


ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	Helical Planet Gear v4	Planet Gears in a helical pattern	6
2	AFBMA 12.1.4.1 - 0030-10 - 8,DE,NC,8_68	Small 10x3x4mm Bearings	6
3	B18.3.1M - 3 x 0.5 x 12 Hex SHCS -- 12NHX	Fastner for Planet gear to carrier stack/output	6
4	Stackable Helical Ring Gear and Outer Casing v4	Ring gear in helical patternto encase planetary gear system	2
5	Carrier Output v4	Carrier Output for planetary gears	1
6	Helical Staked SUN Gear v4	Stacked sun gear in helical pattern to connect first stage to second stage	1
7	Output Spacer and Bearing Case v2	Keeps bearing and by extension planetary gears in enclosure	1
8	AFBMA 20.1 - 18-45 - 34,DE,NC,34_68		1
9	B18.6.7M - M3 x 0.5 x 16 Type I Cross Recessed FHMS --16N	Coutersunk screws fastening the Outer Casng to second Outer Casing (longer screws)	3
10	B18.6.7M - M3 x 0.5 x 13 Type I Cross Recessed FHMS --13N		3
11	Helical SUN Gear Nema 17 v4	Sun gearar in helical pattern that is fastened to Stepper Motor	1
12	Input Spacer NEMA 17	Spacer	1
13	Input Face NEMA 17	Acrylic face to look into gearbox	1
14	NEMA17 17HS8401	Stepper Motor	1
15	B18.3.4M - 3 x 0.5 x 8 SBHCS --N		4
16	B18.6.7M - M3 x 0.5 x 16 Type I Cross Recessed PHMS --16C		3

 CONNOR LINSELL STUDENT ID: 24555106	DO NOT SCALE DRAWING		NAME	SIGNATURE	DATE	UNLESS OTHERWISE SPECIFIED OTHERWISE DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR: DEBUR AND BREAK SHARP EDGES	TITLE: Stacked Planetary Gear Drive Acctuator NEMA17 v4	
	THIRD ANGLE PROJECTION	DRAWN					DWG NO.	A3
		APPV'D						
		CHK'D				FINISH:	REVISION	
		MFG						
		Q.A				MATERIAL:		
					WEIGHT:	SCALE: 2:3		

F

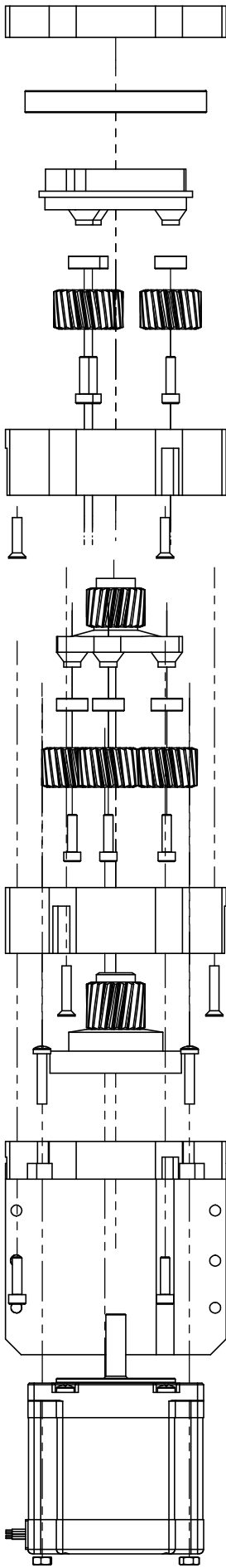
E

D

C

B

A



F

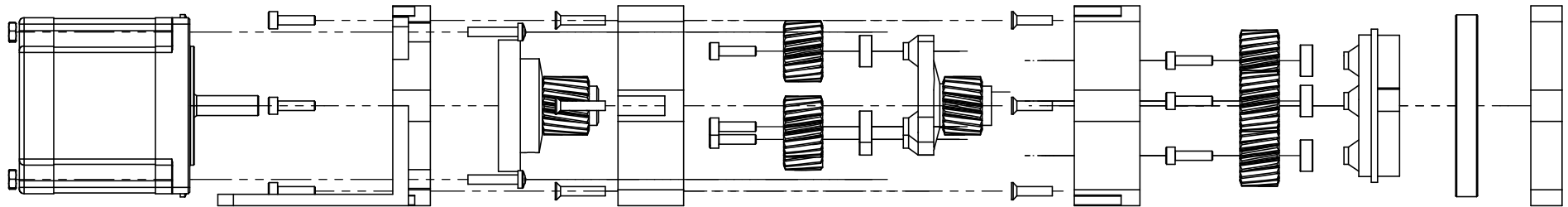
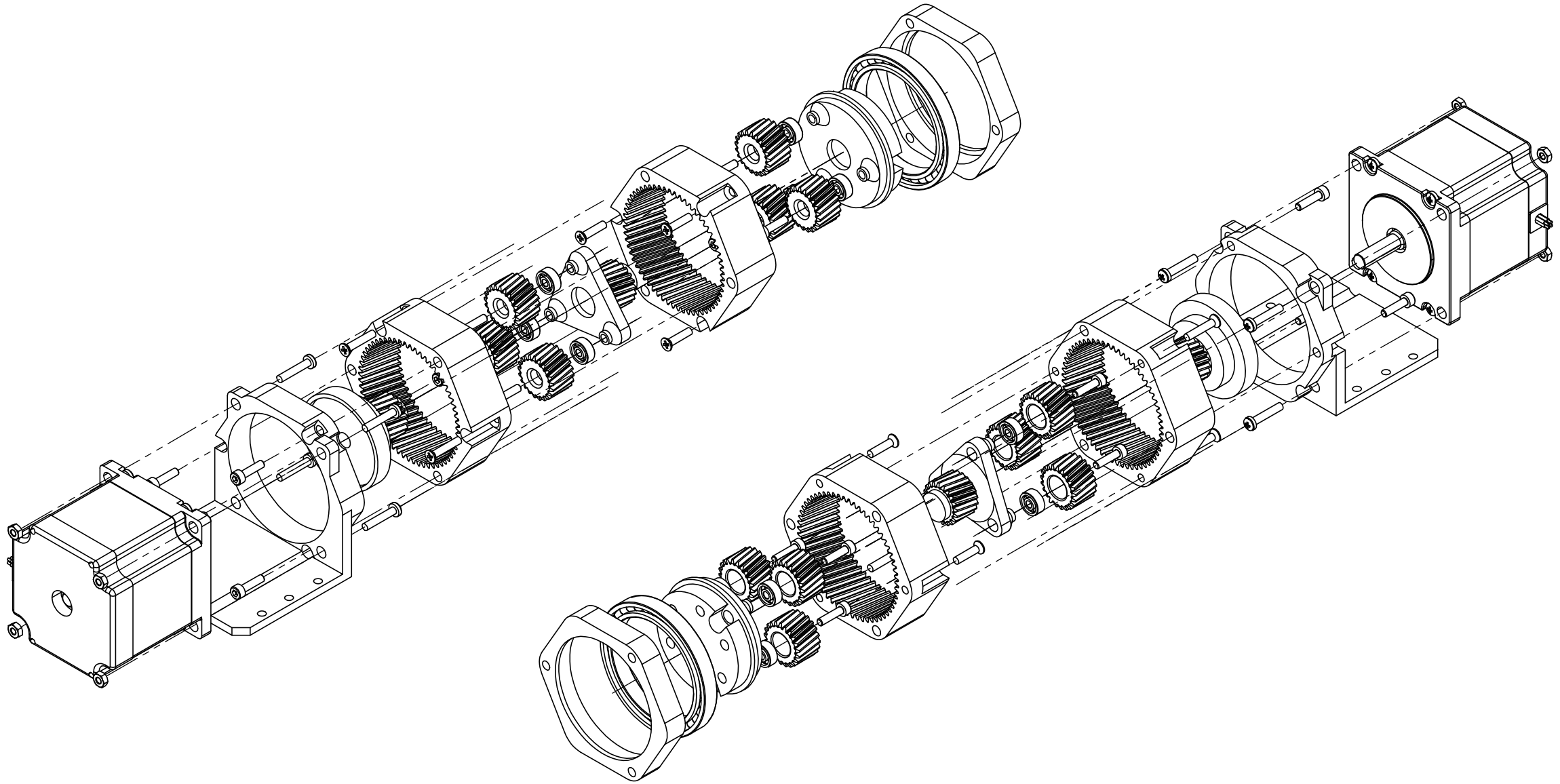
E

D

C

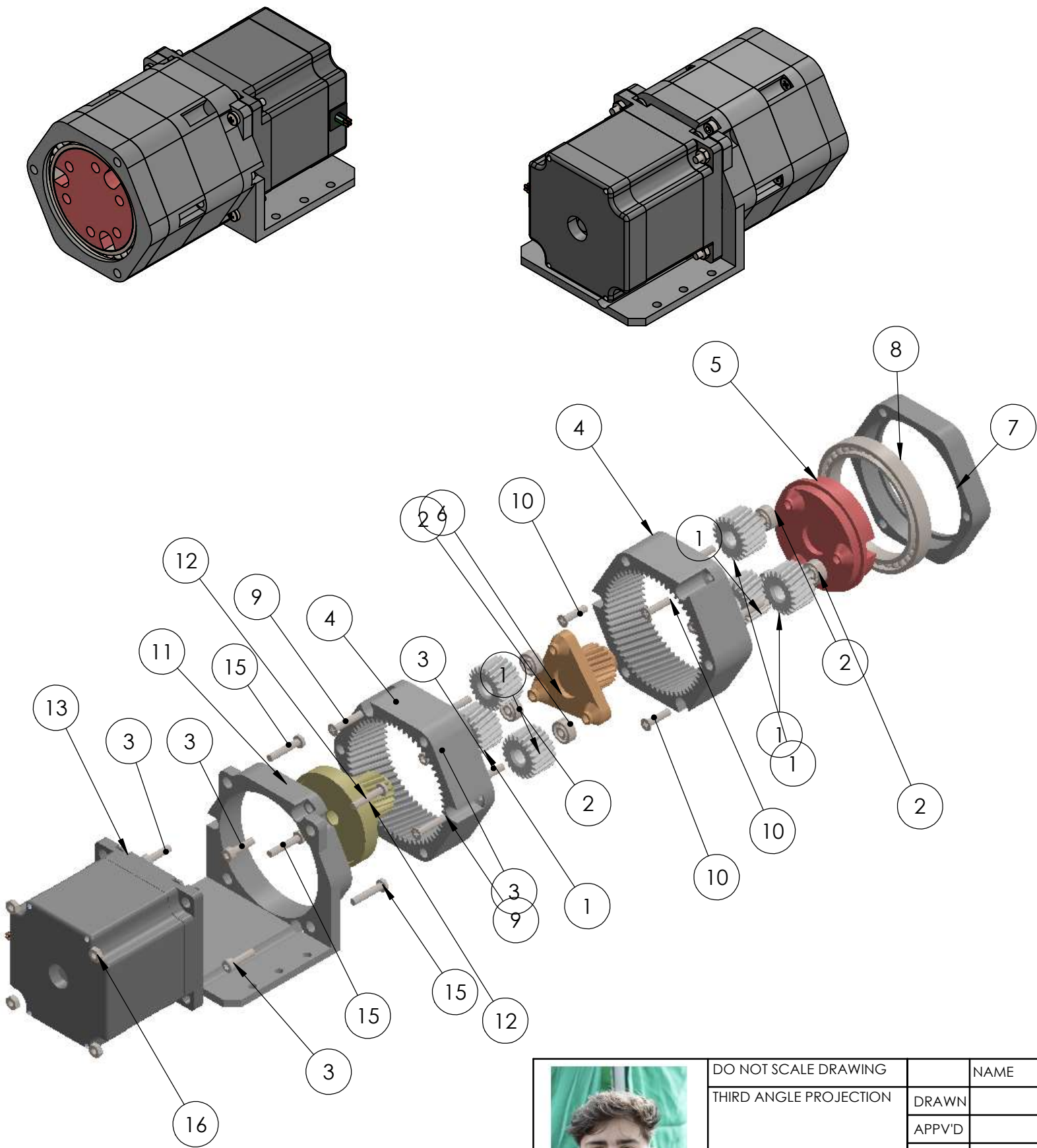
B

A



CONNOR LINDELL
STUDENT ID: 24555106

DO NOT SCALE DRAWING THIRD ANGLE PROJECTION	NAME	SIGNATURE	DATE	UNLESS OTHERWISE SPECIFIED OTHERWISE DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR: DEBUR AND BREAK SHARP EDGES	TITLE: Stacked Planetary Gear Drive Acctuator NEMA23 v4 Detailed Overview - Exploded view	
	DRAWN					
	APPV'D					
	CHK'D				DWG NO.	A3 SHEET 2 OF 5
	MFG			FINISH:		
	Q.A			MATERIAL:		
				WEIGHT:	SCALE: 1:2	REVISION



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	Helical Planet Gear v4	Planet Gears in a helical pattern	6
2	AFBMA 12.1.4.1 - 0030-10 - 8,DE,NC,8_68		6
3	B18.3.1M - 3 x 0.5 x 12 Hex SHCS -- 12NHX		9
4	Stackable Helical Ring Gear and Outer Casing v4	Ring gear in helical pattern to encase planetary gear system	2
5	Carrier Output v4	Carrier Output for planetary gears	1
6	Helical Staked SUN Gear v4	Stacked sun gear in helical pattern to connect first stage to second stage	1
7	Output Spacer and Bearing Case v2	Keeps bearing and by extension planetary gears in enclosure	1
8	AFBMA 20.1 - 18-45 - 34,DE,NC,34_68		1
9	B18.6.7M - M3 x 0.5 x 16 Type I Cross Recessed FHMS --16N		3
10	B18.6.7M - M3 x 0.5 x 13 Type I Cross Recessed FHMS --13N		3
11	Input Spacer and Bracket NEMA 23	Spacer and Bracket that connects to the platform which that acuator is positioned	1
12	Helical SUN Gear Nema 23 v4	Helical Sun Gear that attatches to the NEMA 23	1
13	NEMA 23 - 56mm_1.STEP	Stepper Motor	1
14	pan head cross recess screw_iso_ISO 7045 - M3 x 10 - Z - 10N.STEP		4
15	B18.6.7M - M3 x 0.5 x 16 Type I Cross Recessed PHMS --16C		4
16	B18.2.4.1M - Hex nut, Style 1, M3 x 0.5 --D-N		4



CONNOR LINSELL
STUDENT ID: 24555106

DO NOT SCALE DRAWING	NAME	SIGNATURE	DATE	UNLESS OTHERWISE SPECIFIED OTHERWISE DIMENSIONS ARE IN MILLIMETERS	TITLE: Stacked Planetary Gear Drive Acuator NEMA23 v4	
THIRD ANGLE PROJECTION	DRAWN			SURFACE FINISH:		
	APPV'D			TOLERANCES:		
	CHK'D			LINEAR:		
				ANGULAR:		
	MFG			DEBUR AND BREAK SHARP EDGES	DWG NO.	A3
	Q.A			FINISH:		
				MATERIAL:		
				WEIGHT:	SCALE: 1:2	REVISION

F

Top View

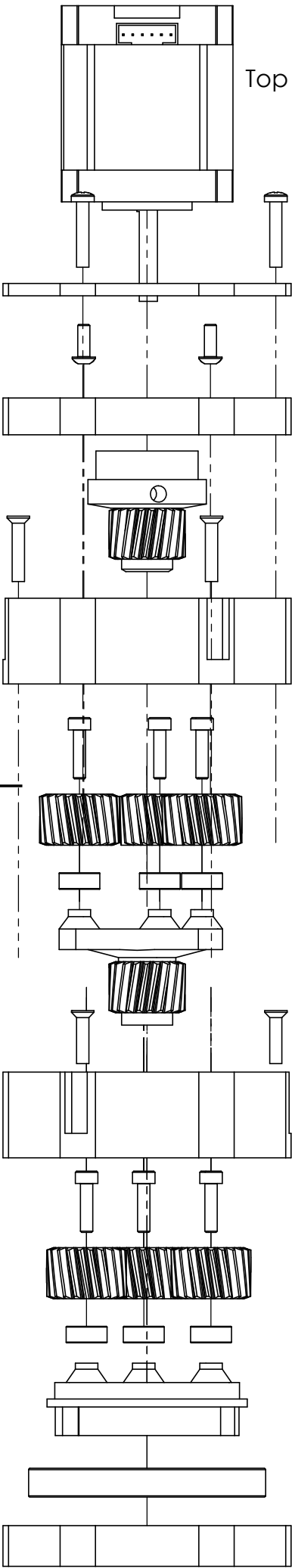
E

D

C

B

A



F

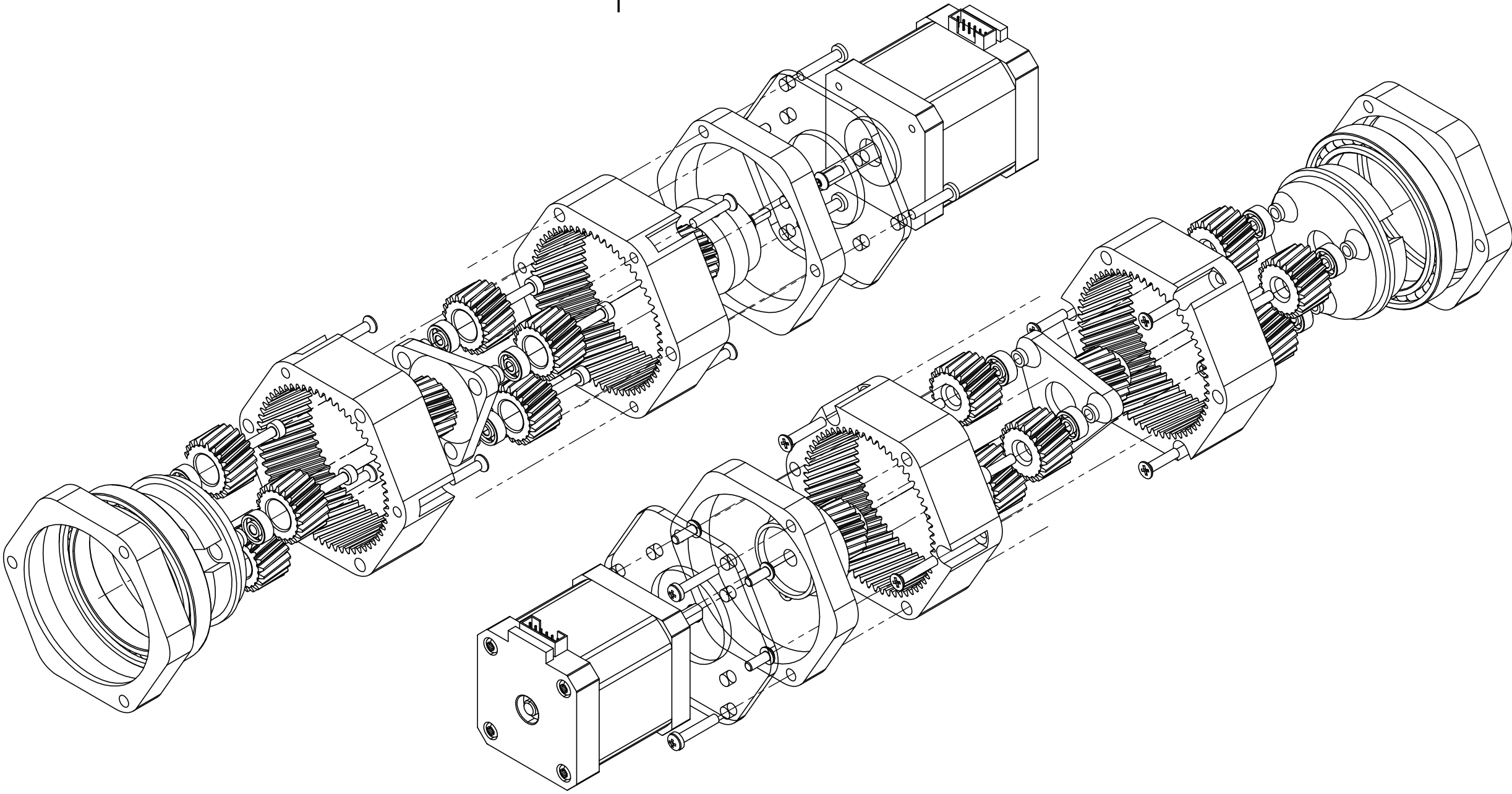
E

D

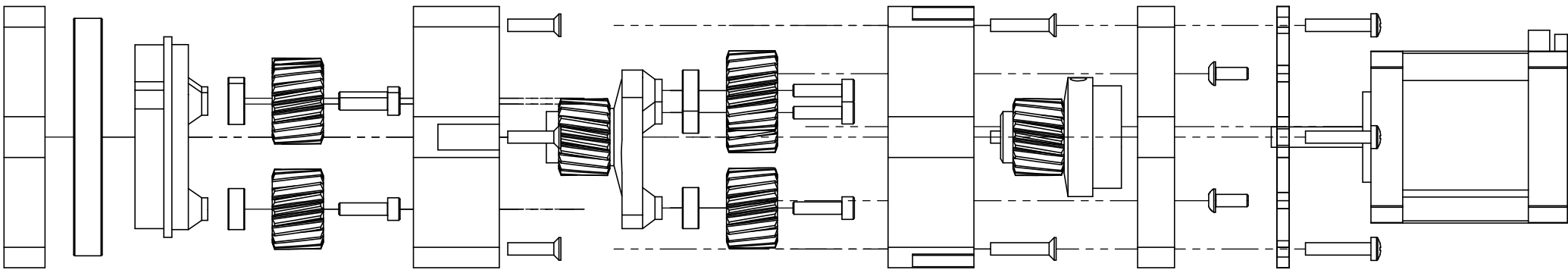
C

B

A



Side View



CONNOR LINSELL
STUDENT ID: 24555106

DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION

	NAME	SIGNATURE	DATE
DRAWN			
APPV'D			
CHK'D			
MFG			
Q.A			

UNLESS OTHERWISE SPECIFIED OTHERWISE
DIMENSIONS ARE IN MILLIMETERS
SURFACE FINISH:
TOLERANCES:
LINEAR:
ANGULAR:
DEBUR AND BREAK SHARP EDGES
FINISH:
MATERIAL:
WEIGHT:

TITLE:
Stacked Planetary Gear Drive
Acctuator NEMA17 v4
Detailed Overview - Exploded view

DWG NO.	A3
SCALE: 5:7	REVISION

8

7

6

5

4

3

2

1

F

E

D

C

B

A

F

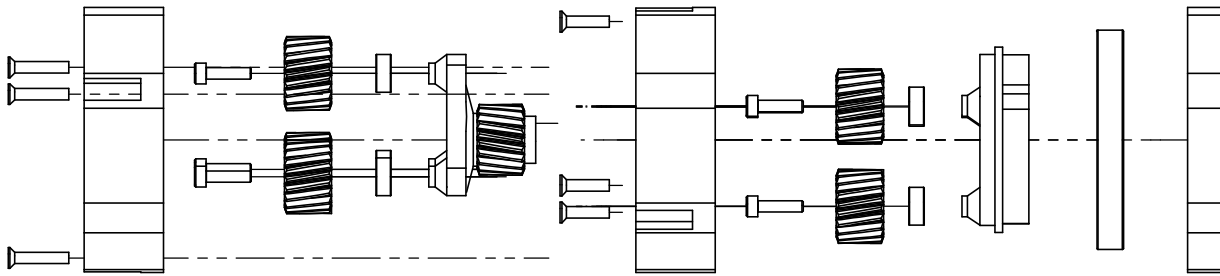
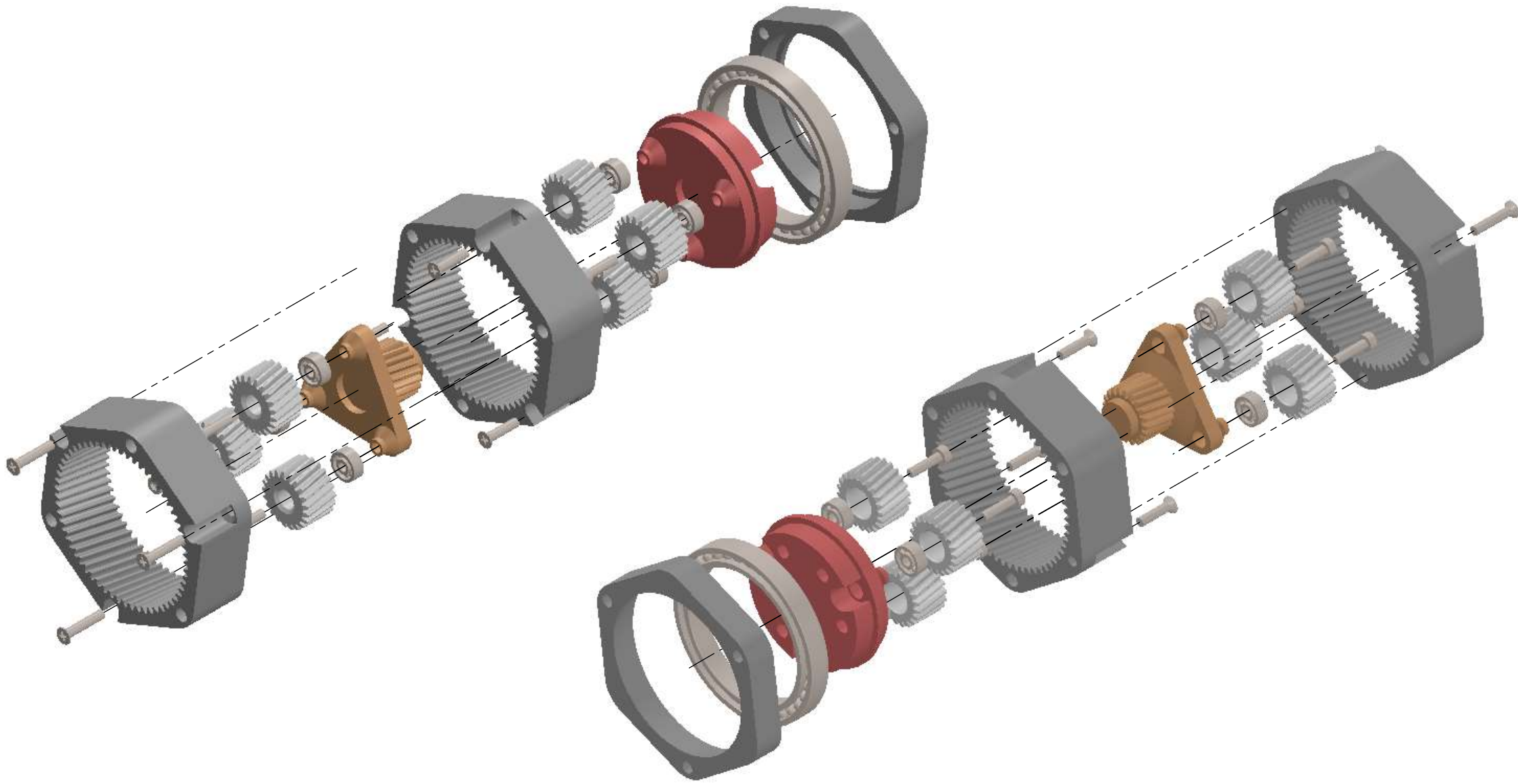
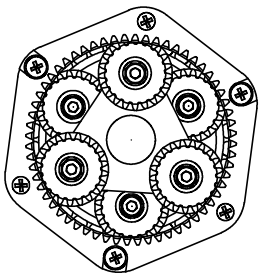
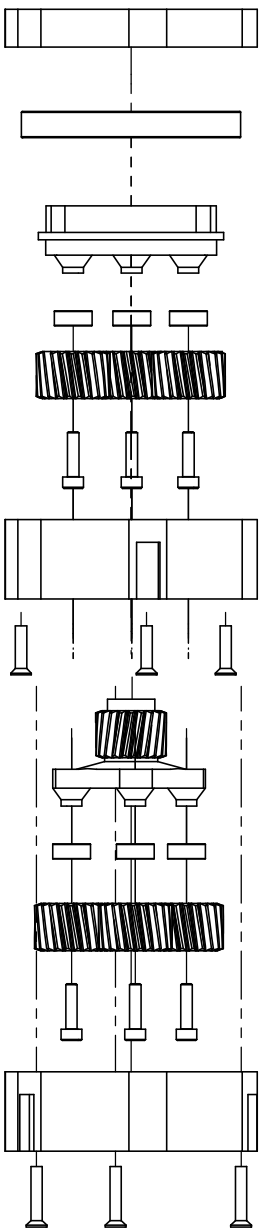
E

D

C

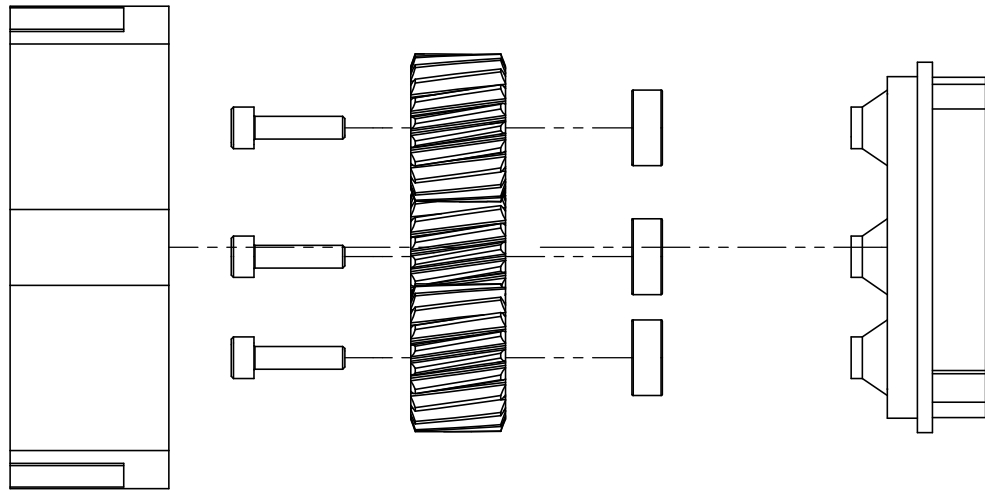
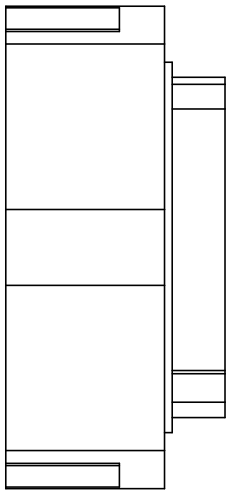
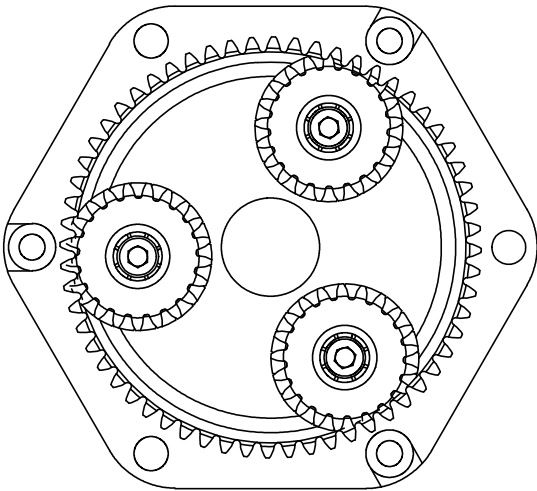
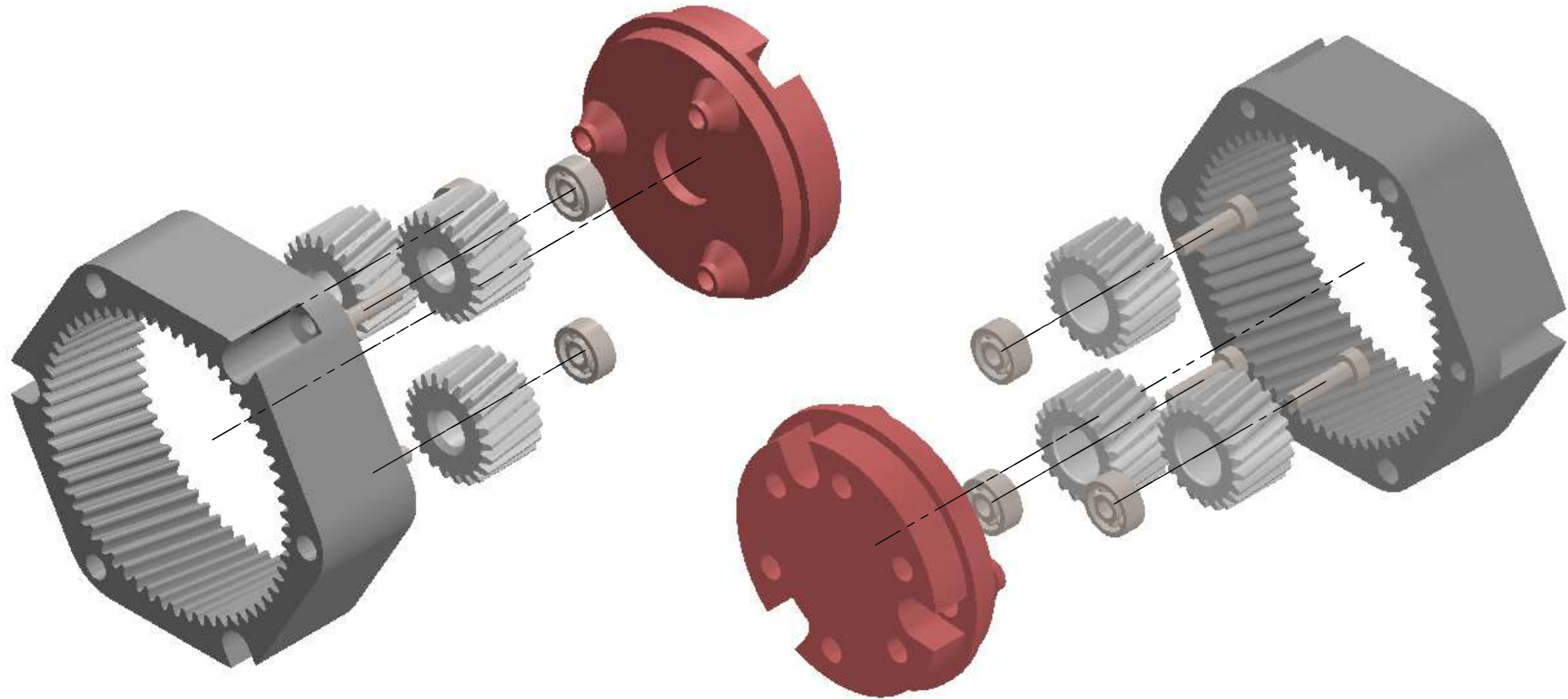
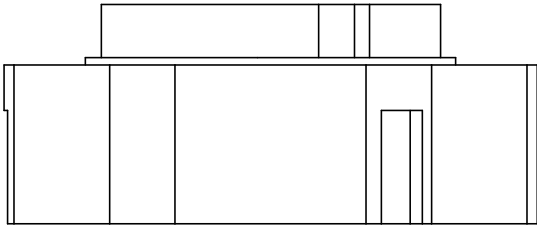
B

A



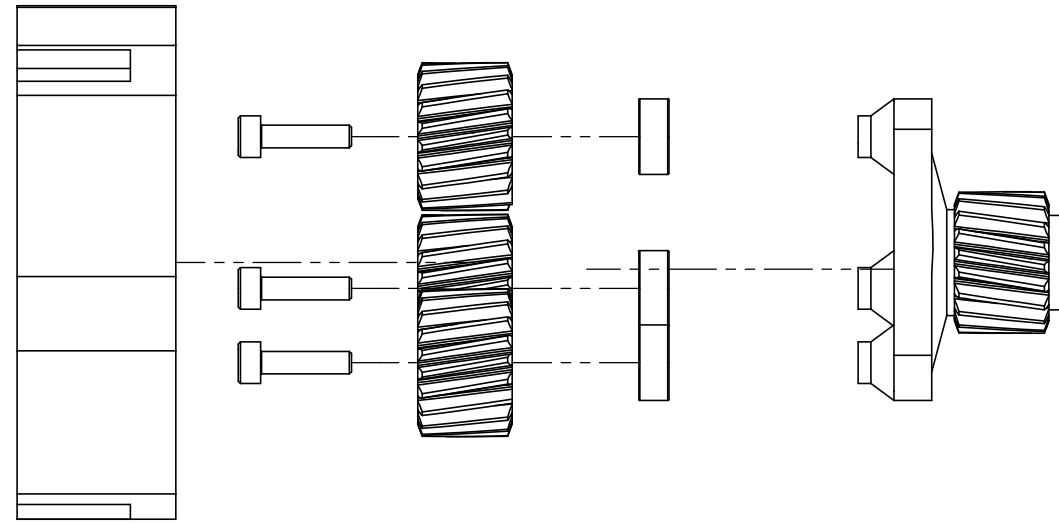
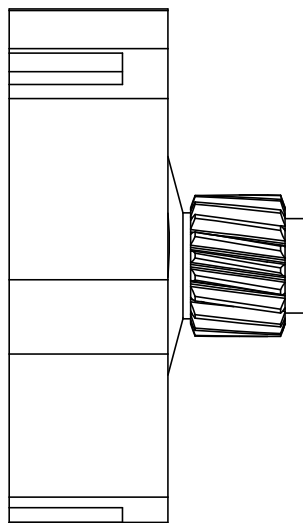
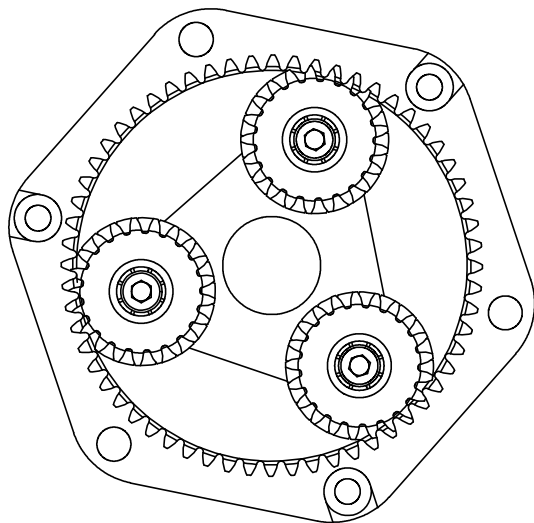
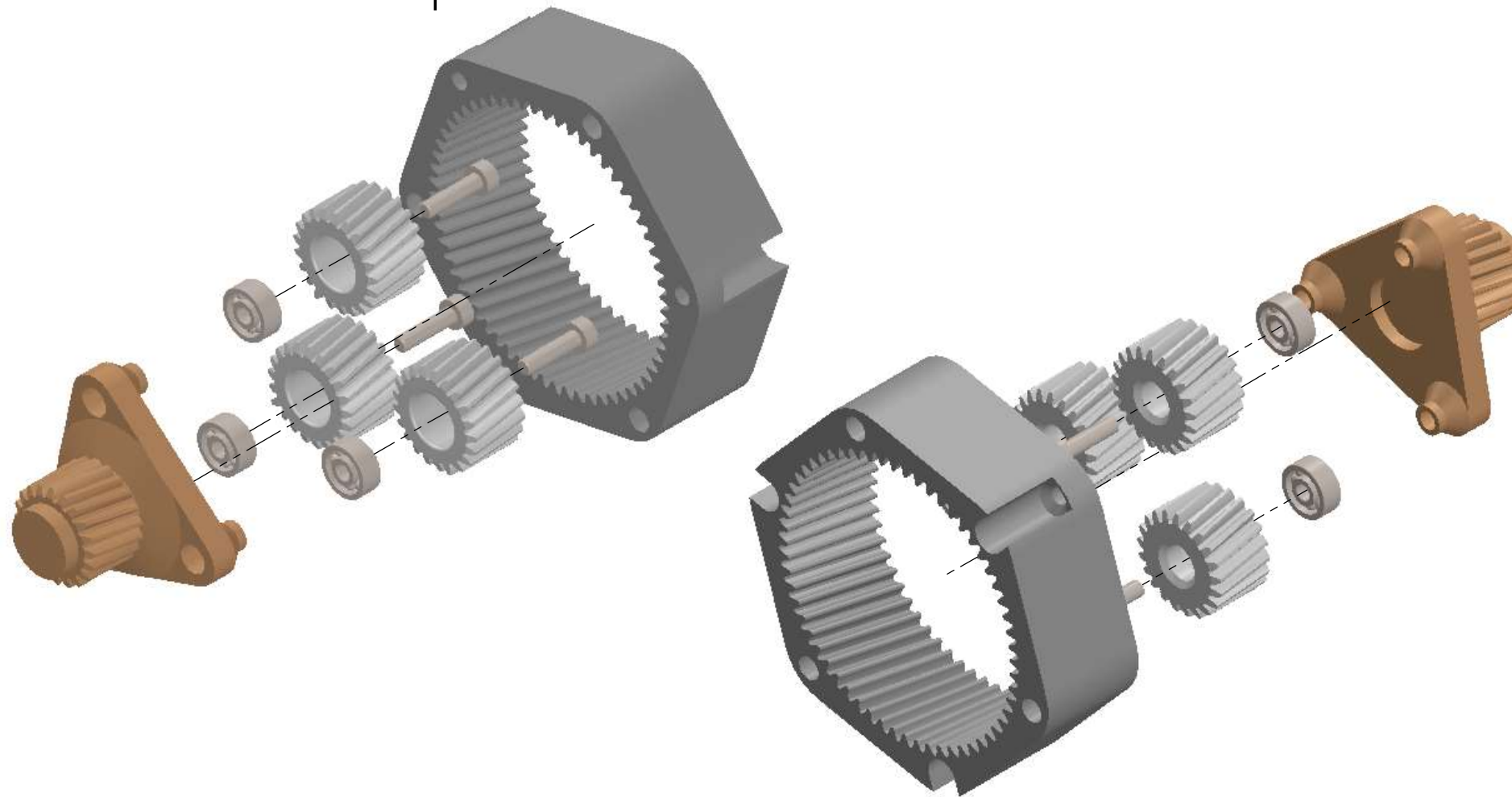
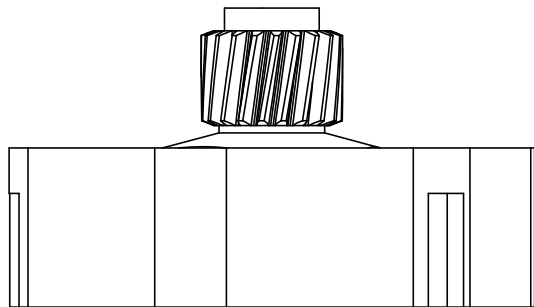
CONNOR LINSELL
STUDENT ID: 24555106

DO NOT SCALE DRAWING THIRD ANGLE PROJECTION		NAME	SIGNATURE	DATE	UNLESS OTHERWISE SPECIFIED OTHERWISE DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR:	TITLE: Sub-Assembly: 2 Stage Planetary Drive	
	DRAWN						
	APPV'D						
	CHK'D				DEBUR AND BREAK SHARP EDGES	DWG NO.	A3
	MFG						
	Q.A				FINISH:	SCALE: 1:2	REVISION
					MATERIAL:		
					WEIGHT:		



CONNOR LINSELL
STUDENT ID: 24555106

DO NOT SCALE DRAWING THIRD ANGLE PROJECTION		NAME	SIGNATURE	DATE	UNLESS OTHERWISE SPECIFIED OTHERWISE DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR: DEBUR AND BREAK SHARP EDGES	TITLE: Sub-Assembly: Final Stage Planetary Drive	
	DRAWN						
	APPV'D						
	CHK'D				FINISH: MATERIAL: WEIGHT:	DWG NO.	A3 SHEET 4 OF 5
	MFG						
	Q.A					SCALE: 1:1	REVISION



CONNOR LINDELL
STUDENT ID: 24555106

DO NOT SCALE DRAWING THIRD ANGLE PROJECTION	NAME	SIGNATURE	DATE	UNLESS OTHERWISE SPECIFIED OTHERWISE DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR: DEBUR AND BREAK SHARP EDGES	TITLE: Sub-Assembly: Planetary Stage Drive	
	DRAWN				DWG NO.	A3 SHEET 3 OF 5
	APPV'D					
	CHK'D					
	MFG			FINISH:	SCALE: 1:1	REVISION
	Q.A			MATERIAL:		
				WEIGHT:		

F

E

D

C

B

A

F

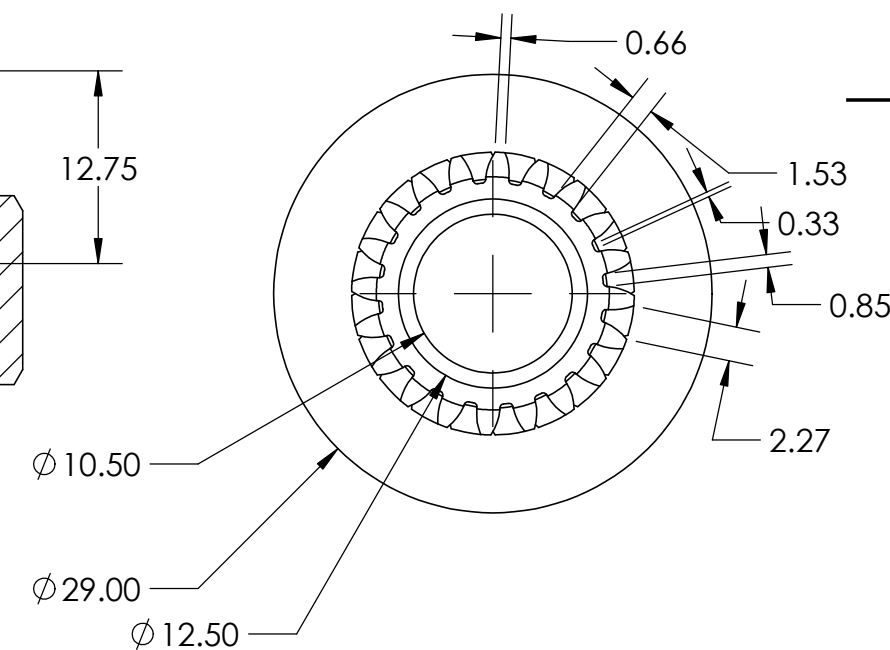
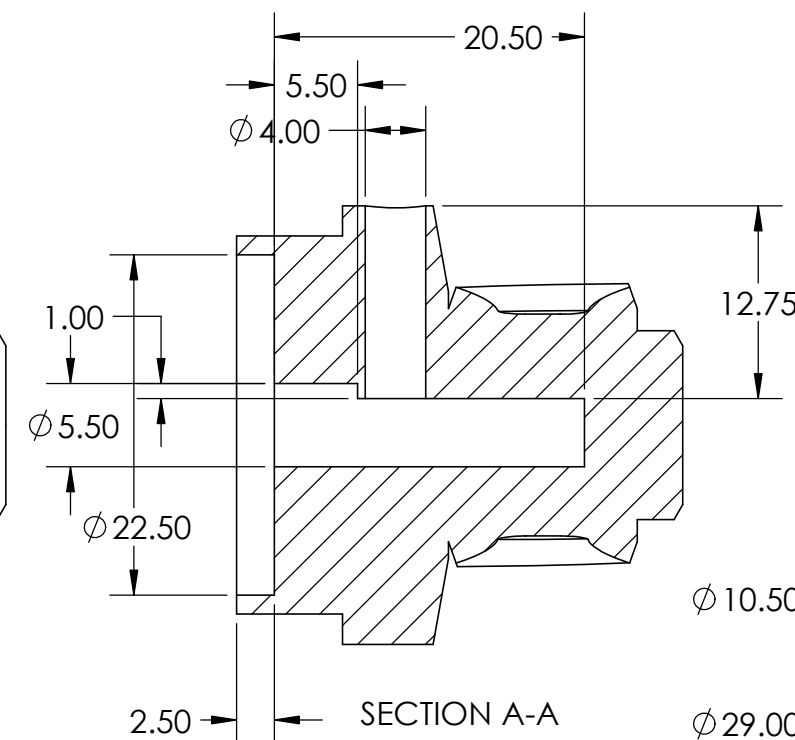
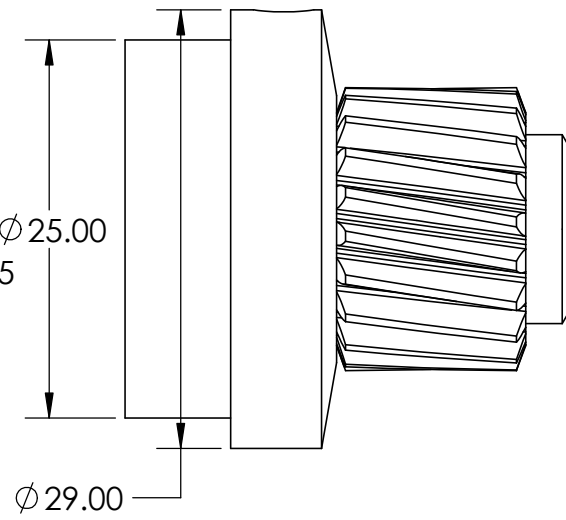
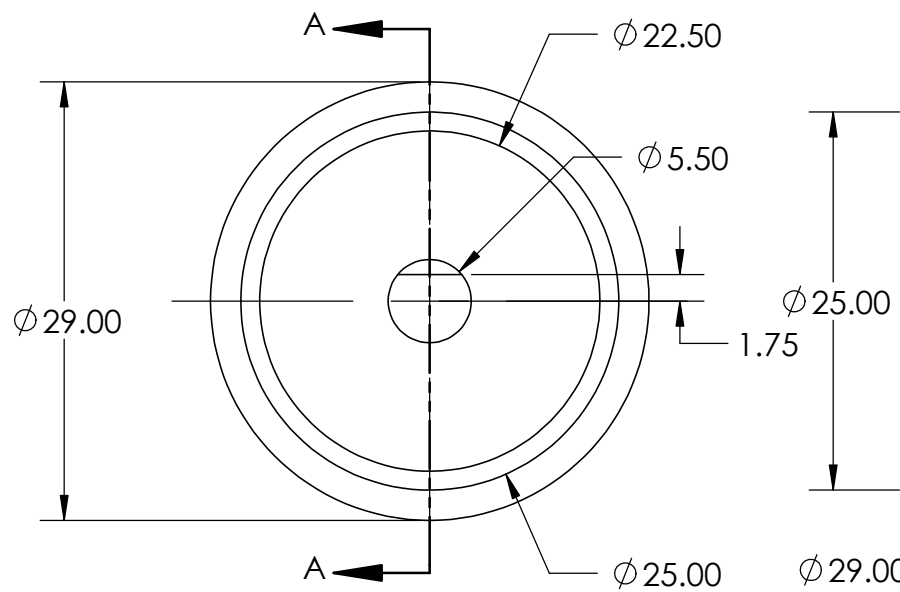
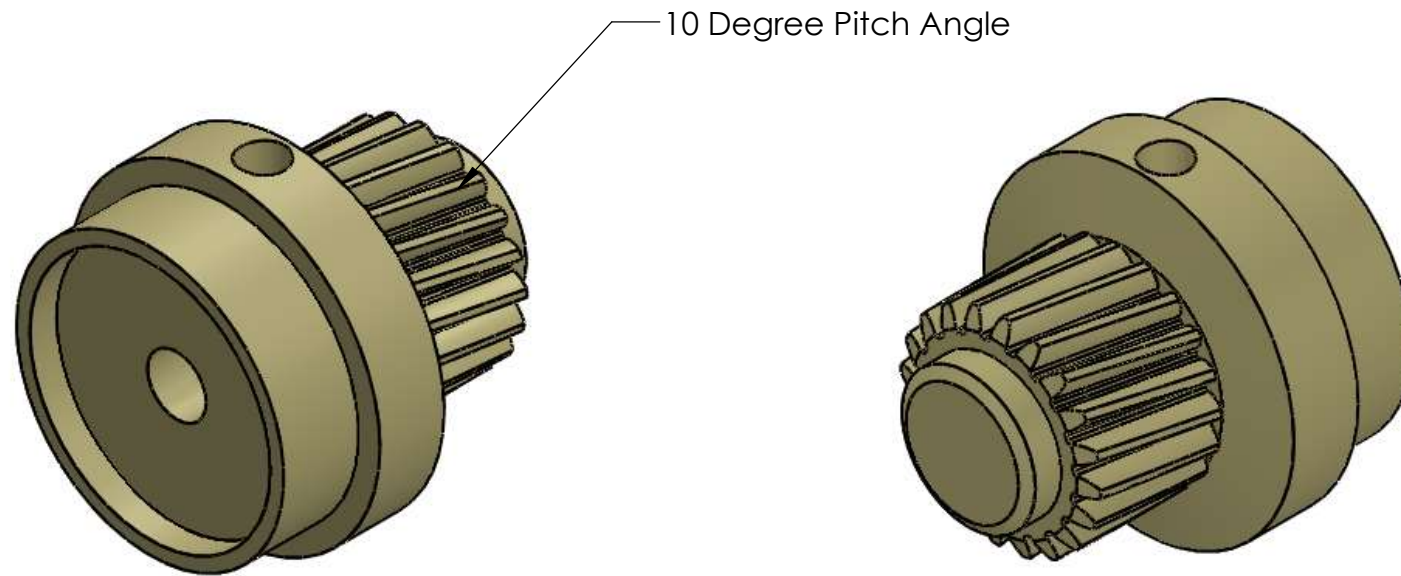
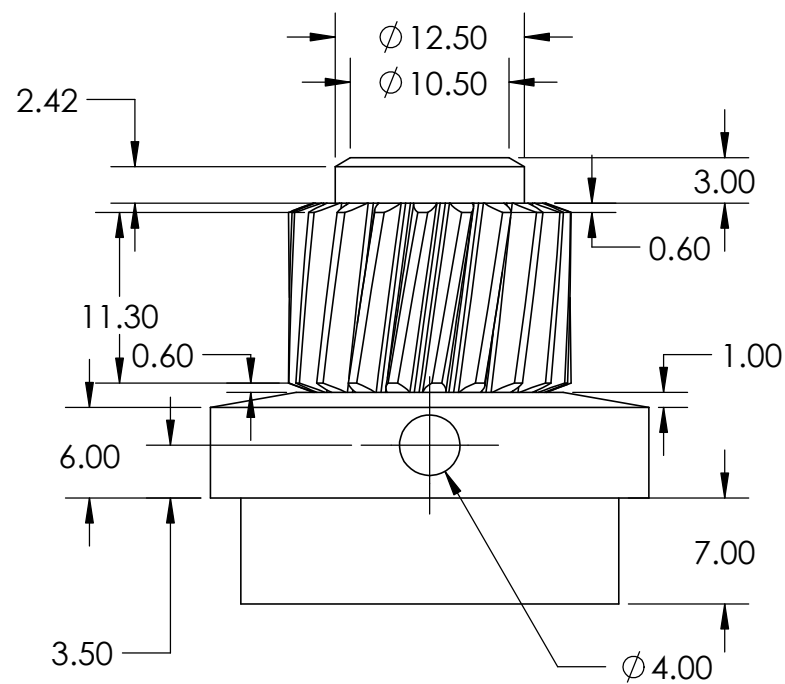
E

D

C

B


A



CONNOR LINSELL
STUDENT ID: 24555106

DO NOT SCALE DRAWING THIRD ANGLE PROJECTION	NAME	SIGNATURE	DATE	UNLESS OTHERWISE SPECIFIED OTHERWISE DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR: DEBUR AND BREAK SHARP EDGES	TITLE: Helical Sun Gear NEMA17	
	DRAWN					
	APPV'D					
	CHK'D				DWG NO.	A3 SHEET 1 OF 1
	MFG			FINISH:		
	Q.A			MATERIAL: PLA		
				WEIGHT:	SCALE: 2:1	REVISION

8	7	6	5	4	3	2	1	
F								F
E								E
D								D
C								C
B								B
A								A

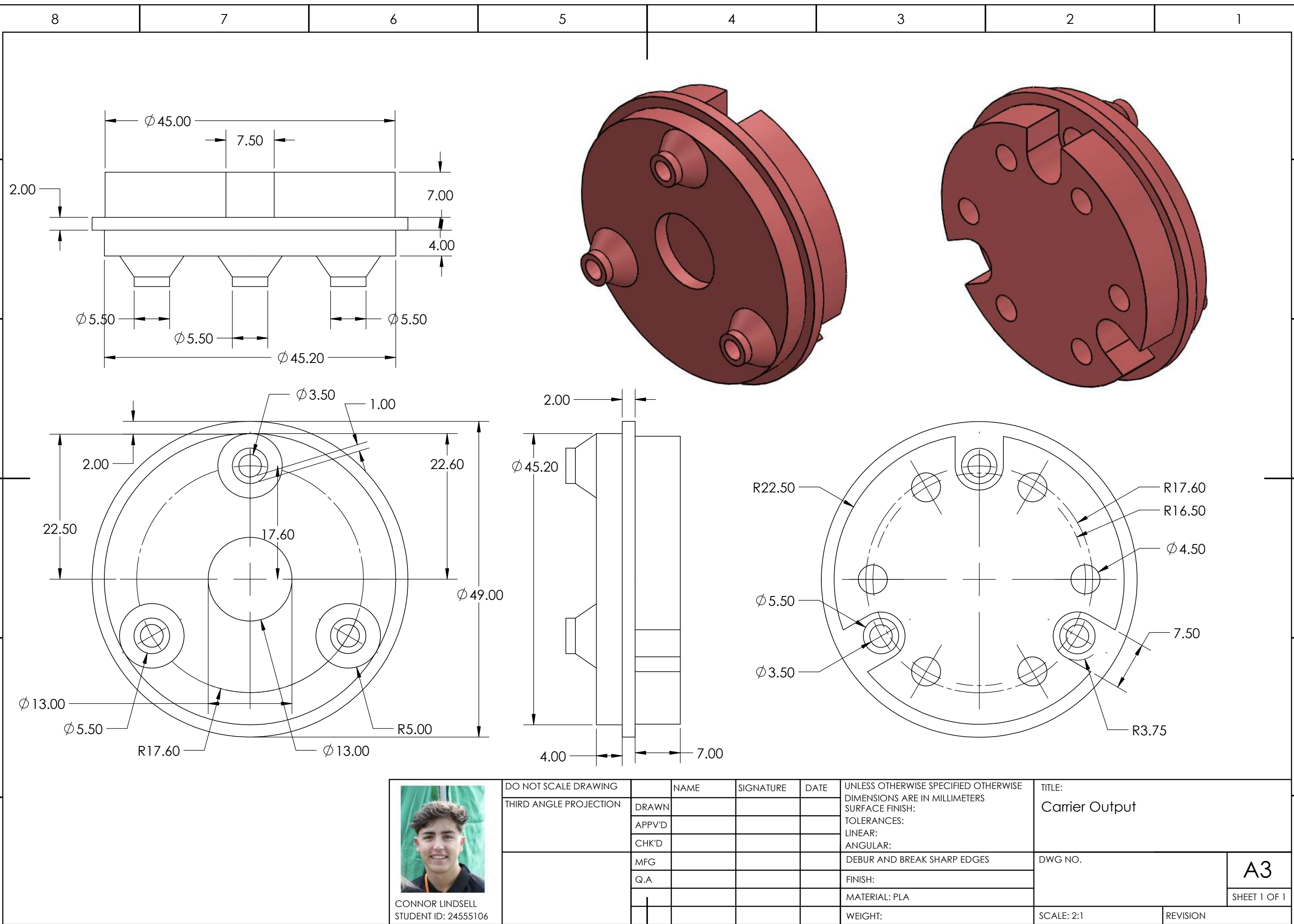


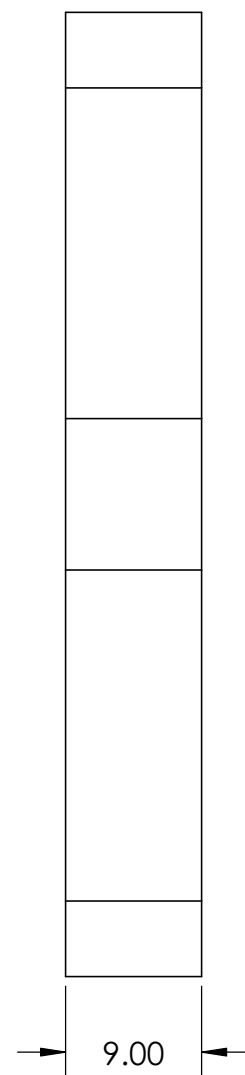
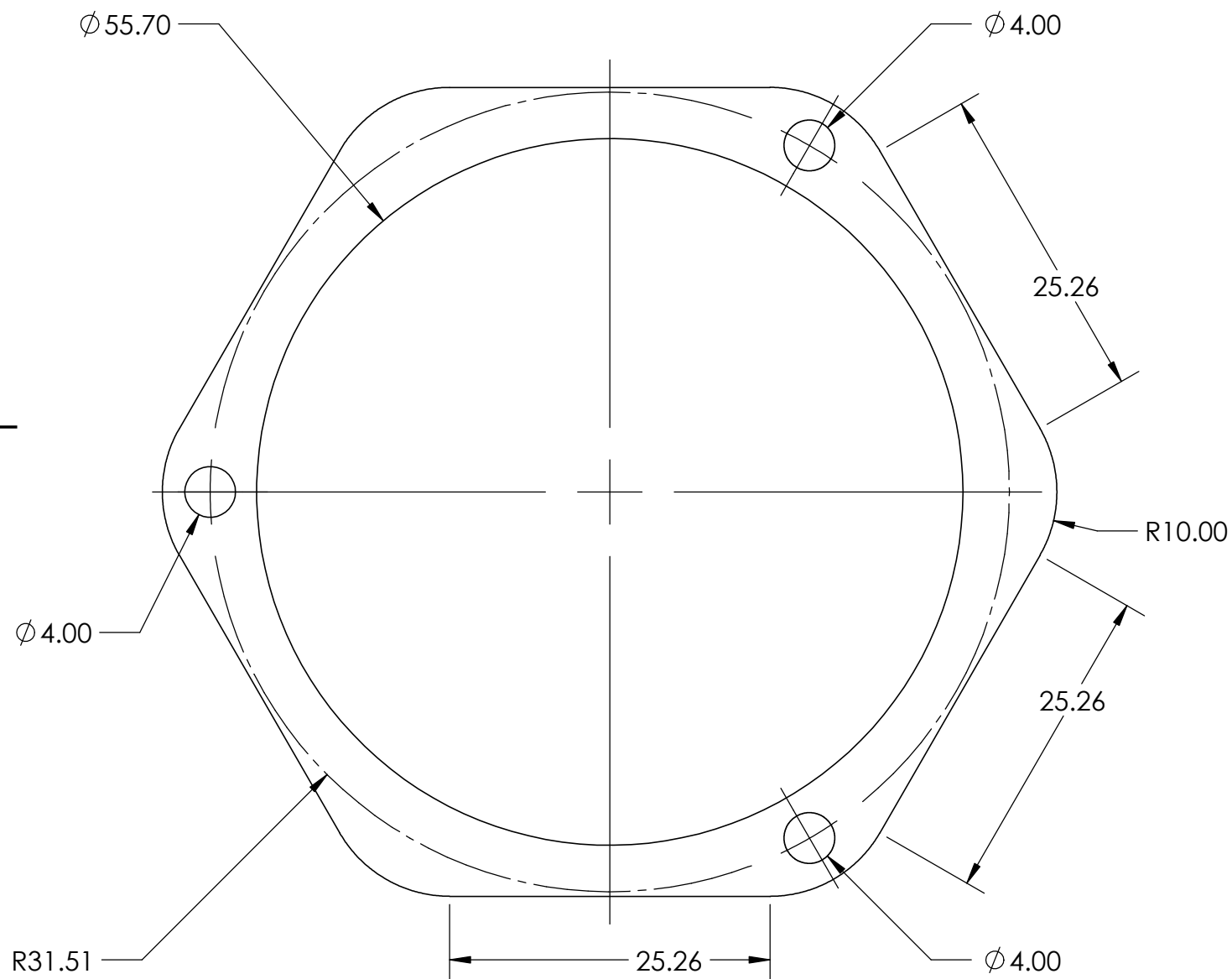
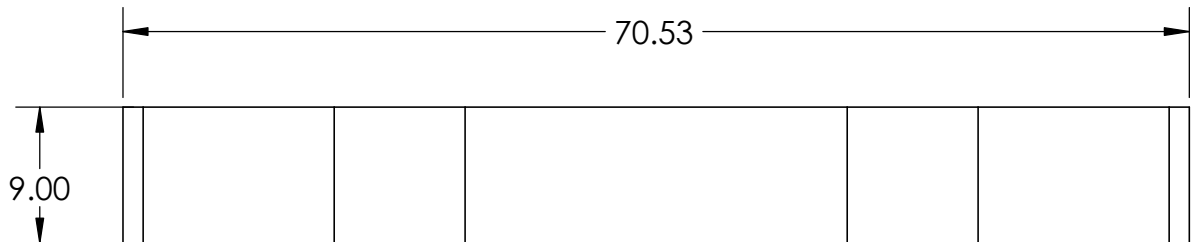
CONNOR LINDSELL
STUDENT ID: 24555106


DO NOT SCALE DRAWING		NAME	SIGNATURE	DATE	UNLESS OTHERWISE SPECIFIED OTHERWISE DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR:	TITLE:	
THIRD ANGLE PROJECTION	DRAWN						
	APPV'D						
	CHK'D						
	MFG				DEBUR AND BREAK SHARP EDGES	DWG NO.	A3
	Q.A				FINISH:		
					MATERIAL:		
						WEIGHT:	SCALE: 5:1

SOLIDWORKS Educational Product. For Instructional Use Only.

5	4	3	2	1
---	---	---	---	---





 CONNOR LINSELL STUDENT ID: 24555106	DO NOT SCALE DRAWING			NAME	SIGNATURE	DATE	UNLESS OTHERWISE SPECIFIED OTHERWISE DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR:		TITLE: Input Spacer NEMA17		
	THIRD ANGLE PROJECTION		DRAWN								
			APP'V'D								
			CHK'D								
			MFG				DEBUR AND BREAK SHARP EDGES		DWG NO.		A3
			Q.A				FINISH:				
							MATERIAL: PLA				
							WEIGHT:		SCALE: 2:1	REVISION	

F

E

D

C

B

A

F

E

D

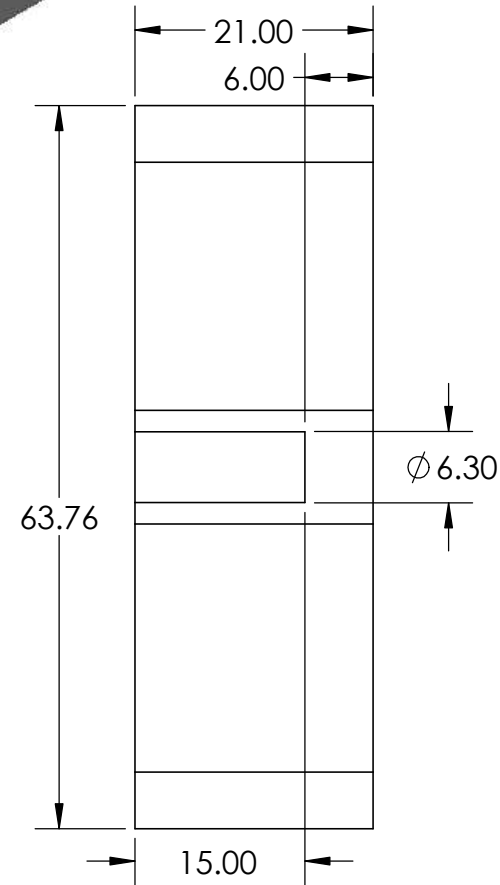
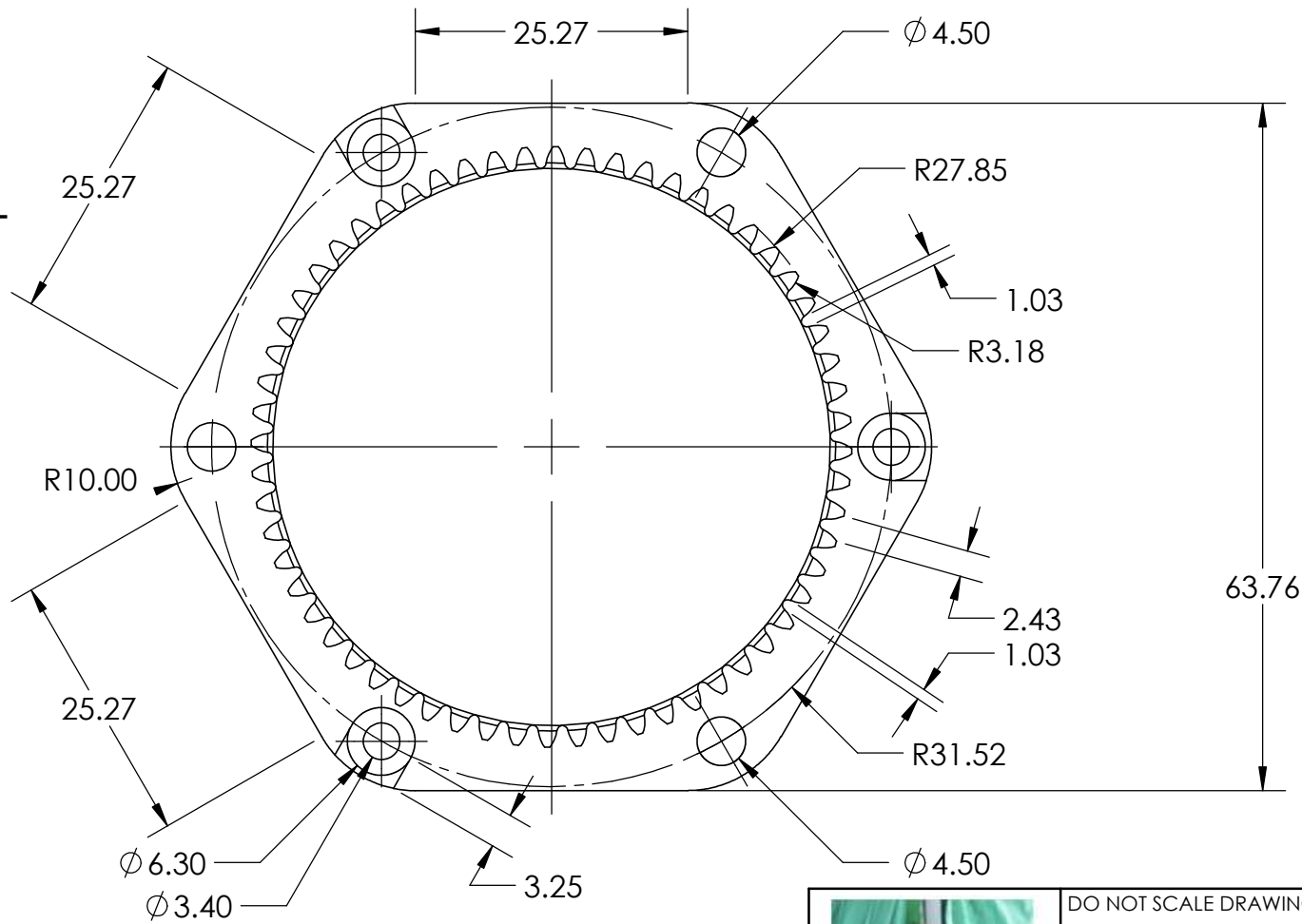
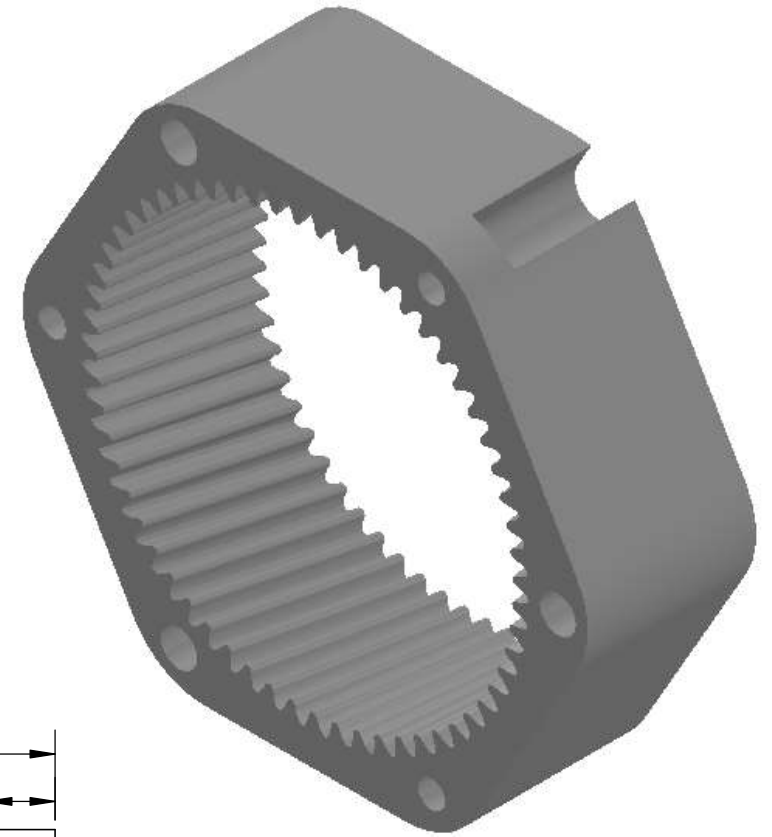
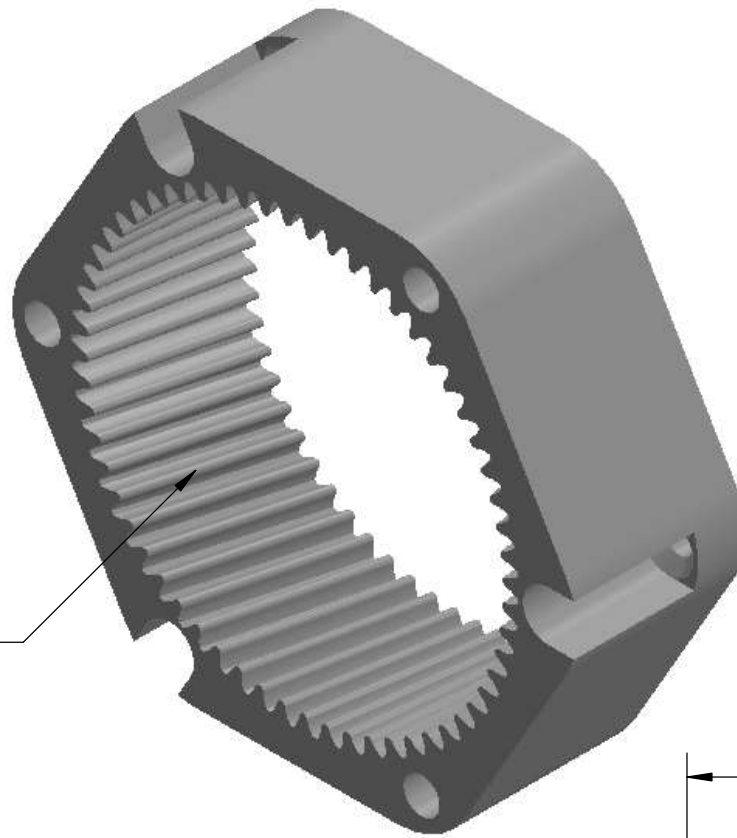
C

B

A

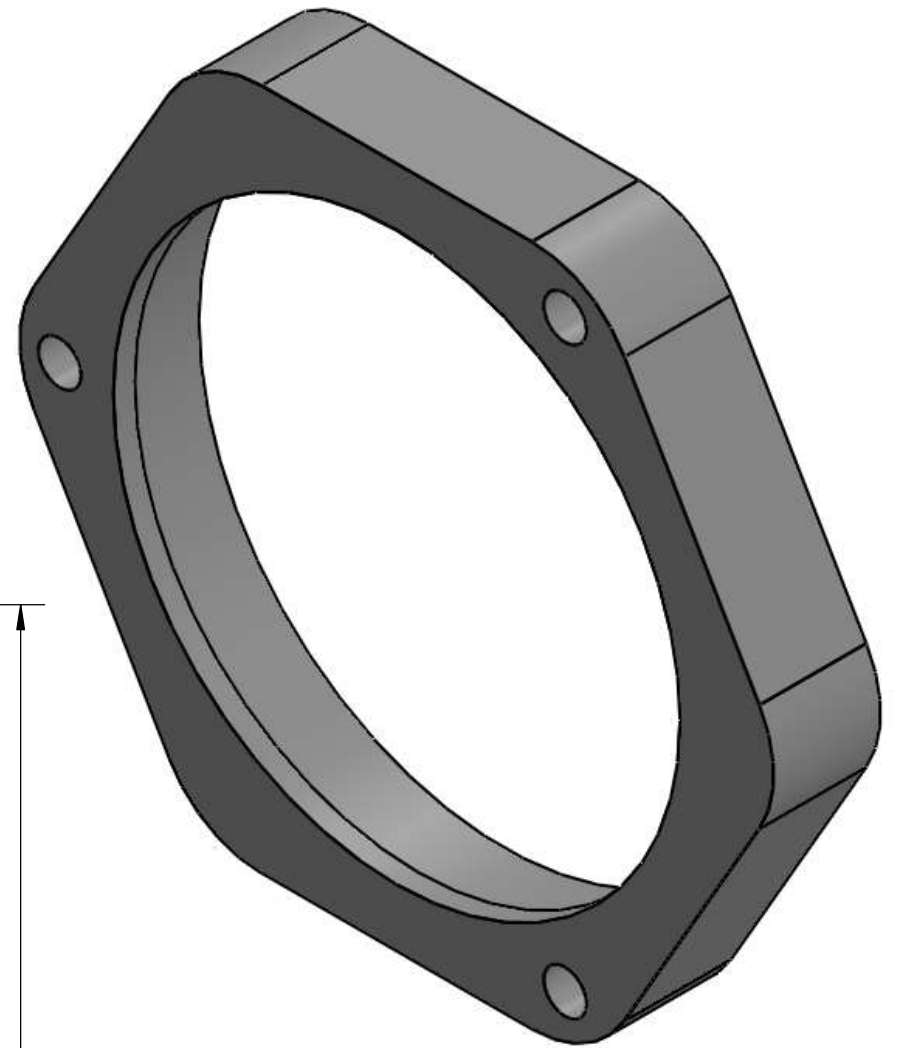
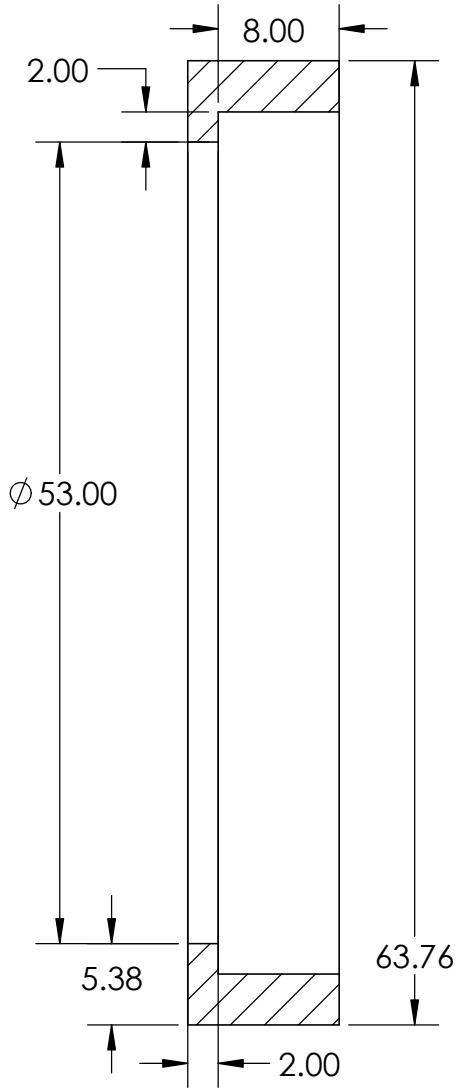
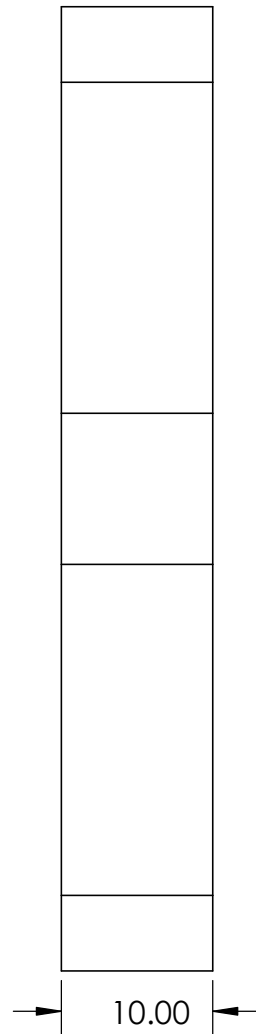
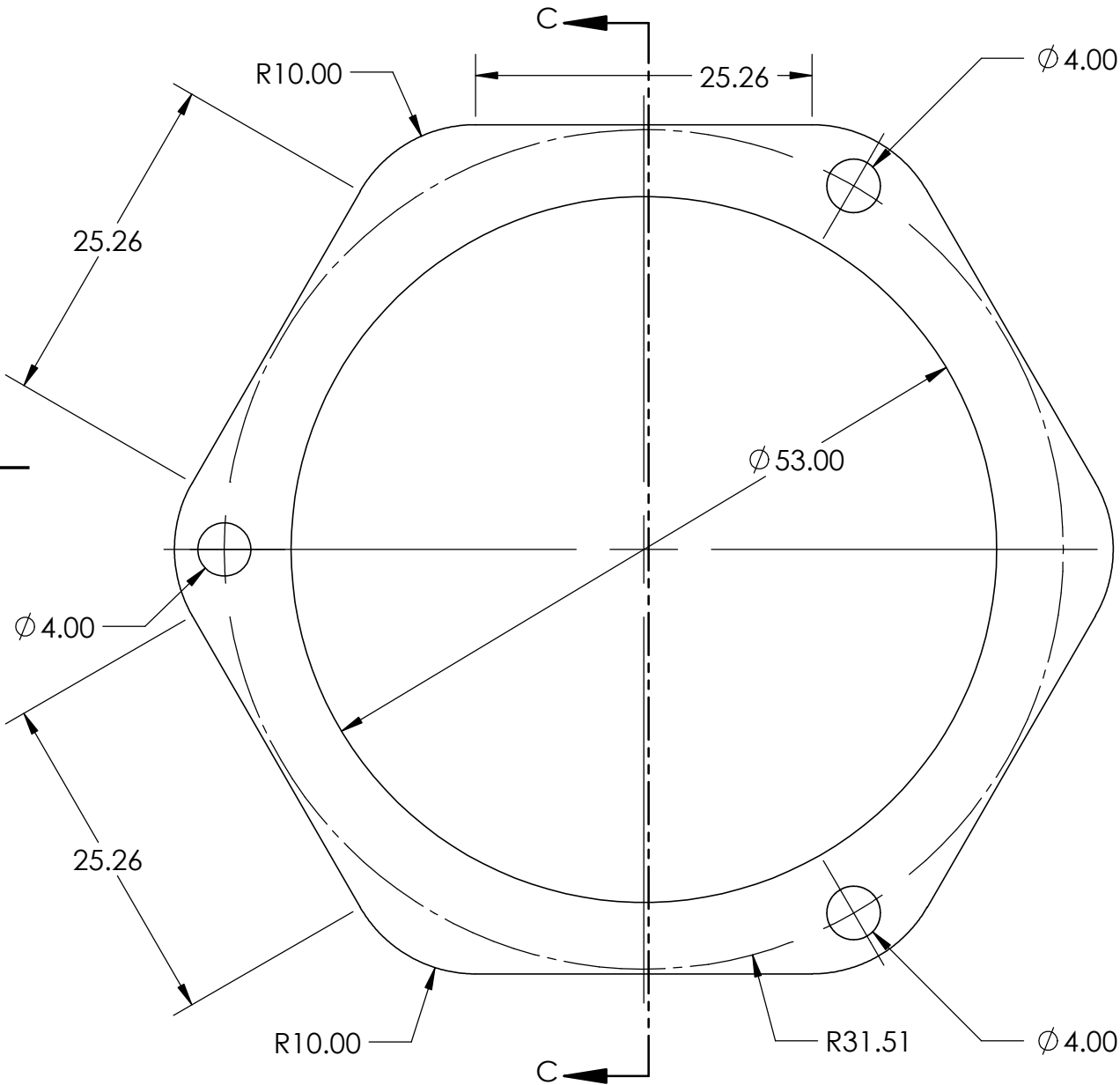


10 Degree Pitch Angle



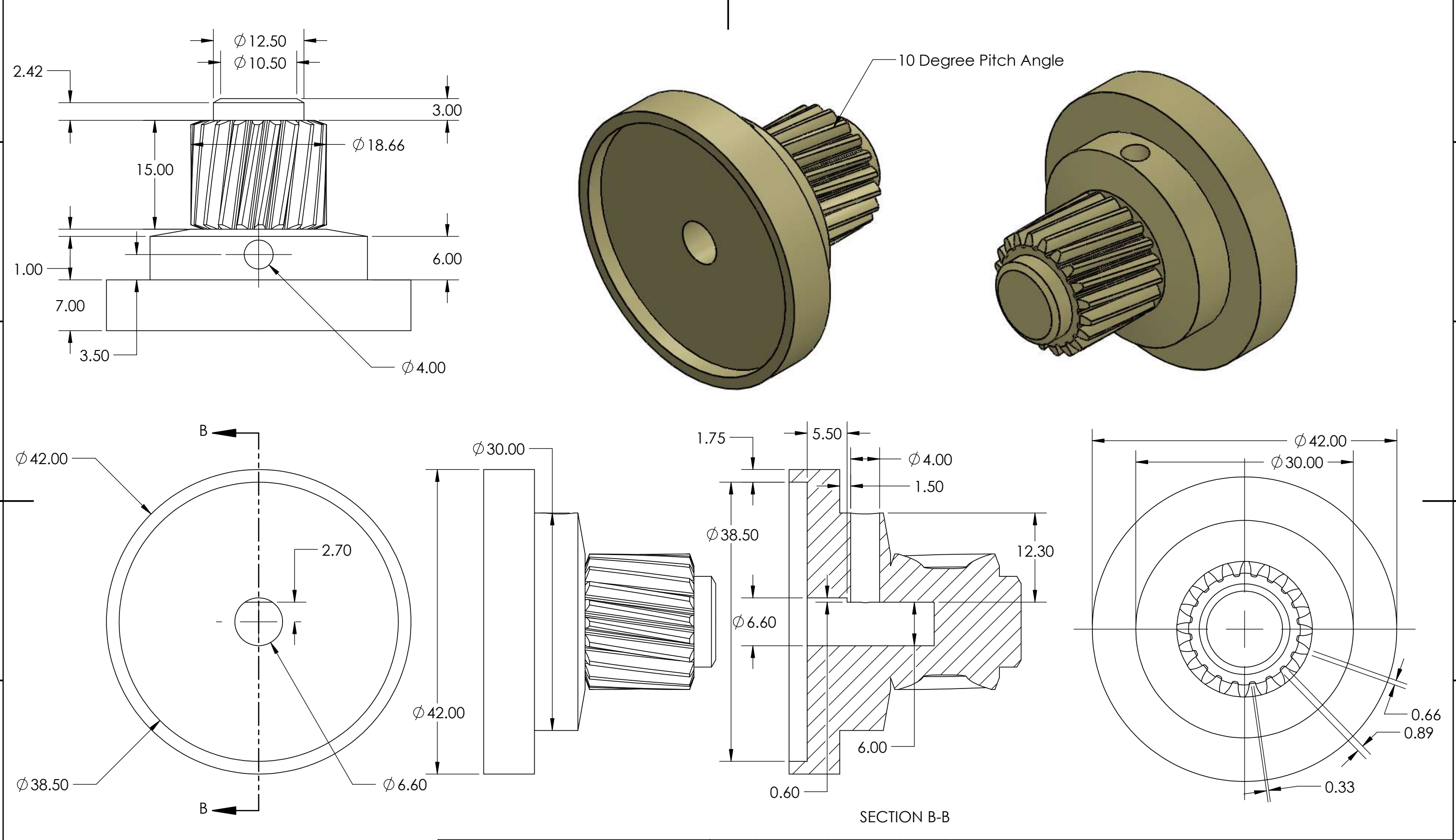
CONNOR LINSELL
STUDENT ID: 24555106


DO NOT SCALE DRAWING THIRD ANGLE PROJECTION	NAME	SIGNATURE	DATE	UNLESS OTHERWISE SPECIFIED OTHERWISE DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR:	TITLE: Stackable Helical Ring Gear And Outer Casing v4	
	DRAWN					
	APP'V'D					
	CHK'D			DEBUR AND BREAK SHARP EDGES	DWG NO.	A3 SHEET 1 OF 1
	MFG			FINISH:		
	Q.A			MATERIAL: PLA		
				WEIGHT:	SCALE: 3:2	REVISION

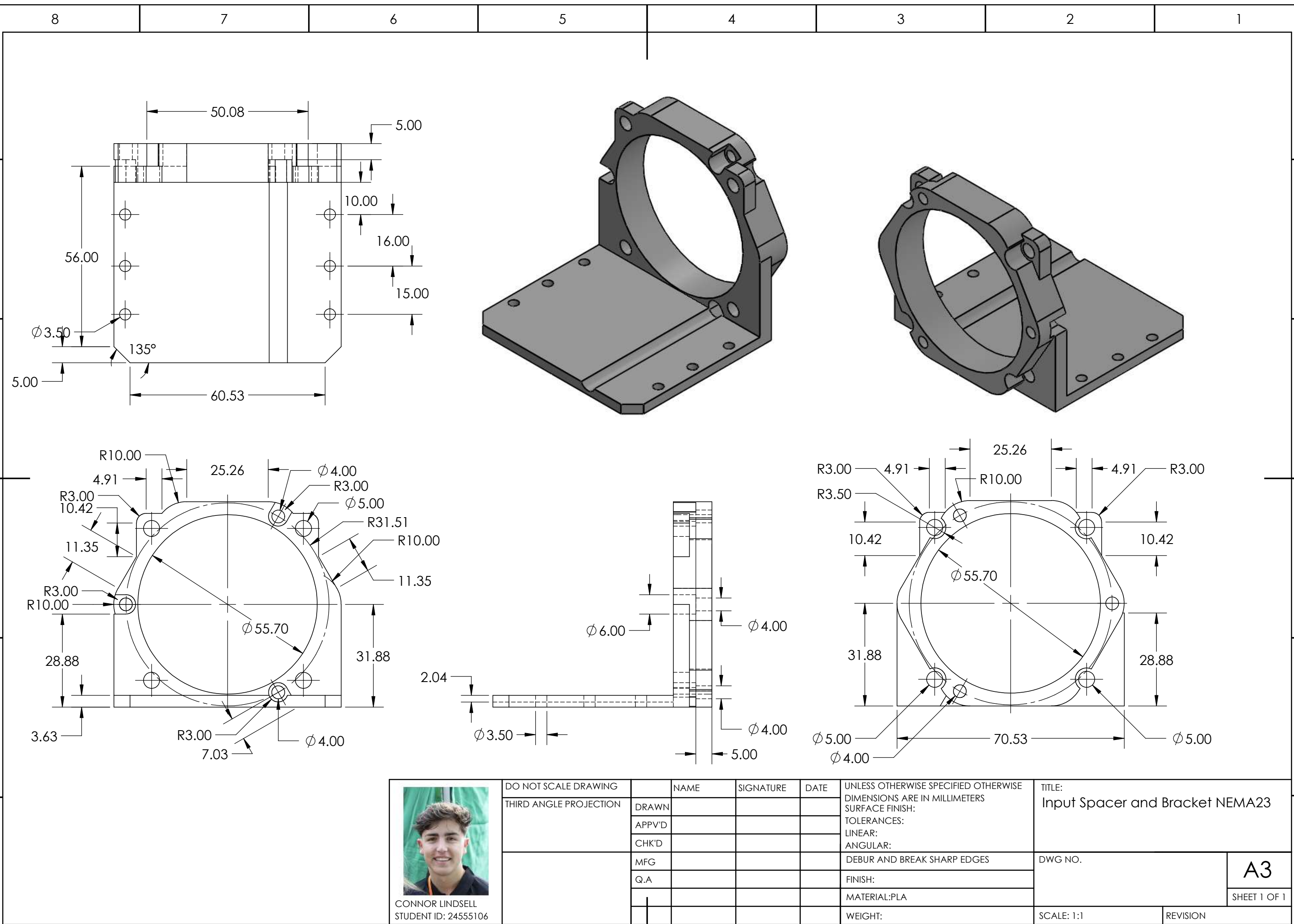


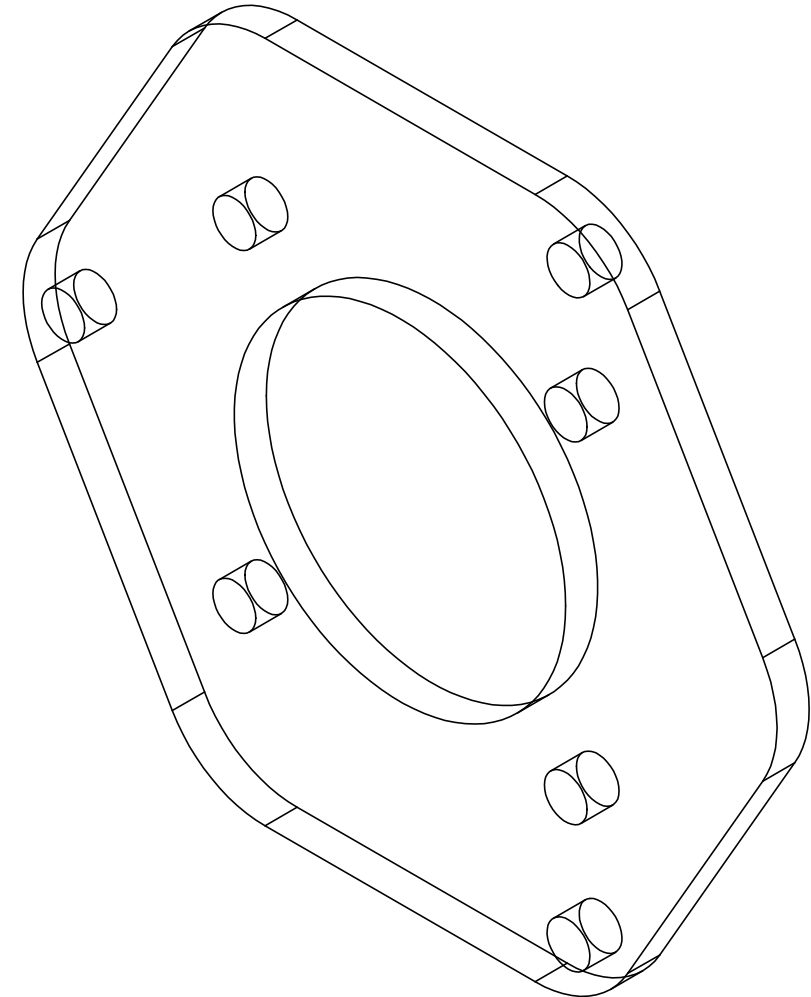
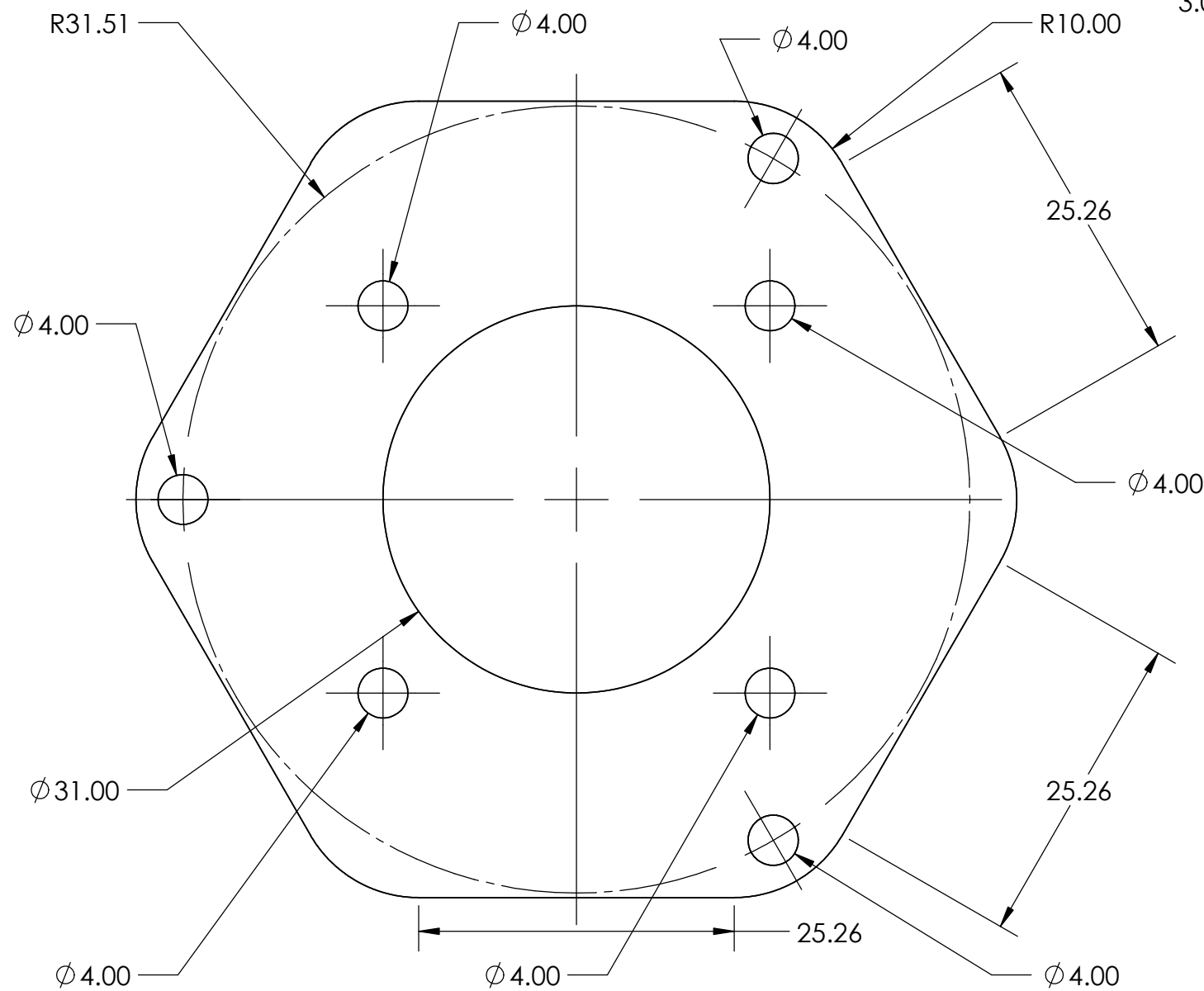
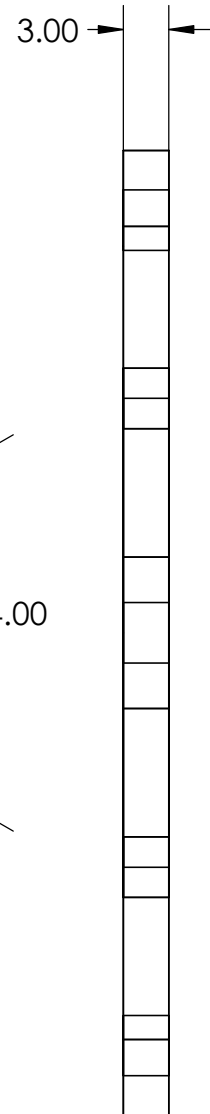
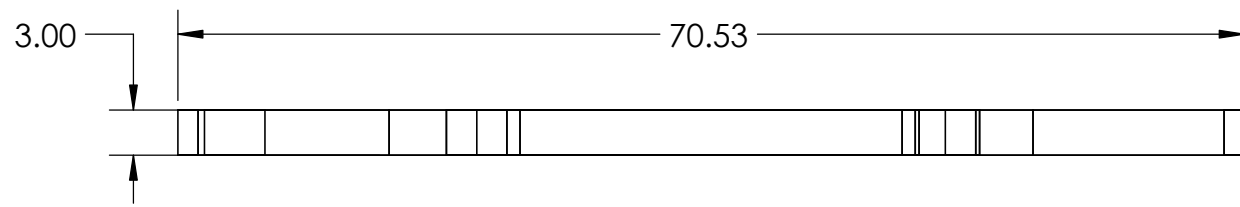
SECTION C-C

CONNOR LINDSELL STUDENT ID: 24555106	DO NOT SCALE DRAWING		NAME	SIGNATURE	DATE	UNLESS OTHERWISE SPECIFIED OTHERWISE DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR:	TITLE: Output Spacer and Bearing Case v2		
	THIRD ANGLE PROJECTION	DRAWN							
		APPV'D							
		CHK'D							
		MFG				DEBUR AND BREAK SHARP EDGES	DWG NO.		A3
		Q.A				FINISH:			
						MATERIAL: PLA			
							WEIGHT:	SCALE: 2:1	REVISION



 CONNOR LINDSELL STUDENT ID: 24555106	DO NOT SCALE DRAWING		NAME	SIGNATURE	DATE	UNLESS OTHERWISE SPECIFIED OTHERWISE DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR:	TITLE: Helical Sun Gear NEMA 23	
	THIRD ANGLE PROJECTION	DRAWN						
		APPV'D						
		CHK'D						
		MFG				DEBUR AND BREAK SHARP EDGES	DWG NO.	A3
		Q.A				FINISH:		
						MATERIAL: PLA		
					WEIGHT:	SCALE: 2:1	REVISION	





CONNOR LINDSELL
STUDENT ID: 24555106

DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION

NAME

SIGNATURE

DATE

UNLESS OTHERWISE SPECIFIED OTHERWISE

DIMENSIONS ARE IN MILLIMETERS

SURFACE FINISH:

TOLERANCES:
LINEAR

LINEAR:
ANGUL

ANGULAR:	
DEFINITION:	

TITLE:

Input Face NEMA 17

DWG NO.	
---------	--

A3

SHEET 1 OF 1

DEBUR AND BREAK SHARP EDGES

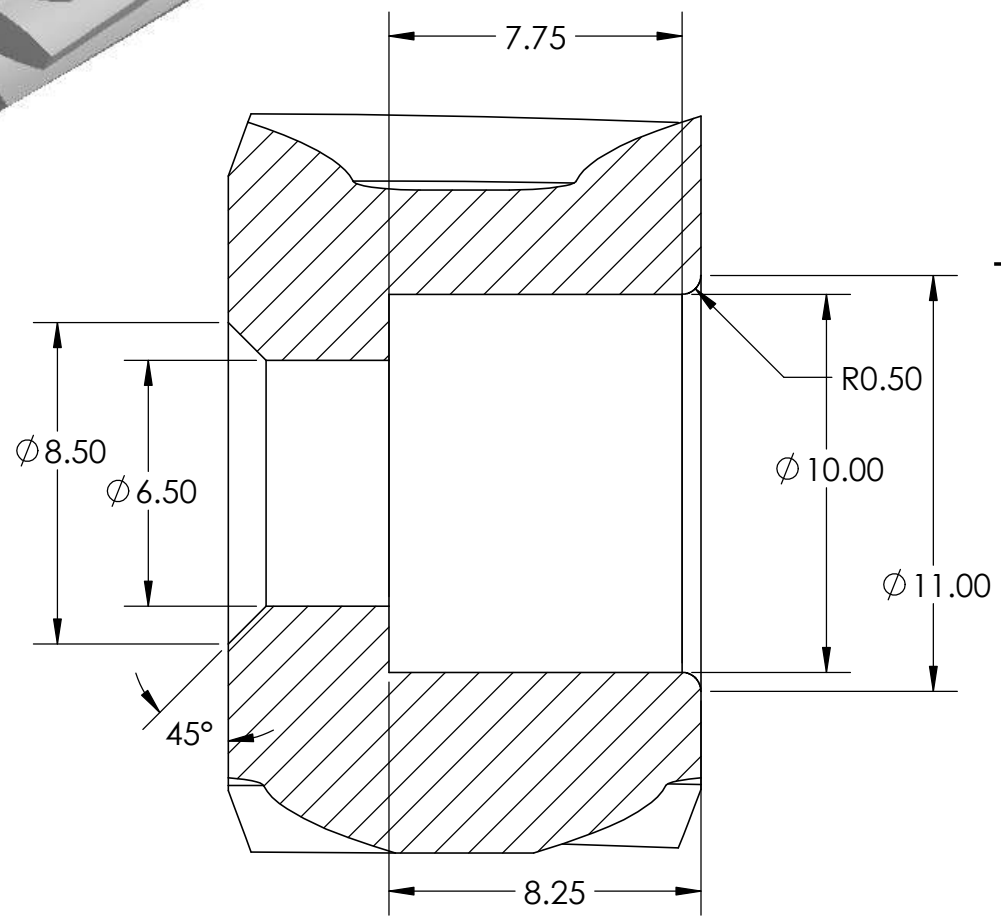
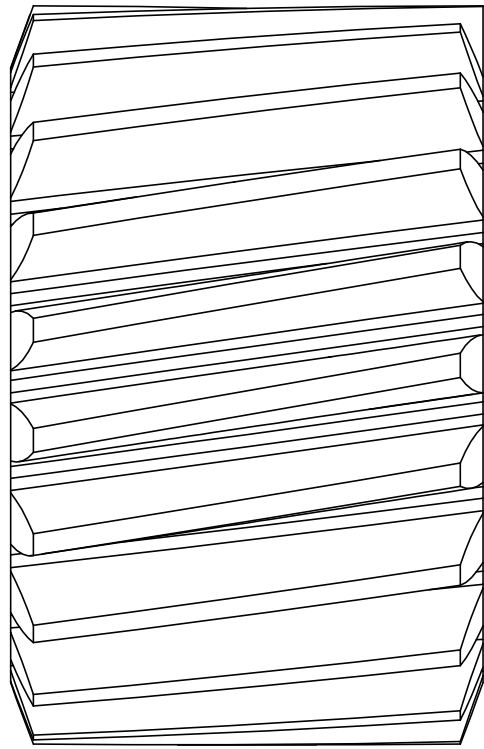
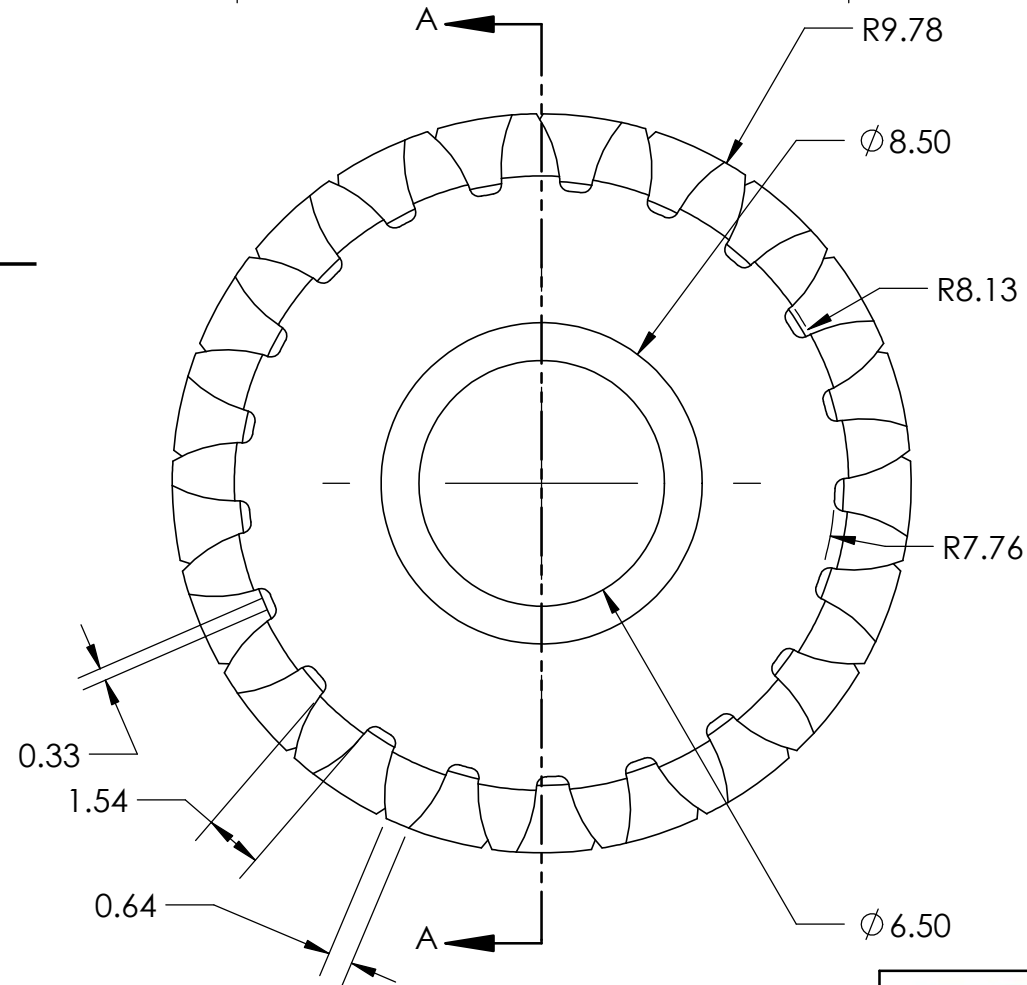
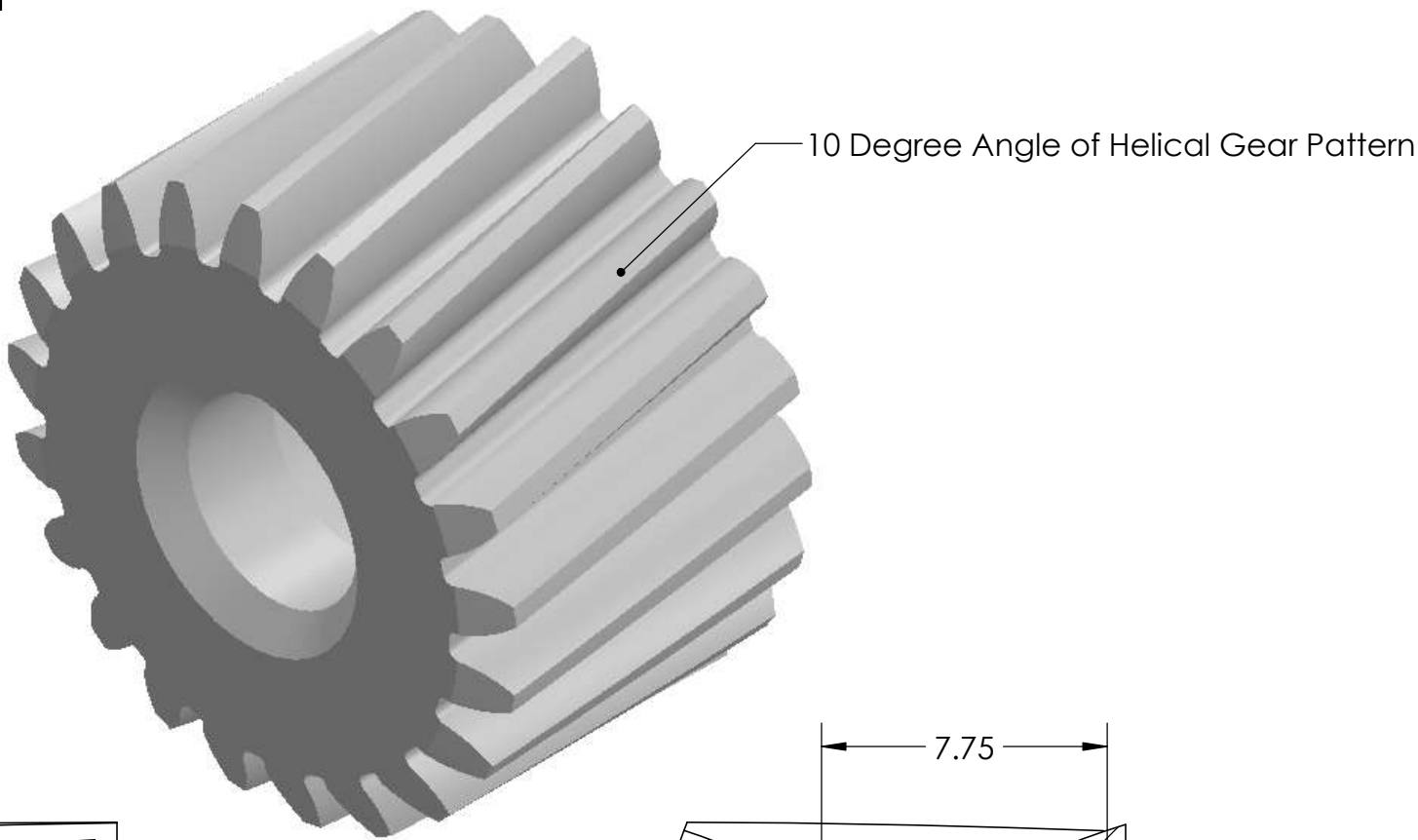
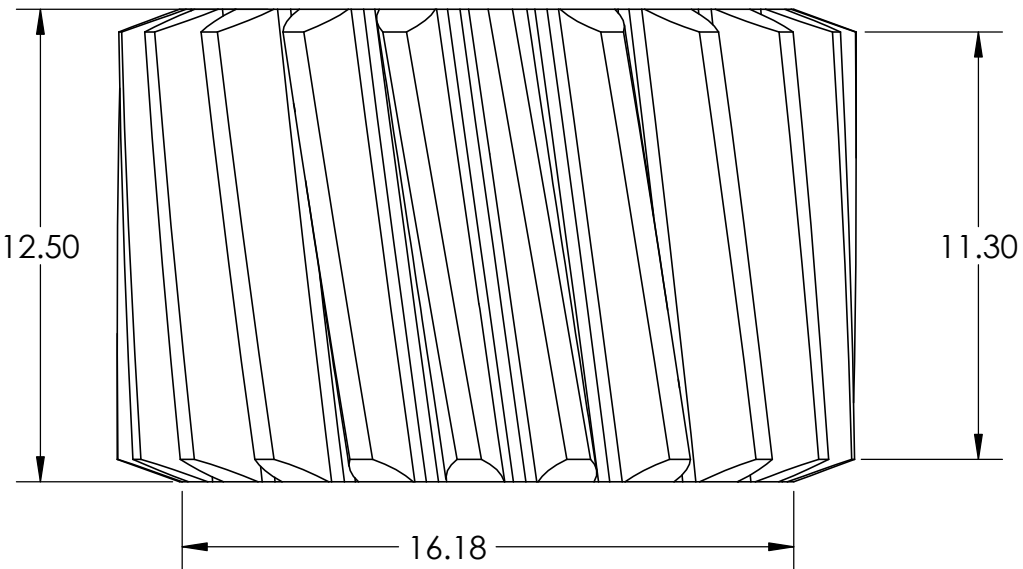
	FINISH:
--	---------

MATERIAL: Acrylic

WEIGHT:

SCALE: 2:1

REVISION



SECTION A-A



CONNOR LINSELL
STUDENT ID: 24555106

DO NOT SCALE DRAWING		NAME	SIGNATURE	DATE	UNLESS OTHERWISE SPECIFIED OTHERWISE DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR:	TITLE: Helical Planet Gear		
THIRD ANGLE PROJECTION	DRAWN							
	APPV'D							
	CHK'D							
	MFG				DEBUR AND BREAK SHARP EDGES	DWG NO.		A3
	Q.A				FINISH:			
					MATERIAL: PLA			
						WEIGHT:	SCALE: 5:1	REVISION