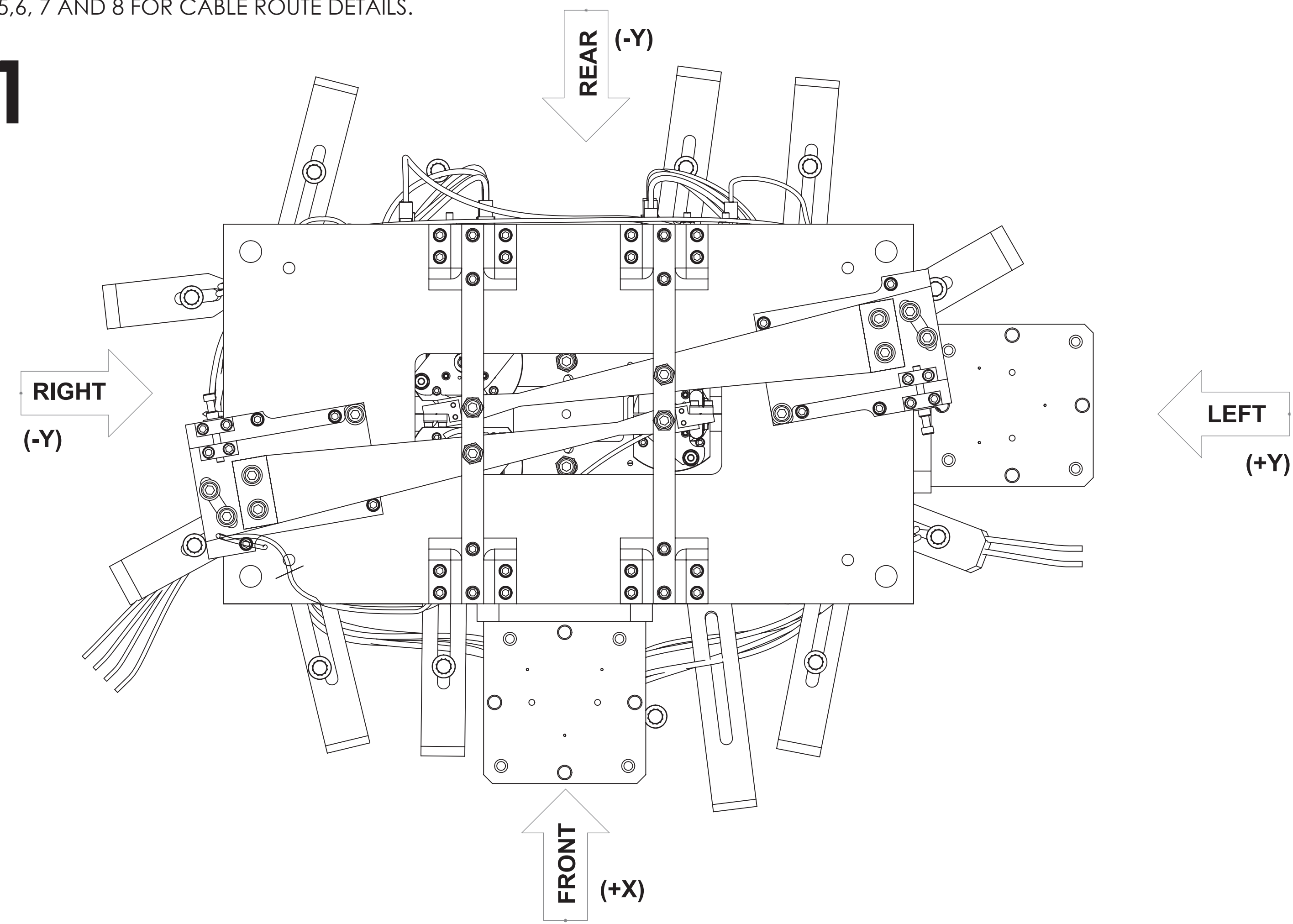


- ① REFERENCED DOCUMENTATION:
 1.1 LIGO-E1100109, HAM SUS CONTROL ARRANGEMENT.
 1.2 LIGO-D1101493, OSEM ORIENTATION.
 1.3 LIGO-D1000581, SYSTEM CABLING DIAGRAM.
 1.4 LIGO-D1002424, VIBRATION ABSORBER ORIENTATION.
 1.5 LIGO-E1100411, CABLE CLAMP TORQUE.
 1.6 LIGO-D1101296, HAM ISI HOLE TABLE.

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

MC1



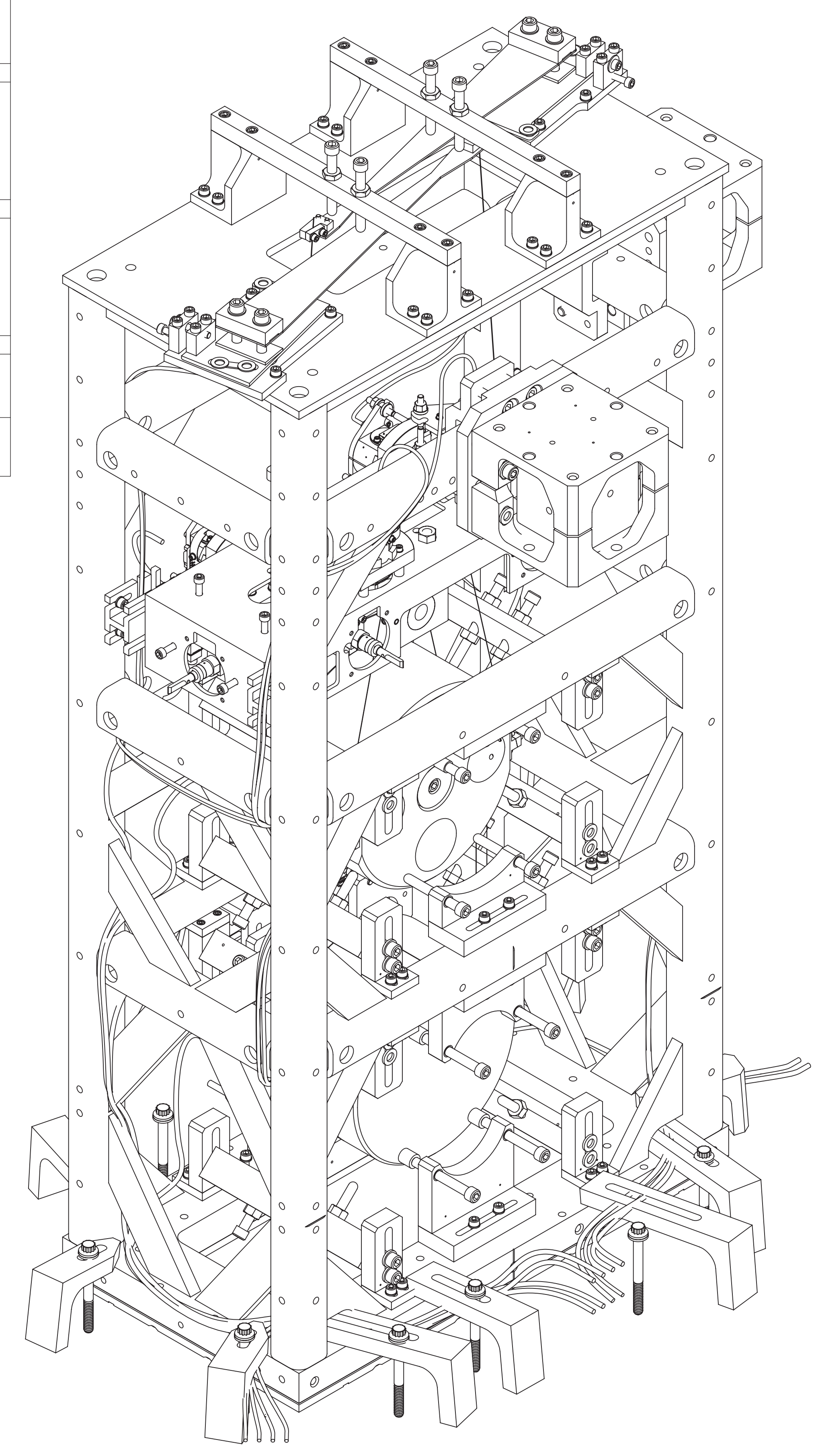
INSTALL CONFIGURATION (i.e.: IN CHAMBER - DOORS CLOSED)

TABLE 1: HAM2-L1 MC1 CABLING SPECIFICATIONS, FROM/TO DES.

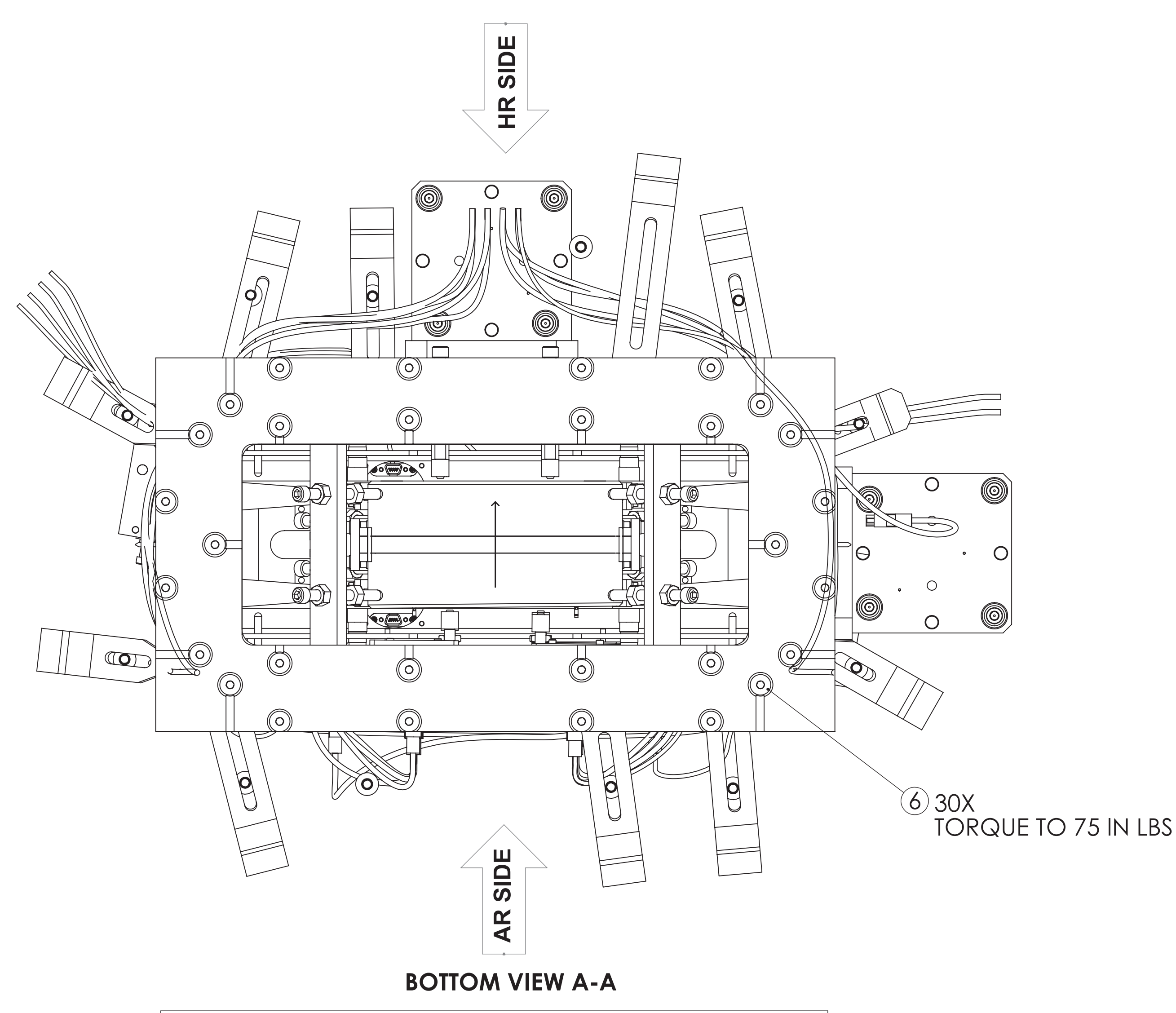
ROUTE NO.	FROM OSEM POSITION	TO CB FLOOR DES.	QP LEG DES.	CABLE PART NO.	NOM. CABLE LENGTH (IN)
1	M3-UL (S)	CB-3 (THIRD)	A	D1000234	60
	M3-LL (N)		B		
	M3-UR (N)		C		
	M3-LR (S)		D		
2	M2-UL (S)	CB-3 (SECOND)	A	D1000234	60
	M2-LL (N)		B		
	M2-UR (N)		C		
	M2-LR (S)		D		
3	M1-T1 (S)	CB-3 (FIRST)	A	D1000234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

NOTE : ROUTE NO. 4 IS A SHARED CABLE, SEE D0900414 FOR QP LEGS 'C' AND 'D' ROUTING

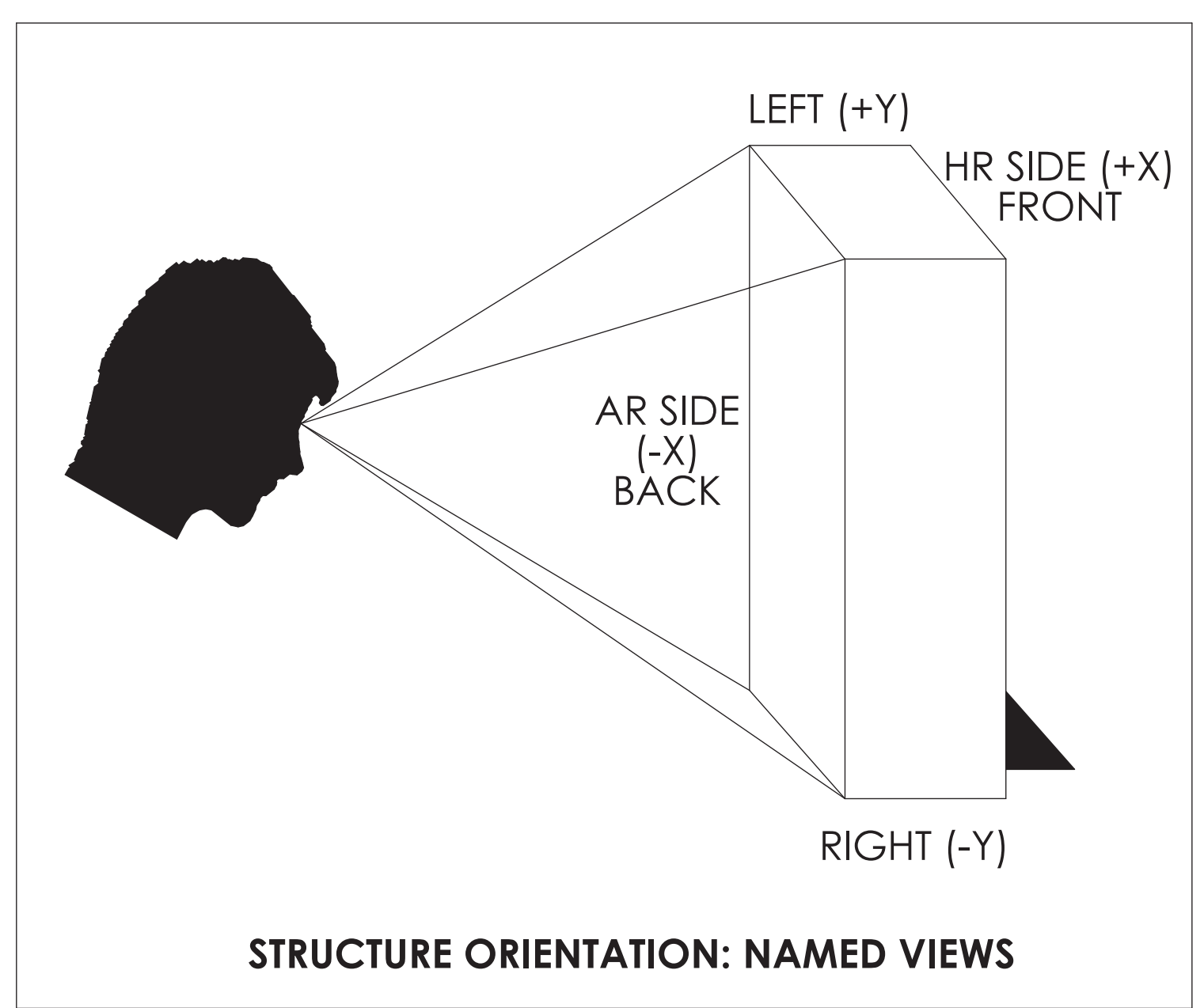
REV.	DATE	DCN #	DRAWING TREE #
v1	17 AUG 2011	-	-
v5	23 MAY 2012	-	-
v6	30 OCT 2012	E1200960-x0	-



ISO VIEW



BOTTOM VIEW A-A

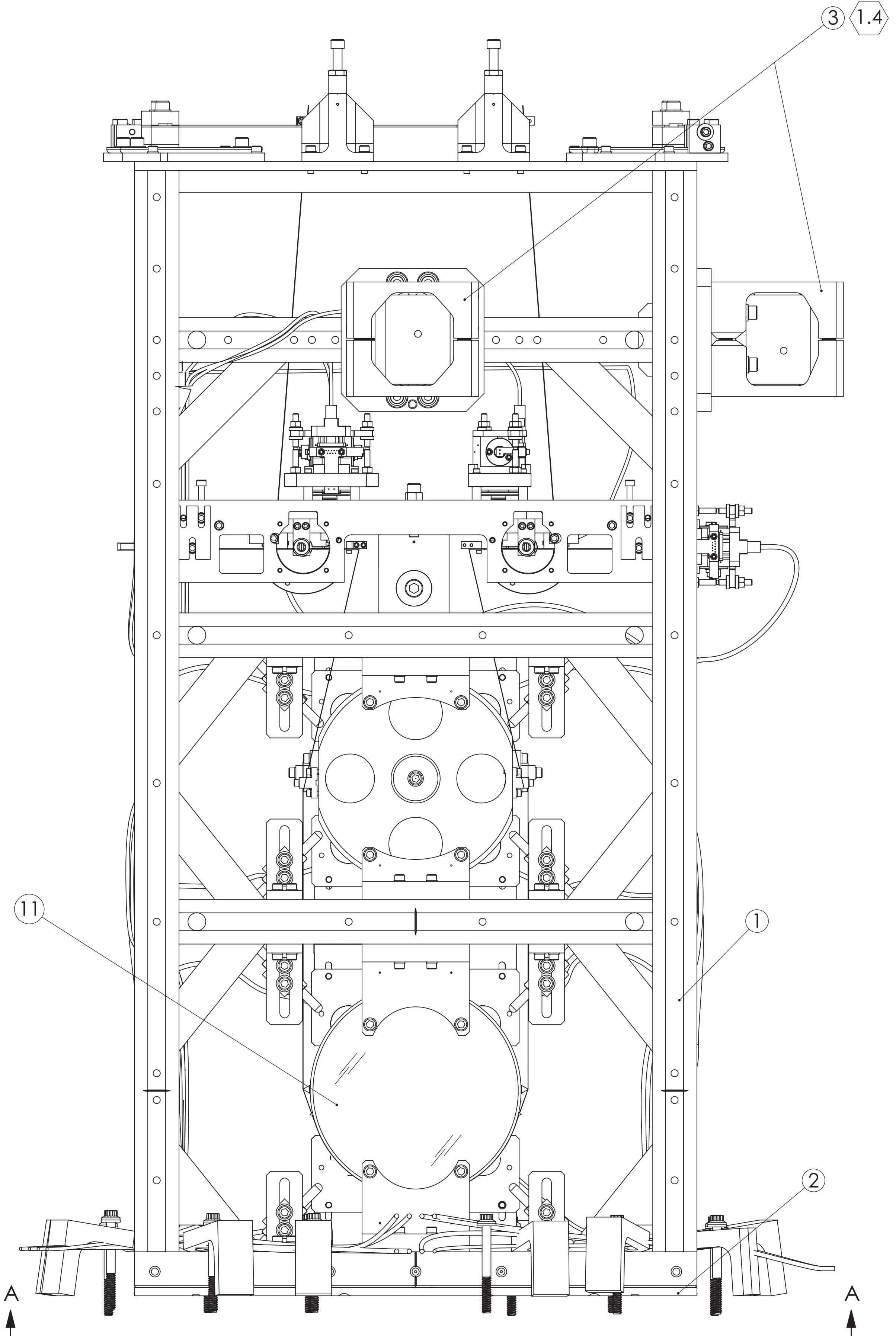


STRUCTURE ORIENTATION: NAMED VIEWS

LOCAL COORDINATES - REFERENCE

Xmm	Ymm	Zmm	YAW °
49.25	255	-107	134.35°

REFER TO DRAWING D1101233 FOR HAM2-L1 INSTALLATION PLATE, LAYOUT



HR SIDE - FRONT

ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	QTY.
12	D1201157	ALIGO, SUS, DOG CLAMP CHAMFERED ENDS (CUSTOM)	304 SSSL	1
11	D1101365	MC1 L1 OPTICS ASSEMBLY	N/A	1
10	D1001376-12	AdvLIGO HAM Optics Table Dog Clamp 1.60L	304 SSSL	1
9	D1001376-11	AdvLIGO HAM Optics Table Dog Clamp 1.60M	304 SSSL	2
8	D1100641-12	AdvLIGO HAM Optics Table Dog Clamp Chamfered End 1.60L	304 SSSL	4
7	D1100641-10	AdvLIGO HAM Optics Table Dog Clamp Chamfered End 1.60S	304 SSSL	3
6	FA-2016-NA	.25-20 X 1 FHSC SCREW UC COMPONENTS FA-2016-NA	18-8 SSSL	30
5	D1100785-530	WASHER, FLAT, .25 X .530 O.D.	NITRONIC 60	12
4	2A12.50-12SL	1/4-20 X 2.50 12PT BOLT	450 SSSL	12
3	D1002424	VIBRATION ABSORBER ASSEMBLY	N/A	2
2	D1100173	HSTS SUS STRUCTURE SPACER 5.71 MM	6061-T6 Al	1
1	D020700	HSTS OVERALL ASSEMBLY	N/A	1

NOTES AND TOLERANCES: (UNLESS OTHERWISE SPECIFIED)

LIGO CALIFORNIA INSTITUTE OF TECHNOLOGY MASSACHUSETTS INSTITUTE OF TECHNOLOGY

SYSTEM: ADVANCED LIGO SUB-SYSTEM: SUS

PART NAME: HAM2-L1, XYZ Local CS for HSTS (MC1) Sub-Assy

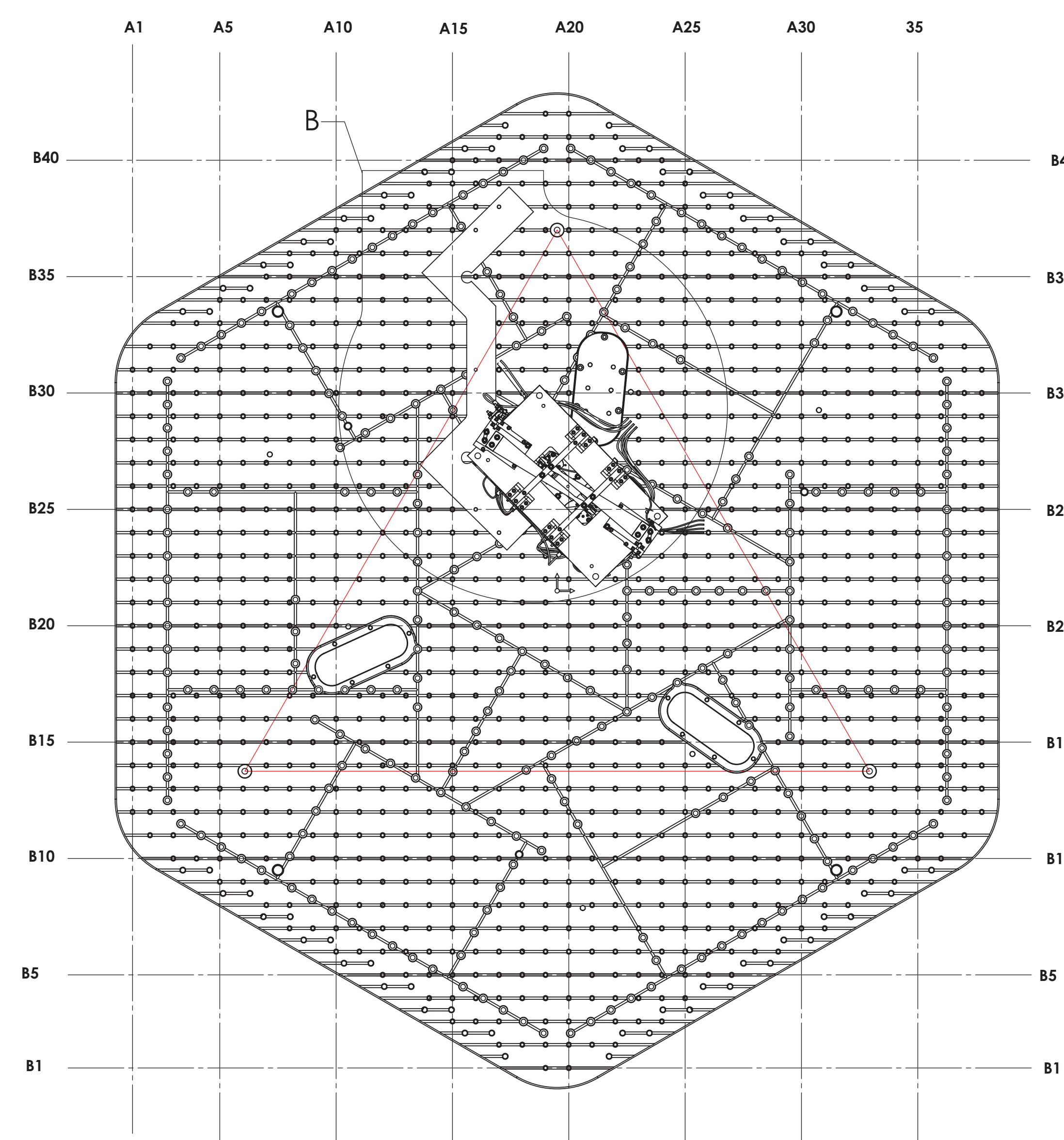
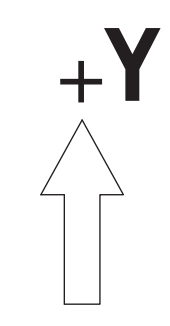
DESIGNER: K. BUCKLAND DATE: 17 AUG 2011 SIZE: DWG. NO. E D0900413 REV. v6

DRAFTER: SEE DCC CHECKER: SEE DCC APPROVAL: SEE DCC

MATERIAL: -- FINISH: -- TOLERANCE: .001 INCH

SCALE: 1:2 PROJECTION: SHEET 1 OF 10

MC1

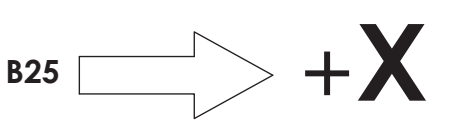


TOP VIEW (1.6)
REF. TRIANGLE: SEE G1000125
FOR ISI NAMING AND ORIENTATION CONVENTION

ATTACH AT SCREW LOCATION A16/B37

ATTACH SCREW AT LOCATION A17/B38

ATTACH AT SCREW LOCATION A16/B31



B35

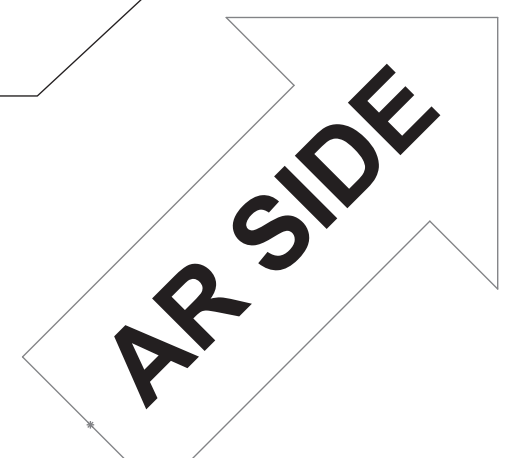
D1000140 IO L1 MC1 MC3 INSTALLATION PLATE

B30

B25

ATTACH AT SCREW LOCATION A16/B25

ATTACH SCREW AT LOCATION A17/B24



A15

A20

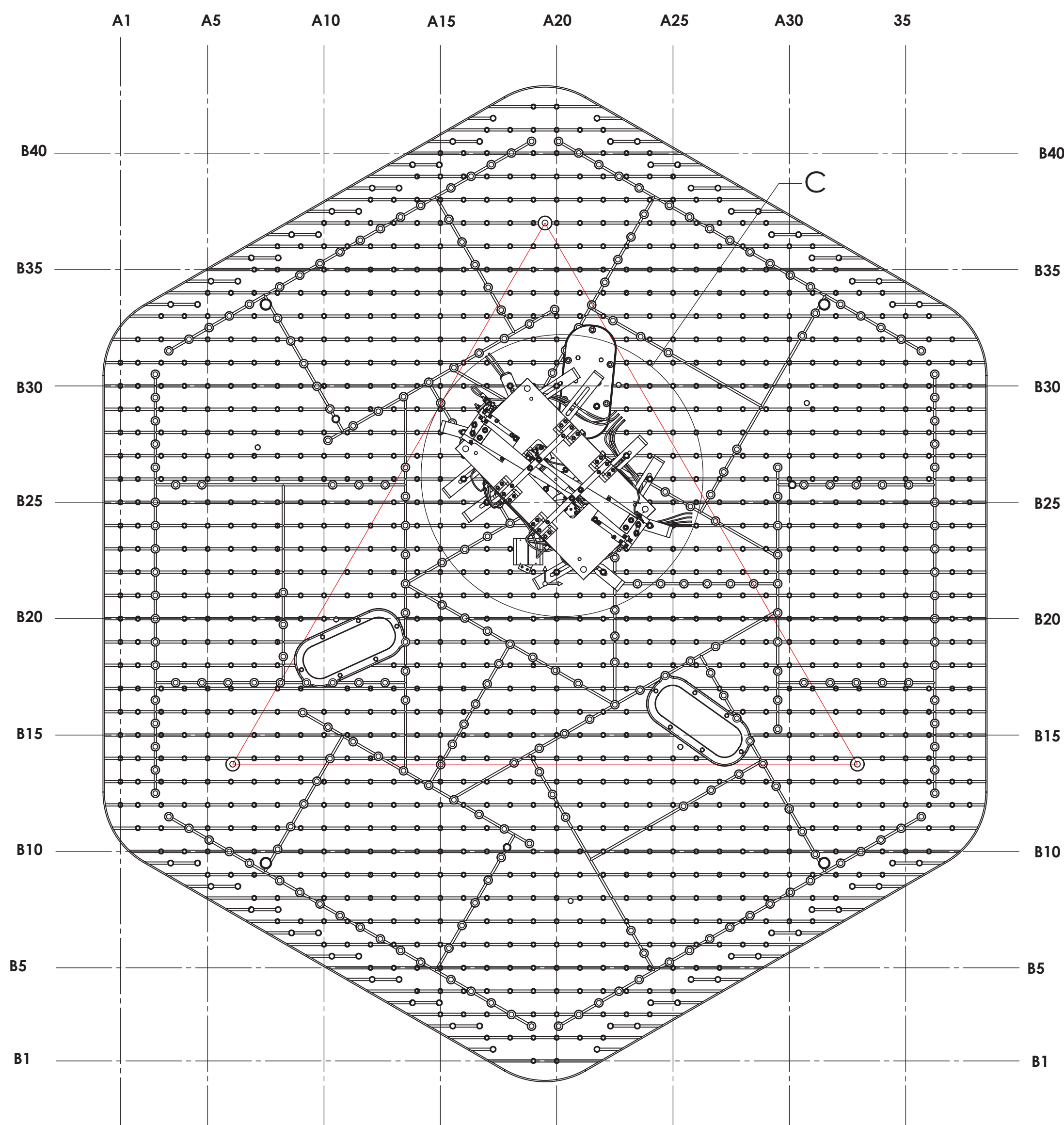
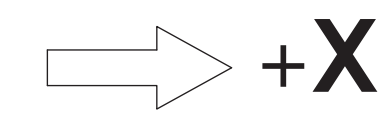
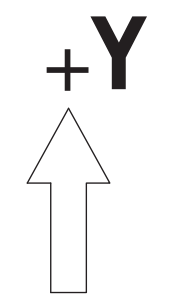
A25

DETAIL B
SCALE 1 : 1.5

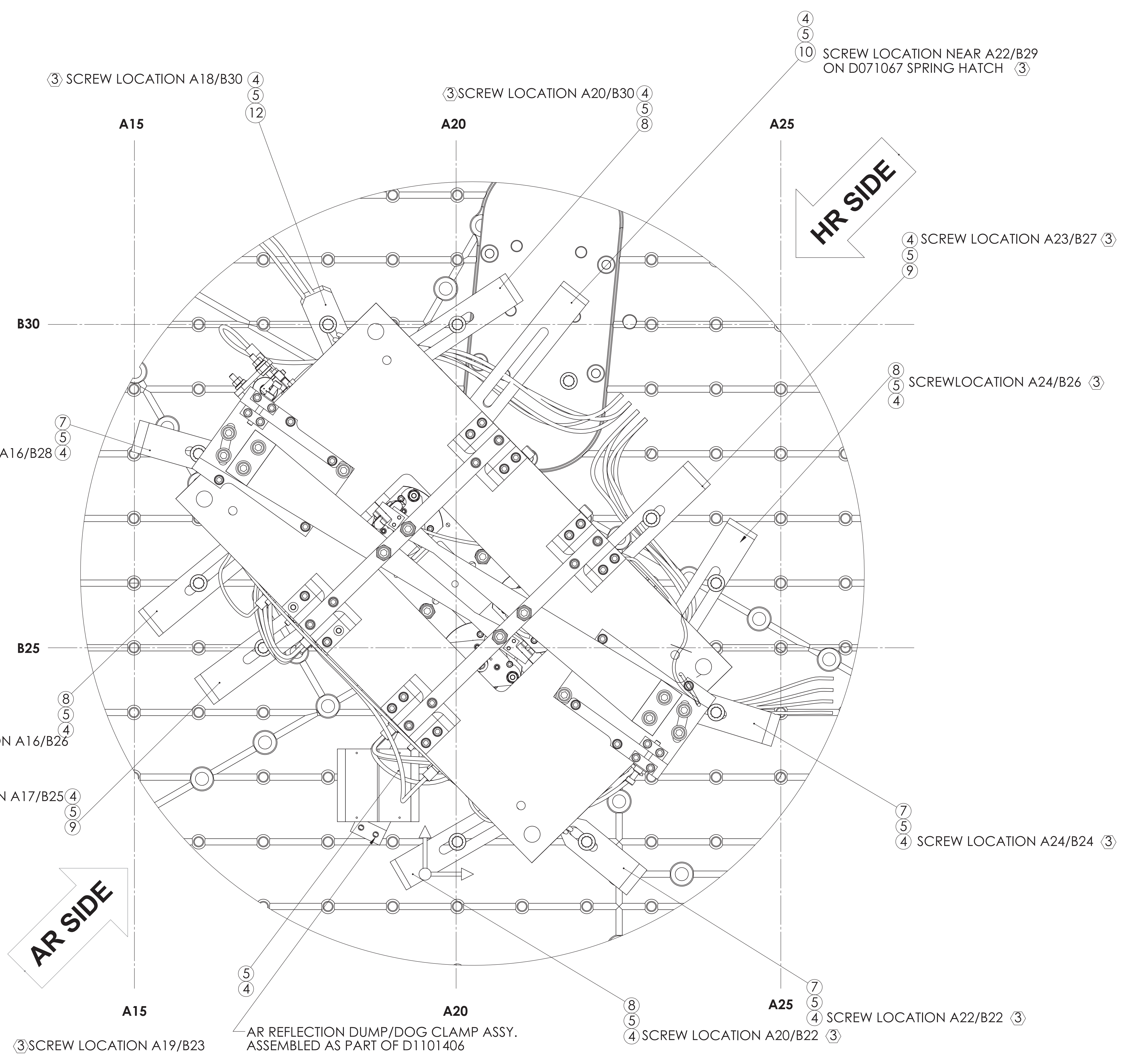
TOP VIEW SHOWING INSTALLATION PLATE LOCATION (1.6)
OPTICAL TABLE SHOWN FOR STRUCTURE LOCATION AND ORIENTATION
DOG CLAMPS VIBRATION ABSORBERS AND HARDWARE REMOVED FOR CLARITY

ALIGNMENT PLATE INSTALLATION / LOCATION

MC1



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



DETAIL C
SCALE 1 : 1.5
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.
12	D1201157	ALIGO, SUS, DOG CLAMP CHAMFERED ENDS (CUSTOM)	304 SSSL	1
10	D1001376-12	AdvLIGO HAM Optics Table Dog Clamp 1.60L	304 SSSL	1
9	D1001376-11	AdvLIGO HAM Optics Table Dog Clamp 1.60M	304 SSSL	2
8	D1100641-12	AdvLIGO HAM Optics Table Dog Clamp Chamfered End 1.60L	304 SSSL	4
7	D1100641-10	AdvLIGO HAM Optics Table Dog Clamp Chamfered End 1.60S	304 SSSL	3
5	D1100785-530	WASHER, FLAT, .25 X .530 O.D.	NITRONIC 60	12
4	2AL2.50-12SL	1/4-20 X 2.50 12PT BOLT	450 SSSL	12

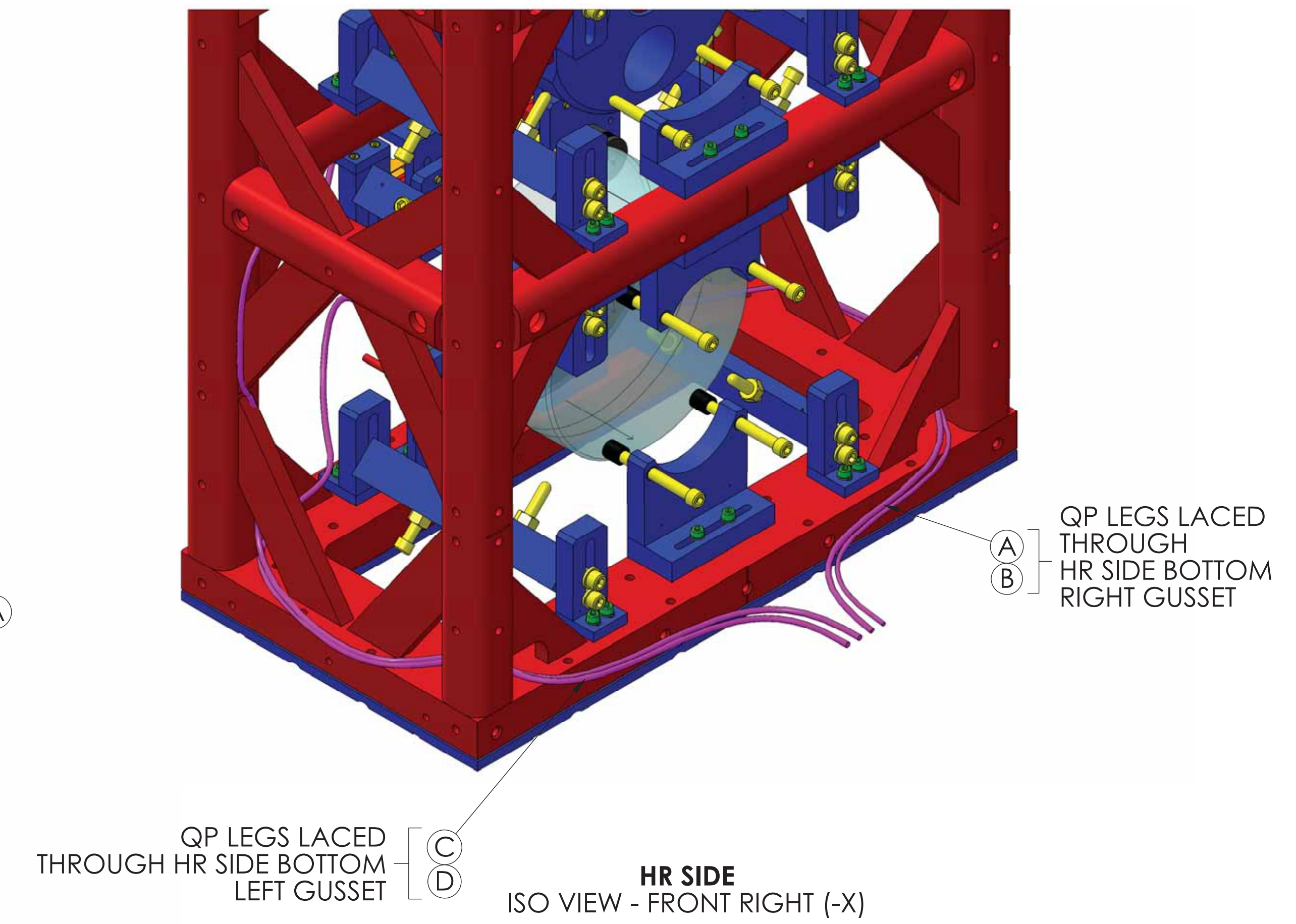
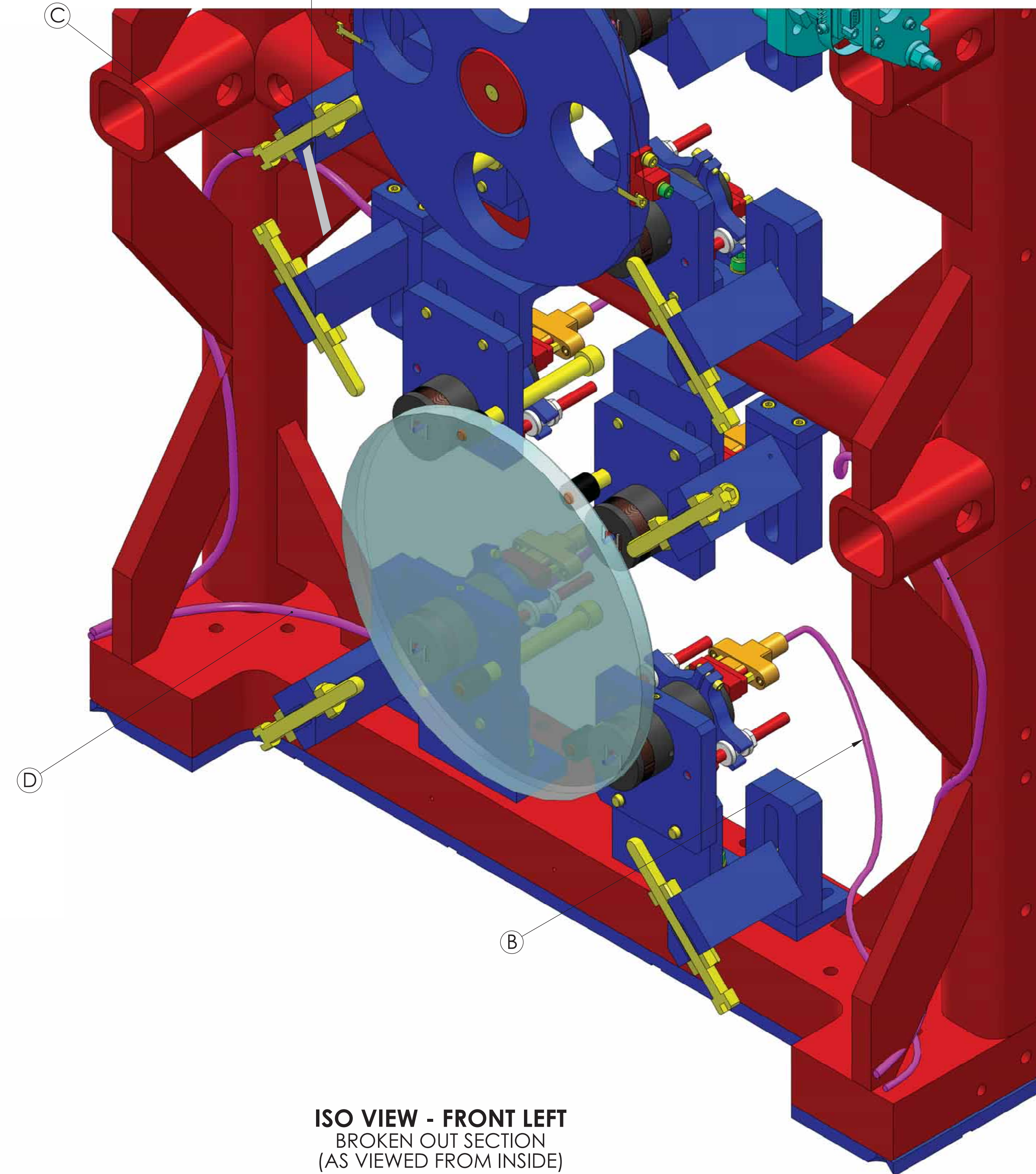
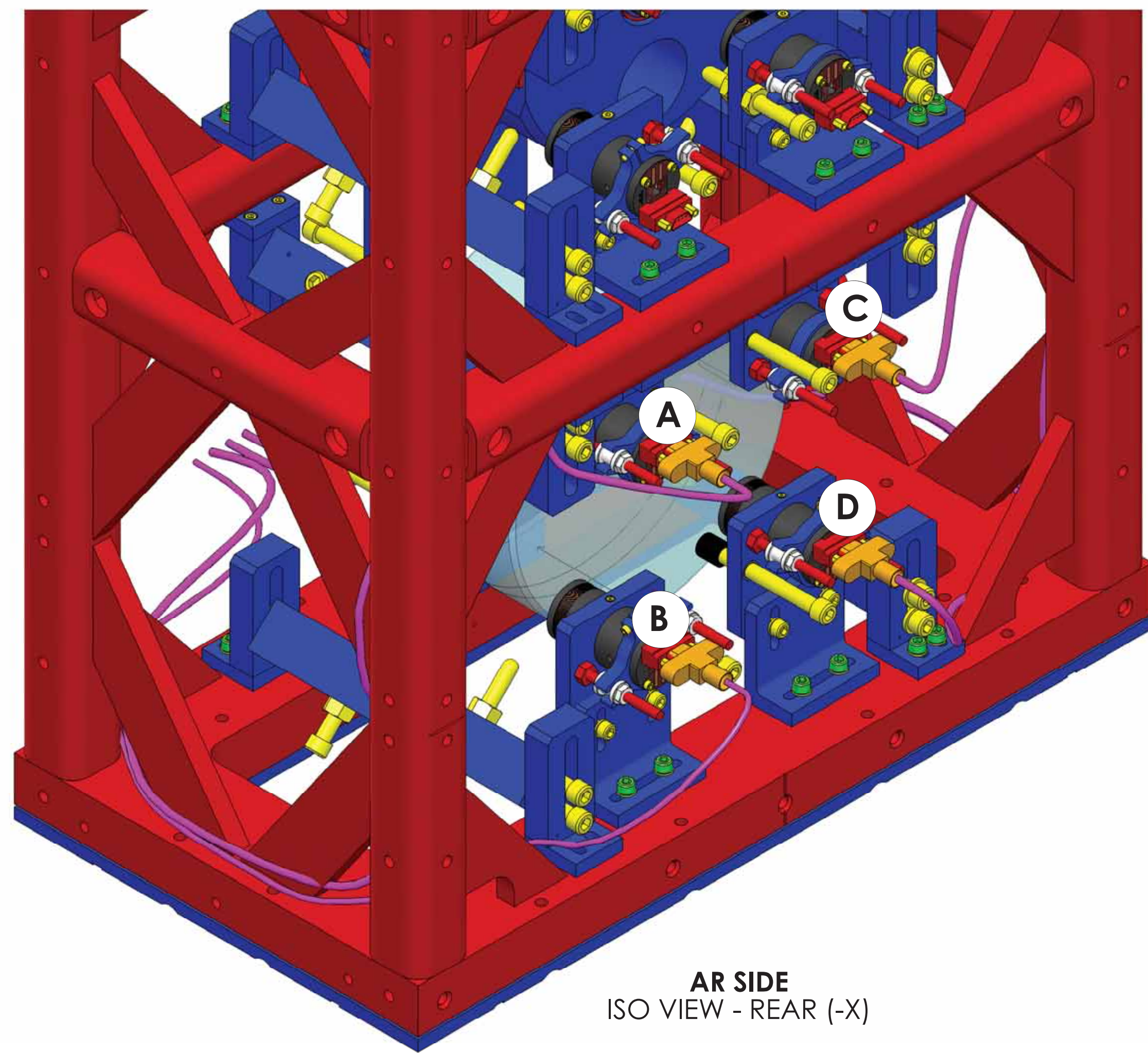
DOG CLAMP IDENTIFICATION / INSTALLATION

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

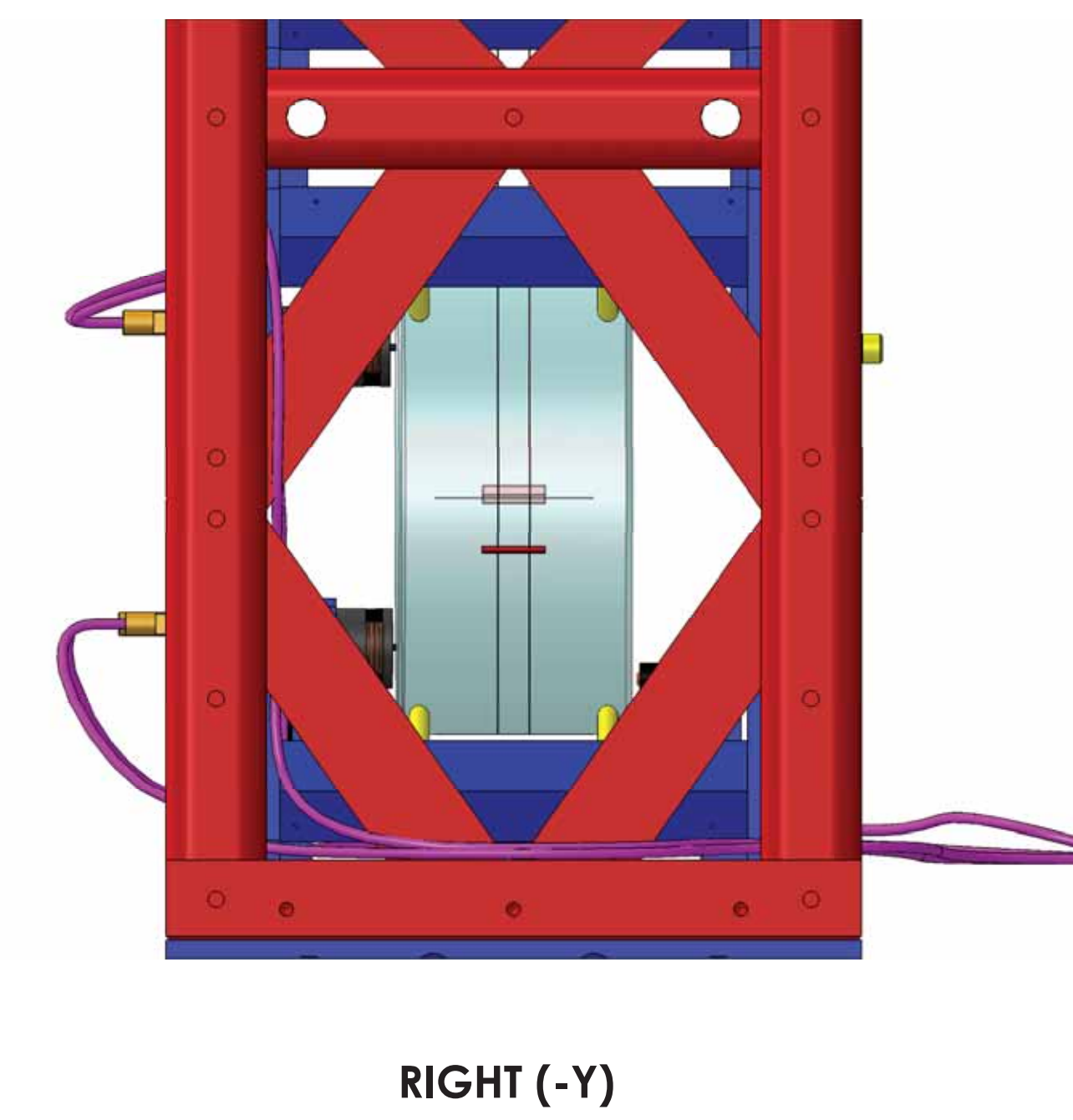
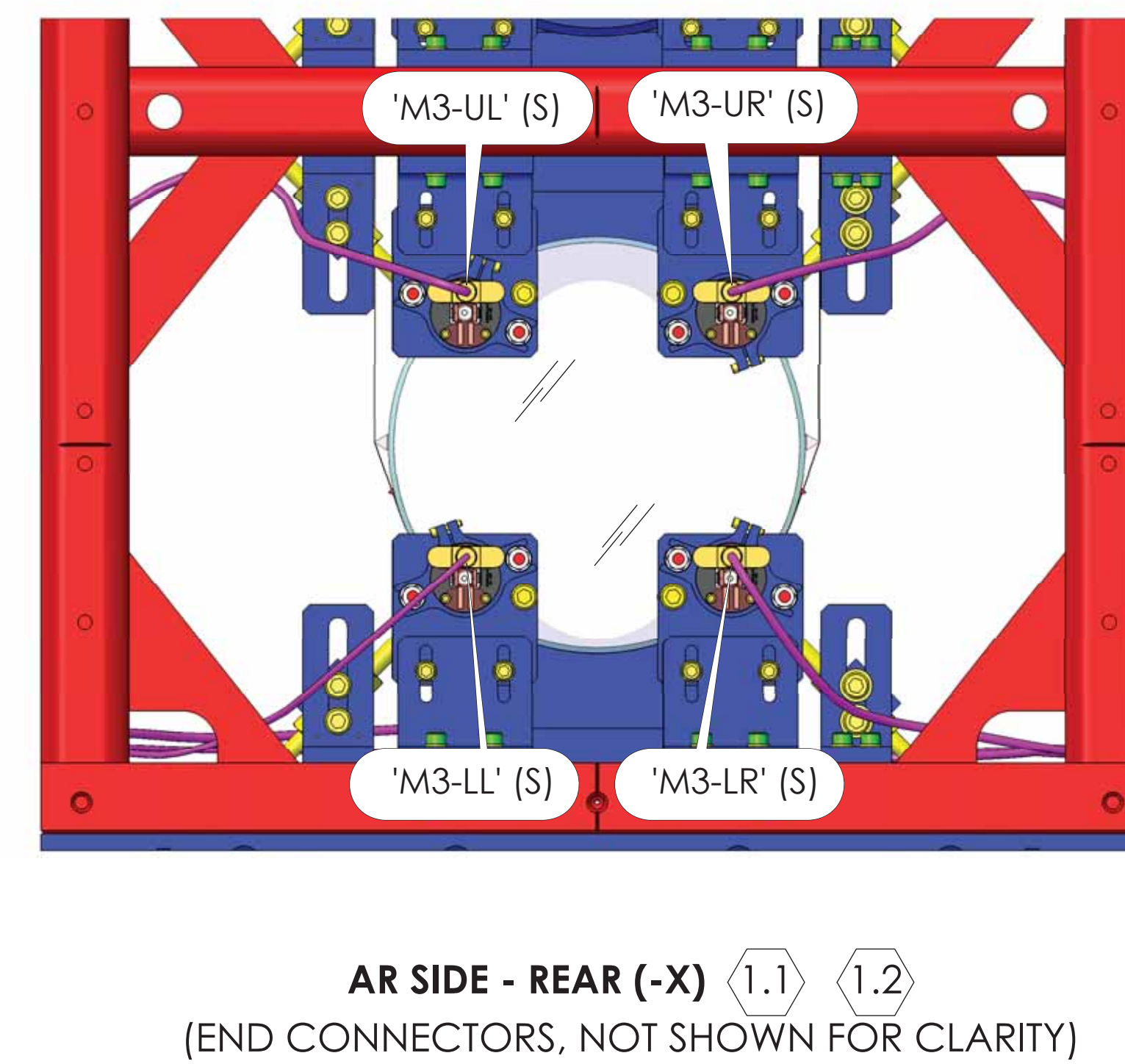
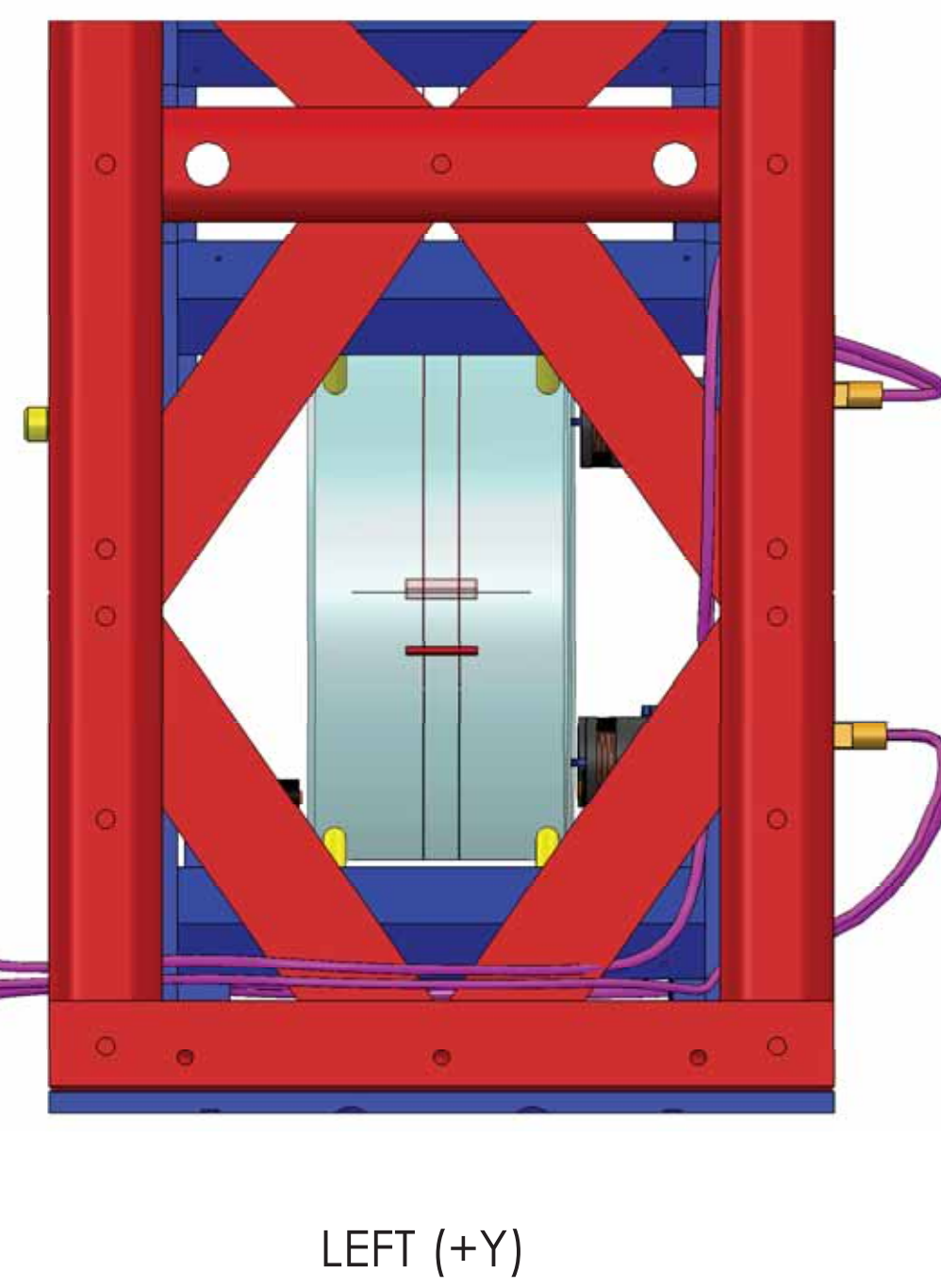
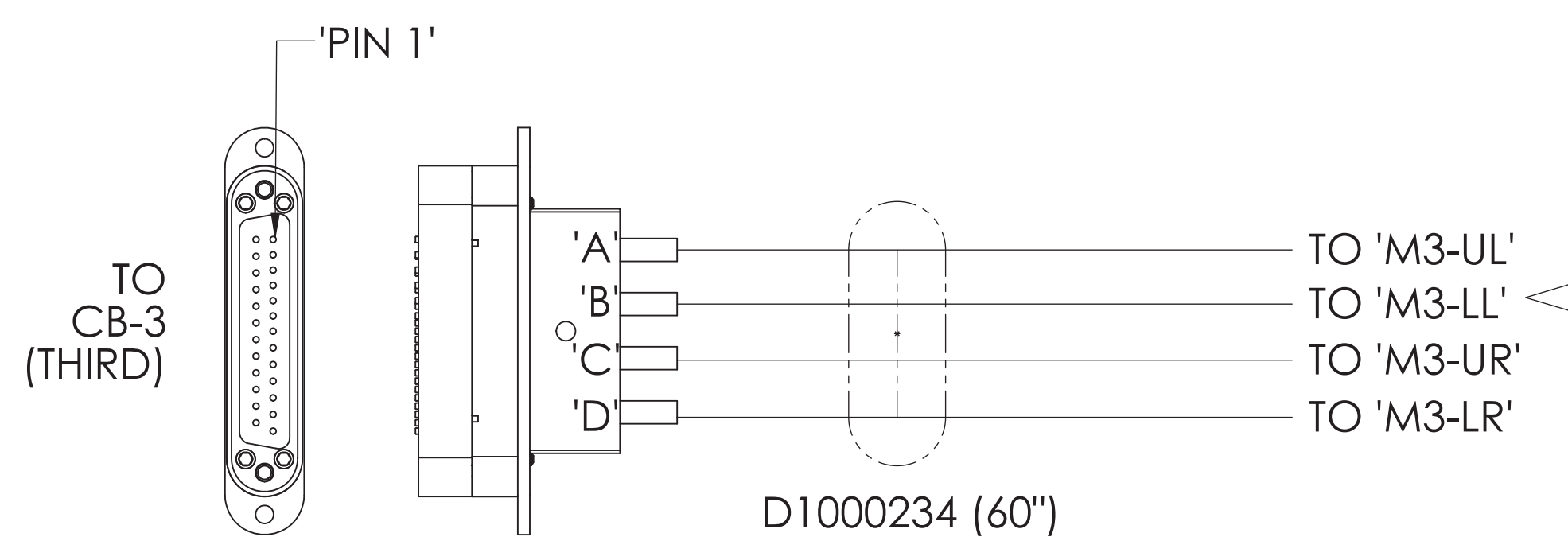
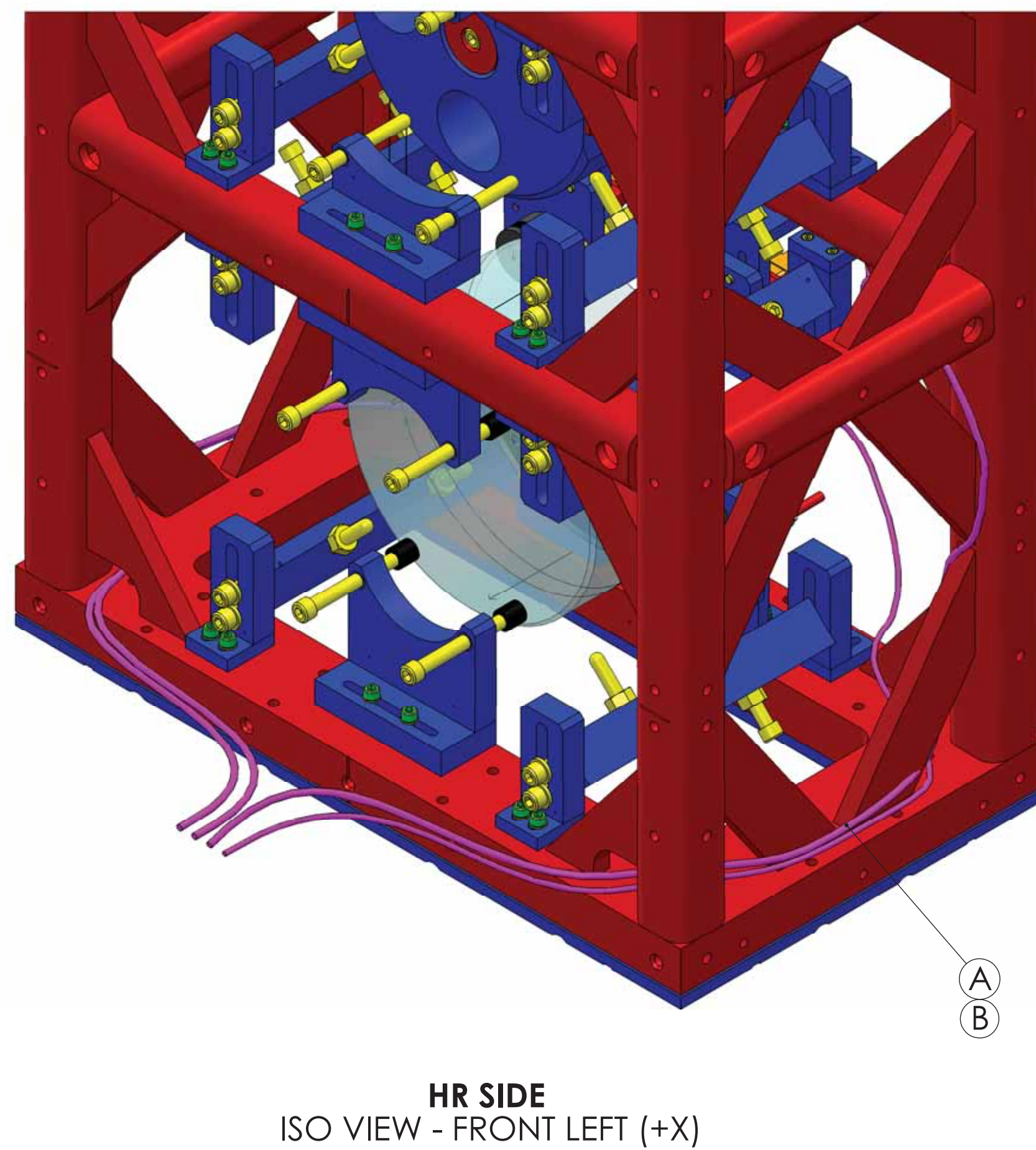
CALIFORNIA INSTITUTE OF TECHNOLOGY
 MASSACHUSETTS INSTITUTE OF TECHNOLOGY
 SIZE DWG. NO. **D0900413** REV. **v6**
 SCALE: 1:8 PROJECTION: SHEET 3 OF 10

MC1

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



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.



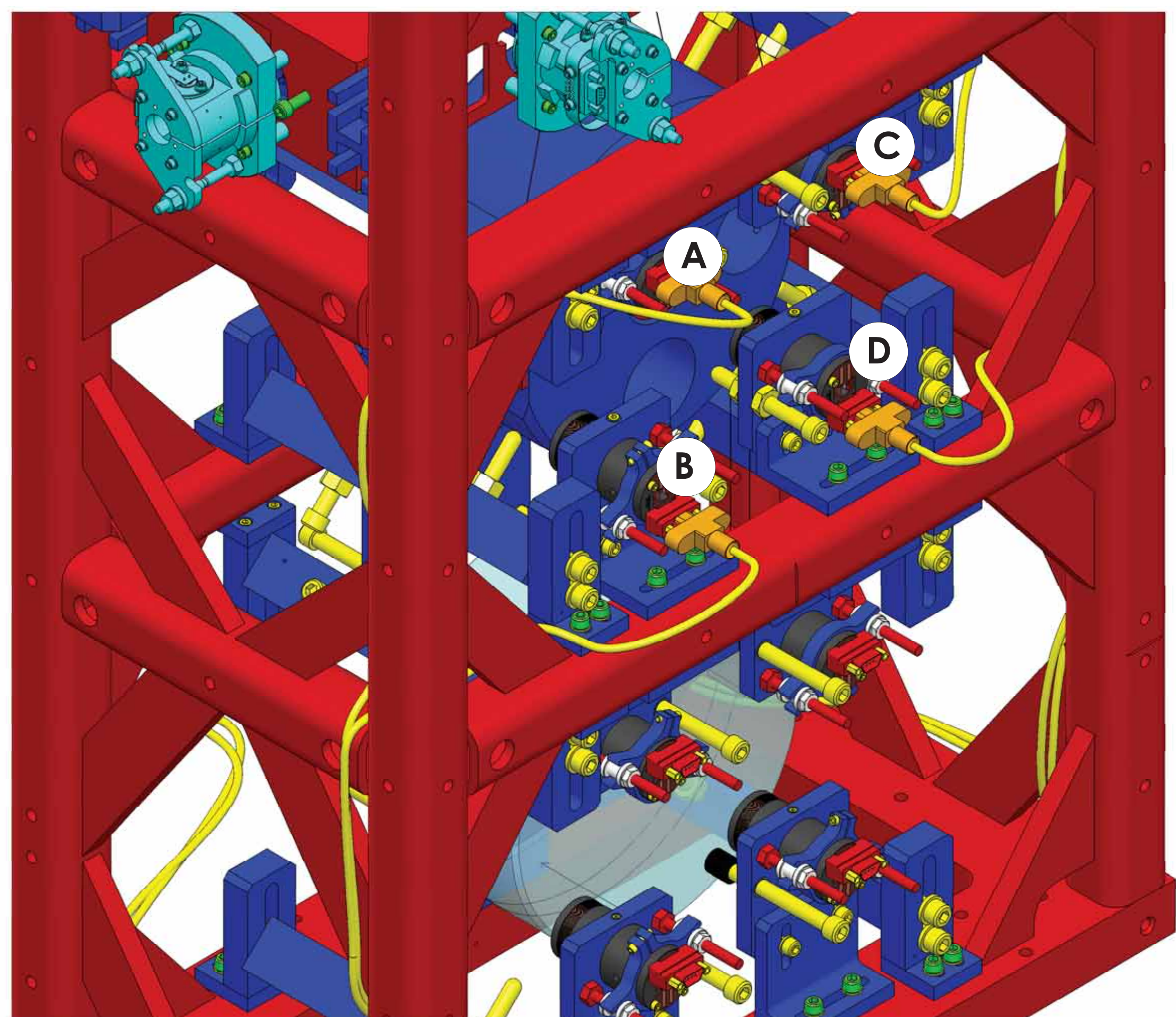
ROUTE NO.1

SEE LIGO-T1200318 FOR STEP BY STEP CABLING GUIDE

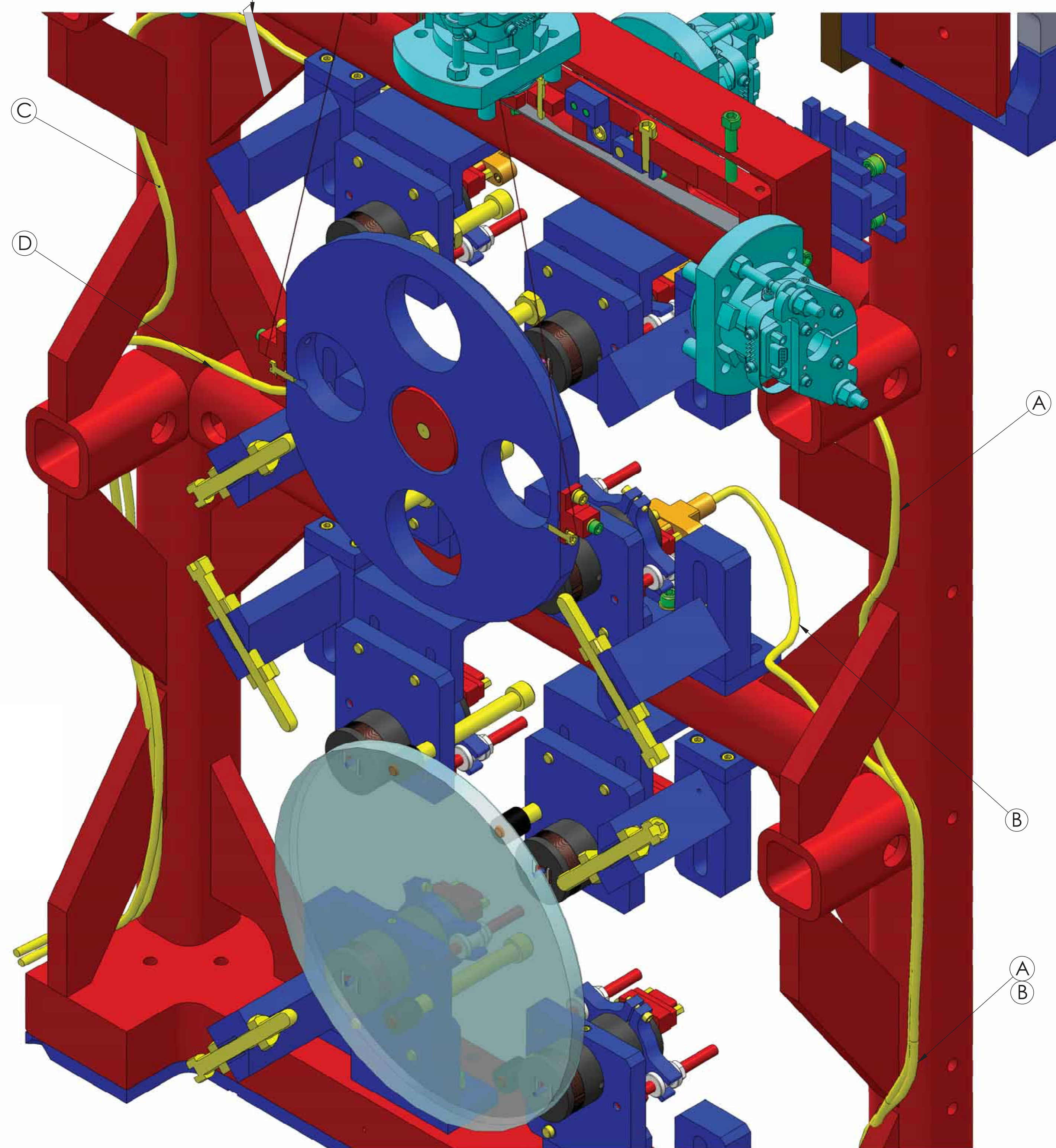
- ① REFERENCED DOCUMENTATION:
- LIGO-E1100109, HAM SUS CONTROL ARRANGEMENT.
 - LIGO-D1101493, OSEM ORIENTATION.
 - LIGO-D1000581, SYSTEM CABLING DIAGRAM.
 - LIGO-D1002424, VIBRATION ABSORBER ORIENTATION.
 - LIGO-E1100411, CABLE CLAMP TORQUE.
 - LIGO-D1101296, HAM ISI HOLE TABLE.

MC1

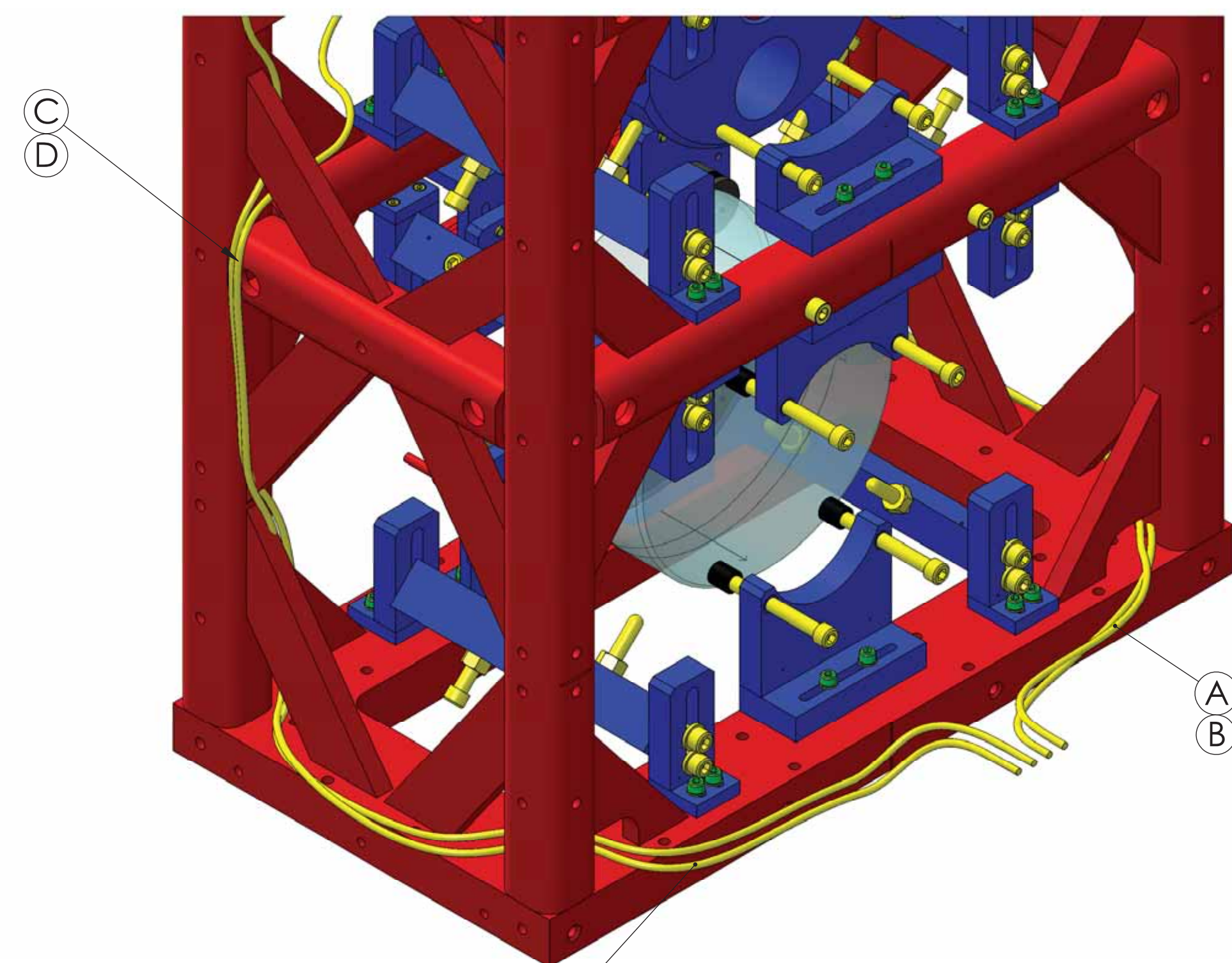
IF REQUIRED, SECURE CABLES USING PEEK CABLE TIES OR EQ. 4 PLACES.



AR SIDE
ISO VIEW - REAR (-X)



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



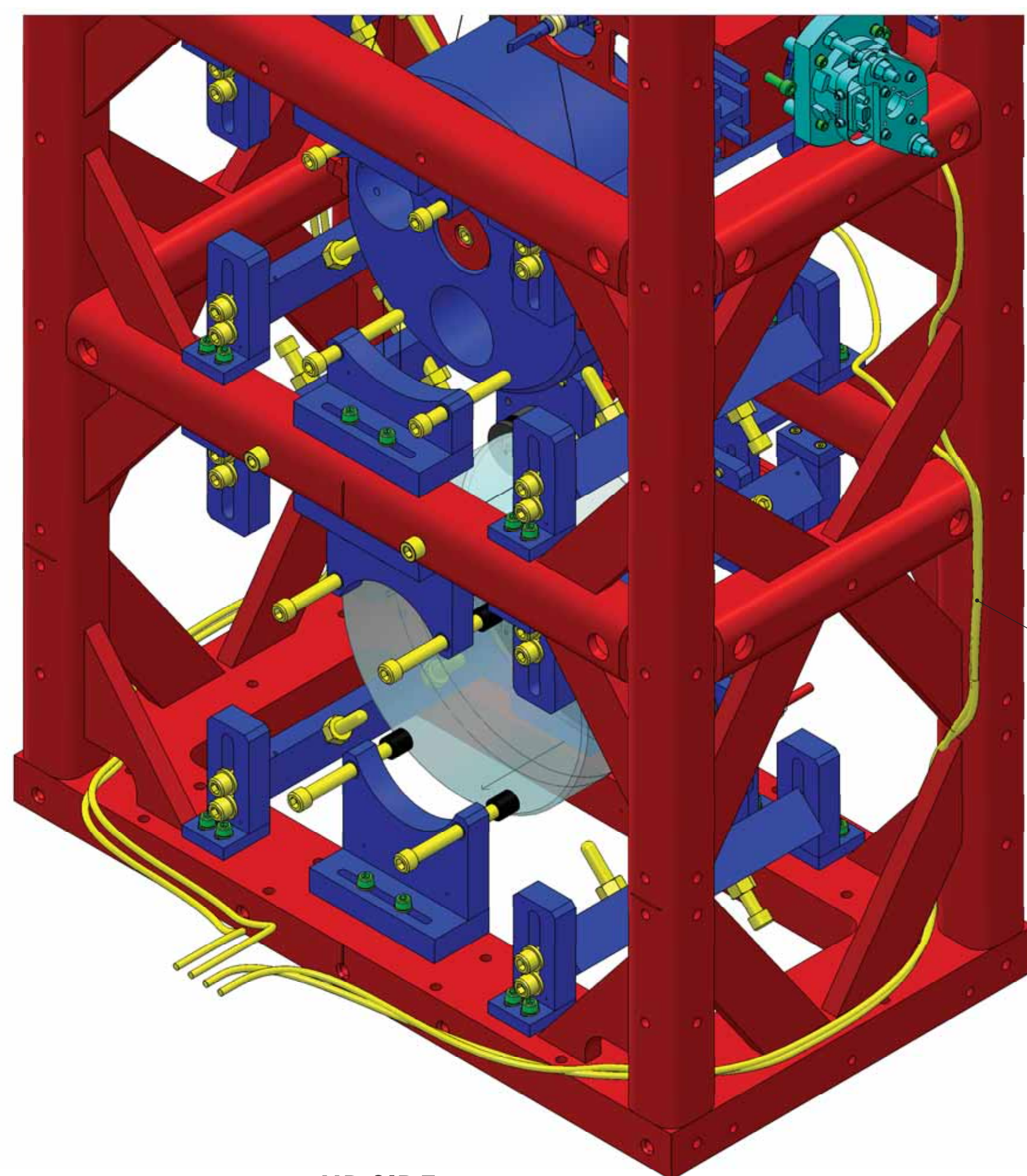
HR SIDE
ISO VIEW - FRONT RIGHT (-X)

QP LEGS LACED THROUGH HR SIDE BOTTOM RIGHT GUSSET

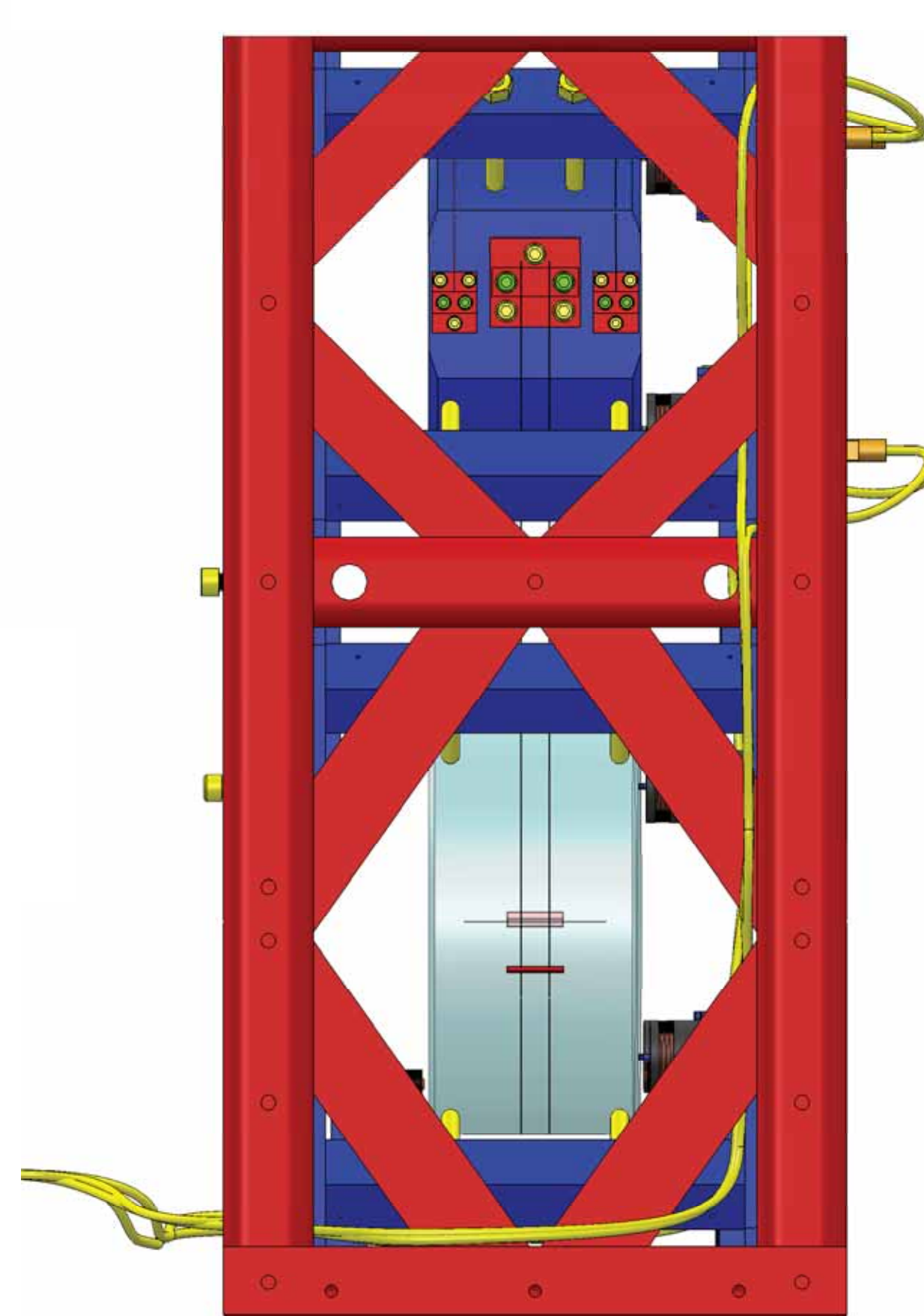
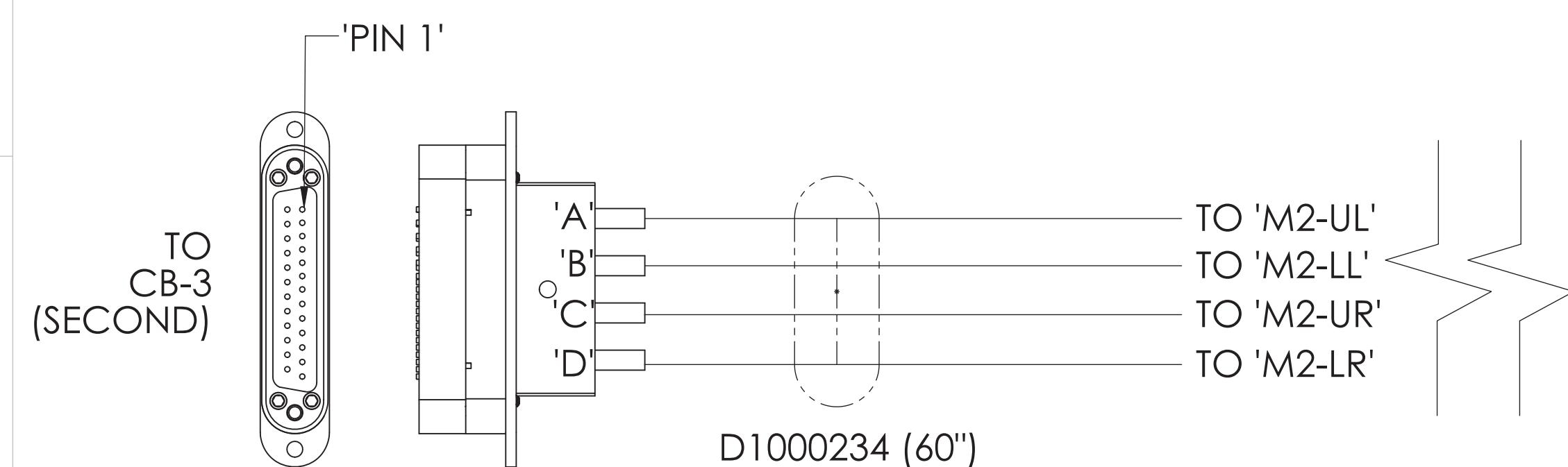


WARNING

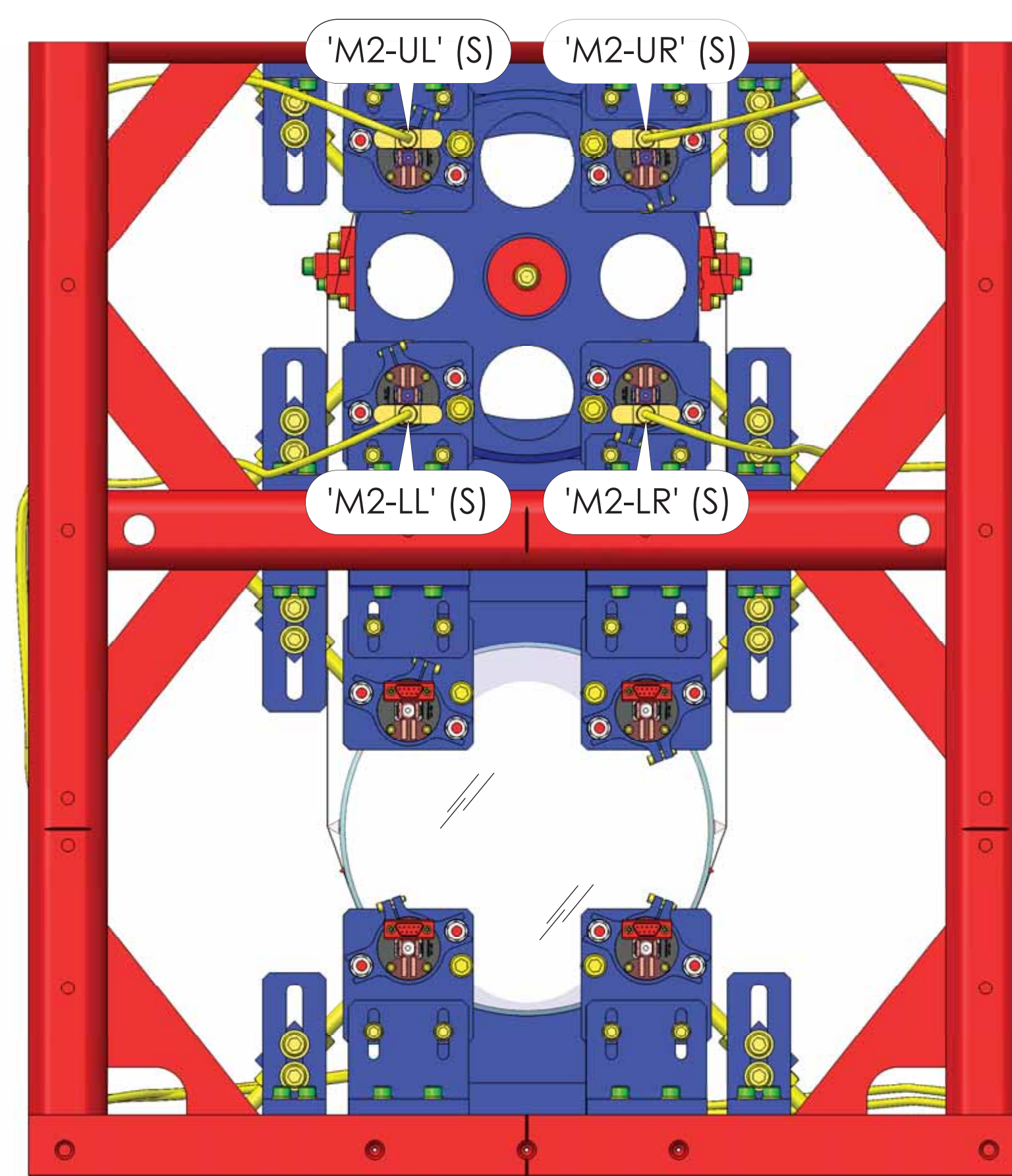
CABLE ROUTING:
ROUTE ALL CABLES IN ACCORDANCE WITH LIGO-T1200203 AND T1200318. CABLE ROUTES DEPICTED IN THIS DOCUMENT ARE NOT MANDATORY, BUT RATHER A CONSIDERED ROUTE AIMED TO CLEAR LASER BEAM PATHS. ALTERNATE ROUTES FOR PROBLEMATIC AREAS ARE ACCEPTABLE, BUT SHOULD BE HANDLED IN A CASE BY CASE SITUATION. 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.



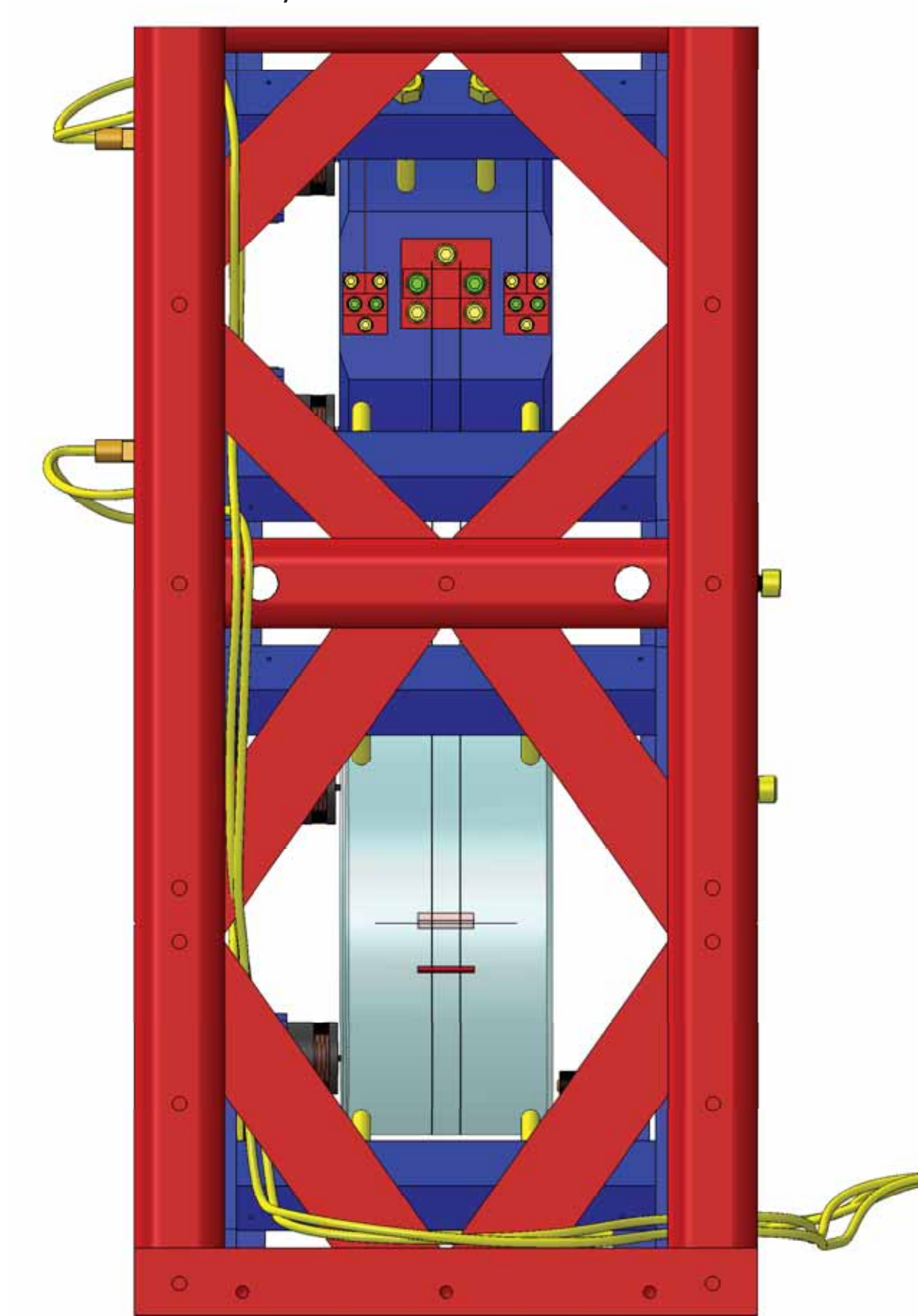
HR SIDE
ISO VIEW - FRONT LEFT (+X)



LEFT (+Y)



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



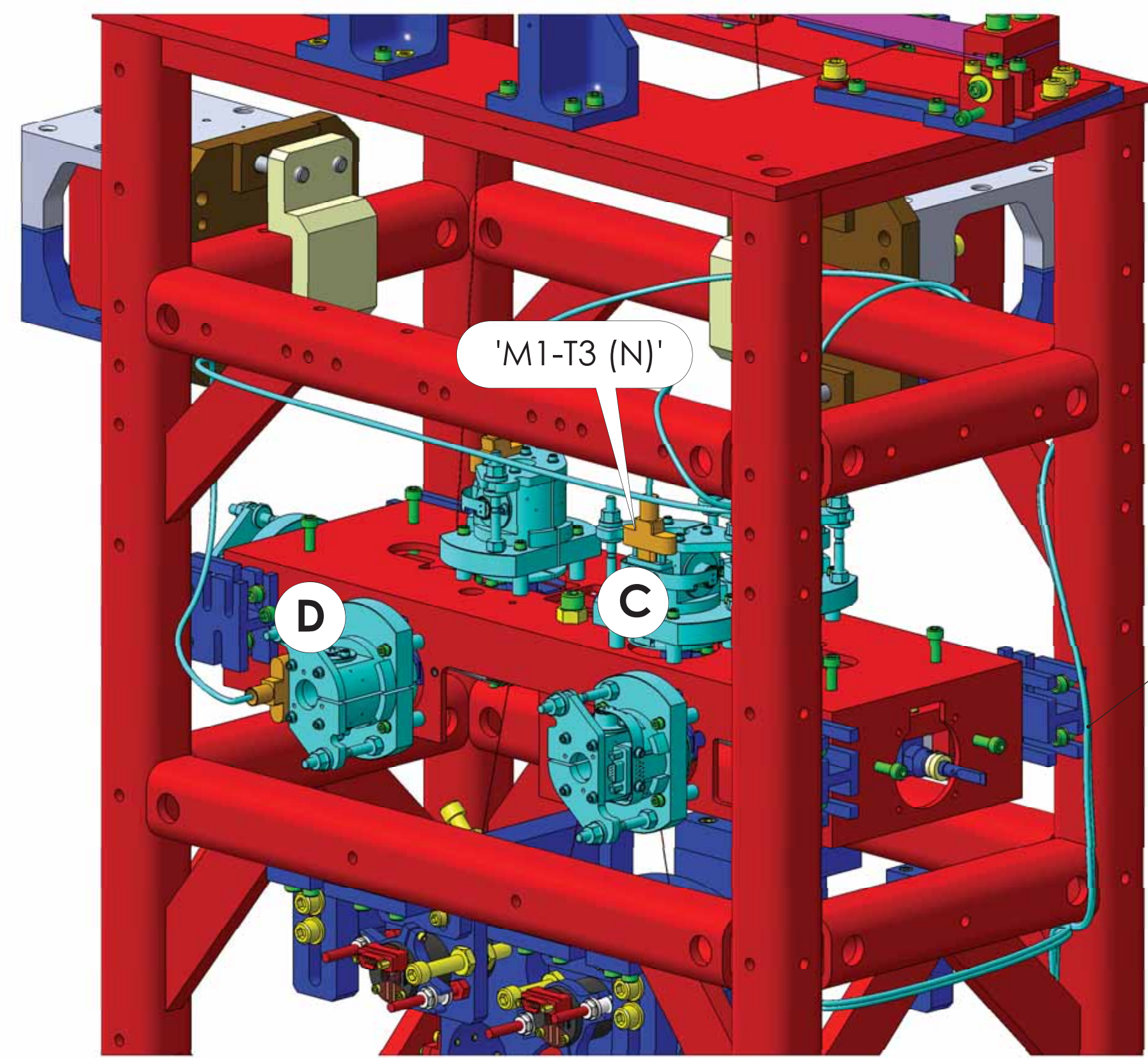
RIGHT (-Y)

ROUTE NO.2

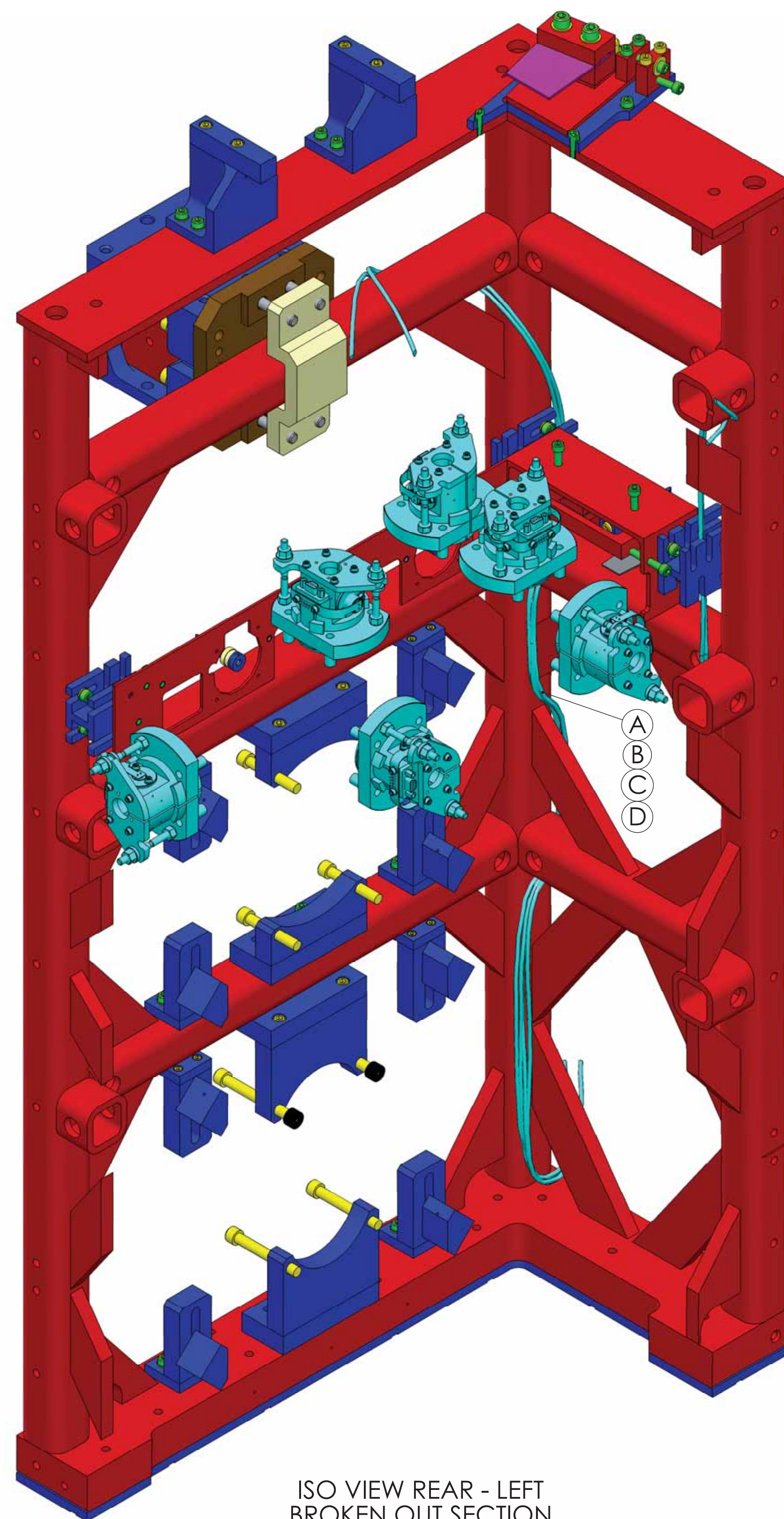
SEE LIGO T1200318
FOR STEP BY STEP CABLING GUIDE

- 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.

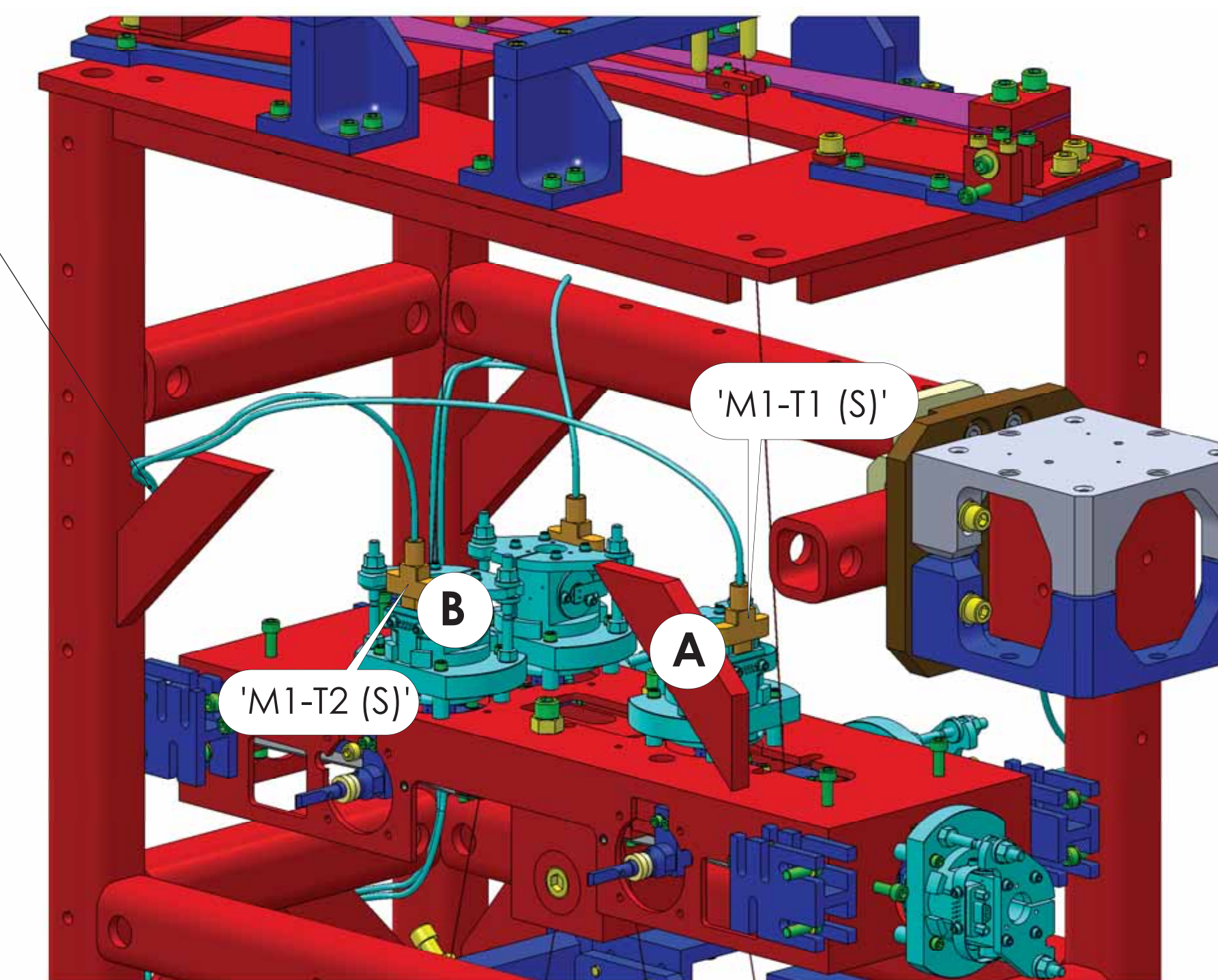
MC1



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

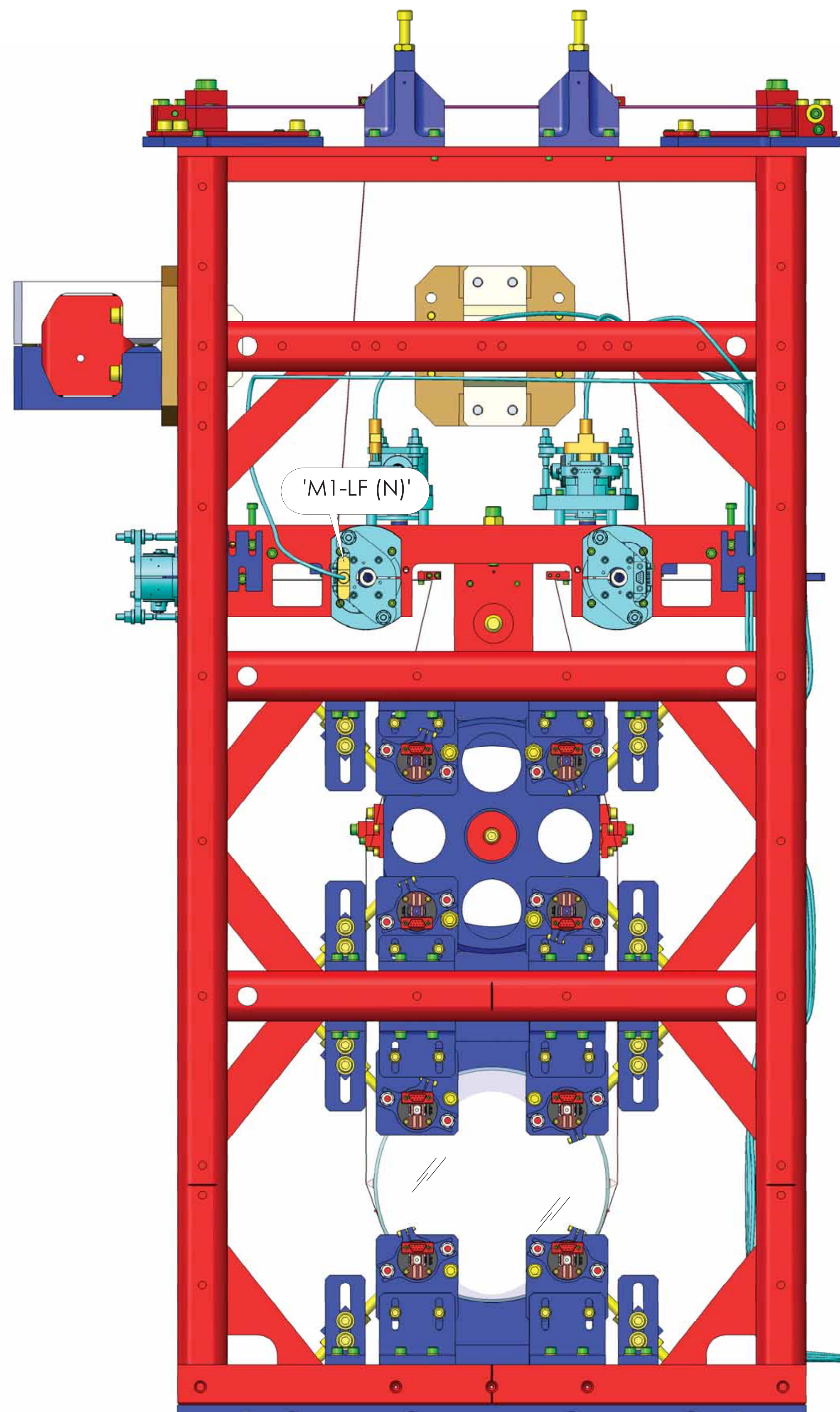


ISO VIEW REAR - LEFT
BROKEN OUT SECTION
(AS VIEWED FROM INSIDE)

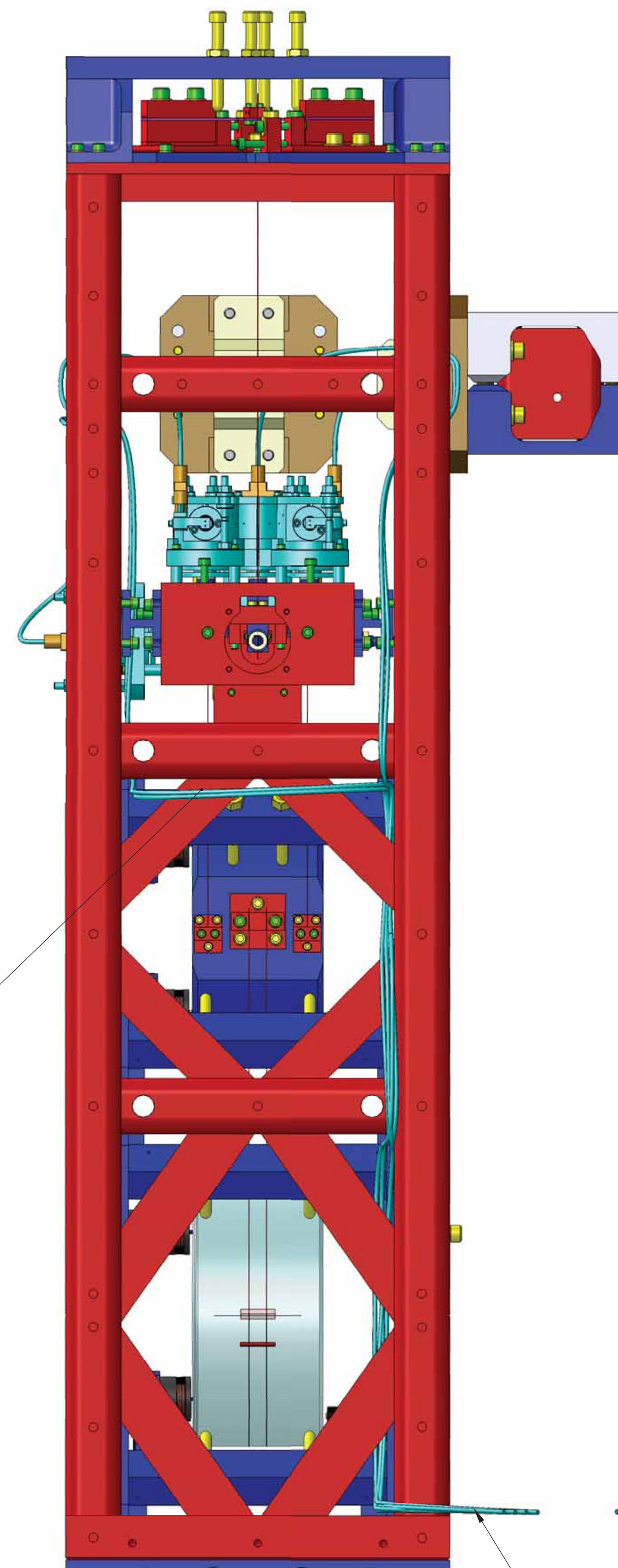


HR SIDE (1.1) (1.2)
ISO VIEW, FRONT - RIGHT (+X)

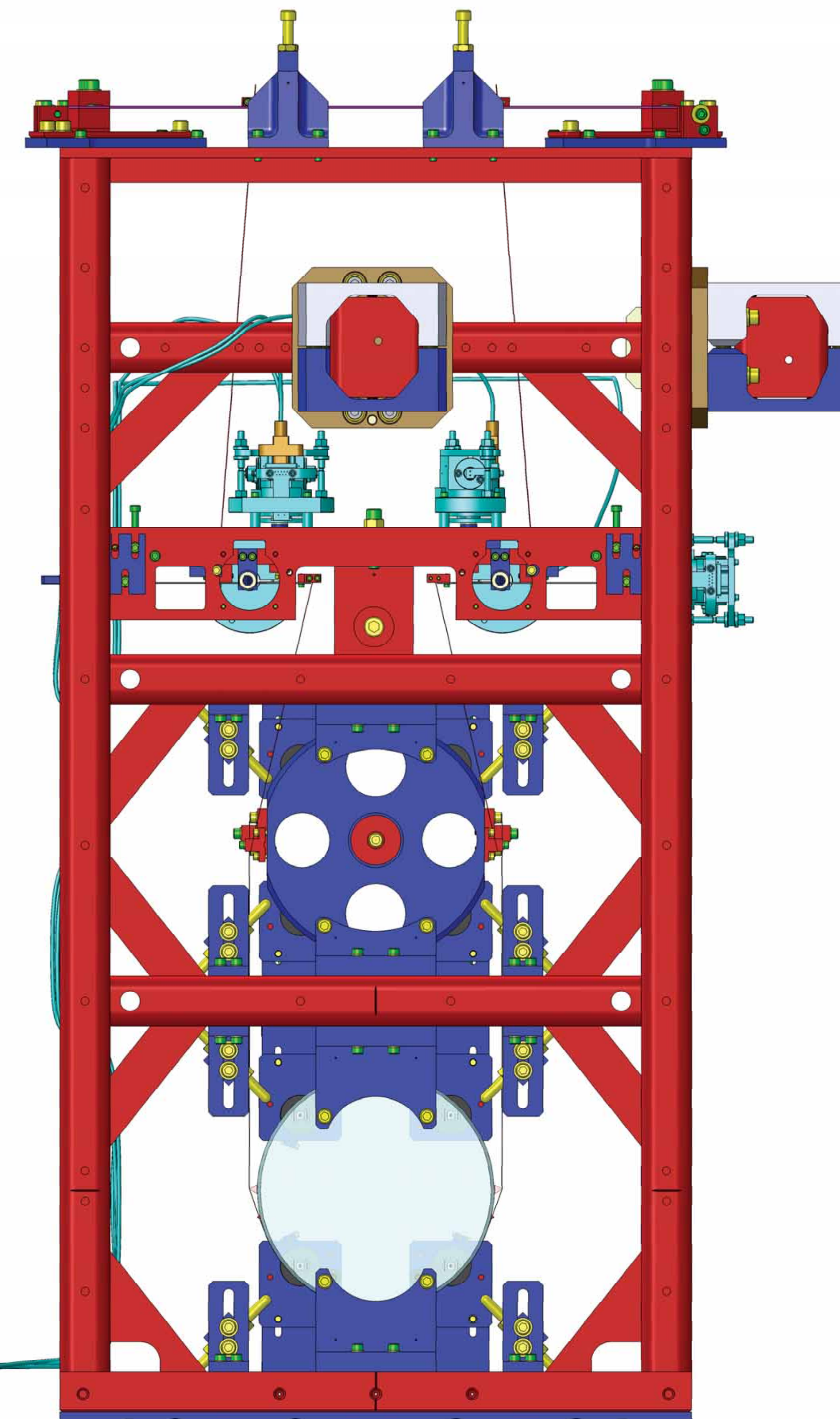
IF REQUIRED,
SECURE CABLES
USING PEEK CABLE TIES
OR EQ.



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



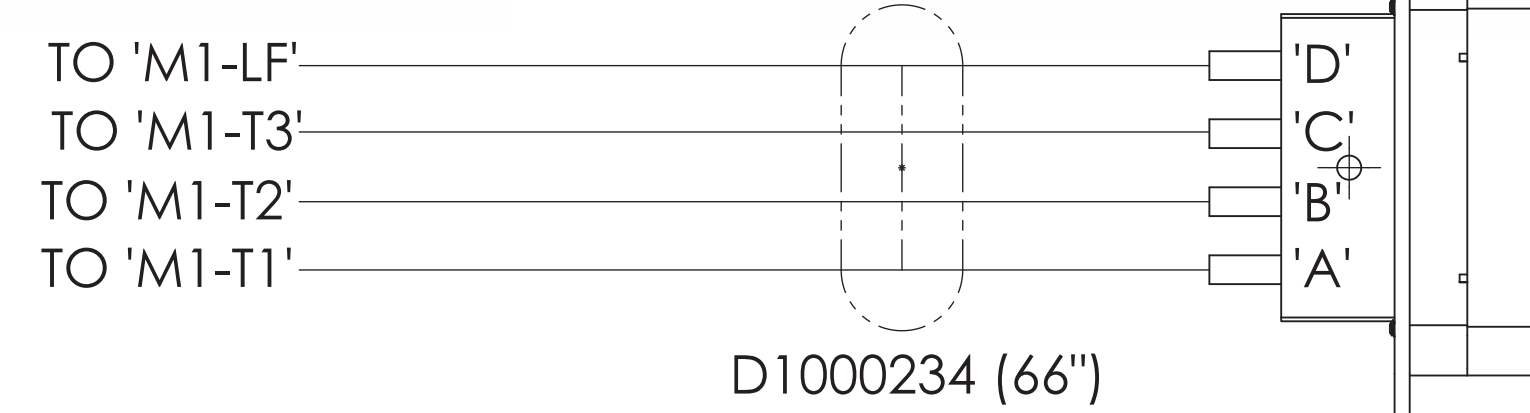
RIGHT SIDE (-Y)



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



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.



ROUTE NO.3
SEE LIGO-T1200318
FOR STEP BY STEP CABLING GUIDE

① REFERENCED DOCUMENTATION:

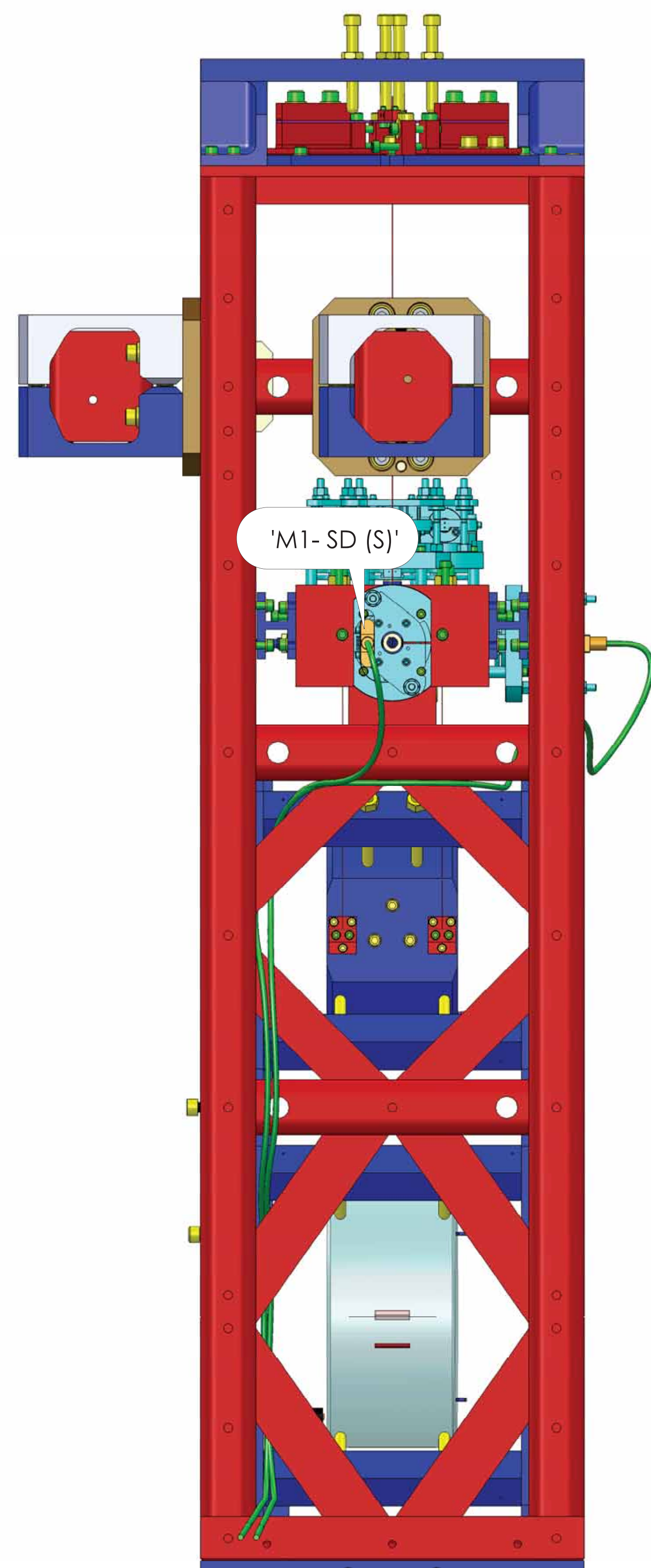
- 1.1 LIGO-E1100109, HAM SUS CONTROL ARRANGEMENT.
- 1.2 LIGO-D1101493, OSEM ORIENTATION.
- 1.3 LIGO-D1000581, SYSTEM CABLING DIAGRAM.
- 1.4 LIGO-D1002424, VIBRATION ABSORBER ORIENTATION.
- 1.5 LIGO-E1100411, CABLE CLAMP TORQUE.
- 1.6 LIGO-D1101296, HAM ISI HOLE TABLE.

MC1

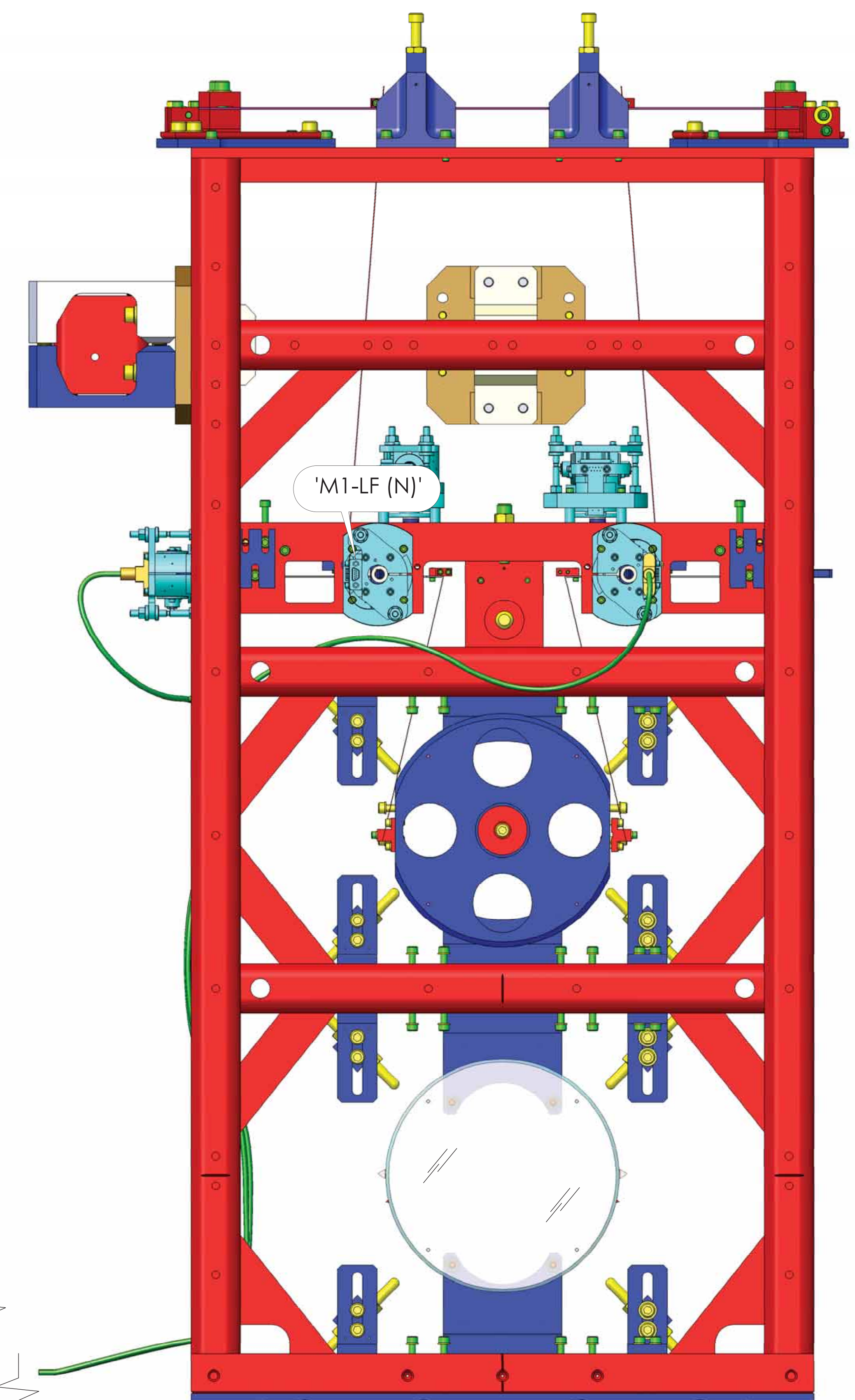
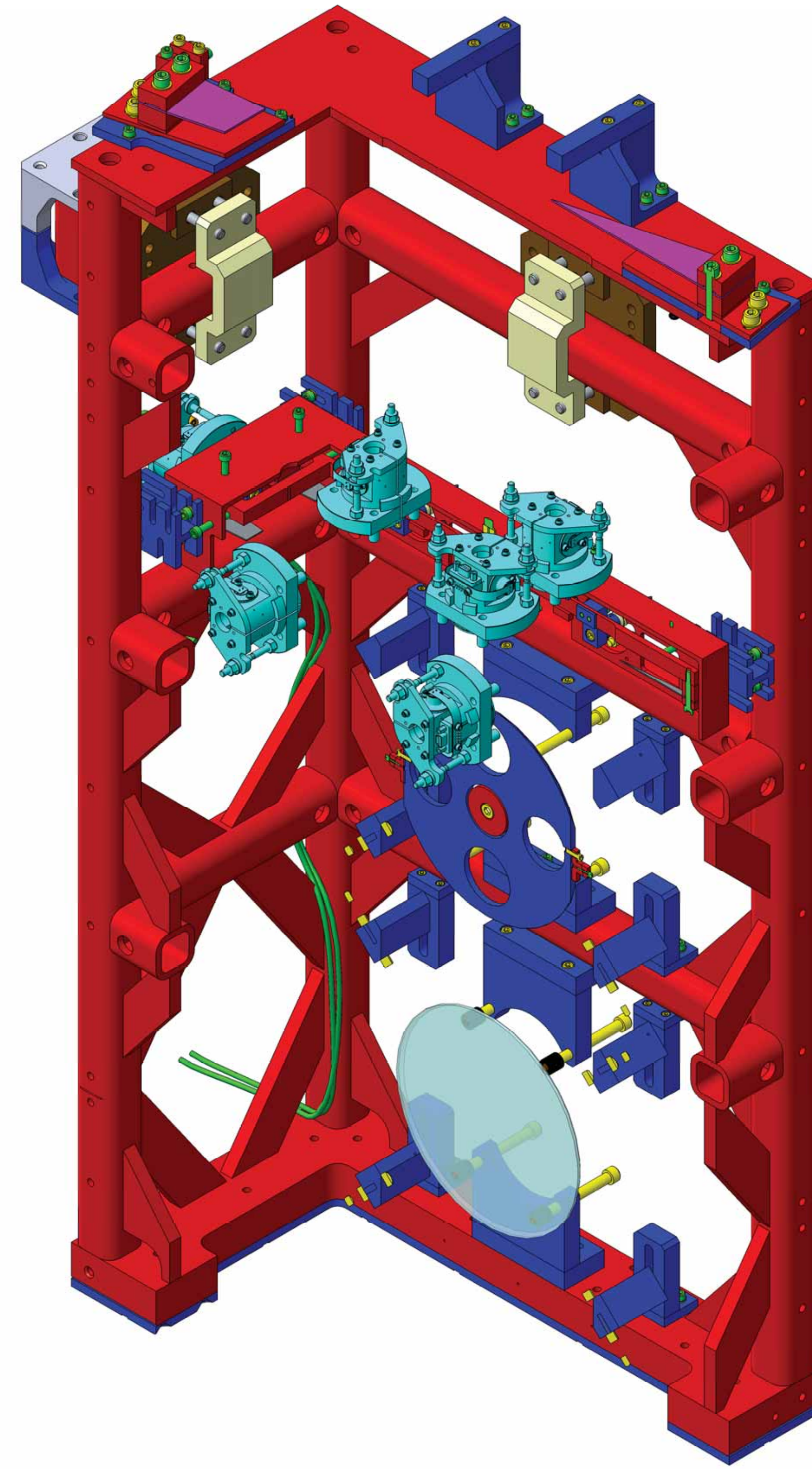
(SHARED)



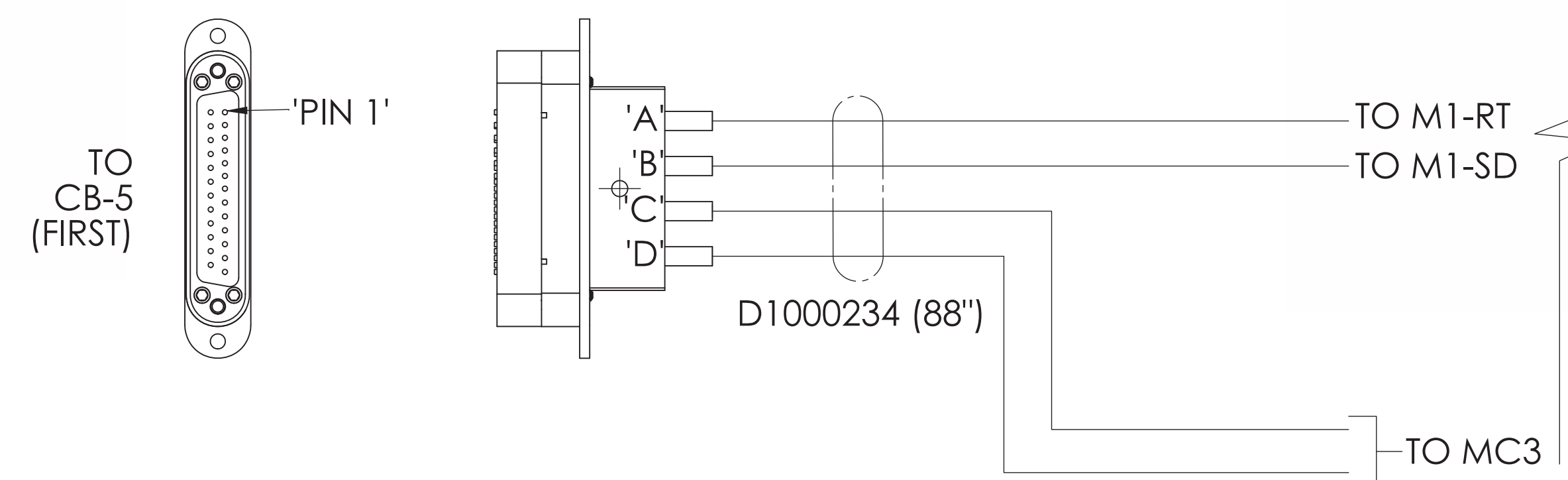
CABLE ROUTING:
 ROUTE ALL CABLES IN ACCORDANCE WITH LIGO-T1200203 AND T1200318
 CABLE ROUTES DEPICTED IN THIS DOCUMENT ARE NOT MANDATORY, BUT RATHER A CONSIDERED ROUTE AIMED TO CLEAR LASER BEAM PATHS.
 ALTERNATE ROUTES FOR PROBLEMATIC AREAS ARE ACCEPTABLE, BUT SHOULD BE HANDLED IN A CASE BY CASE SITUATION. 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) (1.1) (1.2)



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



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

- 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.

MC1

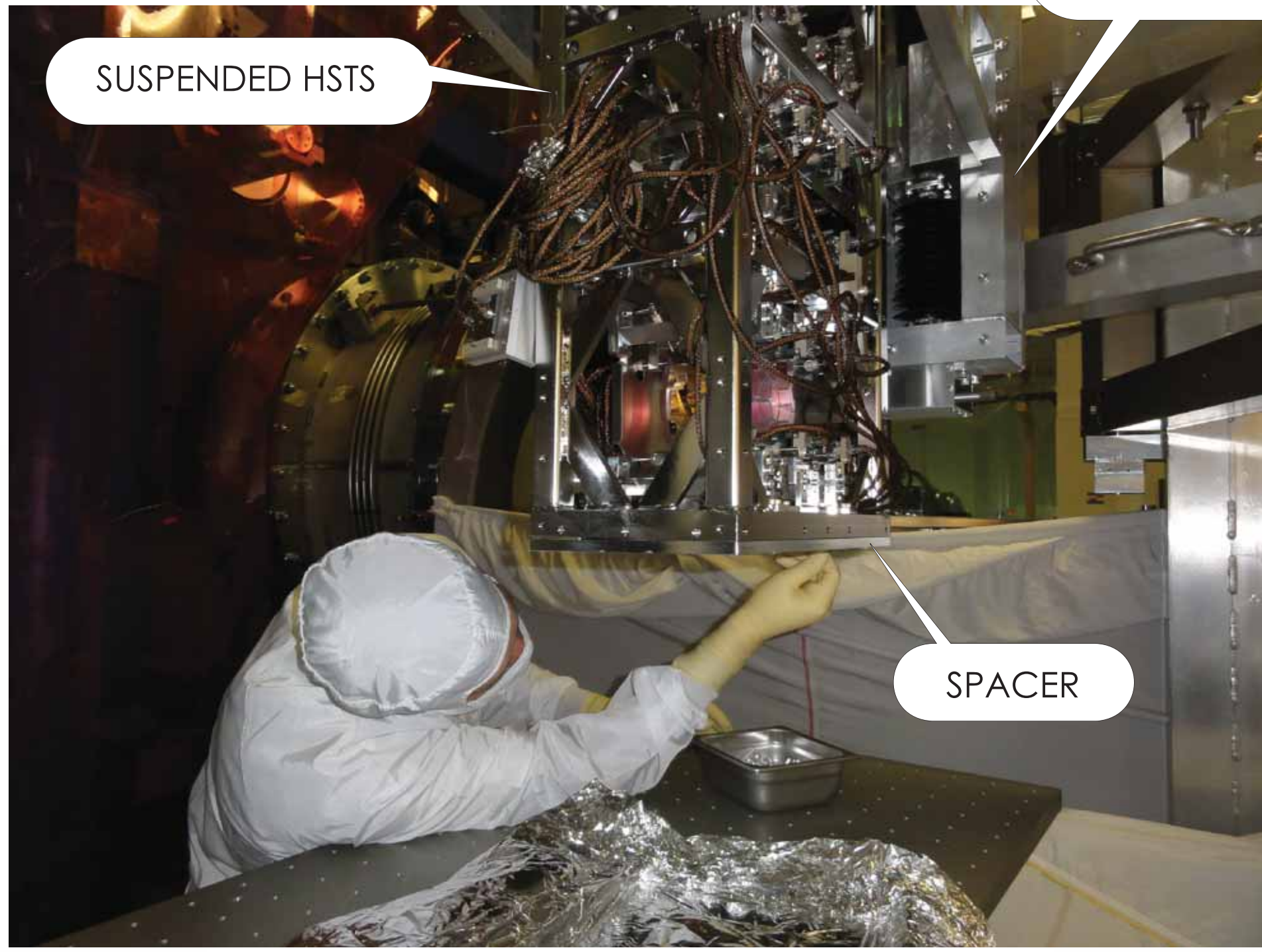
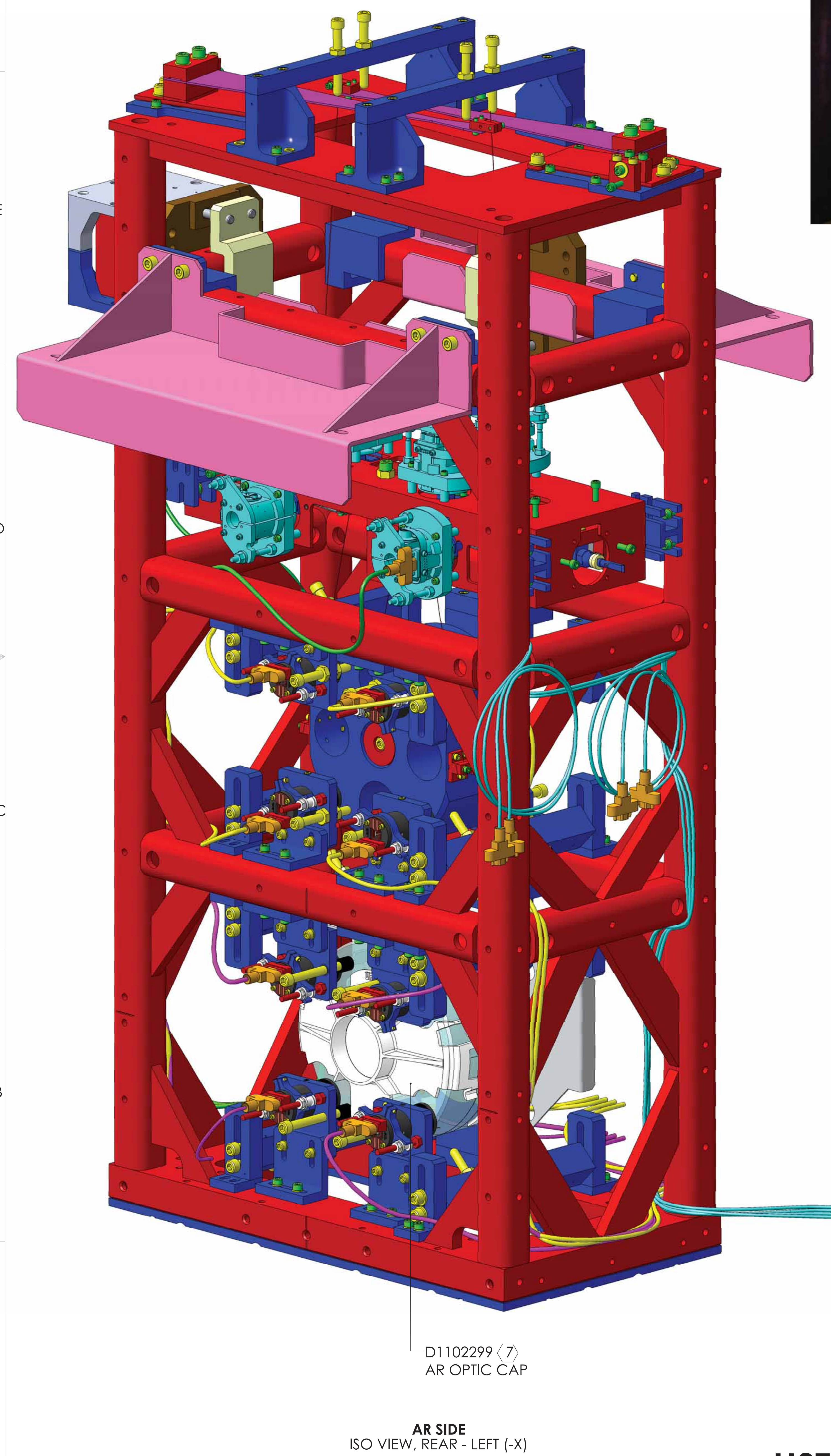
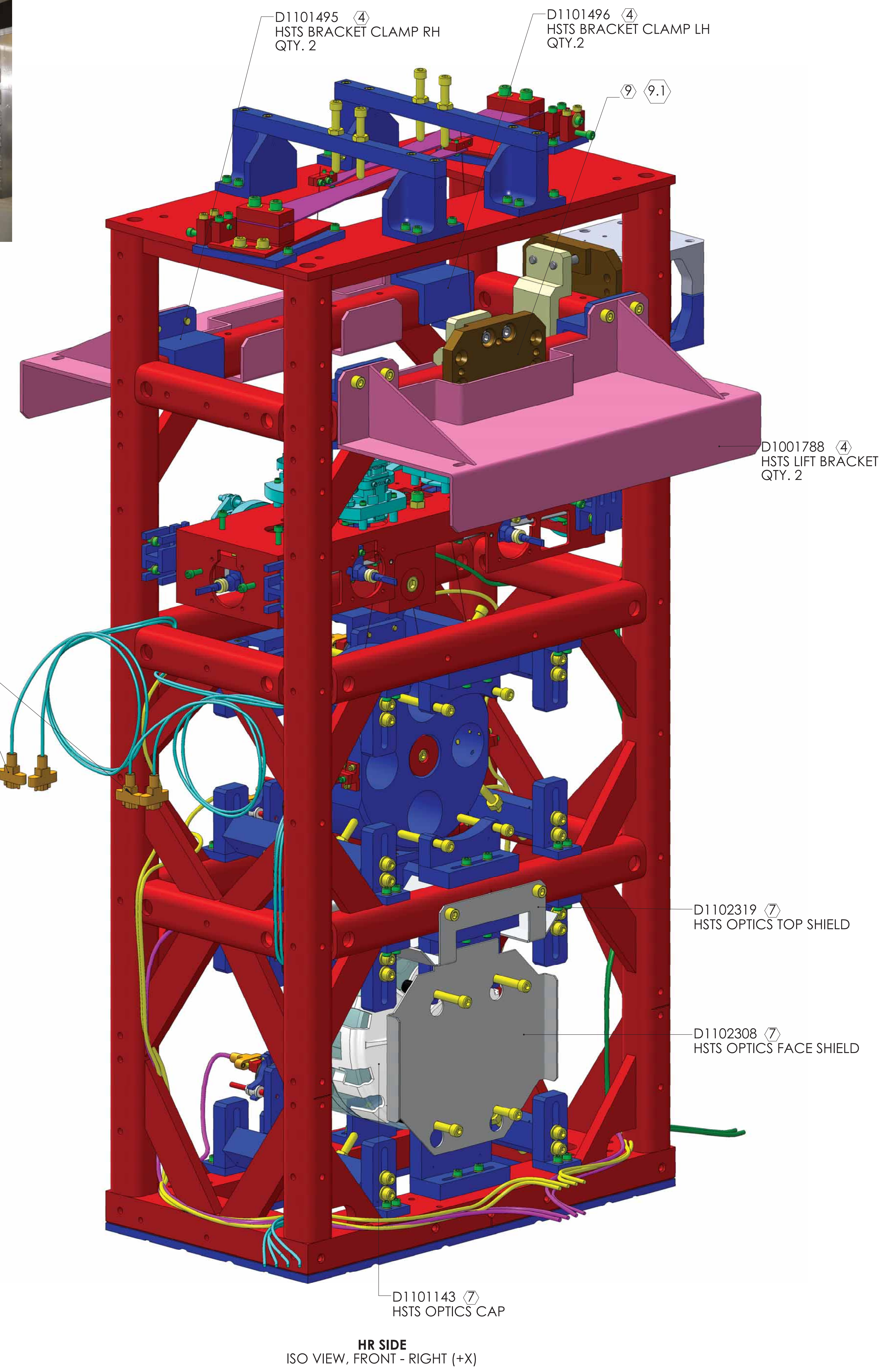


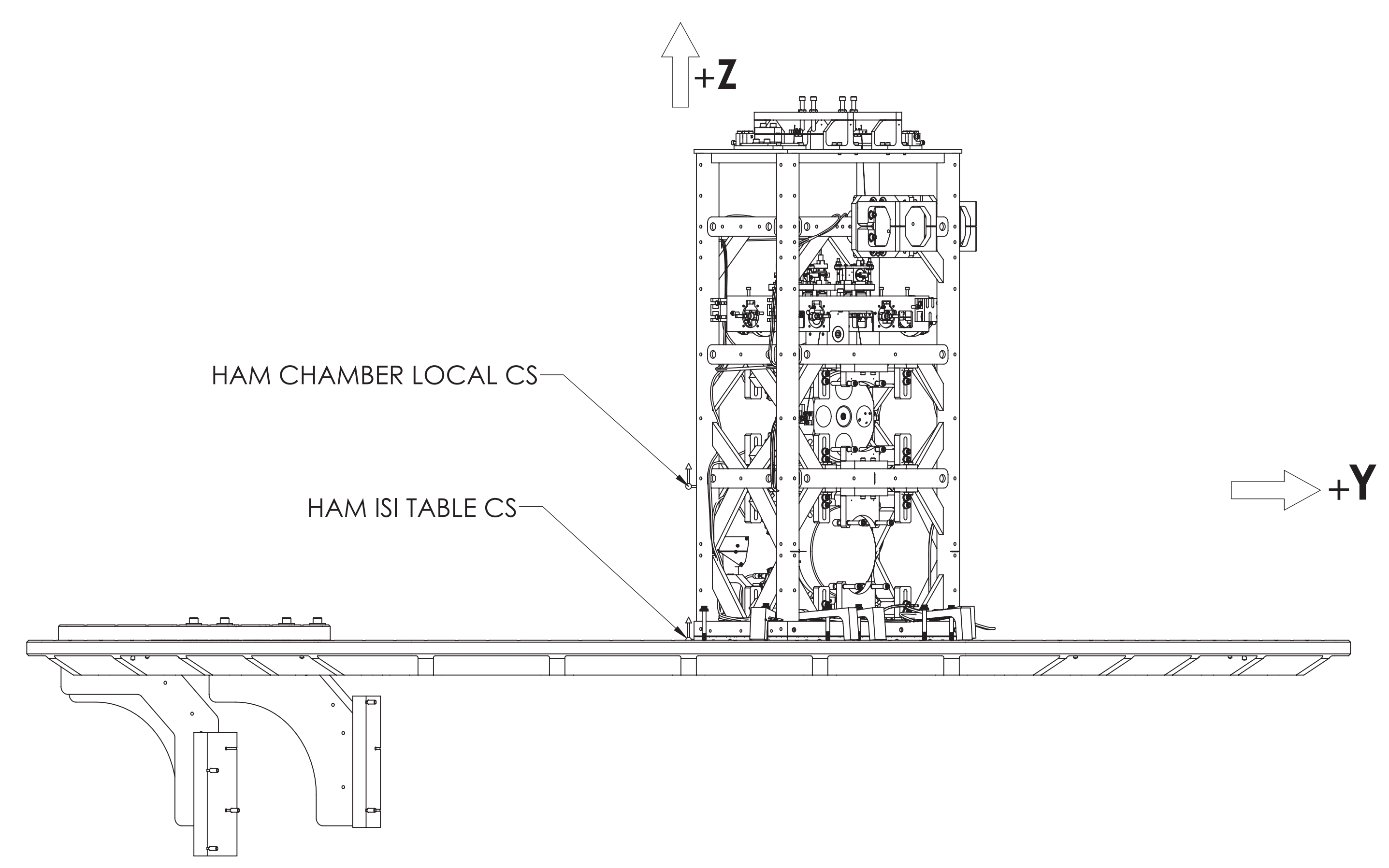
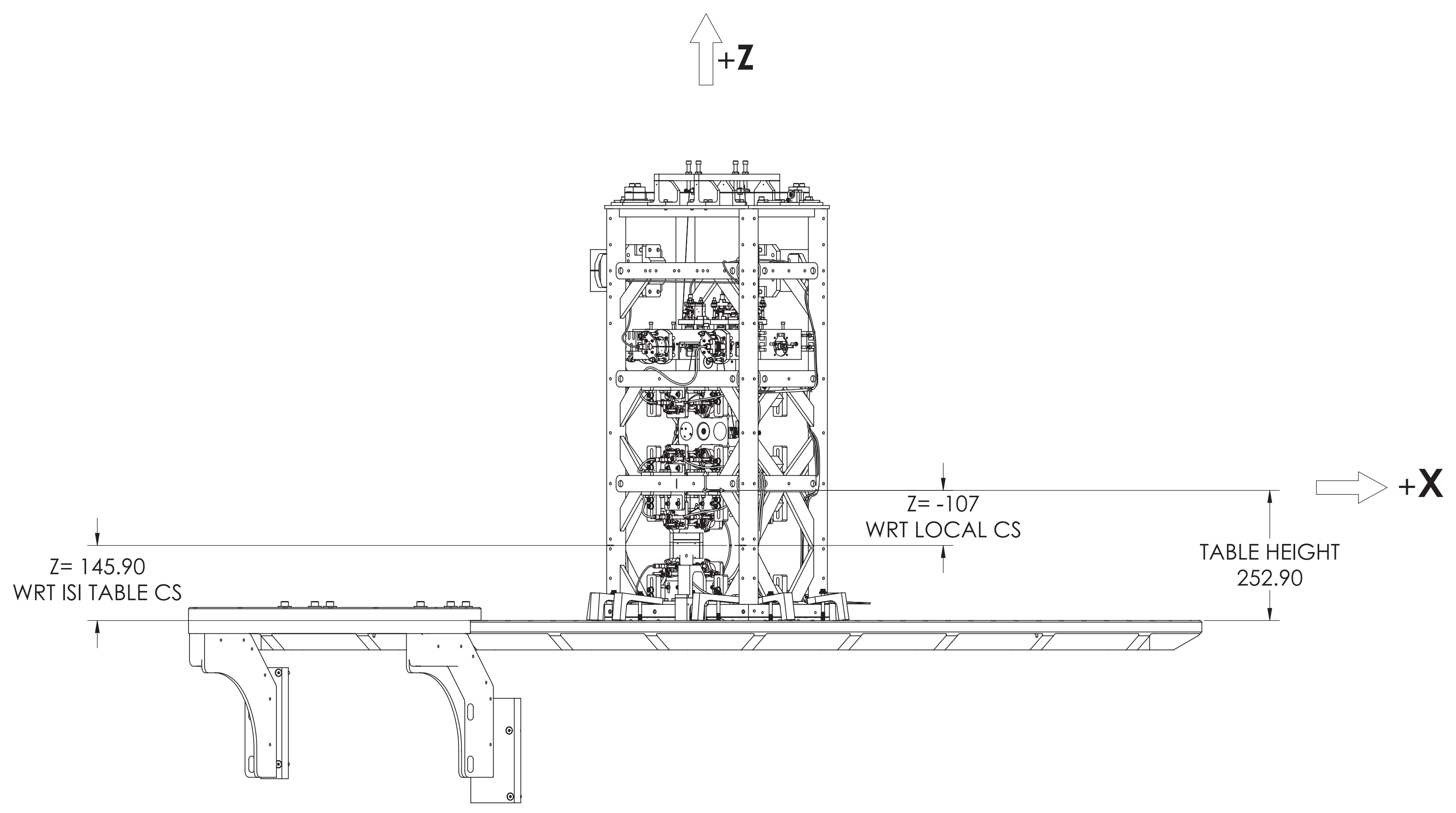
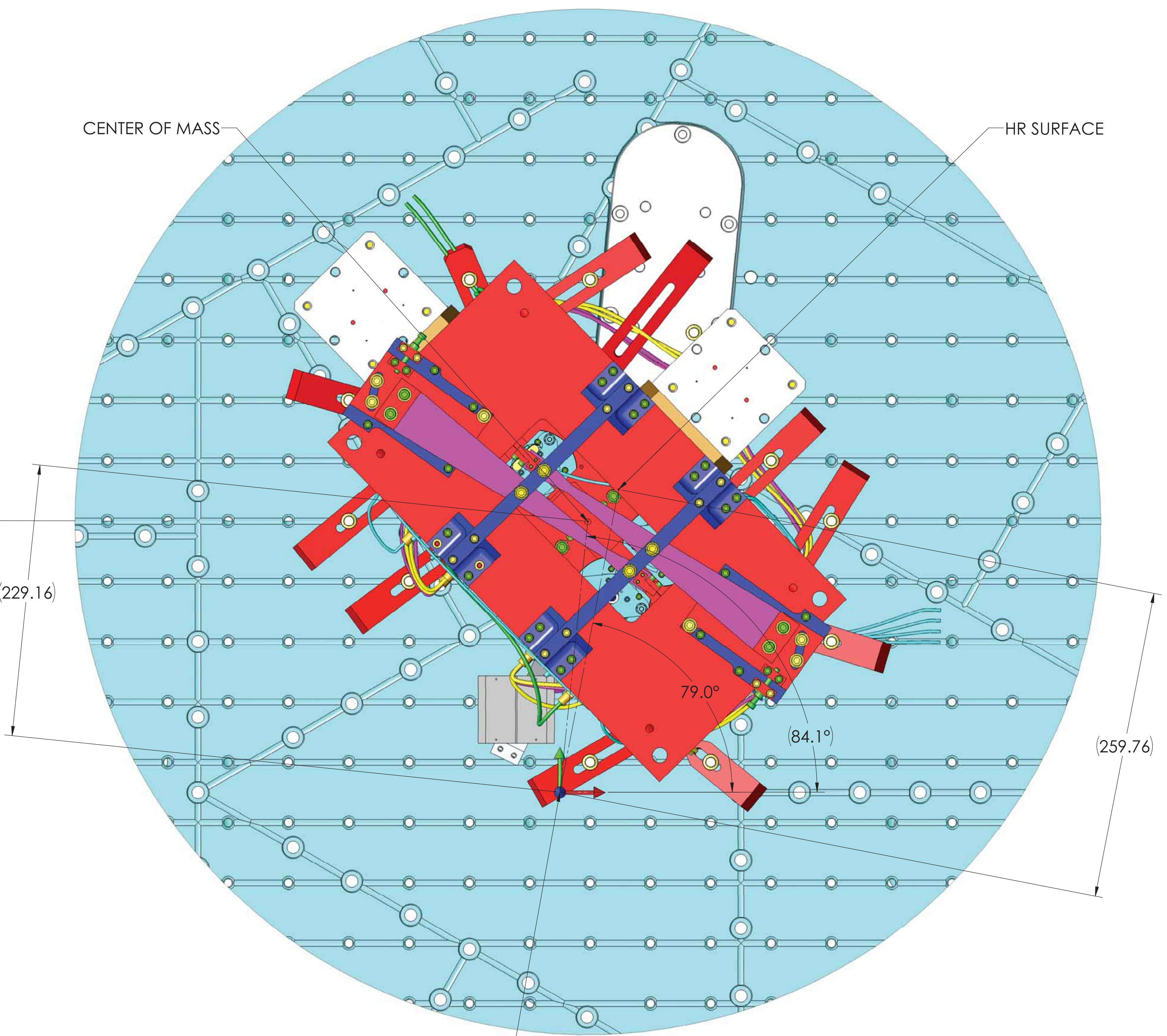
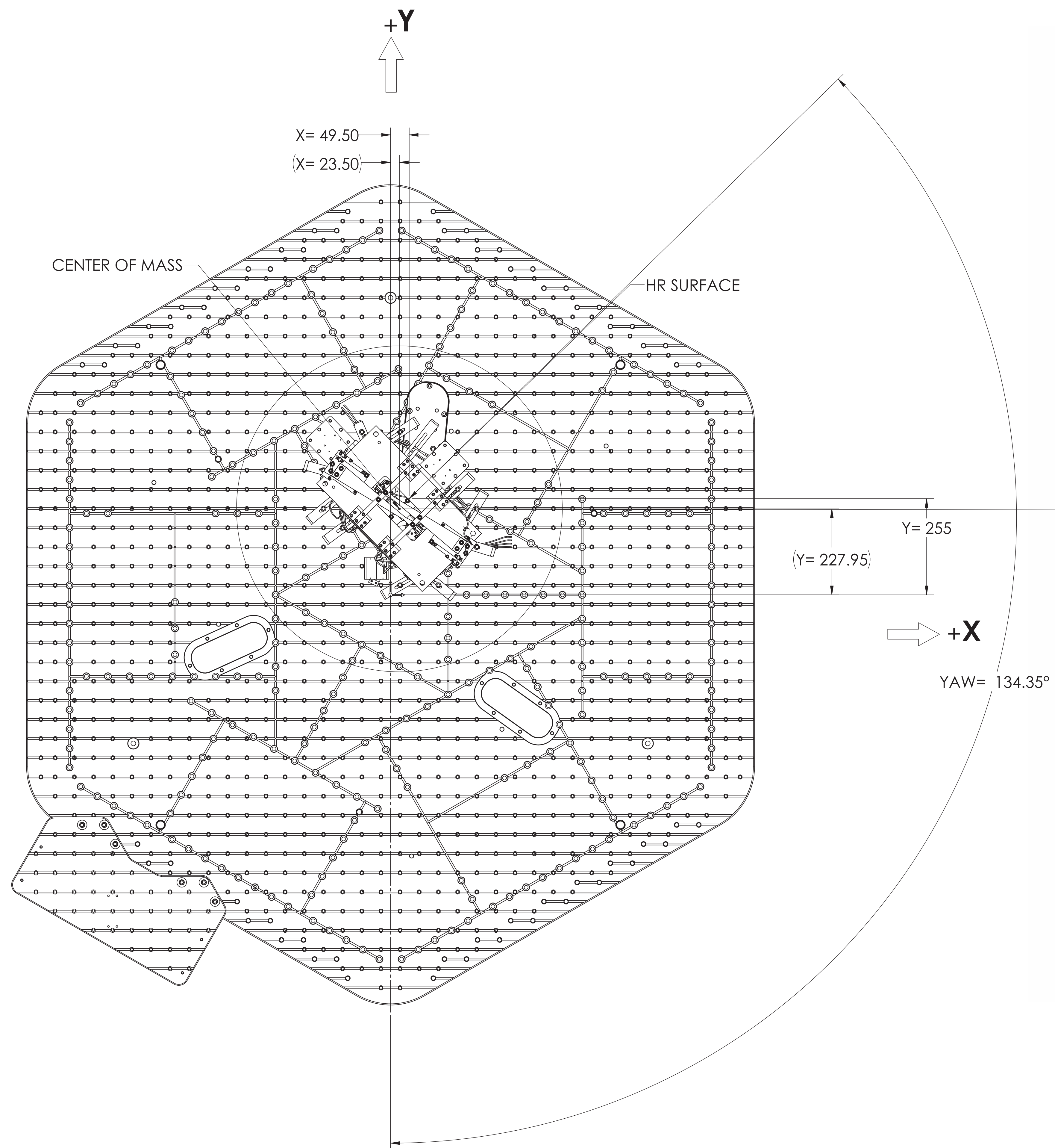
FIG 1.0: SPACER INSTALLATION (10)

BUNDLE CABLES (5) AND ATTACH AS SHOWN TO THE SIDE OF THE STRUCTURE FOR TRANSPORTATION PURPOSES ONLY (SEE SHEET 6, FOR ROUTE DETAILS)



- (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 FRONT 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 6 (SCREW). TORQUE TO 75 IN LB. SEE FIG 1.0 FOR REFERENCE.

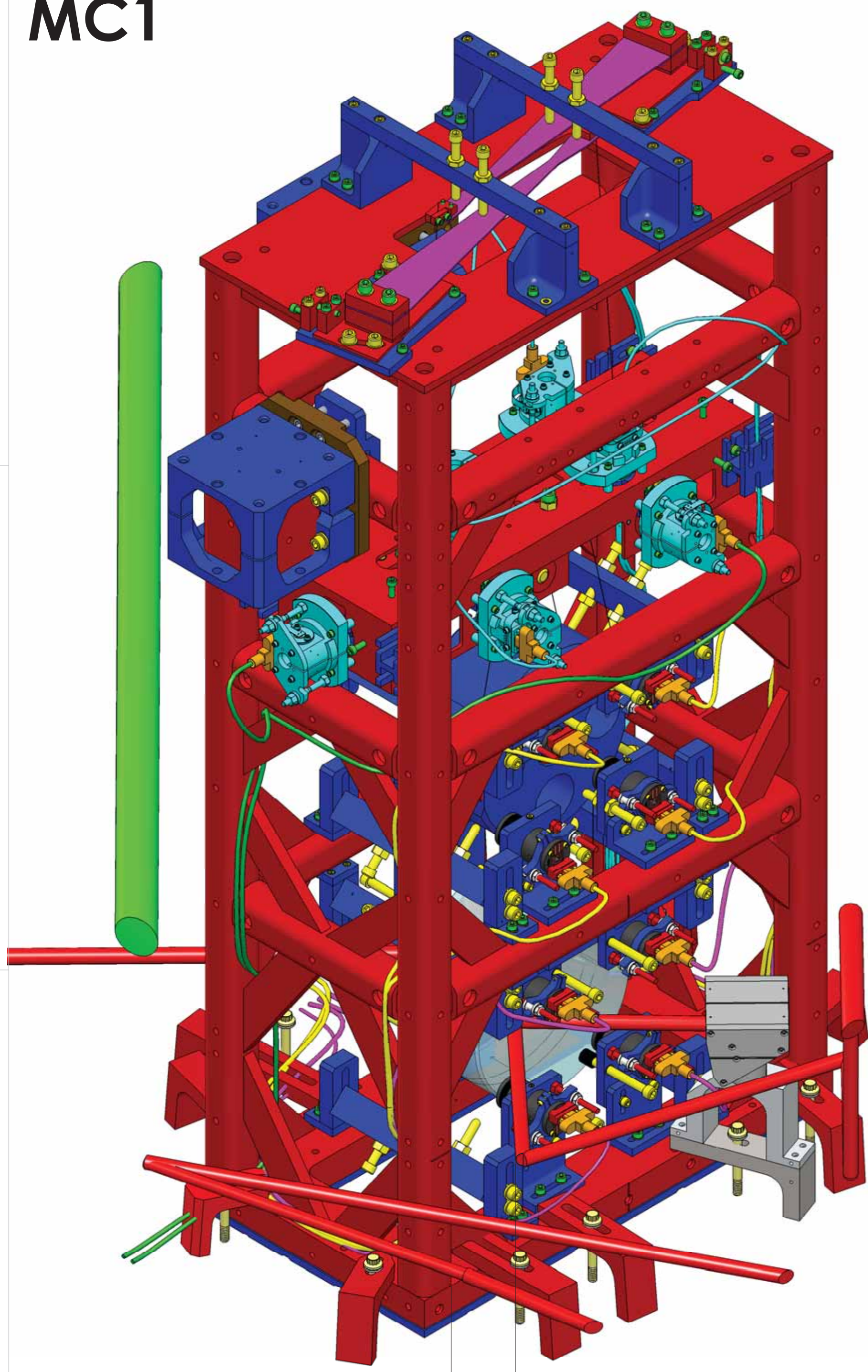
HSTS STRUCTURE TRANSPORT
 VIBRATION ABSORBER ON FRONT SIDE NOT SHOWN
 (REMOVED FOR TRANSP. PURPOSES)



LOCAL COORDINATES DEFINITIONS

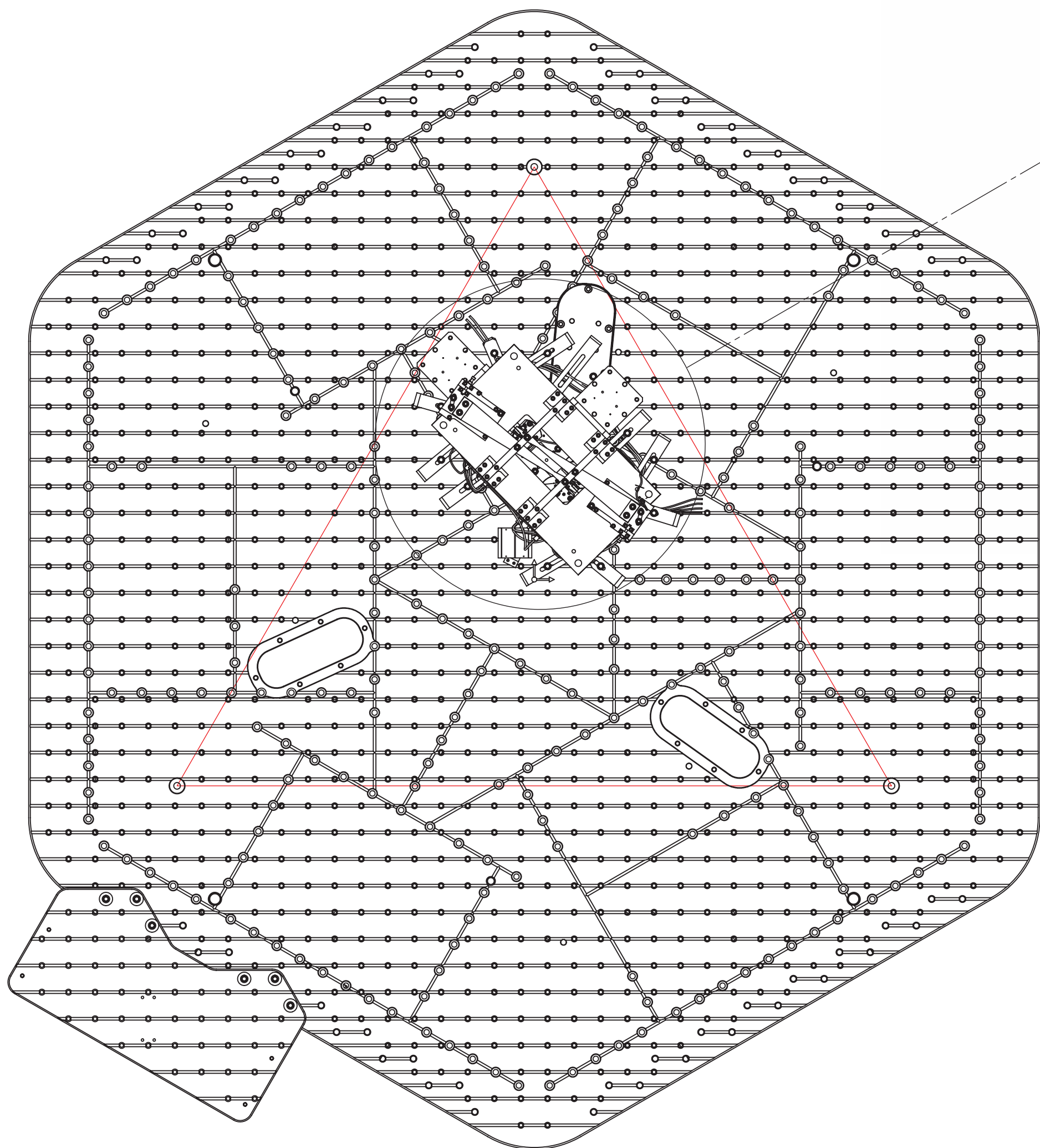
NOTE: DIMENSION IN PARENTHESIS (REFERENCE DIMENSIONS), ARE FROM CENTER OF MASS.

MC1



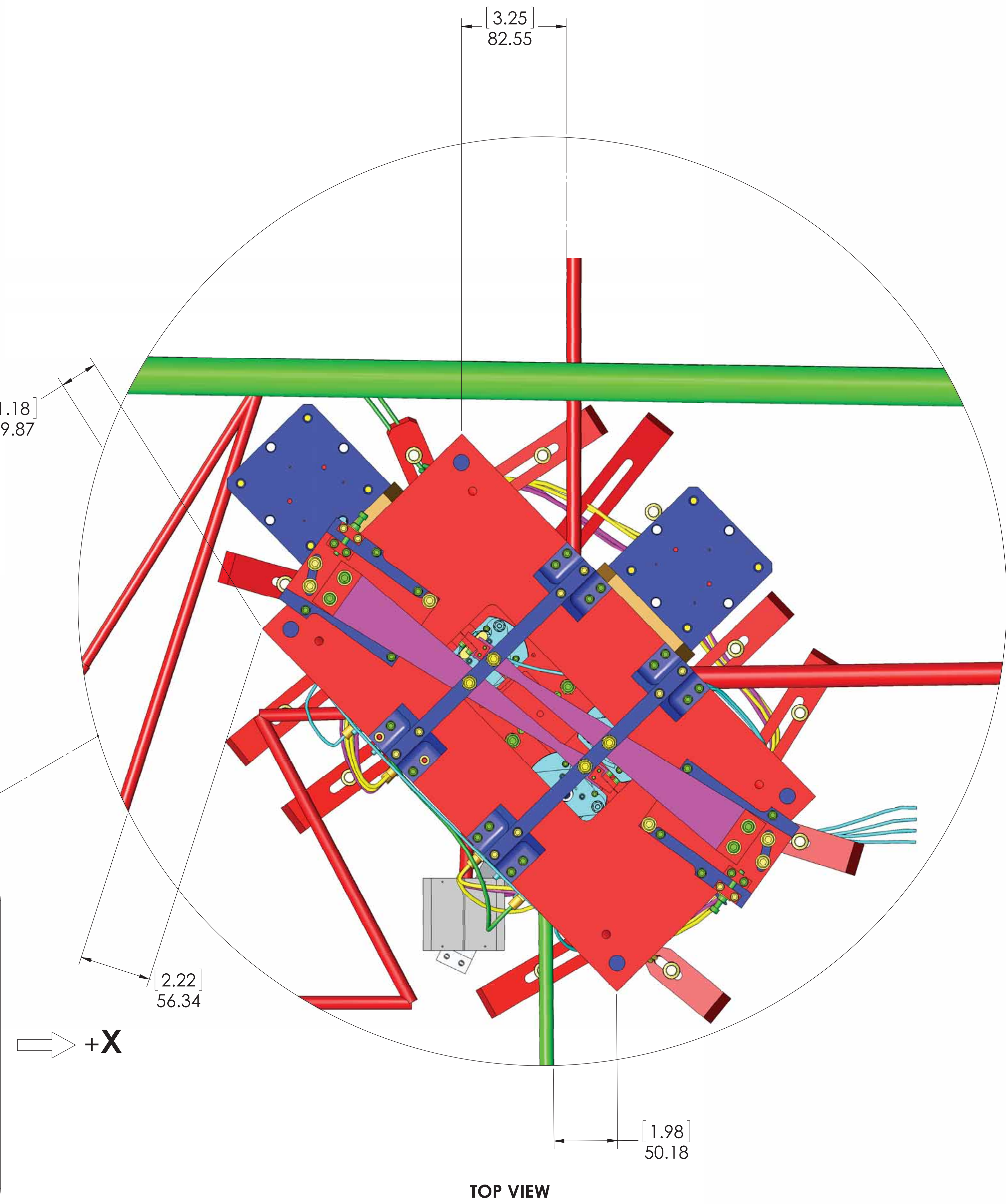
AR SIDE
ISO VIEW, REAR - LEFT (-X)

+Y



TOP VIEW

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

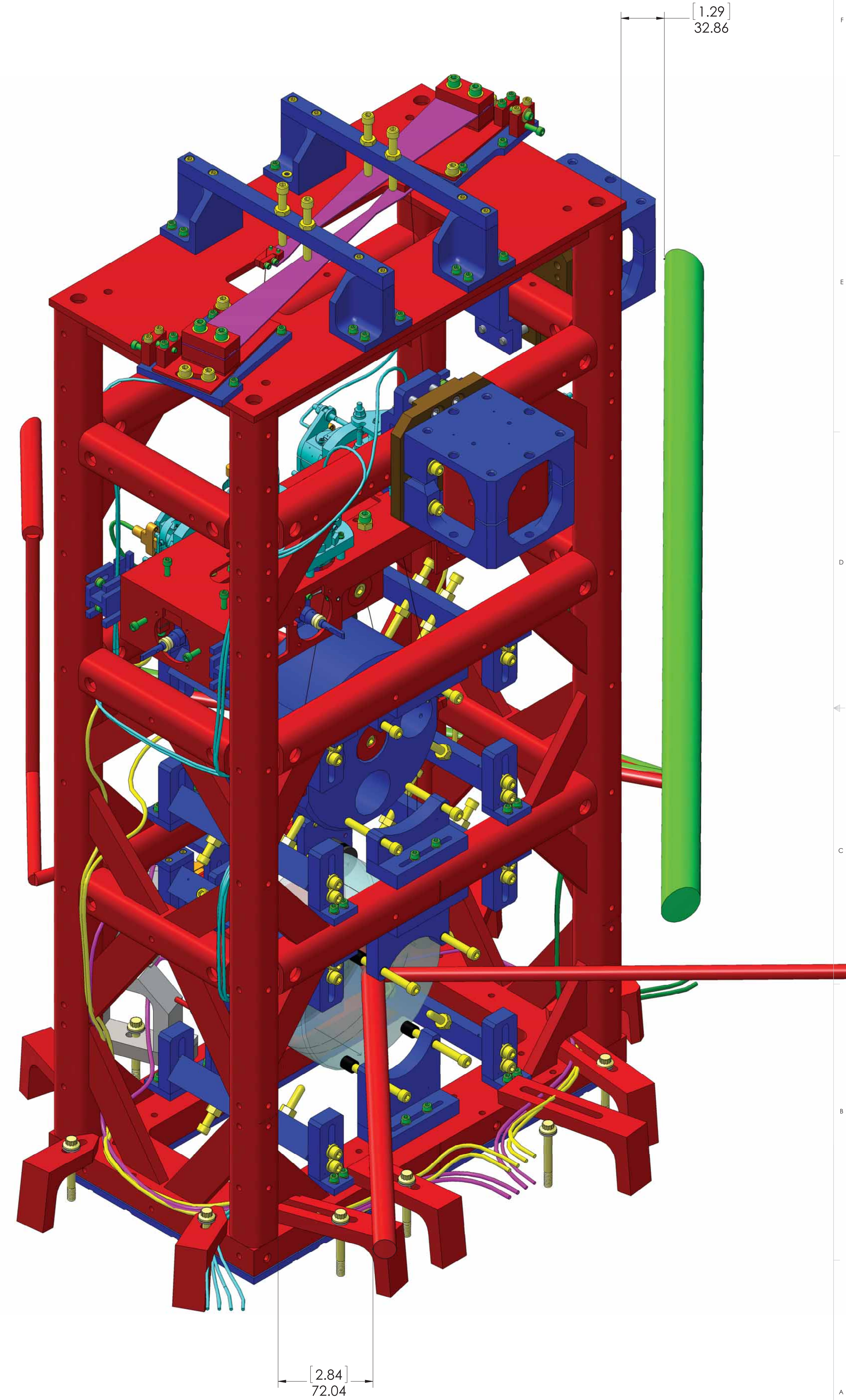


TOP VIEW

+X

LASER BEAM CLEARANCES

(ALL DIMENSIONS ARE FOR REFERENCE ONLY)



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