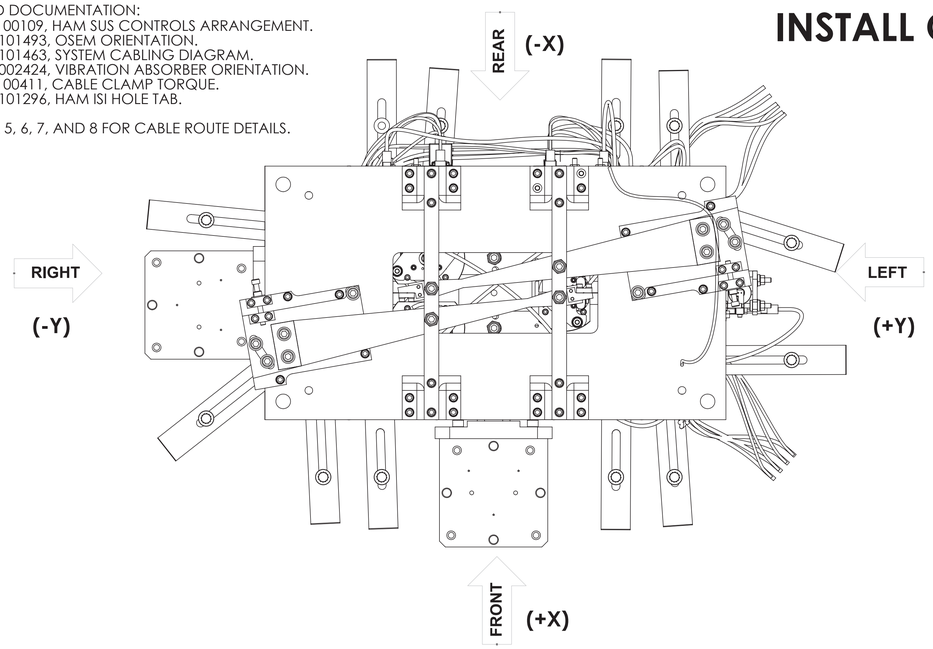
INSTALL CONFIGURATION (i.e.: IN CHAMBER - DOORS CLOSED)

REV.	DATE	DCN #	DRAWING TREE #
v1	25 APR 2012	-	-
v2	01 AUG 2012	E1200728-x0	-
-	-	-	-

① REFERENCED DOCUMENTATION:
1.1 LIGO-E1100109, HAM SUS CONTROLS ARRANGEMENT.
1.2 LIGO-D1101493, OSEM ORIENTATION.
1.3 LIGO-D1101463, 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.

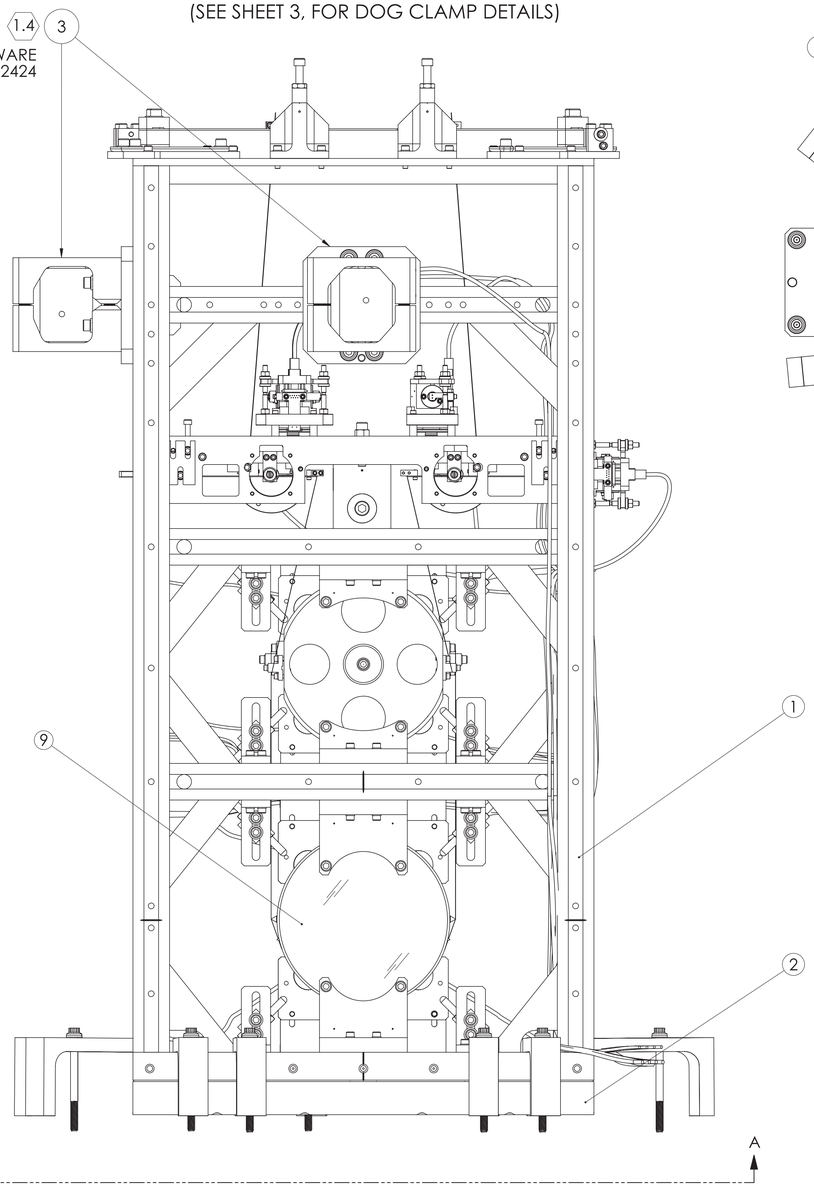
2. SEE SHEETS 4, 5, 6, 7, AND 8 FOR CABLE ROUTE DETAILS.

PR2

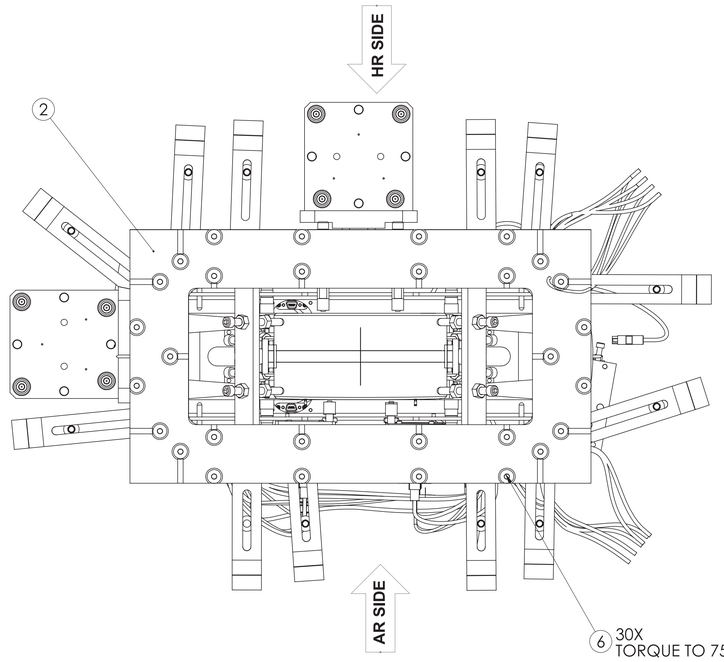


TOP VIEW
(SEE SHEET 3, FOR DOG CLAMP DETAILS)

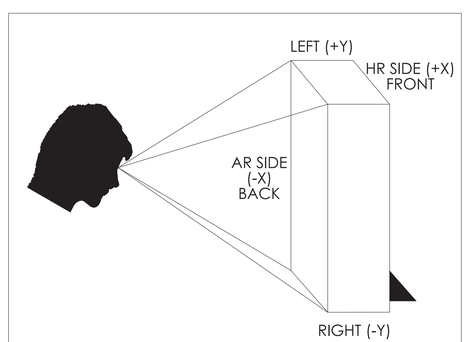
TABLE 1: HAM3-H1 PR2 CABLING SPECIFICATIONS, FROM/TO DES.					
ROUTE NO.	**FROM** OSEM POSITION	**TO** CB FLOOR DES.	**QP LEG DES.**	**CABLE PART NO.**	**NOM. CABLE LENGTH (IN)**
1	M3-UL (S)	CB-2 (SECOND)	A	D1000234	60
	M3-LL (N)		B		
	M3-UR (N)		C		
	M3-LR (S)		D		
2	M2-UL (S)	CB-1 (SECOND)	A	D1000234	66
	M2-LL (N)		B		
	M2-UR (N)		C		
	M2-LR (S)		D		
3	M1-T3 (N)	CB-1 (FIRST)	A	D1000234	66
	M1-LF (N)		B		
	M1-RT (S)		C		
	M1-SD (S)		D		
4	M1-T1 (S)	CB-2 (FIRST)	C	D1000234	96
	M1-T2 (S)		D		
NOTE : ROUTE NO. 4 IS A SHARED CABLE, SEE D0901099 FOR QP LEGS 'A' AND 'B' ROUTING					



HR SIDE - FRONT VIEW



BOTTOM VIEW A-A

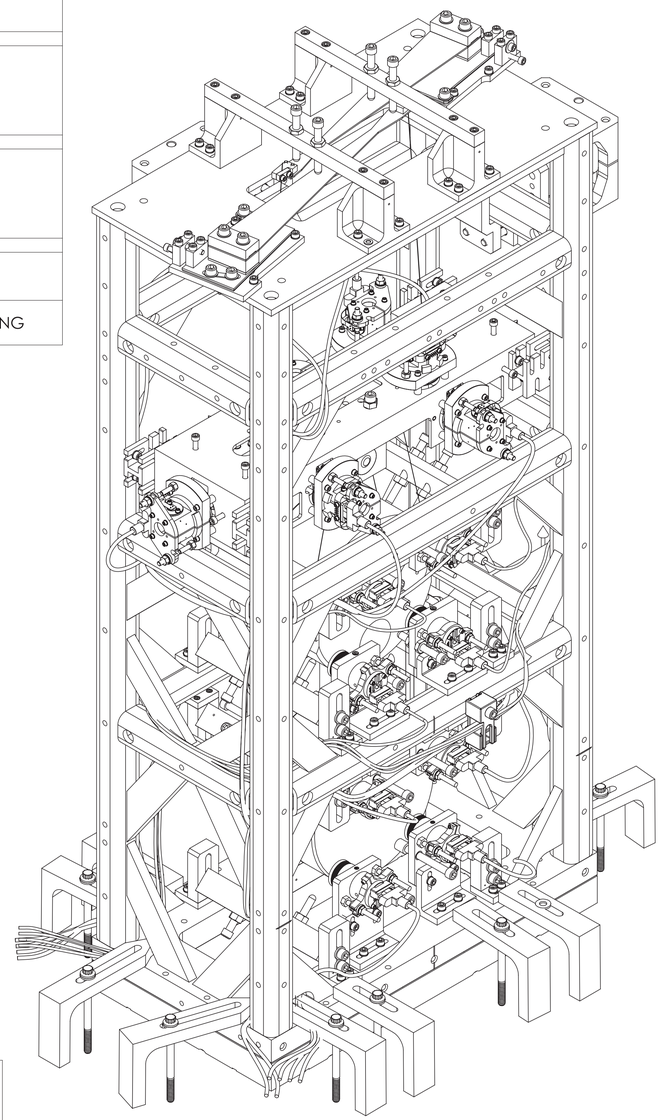


STRUCTURE ORIENTATION: NAMED VIEWS

LOCAL COORDINATES - REFERENCE

Xmm	Ymm	Zmm	YAW °
249.3	-530.4	-83.2	.46 °

REFER TO DRAWING D1101252 FOR HAM3-H1
INSTALLATION PLATE LAYOUT



ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	QTY
10	D0902462	CLAMP ASSY., UHV COMPATIBLE	N/A	1
9	D1101378	PR2 H1 OPTICS ASSEMBLY	N/A	1
8	D1100785-530	WASHER, FLAT, .25 X .530 O.D.	NITRONIC 60	12
7	2AL3.25-12SL	1/4-20 X 3.25 12PT BOLT	450 SSTL	12
6	FA-2024-NA	.25-20 X 1.5 FHSC SCREW UC COMPONENTS FA-2024-NA	18-8 SSTL	30
5	D1100641-09	AdvLIGO HAM Optics Table Dog Clamp Chamfered End 2.2L	304 SSTL	7
4	D1001376-08	AdvLIGO HAM Optics Table Dog Clamp 2.20M	304 SSTL	5
3	D1002424	VIBRATION ABSORBER ASSEMBLY	N/A	2
2	D1100038	HSTS SUS STRUCTURE SPACER 28.7MM	6061-T6 Al	1
1	D020700	HSTS OVERALL ASSEMBLY	N/A	1

PARTS LIST

NOTES AND TOLERANCES: (UNLESS OTHERWISE SPECIFIED)

MATERIAL: N/A | FINISH: N/A µinch

LIGO CALIFORNIA INSTITUTE OF TECHNOLOGY
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

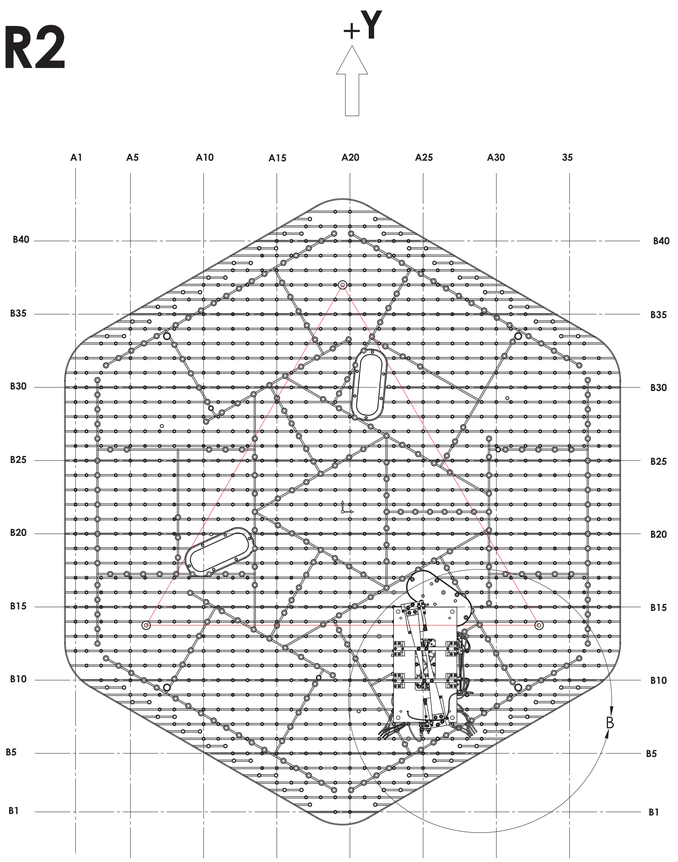
PART NAME: AdvLIGO SUS HAM3-H1, XYZ Local CS for HSTS (PR2) Sub-Assy.

SYSTEM: ADVANCED LIGO | SUB-SYSTEM: SUS | NEXT ASSY: D0901094

DESIGNER			SIZE	DWG. NO. / REV.
DRAFTER	E.SANCHEZ	25 APR 2012	E	D0901098 v2
CHECKER	E.SANCHEZ	25 APR 2012		
APPROVAL	SEE DCC	SEE DCC	SCALE: 1:2	PROJECTION: SHEET 1 OF 9

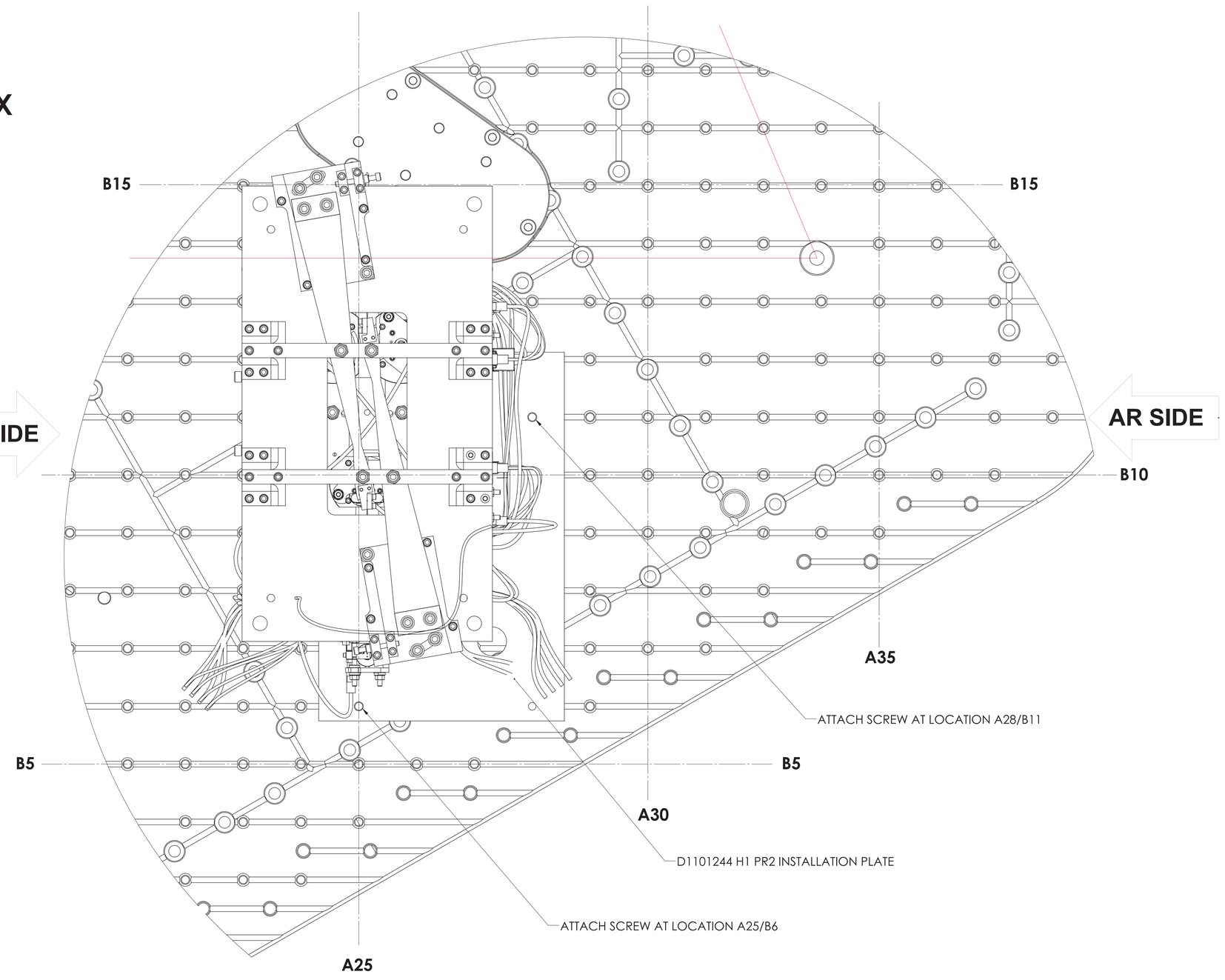
D0901099 AdvLIGO SUS HAM3-H1, XYZ Local CS for HSTS (PR2) Sub-Assy, PART FROM REV: X-001, DRAWING FROM REV: X-005

PR2



TOP VIEW 1.6

REF. TRIANGLE: SEE D1000125 FOR
ISI NAMING AND ORIENATION 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

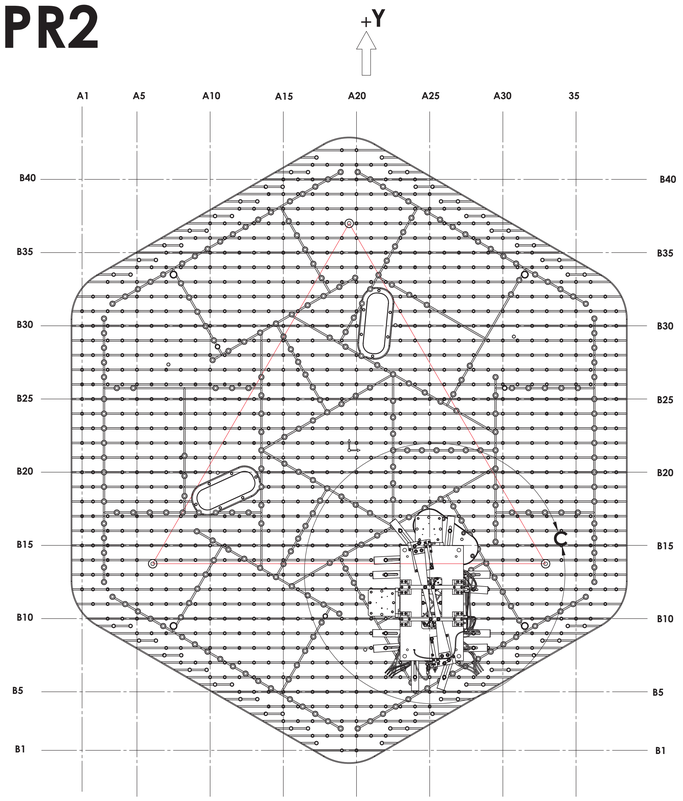
LIGO CALIFORNIA INSTITUTE OF TECHNOLOGY
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

SIZE	DWG. NO.	REV.
E	D0901098	v2

SCALE: 1:4 | PROJECTION: | SHEET 2 OF 9

D0901098 AdvLIGO SUS MAMS-H1 XYZ Local CS for HSTS (PR2) Sub-Assy, PART PDM REV: X-009, DRAWING PDM REV: X-005

PR2



TOP VIEW ⟨1.6⟩

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

⟨3⟩ SCREW LOCATION A22/B14 — 5, 7, 8

⟨3⟩ SCREW LOCATION A22/B13 — 4, 7, 8

HR SIDE

⟨3⟩ SCREW LOCATION A22/B9 — 8, 7, 4

⟨3⟩ SCREW LOCATION A22/B8 — 5, 7, 8

⟨3⟩ SCREW LOCATION A24/B6 — 5, 7, 8

8 SCREW LOCATION ON A23/B16 ⟨3⟩ — 8, 7, 5

8 SCREW LOCATION ON SPRING HATCH NEAR A26/B16 ⟨3⟩ — 8, 7, 5

⟨3⟩ SCREW LOCATION A28/B13 — 8, 7, 4

8 SCREW LOCATION A28/B12 ⟨3⟩ — 8, 7, 4

8 SCREW LOCATION A28/B9 ⟨3⟩ — 8, 7, 4

5, 7, 8 SCREW LOCATION A28/B8 ⟨3⟩

5, 7, 8 SCREW LOCATION A26/B6 ⟨3⟩

AR SIDE

A20 A25 A30

B20 B15 B10 B5

DETAIL C
SCALE 1 : 1.5

ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	QTY
8	D1100785-530	WASHER, FLAT, .25 X .530 O.D.	NITRONIC 60	12
7	2AL3.25-12SL	1/4-20 X 3.25 12PT BOLT	450 SSTL	12
5	D1100641-09	AdvLIGO HAM Optics Table Dog Clamp Chamfered End 2.2L	304 SSTL	7
4	D1001376-08	AdvLIGO HAM Optics Table Dog Clamp 2.20M	304 SSTL	5

PARTIAL BOM, SEE SHEET 1 FOR COMPLETE PARTS LSIT

DOG CLAMPS IDENTIFICATION / INSTALLATION

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

TOP VIEW ⟨1.6⟩

OPTICAL TABLE SHOWN FOR STRUCTURE AND DOG CLAMP LOCATIONS AND ORIENTATION

LIGO CALIFORNIA INSTITUTE OF TECHNOLOGY
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

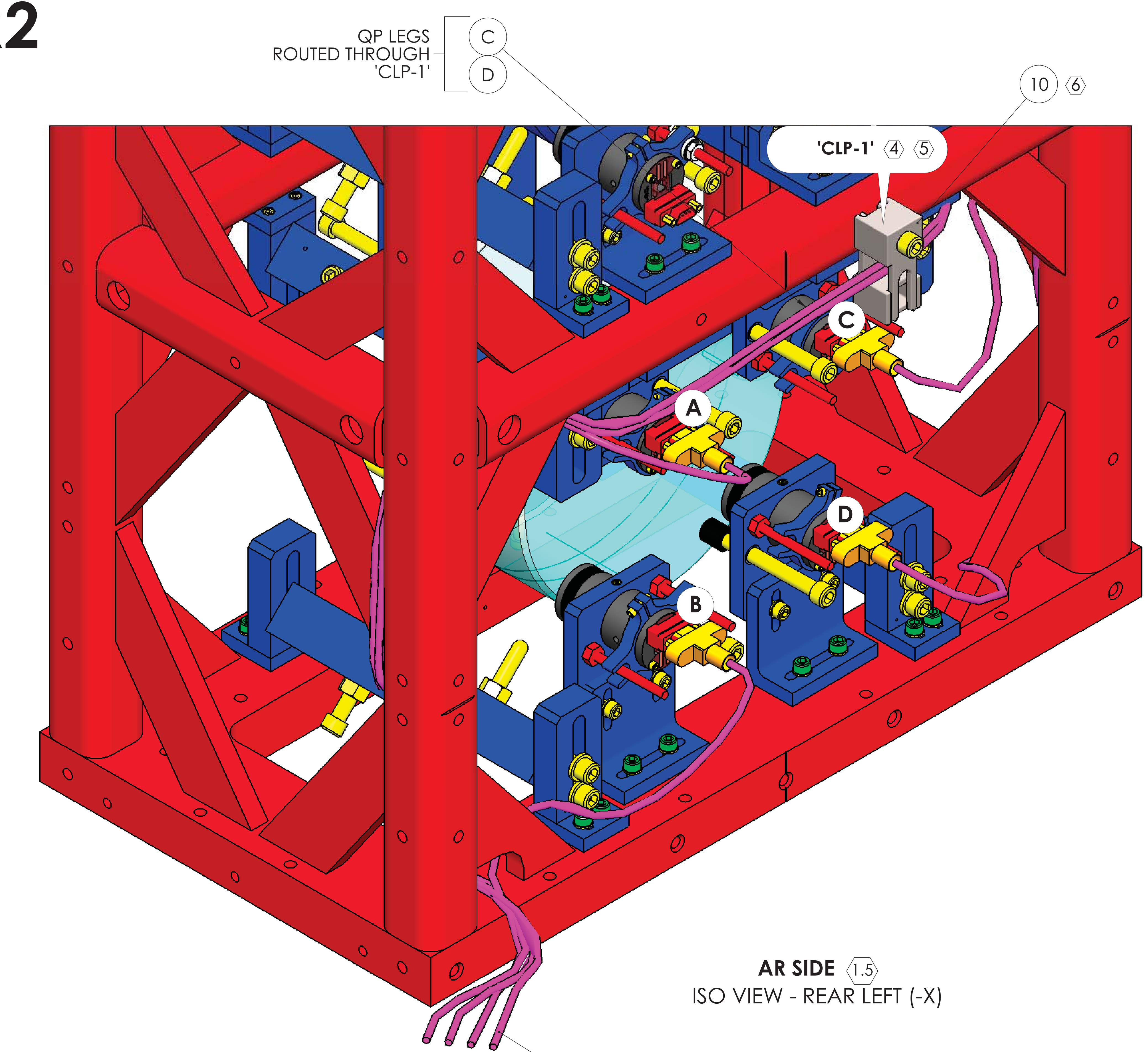
SIZE	DWG. NO.	REV.
E	D0901098	v2

SCALE: 1:4 PROJECTION: SHEET 3 OF 9

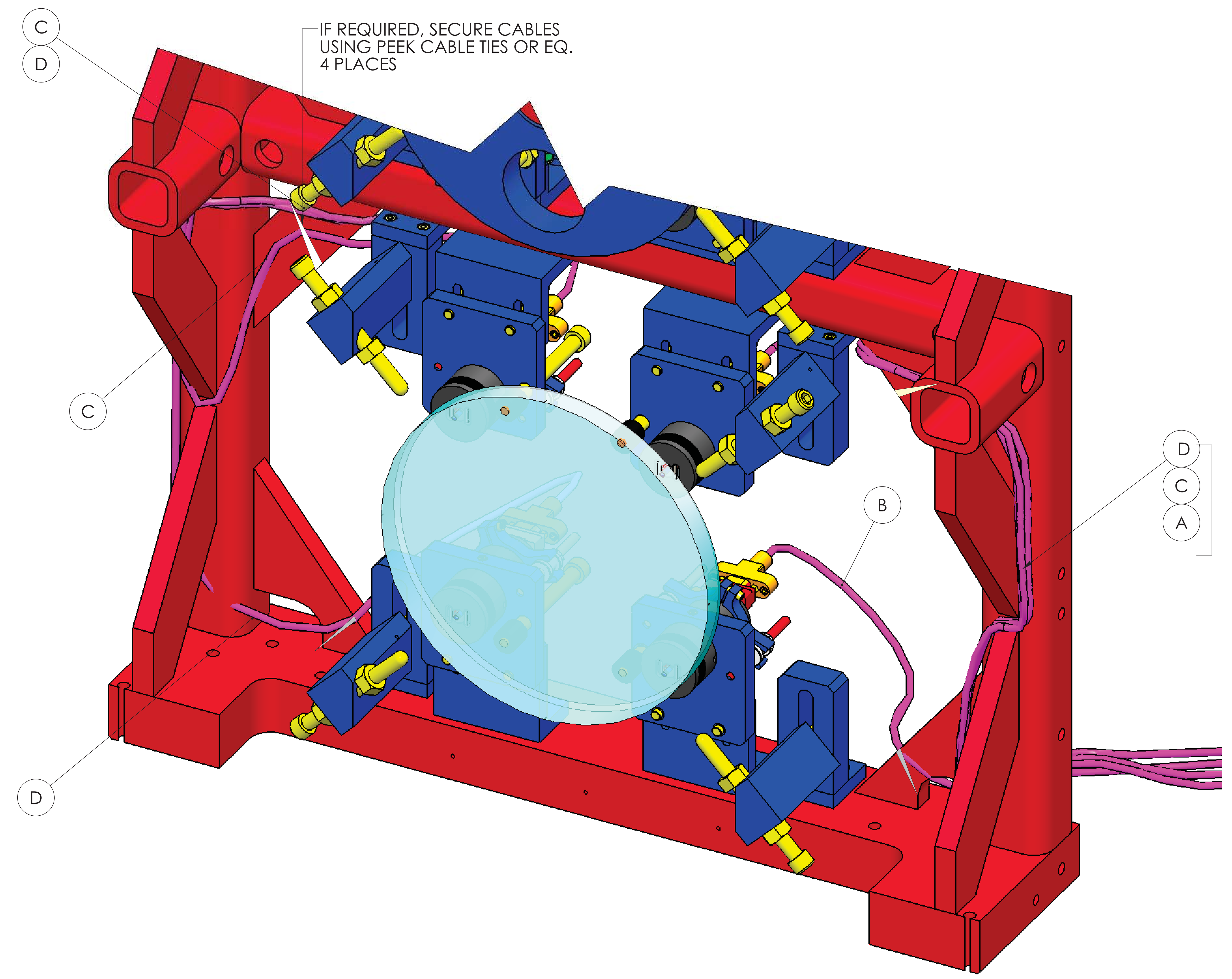
SEE SHEET 1, TABLE 1 ; FOR CABLING SPECIFICATIONS.

FOR SYSTEM CABLING DIAGRAM, CABLE BRACKET LOCATION/ORIENTATION WRT CHAMBER, & ROUTING LAYOUT SEE D1101463.

PR2

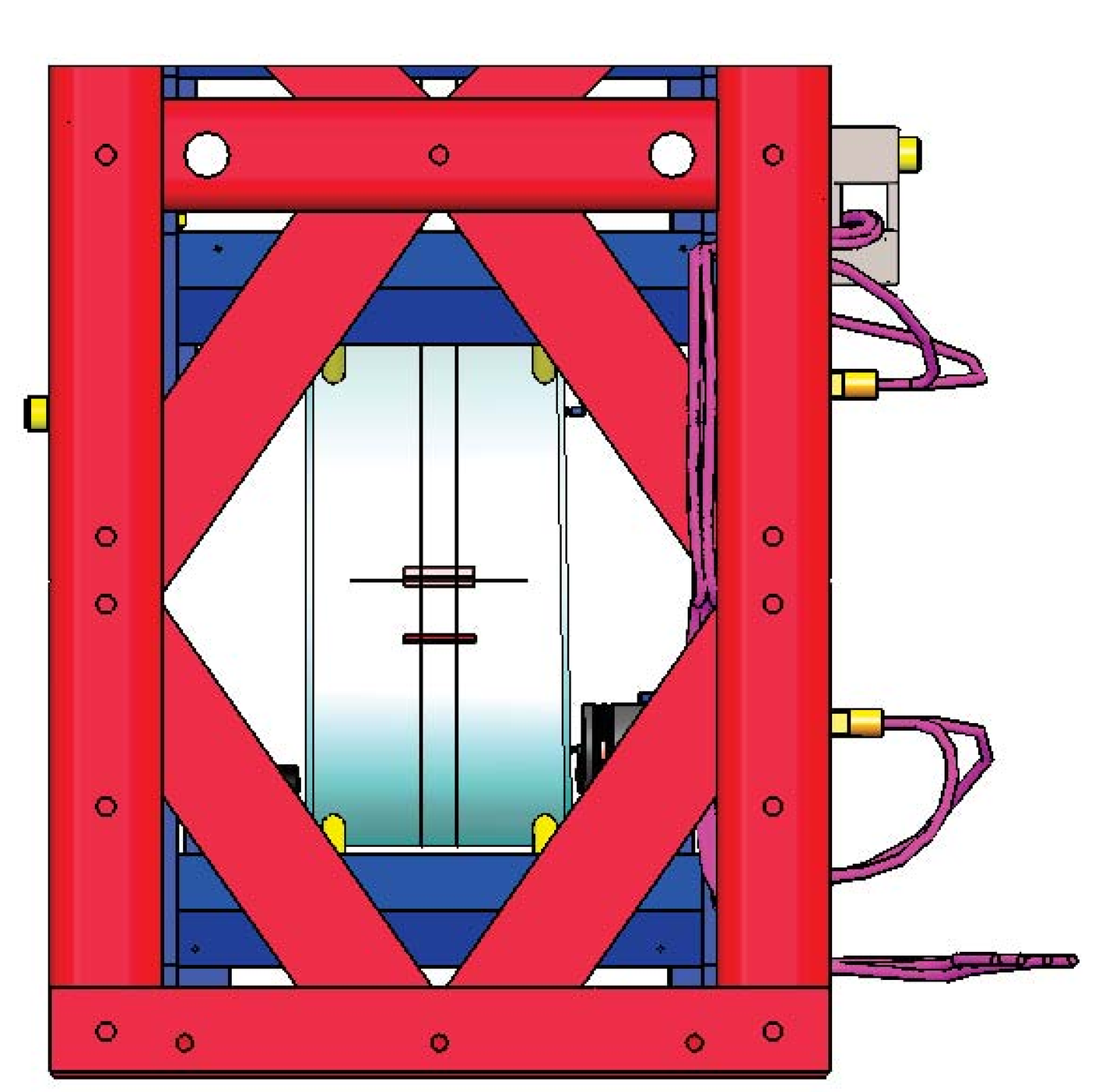


AR SIDE 1.5
ISO VIEW - REAR LEFT (-X)

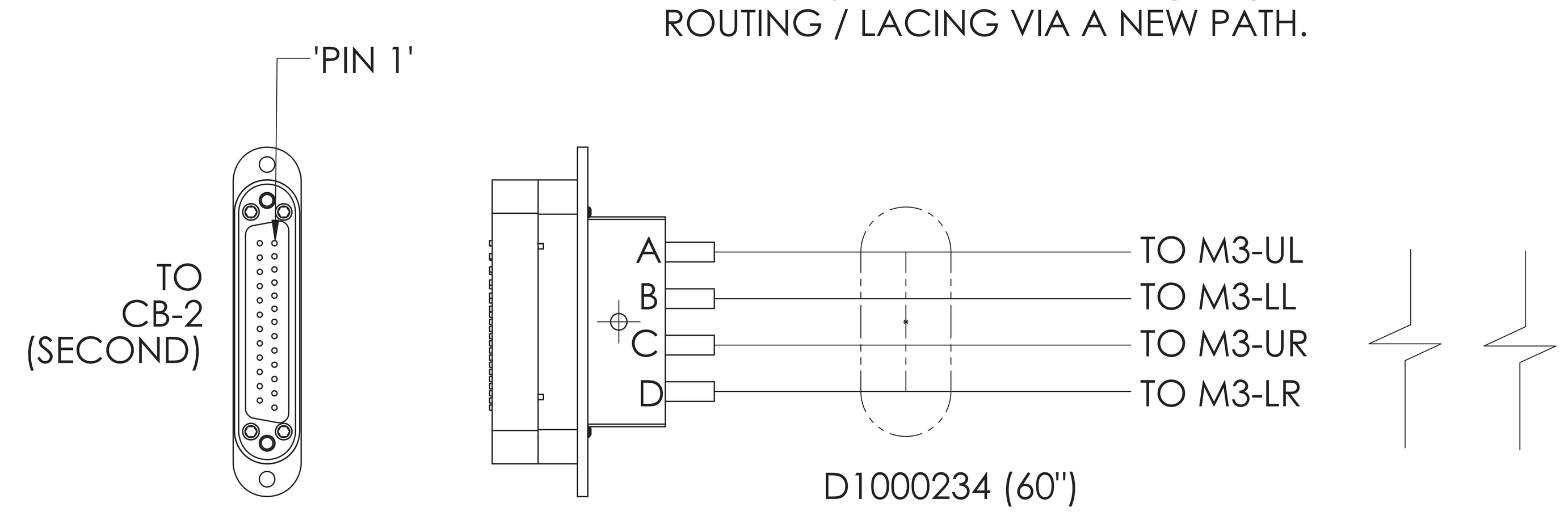


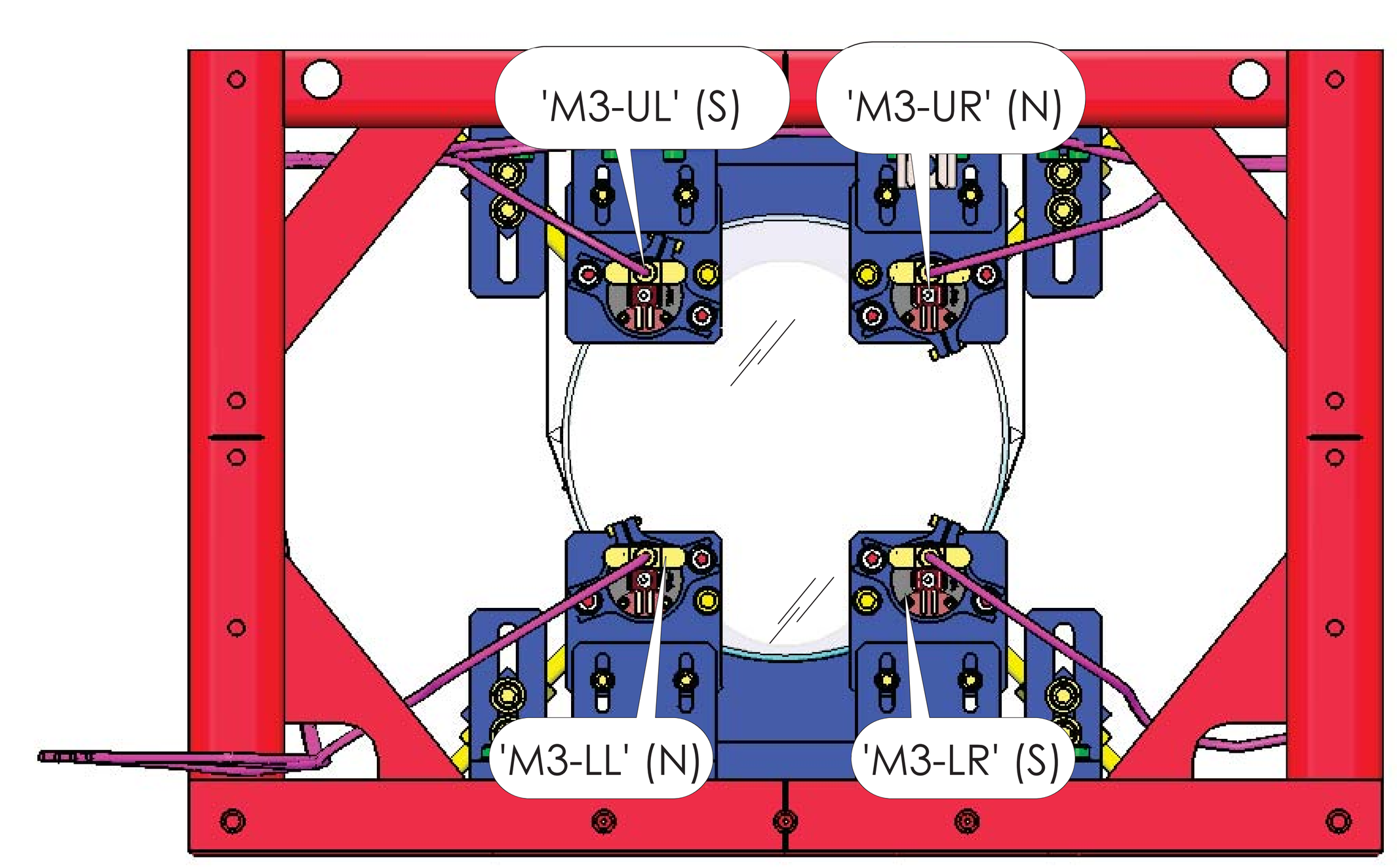
ISO VIEW- FRONT LEFT
BROKEN OUT SECTION
(AS VIEWED FROM INSIDE)

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.

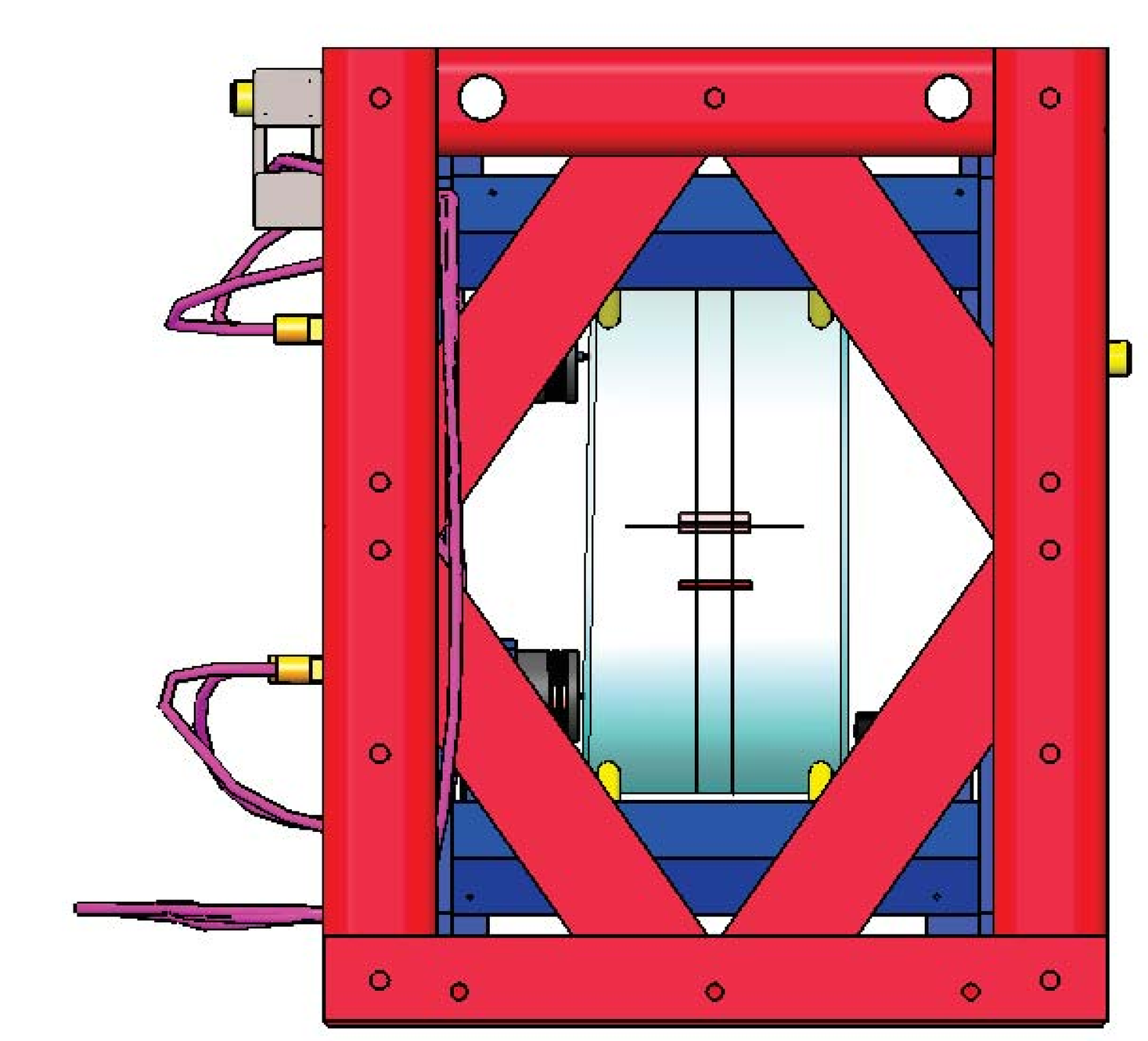


LEFT SIDE (+Y)





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



RIGHT SIDE (-Y)

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

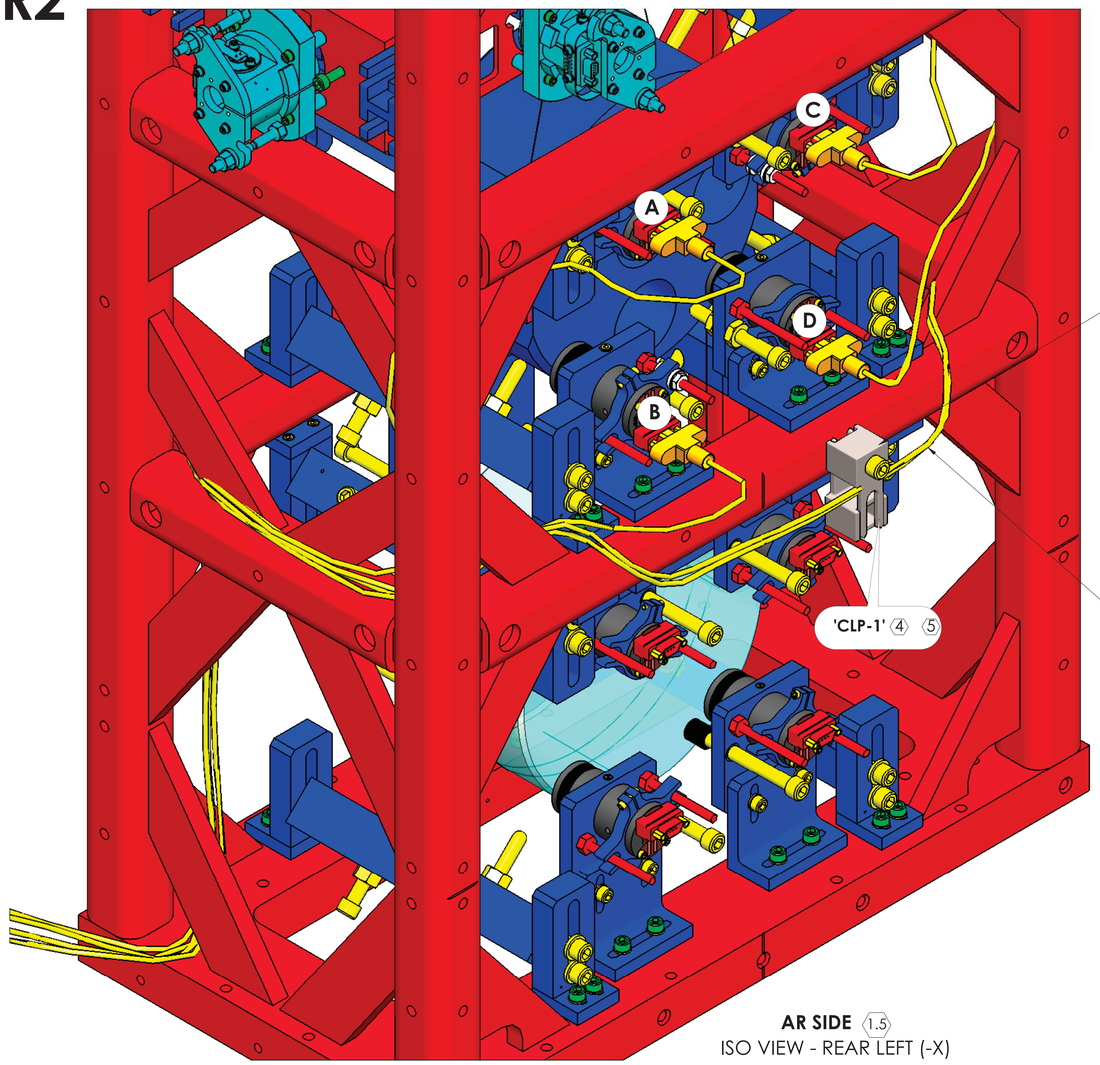
SEE LIGO-T1200318
FOR STEP BY STEP CABLING GUIDE

LIGO	CALIFORNIA INSTITUTE OF TECHNOLOGY MASSACHUSETTS INSTITUTE OF TECHNOLOGY	
SIZE: E	DWG. NO.: D0901098	REV.: v2
SCALE: 1:4	PROJECTION:	SHEET 4 OF 9

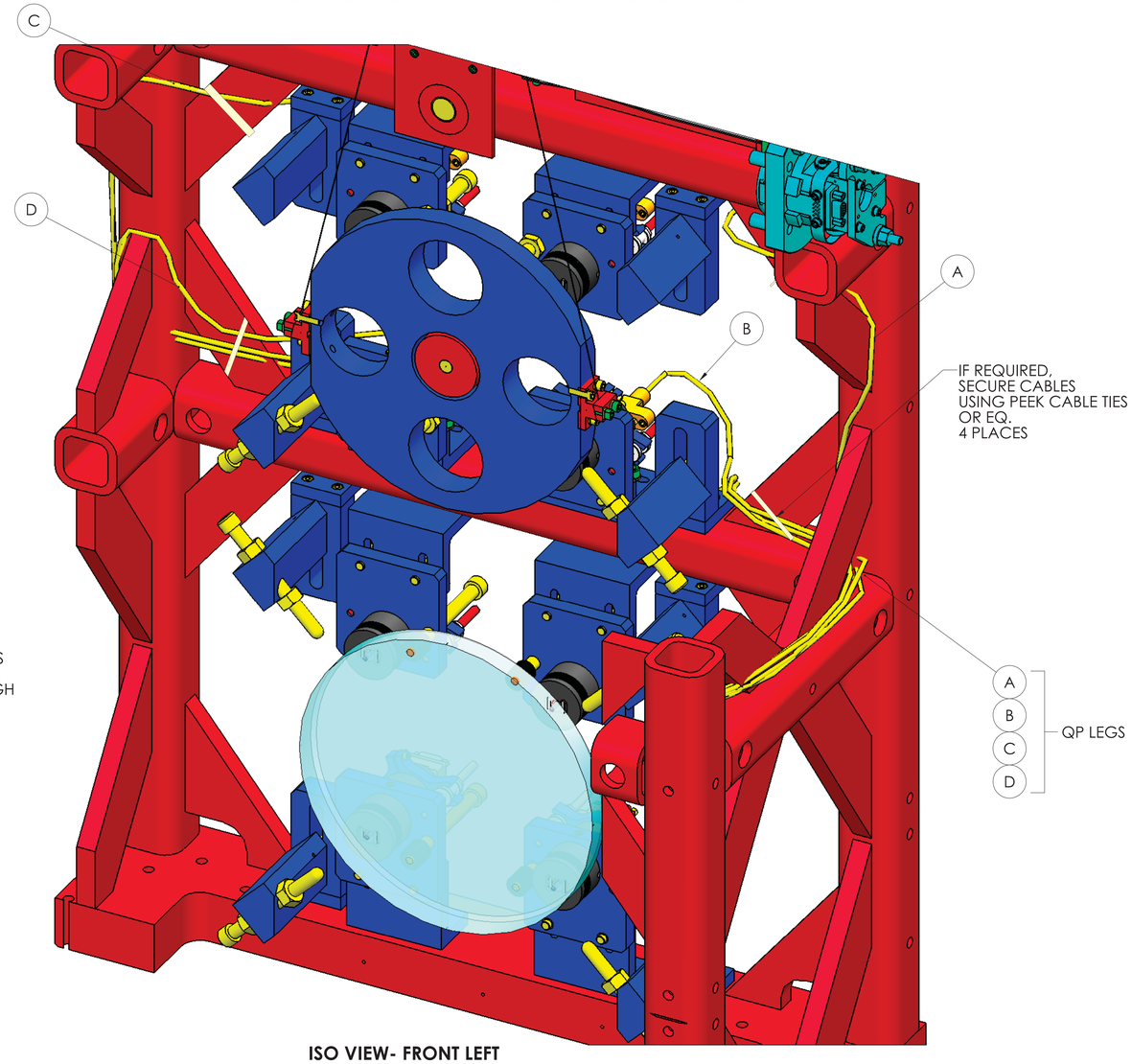
SEE SHEET 1, TABLE 1 ; FOR CABLING SPECIFICATIONS.

FOR SYSTEM CABLING DIAGRAM, CABLE BRACKET LOCATION/ORIENTATION WRT CHAMBER, & ROUTING LAYOUT SEE D1101463.

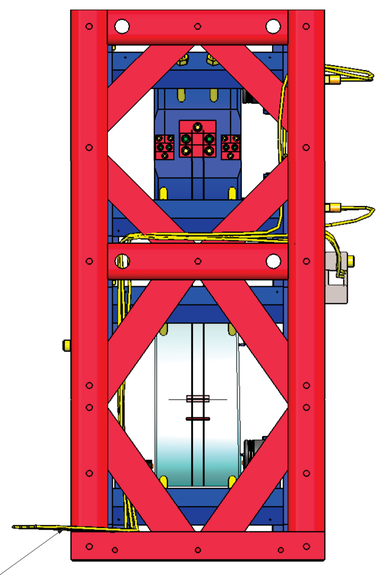
PR2



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



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

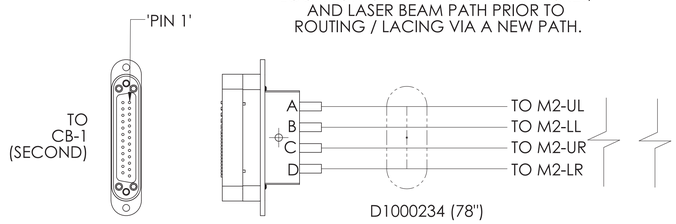


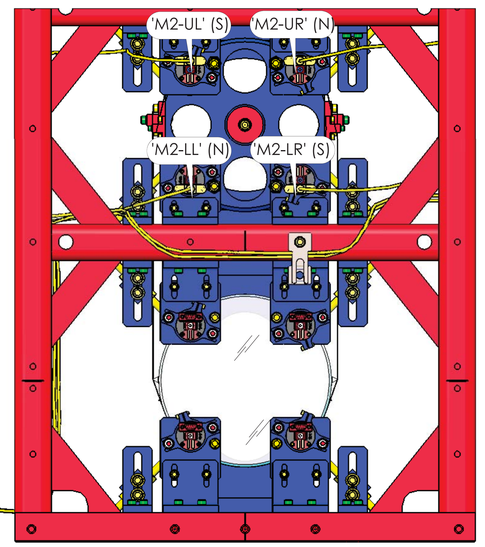
LEFT SIDE (+Y)

A
B
C
D
QP LEGS LACED THROUGH LEFT SIDE BOTTOM LEFT GUSSET

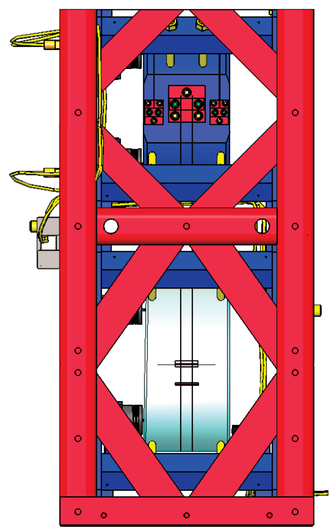
WARNING

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.





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



RIGHT SIDE (-Y)

ROUTE NO. 2

SEE LIGO-T1200318
FOR STEP BY STEP CABLING GUIDE

LIGO CALIFORNIA INSTITUTE OF TECHNOLOGY MASSACHUSETTS INSTITUTE OF TECHNOLOGY

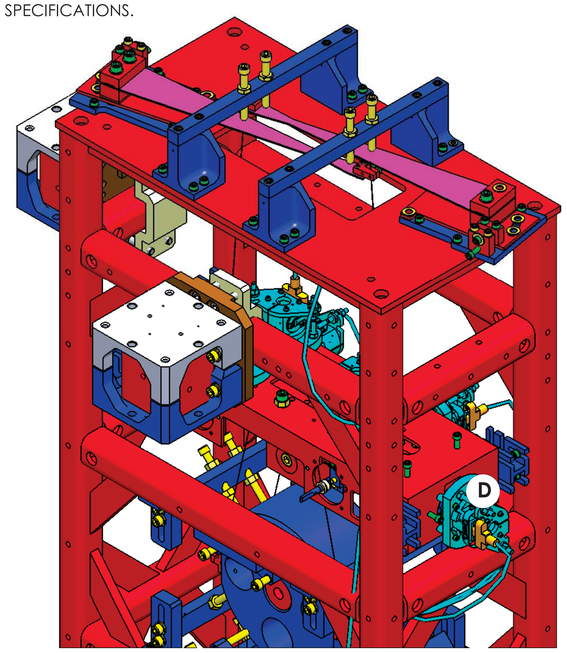
SIZE	DWG. NO.	REV.
E	D0901098	v2

SCALE: 1:4 PROJECTION: SHEET 5 OF 9

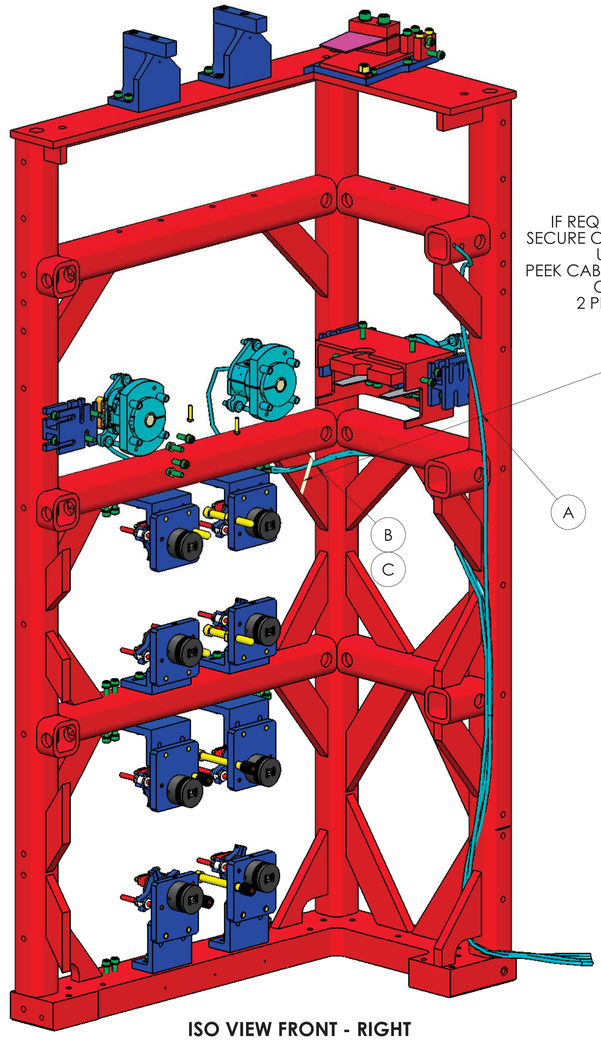
SEE SHEET 1, TABLE 1 ; FOR CABLING SPECIFICATIONS.

FOR SYSTEM CABLING DIAGRAM, CABLE BRACKET LOCATION/ORIENTATION WRT CHAMBER, & ROUTING LAYOUT SEE D1101463.

PR2

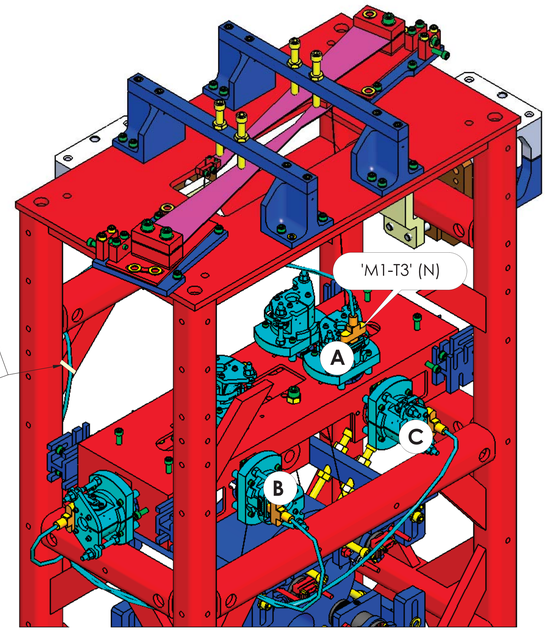


HR SIDE
ISO VIEW, FRONT - LEFT (+X)

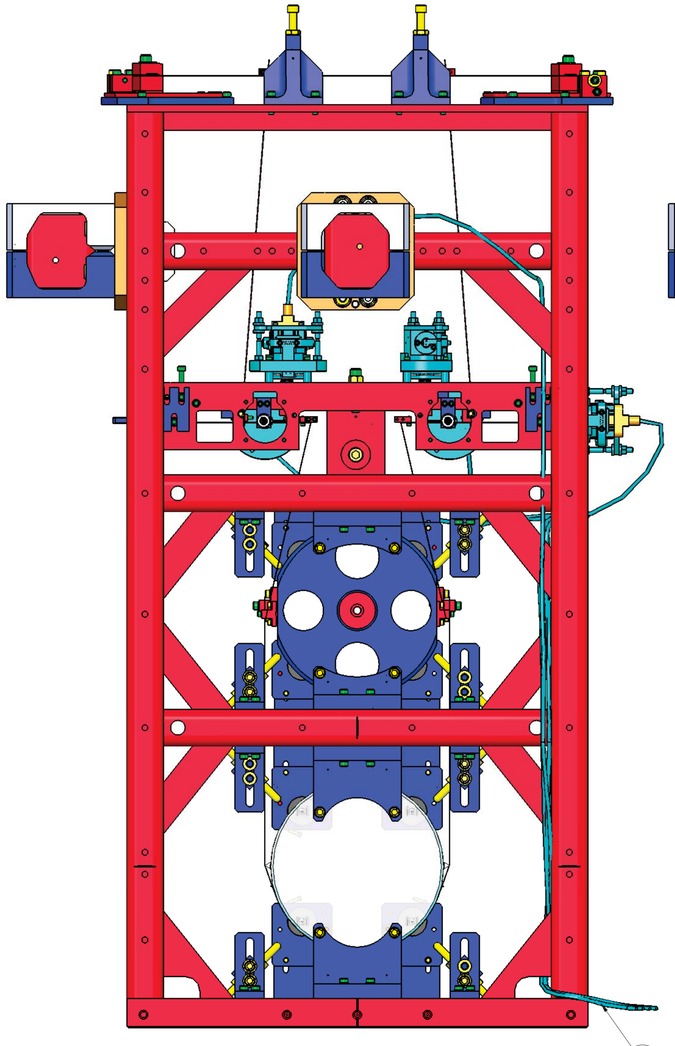


ISO VIEW FRONT - RIGHT
BROKEN OUT SECTION
(AS VIEWED FROM INSIDE)

IF REQUIRED, SECURE CABLES USING PEEK CABLE TIES OR EQ. 2 PLACES

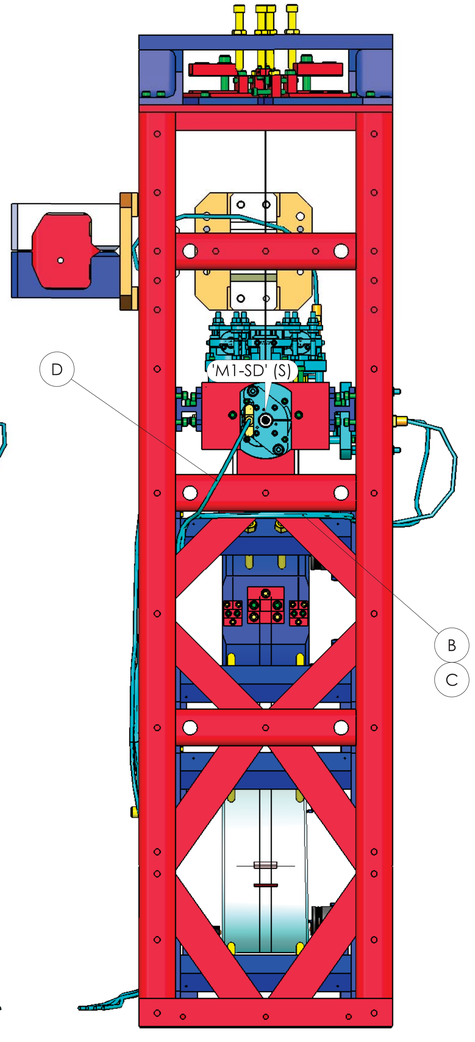


AR SIDE 1.1 1.2
ISO VIEW, REAR - LEFT (-X)

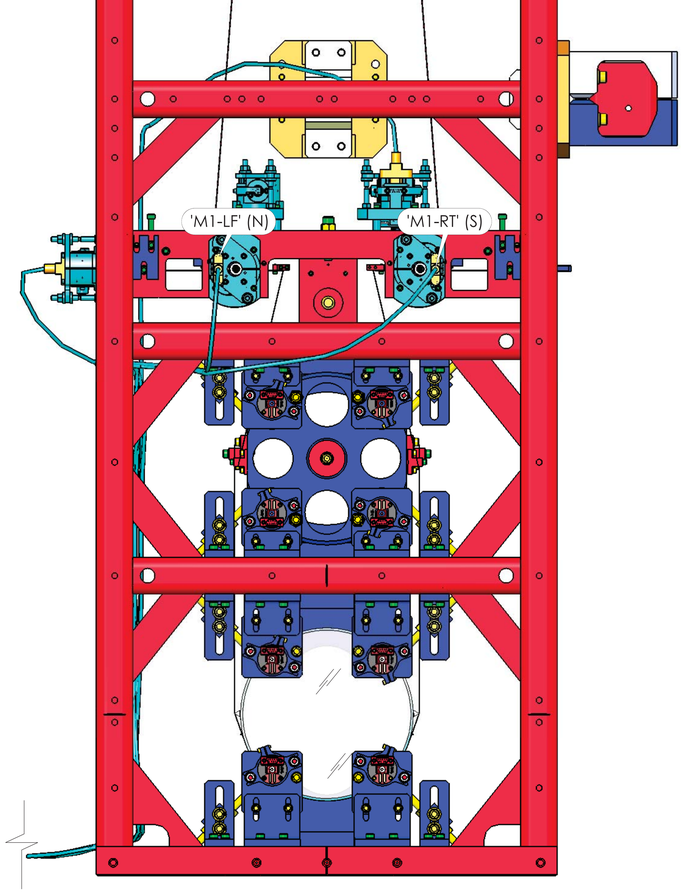


HR SIDE - FRONT (+X)
(END CONNECTORS, NOT SHOWN FOR CLARITY)

QP LEGS LACED THROUGH HR SIDE BOTTOM RIGHT GUSSET



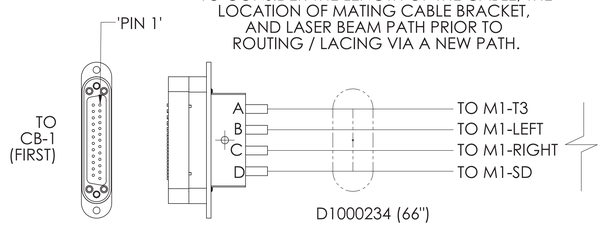
LEFT SIDE (+Y) 1.1 1.2



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

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.



ROUTE NO. 3

SEE LIGO-T1200318
FOR STEP BY STEP CABLING GUIDE

LIGO CALIFORNIA INSTITUTE OF TECHNOLOGY
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

SIZE	DWG. NO.	REV.
E	D0901098	v2

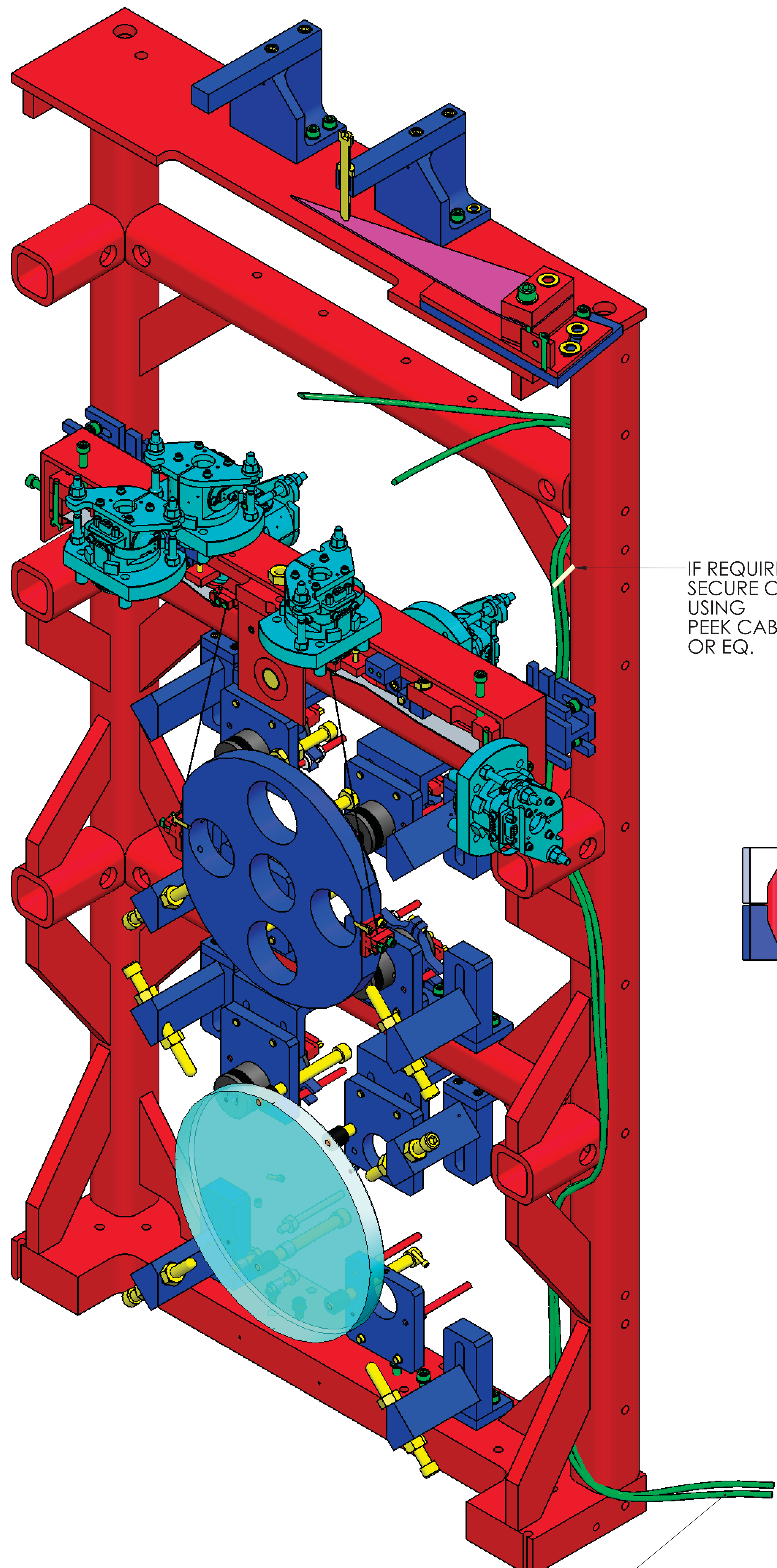
SCALE: 1:4 PROJECTION: SHEET 6 OF 9

SEE SHEET 1, TABLE 1 ; FOR CABLING SPECIFICATIONS.

FOR SYSTEM CABLING DIAGRAM, CABLE BRACKET LOCATION/ORIENTATION WRT CHAMBER, & ROUTING LAYOUT SEE D1101463.

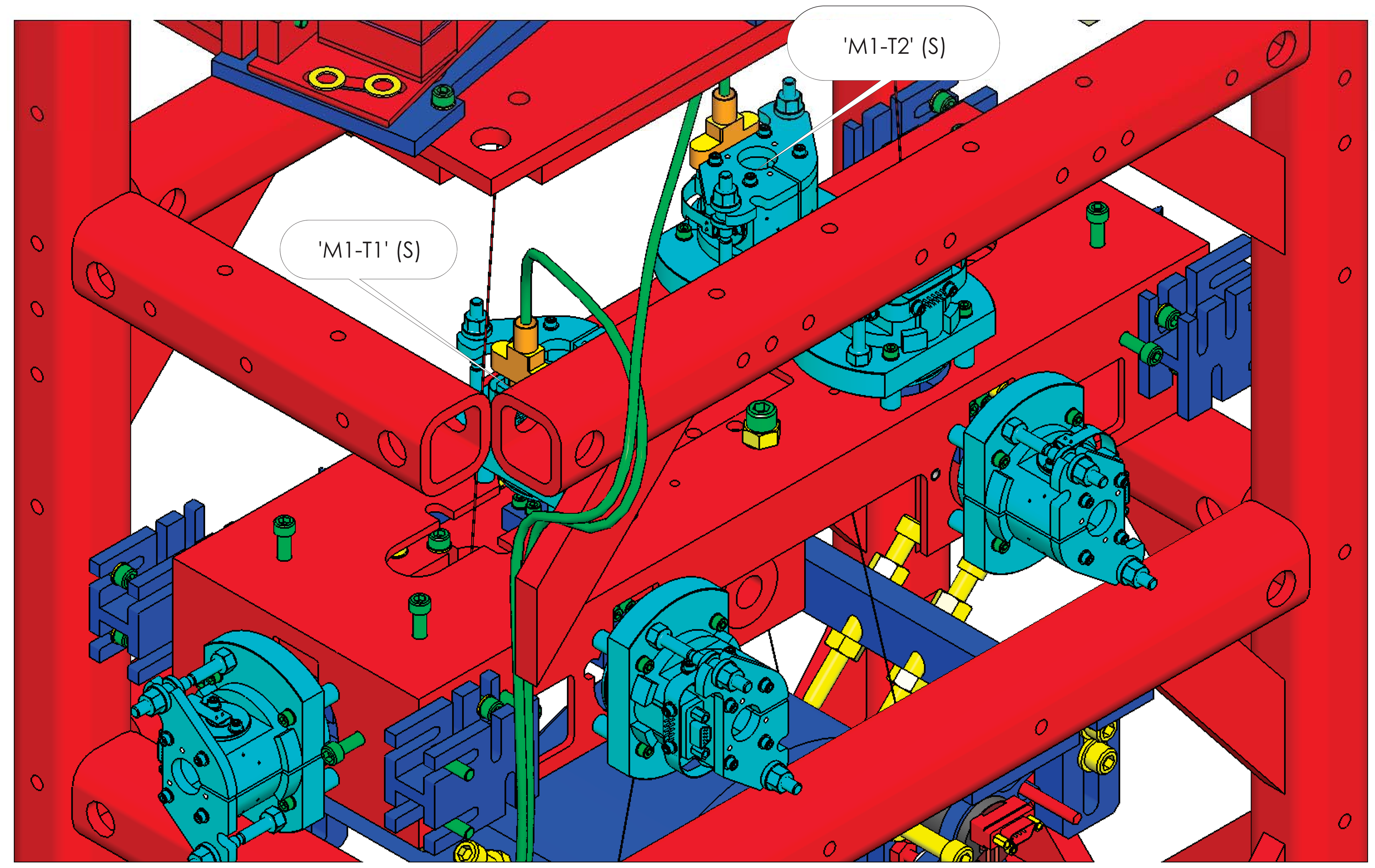
PR2

(SHARED)

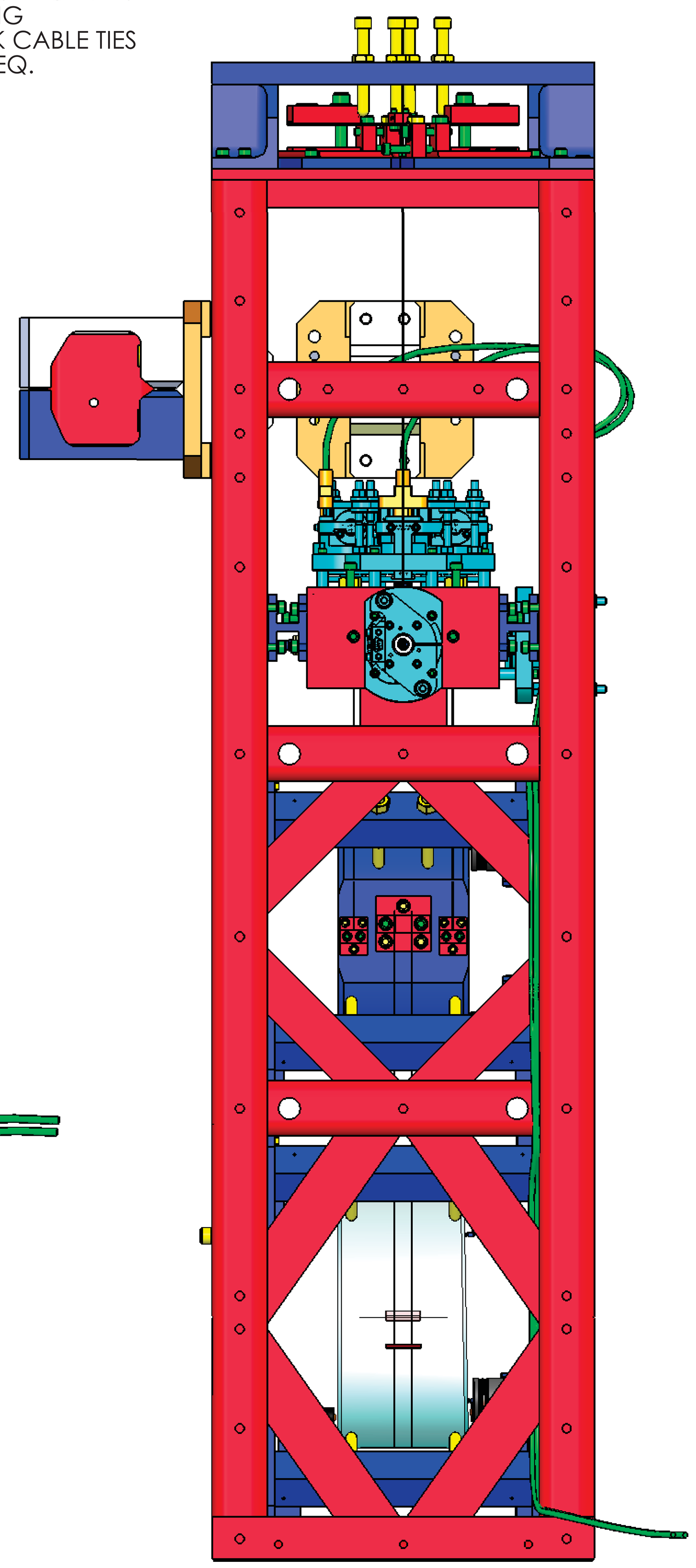


ISO VIEW FRONT - LEFT
BROKEN OUT SECTION
(AS VIEWED FROM INSIDE)

QP LEGS LACED
LEFT SIDE BOTTOM
RIGHT GUSSET



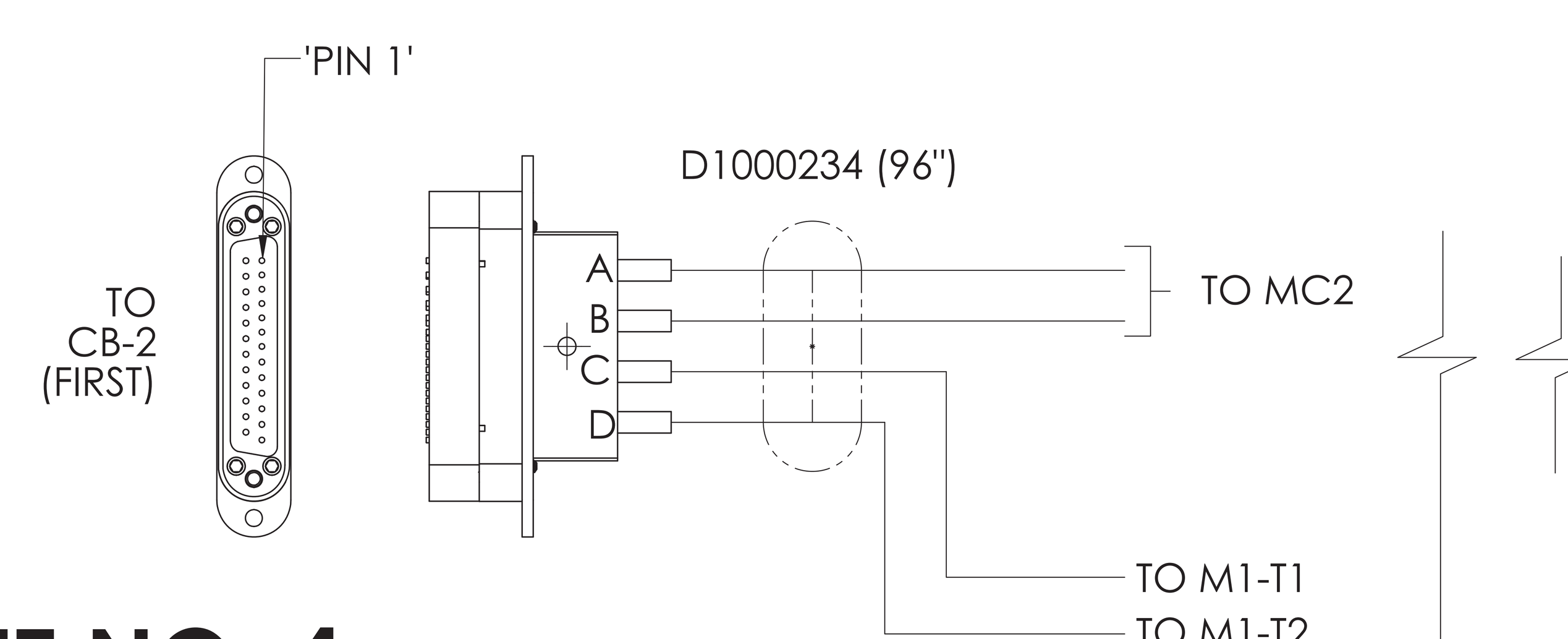
AR SIDE 1.1 1.2
ISO VIEW, REAR - LEFT (-X)

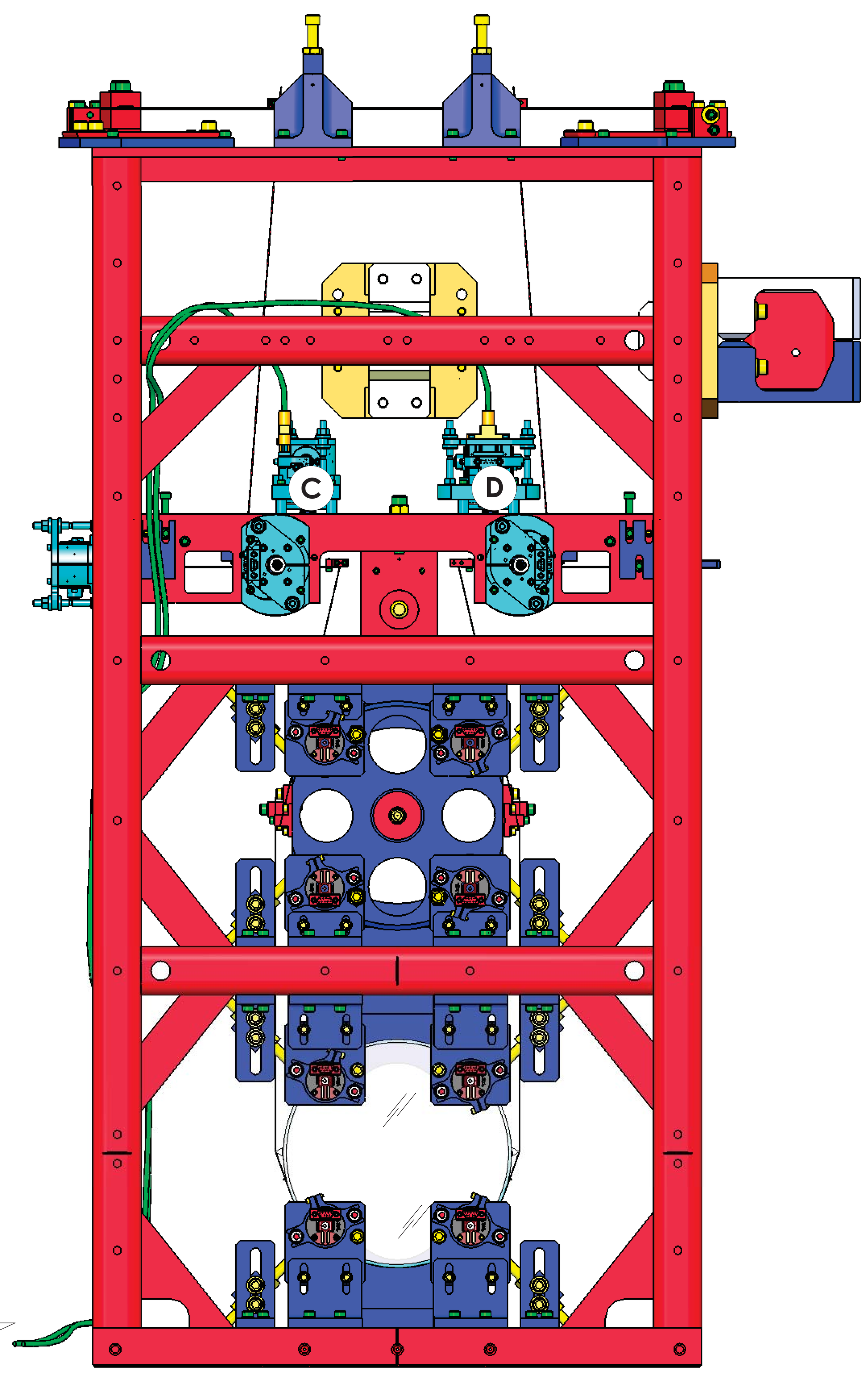


LEFT SIDE (+Y)

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.





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

ROUTE NO. 4

SEE LIGO-T1200318
FOR STEP BY STEP CABLING GUIDE

LIGO	CALIFORNIA INSTITUTE OF TECHNOLOGY MASSACHUSETTS INSTITUTE OF TECHNOLOGY
SIZE: E	DWG. NO.: D0901098
REV.	v2
SCALE: 1:4	PROJECTION:

SEE SHEET 1, TABLE 1 ; FOR CABLING SPECIFICATIONS.

PR2

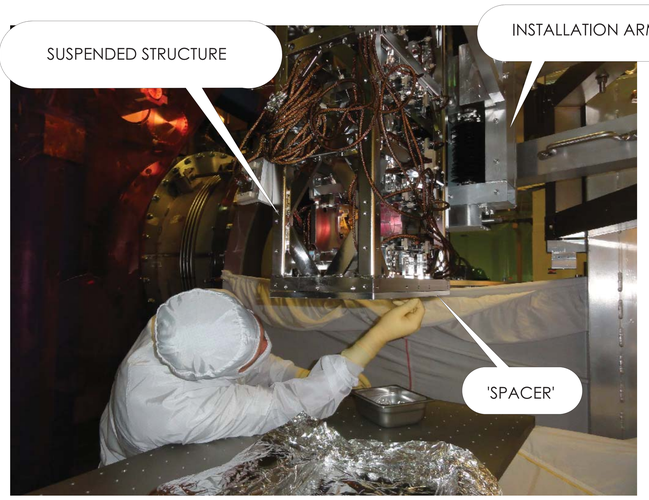


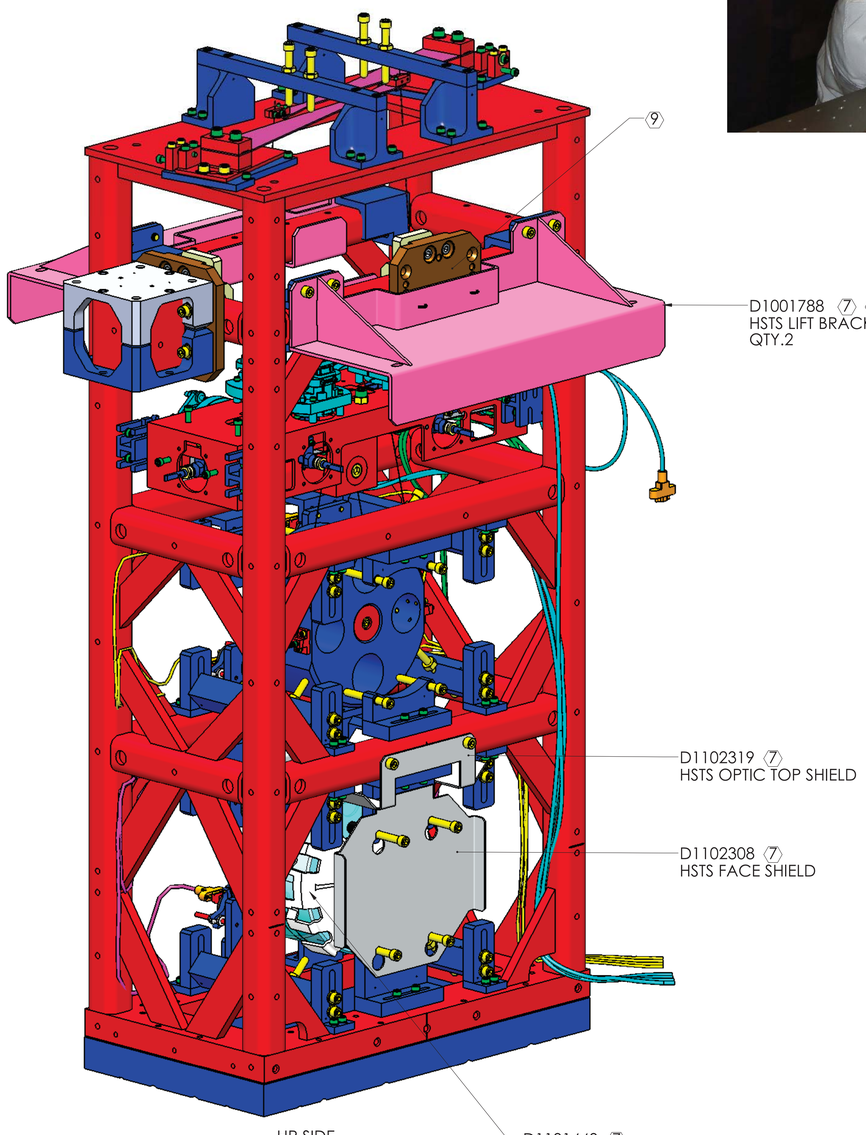
FIG 1.0: SPACER INSTALLATION 〈10〉

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

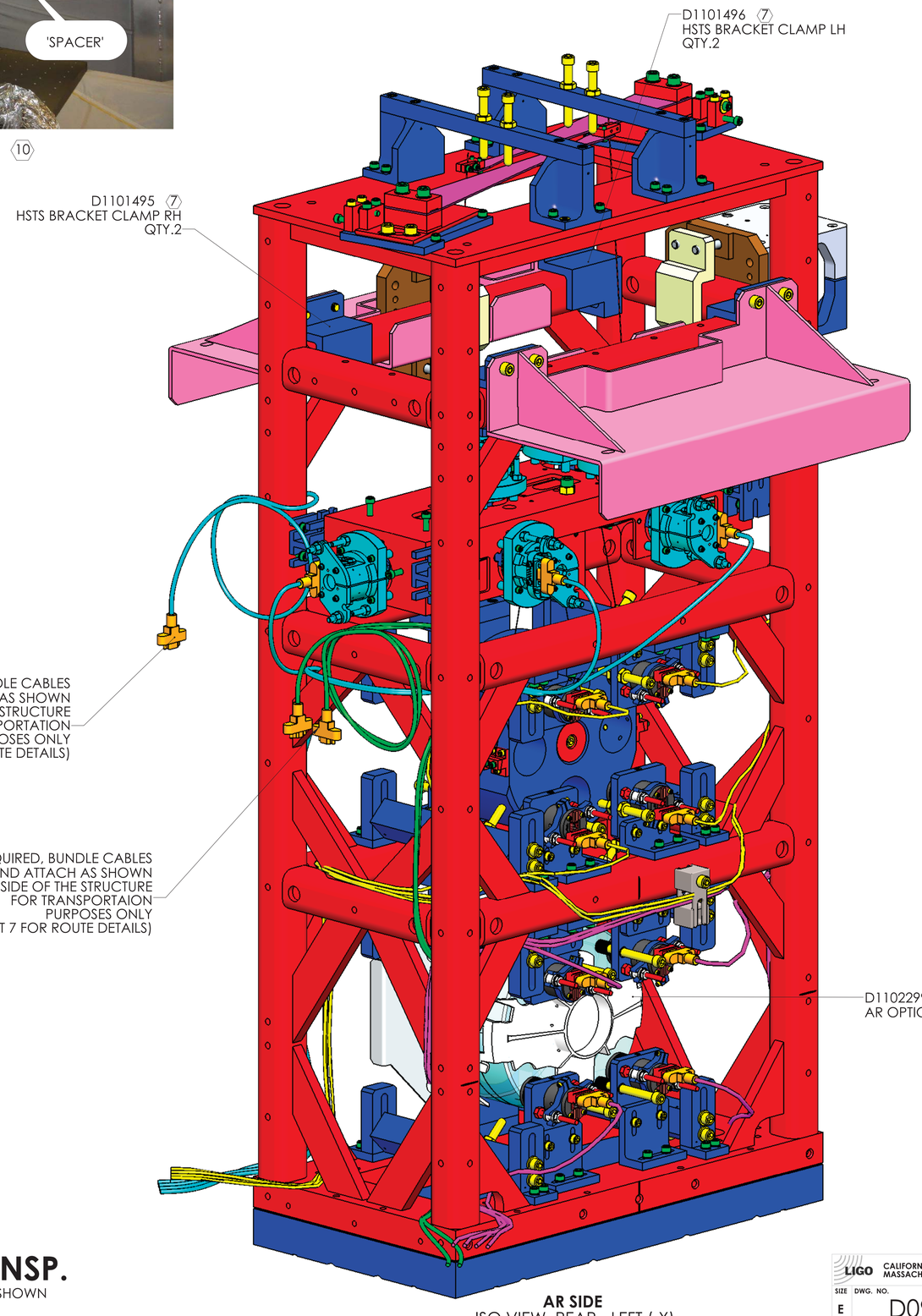
〈8〉 REMOVE INDICATED ITEMS FOR TRANSPORTATION PURPOSES. BUNDLE CABLES AS SHOWN.

〈9〉 REMOVE VIBRATION ABSORVER ON FRONT SIDE TO AVOID INTERFERENCE WITH LIFT BRACKET.
9.1 LOCKING PINS: RETAIN IN PLACE FOR TRANSPORTATION AND INSTALLATION ONLY. REMOVE BEFORE CHAMBER DOORS ARE CLOSED.

〈10〉 LIFT STRUCTURE VIA ISTALLATION ARM AT CHAMBER SIDE. ATTACHED ITEM 2 (SPACER) USING ITEM 6 (SCREW). TORQUE TO 75 IN LB. SEE FIG 1.0 FOR REFERENCE.



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



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

HSTS STRUCTURE TRANSP.

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

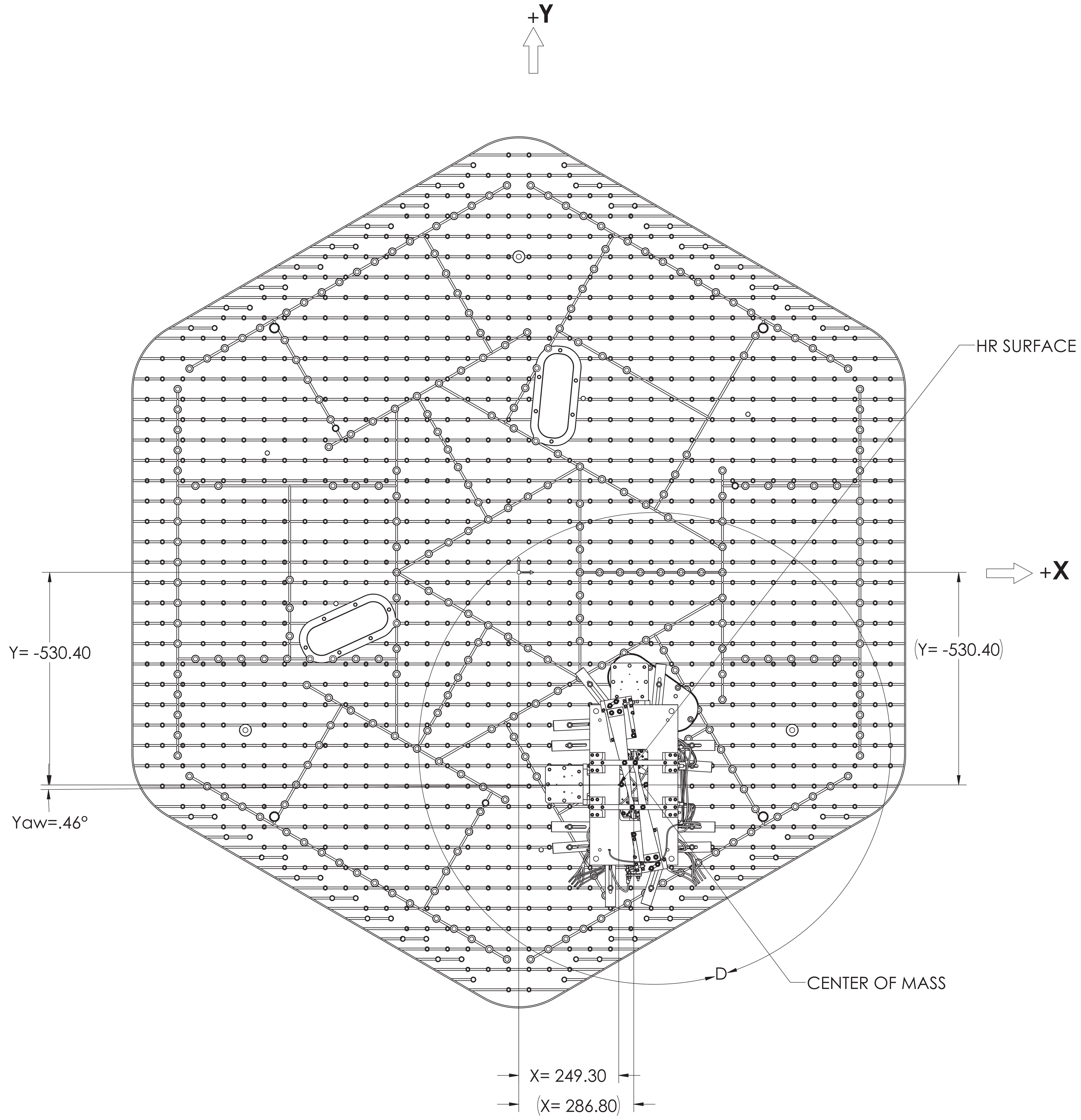
LIGO CALIFORNIA INSTITUTE OF TECHNOLOGY
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

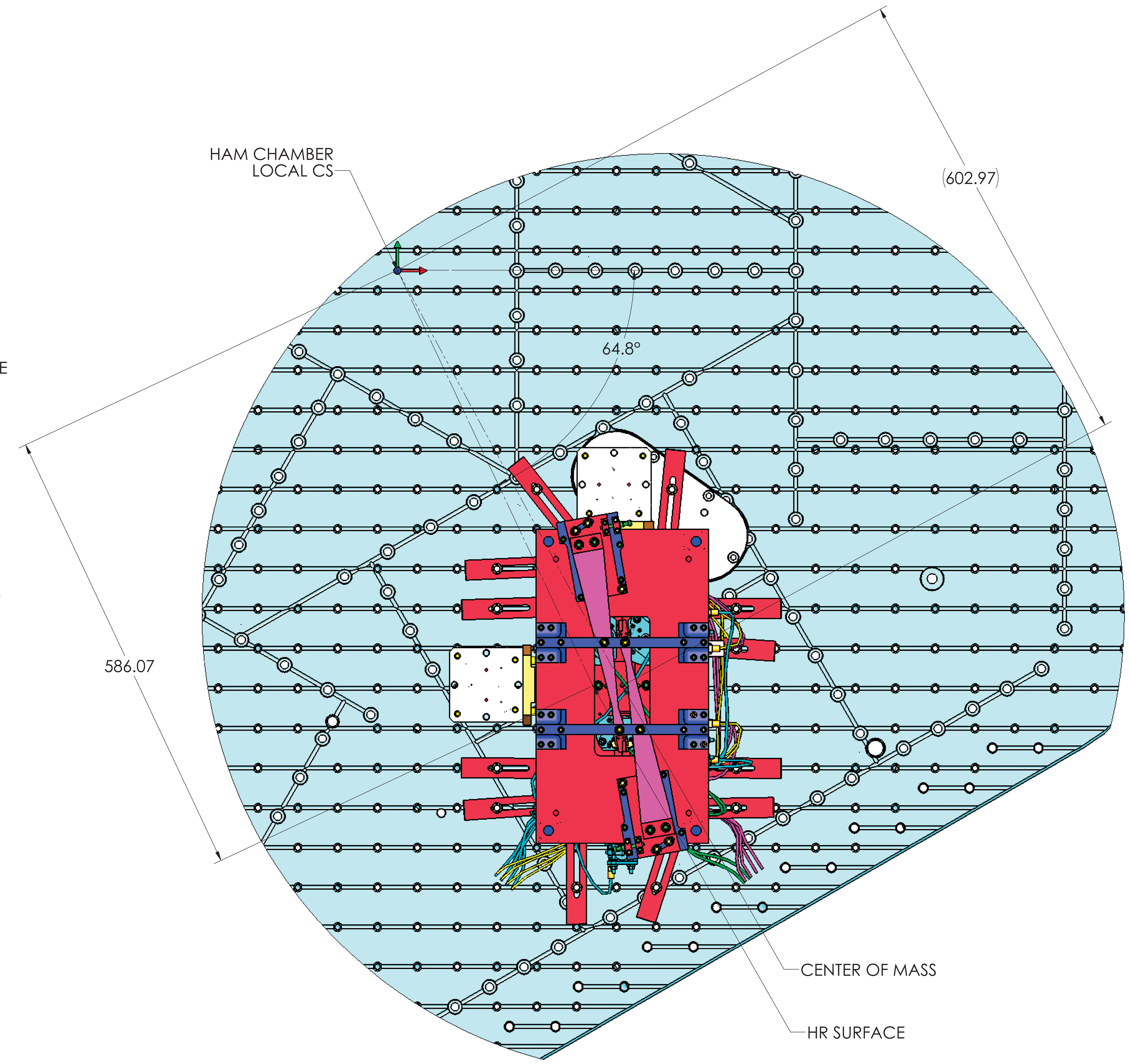
SIZE	DWG. NO.	REV.
E	D0901098	v2

SCALE: 1:4 PROJECTION: SHEET 8 OF 9

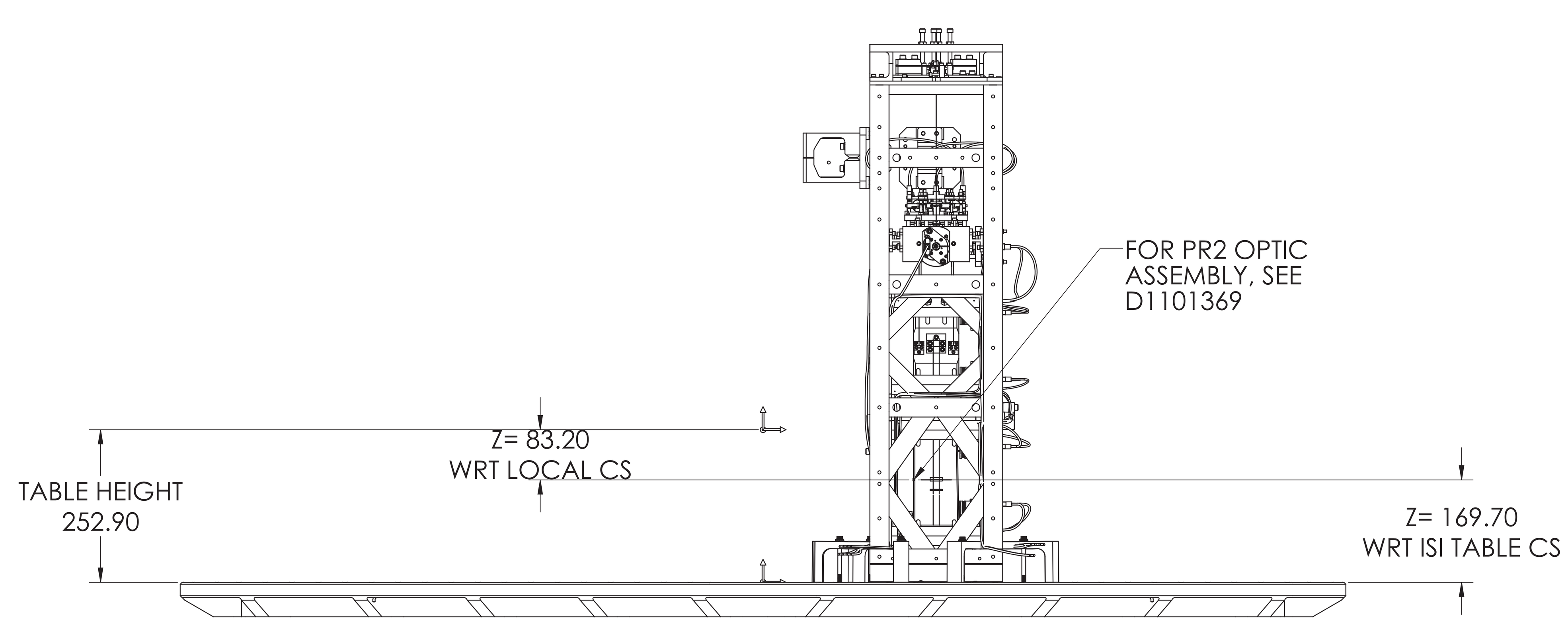
D0901098 AdvLIGO SUS HAM3-H1_XYZ Locust CS for HSTS (PR2) Sub-Assy, PART PDM REV: X 699, DRAWING PDM REV: X 655

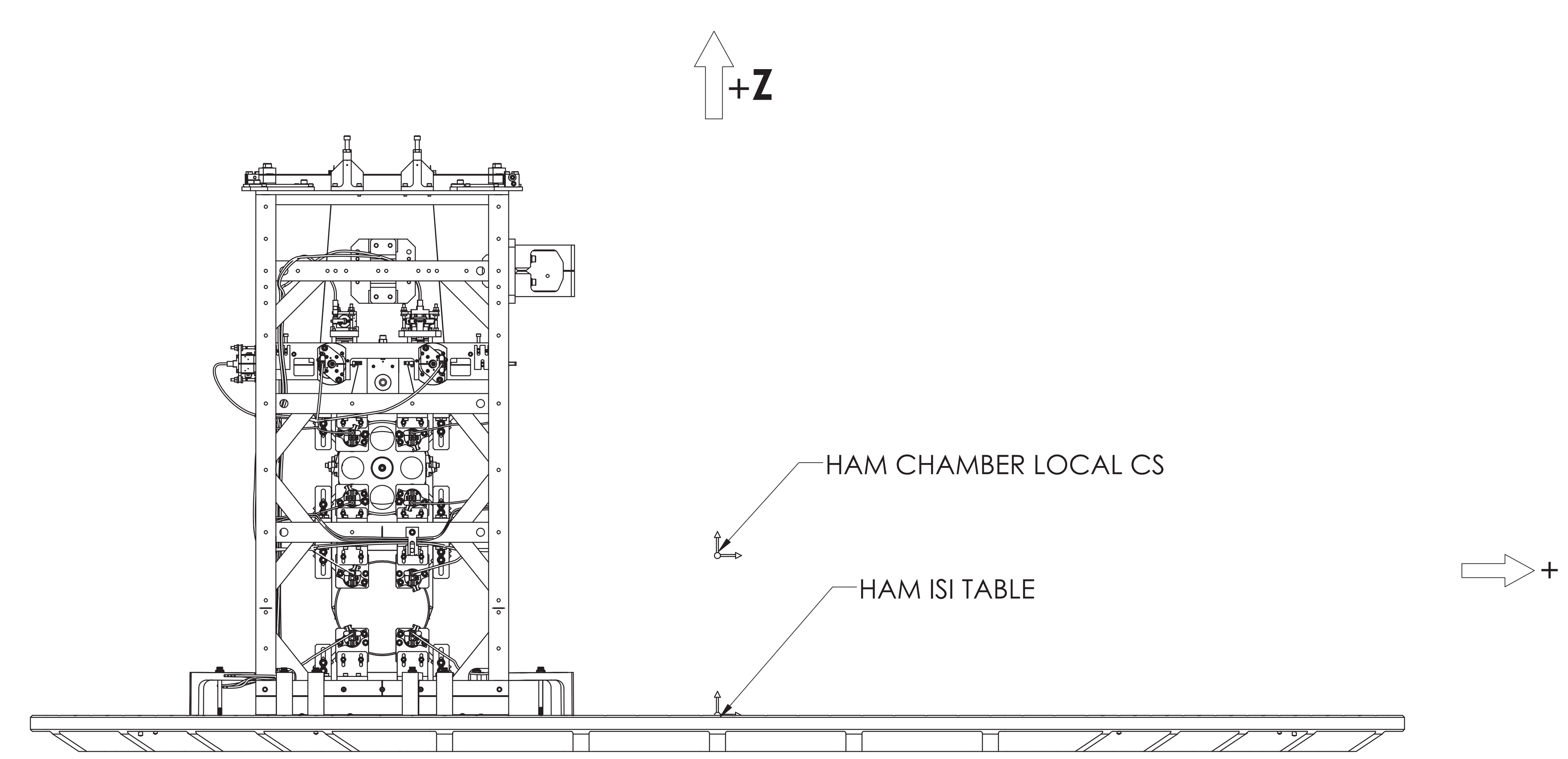
PR2





DETAIL D
SCALE 1 : 3





LOCAL COORDINATES DEFINITIONS

NOTE: DIMENSION IN PARENTHESIS (REFEENCE DIMIENSIONS), ARE FROM CENTER OF MASS.

LIGO CALIFORNIA INSTITUTE OF TECHNOLOGY
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

SIZE	DWG. NO.	REV.
E	D0901098	v2

SCALE: 1:4 PROJECTION: SHEET 9 OF 9