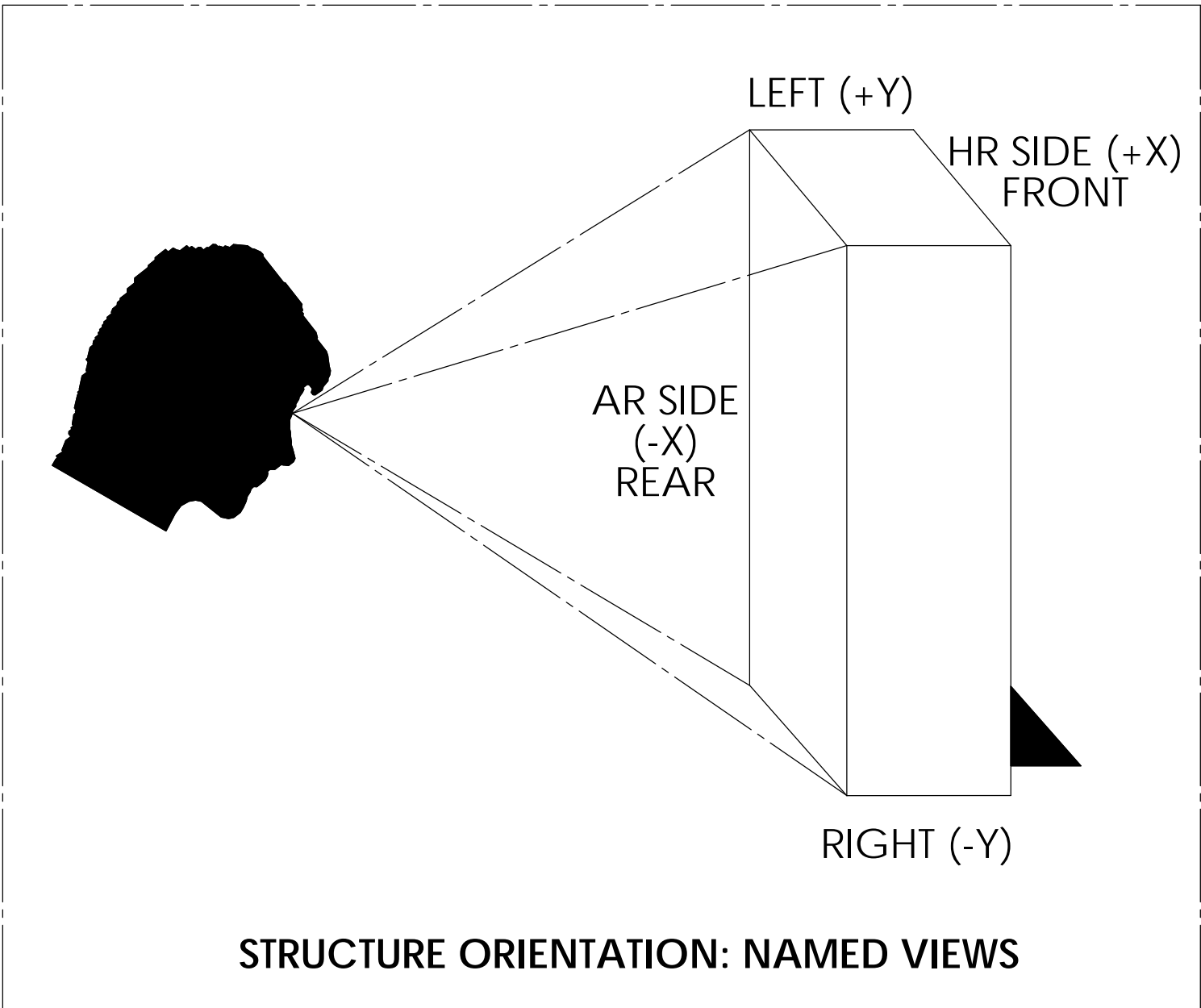
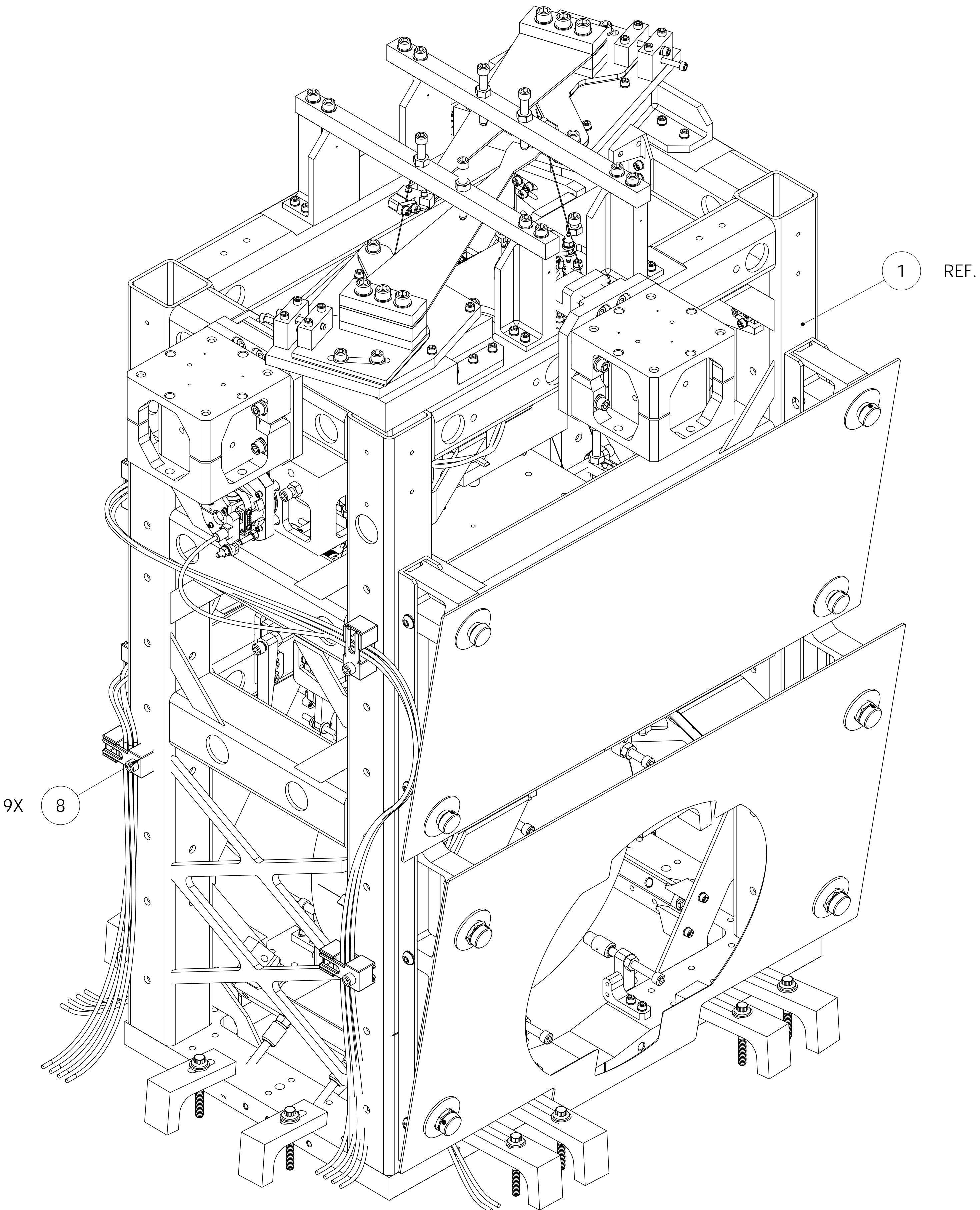
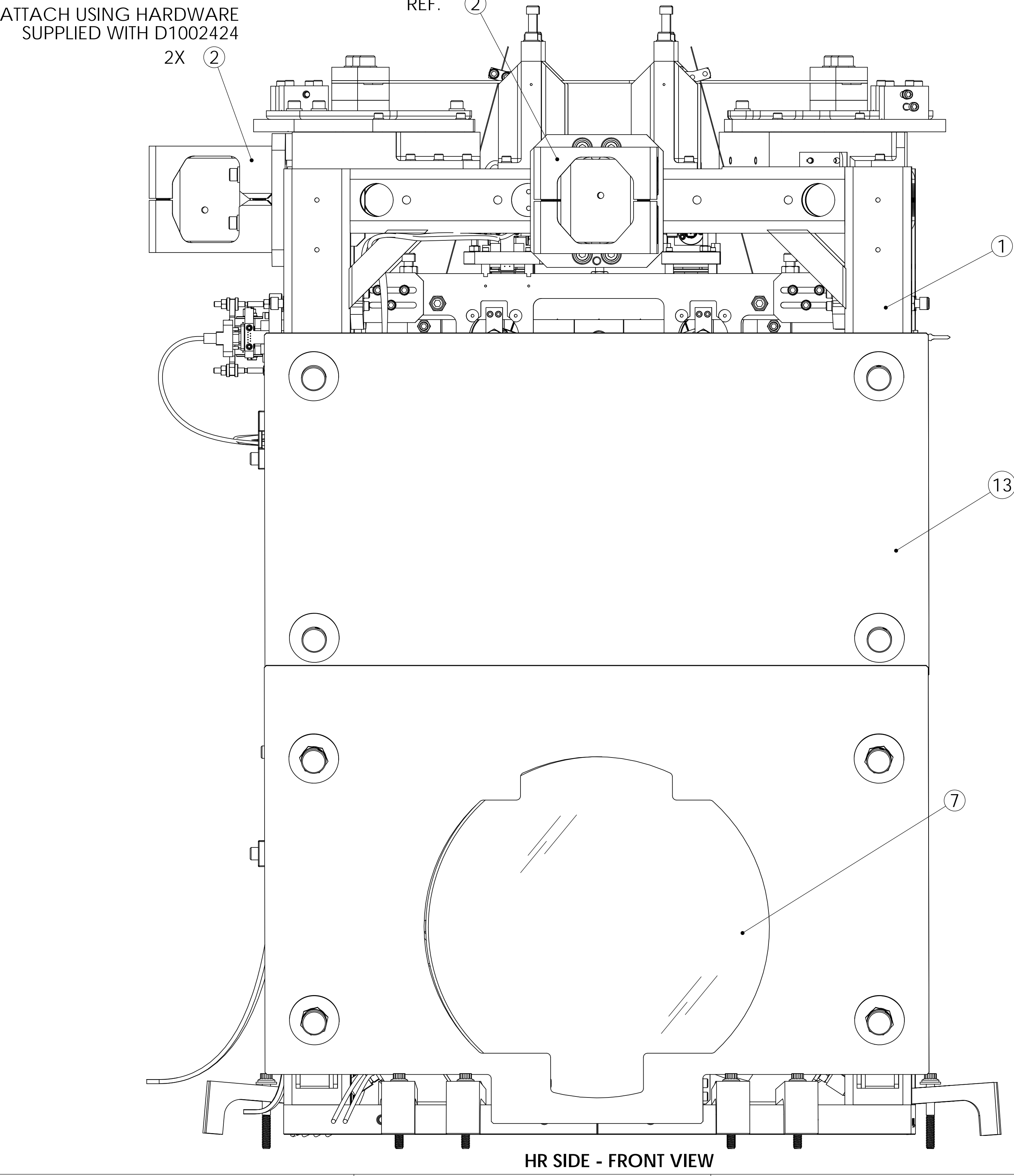
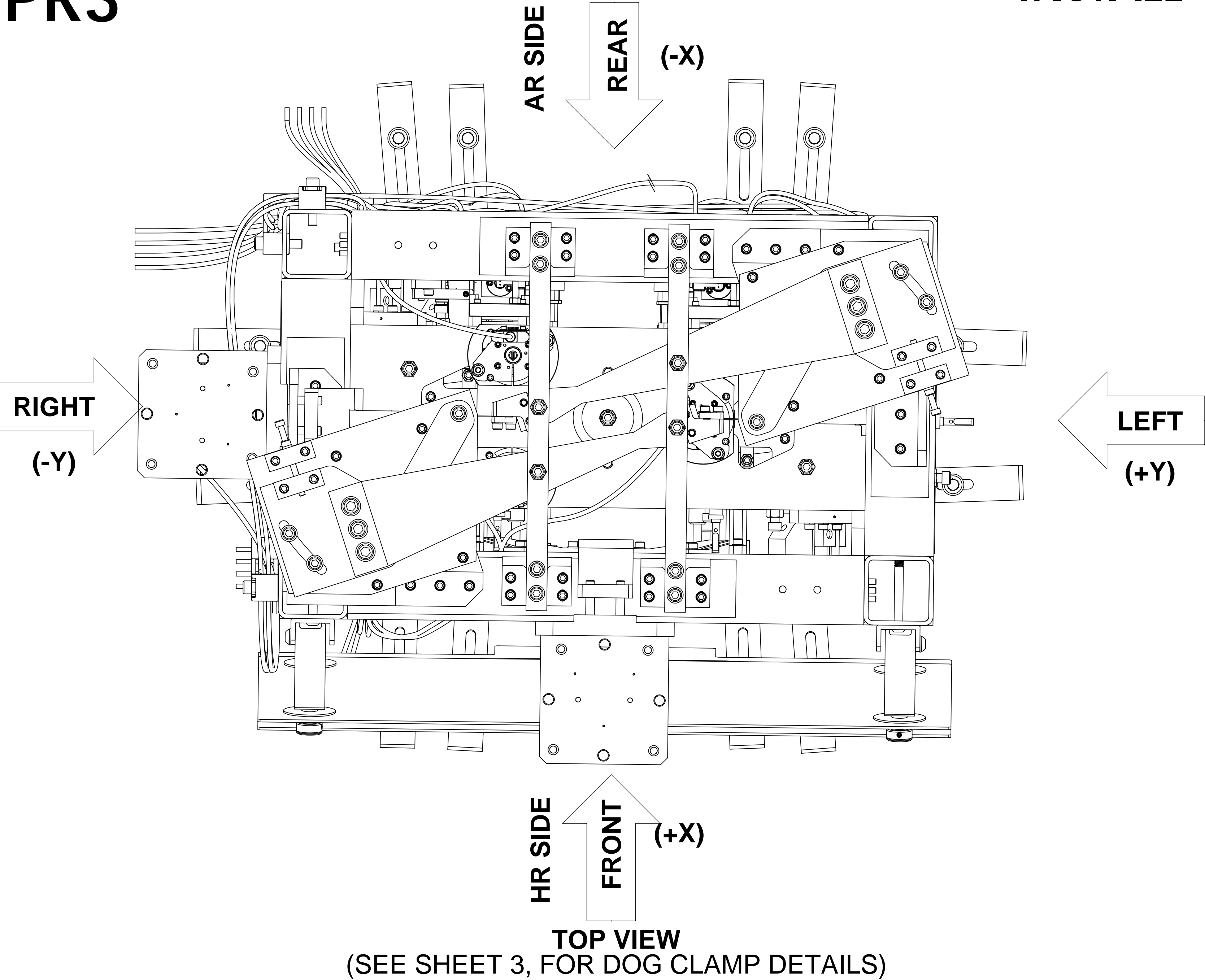


PR3

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

REV.	DATE	DCN #	DRAWING TREE #
v1	29 MAY 2012	-	-
v4	01 AUG 2017	E1700274-x0	-
-	-	-	-

- ① REFERENCED DOCUMENTATION:
- 1.1 LIGO-E1100109, HAM SUS CONTROLS 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 TAB.
2. SEE SHEETS 4,5,6,7,AND 8 FOR CABLE ROUTE DETAILS.



LOCAL COORDINATES - REFERENCE

Xmm	Ymm	Zmm	YAW°
381.5	-177.40	-94.9	-0.64°

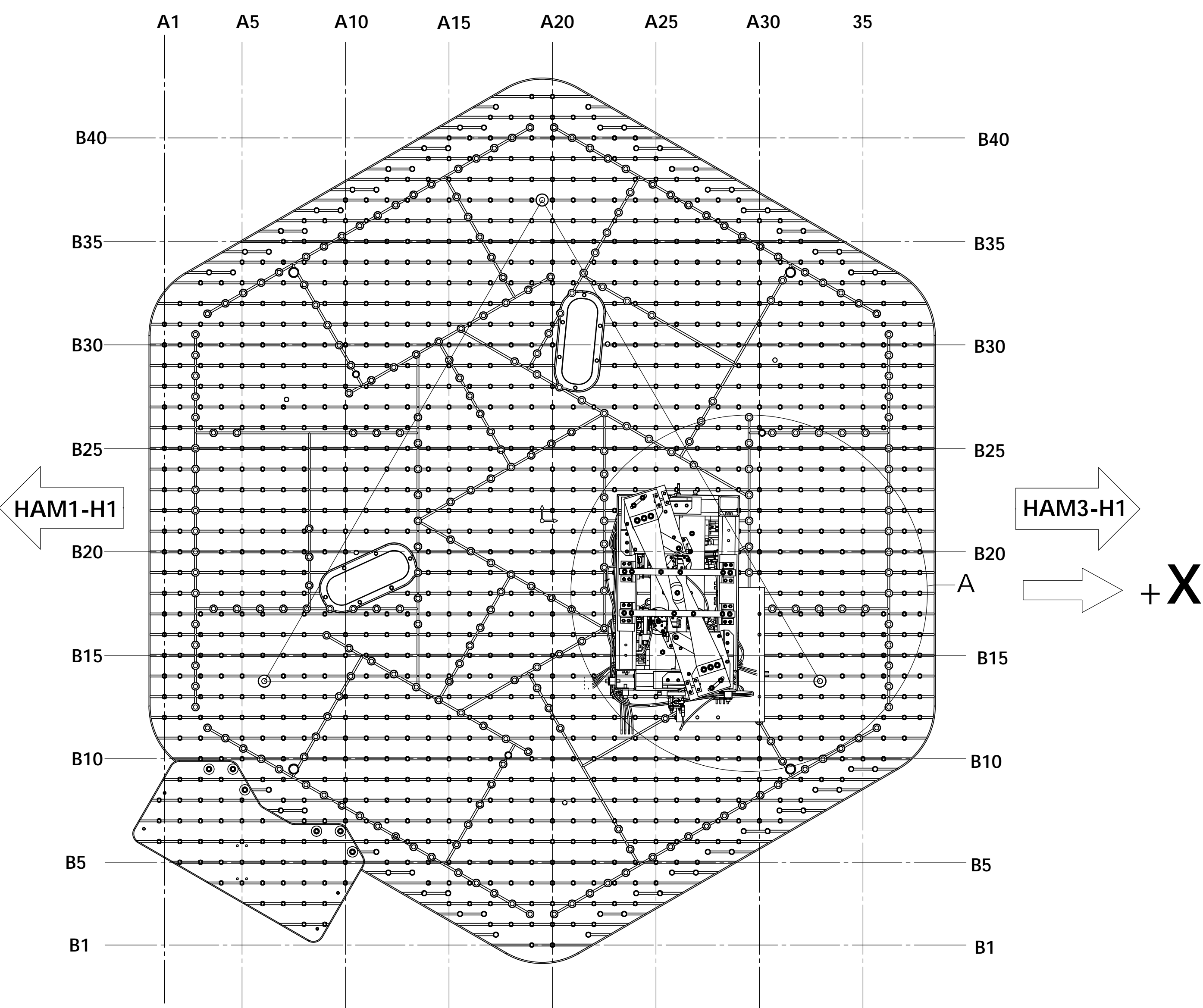
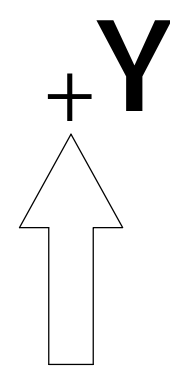
REFER TO DRAWING D1101233 FOR HAM2-L1  
INSTALLATION PLATE LAYOUT

TABLE 1: HAM2-H1 PR3 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-1 (SECOND)	A	D1000234	78
	M3-LL (N)		B		
	M3-UR (N)		C		
	M3-LR (S)		D		
2	M2-UL (S)	CB-1 (FIRST)	A	D1000234	60
	M2-LL (N)		B		
	M2-UR (N)		C		
	M2-LR (S)		D		
3	M1-T3 (N)	CB-2 (FIRST)	A	D1000234	66
	M1-LF (N)		B		
	M1-RT (S)		C		
	M1-SD (S)		D		
4	M1-T1 (S)	CB-2 (SECOND)	C	D1000234	78
	M1-T2 (S)		D		
NOTE : ROUTE NO. 4 IS A SHARED CABLE, SEE D0901090 FOR QP LEGS 'A' AND 'B' ROUTING					

13	D1700239	aLIGO, SLIC, HLTS BAFFLE ASSY.	N/A	1
12	N-2520-A UC COMPONENTS OR EQ.	HEX NUT 1/4-20, Ag PLATED	Ag-PLATED 300 SSTL	1
11	MS15795-810 OR EQ.	WASHER, FLAT, 1/4	300 SSTL	A/R
10	92196A555 OR EQ. McMASTER-CARR	SCREW, SHC, 1/4-20 X 3.25 LG.	300 SSTL	A/R
9	2AL2.00-12SL	1/4-20 X 2.00 12PT BOLT	450 SSTL	12
8	D0902462	CLAMP ASSY., UHV COMPATIBLE	N	9
7	D1101381	PR3 H1 OPTICS ASSEMBLY	N/A	1
6	D1100785-620	WASHER, FLAT, .38 X .620 O.D.	NITRONIC 60	12
5	D1001376-02	AdvLIGO HAM Optics Table Dog Clamp 1.1M	304 SSTL	8
4	D1001376-01	AdvLIGO HAM Optics Table Dog Clamp 1.1S	304 SSTL	4
3	D1000158	L1 H1 PR3 INSTALLATION PLATE	6061 Alloy	1
2	D1002424	VIBRATION ABSORBER ASSEMBLY	N/A	2
1	D070447	HLTS OVERALL ASSEMBLY	N/A	1
ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	QTY.

NOTES AND TOLERANCES: (UNLESS OTHERWISE SPECIFIED)				PART NAME			
				AdvLIGO SUS HAM2-H1, XYZ Local CS for HLTS (PR3)			
MATERIAL		FINISH		DESIGNER		SIZE DWG. NO.	
N/A		N/A μinch		DRAFTER		E	
				CHECKER		D0901086	
				APPROVAL		SCALE: 1:2	
						PROJECTION:	
						SHEET 1 OF 9	

PR3

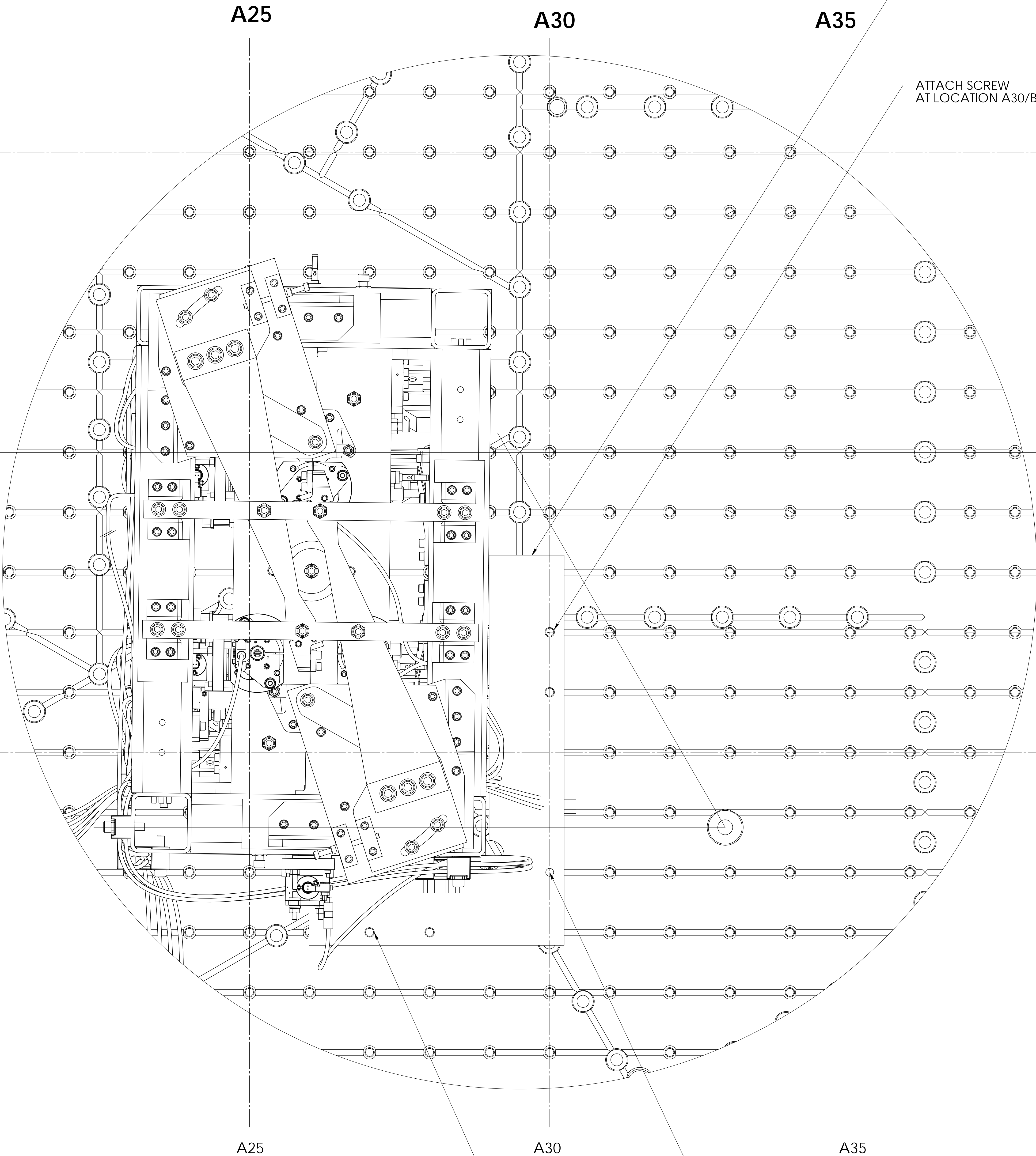


TOP VIEW <sup>(1.6)</sup>

REF. TRIANGLE: SEE D1000125 FOR  
ISI NAMING AND ORIENTATION CONVENTION

AR SIDE

HR SIDE

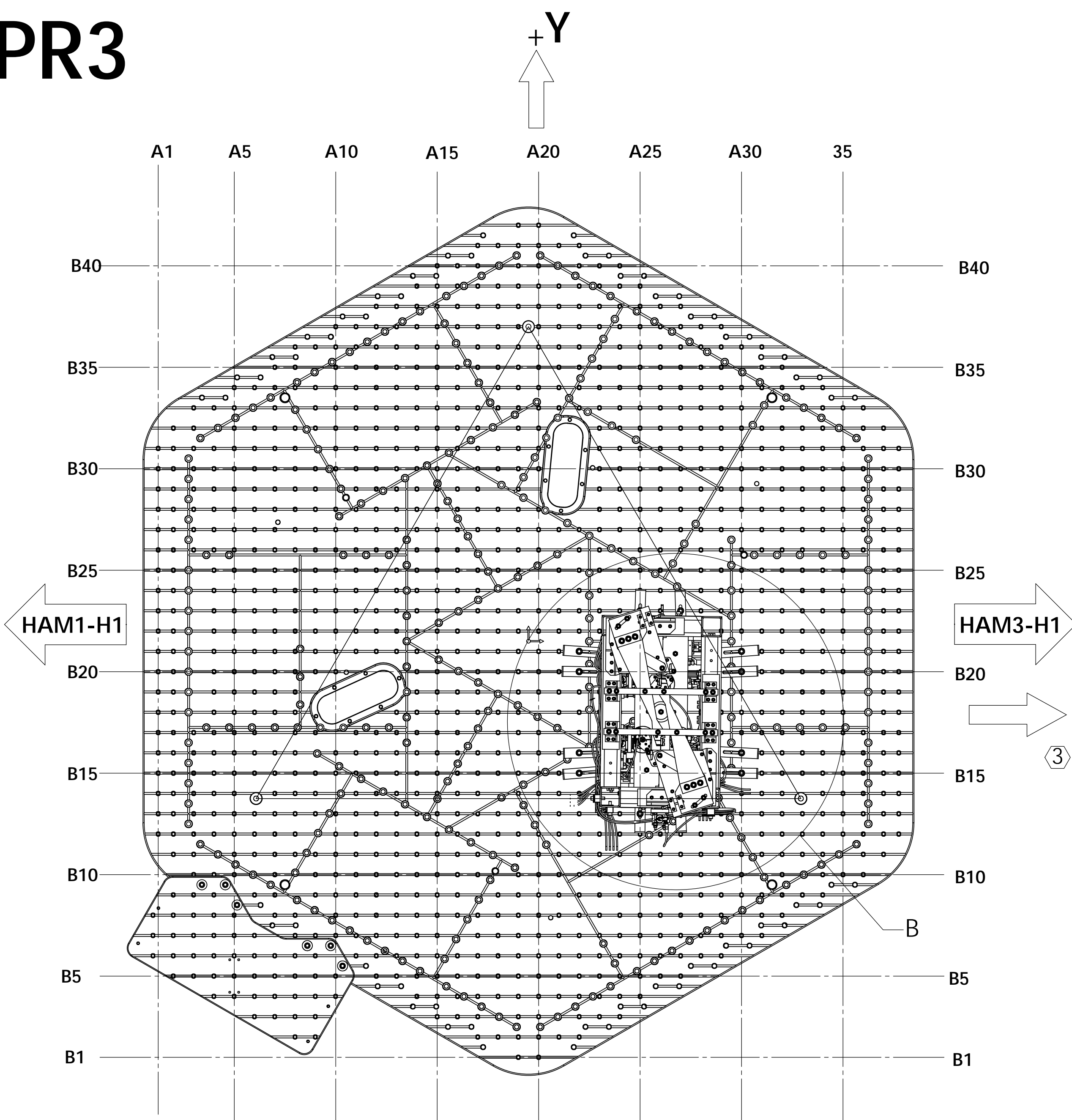


DETAIL A  
SCALE 1 : 1.5

TOP VIEW SHOWING INSTALLATION PLATE LOCATION <sup>(1.6)</sup>  
OPTICAL TABLE SHOWN FOR STRUCTURE LOCATION AND ORIENTATION ONLY.  
DOG CLAMPS, VIBRATION ABSORBERS AND HARDWARE REMOVED FOR CLARITY

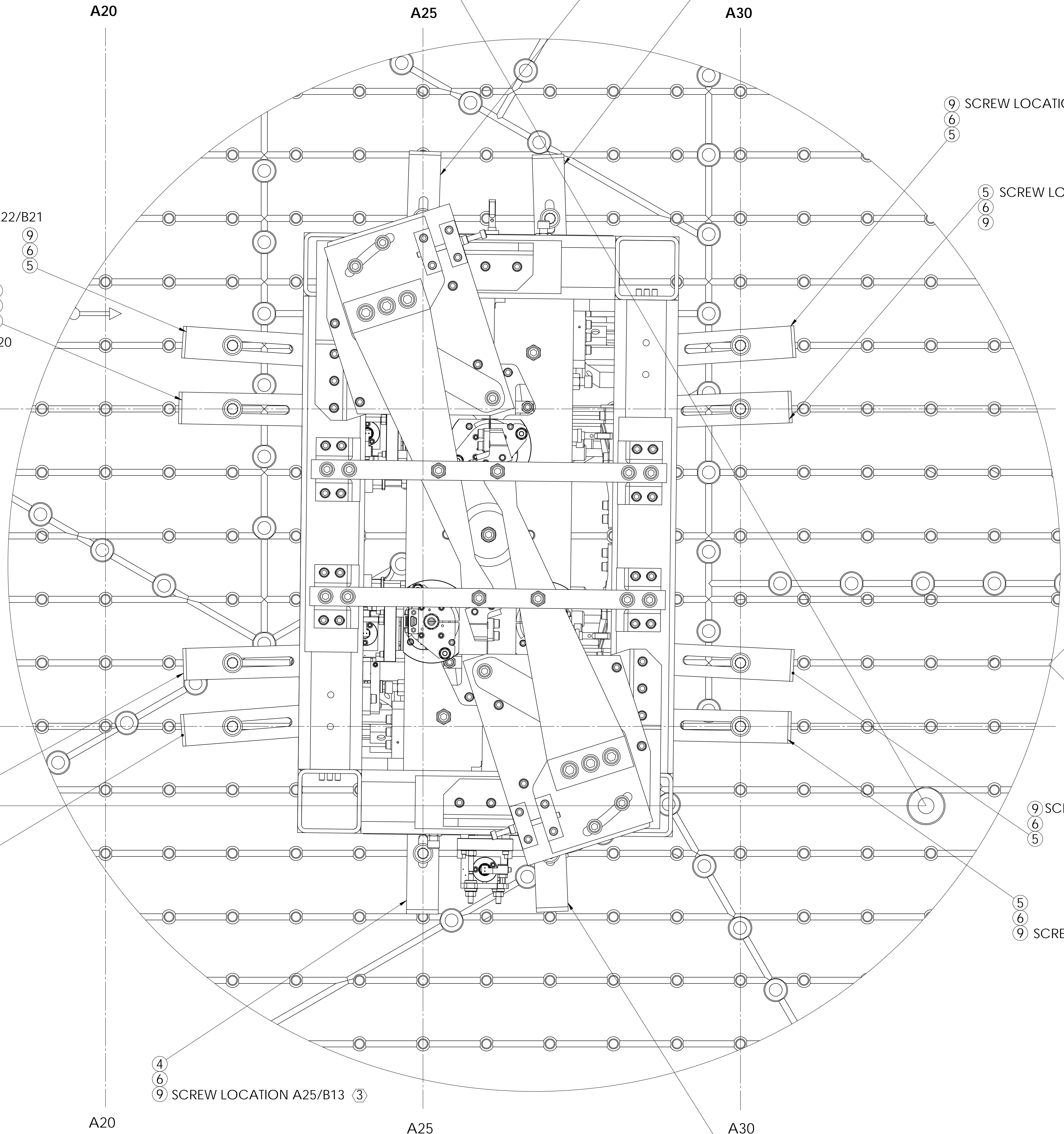
ALIGNMENT PLATE INSTALLATION / LOCATION

PR3



TOP VIEW 1.6  
REF. TRIANGLE: SEE D1000125 FOR  
ISI NAMING AND ORIENTATION CONVENTION

AR SIDE



HR SIDE


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

DETAIL B  
SCALE 1 : 1.5

DOG CLAMPS IDENTIFICATION / INSTALLATION

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

9	2AL2.00-12SL	1/4-20 X 2.00 12PT BOLT	12
6	D1100785-620	WASHER, FLAT, .38 X .620 O.D.	12
5	D1001376-02	AdvLIGO HAM Optics Table Dog Clamp 1.1M	8
4	D1001376-01	AdvLIGO HAM Optics Table Dog Clamp 1.1S	4
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.

**LIGO**  
CALIFORNIA INSTITUTE OF TECHNOLOGY  
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

SIZE DWG. NO.

E D0901086

REV.

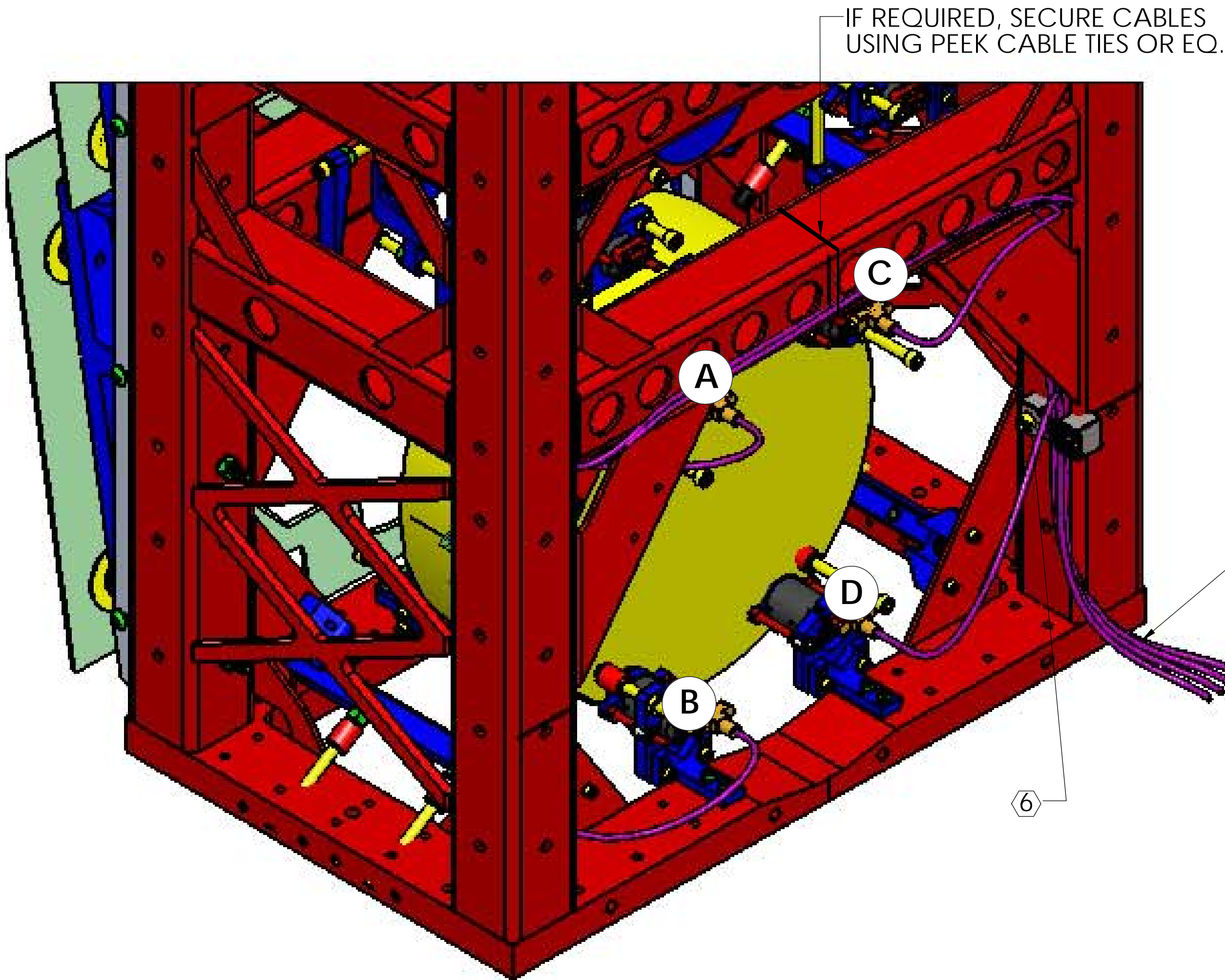
v4

SCALE: 1:8

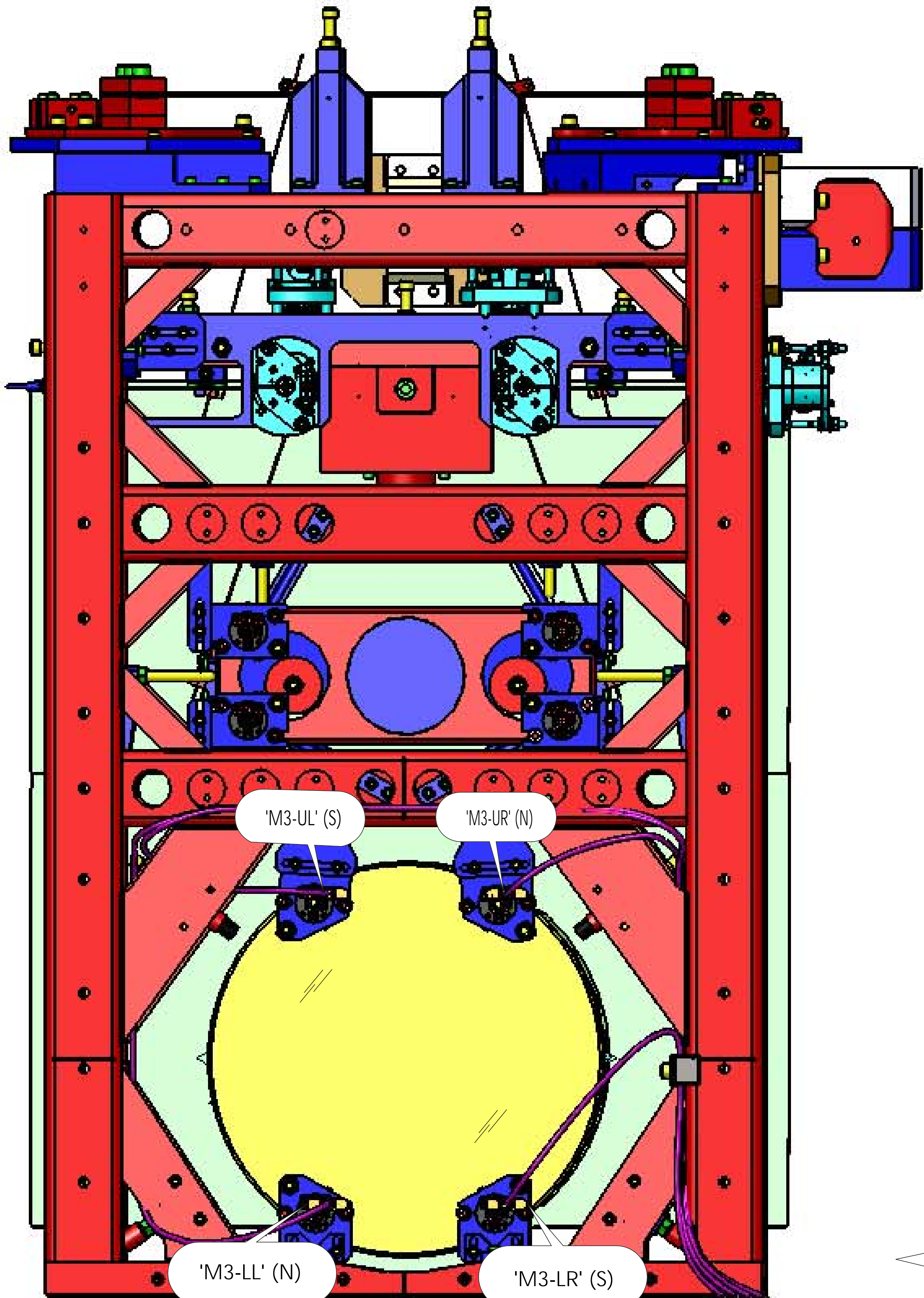
PROJECTION:

SHEET 3 OF 9

PR3



AR SIDE 1.5  
ISO VIEW- REAR LEFT (-X)



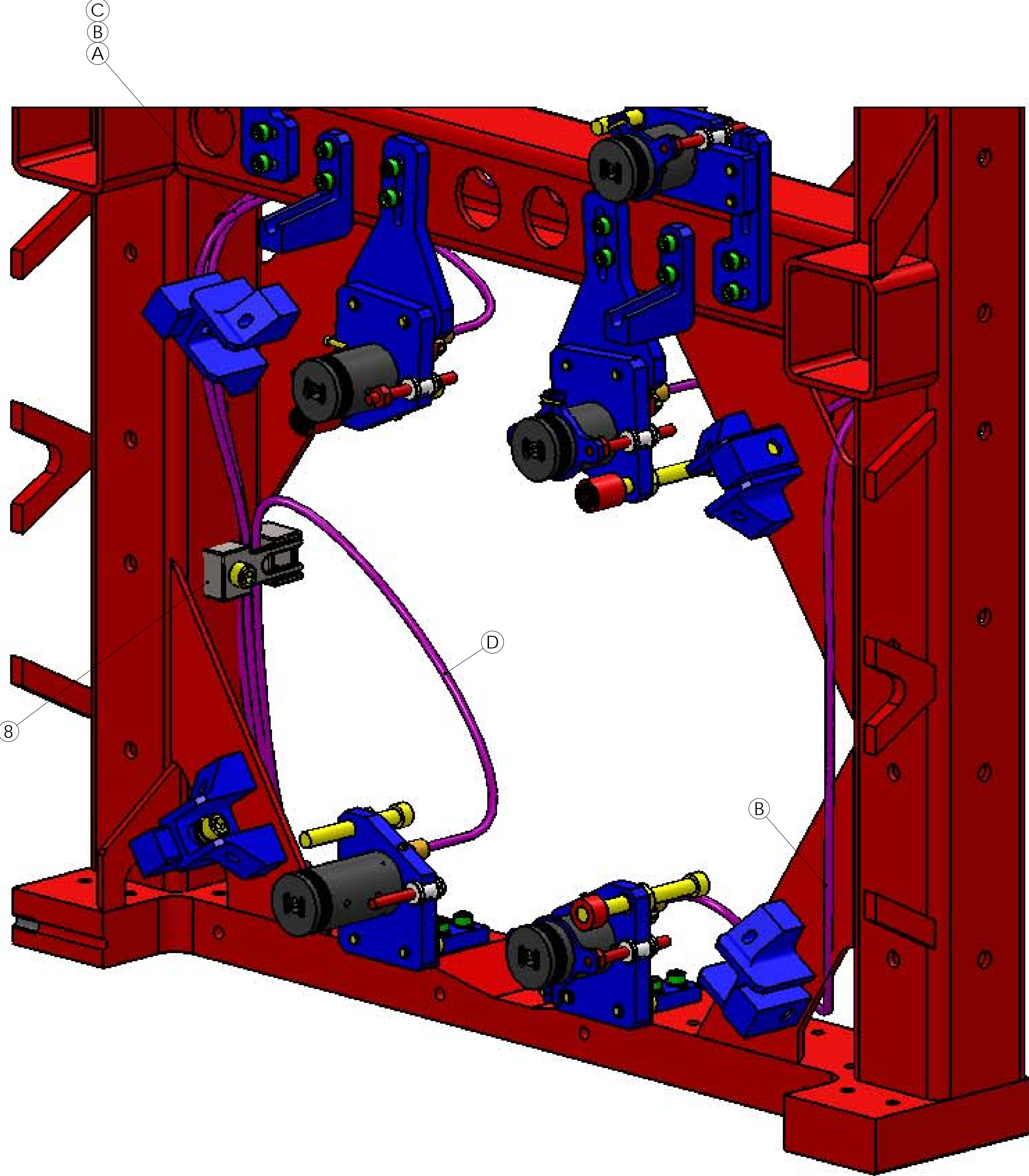
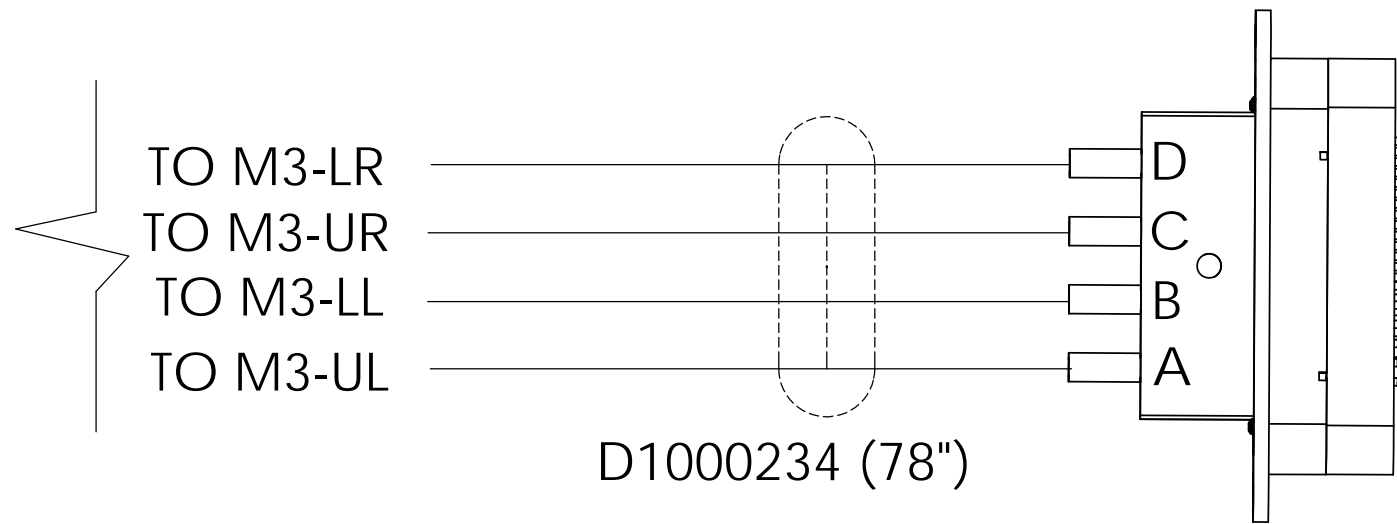
AR SIDE - REAR (-X)  
(END CONNECTORS, NOT SHOWN FOR CLARITY)

FOR SYSTEM CABLING DIAGRAM, CABLE BRACKET LOCATION/ORIENTATION WRT CHAMBER, & ROUTING LAYOUT SEE D1000581.

D QP LEG LACED  
C INSIDE HLTS  
B THROUGH  
A AR SIDE  
RIGHT GUSSET



**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.



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

1 REFERENCED DOCUMENTATION:  
1.1 LIGO-E1100109, HAM SUS CONTROLS 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 TAB.

4 DO NOT CLAMP CABLES TIGHTLY. PROVIDE SUFFICIENT SPACE  
FOR THE CABLES TO RUN FREELY BETWEEN CLAMP JAWS.

5 SHORTING MAY OCCUR IN QP BOSEM & 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.

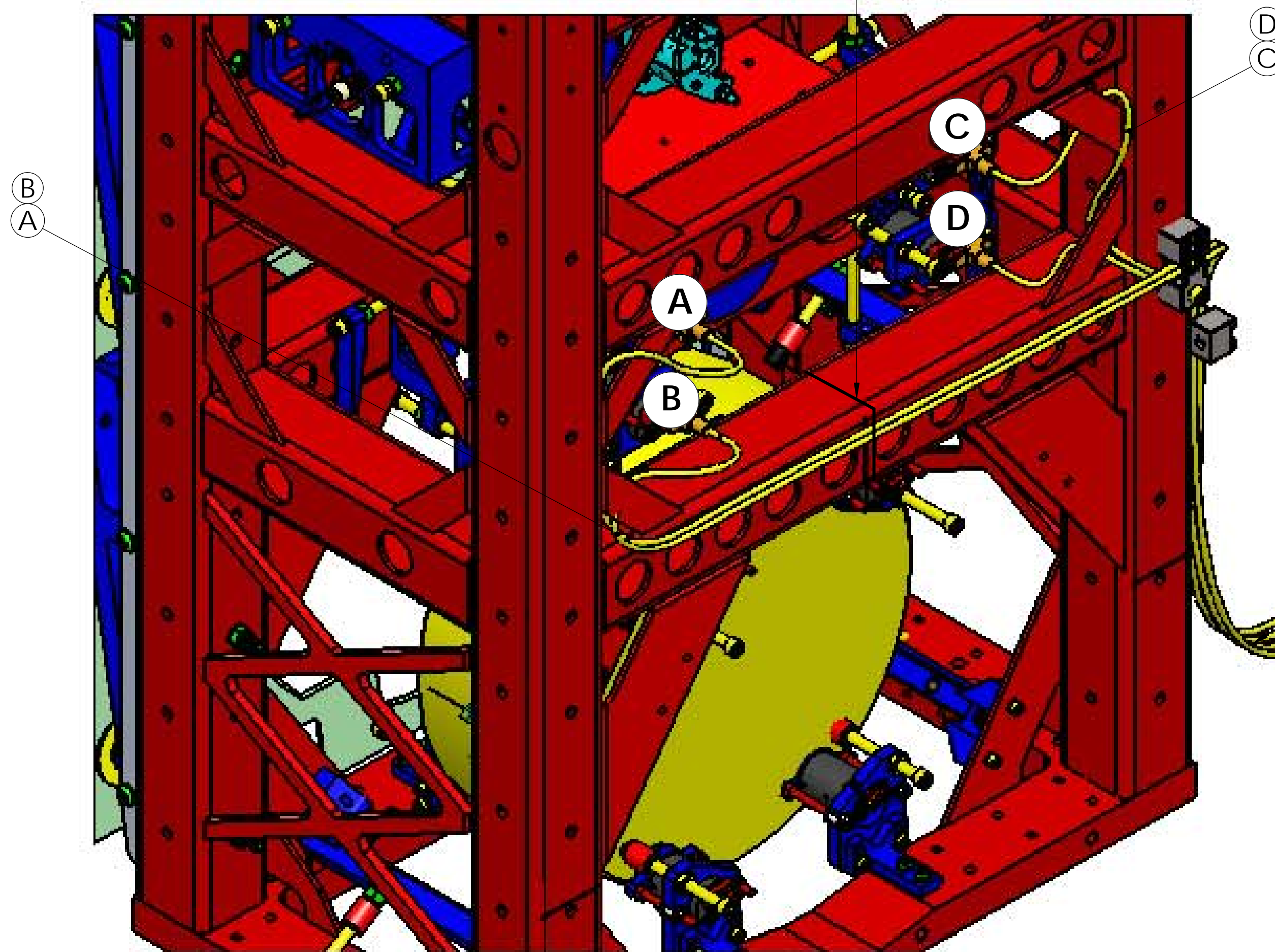
**ROUTE NO. 1**  
SEE LIGO T1200318  
FOR STEP BY STEP CABLING GUIDE

SEE SHEET 1, TABLE 1: FOR CABLING SPECIFICATIONS.

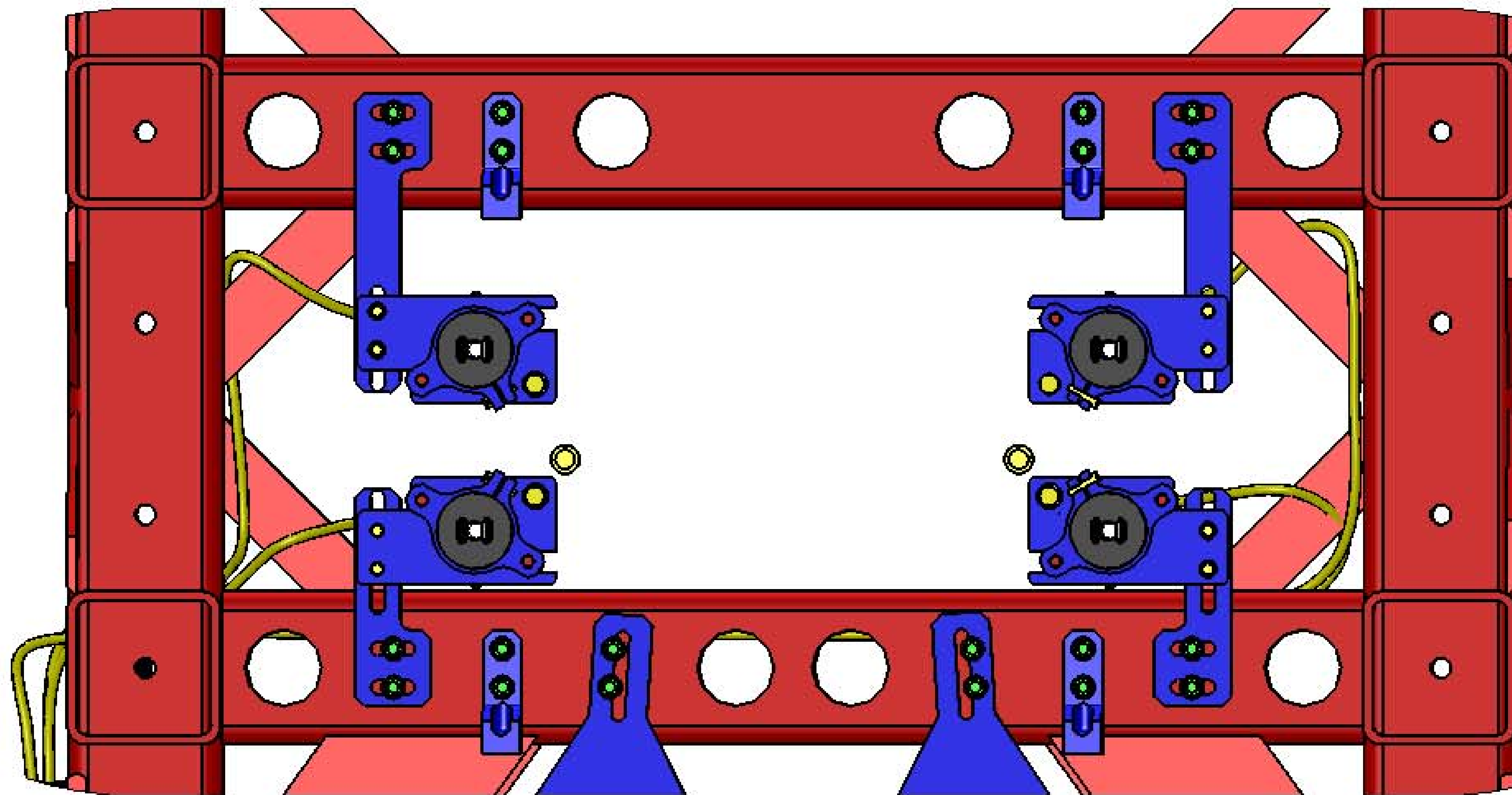
IF REQUIRED, SECURE CABLES  
USING PEEK CABLE TIES OR EQ.

FOR SYSTEM CABLING DIAGRAM, CABLE BRACKET LOCATION/ORIENTATION WRT CHAMBER, & ROUTING LAYOUT SEE D1000581.

PR3



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

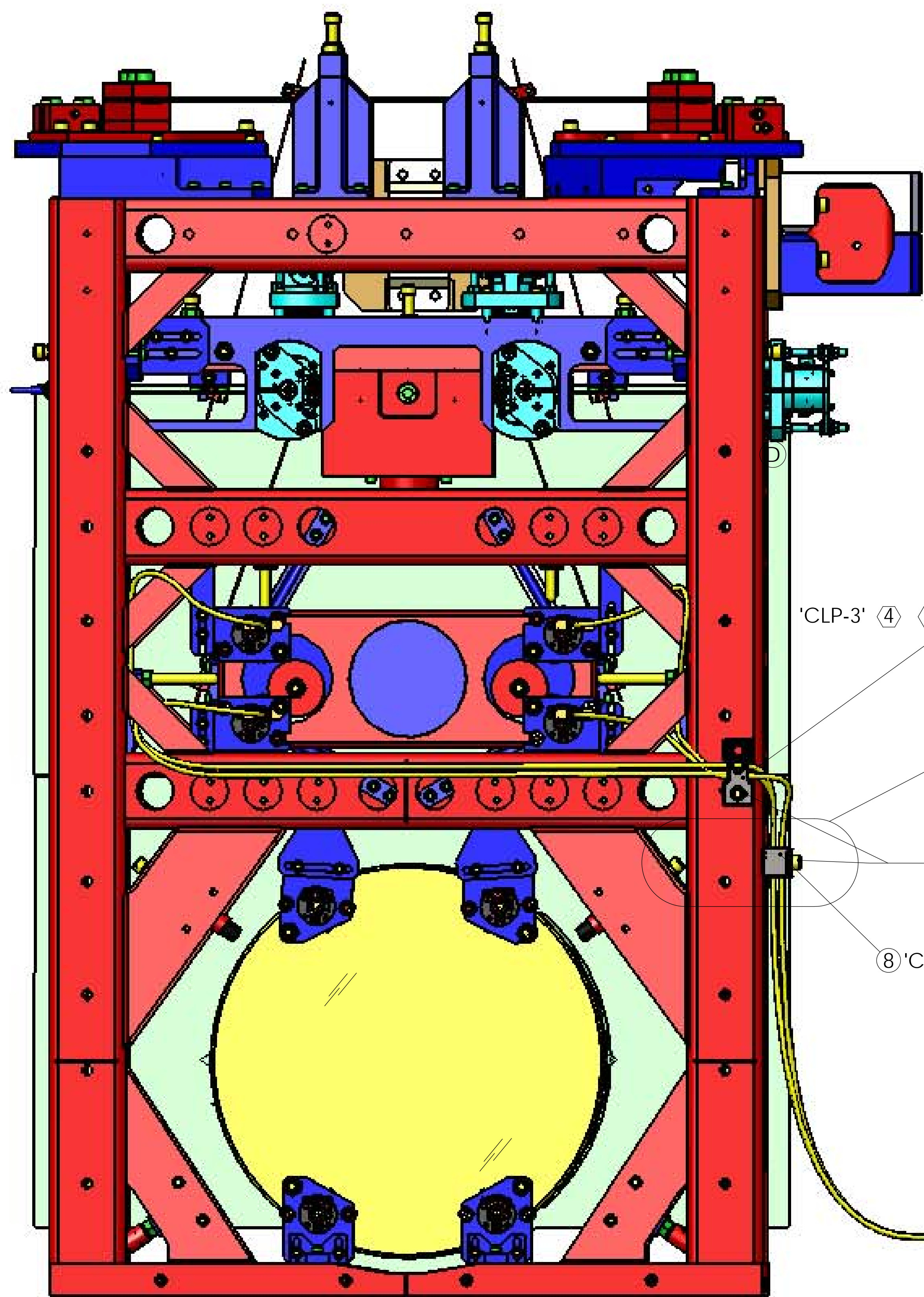


HR SIDE - FRONT (+X)  
BROKEN QUOT SECTION VIEW  
(AS VIEWED FROM INSIDE)



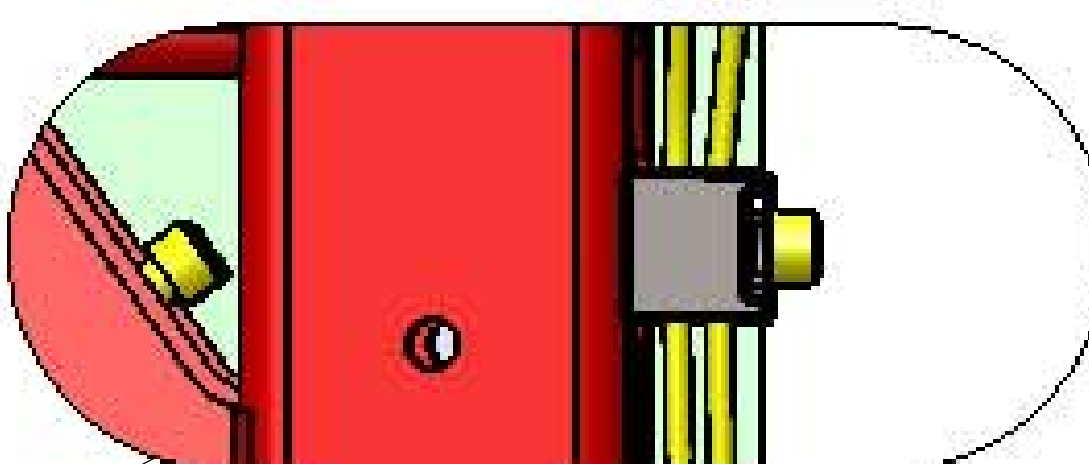
**WARNING**

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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.

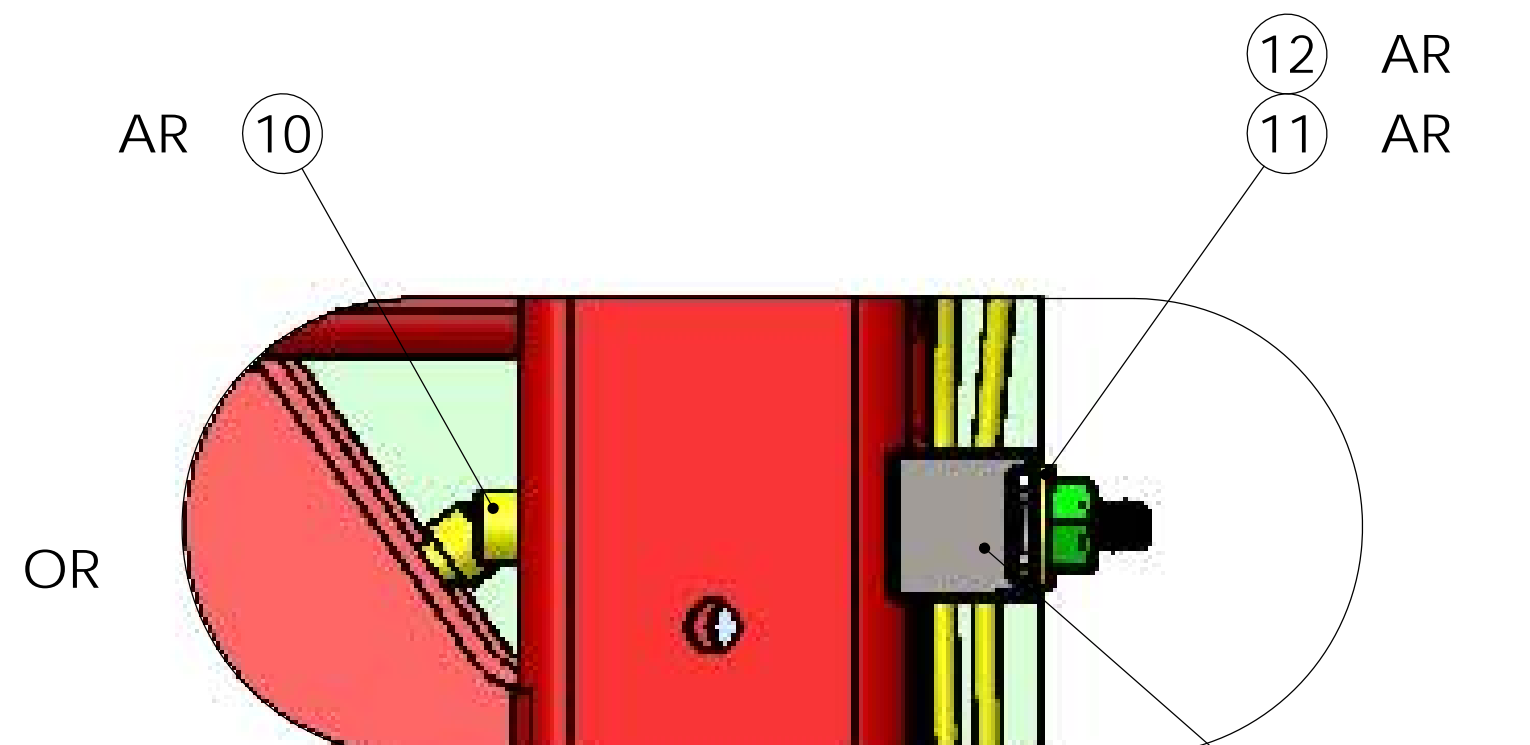


AR SIDE - REAR (-X) (1.1) (1.2)

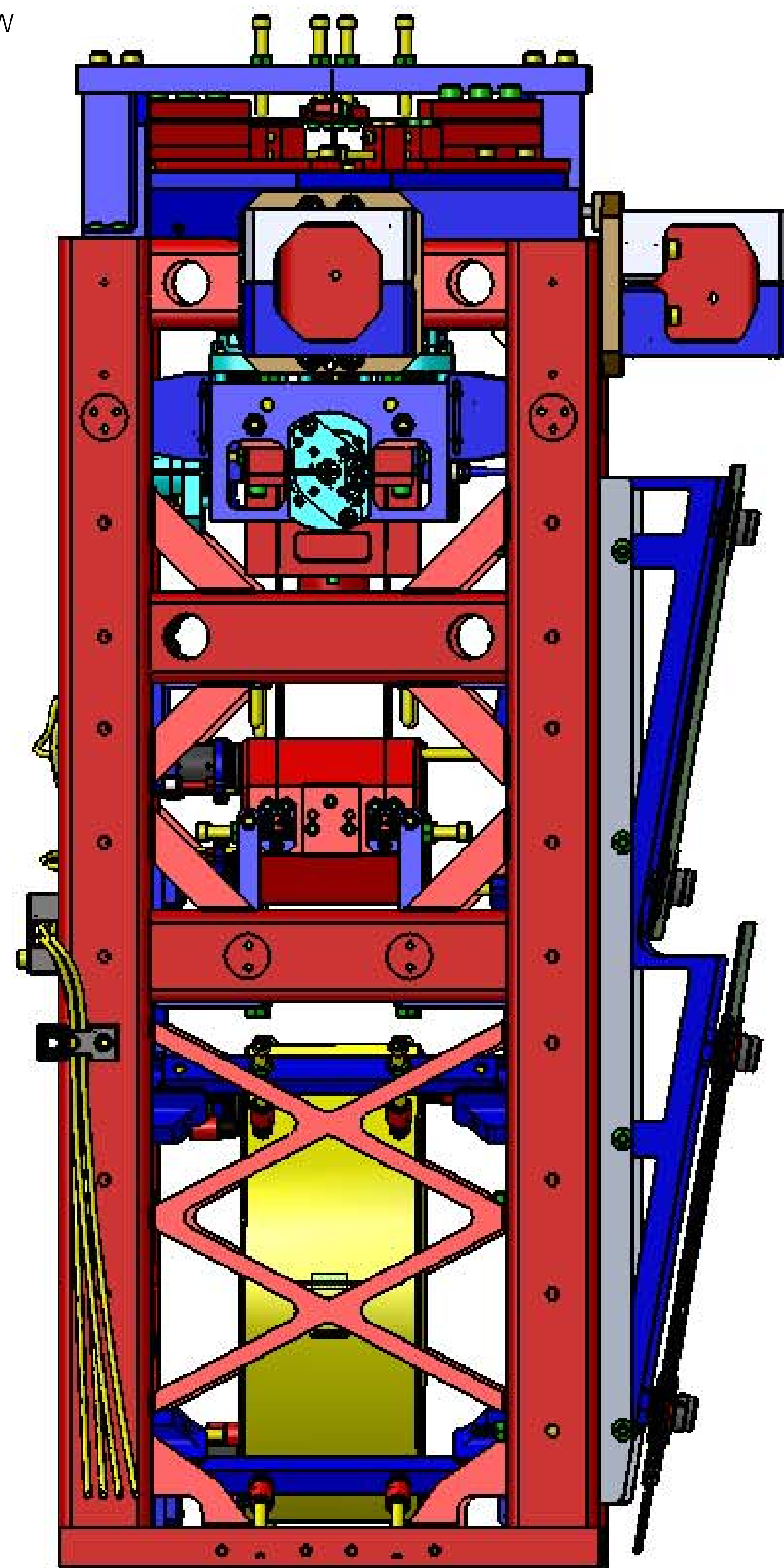
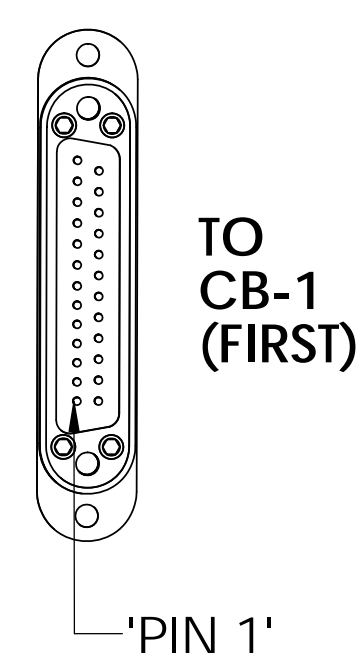
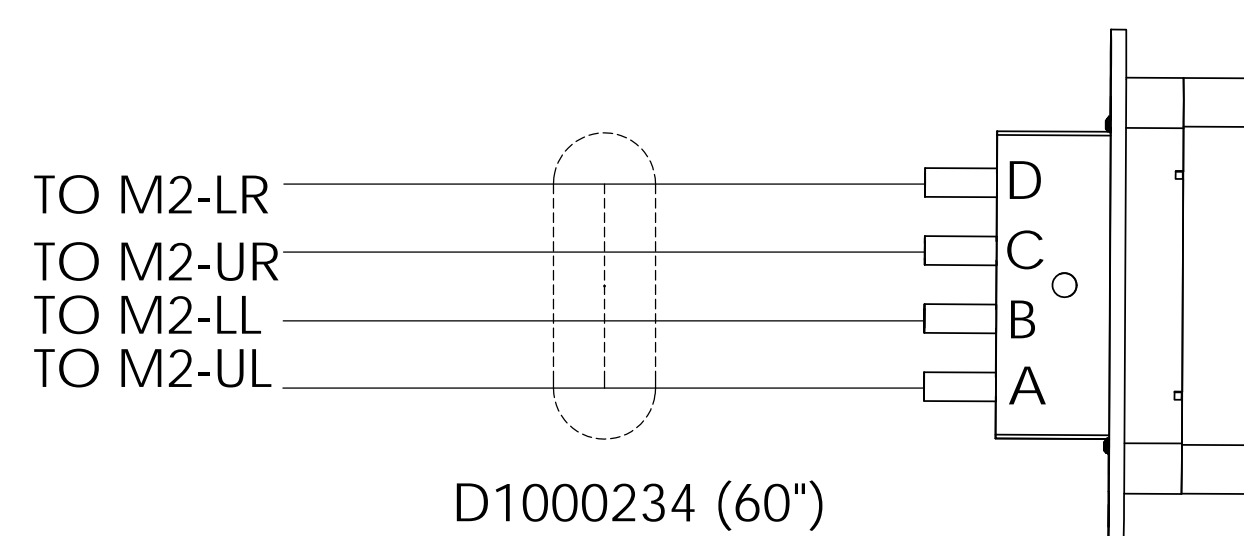
(END CONNECTORS, NOT SHOWN FOR CLARITY)



DETAIL C  
CABLE CLAMP MT. (STANDARD)  
SCALE 1 : 1



DETAIL C  
CABLE CLAMP MT. (ALTERNATE)  
SCALE 1 : 1



RIGHT SIDE (-Y)

- ① REFERENCED DOCUMENTATION:
- 1.1 LIGO-E1100109, HAM SUS CONTROLS 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 TAB.

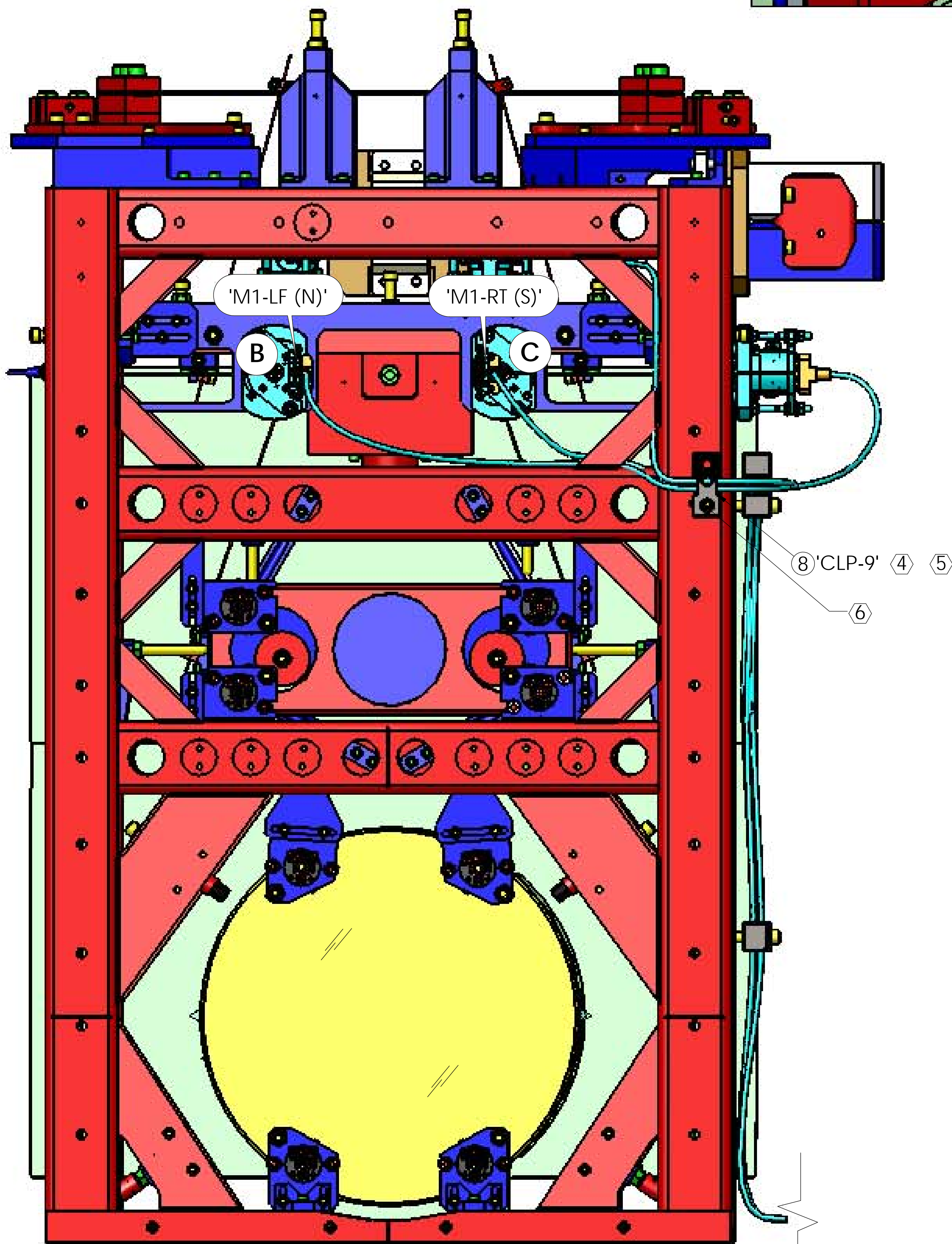
- ④ DO NOT CLAMP CABLES TIGHTLY. PROVIDE SUFFICIENT SPACE  
FOR THE CABLES TO RUN FREELY BETWEEN CLAMP JAWS.
- ⑤ SHORTING MAY OCCUR IN QP BOSEM & AOSEM TEFLON CABLES CLAMPED EXCESSIVELY TIGHT.  
THEREFORE, THE PEEK CLAMPS (i.e. 'CLP-1' AND CABLE TIES) SHOULD SERVE ONLY AS A GUIDE FOR  
THE CABLES TO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

**ROUTE NO. 2**  
SEE LIGO T1200318  
FOR STEP BY STEP CABLING GUIDE

PR3



ISO VIEW REAR - LEFT



AR SIDE - REAR (-X) 1.1 1.2

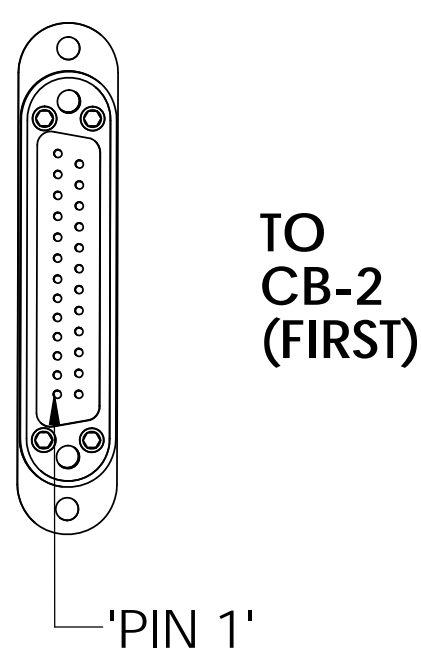
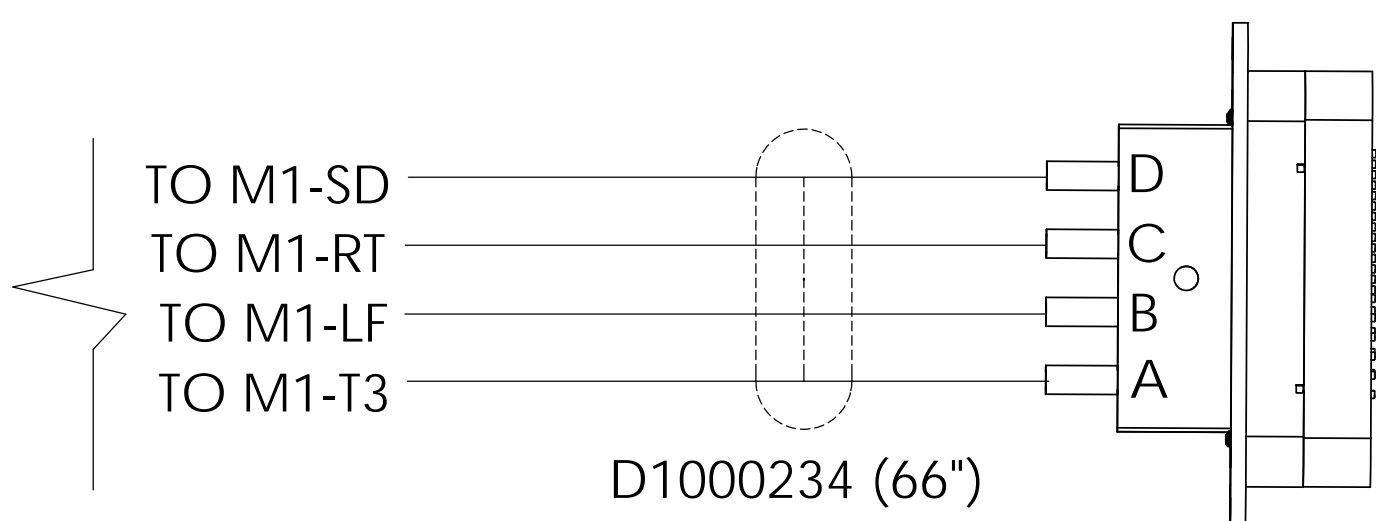
(END CONNECTORS, NOT SHOWN FOR CLARITY)

FOR SYSTEM CABLING DIAGRAM, CABLE BRACKET LOCATION/ORIENTATION WRT CHAMBER, & ROUTING LAYOUT SEE D1000581.



WARNING

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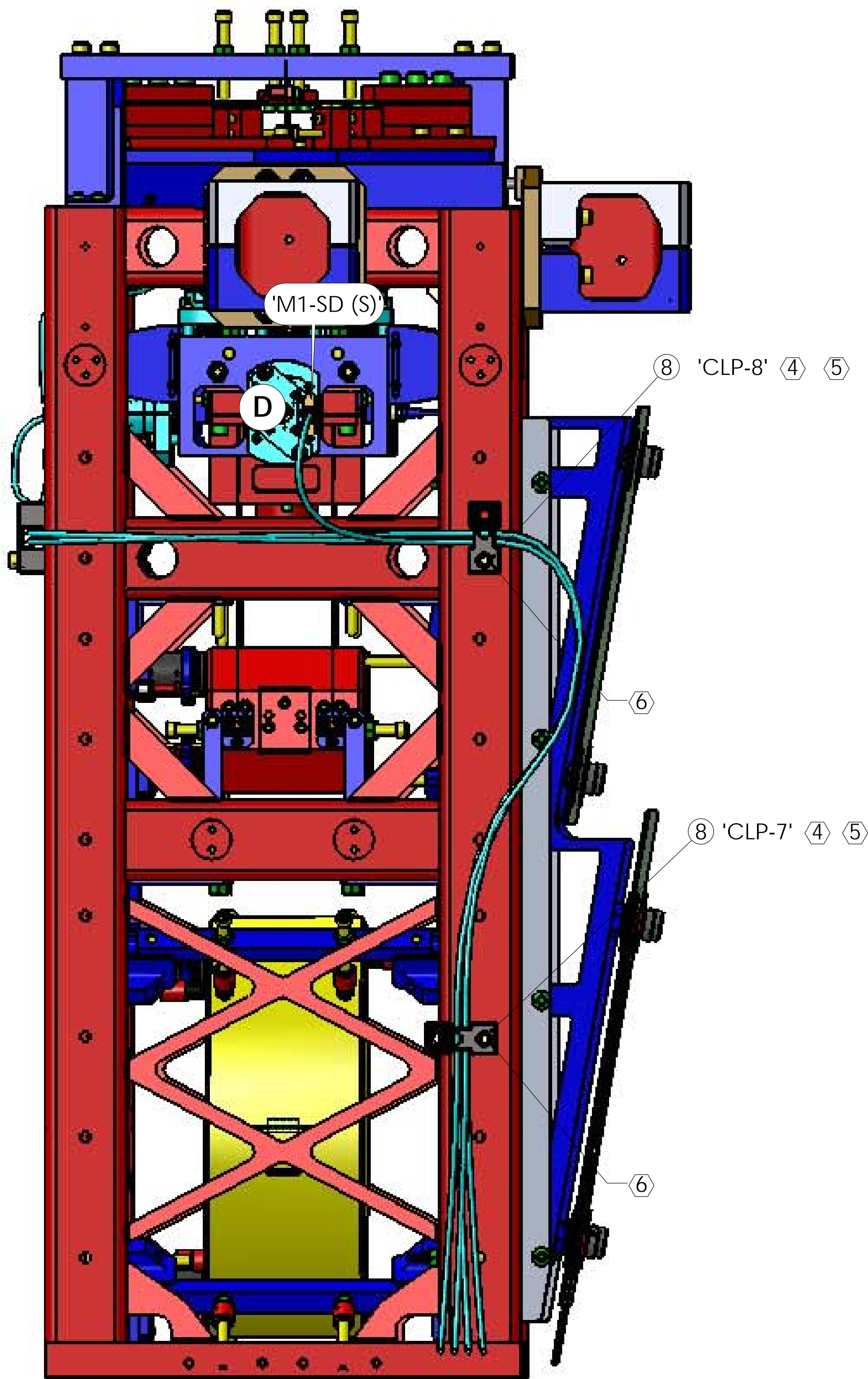


ROUTE NO. 3

SEE LIGO T1200308  
FOR STEP BY STEP CABLING GUIDE

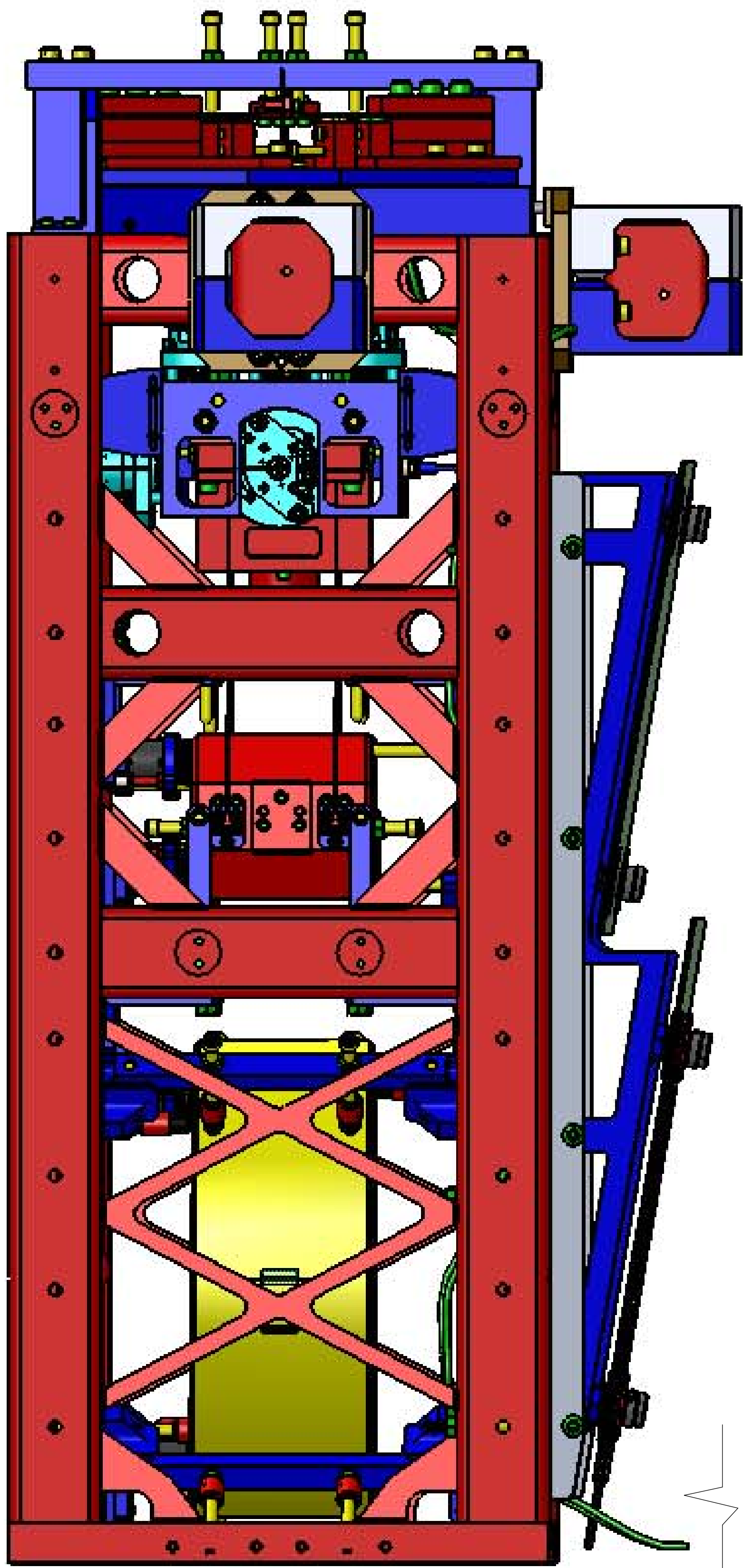
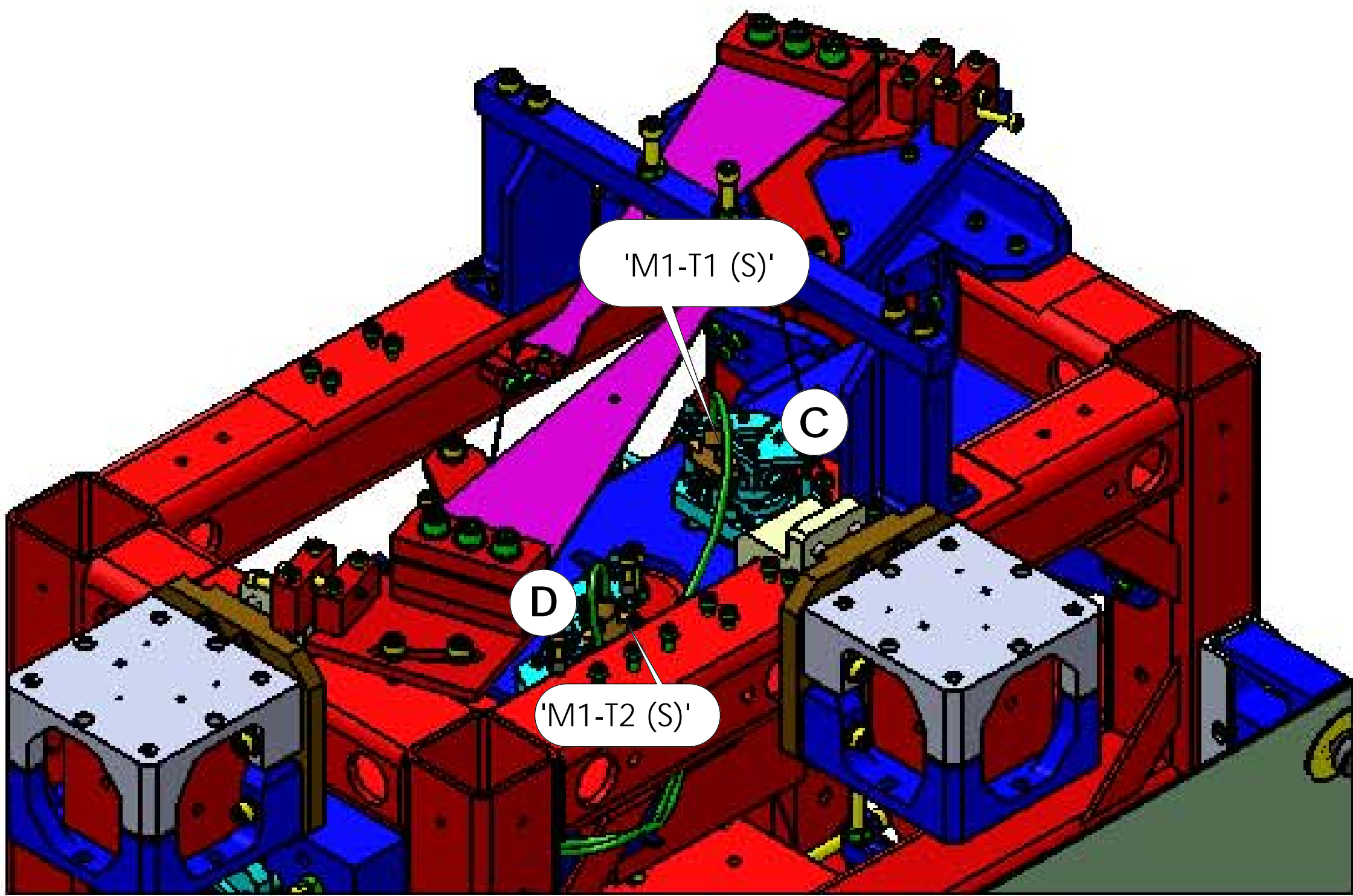
- ① REFERENCED DOCUMENTATION:  
1.1 LIGO-E1100109, HAM SUS CONTROLS ARRANGEMENT.  
1.2 LIGO-D1101493, OSEM ORIENTATION.  
1.3 LIGO-D1000581, SYSTEM CABLING DIAGRAM.  
1.4 LIGO-D1002424, VIBRATION ABSORBER ORIENTATION.  
1.5 LIGO-E1100411, CABLE CLAMP TORQUE.  
1.6 LIGO-D1101296, HAM ISI HOLE TAB.

- ④ DO NOT CLAMP CABLES TIGHTLY, PROVIDE SUFFICIENT SPACE FOR THE CABLES TO RUN FREELY BETWEEN CLAMP JAWS.
- ⑤ SHORTING MAY OCCUR IN QP BOSEM & 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.

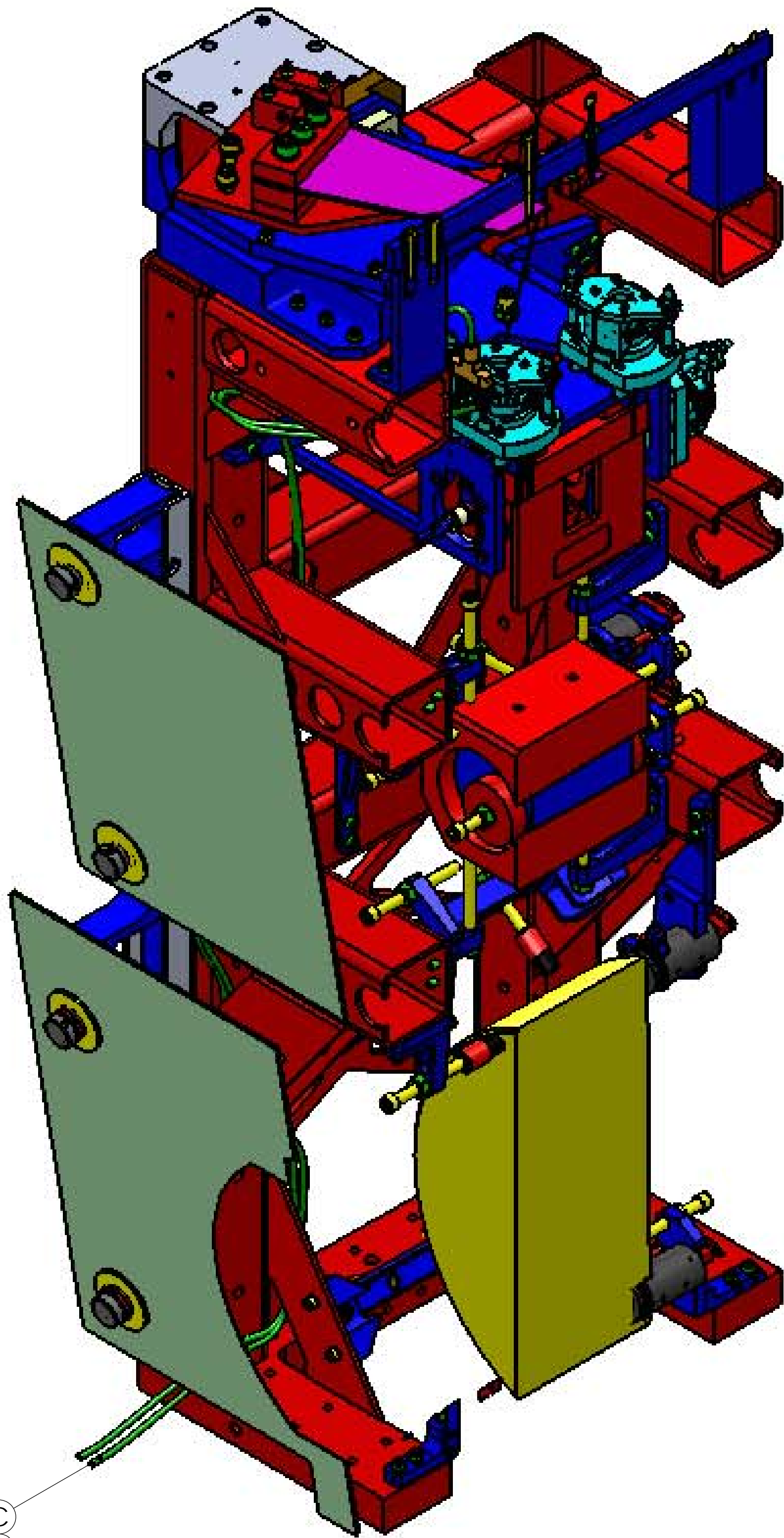


RIGHT SIDE (-Y)

PR3



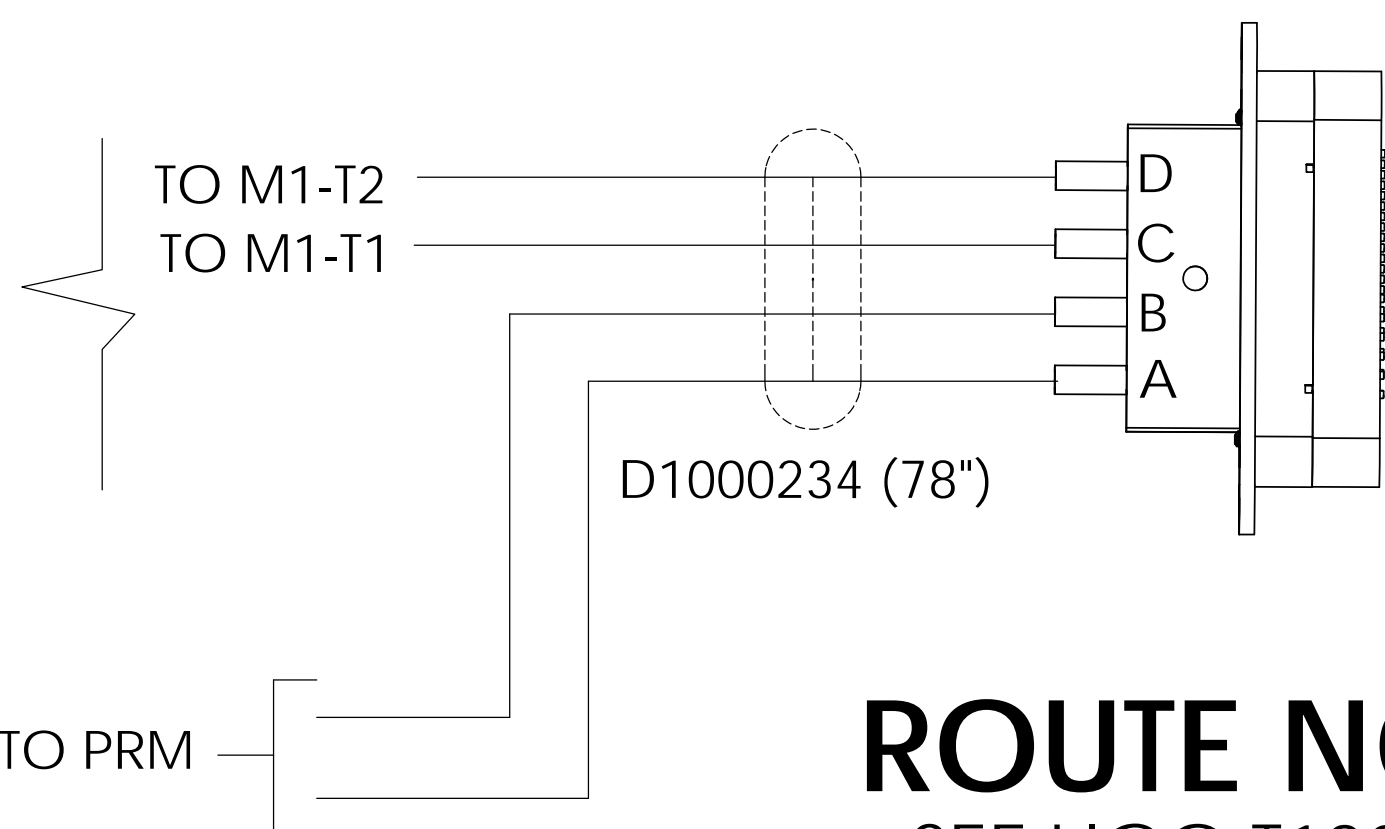
RIGHT SIDE (-Y)



OP LEGS  
LACED  
THOUGH HR SIDE  
BOTTOM LEFT GUSSET

C  
D

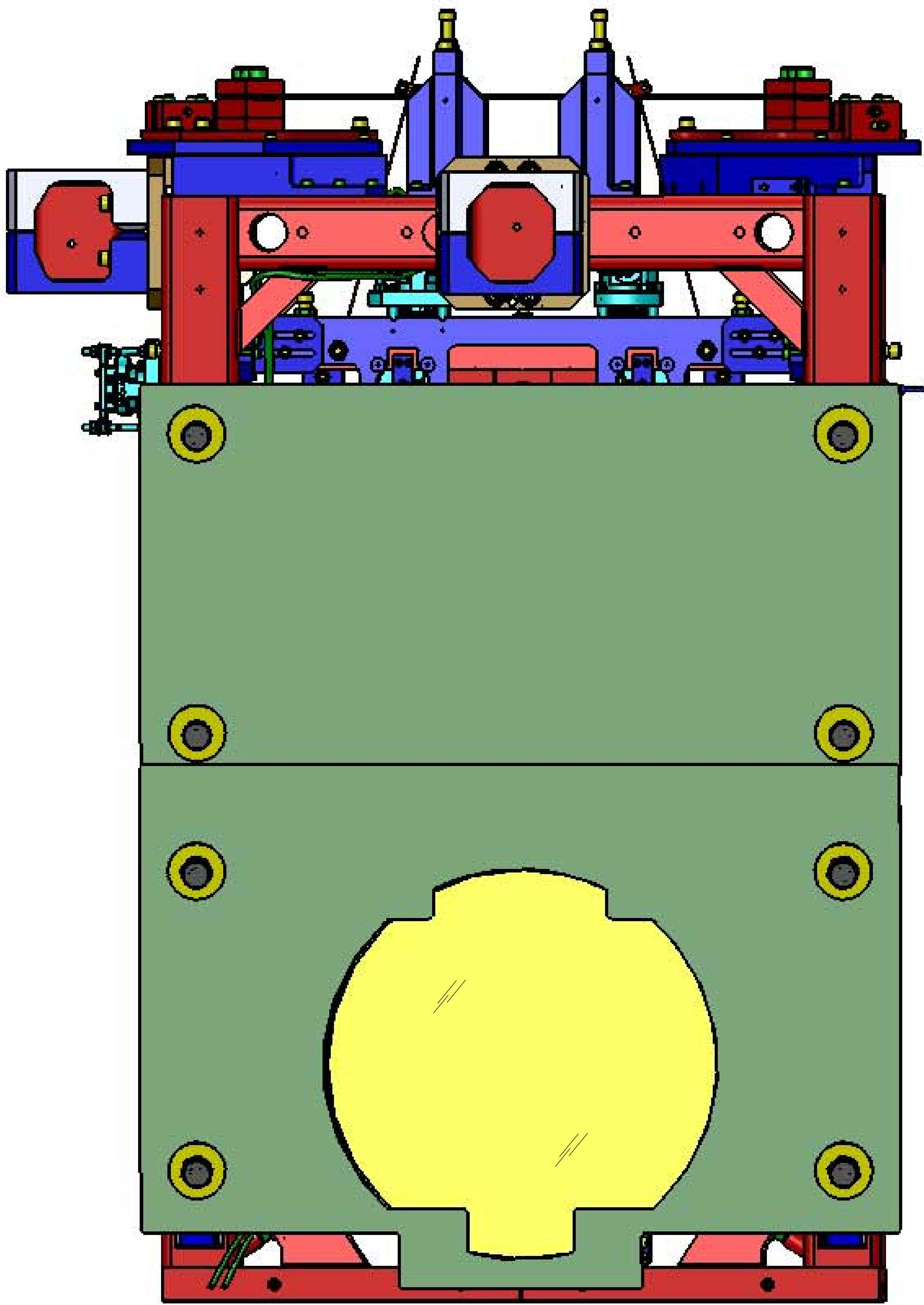
ISO VIEW FRONT - RIGHT  
BROKEN OUT SECTION  
(AS VIEWED FROM THE INSIDE)



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



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LOCATION OF MATING CABLE BRACKET,  
AND LASER BEAM PATH PRIOR TO  
ROUTING / LACING VIA A NEW PATH.

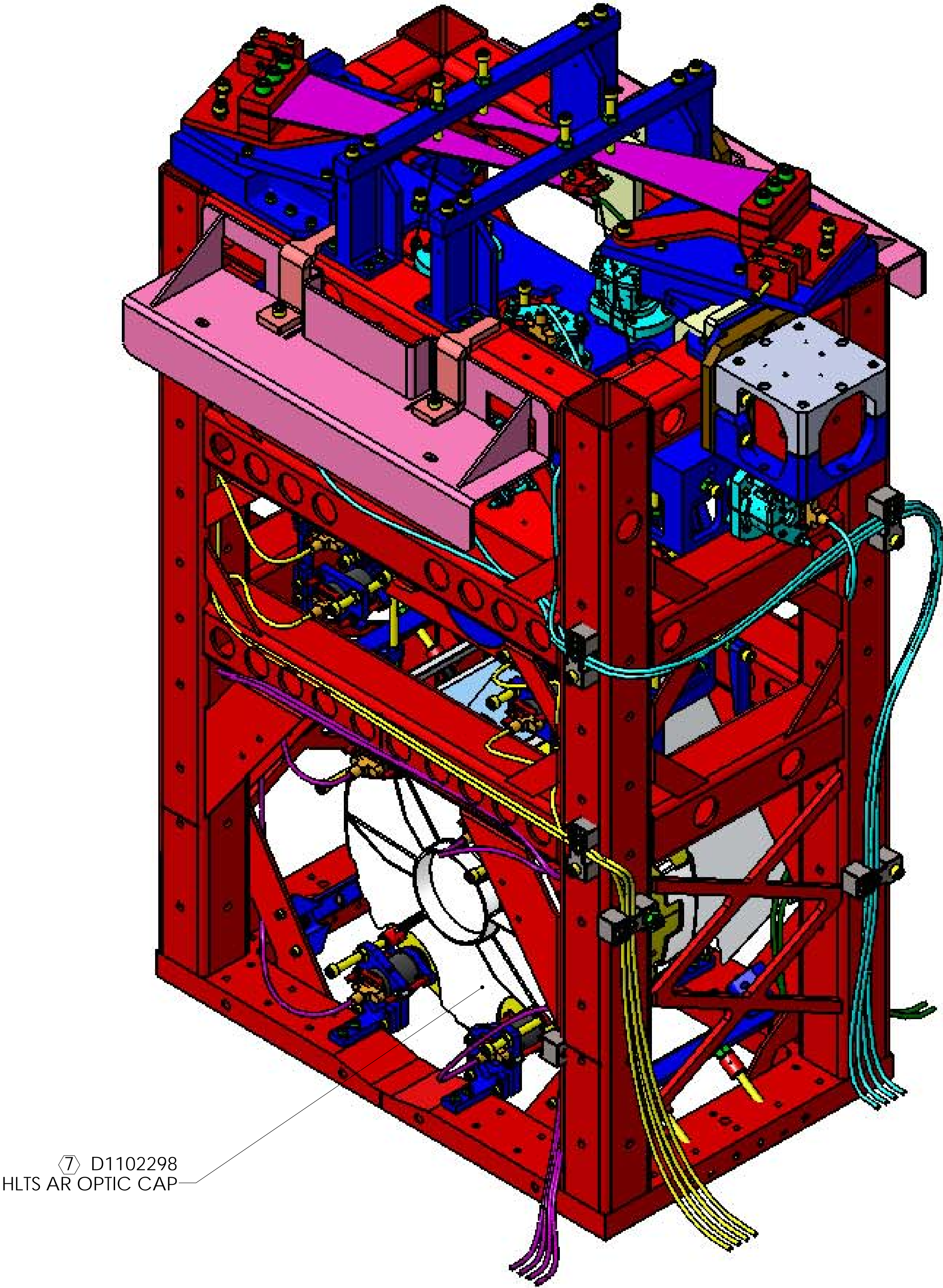


HR SIDE - FRONT (+X)  
(END CONNECTORS, NOT SHOWN FOR CLARITY)

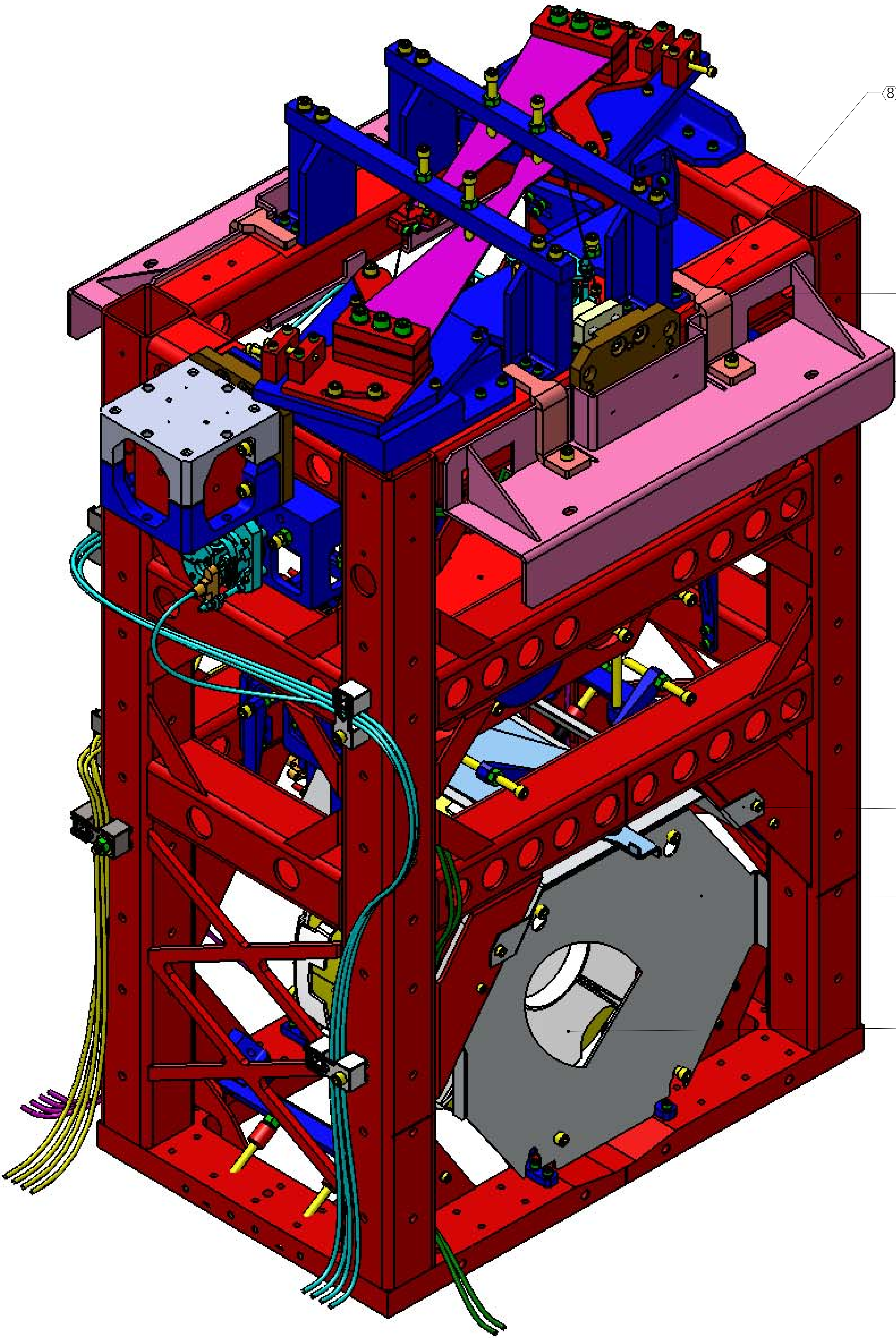
PR3

⑦ INDICATED ITEMS FOR TRANSPORTATION PURPOSES ONLY. AND ARE NOT PART OF FINISHED ASSEMBLY. SEE D1101674 FOR REFERENCE.

⑧ REMOVE VIBRATION ABSORBER ON FRONT SIDE TO AVOID INTERFERENCE WITH LIFT BRACKET. 8.1 LOCKING PINS: RETAIN IN PLACE FOR TRANSPORTATION ANAD INSTALLATION ONLY. REMOVE BEFORE CHAMBER DOORS ARE CLOSED.



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

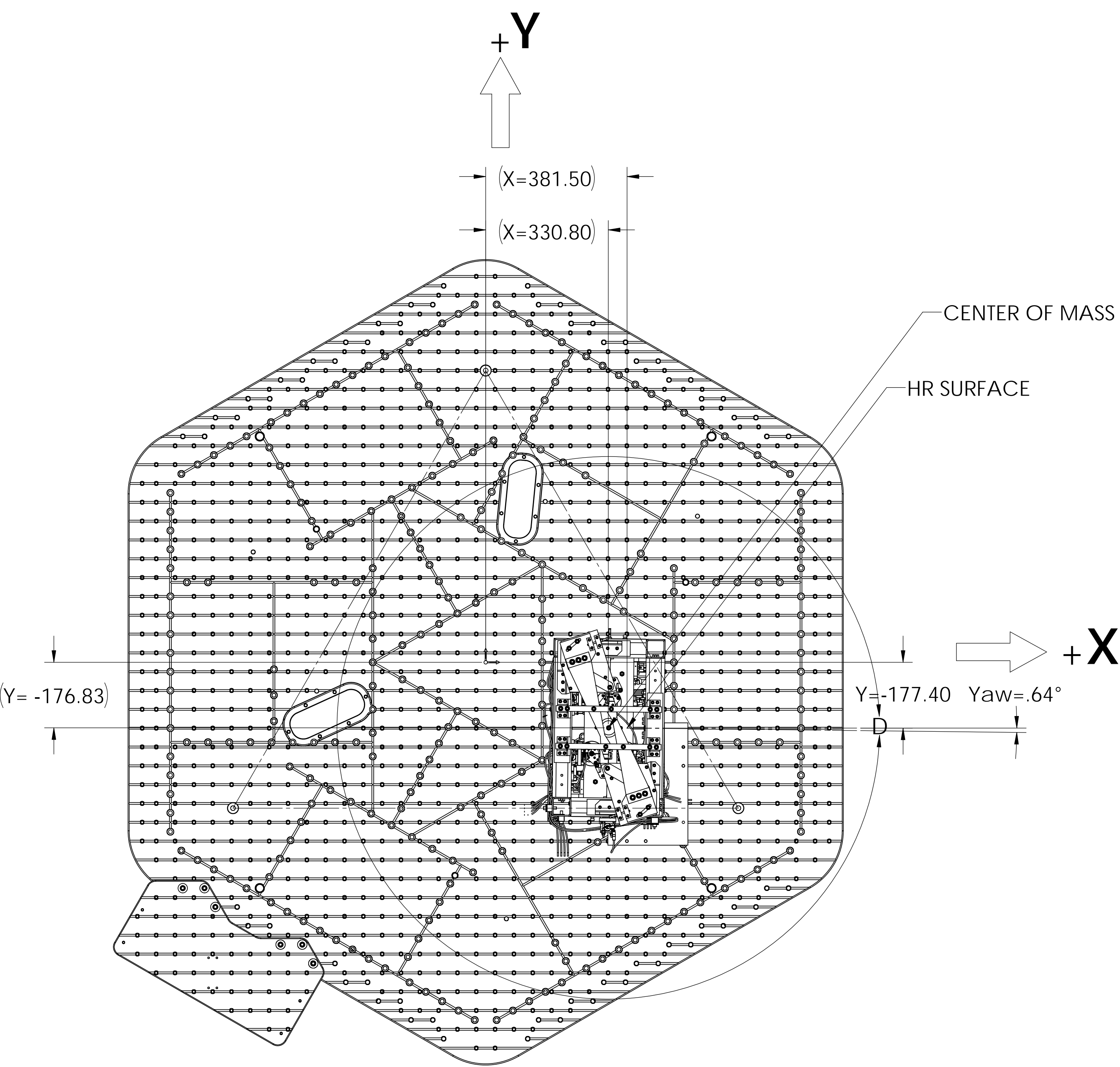


HR SIDE  
ISO VIEW, FRONT - RIGHT (+X)

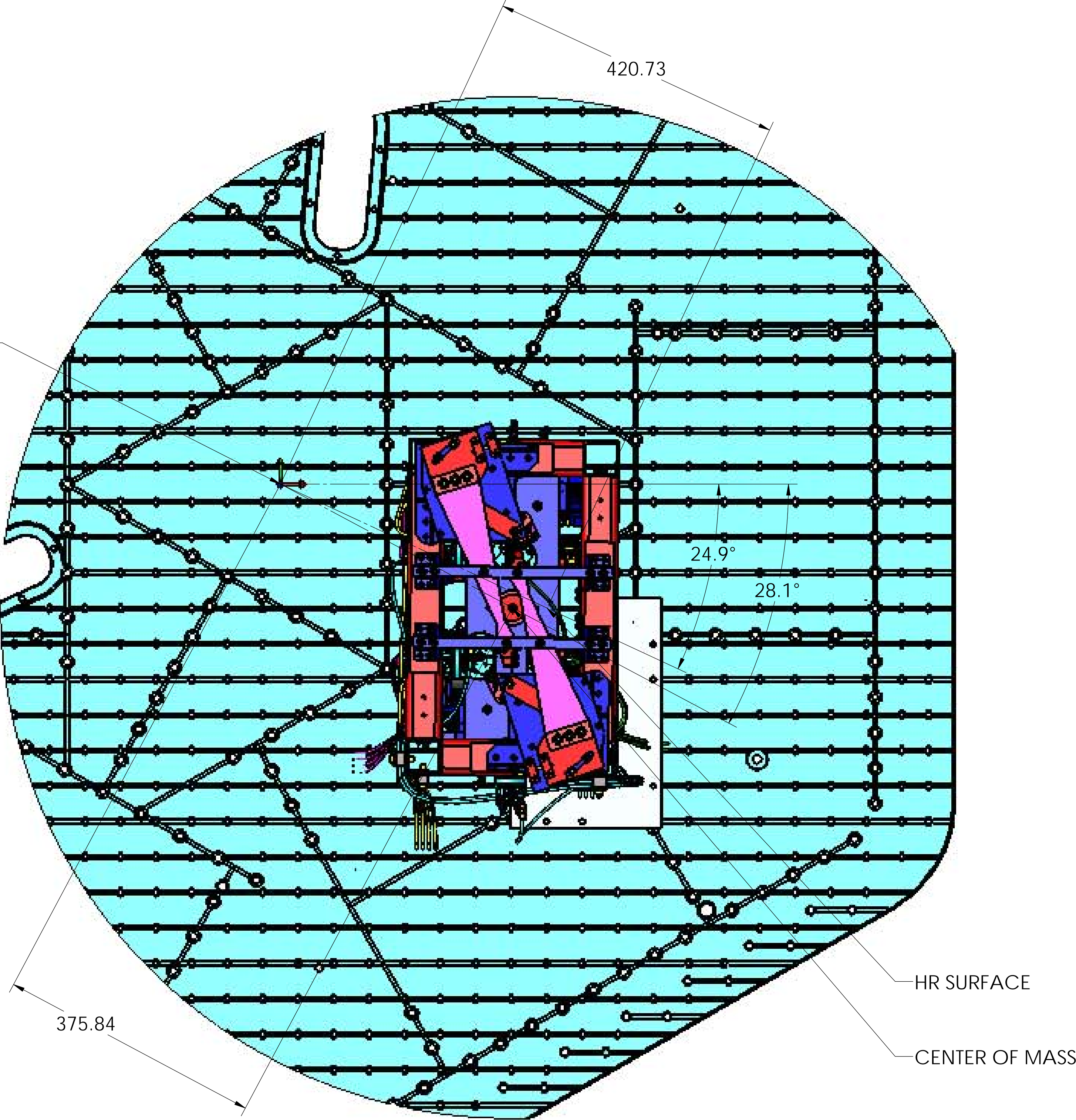
# HLTS STRUCTURE TRANSPORT

VIBRATION ABSORBERS ON FRONT SIDE NOT SHOWN  
(REMOVED FOR TRANSP. PURPOSES)

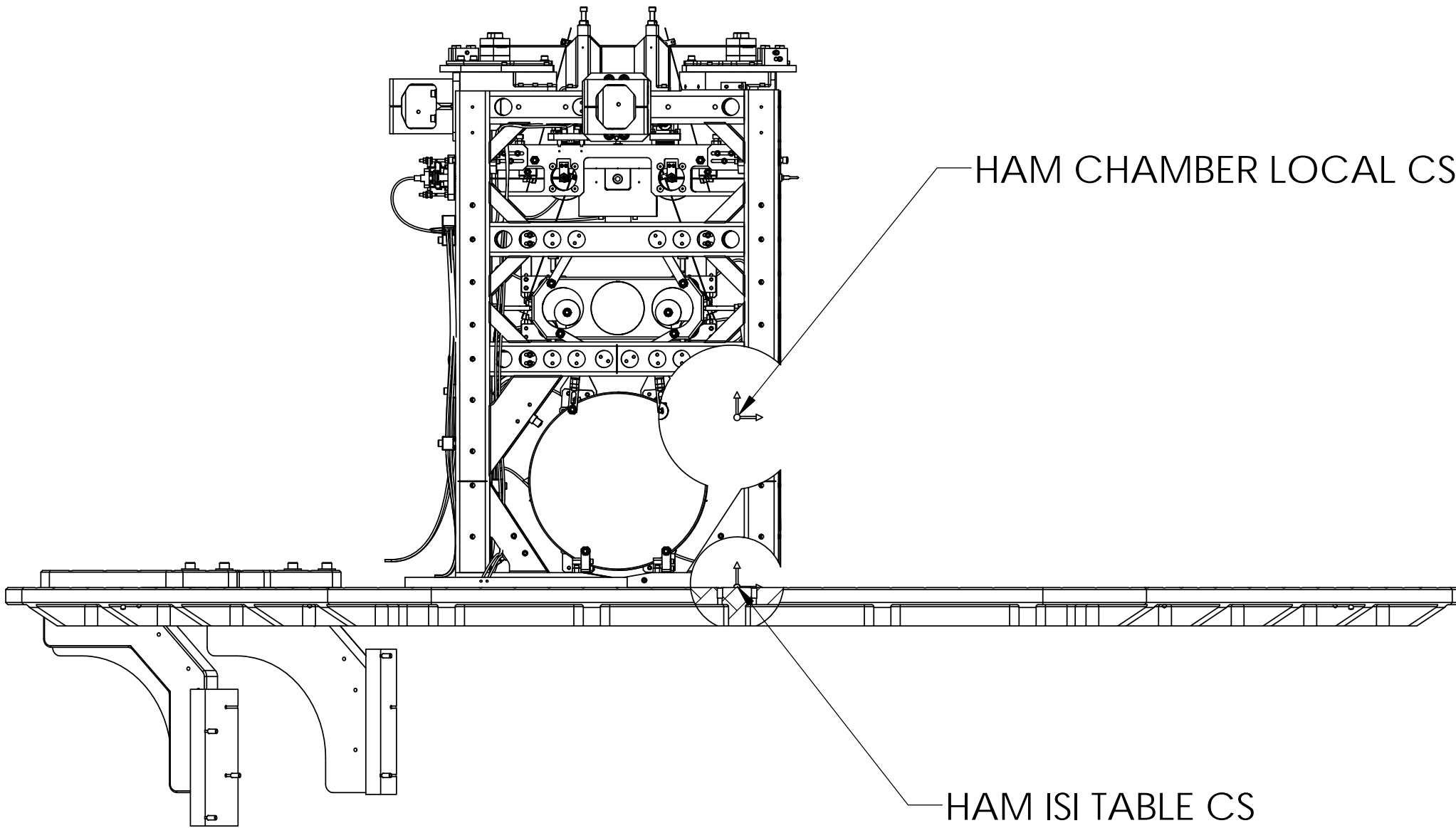
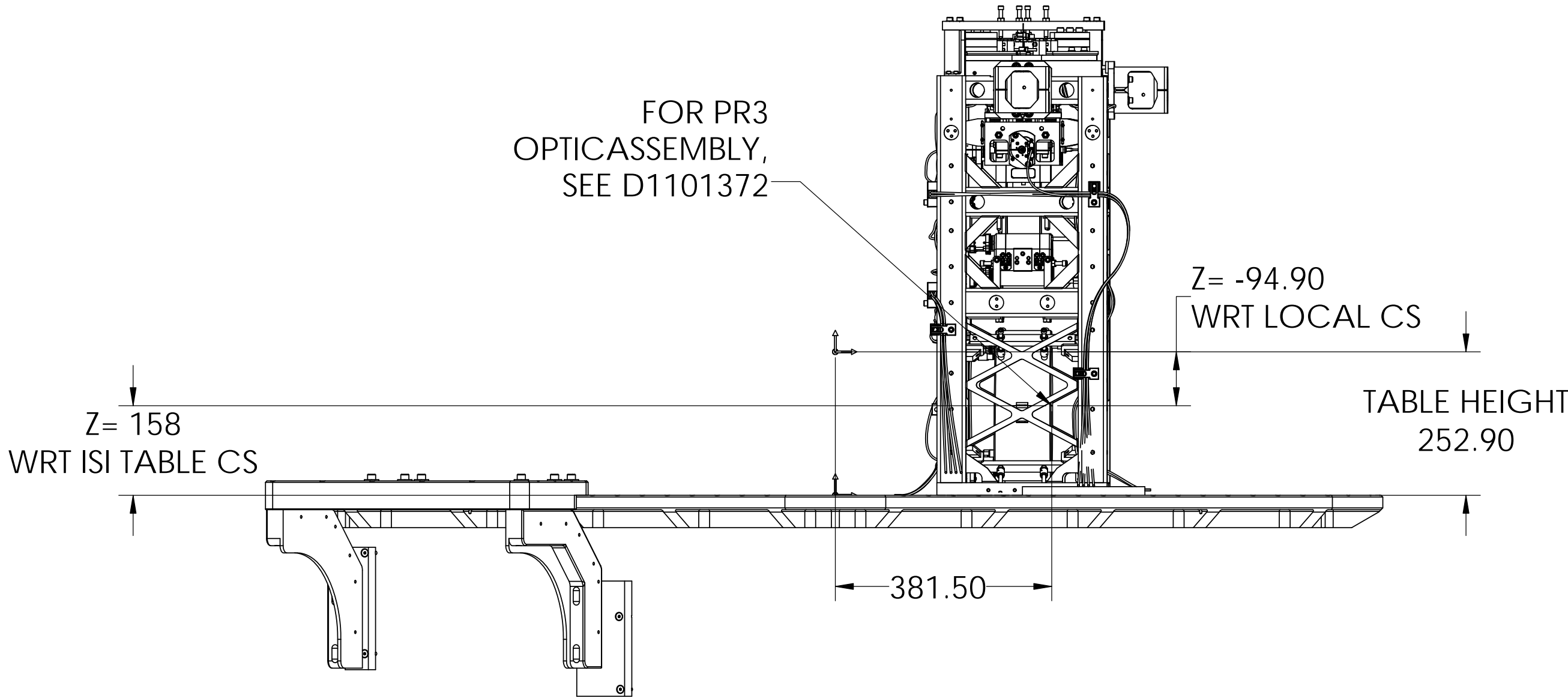
PR3



HAM CHAMBER  
LOCAL CS



DETAIL D  
SCALE 1 : 4



# LOCAL COORDINATES DEFINITIONS

NOTE: DIMENSION IN PARENTHESES (REFERENCE DIMENSIONS), ARE FROM CENTER OF MASS