

PROJECT 2022.0193 – Angiography Room

DATE 5/31/2022

BY CL

Equipment Support

Anchorage:

Per ACI 318-14 17.2.3.4 where the seismic component of the strength level earthquake force applied to a single anchor or group of anchors is equal to or less than 20 percent of the total factored anchor force associated with the same load combination, overstrength is not required. If required, overstrength only applies to the horizontal component per ACI 318-14 and ASCE 7-16.

Per the Non-Structural Component Seismic Forces:

F_p _coeff=**0.260**

Based on the load combination 1.2D+Ev+Eh+L and assuming the total equipment load acts as a live load the seismic force would be larger than 20% of the factored load (assuming entire equipment load on one anchor group). Therefore, overstrength applies.

Hilti Option:

Hilti Kwik bolt TZ

TABLE 8—HILTI KB-TZ2 CARBON STEEL ANCHORS TENSION AND SHEAR DESIGN DATA FOR INSTALLATION IN THE SOFFIT OF 3000 PSI, LIGHTWEIGHT CONCRETE-FILLED PROFILE STEEL DECK ASSEMBLIES FOR HAMMER AND CORE DRILLED INSTALLATIONS^{1,2,3}

Design parameter	Symbol	Units	Anchor Diameter											
			1/4	3/8		1/2			5/8		3/4			
Effective min. embedment ¹	h_{ef}	in.	1-1/2	1-1/2	2	2-1/2	1-1/2	2	2-1/2	3-1/4	2-3/4	4	3-1/4	3-3/4 ⁹
Minimum hole depth	h_o	in.	2	2	2-3/4	3-1/4	2-1/4	2-3/4	3-1/4	4-1/4	3-3/4	4-3/4	4-1/4	4-3/4
Loads According to Figure 5A														
Minimum concrete thickness over upper flute ⁴	$h_{min,deck}$	in.	2-1/2	2-1/2			2-1/2			2-1/2		2-1/2	3-1/4	
Pullout strength, uncracked concrete ^{5,6}	$N_{p,deck,uncr}$	lb	1,725	1,855	2,625	2,995	1,855	2,750	3,745	4,715	4,415	5,815	3,800	4,795
Pullout strength, cracked concrete ^{5,6}	$N_{p,deck,cr}$	lb	515	1,625	2,295	2,405	1,650	2,135	3,275	3,340	3,930	4,395	3,325	3,730
Pullout strength, seismic ^{5,7}	$N_{p,deck,eq}$	lb	515	1,625	2,295	2,405	1,650	2,135	3,275	3,340	3,930	4,395	3,325	3,730
Steel strength in shear ⁸	$V_{sa,deck}$	lb	1,630	1,355	2,120	2,120	1,790	2,260	3,555	4,345	3,815	6,150	4,085	7,865
Steel strength in shear, seismic ⁷	$V_{sa,deck,eq}$	lb	1,630	1,355	2,120	2,120	1,790	2,260	3,555	4,345	3,815	6,150	4,085	7,865

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Simpson option:

Simpson Strong-Tie® Anchoring, Fastening, Restoration and Strengthening Systems for Concrete and Masonry


Strong-Bolt® 2 Design Information – Concrete

 Carbon-Steel Strong-Bolt 2 Tension and Shear Strength Design Data for the Soffit of Concrete over Steel Deck Floor and Roof Assemblies^{1,2,6,8,9}


Characteristic	Symbol	Units	Nominal Anchor Diameter (in.)									
			Carbon Steel									
			Lower Flute						Upper Flute			
			%		½		%		%			
Nominal Embedment Depth	h_{nom}	in.	2	3%	2¾	4½	3%	5%	4½	2	2¾	
Effective Embedment Depth	h_{ef}	in.	1%	3	2¾	4	2¾	5	3%	1%	2¼	
Installation Torque	T_{inst}	ft.-lbf.	30		60		90		150		30	60
Pullout Strength, concrete on steel deck (cracked) ^{3,4}	$N_{p,deck,cr}$	lb.	1,040'	2,615'	2,040'	3,645'	2,615'	4,990'	2,815'	1,340'	3,785'	
Pullout Strength, concrete on steel deck (uncracked) ^{3,4}	$N_{p,deck,uncr}$	lb.	1,765'	3,150'	2,580'	3,840'	3,685'	6,565'	3,800'	2,275'	4,795'	
Pullout Strength, concrete on steel deck (seismic) ^{3,4}	$N_{p,deck,eq}$	lb.	1,040'	2,615'	2,040'	3,645'	2,615'	4,990'	2,815'	1,340'	3,785'	
Steel Strength in Shear, concrete on steel deck ⁵	$V_{sa,deck}$	lb.	1,595	3,490	2,135	4,580	2,640	7,000	4,535	3,545	5,920	
Steel Strength in Shear, concrete on steel deck (seismic) ⁵	$V_{sa,deck,eq}$	lb.	1,595	3,490	1,920	4,120	2,375	6,300	3,690	3,545	5,330	

- The information presented in this table must be used in conjunction with the design criteria of ACI 318-14 Chapter 17 or ACI 318-11 Appendix D, except as modified below.
- The steel deck profile must comply with the configuration in Figure 2 on the previous page, and have a minimum base-steel thickness of 0.035 inch (20 gauge). Steel must comply with ASTM A 653/A 653M SS Grade 33 with minimum yield strength of 33,000 psi.

A seismic reduction of 75% is applied to the capacities per ACI. The smaller of the two brands is chosen (Note, 2"-*2.1/4" embed is chosen although actual will be greater. Embed based on 6Hef spacing requirement)

$$\Phi_{Vn} = 1920 \text{ lbs} \times 0.75 = 1440.000 \text{ lbs}$$

$$\Phi_{Nn} = 2040 \text{ lbs} \times 0.75 = 1530.000 \text{ lbs}$$

Number of Anchors

$$N = 4$$

$$\Phi_{Nn_group} = \Phi_{Vn} \times N = 5760.000 \text{ lbs}$$

$$\Phi_{Vn_group} = \Phi_{Nn} \times N = 6120.000 \text{ lbs}$$

LRFD worst case loads

$$\text{Overstrength} = 2$$

$$V_{ua} = \max(\text{Overstrength} \times \text{Equipment} \times F_{p_coeff}, 1000 \text{ lbs}) = 1000.000 \text{ lbs}$$

$$N_{ua} = (\max(\text{Equipment} + \text{Overstrength} \times \text{Equipment} \times F_{p_coeff} + 0.2 \times \text{SDS} \times \text{Equipment}, \text{Dynamic_Equipment})) = 1597.841 \text{ lbs}$$

Combined Result per ACI 17.6.3 (Combined <1.2 is pass):

$$\text{Result} = N_{ua} / \Phi_{Nn_group} + V_{ua} / \Phi_{Vn_group} = 0.441$$

Less than 1.2 so the anchor is okay for the demands.

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Unistrut Support:

2 P1000T are provided at the top. P9000 and P9200 telestruts are the vertical hangers. P5501 or P1001 are finish rails. P1000 or P5501 are lash rails with P9000 or P1000 diagonal braces.

P1000/P1001 - ELEMENTS OF SECTION

Parameter	P1000		P1001	
Area of Section	0.555	in ²	1.111	in ²
Axis 1-1				
Moment of Inertia (I)	0.185	in ⁴	0.928	in ⁴
Section Modulus (S)	0.202	in ³	0.571	in ³
Radius of Gyration (r)	0.577	in	0.914	in
Axis 2-2				
Moment of Inertia (I)	0.236	in ⁴	0.471	in ⁴
Section Modulus (S)	0.290	in ³	0.580	in ³
Radius of Gyration (r)	0.651	in	0.651	in

$$P1000_Area=0.555in^2$$

$$P1000_Ix=0.185in^4$$

$$P1000_Sx=0.202in^3$$

$$P1000_rx=0.577in$$

$$P1000_Iy=0.236in^4$$

$$P1000_Sy=0.290in^3$$

$$P1000_ry=0.651in$$

Allowable moment:

$$P1000_Ma=5070lbs_in$$

$$P1001_Area=1.111in^2$$

$$P1001_Ix=0.928in^4$$

$$P1001_Sx=0.571in^3$$

$$P1001_rx=0.914in$$

$$P1001_Iy=0.471in^4$$

$$P1001_Sy=0.580in^3$$

$$P1001_ry=0.651in$$

Allowable moment:

$$P1001_Ma=14360lbs_in$$

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P5000/P5001 - ELEMENTS OF SECTION

Parameter	P5000		P5001	
Area of Section	0.897	in ²	1.793	in ²
Axis 1-1				
Moment of Inertia (I)	1.098	in ⁴	6.227	in ⁴
Section Modulus (S)	0.627	in ³	1.916	in ³
Radius of Gyration (r)	1.107	in	1.864	in
Axis 2-2				
Moment of Inertia (I)	0.433	in ⁴	0.866	in ⁴
Section Modulus (S)	0.533	in ³	1.066	in ³
Radius of Gyration (r)	0.695	in	0.695	in

P5000_Area=0.897in²

P5000_Ix=1.098in⁴

P5000_Sx=0.627in³

P5000_rx=1.107in

P5000_Iy=0.433in⁴

P5000_Sy=0.533in³

P5000_ry=0.695in

Allowable moment:

P5000_Ma=15770lbs_in

P5001_Area=1.793in²

P5001_Ix=6.227in⁴

P5001_Sx=1.916in³

P5001_rx=1.864in

P5001_Iy=0.866in⁴

P5001_Sy=1.066in³

P5001_ry=0.695in

Allowable moment:

P5001_Ma=48180lbs_in

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P5500/P5501 - ELEMENTS OF SECTION

Parameter	P5500		P5501	
Area of Section	0.726	In ²	1.452	In ²
Axis 1-1				
Moment of Inertia (I)	0.522	In ⁴	2.805	In ⁴
Section Modulus (S)	0.390	In ³	1.151	In ³
Radius of Gyration (r)	0.848	In	1.390	In
Axis 2-2				
Moment of Inertia (I)	0.334	In ⁴	0.669	In ⁴
Section Modulus (S)	0.411	In ³	0.823	In ³
Radius of Gyration (r)	0.679	In	0.679	In

P5500_Area=0.726in²

P5500_Ix=0.522in⁴

P5500_Sx=0.390in³

P5500_rx=0.848in

P5500_Iy=0.334in⁴

P5500_Sy=0.411in³

P5500_ry=0.679in

Allowable moment:

P5500_Ma=9820lbs_in

P5501_Area=1.452in²

P5501_Ix=2.805in⁴

P5501_Sx=1.151in³

P5501_rx=1.390in

P5501_Iy=0.669in⁴

P5501_Sy=0.823in³

P5501_ry=0.679in

Allowable moment:

P5501_Ma=28940lbs_in

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P9000/P9200 - ELEMENTS OF SECTION

Parameter	P9000		P9200	
Area of Section	0.387	In ²	0.489	In ²
Axis 1-1				
Moment of Inertia (I)	0.166	In ⁴	0.279	In ⁴
Section Modulus (S)	0.205	In ³	0.297	In ³
Radius of Gyration (r)	0.655	In	0.755	In
Axis 2-2				
Moment of Inertia (I)	0.166	In ⁴	0.279	In ⁴
Section Modulus (S)	0.205	In ³	0.297	In ³
Radius of Gyration (r)	0.655	In	0.755	In

P9000_Area=0.387in²

P9000_Ix=0.166in⁴

P9000_Sx=0.205in³

P9000_rx=0.655in

P9000_Iy=0.166in⁴

P9000_Sy=0.205in³

P9000_ry=0.655in

Allowable moment:

P9000_Ma=5150lbs_in

P9200_Area=0.489in²

P9200_Ix=0.279in⁴

P9200_Sx=0.297in³

P9200_rx=0.755in

P9200_Iy=0.279in⁴

P9200_Sy=0.297in³

P9200_ry=0.755in

Allowable moment:




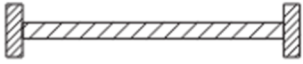





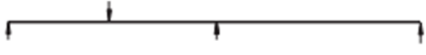

P9200_Ma=7480lbs_in

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For table values, apply beam conversion factors per Unistrut:

CONVERSION FACTORS FOR BEAMS WITH VARIOUS STATIC LOADING CONDITIONS

All Beam Load tables are for single-span (simple) beams supported at the ends. These can be used in the majority of the cases. However, there are times when it is necessary to know what happens with other loading and support conditions. Some common arrangements are shown below. Simply multiply the values from the Beam Load tables by factors given below

Load and Support Condition		Load Factor	Deflection Factor
1. Simple Beam, Uniform Load		1.00	1.00
2. Simple Beam, Concentrated Load at Center		.50	.80
3. Simple Beam, Two Equal Concentrated Loads at 1/4 pts		1.00	1.10
4. Beam Fixed at Both Ends, Uniform Load		1.50	.30
5. Beam Fixed at Both Ends, Concentrated Load at Center		1.00	.40
6. Cantilever Beam, Uniform Load		.25	2.40
7. Cantilever Beam, Concentrated Load at End		.12	3.20
8. Continuous Beam, Two Equal Spans, Uniform Load on One Span		1.30	.92
9. Continuous Beam, Two Equal Spans, Uniform Load on Both Ends		1.00	.42
10. Continuous Beam, Two Equal Spans, Concentrated Load at Center of One Span		.62	.71
11. Continuous Beam, Two Equal Spans, Concentrated Load at Center of Each Span		.67	.48

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LATERAL BRACING LOAD REDUCTION CHARTS

Span		Single Channel											Double Channel											
Ft. (m)	In. (cm)	P1000	P1100	P2000	P3000	P3300	P4000	P4100	P4400	P4520	P5000	P5500	P1001	P1101	P2001	P3001	P3301	P4001	P4101	P4401	P4521	P5001	P5501	
2 (0.61)	24 (61)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
3 (0.91)	36 (91)	0.94	0.89	0.88	0.96	1.00	0.94	0.98	1.00	1.00	0.85	0.89	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
4 (1.22)	48 (122)	0.88	0.78	0.75	0.91	1.00	0.88	0.94	0.98	1.00	0.70	0.77	1.00	0.98	0.98	1.00	1.00	0.98	1.00	1.00	1.00	0.97	0.98	0.98
5 (1.52)	60 (152)	0.82	0.68	0.61	0.88	0.98	0.83	0.91	0.96	1.00	0.55	0.67	0.97	0.93	0.92	0.98	1.00	0.93	0.96	1.00	1.00	0.90	0.93	0.93
6 (1.83)	72 (183)	0.78	0.59	0.48	0.84	0.97	0.79	0.89	0.94	0.98	0.44	0.58	0.93	0.87	0.85	0.95	0.97	0.88	0.92	0.97	0.97	0.83	0.87	0.87
7 (2.13)	84 (213)	0.75	0.52	0.41	0.82	0.96	0.75	0.86	0.92	0.97	0.38	0.51	0.89	0.82	0.78	0.92	0.95	0.83	0.89	0.95	0.95	0.76	0.81	0.81
8 (2.44)	96 (244)	0.71	0.47	0.35	0.79	0.94	0.72	0.84	0.91	0.96	0.33	0.46	0.85	0.76	0.71	0.88	0.92	0.79	0.85	0.92	0.92	0.68	0.76	0.76
9 (2.74)	108 (274)	0.69	0.43	0.32	0.77	0.93	0.69	0.82	0.89	0.95	0.30	0.42	0.81	0.70	0.64	0.85	0.90	0.74	0.81	0.90	0.90	0.61	0.70	0.70
10 (3.05)	120 (305)	0.66	0.40	0.29	0.75	0.92	0.66	0.80	0.87	0.94	0.28	0.40	0.78	0.65	0.57	0.82	0.87	0.69	0.78	0.87	0.87	0.54	0.64	0.64
12 (3.66)	144 (366)	0.61	0.36	0.25	0.70	0.89	0.60	0.76	0.84	0.91	0.24	0.36	0.70	0.54	0.45	0.76	0.82	0.60	0.71	0.82	0.83	0.43	0.53	0.53
14 (4.27)	168 (427)	0.55	0.32	0.23	0.66	0.86	0.55	0.73	0.81	0.89	0.22	0.32	0.63	0.45	0.38	0.70	0.78	0.51	0.64	0.77	0.78	0.35	0.45	0.45
16 (4.88)	192 (488)	0.51	0.30	0.21	0.62	0.84	0.50	0.69	0.78	0.87	0.21	0.30	0.56	0.39	0.32	0.64	0.73	0.44	0.57	0.72	0.73	0.30	0.39	0.39
18 (5.49)	216 (549)	0.47	0.28	0.19	0.58	0.81	0.47	0.65	0.75	0.84	0.19	0.28	0.49	0.34	0.28	0.58	0.68	0.39	0.50	0.67	0.68	0.27	0.34	0.34
20 (6.10)	240 (610)	0.44	0.26	0.18	0.54	0.78	0.43	0.61	0.72	0.82	0.18	0.26	0.44	0.31	0.25	0.52	0.63	0.35	0.45	0.62	0.63	0.24	0.30	0.30

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CHANNELS & COMBINATIONS IN DESCENDING ORDER OF STRENGTH

Channel	Area In ² (cm ²)	Weight lbs/ft (kg/m)	I In ⁴ (cm ⁴)	s In ³ (cm ³)	Allow. Moment In-lbs (N•m)
P5001	1.793 11.57	6.10 9.1	6.227 259.2	1.916 31.4	48,180 5,440
P1004A	1.965 12.68	6.68 9.9	4.068 169.3	1.669 27.4	41,980 4,740
P5501	1.452 9.37	4.94 7.3	2.805 116.8	1.151 18.9	28,940 3,270
P1001C41	2.221 14.33	7.55 11.2	1.856 77.2	1.142 18.7	28,720 3,250
P5000	0.897 5.78	3.05 4.5	1.098 45.7	0.627 10.3	15,770 1,780
P1001	1.111 7.16	3.78 5.6	0.928 38.6	0.571 9.4	14,360 1,620
P1101	0.835 5.39	2.84 4.2	0.733 30.5	0.451 7.4	11,340 1,280
P3001	1.000 6.45	3.40 5.1	0.591 24.6	0.430 7.0	10,810 1,220
P5500	0.726 4.68	2.47 3.7	0.522 21.7	0.390 6.4	9,820 1,110
P2001	0.684 4.41	2.32 3.5	0.618 25.7	0.381 6.2	9,570 1,080
P9200	0.489 3.16	2.23 3.3	0.279 11.6	0.297 4.9	7,480 850
P4401	0.849 5.48	5.77 8.5	0.26 10.6	0.26 4.2	6,410 725
A1001	0.609 3.93	2.07 3.1	0.302 12.6	0.242 4.0	6,070 690
P9000	0.387 2.50	1.88 2.8	0.166 6.9	0.205 3.4	5,150 580
P1000	0.555 3.58	1.89 2.8	0.185 7.7	0.202 3.3	5,070 570

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P1000 - BEAM LOADING

Span In	Max. Allowable Uniform Load Lbs	Defl. at Uniform Load In	Uniform Loading at Deflection		
			Span/180 Lbs	Span/240 Lbs	Span/360 Lbs
24	1,690	0.06	1,690	1,690	1,690

For the P1000 T at the top connection

$$P_{\text{allowable}} = 0.85 * 0.5 * 1690 \text{ lbs} = \mathbf{718.250 \text{ lbs}}$$

$$\text{deflection} = 0.85 * 0.8 * 0.06 \text{ in} = \mathbf{0.041 \text{ in}}$$

Actual deflection based on load, 2 channels and interpolation:

$$\text{deflection} * (\text{Equipment}) / (P_{\text{allowable}} * 2) = \mathbf{0.026 \text{ in}}$$

0.109 (7/64") is the limit for the equipment.

Understanding that the load applied is the maximum The P1000T is okay for 718lbs each or 1436lbs total (4 connections engaged)

$$\text{DCR} = (\max(\text{Dynamic_Equipment}, \text{Equipment} + 0.7 * \text{Equipment} * F_p \text{ coeff} + 0.7 * 0.2 * \text{SDS} * \text{Equipment})) / (1436 \text{ lbs} * 4) = \mathbf{0.222}$$

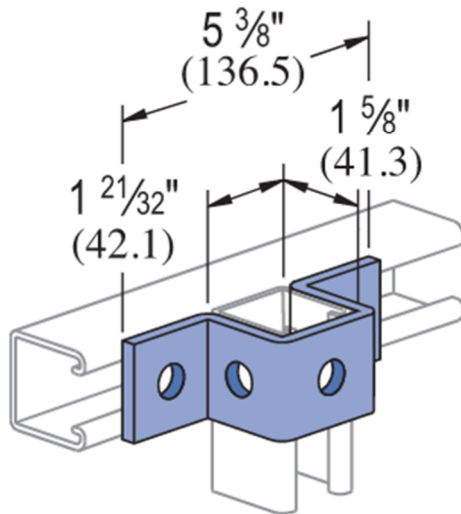
The P1000T channels will be connected to the anchors with P1047.

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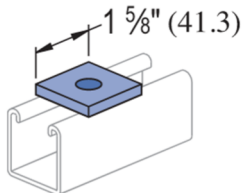
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P1047
DF, EG, GR, HG


Alternatively, P1064 flat washers may be used but the condition doesn't consider the added moment caused by rotation of the channel and how that affects the anchor design.

**P1062, P1063, P1064, P1964,
 P2471, P2490** **DF, EG, GR, HG**


Part No.	Bolt Size	Hole Size	Wt/100 pcs Lbs (kg)
P1062	5/16"	1 1/32"	18 (8.2)
P1063	3/8"	7/16"	18 (8.2)
P1064	1/2"	9/16"	17 (7.7)
P1964	5/8"	1 1/16"	16 (7.3)
P2471	3/4"	13/16"	15 (6.8)
P2490	7/8"	15/16"	14 (6.4)

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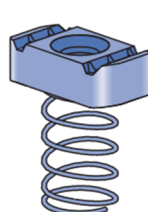
The typical bolt for the system will be ½"Ø with P1010 channel nuts.
 Each channel nut can take 2000lbs pull-out and 1500lbs slip.

MAXIMUM ALLOWABLE PULL-OUT AND SLIP LOADS

Channel	Channel Nut Size-Thread	Gauge	Allowable Pull-Out Strength Lbs (kN)	Resistance to Slip Lbs (kN)	Torque Ft-Lbs (N*m)
P1000 P3000 P4400 P4526 P5000 P5500	¾" - 9	12	2,500 11.12	1,700 7.56	*125 170
	¾" - 10	12	2,500 11.12	1,700 7.56	*125 170
	5/8" - 11	12	2,500 11.12	1,500 6.67	*100 135
	½" - 13	12	2,000 8.90	1,500 6.67	50 70
	7/16" - 14	12	1,400 6.23	1,000 4.45	35 50
	3/8" - 16	12	1,000 4.45	800 3.56	19 25
	5/16" - 18	12	800 3.56	500 2.22	11 15
	¼" - 20	12	600 2.67	300 1.33	6 8

CHANNEL NUT WITH SPRING



	Part Number	Nut Size Thread	Wt/100 pcs Lbs (kg)	Use With
	P1006-0832	#8 -32	7 (3.2)	P1000, P1100, P2000, P3000
P1006-1024	#10 -24	7 (3.2)		
P1006-1420	¼" -20	7 (3.2)		
P1007	5/16" -18	6 (2.7)		
P1008	3/8" -16	10 (4.5)		
P1009	7/16" -14	9 (4.1)		
P1010	½" -13	12 (5.4)		

Demand capacity ratio of at least 2 nuts in tension sustaining all load

$$DCR = \frac{\text{Equipment} + 0.7 * \text{Equipment} * F_p \text{_coeff} + 0.7 * 0.2 * SDS * \text{Equipment}}{(2000 \text{lbs} * 2)} = 0.307$$

Demand capacity ratio of at least 2 nuts in shear sustaining all load (USE 2 CHANNEL NUTS MIN)

$$DCR = \frac{\text{Equipment} + 0.7 * \text{Equipment} * F_p \text{_coeff} + 0.7 * 0.2 * SDS * \text{Equipment}}{(1500 \text{lbs} * 2)} = 0.409$$

PROJECT	2022.0193 – Angiography Room	DATE	5/31/2022	BY	CL
Equipment Support					

Threaded Rod Check:

Connecting Member

$F_y = 36$ ksi
 $F_u = 58$ ksi
 $t = 1/4$ in

Bolts

Bolt Grade = Gr36

$F_y = 36$ ksi

$F_u = 58$ ksi

Threads = Included from shear plane

$F_{nt} = 43.5$ ksi

$F_{nv} = 26.1$ ksi

$D = 1/2$ in Fastener Diameter

Nominal Bolt Area = 0.196 in²

Hole Type = STD

oversize by = 1/16 in

Hole D = 9/16 in Hole size perpendicular to the force

Slot Hole Length = 9/16 in

Minimum Bolt Spacing = 1.3 in

Maximum Bolt Spacing = 6.0 in Not Exterior

C2 = 0 in

Minimum Edge Distance = 3/4 in

Maximum Edge Distance = 3 in

Bolt Spacing, S = 3.00 in

Edge Distance = 0.50 in

6. Tensile and Shear Strength of Bolts and Threaded Parts

$\Phi = 0.75$

ΦR_n Tension = 6.41 kip

ΦR_n Single Shear = 3.84 kip

ΦR_n Double Shear = 7.69 kip

7. Combined Tension and Shear in Bearing Type Connections

$f_{rv} = 5.09$ ksi

$F'_{nt} = 43.5$ ksi

Available Tensile Strength, $\Phi R_n = 6.41$ kip

PROJECT 2022.0193 – Angiography Room	DATE 5/31/2022	BY CL
Equipment Support		

Plate Check:

Imposed weight on one plate is 2788lbs or less

 $P_u = 2788 \text{ lbs}$
 $L = 9 \text{ in}$
 $M_u = P_u \cdot L / 4 = 6.273 \text{ kip_in}$
 $M_u = 0.523 \text{ kip_ft}$

 For a 3" wide plate the DCR is less than 1.05. Okay provided that more than one plate will be engaged and load is less than P_u above.


Rectangular Plate Flexure

AISC 360 F11

 PROJECT NAME: Unistrut Support

ENGINEER: _____

 DESCRIPTION: Top Plate

DATE: _____

 $\phi: 0.9$
 $F_y: 36 \text{ ksi}$
 $E: 29000 \text{ ksi}$
 $M_u: 0.523 \text{ kip-ft}$
 $L: 1.5 \text{ in}$

 Units: kip-ft

		LFRD FLEXURE CAPACITY (kip-ft) $F_y=36 \text{ ksi}$							
		Height							
		1/2 in	3/4 in	1 in	1 1/4 in	1 1/2 in	1 3/4 in	2 in	2 1/4 in
Width	3 in	0.51	1.14	2.03	3.16	4.56	6.20	8.10	10.25
	3 1/4 in	0.55	1.23	2.19	3.43	4.94	6.72	8.78	11.11
	3 1/2 in	0.59	1.33	2.36	3.69	5.32	7.24	9.45	11.96
	3 3/4 in	0.63	1.42	2.53	3.96	5.70	7.75	10.13	12.81
	4 in	0.68	1.52	2.70	4.22	6.08	8.27	10.80	13.67
	4 1/4 in	0.72	1.61	2.87	4.48	6.45	8.79	11.48	14.52
	4 1/2 in	0.76	1.71	3.04	4.75	6.83	9.30	12.15	15.38
	4 3/4 in	0.80	1.80	3.21	5.01	7.21	9.82	12.83	16.23
	5 in	0.84	1.90	3.38	5.27	7.59	10.34	13.50	17.09
	5 1/4 in	0.89	1.99	3.54	5.54	7.97	10.85	14.18	17.94
	5 1/2 in	0.93	2.09	3.71	5.80	8.35	11.37	14.85	18.79
	5 3/4 in	0.97	2.18	3.88	6.06	8.73	11.89	15.53	19.65
	6 in	1.01	2.28	4.05	6.33	9.11	12.40	16.20	20.50
	6 1/4 in	1.05	2.37	4.22	6.59	9.49	12.92	16.88	21.36
	6 1/2 in	1.10	2.47	4.39	6.86	9.87	13.44	17.55	22.21
	6 3/4 in	1.14	2.56	4.56	7.12	10.25	13.95	18.23	23.07
7 in	1.18	2.66	4.73	7.38	10.63	14.47	18.90	23.92	
7 1/4 in	1.22	2.75	4.89	7.65	11.01	14.99	19.58	24.77	
7 1/2 in	1.27	2.85	5.06	7.91	11.39	15.50	20.25	25.63	
7 3/4 in	1.31	2.94	5.23	8.17	11.77	16.02	20.93	26.48	

PROJECT 2022.0193 – Angiography Room	DATE 5/31/2022	BY CL
Equipment Support		

Weld Checks:

P9000 or P9200 welded to plate. (Similarly, a P1000 would work)



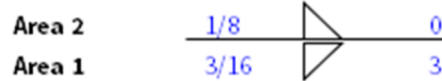
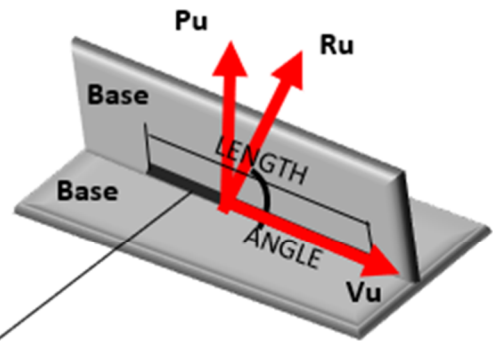
Simply Loaded Weld Capacity of Fillet Weld

 PROJECT NAME: Unistrut Support
 LOCATION: Tension Post Weld

 ENGINEER: _____
 DATE: _____

Simply Loaded Weld Capacity Calculation

Load Parallel to Weld	$V_u = 0$	0	kips
Load Perpendicular to Weld	$P_u = 0$	0	kips
Load at Angle	$R_u = 2$	2	kips
Angle of R_u	Angle = 0	0	degrees
Weld Type	FEXX = 60	60	ksi



Combines 3 Loads for Resultant

Minimum Length of Weld	$l_{min} = 1.5$	1.5	in
Minimum Size of Weld	$a_{min} = 1/8$	1/8	
Maximum Size of Weld	$a_{max} = 0.1875$	0.1875	
Effective Length 2	$l_{ef} = 0$	0	in
Effective Length 1	$l_{ef} = 3$	3	in
Weld Area 1	$A_{we} 1 = 0.40$	0.40	
Weld Area 2	$A_{we} 2 = 0.00$	0.00	in ²
	Resultant Load = 2.00	2.00	kips
	Resultant Angle = 0.00	0.00	degrees If no load entered uses conservative angle
	$F_{nw} = 36$	36	kips
	$R_n = 14.3$	14.3	kips
Weld Capacity at Angle	$\phi R_n = 10.7$	10.7	kips LFRD

 DCR = 0.19 Careful when P_u and V_u Combined, (Long vs Perp)

PROJECT 2022.0193 – Angiography Room	DATE 5/31/2022	BY CL
Equipment Support		

Flare bevel of Unistrut welds to steel.



Flare Bevel Groove Weld

AISC J2
PROJECT NAME: Unistrut Support Condition
ENGINEER: CL
LOCATION: _____

DATE: 2022-05-25
Simply Loaded Weld Capacity Calculation

Load in Shear (into page)

Vu = 0 kips

Load in Tension

Pu = 0 kips

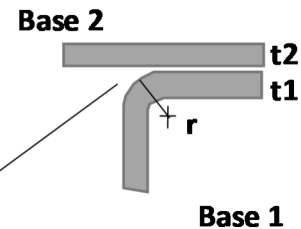
Load used for DCR

Ru = 5 kips

Weld Type

FEXX = 60 ksi

Radius Curve

r = 9/43 in


Base 1 Thickness

t1 = 9/86 in

Base 1 Total Width

w1 = 3 in

Base 1 Material Yield Strength

Fy1 = 36 ksi

Base 1 Material Ultimate Strength

Fu1 = 58 ksi

Base 2 Thickness

t2 = 1/4 in

Base 2 Total Width

w2 = 3 in

Base 2 Material

Fy2 = 36 ksi

Base 2 Material Ultimate Strength

Fu2 = 58 ksi

Weld Capacity Check

Minimum Root Radius

r = 0.2092 in Table 8-2 & J2.2 SMAW only

Effective Throat

E = 0.065 in OR 0 in

Tension LRFD Factor

φ = 0.80 Table J2.5

Shear LRFD Factor

φ = 0.75 Table J2.5

Weld Area

Awe = 0.20 in² J2.1a

Stress

Fnw = 36 ksi Table J2.5

Capacity

Rn = 7.1 kips AISC J2.4a

Weld Capacity in Tension

φRn = 5.6 kips

Weld Capacity in Shear

φRn = 5.3 kips

DCR = 0.94

Based on shear capacity and Ru

PROJECT 2022.0193 – Angiography Room

DATE 5/31/2022

BY CL

Equipment Support

Unistrut Axial Capacities:
P9000 - COLUMN LOADING

Unbraced Height In	Maximum Allowable Load at Slot Face Lbs	Maximum Column Load Applied at C.G.			
		K = 0.65 Lbs	K = 0.80 Lbs	K = 1.0 Lbs	K = 1.2 Lbs
24	3,640	8,730	8,570	8,330	8,040
36	3,540	8,360	8,040	7,530	6,950
48	3,400	7,880	7,340	6,530	5,660
60	3,210	7,290	6,530	5,440	4,360
72	2,990	6,640	5,660	4,360	3,160
84	2,730	5,940	4,790	3,340	2,320
96	2,430	5,220	3,940	2,560	1,780
108	2,110	4,520	3,160	2,020	1,400
120	1,820	3,840	2,560	1,640	**
144	1,390	2,690	1,780	**	**

Typical Post

P9200 - COLUMN LOADING

Unbraced Height In	Maximum Allowable Load at Slot Face Lbs	Maximum Column Load Applied at C.G.			
		K = 0.65 Lbs	K = 0.80 Lbs	K = 1.0 Lbs	K = 1.2 Lbs
24	4,620	11,120	10,980	10,740	10,460
36	4,530	10,770	10,460	9,950	9,370
48	4,390	10,300	9,760	8,940	8,030
60	4,220	9,720	8,940	7,800	6,590
72	4,000	9,050	8,030	6,590	5,180
84	3,750	8,320	7,080	5,410	3,890
96	3,460	7,560	6,110	4,290	2,980
108	3,140	6,770	5,180	3,390	2,360
120	2,790	5,990	4,290	2,750	1,910
144	2,170	4,510	2,980	1,910	**
168	1,720	3,320	2,190	**	**

10ft diagonal 8ft diagonal

The maximum allowable load for a vertical post is 5440lbs which is far greater than the imposed equipment load. Okay by observation.

P1000 - COLUMN LOADING

Unbraced Height In	Max. Allowable Load at Slot Face Lbs	Maximum Column Load Applied at C.G.			
		K = 0.65 Lbs	K = 0.80 Lbs	K = 1.0 Lbs	K = 1.2 Lbs
24	3,550	10,740	9,890	8,770	7,740
36	3,190	8,910	7,740	6,390	5,310
48	2,770	7,260	6,010	4,690	3,800
60	2,380	5,910	4,690	3,630	2,960
72	2,080	4,840	3,800	2,960	2,400
84	1,860	4,040	3,200	2,480	1,980
96	1,670	3,480	2,750	2,110	1,660
108	1,510	3,050	2,400	1,810	**
120	1,380	2,700	2,110	**	**
144	1,150	2,180	1,660	**	**

8ft

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Equipment Support					

P5000 - COLUMN LOADING

Unbraced Height In	Maximum Allowable Load at Slot Face Lbs	Maximum Column Load Applied at C.G.			
		K = 0.65 Lbs	K = 0.80 Lbs	K = 1.0 Lbs	K = 1.2 Lbs
24	5,650	16,870	15,180	12,850	10,600
36	4,690	13,140	10,600	7,650	5,660
48	3,560	9,550	6,860	4,790	3,660
60	2,730	6,680	4,790	3,450	2,710
72	2,160	4,980	3,660	2,710	2,170
84	1,760	3,950	2,960	2,240	1,820
96	1,500	3,270	2,500	1,930	1,580
108	1,310	2,800	2,170	1,690	1,390
120	1,170	2,450	1,930	1,510	**
144	980	1,980	1,580	**	**
168	850	1,670	1,340	**	**

P5500 - COLUMN LOADING

Unbraced Height In	Maximum Allowable Load at Slot Face Lbs	Maximum Column Load Applied at C.G.			
		K = 0.65 Lbs	K = 0.80 Lbs	K = 1.0 Lbs	K = 1.2 Lbs
24	4,640	13,840	12,570	10,840	9,190
36	3,970	11,050	9,190	7,030	5,370
48	3,180	8,420	6,390	4,620	3,630
60	2,550	6,250	4,620	3,450	2,780
72	2,120	4,790	3,630	2,780	2,260
84	1,810	3,890	3,010	2,330	1,910
96	1,580	3,290	2,580	2,020	1,650
108	1,400	2,860	2,260	1,770	1,440
120	1,270	2,530	2,020	1,580	**
144	1,060	2,070	1,650	**	**
168	920	1,750	1,380	**	**

If P1000 columns were used, the maximum load would be 3630lbs allowable.

Vertical Hanger Capacity (Using P1000 with minimum value of options)

$$DCR = (\max(\text{Dynamic_Equipment}, \text{Equipment} + 0.7 * \text{Equipment} * Fp_coeff + 0.7 * 0.2 * SDS * \text{Equipment})) / 3630 \text{ lbs} = 0.351$$

For a diagonal brace, the maximum allowable axial load at 9ft

$$P1000T = 1810 \text{ lbs} * 0.85 = 1538.500 \text{ lbs}$$

$$P9000 = 2020 \text{ lbs}$$

$$DCR = \sqrt{(\max(\text{Dynamic_Equipment}, \text{Equipment} + 0.7 * \text{Equipment} * Fp_coeff + 0.7 * 0.2 * SDS * \text{Equipment}))^2 + (\max(1000 \text{ lbs}, \max(\text{Dynamic_Equipment}, 0.7 * \text{Equipment} * Fp_coeff)))^2} / \min(P1000T, P9000) = 1.171$$

Provide a minimum 2 diagonal braces

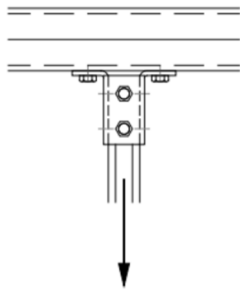
PROJECT	2022.0193 – Angiography Room	DATE	5/31/2022	BY	CL
Equipment Support					

As an alternative connection, the contractor may choose to work with a P2346 connection (from Unistrut below)

DESIGN LOADS

GENERAL SPECIFICATIONS

MATERIALS & FINISHES



Tension

Ave. Ultimate Tension (lbs)	Design Tension Load (lbs)	Ave. Deflection at Design Tension Load
8,400	2,800	0.092"

Notes:

1. Design Loads only apply to UNISTRUT brand products. Look for "UNISTRUT" on the part.
2. Safety Factor = 3.0 based on static testing to the ultimate strength of connection.
3. 1/2" Unistrut Channel Nut and Cap Screw torqued to 50 ft-lbs required for installation.
4. Deflection is the straight line interpolation of the average deflection readings at 2,000 lbs and 3,000 lbs. Deflection is measured in the direction of the Tension Load.

$$DCR = (\max(\text{Dynamic_Equipment, Equipment} + 0.7 * \text{Equipment} * F_p_coeff + 0.7 * 0.2 * SDS * \text{Equipment})) / 2800 \text{ lbs} = \mathbf{0.455}$$

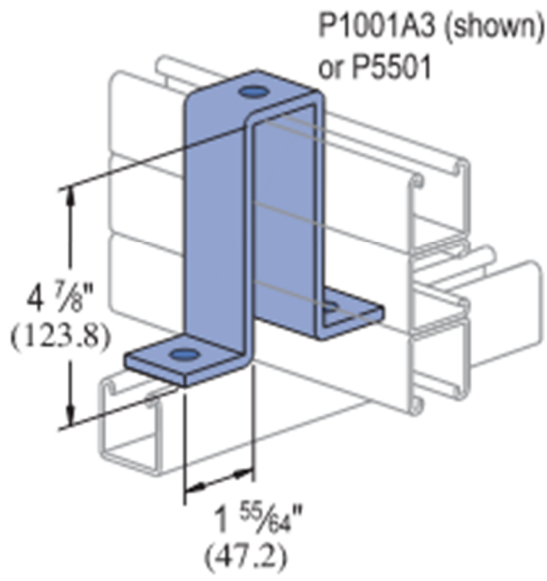
$$\text{Deflection} = 0.092 \text{ in} * (\max(\text{Dynamic_Equipment, Equipment} + 0.7 * \text{Equipment} * F_p_coeff + 0.2 * 0.7 * SDS * \text{Equipment})) / (2800 \text{ lbs} * 4) = \mathbf{0.010 \text{ in}}$$

Alternative is acceptable.

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Equipment Support					

The lash rail connection is as follows.

P2473 **EG, GR, HG**



Channel nuts are okay for the imposed loads.

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DATE 5/31/2022

BY CL

Equipment Support

Horizontal Beam Checks:
P1001 - BEAM LOADING

Span In	Max. Allowable Uniform Load Lbs	Defl. at Uniform Load In	Uniform Loading at Deflection		
			Span/180 Lbs	Span/240 Lbs	Span/360 Lbs
24	3,500*	0.02	3,500*	3,500*	3,500*
36	3,190	0.07	3,190	3,190	3,190
48	2,390	0.13	2,390	2,390	2,390
60	1,910	0.20	1,910	1,910	1,620
72	1,600	0.28	1,600	1,600	1,130
84	1,370	0.39	1,370	1,240	830

P5501 - BEAM LOADING

Span In	Max Allowable Uniform Load Lbs	Defl. at Uniform Load In	Uniform Loading at Deflection		
			Span/180 Lbs	Span/240 Lbs	Span/360 Lbs
24	5,220*	0.01	5,220*	5,220*	5,220*
36	5,220*	0.04	5,220*	5,220*	5,220*
48	4,820	0.08	4,820	4,820	4,820
60	3,860	0.13	3,860	3,860	3,860
72	3,220	0.19	3,220	3,220	3,220
84	2,760	0.26	2,760	2,760	2,500

P5001 - BEAM LOADING

Span In	Max Allowable Uniform Load Lbs	Defl. at Uniform Load In	Uniform Loading at Deflection		
			Span/180 Lbs	Span/240 Lbs	Span/360 Lbs
24	6,890*	0.01	6,890*	6,890*	6,890*
36	6,890*	0.02	6,890*	6,890*	6,890*
48	6,890*	0.05	6,890*	6,890*	6,890*
60	6,420	0.10	6,420	6,420	6,420
72	5,350	0.14	5,350	5,350	5,350
84	4,590	0.19	4,590	4,590	4,590

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Equipment Support					

For a 4ft maximum span with point load at center:

P5501:

$$P5501_Allowable=4820\text{lbs}\cdot 0.5\cdot 0.98=\mathbf{2361.800\text{lbs}}$$

$$P5501_Deflection=0.08\text{in}\cdot 0.8\cdot 0.98=\mathbf{0.063\text{in}}$$

$$DCR=(\max(\text{Dynamic_Equipment}, \text{Equipment}+0.7\cdot 0.2\cdot \text{SDS}\cdot \text{Equipment}))/P5501_Allowable=\mathbf{0.539}$$

$$\text{Combined_DCR}=\max((\text{Equipment}+0.7\cdot 0.2\cdot \text{SDS}\cdot \text{Equipment})/P5501_Allowable+0.7\cdot \text{Equipment}\cdot \text{Fp_coeff}/20510\text{lbs}, \text{Dynamic_Equipment}/P5501_Allowable+900\text{lbs}/20510\text{lbs})=\mathbf{0.583}$$

$$\text{Deflection}=P5501_Deflection\cdot (\text{Dynamic_Equipment})/P5501_Allowable=\mathbf{0.034\text{in}}$$

Deflection is less than 1/16"

P5001:

$$P5001_Allowable=6890\text{lbs}\cdot 0.5\cdot 0.97=\mathbf{3341.650\text{lbs}}$$

$$P5001_Deflection=0.05\text{in}\cdot 0.8\cdot 0.97=\mathbf{0.039\text{in}}$$

$$DCR=(\max(\text{Dynamic_Equipment}, \text{Equipment}+0.7\cdot 0.2\cdot \text{SDS}\cdot \text{Equipment}))/P5001_Allowable=\mathbf{0.381}$$

$$\text{Combined_DCR}=\max((\text{Equipment}+0.7\cdot 0.2\cdot \text{SDS}\cdot \text{Equipment})/P5001_Allowable+0.7\cdot \text{Equipment}\cdot \text{Fp_coeff}/22470\text{lbs}, \text{Dynamic_Equipment}/P5001_Allowable+900\text{lbs}/22470\text{lbs})=\mathbf{0.421}$$

$$\text{Deflection}=P5001_Deflection\cdot (\text{Dynamic_Equipment})/P5001_Allowable=\mathbf{0.015\text{in}}$$

P1001:

$$P1001_Allowable=2390\text{lbs}\cdot 0.5\cdot 1.0=\mathbf{1195.000\text{lbs}}$$

$$P1001_Deflection=0.13\text{in}\cdot 0.8\cdot 1.0=\mathbf{0.104\text{in}}$$

$$DCR=(\max(\text{Dynamic_Equipment}, \text{Equipment}+0.7\cdot 0.2\cdot \text{SDS}\cdot \text{Equipment}))/P1001_Allowable=\mathbf{1.066}$$

$$\text{Combined_DCR}=\max((\text{Equipment}+0.7\cdot 0.2\cdot \text{SDS}\cdot \text{Equipment})/P1001_Allowable+0.7\cdot \text{Equipment}\cdot \text{Fp_coeff}/15520\text{lbs}, \text{Dynamic_Equipment}/P1001_Allowable+900\text{lbs}/15520\text{lbs})=\mathbf{1.124}$$

$$\text{Deflection}=P1001_Deflection\cdot (\text{Dynamic_Equipment})/P1001_Allowable=\mathbf{0.111\text{in}}$$

PROJECT	2022.0193 – Angiography Room	DATE	5/31/2022	BY	CL
Equipment Support					

For a 5ft maximum span with point load at center:

P5501:

$$P5501_Allowable=3860\text{lbs}\cdot 0.5\cdot 0.93=\mathbf{1794.900\text{lbs}}$$

$$P5501_Deflection=0.13\text{in}\cdot 0.8\cdot 0.93=\mathbf{0.097\text{in}}$$

$$DCR=(\max(\text{Dynamic_Equipment}, \text{Equipment}+0.7\cdot 0.2\cdot \text{SDS}\cdot \text{Equipment}))/P5501_Allowable=\mathbf{0.710}$$

$$\text{Combined_DCR}=\max((\text{Equipment}+0.7\cdot 0.2\cdot \text{SDS}\cdot \text{Equipment})/P5501_Allowable+0.7\cdot \text{Equipment}\cdot \text{Fp_coeff}/20510\text{lbs}, \text{Dynamic_Equipment}/P5501_Allowable+900\text{lbs}/20510\text{lbs})=\mathbf{0.754}$$

$$\text{Deflection}=P5501_Deflection\cdot (\text{Dynamic_Equipment})/P5501_Allowable=\mathbf{0.069\text{in}}$$

P5001:

$$P5001_Allowable=6420\text{lbs}\cdot 0.5\cdot 0.90=\mathbf{2889.000\text{lbs}}$$

$$P5001_Deflection=0.10\text{in}\cdot 0.8\cdot 0.90=\mathbf{0.072\text{in}}$$

$$DCR=(\max(\text{Dynamic_Equipment}, \text{Equipment}+0.7\cdot 0.2\cdot \text{SDS}\cdot \text{Equipment}))/P5001_Allowable=\mathbf{0.441}$$

$$\text{Combined_DCR}=\max((\text{Equipment}+0.7\cdot 0.2\cdot \text{SDS}\cdot \text{Equipment})/P5001_Allowable+0.7\cdot \text{Equipment}\cdot \text{Fp_coeff}/22470\text{lbs}, \text{Dynamic_Equipment}/P5001_Allowable+900\text{lbs}/22470\text{lbs})=\mathbf{0.481}$$

$$\text{Deflection}=P5001_Deflection\cdot (\text{Dynamic_Equipment})/P5001_Allowable=\mathbf{0.032\text{in}}$$

P1001:

$$P1001_Allowable=1910\text{lbs}\cdot 0.5\cdot 0.97=\mathbf{926.350\text{lbs}}$$

$$P1001_Deflection=0.2\text{in}\cdot 0.8\cdot 0.97=\mathbf{0.155\text{in}}$$

$$DCR=(\max(\text{Dynamic_Equipment}, \text{Equipment}+0.7\cdot 0.2\cdot \text{SDS}\cdot \text{Equipment}))/P1001_Allowable=\mathbf{1.375}$$

$$\text{Combined_DCR}=\max((\text{Equipment}+0.7\cdot 0.2\cdot \text{SDS}\cdot \text{Equipment})/P1001_Allowable+0.7\cdot \text{Equipment}\cdot \text{Fp_coeff}/15520\text{lbs}, \text{Dynamic_Equipment}/P1001_Allowable+900\text{lbs}/15520\text{lbs})=\mathbf{1.433}$$

$$\text{Deflection}=P1001_Deflection\cdot (\text{Dynamic_Equipment})/P1001_Allowable=\mathbf{0.213\text{in}}$$

PROJECT	2022.0193 – Angiography Room	DATE	5/31/2022	BY	CL
Equipment Support					

For a 3ft maximum span with point load at center:

P5501:

$$P5501_Allowable=5220\text{lbs}\cdot 0.5\cdot 0.98=\mathbf{2557.800\text{lbs}}$$

$$P5501_Deflection=0.04\text{in}\cdot 0.8\cdot 1=\mathbf{0.032\text{in}}$$

$$DCR=(\max(\text{Dynamic_Equipment}, \text{Equipment}+0.7\cdot 0.2\cdot \text{SDS}\cdot \text{Equipment}))/P5501_Allowable=\mathbf{0.498}$$

$$\text{Combined_DCR}=\max((\text{Equipment}+0.7\cdot 0.2\cdot \text{SDS}\cdot \text{Equipment})/P5501_Allowable+0.7\cdot \text{Equipment}\cdot \text{Fp_coeff}/20510\text{lbs}, \text{Dynamic_Equipment}/P5501_Allowable+900\text{lbs}/20510\text{lbs})=\mathbf{0.542}$$

$$\text{Deflection}=P5501_Deflection\cdot (\text{Dynamic_Equipment})/P5501_Allowable=\mathbf{0.016\text{in}}$$

P5001:

$$P5001_Allowable=6890\text{lbs}\cdot 0.5\cdot 0.97=\mathbf{3341.650\text{lbs}}$$

$$P5001_Deflection=0.02\text{in}\cdot 0.8\cdot 1=\mathbf{0.016\text{in}}$$

$$DCR=(\max(\text{Dynamic_Equipment}, \text{Equipment}+0.7\cdot 0.2\cdot \text{SDS}\cdot \text{Equipment}))/P5001_Allowable=\mathbf{0.381}$$

$$\text{Combined_DCR}=\max((\text{Equipment}+0.7\cdot 0.2\cdot \text{SDS}\cdot \text{Equipment})/P5001_Allowable+0.7\cdot \text{Equipment}\cdot \text{Fp_coeff}/22470\text{lbs}, \text{Dynamic_Equipment}/P5001_Allowable+900\text{lbs}/22470\text{lbs})=\mathbf{0.421}$$

$$\text{Deflection}=P5001_Deflection\cdot (\text{Dynamic_Equipment})/P5001_Allowable=\mathbf{0.006\text{in}}$$

P1001:

$$P1001_Allowable=3190\text{lbs}\cdot 0.5\cdot 1.0=\mathbf{1595.000\text{lbs}}$$

$$P1001_Deflection=0.07\text{in}\cdot 0.8\cdot 1.0=\mathbf{0.056\text{in}}$$

$$DCR=(\max(\text{Dynamic_Equipment}, \text{Equipment}+0.7\cdot 0.2\cdot \text{SDS}\cdot \text{Equipment}))/P1001_Allowable=\mathbf{0.799}$$

$$\text{Combined_DCR}=\max((\text{Equipment}+0.7\cdot 0.2\cdot \text{SDS}\cdot \text{Equipment})/P1001_Allowable+0.7\cdot \text{Equipment}\cdot \text{Fp_coeff}/15520\text{lbs}, \text{Dynamic_Equipment}/P1001_Allowable+900\text{lbs}/15520\text{lbs})=\mathbf{0.857}$$

$$\text{Deflection}=P1001_Deflection\cdot (\text{Dynamic_Equipment})/P1001_Allowable=\mathbf{0.045\text{in}}$$

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Equipment Support					

The actual maximum spacing is 5'-0" or less.

The following calculation is presented as if the load is at ¼ points

Span=4ft

$M = (\max(\text{Dynamic_Equipment}, \text{Equipment} + 0.7 * 0.2 * \text{SDS} * \text{Equipment})) * 0.25 * \text{Span} * 0.75 * \text{Span} / \text{Span} = 11466.000 \text{ lbs_in}$

$P = \max(0.7 * \text{Equipment} * F_p \text{_coeff}, 900 \text{ lbs}) = 900.000 \text{ lbs}$

P5501:

$M_a = P5501_M_a = 28940.000 \text{ lbs_in}$

Flexure:

$DCR = M / M_a = 0.396$

$\text{Combined_DCR} = M / M_a + P / 20510 \text{ lbs} = 0.440$

P5501 Finish Rails okay

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Equipment Support

Lateral Bracing:

Maximum lateral load is 350lbs

Maximum allowable seismic lateral load:

$$F_p = 0.7 * \text{Equipment} * F_p_coeff = \mathbf{168.383\text{lbs}}$$

Induced horizontal load is greater than seismic load. Use 1000lbs as conservative option

$$\text{Lateral_Load} = \max(1000\text{lbs}, F_p, 350\text{lbs}) = \mathbf{1000.000\text{lbs}}$$

Load at diagonal

$$E_u = \sqrt{(\text{Lateral_Load})^2 + (\text{Lateral_Load})^2} = \mathbf{1.414\text{kip}}$$

Using a P1000 brace with a 9ft span

$$\text{DCR} = E_u / 1810\text{lbs} = \mathbf{0.781}$$

Using a P1000T brace with a 9ft span

$$\text{DCR} = E_u / (1810\text{lbs} * 0.85) = \mathbf{0.919}$$

If span is up to 10ft, use P9000

$$\text{DCR} = E_u / 1640\text{lbs} = \mathbf{0.862}$$

Bolt and nut capacity

$$\text{DCR} = E_u / 1500\text{lbs} = \mathbf{0.943}$$

Bracing is okay.

Optionally use P1000 as lash rails (5ft span):

Axial Capacity

$$\text{DCR} = \text{Lateral_Load} / 3630\text{lbs} = \mathbf{0.275}$$

Optionally use P1000T as lash rails (5ft span):

Axial Capacity

$$\text{DCR} = \text{Lateral_Load} / (3630\text{lbs} * 0.85) = \mathbf{0.324}$$

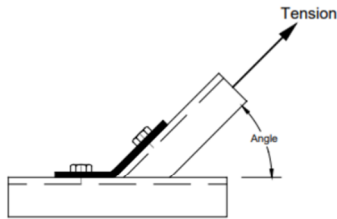
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Equipment Support					

Other optional diagonal connection types:

DESIGN LOADS

GENERAL SPECIFICATIONS

MATERIALS & FINISHES



Design Loads – P1546, P2094 thru P2100

Part Number	Angle	Average Ultimate Tension (lbs)	Design Tension Load (lbs)	Average Deflection at Design Tension Load
P2094	82-1/2°	7,000	1,500	0.046"
P2095	75°	7,200	1,500	0.081"
P2096	67-1/2°	6,900	1,500	0.046"
P2097	60°	6,500	1,500	0.079"
P2098	52-1/2°	6,300	1,500	0.059"
P1546	45°	6,200	1,500	0.081"
P2099	37-1/2°	6,800	1,500	0.171"
P2100	37-1/2°	5,700	1,500	0.169"

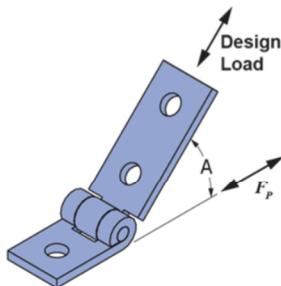
Notes:

1. Design loads only apply to UNISTRUT brand products. Look for "UNISTRUT" on the part.
2. Average Safety Factor = 4.0 based on static testing to the ultimate strength of connection. Design Loads are limited to 1,500 lbs for Slip Load of Channel Nuts with a Safety Factor = 3.0.
3. 1/2" Unistrut Channel Nut and Cap Screw torqued to 50 ft-lbs required for installation.

SEISMIC DESIGN LOADS

GENERAL SPECIFICATIONS

MATERIALS & FINISHES



Fittings: P1354AW, P3835-050

Angle "A" from Horizontal	Design Load (lbs)	F _p (lbs)
30° ^{+5°} / _{-25°}	2,136	1,850
45° ^{+5°} / _{-10°}	1,397	985
60° ^{+0°} / _{-10°}	1,462	730

Notes:

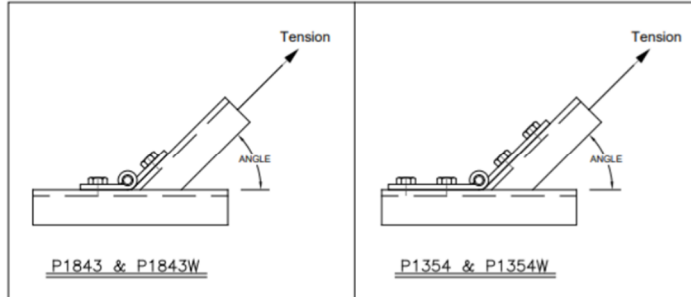
1. Seismic Design Loads only apply to UNISTRUT brand products. Look for "UNISTRUT" on the part.
2. Seismic Design Loads are based on FM1950-10 dynamic testing with 12 ga. channel and a safety factor of 1.5.
3. 1/2" Unistrut Channel Nut and Cap Screw torqued to 50 ft-lbs required for installation.
4. Seismic Design Loads apply only to the P1354AW EG fitting. The "W" in the part number designates that the hinge has welds to increase strength.
5. Reference [page 5c.1](#) of Unistrut OPM-0295-13.

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Equipment Support

DESIGN LOADS
GENERAL SPECIFICATIONS
MATERIALS & FINISHES


P/N	Angle	Ave. Ultimate Tension (lbs)	Design Tension Load (lbs)
P1843	0°	4,700	1,500
	45°	4,300	1,400
P1354	0°	4,800	1,600
	45°	4,400	1,400
P1843W	0°	10,000	1,500
	45°	7,000	1,500
P1354W	0°	11,600	3,000
	45°	7,100	2,300

Notes:

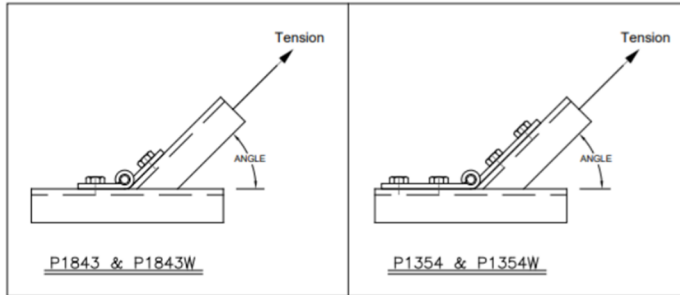
1. Design loads only apply to UNISTRUT brand products. Look for "UNISTRUT" on the part.
2. Design loads are based on static testing with a Safety Factor = 3.0 to the ultimate strength of connection.
3. 1/2" Unistrut Channel Nut and Cap Screw torqued to 50 ft-lbs required for installation.
4. Some design loads limited to 1,500 lbs for Slip Load of Channel Nuts.
5. The "W" in the part number designates that the hinge has welds to increase strength.

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Equipment Support					

DESIGN LOADS

GENERAL SPECIFICATIONS

MATERIALS & FINISHES

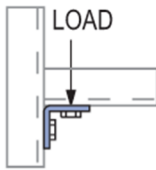


P/N	Angle	Ave. Ultimate Tension (lbs)	Design Tension Load (lbs)
P1843	0°	4,700	1,500
	45°	4,300	1,400
P1354	0°	4,800	1,600
	45°	4,400	1,400
P1843W	0°	10,000	1,500
	45°	7,000	1,500
P1354W	0°	11,600	3,000
	45°	7,100	2,300

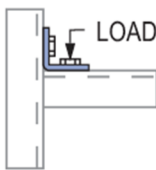
Notes:

1. Design loads only apply to UNISTRUT brand products. Look for "UNISTRUT" on the part.
2. Design loads are based on static testing with a Safety Factor = 3.0 to the ultimate strength of connection.
3. 1/2" Unistrut Channel Nut and Cap Screw torqued to 50 ft-lbs required for installation.
4. Some design loads limited to 1,500 lbs for Slip Load of Channel Nuts.
5. The "W" in the part number designates that the hinge has welds to increase strength.

		Channel Thickness		
Load – P1026		12 ga.	14 ga.	16 ga.
	Lbs	1,500	1,000	750
	<i>kN</i>	6.67	4.45	3.34



		Channel Thickness		
Load – P1026		12 ga.	14 ga.	16 ga.
	Lbs	1,000	650	500
	<i>kN</i>	4.45	2.89	2.22

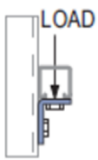


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Equipment Support					

DESIGN LOADS

GENERAL SPECIFICATIONS

Load – P1068	Channel Thickness			
		12 ga.	14 ga.	16 ga.
	Lbs	500	500	500
	kN	2.22	2.22	2.22



Notes:

1. Design loads only apply to Unistrut brand products. Look for "UNISTRUT" on the part.
2. Both ends of beam must be supported.
3. Load data is based on a P1010 nut and 1/2" bolt.
4. Safety factor = 2.5 based on ultimate strength of connection.

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Equipment Support					

Out of plane deflection between lateral supports:

P1000/P1001 - ELEMENTS OF SECTION

Parameter	P1000		P1001	
Area of Section	0.555	ln ²	1.111	ln ²
Axis 1-1				
Moment of Inertia (I)	0.185	ln ⁴	0.928	ln ⁴
Section Modulus (S)	0.202	ln ³	0.571	ln ³
Radius of Gyration (r)	0.577	ln	0.914	ln
Axis 2-2				
Moment of Inertia (I)	0.236	ln ⁴	0.471	ln ⁴
Section Modulus (S)	0.290	ln ³	0.580	ln ³
Radius of Gyration (r)	0.651	ln	0.651	ln

P5500/P5501 - ELEMENTS OF SECTION

Parameter	P5500		P5501	
Area of Section	0.726	ln ²	1.452	ln ²
Axis 1-1				
Moment of Inertia (I)	0.522	ln ⁴	2.805	ln ⁴
Section Modulus (S)	0.390	ln ³	1.151	ln ³
Radius of Gyration (r)	0.848	ln	1.390	ln
Axis 2-2				
Moment of Inertia (I)	0.334	ln ⁴	0.669	ln ⁴
Section Modulus (S)	0.411	ln ³	0.823	ln ³
Radius of Gyration (r)	0.679	ln	0.679	ln

Lateral_Load_Deflection=350lbs

Out of plate deflection between lateral supports

For P5501

Span=5ft

E=29000ksi

I=0.669in⁴

Deflection=(Lateral_Load_Deflection /2*(Span)³)/(48*E*I)=**0.041**in

Less than 1/16" Okay

For P1001

E=29000ksi

I=0.471in⁴

Deflection=(Lateral_Load_Deflection /2*(Span)³)/(48*E*I)=**0.058**in

Appendix

Equipment Drawings **for Reference Only**

FOR CALCULATION PACKET REFERENCE ONLY



**Intermountain Medical Center
Murray, UT
USA**

REV	DATE	MODIFICATIONS
A	11/May/2022	Final (DC-340464)

- 01 - C1 - Cover Sheet
- 02 - C2 - Disclaimer - Site Readiness
- 03 - A1 - General Notes
- 04 - A2 - Equipment Layout
- 05 - A3 - Section Views
- 06 - A4 - Equipment Details (1)
- 07 - A5 - Equipment Details (2)
- 08 - A6 - Delivery
- 09 - S1 - Structural Notes
- 10 - S2 - Structural Layout
- 11 - S3 - Structural Details (1)
- 12 - S4 - Structural Details (2)
- 13 - S5 - Structural Details (3)
- 14 - M1 - HVAC
- 15 - E1 - Electrical Notes

- 16 - E2 - Electrical Layout (2)
- 17 - E3 - Electrical Elevations
- 18 - E4 - Power Requirements
- 19 - E5 - Interconnections
- 20 - E6 - Power requirements (Light Signaling)



GE Healthcare

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**INNOVA IGS 520/530/540/330 WITH AUTORIGHT
FINAL STUDY**

A mandatory component of this drawing set is the GE Healthcare Pre Installation manual. Failure to reference the Pre Installation manual will result in incomplete documentation required for site design and preparation.
Pre Installation documents for GE Healthcare products can be accessed on the web at: www.gehealthcare.com/siteplanning

GE does not take responsibility for any damages resulting from changes on drawings made by others. Errors may occur by not referring to the complete set of final issue drawing. GE cannot accept responsibility for any damage due to the partial use of GE final issue drawings, however caused. All dimensions are in millimeters unless otherwise specified. Do not scale from printed pdf files. GE accepts no responsibility or liability for defective work due to scaling from these drawings.

Drawn by	Verified by	Concession	S.O. (GON)	PIM Manual	Rev
JM	JM	-	5120436	5813633-8EN	3
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A3	1/4"=1'-0"	IGS-M265969-FIN-00-A.DWG		11/May/2022	01/20

DISCLAIMER

FOR CALCULATION PACKET REFERENCE ONLY

GENERAL SPECIFICATIONS

- GE is not responsible for the installation of developers and associated equipment, lighting, cassette trays and protective screens or derivatives not mentioned in the order.
- The final study contains recommendations for the location of GE equipment and associated devices, electrical wiring and room arrangements. When preparing the study, every effort has been made to consider every aspect of the actual equipment expected to be installed.
- The layout of the equipment offered by GE, the dimensions given for the premises, the details provided for the pre-installation work and electrical power supply are given according to the information noted during on-site study and the wishes expressed by the customer.
- The room dimensions used to create the equipment layout may originate from a previous layout and may not be accurate as they may not have been verified on site. GE cannot take any responsibility for errors due to lack of information.
- Dimensions apply to finished surfaces of the room.
- Actual configuration may differ from options presented in some typical views or tables.
- If this set of final drawings has been approved by the customer, any subsequent modification of the site must be subject to further investigation by GE about the feasibility of installing the equipment. Any reservations must be noted.
- The equipment layout indicates the placement and interconnection of the indicated equipment components. There may be local requirements that could impact the placement of these components. It remains the customer's responsibility to ensure that the site and final equipment placement complies with all applicable local requirements.
- All work required to install GE equipment must be carried out in compliance with the building regulations and the safety standards of legal force in the country concerned.
- These drawings are not to be used for actual construction purposes. The company cannot take responsibility for any damage resulting therefrom.

CUSTOMER RESPONSIBILITIES

- It is the responsibility of the customer to prepare the site in accordance with the specifications stated in the final study. A detailed site readiness checklist is provided by GE. It is the responsibility of the customer to ensure all requirements are fulfilled and that the site conforms to all specifications defined in the checklist and final study. The GE Project Manager of Installation (PMI) will work in cooperation with the customer to follow up and ensure that actions in the checklist are complete, and if necessary, will aid in the rescheduling of the delivery and installation date.
- Prior to installation, a structural engineer of record must ensure that the floor and ceiling is designed in such a way that the loads of the installed system can be securely borne and transferred. The layout of additional structural elements, dimensioning and the selection of appropriate installation methods are the sole responsibility of the structural engineer. Execution of load bearing structures supporting equipment on the ceiling, floor or walls are the customer's responsibility.

RADIO-PROTECTION

- Suitable radiological protection must be determined by a qualified radiological physicist in conformation with local regulations. GE does not take responsibility for the specification or provision of radio-protection.

THE UNDERSIGNED, HEREBY CERTIFIES THAT I HAVE READ AND APPROVED THE PLANS IN THIS DOCUMENT.		
DATE	NAME	SIGNATURE

GLOBAL SITE READINESS CHECKLIST (DI)

DOC1809666 Rev. 7

Site Ready Checks at Installation
EHS Site Requirements
Overall access route to the scan room free from obstruction / high hazards.
Enough space to store tools, equipment, parts, install waste and the general area free from obstruction and trip hazards.
Enough necessary facilities for the GE employees available.
No 3rd parties working in the area that may affect the safety of the installation activity.
Area free from any chemical, gas, dust, welding fume exposure and has painting been completed and dry.
All emergency routes identified, signed and clear from obstruction.
Accessible single source lockable panel that LOTO can be applied to for GE equipment installation (MDP and/or PDU).
There are no other conditions or hazards that you have observed or have been made aware of by the customer or contractors on site.
Required for Mechanical Install start
Room dimensions, including ceiling height, for all Exam, Equipment/Technical & Control rooms meets GE specifications.
Ceiling support structure, if indicated on the GE drawing, is in the correct location and at the correct height according to the Original Equipment Manufacturer specifications.
Levelness and spacing has been measured, and is ready for the installation of any GE supplied components.
Overhead support Structure (unistrut) has been confirmed with customer/contractor to meet required GE provided criteria.
Finished ceiling is installed. If applicable ceiling tiles installed per PMI discretion.
Floor levelness/flatness is measured and within tolerance, and there are no visible defects per GEHC specifications.
Entry door threshold meets PIM requirement
Floor Strength and thickness have been discussed with customer/contractor and they have confirmed GE requirements are met.
Rooms that will contain equipment, including staging areas if applicable, are construction debris free. Precautions must be taken to prevent debris from entering rooms containing equipment.
Cable ways (floor/wall/ceiling/Access Flooring) are available for installation of GE cables are of correct length and diameter.
Cable ways routes per GE Final drawings and cable access openings areas installed at a time determined by GEHC PM. Surface floor duct can be installed at time of system installation.
Adequate room illumination installed and working.
Customer supplied countertops where GE equipment will be installed are in place.
Vascular baseplates preparation complete per GE requirements.
For IGS 730/740: Floor finish is according to the GE Specifications and protection is installed . Specifications for concrete substrate & Monopur 7 mm flooring have been met. Table baseplate installed and flush to the finished floor.
For IGS 730/740: Room Interventional Reference Point (RIRP) value has been defined with the customer. Either 1120mm, 1278 mm or 1508 mm.
Ensure that all third party suppliers are identified and have been informed about the project dates and how they need to proceed in accordance with their needs for interfacing to our equipment.
Required for Calibration start
HVAC systems Installed, and the site meets minimum environmental operational system requirements.
System power & grounding (PDB/MDP) is available as per GE specifications.
System power & grounding (PDB/MDP) is installed at point of final connection and ready to use. Lock Out Tag Out is available.
PMI to confirm all feeder wires and breaker are size appropriately. EPO installed if needed.
PMI to confirm with electrician all power and signal cables are well terminated ensuring there are no loose connections.
Network outlets installed.
Computer network available and working.
Lead doors and windows complete or scheduled to be installed. If applicable, radiation protection (shielding) finished & radioprotection regulatory approval for installation obtained.

Note: The details shown here are only an extract from DOC1809666. For the complete document please contact your PMI.

CONNECTIVITY REQUIREMENTS

FOR CALCULATION PACKET REFERENCE ONLY

Service Connectivity for new systems will be based on the Insite-RSvP Platform which allows to configure a direct Internet connection to the RSvP Server (routers/VPN tunnel no more mandatory). Communication with the RSvP server will be outbound only and require using Transport Layer Security (TLS) over TCP port 443. This is commonly known as an HTTPS (HTTP-Secure) connection.

There will be several ways to connect the system to the RSvP Enterprise Server. See below the main options that might not be all available or authorized at your site depending on actual network constraints or local regulations.:

- The system allows for DNS configuration or proxy server-based connection to the Internet.
- Connection thru a GE Proxy will be possible in the future.
- In the case the customer does not accept the above connection protocol or regulatory reasons prevent using these types of configurations, the local/regional connectivity teams can provide help to connect through SSL/TLS proxy IP over the site-to-site VPN.

To make the system connectivity operational before the system installation is finished, ensure the connectivity solution is defined as early as possible during the pre-installation process and proper information are exchanged between the customer Network Administrators and GEHC Sales and/or Service representatives.

For more information please refer to the latest version of the Pre Installation Manual.

ELECTROMAGNETIC INTERFERENCE

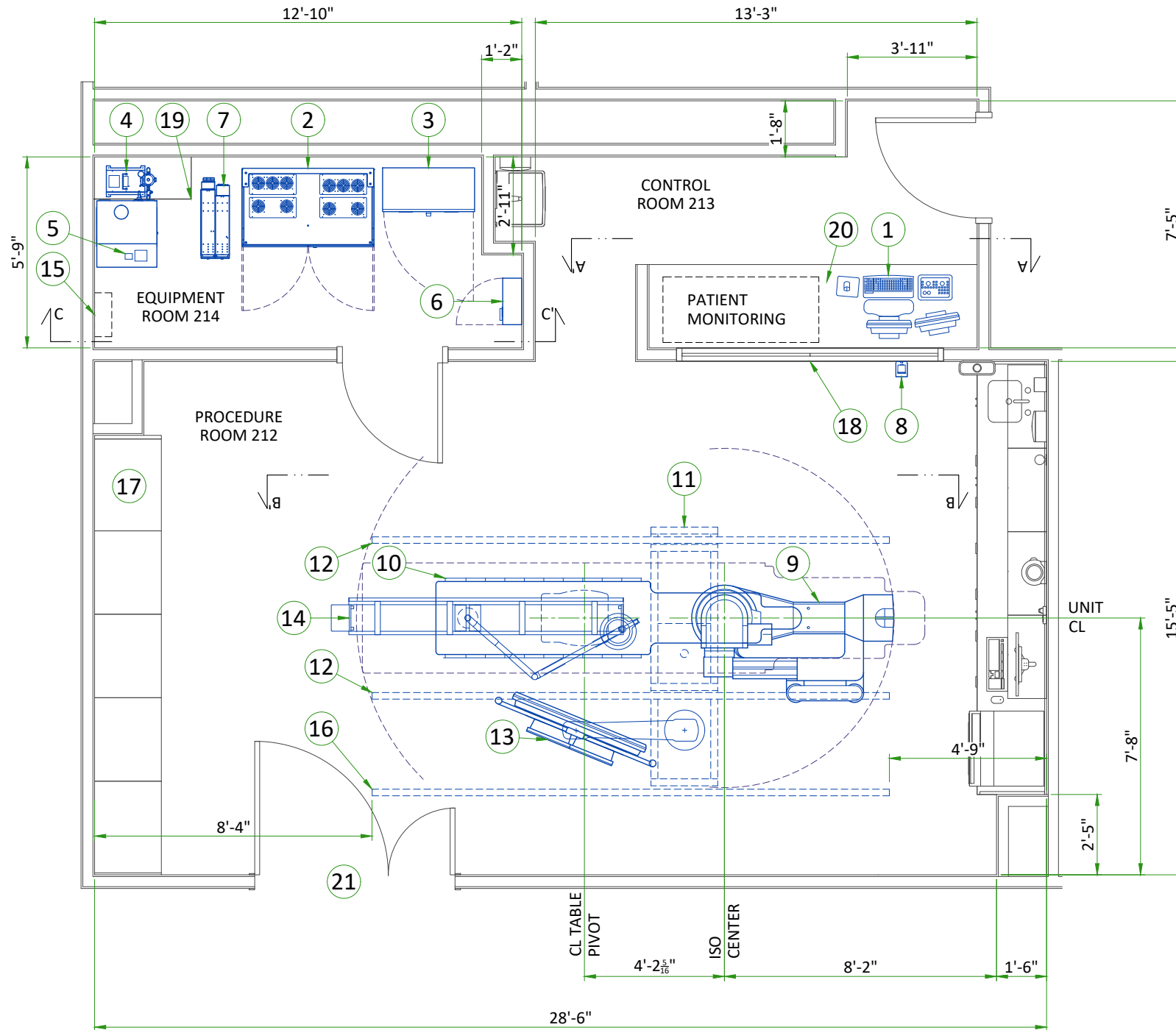
The IGS System is intended for use in the electromagnetic environment specified below. The Customer or the user of the System should assure that it is used in such an environment.

EMISSIONS	TEST COMPLIANCE	ELECTROMAGNETIC ENVIRONMENT
Radio-Frequency Emissions CISPR11	Group1 Class A limits	The IGS System uses Radio Frequency energy only for its internal function. Therefore, its Radio Frequency emissions are very low and are not likely to cause any interference in nearby electronic equipment. The IGS System is suitable for use in all establishments other than domestic and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC 61000-3-2	Not applicable	The IGS System is suitable for use in all establishments other than domestic and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Voltage fluctuations/ flicker emissions IEC 61000-3-3	Not applicable	The IGS System is suitable for use in all establishments other than domestic and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.

CUSTOMER SITE READINESS REQUIREMENTS

- Any deviation from these drawings must be communicated in writing to and reviewed by your local GE Healthcare installation project manager prior to making changes.
- Make arrangements for any rigging, special handling, or facility modifications that must be made to deliver the equipment to the installation site. If desired, your local GE Healthcare installation project manager can supply a reference list of rigging contractors.
- New construction requires the following;
 1. Secure area for equipment,
 2. Power for drills and other test equipment,
 3. Capability for image analysis,
 4. Restrooms.
- Provide for refuse removal and disposal (e.g. crates, cartons, packing)
- For CT, MR, PET/CT, and SPECT systems it is required to minimize vibrations within the scan room. It is the customer's responsibility to contract a vibration consultant/engineer to implement site design modifications to meet the GE vibration specification. Refer to the system pre-installation manual for vibration specifications.

FOR CALCULATION PACKET REFERENCE ONLY



LEGEND

A	GE Supplied	D	Available from GE
B	GE Supplied/contractor installed	E	Equipment existing in room
C	Customer/contractor supplied and installed	*	Item to be reinstalled from another site

BY	ITEM	DESCRIPTION	MAX HEAT OUTPUT (btu)	WEIGHT (lbs)	MAX HEAT OUTPUT (W)	WEIGHT (kg)
A	1	Operator console	341	19.6	100	9
A	2	C-FRT Cabinet	7370	1226	2160	556
A	3	System Interface Cabinet (PDU)	1706	642	500	291
A	4	Detector conditioner	717	32	210	14.5
A	5	COOLIX 4100 tube chiller	23646	265	6930	120
B	6	Main Disconnect Panel	205	49	60	22
A	7	8kVA UPS	1760	185	520	84
A	8	Xray buzzer	-	1	-	0.5
A	9	LC gantry	5528	1733	1620	786
A	10	Tilting table	-	2242	-	1017
A	11	Monitor suspension short bridge	-	-	-	-
A	12	Longitudinal stationary rail	-	68	-	31
A	13	Large Display Monitor with two backup monitors	341	645	100	293
A	14	Mavig YLED lamp with transformer on 2.5m ceiling track	-	143	-	65
B	15	Light signaling control box	-	26	-	12
C	16	Cable drape rail				
C	17	Storage cabinet				
C	18	Control wall to ceiling with lead glass viewing window.				
C	19	Shelf - customer to provide adequate wall support				
C	20	Counter top for equipment- provide grommeted openings as required to route cables				
C	21	Minimum door opening for equipment delivery is 46 in. w x 87 in. h [1160mm x 2200mm], contingent on a 96 in. [2438mm] corridor width				

EXAM ROOM HEIGHT

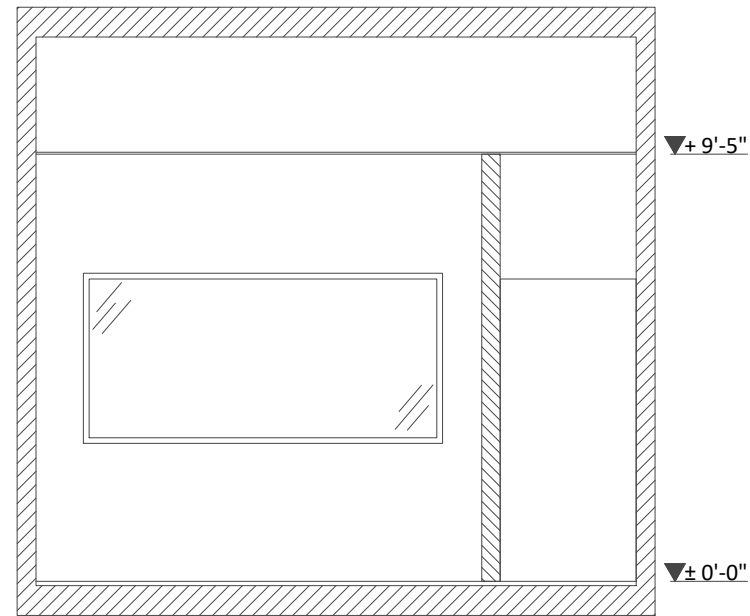
FINISHED FLOOR TO FALSE CEILING	9'-5"
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For Accessory Sales: (866) 281-7545 Options 1, 2, 1, 2 or mail to: gehcaccessorysales@ge.com

CONTROL ROOM VIEW

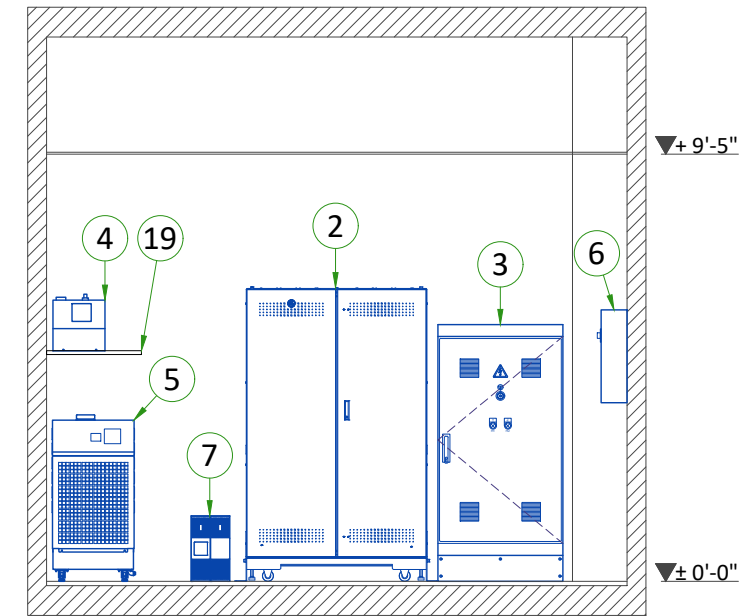
FOR CALCULATION PACKET REFERENCE ONLY

SECTION A-A



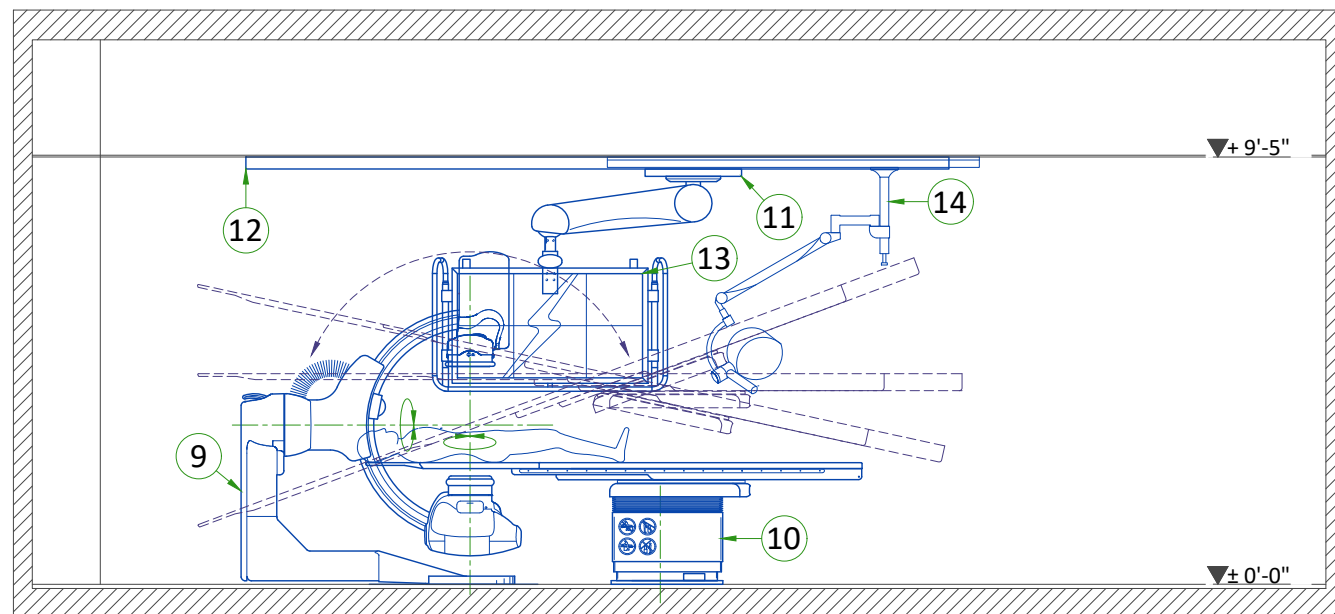
TECHNICAL ROOM VIEW

SECTION C-C'



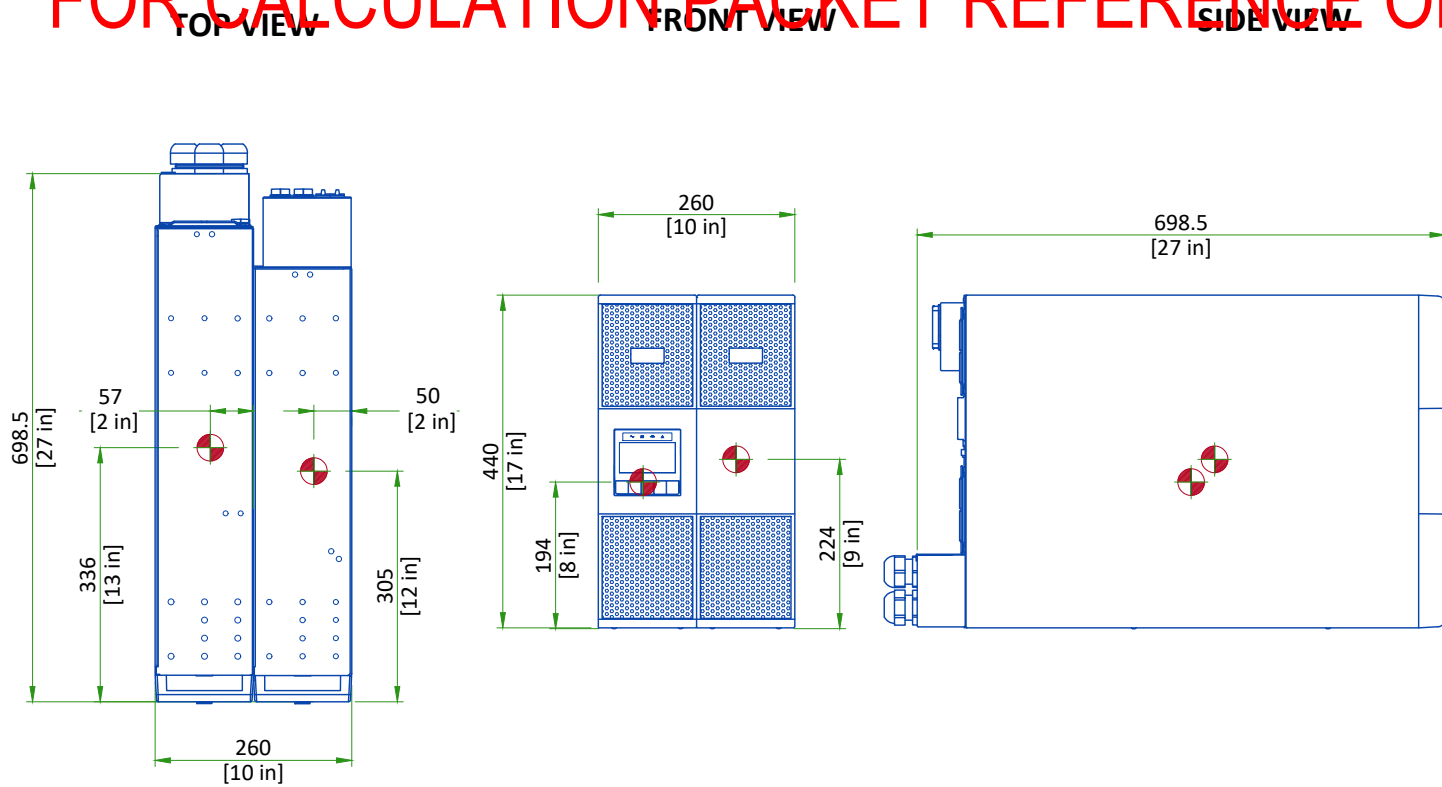
EXAM ROOM VIEW

SECTION B-B'



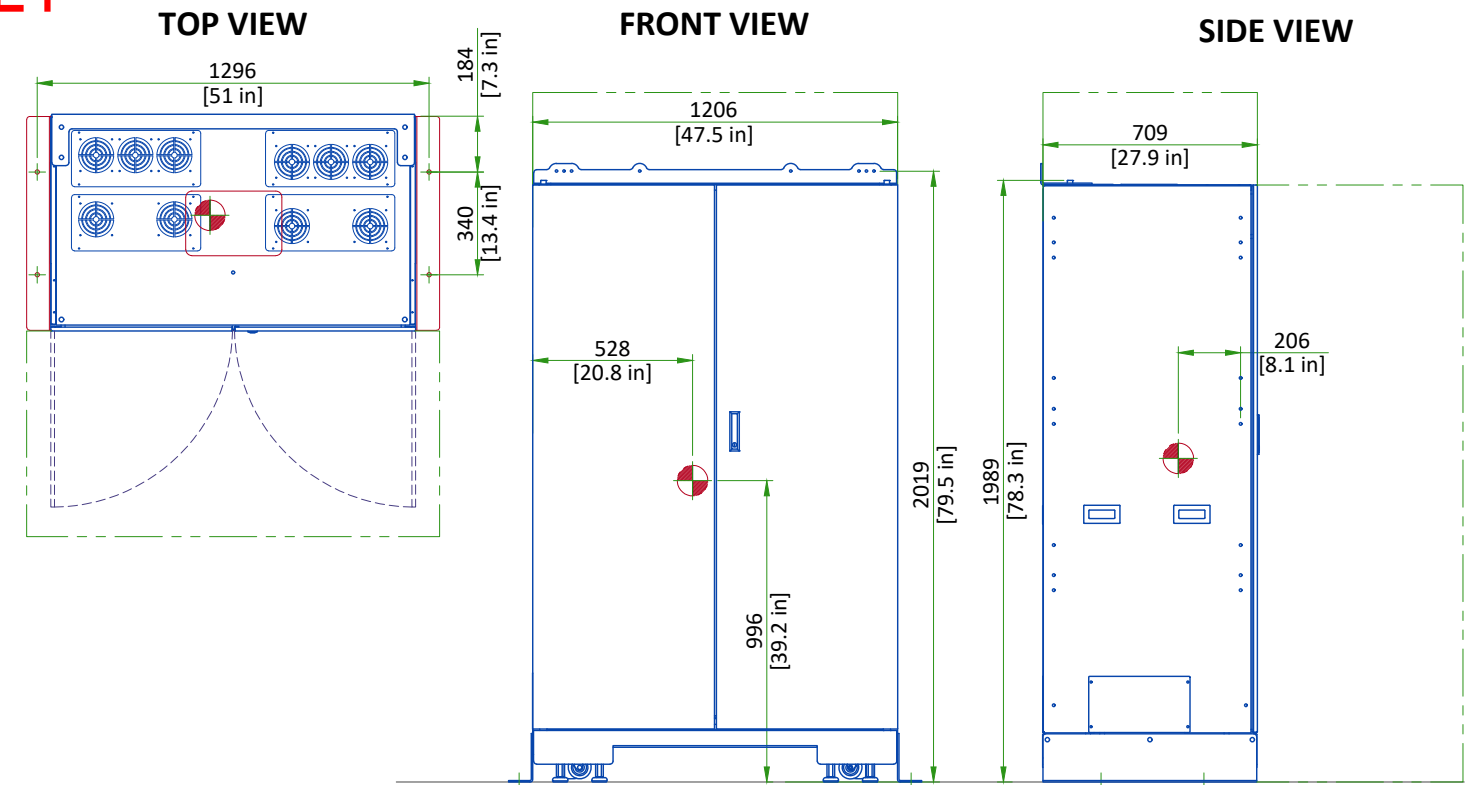
8kVA UPS

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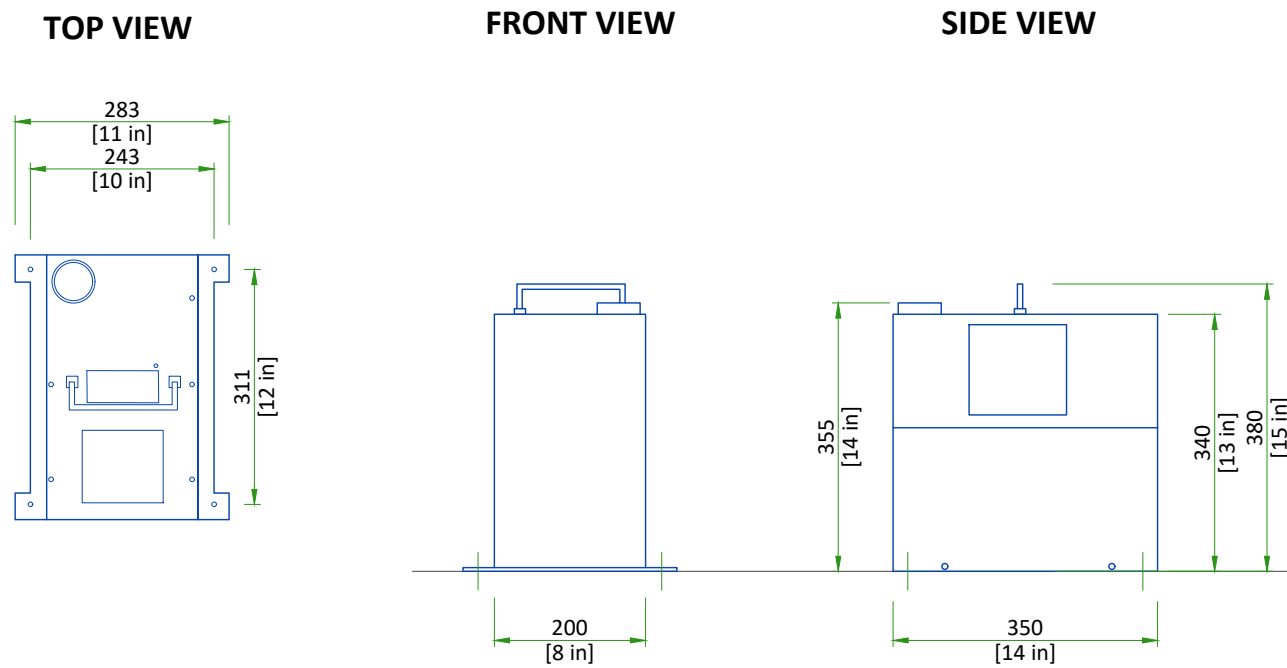
Center of Gravity
 Scale 1:10

C-FRT CABINET



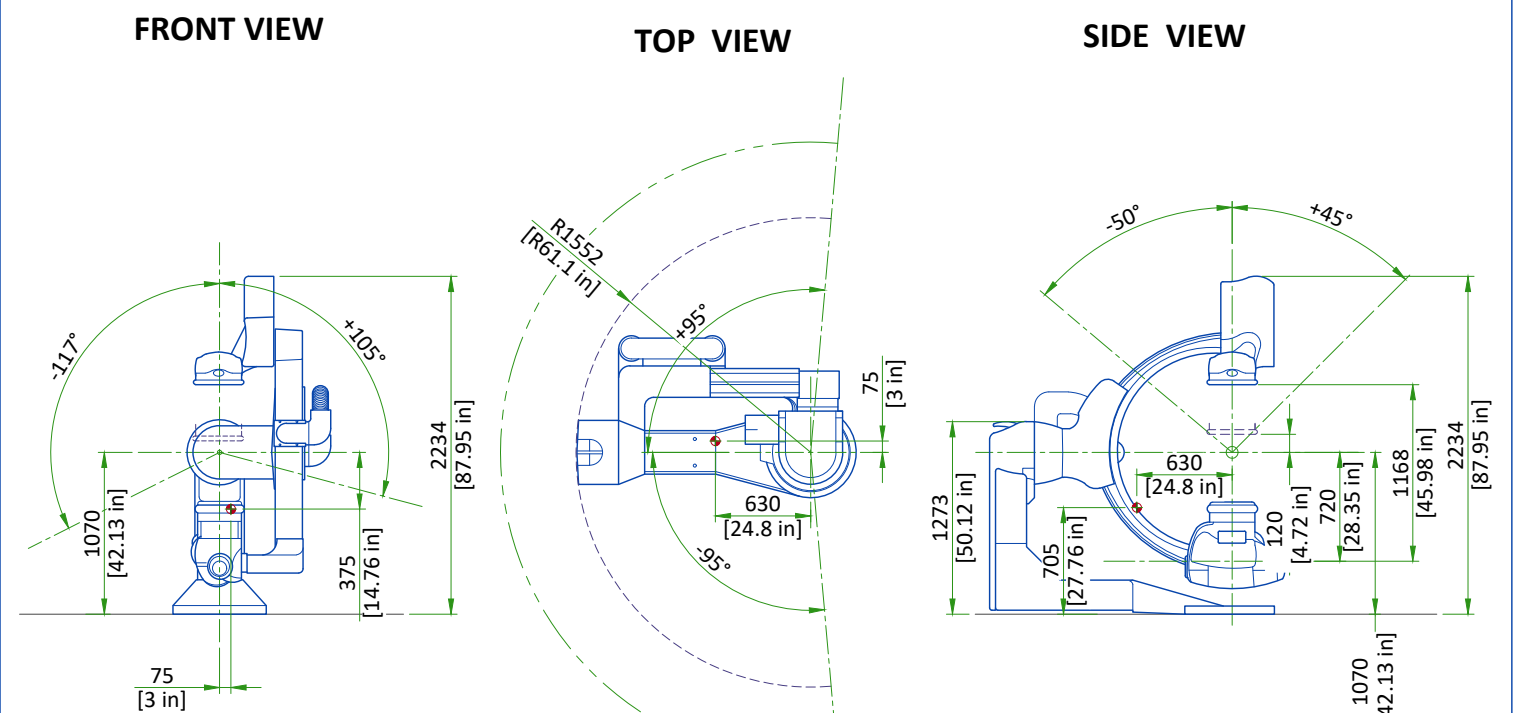
Center of Gravity
 SCALE 1:25

DETECTOR CONDITIONER



Scale 1:10

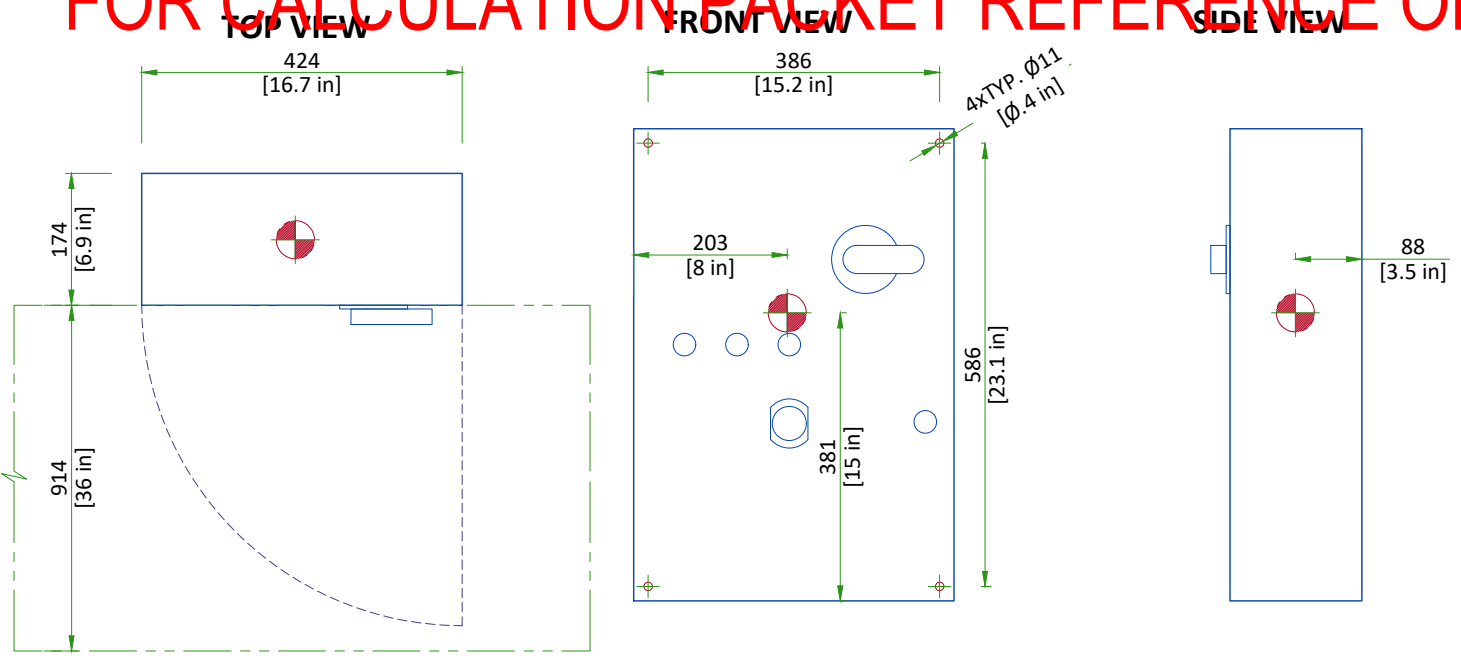
GANTRY



Center of Gravity
 SCALE 1:50

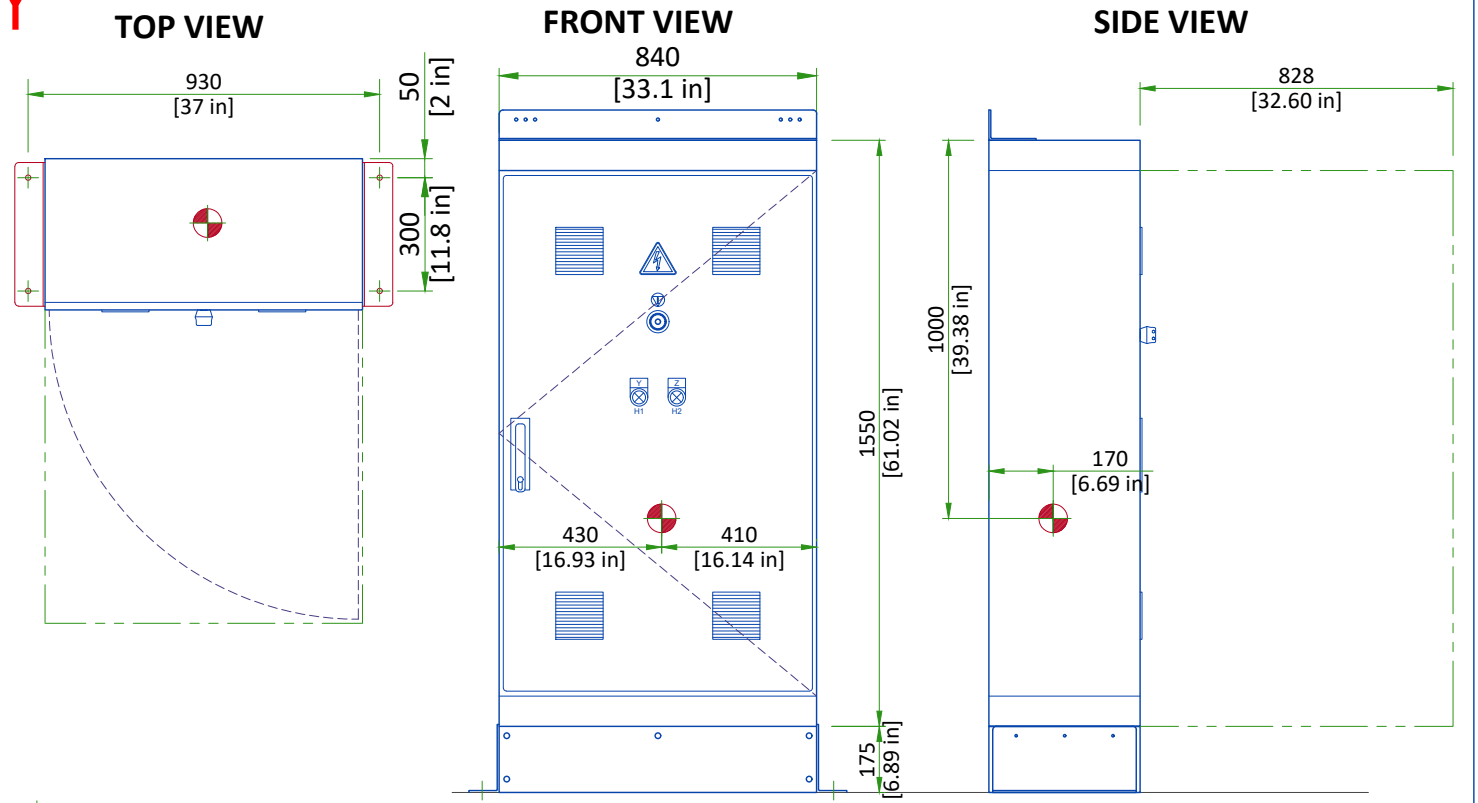
MAIN DISCONNECT PANEL

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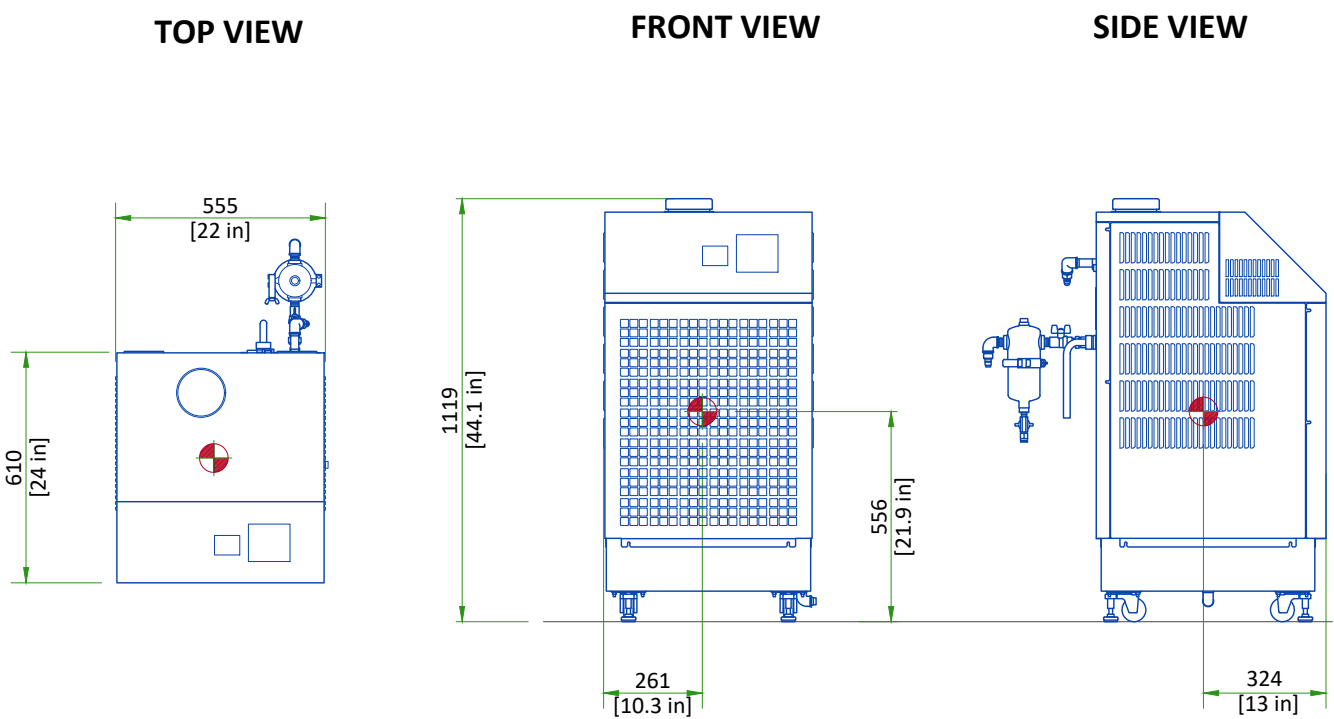
Center of Gravity
 Scale 1:10

NPA PDU



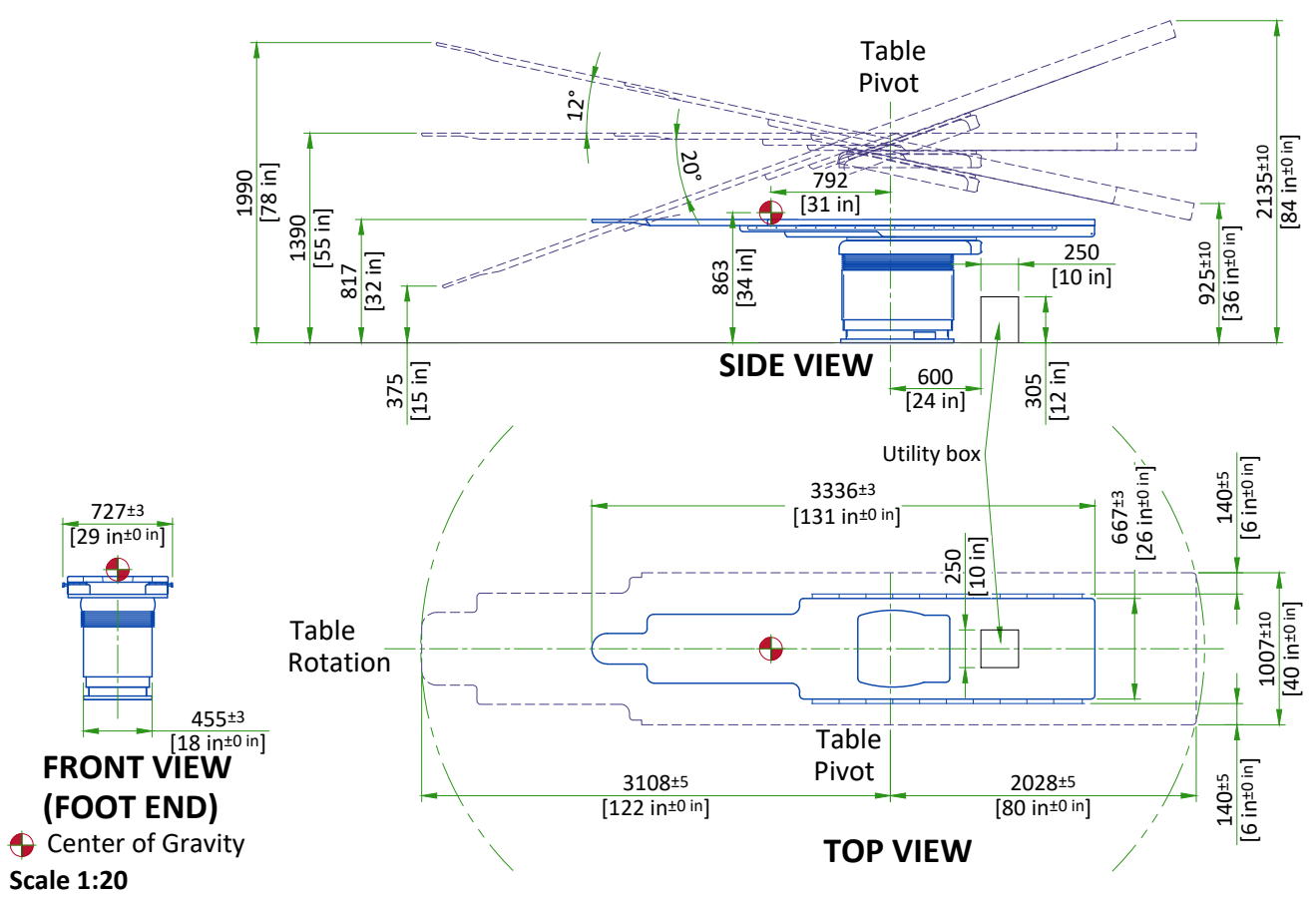
Center of Gravity
 Scale 1:20

X-RAY TUBE CHILLER



Center of Gravity
 Scale 1:20

INNOVA IQ PATIENT TABLE



Center of Gravity
 Scale 1:20

DELIVERY

FOR CALCULATION PACKET REFERENCE ONLY

THE CUSTOMER/CONTRACTOR SHOULD:

- Provide an area adjacent to the installation site for delivery and unloading of the GE equipment.
- Ensure that the dimensions of all doors, corridors, ceiling heights are sufficient to accommodate the movement of GE equipment from the delivery area into the definitive installation room.
- Ensure that access routes for equipment will accommodate the weights of the equipment and any transportation, lifting and rigging equipment.
- Ensure that all necessary arrangements for stopping and unloading on public or private property not belonging to the customer have been made.

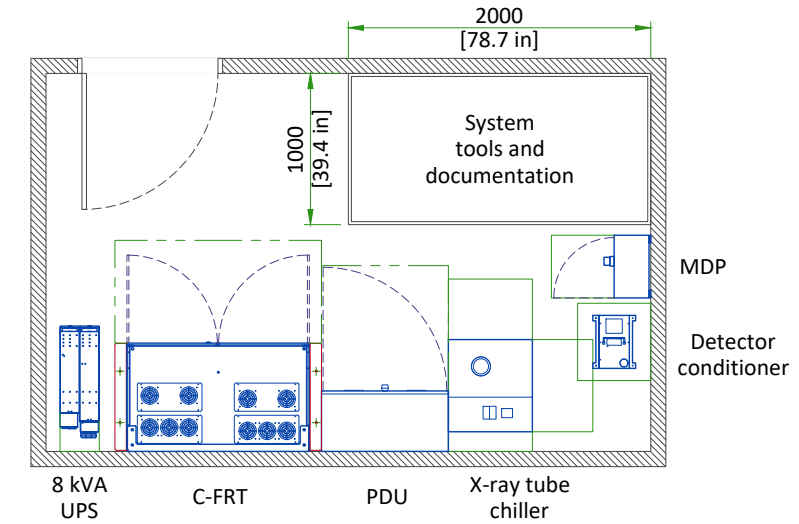
DIMENSIONS OF DELIVERY

EQUIPMENT	DIMENSIONS		WEIGHT	
GANTRY (SHIPPING DOLLY)	LENGTH	2820 mm 111 in	1060 kg 2340 lb	
	WIDTH	1230 mm 48.4 in		
	HEIGHT	2000 mm 79 in		
TILTING TABLE BASE ASSEMBLY AND COVERS (ON PALLET)	LENGTH	2150 mm 84.6 in	750 kg 1653 lb	
	WIDTH	1000 mm 39.4 in		
	HEIGHT	1160 mm 45.7 in		
C-FRT CABINET (ON PALLET)	LENGTH	850 mm 34 in	630 kg 1388 lb	
	WIDTH	1500 mm 59 in		
	HEIGHT	2200 mm 87 in		

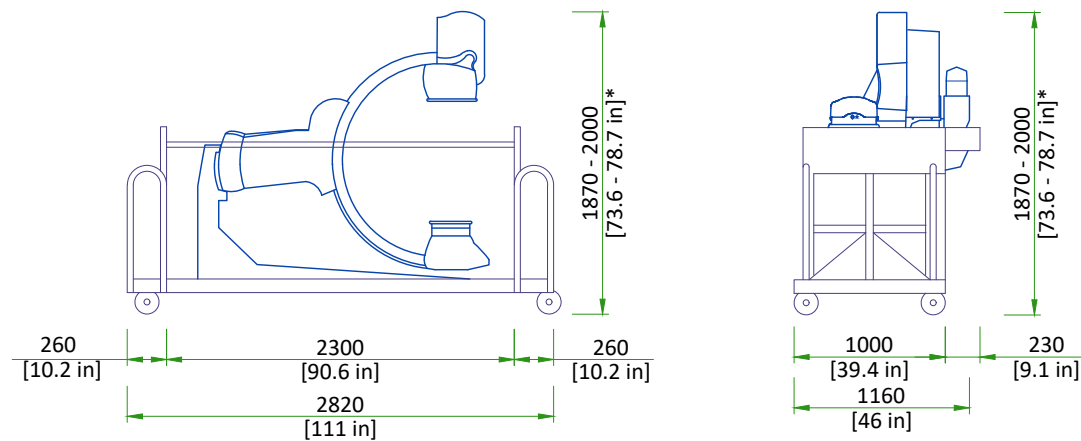
RECOMMENDED AREA IN THE TECHNICAL ROOM

THE TECHNICAL ROOM NEED EXTRA SPACE FOR TOOLS AND DOCUMENTATION

- GE recommend an extra area of 2.0 x 1.0 m (78.7 x 39.4 in) for storage of tools and documentation for the system
- This area doesn't need to be inside the technical room, but in a closer space from the system



SHIPPING DOLLY FOR LC GANTRY



SHIPPING WEIGHT: 1060 kg [2337 lb].

DIMENSIONS

	HEIGHT	WIDTH	LENGTH
Full configuration	1870-2000 mm [73.6 - 78.7 in]*	1230 mm [48.4 in]	2820 mm [111.0 in]
Left top handle removed and right top handle inside	1870-2000 mm [73.6 - 78.7 in]*	1160 mm [45.7 in]	2820 mm [111.0 in]
Short lifts configuration	2000 mm [78.7 in]	1160 mm [45.7 in]	2300 mm [90.5 in]
NOTE	* Height can be adjusted: ONLY when necessary on delivery path and IF floor rolling surface is flat and leveled (no obstacle), Dolly can be lowered down by 120-130 mm (it means dolly horizontal bars are at 10 mm from floor surface, to prevent any damage on gantry).		

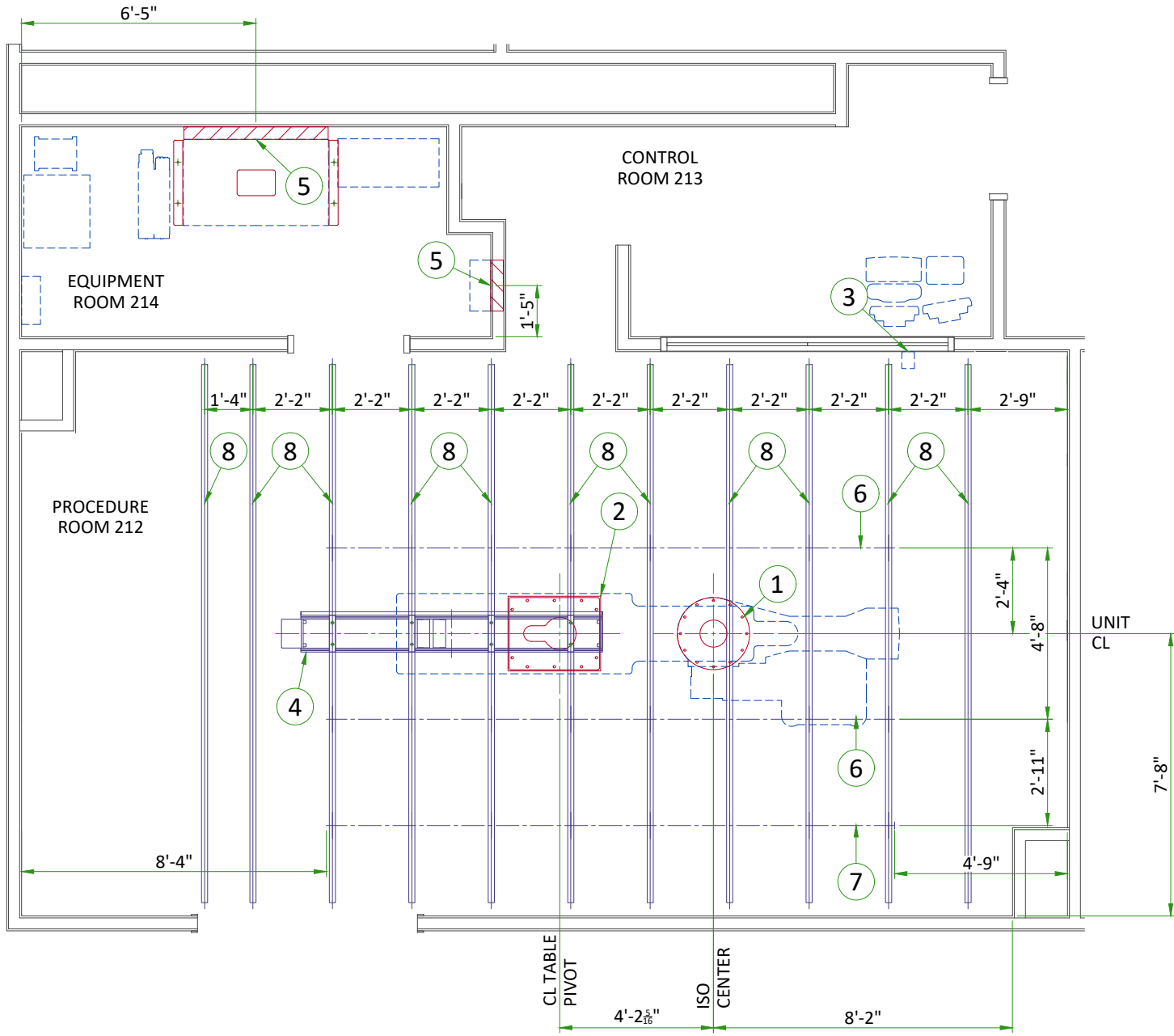
SCALE 1:50

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STRUCTURAL NOTES

- All steel work and parts necessary to support ceiling mounted tube hanger or other equipment are to be supplied by the customer or his contractors. The unistrut or equivalent structure should run continuous with no fittings extending below face of unistrut channel, run wall to wall, be parallel, square and in the same horizontal plane flush with finished ceiling. The system is to be cross braced vertically, horizontally and diagonally to allow no movement and a maximum of 1,58mm(1/16") deflection. (10) 12,7mm (1/2") dia. X 38,1mm (1 1/2") long bolts with unistrut 12,7mm (1/2") nuts with springs are to be provided by customer or his contractors for each stationary and auxillary support rail. Closure strips shall be provided for areas of unistrut exposed and without mounting units.
- Methods of support for the steelwork that will permit attachment to structural steel or through bolts in concrete construction should be favored. Do not use concrete or masonry anchors in direct tension.
- All units that are wall mounted or wall supported are to be provided with supports where necessary. Wall supports are to be supplied and installed by the customer or his contractors. See plan and detail sheets for suggested locations and mounting hole locations.
- All ceiling mounted fixtures, air vents, sprinklers, etc. To be flush mounted, or shall not extend more than 6,35mm (1/4") below the finished ceiling.
- Control walls with tube hanger passage above shall be constructed to 2130mm (7'-0") high.
- Floor slabs on which equipment is to be installed must be level to 3,17mm (1/8") in 3050mm (10'-0")
- Minimum floor thickness of 203mm (8").
- Dimensions are to finished surfaces of room.
- Customers contractor must provide all penetrations in post tension floors.
- Customers contractor must provide and install any non-standard anchoring. Documents for standard anchoring methods are included with GE equipment drawings for geographic areas that require such documentation.
- Customers contractor must provide and install hardware for "through the floor" anchoring and/or any bracing under access floors. This contractor must also provide floor drilling that cannot be completed because of an obstruction encountered while drilling by the GE installer such as rebar etc.
- It is the customer's responsibility to perform any floor or wall penetrations that may be required. The customer is also responsible for ensuring that no subsurface utilities (e.g., electrical or any other form of wiring, conduits, piping, duct work or structural supports (i.e. post tension cables or rebar)) will interfere or come in contact with subsurface penetration operations (e.g. drilling and installation of anchors/screws) performed during the installation process. To ensure worker safety, GE installers will perform surface penetration operations only after the customer's validation and completion of the "GE surface penetration permit"

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STRUCTURAL LAYOUT ITEM LIST

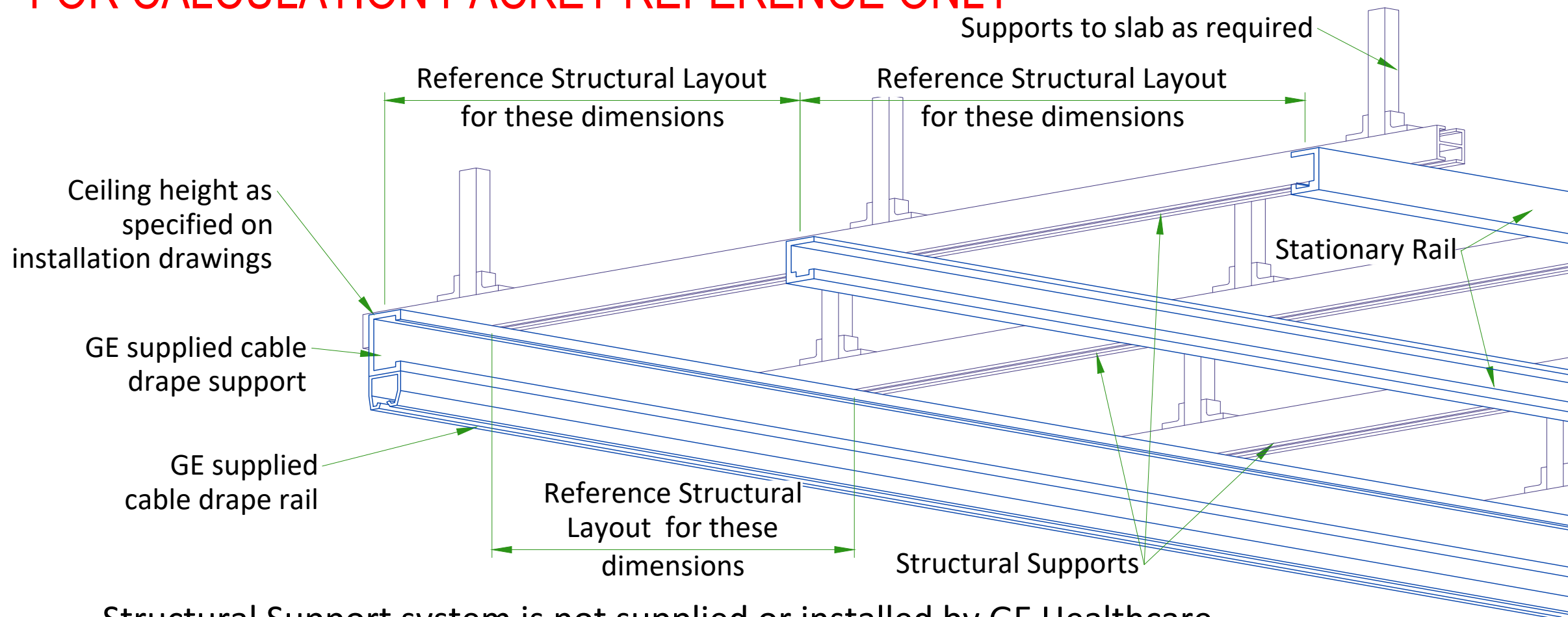
(GE SUPPLIED / CONTRACTOR INSTALLED)

1	Area occupied by GE supplied positioner baseplate
2	Area occupied by GE supplied table baseplate
3	Mount X-Ray buzzer bracket on wall above ceiling
(CUSTOMER SUPPLIED / CONTRACTOR INSTALLED)	
4	Area of radiation shield mounted to unistrut grid in ceiling
5	Support backing, locate as shown.
6	Stationary rails attached to gridded support in ceiling.
7	Cable drape rail attached to gridded support in ceiling.
8	Structural support in ceiling for fastening ceiling supported equipment. Supports to run continuous with no fittings extending below face of channel, run wall to wall, be parallel, square, and in the same horizontal plane, flush with the finished ceiling. Rails are mounted to these supports every 2'-2" and require 350 lbs. (597 lbs. In seismic regions) per bolt load. Methods of support that permit attachment to structural steel or through bolts in concrete should be favored. Do not use screw anchors in direct tension.

IF ACCESS IS NOT READILY AVAILABLE IT IS RECOMMENDED TO PROVIDE A TRAPDOOR IN THE CEILING TO ALLOW SERVICE ACCESS FOR CABLE MANAGEMENT.

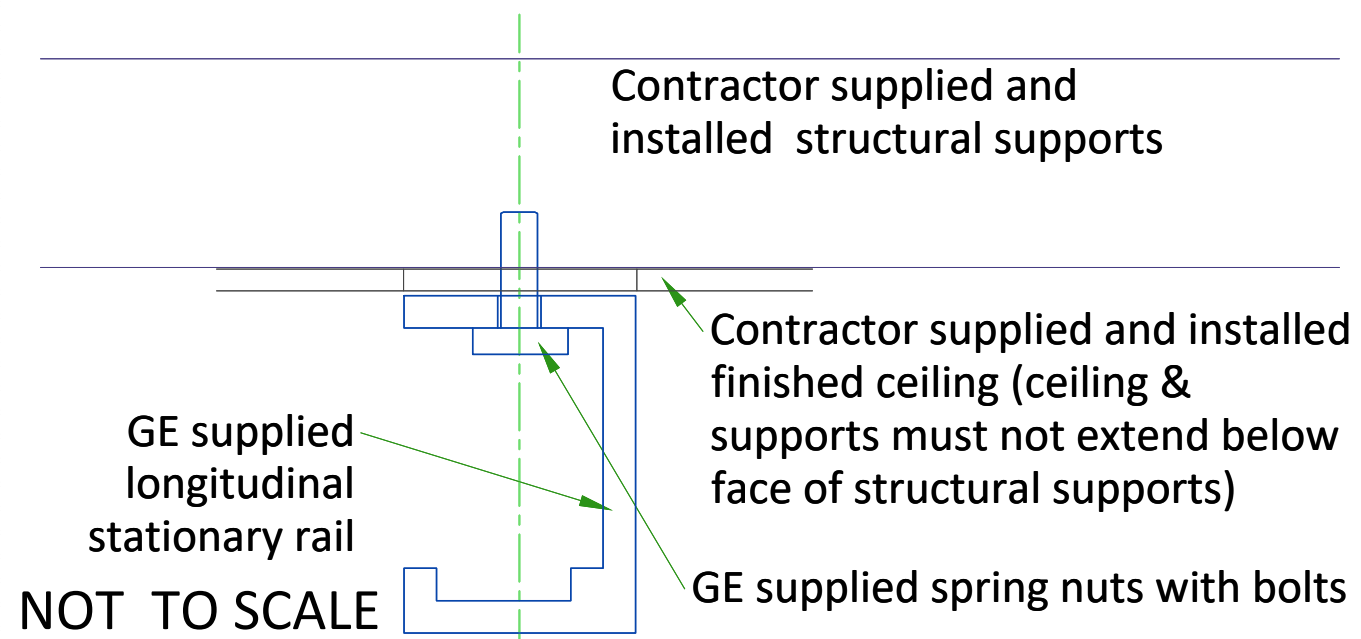
XT RADIOGRAPHIC SUSPENSION, INBOARD MOUNTING

FOR CALCULATION PACKET REFERENCE ONLY



Structural Support system is not supplied or installed by GE Healthcare

DETAIL 1



DETAIL 2

