

1. REFERENCED DOCUMENTATION:
 1.1 LIGO-E1100109, HAM SUS CONTROL ARRANGEMENT.
 1.2 LIGO-D1101493, OSEM ORIENTATION.
 1.3 LIGO-D1000581, SYSTEM CABLING DIAGRAM.
 1.4 LIGO-D1002424, VIBRATION ABSORBER ORIENTATION.
 1.5 LIGO-E1100411, CABLE CLAMP TORQUE.
 1.6 LIGO-D1101296, HAM ISI HOLE TABLE.

2. SEE SHEETS 4,5,6, 7 AND 8 FOR CABLE ROUTE DETAILS.

MC3

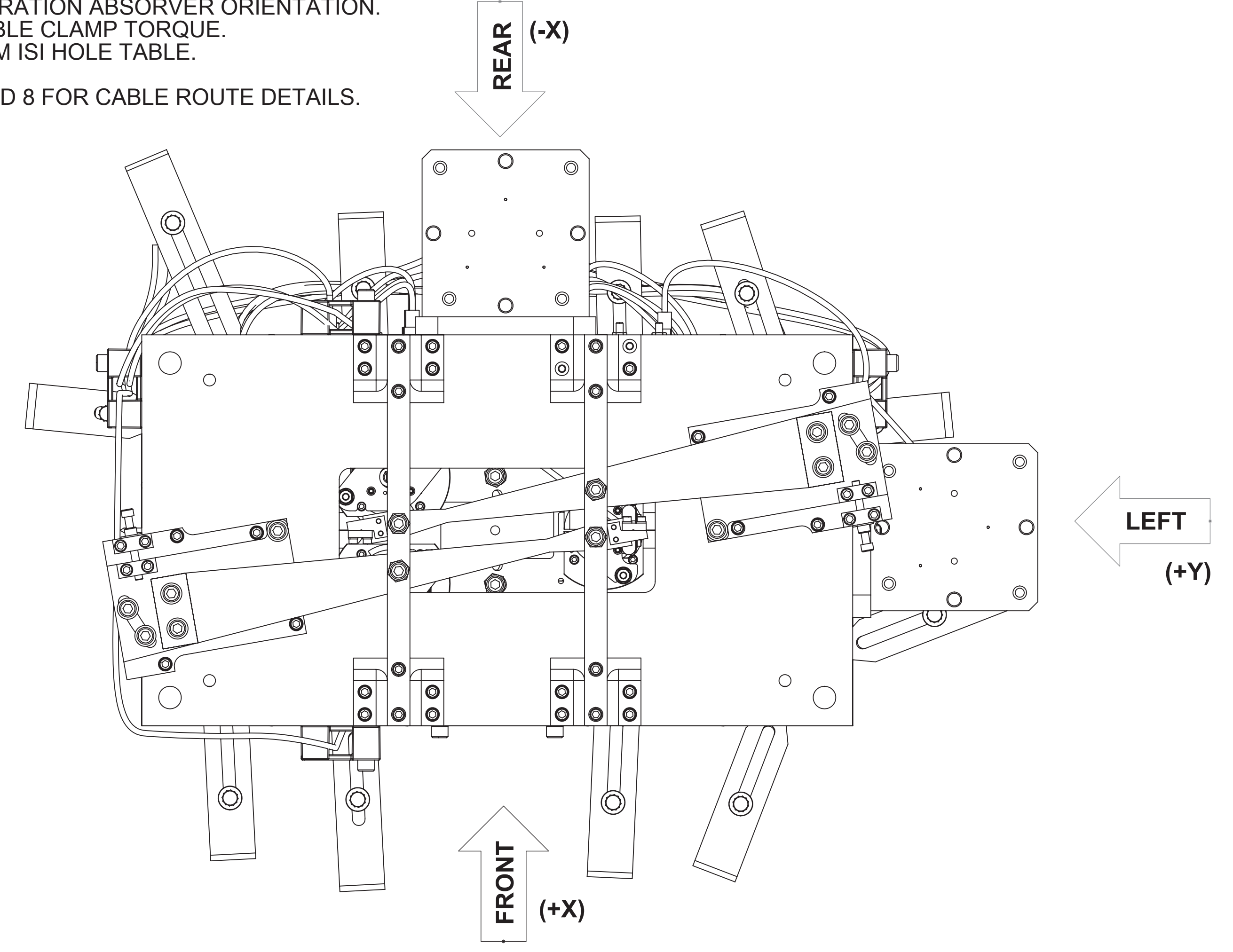
INSTALL CONFIGURATION (i.e.: IN CHAMBER - DOORS CLOSED)

REV.	DATE	DCN #	DRAWING TREE #
v1	30 MAY 2012	-	-
v2	22 AUG 2012	-	-
v3	30 OCT 2012	E1200965-x0	-

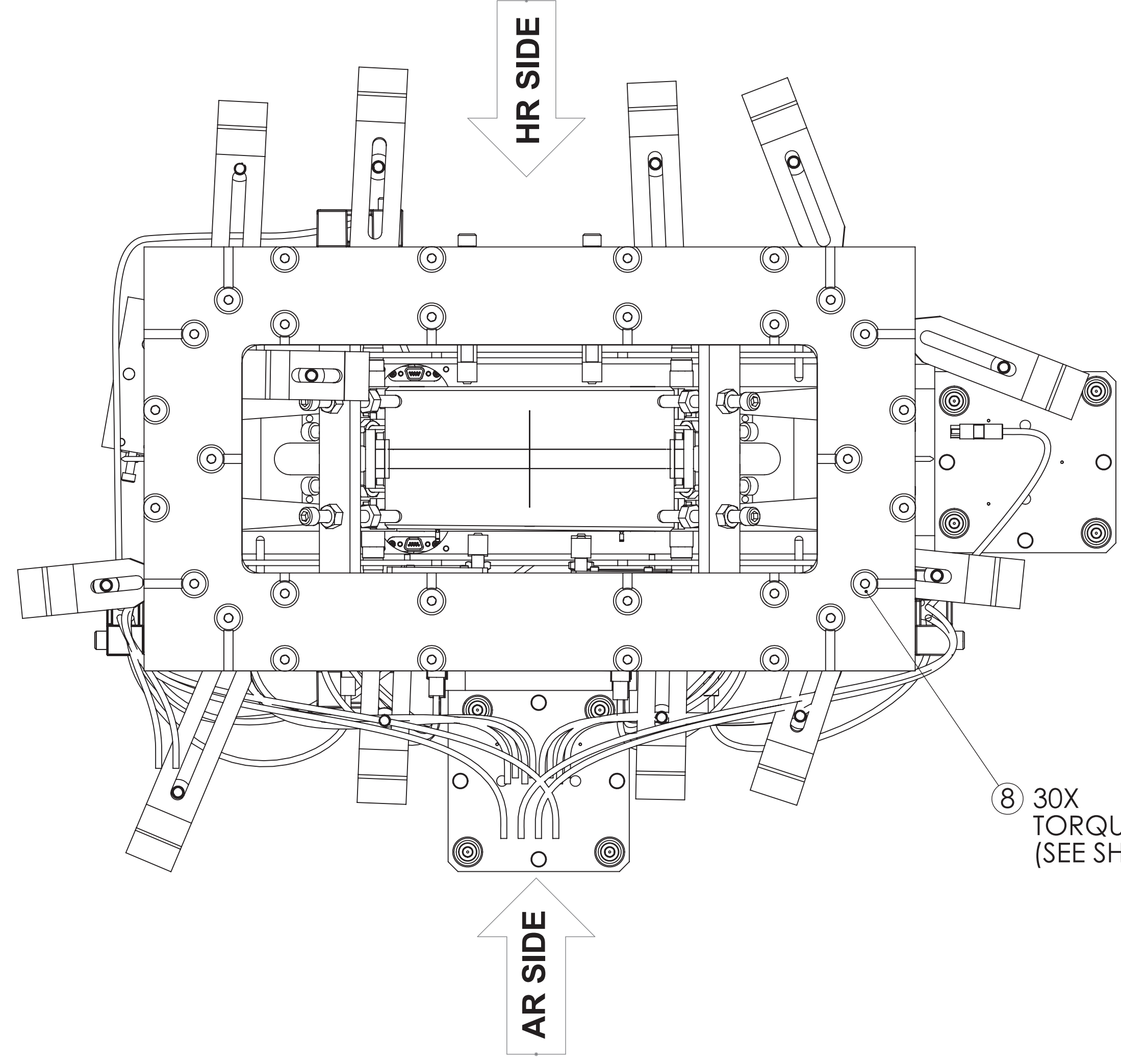
TABLE 1: HAM2-H1 MC3 CABLING SPECIFICATIONS, FROM/TO DES.

ROUTE NO.	FROM OSEM POSITION	TO CB FLOOR DES.	QP LEG DES.	CABLE PART NO.	NOM. CABLE LENGTH (IN)
1	M3-UL (S)	CB-4 (FIRST)	A	D1000234	60
	M3-LL (N)		B		
	M3-UR (N)		C		
	M3-LR (S)		D		
2	M2-UL (S)	CB-4 (SECOND)	A	D1000234	60
	M2-LL (N)		B		
	M2-UR (N)		C		
	M2-LR (S)		D		
3	M1-T3 (N)	CB-4 (THIRD)	A	D1000234	66
	M1-LF (N)		B		
	M1-RT (S)		C		
	M1-SD (S)		D		
4	M1-T1 (S)	CB-5 (FIRST)	C	D1000234	78
	M1-T2 (S)		D		

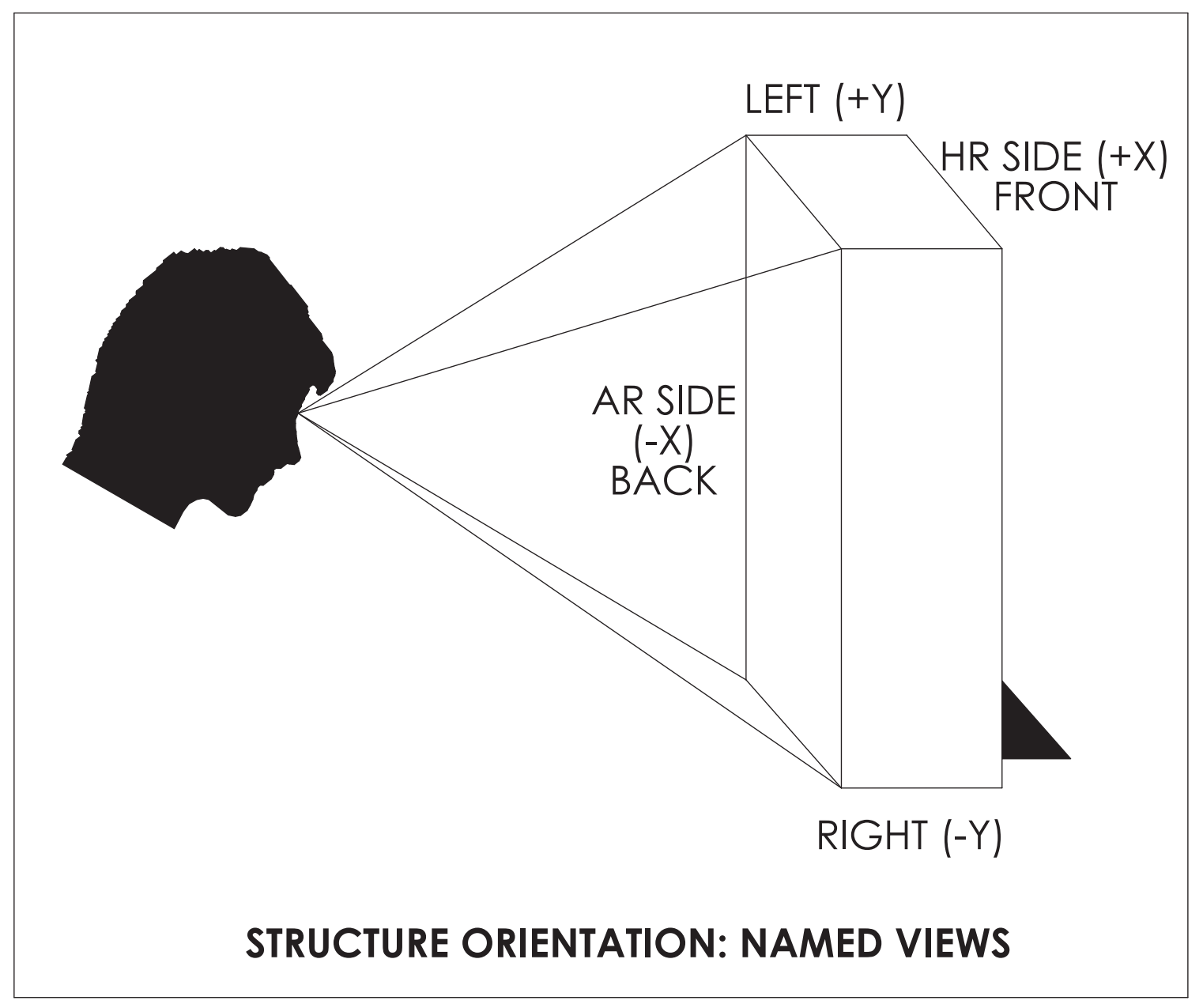
NOTE : ROUTE NO. 4 IS A SHARED CABLE, SEE D0901088 FOR QP LEGS 'A' AND 'B' ROUTING



TOP VIEW
(SEE SHEET 3, FOR DOG CLAMP DETAILS)



BOTTOM VIEW A-A

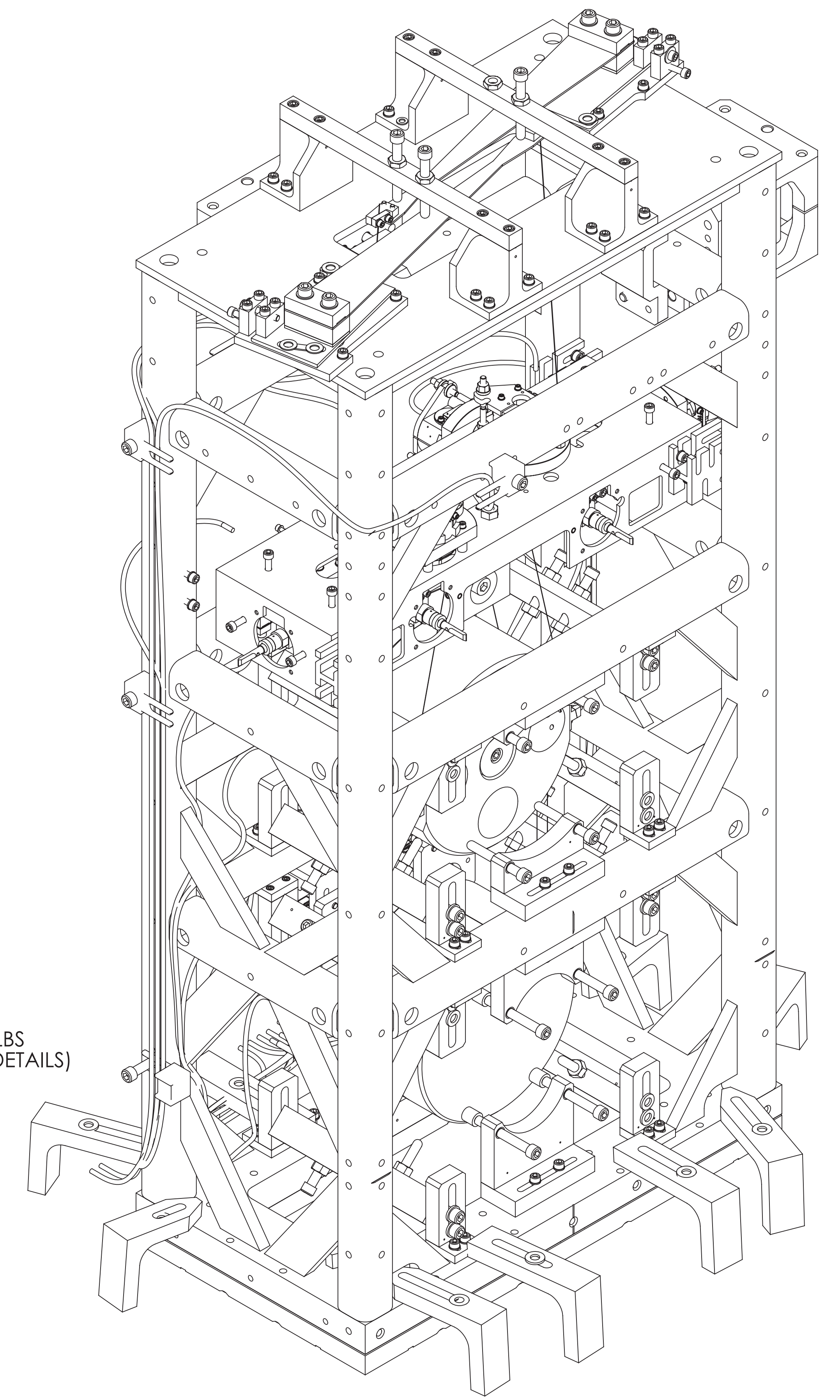


STRUCTURE ORIENTATION: NAMED VIEWS

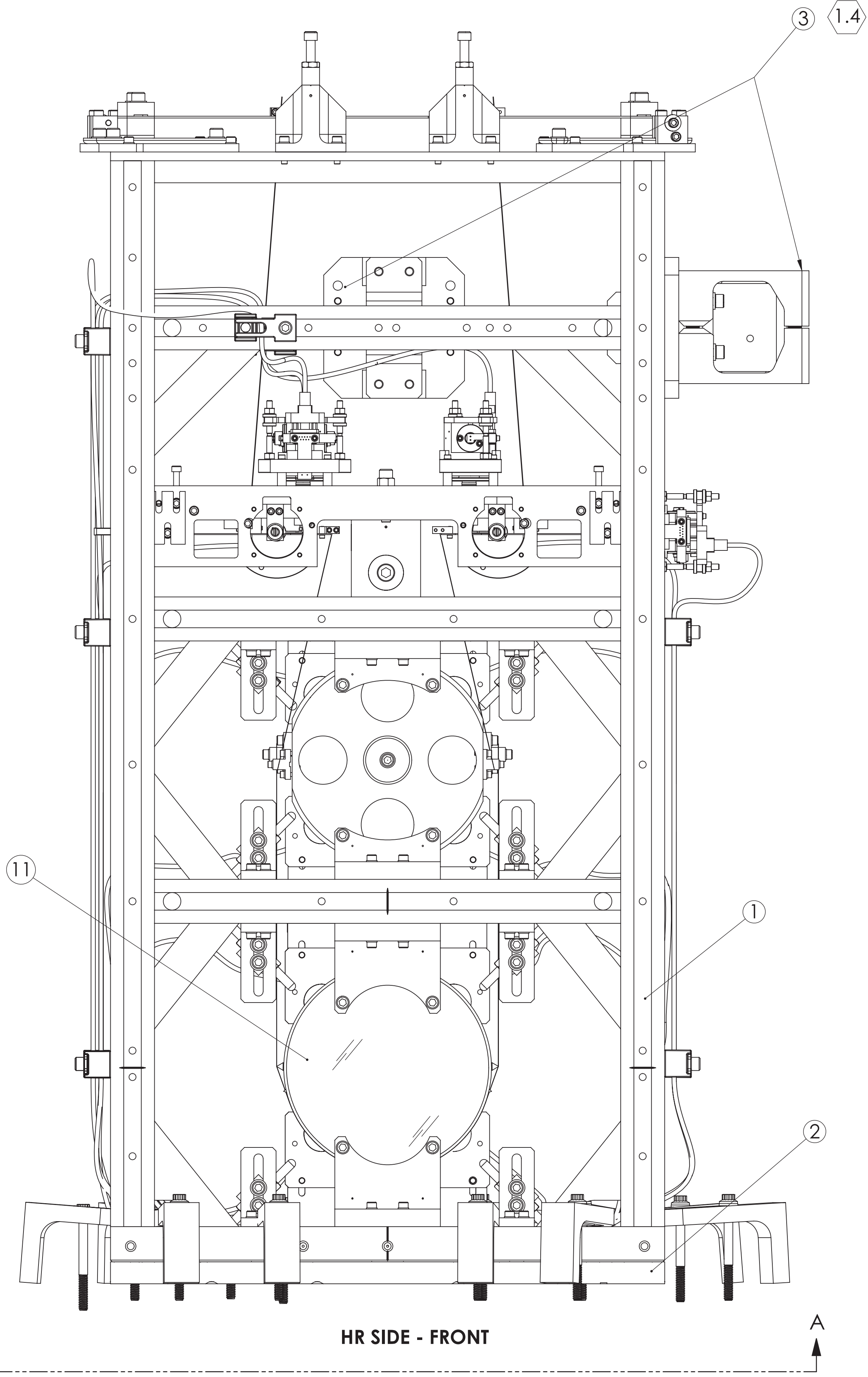
LOCAL COORDINATES - REFERENCE

Xmm	Ymm	Zmm	YAW°
49.5	720.0	-97.4	134.33°

REFER TO DRAWING D1101251 FOR HAM2-H1 INSTALLATION PLATE LAYOUT



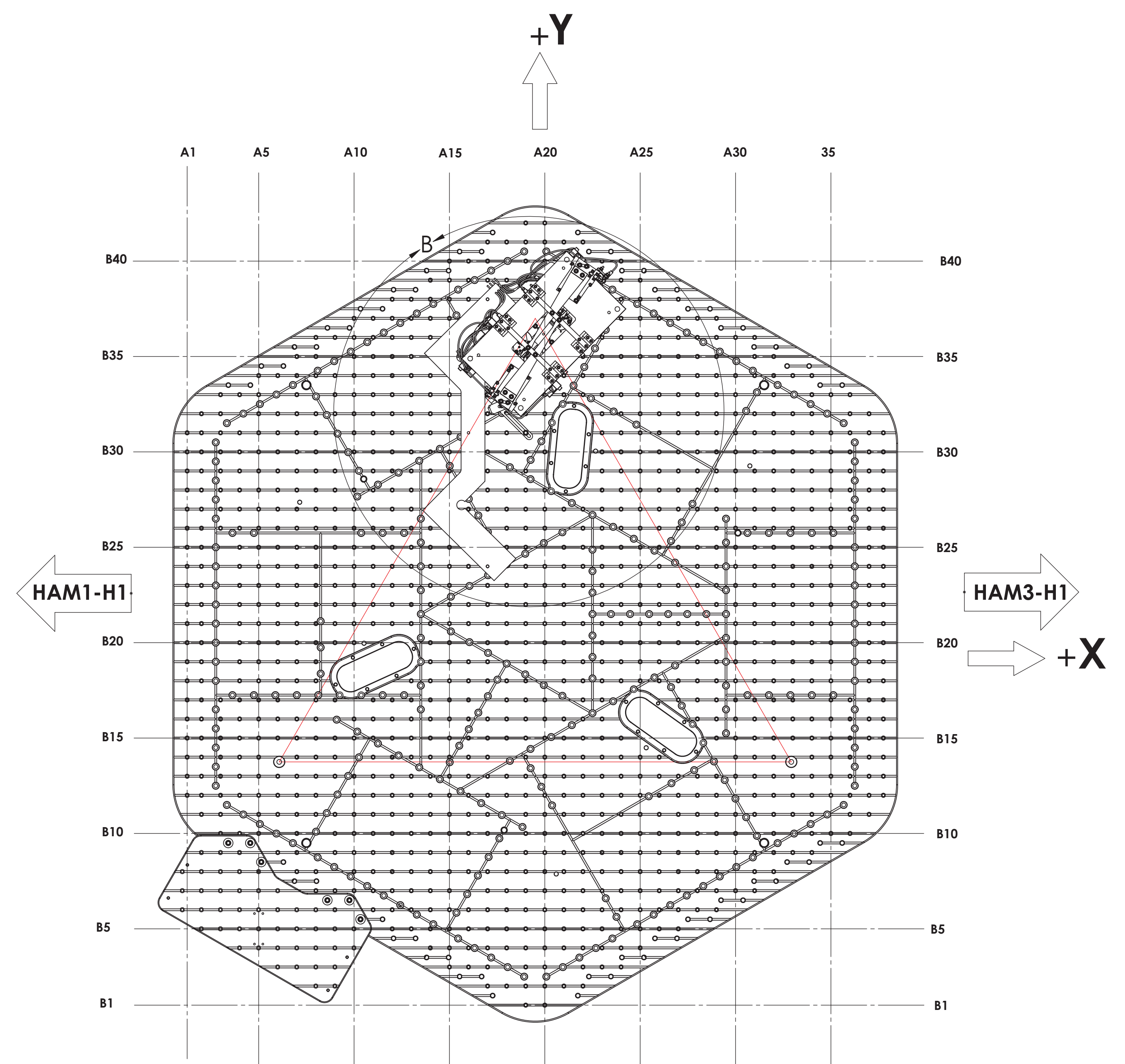
ISO VIEW



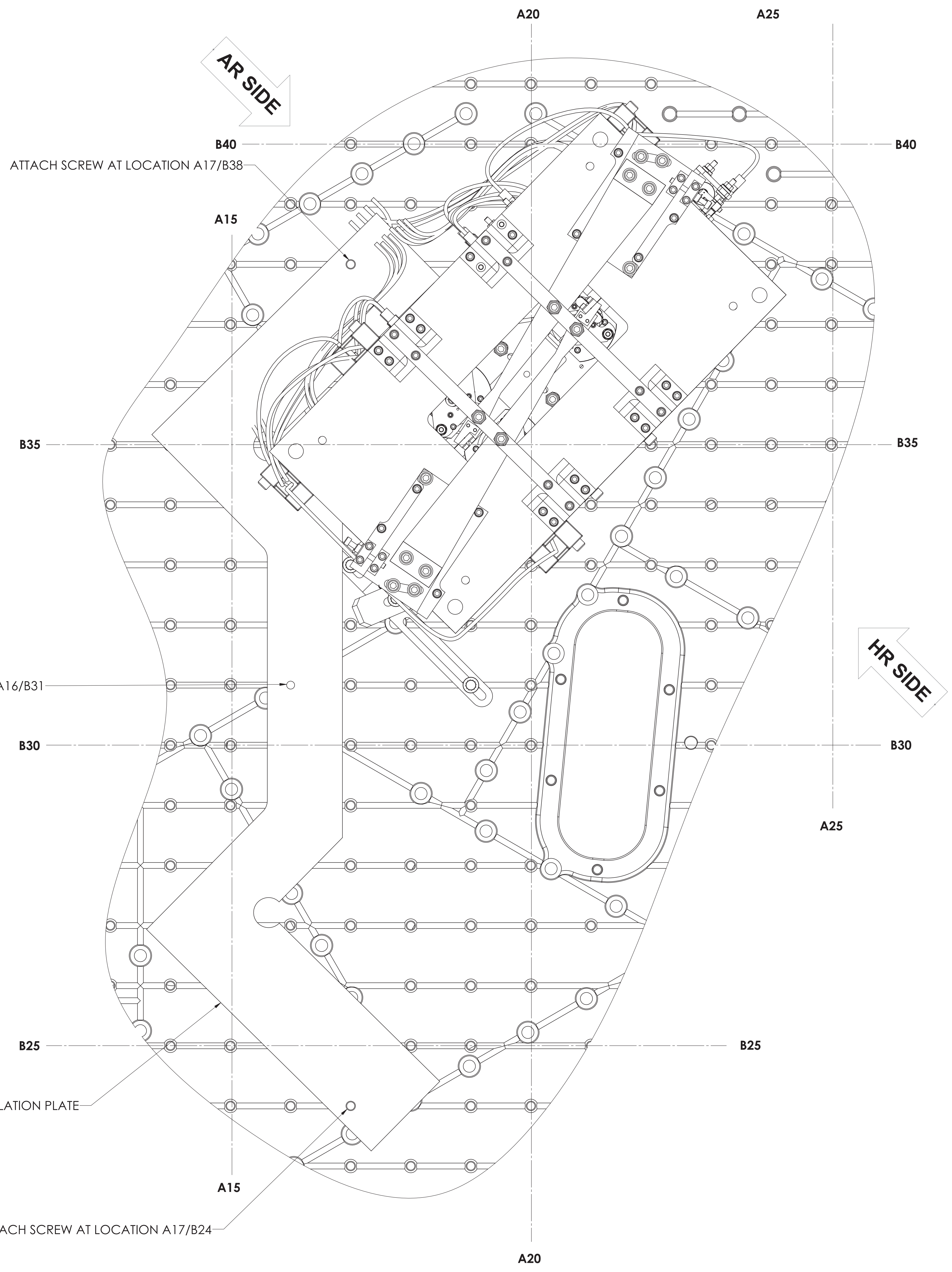
HR SIDE - FRONT

ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	QTY.
17	2AL1.75-12SL	1/4-20 X 1.75 12PT BOLT	450 SSSL	1
16	2AL1.25-12SL	1/4-20 X 1.25 12PT BOLT	450 SSSL	3
15	D1201158	ALIGO, SUS, DOG CLAMP SUPPORT (CUSTOM)	AS NOTED	1
14	D1201157-2	ALIGO, SUS, DOG CLAMP CHAMFERED ENDS, 1.792 H (CUSTOM)	304 SSSL	1
13	D1201156-2	ALIGO, SUS, Z-CLAMP CHAMFERED ENDS, 1.818 H (H1)	304 SSSL	1
12	D0902462	CLAMP ASSY., UHV COMPATIBLE	N/A	A/R
11	D1101376	MC3 H1 OPTICS ASSEMBLY	N/A	1
10	D1100785-530	WASHER, FLAT, .25 X .530 O.D.	NITRONIC 60	15
9	2AL2.75-12SL	1/4-20 X 2.75 12PT BOLT	450 SSSL	11
8	FA-2016-NA	.25-20 X 1 FHSC SCREW UC COMPONENTS FA-2016-NA	18-8 SSSL	30
7	D1100641-06	AdvLIGO HAM Optics Table Dog Clamp Chamfered End 1.80L	304 SSSL	1
6	D1100641-05	AdvLIGO HAM Optics Table Dog Clamp Chamfered End 1.80M	304 SSSL	4
5	D1100641-04	AdvLIGO HAM Optics Table Dog Clamp Chamfered End 1.80S	304 SSSL	2
4	D1001376-05	AdvLIGO HAM Optics Table Dog Clamp 1.8M	304 SSSL	4
3	D1002424	VIBRATION ABSORBER ASSEMBLY	N/A	2
2	D1001070	HSTS SUS STRUCTURE SPACER 15.8MM	6061-T6 Al	1
1	D020700	HSTS OVERALL ASSEMBLY	N/A	1

NOTES AND TOLERANCES: (UNLESS OTHERWISE SPECIFIED)		PARTS LIST	
MATERIAL	N/A	FINISH	N/A μinch
SYSTEM	ADVANCED LIGO	SUB-SYSTEM	SUS
DESIGNER	ESANCHEZ	DATE	30 MAY 2012
DRAWER	ESANCHEZ	SIZE	DWG. NO. E
CHECKER	SEE DCC	SCALE	1:2
APPROVAL	SEE DCC	PROJECTION	1ST ANGLE
NEXT ASSY		D0901083	
PART NAME		HAM2-H1, XYZ Local CS for HSTS (MC3) Sub-Assy	
REV.		v3	



TOP VIEW (1.6)
REF. TRIANGLE: SEE G1000125
FOR ISI NAMING AND ORIENTATION CONVENTION

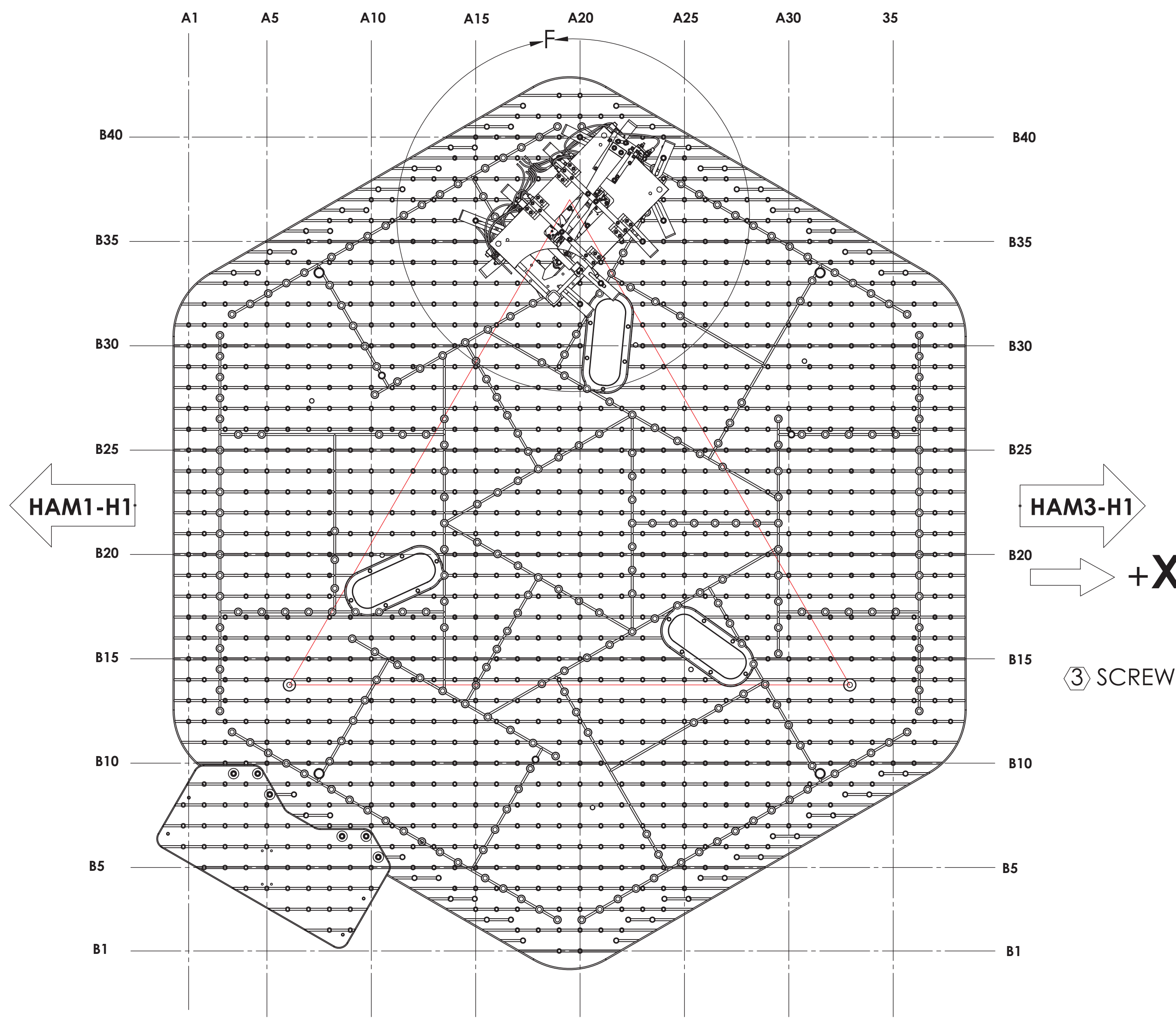


DETAIL B
SCALE 1 : 1.5

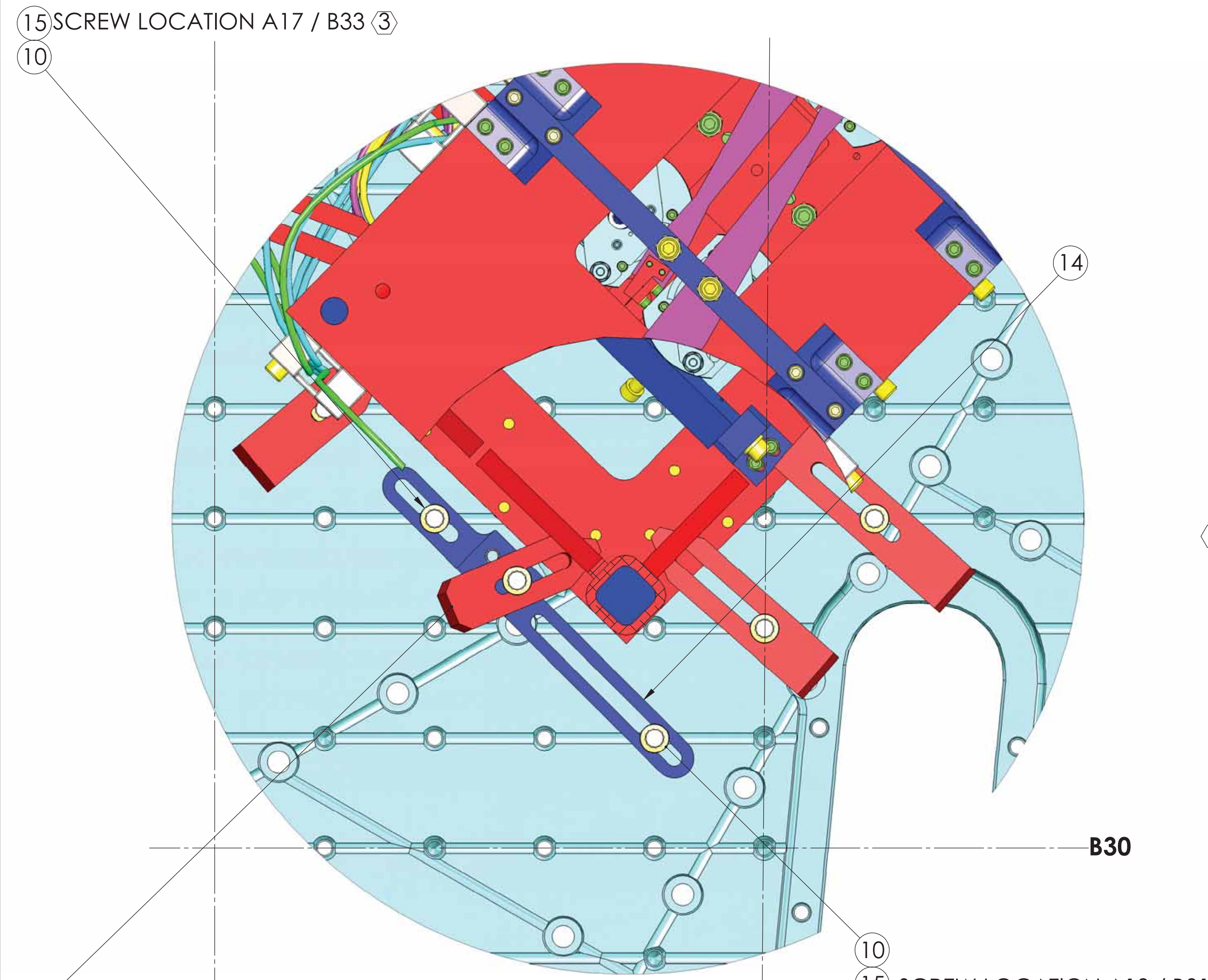
TOP VIEW SHOWING INSTALLATION PLATE LOCATION (1.6)
OPTICAL TABLE SHOWN FOR STRUCTURE LOCATION AND ORIENTATION
DOG CLAMPS VIBRATION ABSORBERS AND HARDWARE REMOVED FOR CLARITY

ALIGNMENT PLATE INSTALLATION / LOCATION

+Y

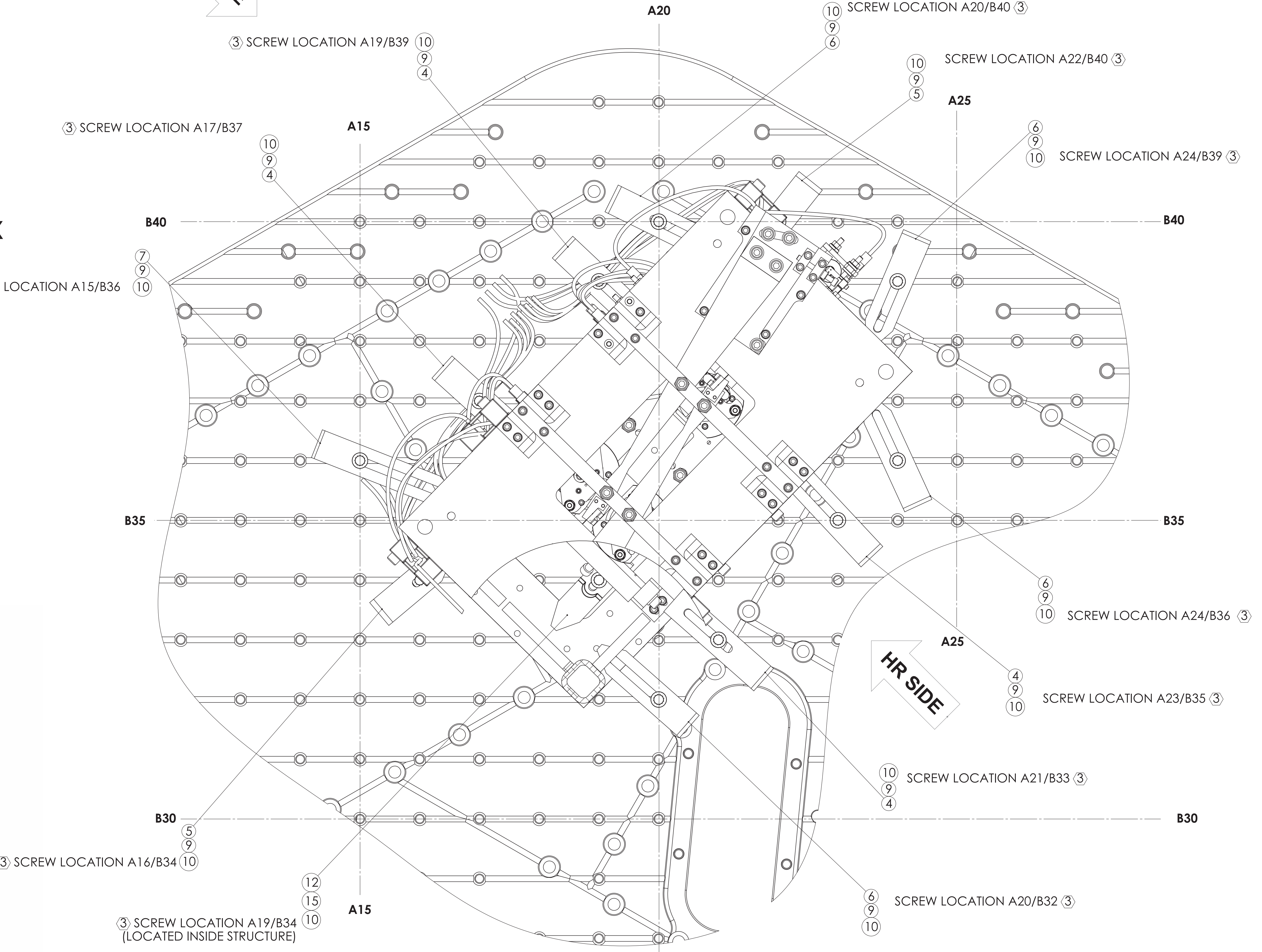


TOP VIEW 1.6
REF. TRIANGLE: SEE G1000125
FOR ISI NAMING AND ORIENTATION CONVENTION



ALTERNATE CLAMPING METHOD

AR SIDE



DETAIL F
SCALE 1 : 1.5

OR

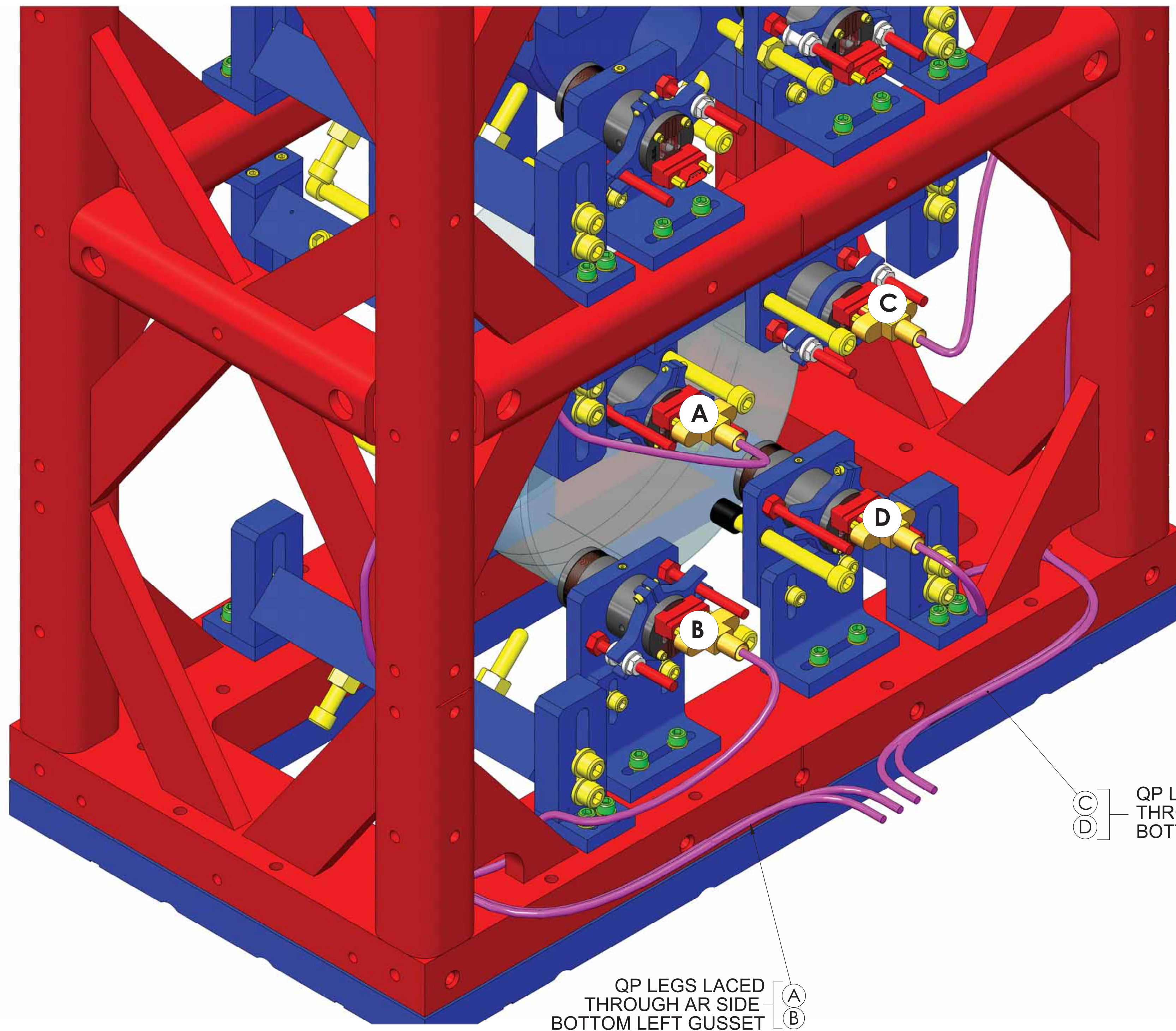
TOP VIEW SHOWING DOG CLAMP INSTALLATION
OPTICAL TABLE SHOWN FOR STRUCTURE AND DOG CLAMP
LOCATIONS AND ORIENTATION ONLY.
VIBRATION ABSORBERS REMOVED FOR CLARITY

ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	QTY.
16	2AL1.75-12SL	1/4-20 X 1.75 12PT BOLT	450 SSSL	1
15	2AL1.25-12SL	1/4-20 X 1.25 12PT BOLT	450 SSSL	3
14	D1201158	ALIGO, SUS, DOG CLAMP SUPPORT (CUSTOM)	AS NOTED	1
13	D1201157-2	ALIGO, SUS, DOG CLAMP CHAMFERED ENDS, 1.792 H (CUSTOM)	304 SSSL	1
12	D1201156-2	ALIGO, SUS, Z-CLAMP CHAMFERED ENDS, 1.818 H (H1)	304 SSSL	1
10	D1100785-530	WASHER, FLAT, .25 X .530 O.D.	NITRONIC 60	15
9	2AL2.75-12SL	1/4-20 X 2.75 12PT BOLT	450 SSSL	11
7	D1100641-06	AdvLIGO HAM Optics Table Dog Clamp Chamfered End 1.80L	304 SSSL	1
6	D1100641-05	AdvLIGO HAM Optics Table Dog Clamp Chamfered End 1.80M	304 SSSL	4
5	D1100641-04	AdvLIGO HAM Optics Table Dog Clamp Chamfered End 1.80S	304 SSSL	2
4	D1001376-05	AdvLIGO HAM Optics Table Dog Clamp 1.8M	304 SSSL	4
		PARTIAL BOM (SEE SHEET 1 FOR COMPLETE BOM)		

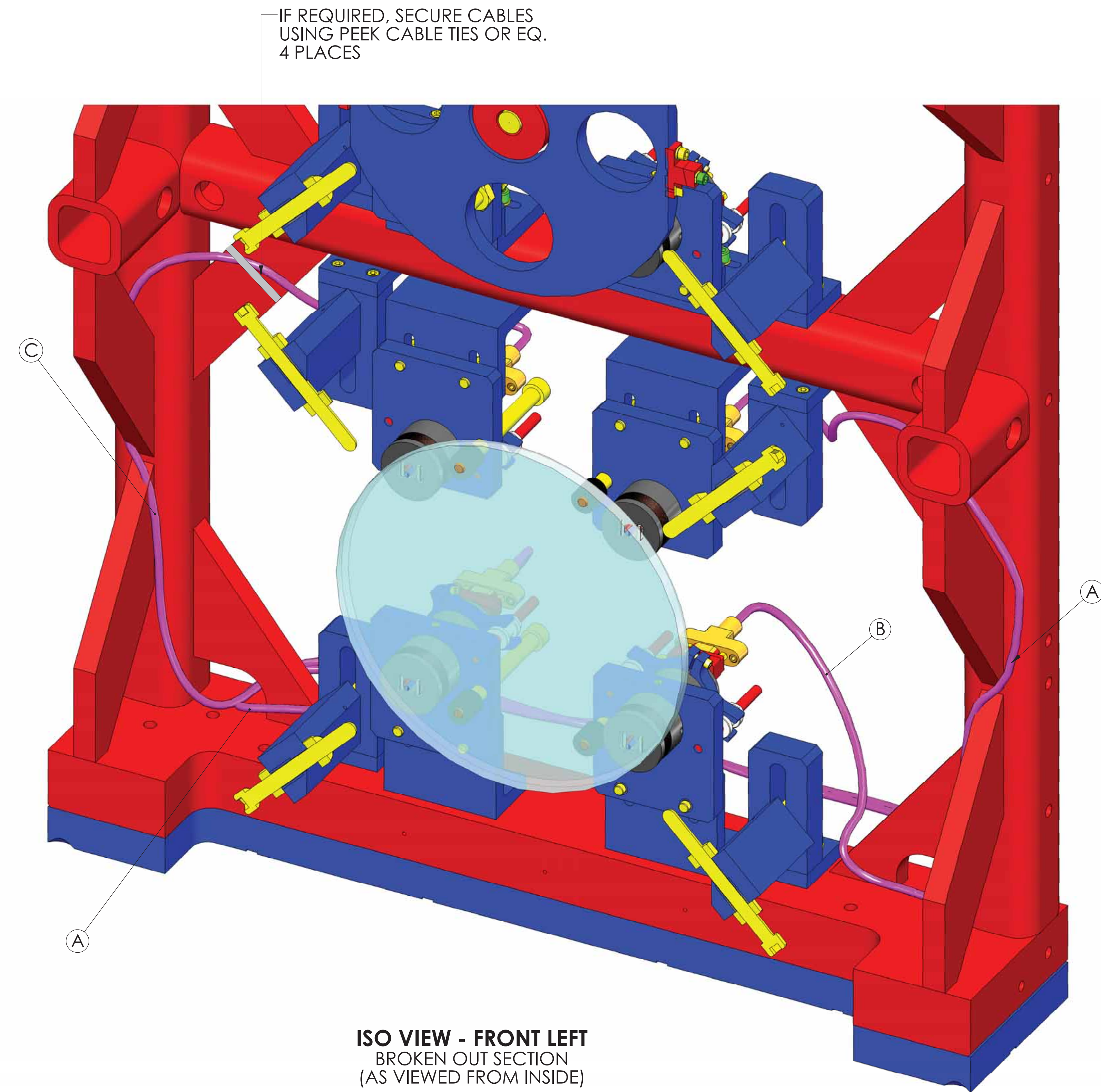
DOG CLAMP IDENTIFICATION / INSTALLATION

(3) TORQUE TO 100 IN LBS (USE STANDARD 12 PT SOCKET)

MC3



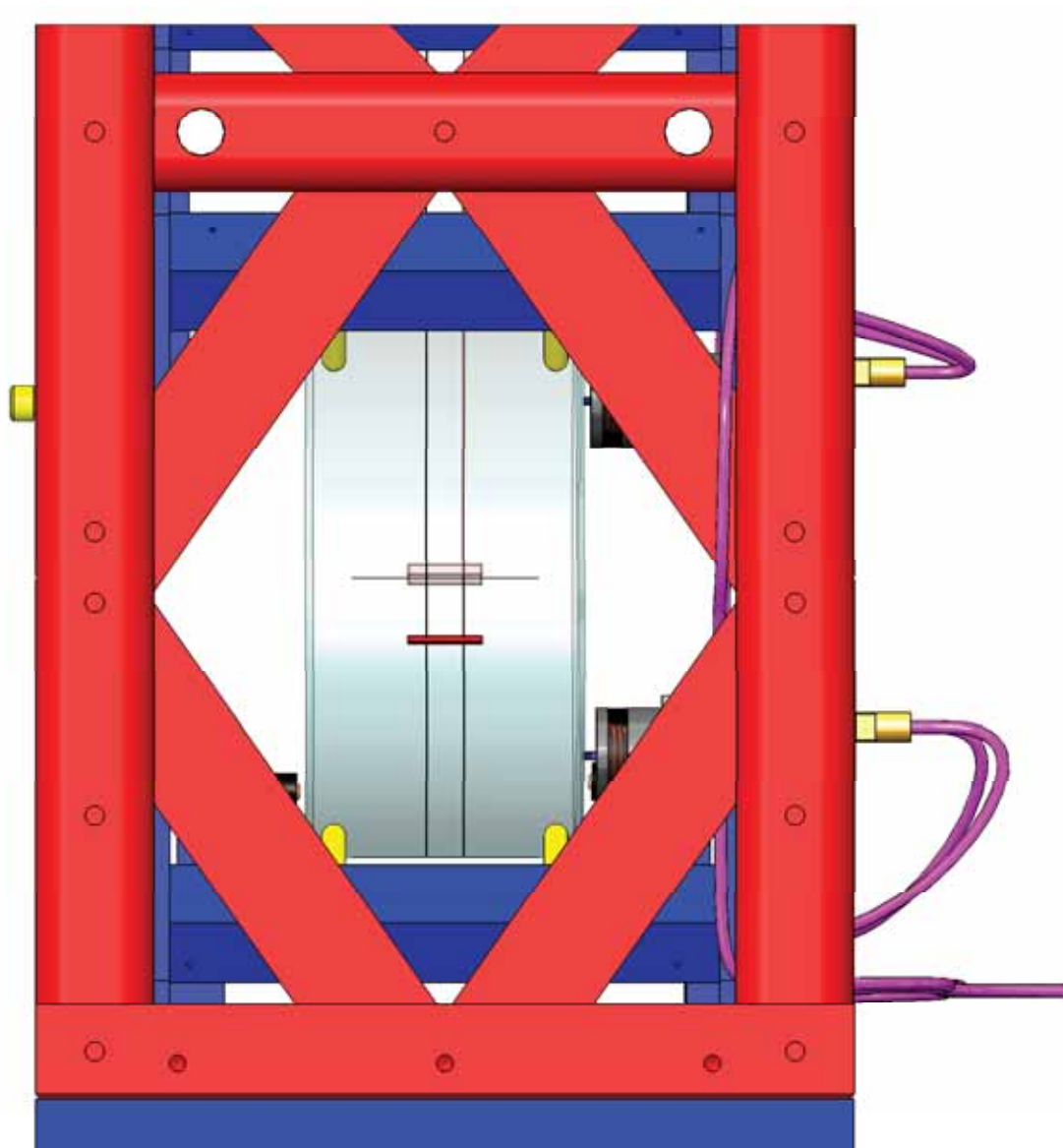
AR SIDE
ISO VIEW - REAR (-X)



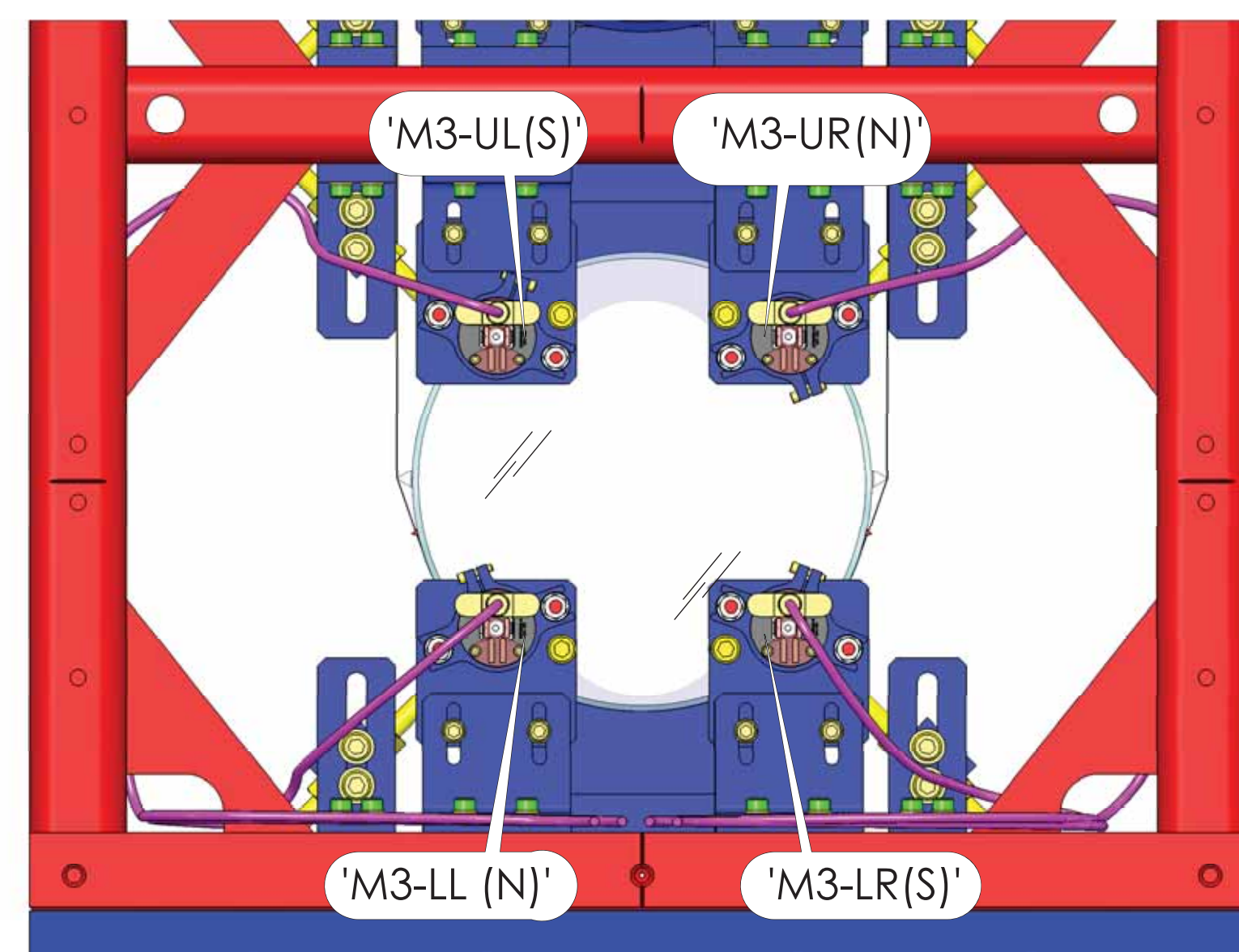
ISO VIEW - FRONT LEFT
BROKEN OUT SECTION
(AS VIEWED FROM INSIDE)



CABLE ROUTING:
ROUTE ALL CABLES IN ACCORDANCE WITH LIGO-T1200203 AND T1200318. CABLE ROUTES DEPICTED IN THIS DOCUMENT ARE NOT MANDATORY, BUT RATHER A CONSIDERED ROUTE AIMED TO CLEAR LASER BEAM PATHS. ALTERNATE ROUTES FOR PROBLEMATIC AREAS ARE ACCEPTABLE, BUT SHOULD BE HANDLED IN A CASE BY CASE SITUATION. IT IS IMPERATIVE TO CONSIDER THE LENGTH OF THE CABLE, THE LOCATION OF MATING CABLE BRACKET, AND LASER BEAM PATH PRIOR TO ROUTING / LACING VIA A NEW PATH.

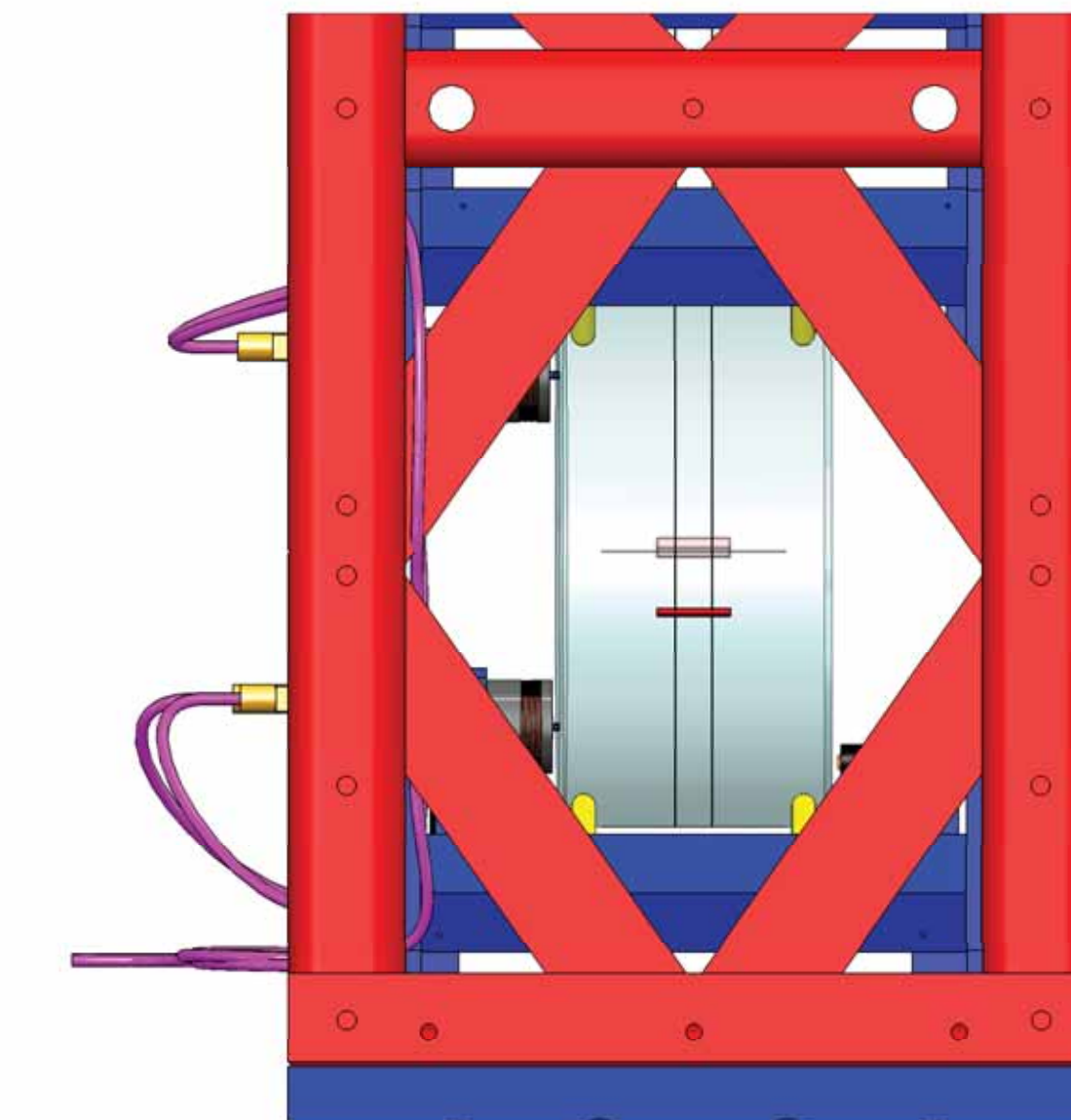
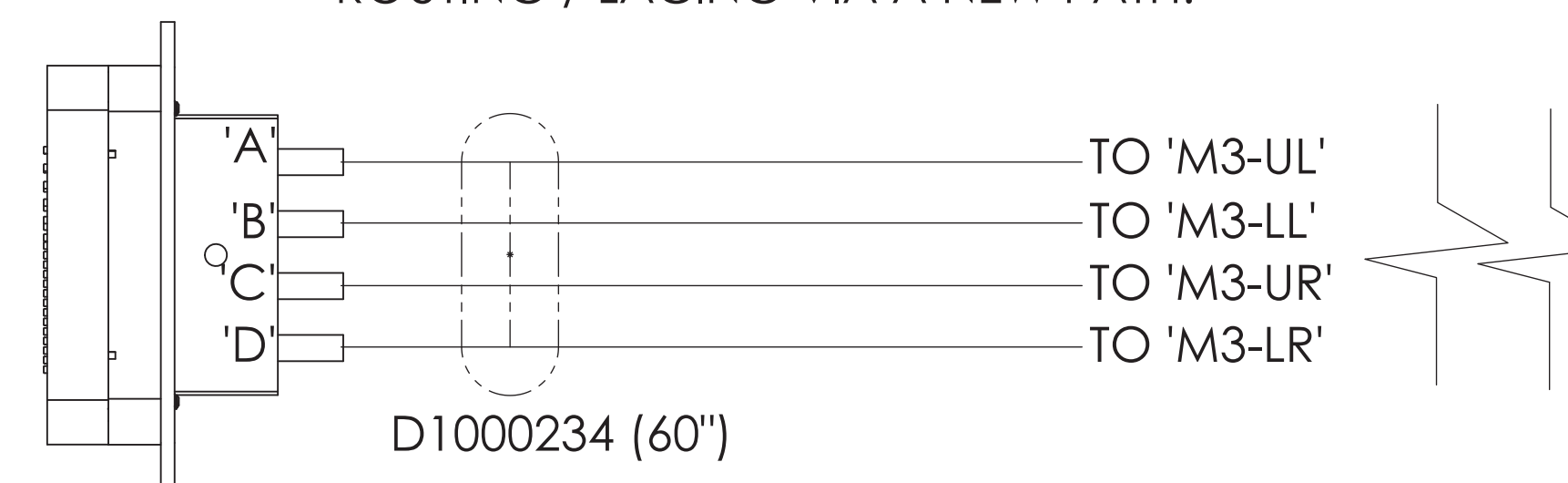
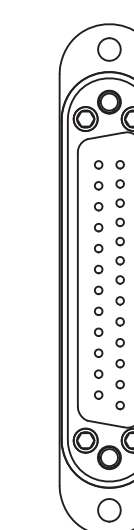


LEFT SIDE (+Y)



AR SIDE - REAR (-X) (1.1) (1.2)
END CONNECTORS, NOT SHOWN FOR CLARITY

TO
CB-4
(FIRST)



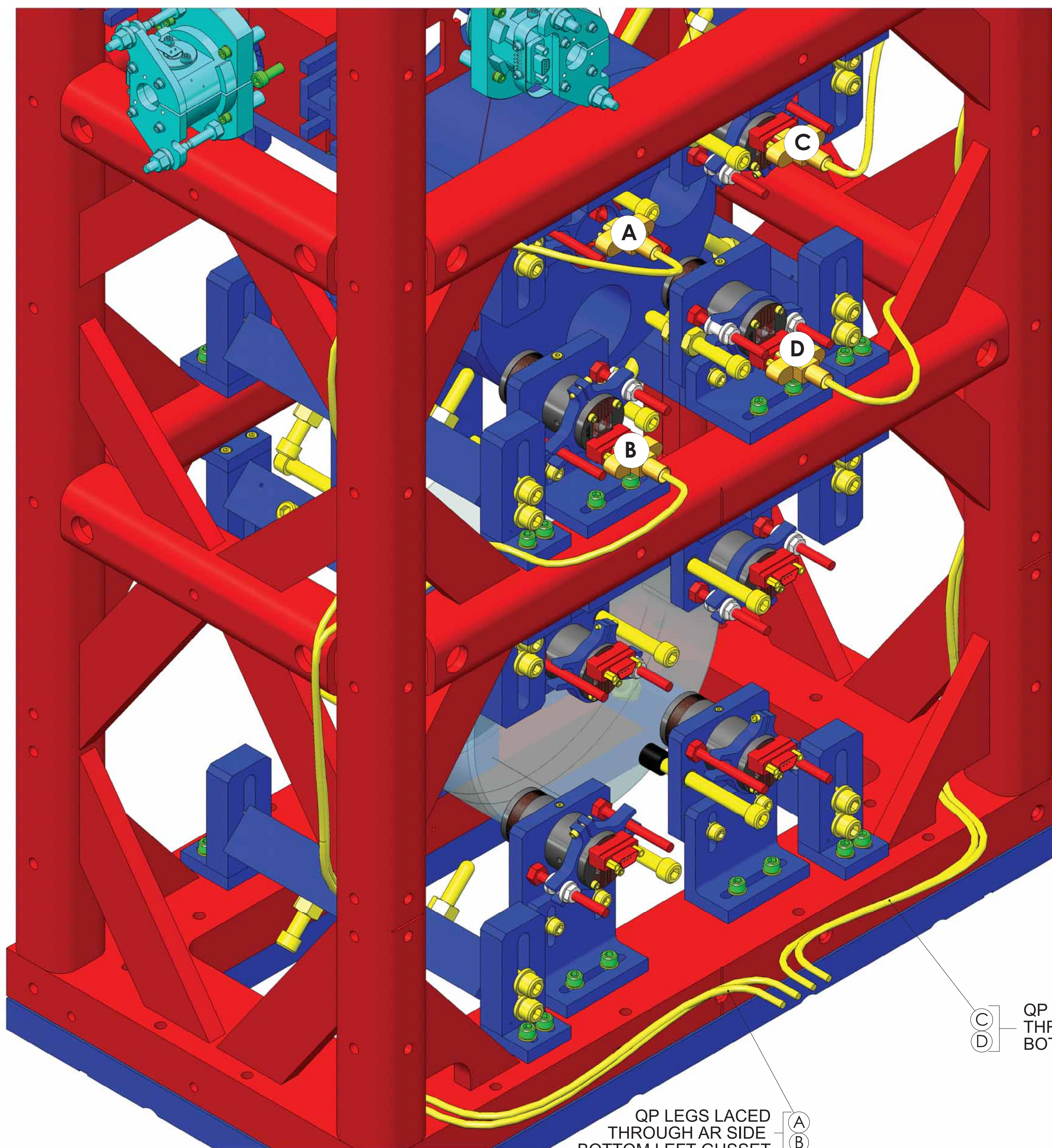
RIGHT SIDE (-Y)

ROUTE NO.1

SEE LIGO-T1200318
FOR STEP BY STEP CABLING GUIDE

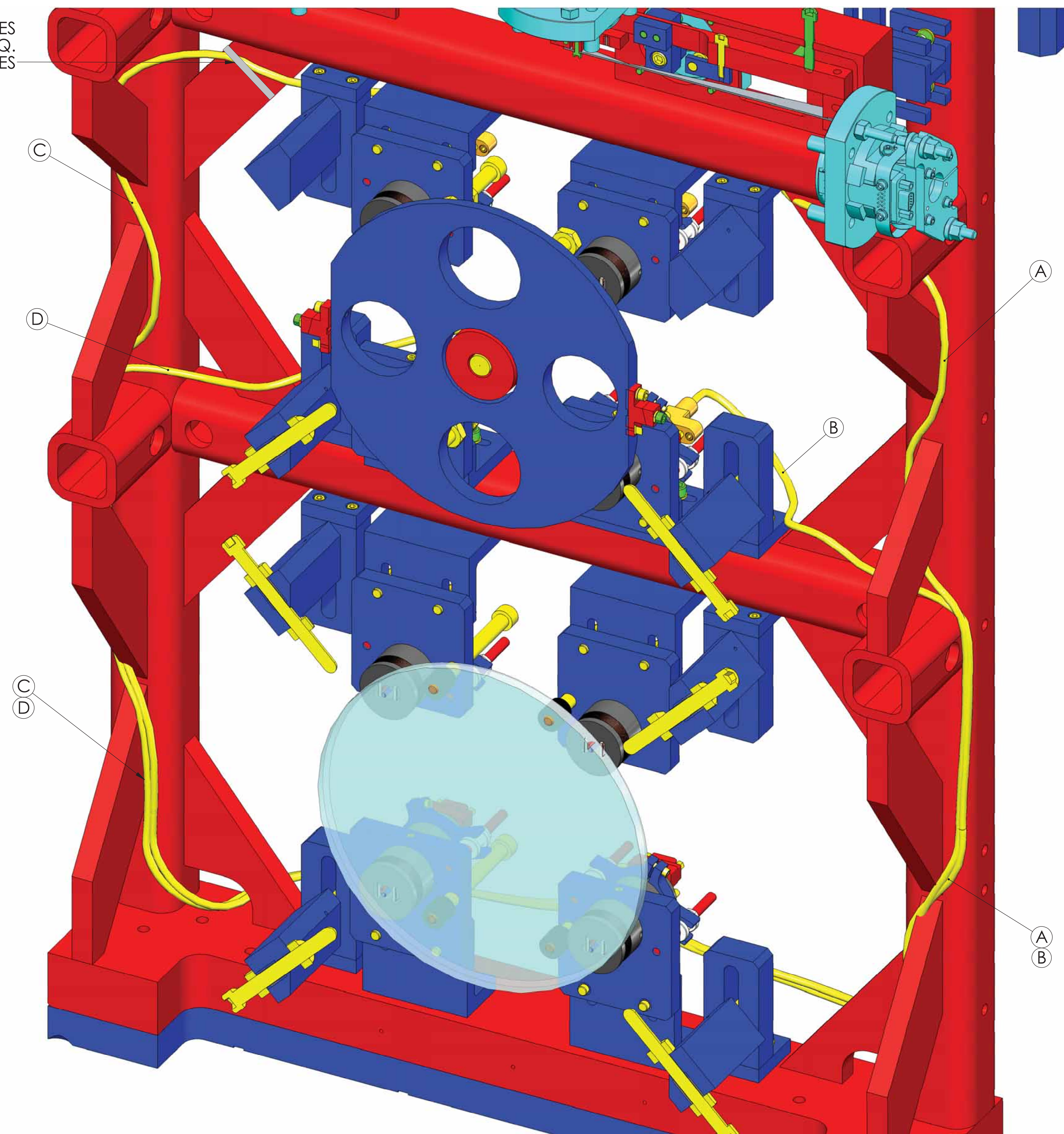
- ① REFERENCED DOCUMENTATION:
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 - 1.4 LIGO-D1002424, VIBRATION ABSORBER ORIENTATION.
 - 1.5 LIGO-E1100411, CABLE CLAMP TORQUE.
 - 1.6 LIGO-D1101296, HAM ISI HOLE TABLE.

MC3



AR SIDE
ISO VIEW - REAR (-X)

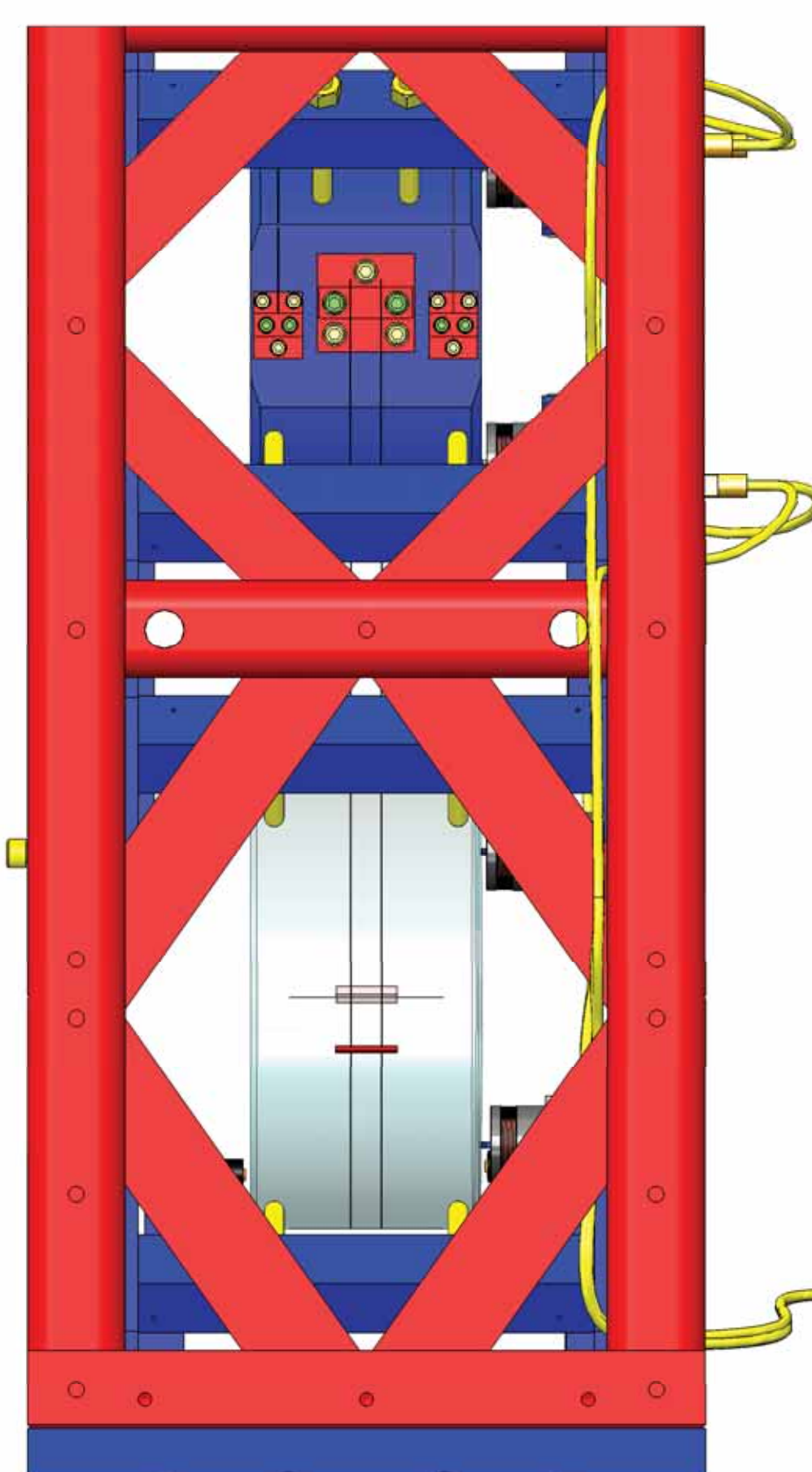
IF REQUIRED, SECURE CABLES USING PEEK CABLE TIES OR EQ. 4 PLACES



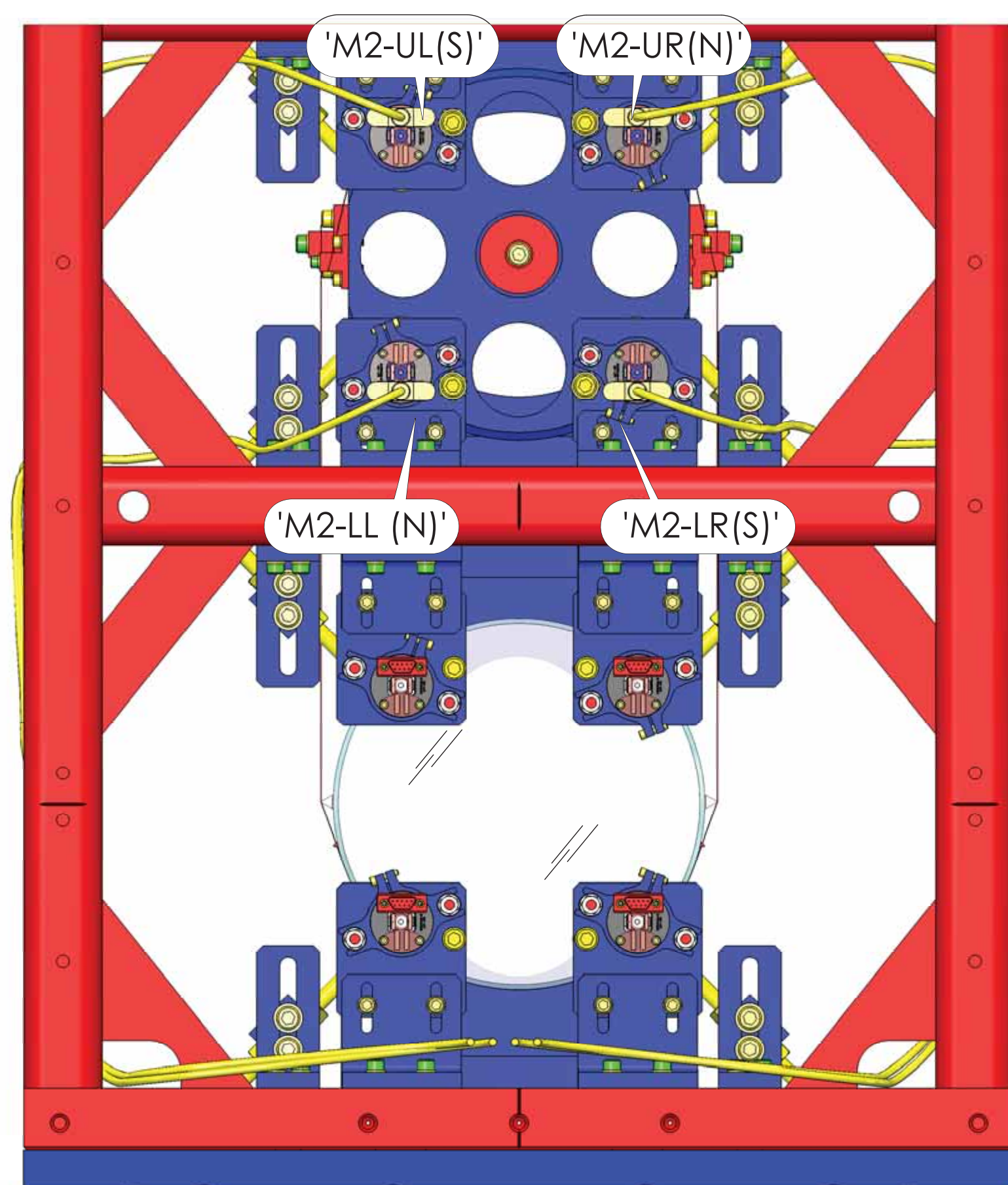
ISO VIEW - FRONT LEFT
BROKEN OUT SECTION
(AS VIEWED FROM INSIDE)

C QP LEGS LACED THROUGH AR SIDE
D BOTTOM RIGHT GUSSET

A QP LEGS LACED THROUGH AR SIDE
B BOTTOM LEFT GUSSET



LEFT SIDE (+Y)

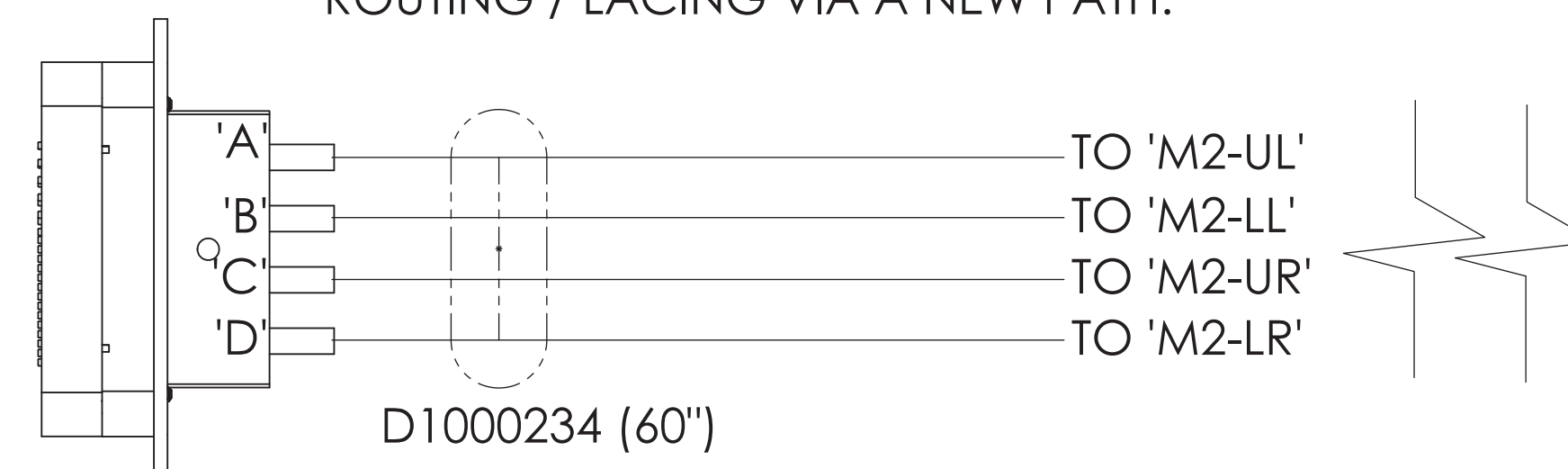


AR SIDE - REAR (-X) (1.1) (1.2)
END CONNECTORS, NOT SHOWN FOR CLARITY



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TO
CB-4
(SECOND)



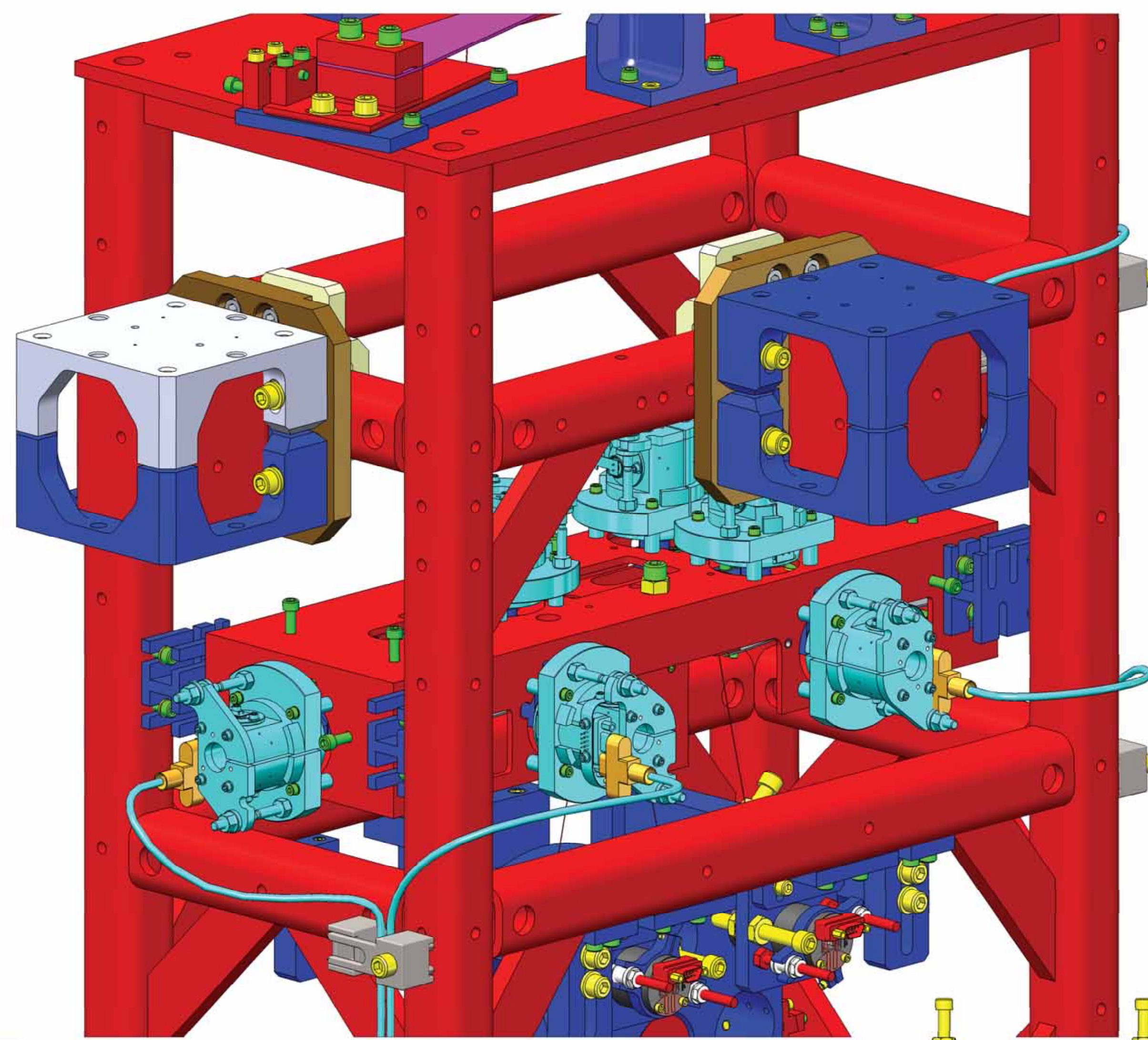
RIGHT SIDE (-Y)

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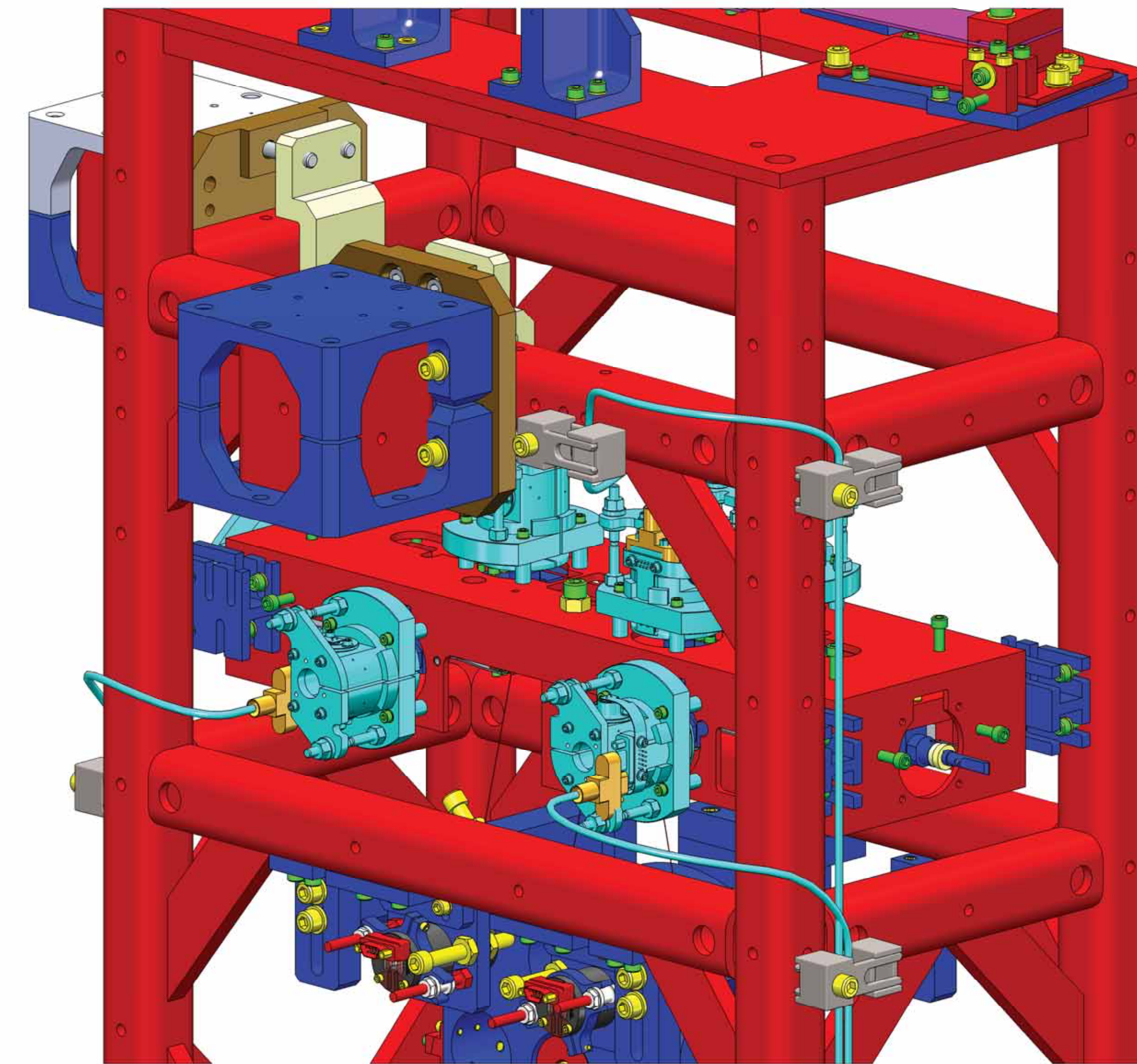
ROUTE NO.2

SEE LIGO-T1200318
FOR STEP BY STEP CABLING GUIDE

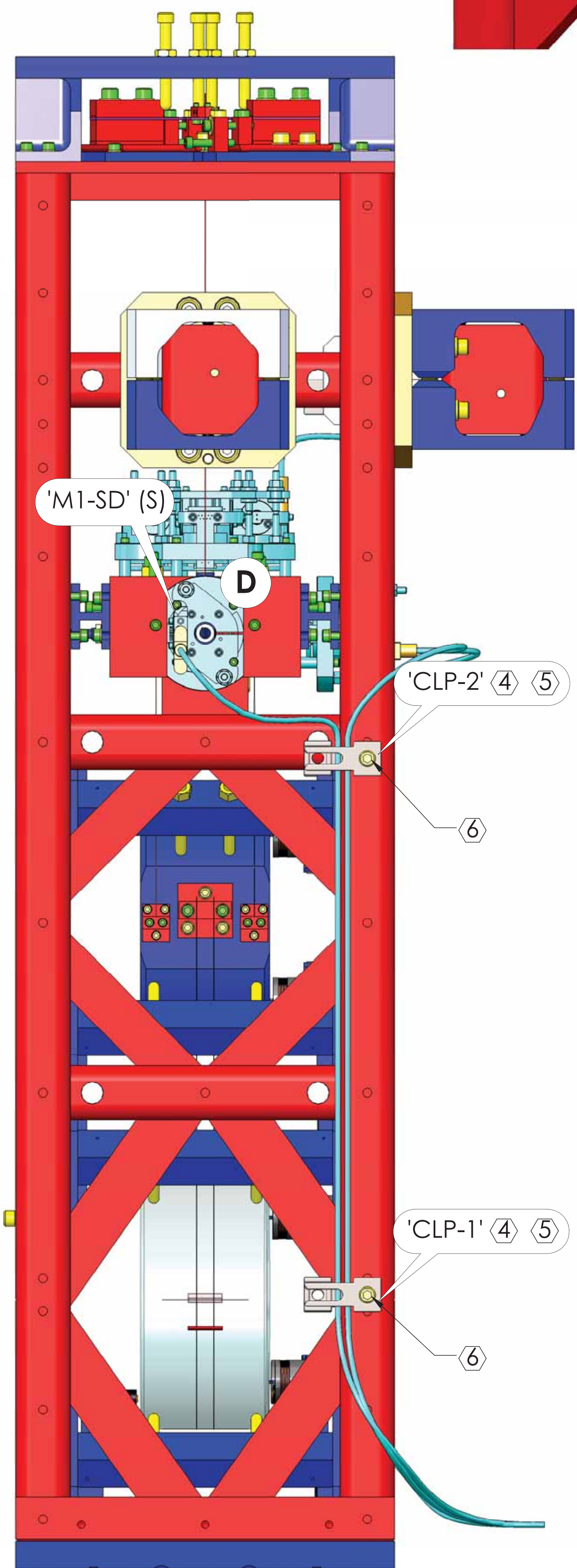
MC3



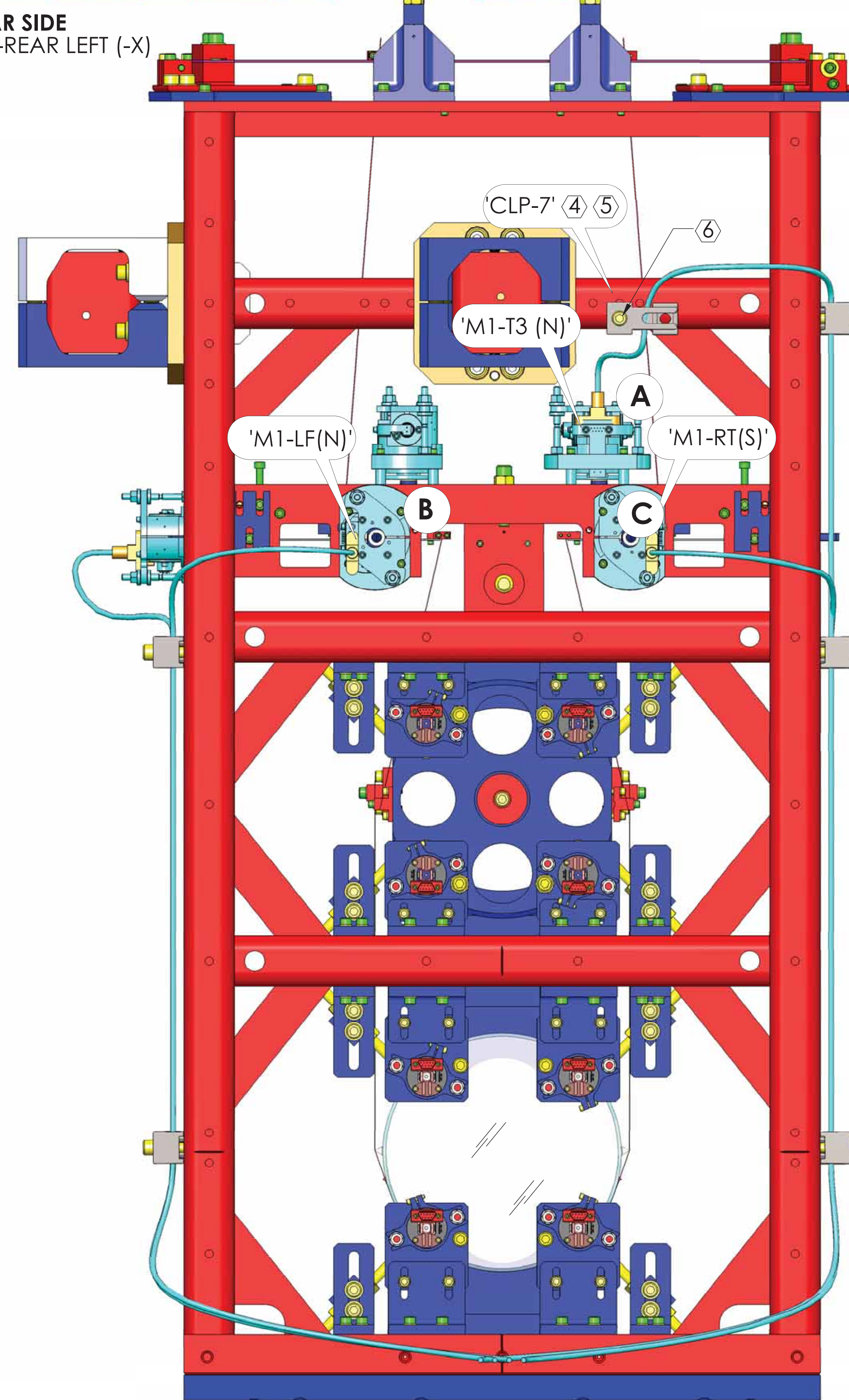
AR SIDE
ISO VIEW-REAR LEFT (-X)



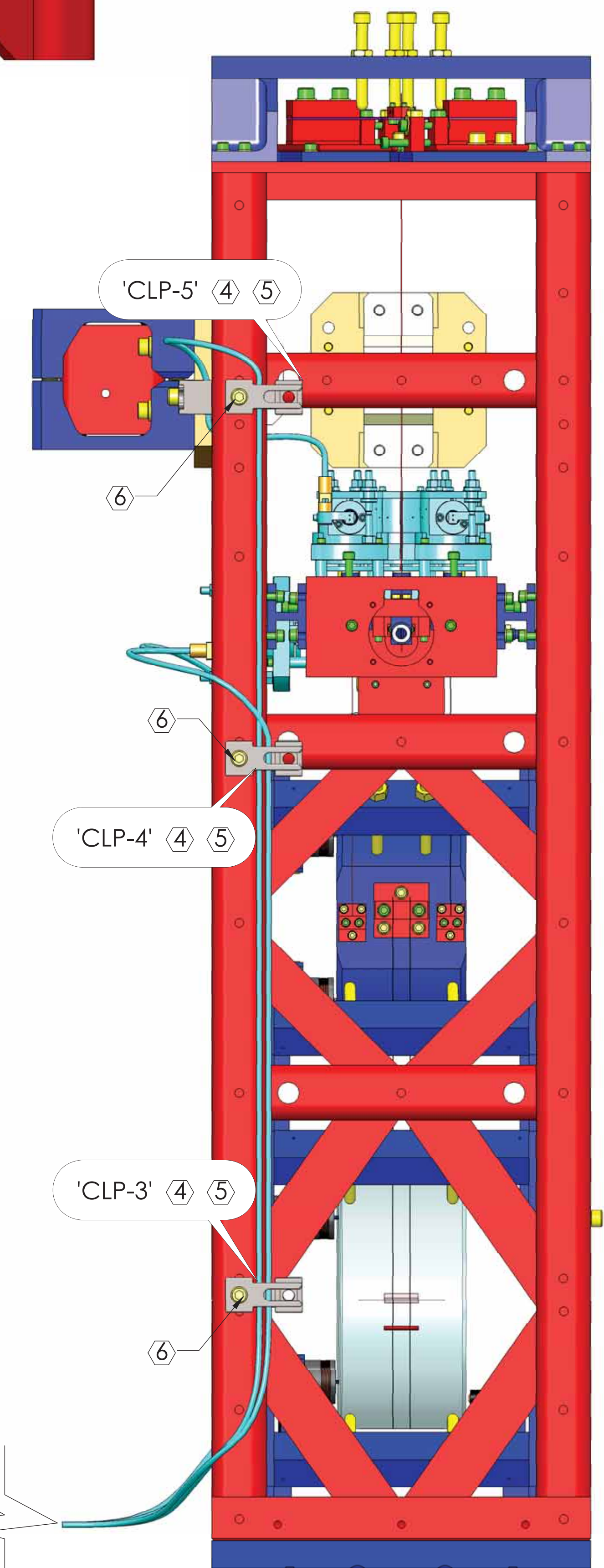
AR SIDE
ISO VIEW-REAR RIGHT (-X)



LEFT SIDE (+Y)



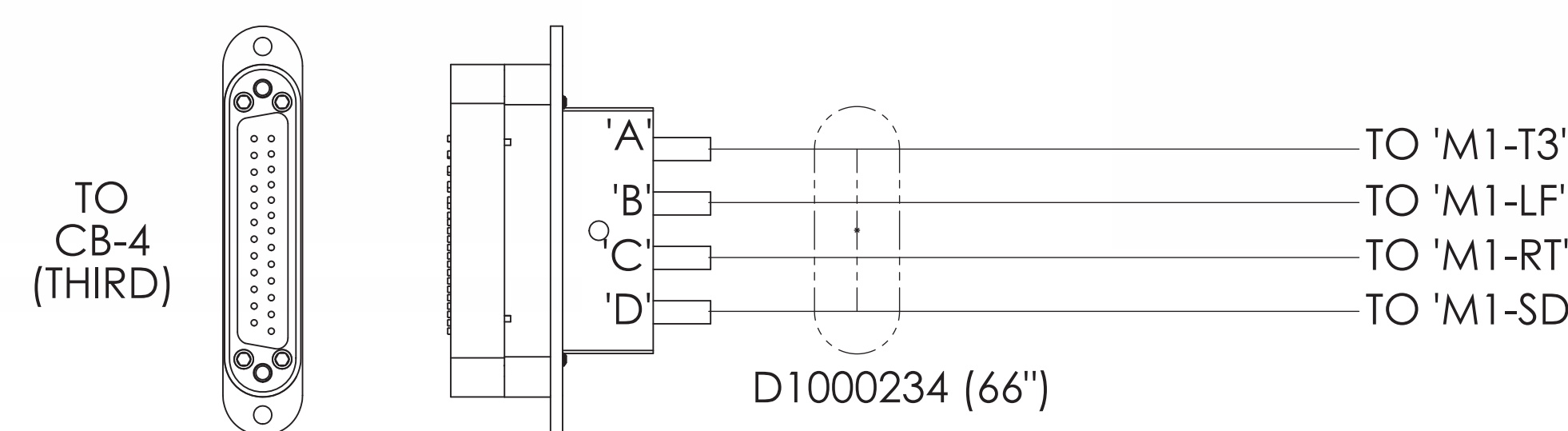
AR SIDE - REAR (-X) (1) (2)
(END CONNECTORS, NOT SHOWN FOR CLARITY)



RIGHT SIDE (-Y)



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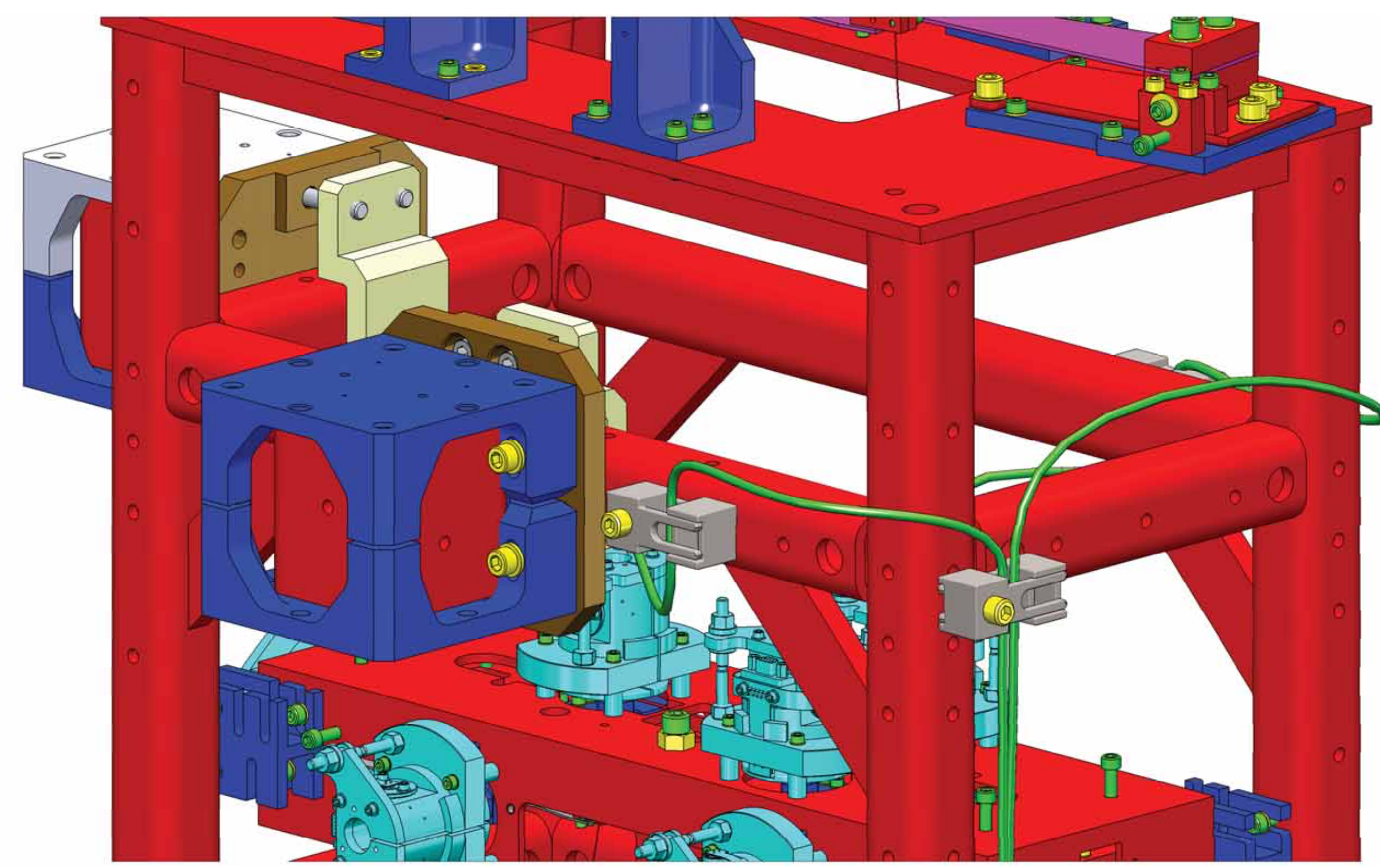
- ④ DO NOT CLAMP CABLES TIGHTLY. PROVIDE SUFFICIENT SPACE FOR THE CABLES TO RUN FREELY BETWEEN CLAMP JAWS.
- ⑤ SHORTING MAY OCCUR IN QP BOSEMAN & AOSEM TEFLON CABLES CLAMPED EXCESSIVELY TIGHT. THEREFORE, THE PEEK CLAMPS (i.e.: 'CLP-1' AND CABLE TIES) SHOULD SERVE ONLY AS A GUIDE FOR THE CABLES TO REACH THEIR DESTINATION, AND SHOULD NOT CLAMP THE CABLES IN PLACE.
- ⑥ TORQUE TO APPROXIMATELY 20 IN/LBS.

ROUTE NO.3

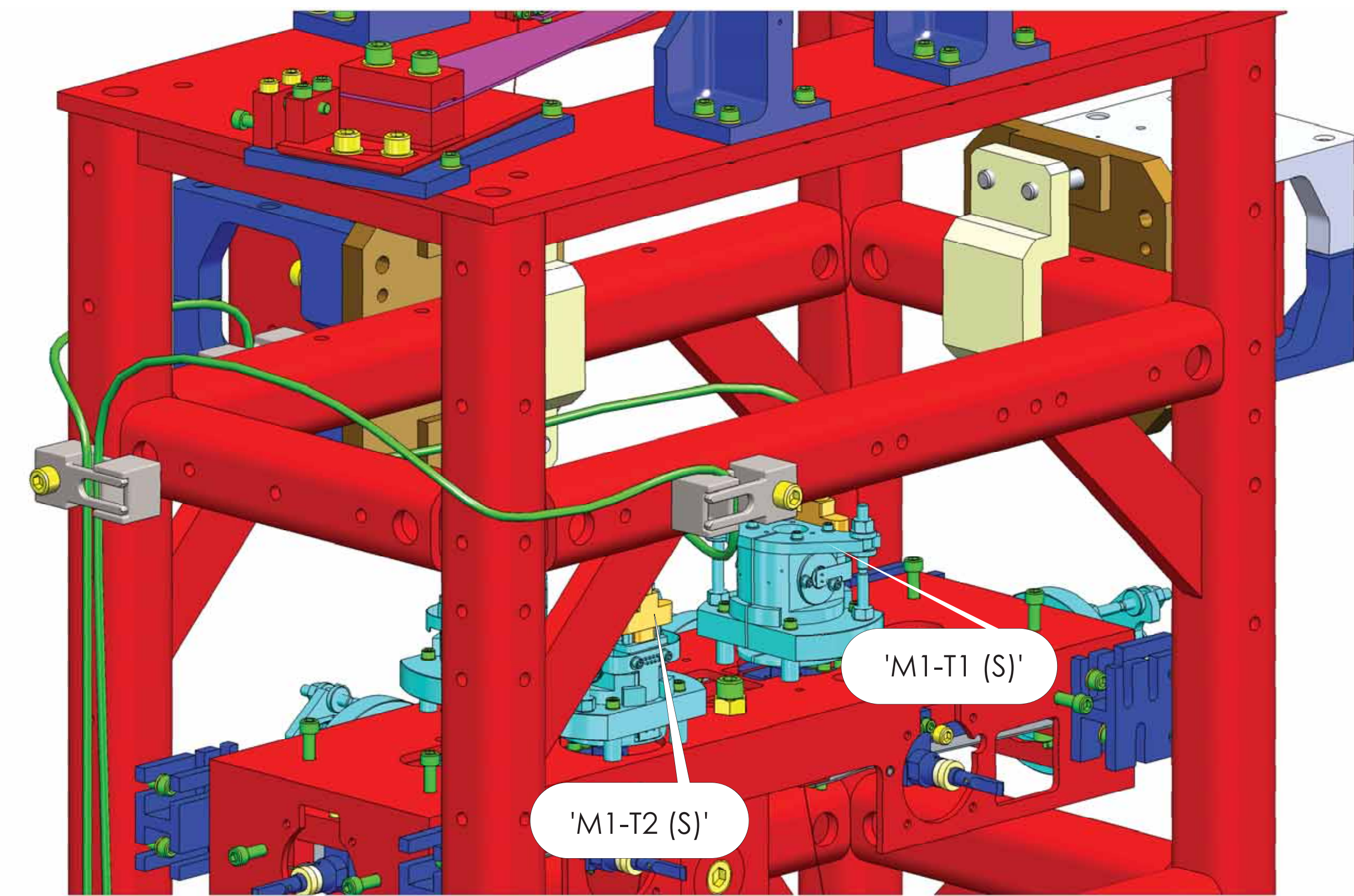
SEE LIGO-T1200318
FOR STEP BY STEP CABLING GUIDE

MC3

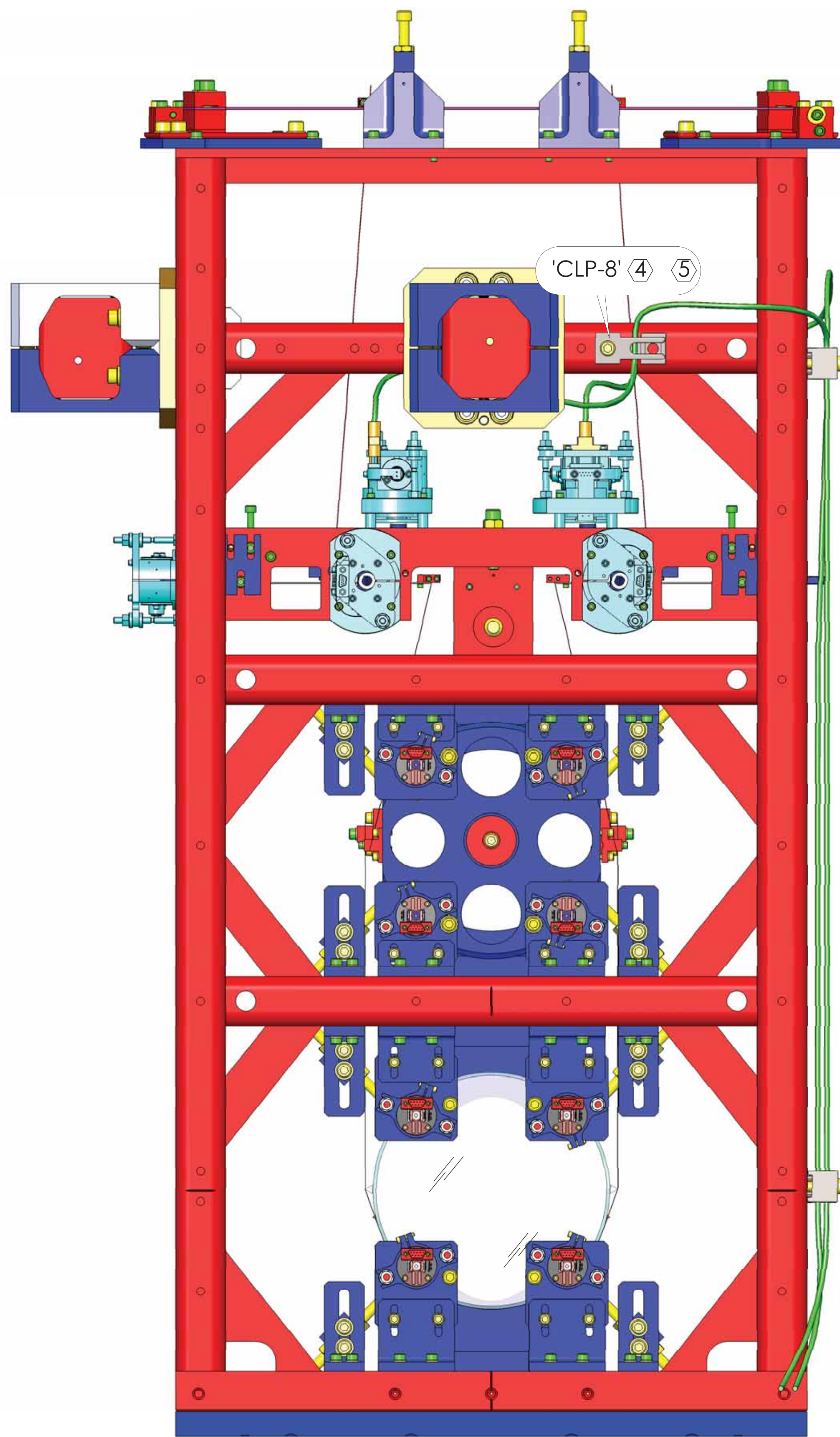
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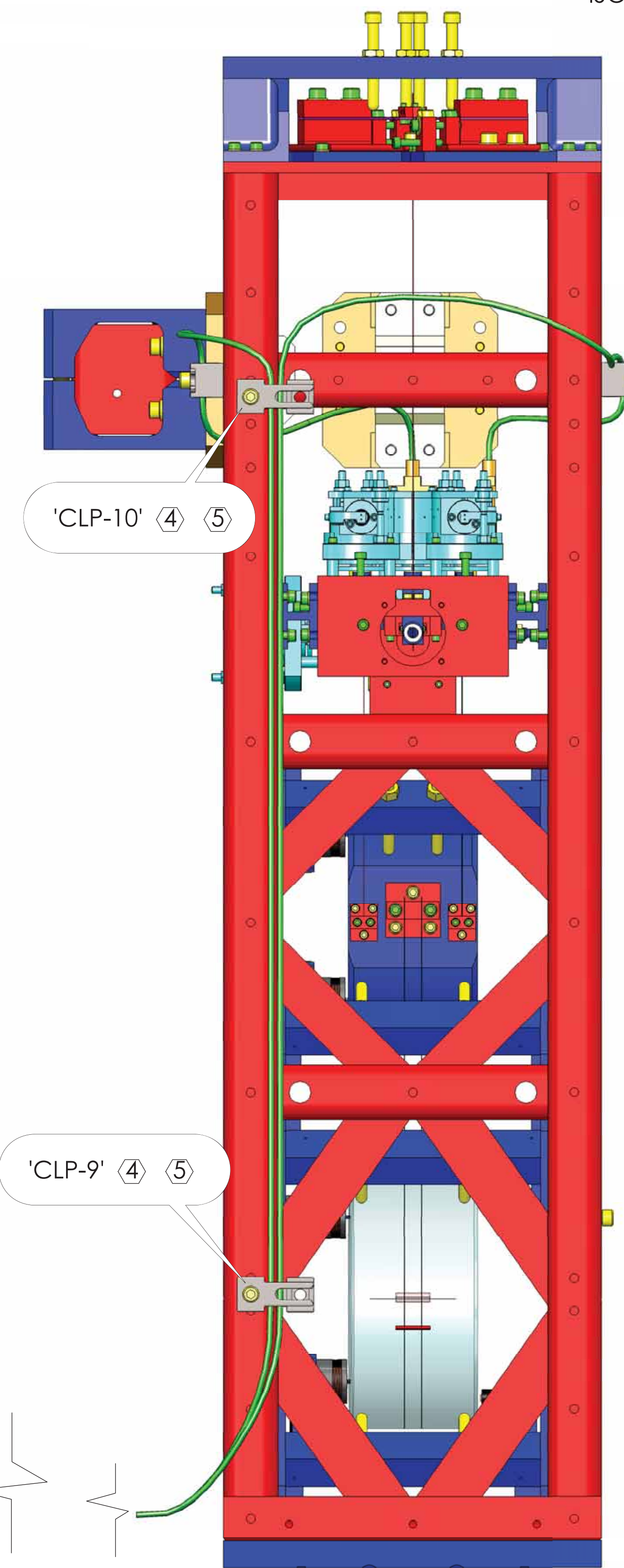
AR SIDE (1.1) (1.2)
ISO VIEW, REAR - RIGHT (-X)



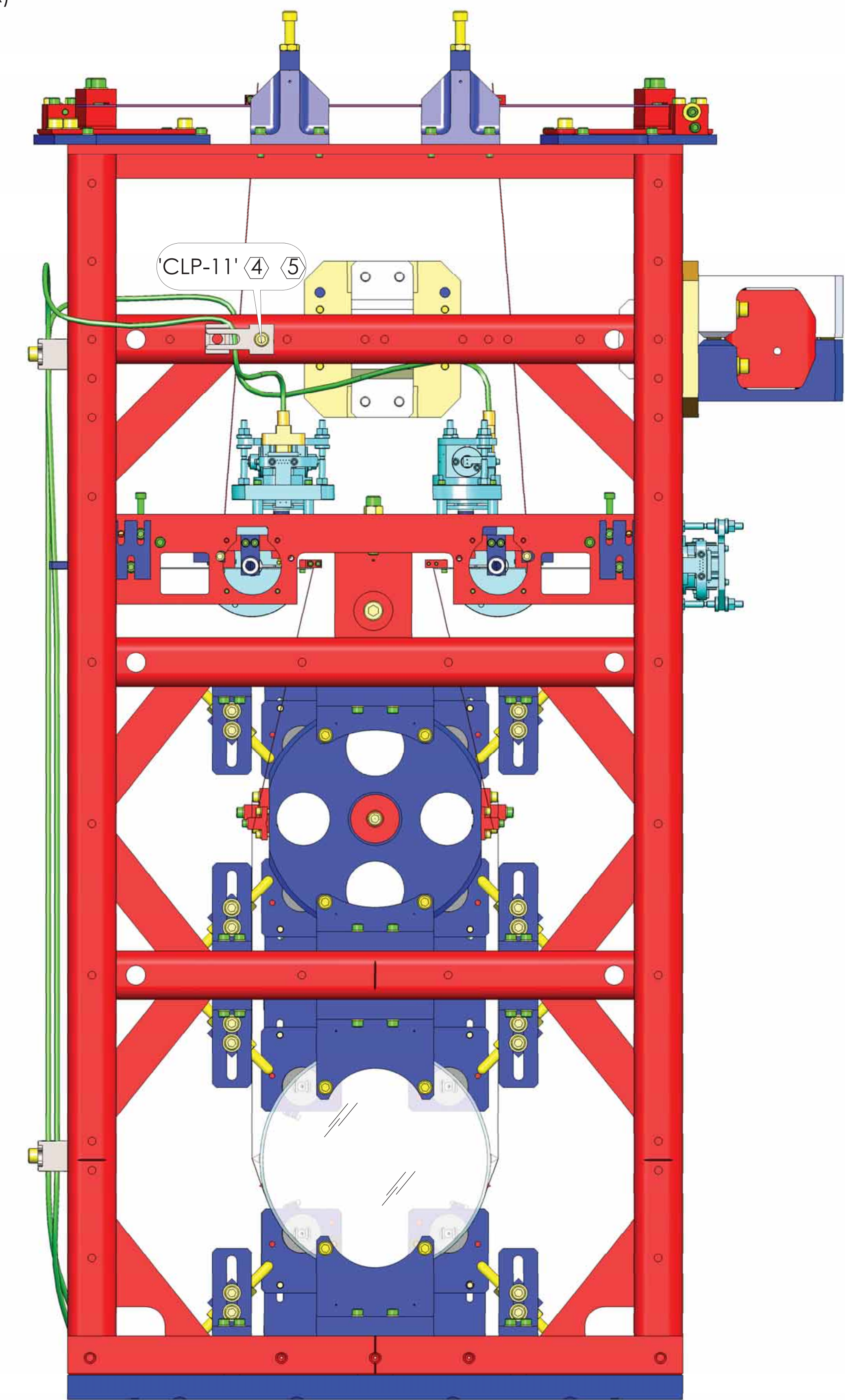
HR SIDE (1.1) (1.2)
ISO VIEW, FRONT-RIGHT (+X)



AR SIDE - REAR (-X) (1.1) (1.2)
(END CONNECTORS, NOT SHOWN FOR CLARITY)



RIGHT SIDE (-Y)

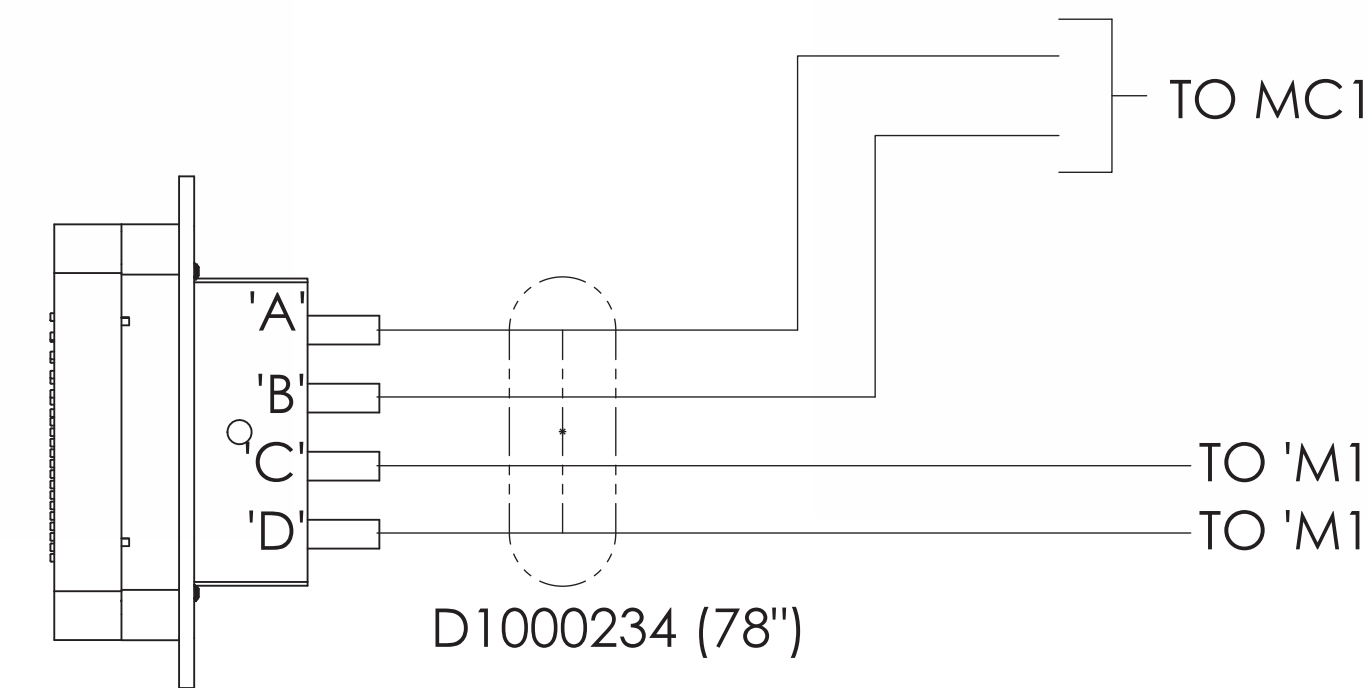


HR SIDE - FRONT (+X)
(END CONNECTORS, NOT SHOWN FOR CLARITY)



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TO CB-5 (FIRST)

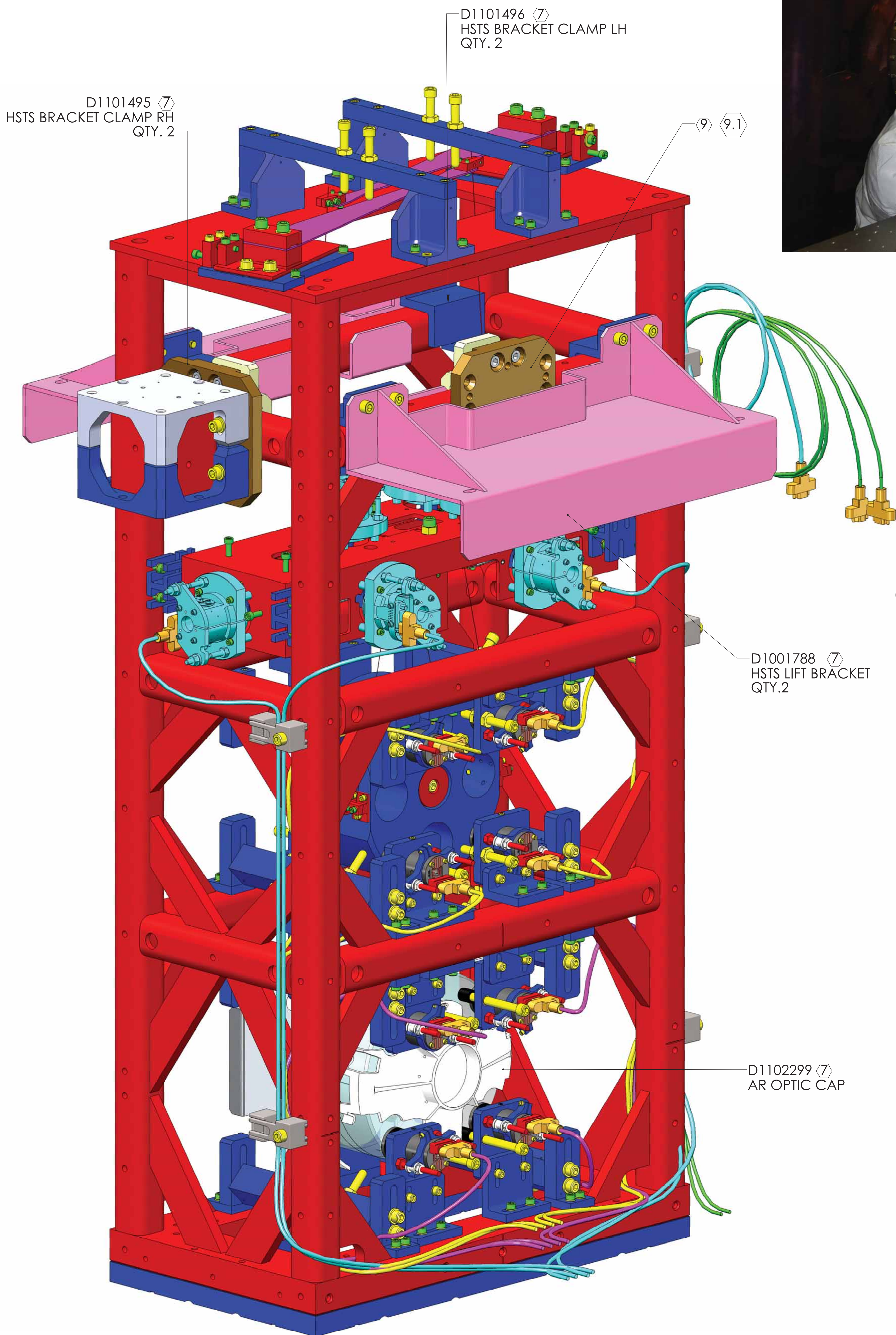


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- ⑥ TORQUE TO APPROXIMATELY 20 IN/LBS.

ROUTE NO.4
SEE LIGO-T1200318
FOR STEP BY STEP CABLING GUIDE

MC3



AR SIDE
ISO VIEW, REAR - LEFT (-X)

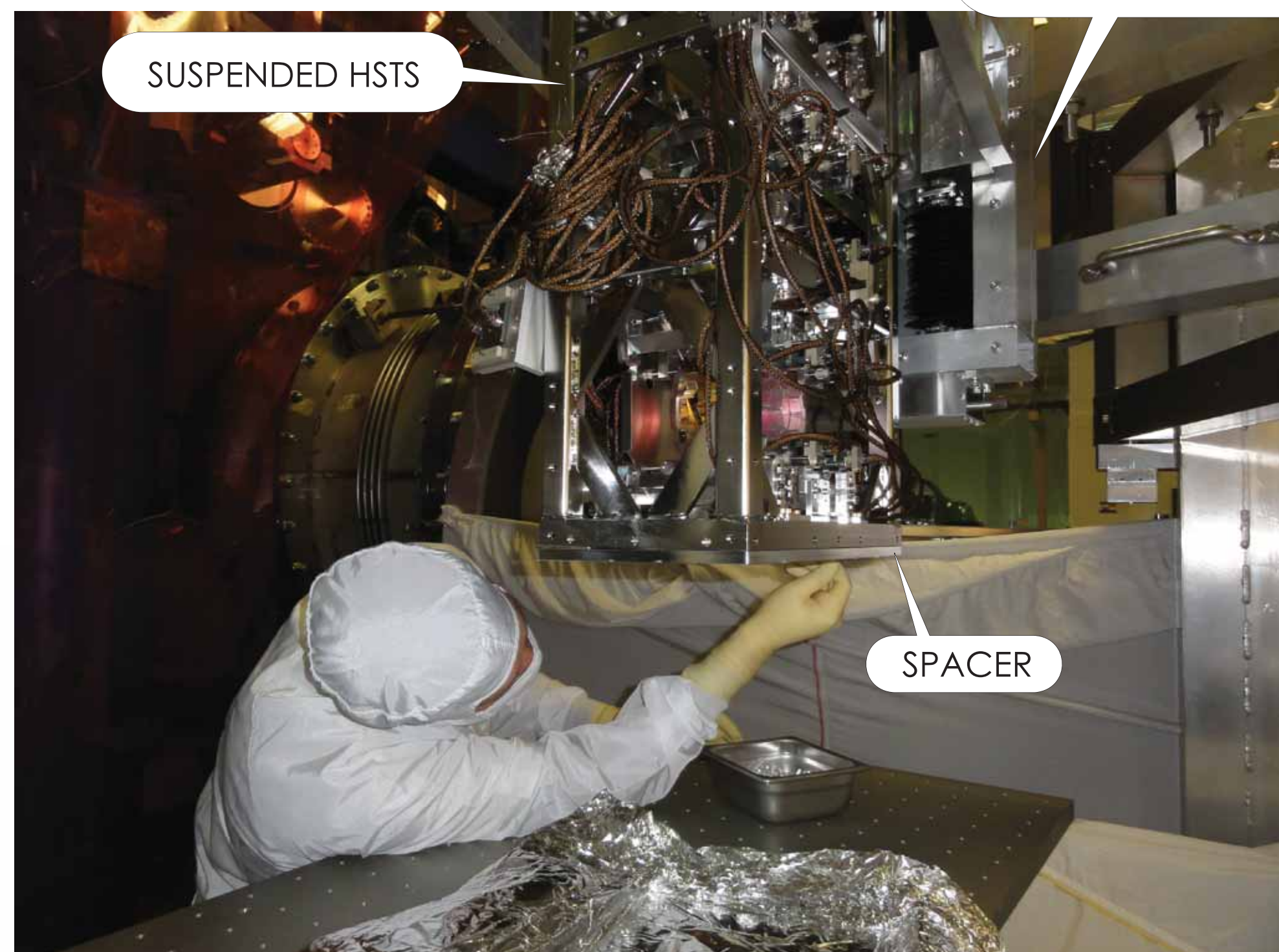
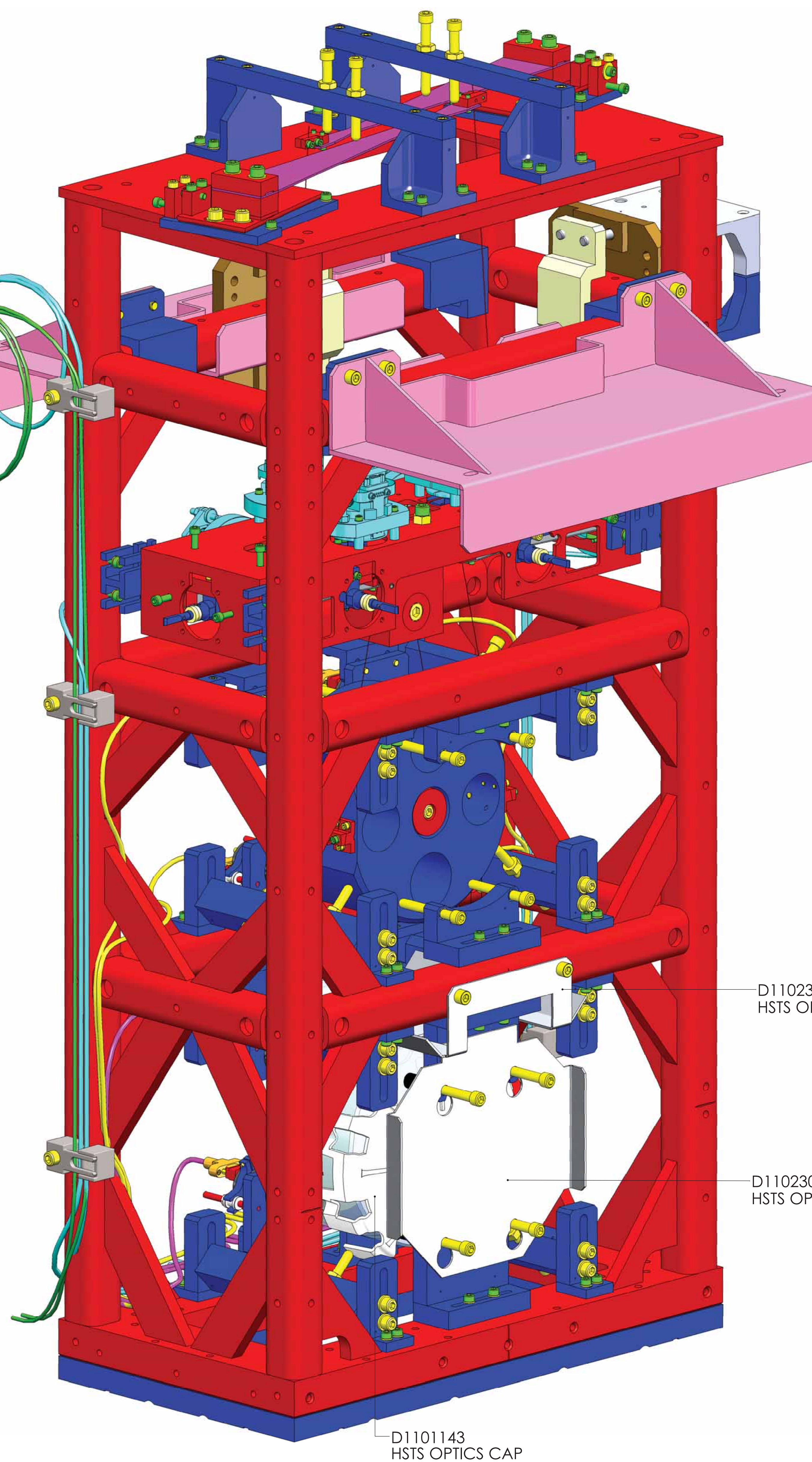


FIG 1.0: SPACER INSTALLATION (10)

(8) IF REQUIRED, BUNDLE CABLES AND ATTACH AS SHOWN TO THE SIDE OF THE STRUCTURE FOR TRANSPORTATION PURPOSES ONLY (SEE SHEET 6 AND 7, FOR ROUTE 3 DETAILS)



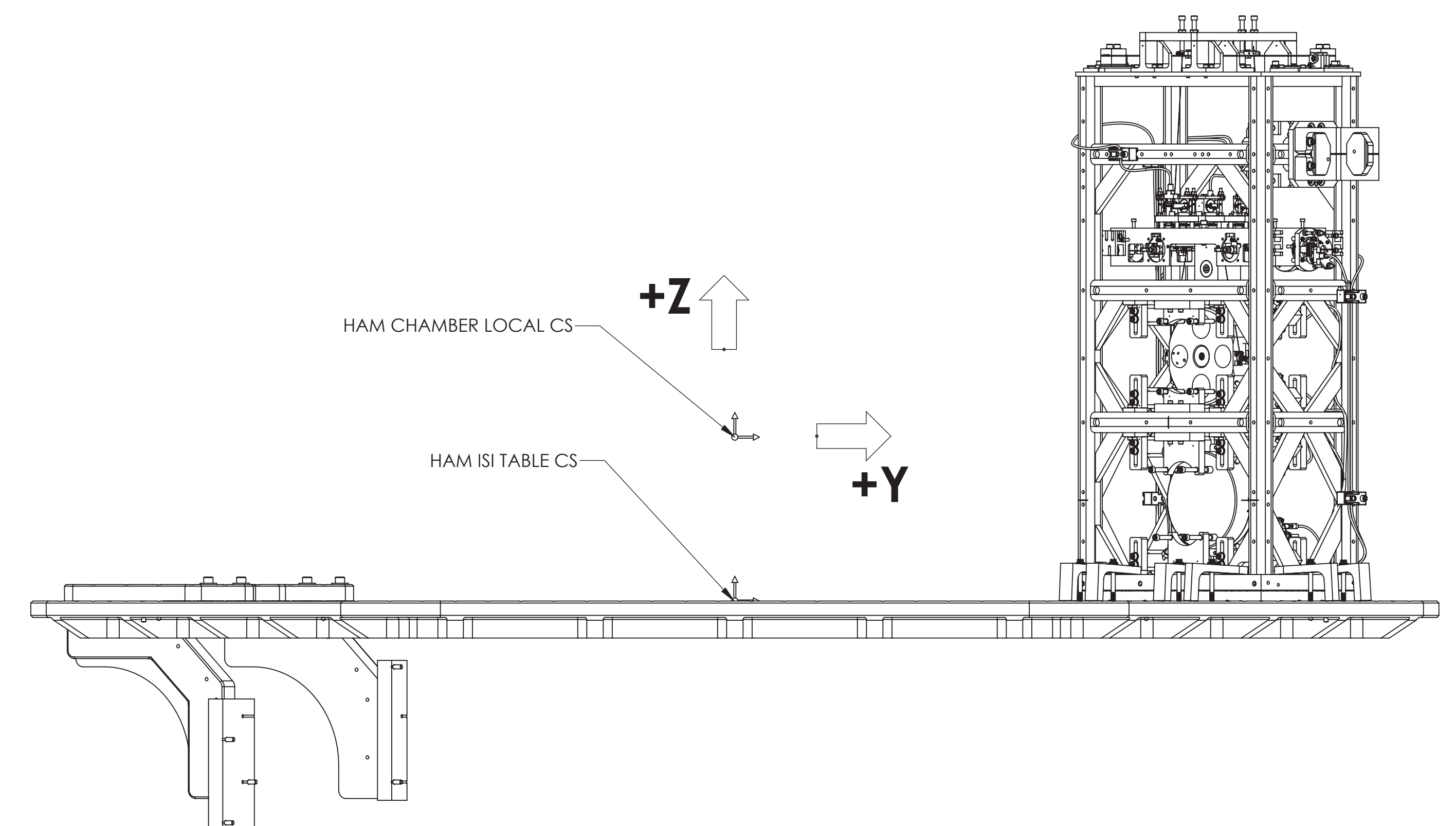
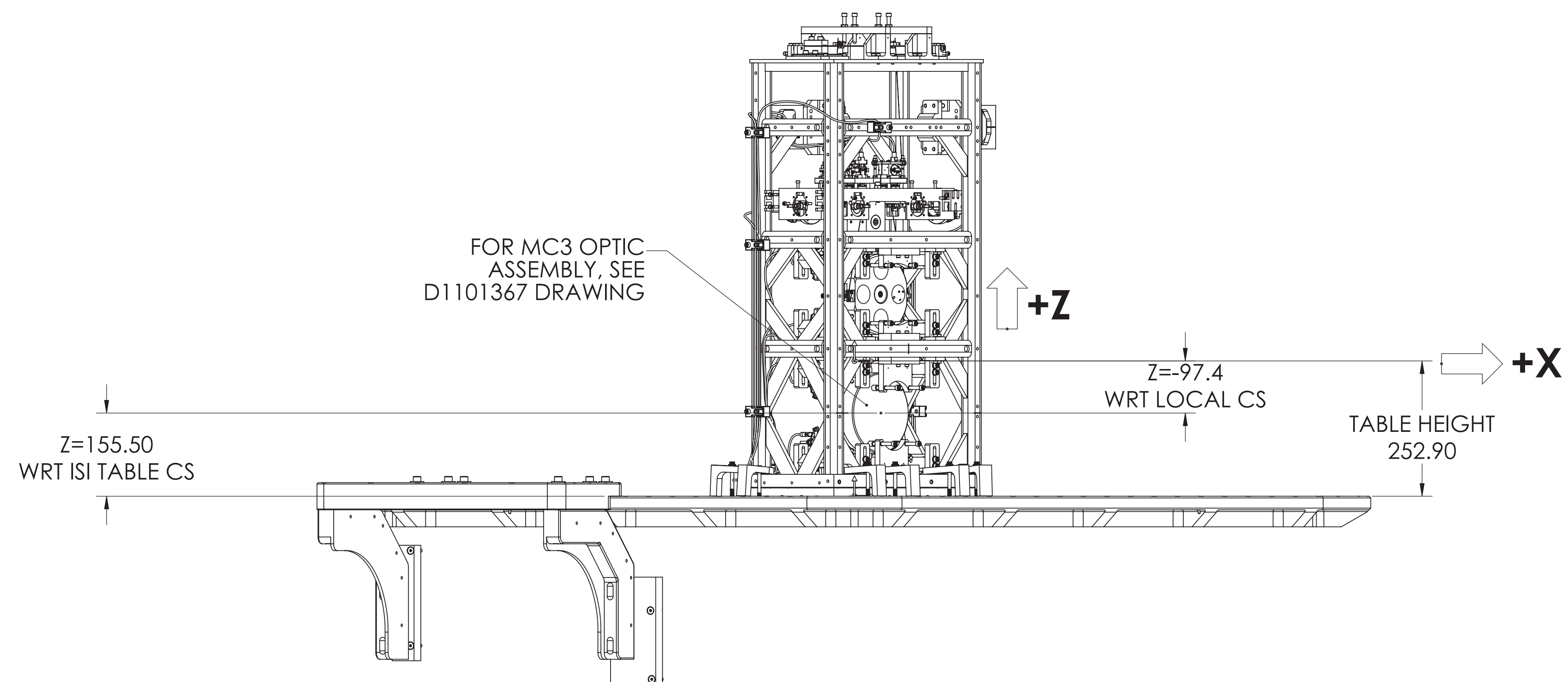
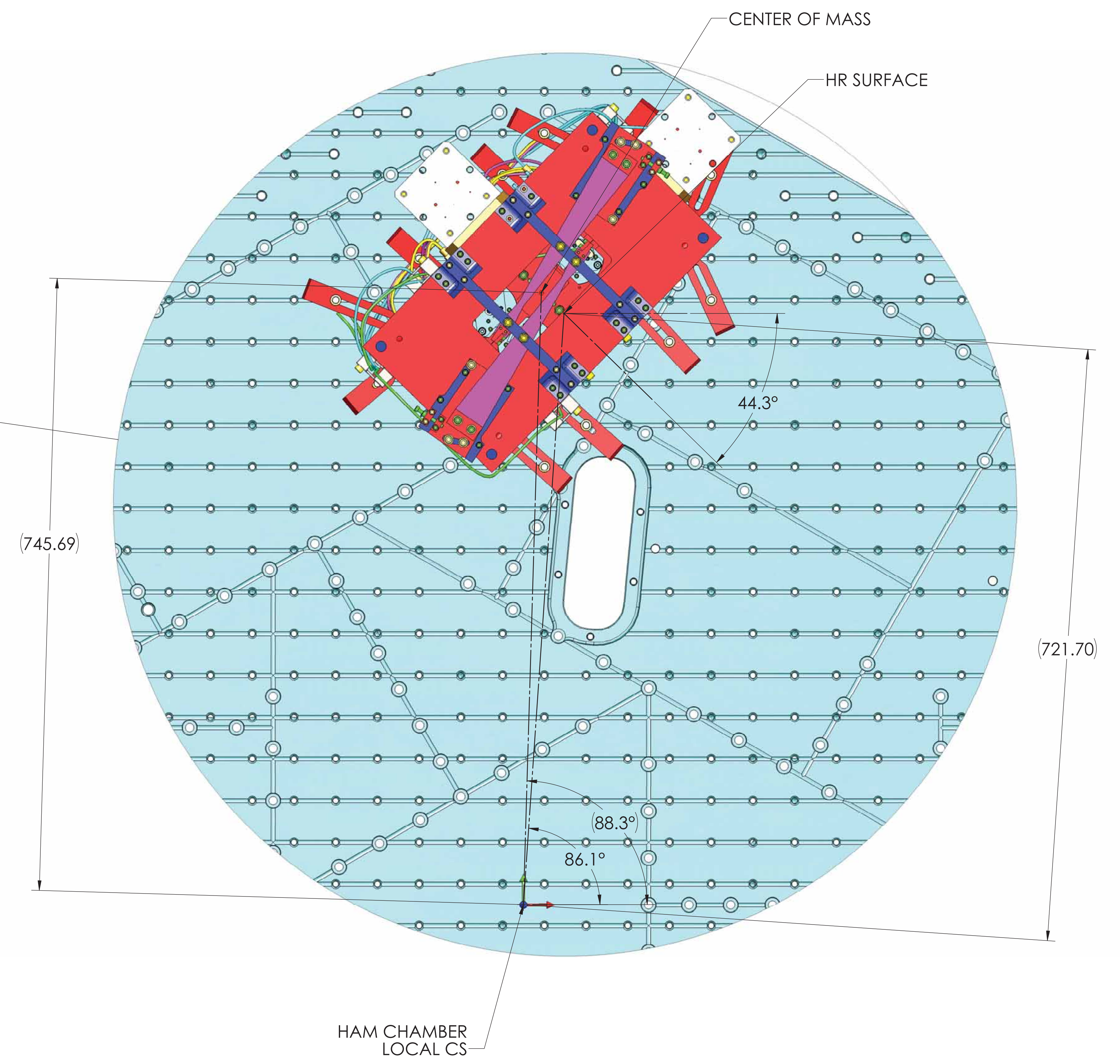
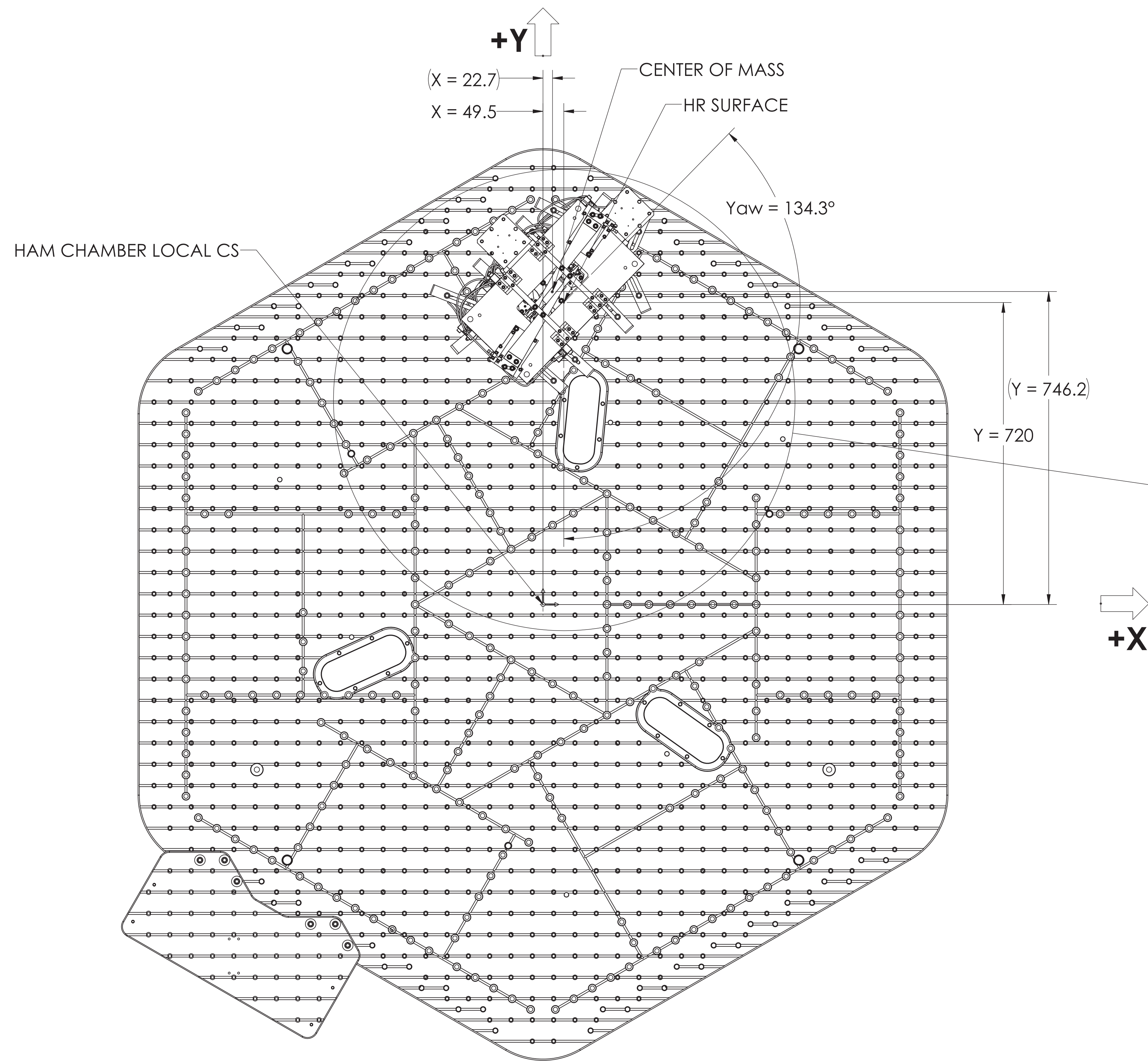
HR SIDE
ISO VIEW, FRONT - RIGHT (+X)

- (7) INDICATED ITEMS FOR TRANSPORTATION PURPOSES ONLY. AND ARE NOT PART OF FINISHED ASSEMBLY. SEE D1101674 FOR REFERENCE.
- (8) REMOVE INDICATED ITEMS FOR TRANSPORTATION PURPOSES. BUNDLE CABLES AS SHOWN.
- (9) REMOVE VIBRATION ABSORBER ON BACK SIDE TO AVOID INTERFERENCE WITH BRACKET.
9.1 LOCKING PINS: RETAIN IN PLACE FOR TRANSPORTATION AND INSTALLATION ONLY. REMOVE BEFORE CHAMBER DOORS ARE CLOSED.
- (10) LIFT STRUCTURE VIA INSTALLATION ARM AT CHAMBER SIDE. ATTACH ITEM 2 (SPACER) USING ITEM 8 (SCREW). TORQUE TO 75 IN LB. SEE FIG 1.0 FOR REFERENCE.

HSTS STRUCTURE TRANSPORT

VIBRATION ABSORBER ON BACK SIDE NOT SHOWN (REMOVED FOR TRANSP. PURPOSES)

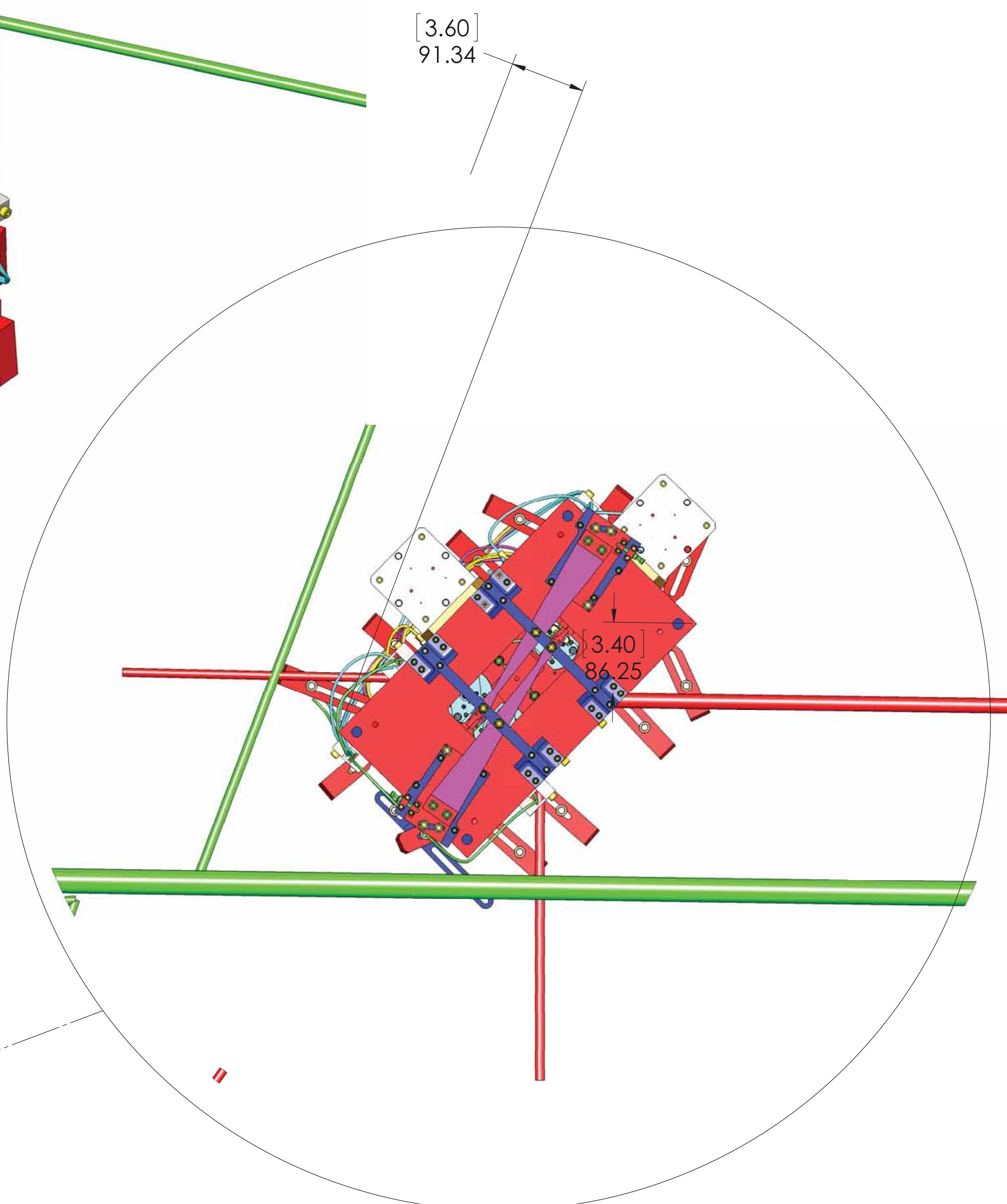
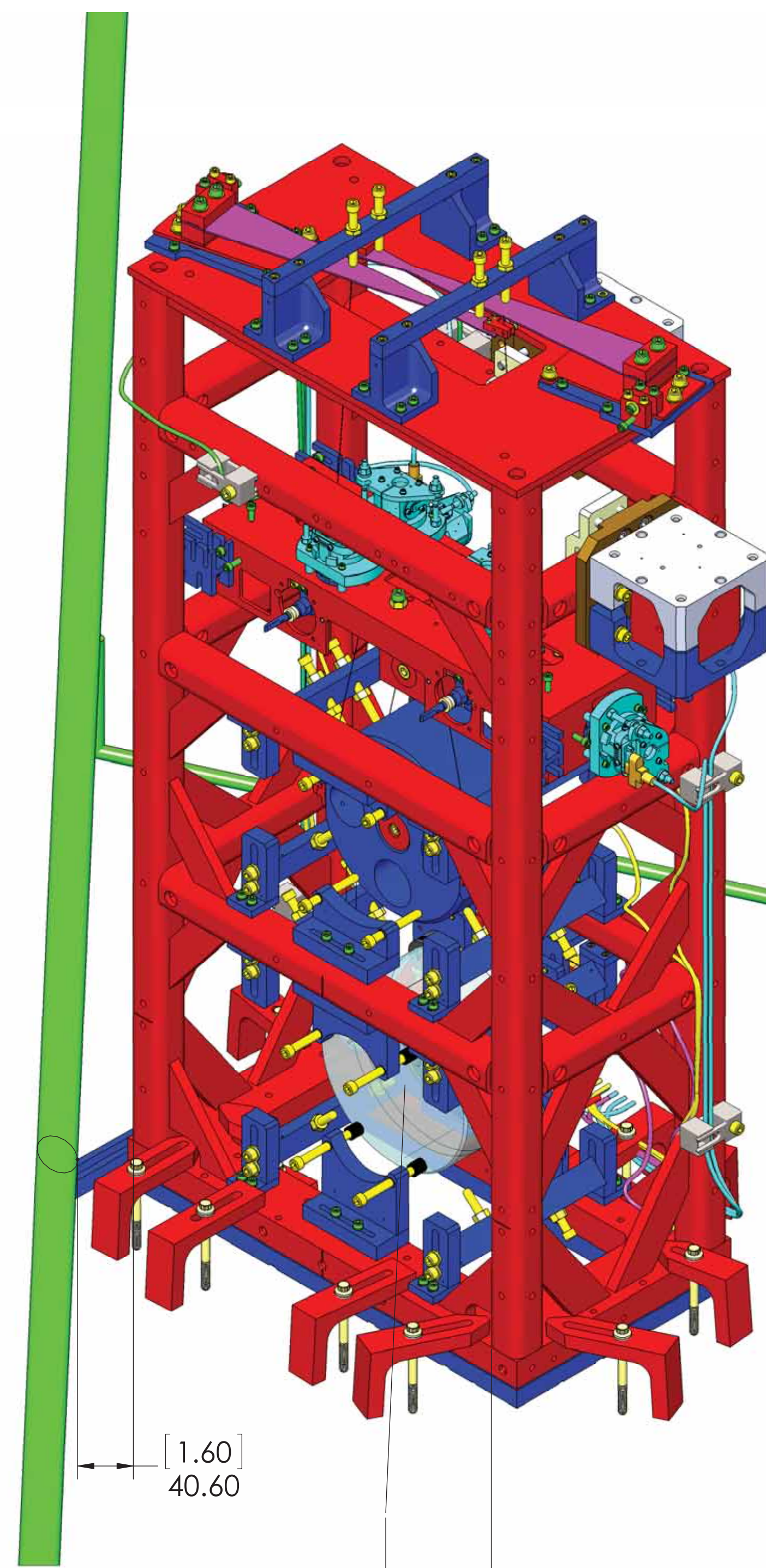
MC3



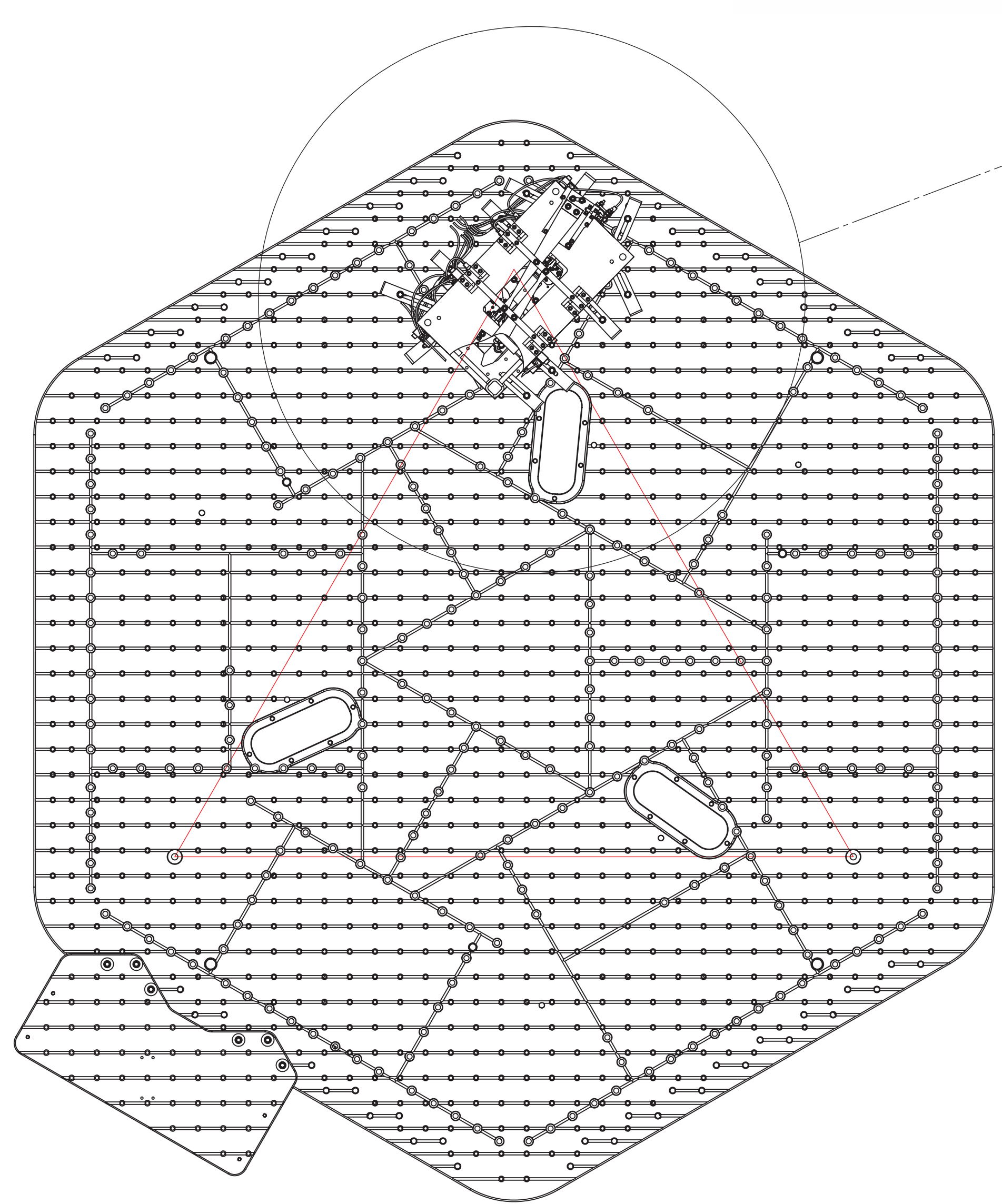
LOCAL COORDINATES DEFINITIONS

NOTE: DIMENSIONS IN PARENTHESIS (REFERENCE DIMENSIONS), ARE FROM CENTER OF MASS.

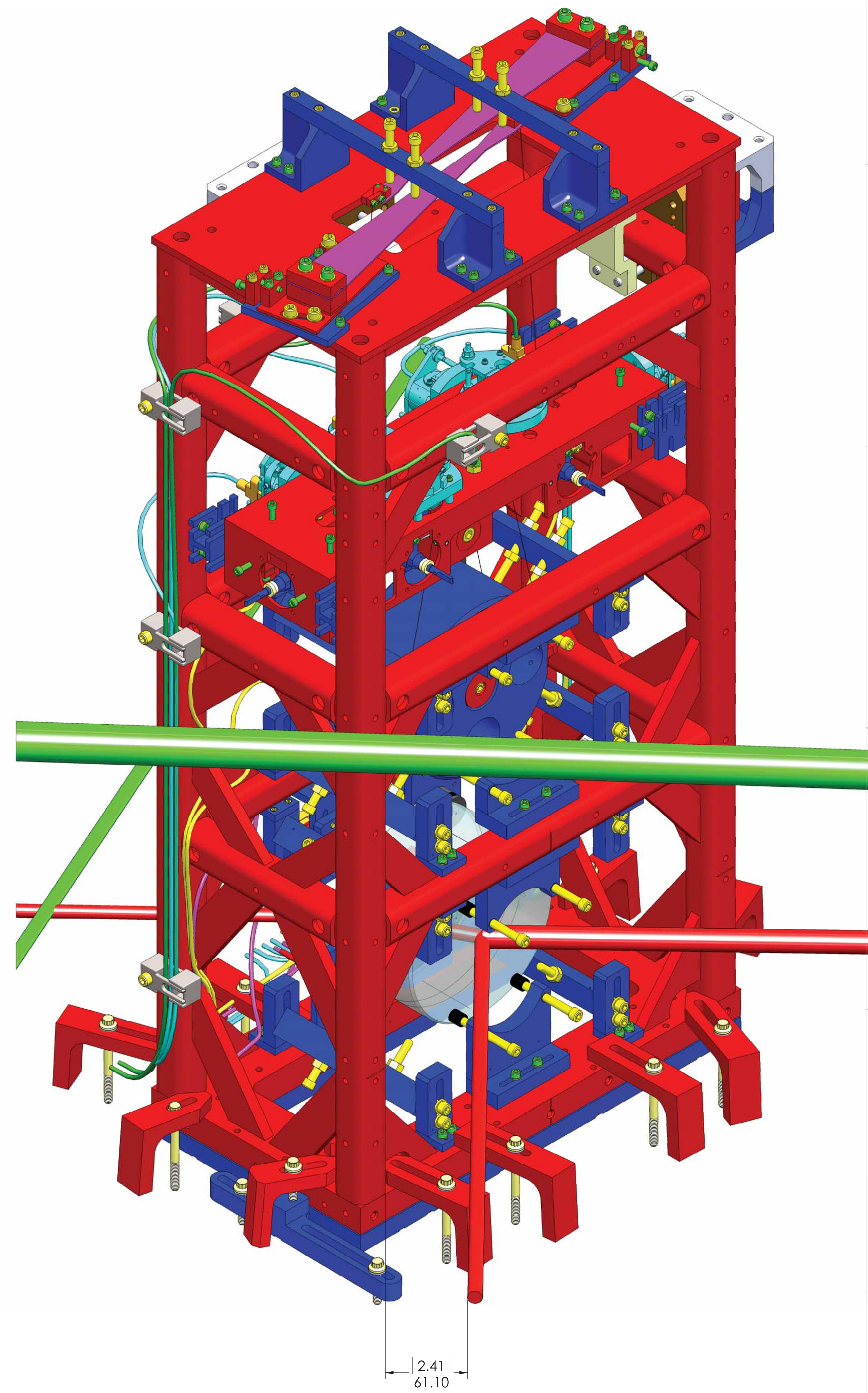
MC3



TOP VIEW



TOP VIEW
REF. TRIANGLE: SEE G1000125
FOR ISI NAMING AND ORIENTATION CONVENTION



LASER BEAM CLEARANCES

(ALL DIMENSIONS ARE FOR REFERENCE ONLY)