


STEP	DESCRIPTION	PART#	QTY	TIME
1	BOLT D1000574 TOOLING TO OPTICS BENCH	SURFACE_TABLE	1	0.08
		TD-1084-038	1	
2	ADD BLADE CLAMP HELICOILS	1-4_20X1-5D_UNC_THREAD_INSERT	5	
		3-8_16X1-5D_UNC_THREAD_INSERT	4	
		D060326-000	1	
3	ASSEMBLE BLADE TO BLADE CLAMP INDEPENDANTLY OF ANT TOOLING	3-8_16_UNC_1-75_INCH	2	0.08
		3-8_INCH_WASHER	2	
		D060235	1	
		D060327_000	1	
4	ADD INTERFACE PIECE TO UNDERSIDE OF CLAMP AND BOLT IN PLACE	3-8_16_UNC_2-00INCH	2	0.08
		3-8_INCH_WASHER	2	
		D060367	1	
5	BOLT BLADE CLAMP ASSEMBLY INTO BLADE STREIGHTENING TOOLING	3-8_16_UNC_1-25INCH	2	
6	DRAW THE BLADE FLAT	D060235_FLAT	1	
7	HELICOIL ROTATIONAL ADJUSTER	1-4_20X1-5D_UNC_THREAD_INSERT	1	
		D060330	1	
8	ADD ROTATETIONAL ADJUSTMENT PLATE, AND BOLT IN PLACE	1-4_20_UNC_1-00INCH	5	0.08
9	HELICOIL BACKBONE	3-8_16X1-5D_UNC_THREAD_INSERT	1	
		D060329	1	
10	HELICOIL ROTATIONAL ADJUSTER BRACKET	1-4_20X1-5D_UNC_THREAD_INSERT	1	
		D060325	1	
11	ADD BLADE TIP STOP AND ROTATIONAL ADJUSTER BRACKET TO TS STIFF BACK	1-4_20_UNC_1-25INCH	2	0.08
		D060331	1	
12	ASSEMBLE BACKBONE TO THE REST OF THE BLADE CARTRIDGE	3-8_16_UNC_3-00INCH	2	
13	ADD TEMPORARY CLAMP	3-8_16_UNC_3-5INCH	2	0.08
		D060368	1	
14	REMOVE BLADE CARTRIDGE FROM TOOLING	3-8_16_UNC_1-25INCH	2	0.08
15	HELICOIL TEE-NUTS	3-8_16X1D_UNC_THREAD_INSERT	2	
		D060328	2	

16	BOLT TS ASSEMBLY TOGETHER WITH CAP SCREWS AND TEE-NUTS	3-8_16_UNC_3-00INCH	2	0.08
17	REMOVE REMAINING TOOLING	3-8_16_UNC_3-00INCH	2	0.08
		3-8_16_UNC_3-5INCH	2	
		D060367	1	
		D060368	1	
18	ADD ROTATIONAL ADJUSTER SCREWS	1-4_20_UNC_1-00INCH_ROUND_	1	0.08
		1-4_20_UNC_1-5INCH	1	

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	SYSTEM	aLIGO
	NOT TO BE USED FOR MANUFACTURE	SUB-SYSTEM	SUS
		NEXT ASSY	QUAD
		PART NAME	TS ASSEMBLY PROCEDURE QUAD TS AND TOOLING
	NAME	DATE	SIZE
DRAWN	J O'DELL	17/MAR/10	B
CHECKED	J'OD	18/MAR/10	DRG. NO.
APPROVED	JOD	18/MAR/10	D060370_ASM_PROCEDURE
	SCALE	PROJECTION	SHEET 1 OF 1

1

2


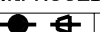
HEX L WRENCH SIZE: 3/16  
TORQUE 10LB FT

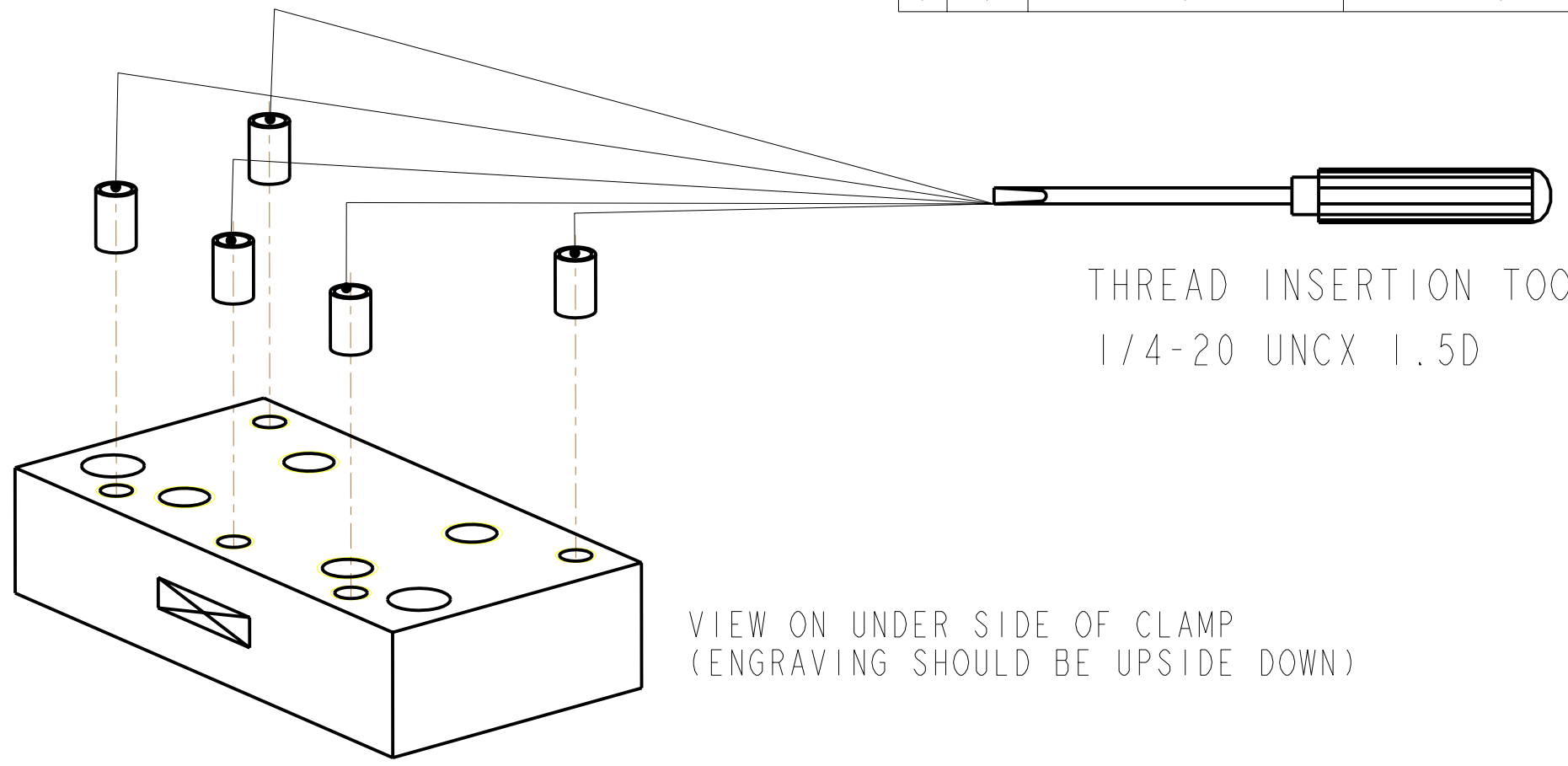
**WARNING**

A DANGEROUS LEVEL OF ENERGY IS STORED IN THE BLADE THROUGH MOST OF THIS PROCEDURE, GIVING IT THE POTENTIAL TO CAUSE SEIOUS INJURY. TO AVOID INJURY, THE ASSEMBLY INSTRUCTIONS SHOULD BE FOLLWED EXACTLY THROUGHOUT THE PROCEDURE!

**NOTE:**

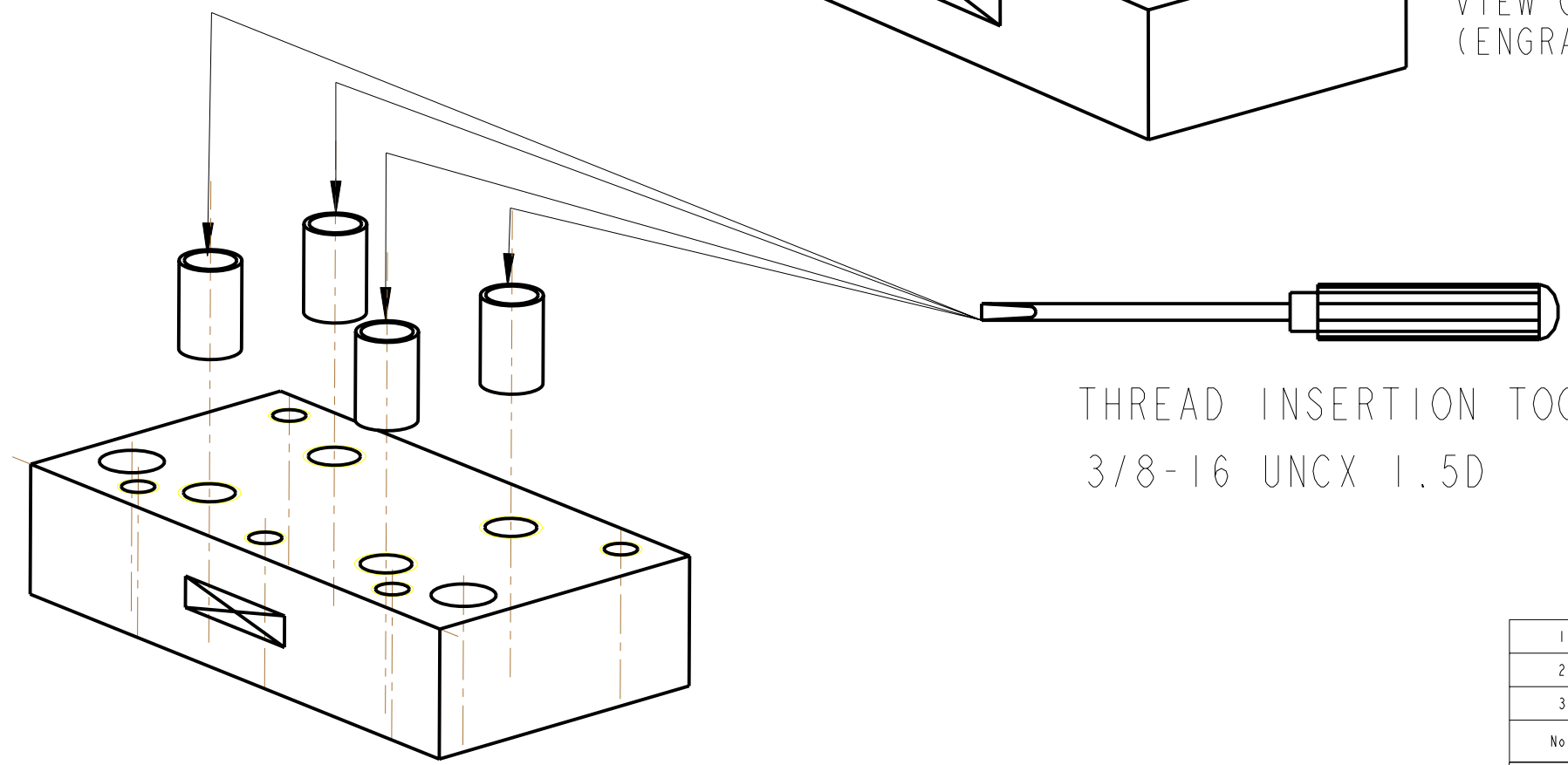
START WITH ASSEMBLY D1000574  
BOLT D1000574 TOOLING TO OPTICS BENCH  
USING SCREWS SHOWN IN THIS VIEW

1	SURFACE TABLE	1
2	TD-1084-038	STREIGHTENING ASSEMBLY
No.	PART NUMBER	PART DESCRIPTION
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 1GR, GLASGOW UNIVERSITY GEO 600 GROUP RUTHERFORD APPLETON LABORATORIES
		SYSTEM <b>aLIGO</b>
		SUB-SYSTEM <b>SUS</b>
		NEXT ASSY <b>QUAD</b>
		PART NAME <b>TS ASSEMBLY PROCEDURE QUAD TS AND TOOLING</b>
	NAME DATE	SIZE
DRAWN	J O'DELL 02/11/09	B
CHECKED	J'OD 18/MAR/10	
APPROVED	JOD 18/MAR/10	
		DRG. NO. <b>D060370_ASM_PROCEDURE</b>
		SCALE 1:5 PROJECTION:  SHEET 2 OF 1



THREAD INSERTION TOOL  
1/4-20 UNC X 1.5D

VIEW ON UNDER SIDE OF CLAMP  
(ENGRAVING SHOULD BE UPSIDE DOWN)



THREAD INSERTION TOOL  
3/8-16 UNC X 1.5D

ADD BLADE CLAMP HELICOILS

VIEW ON TOP SIDE OF CLAMP

1	1-4_20X1-5D_UNC_THREAD_INSERT	1/4-20 x 1.5D UNC THREAD INSERT	5
2	3-8_16X1-5D_UNC_THREAD_INSERT	3/8-16 x 1.5D UNC THREAD INSERT	4
3	D060326-000	BLADE CLAMP	1
No.	PART NUMBER	PART DESCRIPTION	NO. REQD

NOTES: (UNLESS OTHERWISE SPECIFIED)

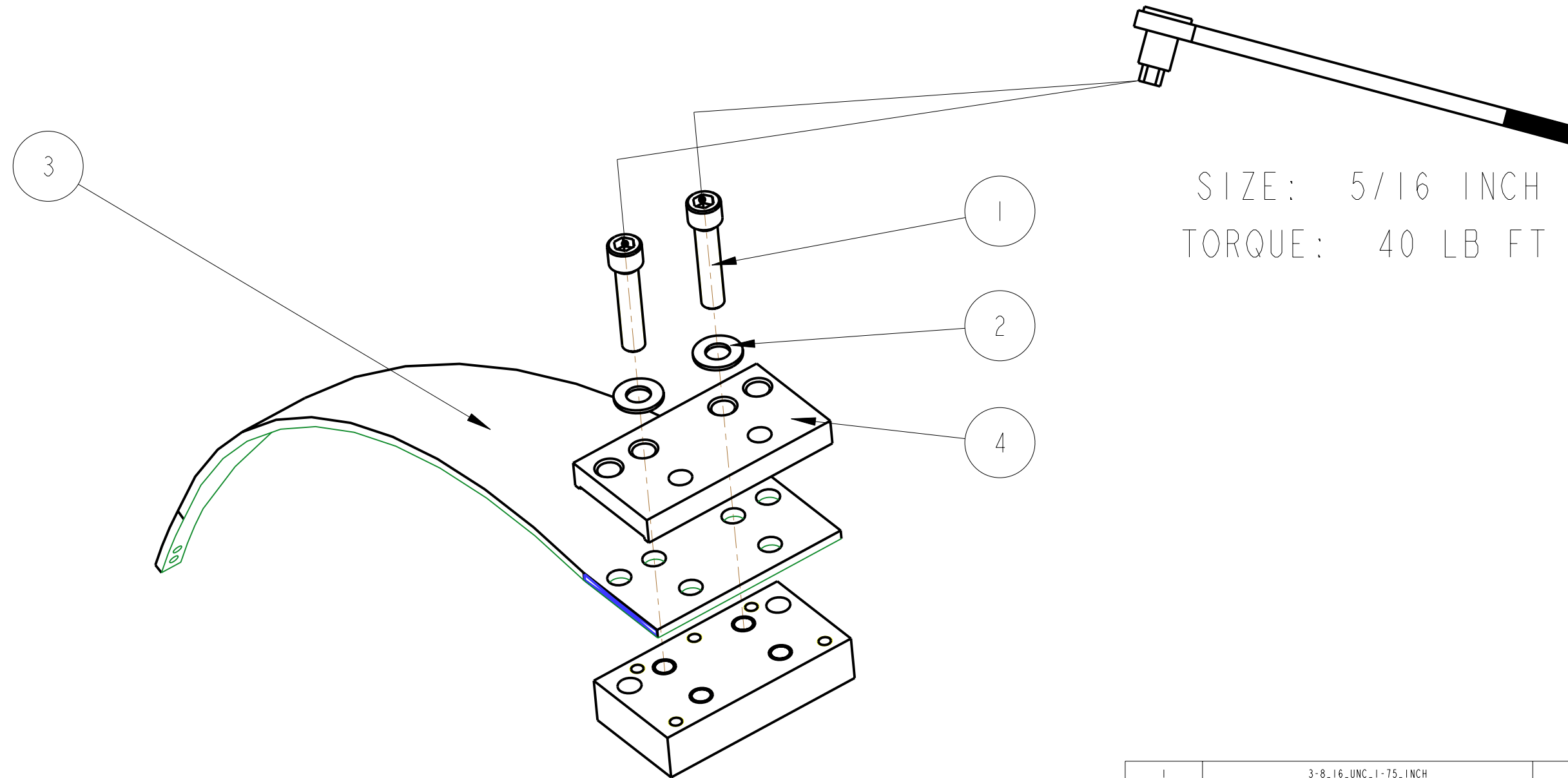
1. PROCESS PLAN TO BE USED FOR ASSEMBLY ONLY NOT TO BE USED FOR MANUFACTURE

NAME	DATE	SYSTEM	aLIGO
DRAWN	J O'DELL	10/11/09	
CHECKED	J O'D	18/MAR/10	
APPROVED	JOD	18/MAR/10	

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MASSACHUSETTS INSTITUTE OF TECHNOLOGY  
IGR, GLASGOW UNIVERSITY GEO 600 GROUP  
RUTHERFORD APPLETON LABORATORIES

SYSTEM aLIGO  
SUB-SYSTEM SUS  
NEXT ASSY QUAD  
PART NAME TS ASSEMBLY PROCEDURE  
QUAD TS AND TOOLING

SCALE 1:1 PROJECTION: SHEET 3 OF 1



SIZE: 5/16 INCH  
 TORQUE: 40 LB FT

ASSEMBLE BLADE TO BLADE CLAMP INDEPENDANTLY OF ANT TOOLING

No.	PART NUMBER	PART DESCRIPTION	NO. REOD
1	3-8_16 UNC_1-75_1 INCH	3/8-16 UNC X 1.75" CAP HEAD	2
2	3-8_1 INCH_WASHER	3/8 FLAT WASHER	2
3	D060235	TOP STAGE BLADES	1
4	D060327_000	BLADE CLAMP	1

NOTES: (UNLESS OTHERWISE SPECIFIED)

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

SYSTEM	aLIGO
SUB-SYSTEM	SUS
NEXT ASSY	QUAD
PART NAME	TS ASSEMBLY PROCEDURE QUAD TS AND TOOLING

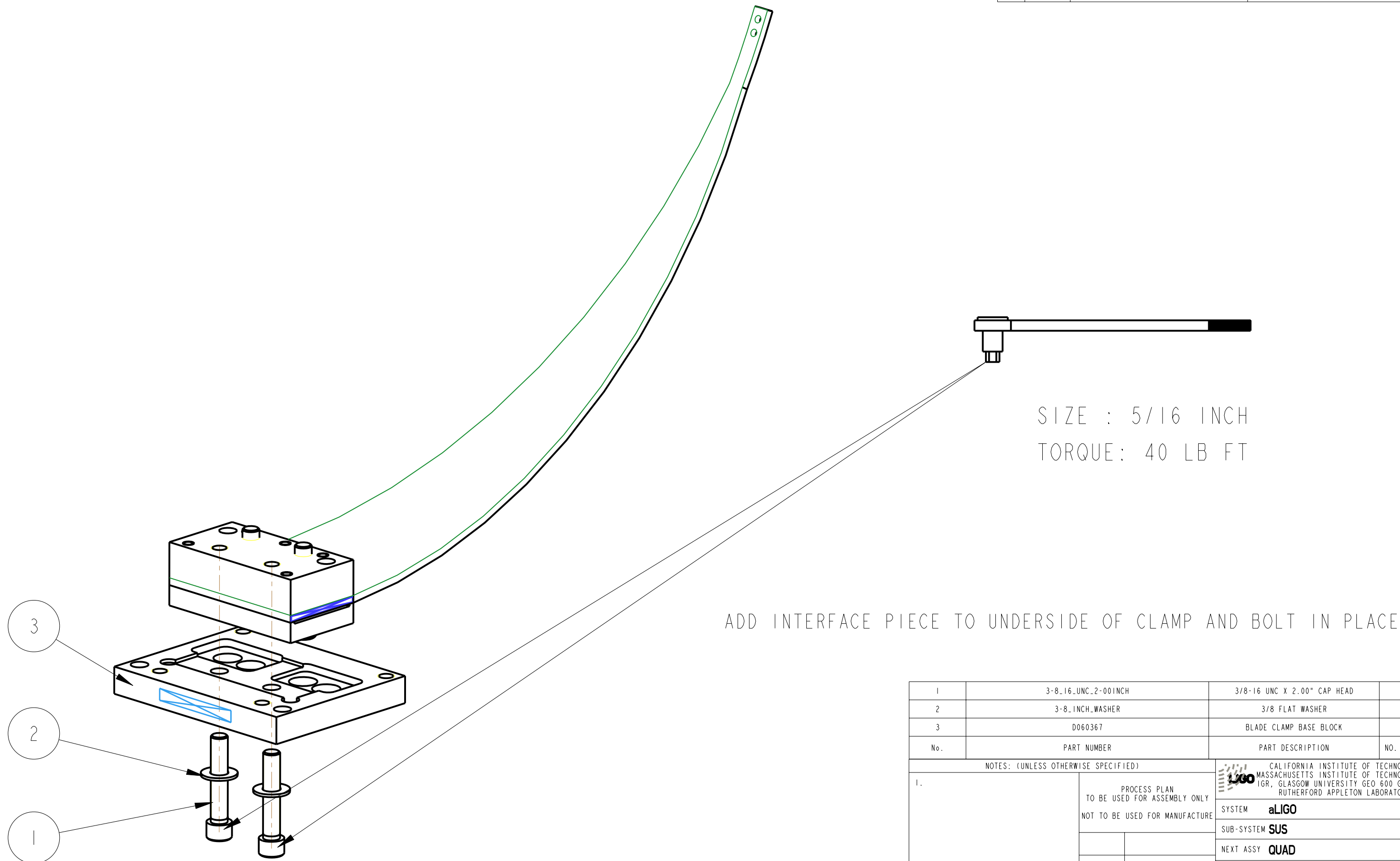
DRAWN	J O'DELL	02/11/09
CHECKED	J'OD	18/MAR/10
APPROVED	JOD	18/MAR/10

SCALE 1:2 PROJECTION: SHEET 4 OF 1

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 IGR, GLASGOW UNIVERSITY GEO 600 GROUP  
 RUTHERFORD APPLETON LABORATORIES

DRG. NO. D060370\_ASM\_PROCEDURE  
 REV. A.

REV.	DATE	DCN #	DRAWING TREE #



No.	PART NUMBER	PART DESCRIPTION	NO. REOD
1	3-8_16 UNC_2-00 INCH	3/8-16 UNC X 2.00" CAP HEAD	2
2	3-8_1 INCH_WASHER	3/8 FLAT WASHER	2
3	D060367	BLADE CLAMP BASE BLOCK	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	02/11/09
CHECKED J'OD	18/MAR/10
APPROVED JOD	18/MAR/10

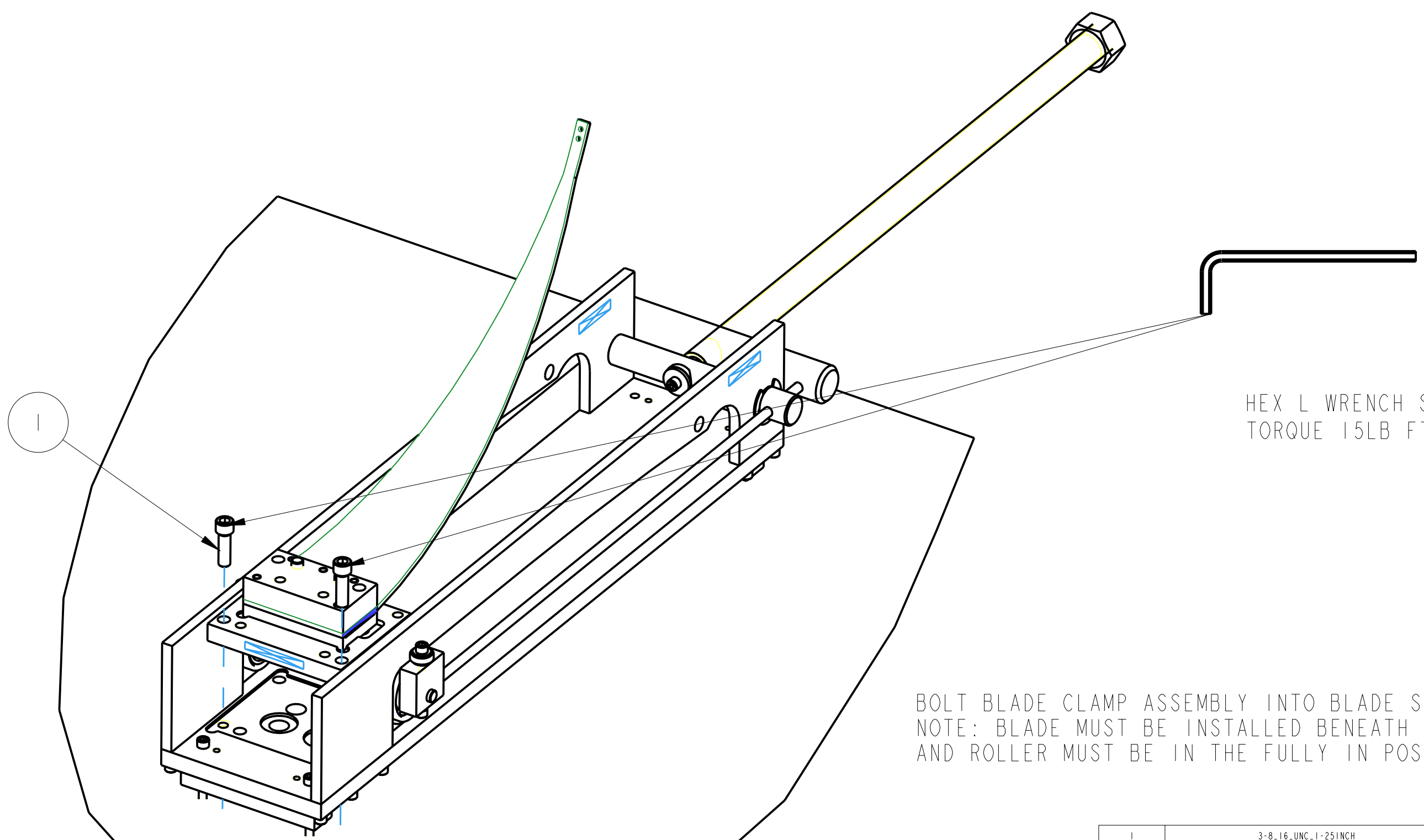
SYSTEM	aLIGO
SUB-SYSTEM	SUS
NEXT ASSY	QUAD
PART NAME	TS ASSEMBLY PROCEDURE QUAD TS AND TOOLING

SCALE	1:2	PROJECTION		SHEET	5 OF 1
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**MIT** CALIFORNIA INSTITUTE OF TECHNOLOGY  
 MASSACHUSETTS INSTITUTE OF TECHNOLOGY  
 IGR, GLASGOW UNIVERSITY GEO 600 GROUP  
 RUTHERFORD APPLETON LABORATORIES


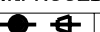
DRG. NO. **D060370\_ASM\_PROCEDURE** REV. **A.**

REV.	DATE	DCN #	DRAWING TREE #



HEX L WRENCH SIZE: 5/16  
TORQUE 15LB FT

BOLT BLADE CLAMP ASSEMBLY INTO BLADE STREIGHTENING TOOLING  
NOTE: BLADE MUST BE INSTALLED BENEATH ROLLER,  
AND ROLLER MUST BE IN THE FULLY IN POSITION

1	3-8.16 UNC 1-25 INCH	3/8 16 UNC X 1.25" CAP HEAD	2
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	aLIGO
		SUB-SYSTEM	SUS
		NEXT ASSY	QUAD
		PART NAME	TS ASSEMBLY PROCEDURE QUAD TS AND TOOLING
	NAME	DATE	SIZE
	DRAWN J O'DELL	02/11/09	B
	CHECKED J'OD	18/MAR/10	DRG. NO. D060370_ASM_PROCEDURE
	APPROVED JOD	18/MAR/10	REV A.
SCALE 3:10 PROJECTION:  SHEET 6 OF 1			

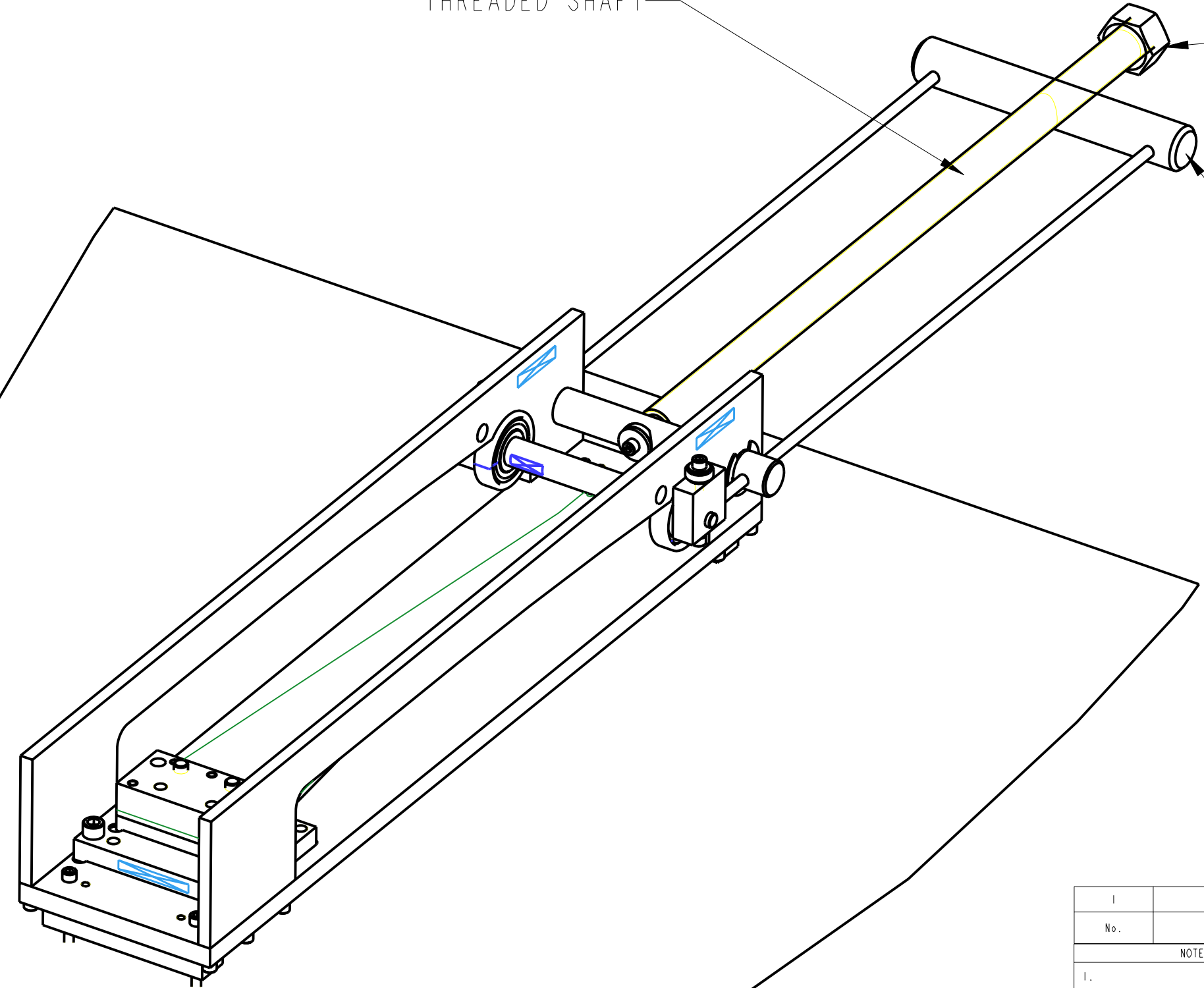
D  
C  
B  
A

D  
C  
B  
A



THREADED SHAFT



BLADE STRAIGHTENER HANDLE

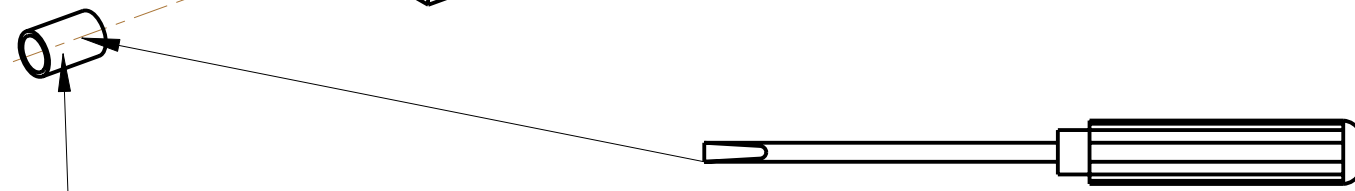
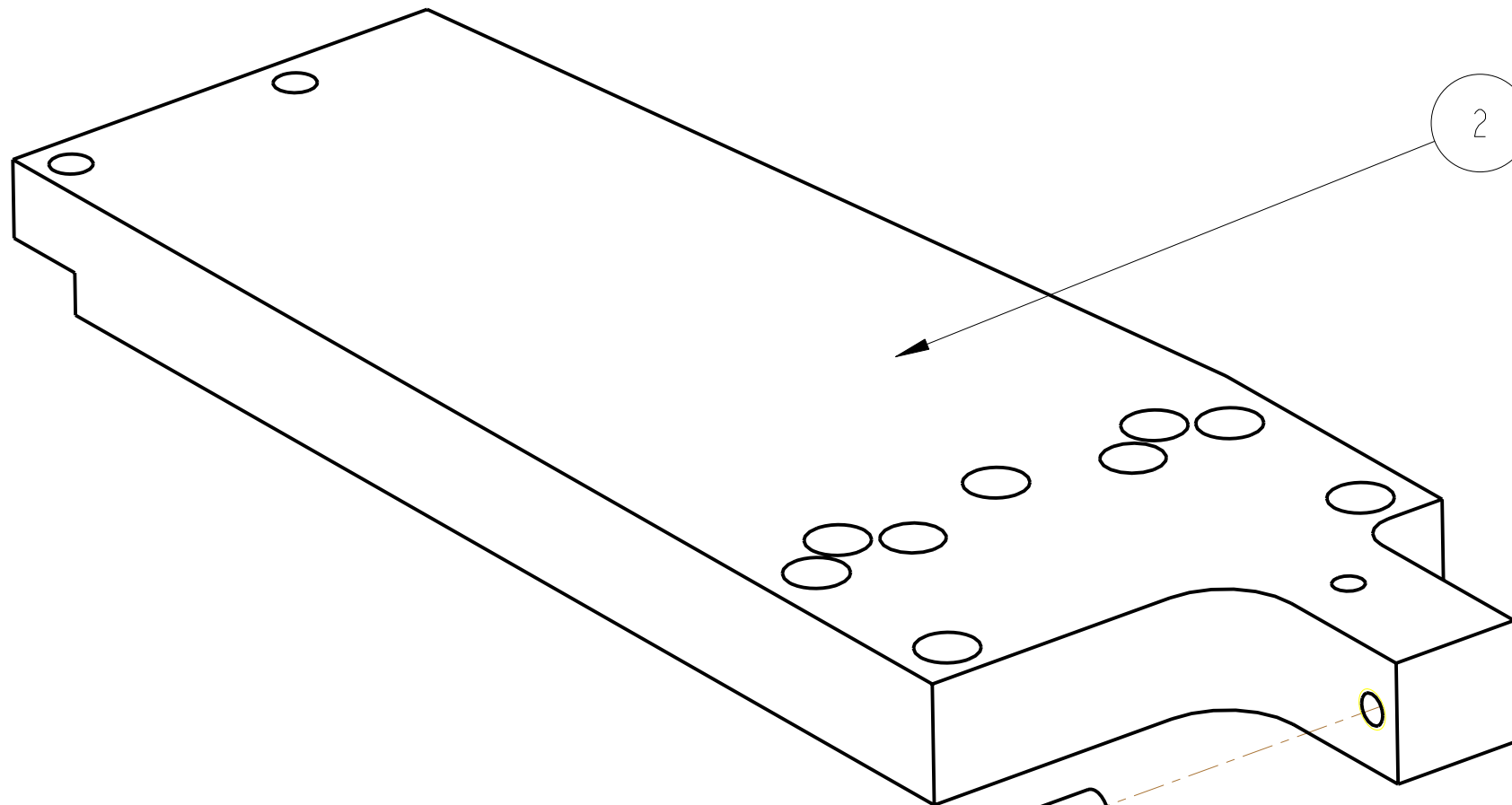


DRAW THE BLADE FLAT  
THIS IS DONE BY TURNING THE  
THREADED SHAFT, SUCH THAT  
THE BLADE STRAIGHTENER  
HANDLE IS WOUND OUT

I	D060235_FLAT	TOP STAGE BLADES	I
No.	PART NUMBER	PART DESCRIPTION	NO. REOD
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 <b>aLIGO</b>	
		SUB-SYSTEM <b>SUS</b>	
		NEXT ASSY <b>QUAD</b>	
		PART NAME <b>TS ASSEMBLY PROCEDURE QUAD TS AND TOOLING</b>	
	NAME	DATE	SIZE
DRAWN	J O'DELL	02/11/09	B
CHECKED	J'OD	18/MAR/10	
APPROVED	JOD	18/MAR/10	
		DRG. NO. <b>D060370_ASM_PROCEDURE</b>	
		SCALE 3:10 PROJECTION:  SHEET 7 OF 1	

8 7 6 5 4 3 2 1

REV.	DATE	DCN #	DRAWING TREE #




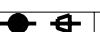
HELICOIL ROTATIONAL ADJUSTER

1/4 UNC  
THREAD INSERTION TOOL

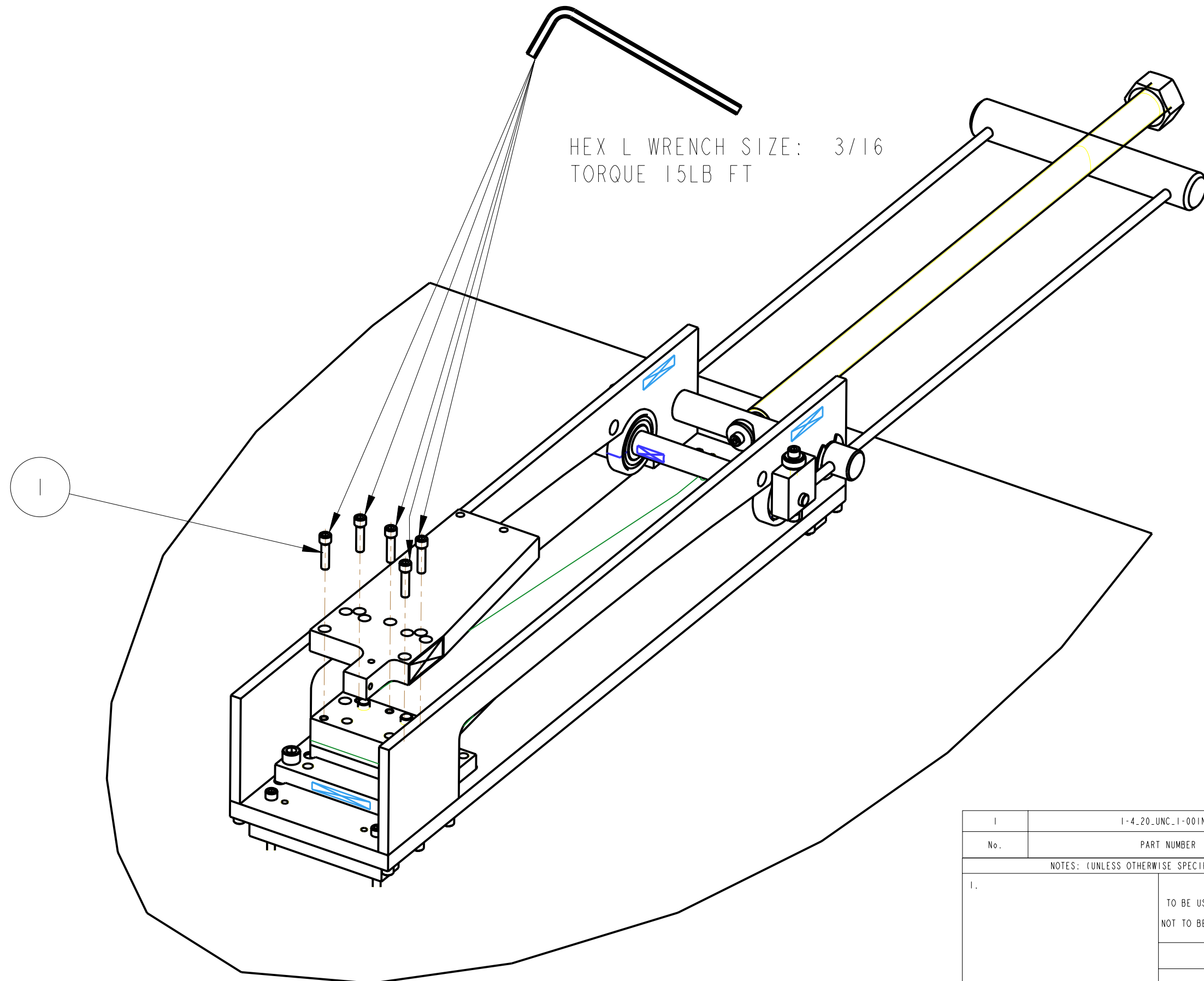
1	1-4_20X1-5D_UNC_THREAD_INSERT	1/4-20 x 1.5D UNC THREAD INSERT	1
2	D060330	ROTATIONAL ADJUSTER	1
No.	PART NUMBER	PART DESCRIPTION	NO. REOD



NOTES: (UNLESS OTHERWISE SPECIFIED)

1.

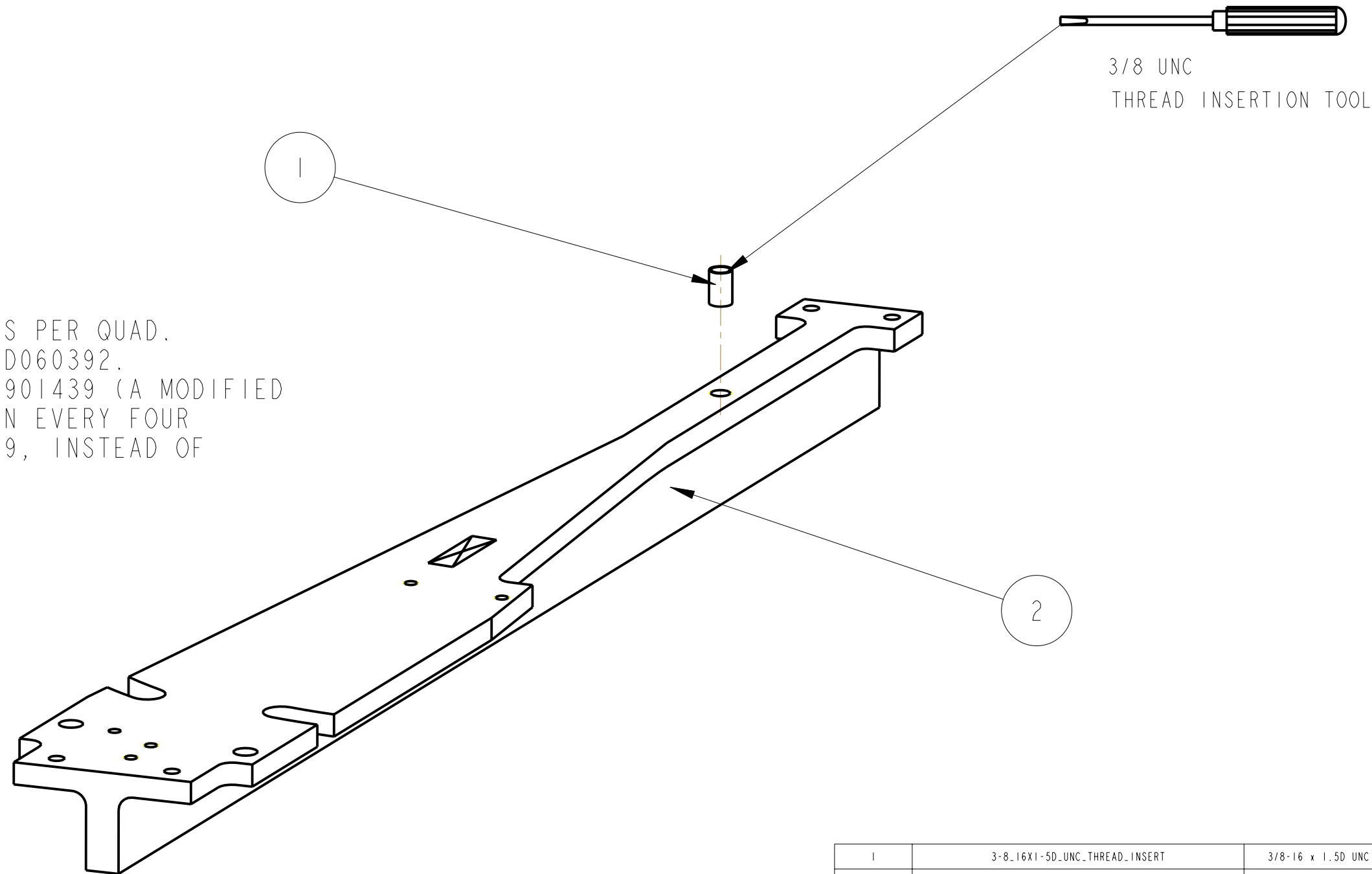
PROCESS PLAN TO BE USED FOR ASSEMBLY ONLY NOT TO BE USED FOR MANUFACTURE		 CALIFORNIA INSTITUTE OF TECHNOLOGY MASSACHUSETTS INSTITUTE OF TECHNOLOGY IGR, GLASGOW UNIVERSITY GEO 600 GROUP RUTHERFORD APPLETON LABORATORIES
SYSTEM <b>aLIGO</b>		
SUB-SYSTEM <b>SUS</b>		
NEXT ASSY <b>QUAD</b>		
PART NAME <b>TS ASSEMBLY PROCEDURE QUAD TS AND TOOLING</b>		SIZE <b>B</b> DRG. NO. <b>D060370_ASM_PROCEDURE</b> REV <b>A.</b> SCALE 1:1 PROJECTION:  SHEET 8 OF 1
DRAWN	J O'DELL 18/03/10	
CHECKED	J'OD 18/MAR/10	
APPROVED	JOD 18/MAR/10	





1	1-4_20_UNC_1-001NCH	1/4" 20 UNC X 1" CAP HEAD	5
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 1GR, GLASGOW UNIVERSITY GEO 600 GROUP RUTHERFORD APPLETON LABORATORIES
		SYSTEM	aLIGO
		SUB-SYSTEM	SUS
		NEXT ASSY	QUAD
		PART NAME	TS ASSEMBLY PROCEDURE QUAD TS AND TOOLING
	NAME	DATE	SIZE
	DRAWN J O'DELL	02/11/09	B
	CHECKED J'OD	18/MAR/10	DRG. NO. D060370_ASM_PROCEDURE
	APPROVED JOD	18/MAR/10	REV A.
SCALE 3:10 PROJECTION:  SHEET 9 OF 11			

REV.	DATE	DCN #	DRAWING TREE #



NOTE:

THERE ARE FOUR TOP STAGE UNITS PER QUAD.  
 THREE OF THESE USE PART 2 AS D060392.  
 IN ONE INSTANCE, PART 2 IS D0901439 (A MODIFIED  
 BACKBONE VERSION) MAKE ONE IN EVERY FOUR  
 TOP STAGE UNITS USING D0901439, INSTEAD OF  
 D060329, SHOWN IN THIS VIEW.

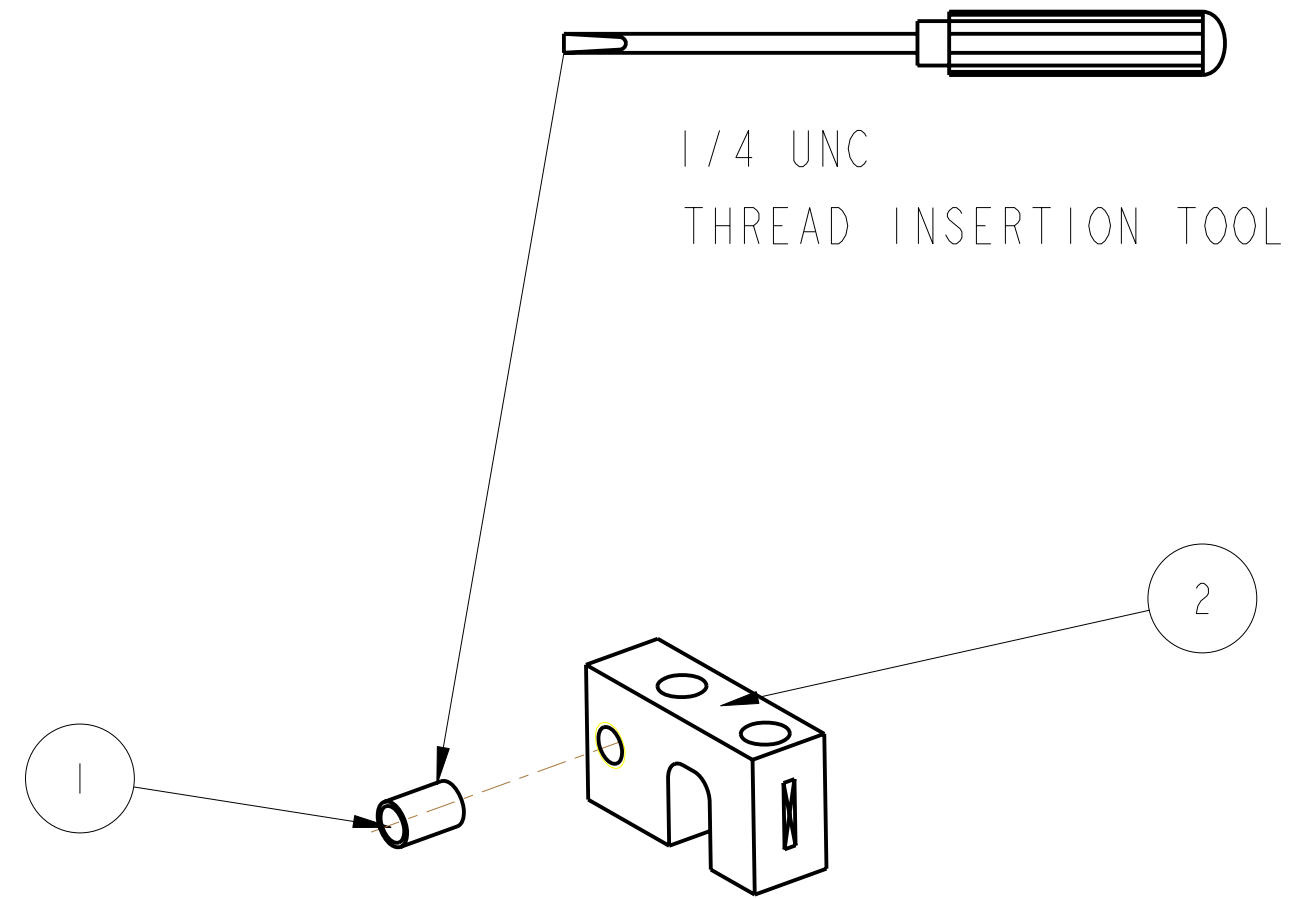
HELICOIL ROTATIONAL ADJUSTER

No.	PART NUMBER	PART DESCRIPTION	NO. REOD
1	3-8_16X1-5D_UNC_THREAD_INSERT	3/8-16 x 1.5D UNC THREAD INSERT	1
2	D060329	TOP STAGE STIFF BACK	1

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 <b>aLIGO</b>
		SUB-SYSTEM <b>SUS</b>
		NEXT ASSY <b>QUAD</b>
		PART NAME <b>TS ASSEMBLY PROCEDURE QUAD TS AND TOOLING</b>
DRAWN	J O'DELL 18/03/10	SIZE <b>B</b>
CHECKED	J'OD 18/MAR/10	DRG. NO. <b>D060370_ASM_PROCEDURE</b>
APPROVED	JOD 18/MAR/10	REV <b>A.</b>
SCALE 1:2		PROJECTION:
		SHEET 10 OF 9

REV.	DATE	DCN #	DRAWING TREE #



1/4 UNC  
THREAD INSERTION TOOL

HELICOIL ROTATIONAL ADJUSTER BRACKET

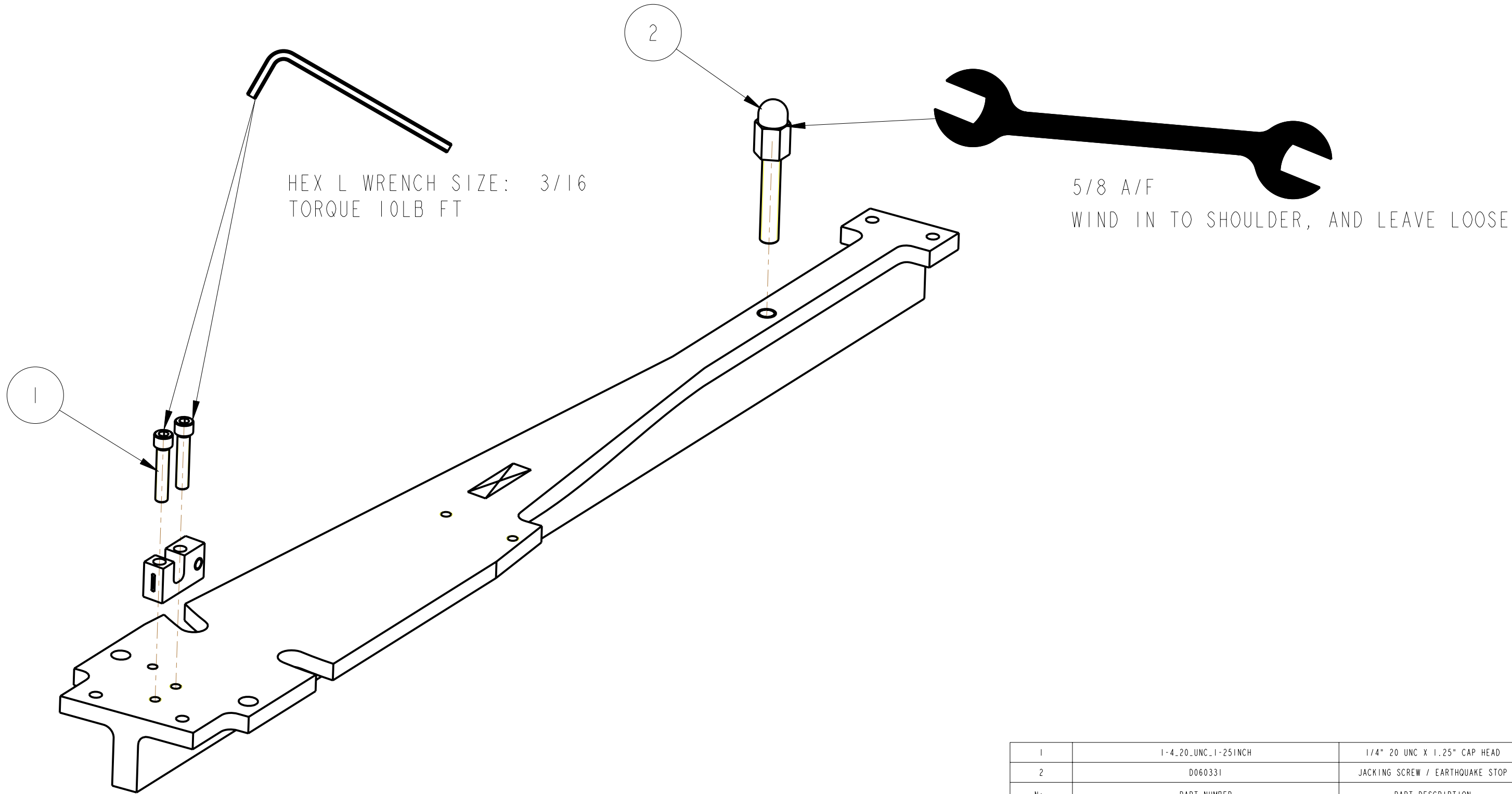
No.	PART NUMBER	PART DESCRIPTION	NO. REOD
1	1-4_20X1-5D_UNC_THREAD_INSERT	1/4-20 x 1.5D UNC THREAD INSERT	1
2	D060325	ROTATIONAL ADJUSTER	1

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 <b>aLIGO</b>		
SUB-SYSTEM <b>SUS</b>		
NEXT ASSY <b>QUAD</b>		
PART NAME <b>TS ASSEMBLY PROCEDURE QUAD TS AND TOOLING</b>		
NAME	DATE	
DRAWN J O'DELL	18/03/10	
CHECKED J'OD	18/MAR/10	
APPROVED JOD	18/MAR/10	

SIZE <b>B</b>	DRG. NO. <b>D060370_ASM_PROCEDURE</b>	REV <b>A.</b>
SCALE 1:1	PROJECTION:	SHEET 11 OF 9

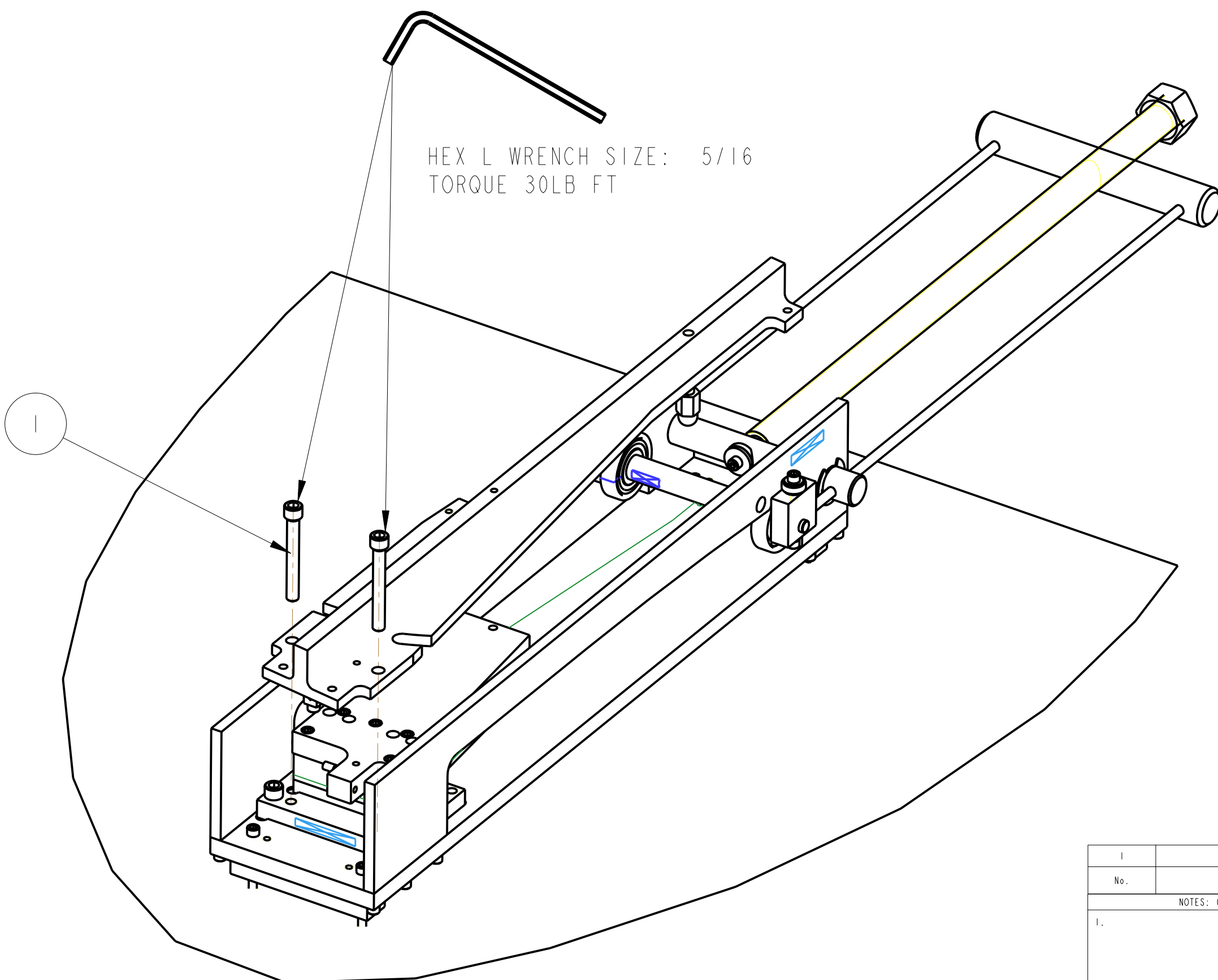


HEX L WRENCH SIZE: 3/16  
TORQUE 10LB FT

5/8 A/F  
WIND IN TO SHOULDER, AND LEAVE LOOSE


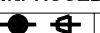
ADD BLADE TIP STOP AND ROTATIONAL  
ADJUSTER BRACKET TO TS STIFF BACK

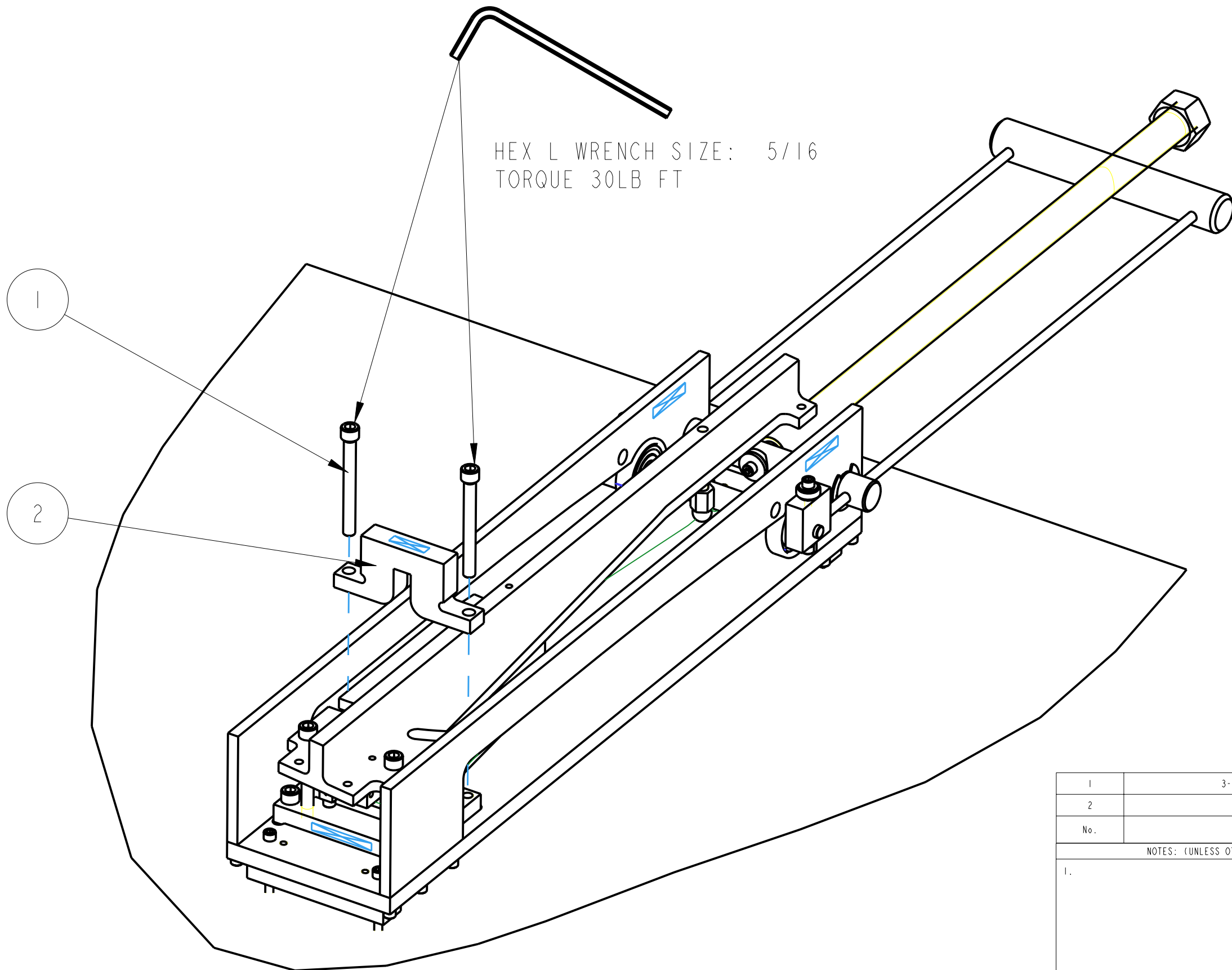
1	1-4_20_UNC_1-25INCH	1/4" 20 UNC X 1.25" CAP HEAD	2
2	D060331	JACKING SCREW / EARTHQUAKE STOP	1
No.	PART NUMBER	PART DESCRIPTION	NO. REOD
NOTES: (UNLESS OTHERWISE SPECIFIED)			
1.		<p>PROCESS PLAN TO BE USED FOR ASSEMBLY ONLY NOT TO BE USED FOR MANUFACTURE</p> <p>CALIFORNIA INSTITUTE OF TECHNOLOGY MASSACHUSETTS INSTITUTE OF TECHNOLOGY IGR, GLASGOW UNIVERSITY GEO 600 GROUP RUTHERFORD APPLETON LABORATORIES</p> <p>SYSTEM <b>aLIGO</b> SUB-SYSTEM <b>SUS</b> NEXT ASSY <b>QUAD</b> PART NAME <b>TS ASSEMBLY PROCEDURE QUAD TS AND TOOLING</b></p>	
	NAME	DATE	SIZE
DRAWN	J O'DELL	02/11/09	B
CHECKED	J'OD	18/MAR/10	DRG. NO. <b>D060370_ASM_PROCEDURE</b>
APPROVED	JOD	18/MAR/10	REV <b>A.</b>
SCALE 1:2		PROJECTION:	SHEET 12 OF 9



HEX L WRENCH SIZE: 5/16  
TORQUE 30LB FT

ASSEMBLE BACKBONE TO THE REST OF THE BLADE CARTRIDGE

I	3-8_16 UNC_3-00INCH	3/8-16 UNC X 3.0" CAP HEAD	2
No.	PART NUMBER	PART DESCRIPTION	NO. REOD
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 <b>aLIGO</b>	
		SUB-SYSTEM <b>SUS</b>	
		NEXT ASSY <b>QUAD</b>	
		PART NAME <b>TS ASSEMBLY PROCEDURE QUAD TS AND TOOLING</b>	
	NAME	DATE	SIZE
DRAWN	J O'DELL	02/11/09	<b>B</b>
CHECKED	J'OD	18/MAR/10	
APPROVED	JOD	18/MAR/10	
		DRG. NO. <b>D060370_ASM_PROCEDURE</b>	
		SCALE 3:10 PROJECTION:  SHEET 13 OF 19	


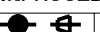


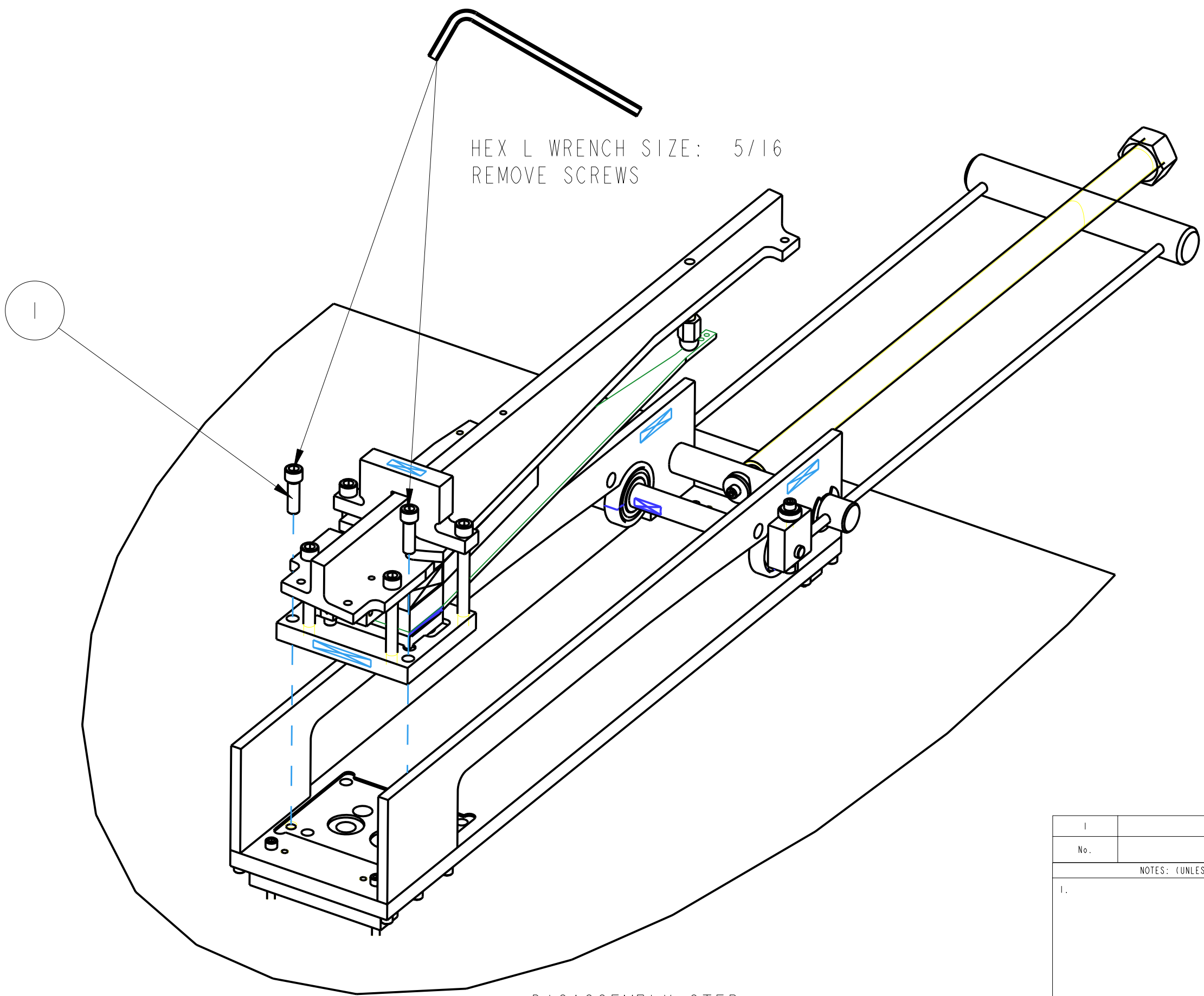
HEX L WRENCH SIZE: 5/16  
TORQUE 30LB FT

1

2


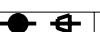
ADD TEMPORARY CLAMP

1	3-8.16 UNC 3-5 INCH	3/8-16 UNC X 3.5" CAP HEAD	2
2	D060368	BLADE CLAMP TOP BLOCK	1
No.	PART NUMBER	PART DESCRIPTION	NO. REOD
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 <b>aLIGO</b>	
		SUB-SYSTEM <b>SUS</b>	
		NEXT ASSY <b>QUAD</b>	
		PART NAME <b>TS ASSEMBLY PROCEDURE QUAD TS AND TOOLING</b>	
	NAME	DATE	
DRAWN	J O'DELL	18/03/10	SIZE <b>B</b>
CHECKED	J'OD	18/MAR/10	DRG. NO. <b>D060370_ASM_PROCEDURE</b>
APPROVED	JOD	18/MAR/10	REV <b>A.</b>
SCALE 3:10 PROJECTION: 			SHEET 14 OF 19

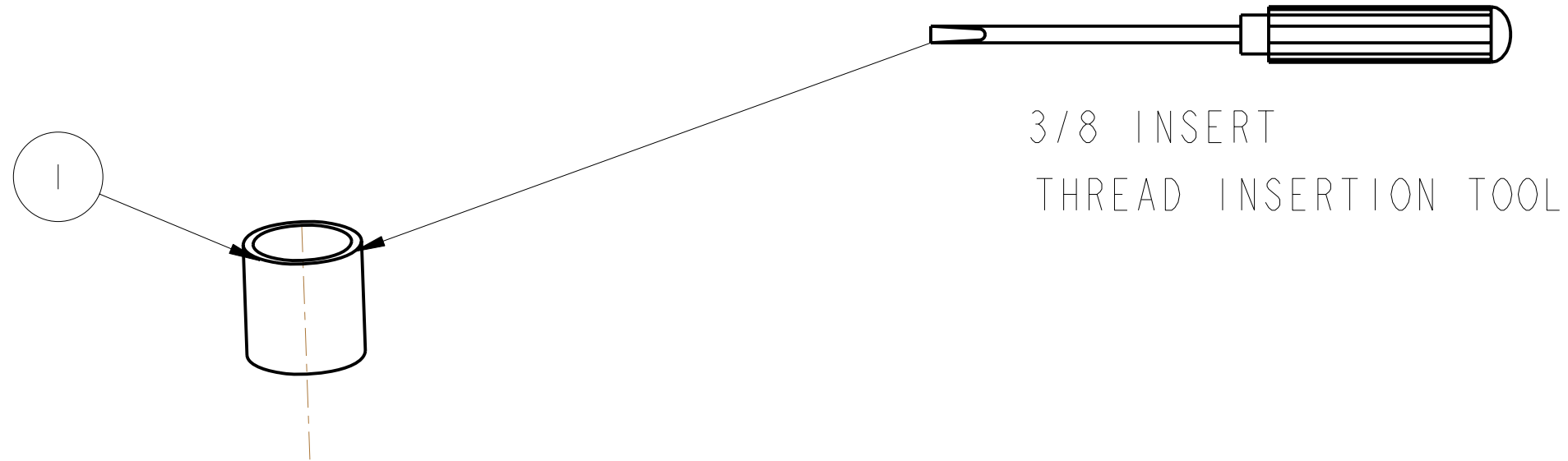


HEX L WRENCH SIZE: 5/16  
REMOVE SCREWS

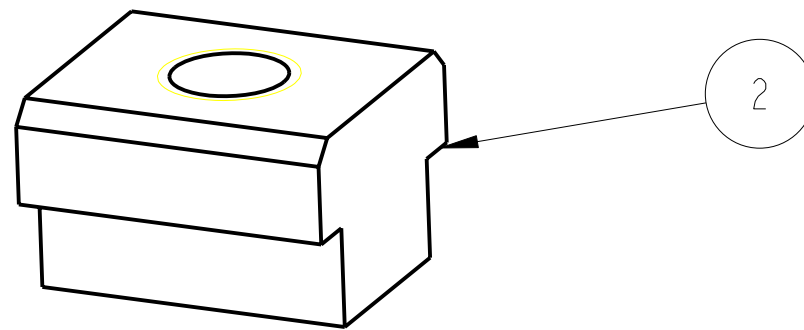
DISASSEMBLY STEP  
REMOVE BLADE CARTRIDGE FROM TOOLING

1	3-8.16 UNC 1-25 INCH	3/8 16 UNC X 1.25" CAP HEAD	2
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	aLIGO
		SUB-SYSTEM	SUS
		NEXT ASSY	QUAD
		PART NAME	TS ASSEMBLY PROCEDURE QUAD TS AND TOOLING
	NAME	DATE	SIZE
	DRAWN J O'DELL	02/11/09	B
	CHECKED J'OD	18/MAR/10	DRG. NO. D060370_ASM_PROCEDURE
	APPROVED JOD	18/MAR/10	REV. A.
SCALE 3:10 PROJECTION: 			SHEET 15 OF 19

REV.	DATE	DCN #	DRAWING TREE #



3/8 INSERT  
THREAD INSERTION TOOL




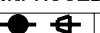
SCALE 2:1

HELICOIL TEE-NUTS  
X 2

No.	PART NUMBER	PART DESCRIPTION	NO. REOD
1	3-8-.16XID.UNC.THREAD.INSERT	3/8-16 x ID UNC THREAD INSERT	2
2	D060328	3/8-16 UNC T NUT	2

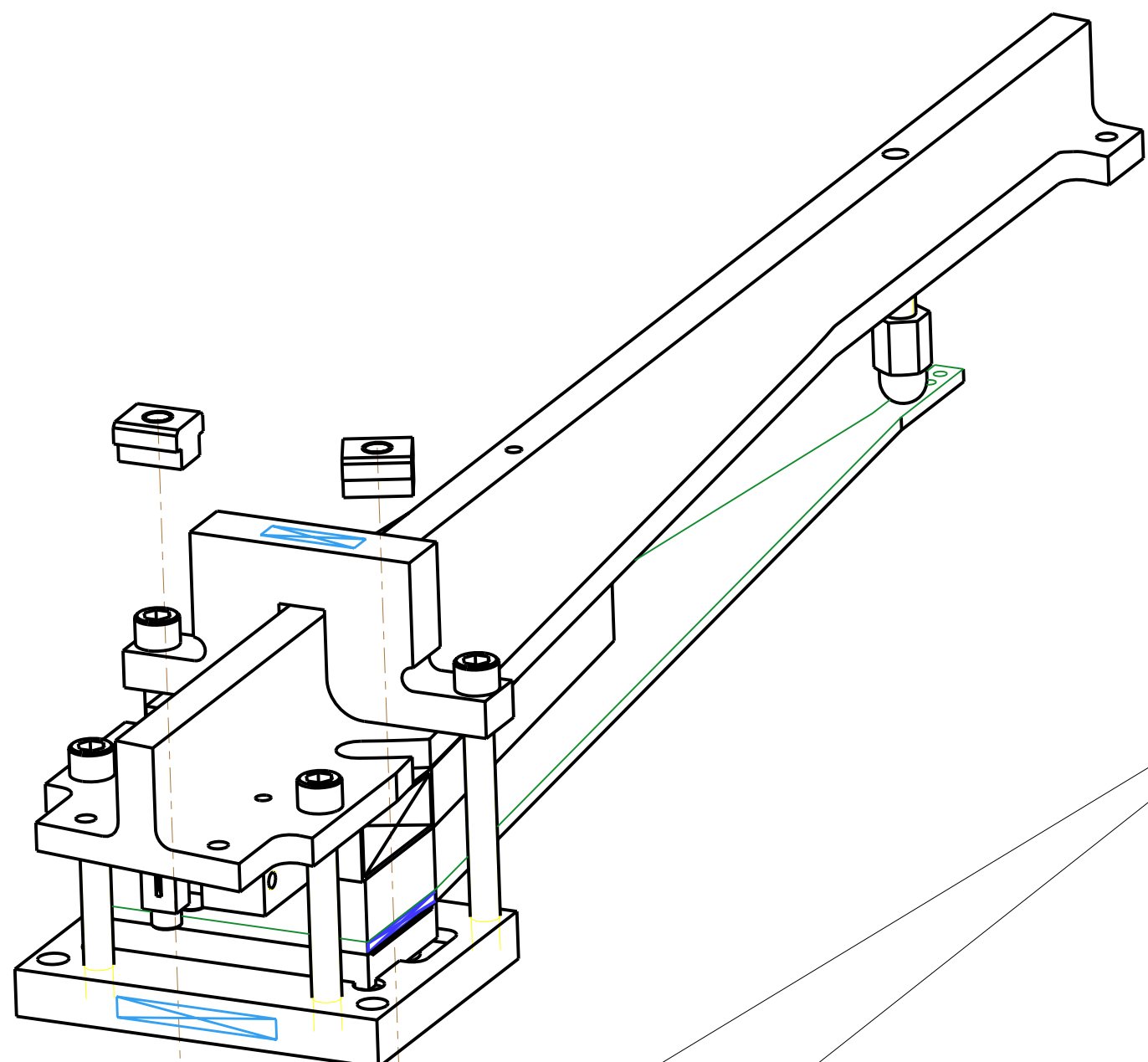
NOTES: (UNLESS OTHERWISE SPECIFIED)

1.

PROCESS PLAN TO BE USED FOR ASSEMBLY ONLY NOT TO BE USED FOR MANUFACTURE		 CALIFORNIA INSTITUTE OF TECHNOLOGY MASSACHUSETTS INSTITUTE OF TECHNOLOGY 1GR, GLASGOW UNIVERSITY GEO 600 GROUP RUTHERFORD APPLETON LABORATORIES
SYSTEM <b>aLIGO</b>		
SUB-SYSTEM <b>SUS</b>		
NEXT ASSY <b>QUAD</b>		
PART NAME <b>TS ASSEMBLY PROCEDURE QUAD TS AND TOOLING</b>		SIZE <b>B</b> DRG. NO. <b>D060370_ASM_PROCEDURE</b> REV <b>A.</b> SCALE 1:1 PROJECTION:  SHEET 16 OF 19
DRAWN	J O'DELL 18/03/10	
CHECKED	J'OD 18/MAR/10	
APPROVED	JOD 18/MAR/10	


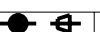


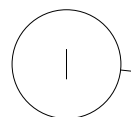
REV.	DATE	DCN #	DRAWING TREE #

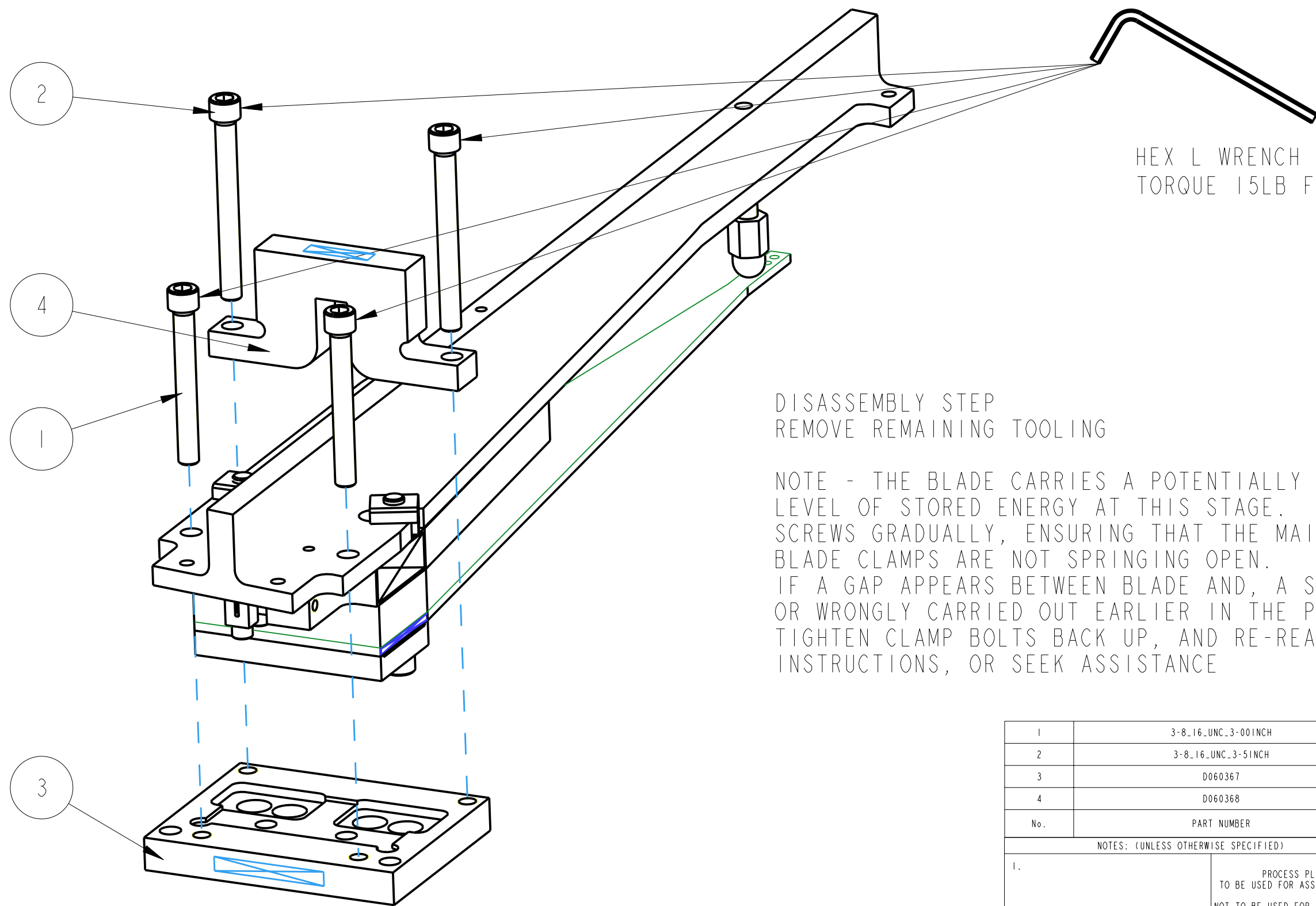


BOLT TS ASSEMBLY TOGETHER WITH  
CAP SCREWS AND TEE-NUTS

HEX L WRENCH SIZE: 5/16  
TORQUE 40LB FT

1	3-8_16 UNC_3-00 INCH	3/8-16 UNC X 3.0" CAP HEAD	2
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 1GR, GLASGOW UNIVERSITY GEO 600 GROUP RUTHERFORD APPLETON LABORATORIES
		SYSTEM	aLIGO
		SUB-SYSTEM	SUS
		NEXT ASSY	QUAD
		PART NAME	TS ASSEMBLY PROCEDURE QUAD TS AND TOOLING
	NAME	DATE	SIZE
	DRAWN J O'DELL	02/11/09	B
	CHECKED J'OD	18/MAR/10	DRG. NO. D060370_ASM_PROCEDURE
	APPROVED JOD	18/MAR/10	REV. A.
SCALE 1:2		PROJECTION: 	SHEET 17 OF 19





HEX L WRENCH SIZE: 5/16  
TORQUE 15LB FT

DISASSEMBLY STEP  
REMOVE REMAINING TOOLING

NOTE - THE BLADE CARRIES A POTENTIALLY DANGEROUS LEVEL OF STORED ENERGY AT THIS STAGE. RELEASE CLAMPING SCREWS GRADUALLY, ENSURING THAT THE MAIN (PERMINENT) BLADE CLAMPS ARE NOT SPRINGING OPEN. IF A GAP APPEARS BETWEEN BLADE AND, A STEP HAS BEEN MISSED OR WRONGLY CARRIED OUT EARLIER IN THE PROCEDURE. TIGHTEN CLAMP BOLTS BACK UP, AND RE-READ EARLIER INSTRUCTIONS, OR SEEK ASSISTANCE

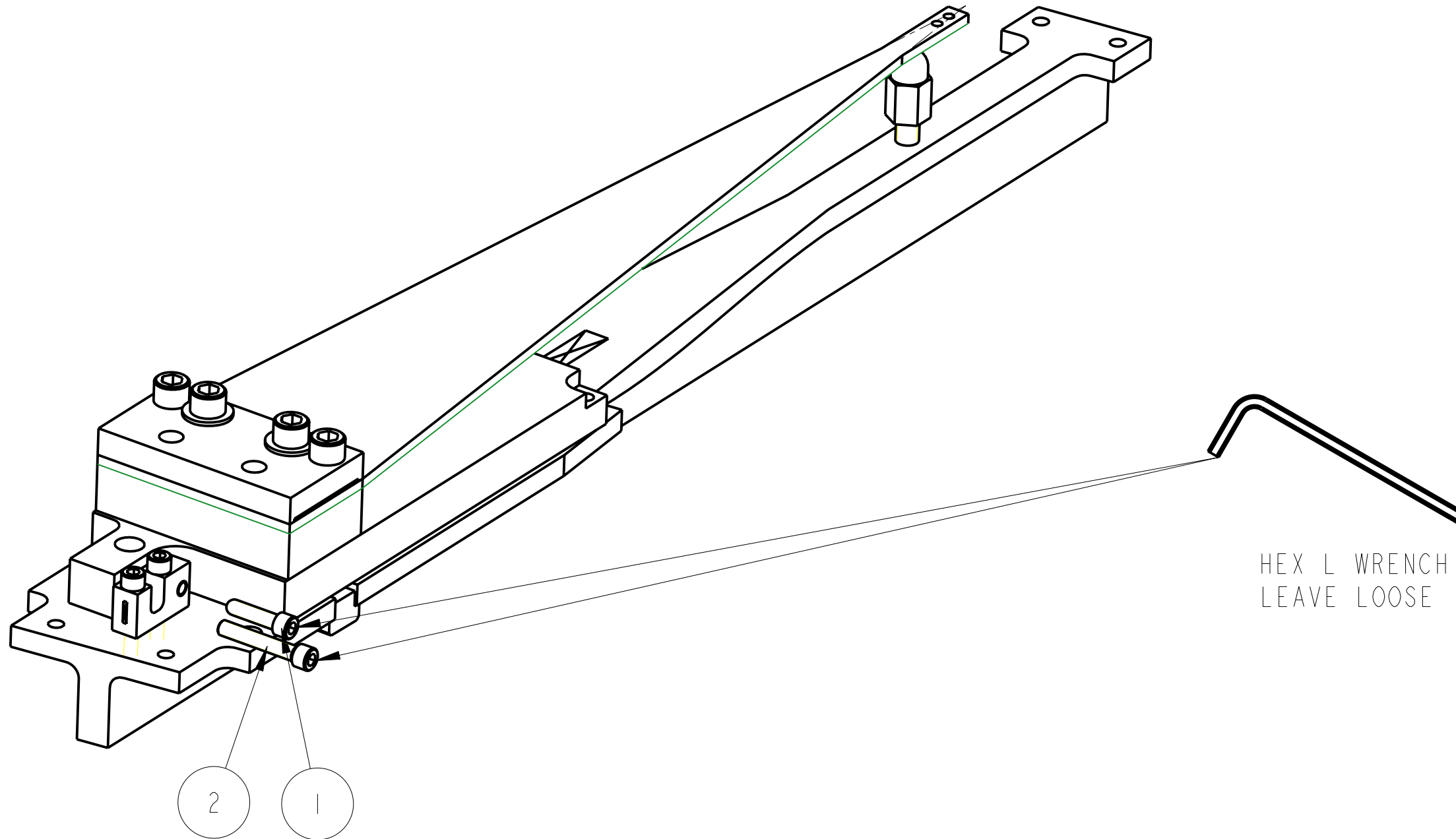
1	3-8.16 UNC.3-001NCH	3/8-16 UNC X 3.0" CAP HEAD	2
2	3-8.16 UNC.3-51NCH	3/8-16 UNC X 3.5" CAP HEAD	2
3	D060367	BLADE CLAMP BASE BLOCK	1
4	D060368	BLADE CLAMP TOP BLOCK	1
No.	PART NUMBER	PART DESCRIPTION	NO. REOD

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 1GR, GLASGOW UNIVERSITY GEO 600 GROUP RUTHERFORD APPLETON LABORATORIES
		SYSTEM <b>aLIGO</b>
		SUB-SYSTEM <b>SUS</b>
		NEXT ASSY <b>QUAD</b>
		PART NAME <b>TS ASSEMBLY PROCEDURE QUAD TS AND TOOLING</b>
NAME	DATE	SIZE <b>B</b> DRG. NO. <b>D060370_ASM_PROCEDURE</b> REV <b>A.</b> SCALE 1:2 PROJECTION:  SHEET 18 OF 19
DRAWN	J O'DELL 18/03/10	
CHECKED	J'OD 18/MAR/10	
APPROVED	JOD 18/MAR/10	

REV.	DATE	DCN #	DRAWING TREE #



HEX L WRENCH SIZE: 3/16  
LEAVE LOOSE

ADD ROTATIONAL ADJUSTER SCREWS

THIS STEP COMPLETES THE ASSEMBLY OF A QUAD TOP STAGE UNIT.  
THERE ARE FOUR OF THESE UNITS REQUIRED FOR EACH QUAD

No.	PART NUMBER	PART DESCRIPTION	NO. REOD
1	1-4.20 UNC. 1-00INCH. ROUND.	1/4" 20 UNC X 2" CAP HEAD, SPHERICAL TIP	1
2	1-4.20 UNC. 1-5INCH	1/4-20 UNC X 1.5" CAP HEAD	1

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 <b>aLIGO</b>
		SUB-SYSTEM <b>SUS</b>
		NEXT ASSY <b>QUAD</b>
		PART NAME <b>TS ASSEMBLY PROCEDURE QUAD TS AND TOOLING</b>
	NAME DATE	SIZE
DRAWN	J O'DELL 18/03/10	B
CHECKED	J'OD 18/MAR/10	DRG. NO. <b>D060370_ASM_PROCEDURE</b>
APPROVED	JOD 18/MAR/10	REV <b>A.</b>
SCALE 1:2		PROJECTION:
		SHEET 19 OF 19