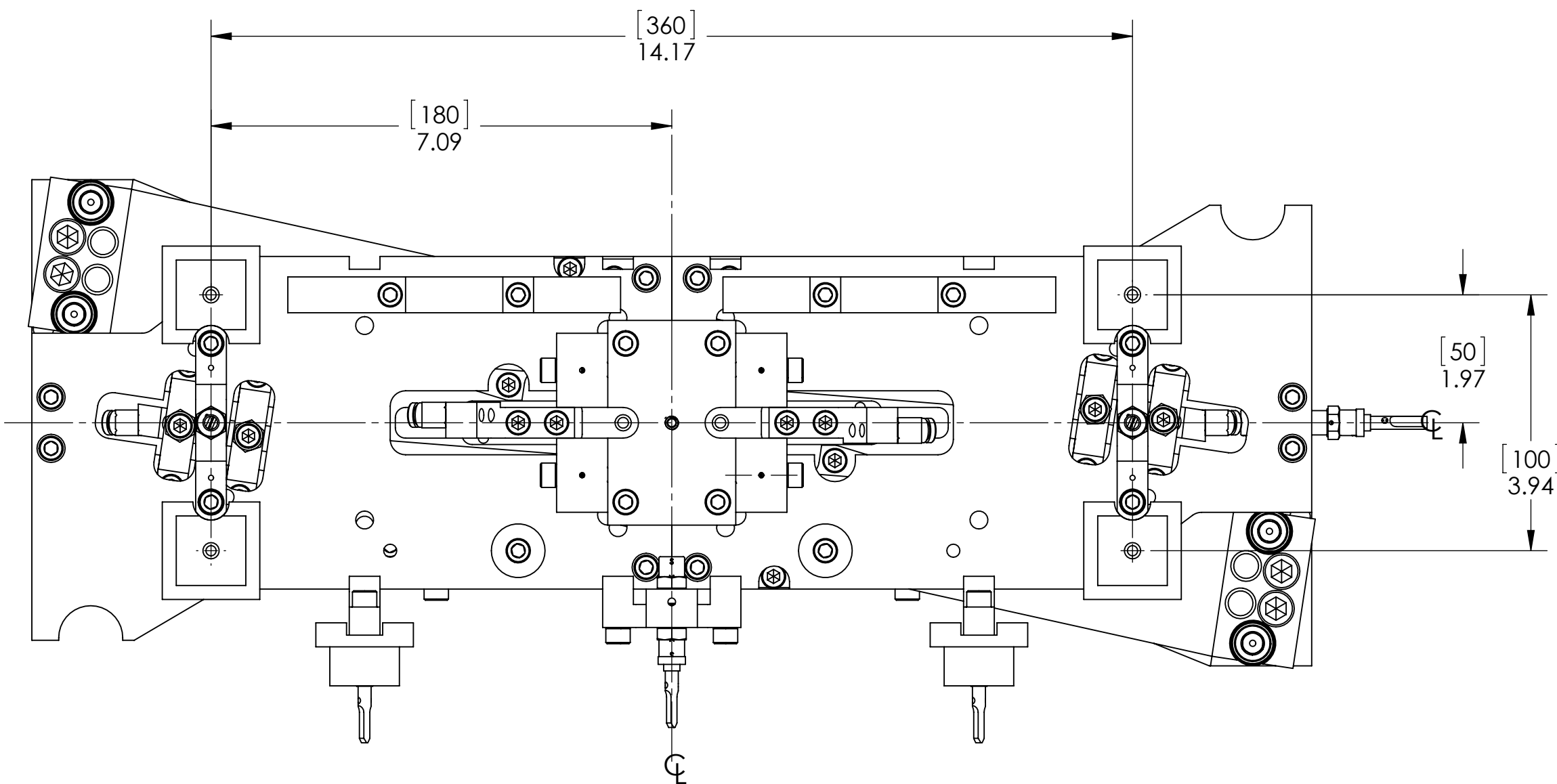


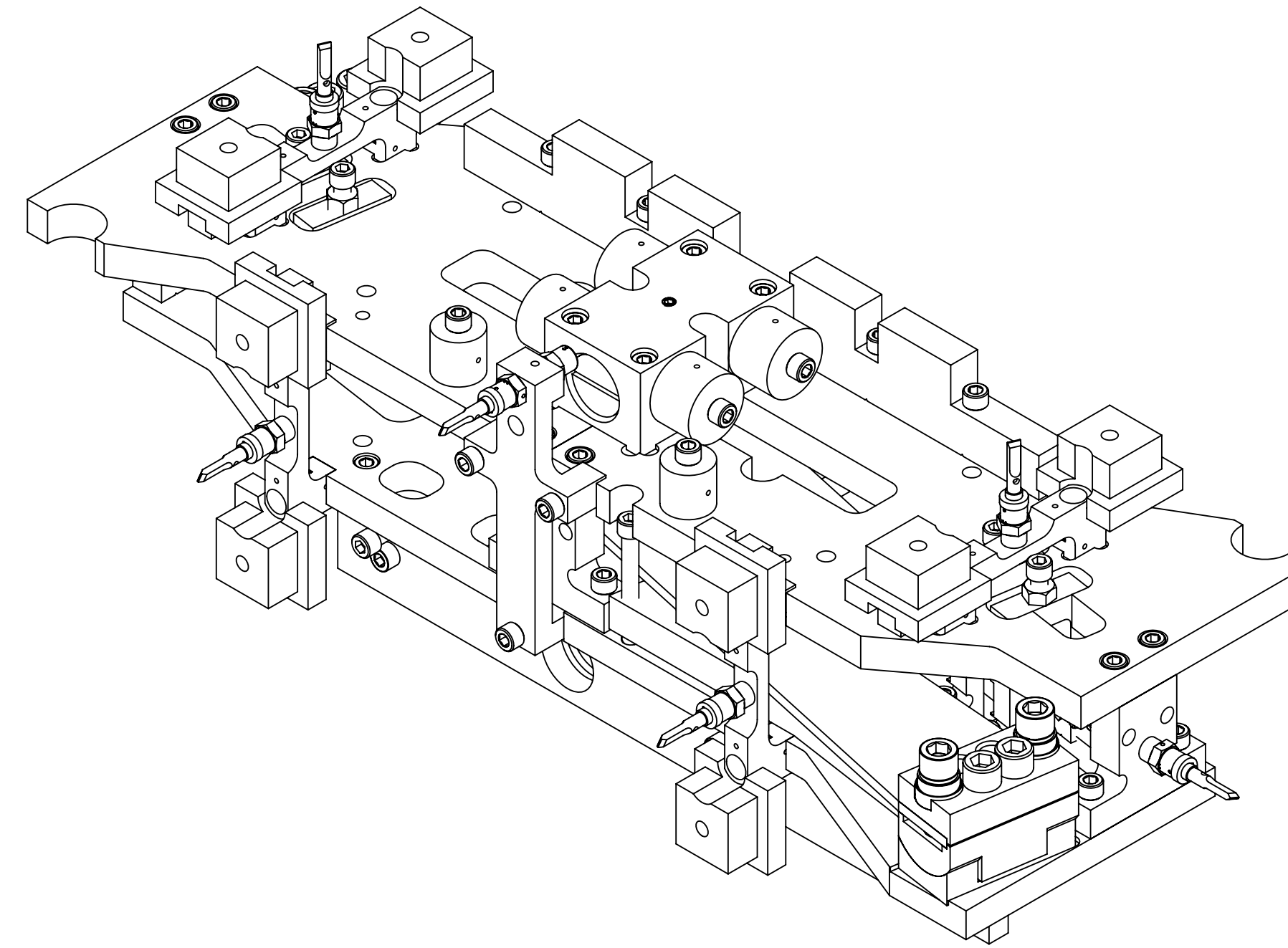
ASSEMBLY PROCESS

(DRAWING UPDATED TO CURRENT CAD FORMAT BY E.SANCHEZ 03/29/2014)

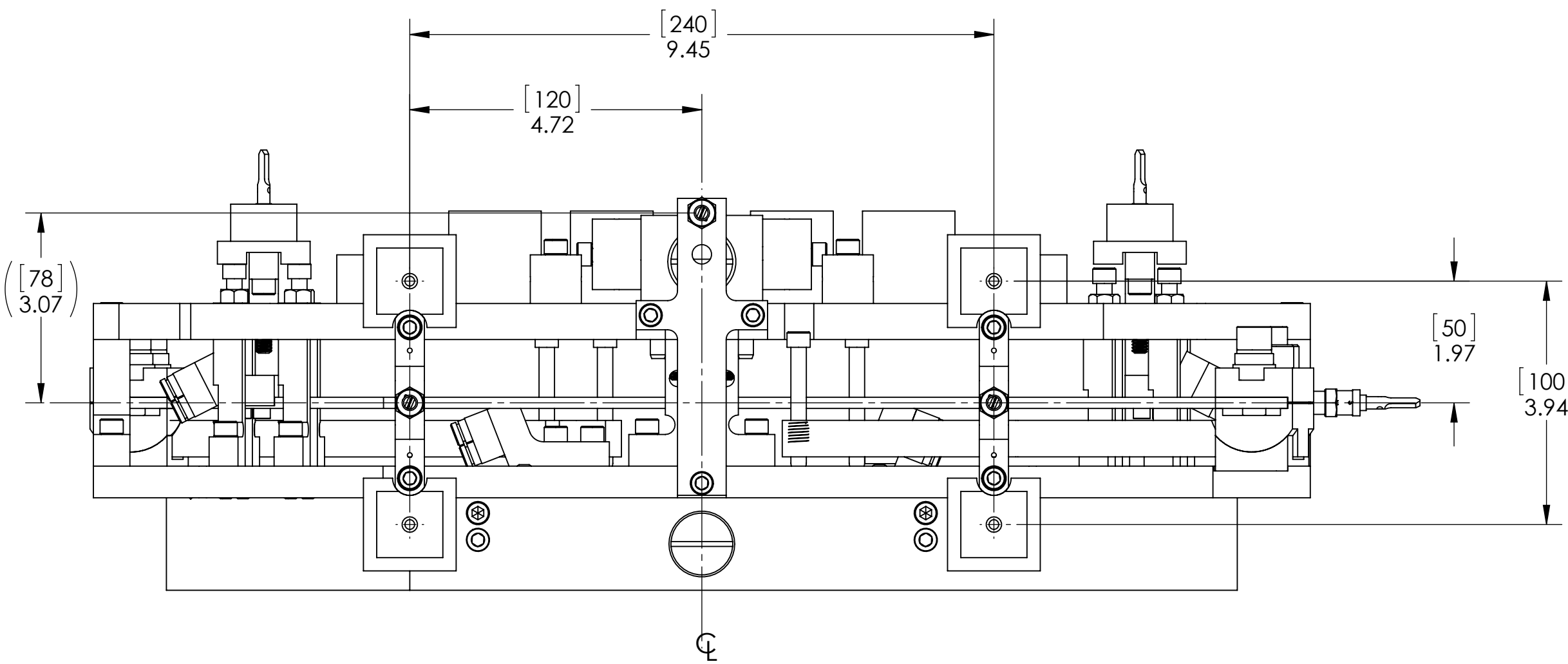
REV.	DATE	DCN #	DRAWING TREE #
v8	29 APR 2014	E1300970-x0	-
-	-	-	-
-	-	-	-



TOP MASS - REACTION CHAIN WITH REF. DIMS

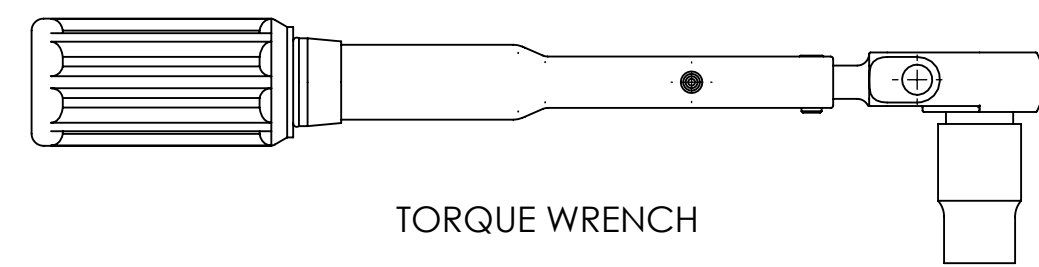


TOP MASS - MAIN CHAIN



RECOMMENDED TOOLING

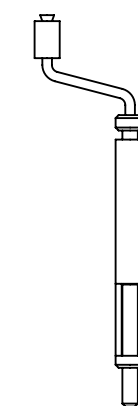
(IMAGE SHOWN MAY NOT REFLECT ACTUAL TOOL)



TORQUE WRENCH



1/8" HEX L ALLEN WRENCH

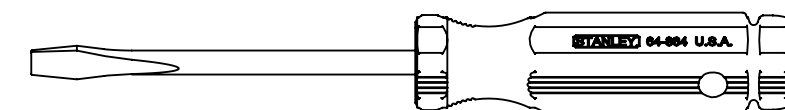


3/16" HEX L ALLEN WRENCH

3/8 HELICOIL INSERTION TOOL
1/4 HELICOIL INSERTION TOOL
&
#8 HELICOIL INSERTION TOOL



RETAINING RING PLIERS



FLAT BLADE SCREW DRIVER



7/16" OPEN END WRENCH

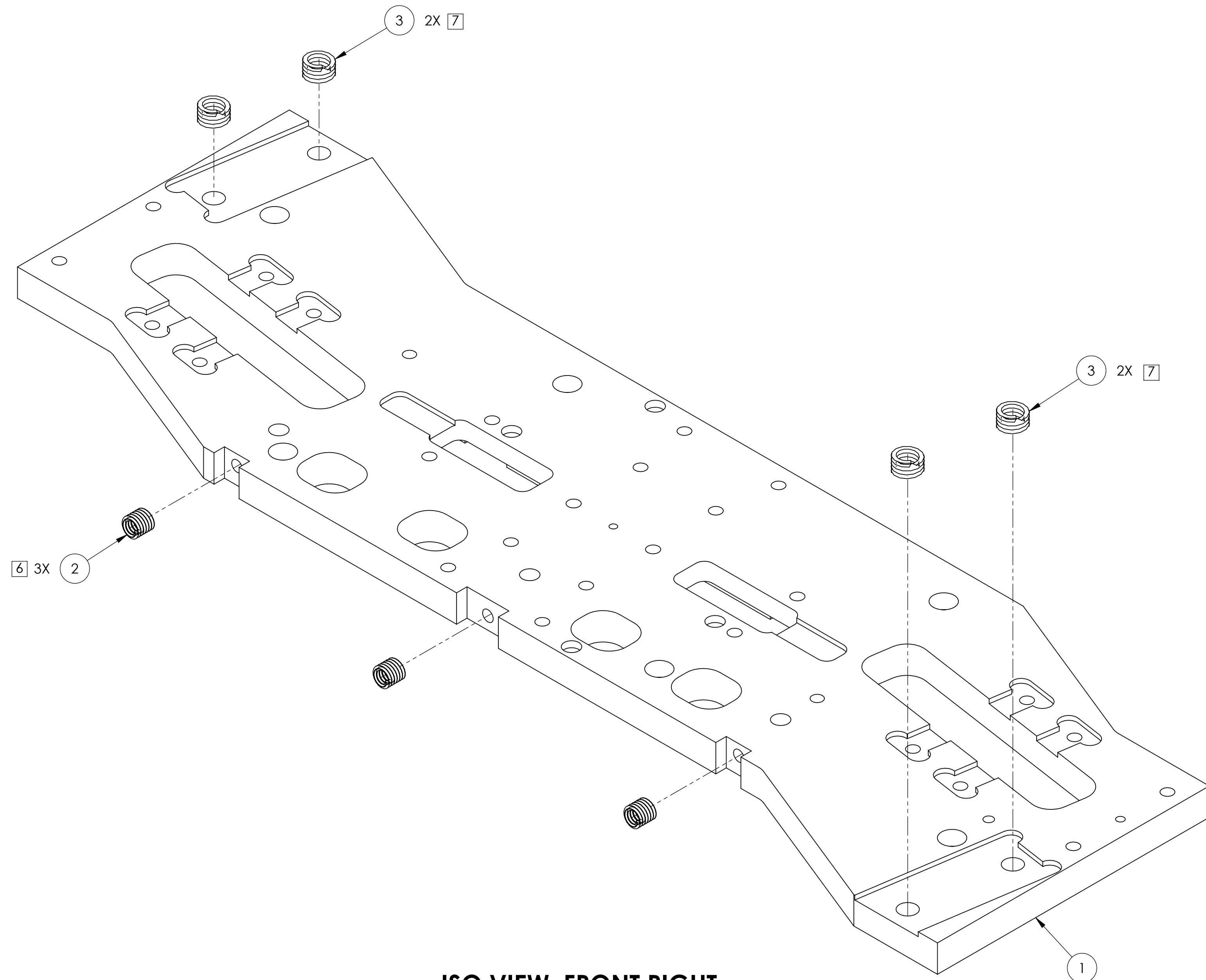
(REFER TO D0902031 FOR COMPLETE REACTION CHAIN BOM)

ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	QTY.
38	MS16995-86 OR EQ.	SCREW, SHC, 3/8-16 X 2.25 LG.	300 SSSL	4
37	94355A533 McMASTER-CARR OR EQ.	SET SCREW, 1/4-20 X .25 LG.	18-8 SSSL	2
36	91944A030 McMASTER-CARR OR EQ.	LEVELING WASHER, 3/8" SCREW SIZE	18-8 SSSL	4
35	1185-6EN562 EMHART OR EQ.	HELICOIL, 3/8-16 X .562 LG.	NITRONIC 60	4
34	1185-6EN375 EMHART OR EQ.	HELICOIL, 3/8-16X .375 LG.	NITRONIC 60	4
33	1185-4EN375 EMHART OR EQ.	HELICOIL, 1/4-20 X .375 LG.	NITRONIC 60	12
32	1185-4EN250 EMHART OR EQ.	HELICOIL, 1/4-20 X .25 LG.	NITRONIC 60	12
31	C-2032-NA UC COMPONENTS OR EQ.	SHCS, 1/4-20 x 2" LG., Ag PLATED	Ag-PLATED 300 SSSL	8
30	C-2032-N UC COMPONENTS OR EQ.	SHCS, 1/4-20 x 2" L, 18-8 SSSL	18-8 SSSL	2
29	N-2520-A UC COMPONENTS OR EQ.	HEX NUT 1/4-20, Ag PLATED	Ag-PLATED 300 SSSL	4
28	C-2016-NA UC COMPONENTS OR EQ.	SCREW, SHC, 1/4-20 x 1.0 LG, Ag PLATED	Ag-PLATED 300 SSSL	48
27	C-2016-N UC COMPONENTS OR EQ.	SCREW, SHC, 1/4-20 x 1" LG.	18-8 SSSL	15
26	C-1620-NA UC COMPONENTS OR EQ.	SCREW, SHC, 3/8-16 X 1.25 LG. (Ag PLATED)	Ag-PLATED 300 SSSL	4
25	C-808-NA UC COMPONENTS OR EQ.	SCREW, SHC, 8-32 X .50 LG., Ag PLATED	Ag-PLATED 300 SSSL	4
24	TD-1084-727	DOWEL PIN, 5mm DIA. X 13mm Lg.	Material <not specified>	4
23		SCREW, SHC, 1/4-20 X 2.00, ROUNDED END	300 SSSL	10
22	D1100785-562	WASHER, FLAT, .38 X .562 O.D.	NITRONIC 60	4
21	D060359-050	αLIGO, SUS, QUAD N-PYTYPE, ADDITIONAL MASS, 50 G	304 SSSL	4
20	D060236	ADV LIGO, SUS, QUAD N-PYTYPE TOP MASS, MIDDLE BLADE SPRING	MARAGING STEEL C250	2
19	D060359-100	MASS, αLIGO SUS, 100g	316 SSSL	8
18	D060399	αLIGO, SUS, QUAD TOP MASS N-PYTYPE, STOP BRIDGE	6061-T6 Al	4
17	D060398	αLIGO, SUS, TOP MASS QUAD N-PYTYPE, PITCH ADJUSTER & MASS ADJUSTER TURRET	6061-T6 Al	2
16	D060397	αLIGO, SUS, TOP MASS QUAD N-PYTYPE, TOP MASS SPACER	304 SSSL	4
15	D060391	Advanced LIGO, SUS, Quad N-Ptype Top Mass, TOP WIRE CLAMP (Top Mass)	N/A	2
14	D060430	αLIGO, SUS, QUAD N-PYTYPE TOP MASS, BASE PLATE	316 SSSL	1
13	D060421	ADVANCED LIGO, SUS, TOP MASS QUAD N-PYTYPE, MASS AND SUPPORT MEMBER	304 SSSL	2
12	D060420	αLIGO, SUS, TOP MASS QUAD N-PYTYPE, WIRE CLAMP ADJUSTMENT BLOCK	6061-T6 Al	2
11	D060419	ADVANCED LIGO, SUS, TOP MASS QUAD N-PYTYPE, TOP MASS WIRE CLAMP	N/A	2
10	D060417	αLIGO, SUS, TOP MASS QUAD N-PYTYPE, OSEM MAGNET AND FLAG CONCEPT PART BUILT	N/A	2
9	D060416	Magnet and Flag Assembly	N/A	2
8	D060415	Advanced LIGO, SUS, Quad N-Ptype Top Mass, BLADE TIP Z POSITION ADJ (BTM HALF)	304 SSSL	2
7	D060414	Advanced LIGO, SUS, Quad N-Ptype Top Mass, BLADE TIP Z POSITION ADJ (BTM HALF PART 2)	6061-T6 Al	2
6	D060412	Advanced LIGO, SUS, Quad N-Ptype Top Mass, OSEM BRACKET (TOP OSEM)	6061-T6 Al	1
5	D060411	Advanced LIGO, SUS, Quad N-Ptype Top Mass, TOP PLATE	304 SSSL	2
4	D060409	Advanced LIGO, SUS, Quad N-Ptype Top Mass, OSEM / FLAG ASSEMBLY	N/A	4
3	D060406	Advanced LIGO, SUS, Quad N-Ptype Top Mass, BASE PLATE STIFFENER	6061-T6 Al	2
2	D060405	αLIGO, SUS, QUAD N-PYTYPE TOP MASS, PITCH ADJUSTER	304 SSSL	2
1	D060404	Advanced LIGO, SUS, Quad N-Ptype Top Mass, BLADE CLAMP (TOP Half)	304, 316 OR 302 SSSL	2

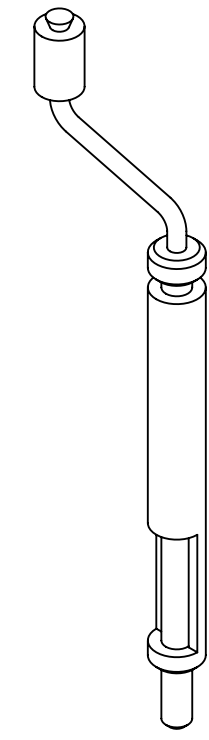
NOTES AND TOLERANCES: (UNLESS OTHERWISE SPECIFIED)	
DIMENSIONS ARE IN INCHES [MM]	
MATERIAL	N/A
FINISH	N/A μinch

LIGO CALIFORNIA INSTITUTE OF TECHNOLOGY MASSACHUSETTS INSTITUTE OF TECHNOLOGY		PART NAME	
SYSTEM	ADVANCED LIGO	αLIGO, SUS, QUAD N-PYTYPE TOP MASS MAIN & REACTION CHAIN	
SUB-SYSTEM	SUS	DESIGNER	C.MAK 10 Aug 2010
NEXT ASSY	D0901346	DRAFTER	J.O'DELL 08 SEP 2009
		CHECKER	L.WILMUT 08 SEP 2009
		APPROVAL	J.O'DELL 08 MAR 2010
		SIZE	D
		DWG. NO.	D060403
		REVISION	v8
		SCALE	1:2
		PROJECTION	First Angle
		SHEET	1 OF 24

ASSY. STEP 1: ADD THREADED INSERTS TO BASE PLATE.



ISO VIEW, FRONT RIGHT



- 6 USE 1/4 HELICOIL INSERTION TOOL.
- 7 USE 3/8 HELICOIL INSERTION TOOL.

REPAIR PLUGS

1. CHECK FOR DAMAGED THREADS BEFORE INSTALLING. TAP IF NECESSARY.
2. INSTALL TAPER DOWN.

TO INSTALL:

3. THREAD ON 1/4-20 SHCS (ONLY 4 THREADS) AND START.
4. REMOVE 1/4-20 SHCS.
5. USE 1/4-20 TAP TO INSTALL PLUG AND CHASE DAMAGED THREADS.

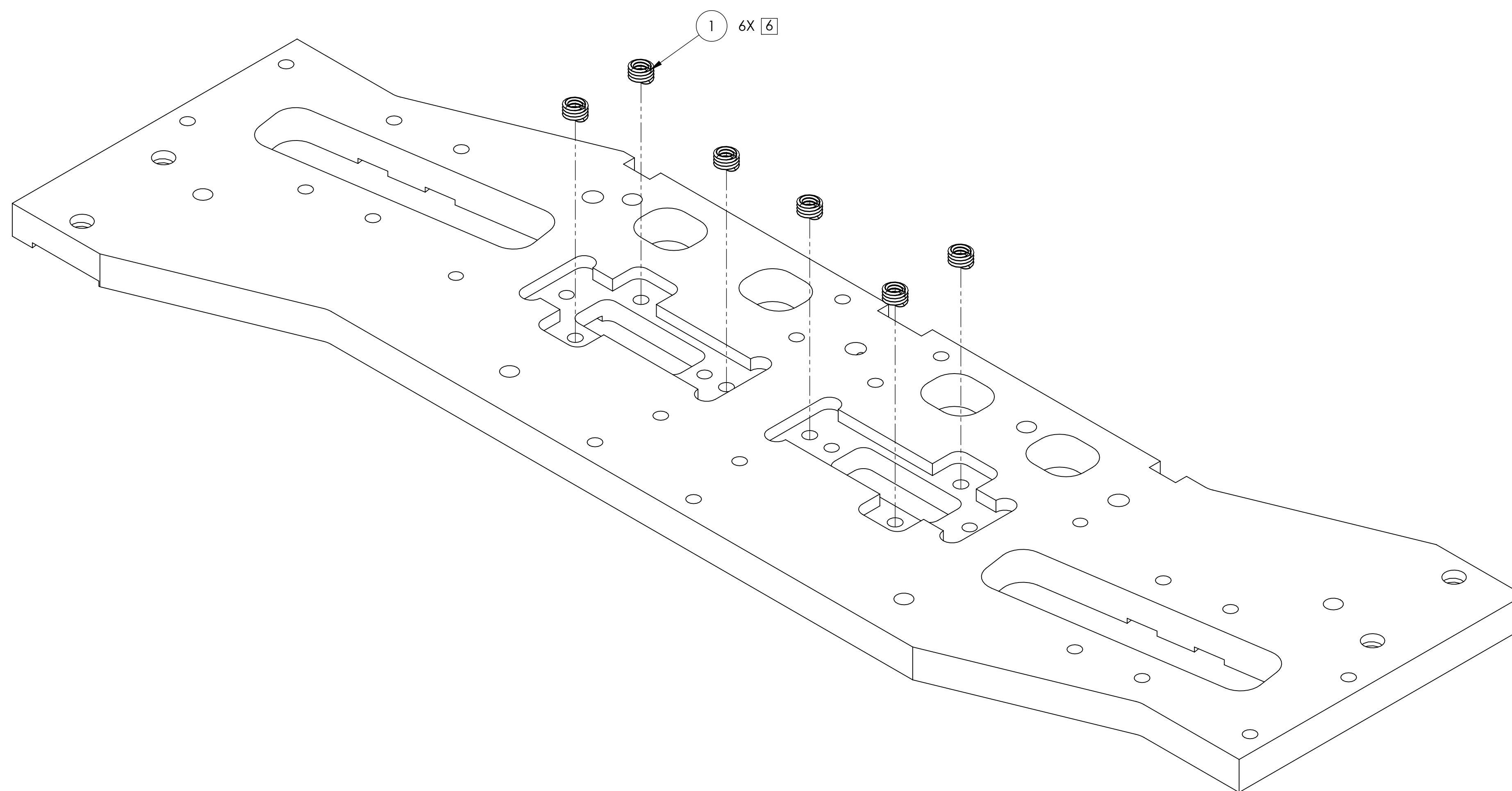
ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	QTY.
3	1185-6EN375 EMHART OR EQ.	HELICOIL, 3/8-16X .375 LG.	NITRONIC 60	4
2	1185-4EN375 EMHART OR EQ.	HELICOIL, 1/4-20 X .375 LG.	NITRONIC 60	3
1	D060430	ALIGO, SUS. QUAD N-PTYPE TOP MASS, BASE PLATE	316 SSSL	1

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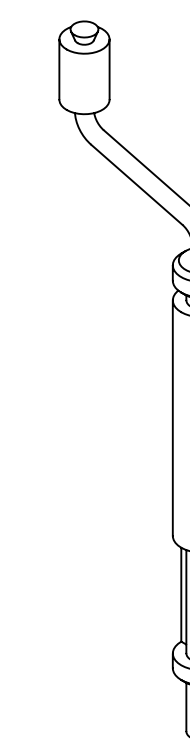
SIZE	DWG. NO.	REV.
D	D060403	v8
SCALE: 1:1	PROJECTION:	SHEET 2 OF 24

D060403 Advanced UCO.SUS. Quad N-Type Top Mass - MAIN CHAN. PART PDM REV. X-057. DRAWING PDM REV. X-003

ASSY. STEP 2: ADD THREADED INSERTS TO BASE PLATE.



ISO VIEW, UNDERSIDE



6 USE 1/4 HELICOIL INSERTION TOOL.

ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	QTY.
1	1185-4EN250 EMHART OR EQ.	HELICOIL, 1/4-20 X .25 LG.	NITRONIC 60	6

PARTS LIST

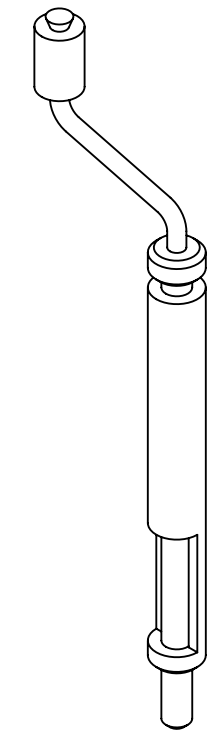
LIGO CALIFORNIA INSTITUTE OF TECHNOLOGY
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

SIZE	DWG. NO.	REV.
D	D060403	v8

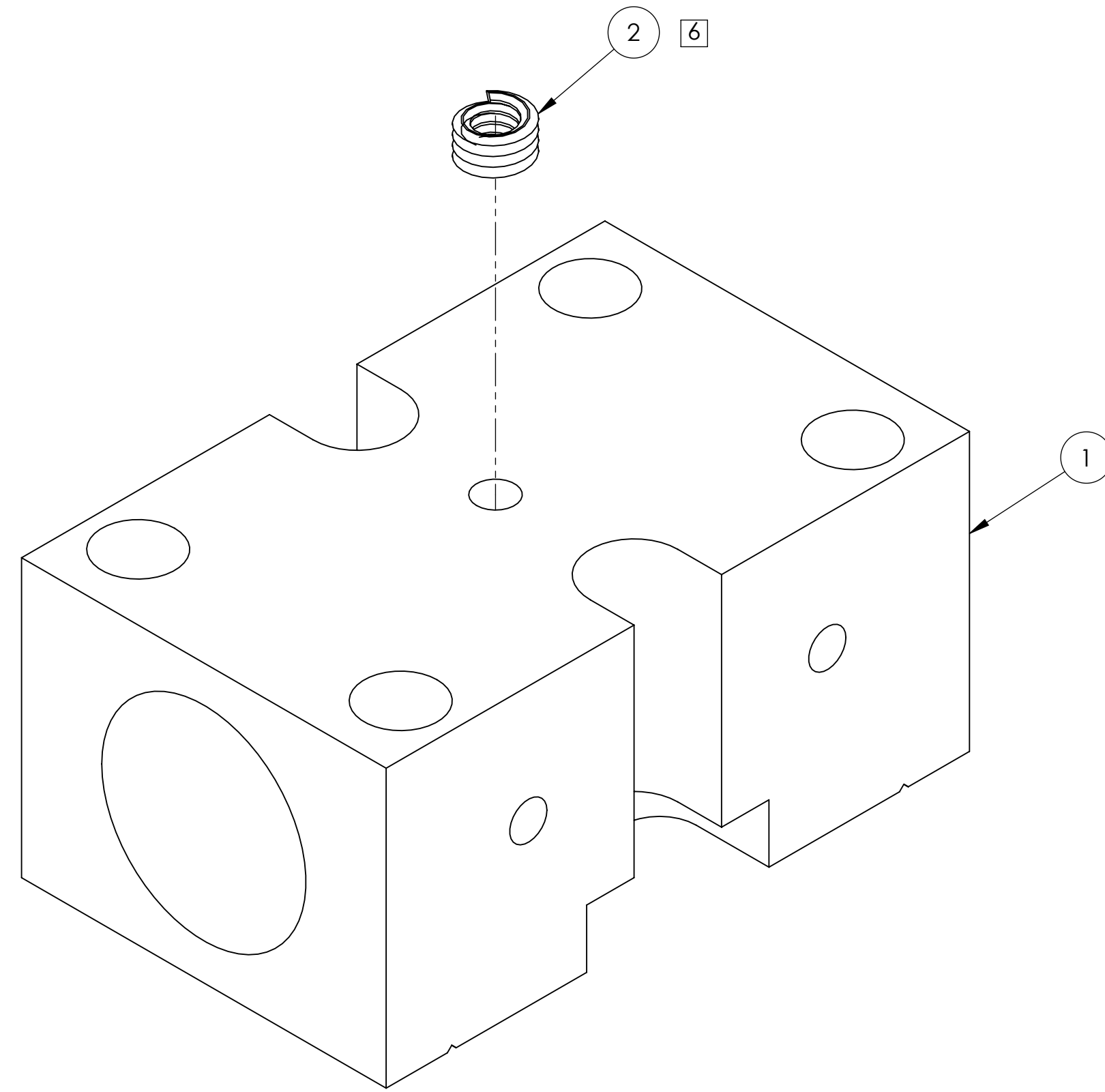
SCALE: 1:1 PROJECTION: SHEET 3 OF 24

D060403 Advanced UCO.315. Good HP Type Top Mats - MAIN CHAN. PAR FDM REV. X-037. DRAWING PDM REV. X-033

ASSY. STEP 3: ADD THREADED INSERTS INTO PITCH ADJUSTER BLOCK.
 (REPEAT THIS STEP FOR THE SECOND PITCH ADJUSTER BLOCK)



6 USE 1/4 HELICOIL INSERTION TOOL.



ISO VIEW

ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	QTY.
2	1185-4EN250 EMHART OR EQ.	HELICOIL, 1/4-20 X .25 LG.	NITRONIC 60	1
1	D060398	GLIGO, SUS. TOP MASS QUAD N-PTYPE PITCH ADJUSTER & MASS ADJUSTER TURRET	6061-T6 Al	1

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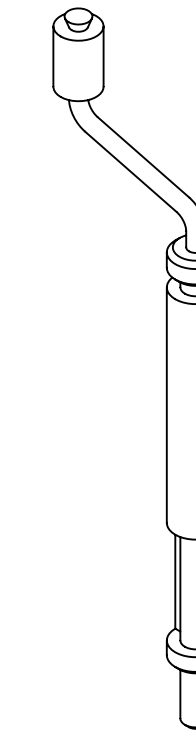
SIZE DWG. NO. REV.
D **D060403** v8

SCALE: 1:1 PROJECTION: SHEET 4 OF 24

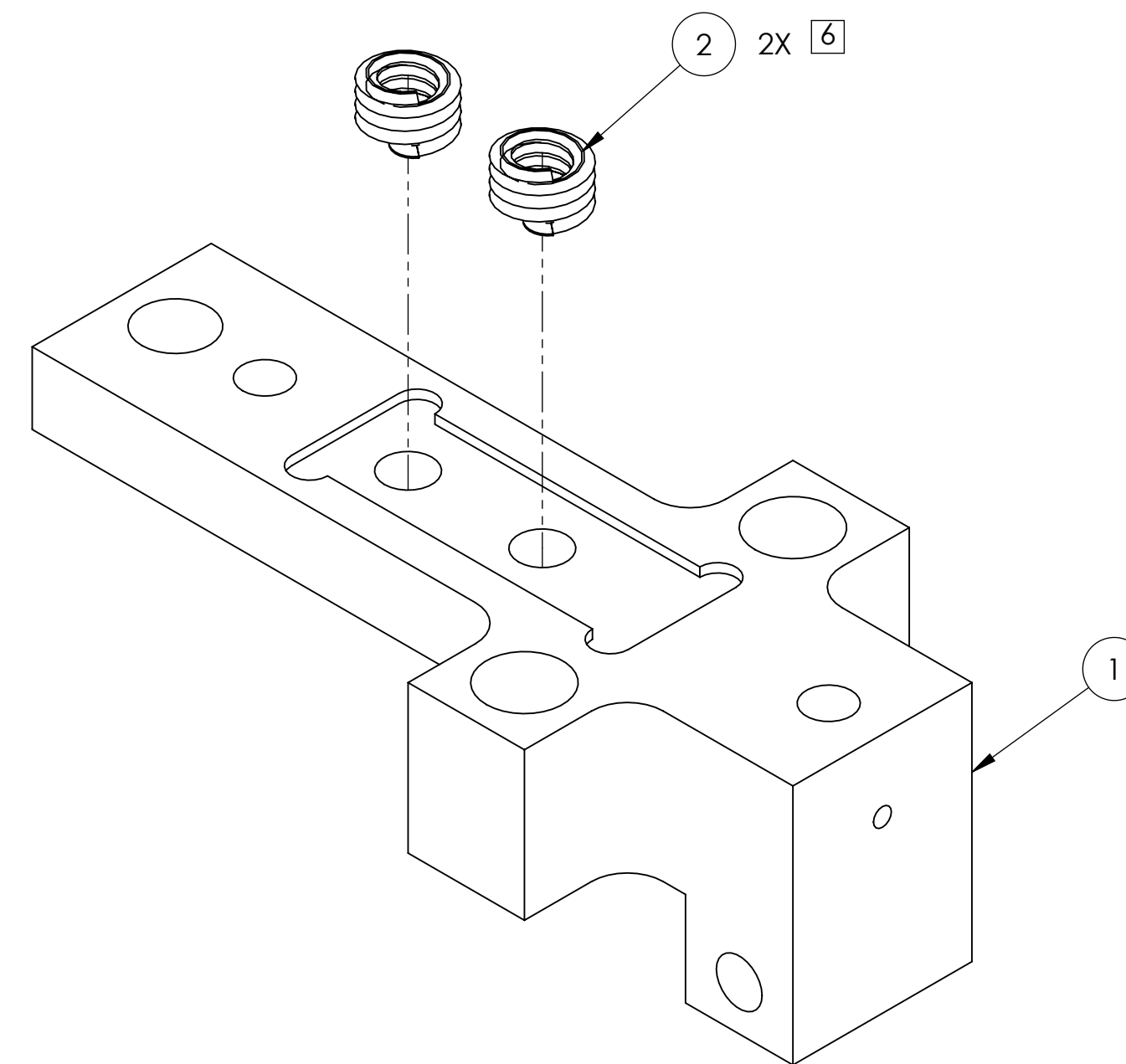
8. FIT CHECK PITCH ADJUSTER SCREW BEFORE MOUNTING TURRET.

D060403 Advanced LIGO, SUS. Quad N-Type Top Mass - MAIN CHAN. PAR FDM REV. X-037. DRAWING PDM REV. X-033

ASSY. STEP 4: ADD THREADED INSERTS INTO WIRE CLAMP ADJUSTMENT BLOCK.
 (REPEAT THIS STEP FOR THE SECOND WIRE CLAMP)



6 USE 1/4 HELICOIL INSERTION TOOL.



ISO VIEW

ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	QTY.
2	1185-4EN250 EMHART OR EQ.	HELICOIL, 1/4-20 X .25 LG.	NITRONIC 60	2
1	D060420	ALIGO, SUS, TOP MASS QUAD N-P-TYPE, WIRE CLAMP ADJUSTMENT BLOCK	6061-T6 Al	1

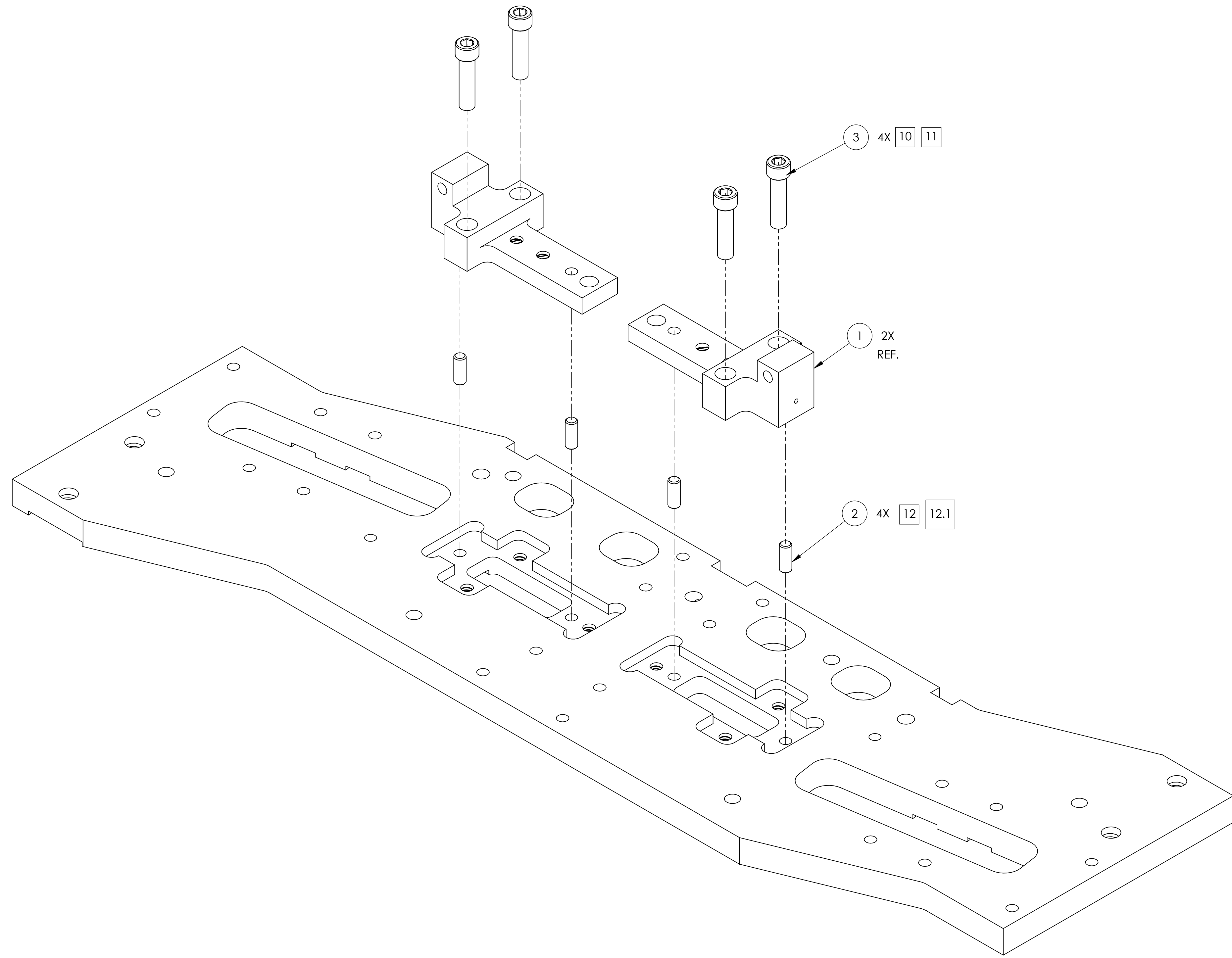
LIGO CALIFORNIA INSTITUTE OF TECHNOLOGY
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SIZE	DWG. NO.	REV.
D	D060403	v8
SCALE: 1:1	PROJECTION:	SHEET 5 OF 24

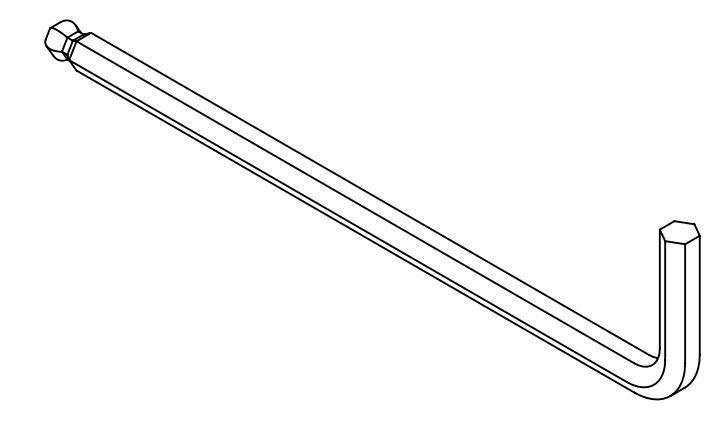
9. INSTALL WIRE CLAMP ADJUSTMENT BLOCKS BEFORE TURRET.

D060403 Advanced LIGO, SUS, Quad N-P-type Top Mass - MAIN CHAN, PAR FDM REV: X-037, DRAWING PDM REV: X-033

ASSY. STEP 5: ATTACH WIRE CLAMP ADJUSTMENT BLOCKS TO BASE PLATE.



ISO VIEW, UNDERSIDE



- 10 USE STANDARD 3/16" HEX L ALLEN WRENCH.
- 11 TORQUE TO 10 LB / FT.

- 12 ITEM NO. 1 (ADJUSTMENT BLOCK), NEEDS TO BE ALIGNED WITH TEMPORARY DOWEL PINS (ITEM NO. 2 OR EQ).
- 12.1 1/4-20 HELICOIL BREAK OFF TOOL MAY BE USED FOR ALIGNMENT PURPOSES. (OPTIONAL).

ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	QTY.
3	C-2016-N UC COMPONENTS OR EQ.	SCREW, SHC, 1/4-20 x 1" LG.	18-8 SSSL	4
2	TD-1084-727	DOWEL PIN, 5mm DIA. X 13mm Lg.	Material <not specified>	4
1	D060420	ALIGO, SUS. TOP MASS QUAD N-PYTYPE, WIRE CLAMP ADJUSTMENT BLOCK	6061-T6 Al	2

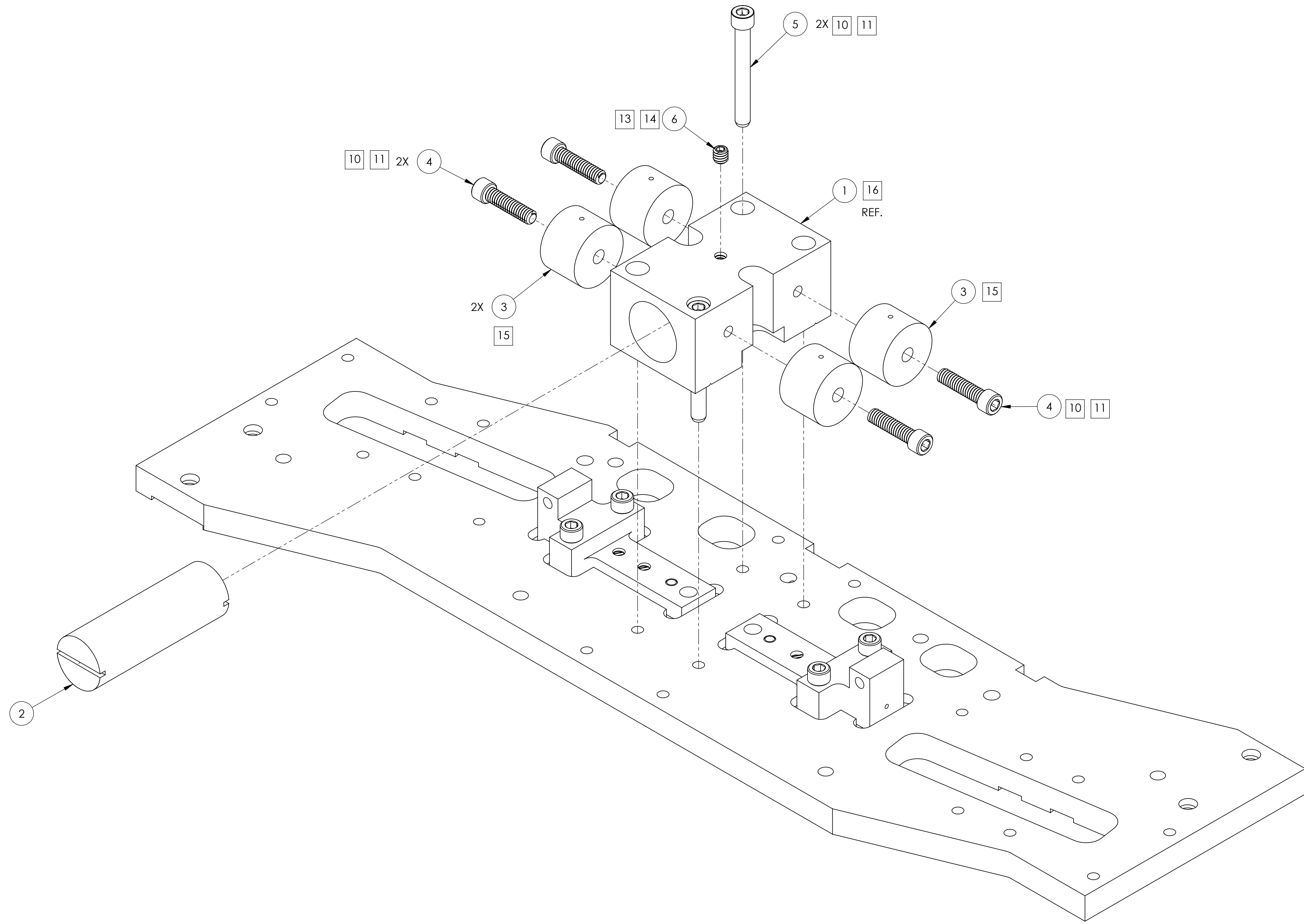
LIGO CALIFORNIA INSTITUTE OF TECHNOLOGY
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SIZE DWG. NO. **D060403** REV. **v8**

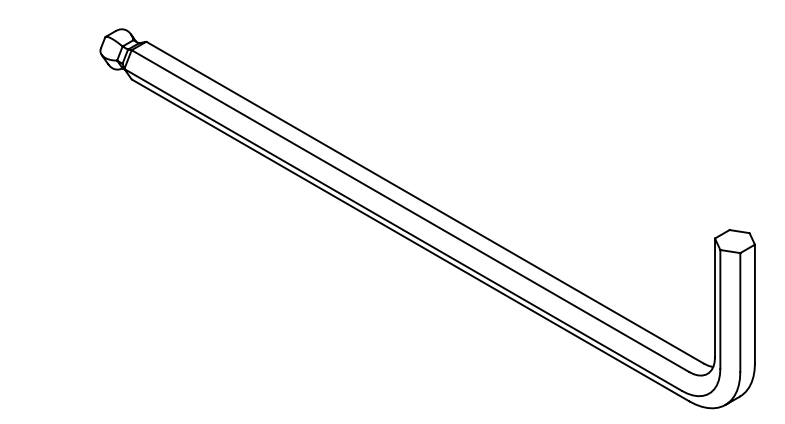
SCALE: 1:1 PROJECTION: SHEET 6 OF 24

D060403 Advanced UGEO.SUS. Good HP Pipe Top Miss - MAIN CHAN. PARF PDM REV. X-037. DRAWING PDM REV. X-033

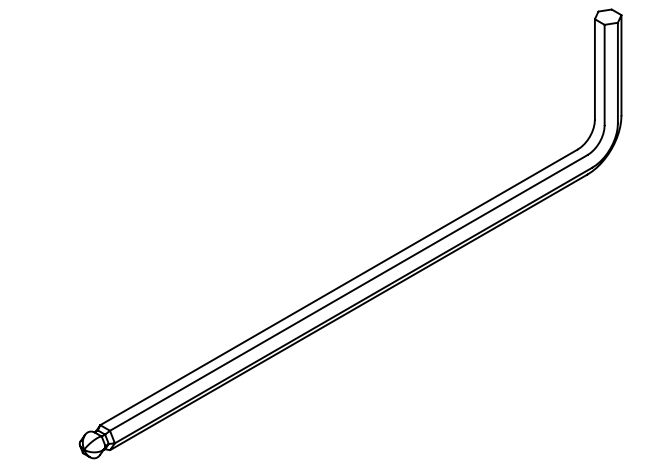
ASSY. STEP 6: ADD PITCH ADJUSTER COMPONENTS TO BASE PLATE.



ISO VIEW, UNDERSIDE



10 USE STANDARD 3/16" HEX L ALLEN WRENCH.
11 TORQUE TO 10 LB / FT.



13 USE STANDARD 1/8" HEX L ALLEN WRENCH.
14 TORQUE TO 8 LB / FT.

15 EXACT QUANTITY OF ADDED MASS WILL NEED TO BE WORKED OUT AT END.

16 CHECK ALL THREADS BEFORE MOUNTING TURRET.

ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	QTY.
6	94355A533 McMASTER-CARR OR EQ.	SET SCREW, 1/4-20 X .25 LG.	18-8 SSSL	1
5	C-2032-NA UC COMPONENTS OR EQ.	SHCS, 1/4-20 x 2" LG., Ag PLATED	Ag-PLATED 300 SSSL	2
4	C-2016-NA UC COMPONENTS OR EQ.	SCREW, SHC, 1/4-20 x 1.0 LG, Ag PLATED	Ag-PLATED 300 SSSL	4
3	D060359-100	MASS, αLIGO SUS, 100g	316 SSSL	4
2	D060405	αLIGO, SUS, QUAD N-PYYPE TOP MASS, PITCH ADJUSTER	304 SSSL	1
1	D060398	αLIGO, SUS, TOP MASS QUAD N-PYYPE PITCH ADJUSTER & MASS ADJUSTER TURRET	6061-T6 Al	1

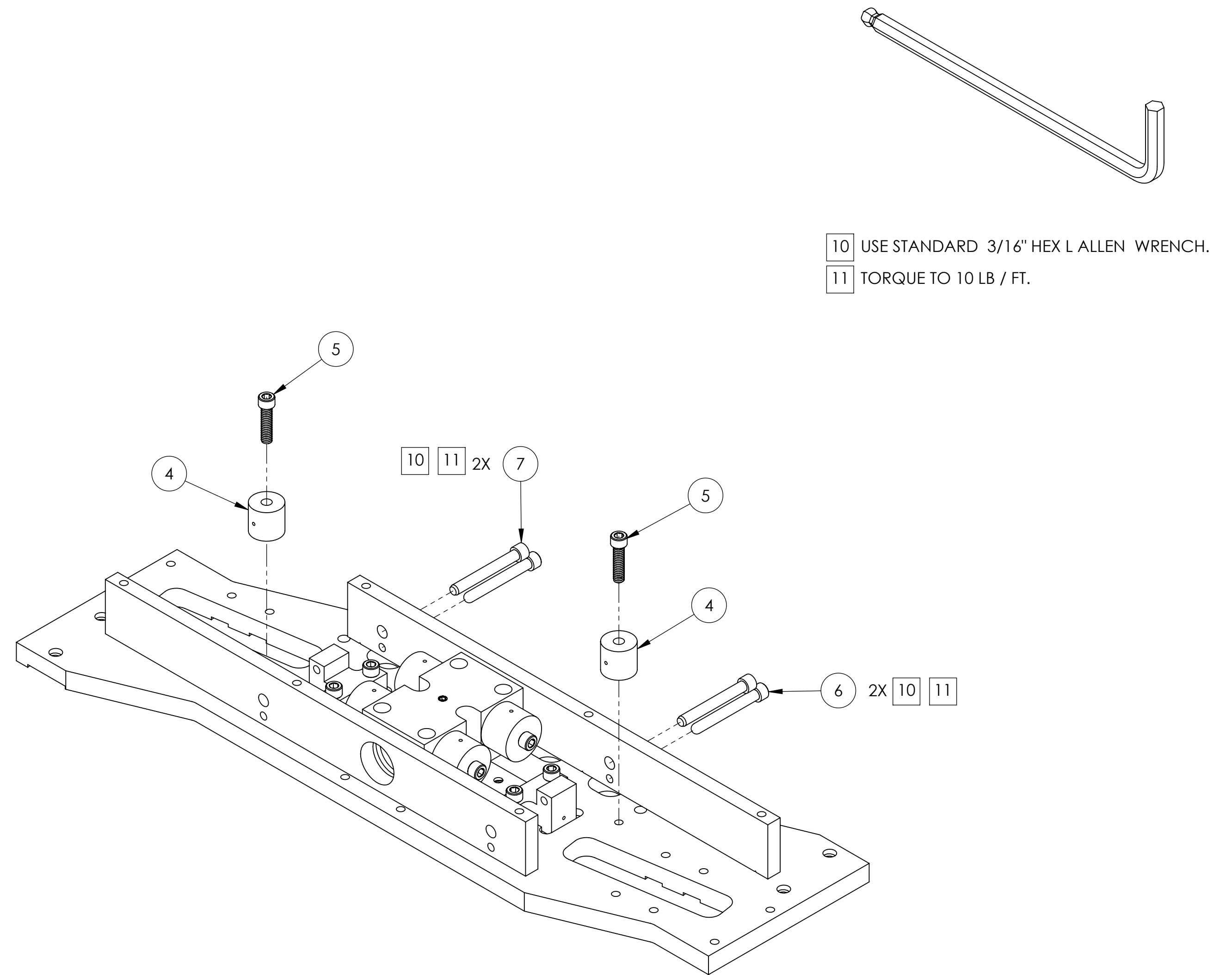
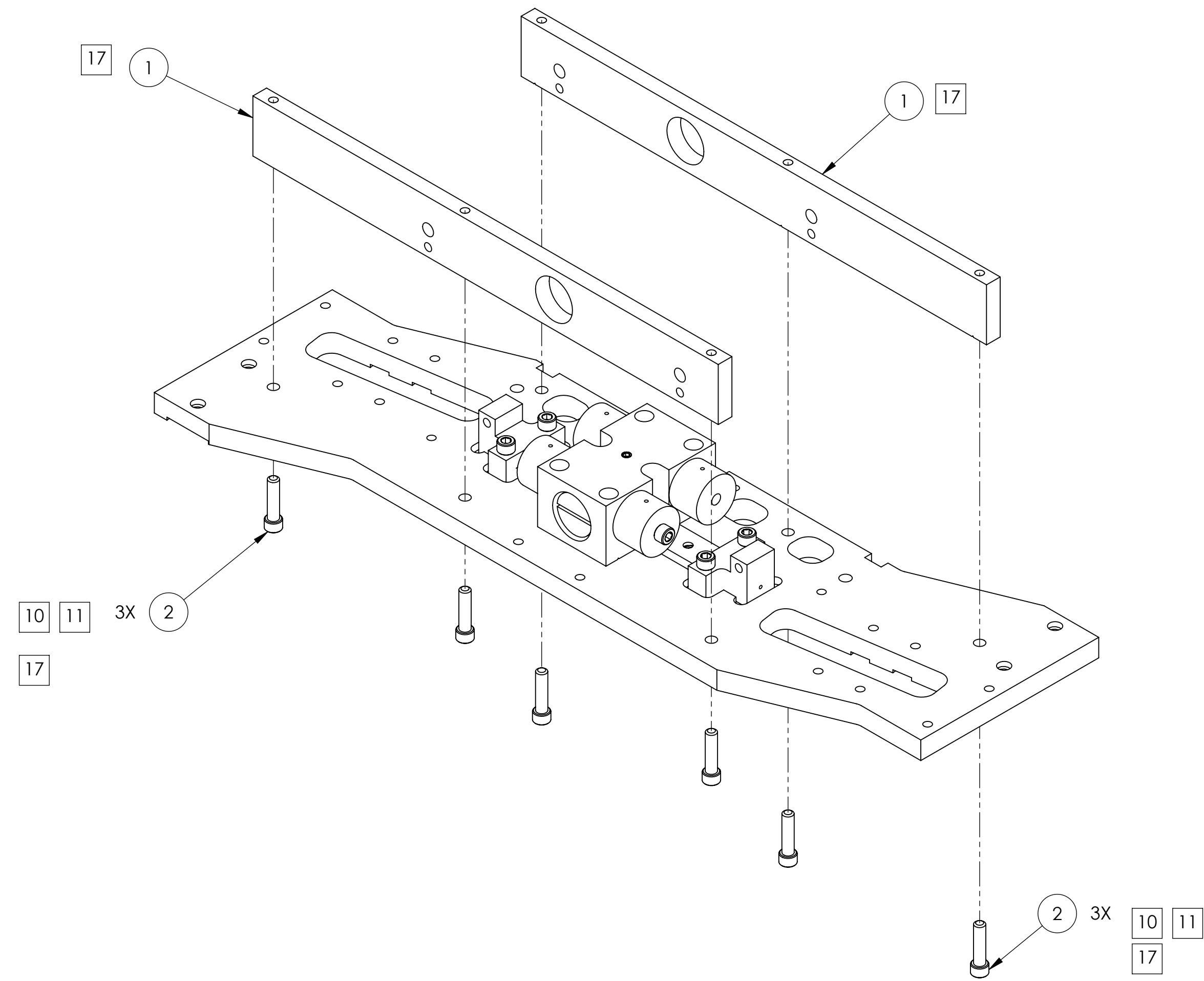
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SIZE DWG. NO. **D060403** REV. **v8**

SCALE: 1:1 PROJECTION: SHEET 7 OF 24

D060403 Advanced LIGO, SUS, Quad N-PTYPE Top Mass - MAIN CHAIN, PART PDM REV. X-027, DRAWING PDM REV. X-003

ASSY. STEP 7: ADD BASE PLATE STIFFENERS.



10 USE STANDARD 3/16" HEX L ALLEN WRENCH.
 11 TORQUE TO 10 LB / FT.

17 CHECK SURFACE FIT BETWEEN BASE PLATE AND ITEM NO. 1 (STIFFENERS) - VARIATIONS CAN BE TAKEN OUT WHEN DRAWING DOWN MOUNTING BOLTS.

ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	QTY.
7	C-2032-N UC COMPONENTS OR EQ.	SHCS, 1/4-20 x 2" L, 18-8 SSSL	18-8 SSSL	2
6		SCREW, SHC, 1/4-20 X 2.00, ROUNDED END	300 SSSL	2
5	C-2016-NA UC COMPONENTS OR EQ.	SCREW, SHC, 1/4-20 x 1.0 LG, Ag PLATED	Ag-PLATED 300 SSSL	2
4	D060359-050	ALIGO, SUS, QUAD N-PYTYPE, ADDITIONAL MASS, 50 G	304 SSSL	2
3	D060398	ALIGO, SUS, TOP MASS QUAD N-PYTYPE PITCH ADJUSTER & MASS ADJUSTER TURRET	6061-T6 Al	1
2	C-2016-N UC COMPONENTS OR EQ.	SCREW, SHC, 1/4-20 x 1" LG.	18-8 SSSL	6
1	D060406	Advanced LIGO, SUS, Quad N-Plype Top Mass, BASE PLATE STIFFENER	6061-T6 Al	2

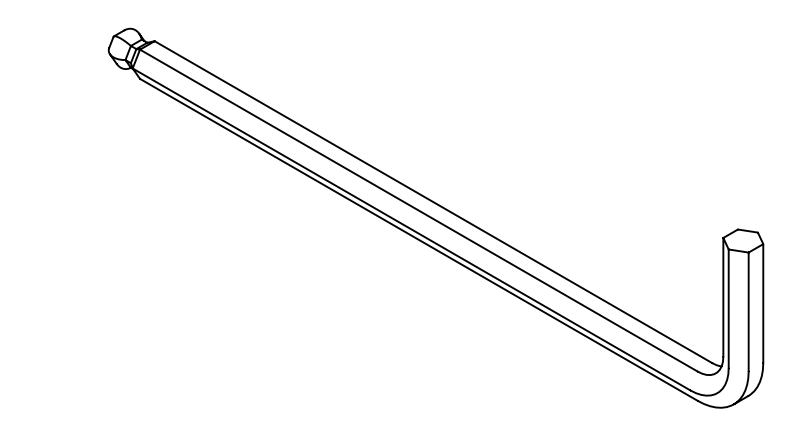
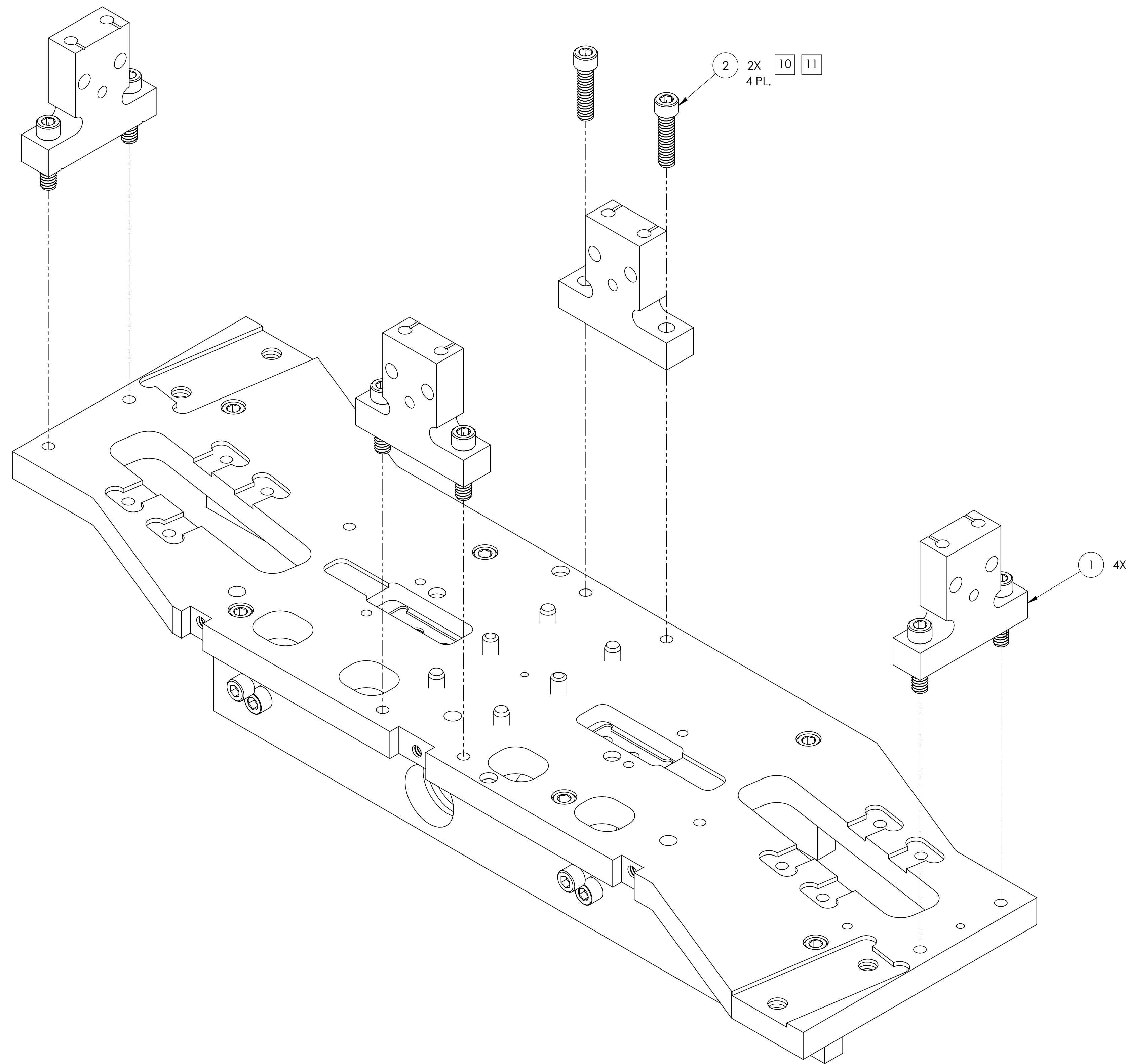
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SIZE DWG. NO. **D060403** REV. **v8**

SCALE: 1:1 PROJECTION: SHEET 8 OF 24

D060403 Advanced LIGO, SUS, Quad N-Plype Top Mass - MAIN CHAN, PARF PDM REV: X-057, DRAWING PDM REV: X-003

ASSY. STEP 8: ADD TOP MASS SPACERS.



10 USE STANDARD 3/16" HEX L ALLEN WRENCH.
 11 TORQUE TO 10 LB / FT.

ISO VIEW, FRONT RIGHT

ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	QTY.
2	C-2016-NA UC COMPONENTS OR EQ.	SCREW, SHC, 1/4-20 x 1.0 LG, Ag PLATED	Ag-PLATED 300 SSSL	8
1	D060397	gLIGO, SUS, TOP MASS QUAD N-P-TYPE, TOP MASS SPACER	304 SSSL	4

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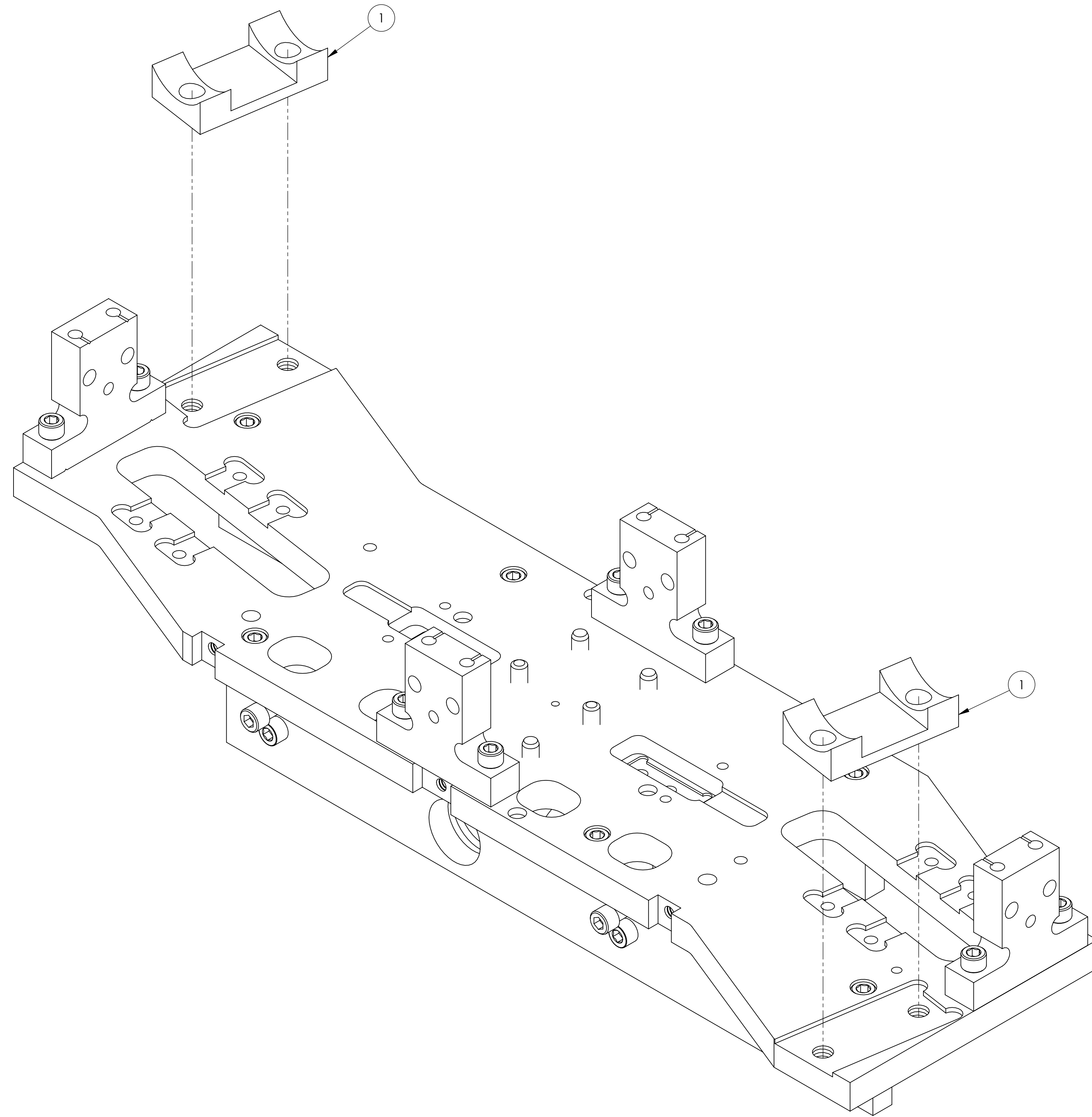
SIZE DWG. NO. **D060403** REV. **v8**

SCALE: 1:1 PROJECTION: SHEET 9 OF 24

D060403 Advanced LIGO, SUS, Quad N-P-Type Top Mass - MAIN CHAN, PARF PDM REV: X-037, DRAWING PDM REV: X-033

ASSY. STEP 9: INSTALL BLADE TIP Z POSITION ADJUSTER

(MAY REQUIRE TAPPING IN WITH SOFT HEAD HAMMER)



ISO VIEW, FRONT RIGHT

ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	QTY.
1	D060414	Advanced LIGO, SUS, Quad N-Plane Top Mass, BLADE TIP Z POSITION ADJ (BTM HALF PART 2)	6061-T6 Al	2

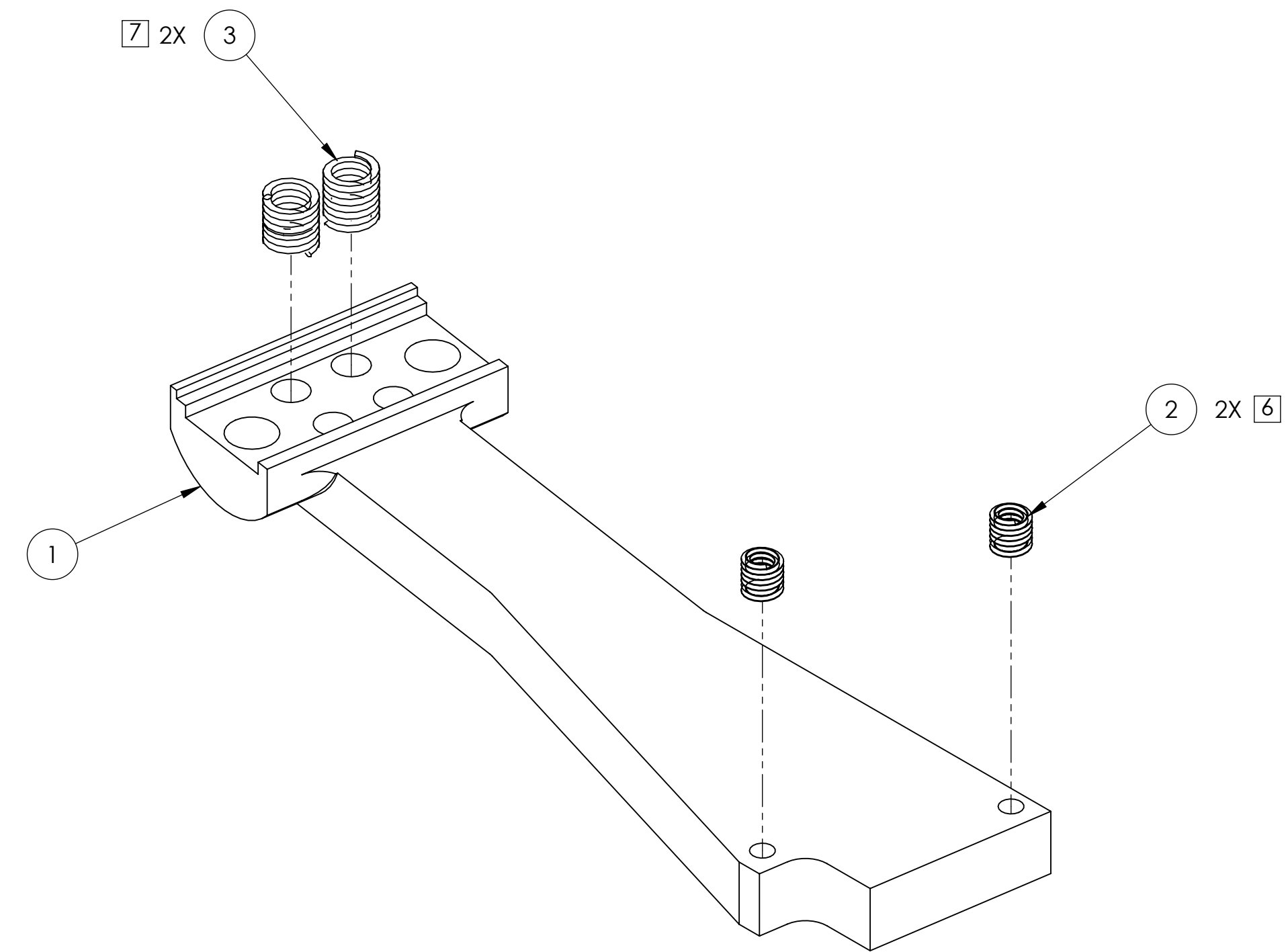
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SIZE DWG. NO. REV.
D **D060403** v8

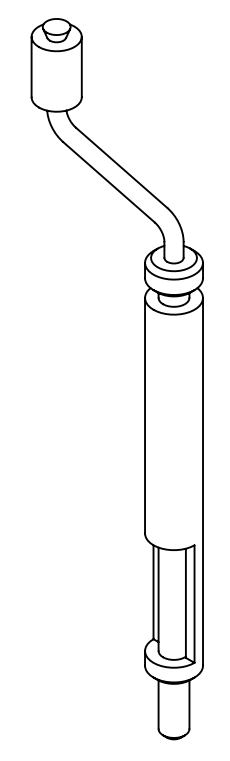
SCALE: 1:1 PROJECTION: SHEET 10 OF 24

D060403 Advanced LIGO, SUS, Quad N-Plane Top Mass - MAIN CHAN, PAR FDM REV: X-037, DRAWING PDM REV: X-033

ASSY. STEP 10: ADD THREADED INSERTS INTO BLADE ADJUSTER. (2 OFF)



ISO VIEW, FRONT RIGHT



- 6 USE 1/4 HELICOIL INSERTION TOOL.
- 7 USE 3/8 HELICOIL INSERTION TOOL.

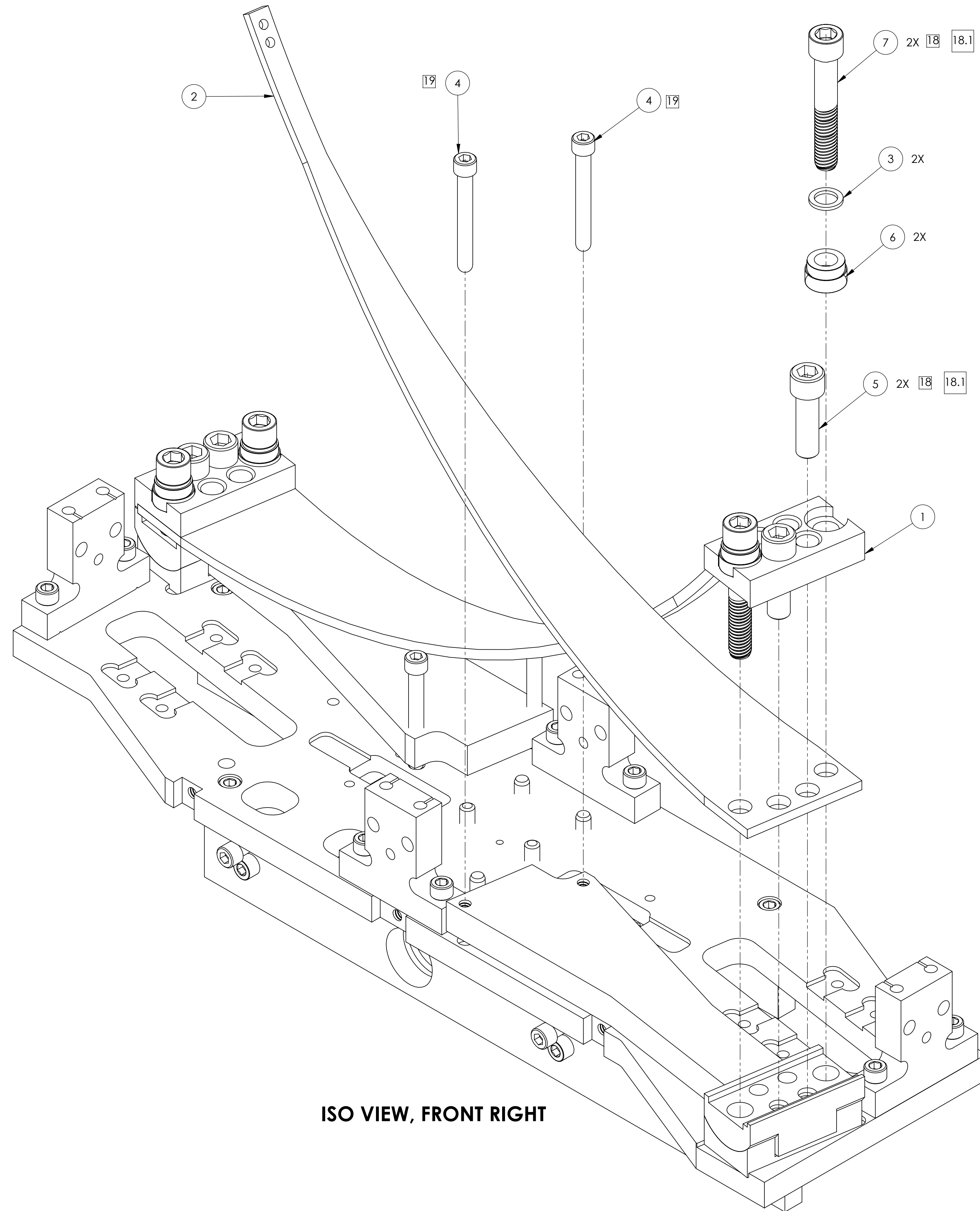
ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	QTY.
3	1185-6EN562 EMHART OR EQ.	HELICOIL, 3/8-16 X .562 LG.	NITRONIC 60	2
2	1185-4EN375 EMHART OR EQ.	HELICOIL, 1/4-20 X .375 LG.	NITRONIC 60	2
1	D060415	Advanced LIGO, SUS, Quad N-Ptype Top Mass, BLADE TIP Z POSITION ADJ (BTM HALF)	304 SSSL	1

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SIZE	DWG. NO.	REV.
D	D060403	v8
SCALE: 1:1	PROJECTION:	SHEET 11 OF 24

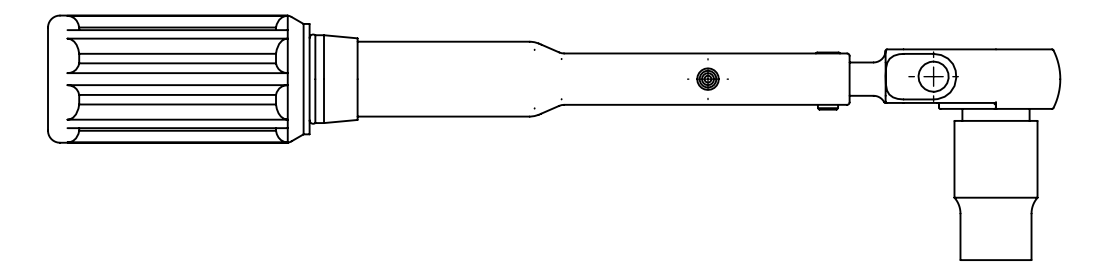
D060403 Advanced LIGO, SUS, Quad N-Ptype Top Mass - MAIN CHAN, PARF FDM REV: X-037, DRAWING PDM REV: X-033

ASSY. STEP 11: ASSEMBLE BLADE INTO BLADE CLAMP (2 OFF)



ISO VIEW, FRONT RIGHT

10 USE STANDARD 3/16" HEX L ALLEN WRENCH.
11 TORQUE TO 10 LB / FT.



18 5/16 TORQUE WRENCH.
18.1 TORQUE TO 40 LB / FT.

19 ROUND TRIP PROTUDES 8 - 10mm.

ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	QTY.
7	MS16995-86 OR EQ.	SCREW, SHC, 3/8-16 X 2.25 LG.	300 SSSL	4
6	91944A030 McMASTER-CARR OR EQ.	LEVELING WASHER, 3/8" SCREW SIZE	18-8 SSSL	4
5	C-1620-NA UC COMPONENTS OR EQ.	SCREW, SHC, 3/8-16 X 1.25 LG. (Ag PLATED)	Ag-PLATED 300 SSSL	4
4		SCREW, SHC, 1/4-20 X 2.00, ROUNDED END	300 SSSL	4
3	D1100785-562	WASHER, FLAT, .38 X .562 O.D.	NITRONIC 60	4
2	D060236	ADV LIGO, SUS, QUAD N-PType TOP MASS, MIDDLE BLADE SPRING	MARAGING STEEL C250	2
1	D060404	Advanced LIGO, SUS, Quad N-Ptype Top Mass, BLADE CLAMP (TOP Half)	304, 316 OR 302 SSSL	2

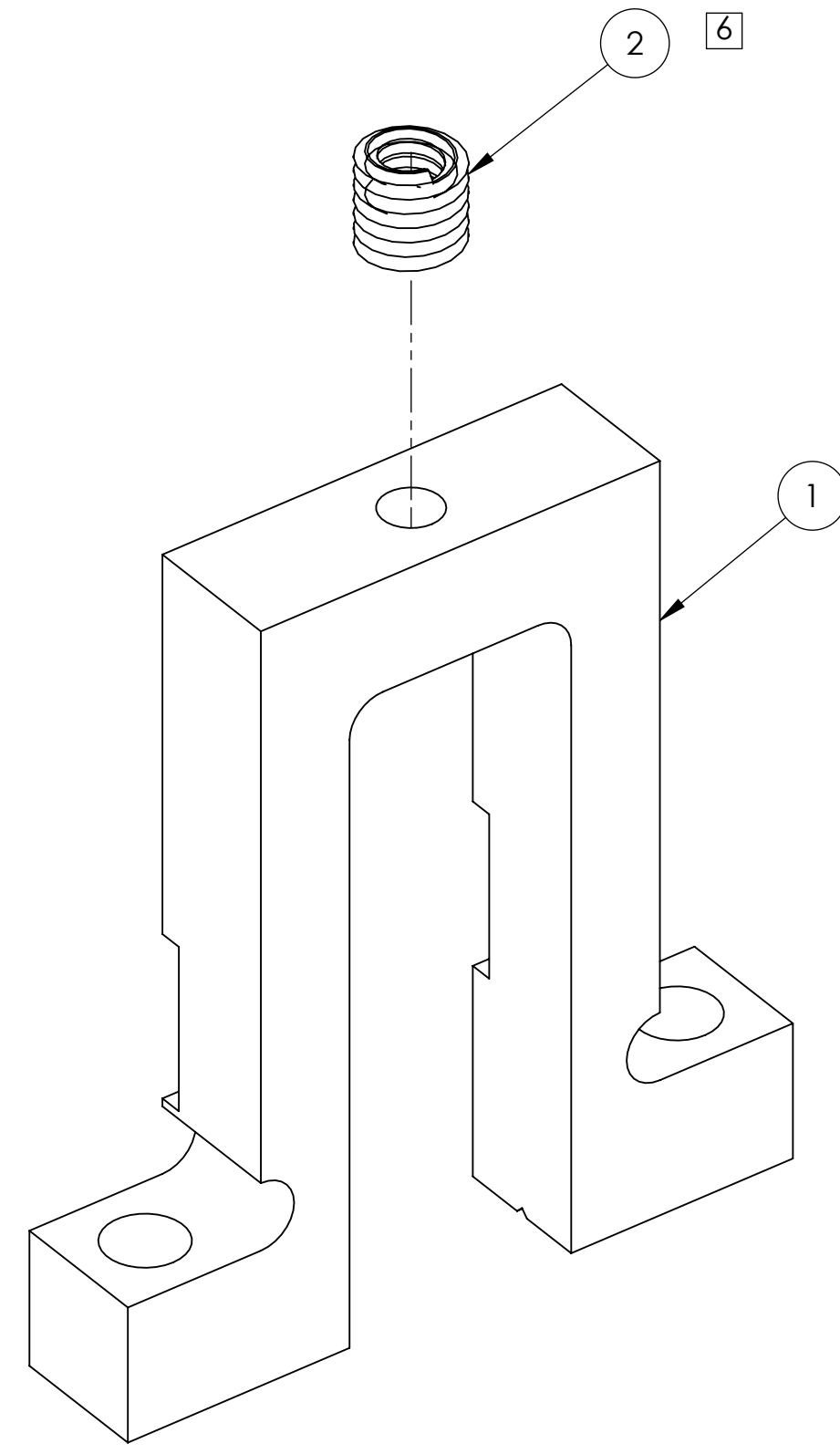
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SIZE DWG. NO. REV.
D D060403 v8

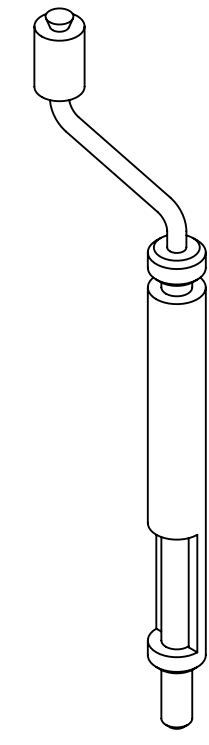
SCALE: 1:1 PROJECTION: SHEET 12 OF 24

D060403 Advanced LIGO, SUS, Quad N-Ptype Top Mass - MAIN CHAIN - PART FDM REV. X-037. DRAWING PDM REV. X-033

ASSY. STEP 12: ADD THREADED INSERTS INTO STOP BRIDGE (4 OFF)



ISO VIEW



6 USE 1/4 HELICOIL INSERTION TOOL.

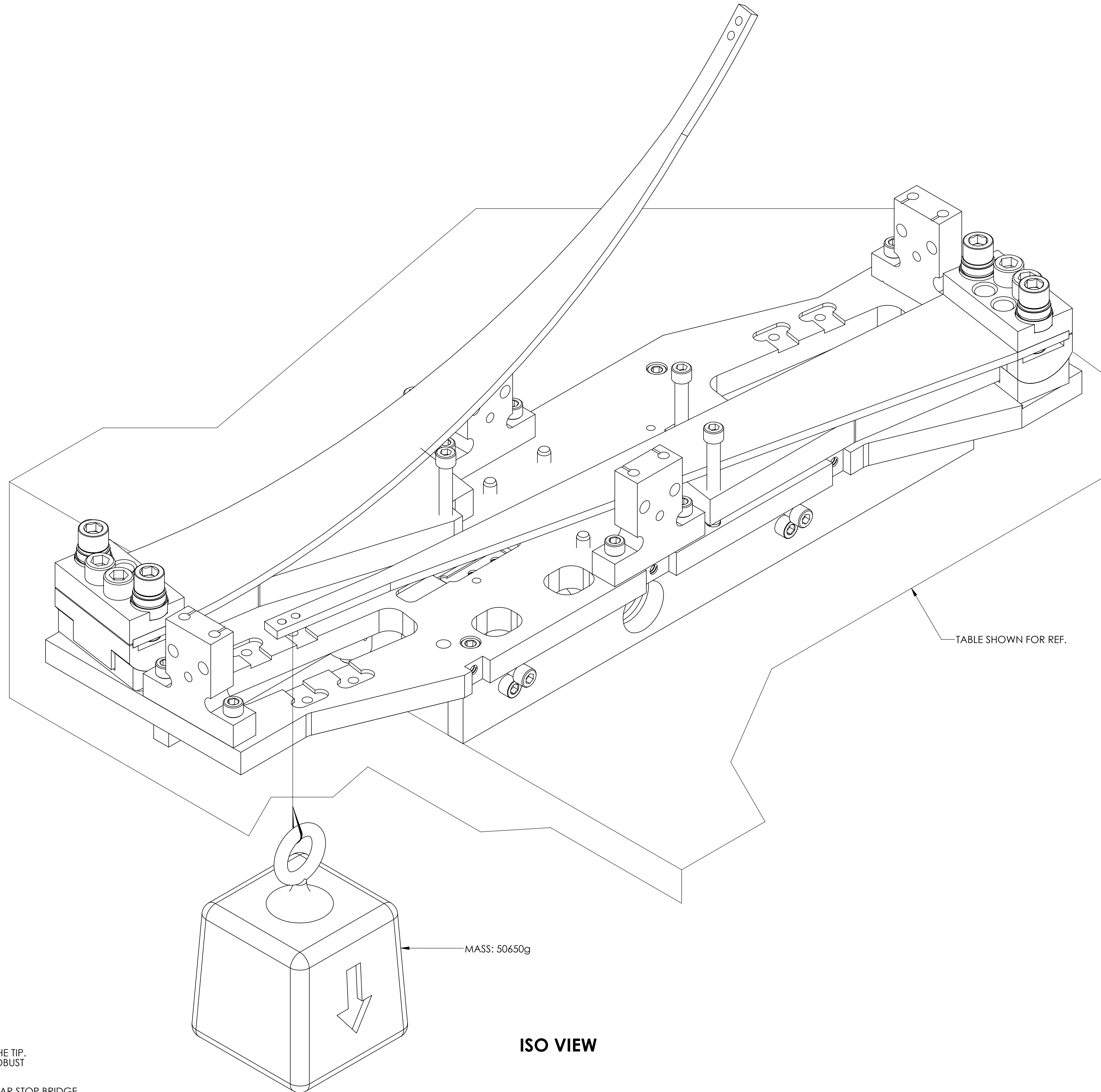
ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	QTY.
2	1185-4EN375 EMHART OR EQ.	HELICOIL, 1/4-20 X .375 LG.	NITRONIC 60	4
1	D060399	øLIGO, SUS, QUAD TOP MASS N-PTYPE, STOP BRIDGE	6061-T6 Al	4

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SIZE	DWG. NO.	REV.
D	D060403	v8
SCALE: 1:1	PROJECTION:	SHEET 13 OF 24

D060403 Advanced LIGO, SUS, Quad N-PTYPE Top Mass - MAIN CHAN, PAR FDM REV: X-037, DRAWING PDM REV: X-033

ASSY. STEP 13: STRAIGHTEN FIRST BLADE



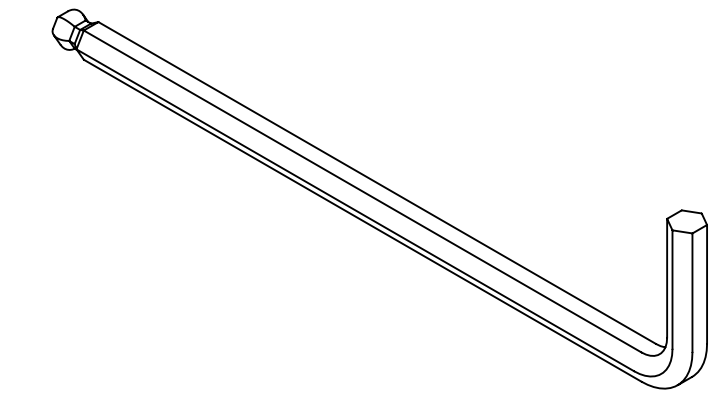
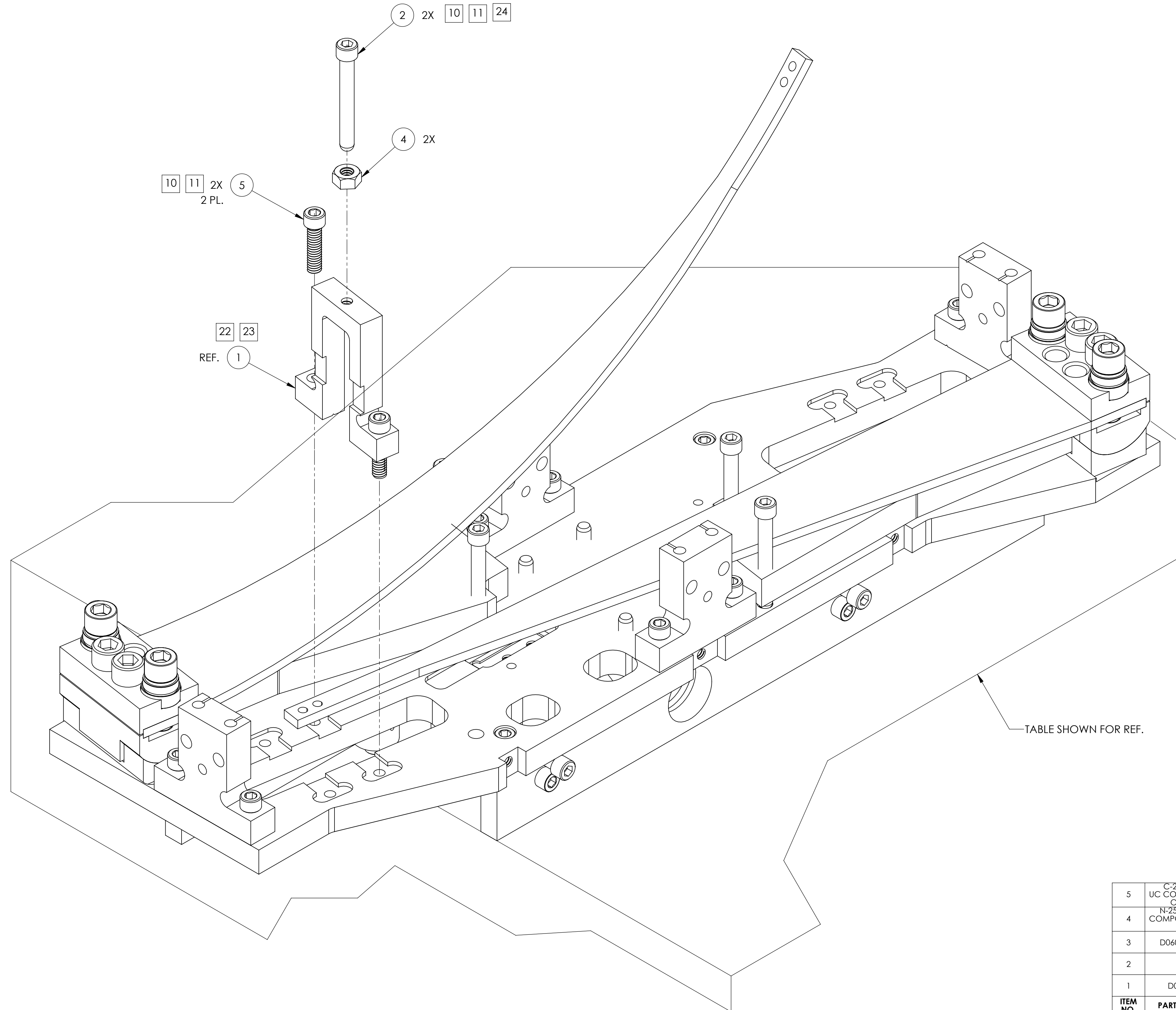
- 20. PULL THE FIRST BLADE FLAT BY HANGING MASS FROM THE TIP. ENSURE THAT THE MASS IS SECURELY CLAMPED TO A ROBUST TABLE DURING THIS PROCEDURE.
- 21. PUT WIRE CLAMP TOOLING IN OUTBOARD HOLE TO CLEAR STOP BRIDGE.

ISO VIEW

CALIFORNIA INSTITUTE OF TECHNOLOGY MASSACHUSETTS INSTITUTE OF TECHNOLOGY		REV.
SIZE	DWG. NO.	REV.
D	D060403	v8
SCALE: 1:1	PROJECTION:	SHEET 14 OF 24

D060403 Advanced LIGO, SLS, Good11rType Top Mass - MAIN CHAIN - PART FDM REV: X-037, DRAWING PDM REV: X-033

**ASSY. STEP 14: ADD STOP BRIDGE.
(NOTE POSITION OF STOP)
REPEAT LAST TWO STEPS FOR REMAINING BLADE.**



10 USE STANDARD 3/16" HEX L ALLEN WRENCH.
11 TORQUE TO 10 LB / FT.

TABLE SHOWN FOR REF.

ISO VIEW

ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	QTY.
5	C-2016-NA UC COMPONENTS OR EQ. N-2520-A UC COMPONENTS OR EQ.	SCREW, SHC, 1/4-20 x 1.0 LG, Ag PLATED	Ag-PLATED 300 SSSL	4
4		HEX NUT 1/4-20, Ag PLATED	Ag-PLATED 300 SSSL	2
3	D060359-050	ALIGO, SUS, QUAD N-PYTYPE, ADDITIONAL MASS, 50 G	304 SSSL	2
2		SCREW, SHC, 1/4-20 X 2.00 , ROUNDED END	300 SSSL	2
1	D060399	ALIGO, SUS, QUAD TOP MASS N-PYTYPE, STOP BRIDGE	6061-T6 Al	2

- 22 9.6mm - FROM TOP CUT IN STOP BRIDGE TO BLADE.
- 23 USE 5mm BLCOK TO SET BLADE ANGLE TO STOP BRIDGE SIDE TO SIDE.
- 24 ITEM NO. 2 ROUND TIP TO TOUCH BLADE.

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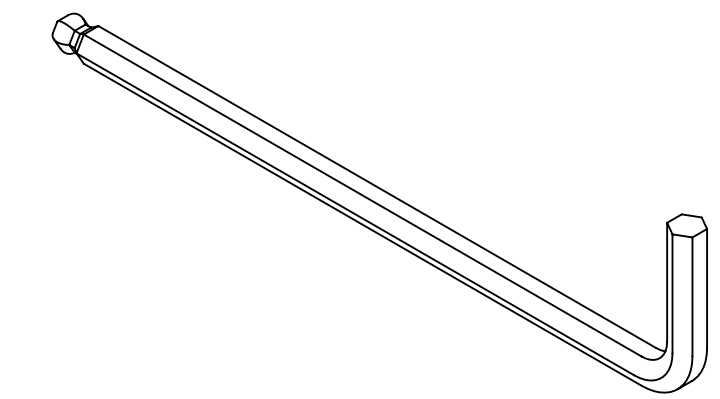
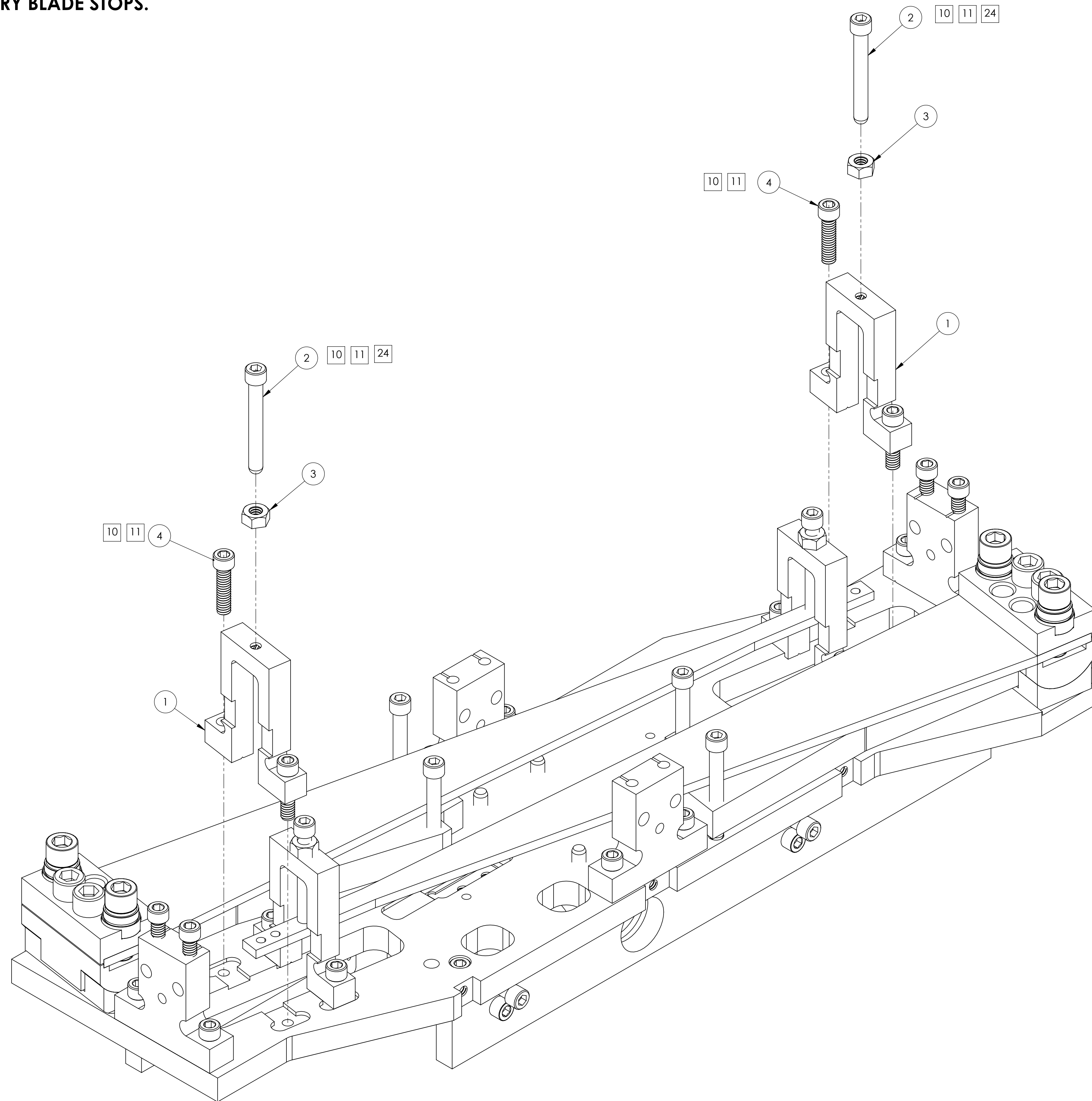
SIZE DWG. NO. **D060403** REV. **v8**

SCALE: 1:1 PROJECTION: SHEET 15 OF 24

D060403 Advntech LLC, SJS, Covid-19 Type Top Mass - MAIN CHAN, PART PDM REV: X-057, DRAWING PDM REV: X-003

ASSY. STEP 15: ADD SECONDARY BLADE STOPS.

****STOP HERE FOR CREAK BAKE****



- 10 USE STANDARD 3/16" HEX L ALLEN WRENCH.
- 11 TORQUE TO 10 LB / FT.

ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	Qty.
4	C-2016-NA UC COMPONENTS OR EQ.	SCREW, SHC, 1/4-20 x 1.0 LG, Ag PLATED	Ag-PLATED 300 SSSL	4
3	N-2520-A UC COMPONENTS OR EQ.	HEX NUT 1/4-20, Ag PLATED	Ag-PLATED 300 SSSL	2
2		SCREW, SHC, 1/4-20 X 2.00 , ROUNDED END	300 SSSL	2
1	D060399	gLIGO, SUS, QUAD TOP MASS N-PTYPE, STOP BRIDGE	6061-T6 Al	2
		PARTS LIST		
		Assy. Step 15/QTY.		

ISO VIEW

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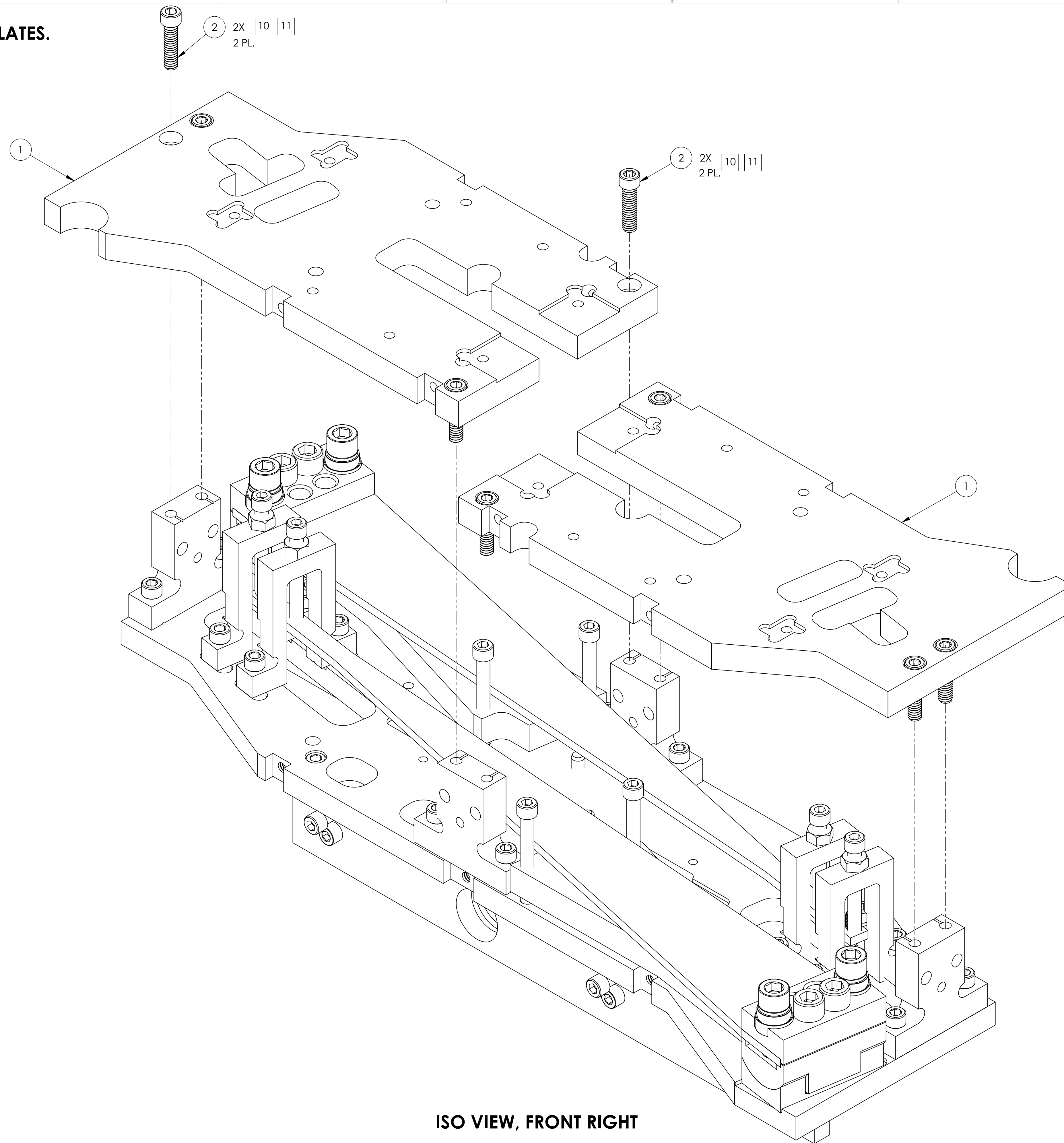
SIZE DWG. NO. **D060403** REV. **v8**

SCALE: 1:1 PROJECTION: SHEET 16 OF 24

24 ITEM NO. 2 ROUND TIP TO TOUCH BLADE.

D060403 Advanced LIGO, SUS, Quad N-PTYPE Top Mass - MAIN CHAN, PARF PDM REV: X-037, DRAWING PDM REV: X-003

ASSY. STEP 16: ADD TOP PLATES.



10 USE STANDARD 3/16" HEX L ALLEN WRENCH.
 11 TORQUE TO 10 LB / FT.

ISO VIEW, FRONT RIGHT

ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	QTY.
2	C-2016-NA UC COMPONENTS OR EQ.	SCREW, SHC, 1/4-20 x 1.0 LG, Ag PLATED	Ag-PLATED 300 SSSL	8
1	D060411	Advanced LIGO, SUS, Quad N-Ptype Top Mass, TOP PLATE	304 SSSL	2

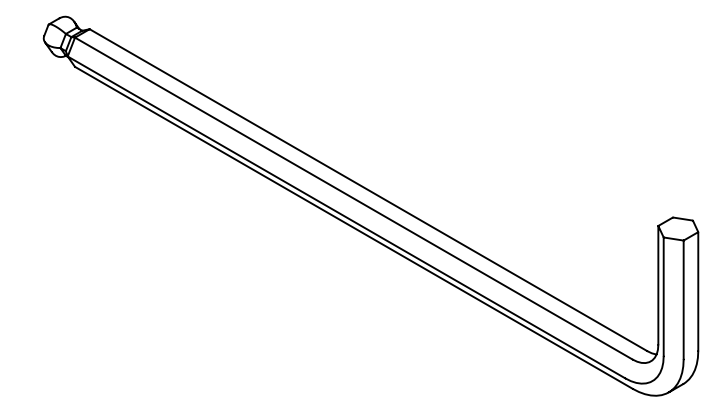
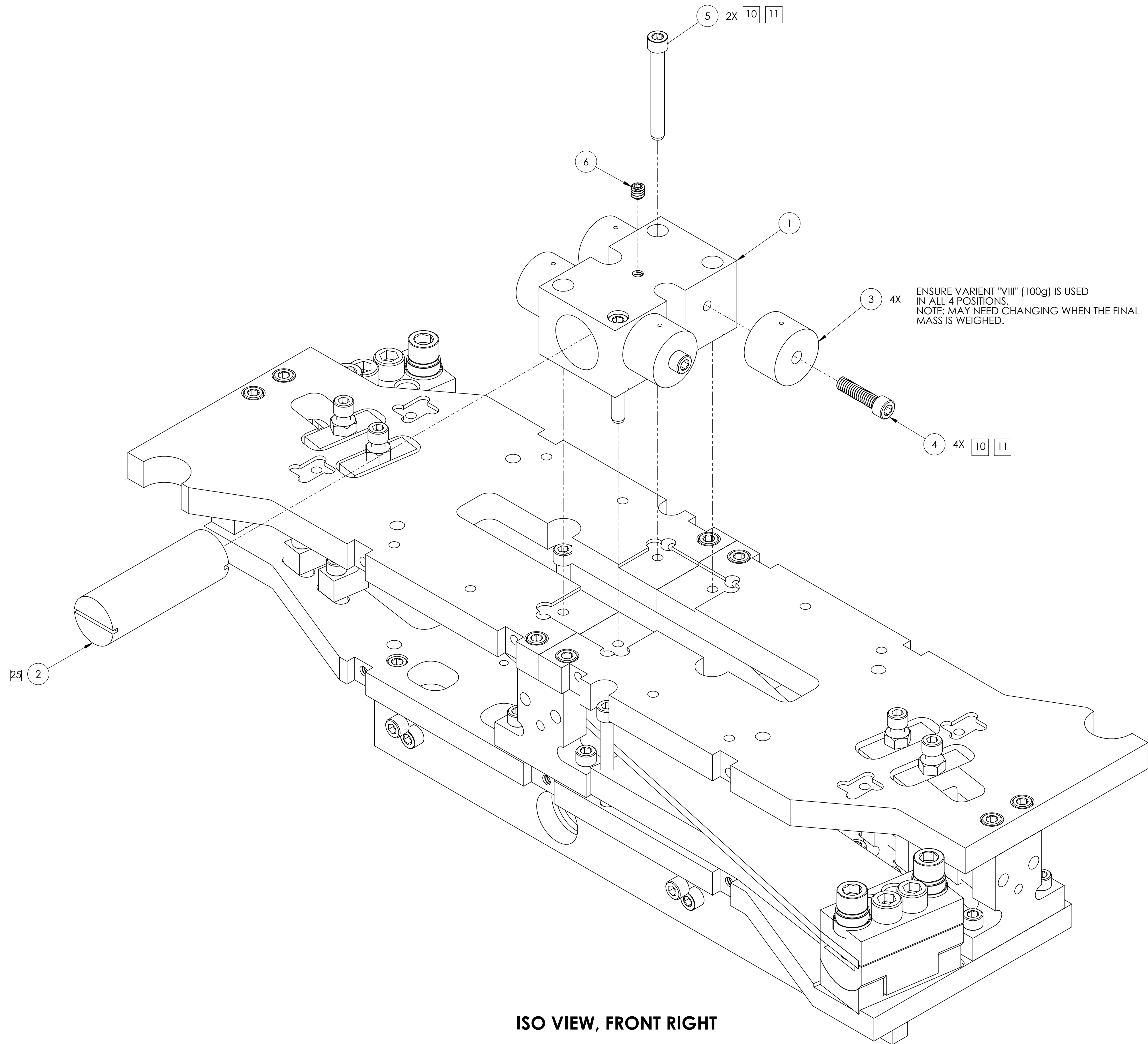
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SIZE DWG. NO. **D060403** REV. **v8**

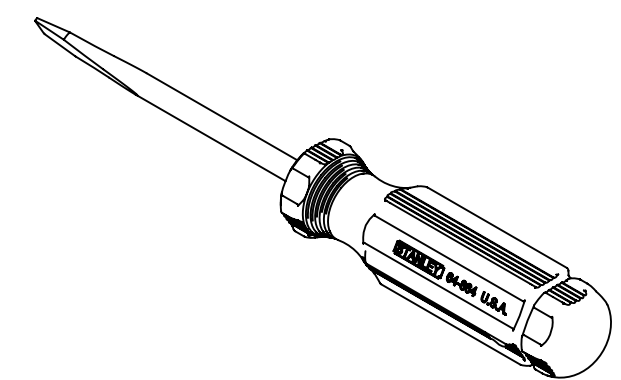
SCALE: 1:1 PROJECTION: SHEET 17 OF 24

D060403 Advanced LIGO, SUS, Quad N-Ptype Top Mass - MAIN CHAIN - PART PDM REV: X-037, DRAWING PDM REV: X-033

ASSY. STEP 17: ADD TOP PITCH ADJUSTER.



10 USE STANDARD 3/16" HEX L ALLEN WRENCH.
11 TORQUE TO 10 LB / FT.



25 FLAT BLADE SCREW DRIVER

25 INSERT ITEM NO. 6 (ADJUSTER) INTO ITEM NO. 1 (TURRET), UNTIL IT IS CENTRAL IN THE BLOCK

ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	QTY.
6	94355A533 McMASTER-CARR OR EQ.	SET SCREW, 1/4-20 X .25 LG.	18-8 SSSL	1
5	C-2032-NA UC COMPONENTS OR EQ.	SHCS, 1/4-20 x 2" LG., Ag PLATED	Ag-PLATED 300 SSSL	2
4	C-2016-NA UC COMPONENTS OR EQ.	SCREW, SHC, 1/4-20 x 1.0 LG, Ag PLATED	Ag-PLATED 300 SSSL	4
3	D060359-100	MASS, qLIGO SUS, 100g	316 SSSL	4
2	D060405	qLIGO, SUS, QUAD N-PTYPE TOP MASS, PITCH ADJUSTER	304 SSSL	1
1	D060398	qLIGO, SUS, TOP MASS QUAD N-PTYPE, PITCH ADJUSTER & MASS ADJUSTER TURRET	6061-T6 Al	1

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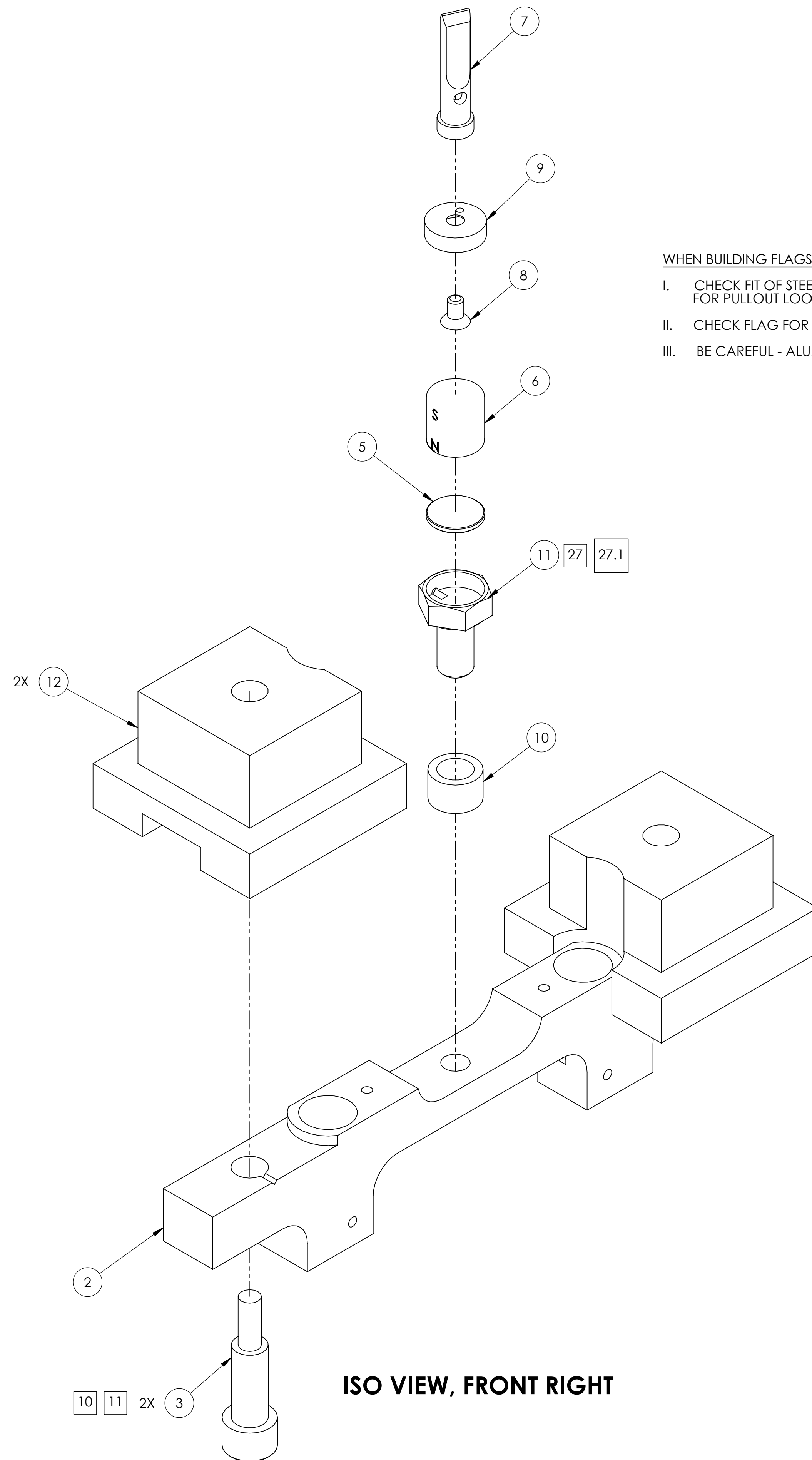
SIZE DWG. NO. **D060403** REV. **v8**

SCALE: 1:1 PROJECTION: SHEET 18 OF 24

ISO VIEW, FRONT RIGHT

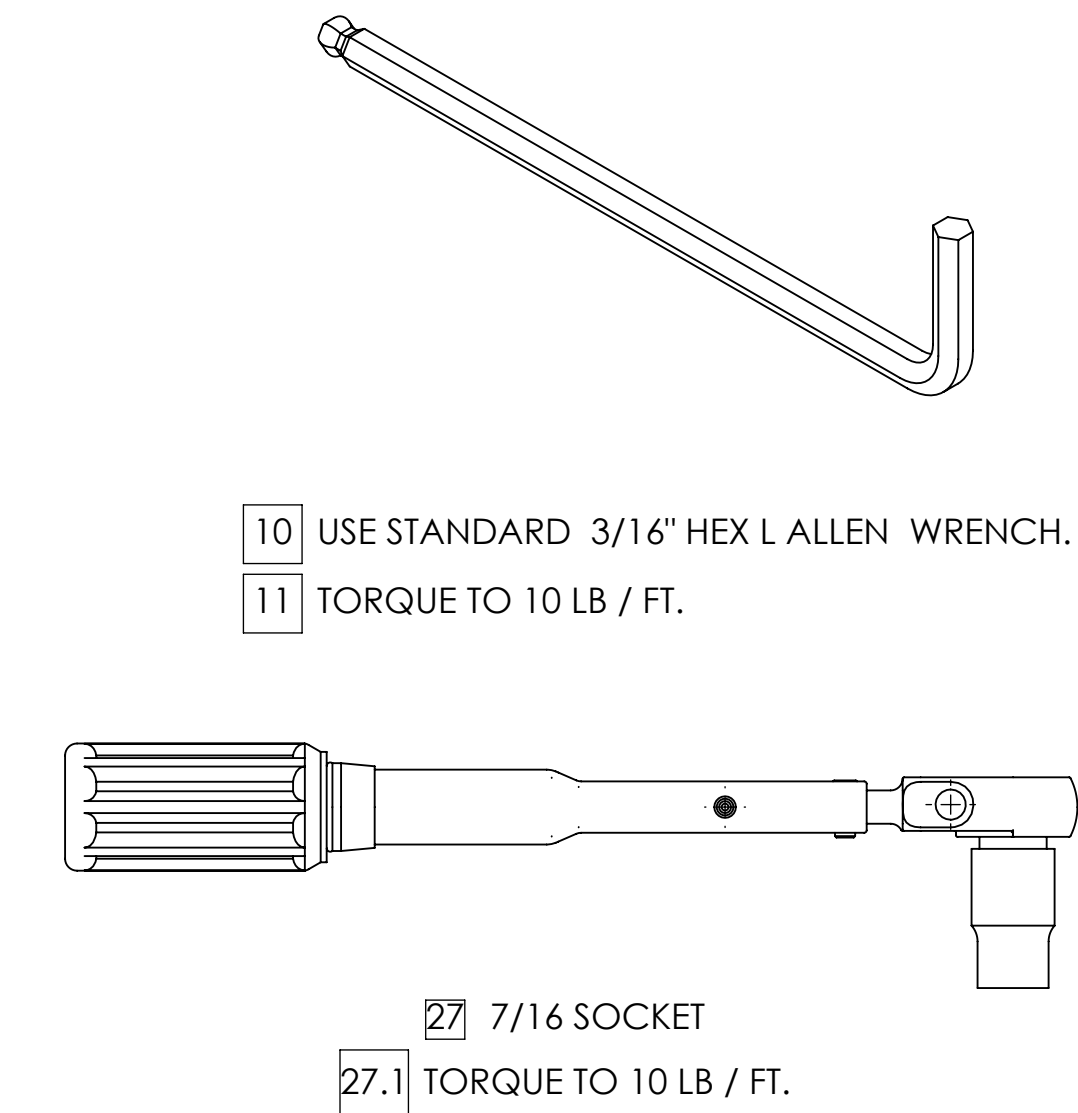
D060403 Advanced UCO, SUS, Quad N-Type Top Mass - MAIN CHAN, PARF PDM REV: X-057, DRAWING PDM REV: X-003

ASSY. STEP 18: ASSEMBLE BACKBONE W/ FLAGS. (4 OFF)



WHEN BUILDING FLAGS:

- I. CHECK FIT OF STEEL DISK INTO MOUNT WITH MAGNET FOR PULLOUT LOOSE DISK.
- II. CHECK FLAG FOR TRUE ALIGNMENT.
- III. BE CAREFUL - ALUMINUM MOUNTS ARE FRAGILE.



10 USE STANDARD 3/16" HEX L ALLEN WRENCH.
11 TORQUE TO 10 LB / FT.

27 7/16 SOCKET
27.1 TORQUE TO 10 LB / FT.

ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	QTY.
12	D1200749	AL Mass Replacement for ECD Magnet Assembly	6061-T6 Al	2
11	D1003127	ALIGO, SUS, TOP MAS QUAD, MAGNET RETAINER	304, 316 OR 302 SSSL	1
10	D1003126	ALIGO, SUS, TOP MASS, FLAG SPACER	6061-T6 Al	1
9	D1100574	BOSEM FLAT FLAG DISK ALIGO SUS	416 SSSL	1
8	96877A198 McMASTER-CARR OR EQ.	SCREW, FLAT HEAD 4-40 X 3/16 LG	18-8 SSSL	1
7	D1100573	BOSEM FLAG, ALIGO SUS	6061-T6 Al	1
6	D0901344	10 MM DIA X 10 MM MAGNET	NEO 35 (NdFeB)	1
5	D060401	MAGNET PLUG, ALIGO SUS	416 SSSL	1
4	D060416	Magnet and Flag Assembly	N/A	1
3	D060413	ALIGO, SUS, TOP MASS, 1/4-20 X 1.0 LG.	300 SSSL	2
2	D060407	ALIGO, SUS, QUAD TOP MASS, ECD UNIT BACKBONE	6061-T6 Al	1
1	D060409	Advanced LIGO, SUS, Quad N-Ptype Top Mass, OSEM / FLAG ASSEMBLY	N/A	1

PARTS LIST

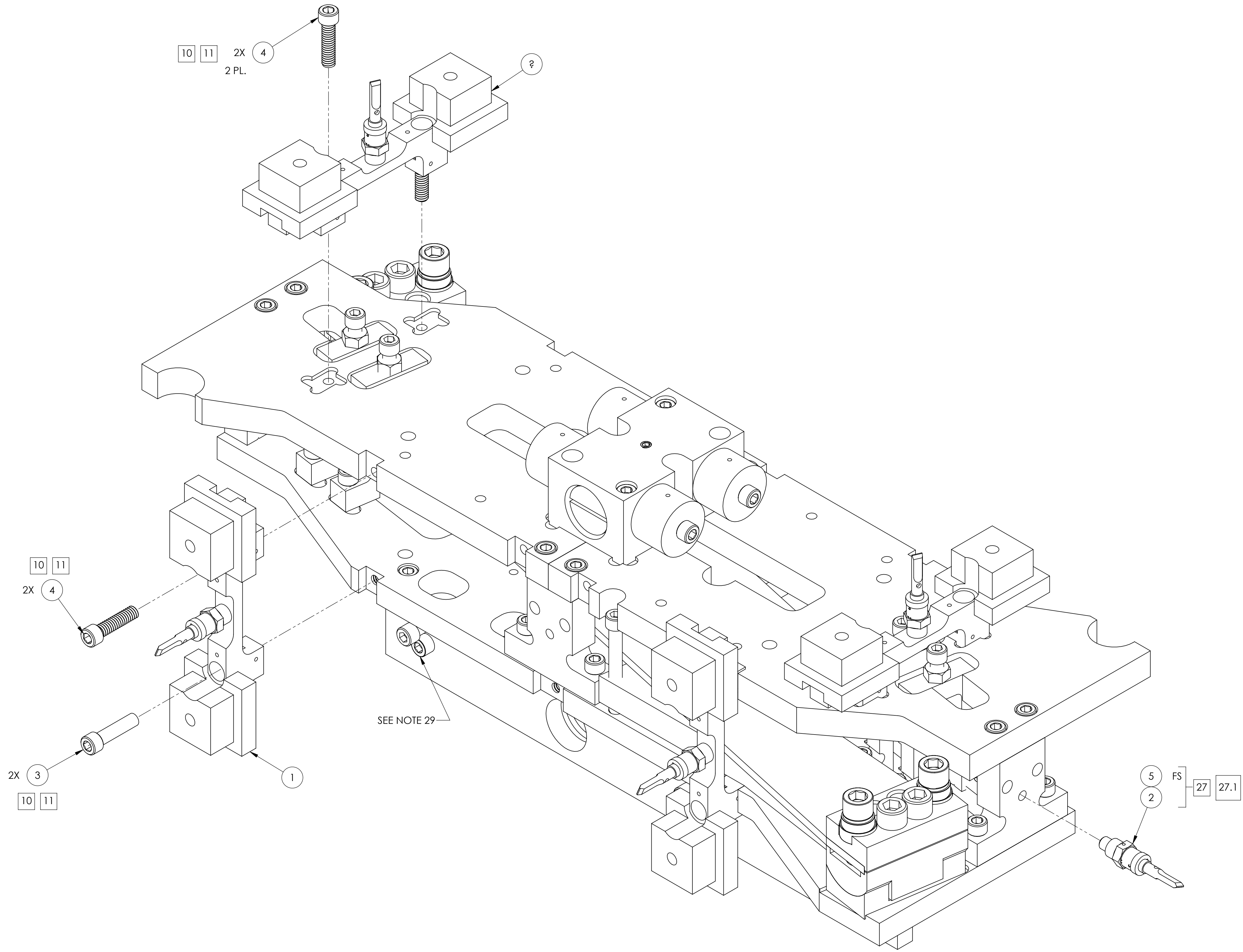
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SIZE DWG. NO. REV.
D D060403 v8

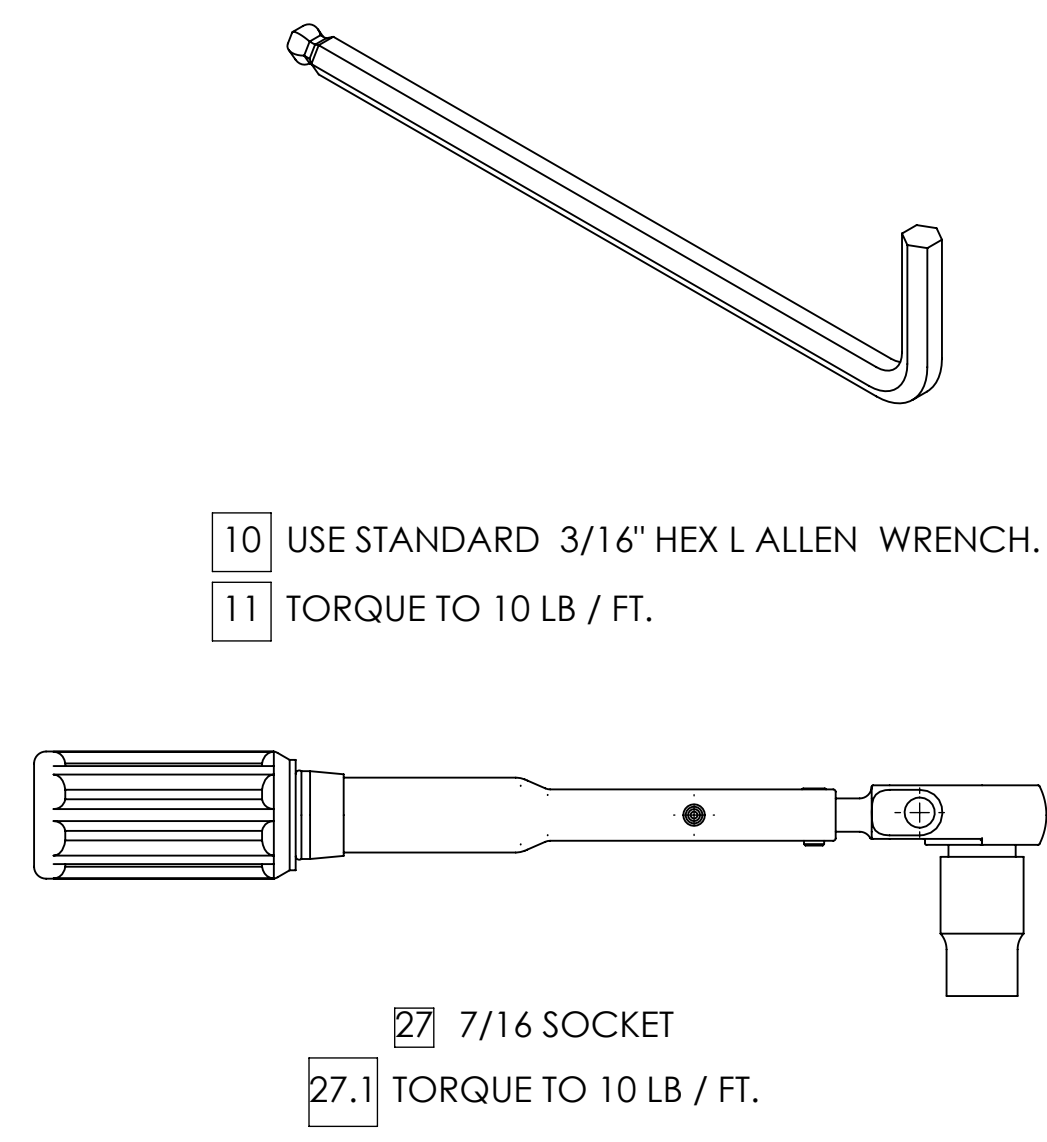
SCALE: 1:1 PROJECTION: SHEET 19 OF 24

ISO VIEW, FRONT RIGHT

ASSY. STEP 19: ADD ALL 4 OSEM / FLAG ASSEMBLY



ISO VIEW, FRONT RIGHT



10 USE STANDARD 3/16" HEX L ALLEN WRENCH.
 11 TORQUE TO 10 LB / FT.

27 7/16 SOCKET
 27.1 TORQUE TO 10 LB / FT.

28 CHECK ITEM NO. 1 ALIGNMENT.
 29 ADJUST ON INDICATED SIDE ONLY.

ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	QTY.
5	D060417	ALIGO, SUS, TOP MASS QUAD N-PTYPE, OSEM MAGNET AND FLAG CONCEPT PART BUILT	N/A	1
4	C-2016-NA UC COMPONENTS OR EQ.	SCREW, SHC, 1/4-20 x 1.0 LG, Ag PLATED	Ag-PLATED 300 SSTL	6
3	C-2016-N UC COMPONENTS OR EQ.	SCREW, SHC, 1/4-20 x 1" LG.	18-8 SSTL	2
2	D060416	Magnet and Flag Assembly	N/A	1
1	D060409	Advanced LIGO, SUS, Quad N-Ptype Top Mass, OSEM / FLAG ASSEMBLY	N/A	4

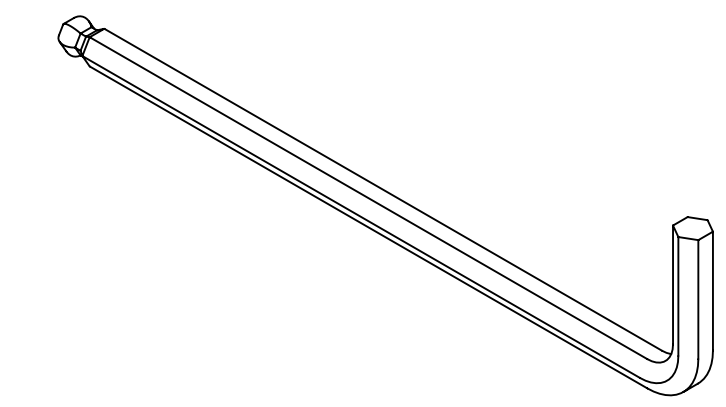
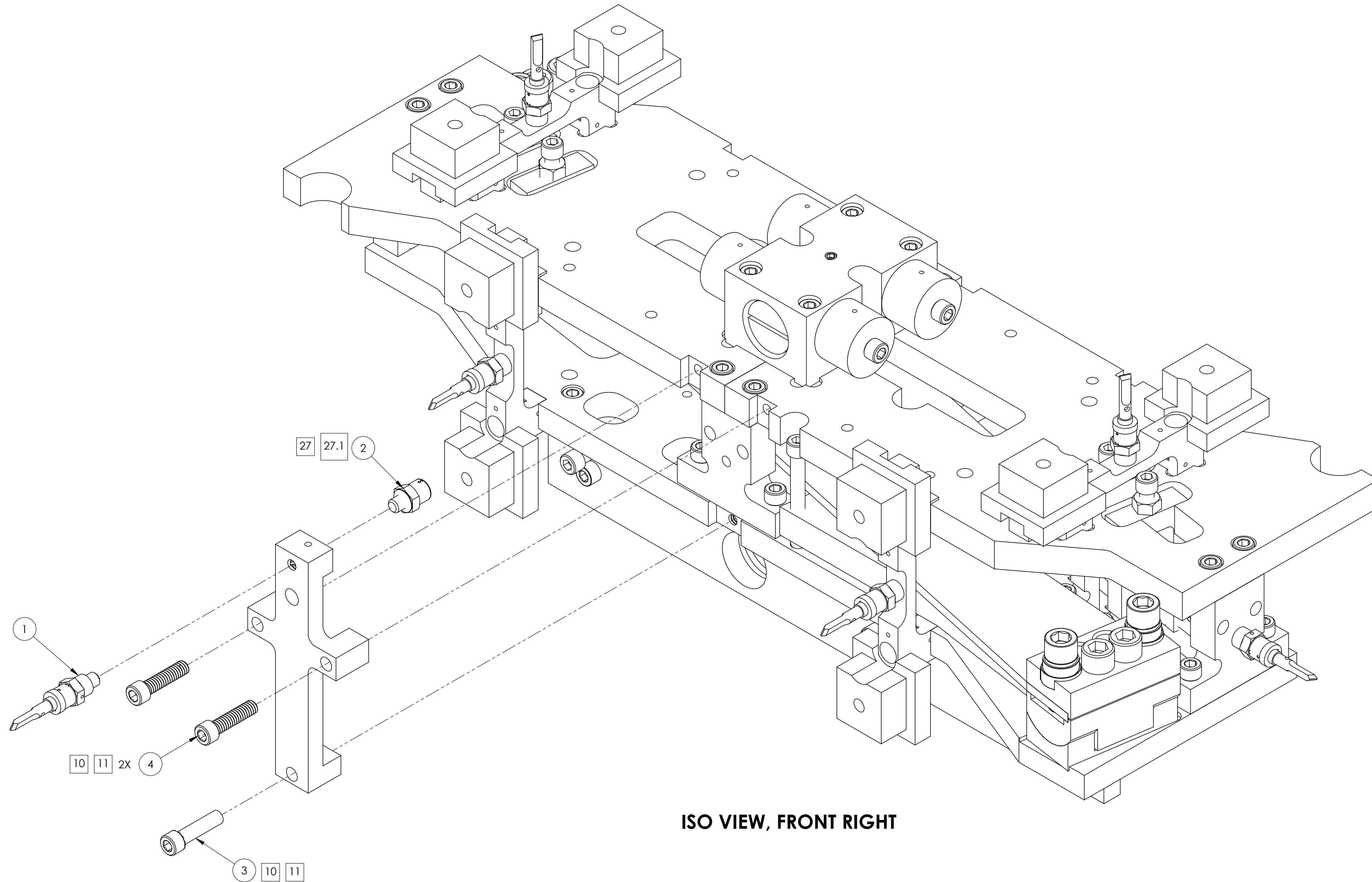
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SIZE DWG. NO. **D060403** REV. **v8**

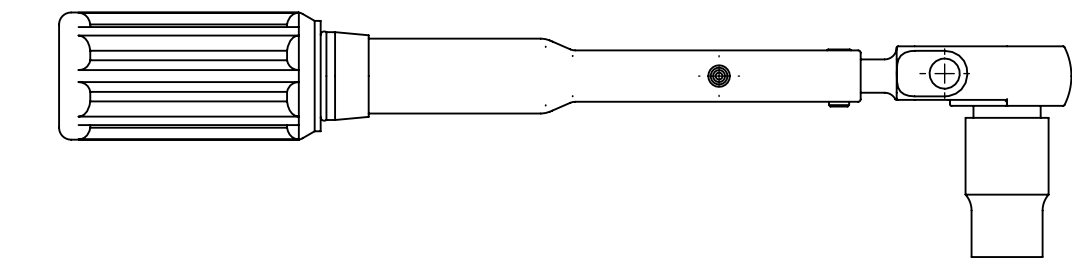
SCALE: 1:1 PROJECTION: SHEET 20 OF 24

D060403 Advanced LIGO, SUS, Quad N-Ptype Top Mass - MAIN CHAIN, PART PDM REV: X-037, DRAWING PDM REV: X-003

ASSY. STEP 20: ADD FINAL OSEM MAGNET FLAG ASSEMBLY.



- 10 USE STANDARD 3/16" HEX L ALLEN WRENCH.
- 11 TORQUE TO 10 LB / FT.



- 27 7/16 SOCKET
- 27.1 TORQUE TO 10 LB / FT.

ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	QTY.
4	C-2016-NA UC COMPONENTS OR EQ.	SCREW, SHC, 1/4-20 x 1.0 LG, Ag PLATED	Ag-PLATED 300 SSSL	2
3	C-2016-N UC COMPONENTS OR EQ.	SCREW, SHC, 1/4-20 x 1" LG.	18-8 SSSL	1
2	D060417	ALIGO, SUS, TOP MASS QUAD N-PTYPE, OSEM MAGNET AND FLAG CONCEPT PART BUILT	N/A	1
1	D060416	Magnet and Flag Assembly	N/A	1

PARTS LIST

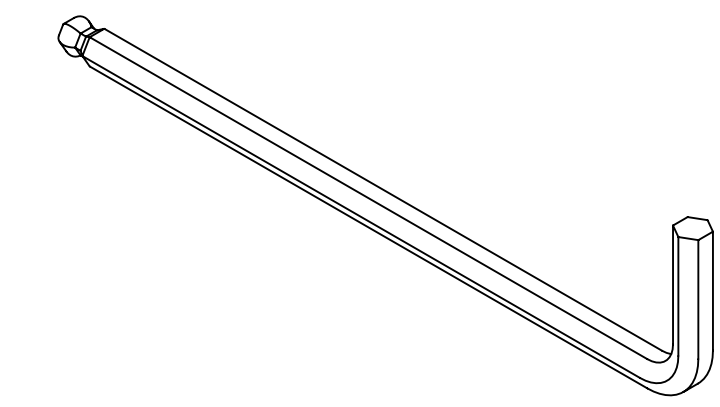
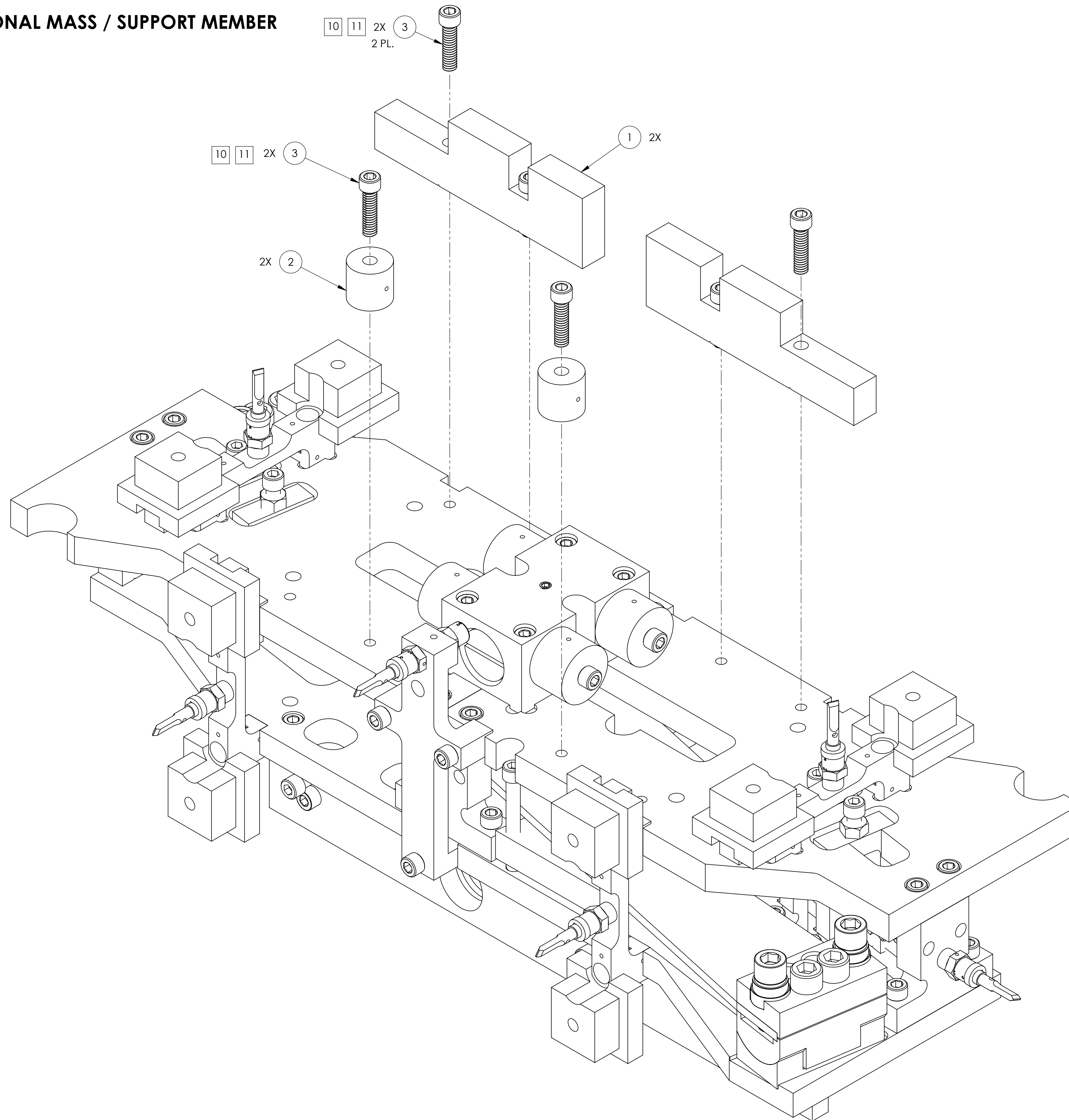
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SIZE DWG. NO. REV.
D **D060403** v8

SCALE: 1:1 PROJECTION: SHEET 21 OF 24

D060403 Advanced LIGO, SUS, Quad N-Type Top Mass - MAIN CHAN. PART PDM REV. X-037. DRAWING PDM REV. X-033

ASSY. STEP 21: ADD ADDITIONAL MASS / SUPPORT MEMBER



- 10 USE STANDARD 3/16" HEX L ALLEN WRENCH.
- 11 TORQUE TO 10 LB / FT.

ISO VIEW, FRONT RIGHT

3	C-2014-NA UC COMPONENTS OR EQ.	SCREW, SHC, 1/4-20 x 1.0 LG, Ag PLATED	Ag-PLATED 300 SSTL	6
2	D060359-050	ALIGO, SUS, QUAD N-PYTYPE, ADDITIONAL MASS, 50 G	304 SSTL	2
1	D060421	ADVANCED LIGO, SUS, TOP MASS QUAD N-PYTYPE, MASS AND SUPPORT MEMBER	304 SSTL	2
ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	QTY.

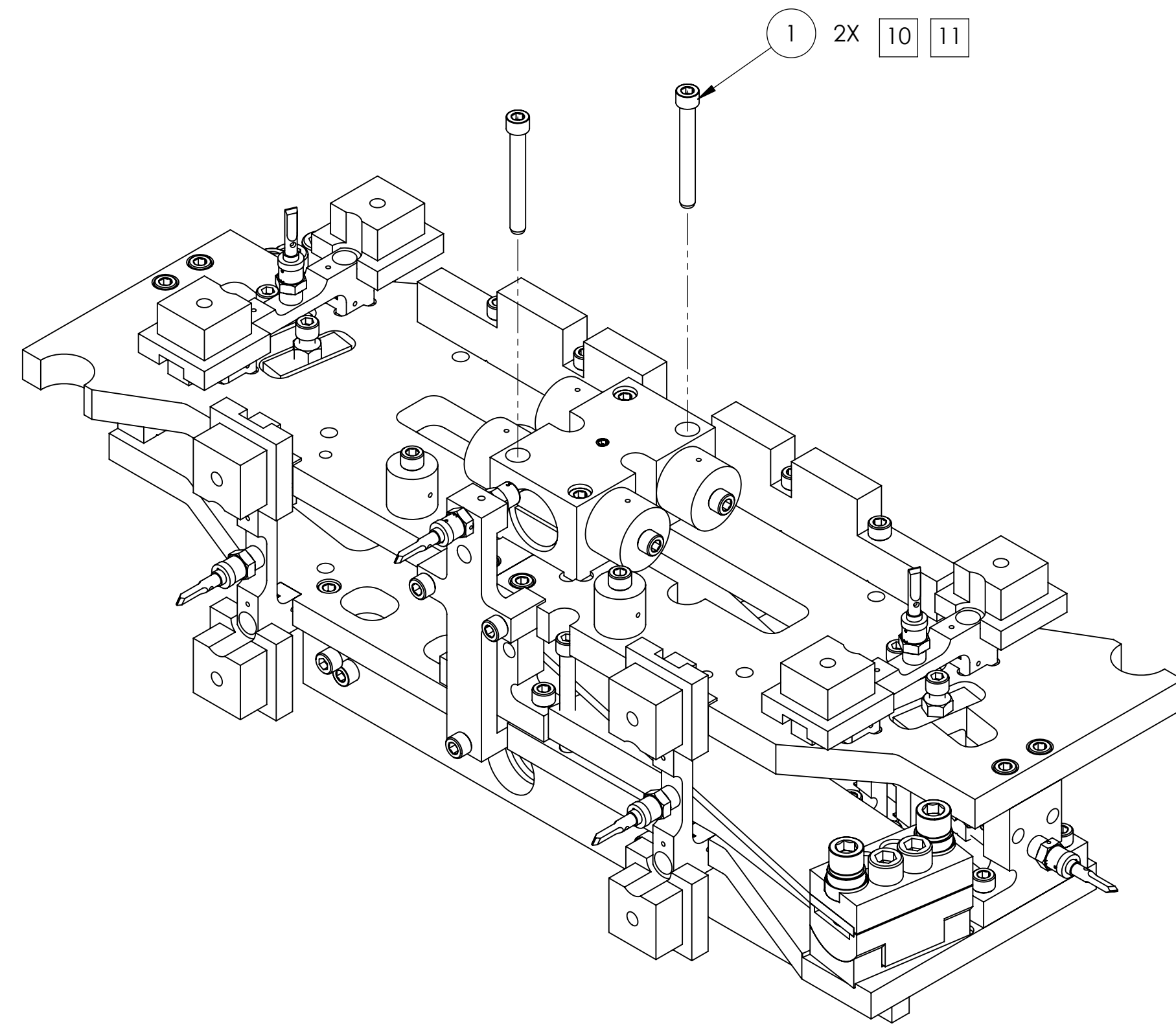
PARTS LIST

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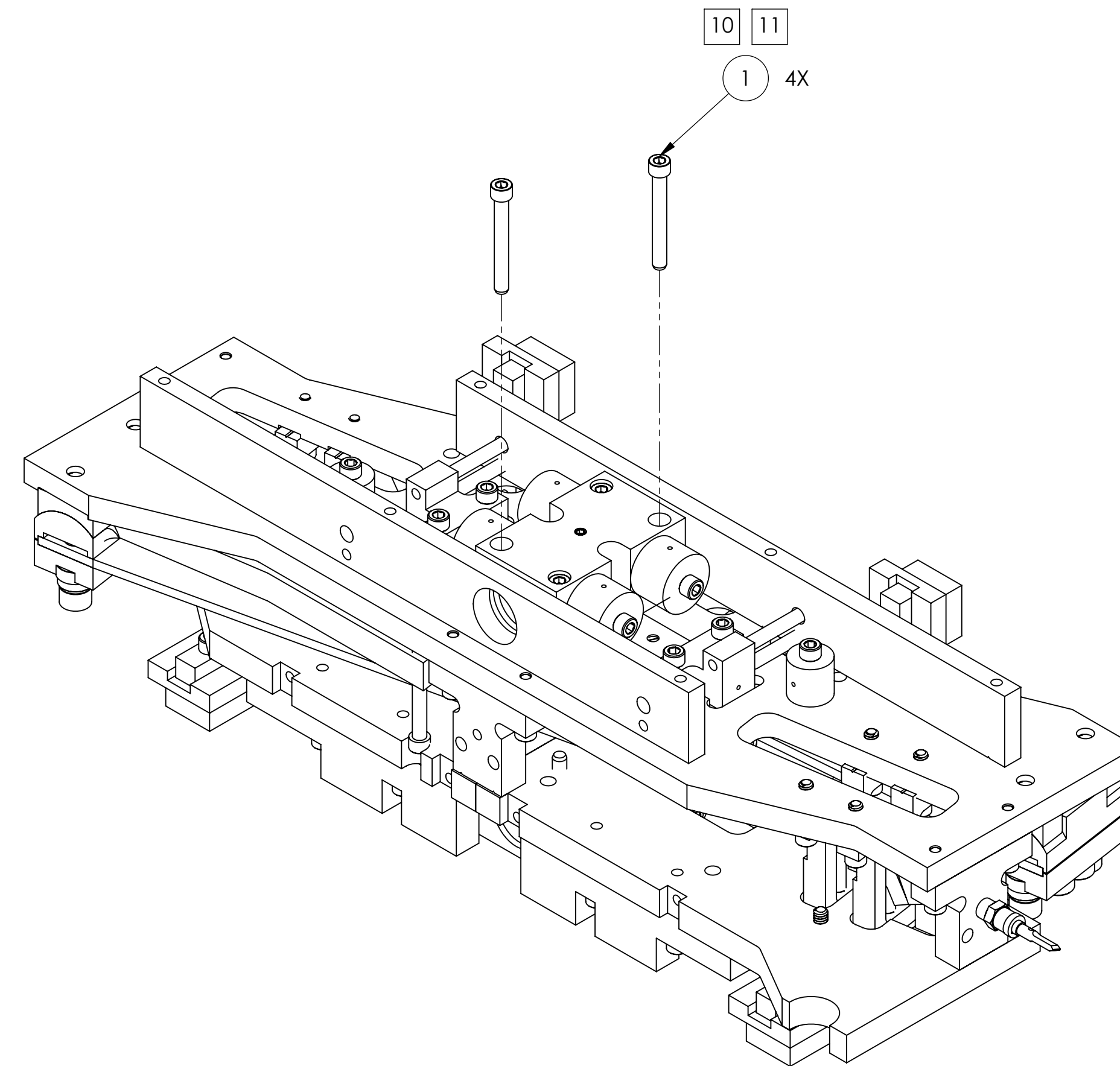
SIZE	DWG. NO.	REV.
D	D060403	v8
SCALE: 1:1	PROJECTION:	SHEET 22 OF 24

D060403 Advanced LIGO, SUS, Quad N-PyType Top Mass - MAIN CHAN, PART FDM REV: X-057, DRAWING PDM REV: X-003

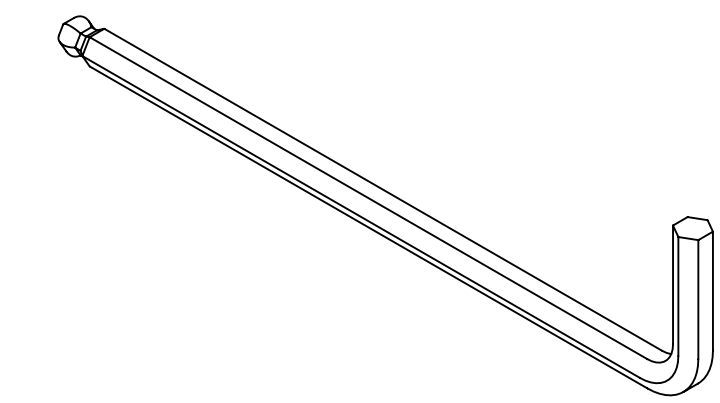
ASSY. STEP 22: ADD TURRET SCREWS (MAIN CHAIN ONLY)



ISO VIEW, FRONT RIGHT



ISO VIEW, UNDERSIDE VIEW



- 10 USE STANDARD 3/16" HEX L ALLEN WRENCH.
- 11 TORQUE TO 10 LB / FT.

MAIN CHAIN ONLY

ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	QTY.
1	C-2032-NA UC COMPONENTS OR EQ.	SHCS, 1/4-20 x 2" LG., Ag PLATED	Ag-PLATED 300 SSTL	4

PARTS LIST

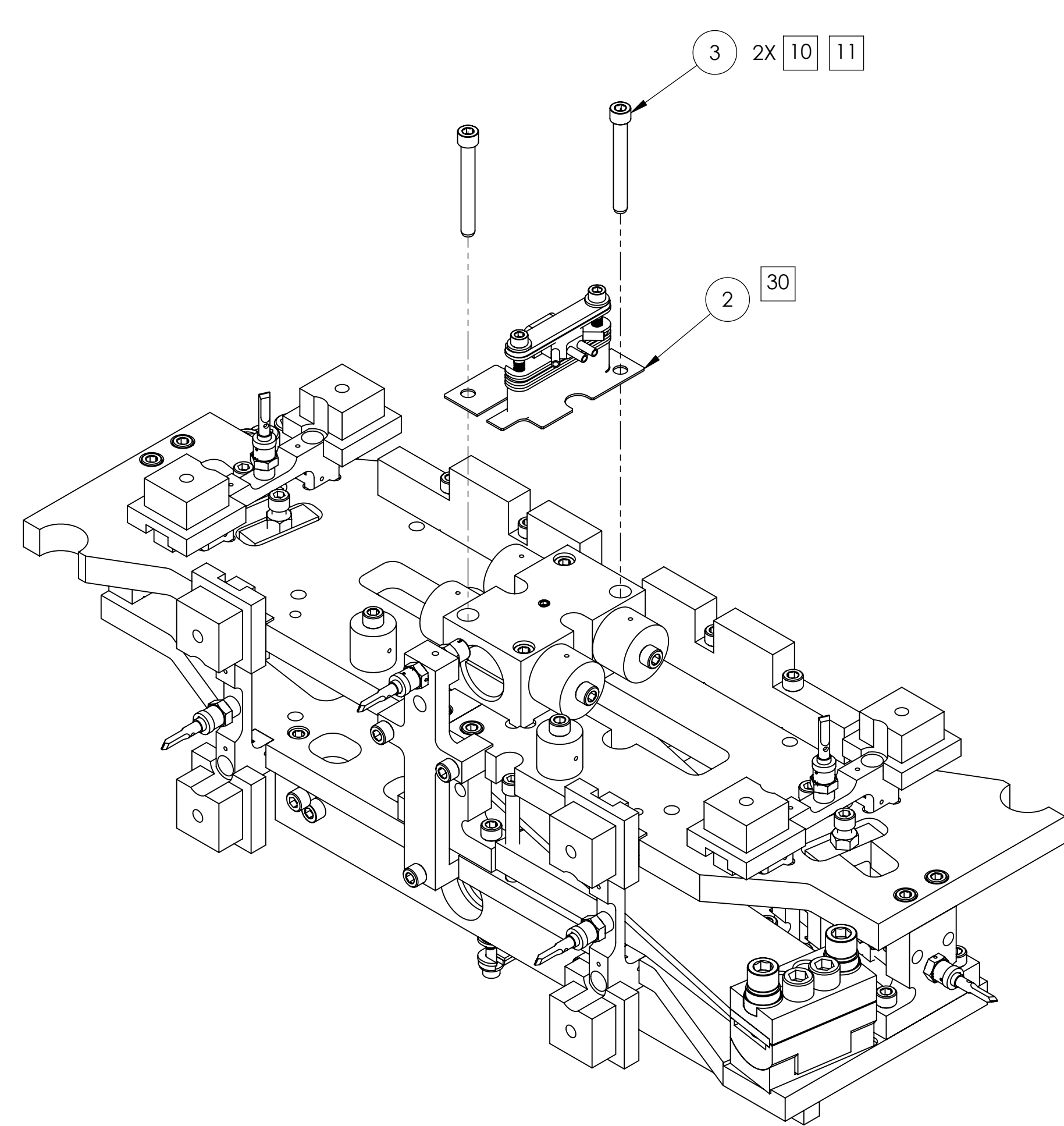
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SIZE	DWG. NO.	REV.
D	D060403	v8

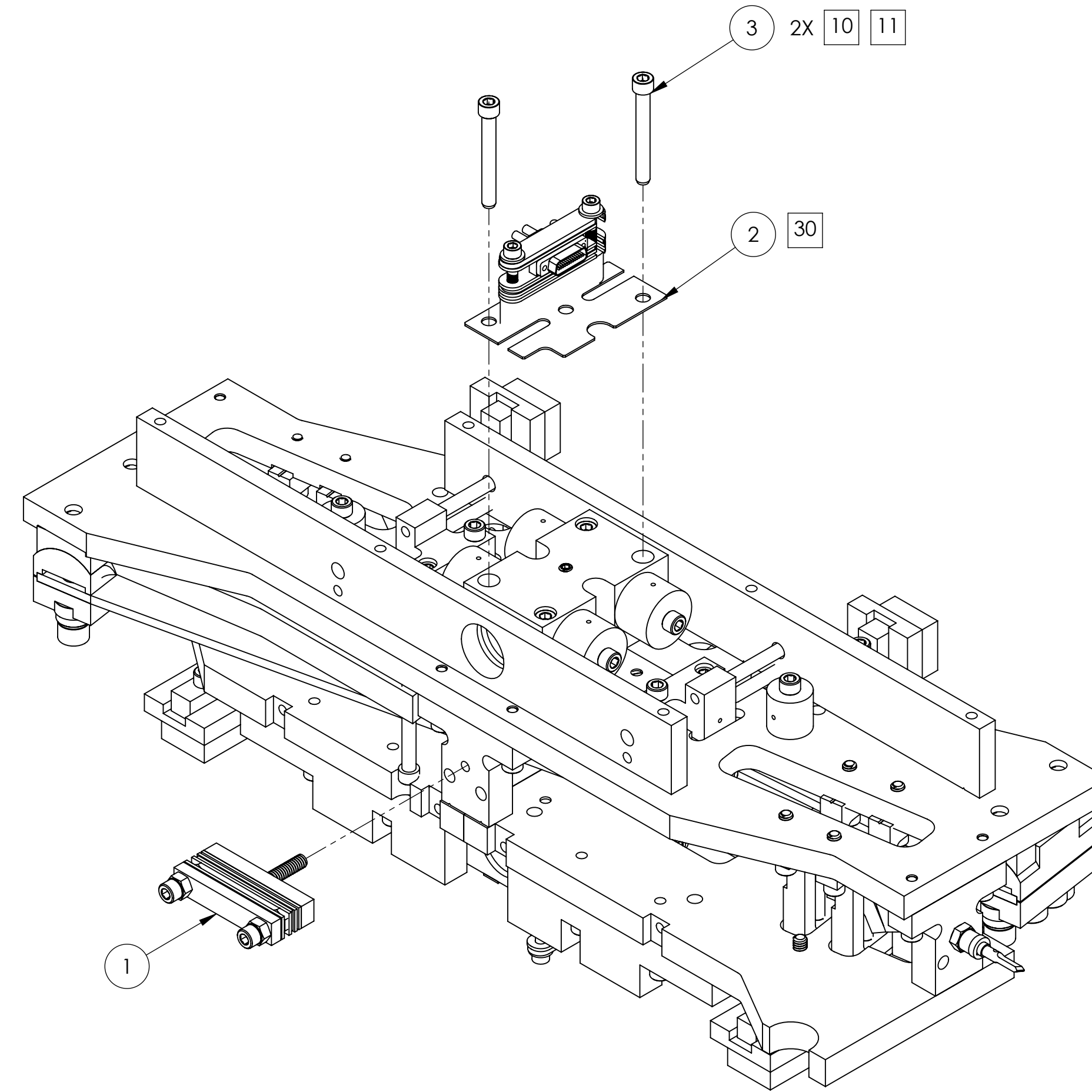
SCALE: 1:1 PROJECTION: SHEET 23 OF 24

D060403 Advanced UGECO, SLS, CloudType Top Miss - MAIN CHAIN, PARFDM, REV: X-057, DRAWING PDM, REV: X-003

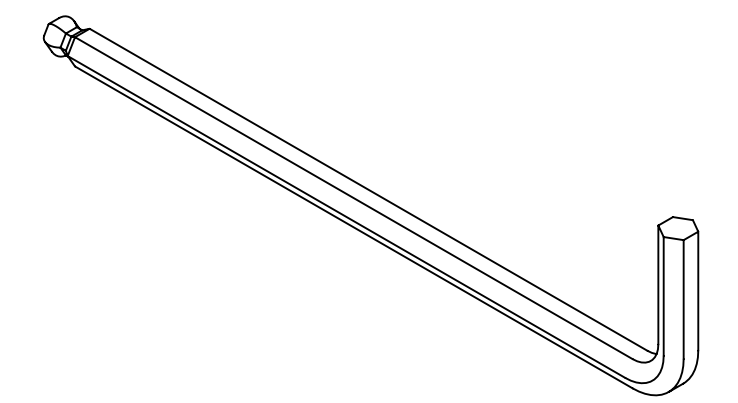
ASSY. STEP 23: ADD CABLE CLAMPS TO TURRET (REACTION CHAIN ONLY)



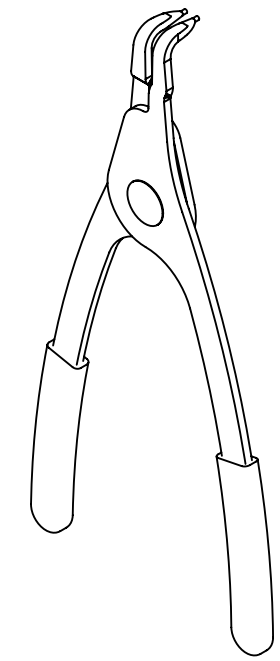
ISO VIEW, FRONT RIGHT



ISO VIEW, UNDERSIDE VIEW



10 USE STANDARD 3/16" HEX L ALLEN WRENCH.
11 TORQUE TO 10 LB / FT.



30 USE STANDARD RETAINING RING PLIERS OR EQ.

REACTION CHAIN ONLY
(REFER TO D0902031 FOR COMPLETE REACTION CHAIN BOM)

ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	QTY.
3	C-2032-NA UC COMPONENTS OR EQ.	SHCS, 1/4-20 x 2" LG., Ag PLATED	Ag-PLATED 300 SSSL	4
2	D070218	ALIGO, SUS, QUAD, WIRING HARNESS, MASS WIRE CLAMP	N/A	2
1	D070225	ALIGO, SUS, QUAD WIRING HARNESS, WIRE CLAMP	N/A	1

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SIZE	DWG. NO.	REV.
D	D060403	v8
SCALE: 1:1	PROJECTION:	SHEET 24 OF 24

D060403 Advanced LIGO, SUS, Quad 14-Pin Top Mass - MAIN CHAIN, PART FDM REV. X-000, DRAWING PDM REV. X-003