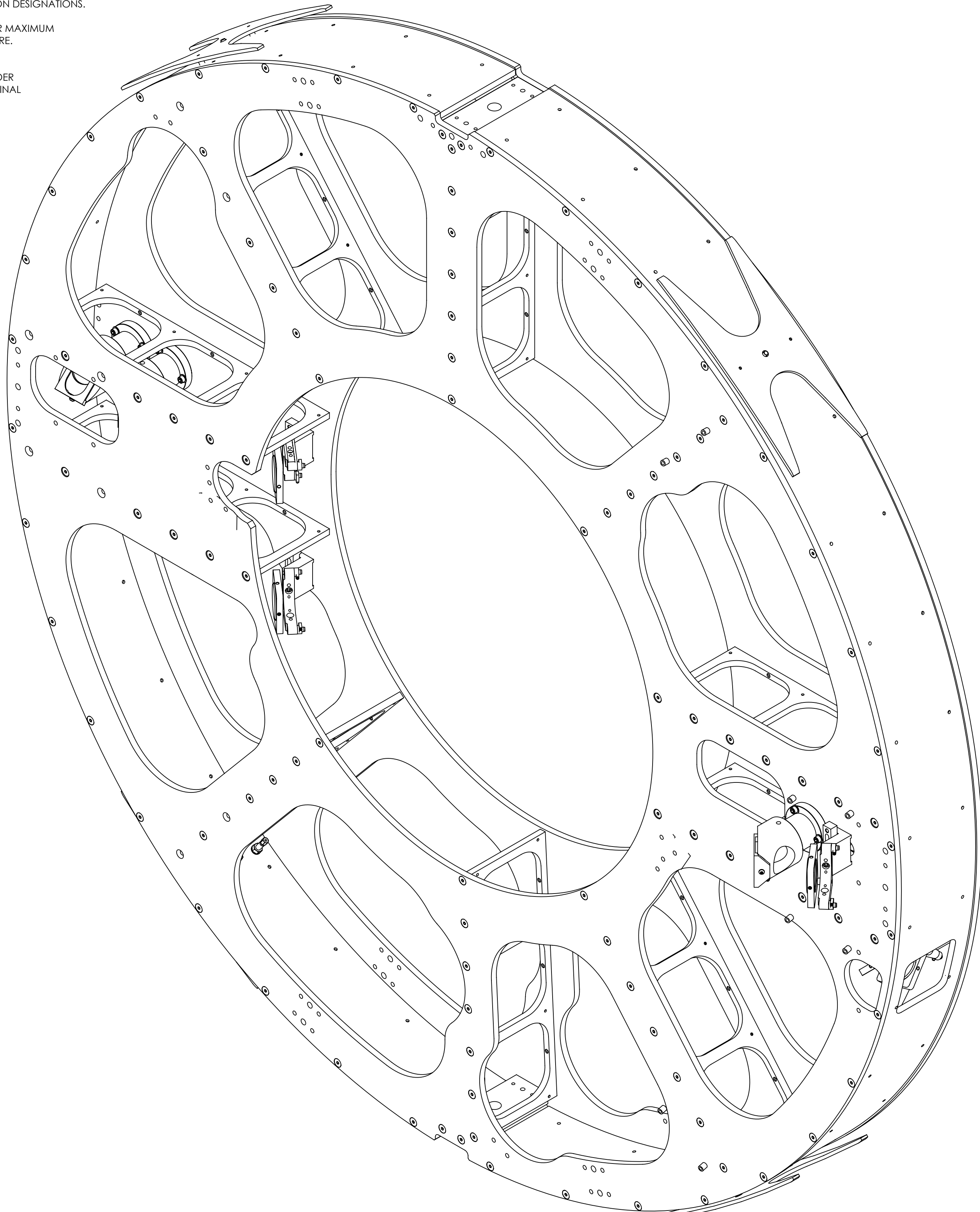


NOTES CONTINUED:

2. APPROXIMATE WEIGHT = 293.42 LB.
3. THIS ASSEMBLY IS TO BE BUILT AND PRE-ALIGNED ACCORDING TO PROCEDURE E1300564.
4. INSTALL ALL MIRROR MOUNTS/BASES WITH SLOTS CENTERED ON MOUNTING HOLES, EXCEPT WHERE OTHERWISE NOTED.
5. USE ITEM 10 AS STRONGBACK OVER ITEMS 6, 7, 8, & 9 TO PREVENT CONTORTION FROM MOUNTING LOADS.
6. AFTER PRE-ALIGNMENT AND REMOVAL OF EACH ITEM 12 MIRROR MOUNT, ENGRAVE EACH ITEM 12 WITH NOTED UNIQUE DESIGNATION. APPLY TO FRONT OF MIRROR FRAME ADJACENT TO MOUNTING HOLE USED. SEE E1300751 FOR COMPLETE MAP OF MIRROR MOUNT DESIGNATIONS.
7. SEE DRAWING D1200176 FOR ITEM 12 ORIENTATION DESIGNATIONS.
8. SPECIFIED ORIENTATION OF NOTED ITEM 12 IS FOR MAXIMUM CLEARANCE OF MANIFOLD CRYO BAFFLE APERTURE.
10. INSTALL ITEMS 13 AT ROUGH FINAL INSTALLATION POSITIONING OF THIS ASSEMBLY IN A7 ADAPTER OER E1300477, SECTION 2.5. ADJUST ITEMS 13 AT IAS FINAL ALIGNMENT OF THIS ASSEMBLY PER E1300477, SECTION 2.5.



**-01 SHOWN (Y-ARM)**  
**-02 OPPOSITE (X-ARM)**

REV.	DATE	DCN #	DRAWING TREE #
v1	31 JAN 2012	-	-
v8	26 FEB 2018	E1800017-x0	-
v9	20 SEP 2019	E1900182-x0	-

**PARTIAL PCAL PERISCOPE BOM**  
 (LESS PCAL CAM RELAY MIRRORS, ASSOCIATED MOUNTS, PCAL SHIELDS AND BARREL BAFFLE)  
 FOR PCAL SHIELDS AND BARREL BAFFLE BOM, SEE PG. 8  
 FOR 03 ADDITIONS, SEE PG. 21-22)

ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	-01 (Yarm)/QTY.	-02 (Xarm)/QTY.
20	D1201203	αLIGO AOS PCAL PERISCOPE FLEXURE	MARAGING STEEL C250	4	4
19	98017A690 (McM-Carr) or equiv PER NAS 1149-C0563R	WASHER, FLAT, 5/16	300 SSSL	8	8
18	91845A030 (McM-Carr) or equiv	HEX NUT, 5/16-18	300 SSSL	8	8
17	92240A550 (McM-Carr) or equiv	SCREW, HEX HEAD, 1/4-20 UNC X 2 LONG	300 SSSL	4	4
16	98017A660 (McM-Carr) or equiv PER NAS 1149-C0463R	WASHER, FLAT, 1/4 (NAS 1149-C416 OR EQUIVALENT)	300 SSSL	4	4
15	91845A029 (McM-Carr) or equiv	HEX NUT, 1/4-20	300 SSSL	4	4
14	D1201408	αLIGO PCAL PERISCOPE FLEXURE ADJUSTMENT SCREW	NITRONIC 60	8	8
13	92196A539 (McM-Carr) or equiv	SCREW, SOCKET HEAD CAP, 1/4-20 UNC-2A X 0.625 LONG	300 SSSL	5	5
12	D1200176	αLIGO PCAL MIRROR MOUNT ASSEMBLY, ETM BEAM	N/A	5	5
11	92200A544 (McM-Carr) or equiv	SCREW, SOCKET HEAD CAP, 1/4-20 UNC-2A X 1.25 LONG	300 SSSL	5	5
10	CL2 (ThorLabs)	TABLE CLAMP, UNANODIZED	6061-T6 Al	5	5
9	D1200172-4	αLIGO PCAL MIRROR MOUNT BASE, ZERO ANGLE	N/A	1	1
8	D1200172-3	αLIGO PCAL MIRROR MOUNT BASE, 49.38 DEG.	N/A	2	2
7	D1200172-2	αLIGO PCAL MIRROR MOUNT BASE, 43.72 DEG.	N/A	1	1
6	D1200172-1	αLIGO PCAL MIRROR MOUNT BASE, 40.63 DEG.	N/A	1	1
5	92200A541 (McM-Carr) or equiv	SCREW, SOCKET HEAD CAP, 1/4-20 UNC-2A X 0.875 LONG	300 SSSL	12	12
4	98017A655 (McM-Carr) or equiv PER NAS 1149-C0432R	WASHER, FLAT, 1/4 (NAS 1149-C416L OR EQUIVALENT)	300 SSSL	17	18
3	D1102439	αLIGO ASSY PCAL 2 INCH MIRROR MOUNT	N/A	4	4
2	D1200993-02	αLIGO PCAL PERISCOPE FRAME, X-ARM	N/A	-	1
1	D1200993-01	αLIGO PCAL PERISCOPE FRAME, Y-ARM	N/A	1	-

NOTES AND TOLERANCES: (UNLESS OTHERWISE SPECIFIED)

1. INTERPRET DRAWING PER ASME Y14.5-1994.

DIMENSIONS ARE IN INCHES

MATERIAL: N/A      FINISH: N/A μinch

SYSTEM: ADVANCED LIGO      SUB-SYSTEM: AOS

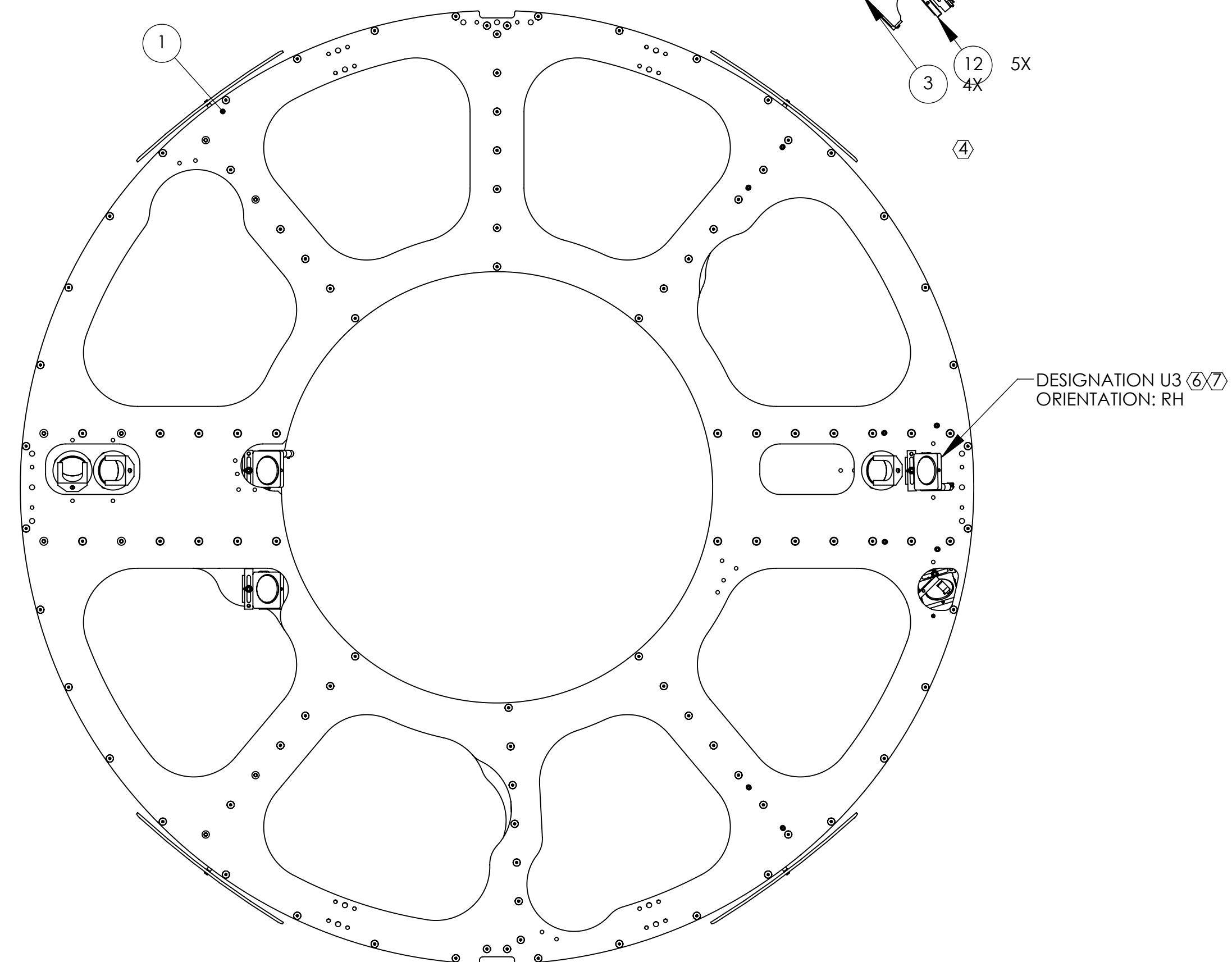
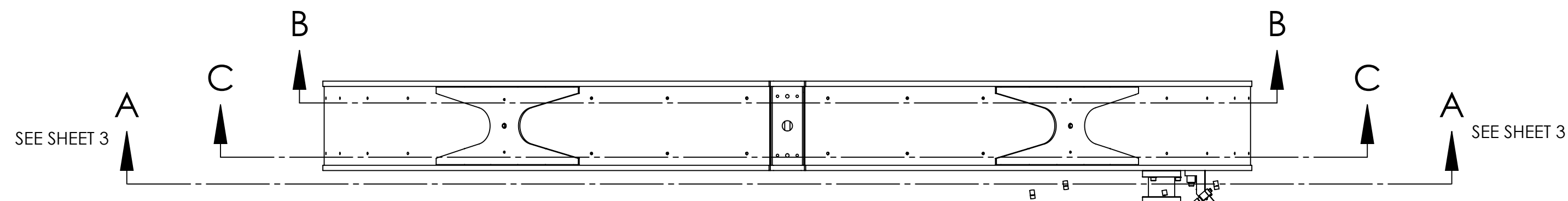
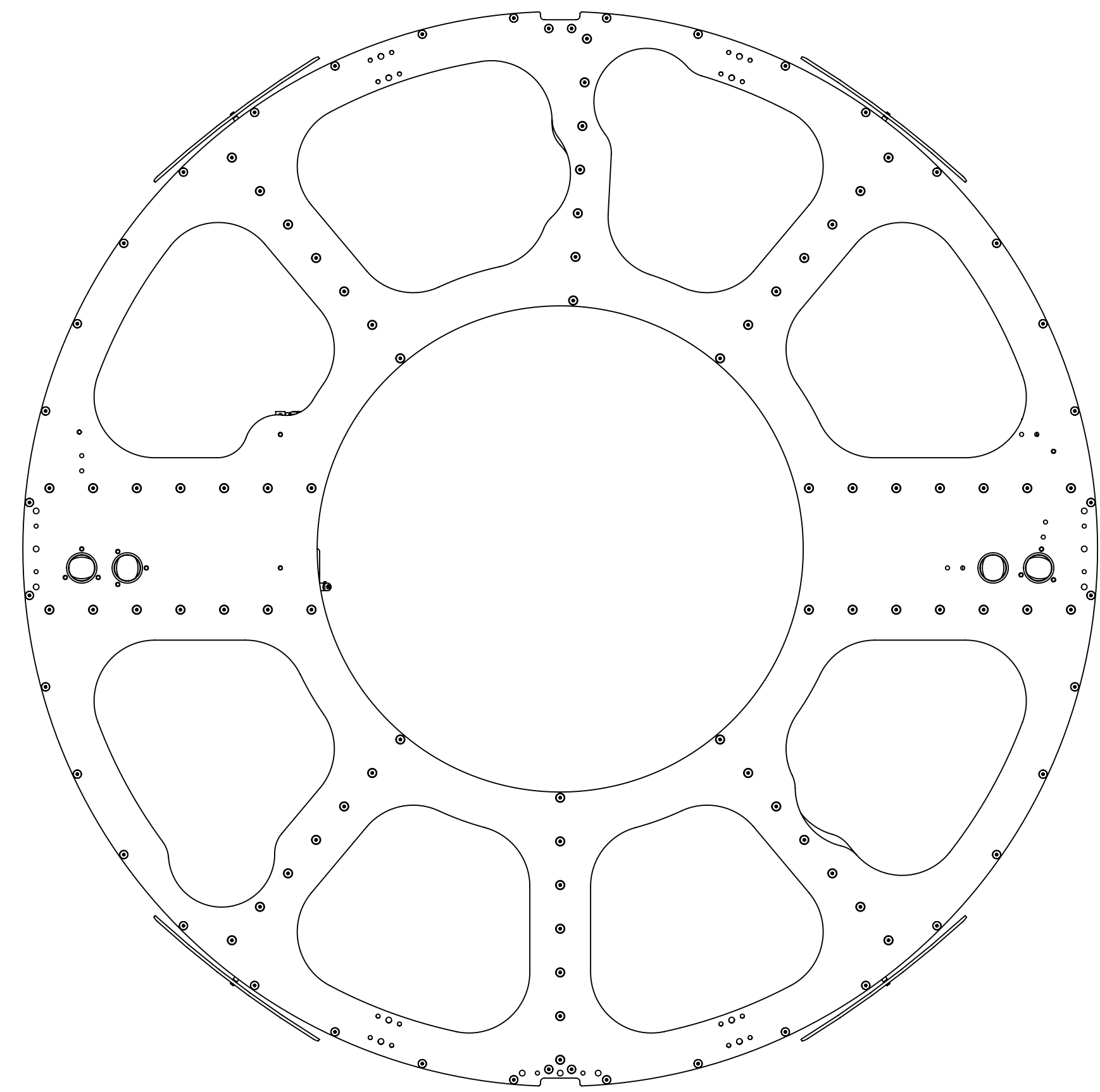
DESIGNER: SAVAGE, SHANKLE, CONLEY      06 JUN 2013      SIZE: D      DWG. NO. D1200174      REV. v9

DRAFTER: C. CONLEY      20 SEP 2013

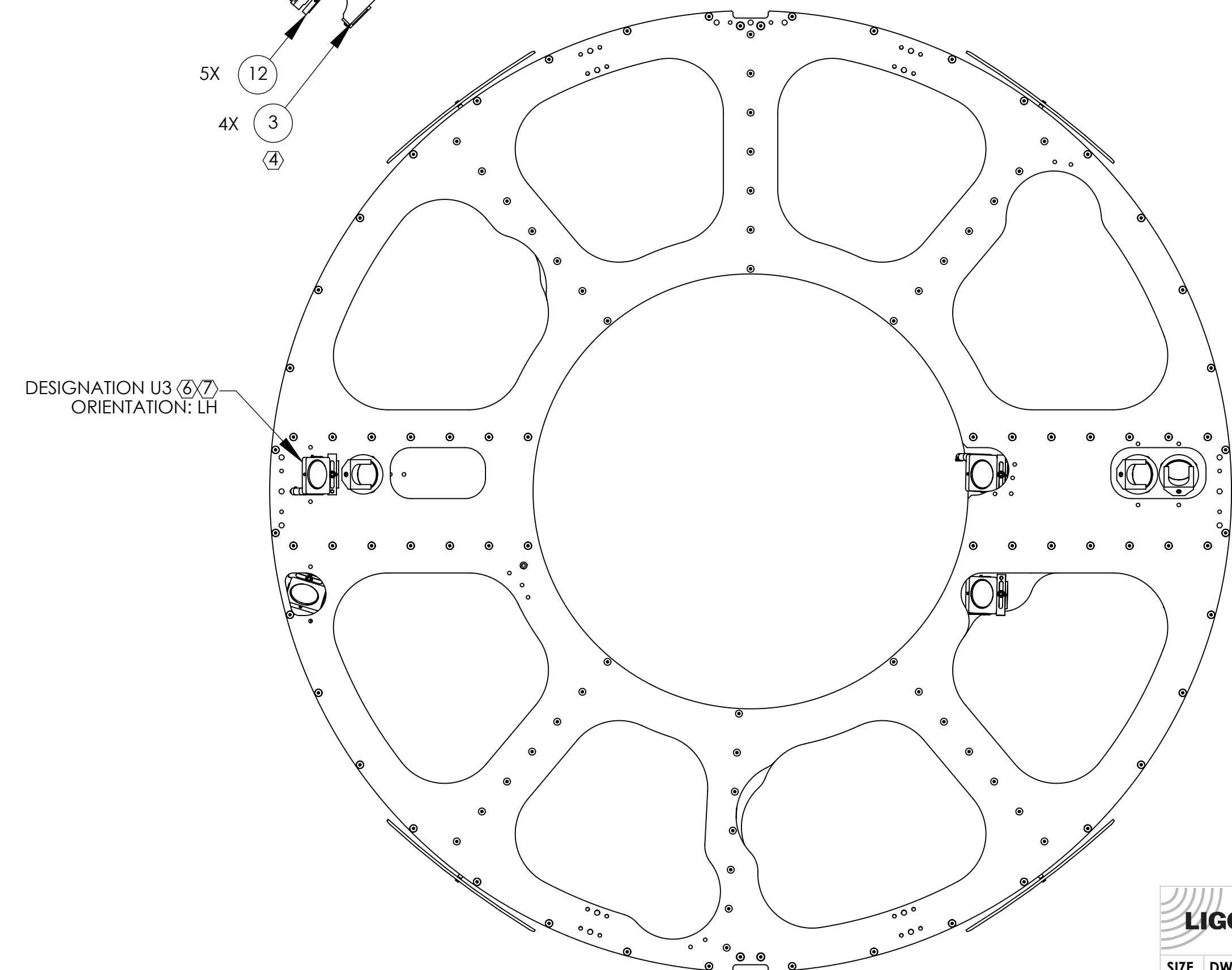
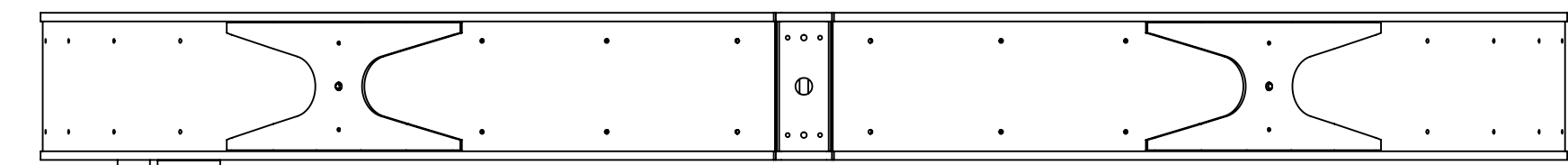
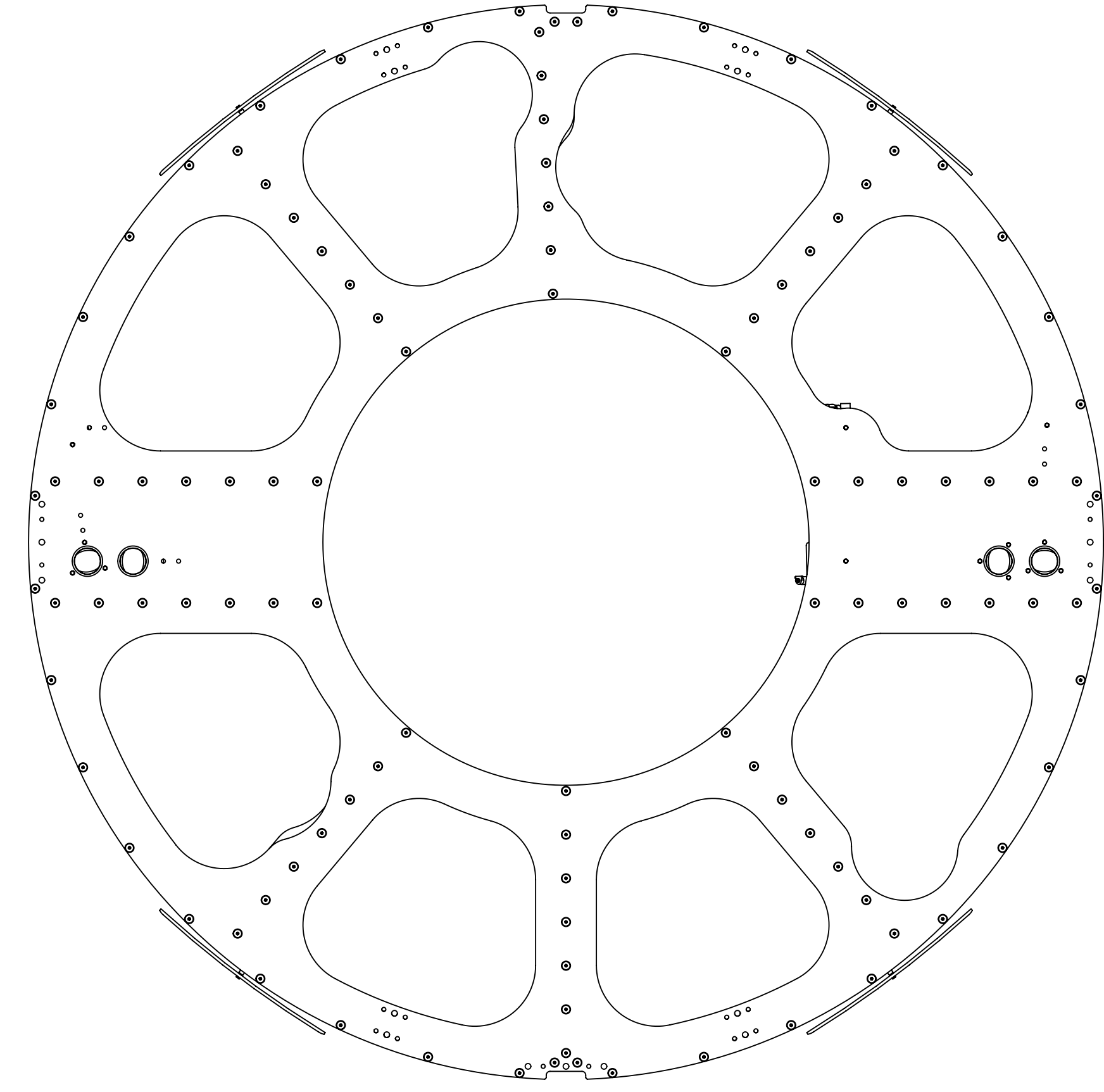
CHECKER:      SEE DCN

APPROVAL:      SEE DCN

SCALE: 1:8      PROJECTION:      SHEET 1 OF 22



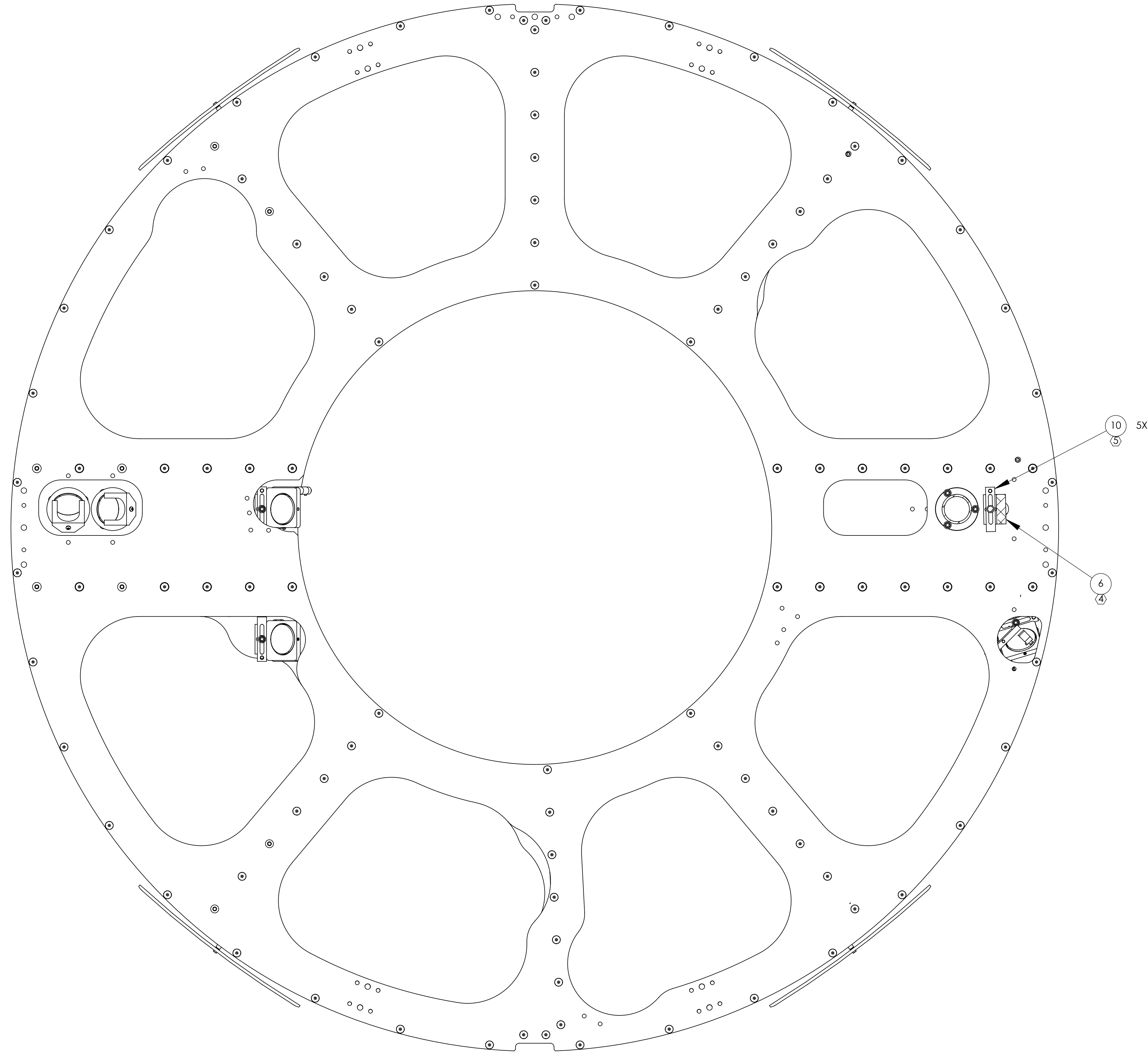
**-01 (Y-ARM)**



**-02 (X-ARM)**

CALIFORNIA INSTITUTE OF TECHNOLOGY MASSACHUSETTS INSTITUTE OF TECHNOLOGY		REV.
SIZE	DWG. NO.	v9
D	D1200174	
SCALE: 1:8	PROJECTION:	SHEET 2 OF 22

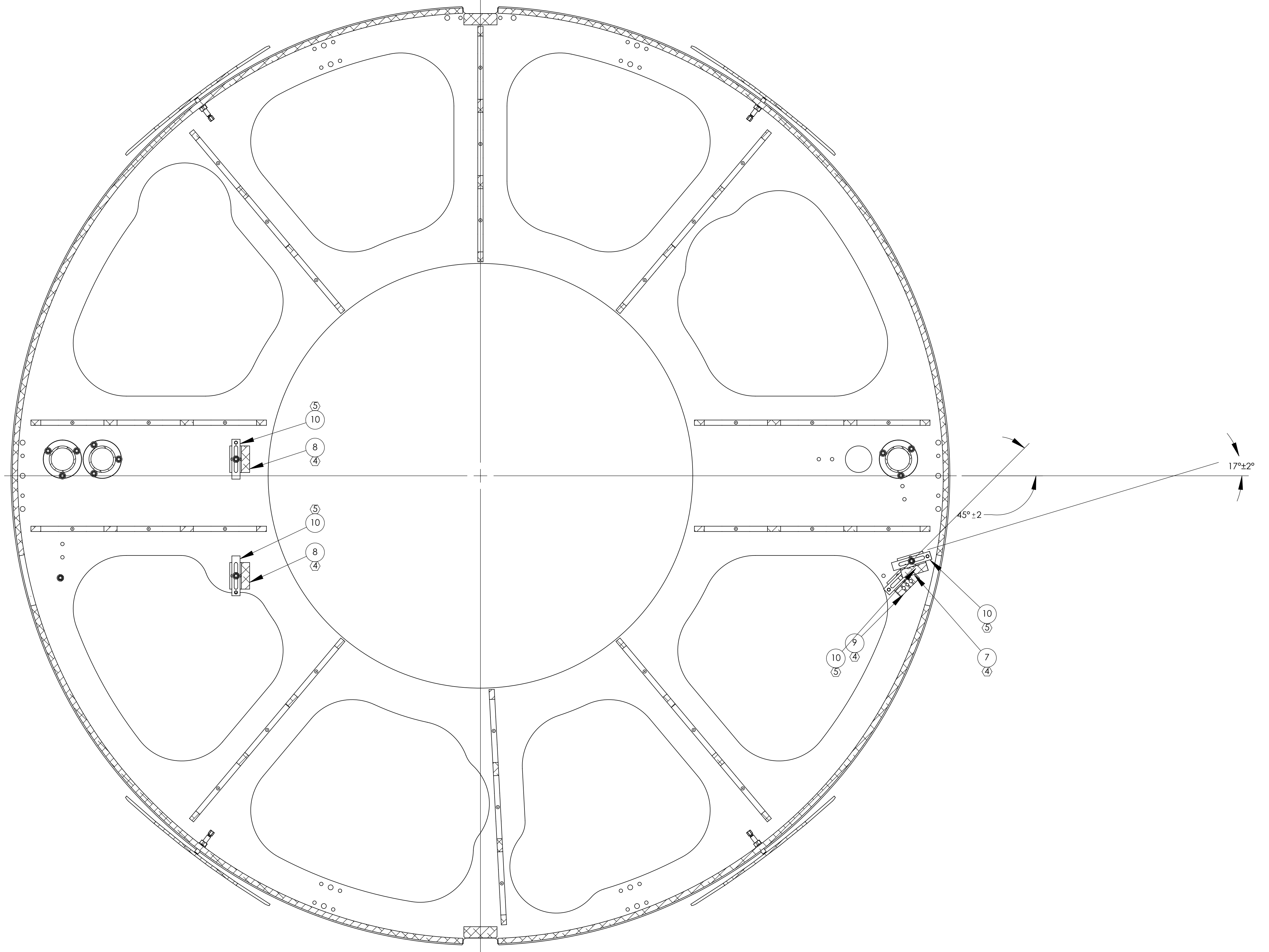
**-01 SHOWN (Y-ARM)**  
**-02 OPPOSITE (X-ARM)**



**SECTION A-A**

 CALIFORNIA INSTITUTE OF TECHNOLOGY MASSACHUSETTS INSTITUTE OF TECHNOLOGY		
SIZE	DWG. NO.	REV.
D	D1200174	v9
SCALE: 1:4	PROJECTION:	SHEET 3 OF 22

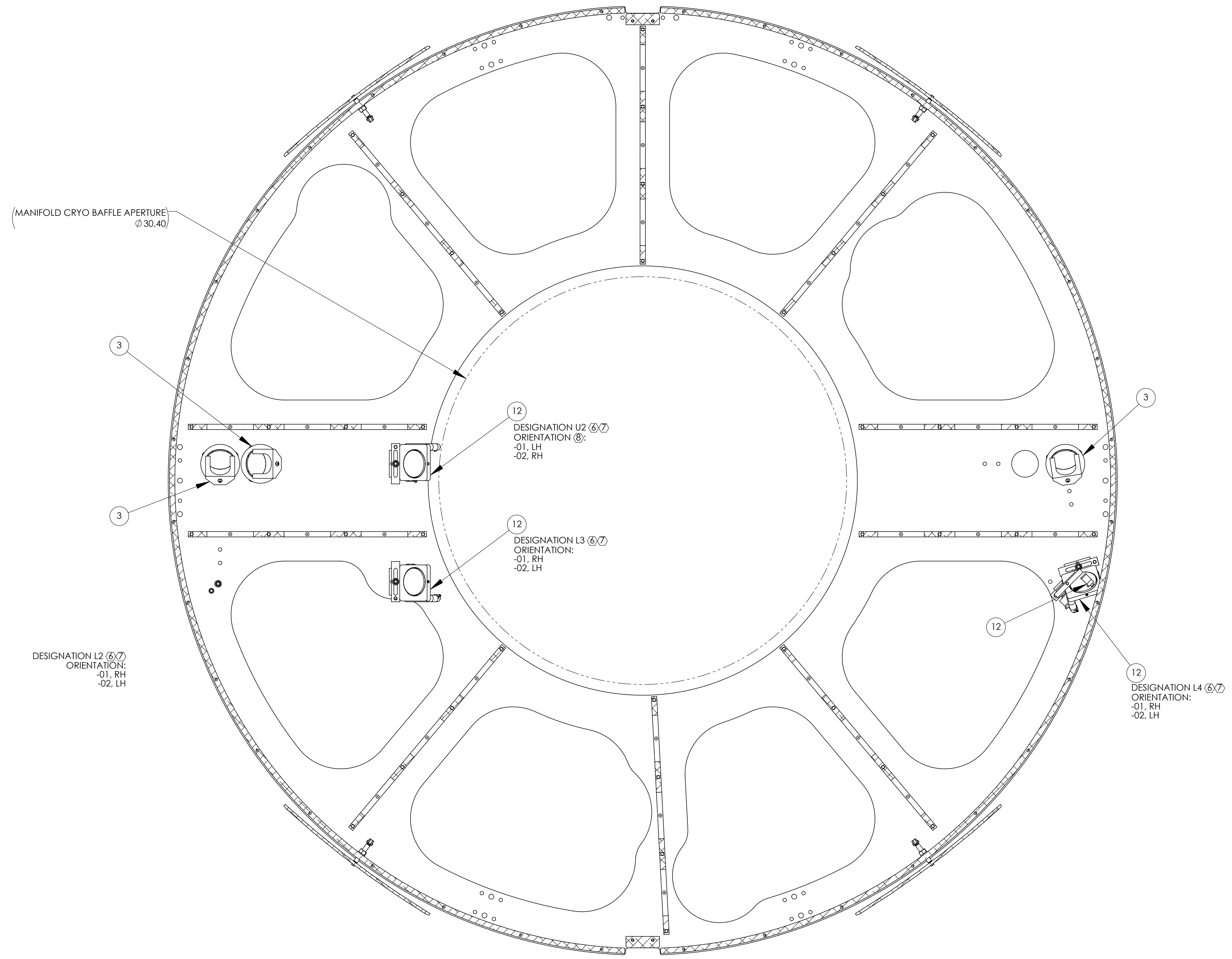
**-01 SHOWN (Y-ARM)**  
**-02 OPPOSITE (X-ARM)**



**SECTION B-B**

 <b>CALIFORNIA INSTITUTE OF TECHNOLOGY</b> <b>MASSACHUSETTS INSTITUTE OF TECHNOLOGY</b>		
SIZE	DWG. NO.	REV.
D	D1200174	v9
SCALE: 1:4	PROJECTION:	SHEET 4 OF 22

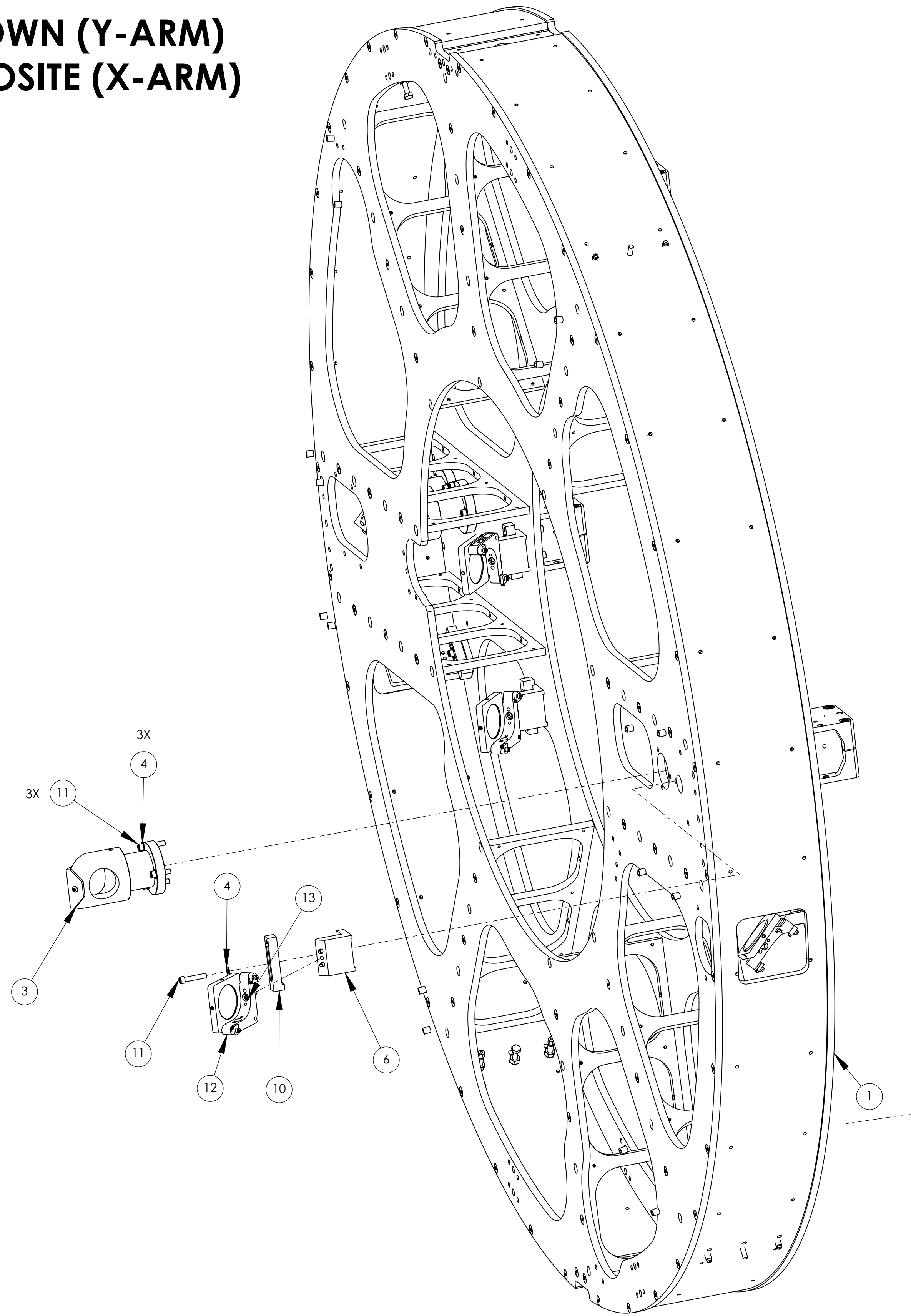
**-01 SHOWN (Y-ARM)**  
**-02 OPPOSITE (X-ARM)**



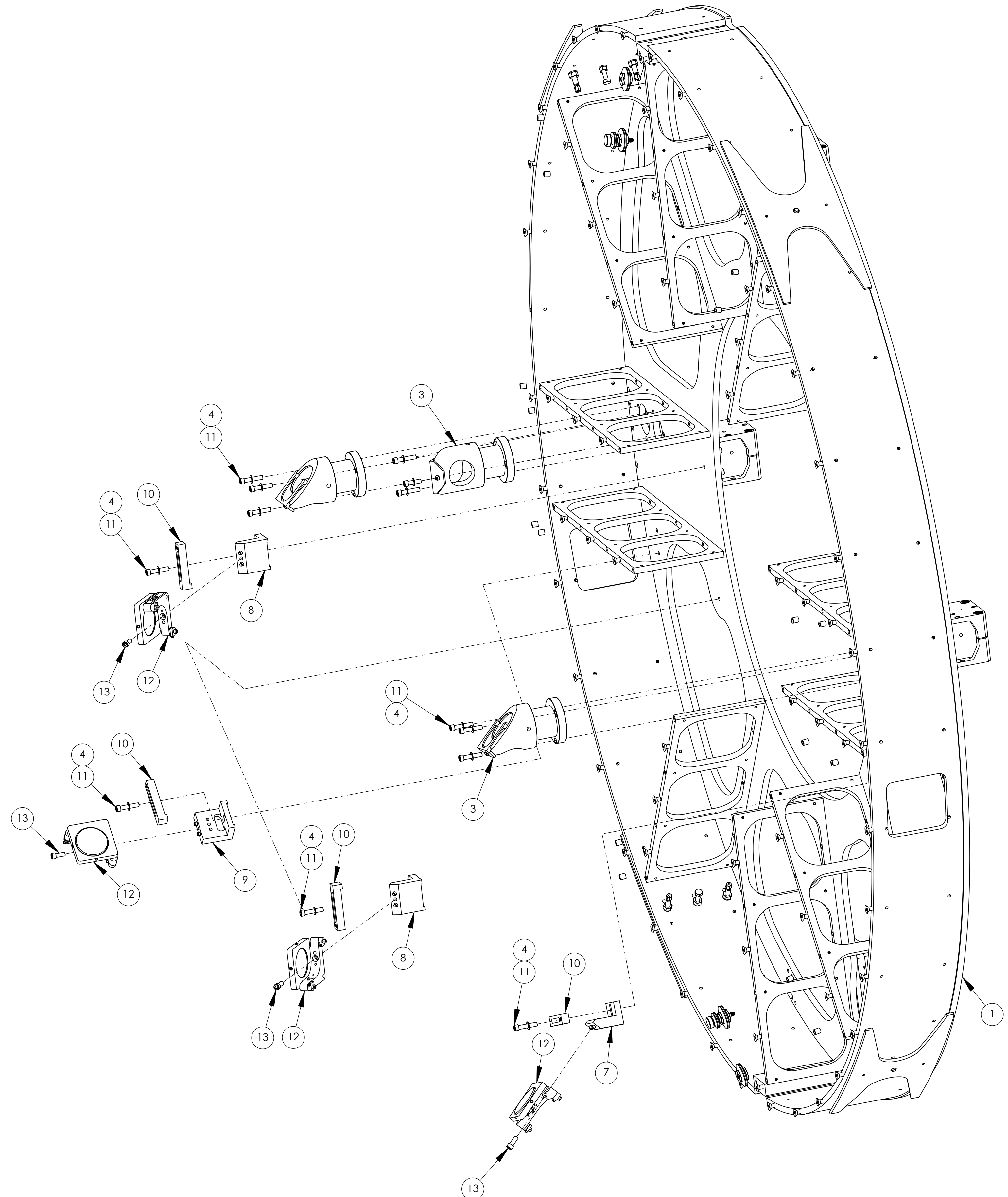
**SECTION C-C**

CALIFORNIA INSTITUTE OF TECHNOLOGY MASSACHUSETTS INSTITUTE OF TECHNOLOGY		
SIZE	DWG. NO.	REV.
D	D1200174	v9
SCALE: 1:4	PROJECTION:	SHEET 5 OF 22

**-01 SHOWN (Y-ARM)  
-02 OPPOSITE (X-ARM)**

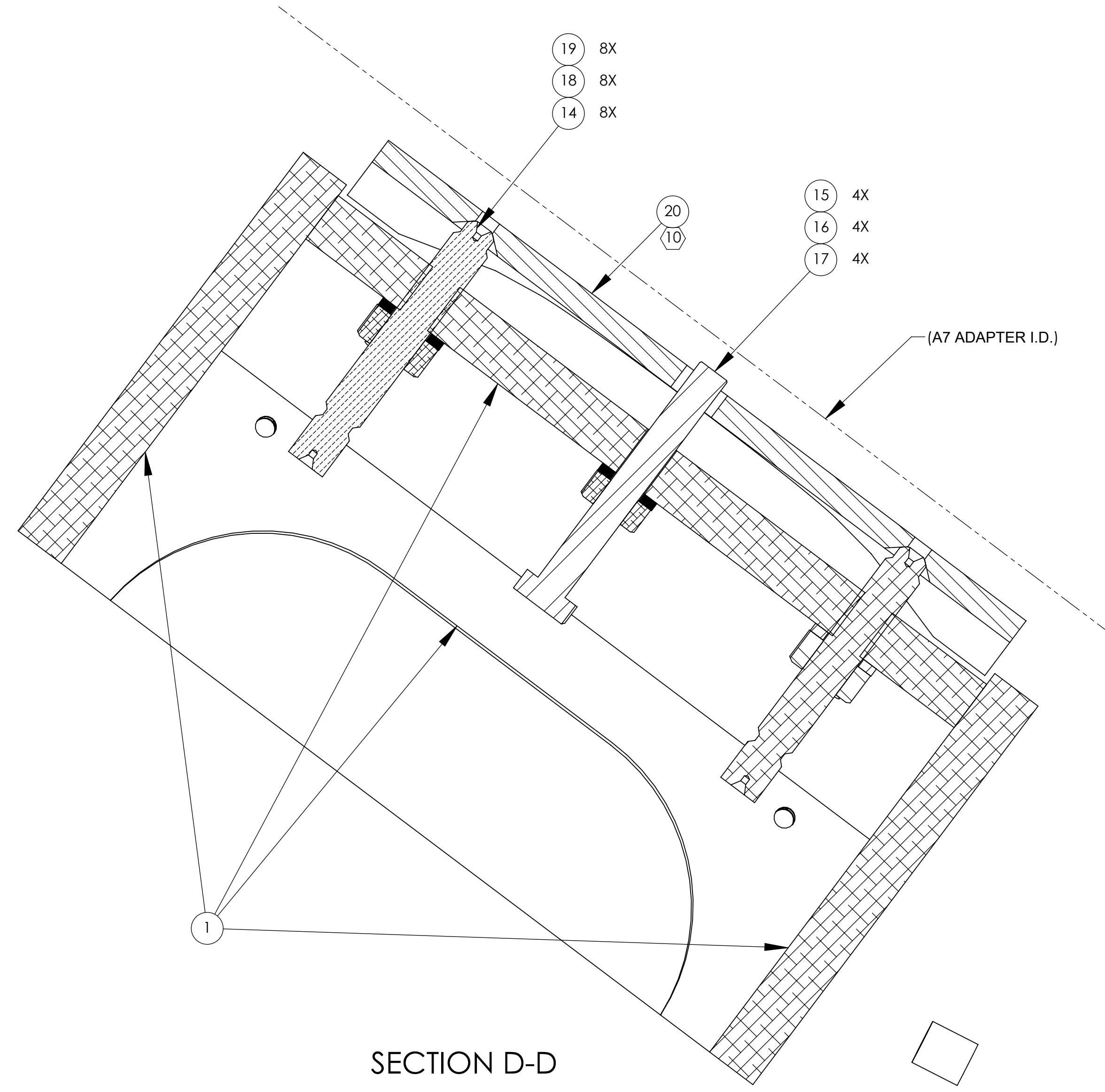
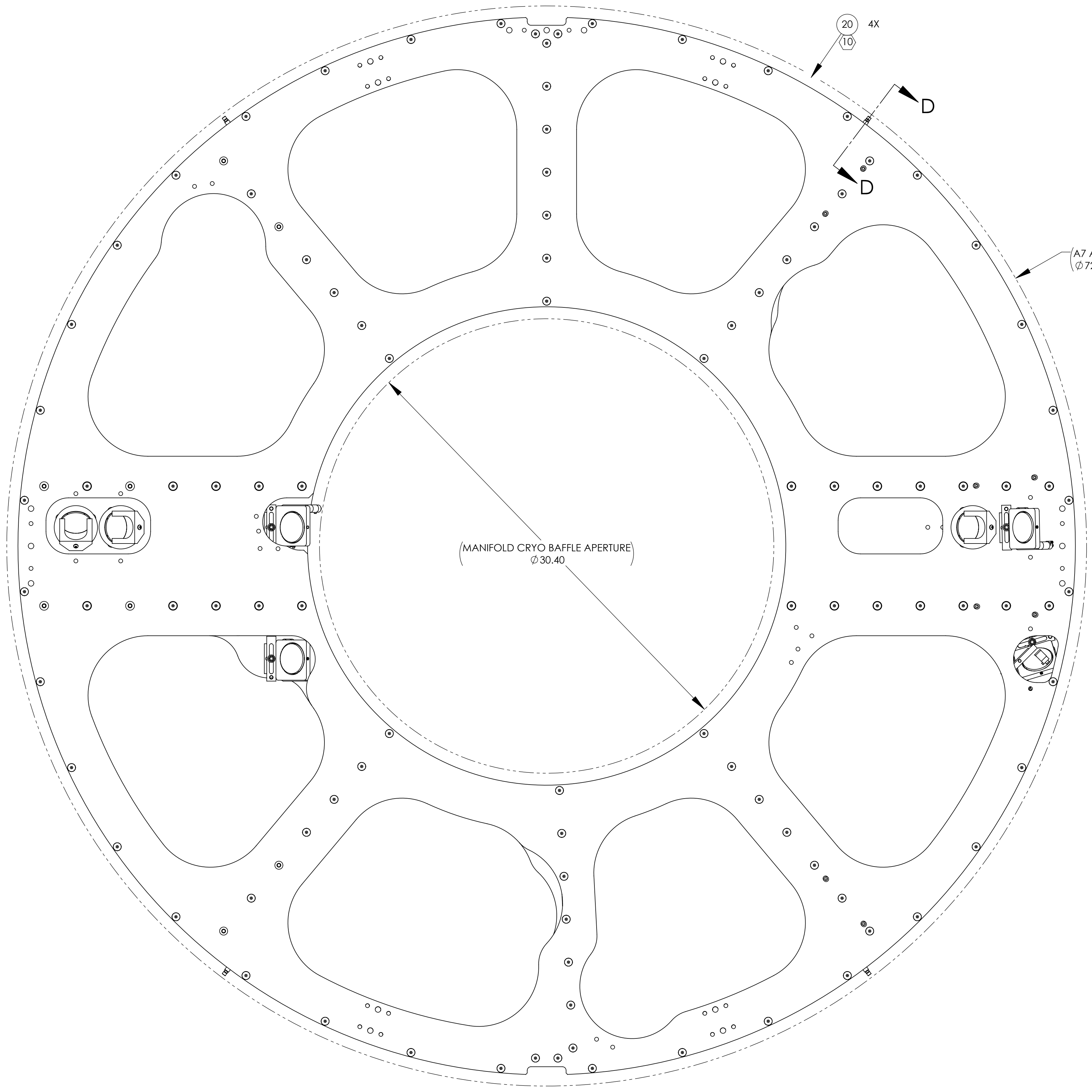


**-01 (Y-ARM)  
SHOWN**



**-01 (Y-ARM)  
SOME ITEMS, & PARTS OF 1,  
OMITTED FROM VIEW**

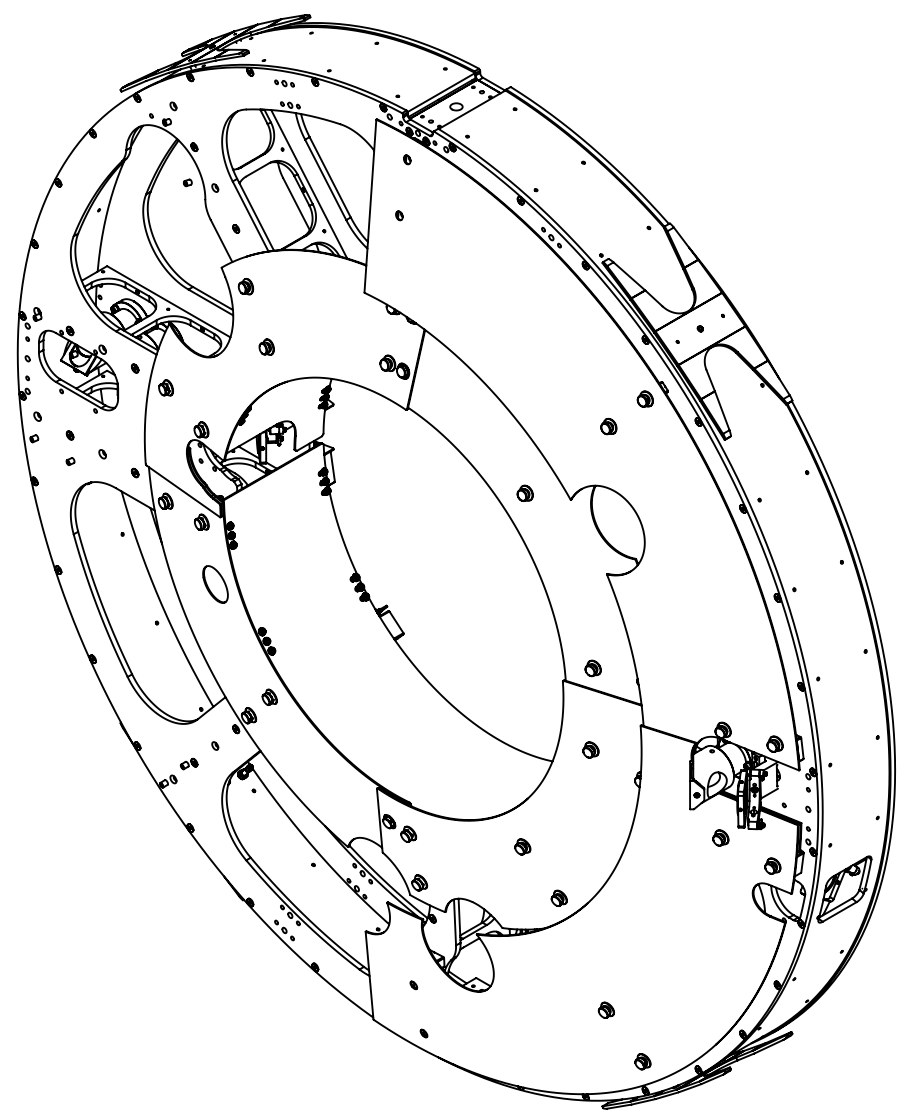
<b>LIGO</b> CALIFORNIA INSTITUTE OF TECHNOLOGY MASSACHUSETTS INSTITUTE OF TECHNOLOGY		REV.
SIZE DWG. NO.	D1200174	v9
SCALE: 1:4	PROJECTION:	SHEET 6 OF 22



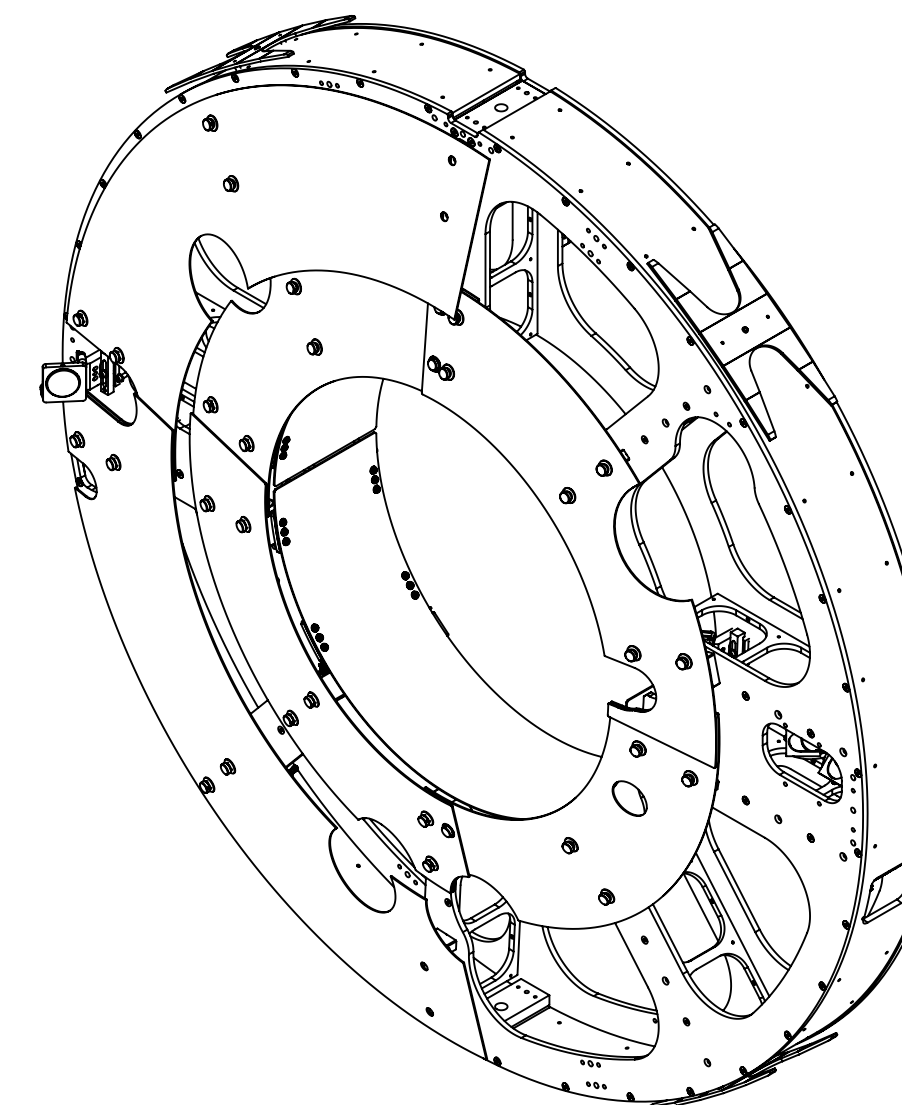
**-01 (Y-ARM)  
 SHOWN**

CALIFORNIA INSTITUTE OF TECHNOLOGY MASSACHUSETTS INSTITUTE OF TECHNOLOGY		REV.
SIZE	DWG. NO.	REV.
D	D1200174	v9
SCALE: 1:4	PROJECTION:	SHEET 7 OF 22

PCAL SHIELD AND BARREL BAFFLE BOM  
(SEE SHEET 1, FOR PCAL PERRISCOPE BOM)



**-01 (Y-ARM)**  
(LESS 03 ADDITIONS, SEE SHEET 21 & 22 FOR 03 ADDITIONS)



**-02 (X-ARM)**  
(LESS 03 ADDITIONS, SEE SHEET 21 & 22 FOR 03 ADDITIONS)

ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	-01 (Y-Arm)/QTY.	-02 (X-Arm)/QTY.
49	D1700220-15	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	1	-
48	D1700220-14	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	-	1
47	D1700220-13	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	1	-
46	D1700220-12	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	-	1
45	D1700220-11	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	1	-
44	D1700220-10	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	-	1
43	D1700220-09	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	1	-
42	D1700220-08	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	-	2
41	D1700220-07	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	2	-
40	D1700220-06	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	-	4
39	D1700220-05	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	4	-
38	D1700220-04	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	-	2
37	D1700220-03	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	2	-
36	D1700220-02	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	6	6
35	D1700220-01	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	6	6
34	D1700165-04	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD (OUTER PANEL), Xarm	304 SSSL	-	1
33	D1700165-03	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD (OUTER PANEL), Xarm	304 SSSL	-	1
32	D1700165-02	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD (OUTER PANEL)	304 SSSL	1	-
31	D1700165-01	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD (OUTER PANEL)	304 SSSL	1	-
30	D1700164-08	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD (QUADRANT IV), Xarm	304 SSSL	-	1
29	D1700164-07	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD (QUADRANT III), Xarm	304 SSSL	-	1
28	D1700164-06	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD (QUADRANT II), Xarm	304 SSSL	-	1
27	D1700164-05	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD (QUADRANT I), Xarm	304 SSSL	-	1
26	D1700164-04	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD (QUADRANT IV)	304 SSSL	1	-
25	D1700164-03	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD (QUADRANT III)	304 SSSL	1	-
24	D1700164-02	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD (QUADRANT II)	304 SSSL	1	-
23	D1700164-01	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD (QUADRANT I)	304 SSSL	1	-
22	D1002424-02	VIBRATION ABSORBER ASSEMBLY	N/A	2	2
21	D1002424-01	VIBRATION ABSORBER ASSEMBLY	N/A	2	2

PARTS LIST

ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	-01 (Y-Arm)/QTY.	-02 (X-Arm)/QTY.
78	WF-25 UC COMPONENTS OR EQ.	FLAT WASHER 1/4 SCREW SIZE	18-8 SSSL	48	48
77	NAS620-C416 OR EQ.	WASHER, FLAT, 1/4	300 SSSL	48	48
76	1185-4EN375 EMHART OR EQ.	HELICOIL, 1/4-20 X .375 LG.	NITRONIC 60	67	67
75	78062 HOLO-KROME	SCREW, SHC, 1/4-20 X 1.00 LG.	18-8 SSSL	56	56
74	BU-2008-N UC COMPONENTS OR EQ.	SCREW, BHSC, 1/4-20 X .50 LG.	18-8 SSSL	48	48
73	D1800007	αLIGO, SLIC, BOLT ASSY. (UNCOATED)	N/A	16	16
72	D1700232-1	αLIGO, SLIC, BOLT ASSY., BN	N/A	35	35
71	D1700397-01	αLIGO, PCAL-VIDEO CAM, SLIC BARREL BAFFLE, NUT PLATE	6061-T6 Al	8	-
70	D1700397	αLIGO, PCAL-VIDEO CAM, SLIC BARREL BAFFLE, NUT PLATE	6061-T6 Al	8	16
69	D1700398-16	αLIGO, PCAL-VIDEO CAM, SLIC BARREL BAFFLE MT. BRACKETS	304 SSSL	1	-
68	D1700398-15	αLIGO, PCAL-VIDEO CAM, SLIC BARREL BAFFLE MT. BRACKETS	304 SSSL	1	-
67	D1700398-14	αLIGO, PCAL-VIDEO CAM, SLIC BARREL BAFFLE MT. BRACKETS	304 SSSL	2	-
66	D1700398-13	αLIGO, PCAL-VIDEO CAM, SLIC BARREL BAFFLE MT. BRACKETS	304 SSSL	2	-
65	D1700398-12	αLIGO, PCAL-VIDEO CAM, SLIC BARREL BAFFLE MT. BRACKETS	304 SSSL	2	-
64	D1700398-11	αLIGO, PCAL-VIDEO CAM, SLIC BARREL BAFFLE MT. BRACKETS	304 SSSL	1	-
63	D1700398-10	αLIGO, PCAL-VIDEO CAM, SLIC BARREL BAFFLE MT. BRACKETS	304 SSSL	1	-
62	D1700398-09	αLIGO, PCAL-VIDEO CAM, SLIC BARREL BAFFLE MT. BRACKETS	304 SSSL	2	-
61	D1700398-08	αLIGO, PCAL-VIDEO CAM, SLIC BARREL BAFFLE MT. BRACKETS	304 SSSL	2	-
60	D1700398-07	αLIGO, PCAL-VIDEO CAM, SLIC BARREL BAFFLE MT. BRACKETS	304 SSSL	2	-
59	D1700398-05	αLIGO, PCAL-VIDEO CAM, SLIC BARREL BAFFLE MT. BRACKETS	304 SSSL	-	2
58	D1700398-04	αLIGO, PCAL-VIDEO CAM, SLIC BARREL BAFFLE MT. BRACKETS	304 SSSL	-	4
57	D1700398-03	αLIGO, PCAL-VIDEO CAM, SLIC BARREL BAFFLE MT. BRACKETS	304 SSSL	-	2
56	D1700398-02	αLIGO, PCAL-VIDEO CAM, SLIC BARREL BAFFLE MT. BRACKETS	304 SSSL	-	4
55	D1700398-01	αLIGO, PCAL-VIDEO CAM, SLIC BARREL BAFFLE MT. BRACKETS	304 SSSL	-	4
54	D1700399-04	αLIGO, PCAL-VIDEO CAM, SLIC BARREL BAFFLE PANELS (TOP HALF, Xarm)	304 SSSL	-	1
53	D1700399-03	αLIGO, PCAL-VIDEO CAM, SLIC BARREL BAFFLE PANELS (TOP HALF, Yarm)	304 SSSL	1	-
52	D1700399-02	αLIGO, PCAL-VIDEO CAM, SLIC BARREL BAFFLE PANELS (BOT HALF, Xarm)	304 SSSL	-	1
51	D1700399-01	αLIGO, PCAL-VIDEO CAM, SLIC BARREL BAFFLE PANELS (BOT HALF, Yarm)	304 SSSL	1	-
50	D1700220-16	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	-	1

PARTS LIST

# PCAL SHIELD + BARREL BAFFLE INSTALLATION SEQUENCE

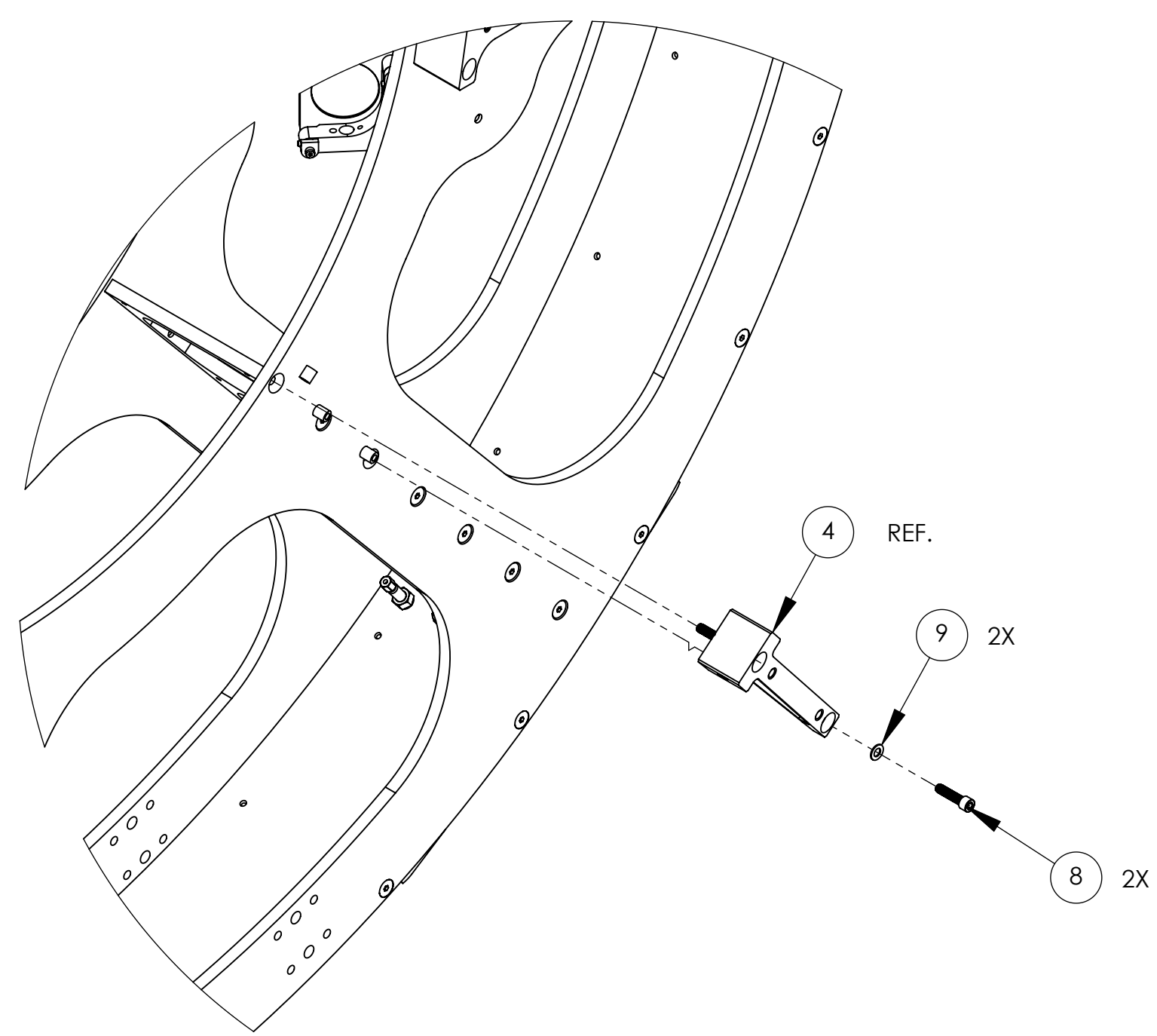
**LIGO** CALIFORNIA INSTITUTE OF TECHNOLOGY  
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

SIZE DWG. NO. **D1200174** REV. **v9**

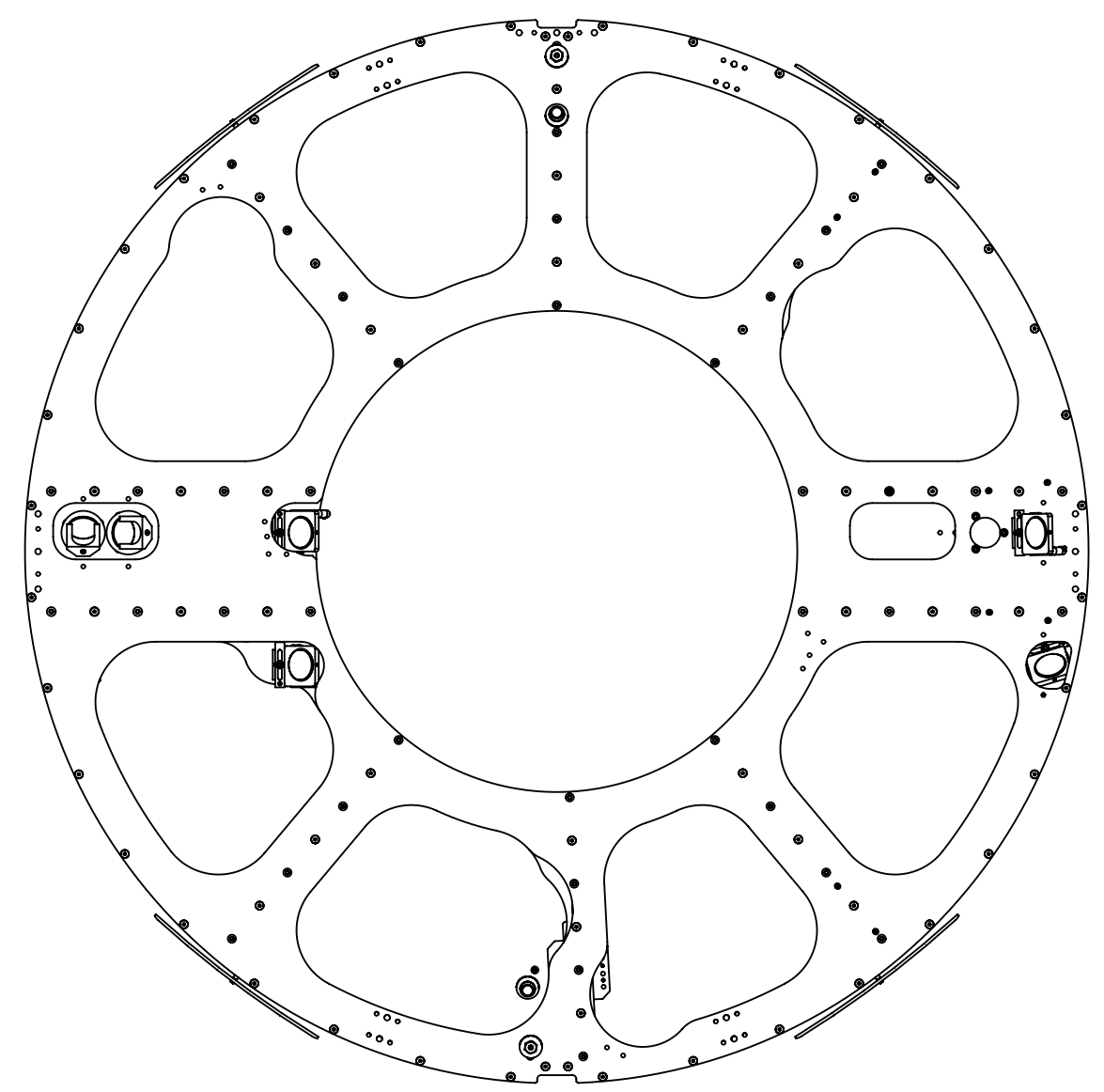
SCALE: 1:12 PROJECTION: SHEET 8 OF 22



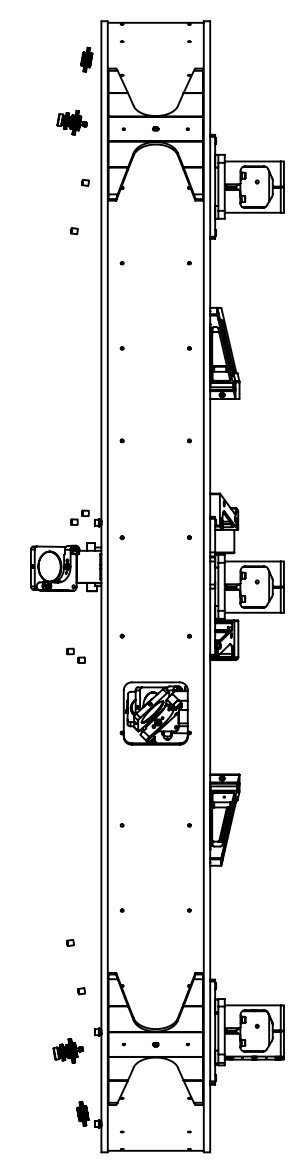
# PCAL SHIELD + BARREL BAFFLE INSTALLATION SEQUENCE -01, Yarm: ASSY. STEP 1



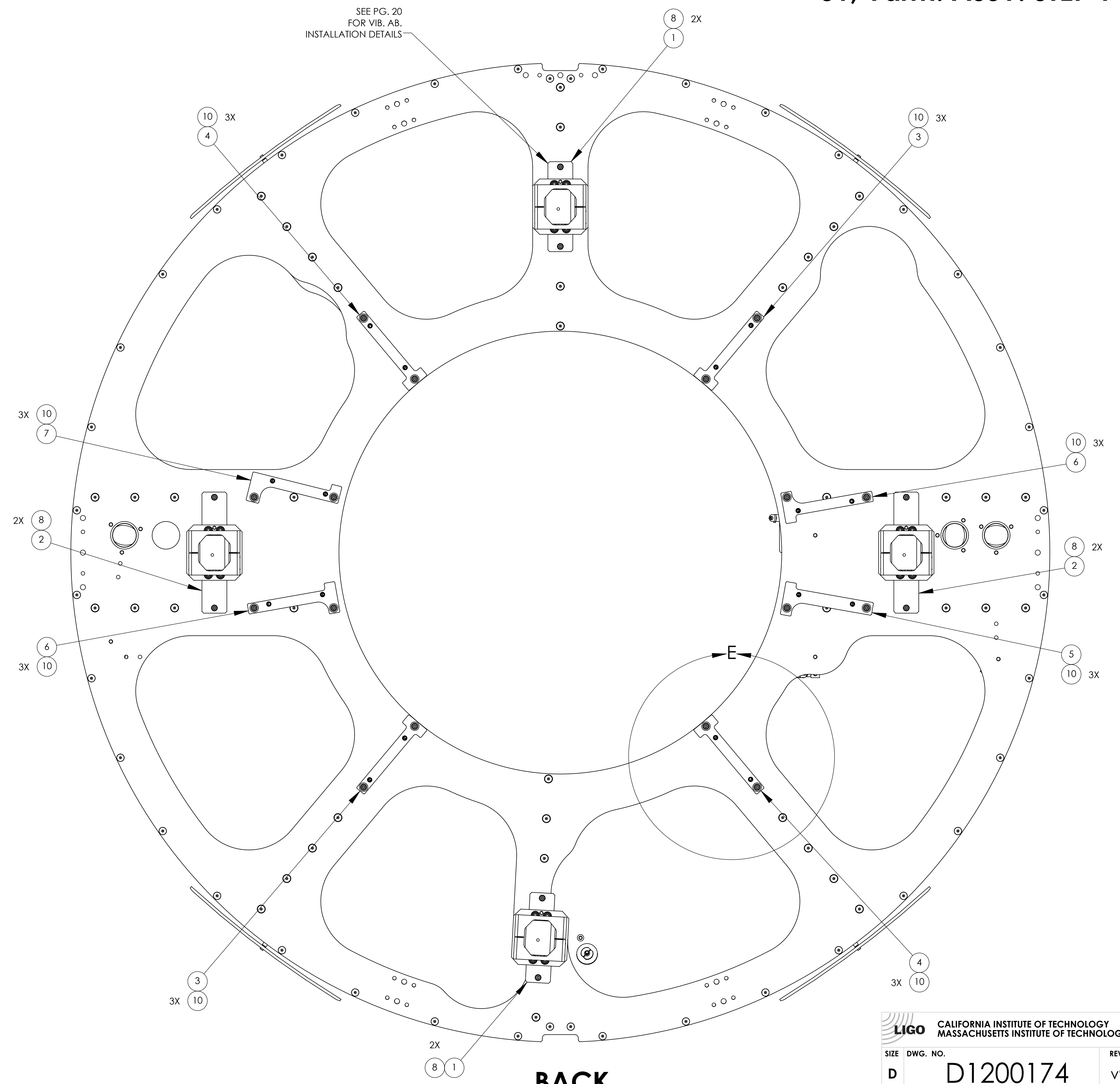
**DETAIL 'E'**  
BRACKET ATTACHMENT  
TYP.



**FRONT**



**SIDE**



**BACK**

**PARTIAL BOM**  
(FOR COMPLETE BOM, SEE SHEET 1 AND SHEET 8)

10	1185-4EN375 EMHART OR EQ.	HELICOIL, 1/4-20 X .375 LG.	NITRONIC 60	24
9	NAS620-C416 OR EQ.	WASHER, FLAT, 1/4	300 SSSL	16
8	78062 HOLO- KROME	SCREW, SHC, 1/4-20 X 1.00 LG.	18-8 SSSL	24
7	D1700220-07	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	1
6	D1700220-05	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	2
5	D1700220-03	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	1
4	D1700220-02	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	2
3	D1700220-01	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	2
2	D1002424-02	VIBRATION ABSORBER ASSEMBLY	N/A	2
1	D1002424-01	VIBRATION ABSORBER ASSEMBLY	N/A	2
<b>ITEM NO.</b>	<b>PART NUMBER</b>	<b>DESCRIPTION</b>	<b>MATERIAL</b>	<b>QTY.</b>

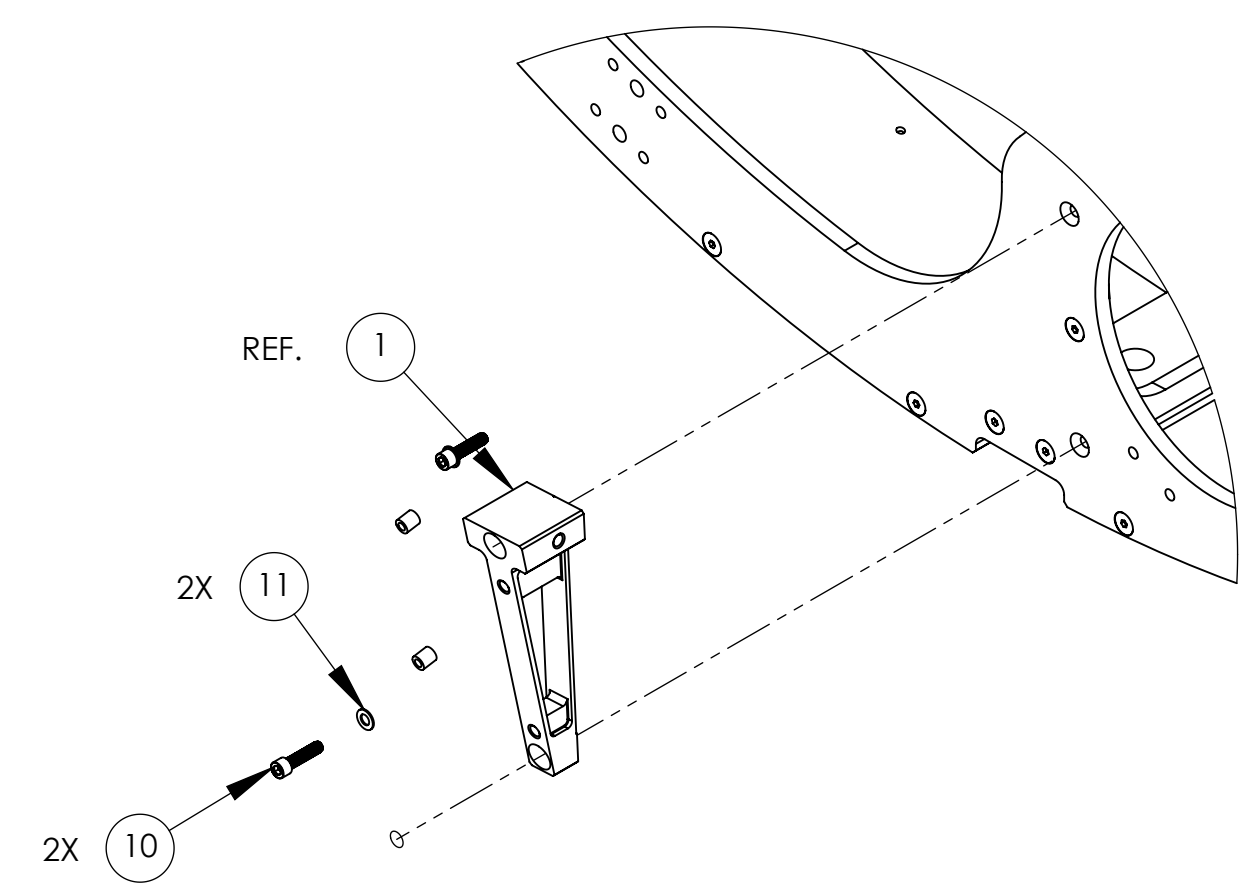
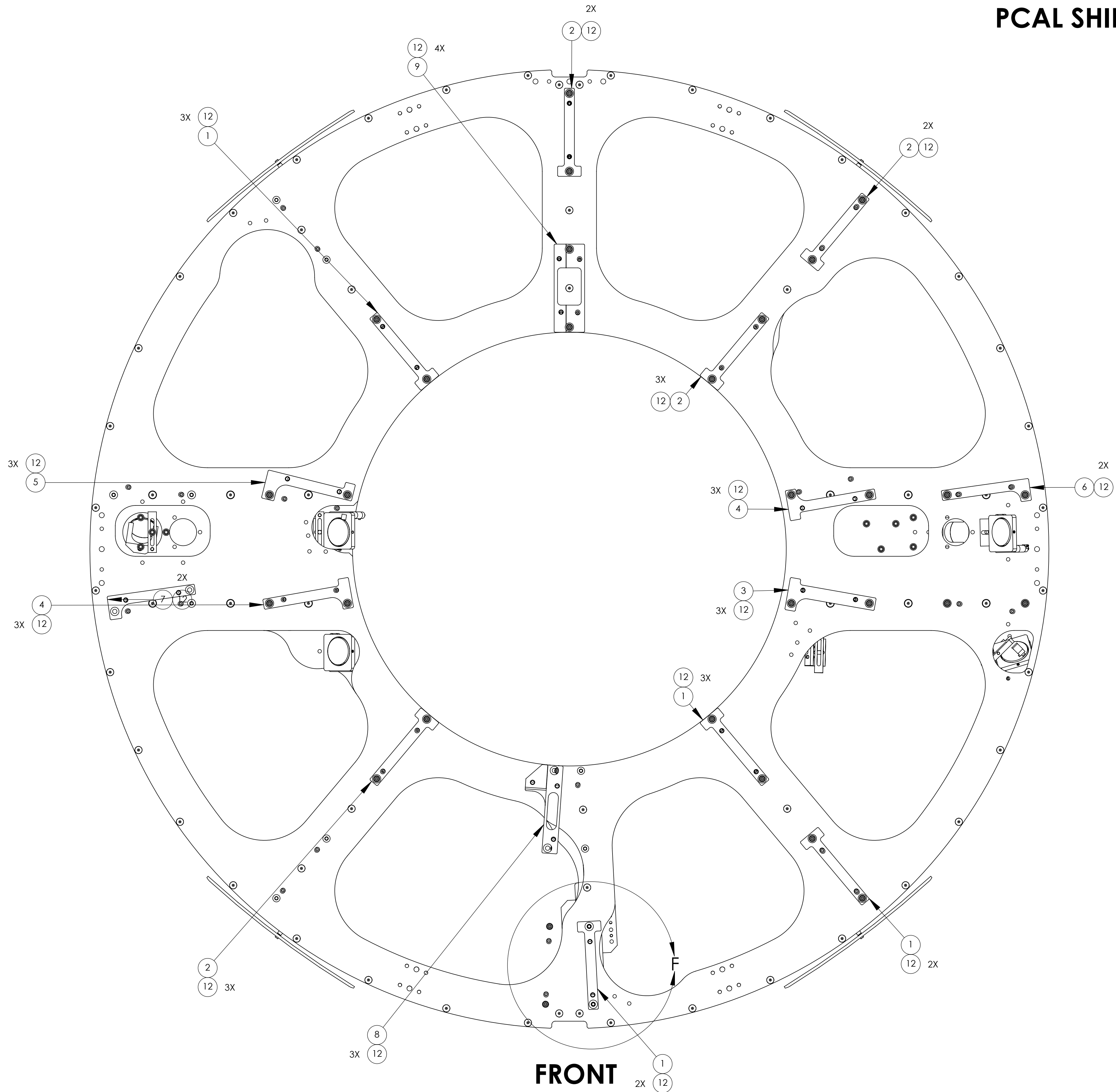
PARTS LIST

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

SIZE DWG. NO. **D1200174** REV. **v9**

SCALE: 1:12 PROJECTION: SHEET 9 OF 22

# PCAL SHIELD + BARREL BAFFLE INSTALLATION SEQUENCE -01, Yarm: ASSY. STEP 2



**DETAIL 'F'**  
BRACKET ATTACHMENT  
TYP.

## PARTIAL BOM (FOR COMPLETE BOM, SEE SHEET 1 AND SHEET 8)

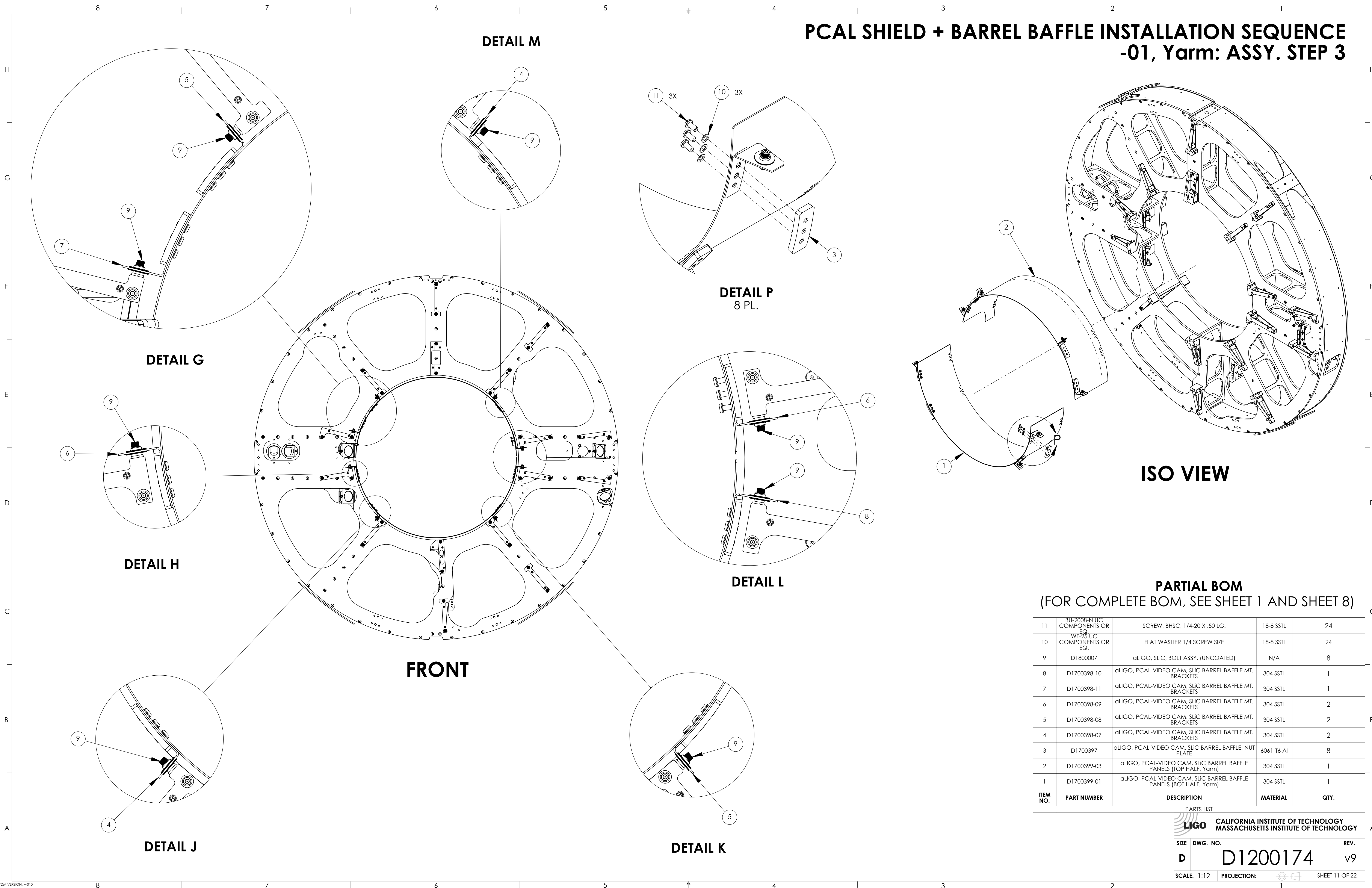
ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	QTY.
12	1185-4EN375 EMHART OR EQ.	HELICOIL, 1/4-20 X .375 LG.	NITRONIC 60	43
11	NAS620-C416 OR EQ.	WASHER, FLAT, 1/4	300 SSSL	32
10	78062 HOLO- KROME	SCREW, SHC, 1/4-20 X 1.00 LG.	18-8 SSSL	32
9	D1700220-15	gLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	1
8	D1700220-13	gLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	1
7	D1700220-11	gLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	1
6	D1700220-09	gLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	1
5	D1700220-07	gLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	1
4	D1700220-05	gLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	2
3	D1700220-03	gLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	1
2	D1700220-02	gLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	4
1	D1700220-01	gLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	4

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

SIZE DWG. NO. **D1200174** REV. **v9**

SCALE: 1:12 PROJECTION: SHEET 10 OF 22

# PCAL SHIELD + BARREL BAFFLE INSTALLATION SEQUENCE -01, Yarm: ASSY. STEP 3



### PARTIAL BOM (FOR COMPLETE BOM, SEE SHEET 1 AND SHEET 8)

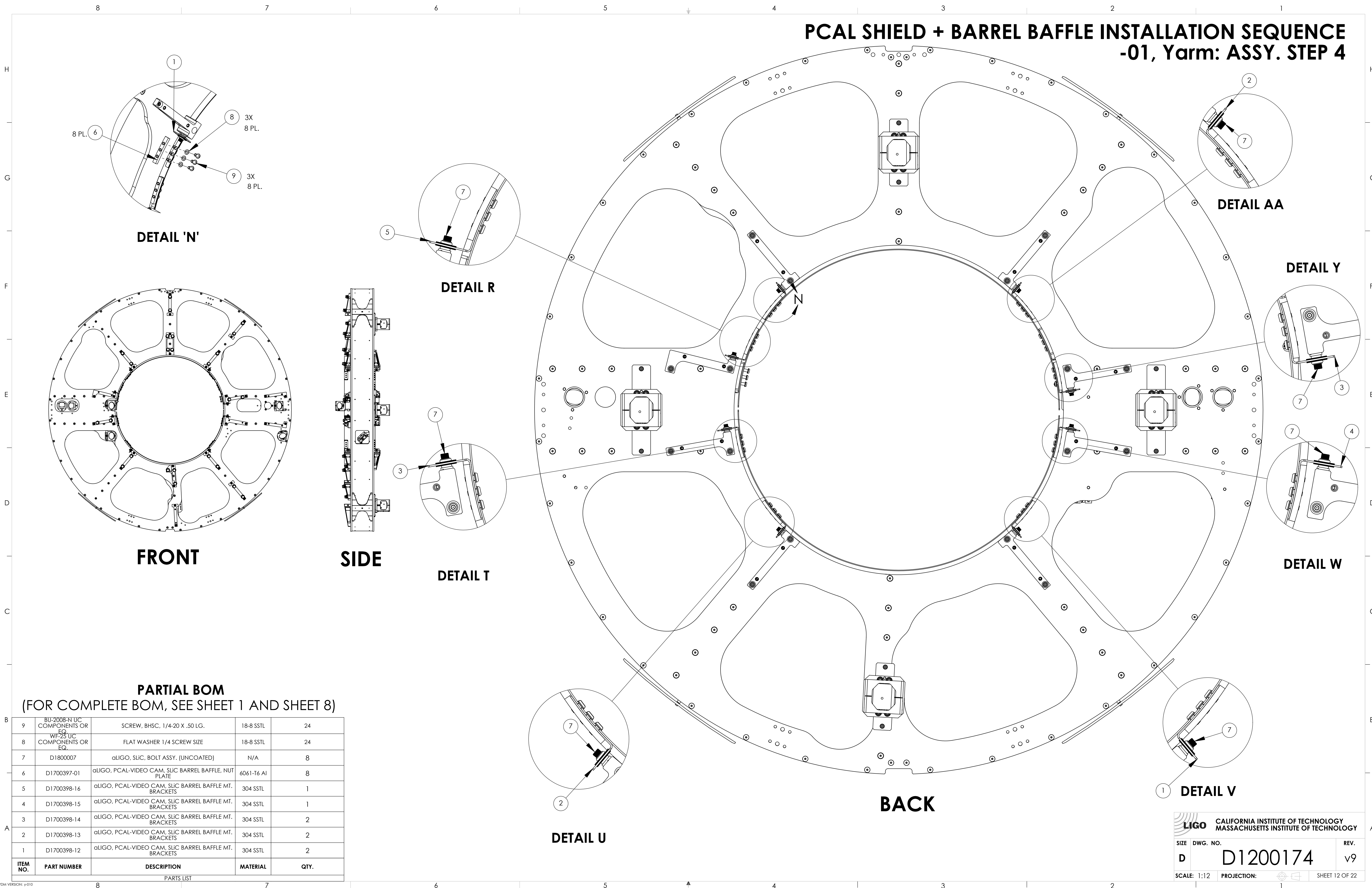
ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	QTY.
11	BU-2008-N UC COMPONENTS OR EQ.	SCREW, BHSC, 1/4-20 X .50 LG.	18-8 SSTL	24
10	WF-23 UC COMPONENTS OR EQ.	FLAT WASHER 1/4 SCREW SIZE	18-8 SSTL	24
9	D1800007	αLIGO, SLIC, BOLT ASSY. (UNCOATED)	N/A	8
8	D1700398-10	αLIGO, PCAL-VIDEO CAM, SLIC BARREL BAFFLE MT. BRACKETS	304 SSTL	1
7	D1700398-11	αLIGO, PCAL-VIDEO CAM, SLIC BARREL BAFFLE MT. BRACKETS	304 SSTL	1
6	D1700398-09	αLIGO, PCAL-VIDEO CAM, SLIC BARREL BAFFLE MT. BRACKETS	304 SSTL	2
5	D1700398-08	αLIGO, PCAL-VIDEO CAM, SLIC BARREL BAFFLE MT. BRACKETS	304 SSTL	2
4	D1700398-07	αLIGO, PCAL-VIDEO CAM, SLIC BARREL BAFFLE MT. BRACKETS	304 SSTL	2
3	D1700397	αLIGO, PCAL-VIDEO CAM, SLIC BARREL BAFFLE, NUT PLATE	6061-T6 Al	8
2	D1700399-03	αLIGO, PCAL-VIDEO CAM, SLIC BARREL BAFFLE PANELS (TOP HALF, Yarm)	304 SSTL	1
1	D1700399-01	αLIGO, PCAL-VIDEO CAM, SLIC BARREL BAFFLE PANELS (BOT HALF, Yarm)	304 SSTL	1

CALIFORNIA INSTITUTE OF TECHNOLOGY  
 MASSACHUSETTS INSTITUTE OF TECHNOLOGY

SIZE DWG. NO. **D1200174** REV. **v9**

SCALE: 1:12 PROJECTION: SHEET 11 OF 22

# PCAL SHIELD + BARREL BAFFLE INSTALLATION SEQUENCE -01, Yarm: ASSY. STEP 4



**DETAIL 'N'**

**DETAIL AA**

**DETAIL R**

**DETAIL Y**

**FRONT**

**SIDE**

**DETAIL T**

**DETAIL W**

**BACK**

**DETAIL V**

**DETAIL U**

**PARTIAL BOM**  
(FOR COMPLETE BOM, SEE SHEET 1 AND SHEET 8)

9	BU-2008-N UC COMPONENTS OR EQ.	SCREW, BHSC, 1/4-20 X .50 LG.	18-8 SSSL	24
8	WF-25 UC COMPONENTS OR EQ.	FLAT WASHER 1/4 SCREW SIZE	18-8 SSSL	24
7	D1800007	αLIGO, SLIC, BOLT ASSY. (UNCOATED)	N/A	8
6	D1700397-01	αLIGO, PCAL-VIDEO CAM, SLIC BARREL BAFFLE. NUT PLATE	6061-T6 Al	8
5	D1700398-16	αLIGO, PCAL-VIDEO CAM, SLIC BARREL BAFFLE MT. BRACKETS	304 SSSL	1
4	D1700398-15	αLIGO, PCAL-VIDEO CAM, SLIC BARREL BAFFLE MT. BRACKETS	304 SSSL	1
3	D1700398-14	αLIGO, PCAL-VIDEO CAM, SLIC BARREL BAFFLE MT. BRACKETS	304 SSSL	2
2	D1700398-13	αLIGO, PCAL-VIDEO CAM, SLIC BARREL BAFFLE MT. BRACKETS	304 SSSL	2
1	D1700398-12	αLIGO, PCAL-VIDEO CAM, SLIC BARREL BAFFLE MT. BRACKETS	304 SSSL	2
<b>ITEM NO.</b>	<b>PART NUMBER</b>	<b>DESCRIPTION</b>	<b>MATERIAL</b>	<b>QTY.</b>

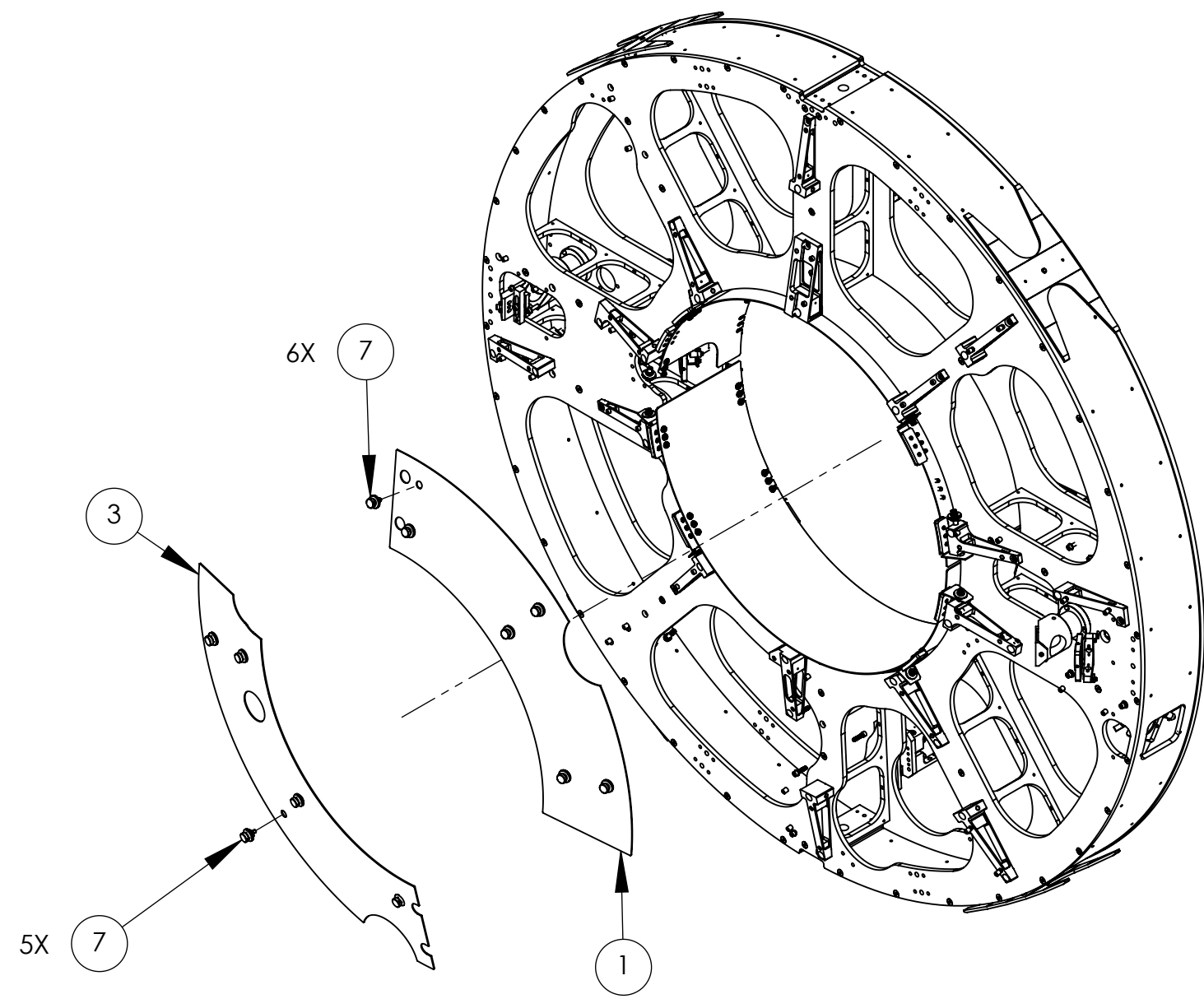
PARTS LIST

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

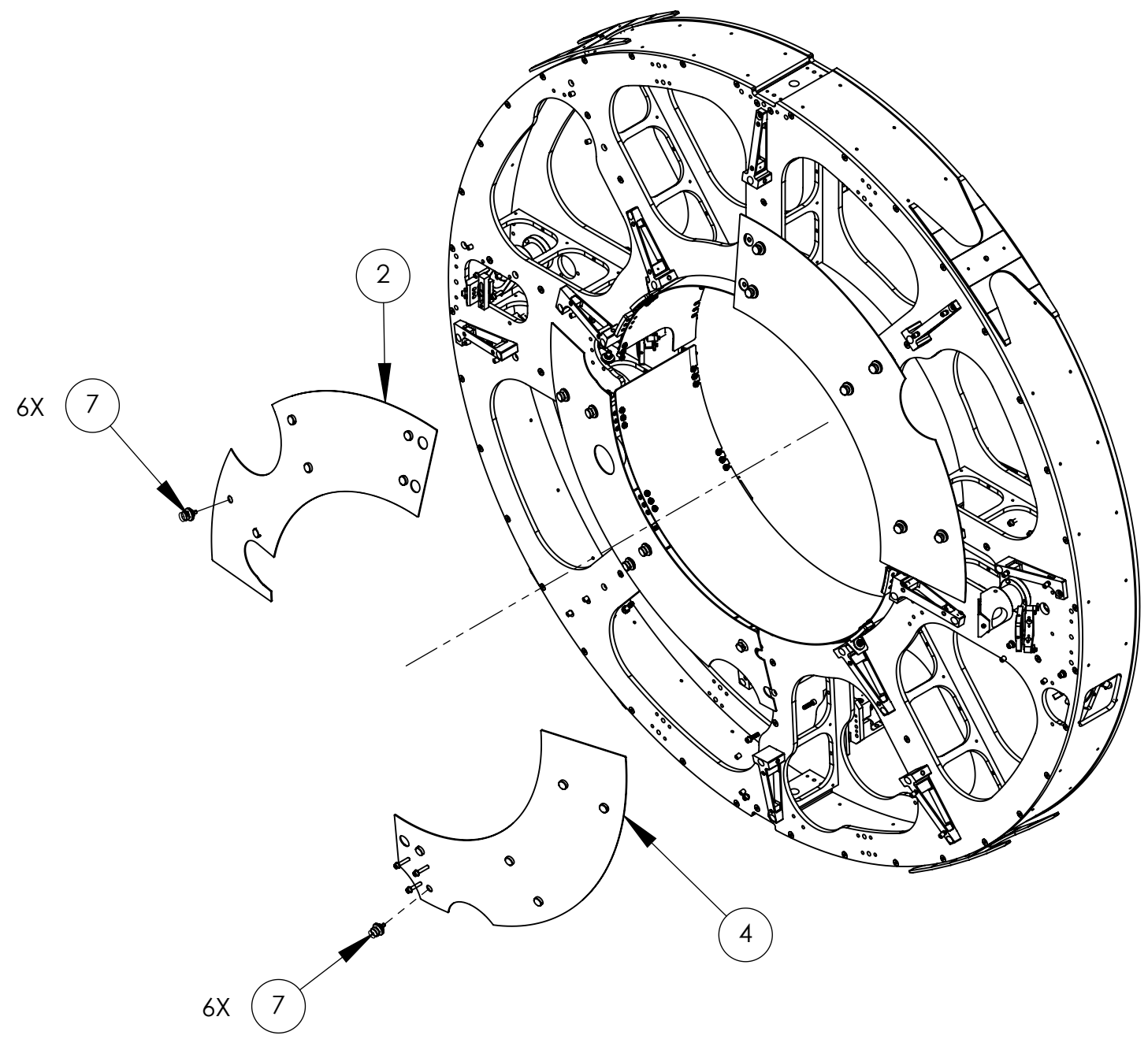
SIZE DWG. NO. **D1200174** REV. **v9**

SCALE: 1:12 PROJECTION: SHEET 12 OF 22

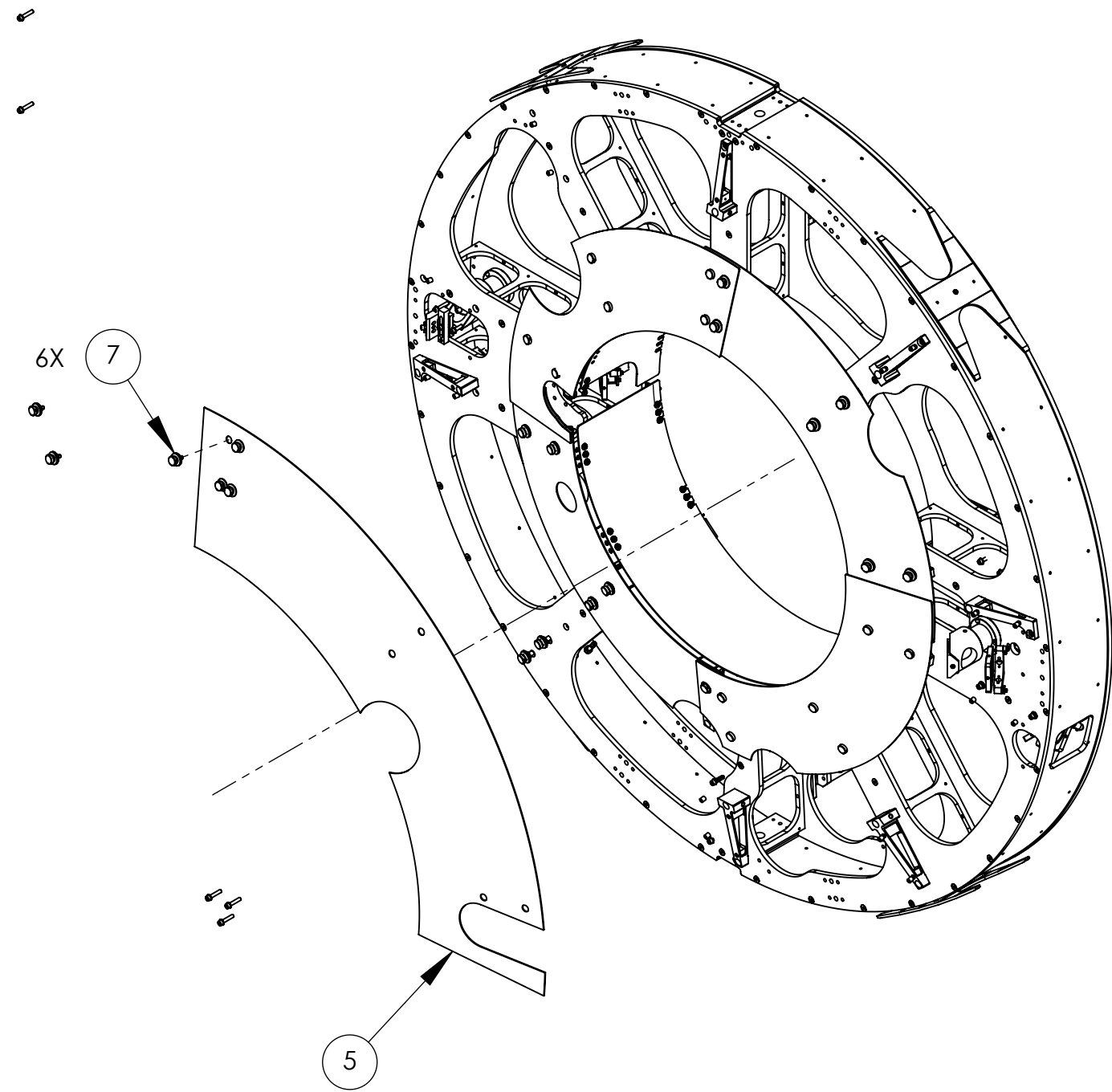
**PCAL SHIELD + BARREL BAFFLE INSTALLATION SEQUENCE**  
**-01, Yarm: ASSY. STEP 5 - 8**



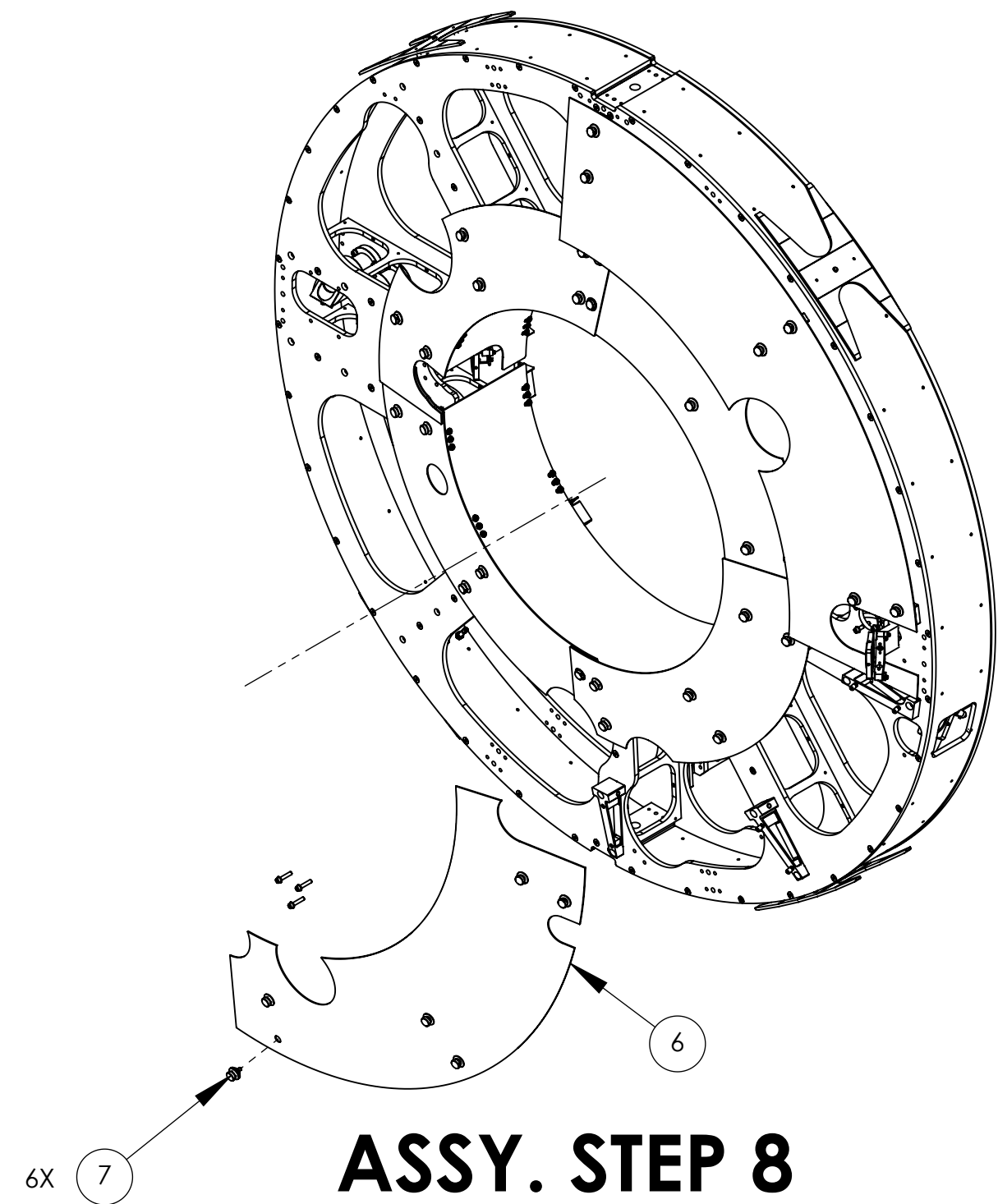
**ASSY. STEP 5**  
**ISO VIEW**



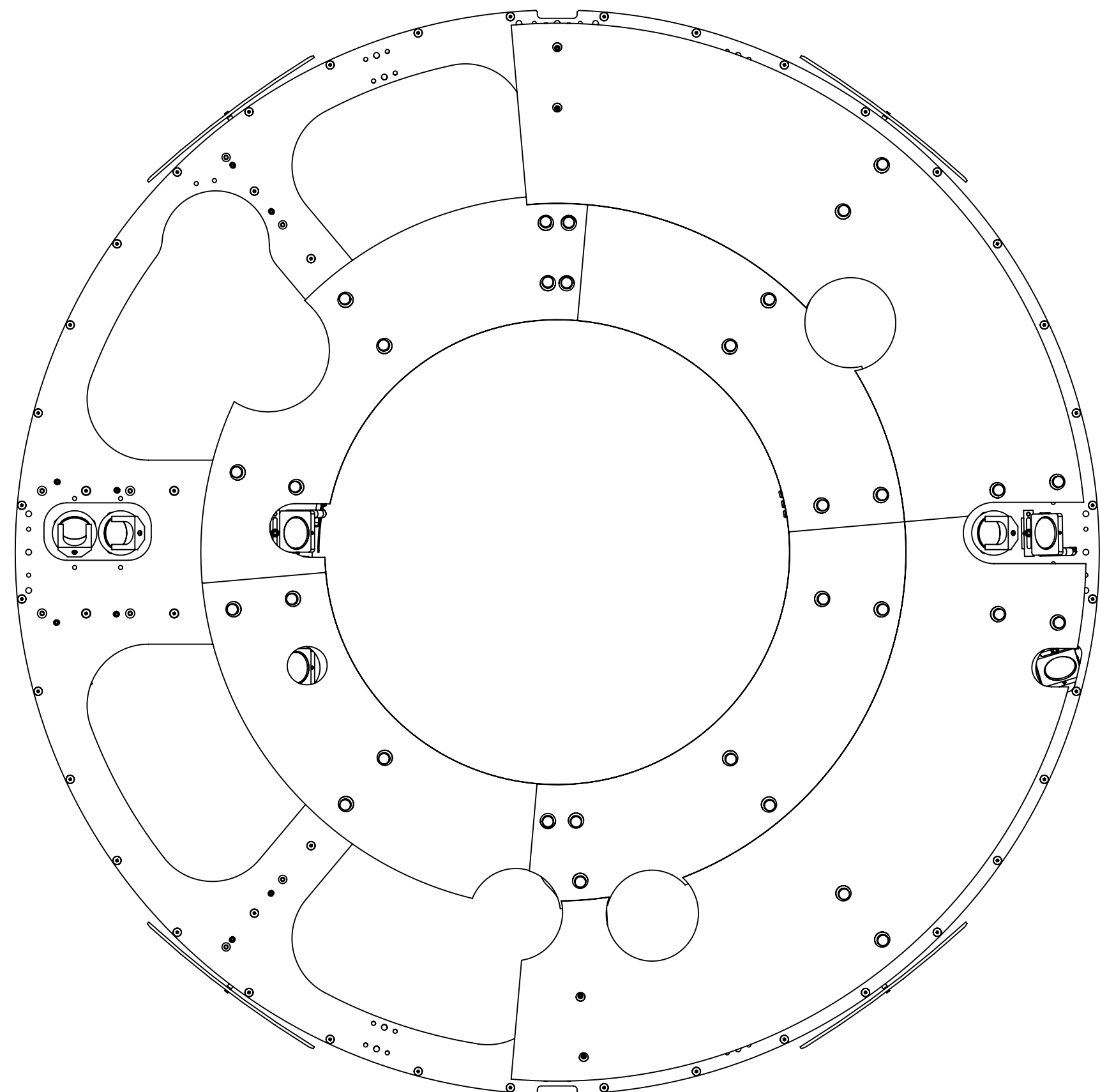
**ASSY. STEP 6**  
**ISO VIEW**



**ASSY. STEP 7**  
**ISO VIEW**



**ASSY. STEP 8**  
**ISO VIEW**



**FRONT**  
(SEE SHEET 21 & 22 FOR O3 ADDITIONS)

**PARTIAL BOM**  
(FOR COMPLETE BOM, SEE SHEET 1 AND SHEET 8)

ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	QTY.
7	D1700232-1	αLIGO, SLIC. BOLT ASSY., BN	N/A	35
6	D1700165-02	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD (OUTER PANEL)	304 SSSL	1
5	D1700165-01	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD (OUTER PANEL)	304 SSSL	1
4	D1700164-04	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD (QUADRANT IV)	304 SSSL	1
3	D1700164-03	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD (QUADRANT III)	304 SSSL	1
2	D1700164-02	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD (QUADRANT II)	304 SSSL	1
1	D1700164-01	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD (QUADRANT I)	304 SSSL	1

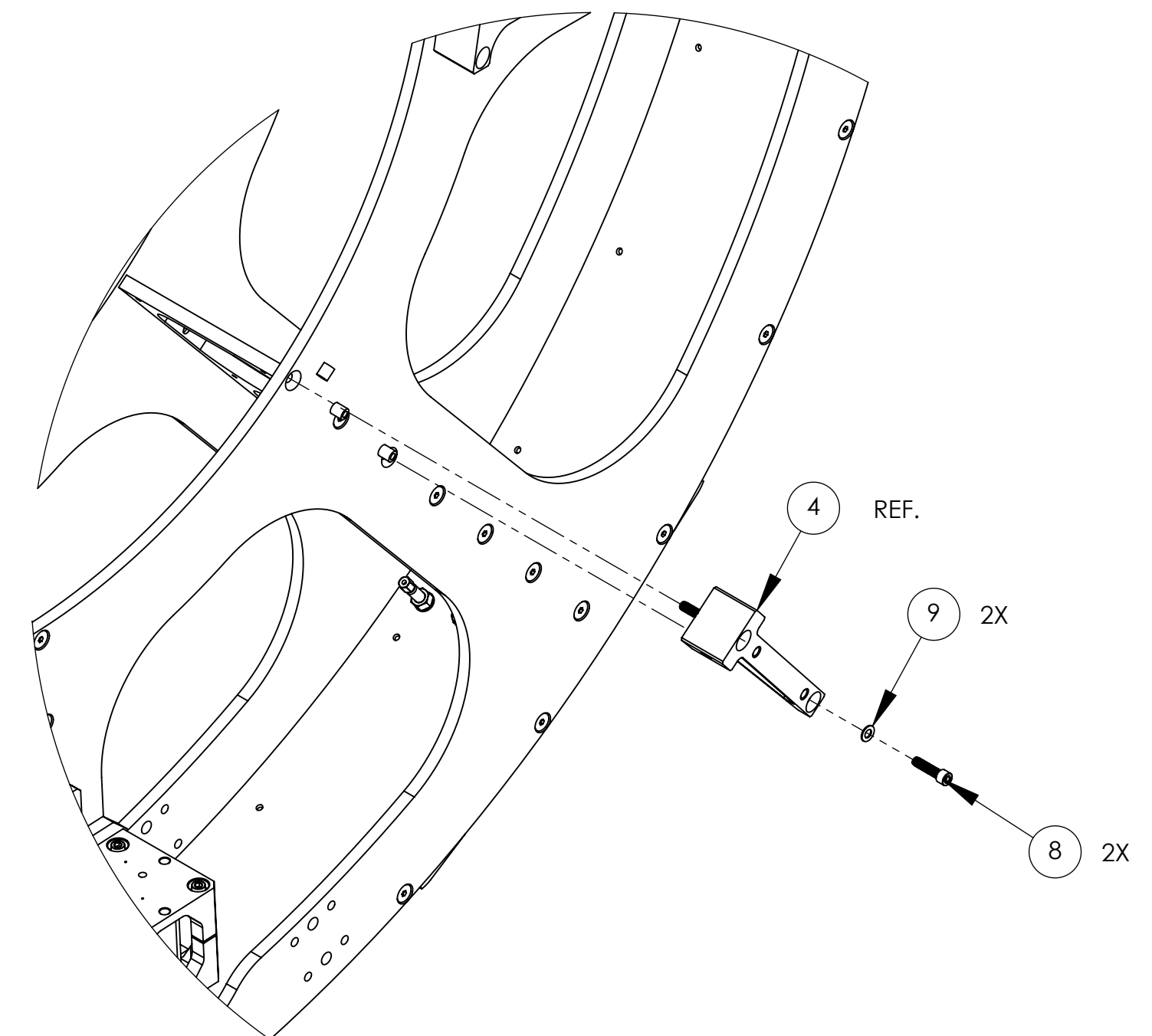
**LIGO** CALIFORNIA INSTITUTE OF TECHNOLOGY  
 MASSACHUSETTS INSTITUTE OF TECHNOLOGY

SIZE DWG. NO. REV.  
 D D1200174 v9

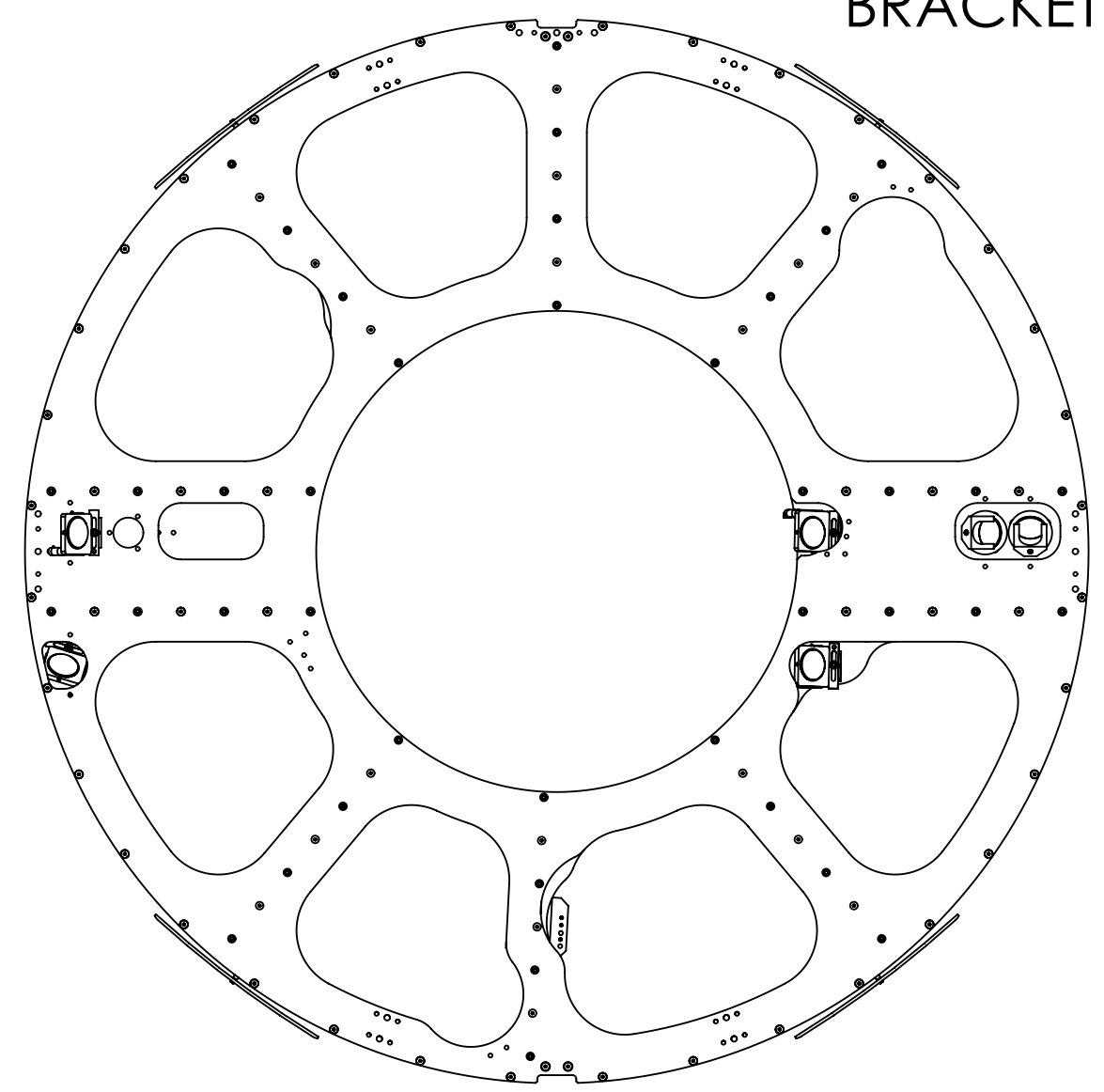
SCALE: 1:12 PROJECTION: SHEET 13 OF 22

PART PDM VERSION: v010  
 DWG PDM VERSION: v003  
 D1200174 αLIGO, PCAL-VIDEO CAM, PERISCOPE

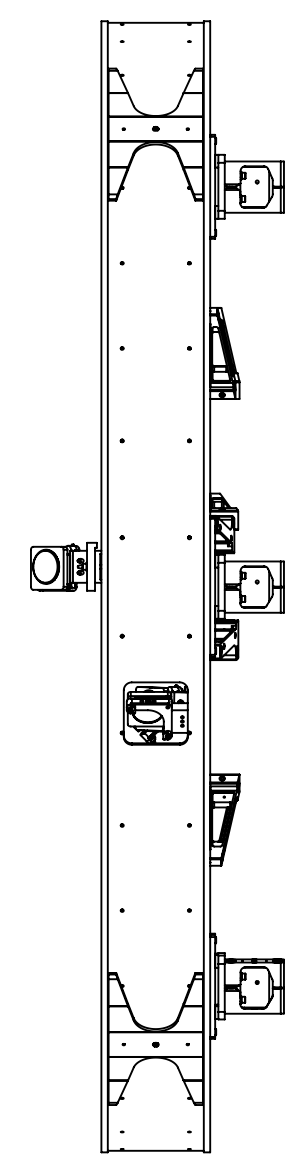
# PCAL SHIELD + BARREL BAFFLE INSTALLATION SEQUENCE -02, Xarm: ASSY. STEP 1



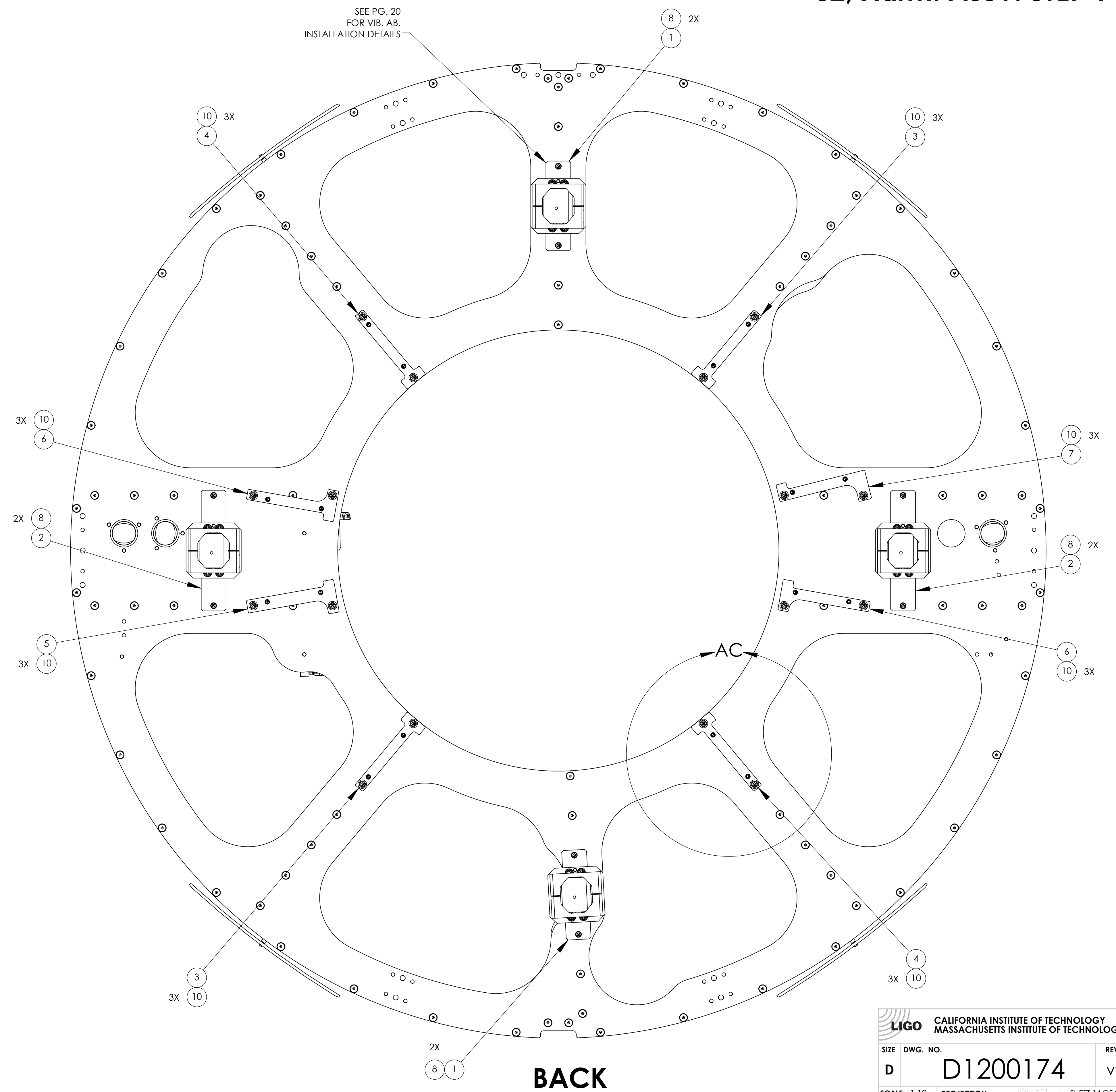
**DETAIL 'E'**  
BRACKET ATTACHMENT  
TYP.



**FRONT**



**SIDE**



**BACK**

**PARTIAL BOM**  
(FOR COMPLETE BOM, SEE SHEET 1 AND SHEET 8)

ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	QTY.
10	1185-4EN375 EMHART OR EQ.	HELICOIL, 1/4-20 X .375 LG.	NITRONIC 60	24
9	NAS620-C416 OR EQ.	WASHER, FLAT, 1/4	300 SSSL	16
8	78062 HOLO-KROME	SCREW, SHC, 1/4-20 X 1.00 LG.	18-8 SSSL	24
7	D1700220-08	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	1
6	D1700220-06	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	2
5	D1700220-04	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	1
4	D1700220-02	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	2
3	D1700220-01	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	2
2	D1002424-02	VIBRATION ABSORBER ASSEMBLY	N/A	2
1	D1002424-01	VIBRATION ABSORBER ASSEMBLY	N/A	2

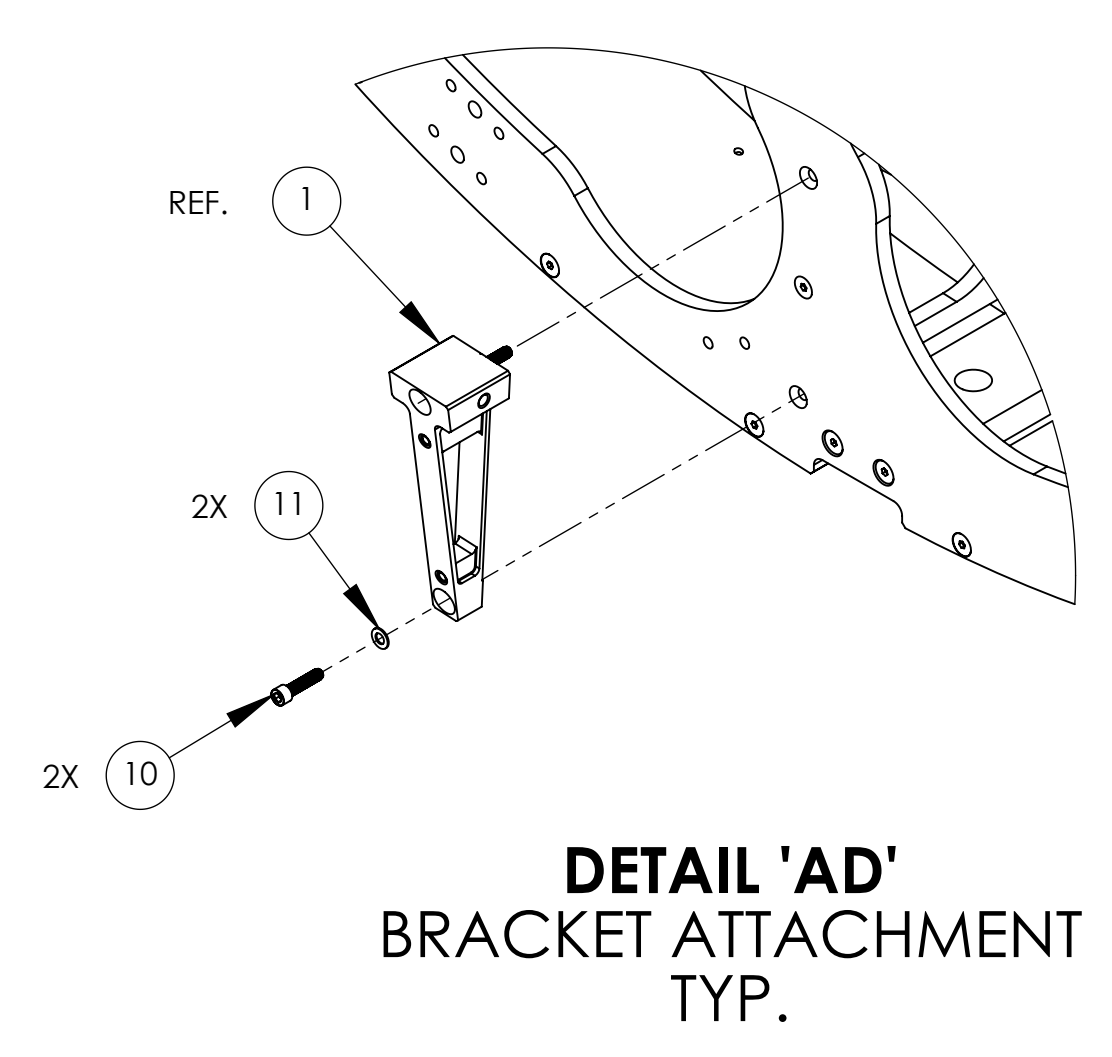
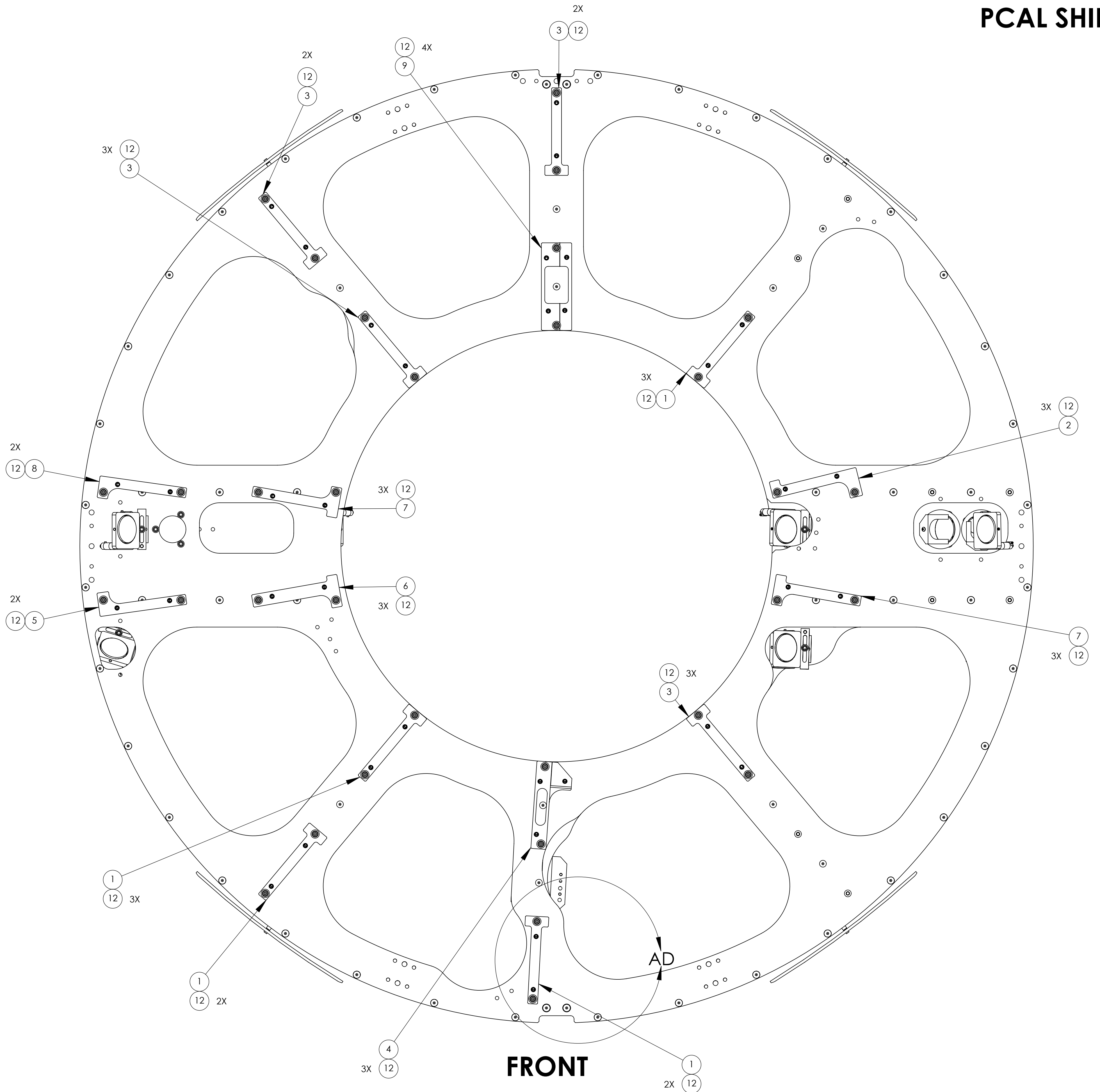
**LIGO** CALIFORNIA INSTITUTE OF TECHNOLOGY  
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

SIZE DWG. NO. **D1200174** REV. **v9**

SCALE: 1:12 PROJECTION: SHEET 14 OF 22

PART PDM VERSION: v010  
DWG PDM VERSION: v003  
D1200174 αLIGO, PCAL-VIDEO CAM, PERISCOPE

# PCAL SHIELD + BARREL BAFFLE INSTALLATION SEQUENCE -02, Xarm: ASSY. STEP 2



## PARTIAL BOM (FOR COMPLETE BOM, SEE SHEET 1 AND SHEET 8)

ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	QTY.
12	1185-4EN375, EMHART OR EQ.	HELICOIL, 1/4-20 X .375 LG.	NITRONIC 60	43
11	NAS620-C416 OR EQ.	WASHER, FLAT, 1/4	300 SSSL	32
10	78062 HOLO-KROME	SCREW, SHC, 1/4-20 X 1.00 LG.	18-8 SSSL	32
9	D1700220-16	gLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	1
8	D1700220-10	gLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	1
7	D1700220-06	gLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	2
6	D1700220-04	gLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	1
5	D1700220-12	gLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	1
4	D1700220-14	gLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	1
3	D1700220-02	gLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	4
2	D1700220-08	gLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	1
1	D1700220-01	gLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	4

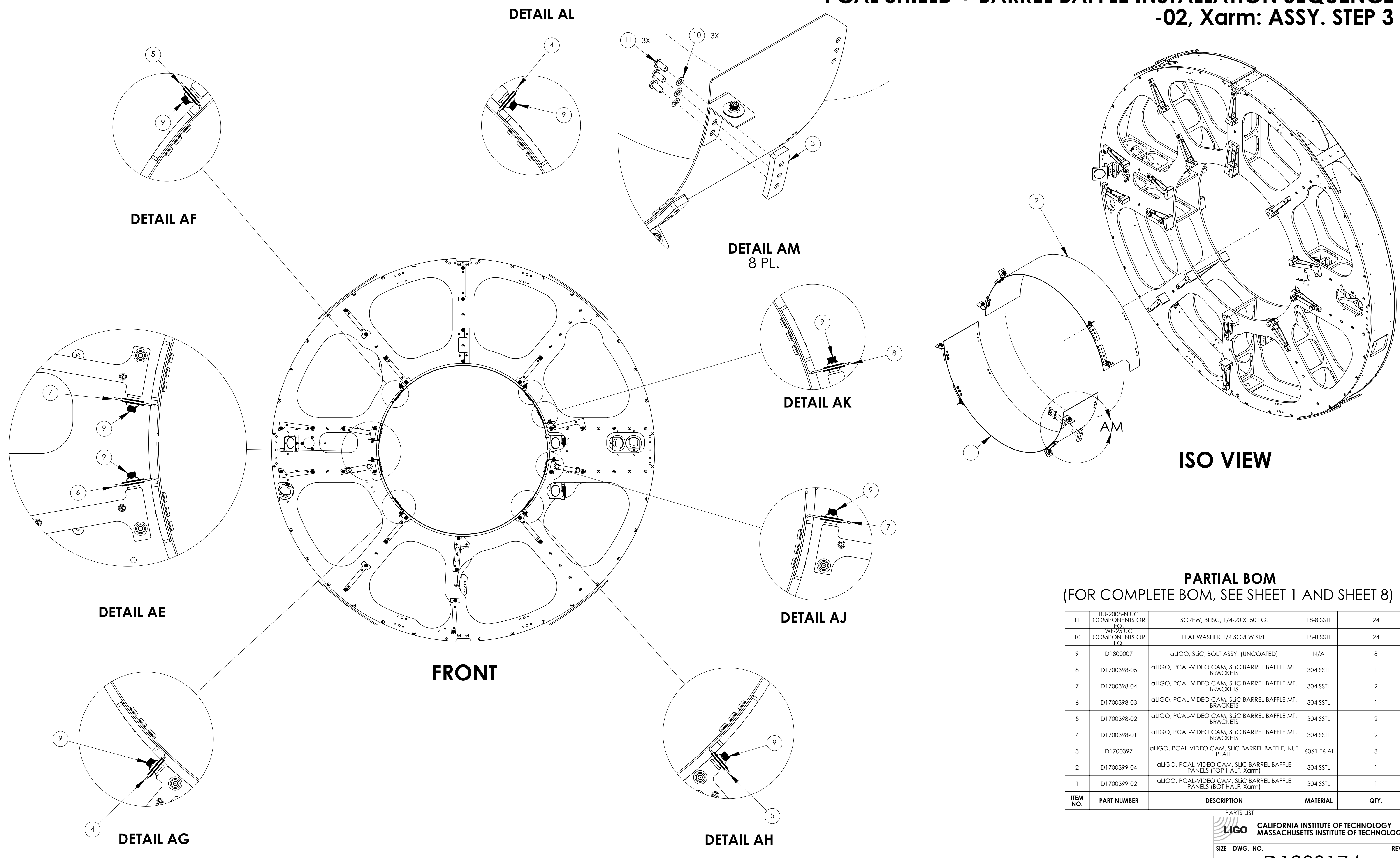
FRONT

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

SIZE DWG. NO. **D1200174** REV. **v9**


SCALE: 1:12 PROJECTION: SHEET 15 OF 22

# PCAL SHIELD + BARREL BAFFLE INSTALLATION SEQUENCE -02, Xarm: ASSY. STEP 3




## PARTIAL BOM (FOR COMPLETE BOM, SEE SHEET 1 AND SHEET 8)

ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	QTY.
11	BU-2008-N UC COMPONENTS OR EQ.	SCREW, BHSC, 1/4-20 X .50 LG.	18-8 SSSL	24
10	WF-23 UC COMPONENTS OR EQ.	FLAT WASHER 1/4 SCREW SIZE	18-8 SSSL	24
9	D1800007	αLIGO, SLIC, BOLT ASSY. (UNCOATED)	N/A	8
8	D1700398-05	αLIGO, PCAL-VIDEO CAM, SLIC BARREL BAFFLE MT. BRACKETS	304 SSSL	1
7	D1700398-04	αLIGO, PCAL-VIDEO CAM, SLIC BARREL BAFFLE MT. BRACKETS	304 SSSL	2
6	D1700398-03	αLIGO, PCAL-VIDEO CAM, SLIC BARREL BAFFLE MT. BRACKETS	304 SSSL	1
5	D1700398-02	αLIGO, PCAL-VIDEO CAM, SLIC BARREL BAFFLE MT. BRACKETS	304 SSSL	2
4	D1700398-01	αLIGO, PCAL-VIDEO CAM, SLIC BARREL BAFFLE MT. BRACKETS	304 SSSL	2
3	D1700397	αLIGO, PCAL-VIDEO CAM, SLIC BARREL BAFFLE, NUT PLATE	6061-T6 Al	8
2	D1700399-04	αLIGO, PCAL-VIDEO CAM, SLIC BARREL BAFFLE PANELS (TOP HALF, Xarm)	304 SSSL	1
1	D1700399-02	αLIGO, PCAL-VIDEO CAM, SLIC BARREL BAFFLE PANELS (BOT HALF, Xarm)	304 SSSL	1

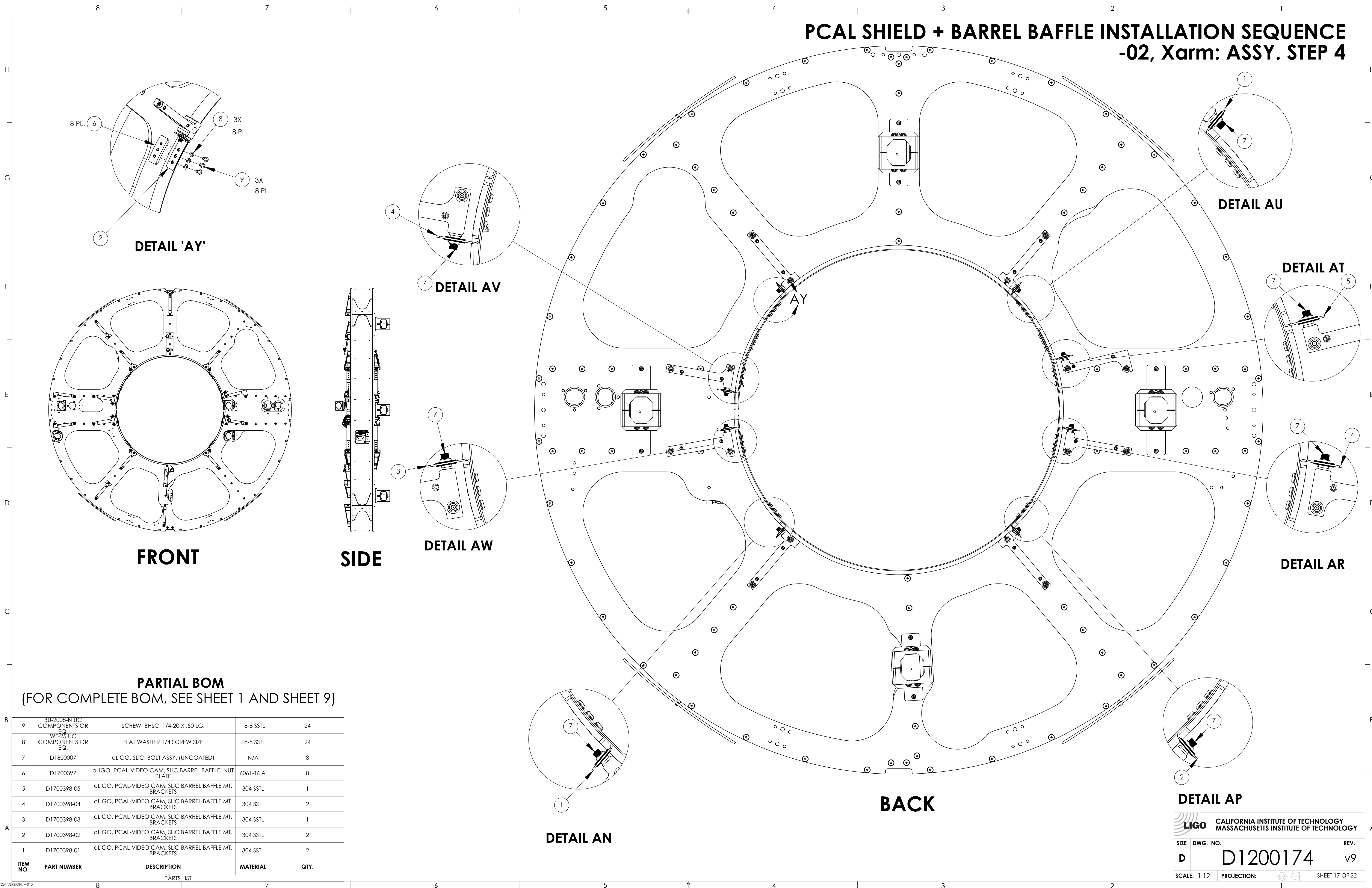
 CALIFORNIA INSTITUTE OF TECHNOLOGY  
 MASSACHUSETTS INSTITUTE OF TECHNOLOGY

SIZE DWG. NO. **D1200174** REV. **v9**

SCALE: 1:12 PROJECTION:  SHEET 16 OF 22



# PCAL SHIELD + BARREL BAFFLE INSTALLATION SEQUENCE -02, Xarm: ASSY. STEP 4



## PARTIAL BOM (FOR COMPLETE BOM, SEE SHEET 1 AND SHEET 9)

9	BU-2008-N UC COMPONENTS OR EQ.	SCREW, BHSC, 1/4-20 X .50 LG.	18-8 SSSL	24
8	WF-25 UC COMPONENTS OR EQ.	FLAT WASHER 1/4 SCREW SIZE	18-8 SSSL	24
7	D1800007	αLIGO, SLIC, BOLT ASSY. (UNCOATED)	N/A	8
6	D1700397	αLIGO, PCAL-VIDEO CAM, SLIC BARREL BAFFLE, NUT PLATE	6061-T6 Al	8
5	D1700398-05	αLIGO, PCAL-VIDEO CAM, SLIC BARREL BAFFLE MT. BRACKETS	304 SSSL	1
4	D1700398-04	αLIGO, PCAL-VIDEO CAM, SLIC BARREL BAFFLE MT. BRACKETS	304 SSSL	2
3	D1700398-03	αLIGO, PCAL-VIDEO CAM, SLIC BARREL BAFFLE MT. BRACKETS	304 SSSL	1
2	D1700398-02	αLIGO, PCAL-VIDEO CAM, SLIC BARREL BAFFLE MT. BRACKETS	304 SSSL	2
1	D1700398-01	αLIGO, PCAL-VIDEO CAM, SLIC BARREL BAFFLE MT. BRACKETS	304 SSSL	2
ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	QTY.

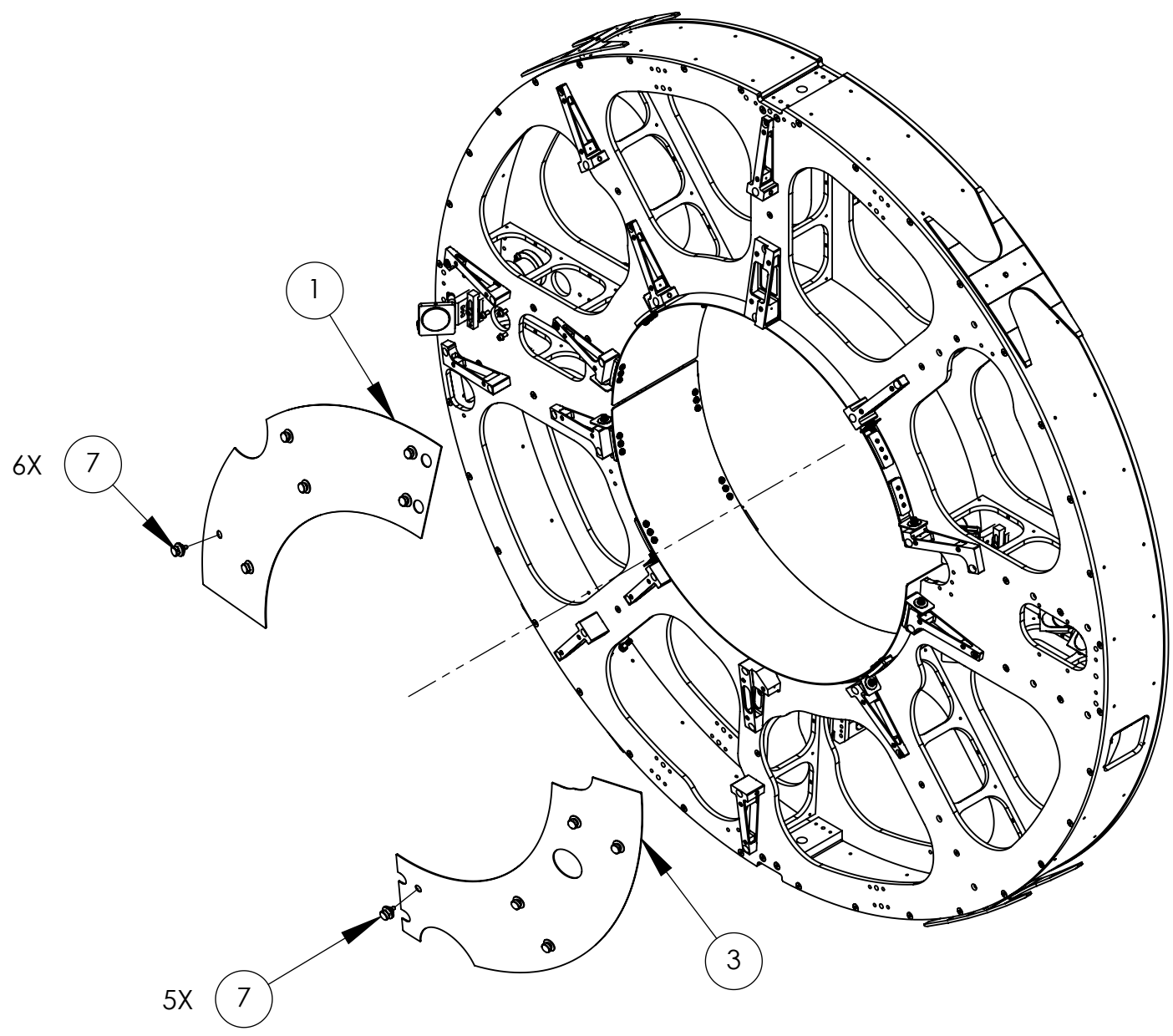
**DETAIL AP**

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

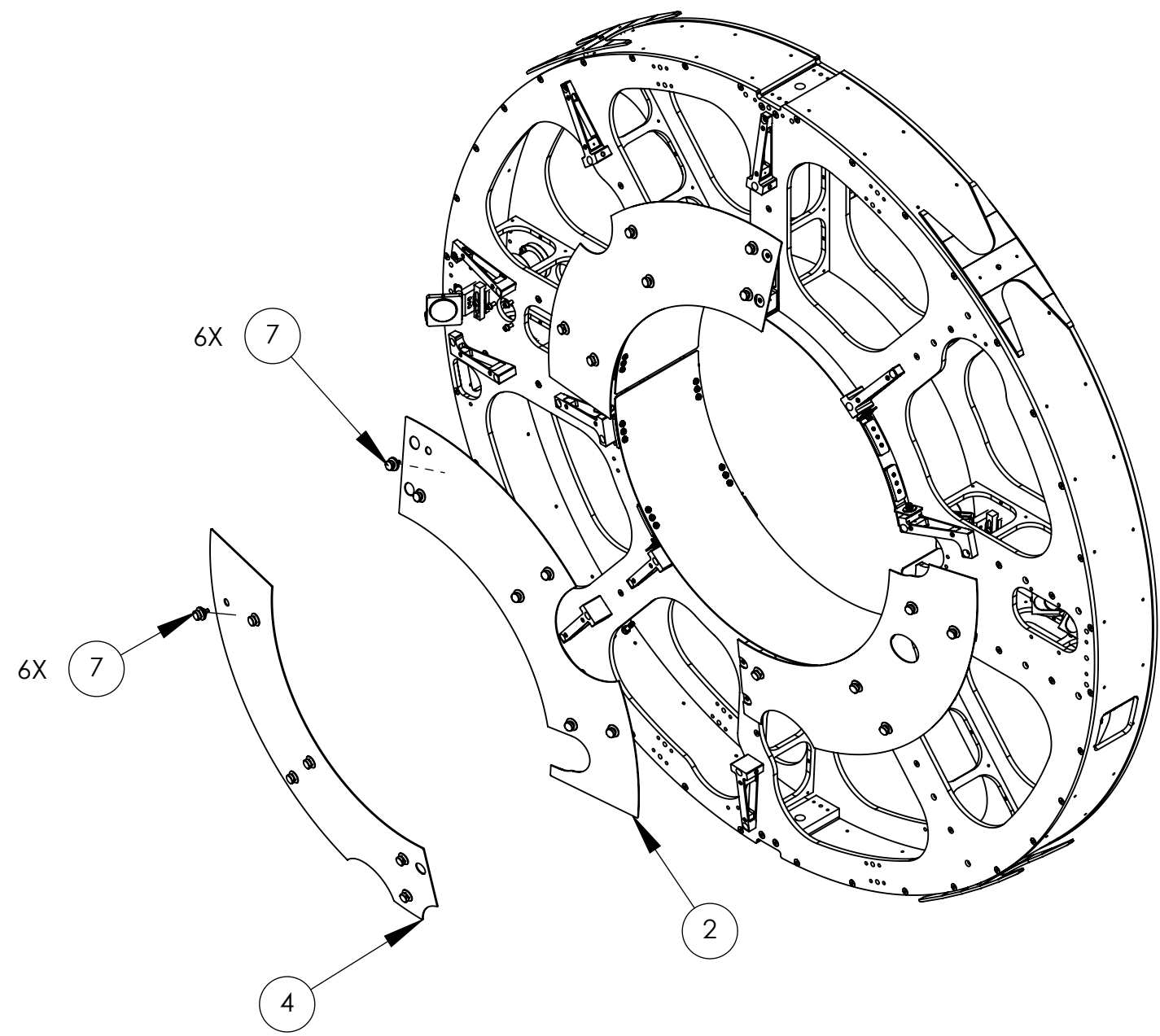
SIZE DWG. NO. REV.  
D D1200174 v9

SCALE: 1:12 PROJECTION: SHEET 17 OF 22

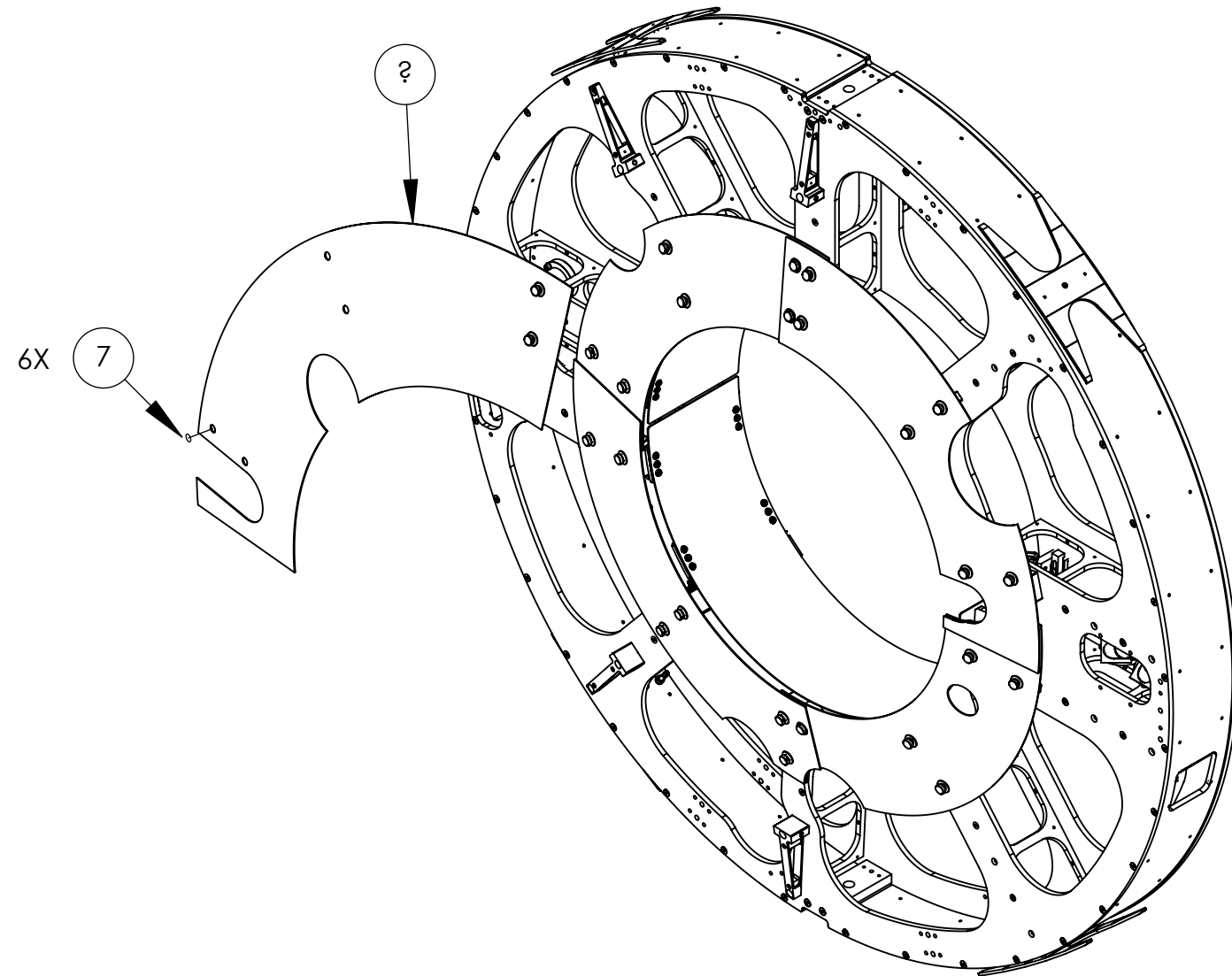
**PCAL SHIELD + BARREL BAFFLE INSTALLATION SEQUENCE**  
**-02, Xarm: ASSY. STEP 5 - 8**



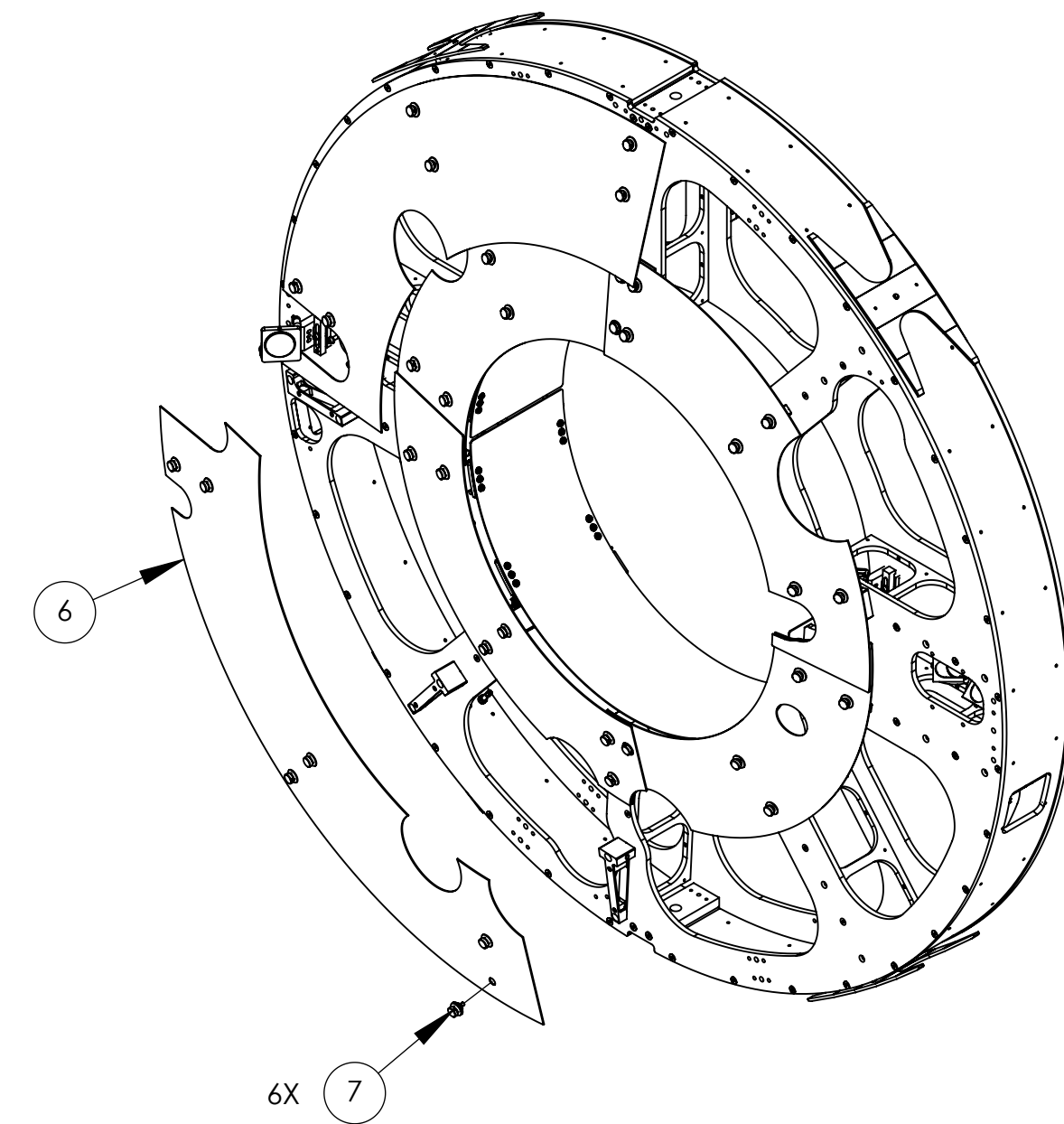
**ASSY. STEP 5**  
**ISO VIEW**



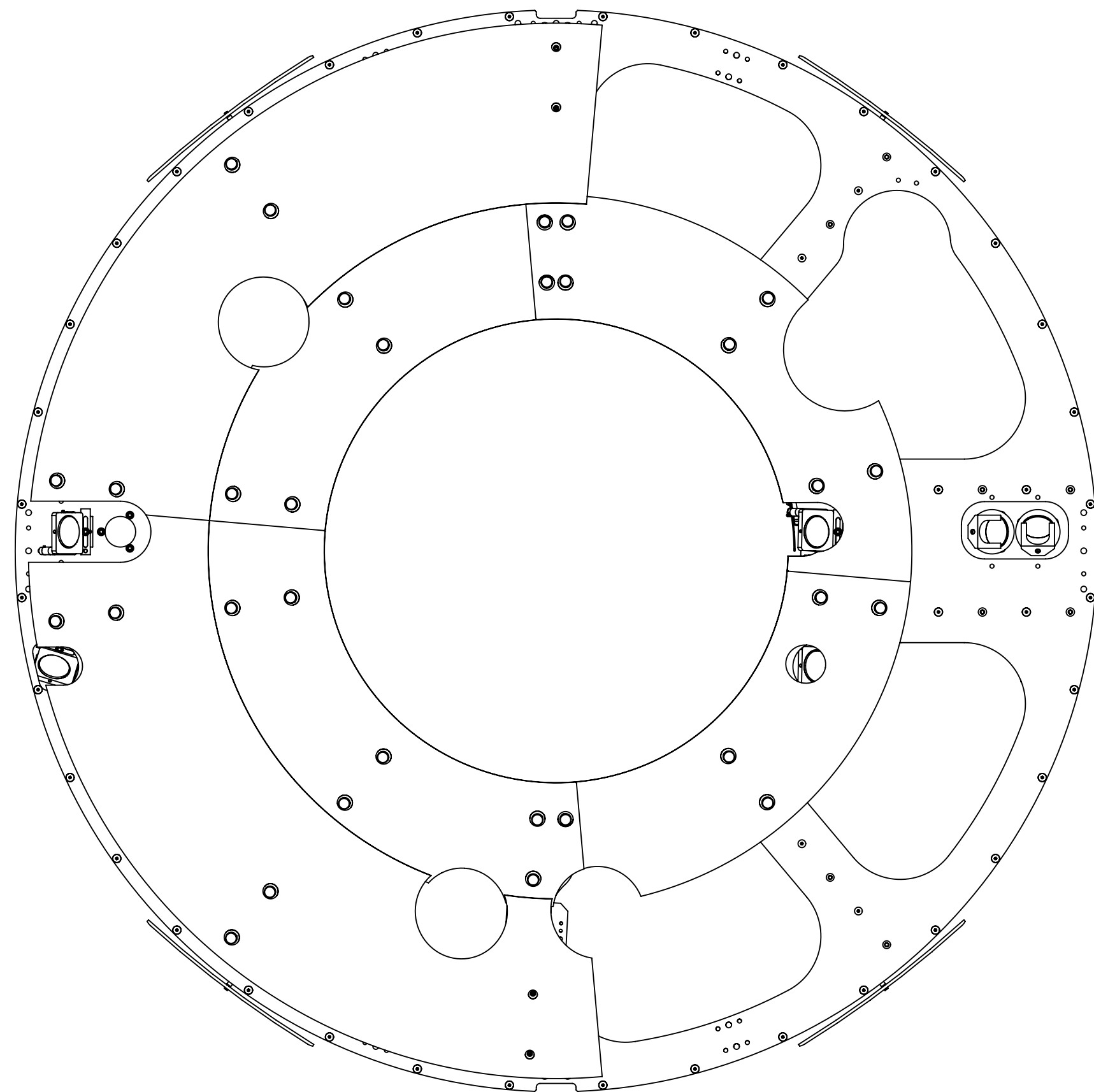
**ASSY. STEP 6**  
**ISO VIEW**



**ASSY. STEP 7**  
**ISO VIEW**



**ASSY. STEP 8**  
**ISO VIEW**



**FRONT**  
(SEE SHEET 21 & 22 FOR O3 ADDITIONS)

**PARTIAL BOM**

(FOR COMPLETE BOM, SEE SHEET 1 AND SHEET 8)

ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	QTY.
7	D1700232-1	αLIGO, SLIC, BOLT ASSY., BN	N/A	35
6	D1700165-04	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD (OUTER PANEL), Xarm	304 SSSL	1
5	D1700165-03	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD (OUTER PANEL), Xarm	304 SSSL	1
4	D1700164-08	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD (QUADRANT IV), Xarm	304 SSSL	1
3	D1700164-07	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD (QUADRANT III), Xarm	304 SSSL	1
2	D1700164-06	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD (QUADRANT II), Xarm	304 SSSL	1
1	D1700164-05	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD (QUADRANT I), Xarm	304 SSSL	1

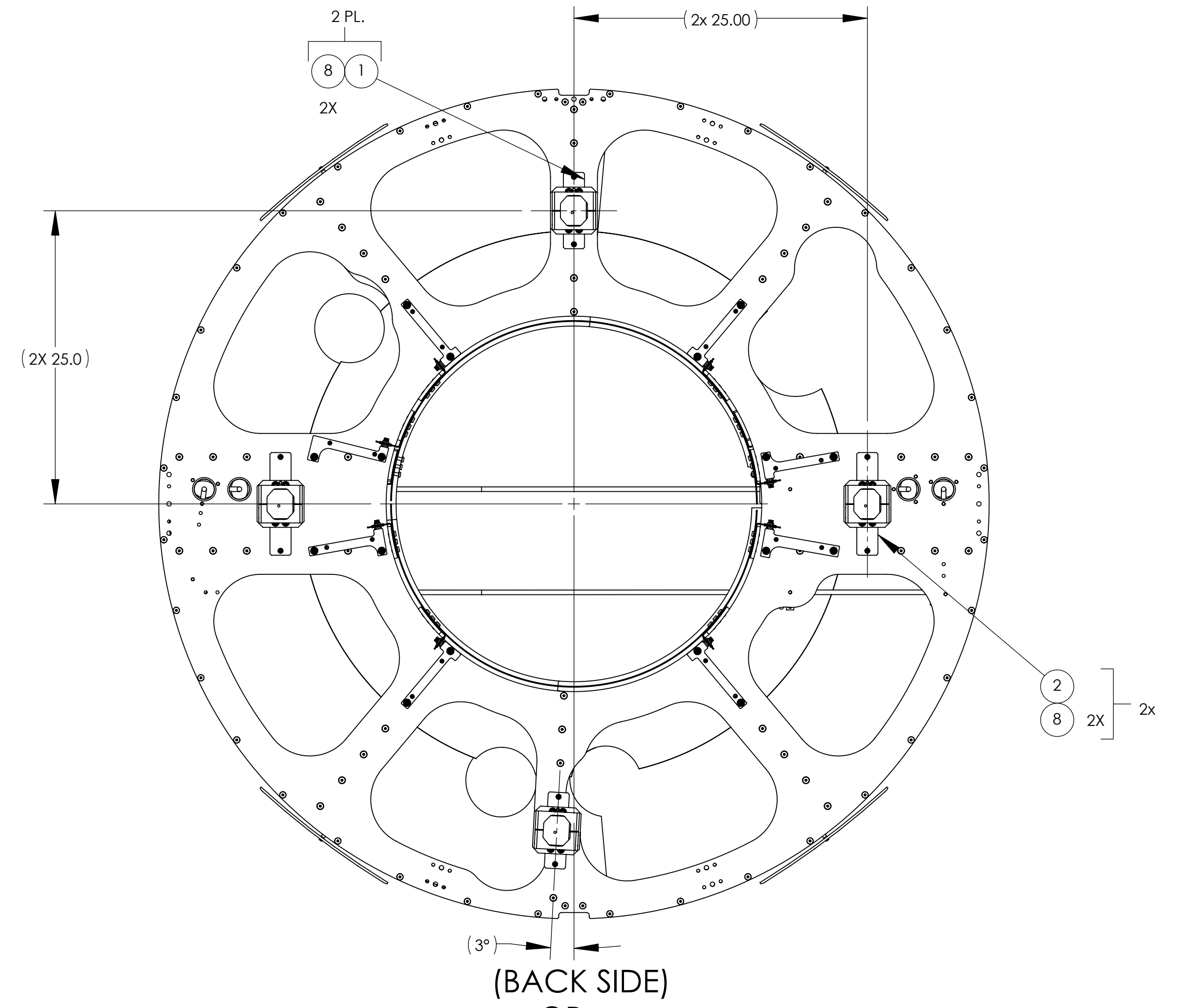
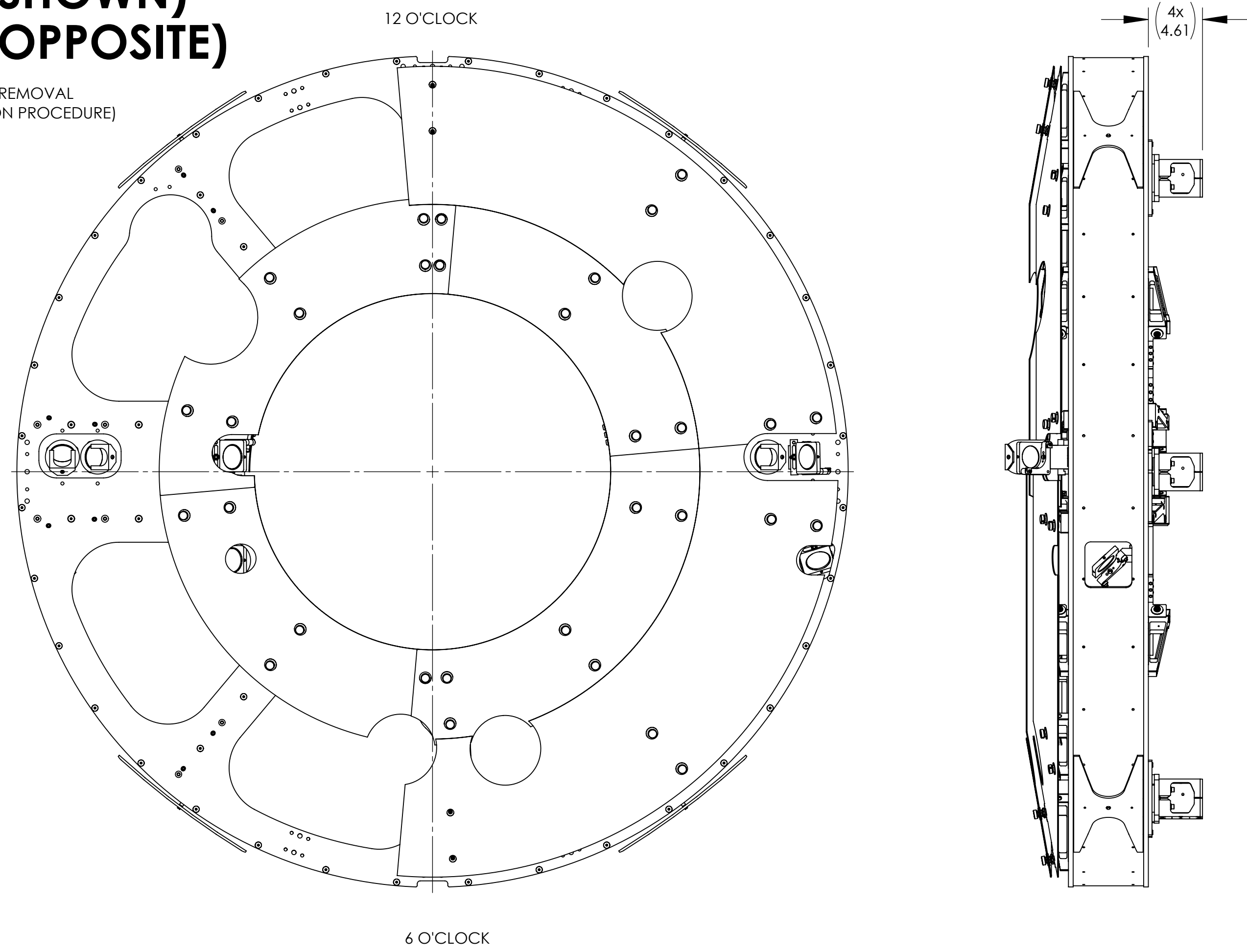
**LIGO** CALIFORNIA INSTITUTE OF TECHNOLOGY  
 MASSACHUSETTS INSTITUTE OF TECHNOLOGY

SIZE DWG. NO. **D1200174** REV. **v9**

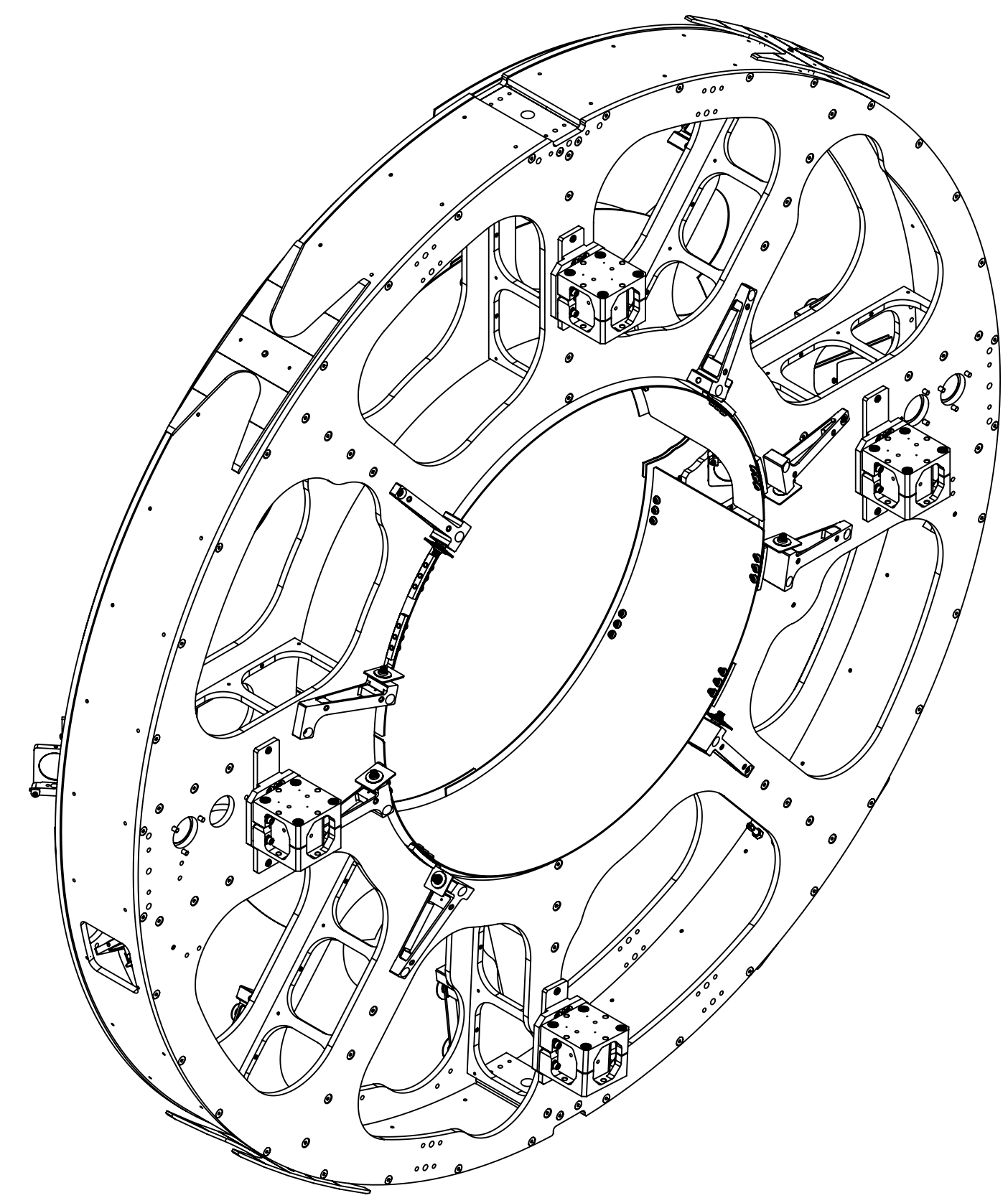
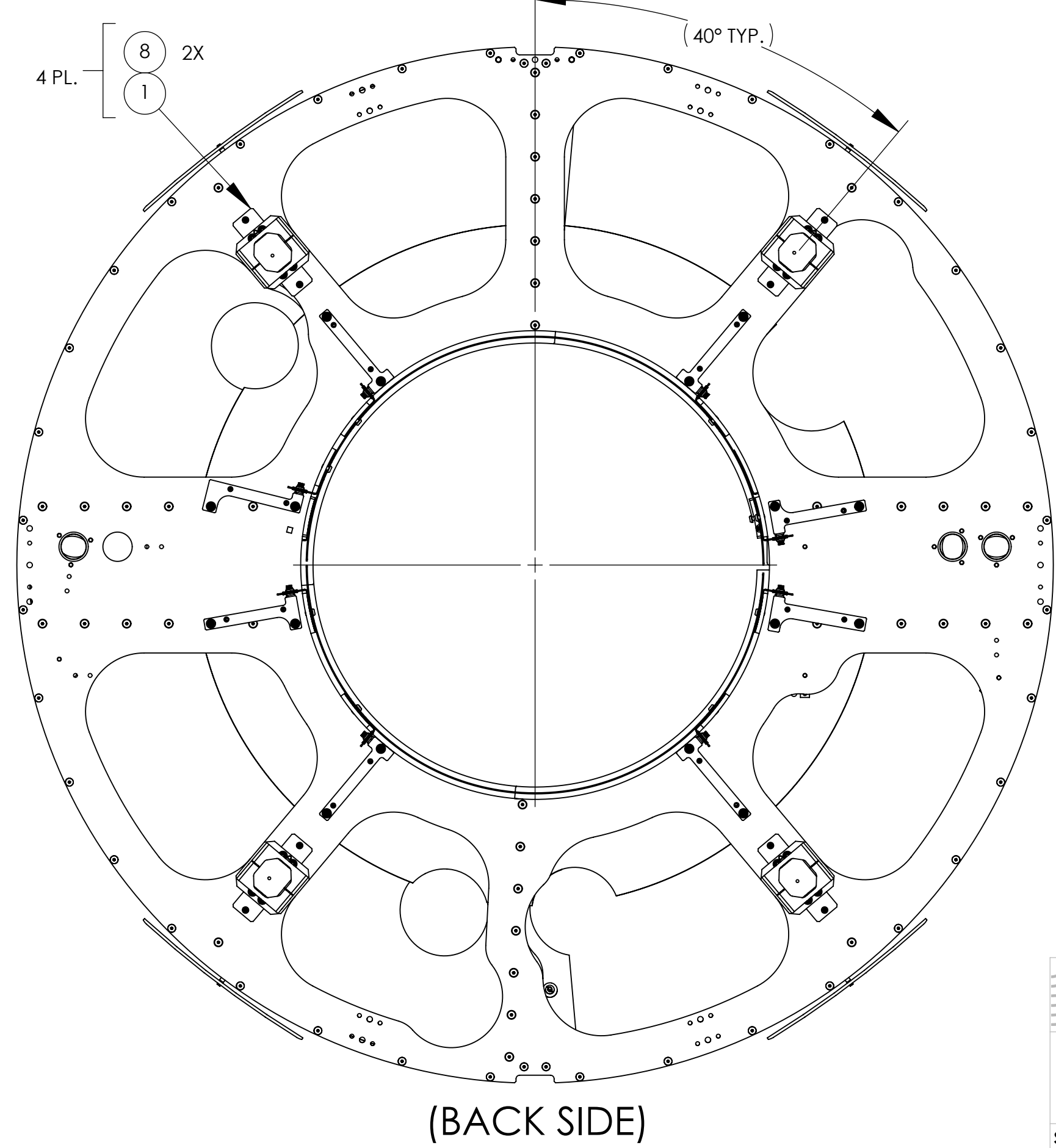
SCALE: 1:12 PROJECTION: SHEET 18 OF 22

**-01 (Y-ARM, SHOWN)**  
**-02 (X-ARM, OPPOSITE)**

(REFER TO LIGO E1700125 FOR MIRROR REMOVAL  
 AND VIBRATION ABSORBER INSTALLATION PROCEDURE)



(BACK SIDE)  
 OR



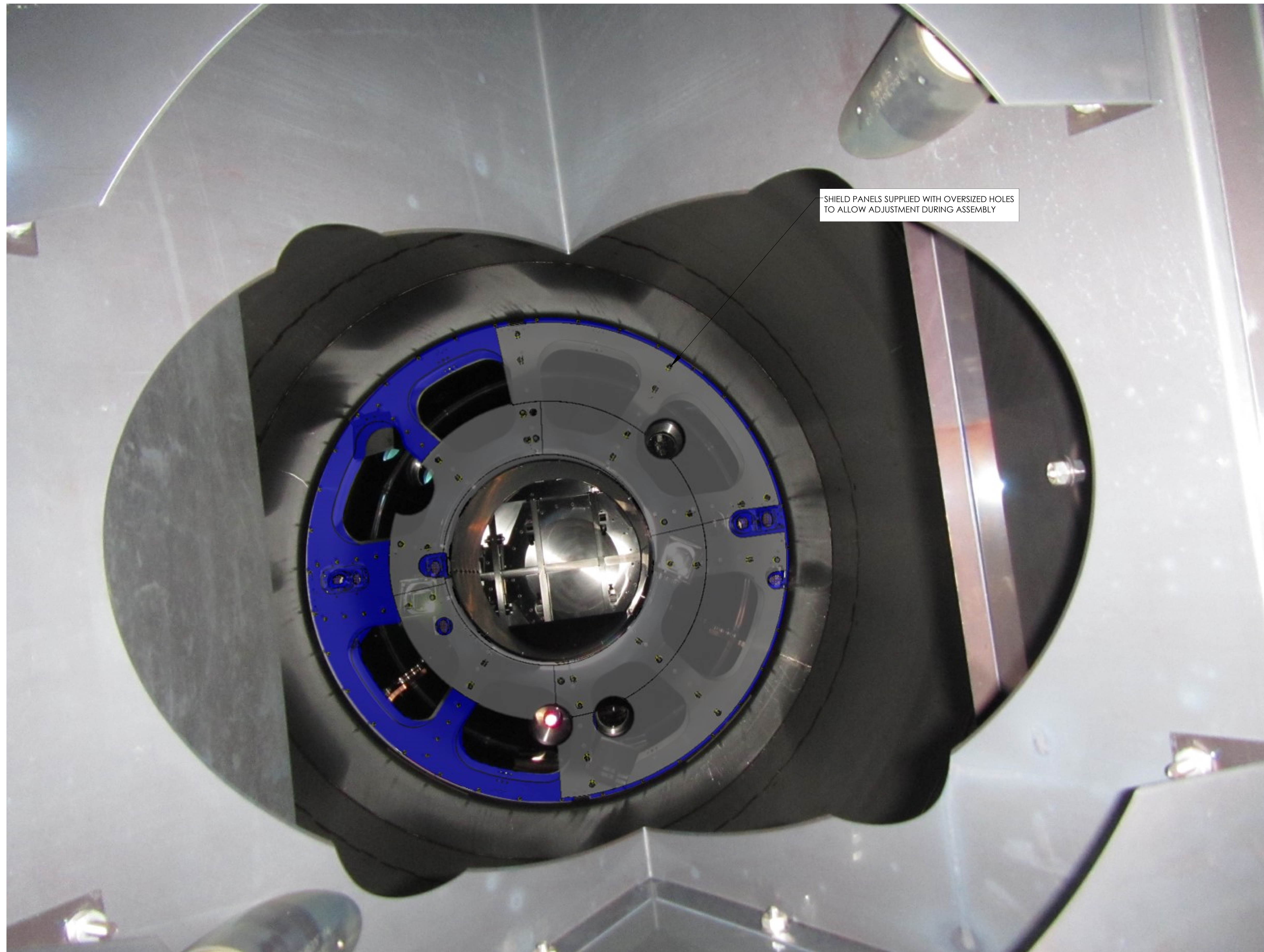
ISO VIEW (BACK SIDE)

(BACK SIDE)

<b>LIGO</b> CALIFORNIA INSTITUTE OF TECHNOLOGY MASSACHUSETTS INSTITUTE OF TECHNOLOGY	
SIZE DWG. NO.	REV.
<b>D</b> <b>D1200174</b>	<b>v9</b>
SCALE: NONE PROJECTION:	SHEET 19 OF 22

D1200174.dwg, F:\CAL\VIDEO CAM, PERISCOPE PART PDM REV-X-193, DRAWING PDM REV-X-193

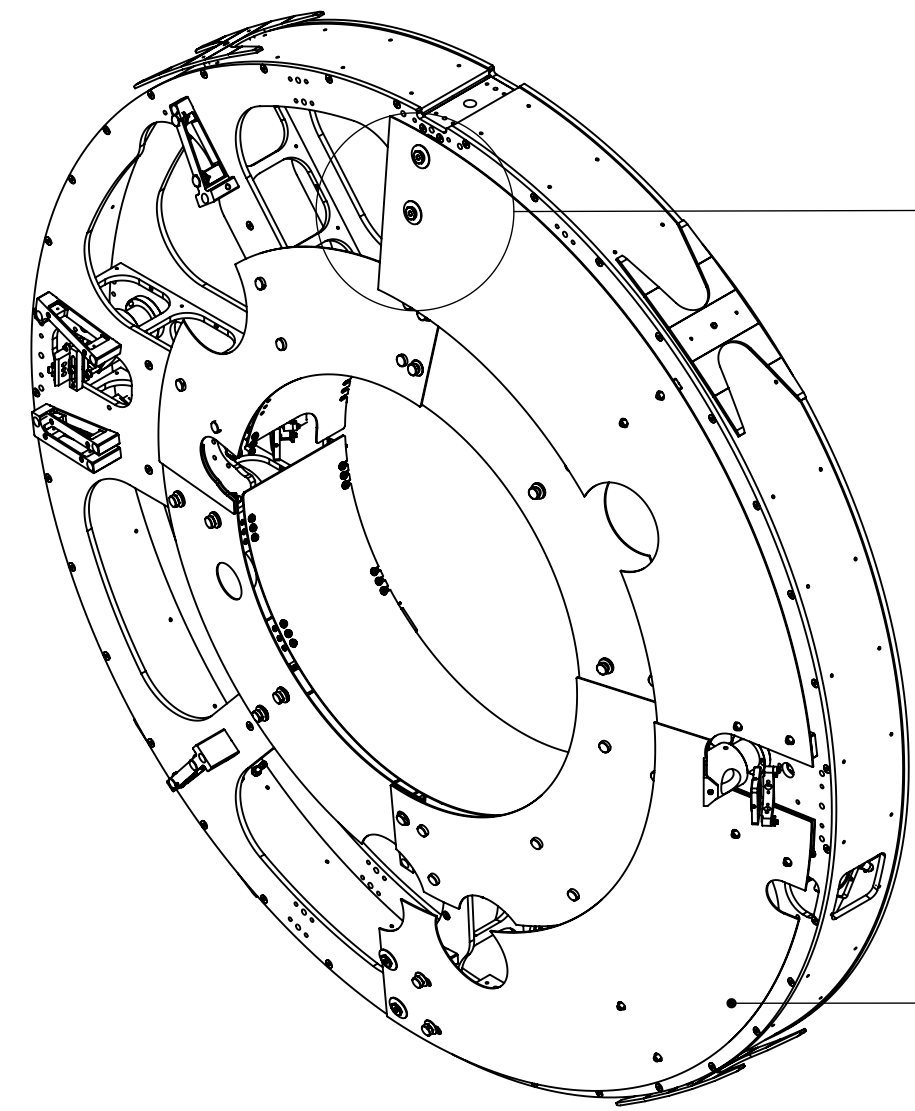
\*\*\*Yarm SHOWN, Xarm SYMMETRICALLY OPPOSITE\*\*\*



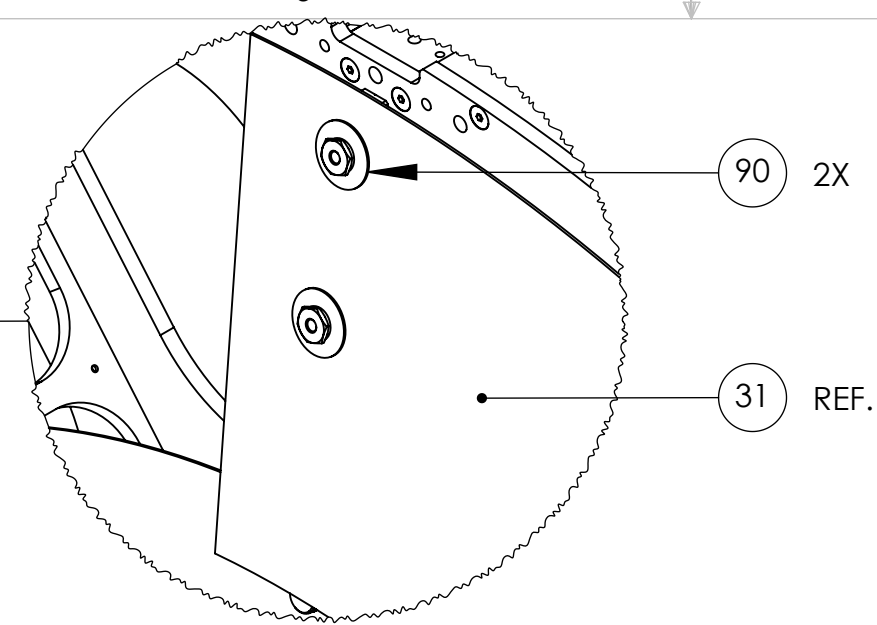
**PCAL PERISCOPE, WITH SHIELDS AND BARREL BAFFLE**  
(COMPOSITE IMAGE OF PCAL PERISCOPE FROM ETMY TAKEN BY ROBERT SCHOFIELD, AND SW CAMERA VIEW OF D1200174-01)

 CALIFORNIA INSTITUTE OF TECHNOLOGY MASSACHUSETTS INSTITUTE OF TECHNOLOGY		
SIZE	DWG. NO.	REV.
D	D1200174	v9
SCALE: 1:8	PROJECTION:	SHEET 20 OF 22

# 03 ADDITIONS -01, Yarm: ASSY. STEPS 9-12

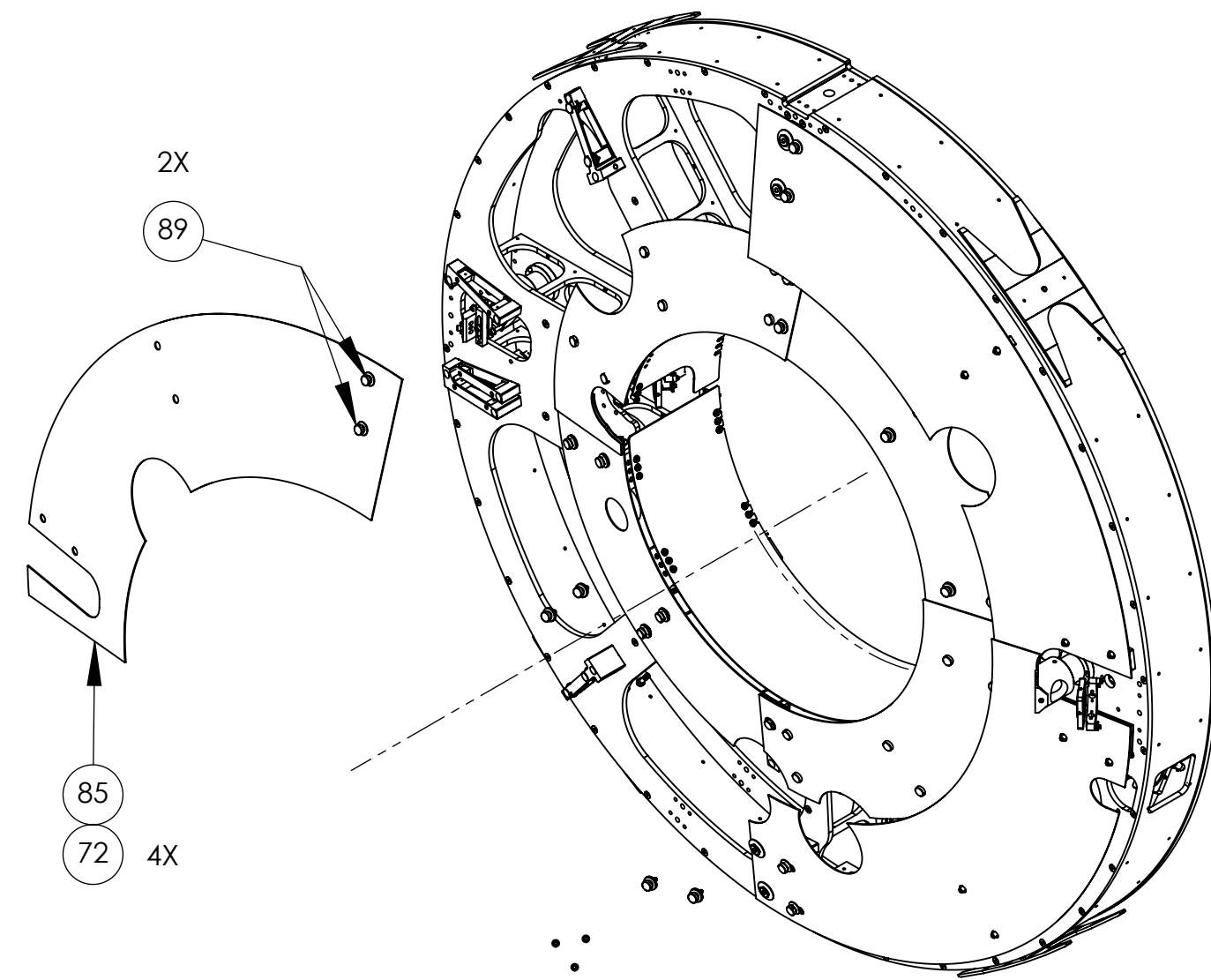


**ASSY. STEP 10  
ISO VIEW**

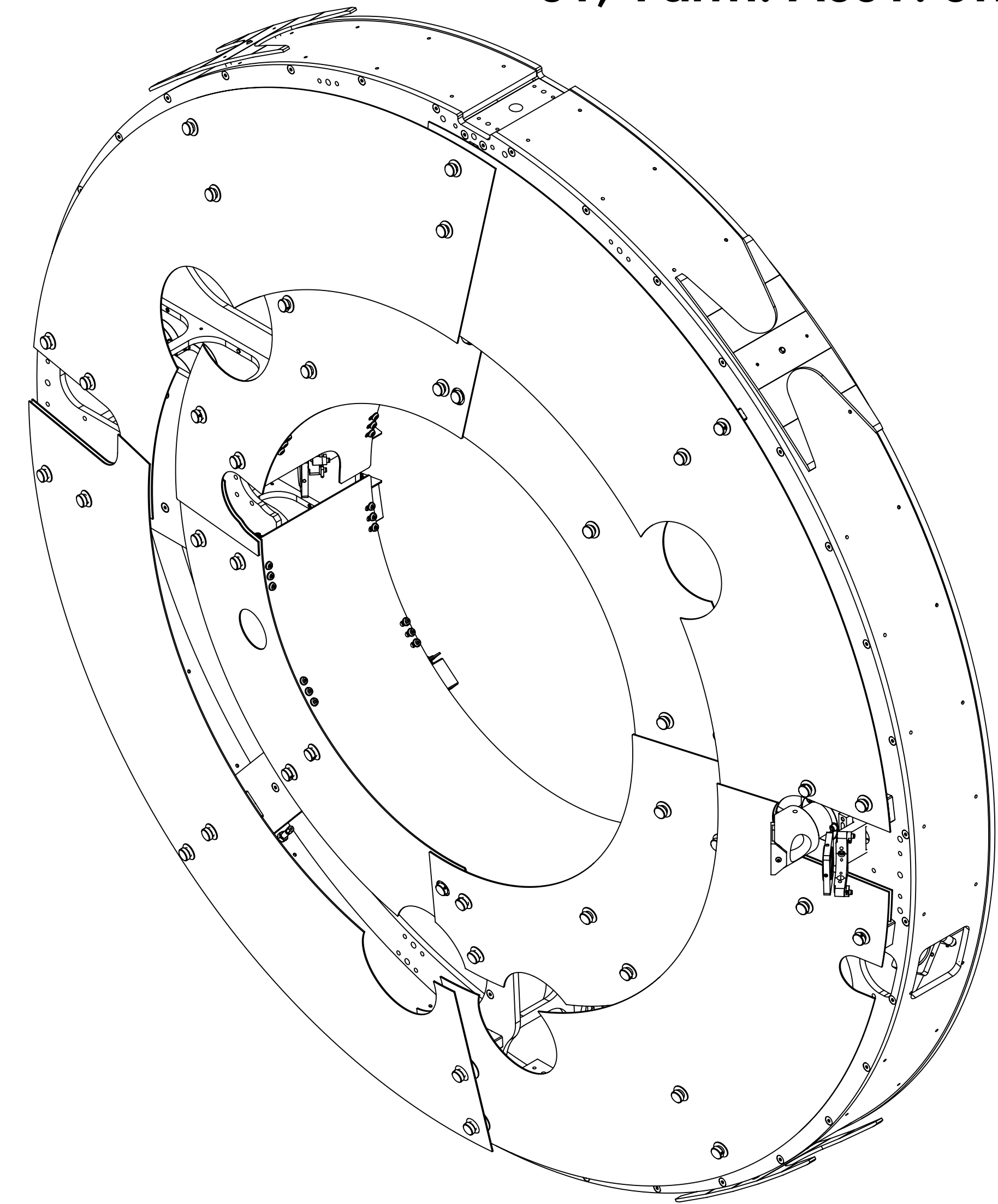


**DETAIL BB**

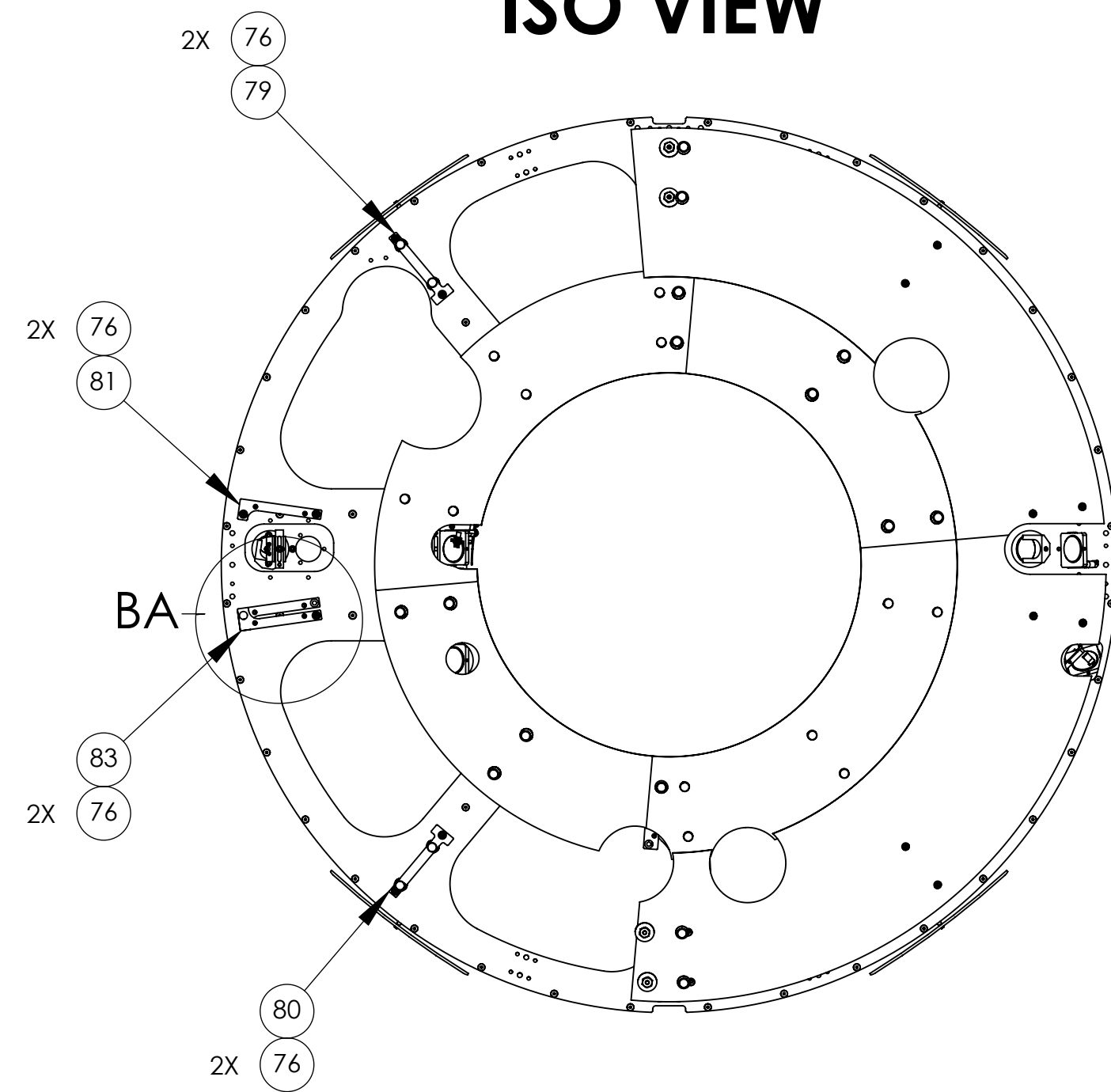
NOTE: REPLACE ITEM ⑦, SHOWN IN ASSEMBLY STEPS 7 AND 8,  
WITH ITEM ⑨⑩ AT 12 AND 6 O'CLOCK POSITIONS]



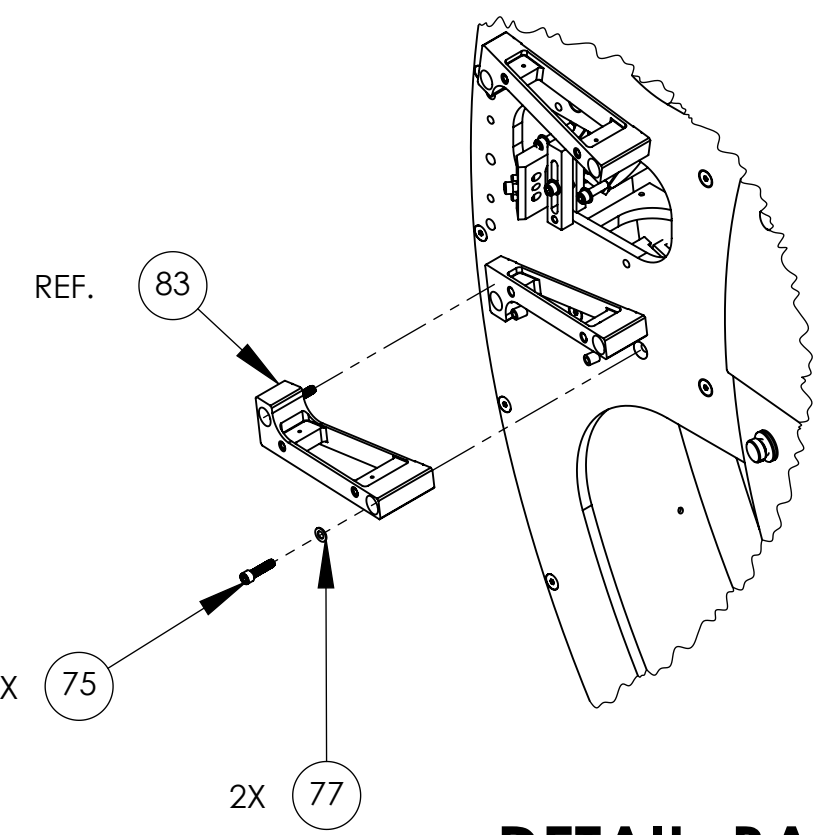
**ASSY. STEP 11  
ISO VIEW**



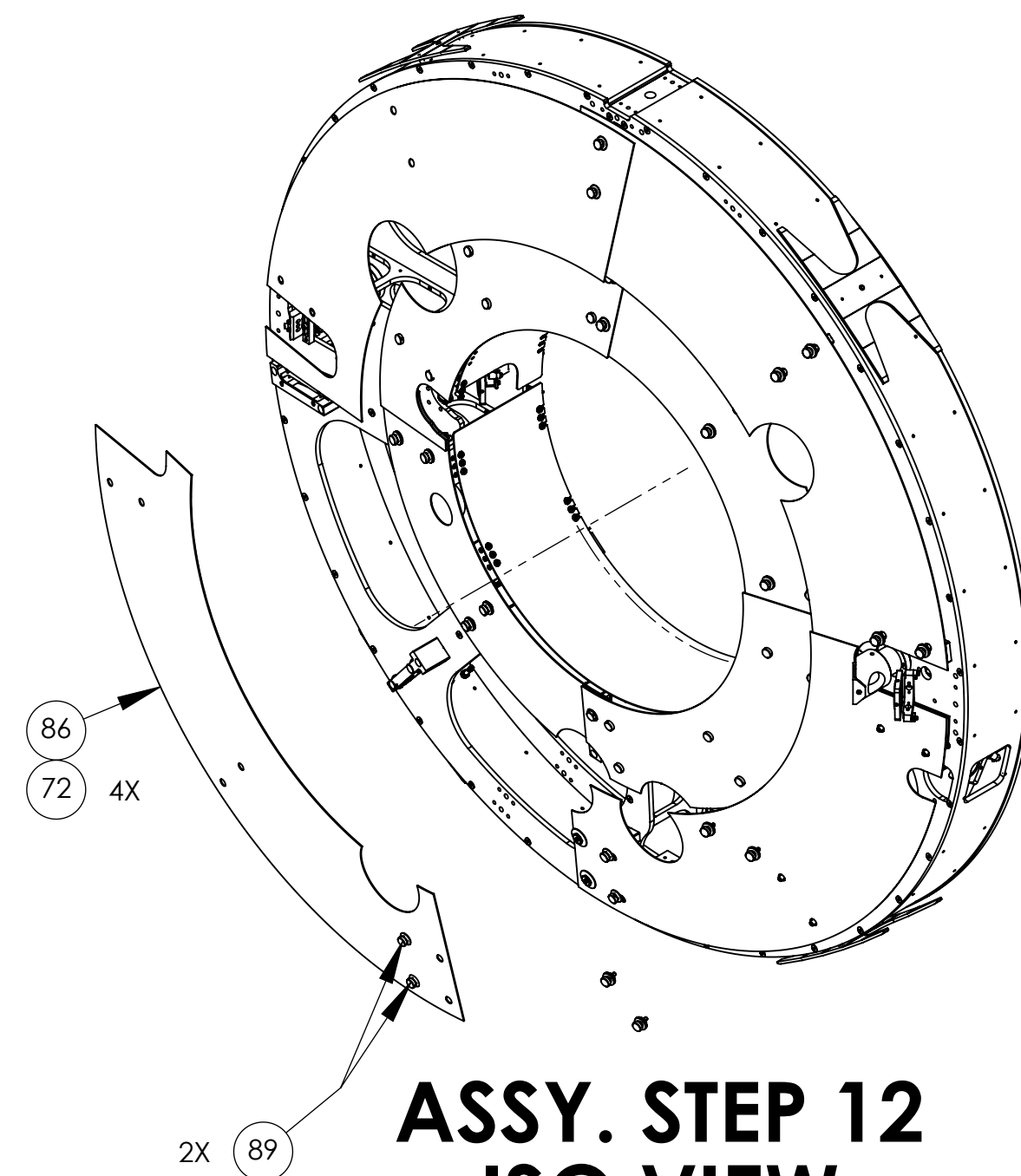
**ISO VIEW**



**ASSY. STEP 9  
ISO VIEW**



**DETAIL BA  
BRACKET ATTACHMENT  
TYP.**



**ASSY. STEP 12  
ISO VIEW**

REF. ONLY

ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	-01 (Y-Arm)/QTY.
90	D1900238	αLIGO, SLiC, PCAL, Captured shoulder nut assy.	N/A	4
89	D1700232-31	αLIGO, SLiC, BOLT ASSY., BN	N/A	4
86	D1700165-06	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD (OUTER PANEL)	304 SSSL	1
85	D1700165-05	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD (OUTER PANEL)	304 SSSL	1
83	D1700220-21	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	1
81	D1700220-19	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	1
80	D1700220-18	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	1
79	D1700220-17	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	1
77	NAS620-C416 OR EQ.	WASHER, FLAT, 1/4	300 SSSL	8
76	1185-4EN375 EMHART OR EQ.	HELICOIL, 1/4-20 X .375 LG.	NITRONIC 60	8
75	78062 HOLO-KROME	SCREW, SHC, 1/4-20 X 1.00 LG.	18-8 SSSL	8
72	D1700232-1	αLIGO, SLiC, BOLT ASSY., BN	N/A	8
32	D1700165-02	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD (OUTER PANEL)	304 SSSL	1
31	D1700165-01	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD (OUTER PANEL)	304 SSSL	1

PARTS LIST

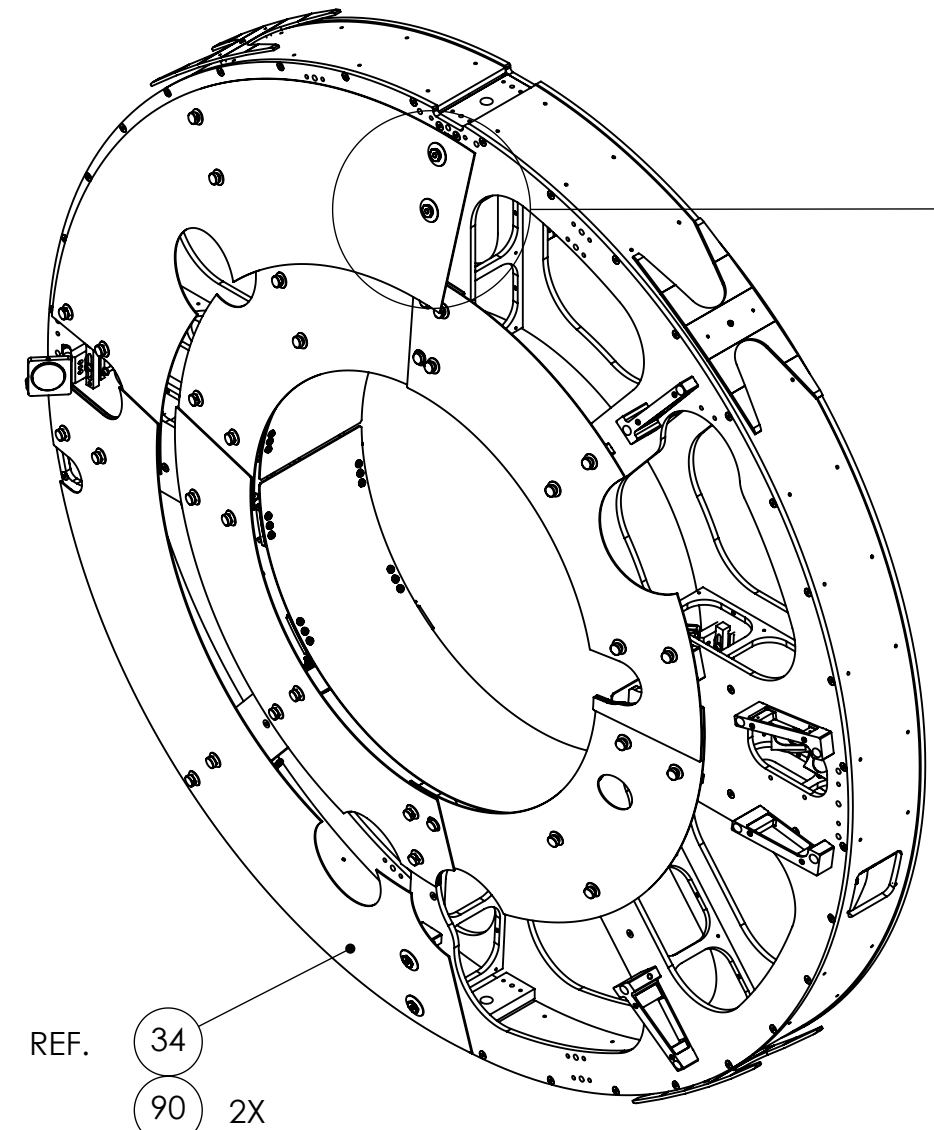
**LIGO** CALIFORNIA INSTITUTE OF TECHNOLOGY  
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

SIZE DWG. NO. REV.

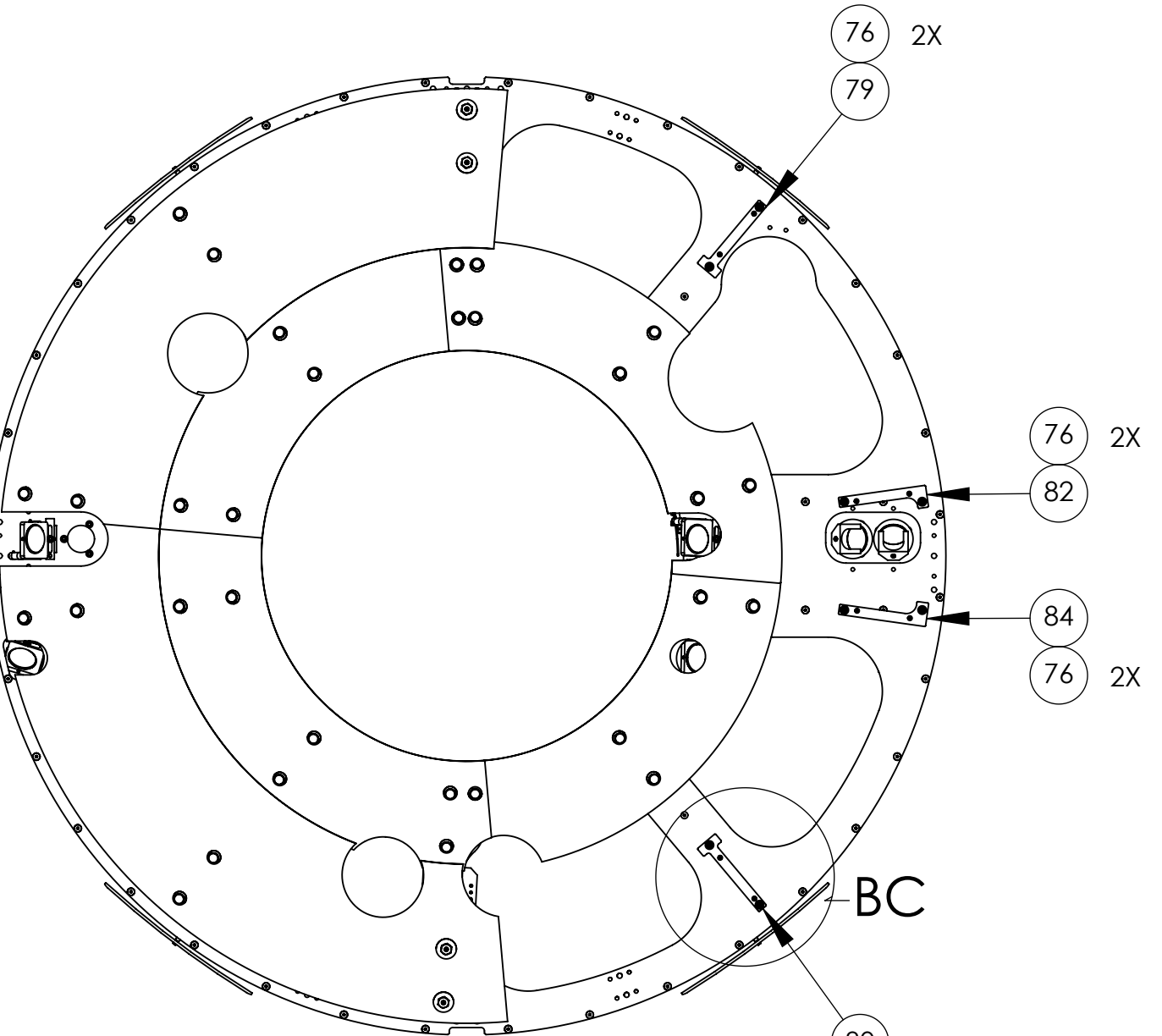
**D** **D1200174** **v9**

SCALE: 1:12 PROJECTION: SHEET 21 OF 22

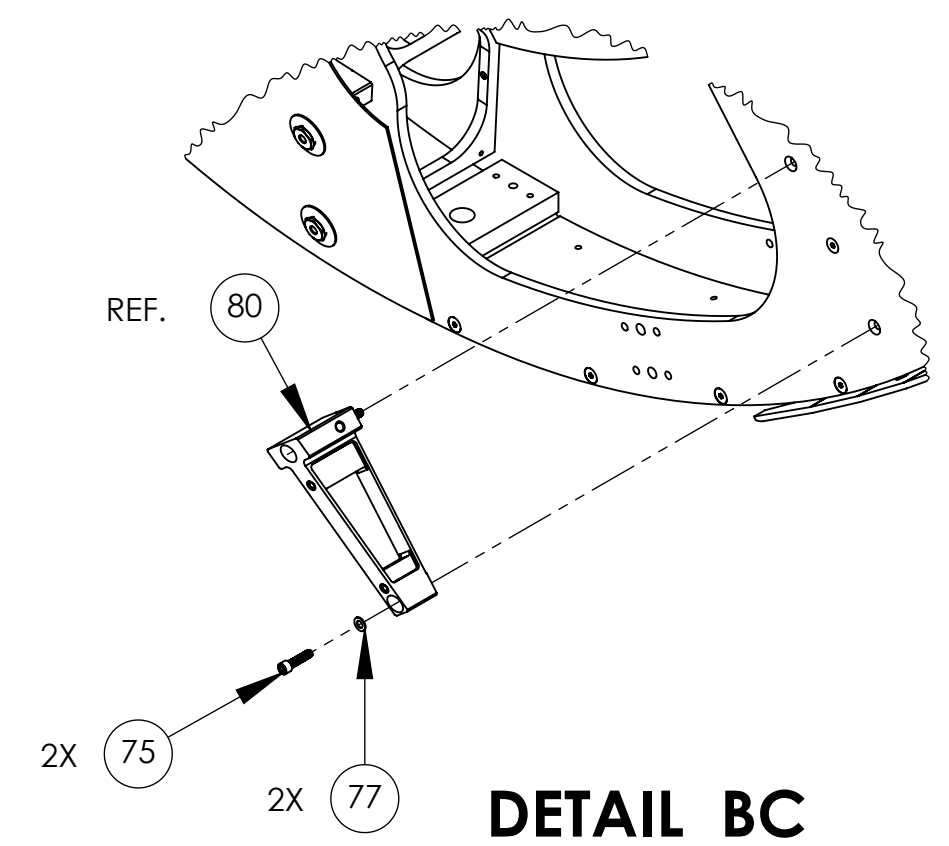
# 03 ADDITIONS -02, Xarm: ASSY. STEPS 9-12



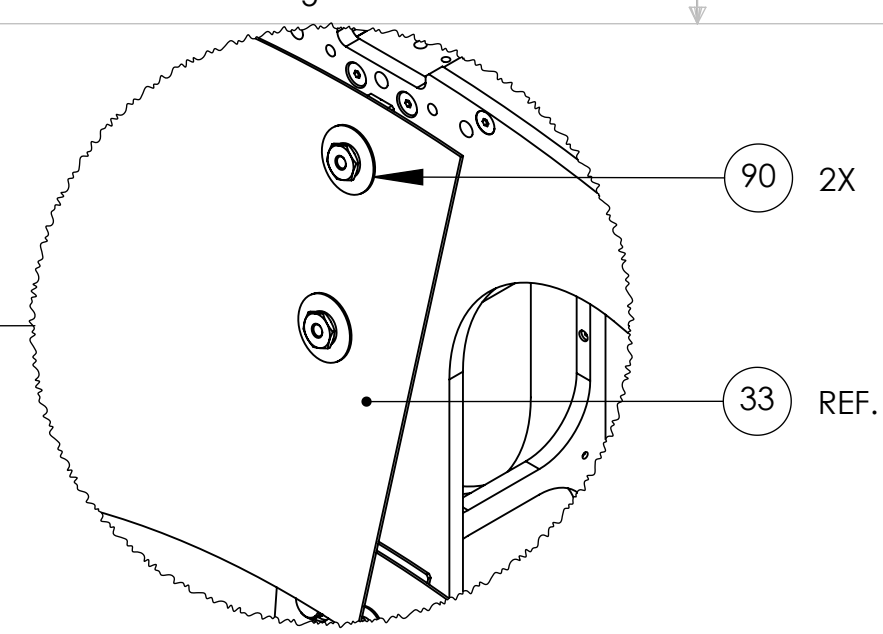
**ASSY. STEP 10  
ISO VIEW**



**ASSY. STEP 9  
ISO VIEW**

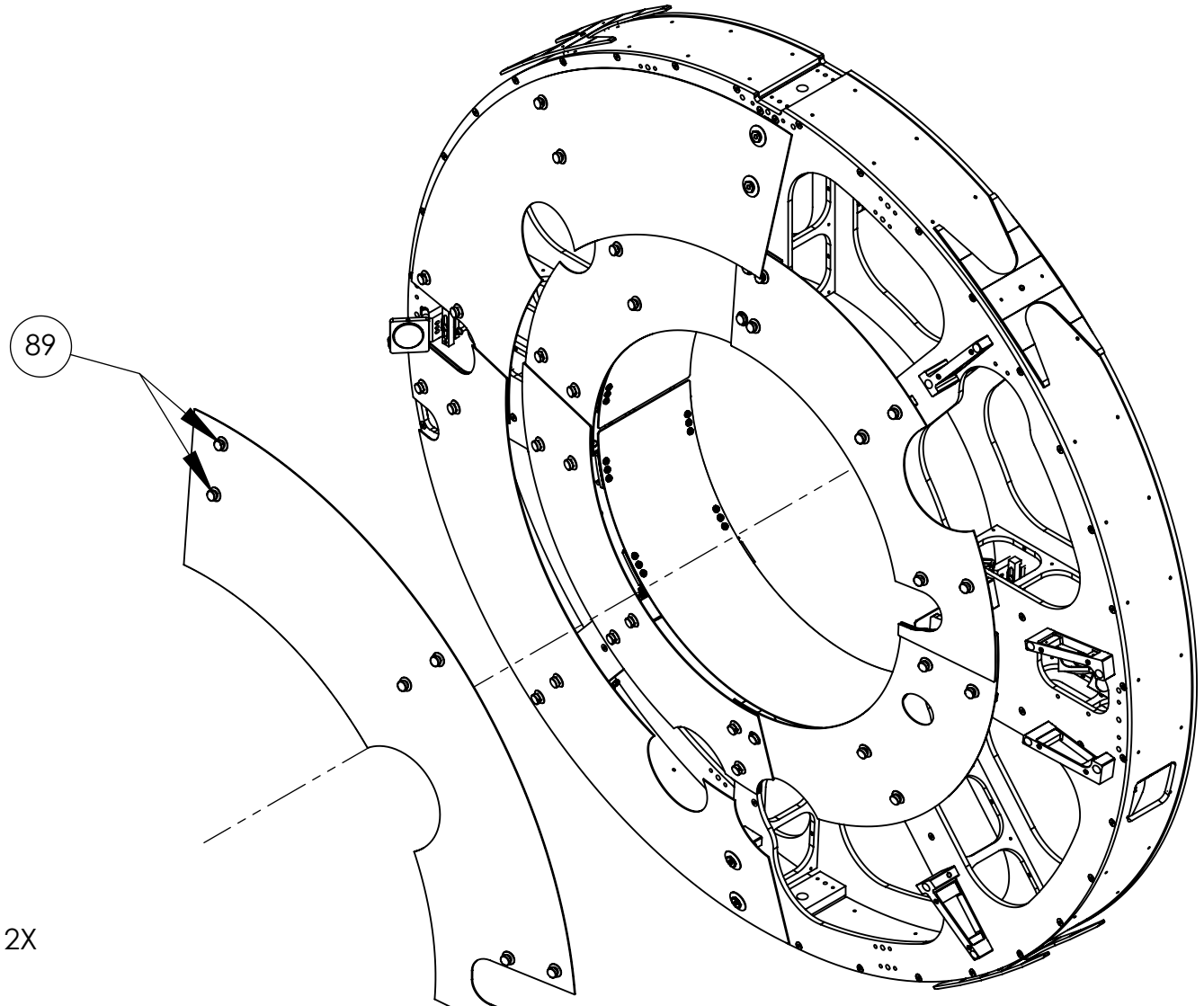


**DETAIL BC  
BRACKET ATTACHMENT  
TYP.**

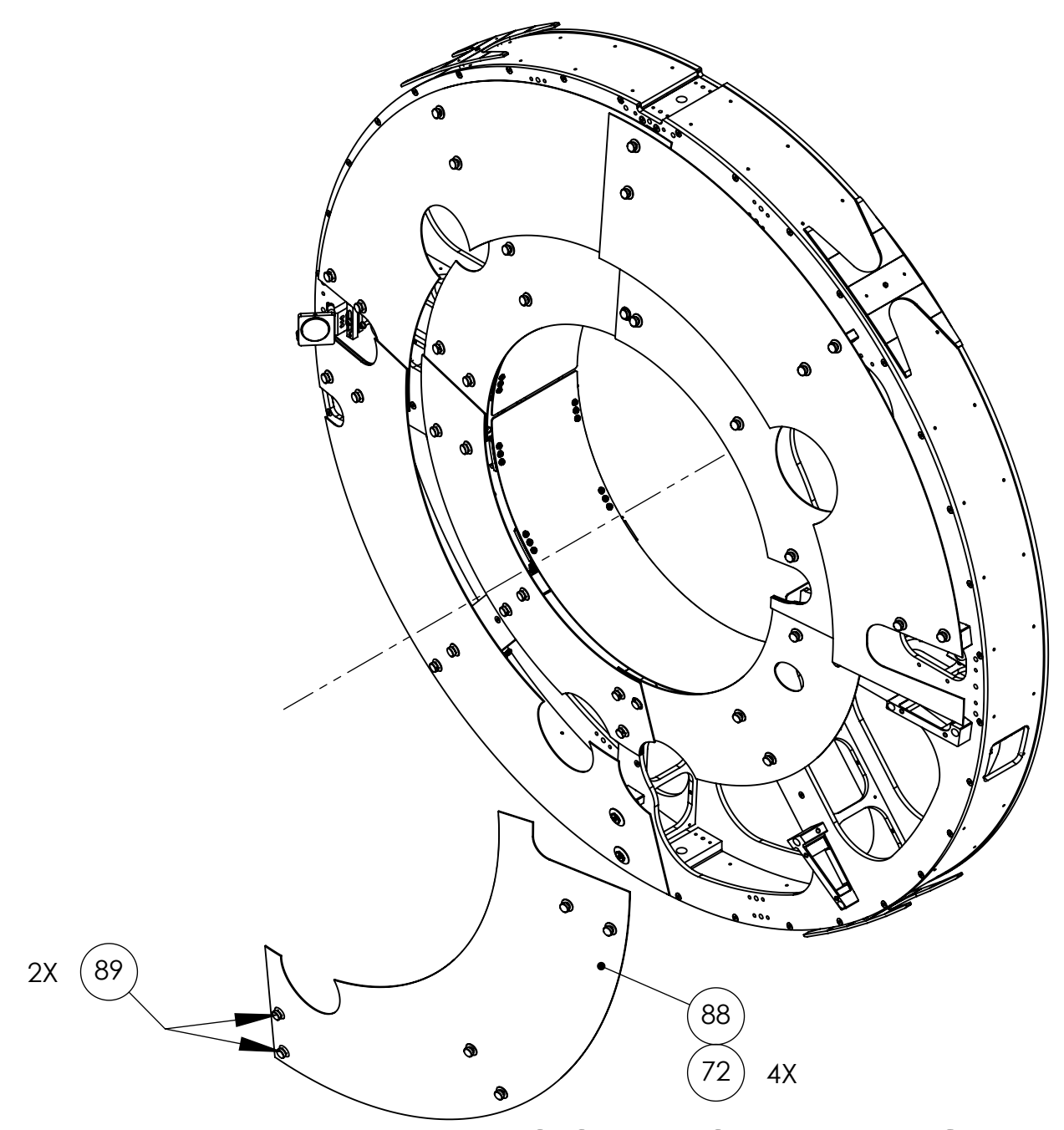


**DETAIL BB**

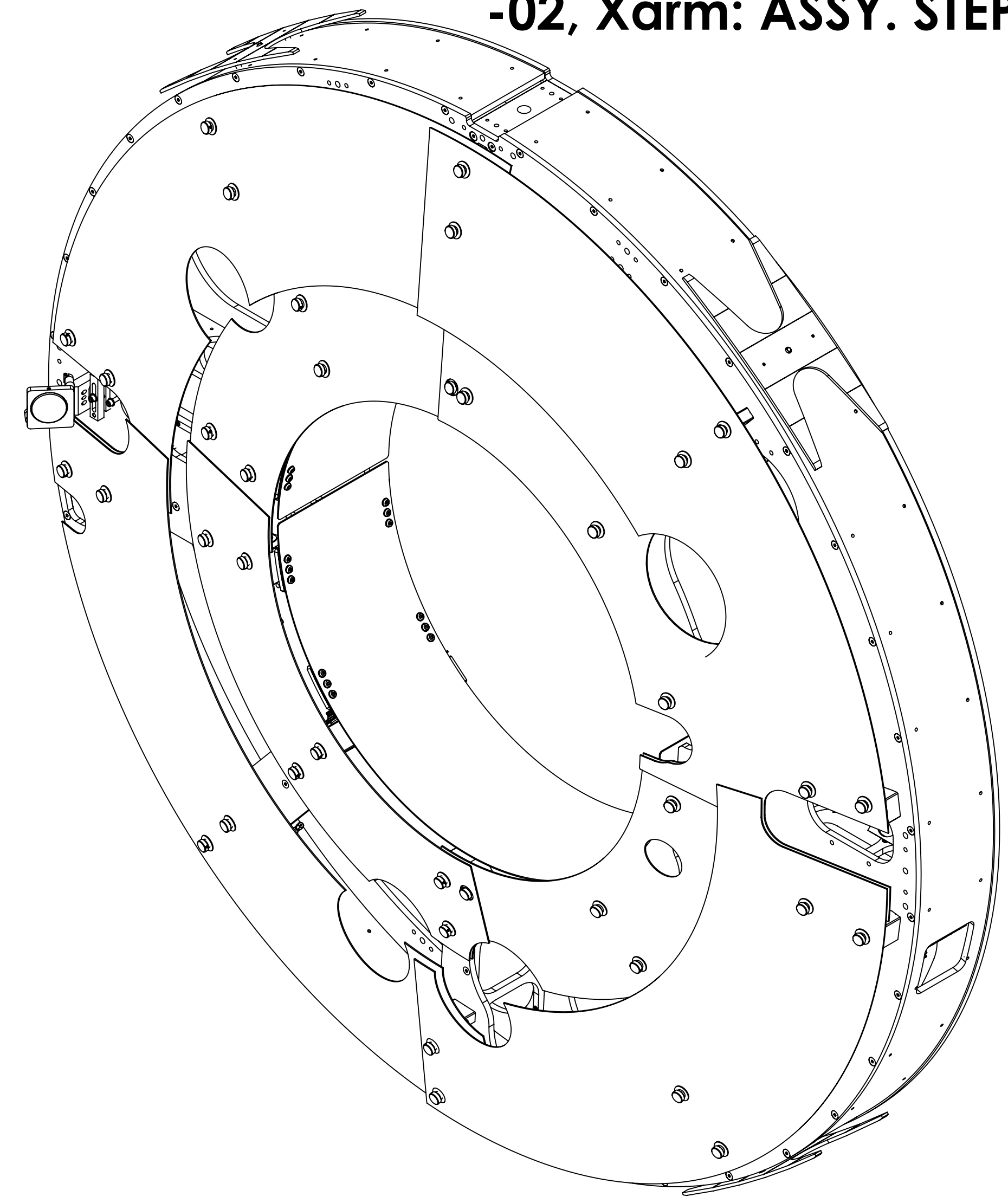
NOTE: REPLACE ITEM (7), SHOWN IN ASSEMBLY STEPS 7 AND 8, WITH ITEM (90) AT 12 AND 6 O'CLOCK POSITIONS]



**ASSY. STEP 11  
ISO VIEW**



**ASSY. STEP 12  
ISO VIEW**



**ISO VIEW**

ITEM NO.	PART NUMBER	DESCRIPTION	MATERIAL	-02 (X-Arm)/QTY.
90	D1900238	αLIGO, SLIC, PCAL, Captured shoulder nut assy.	N/A	4
89	D1700232-31	αLIGO, SLIC, BOLT ASSY., BN	N/A	4
88	D1700165-08	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD (OUTER PANEL), Xarm	304 SSSL	1
87	D1700165-07	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD (OUTER PANEL), Xarm	304 SSSL	1
84	D1700220-22	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	1
82	D1700220-20	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	1
80	D1700220-18	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	1
79	D1700220-17	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD MT. BRACKET	6061-T6 Al	1
77	NAS620-C416 OR EQ.	WASHER, FLAT, 1/4	300 SSSL	8
76	1185-4EN375 EMHART OR EQ.	HELICOIL, 1/4-20 X .375 LG.	NITRONIC 60	8
75	78062 HOLO-KROME	SCREW, SHC, 1/4-20 X 1.00 LG.	18-8 SSSL	8
72	D1700232-1	αLIGO, SLIC, BOLT ASSY., BN	N/A	8
34	D1700165-04	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD (OUTER PANEL), Xarm	304 SSSL	1
33	D1700165-03	αLIGO, PCAL-VIDEO CAM, PERISCOPE SHIELD (OUTER PANEL), Xarm	304 SSSL	1

REF. ONLY

PARTS LIST

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

SIZE DWG. NO. **D1200174** REV. **v9**

SCALE: 1:12 PROJECTION: SHEET 22 OF 22