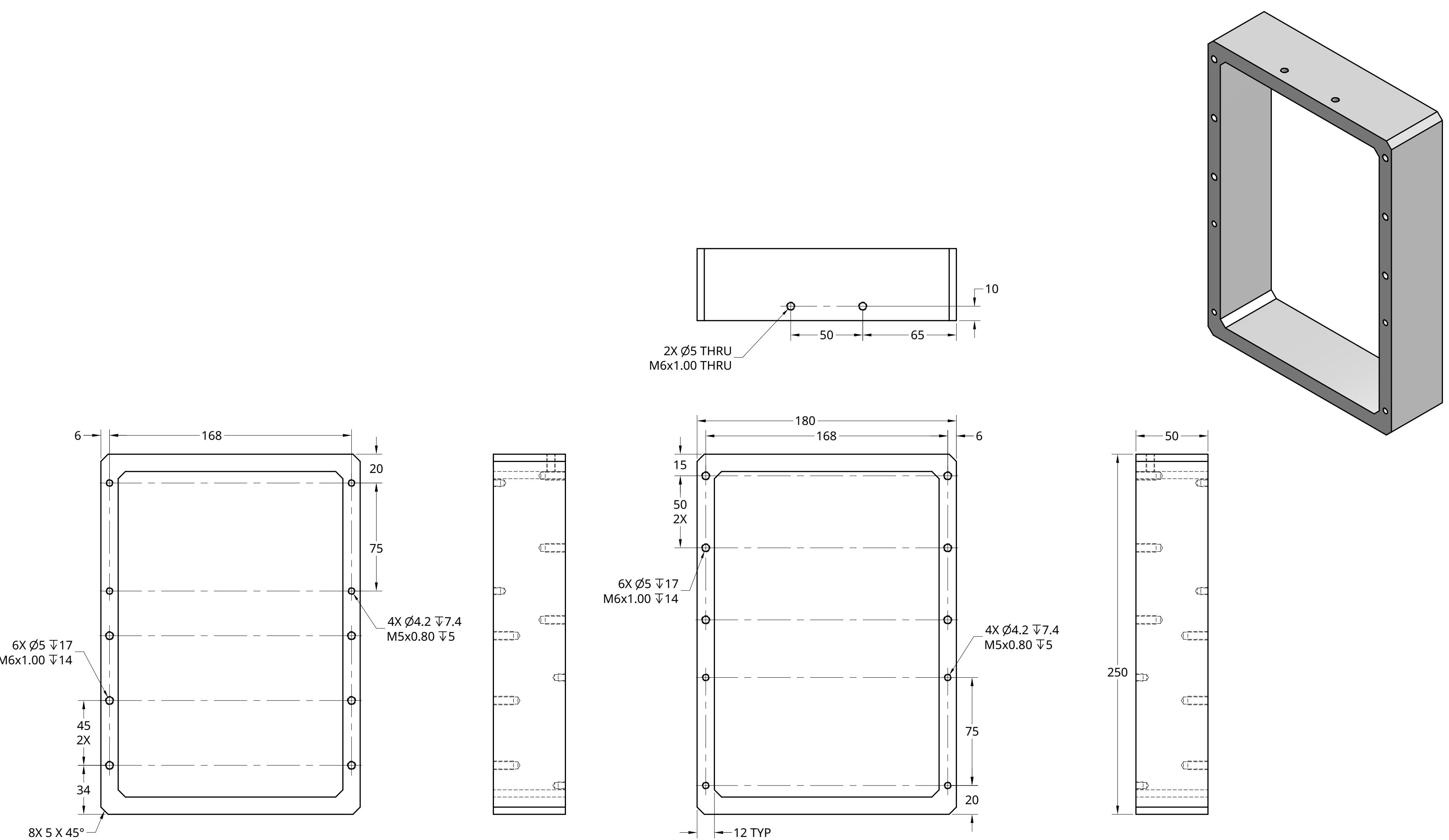
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UNLESS OTHERWISE SPECIFIED, .XX = ±.0-. .XXX = ±.00-. .XXXX = ±.000-. SURFACE FINISH		NAME DRAWN BRIAN BRADY	DATE 10/16/2019
ANGULAR = ± * FRACTIONAL = *		CHECKED	
APPROVED			
DO NOT SCALE DRAWING			
BREAK ALL SHARP EDGES AND REMOVE BURRS			
THIRD ANGLE PROJECTION		MATERIAL STEEL 1020	VOLUME 481738 mm ³
		REV.	
SIZE C DWG NO. BR-549-C-008		SCALE 1:2	WEIGHT 3.791 kg
SHEET 11 of 20			

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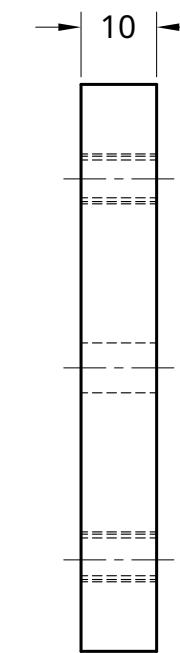
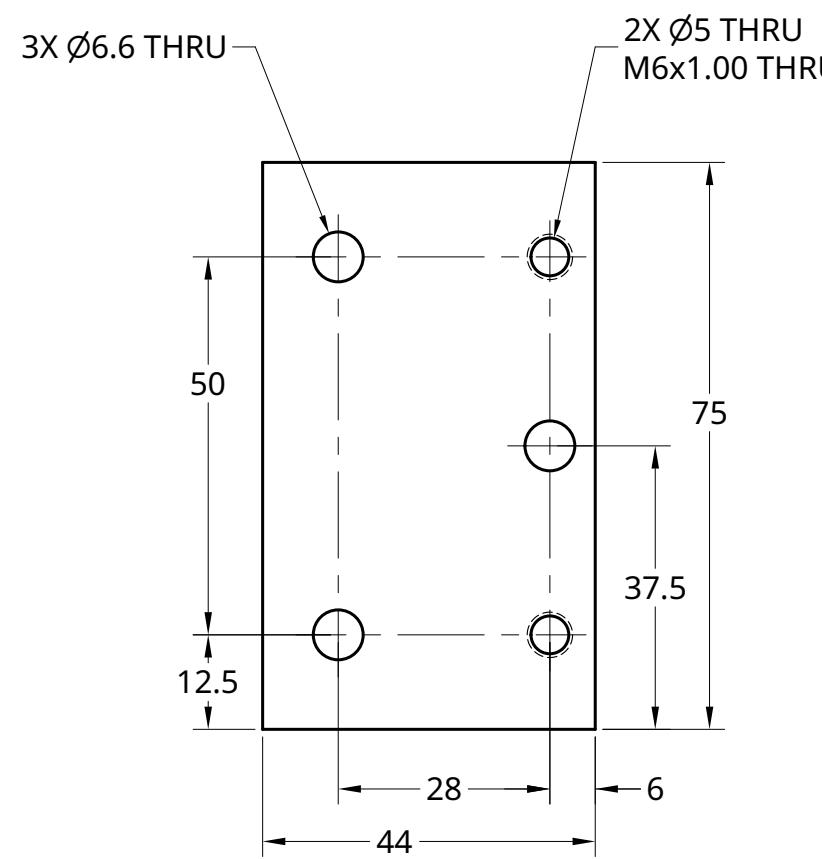
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UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES .XX = ±.0- .XXX = ±.00- .XXXX = ±.000-		NAME	DATE
DRAWN	BRIAN BRADY	10/16/2019	
CHECKED			TITLE
APPROVED			DRILL UNIT
DO NOT SCALE DRAWING			MAIN ASSEMBLY DETAILS
BREAK ALL SHARP EDGES AND REMOVE BURRS			SERVO ADJUSTER BLOCK
THIRD ANGLE PROJECTION	MATERIAL	VOLUME	
	STEEL 1020	31581 mm ³	REV.
	SCALE	1:1	WEIGHT
		0.249 kg	12 of 20

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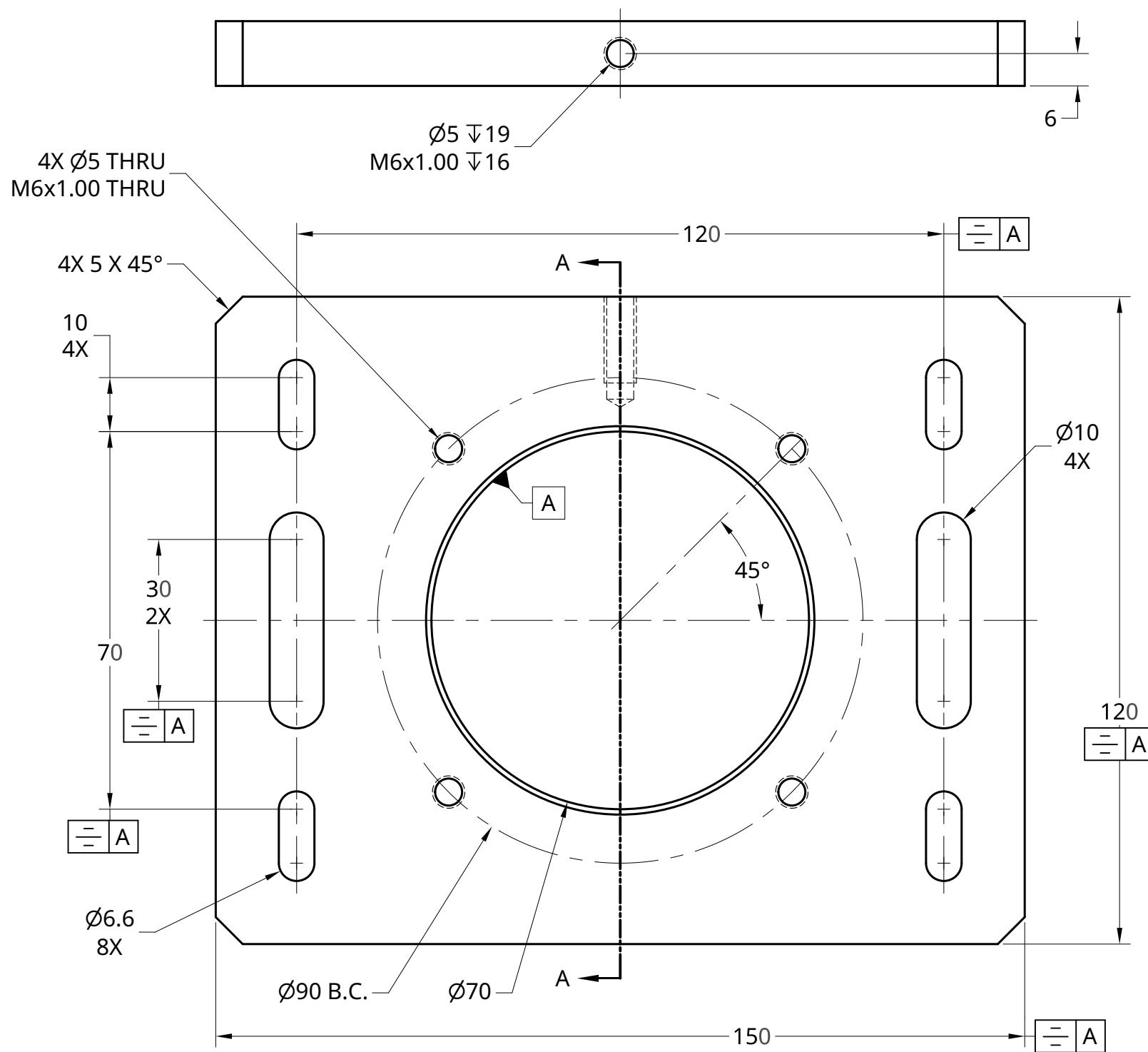
C

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SECTION A - A

Ferris State University			
DRILL UNIT MAIN ASSEMBLY DETAILS SERVO MOTOR ADAPTER			
DRAWN	NAME		DATE
	BRIAN BRADY		10/16/2019
CHECKED			
APPROVED			
DO NOT SCALE DRAWING			
BREAK ALL SHARP EDGES AND REMOVE BURRS			
THIRD ANGLE PROJECTION			
SURFACE FINISH			
SIZE	DWG NO.	REV.	
B	BR-549-C-010		
SCALE	1:1	WEIGHT	1.208 kg
		SHEET	13 of 20

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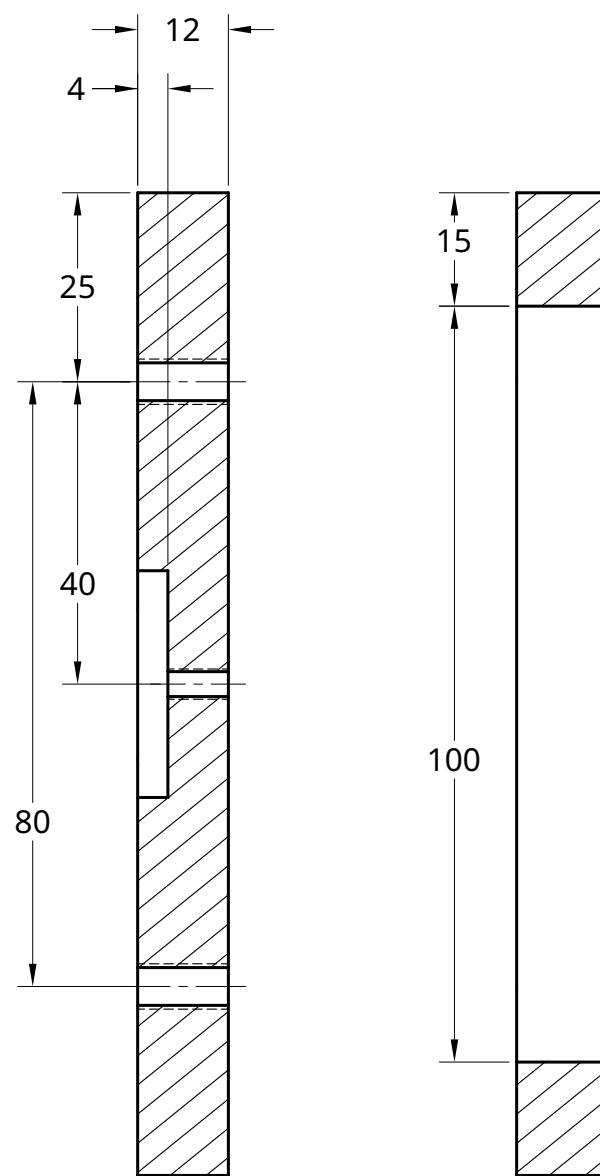
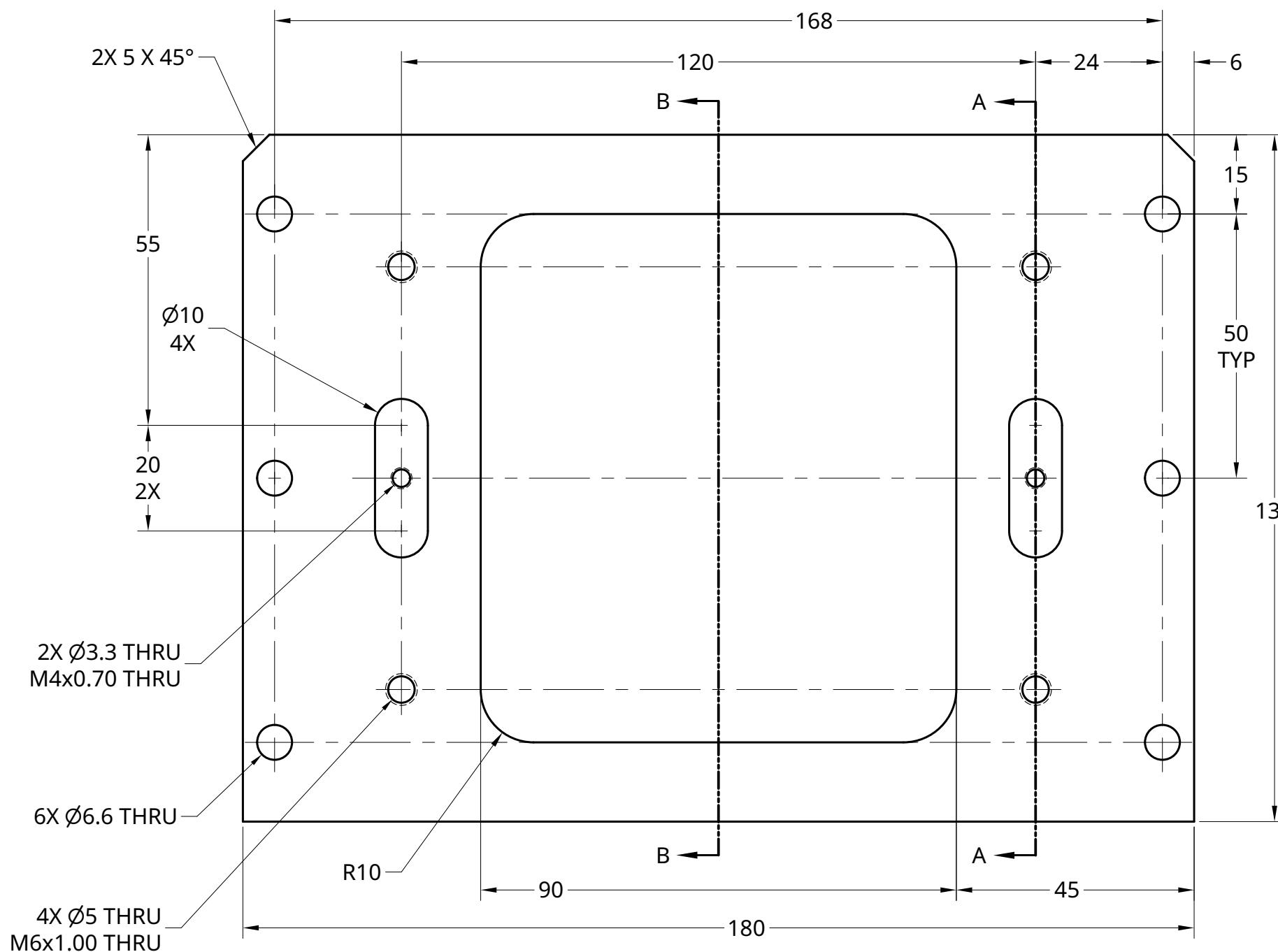
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UNLESS OTHERWISE SPECIFIED,
DIMENSIONS ARE IN INCHES
.XX = ±.0-
.XXX = ±.00-
.XXXX = ±.000- ANGULAR = ± °
FRACTIONAL = ±

SURFACE FINISH ✓

DO NOT SCALE DRAWING

BREAK ALL SHARP EDGES AND REMOVE BURRS

THIRD ANGLE PROJECTION



DRAWN BRIAN BRADY DATE 10/16/2019
CHECKED _____
APPROVED _____

TITLE DRILL UNIT
MAIN ASSEMBLY DETAILS
SERVO MOUNTING PLATE

SIZE	DWG NO.	REV.
B	BR-549-C-011	
SCALE 1:1	WEIGHT 1.317 kg	HEET 14 of 20

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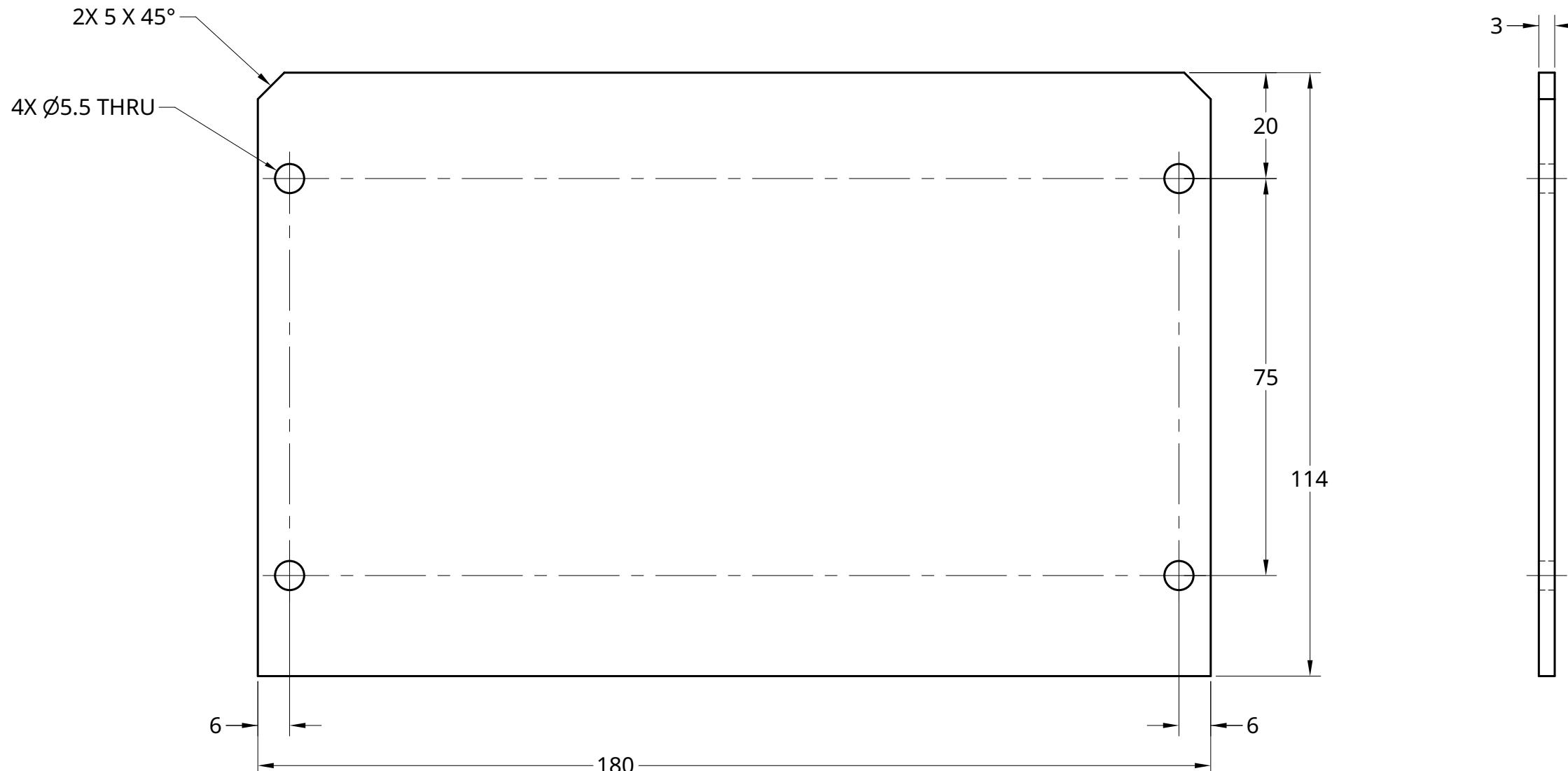
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UNLESS OTHERWISE SPECIFIED,
DIMENSIONS ARE IN INCHES
.XX = ±.0-
.XXX = ±.00-
.XXXX = ±.000- ANGULAR = ± °
FRACTIONAL = ±

SURFACE FINISH ✓

DO NOT SCALE DRAWING

BREAK ALL SHARP EDGES AND
REMOVE BURRS

THIRD ANGLE PROJECTION



DRAWN	NAME	DATE
BRIAN BRADY		10/16/2019
CHECKED		
APPROVED		
DO NOT SCALE DRAWING		
BREAK ALL SHARP EDGES AND REMOVE BURRS		
THIRD ANGLE PROJECTION		
MATERIAL	VOLUME	

ANGULAR = ± °
FRACTIONAL = ±



Ferris State University
DRILL UNIT
MAIN ASSEMBLY DETAILS
UPPER COVER PLATE - SERVO

TITLE

SIZE DWG NO.

B BR-549-C-012 REV.

SCALE 1:1 WEIGHT 0.073 kg SHEET 15 of 20

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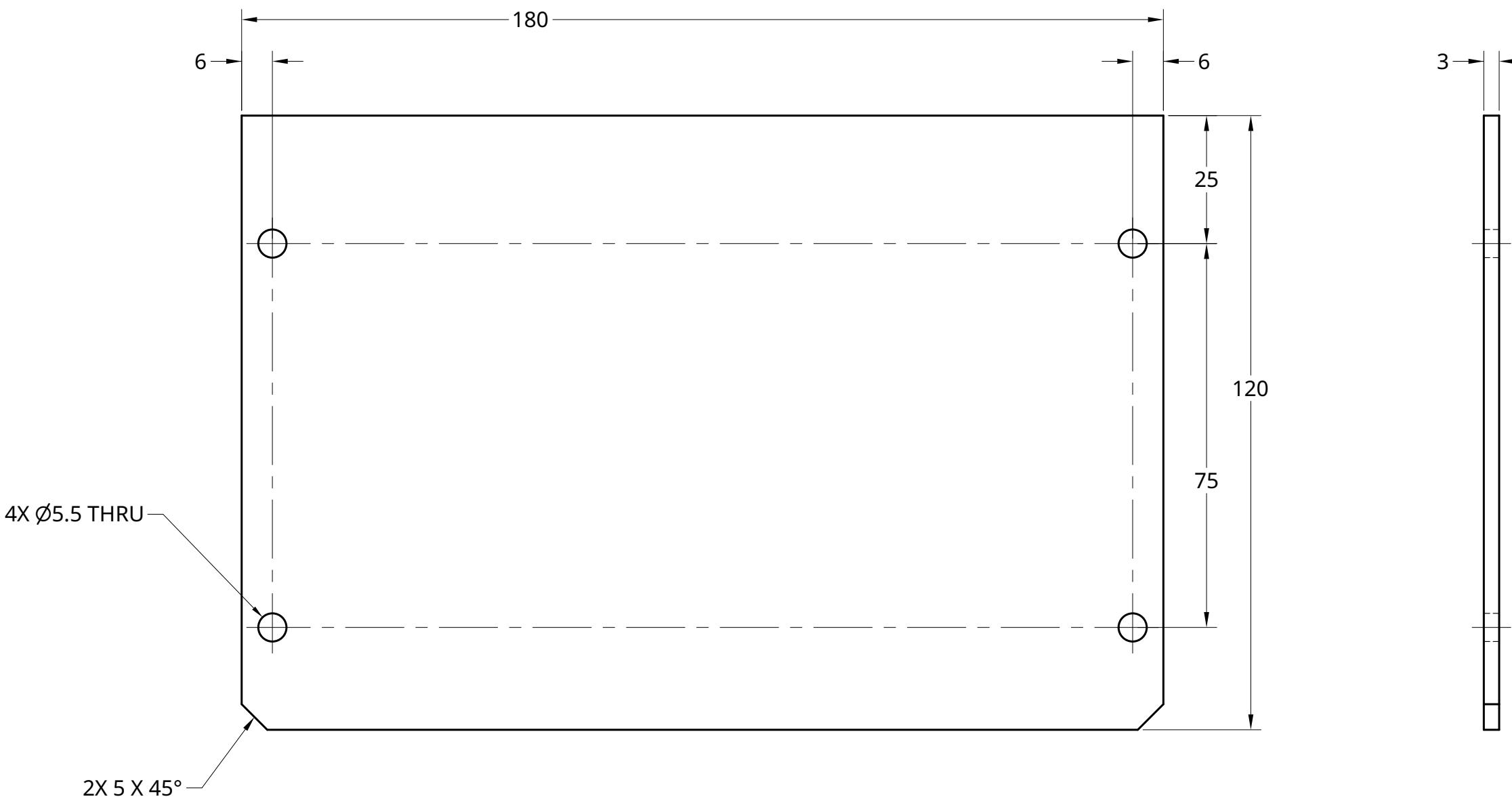
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UNLESS OTHERWISE SPECIFIED,
DIMENSIONS ARE IN INCHES
.XX = ±.0-
.XXX = ±.00-
.XXXX = ±.000- ANGULAR = ± °
FRACTIONAL = ±

SURFACE FINISH ✓

DO NOT SCALE DRAWING

BREAK ALL SHARP EDGES AND REMOVE BURRS

THIRD ANGLE PROJECTION



MATERIAL
POLYCARBONATE

VOLUME
64440 mm³

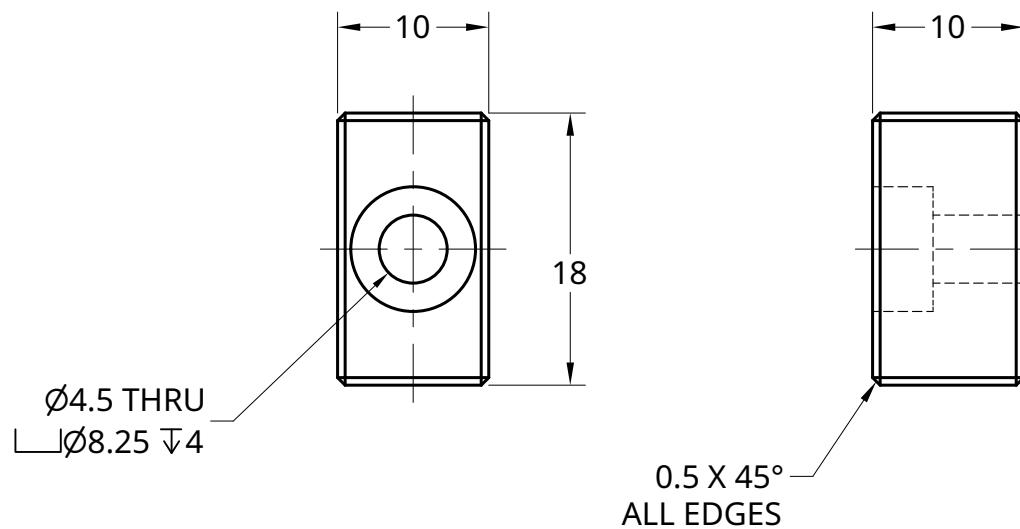
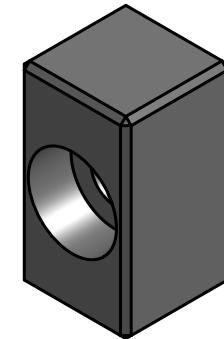
DRAWN BRIAN BRADY DATE 10/16/2019
CHECKED
APPROVED

TITLE

Ferris State University
DRILL UNIT
MAIN ASSEMBLY DETAILS
LOWER COVER PLATE - SERVO

SIZE B DWG NO. BR-549-C-013 REV.

SCALE 1:1 WEIGHT 0.077 kg SHEET 16 of 20



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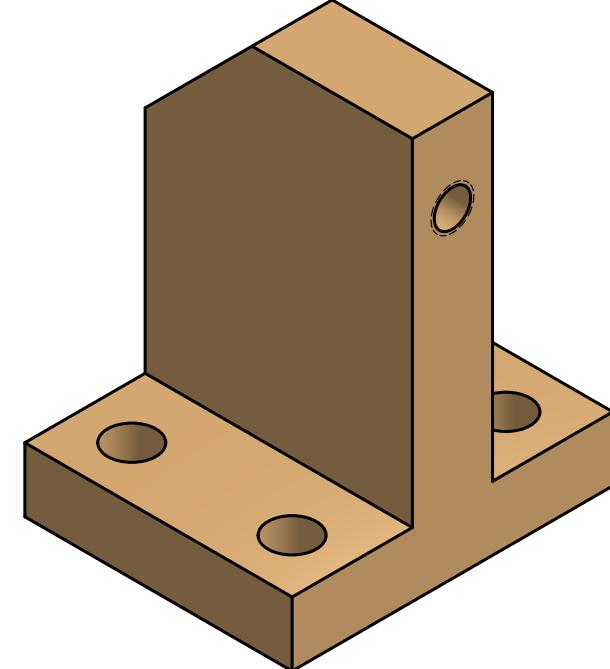
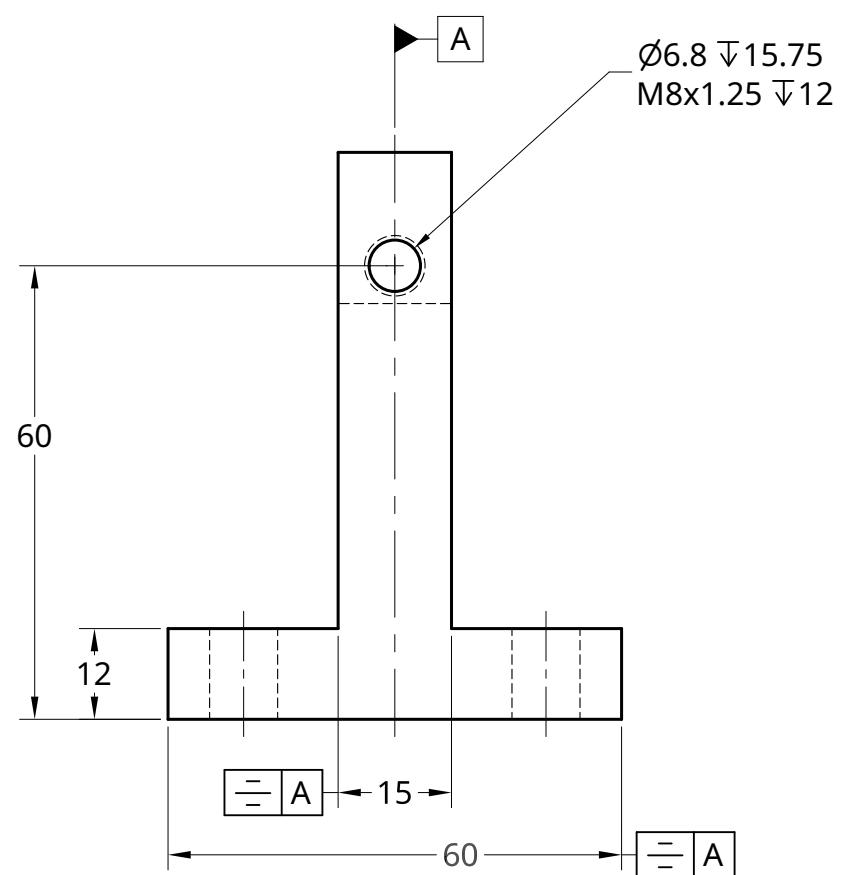
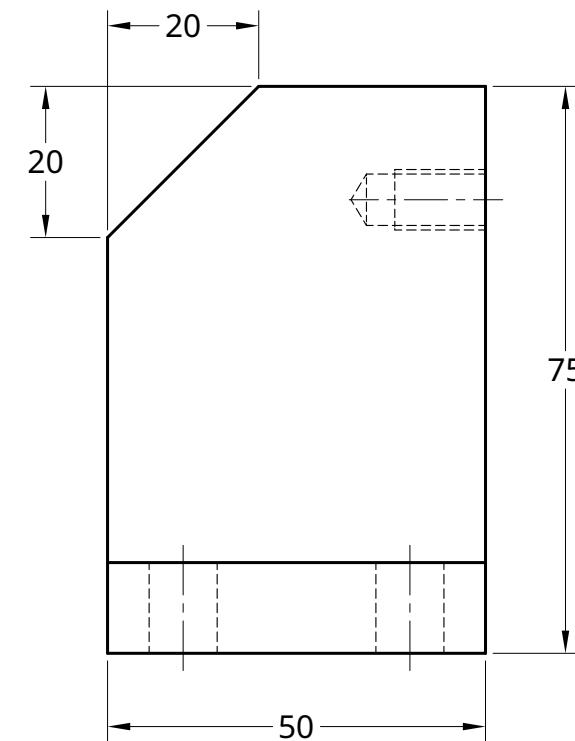
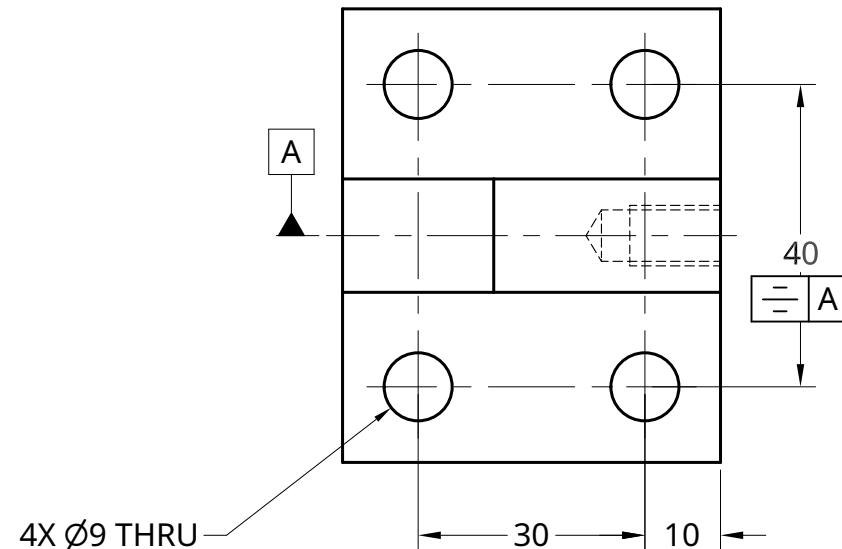
UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES			NAME	DATE	Ferris State University		
XX = ±.0- XXX = ±.00- XXXX = ±.000-		ANGULAR = ± ° FRACTIONAL = ±	DRAWN	BRIAN BRADY	10/16/2019		
SURFACE FINISH ✓			CHECKED				
DO NOT SCALE DRAWING			APPROVED				
BREAK ALL SHARP EDGES AND REMOVE BURRS							
THIRD ANGLE PROJECTION	MATERIAL	VOLUME	DRILL UNIT SLIDE PLATE ASSEMBLY DETAILS SMALL SLIDE KEY			SIZE A DWG NO. BR-549-C-014 REV.	
	STEEL 4130	1472 mm ³	SCALE 2:1	WEIGHT 0.012 kg	SHEET 17 of 20		

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2

1

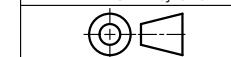


UNLESS OTHERWISE SPECIFIED,
DIMENSIONS ARE IN INCHES
.XX = ±.0-
.XXX = ±.00- ANGULAR = ± °
.XXXX = ±.000- FRACTIONAL = ±
SURFACE FINISH ✓

DO NOT SCALE DRAWING

BREAK ALL SHARP EDGES AND REMOVE BURRS

THIRD ANGLE PROJECTION



NAME: BRIAN BRADY DATE: 10/16/2019
DRAWN BY: CHECKED BY: APPROVED BY:

TITLE: DRILL UNIT
MAIN ASSEMBLY DETAILS
STOP BRACKET - REAR

SIZE: B DWG NO.: BR-549-C-015 REV.:

MATERIAL: STEEL 1020 VOLUME: 76600 mm³

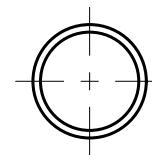
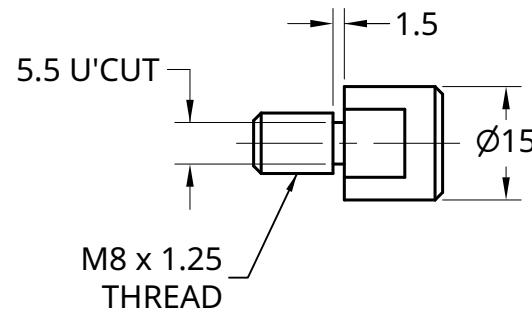
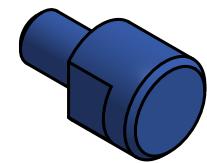
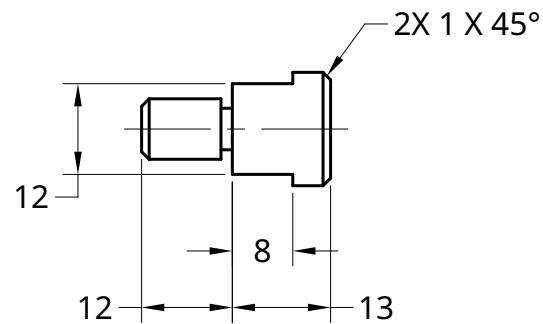
SCALE: 1:1 WEIGHT: 0.603 kg SHEET: 18 of 20

4

3

2

1



B

B

A

A

UNLESS OTHERWISE SPECIFIED,
DIMENSIONS ARE IN INCHES

.XX = ±.0-
.XXX = ±.00-
.XXXX = ±.000-

SURFACE FINISH ✓

DO NOT SCALE DRAWING

BREAK ALL SHARP EDGES AND
REMOVE BURRS

THIRD ANGLE PROJECTION



DRAWN

CHECKED

APPROVED

NAME

BRIAN BRADY

DATE

10/16/2019

TITLE

Ferris State University

DRILL UNIT
MAIN ASSEMBLY DETAILS
STOP BUTTON

SIZE

A

DWG NO.

BR-549-C-016

REV.

SCALE

1:1

WEIGHT

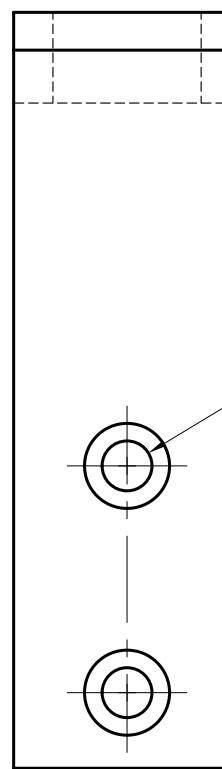
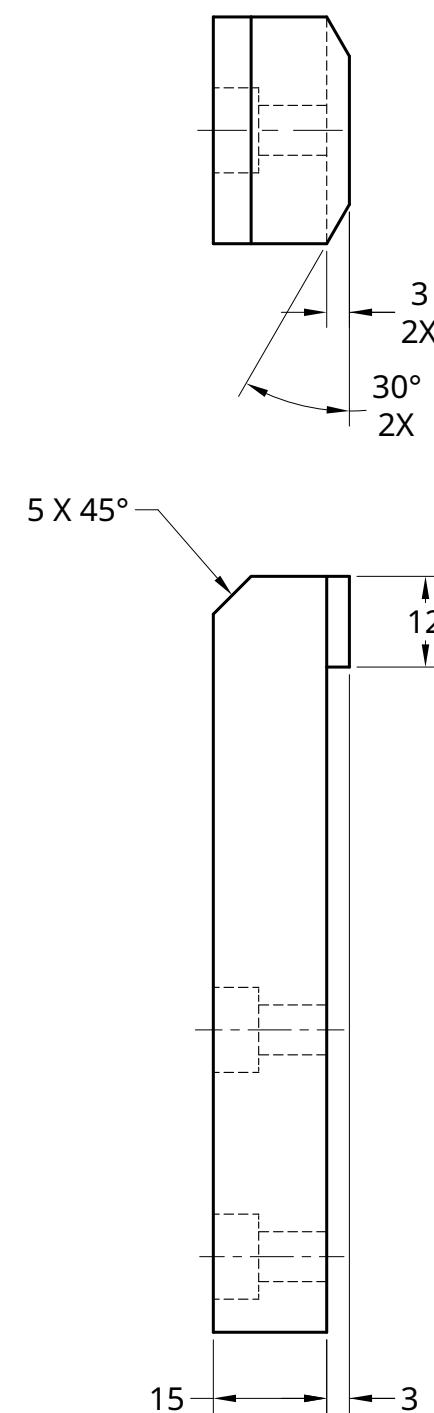
0.021 kg

SHEET

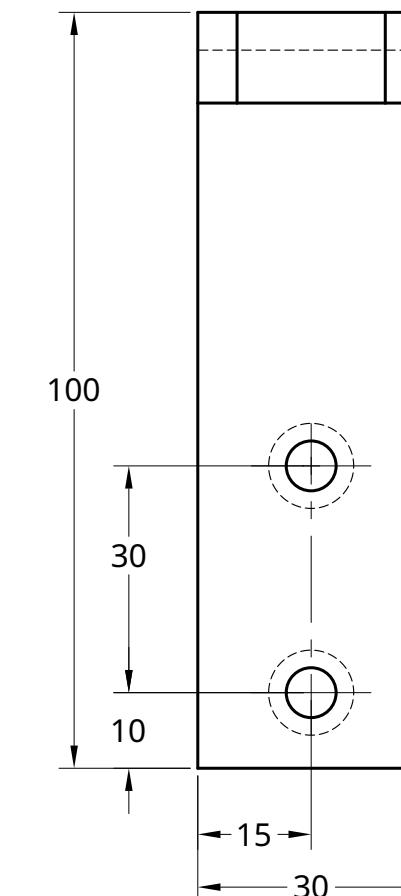
19 of 20

4 3 2 1

D

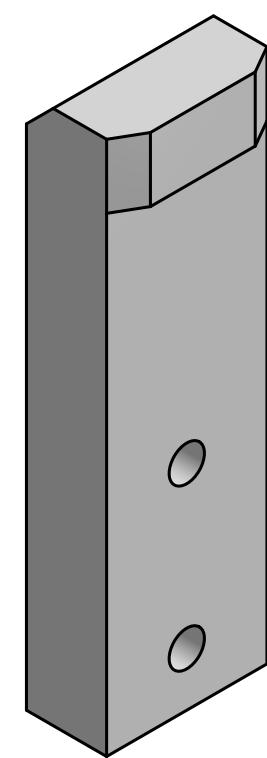
2X Ø6.6 THRU
Ø11.25 ±6

3



2

2



D

C

B

A

UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES .XX = ±.0- .XXX = ±.00- .XXXX = ±.000- ANGULAR = ± ° FRACTIONAL = ±	
SURFACE FINISH	✓
DO NOT SCALE DRAWING	
BREAK ALL SHARP EDGES AND REMOVE BURRS	
THIRD ANGLE PROJECTION	

DRAWN	NAME	DATE	TITLE
CHECKED	BRIAN BRADY	10/16/2019	
APPROVED			
SIZE	DWG NO.	REV.	DRILL UNIT MAIN ASSEMBLY DETAILS STOP BAR - FRONT
B	BR-549-C-017		
SCALE	1:1	WEIGHT	0.343 kg
		SHEET	20 of 20

4

3

2

1