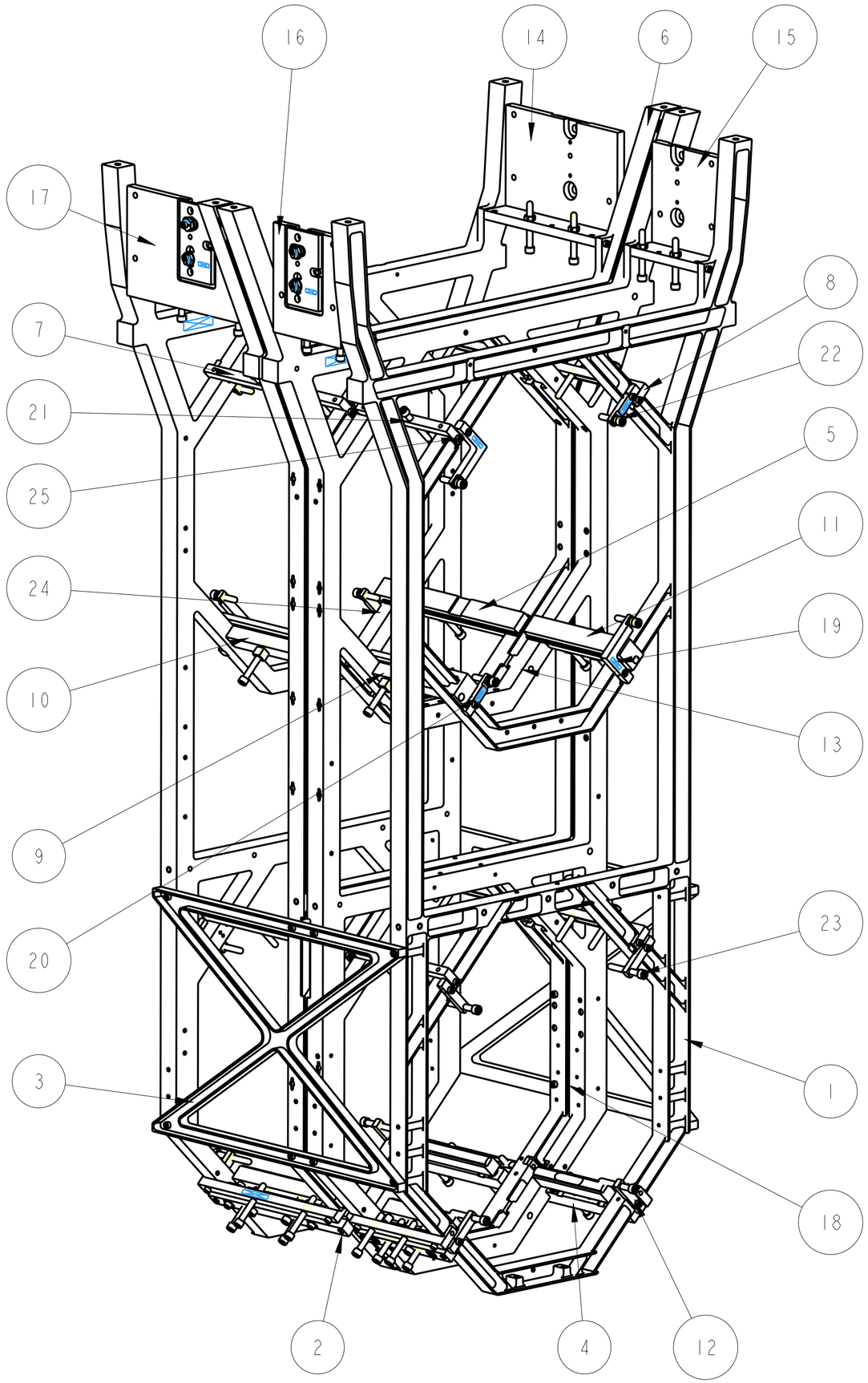
INTRALINK NAME: D060454

REV.	DATE	DCN #	DRAWING TREE #
REV.	DATE	DCN #	DRAWING TREE #
A	30-OCT-06	E060260-00	.
B	21/DEC/07	E060260-B	.



QUAD LOWER STRUCTURE - METAL MASS CONFIGURATION

NOTE:

THIS CONFIGURATION OF EQ STOPS SHOULD BE USED FOR INSERTING, SUSPENDING AND TRANSPORTING THE METAL MASSES.

ITEM	QTY	SPARE	TOTAL	PART NUMBER	DESCRIPTION	MATERIALS
1	2			D060434	OUTER FACE PLATE; LOWER STRUCTURE	ALUMINIUM ALLOY: 6082
2	2			D060446	ADJUSTABLE PAD ASSEMBLY; LONG	AS DRW: SEE PARTS LIST
3	2			D060455	LOWER STRUCTURE X-BRACE; LOWER STRUCTURE	AL ALLOY: 5083 OR SIMILAR
4	2			D060457	ADJUSTABLE PAD ASSEMBLY SHORT; .	SEE PARTS LIST: --------
5	2			D060461	PEN TEST MASS PAD; .	PFA 440 HP: --------
6	2			D060462	INNER FACE PLATE; LOWER STRUCTURE	ALUMINIUM ALLOY: 6082
7	6			D060475	EARTHQUAKE-STOP MOUNTS-LONG; LOWER STRUCTURE	AL ALLOY: 5083 H4 OR 6061
8	6			D060476	EARTHQUAKE-STOP MOUNTS-SHORT; LOWER STRUCTURE	AL ALLOY: 5083 H4 OR 6061
9	2			D060477	PENULTIMATE MASS LWR STOP MT 1; .	AL. ALLOY: 5083 H4 OR 6061
10	2			D060478	PENULTIMATE MASS LWR STOP MT 2; .	AL. ALLOY: 5083 H4 OR 6061
11	2			D060479	PEN RE MASS PAD; .	PFA 440 HP: --------
12	8			D060481	ROUND MASS FRONT STOP; .	AL. ALLOY: 5083 H4 OR 6061
13	8			D070008	SPACING PLUG; LOWER STRUCTURE	AL ALLOY: 5083 OR SIMILAR
14	1			D070540	UIM TC E'QUAKE STOP ASSY #1; .	AS DRW: AS DRW
15	1			D070541	UIM RC E'QUAKE STOP ASSY #1; .	AS DRW: AS DRW
16	1			D070542	UIM RC E'QUAKE STOP ASSY #2; .	AS DRW: AS DRW
17	1			D070543	UIM TC E'QUAKE STOP ASSY #2; .	AS DRW: AS DRW
18	4			D090438	RINGHEATER ATTACHMENT PIECE; QUAD LOWER STRUCTURE	AL ALLOY: 5083
19	4			D1101959	SHORT EQ STOP ASSY; SLEEVE BRACE POSITIONS	--------: AS DRW
20	4			D1101963	SHORT EQ STOP ASSEMBLY #2; QUAD EQ STOPS	--------: AS DRW
21	62				1/4-20 x 1.5D UNC THREAD INSERT; .	
22	10				1/4-20 x 1D UNC THREAD INSERT; .	
23	40				1/4" 20 UNC X 2" CAP HEAD, SPHERICAL TIP; .	
24	36				8-32 x 1.5D UNC THREAD INSERT; .	
25	73				8-32 UNC X 0.625" CAP HEAD; .	

PARTS LIST

NOTES: (UNLESS OTHERWISE SPECIFIED)

1. REMOVE ALL SHARP EDGES, R.02 MIN.
2. DO NOT SCALE FROM DRAWING.
3. ALL MACHINING FLUIDS SHALL BE WATER SOLUBLE AND FREE OF SULFUR, CHLORINE AND SILICONE, SUCH AS CINCINNATI MILACRON'S CIMTECH 410 (STAINLESS STEEL)
4. SCRIBE, ENGRAVE OR STAMP DRAWING PARTNUMBER ON NOTED SURFACE OF PART AND A THREE DIGIT SERIAL NUMBER. SERIAL NUMBERS START AT 001 FOR THE FIRST PART AND PROCEED CONSECUTIVELY. USE .07" HIGH CHARACTERS. EXAMPLE: D020188- 001. A VIBRATORY TOOL MAY BE USED.

DIMENSIONS ARE IN mm [INCHES]
TOLERANCES:

X.XX ± mm[INCHES]
ANGULAR ±. °

MATERIAL: AS DRW --------

FINISH: CLEAN
√µm [µin] Ra : AS DRW

	NAME	DATE
DRAWN	J O'DELL	16/NOV/11
CHECKED	MB	15/MAR/11
APPROVED	JOD	15/MAR/11

LIGO 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 D0901346
PART NAME INNER LOWER STRUCTURE SUSPENSION STRUCTURE

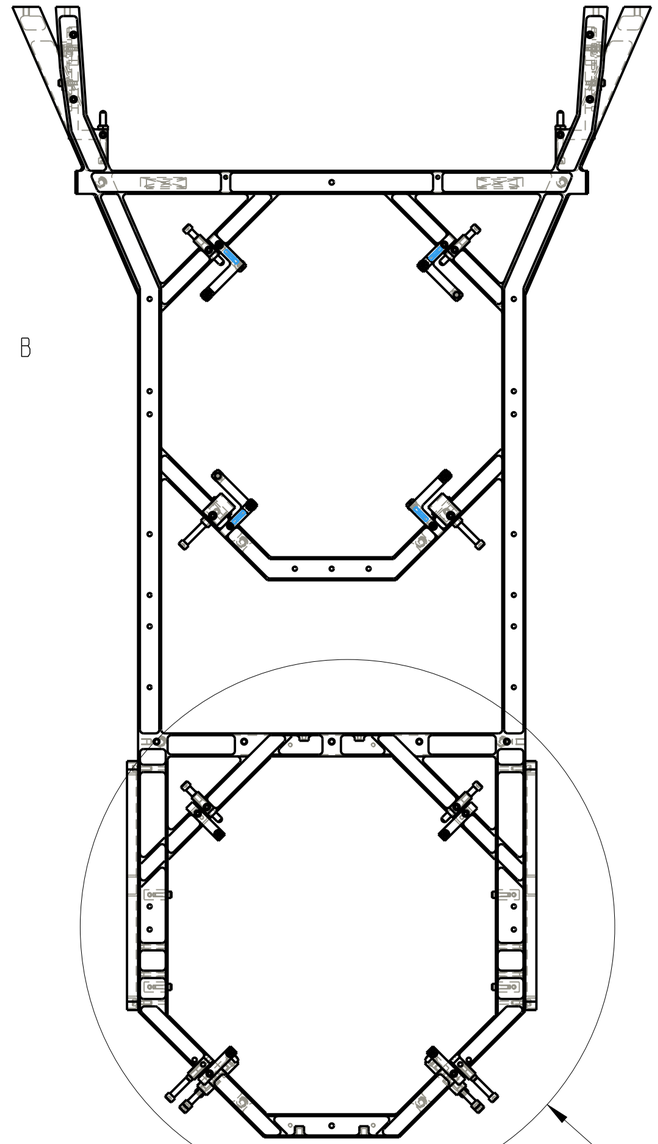
SIZE C | DRG. NO. D060454 | REV F.

SCALE 1:1 | PROJECTION: | SHEET 1 OF 5

INTRALINK NAME: D060454

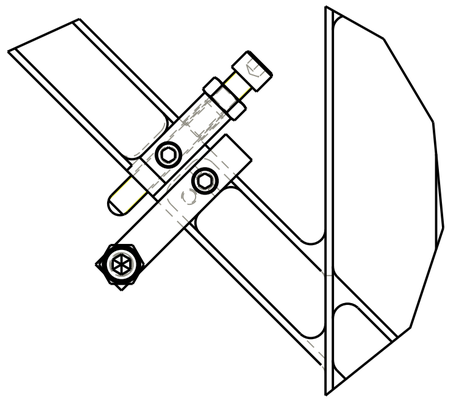
REV.	DATE	DCN #	DRAWING TREE #
.	.	.	.

QUAD LOWER STRUCTURE - METAL MASS CONFIGURATION



SCALE 1:5

TEST STAGE UPPER FACE STOPS

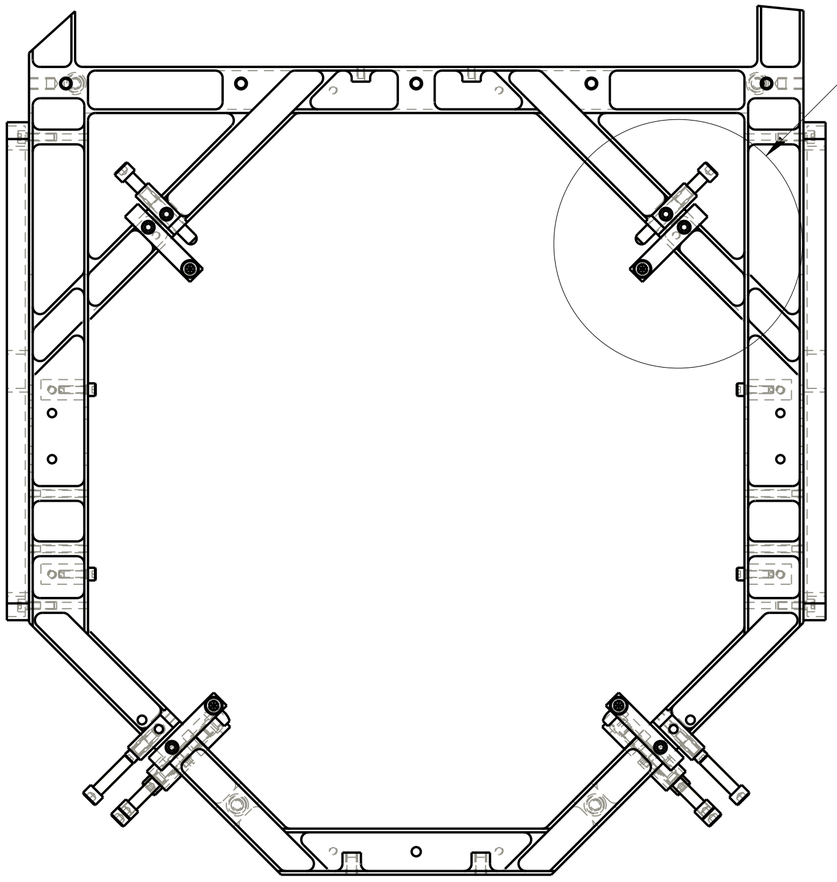


DETAIL B
SCALE 4:5

NOTE:

TEST STAGE UPPER FACE STOPS SHOULD BE MOUNTED IN THE POSITION SHOWN (IN THE UPPER OF THE TWO MOUNTING HOLES)

THEY MAY BE MOUNTED IN THE LOWER HOLE IF NECESSARY DURING ASSEMBLY AND INSTALLATION BUT THEY SHOULD BE REPLACED IN THE POSITION SHOWN BEFORE THEY ARE INSTALLED INTO A TANK



DETAIL A
SCALE 2:5

NOTES: (UNLESS OTHERWISE SPECIFIED)

1. REMOVE ALL SHARP EDGES, R.02 MIN.
2. DO NOT SCALE FROM DRAWING.
3. ALL MACHINING FLUIDS SHALL BE WATER SOLUBLE AND FREE OF SULFUR, CHLORINE AND SILICONE, SUCH AS CINCINNATI MILACRON'S CIMTECH 410 (STAINLESS STEEL)
4. SCRIBE, ENGRAVE OR STAMP DRAWING PARTNUMBER ON NOTED SURFACE OF PART AND A THREE DIGIT SERIAL NUMBER. SERIAL NUMBERS START AT 001 FOR THE FIRST PART AND PROCEED CONSECUTIVELY. USE .07" HIGH CHARACTERS. EXAMPLE; D020188- 001. A VIBRATORY TOOL MAY BE USED.

DIMENSIONS ARE IN mm [INCHES]
TOLERANCES:
X.XX ± mm[INCHES]
ANGULAR ±- °

MATERIAL: AS DRW

FINISH: CLEAN
√µm [µin] Ra = AS DRW

	NAME	DATE
DRAWN	J O'DELL	16/NOV/11
CHECKED	MB	15/MAR/11
APPROVED	JOD	15/MAR/11

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IGR, GLASGOW UNIVERSITY GEO 600 GROUP
RUTHERFORD APPLETON LABORATORIES

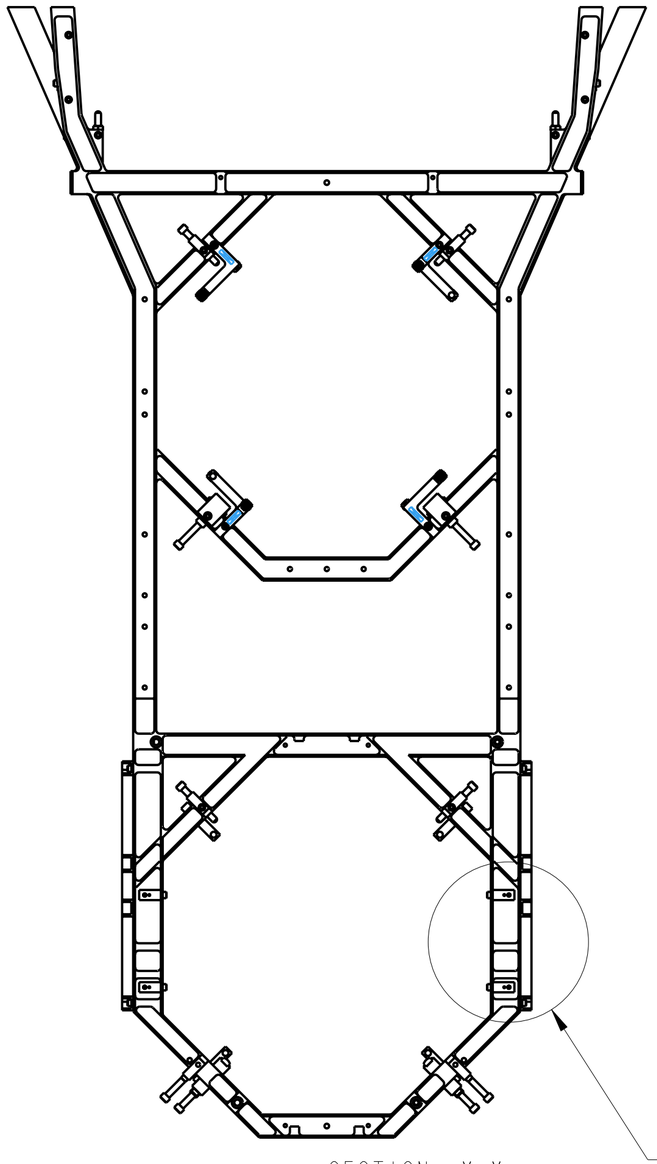
SYSTEM ADVANCED LIGO
SUB-SYSTEM SUS
NEXT ASSY D0901346
PART NAME INNER LOWER STRUCTURE SUSPENSION STRUCTURE

SIZE C | DRG. NO. D060454 | REV F.
SCALE 1:1 | PROJECTION: | SHEET 2 OF 5

INTRALINK NAME: D060454

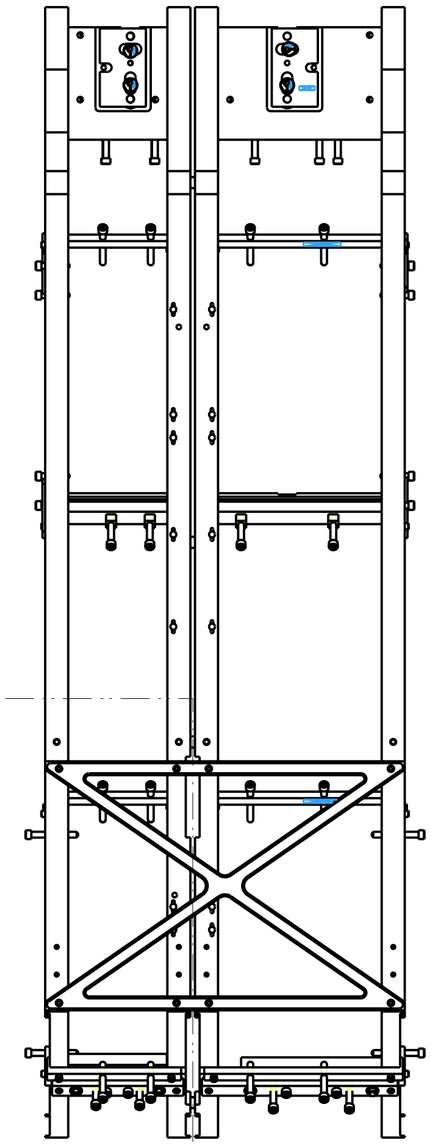
REV.	DATE	DCN #	DRAWING TREE #
.	.	.	.

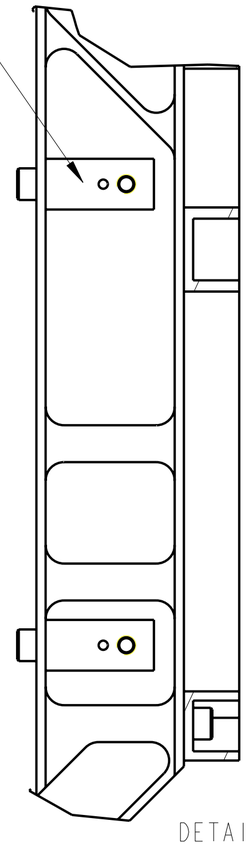
D090438 - RING HEATER MOUNT BRACKETS - 4 OFF
ENSURE THAT THESE ARE INSTALLED IN THE
INNER FACEPLATE OF THE MAIN CHAIN BEFORE
THE MAIN AND REACTION CHAINS ARE JOINED



SECTION X-X
SCALE 1:5

SEE DETAIL E





DETAIL E
SCALE 1:1

NOTES: (UNLESS OTHERWISE SPECIFIED)

1. REMOVE ALL SHARP EDGES, R.02 MIN.
2. DO NOT SCALE FROM DRAWING.
3. ALL MACHINING FLUIDS SHALL BE WATER SOLUBLE AND FREE OF SULFUR, CHLORINE AND SILICONE, SUCH AS CINCINNATI MILACRON'S CIMTECH 410 (STAINLESS STEEL)
4. SCRIBE, ENGRAVE OR STAMP DRAWING PARTNUMBER ON NOTED SURFACE OF PART AND A THREE DIGIT SERIAL NUMBER. SERIAL NUMBERS START AT 001 FOR THE FIRST PART AND PROCEED CONSECUTIVELY. USE .07" HIGH CHARACTERS. EXAMPLE: D020188- 001. A VIBRATORY TOOL MAY BE USED.

DIMENSIONS ARE IN mm [INCHES]
TOLERANCES:

X.XX ± mm[INCHES]
ANGULAR ±: °

MATERIAL: AS DRW

FINISH: CLEAN
√µm [µin] Ra = AS DRW

	NAME	DATE
DRAWN	J O'DELL	16/MAR/11
CHECKED	MB	15/MAR/11
APPROVED	JOD	15/MAR/11

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IGR, GLASGOW UNIVERSITY GEO 600 GROUP
RUTHERFORD APPLETON LABORATORIES

SYSTEM ADVANCED LIGO
SUB-SYSTEM SUS
NEXT ASSY D0901346
PART NAME INNER LOWER STRUCTURE
SUSPENSION STRUCTURE

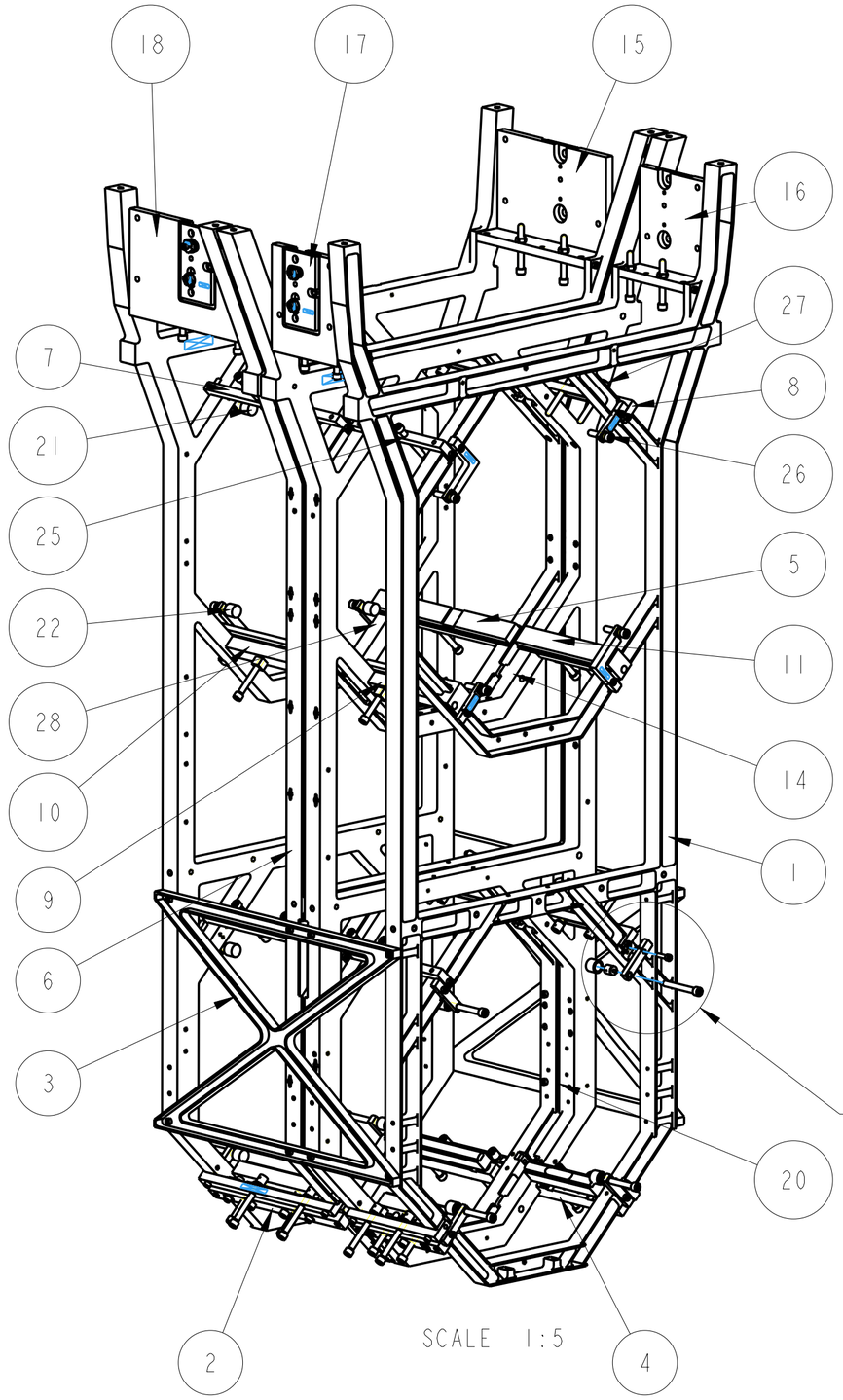
SIZE C | DRG. NO. D060454 | REV. F.
SCALE 1:1 | PROJECTION: | SHEET 3 OF 5

INTRALINK NAME: D060454

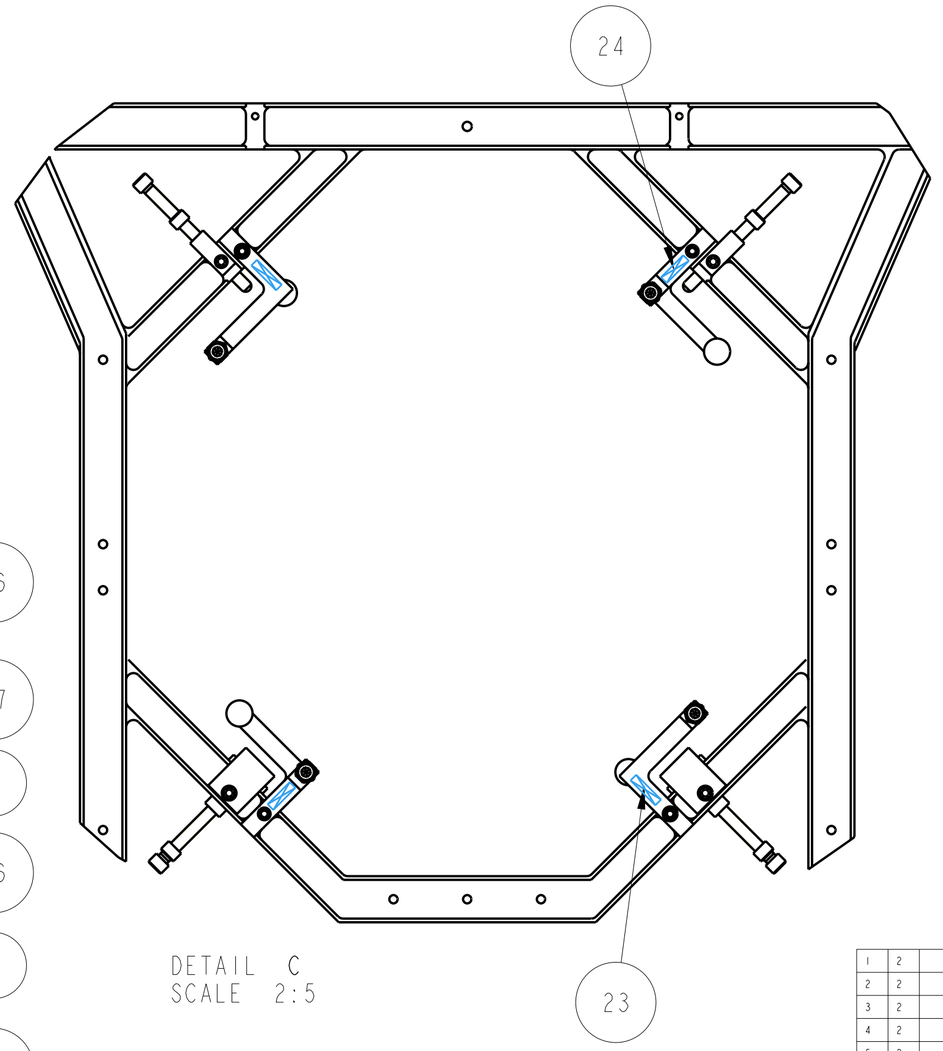
REV.	DATE	DCN #	DRAWING TREE #
.	.	.	.

QUAD LOWER STRUCTURE - GLASS MASS CONFIGURATION

THIS CONFIGURATION SHOULD BE USED FOR THE ASSEMBLY, ALIGNMENT AND TESTING OF A QUAD WITH GLASS MASSES. THE 'TRANSPORT PADS' SHOULD NOT BE REMOVED UNTIL AFTER THE INSTALLATION OF THE QUAD IN THE TANK

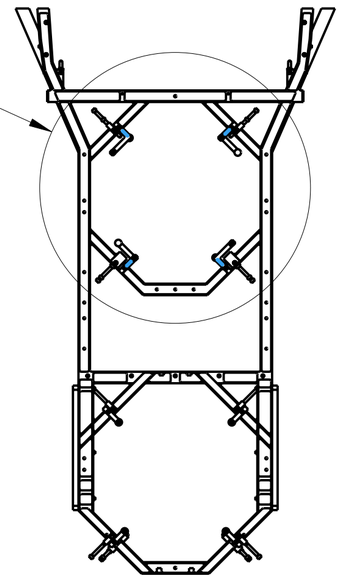


SCALE 1:5

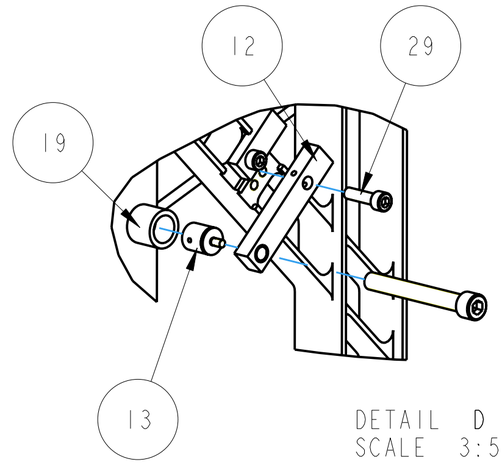


DETAIL C
SCALE 2:5

SEE DETAIL C



SCALE 1:10



DETAIL D
SCALE 3:5

NOTES:

FOR A DETAILED DESCRIPTION OF THE PUM STOP POSITIONS, REFER TO T1100557

REMOVE EQ STOP BRACKET D060481 BEFORE REMOVING METAL EQ STOP AND INSTALLING SILICA TIPPED STOP (AS SHOWN IN DETAIL D)

ITEM	QTY	SPARE	TOTAL	PART NUMBER	DESCRIPTION	MATERIALS
1	2			D060434	OUTER FACE PLATE; LOWER STRUCTURE	ALUMINIUM ALLOY: 6082
2	2			D060446	ADJUSTABLE PAD ASSEMBLY; LONG	AS DRW: SEE PARTS LIST
3	2			D060455	LOWER STRUCTURE X-BRACE; LOWER STRUCTURE	AL ALLOY: 5083 OR SIMILAR
4	2			D060457	ADJUSTABLE PAD ASSEMBLY SHORT; .	SEE PARTS LIST: --------
5	2			D060461	PEN TEST MASS PAD; .	PFA 440 HP: --------
6	2			D060462	INNER FACE PLATE; LOWER STRUCTURE	ALUMINIUM ALLOY: 6082
7	6			D060475	EARTHQUAKE-STOP MOUNTS-LONG; LOWER STRUCTURE	AL ALLOY: 5083 H4 OR 6061
8	6			D060476	EARTHQUAKE-STOP MOUNTS-SHORT; LOWER STRUCTURE	AL ALLOY: 5083 H4 OR 6061
9	2			D060477	PENULTIMATE MASS LWR STOP MT 1; .	AL. ALLOY: 5083 H4 OR 6061
10	2			D060478	PENULTIMATE MASS LWR STOP MT 2; .	AL. ALLOY: 5083 H4 OR 6061
11	2			D060479	PEN RE MASS PAD; .	PFA 440 HP: --------
12	8			D060481	ROUND MASS FRONT STOP; .	AL. ALLOY: 5083 H4 OR 6061
13	32			D060544	EARTHQUAKE STOP ASSY; .	N/A: --------
14	8			D070008	SPACING PLUG; LOWER STRUCTURE	AL ALLOY: 5083 OR SIMILAR
15	1			D070540	UIM TC E'QUAKE STOP ASSY #1; .	AS DRW: AS DRW
16	1			D070541	UIM RC E'QUAKE STOP ASSY #1; .	AS DRW: AS DRW
17	1			D070542	UIM RC E'QUAKE STOP ASSY #2; .	AS DRW: AS DRW
18	1			D070543	UIM TC E'QUAKE STOP ASSY #2; .	AS DRW: AS DRW
19	8			D090434	FRONT TRANSPORT PAD; QUAD SUS	PFA 440 HP: PFA440HP
20	4			D090438	RINGHEATER ATTACHMENT PIECE; QUAD LOWER STRUCTURE	AL ALLOY: 5083
21	2			D1101236	SHORT EARTHQUAKE STOP ASSY; .	N/A: --------
22	2			D1101945	SHORT EQ STOP ASSY; SLEEVE BRACE POSITIONS	-------: AS DRW
23	4			D1101959	SHORT EQ STOP ASSY; SLEEVE BRACE POSITIONS	-------: AS DRW
24	4			D1101963	SHORT EQ STOP ASSEMBLY #2; QUAD EQ STOPS	-------: AS DRW
25	62				1/4-20 x 1.5D UNC THREAD INSERT; .	
26	12				1/4-20 x 1D UNC THREAD INSERT; .	
27	8				1/4" 20 UNC X 2" CAP HEAD, SPHERICAL TIP; .	
28	36				8-32 x 1.5D UNC THREAD INSERT; .	
29	80				8-32 UNC X 0.625" CAP HEAD; .	

PARTS LIST

NOTES: (UNLESS OTHERWISE SPECIFIED)

1. REMOVE ALL SHARP EDGES, R.02 MIN.
2. DO NOT SCALE FROM DRAWING.
3. ALL MACHINING FLUIDS SHALL BE WATER SOLUBLE AND FREE OF SULFUR, CHLORINE AND SILICONE, SUCH AS CINCINNATI MILACRON'S CIMTECH 410 (STAINLESS STEEL)
4. SCRIBE, ENGRAVE OR STAMP DRAWING PARTNUMBER ON NOTED SURFACE OF PART AND A THREE DIGIT SERIAL NUMBER. SERIAL NUMBERS START AT 001 FOR THE FIRST PART AND PROCEED CONSECUTIVELY. USE .07" HIGH CHARACTERS. EXAMPLE: D020188- 001. A VIBRATORY TOOL MAY BE USED.

DIMENSIONS ARE IN mm [INCHES]
TOLERANCES:
X.XX ± mm[INCHES]
ANGULAR ±: °
MATERIAL: AS DRW
FINISH: CLEAN
√µm [µin] Ra = AS DRW

	NAME	DATE
DRAWN	J O'DELL	16/NOV/11
CHECKED	MB	15/MAR/11
APPROVED	JOD	15/MAR/11

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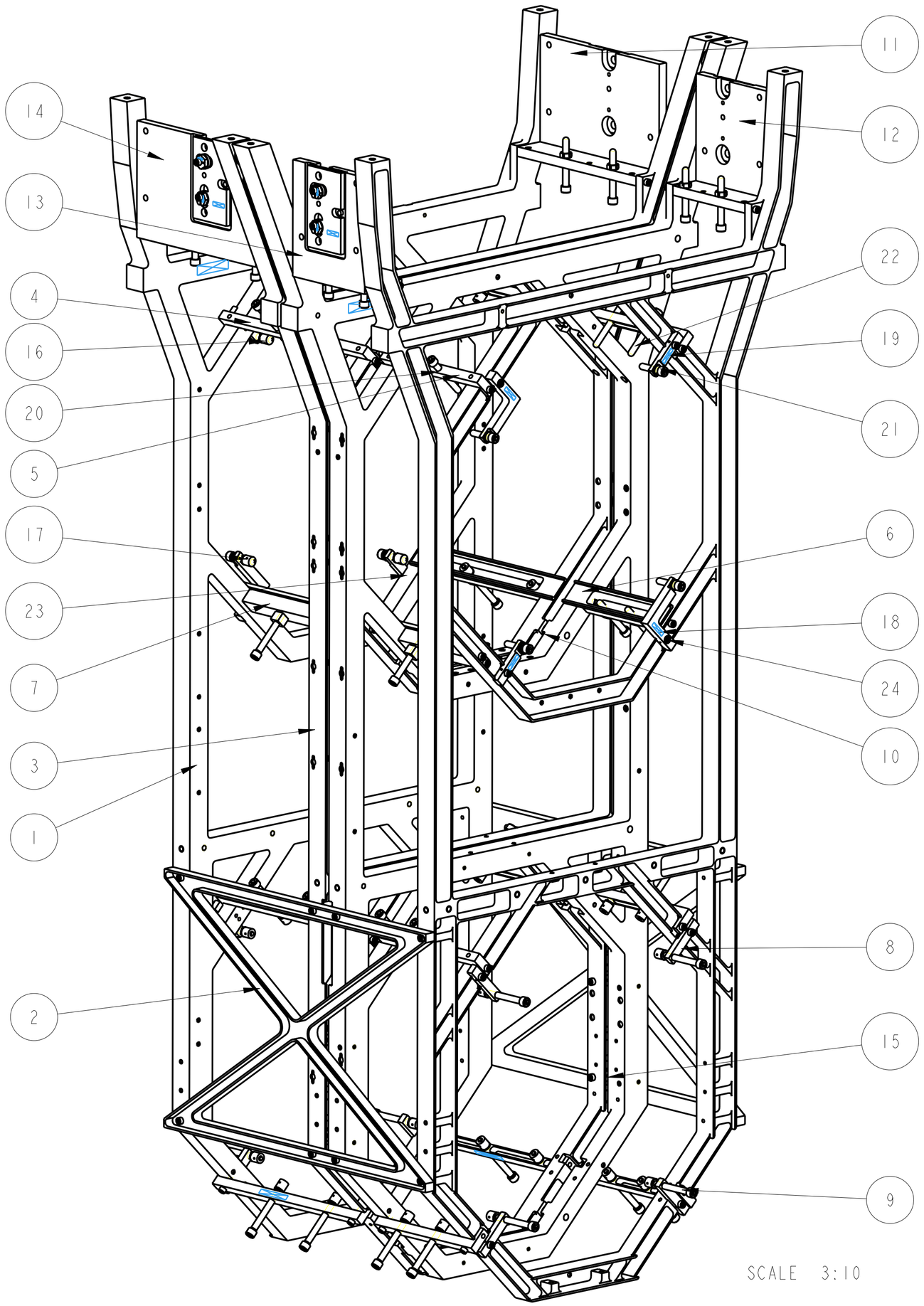
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
IGR, GLASGOW UNIVERSITY GEO 600 GROUP
RUTHERFORD APPLETON LABORATORIES

SYSTEM ADVANCED LIGO
SUB-SYSTEM SUS
NEXT ASSY D0901346
PART NAME INNER LOWER STRUCTURE SUSPENSION STRUCTURE

SIZE C | DRG. NO. D060454 | REV F.
SCALE 1:1 | PROJECTION: | SHEET 4 OF 5

INTRALINK NAME: D060454

REV.	DATE	DCN #	DRAWING TREE #
.	.	.	.



SCALE 3:10

QUAD LOWER STRUCTURE - METAL MASS CONFIGURATION FINAL (IN TANK)

NOTE:

REMOVE ALL PFA PADS, AND TOOLING

ITEM	QTY	SPARE	TOTAL	PART NUMBER	DESCRIPTION	MATERIALS
1	2			D060434	OUTER FACE PLATE; LOWER STRUCTURE	ALUMINIUM ALLOY: 6082
2	2			D060455	LOWER STRUCTURE X-BRACE; LOWER STRUCTURE	AL ALLOY: 5083 OR SIMILAR
3	2			D060462	INNER FACE PLATE; LOWER STRUCTURE	ALUMINIUM ALLOY: 6082
4	6			D060475	EARTHQUAKE-STOP MOUNTS-LONG; LOWER STRUCTURE	AL ALLOY: 5083 H4 OR 6061
5	6			D060476	EARTHQUAKE-STOP MOUNTS-SHORT; LOWER STRUCTURE	AL ALLOY: 5083 H4 OR 6061
6	2			D060477	PENULTIMATE MASS LWR STOP MT 1; .	AL. ALLOY: 5083 H4 OR 6061
7	2			D060478	PENULTIMATE MASS LWR STOP MT 2; .	AL. ALLOY: 5083 H4 OR 6061
8	8			D060481	ROUND MASS FRONT STOP; .	AL. ALLOY: 5083 H4 OR 6061
9	32			D060544	EARTHQUAKE STOP ASSY; .	N/A: --------
10	8			D070008	SPACING PLUG; LOWER STRUCTURE	AL ALLOY: 5083 OR SIMILAR
11	1			D070540	UIM TC E'QUAKE STOP ASSY #1; .	AS DRW: AS DRW
12	1			D070541	UIM RC E'QUAKE STOP ASSY #1; .	AS DRW: AS DRW
13	1			D070542	UIM RC E'QUAKE STOP ASSY #2; .	AS DRW: AS DRW
14	1			D070543	UIM TC E'QUAKE STOP ASSY #2; .	AS DRW: AS DRW
15	4			D090438	RINGHEATER ATTACHMENT PIECE; QUAD LOWER STRUCTURE	AL ALLOY: 5083
16	2			D1101236	SHORT EARTHQUAKE STOP ASSY; .	N/A: --------
17	2			D1101945	SHORT EQ STOP ASSY; SLEEVE BRACE POSITIONS	-------: AS DRW
18	4			D1101959	SHORT EQ STOP ASSY; SLEEVE BRACE POSITIONS	-------: AS DRW
19	4			D1101963	SHORT EQ STOP ASSEMBLY #2; QUAD EQ STOPS	-------: AS DRW
20	62				1/4-20 x 1.5D UNC THREAD INSERT; .	
21	12				1/4-20 x 1D UNC THREAD INSERT; .	
22	8				1/4" 20 UNC X 2" CAP HEAD, SPHERICAL TIP; .	
23	36				8-32 x 1.5D UNC THREAD INSERT; .	
24	72				8-32 UNC X 0.625" CAP HEAD; .	

PARTS LIST

NOTES: (UNLESS OTHERWISE SPECIFIED)

1. REMOVE ALL SHARP EDGES, R.02 MIN.
2. DO NOT SCALE FROM DRAWING.
3. ALL MACHINING FLUIDS SHALL BE WATER SOLUBLE AND FREE OF SULFUR, CHLORINE AND SILICONE, SUCH AS CINCINNATI MILACRON'S CIMTECH 410 (STAINLESS STEEL)
4. SCRIBE, ENGRAVE OR STAMP DRAWING PARTNUMBER ON NOTED SURFACE OF PART AND A THREE DIGIT SERIAL NUMBER. SERIAL NUMBERS START AT 001 FOR THE FIRST PART AND PROCEED CONSECUTIVELY. USE .07" HIGH CHARACTERS. EXAMPLE: D020188-001. A VIBRATORY TOOL MAY BE USED.

DIMENSIONS ARE IN mm [INCHES]
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ANGULAR ±: °

MATERIAL: AS DRW

FINISH: CLEAN
√µm [µin] Ra : AS DRW

	NAME	DATE
DRAWN	J O'DELL	16/NOV/11
CHECKED	MB	15/MAR/11
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IGR, GLASGOW UNIVERSITY GEO 600 GROUP
RUTHERFORD APPLETON LABORATORIES

SYSTEM ADVANCED LIGO

SUB-SYSTEM SUS

NEXT ASSY D0901346

PART NAME INNER LOWER STRUCTURE SUSPENSION STRUCTURE

SIZE C | DRG. NO. D060454 | REV F.

SCALE 1:1 | PROJECTION: | SHEET 5 OF 5