
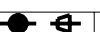
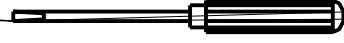


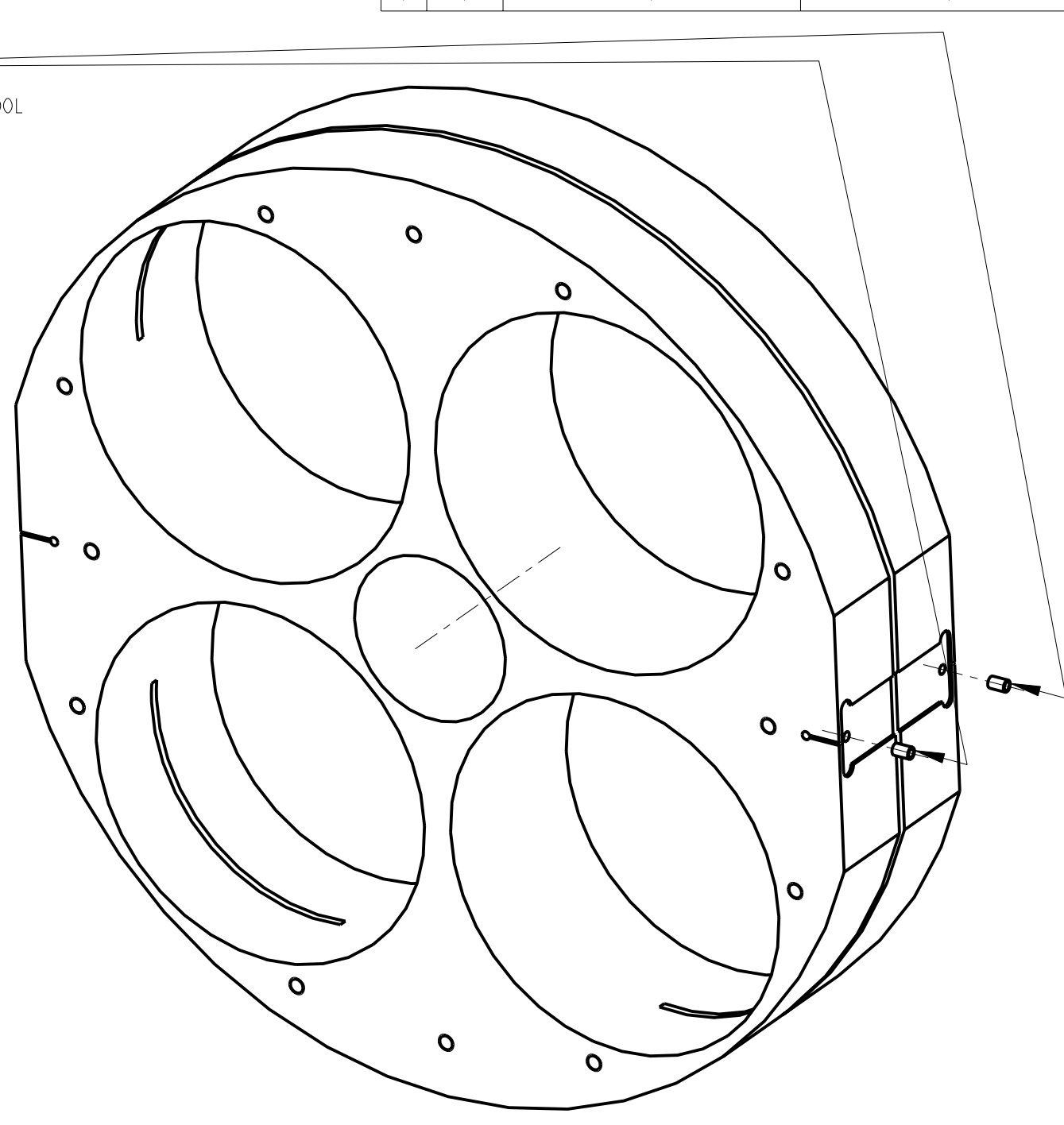
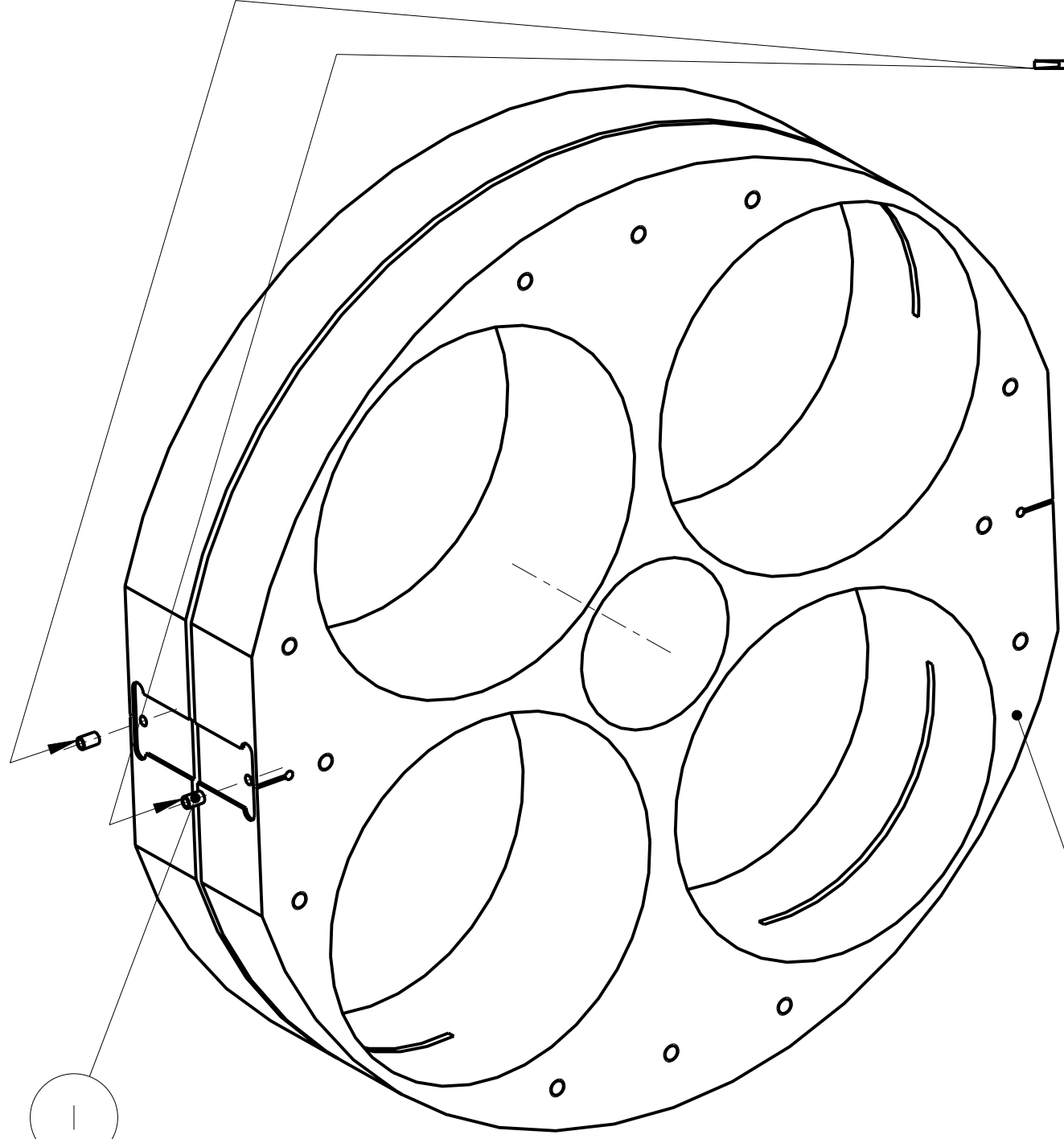
STEP	DESCRIPTION	PART#	QTY	TIME
1	ADD THREAD INSERTS TO D060341	8-32X1-5D UNC_THREAD_INSERT	4	
		D060342	1	
2	ADD BACK PLATE, AND BOLT IN PLACE	1-4_20 UNC_1-00INCH_SIL_PLT	8	
		D060343	1	
3	HELICOIL BACK PLATE AND BOLT IN PLACE	1-4_20 UNC_1-00INCH_SIL_PLT	8	
		8-32X1-5D UNC_THREAD_INSERT	4	
		D060344	1	
4	ASSEMBLE AND INSTALL PITCH MASS	1-4_20X1-5D UNC_THREAD_INSERT	1	
		1-4_20 UNC_2-00INCH_ROUND	1	
		D060353	1	
		D060354	1	
5	HELICOIL CAN FRONT PLATE	8-32X1D UNC_THREAD_INSERT	2	
		D080167	1	
6	ASSEMBLE OSEM X-Y STAGE TO OSEM CAN FRONT PLATE (4 ASSEMBLIES)	8-32 UNC_0-625INCH	2	
		D060336	2	
		D060348	1	
7	ASSEMBLE OSEM AND OSEM Z ADJUSTER TO OSEM CAN ASSEMBLY (4 ASSEMBLIES)	2-56 UNC_0-375INCH	1	
		8-32 UNC_0-625INCH	2	
		8-32 UNC_1-50INCH	2	
		D000069	1	
		D060350	1	
		D060351	1	
8	ADD THREAD INSERTS TO CAN BODY AND ASSEMBLE CAN BODY TO CAN (4 ASSEMBLIES)	8-32 UNC_0-625INCH	4	

STEP	DESCRIPTION	PART#	QTY	TIME
		D080168	1	
9	ADD STOP SCREWS AND WASHERS TO BACK OF OSEM CANS (4 ASSEMBLIES)	8-32 UNC_0-625INCH	3	
		8-32 UNC_BIG_WASHER	3	
10	ASSEMBLE 4 OSEM CANS TO MASS AND BOLT IN PLACE	8-32 UNC_0-625INCH	4	
		8-32 UNC_BIG_WASHER	4	
		D080166	3	
11	ASSEMBLE BUMP STOP	D060548	1	
		D080242	1	
		D080243	1	
		D080245	1	
12	ASSEMBLE CABLE CLAMP	1-4_20 UNC_1-00INCH	2	
		1-4_20 UNC_NUT_	2	
		D070223	1	
		D070226	1	
13	ADD ADDABLE/REMOVABLE MASS	1-4_20 UNC_1-00INCH_SIL_PLT	4	
		D080240	3	
		D060359-050_0	1	
		D060359-100_0	7	

NOTES: (UNLESS OTHERWISE SPECIFIED)		 CALIFORNIA INSTITUTE OF TECHNOLOGY MASSACHUSETTS INSTITUTE OF TECHNOLOGY 1GR, GLASGOW UNIVERSITY GEO 600 GROUP RUTHERFORD APPLETON LABORATORIES	
1.	PROCESS PLAN TO BE USED FOR ASSEMBLY ONLY NOT TO BE USED FOR MANUFACTURE		SYSTEM ADVANCED LIGO
			SUB-SYSTEM SUS
			NEXT ASSY QUAD ETM ITM
			PART NAME PEN-RE MASS REACTION CHAIN
			DRG. NO. D060341_PROCESS
	NAME	DATE	SCALE 1:1 PROJECTION:  SHEET 1 OF 1
	DRAWN J O'DELL	16/FEB/10	REV B.
	CHECKED J'OD	16/FEB/10	
	APPROVED JOD	16/FEB/10	



THREAD INSERT INSERTION TOOL
8-32 UNC



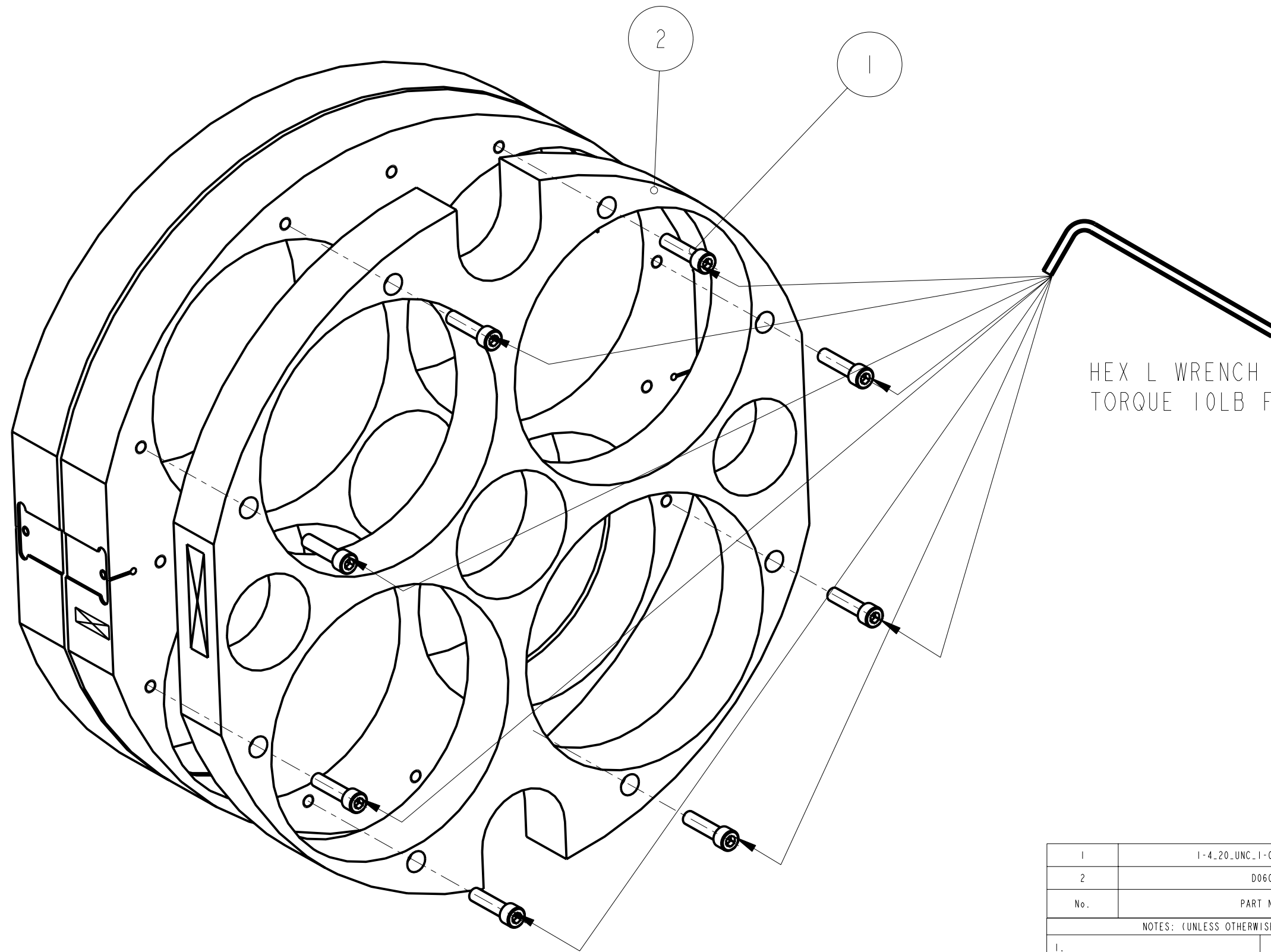
1

2

ADD THREAD INSERTS TO D060341


1	8-32X1-5D UNC THREAD INSERT	8-32 x 1.5D UNC THREAD INSERT	4
2	D060342	CENTRAL MASS	1
No.	PART NUMBER	PART DESCRIPTION	NO. REOD
NOTES: (UNLESS OTHERWISE SPECIFIED)			
1.		CALIFORNIA INSTITUTE OF TECHNOLOGY MASSACHUSETTS INSTITUTE OF TECHNOLOGY IGR, GLASGOW UNIVERSITY GEO 600 GROUP RUTHERFORD APPLETON LABORATORIES	
PROCESS PLAN TO BE USED FOR ASSEMBLY ONLY NOT TO BE USED FOR MANUFACTURE		SYSTEM ADVANCED LIGO SUB-SYSTEM SUS NEXT ASSY QUAD ETM ITM PART NAME PEN-RE MASS REACTION CHAIN	
	NAME	DATE	SIZE
DRAWN	J O'DELL	12/FEB/10	B
CHECKED	J'OD	16/FEB/10	DRG. NO. D060341_PROCESS
APPROVED	JOD	16/FEB/10	REV B.
SCALE 1:2		PROJECTION:	SHEET 2 OF 1

REV.	DATE	DCN #	DRAWING TREE #

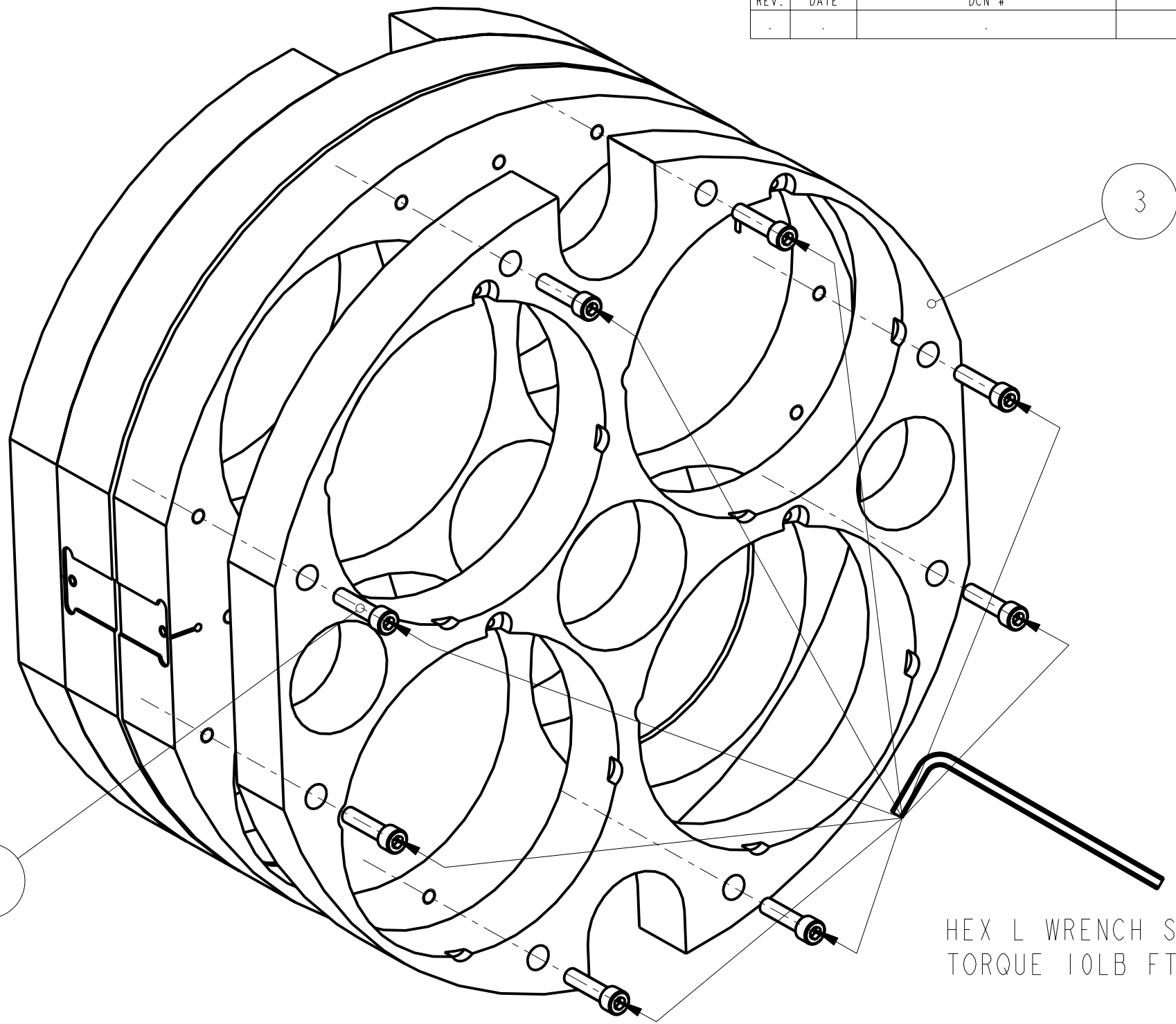
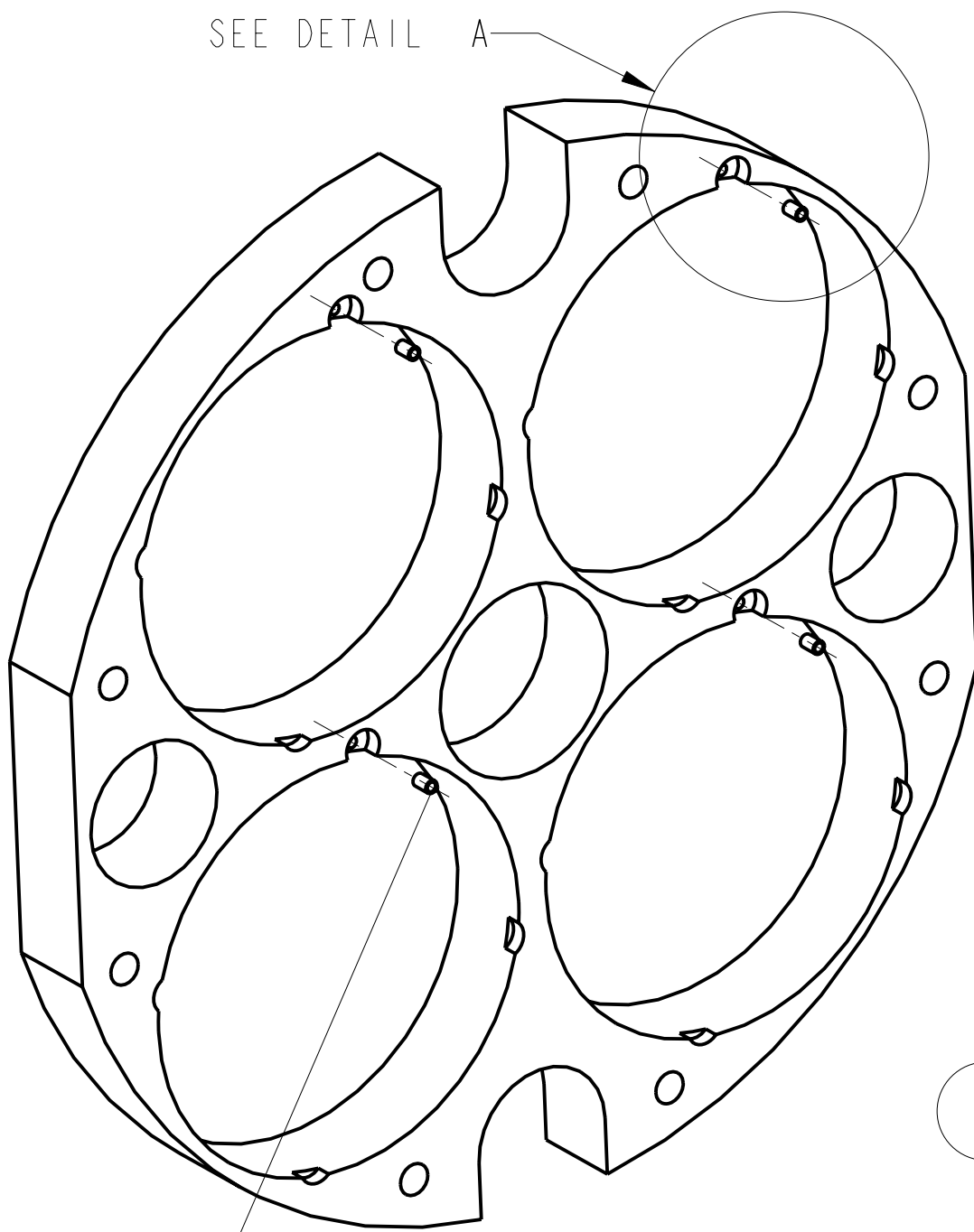


HEX L WRENCH SIZE: 3/16
TORQUE 10LB FT

ADD BACK PLATE, AND BOLT IN PLACE

1	1-4_20_UNC_1-00INCH_SIL_PLT	1/4" 20 UNC X 1" CAP HEAD SILVER PLATED	8
2	D060343	FRONT PLATE	1
No.	PART NUMBER	PART DESCRIPTION	NO. REOD
NOTES: (UNLESS OTHERWISE SPECIFIED)			
1.		PROCESS PLAN TO BE USED FOR ASSEMBLY ONLY NOT TO BE USED FOR MANUFACTURE	 CALIFORNIA INSTITUTE OF TECHNOLOGY MASSACHUSETTS INSTITUTE OF TECHNOLOGY IGR, GLASGOW UNIVERSITY GEO 600 GROUP RUTHERFORD APPLETON LABORATORIES
		SYSTEM	ADVANCED LIGO
		SUB-SYSTEM	SUS
		NEXT ASSY	QUAD ETM ITM
		PART NAME	PEN-RE MASS REACTION CHAIN
	NAME	DATE	SIZE
DRAWN	J O'DELL	12/FEB/10	B
CHECKED	J'OD	16/FEB/10	DRG. NO. D060341_PROCESS
APPROVED	JOD	16/FEB/10	REV B.
SCALE 1:2		PROJECTION:	SHEET 3 OF 1

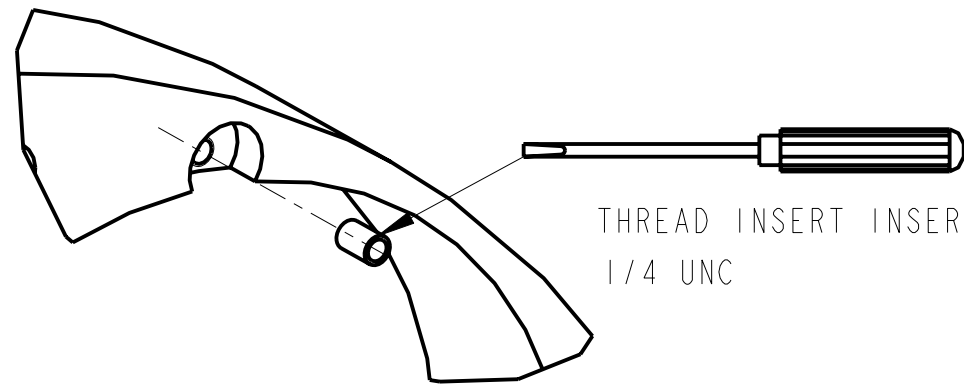
SEE DETAIL A



HEX L WRENCH SIZE: 3/16
TORQUE 10LB FT

2

1



THREAD INSERT INSERTION TOOL
1/4 UNC


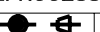
HELICOIL BACK PLATE AND BOLT IN PLACE

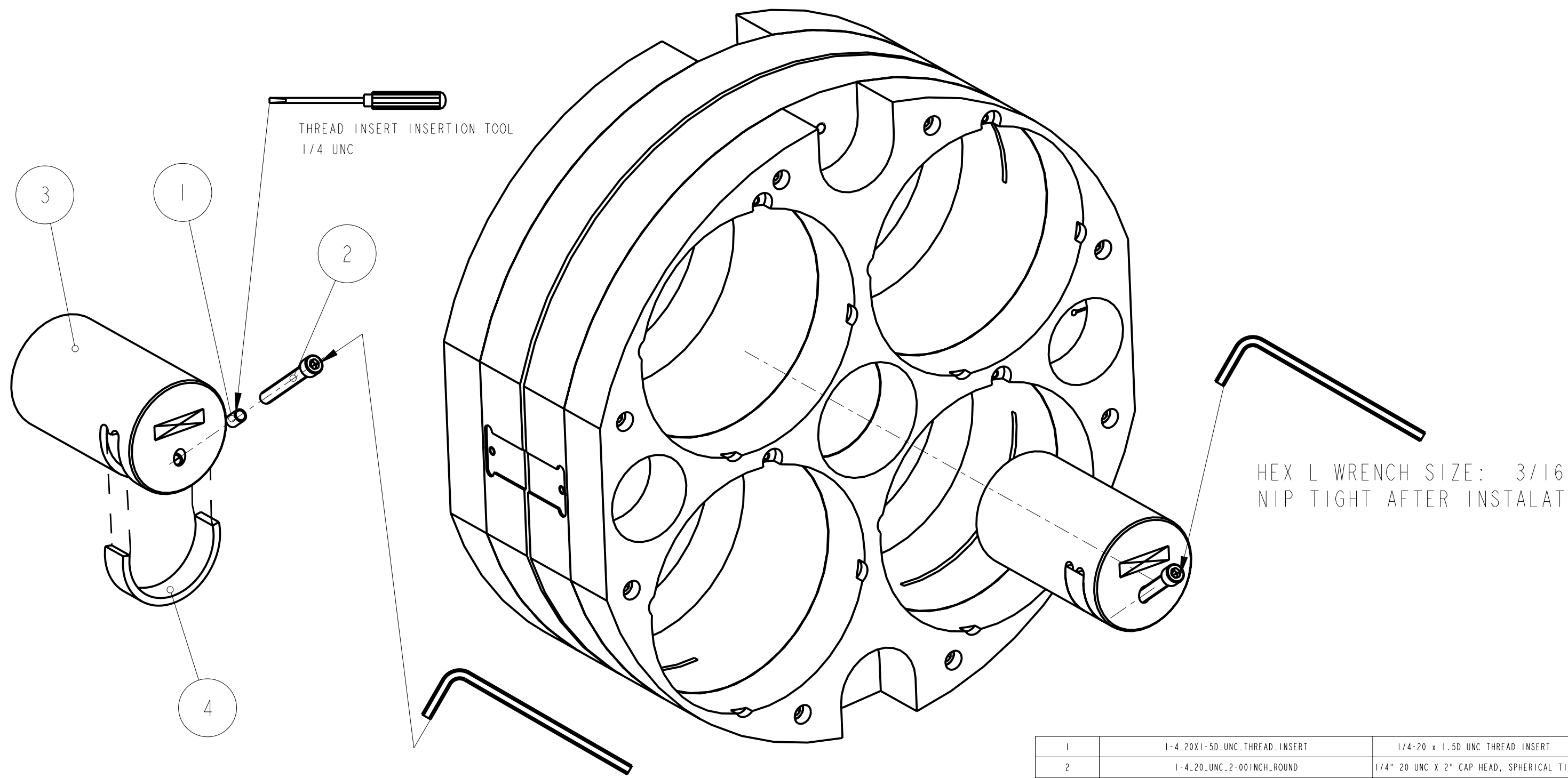
DETAIL A
SCALE 1:1

1	1-4_20 UNC_1-00INCH_SIL_PLT	1/4" 20 UNC X 1" CAP HEAD SILVER PLATED	8
2	8-32X1-5D UNC_THREAD_INSERT	8-32 x 1.50 UNC THREAD INSERT	4
3	D060344	BACK PLATE	1
No.	PART NUMBER	PART DESCRIPTION	NO. REQD

NOTES: (UNLESS OTHERWISE SPECIFIED)

1.

PROCESS PLAN TO BE USED FOR ASSEMBLY ONLY NOT TO BE USED FOR MANUFACTURE		 CALIFORNIA INSTITUTE OF TECHNOLOGY MASSACHUSETTS INSTITUTE OF TECHNOLOGY IGR, GLASGOW UNIVERSITY GEO 600 GROUP RUTHERFORD APPLETON LABORATORIES	
SYSTEM ADVANCED LIGO			
SUB-SYSTEM SUS			
NEXT ASSY QUAD ETM ITM			
PART NAME PEN-RE MASS REACTION CHAIN			
DRAWN	J O'DELL	10/FEB/10	SIZE B DRG. NO. D060341_PROCESS REV B.
CHECKED	J'OD	16/FEB/10	
APPROVED	JOD	16/FEB/10	
SCALE 1:2		PROJECTION: 	SHEET 4 OF 1



THREAD INSERT INSERTION TOOL
1/4 UNC

HEX L WRENCH SIZE: 3/16
NIP TIGHT AFTER INSTALATION

HEX L WRENCH SIZE: 3/16
LOOSE

ASSEMBLE AND INSTALL PITCH MASS

No.	PART NUMBER	PART DESCRIPTION	NO. REOD
1	1-4_20X1-5D_UNC_THREAD_INSERT	1/4-20 x 1.5D UNC THREAD INSERT	1
2	1-4_20_UNC_2-001INCH_ROUND	1/4" 20 UNC X 2" CAP HEAD, SPHERICAL TIP	1
3	D060353	PEN RE PITCH MASS	1
4	D060354	CLAMPING COLLAR	1

NOTES: (UNLESS OTHERWISE SPECIFIED)

1. PROCESS PLAN TO BE USED FOR ASSEMBLY ONLY NOT TO BE USED FOR MANUFACTURE

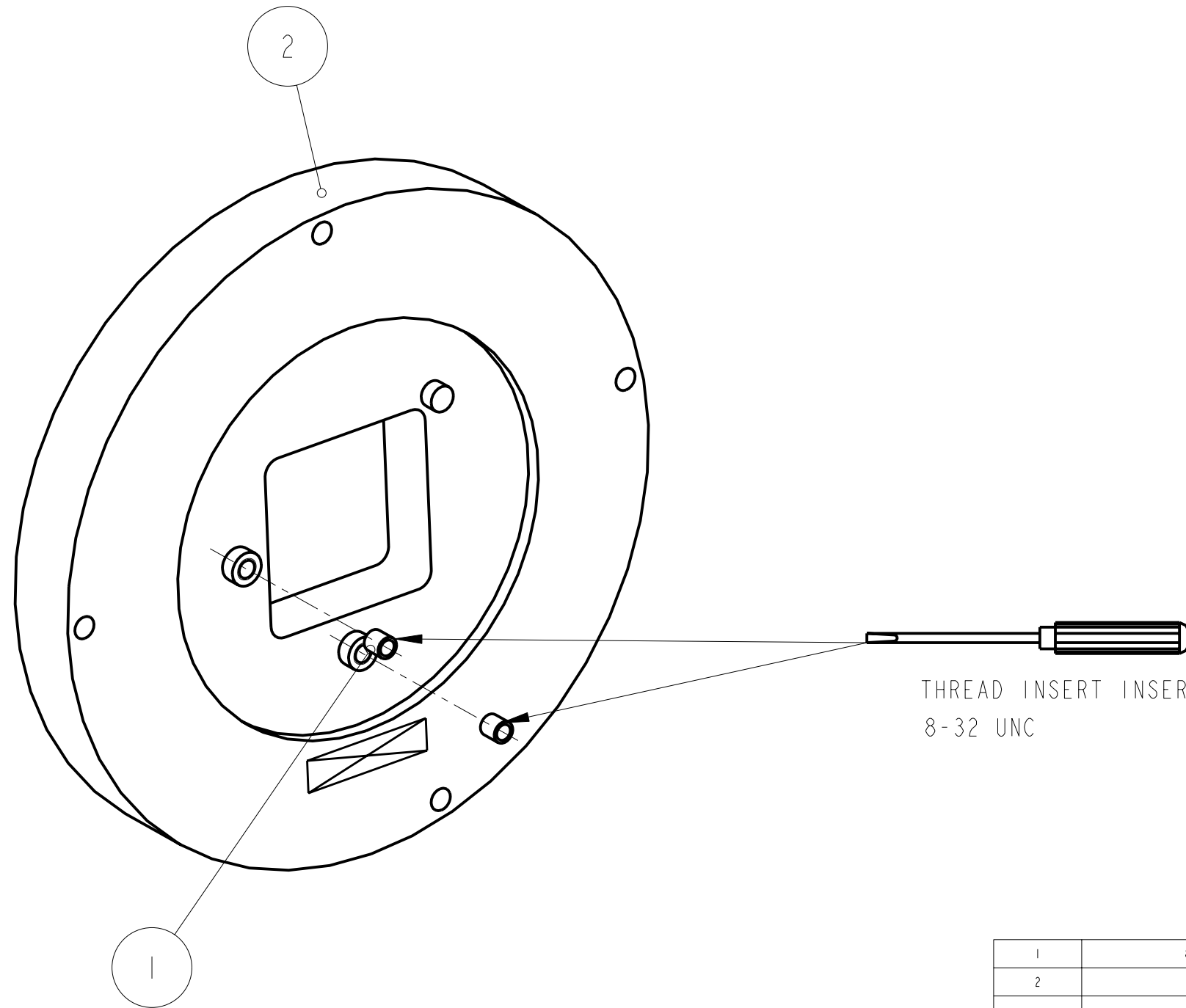
DRAWN	J O'DELL	12/FEB/10
CHECKED	J'OD	16/FEB/10
APPROVED	JOD	16/FEB/10

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 IGR, GLASGOW UNIVERSITY GEO 600 GROUP
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SYSTEM **ADVANCED LIGO**
 SUB-SYSTEM **SUS**
 NEXT ASSY **QUAD ETM ITM**
 PART NAME **PEN-RE MASS REACTION CHAIN**



DRG. NO. **D060341_PROCESS** REV **B.**
 SCALE 1:2 PROJECTION: SHEET 5 OF 1

REV.	DATE	DCN #	DRAWING TREE #

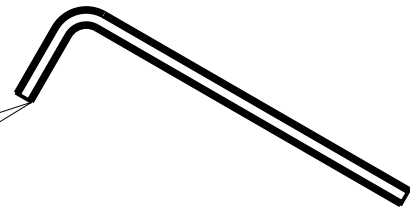
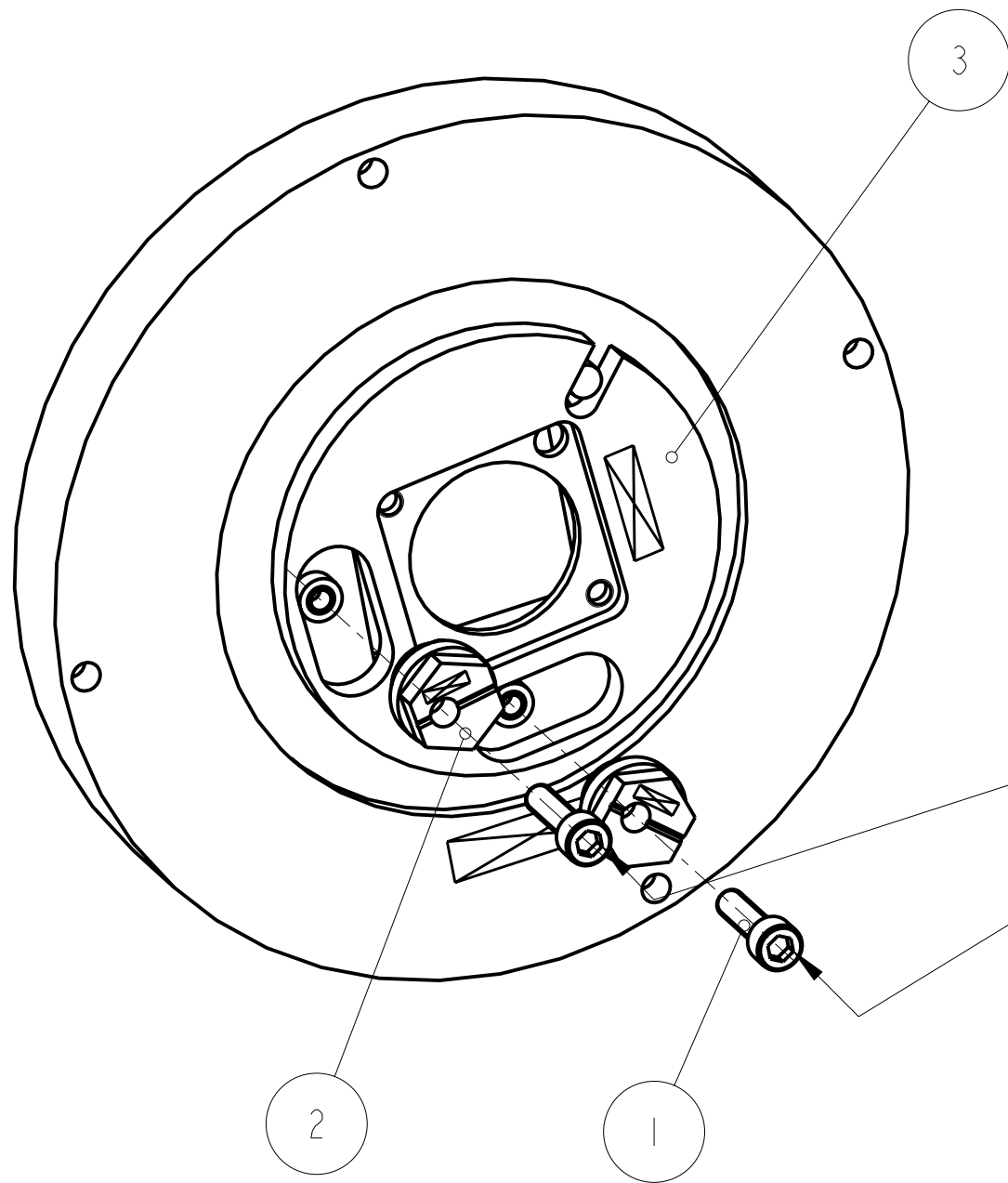


THREAD INSERT INSERTION TOOL
8-32 UNC

HELICOIL CAN FRONT PLATE

1	8-32X1D_UNC_THREAD_INSERT	8-32 x 1D UNC THREAD INSERT	2
2	D080167	CAN FRONT PLATE	1
No.	PART NUMBER	PART DESCRIPTION	NO. REOD
NOTES: (UNLESS OTHERWISE SPECIFIED)			
1.		<p>PROCESS PLAN TO BE USED FOR ASSEMBLY ONLY NOT TO BE USED FOR MANUFACTURE</p>	
		 CALIFORNIA INSTITUTE OF TECHNOLOGY MASSACHUSETTS INSTITUTE OF TECHNOLOGY IGR, GLASGOW UNIVERSITY GEO 600 GROUP RUTHERFORD APPLETON LABORATORIES	
		SYSTEM ADVANCED LIGO	
		SUB-SYSTEM SUS	
		NEXT ASSY QUAD ETM ITM	
		PART NAME PEN-RE MASS REACTION CHAIN	
	NAME	DATE	SIZE
DRAWN	J O'DELL	12/FEB/10	B
CHECKED	J'OD	16/FEB/10	
APPROVED	JOD	16/FEB/10	
		DRG. NO. D060341_PROCESS	REV B.
SCALE 1:1		PROJECTION: 	SHEET 6 OF 1

REV.	DATE	DCN #	DRAWING TREE #



HEX L WRENCH SIZE: 9/64
FINGER TIGHT

ASSEMBLE OSEM X-Y STAGE TO OSEM CAN FRONT PLATE (4 ASSEMBLIES)

No.	PART NUMBER	PART DESCRIPTION	NO. REQD
1	8-32 UNC X 0.625 INCH	8-32 UNC X 0.625" CAP HEAD	2
2	D060336	2MM CAM	2
3	D060348	OSEM TRANSLATION PLATE	1

NOTES: (UNLESS OTHERWISE SPECIFIED)

1. PROCESS PLAN TO BE USED FOR ASSEMBLY ONLY NOT TO BE USED FOR MANUFACTURE

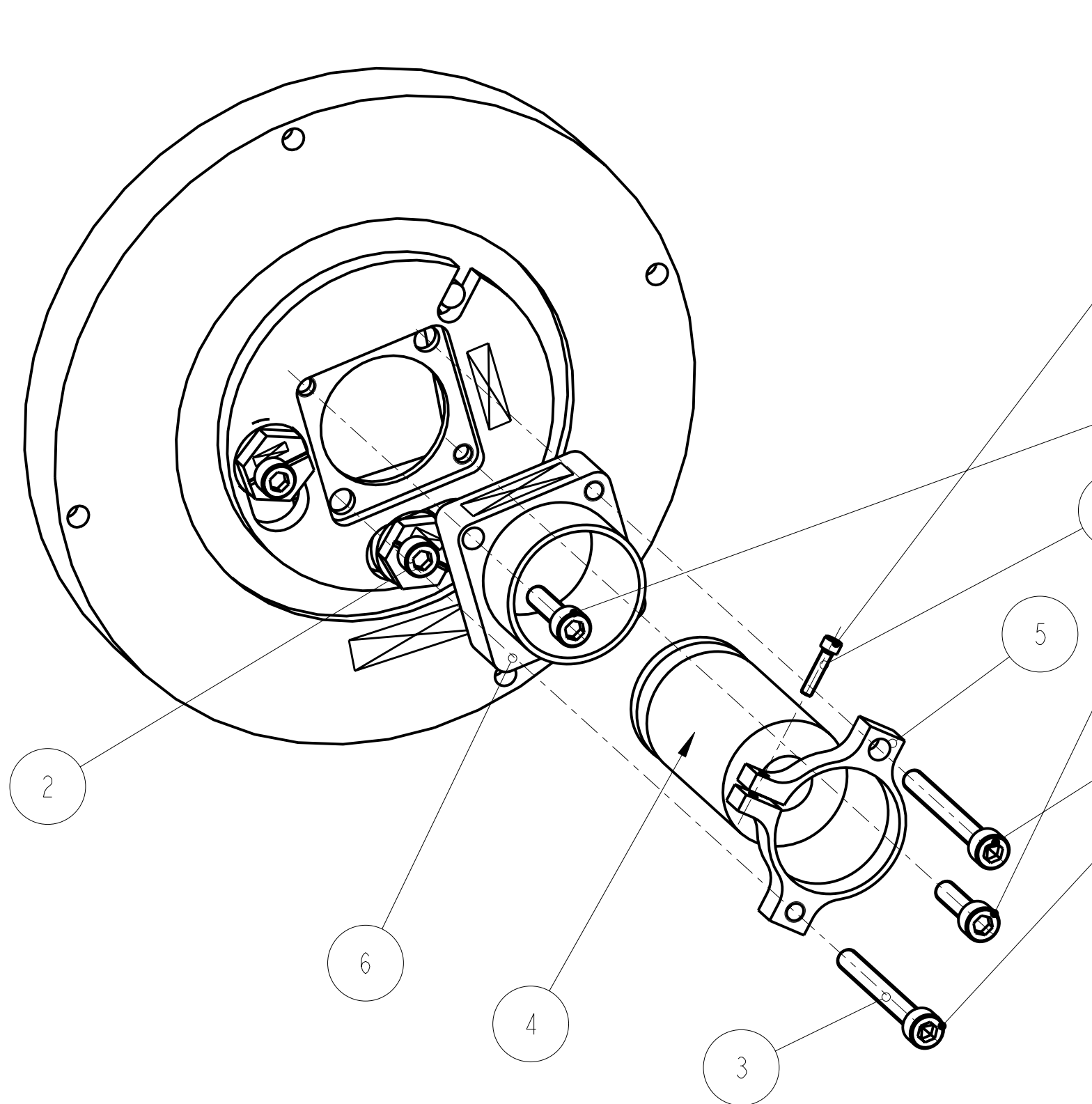
DRAWN	J O'DELL	12/FEB/10
CHECKED	J'OD	16/FEB/10
APPROVED	JOD	16/FEB/10

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 IGR, GLASGOW UNIVERSITY GEO 600 GROUP
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SYSTEM **ADVANCED LIGO**
 SUB-SYSTEM **SUS**
 NEXT ASSY **QUAD ETM ITM**
 PART NAME **PEN-RE MASS REACTION CHAIN**

DRG. NO. **D060341_PROCESS**

SCALE 1:1 PROJECTION: SHEET 7 OF 1



HEX L WRENCH SIZE: 5/64
TORQUE 2LB FT

HEX L WRENCH SIZE: 9/64
TORQUE 5LB FT

HEX L WRENCH SIZE: 9/64
FINGER TIGHT

ASSEMBLE OSEM AND OSEM Z ADJUSTER TO OSEM CAN ASSEMBLY (4 ASSEMBLIES)

No.	PART NUMBER	PART DESCRIPTION	NO. REOD
1	2-56 UNC 0-375 INCH	2-56 UNC X .375" CAP HEAD	1
2	8-32 UNC 0-625 INCH	8-32 UNC X 0.625" CAP HEAD	2
3	8-32 UNC 1-50 INCH	8-32 UNC X 1.5" CAP HEAD	2
4	D000069	LIGO I OSEM	1
5	D060350	CONTROL RING	1
6	D060351	BASE PLATE	1

NOTES: (UNLESS OTHERWISE SPECIFIED)

1. PROCESS PLAN TO BE USED FOR ASSEMBLY ONLY NOT TO BE USED FOR MANUFACTURE

DRAWN	J O'DELL	12/FEB/10
CHECKED	J'OD	16/FEB/10
APPROVED	JOD	16/FEB/10

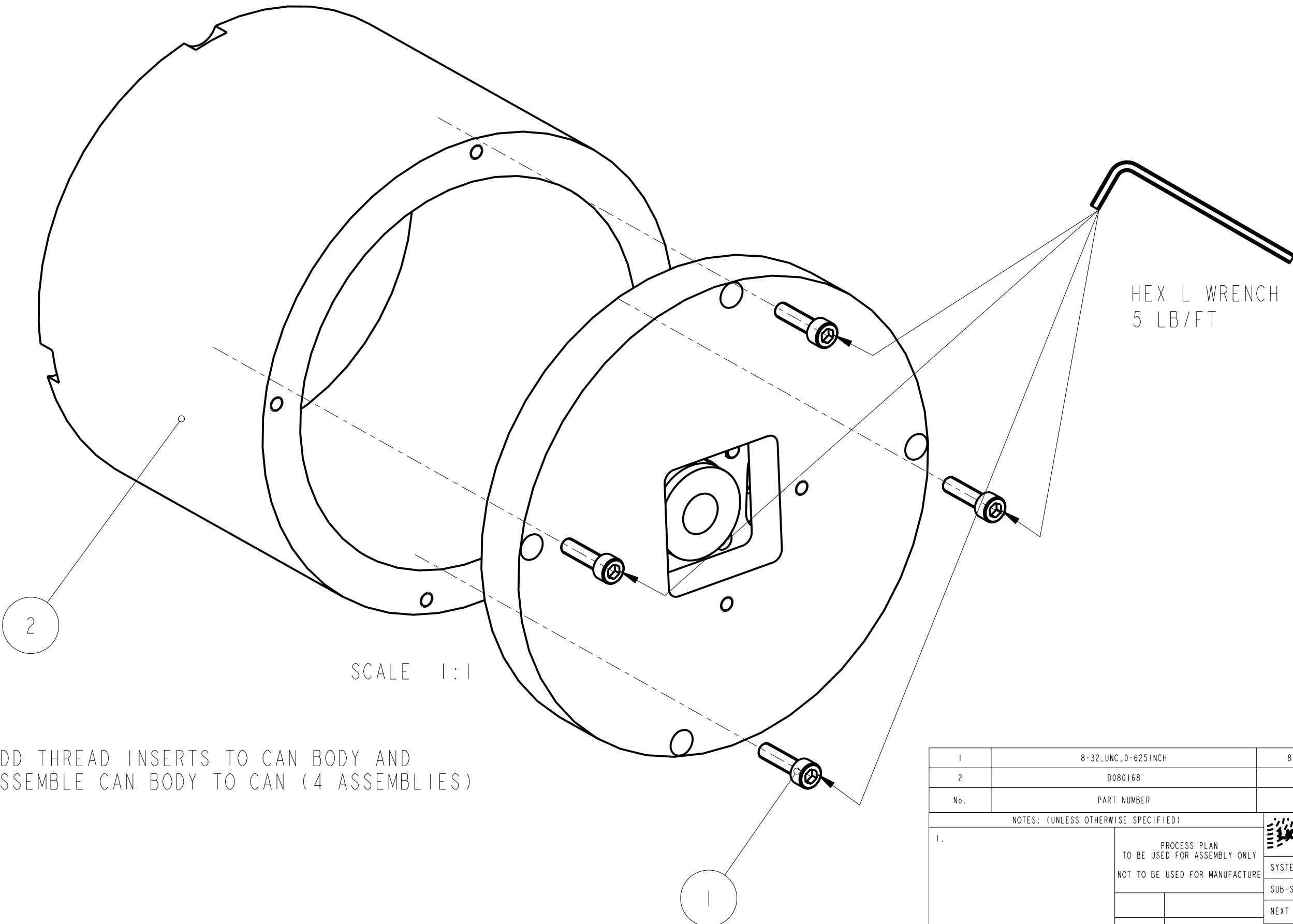
SYSTEM	ADVANCED LIGO
SUB-SYSTEM	SUS
NEXT ASSY	QUAD ETM ITM
PART NAME	PEN-RE MASS REACTION CHAIN
DRG. NO.	D060341_PROCESS

SCALE 1:1 PROJECTION: SHEET 8 OF 1

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RUTHERFORD APPLETON LABORATORIES


D
C
B
A

D
C
B
A

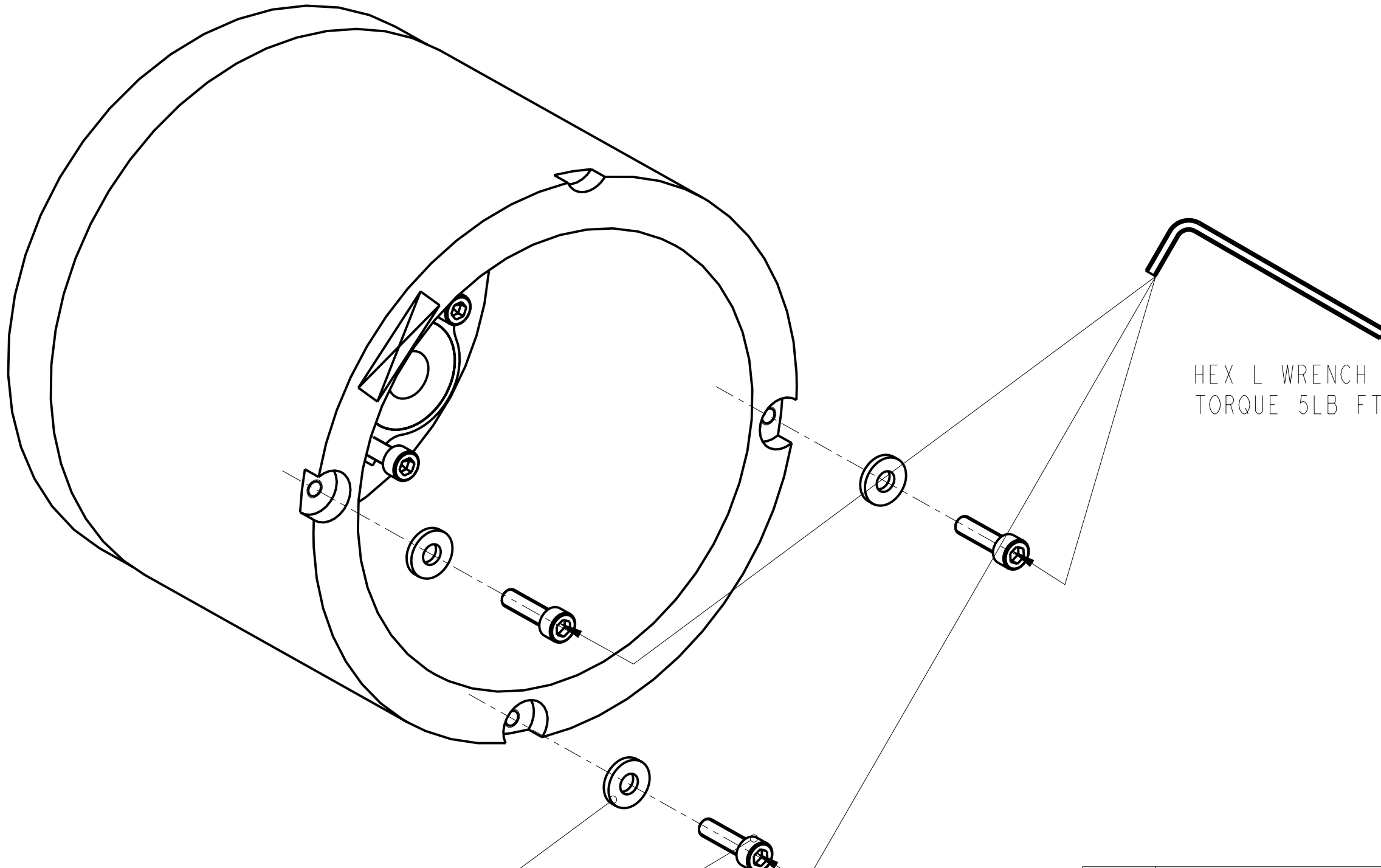


SCALE 1:1

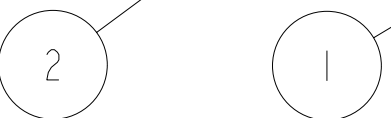
ADD THREAD INSERTS TO CAN BODY AND ASSEMBLE CAN BODY TO CAN (4 ASSEMBLIES)

1	8-32 UNC X 0.625 INCH	8-32 UNC X 0.625" CAP HEAD	4
2	D080168	CAN BODY	1
No.	PART NUMBER	PART DESCRIPTION	NO. REQD
NOTES: (UNLESS OTHERWISE SPECIFIED)			
1.	PROCESS PLAN TO BE USED FOR ASSEMBLY ONLY NOT TO BE USED FOR MANUFACTURE		 CALIFORNIA INSTITUTE OF TECHNOLOGY MASSACHUSETTS INSTITUTE OF TECHNOLOGY IGR, GLASGOW UNIVERSITY GEO 600 GROUP RUTHERFORD APPLETON LABORATORIES
		SYSTEM	ADVANCED LIGO
		SUB-SYSTEM	SUS
		NEXT ASSY	QUAD ETM ITM
		PART NAME	PEN-RE MASS REACTION CHAIN
		SCALE	1:2
		PROJECTION	1st Angle
		SHEET	9 OF 1
		DRG. NO.	D060341_PROCESS
		REV	B.

REV.	DATE	DCN #	DRAWING TREE #



HEX L WRENCH SIZE: 9/64
TORQUE 5LB FT



ADD STOP SCREWS AND WASHERS TO BACK OF OSEM CANS (4 ASSEMBLIES)

No.	PART NUMBER	PART DESCRIPTION	NO. REOD
1	8-32 UNC_0.625 INCH	8-32 UNC X 0.625" CAP HEAD	3
2	8-32 UNC_BIG_WASHER	8-32 UNC WASHER	3

NOTES: (UNLESS OTHERWISE SPECIFIED)

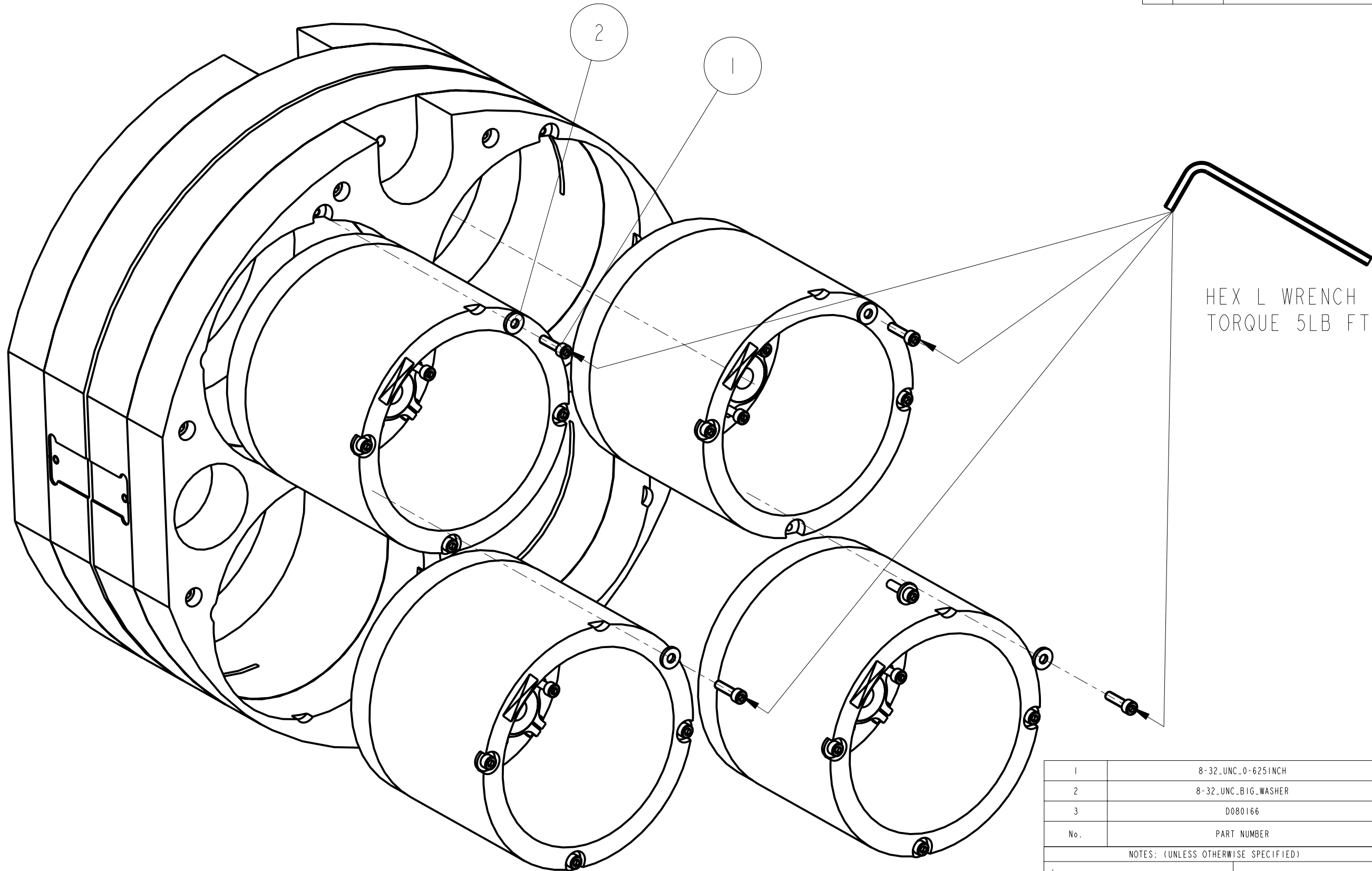
1. PROCESS PLAN TO BE USED FOR ASSEMBLY ONLY NOT TO BE USED FOR MANUFACTURE

DRAWN	J O'DELL	12/FEB/10
CHECKED	J'OD	16/FEB/10
APPROVED	JOD	16/FEB/10

SYSTEM	ADVANCED LIGO
SUB-SYSTEM	SUS
NEXT ASSY	QUAD ETM ITM
PART NAME	PEN-RE MASS REACTION CHAIN
DRG. NO.	D060341_PROCESS

SCALE 1:1 PROJECTION: SHEET 10 OF 4

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ASSEMBLE 4 OSEM CANS TO MASS AND BOLT IN PLACE

No.	PART NUMBER	PART DESCRIPTION	NO. REOD
1	8-32_UNC_0-625INCH	8-32 UNC X 0.625" CAP HEAD	4
2	8-32_UNC_BIG_WASHER	8-32 UNC WASHER	4
3	D080166	ITM OSEM CAN	3

NOTES: (UNLESS OTHERWISE SPECIFIED)

1. PROCESS PLAN TO BE USED FOR ASSEMBLY ONLY NOT TO BE USED FOR MANUFACTURE

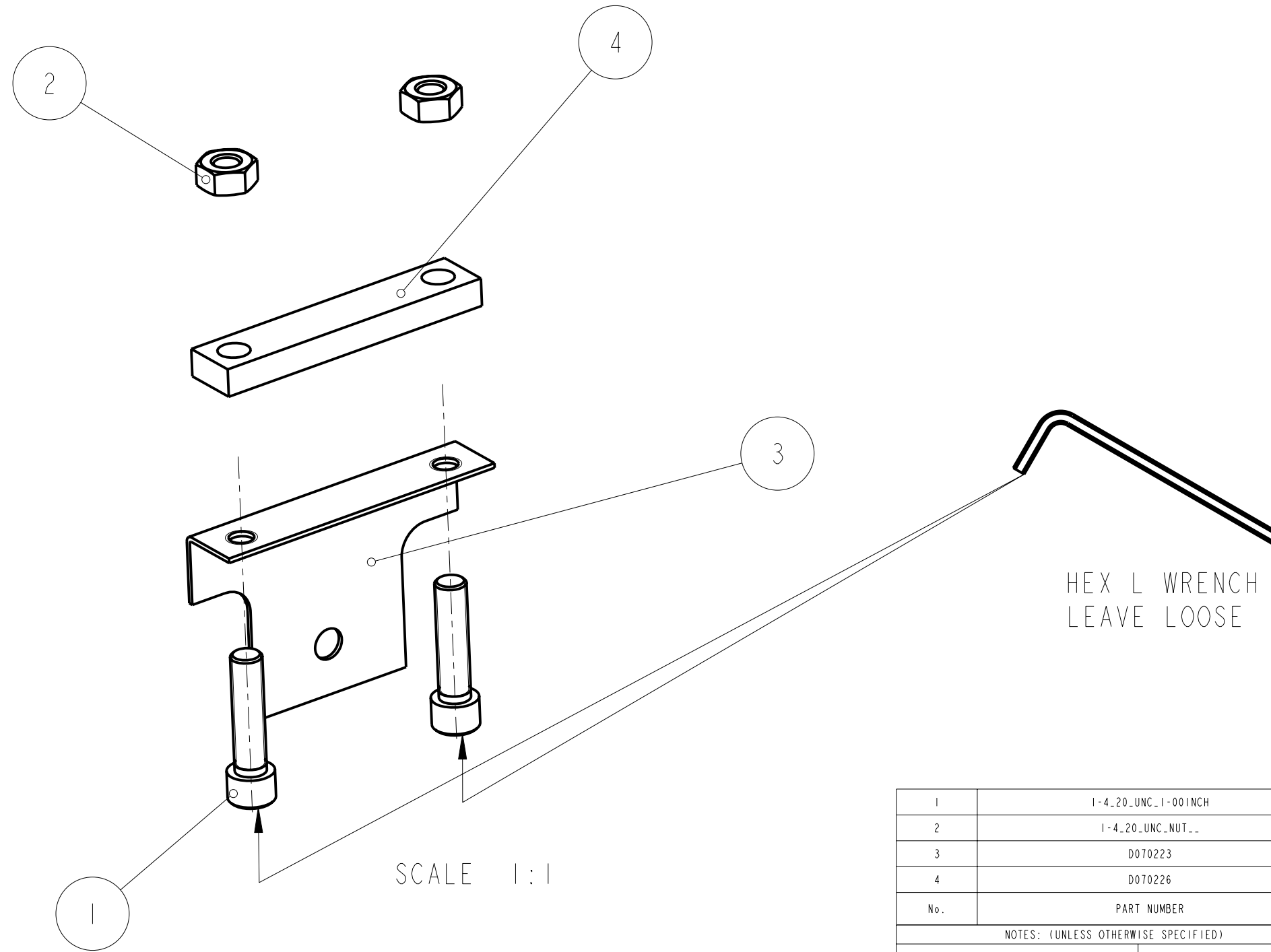
NAME	DATE	SIZE	REV
DRAWN J O'DELL	12/FEB/10	B	B.
CHECKED J'OD	16/FEB/10		
APPROVED JOD	16/FEB/10		

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SYSTEM **ADVANCED LIGO**
 SUB-SYSTEM **SUS**
 NEXT ASSY **QUAD ETM ITM**
 PART NAME **PEN-RE MASS REACTION CHAIN**

DRG. NO. **D060341_PROCESS**
 SCALE 1:2 PROJECTION: SHEET 11 OF 14

REV.	DATE	DCN #	DRAWING TREE #



No.	PART NUMBER	PART DESCRIPTION	NO. REOD
1	1-4_20 UNC_1-00 INCH	1/4" 20 UNC X 1" CAP HEAD	2
2	1-4_20 UNC_NUT_..	1/4 20 UNC NUT	2
3	D070223	PEN RE MASS WIRE CLAMP	1
4	D070226	CABLE CLAMP JAW	1

NOTES: (UNLESS OTHERWISE SPECIFIED)

1. PROCESS PLAN TO BE USED FOR ASSEMBLY ONLY NOT TO BE USED FOR MANUFACTURE

NAME	DATE
DRAWN J O'DELL	12/FEB/10
CHECKED J'OD	16/FEB/10
APPROVED JOD	16/FEB/10

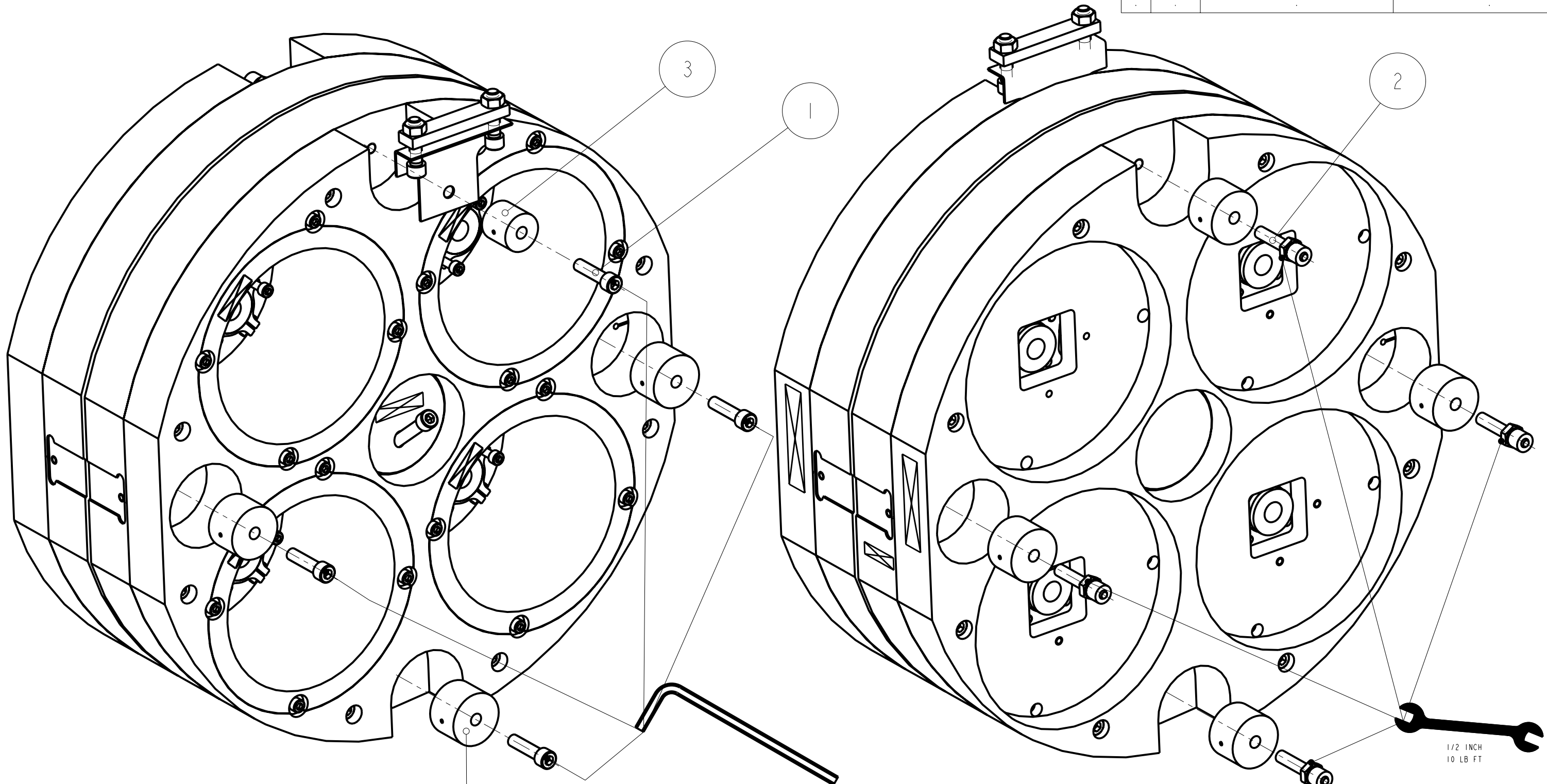
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 IGR, GLASGOW UNIVERSITY GEO 600 GROUP
 RUTHERFORD APPLETON LABORATORIES

SYSTEM **ADVANCED LIGO**
 SUB-SYSTEM **SUS**
 NEXT ASSY **QUAD ETM ITM**
 PART NAME **PEN-RE MASS REACTION CHAIN**

DRG. NO. **D060341_PROCESS** REV **B.**
 SCALE 1:2 PROJECTION: SHEET 12 OF 14

D
C
B
A



D
C
B
A

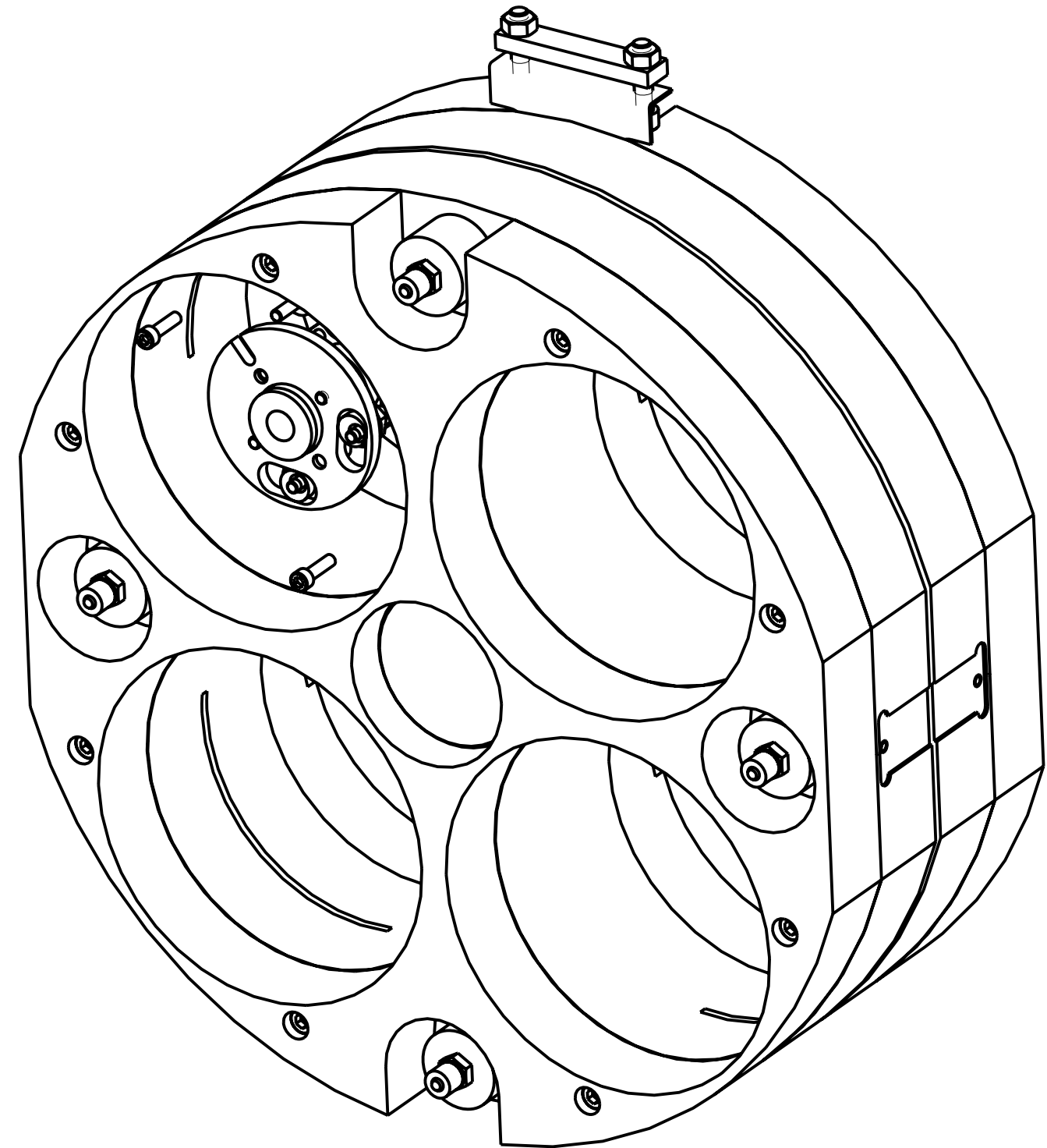
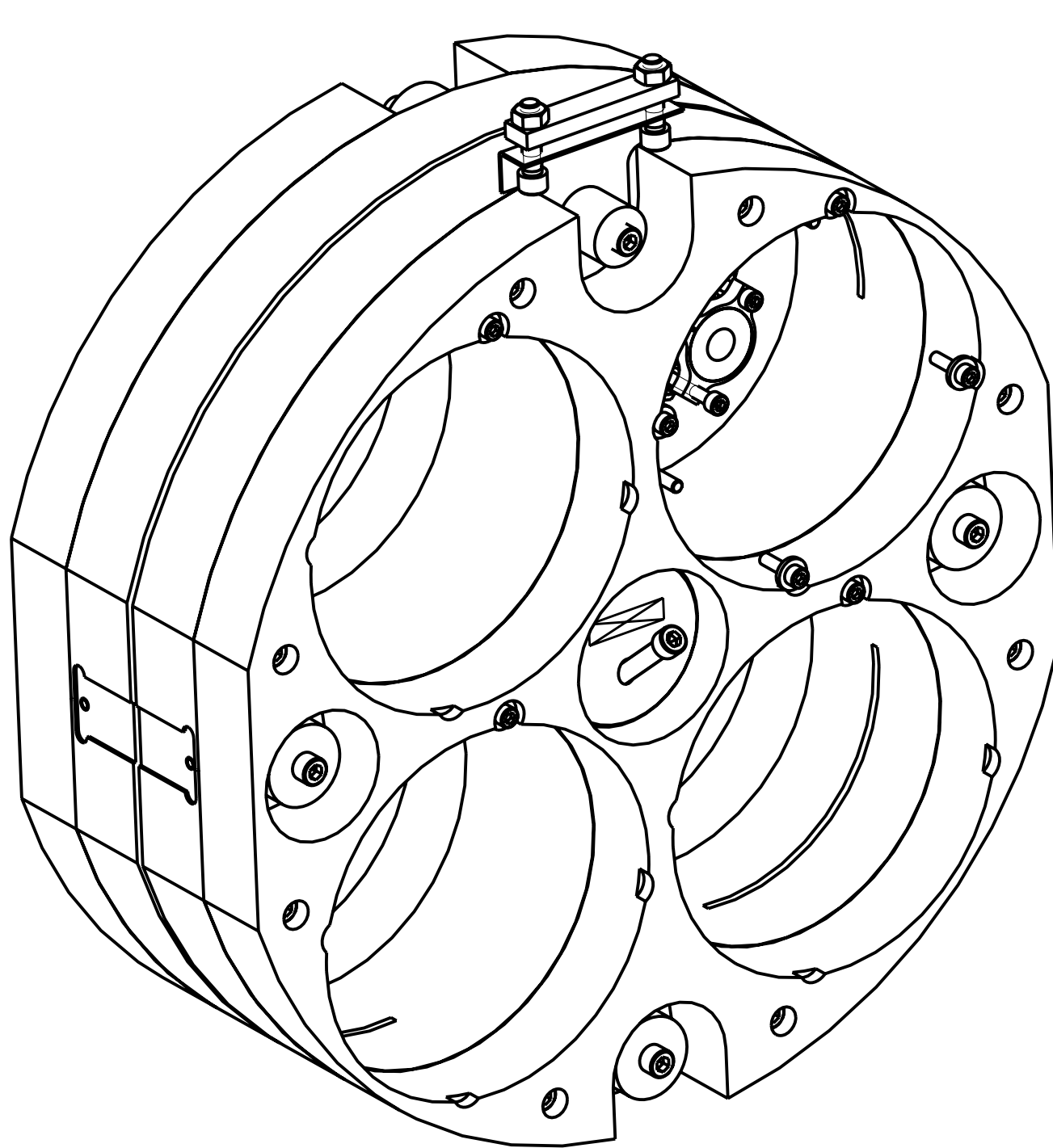


ADD ADDABLE/REMOVABLE MASS


HEX L WRENCH SIZE: 3/16
10 LB FT

1	I-4_20 UNC_1-001NCH_SIL_PLT	1/4" 20 UNC X 1" CAP HEAD SILVER PLATED	4
2	D080240	PEN RE MASS BUMP STOP ASM	3
3	D060359-050_0	ADDITIONAL MASS	1
4	D060359-100_0	ADDITIONAL MASS	7
No.	PART NUMBER	PART DESCRIPTION	NO. REQD

NOTES: (UNLESS OTHERWISE SPECIFIED)		 CALIFORNIA INSTITUTE OF TECHNOLOGY MASSACHUSETTS INSTITUTE OF TECHNOLOGY IGR, GLASGOW UNIVERSITY GEO 600 GROUP RUTHERFORD APPLETON LABORATORIES	
1.		PROCESS PLAN TO BE USED FOR ASSEMBLY ONLY NOT TO BE USED FOR MANUFACTURE	
		SYSTEM	ADVANCED LIGO
		SUB-SYSTEM	SUS
		NEXT ASSY	QUAD ETM ITM
		PART NAME	PEN-RE MASS REACTION CHAIN
SCALE	1:2	DRG. NO.	D060341_PROCESS
PROJECTION		SHEET	13 OF 14



FINISHED PEN RE MASS

NOTES: (UNLESS OTHERWISE SPECIFIED)		 CALIFORNIA INSTITUTE OF TECHNOLOGY MASSACHUSETTS INSTITUTE OF TECHNOLOGY IGR, GLASGOW UNIVERSITY GEO 600 GROUP RUTHERFORD APPLETON LABORATORIES	
1.	PROCESS PLAN TO BE USED FOR ASSEMBLY ONLY NOT TO BE USED FOR MANUFACTURE	SYSTEM	ADVANCED LIGO
		SUB-SYSTEM	SUS
		NEXT ASSY	QUAD N-PTYPE
		PART NAME	PEN-RE MASS REACTION CHAIN
		SIZE	B
		DRG. NO.	D060341_PROCESS
		SCALE	1:2
		PROJECTION	First Angle
		SHEET	14 OF 14

D
C
B
A

D
C
B
A

8 7 6 5 4 3 2 1