



March 22, 2023

Mr. Ryan Estrada  
K2 Systems LLC  
4665 North Avenue, Suite I  
Oceanside, CA 92056

Re: PV Tilt Up Rack System  
Creation of Span Tables  
Various Locations in the USA

LEI Project No: 21220004.003

Dear Mr. Estrada:

Pursuant to your request, Larson Engineering, Inc. (LEI) has performed a structural analysis of the K2 CrossRail Tilt Up System using the rail type: 44-X, 48-X, 48-XL and 80 for a panel size of 41 inches x 86 inches in Portrait orientation. The purpose of the analysis was to provide tables for the maximum spans and reactions to the roof under various loading conditions.

The analysis was performed in accordance with the following codes and guidelines:

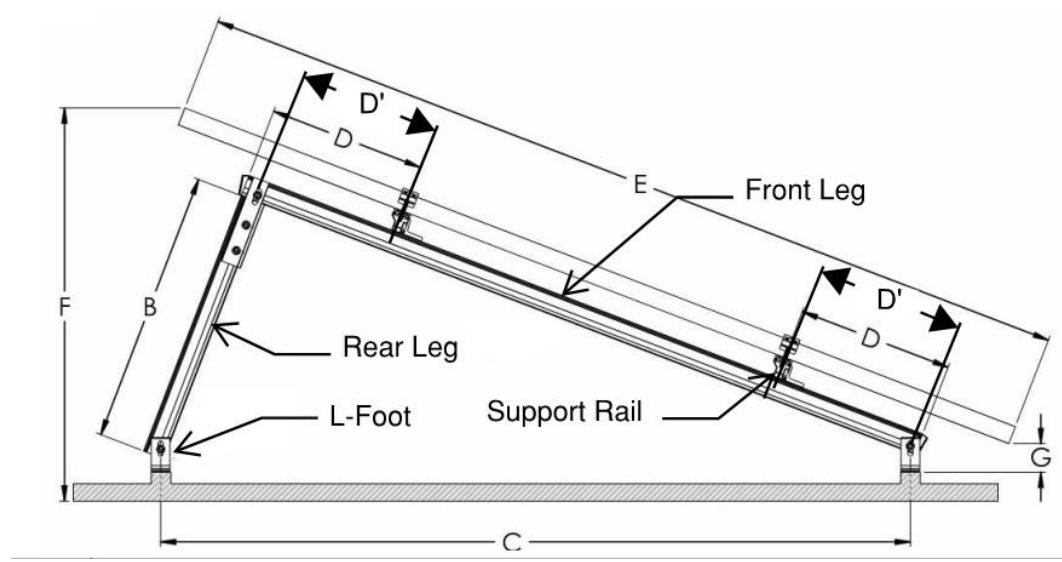
- *ASCE 7-16 Minimum Design Loads for Buildings and Other Structures*, referenced by the International Building Code 2018 and 2021 editions and the International Residential Code 2018 and 2021 editions, 2019 California Building Standards Code and 2022 California Building Standards Code,
- *2015 Aluminum Design Manual* and the *2020 Aluminum Design Manual* by the Aluminum Association,
- *Wind Design for Low-Profile Solar Photovoltaic Arrays on Flat Roofs Report SEAOC PV2-2012* dated August 2012 by the Structural Engineers Association of California (SEAOC), portions of this are referenced in ASCE 7-16, chapter 29.

The rail system used 6000 series aluminum alloy with a minimum yield strength of 34.8ksi. Section properties for each rail system was provided by K2 Systems, LLC.

### **DESCRIPTION**

The K2 CrossRail Tilt Up System consists of extruded aluminum PV support rails that span between an L-shaped support consisting of two (2) members, the front leg and the rear leg, whose lengths can be adjusted as required to vary the tilt angle of the panels. The front and rear legs are constructed of the same type of rail as the PV support rails. They are connected to one another using plates with screws to form a 90 degree triangle and each leg is attached to the roof using an L-foot. The PV support rails connect to the front leg with angle attachments. The PV panels connect to the PV support rails using a clamp. Attachment of the Tilt Up System to the existing roof shall be the responsibility of the installer and is required to be analyzed by a registered professional or structural engineer.

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**Figure 1 Typical Configuration** (refer to K2 CrossRail Tilt Up System Assembly Instructions)

### **METHODS AND DESIGN PARAMETERS**

Load combinations were provided in accordance with the ASCE 7-16 guidelines based on the assumption that the rail is a single span condition or multi-span condition and using an allowable deflection of 1/120. Wind pressure was determined in accordance with ASCE 7-16 chapter 26 and ASCE 7-16 section 29.4.3 “Rooftop Solar Panels for Buildings of all Heights with Flat Roofs or Gable or Hip Roofs with slopes less than 7°” whose tilt angles are less than 35°.

The snow loads indicated in the tables are based on a flat roof snow load. The snow load applied to the system may be adjusted with the tilt angle in accordance with sloped roof snow loads. The appropriate ground snow loads should be determined in accordance with the ground snow load maps in ASCE 7-16 or per the local building code.

The following table shows the equivalent ground snow value associated with the flat snow load shown in the span and reaction tables assuming  $C_t=1.0$ ,  $C_e=1.0$ ,  $I=1.0$ .

Determine Equivalent Ground Snow for indicated flat snow (psf)

P <sub>f</sub> , flat snow (psf)	10	20	30	40	50	60	70
P <sub>g</sub> , ground snow (psf)	14.3	28.5	42.8	57.2	71.4	85.7	100

Seismic criteria were considered per the provisions of ASCE 7-16, chapter 13. Seismic effects did not govern the capacity of this system.

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The following design parameters were used for the purpose of this analysis:

<u>General</u>	<u>Wind</u>	<u>Snow</u>	<u>Seismic</u>
Risk Category: II	V, ult: 90 - 180 mph	Flat snow pf: 0 - 70 psf	Site Class: D
Roof Mean Height: <= 30 ft	Exposures: B, C & D	Ce: 1.0	Design Category: A-E
Roof Slope: 0° to 7 °	Pressure Zones: 1, 2 & 3	Ct: 1.0	Ss:<=2.0
Panel Slope: 7° to 25° (from ground)		Cs: Varies	S1:<=1.25
Panel Orientation: <b>See Charts</b>		Is: 1.0	Ip: 1.0
Panel Size: <b>See Charts</b>			ap: 1.0
			Rp: 1.5

## **DESIGN RESULTS**

The allowable span lengths of the system are controlled by applicable wind and snow load combinations. The reaction loads provided in the tables are only applicable to the corresponding span lengths provided. Reaction loads shown are based on the worst case of the front and rear mounting brackets. Reactions may be scaled linearly where shorter spans are used. The reactions shown for Multi Span assumes an interior support location. The maximum span length may be limited due to the capacity of the support rail, the capacity of the front leg to resist the reaction load from the support rail, or the capacity of the L-foot connection.

The following tables are provided for each exposure category, B, C & D for Interior and Edge Multi-Span Conditions in the **Portrait** Orientation:

Maximum Span Length (Inches) Multi Span Only, Tables 1.1, 1.1A, 2.1, 2.1A, 3.1, 3.1A  
 Maximum Downward Force (lbs) Multi Span Only, Tables 1.2, 1.2A, 2.2, 2.2A, 3.2, 3.2A  
 Maximum Horizontal Force (lbs) Multi Span Only, Tables 1.3, 1.3A, 2.3, 2.3A, 3.3, 3.3A  
 Maximum Uplift Force (lbs) Multi Span Only. Tables 1.4, 1.4A, 2.4, 2.4A, 3.4, 3.4A  
 Maximum Span Length (Inches) Single Span Only, Tables 1.5, 1.5A, 2.5, 2.5A, 3.5, 3.5A  
 Maximum Downward Force (lbs) Single Span Only, Tables 1.6, 1.6A, 2.6, 2.6A, 3.6, 3.6A  
 Maximum Horizontal Force (lbs) Single Span Only, Tables 1.7, 1.7A, 2.7, 2.7A, 3.7, 3.7A  
 Maximum Uplift Force (lbs) Single Span Only. Tables 1.8, 1.8A, 2.8, 2.8A, 3.8, 3.8A

Figures 2 & 3 define the roof zones per ASCE 7-16 Figure 29.4-1 and are referenced in the attached Tables for Interior and Edge Conditions. Figure 4 defines the array edge factors used for wind uplift. The Edge Condition tables should be applied to the north and south rows and to the spans that occur within 1.5 panel lengths of the east and west edges as defined in Figure 4.

The following notations should be applied to Figures 2 through 4.

d1: Horizontal distance orthogonal to the panel edge to an adjacent panel or building edge.

d2: Horizontal distance orthogonal from the edge of one panel to the nearest edge in the next row.

h: Mean Roof Height.

WL=Width of a Building on its longest side.

Ws=Width of a Building on its shortest side.

Lp: Panel Length.

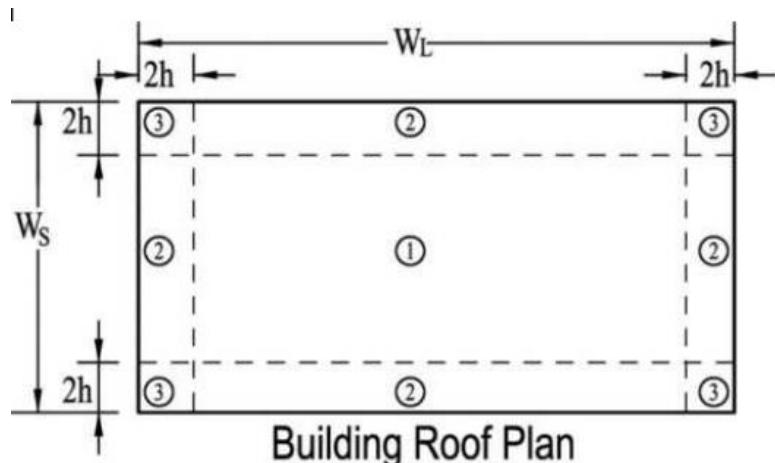


Figure 2. ASCE 7-16 Figure 29.4-7 shows the Building Roof Plan defining the roof zones.

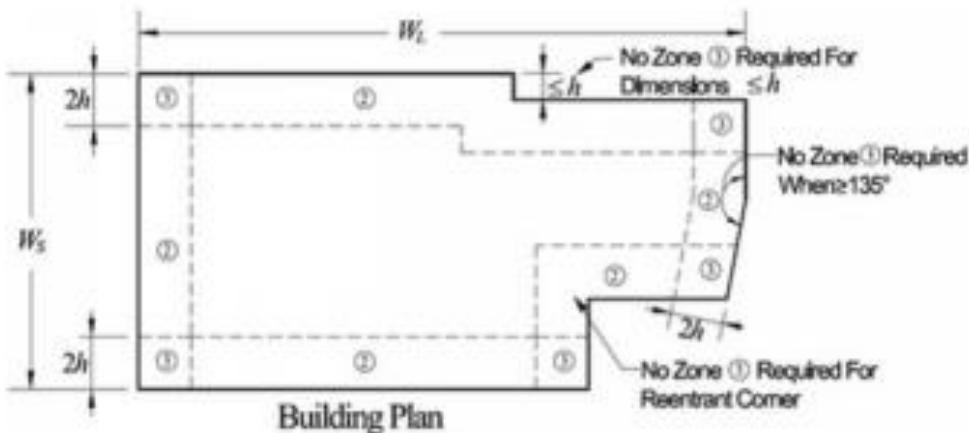


Figure 3. ASCE 7-16 Figure C29.4-1 shows a sketch of Building with Irregular Plan Dimensions

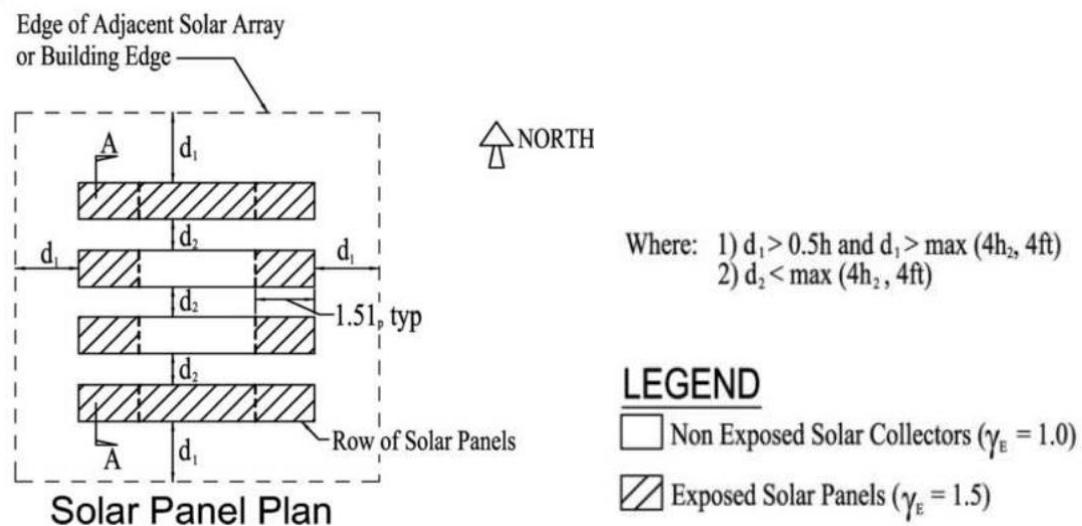


Figure 4. ASCE 7-16 Figure 29.4-7 Array Edge Factors

## **INSTALLATION & CONFIGURATION NOTES**

The following guidelines apply to all installations using the K2 CrossRail Tilt Up System product line:

- Refer to Tilt Up Kit allowable geometry and installation guidelines by K2 Systems, LLC,
- All fasteners and connective hardware shall be installed per manufacturer specifications,
- The support rails shall be placed no further from the center of the L-Foot or Rear leg than 6", see dimension D' on Figure 1,
- This analysis is limited to installations south of any roof ridge, if present. On pitched roofs the northern most row of panels should be located between 3' and 12' from the ridge,
- Span tables assume (2) two independent horizontal support rails per panel. Rails shall be located no further than 8" from cut end of diagonal member (refer to Figure 1),
- High edge of panel not to exceed 30" from roof surface,
- Maximum end cantilever of horizontal support rail shall not exceed one-third (1/3) of allowable span in the roof wind pressure zone,
- Rails shall be continuous over a minimum of two (2) supports unless using an approved K2 Structural Splice,
- Installations over roof overhangs or within 12" of any roof edge is not advised,
- Observe all local jurisdictional requirements regarding roof setback requirements.

## **SUMMARY**

This assessment has provided design validation for code compliant installations of the K2 CrossRail Tilt Up System in the state noted in the stamp below. Local jurisdictions shall be consulted for the proper code requirements. For the configurations and design loadings noted previously, the attached span tables represent maximum span lengths based on allowable stresses and deflection criteria. For all other configurations, refer to K2 Systems, LLC for engineering support.

This report does not provide analysis of any existing structures to support the loading imposed by the K2 CrossRail Tilt Up System, as may be required by the local authority having jurisdiction.

If you have any further questions regarding this matter, please feel free to contact our office.

Sincerely,  
**Larson Engineering, Inc.**

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CAW:ng

Attachments: Tables as indicated above



K2 Systems, LLC

PV Tilt Up Kit Solar PV Mount System

Standard size 41"x 86" Portrait Orientation

Table 1.1 Max Length L (inches) for Multi Span only Interior Conditions

Exp B	Ultimate Wind Speed, V (mph)	Rail Type	Roof Wind Pressure Zone 1							Roof Wind Pressure Zone 2							Roof Wind Pressure Zone 3									
			Roof Snow Load (psf)							Roof Snow Load (psf)							Roof Snow Load (psf)									
			0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70
90	44-X	73	58	42	30	23	0	0	0	57	50	38	30	0	0	0	0	49	45	35	29	0	0	0	0	0
	48-X	74	59	42	30	23	0	0	0	58	51	39	30	0	0	0	0	50	46	36	29	0	0	0	0	0
	48-XL	156	112	78	55	42	34	29	25	122	102	72	55	42	34	29	25	105	96	69	54	42	34	29	25	25
	80	202	145	100	70	54	44	37	32	158	131	93	70	54	44	37	32	136	124	89	70	54	44	37	32	32
	44-X	63	53	40	30	0	0	0	0	48	45	35	28	0	0	0	0	42	40	32	0	0	0	0	0	0
	48-X	64	54	40	30	0	0	0	0	49	45	35	29	0	0	0	0	42	41	33	0	0	0	0	0	0
100	48-XL	133	105	74	55	42	34	29	25	103	94	68	53	42	34	29	25	89	85	65	51	42	34	29	25	25
	80	173	135	95	70	54	44	37	32	134	120	88	68	54	44	37	32	115	110	84	66	54	44	37	32	32
	44-X	54	48	37	30	0	0	0	0	41	40	32	0	0	0	0	0	35	34	29	0	0	0	0	0	0
	48-X	55	49	38	29	0	0	0	0	42	41	32	0	0	0	0	0	36	35	0	0	0	0	0	0	0
110	48-XL	115	98	70	54	42	34	29	25	89	85	64	50	42	34	29	25	75	73	61	49	40	34	29	25	25
	80	149	125	90	70	54	44	37	32	115	110	82	65	54	44	37	32	98	95	78	62	52	44	37	32	32
	44-X	47	44	34	28	0	0	0	0	36	35	29	0	0	0	0	0	30	30	0	0	0	0	0	0	0
120	48-X	48	44	35	0	0	0	0	0	37	36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	100	91	67	52	42	34	29	25	76	74	60	48	40	34	29	25	65	63	56	46	38	33	29	25	25
	80	130	117	86	67	54	44	37	32	99	96	77	62	51	44	37	32	84	82	73	59	49	42	37	32	32
	44-X	41	40	32	0	0	0	0	0	31	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
130	48-X	42	41	32	0	0	0	0	0	32	31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	88	84	63	50	41	34	29	25	67	65	56	45	38	33	29	25	56	55	51	43	36	32	28	25	25
	80	114	108	81	64	53	44	37	32	86	84	72	58	49	42	37	32	73	72	66	56	47	41	36	32	32
	44-X	36	35	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
140	48-X	37	36	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	78	76	60	48	40	34	29	25	58	57	52	43	36	32	28	25	49	48	47	41	35	30	27	0	0
	80	101	98	77	61	51	44	37	32	76	74	68	55	47	41	36	32	64	63	60	52	45	39	34	31	31
	44-X	32	32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
150	48-X	33	32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	69	67	56	46	38	33	29	25	52	51	48	41	35	30	27	24	43	43	42	38	33	29	26	0	0
	80	89	87	72	59	49	42	37	32	67	66	62	52	45	39	35	31	56	55	54	49	42	37	33	30	30
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
160	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	62	60	53	43	37	32	28	25	46	45	44	38	33	29	26	0	39	38	37	35	31	28	0	0	0
	80	80	78	68	56	47	41	36	32	59	59	57	50	43	37	33	30	50	49	48	45	40	35	32	29	29
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
170	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	55	54	50	41	35	31	27	24	41	40	40	36	32	28	0	0	34	34	33	32	29	0	0	0	0
	80	65	63	61	51	44	38	34	30	48	47	46	44	39	34	31	28	40	40	39	38	36	32	29	29	0
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
180	48-X	39	38	37	35	33	31	30	28	33	33	32	32	30	29	28	27	30	30	30	29	27	27	26	0	0
	48-XL	50	49	47	39	34	30	26	0	37	36	36	34	30	0	0	0	31	31	30	30	0	0	0	0	0
	80	65	63	61	51	44	38	34	30	48	47	46	44	39	34	31	28	40	40	39	38	36	32	29	29	0

Note: The Length is based on use of at least two spans. Cantilevered ends may be used that are no greater than 1/3 of the backspan.

See SEAOC PV-2 2012 for definition of Roof Zones

Larson Engineering Inc

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K2 Systems, LLC

PV Tilt Up Kit Solar PV Mount System

Standard size 41"x 86" Portrait Orientation

Table 1.1A Max Length L (inches) for Multi Span only Exterior Conditions

Exp B	Ultimate Wind Speed, V (mph)	Rail Type	Roof Wind Pressure Zone 1							Roof Wind Pressure Zone 2							Roof Wind Pressure Zone 3										
			Roof Snow Load (psf)							Roof Snow Load (psf)							Roof Snow Load (psf)										
			0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	
90	44-X	67	57	39	28	21	0	0	0	46	46	37	28	0	0	0	0	37	37	35	27	0	0	0	0	0	
	48-X	71	56	39	27	21	0	0	0	51	49	36	27	0	0	0	0	41	41	34	27	0	0	0	0	0	
	48-XL	153	117	81	57	44	35	30	26	120	105	75	57	44	35	30	26	102	95	72	56	44	35	30	26	26	
	80	192	153	109	77	59	48	40	35	151	132	100	77	59	48	41	35	130	119	93	76	59	48	40	35	35	
	44-X	53	53	38	28	0	0	0	0	36	36	35	27	0	0	0	0	30	30	30	0	0	0	0	0	0	
100	48-X	58	52	37	27	0	0	0	0	40	40	34	26	0	0	0	0	33	33	31	0	0	0	0	0	0	
	48-XL	131	109	77	57	44	35	30	26	100	94	71	55	44	35	30	26	81	81	67	53	44	35	30	26	26	
	80	165	139	104	77	59	48	40	35	128	118	92	75	59	48	41	35	108	105	84	70	59	48	40	35	35	
	44-X	42	42	36	28	0	0	0	0	30	30	30	0	0	0	0	0	24	24	24	0	0	0	0	0	0	
110	48-X	46	35	27	0	0	0	0	0	33	33	31	0	0	0	0	0	27	27	0	0	0	0	0	0	0	0
	48-XL	113	101	73	56	44	35	30	26	81	81	67	52	43	35	30	26	66	66	61	50	42	35	30	26	26	
	80	143	127	97	76	59	48	40	35	108	105	84	70	59	48	41	35	88	88	76	65	56	48	40	35	35	
	44-X	35	35	34	26	0	0	0	0	25	25	25	0	0	0	0	0	20	20	0	0	0	0	0	0	0	0
120	48-X	38	38	33	0	0	0	0	0	27	27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	96	92	69	54	44	35	30	26	67	67	61	50	41	35	30	26	55	55	55	47	40	34	30	26	26	
	80	124	115	90	73	59	48	40	35	90	90	77	65	56	48	41	35	73	73	69	60	52	46	40	35	35	
	44-X	29	29	29	0	0	0	0	0	21	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
130	48-X	42	41	32	0	0	0	0	0	32	31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	81	81	66	52	43	35	30	26	57	57	56	47	40	34	30	26	47	47	47	44	38	33	29	26	26	
	80	107	105	84	70	58	48	40	35	76	76	71	60	53	46	41	35	62	62	62	55	48	43	39	35	35	
	44-X	36	35	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
140	48-X	28	28	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	69	69	62	50	41	35	30	26	49	49	49	45	38	33	29	26	40	40	40	40	36	31	28	0	0	
	80	92	92	78	66	56	48	40	35	65	65	65	56	49	44	39	35	53	53	53	51	45	41	37	34	34	
	44-X	22	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
150	48-X	24	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	59	59	57	47	40	34	30	26	42	42	42	41	36	32	28	25	35	35	35	33	30	27	0	0	0	
	80	79	79	72	62	54	46	40	35	56	56	56	52	46	42	38	34	46	46	46	42	38	35	32	32	32	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
160	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	52	52	52	45	38	33	29	26	37	37	37	34	30	27	0	30	30	30	30	30	28	0	0	0	0	
	80	69	69	67	58	51	45	40	35	49	49	49	48	43	39	36	33	40	40	40	40	39	36	33	30	30	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
170	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	46	46	46	43	37	32	28	25	33	33	33	33	32	29	0	0	27	27	27	27	27	0	0	0	0	0
	80	54	54	54	51	45	41	37	33	39	39	39	39	38	35	32	30	32	32	32	32	32	31	29	0	0	0
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
180	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	40	40	40	40	35	31	27	0	29	29	29	29	29	0	0	0	24	24	24	24	0	0	0	0	0	0
	80	54	54	54	51	45	41	37	33	39	39	39	39	38	35	32	30	32	32	32	32	32	31	29	0	0	0

Note: The Length is based on use of at least two spans. Cantilevered ends may be used that are no greater than 1/3 of the backspan.

See SEAOC PV-2 2012 for definition of Roof Zones

Larson Engineering Inc

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K2 Systems, LLC

PV Tilt Up Kit Solar PV Mount System

Standard size 41"x 86" Portrait Orientation

Table 1.2 Maximum Downward Force (lbs) Multi Span Only Interior Conditions

Exp B	Ultimate Wind Speed, V (mph)	Rail Type	Roof Wind Pressure Zone 1							Roof Wind Pressure Zone 2							Roof Wind Pressure Zone 3									
			Roof Snow Load (psf)							Roof Snow Load (psf)							Roof Snow Load (psf)									
			0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70
90	44-X	240	271	293	295	296	0	0	0	241	258	281	295	0	0	0	0	242	249	272	287	0	0	0	0	0
	48-X	244	276	291	292	292	0	0	0	246	263	287	292	0	0	0	0	247	254	277	293	0	0	0	0	0
	48-XL	511	525	537	539	539	539	539	539	515	528	538	539	539	541	539	516	529	539	540	539	539	539	539	539	
	80	663	675	690	693	693	694	694	694	667	679	692	693	693	694	696	669	681	693	695	693	694	694	694	694	
	44-X	241	265	287	295	0	0	0	0	242	252	275	289	0	0	0	0	243	247	265	0	0	0	0	0	0
	48-X	245	270	291	292	0	0	0	0	247	257	280	291	0	0	0	0	248	252	270	0	0	0	0	0	0
100	48-XL	513	527	538	539	539	539	539	539	516	530	539	538	539	541	539	518	526	540	541	539	539	539	539	539	
	80	665	678	692	693	693	694	694	694	669	682	693	693	694	696	694	671	682	694	696	693	694	694	694	694	
	44-X	241	260	282	295	0	0	0	0	243	247	269	0	0	0	0	243	239	258	0	0	0	0	0	0	0
	48-X	246	265	287	291	0	0	0	0	248	252	274	0	0	0	0	248	244	0	0	0	0	0	0	0	0
	48-XL	515	179	212	238	263	292	318	343	198	193	225	250	272	293	319	343	216	211	230	258	279	299	318	343	
	80	668	680	693	691	693	694	694	694	671	684	695	693	691	694	696	673	662	696	697	692	694	694	694	694	
110	44-X	242	256	277	290	0	0	0	0	243	240	263	0	0	0	0	244	238	0	0	0	0	0	0	0	0
	48-X	247	261	282	0	0	0	0	0	248	245	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	517	531	539	538	539	539	539	539	519	512	541	539	538	539	541	539	520	509	539	542	539	538	539	539	
	80	670	683	694	692	693	694	694	694	673	664	696	694	692	694	696	674	659	697	698	693	692	694	694	694	
	44-X	243	252	272	0	0	0	0	0	244	238	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	248	257	277	0	0	0	0	0	249	243	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
120	48-XL	518	532	540	539	537	539	539	539	520	508	542	540	539	538	541	539	521	511	528	543	540	539	538	539	
	80	671	685	695	693	692	694	694	694	674	659	697	695	693	692	696	694	676	662	684	699	694	693	692	694	
	44-X	243	242	268	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	248	247	273	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	519	517	541	539	538	538	539	539	521	510	541	541	540	539	538	539	522	513	526	544	540	539	538	0	
	80	673	670	696	694	692	692	694	694	675	661	698	696	694	693	692	694	677	665	682	700	695	694	693	692	
130	44-X	244	238	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	249	243	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	520	507	542	540	539	538	539	539	522	512	532	542	540	539	538	538	523	515	518	536	541	540	539	0	
	80	674	658	697	695	693	692	694	694	676	664	690	697	695	694	693	692	677	667	671	695	696	695	694	693	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
140	48-XL	521	507	542	541	539	538	538	539	522	512	532	542	540	539	538	538	523	515	518	536	541	540	539	0	
	80	675	660	698	696	694	693	692	694	677	666	679	698	696	695	693	692	677	667	671	695	696	695	694	693	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	520	507	542	540	539	538	539	539	522	512	532	542	540	539	538	538	523	515	518	536	541	540	539	0	
	80	674	658	697	695	693	692	694	694	676	664	690	697	695	694	693	692	677	667	671	695	696	695	694	693	
160	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	521	509	542	541	539	538	538	539	522	514	524	542	541	540	539	0	523	516	505	527	542	541	0	0	
	80	675	660	698	696	694	693	692	694	677	666	679	698	696	695	693	692	678	669	655	683	697	696	694	693	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
170	48-XL	521	511	543	541	540	539	538	538	523	515	511	543	542	540	0	524	517	508	526	539	0	0	0	0	
	80	676	663	699	697	695	693	692	692	678	668	662	699	697	695	694	693	679	670	658	682	698	696	695	694	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	522	513	540	542	541	540	539	0	523	516	506	535	542	0	0	0	524	518	510	522	0	0	0	0	0
	80	676	665	700	697	696	694	693	692	678	669	656	693	698	696	695	694	679	672	660	677	688	697	696	695	
180	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	522	513	540	542	541	540	539	0	523	516	506	535	542	0	0	0	524	518	510	522	0	0	0	0	0



## K2 Systems, LLC

PV Tilt Up Kit Solar PV Mount System

Standard size 41"x 86" Portrait Orientation

**Table 1.2A Maximum Downward Force (lbs) Multi Span Only Exterior Conditions**

Exp B	Ultimate Wind Speed, V (mph)	Rail Type	Roof Wind Pressure Zone 1							Roof Wind Pressure Zone 2							Roof Wind Pressure Zone 3										
			Roof Snow Load (psf)							Roof Snow Load (psf)							Roof Snow Load (psf)										
			0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	
90	44-X	220	266	272	274	274	0	0	0	194	239	273	274	0	0	0	0	183	206	273	274	0	0	0	0	0	
	48-X	234	261	267	268	268	0	0	0	213	252	267	268	0	0	0	0	201	226	266	268	0	0	0	0	0	
	48-XL	504	546	558	560	561	561	561	561	507	543	559	560	561	561	563	561	502	522	560	562	561	561	561	561	561	
	80	633	714	756	759	760	760	760	760	637	682	742	759	760	760	763	760	639	656	718	757	760	760	760	760	760	
	44-X	202	264	273	274	0	0	0	0	182	206	274	273	0	0	0	0	173	183	246	0	0	0	0	0	0	0
100	48-X	222	259	267	268	0	0	0	0	200	227	268	267	0	0	0	0	190	201	259	0	0	0	0	0	0	0
	48-XL	506	548	559	560	561	561	561	561	499	530	560	559	561	561	563	561	475	502	556	562	561	561	561	561	561	
	80	635	700	757	759	760	760	760	760	639	666	725	758	760	760	763	760	634	651	699	738	760	760	760	760	760	
	44-X	189	230	273	273	0	0	0	0	173	184	250	0	0	0	0	0	166	168	216	0	0	0	0	0	0	0
	48-X	208	252	268	267	0	0	0	0	190	201	263	0	0	0	0	0	183	185	0	0	0	0	0	0	0	0
110	48-XL	507	546	560	559	561	561	561	561	475	503	561	560	559	561	563	561	456	461	543	563	559	561	561	561	561	
	80	637	687	744	757	760	760	760	760	633	653	709	747	757	760	763	760	608	615	682	721	750	760	760	760	760	
	44-X	180	205	274	273	0	0	0	0	167	169	222	0	0	0	0	0	161	161	0	0	0	0	0	0	0	0
	48-X	198	225	268	0	0	0	0	0	183	186	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	494	537	561	559	561	561	561	561	458	464	553	561	560	561	563	561	442	442	529	561	560	559	561	561	561	
120	80	639	675	731	758	760	760	760	760	610	618	695	732	758	760	763	760	590	667	705	733	756	760	760	760	760	
	44-X	173	186	252	0	0	0	0	0	162	162	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	190	204	266	0	0	0	0	0	178	178	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	474	510	562	560	559	561	561	561	444	444	542	562	560	559	563	561	432	432	482	549	561	560	559	561	561	
	80	632	664	718	754	757	760	760	760	592	592	681	718	745	758	763	760	575	575	642	690	718	740	758	760	760	
130	44-X	168	171	228	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	184	188	250	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	459	470	562	561	560	560	561	561	434	434	503	561	561	560	559	561	423	423	452	534	560	561	560	0	0	
	80	612	627	706	742	758	758	760	760	579	579	669	705	732	753	758	760	564	564	602	676	704	726	745	758	758	
	44-X	163	163	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
140	48-X	179	179	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	448	448	554	562	560	559	561	561	426	426	466	551	562	561	560	559	416	416	429	492	550	562	561	0	0	
	80	597	597	695	731	757	758	760	760	568	568	621	693	719	741	758	755	555	571	656	691	713	731	747	0	0	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
160	48-XL	438	438	529	562	561	560	559	561	419	419	438	519	563	561	561	0	411	411	458	526	557	0	0	0	0	
	80	584	584	686	720	746	759	758	760	559	559	584	682	708	729	746	759	548	548	548	611	678	700	719	734	0	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	430	430	495	563	562	561	560	559	414	414	420	485	554	562	0	0	407	407	437	490	0	0	0	0	0	
170	80	574	574	659	710	735	756	758	757	552	552	559	647	697	718	735	750	542	542	542	582	654	688	707	722	0	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	424	424	466	556	562	561	560	0	409	409	409	457	522	0	0	0	403	403	403	419	0	0	0	0	0	
	80	565	565	621	700	726	746	748	758	546	546	546	609	687	707	725	740	537	537	537	559	614	677	695	0	0	

Note: The Reactions shown in the tables above account for reactions associated with the exterior support of a multi span condition. See Max length for Multi Span Only for corresponding span length.

See SEAOC PV-2 2012 for definition of Roof Zones

**Larson Engineering Inc**

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K2 Systems, LLC

PV Tilt Up Kit Solar PV Mount System

Standard size 41"x 86" Portrait Orientation

Table 1.3 Maximum Horizontal Force (lbs) Multi span only Interior Conditions

Exp B	Ultimate Wind Speed, V (mph)	Rail Type	Roof Wind Pressure Zone 1							Roof Wind Pressure Zone 2							Roof Wind Pressure Zone 3									
			Roof Snow Load (psf)							Roof Snow Load (psf)							Roof Snow Load (psf)									
			0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70
90	44-X	81	65	47	33	26	0	0	0	89	77	59	46	27	0	0	0	102	84	66	54	32	0	0	0	
		83	66	47	33	25	0	0	0	90	79	60	46	26	0	0	0	104	86	67	55	32	0	0	0	
		174	125	87	61	47	38	32	28	189	157	112	85	65	53	45	38	218	179	130	101	78	64	54	46	
		80	225	161	112	78	60	49	41	36	245	203	144	109	84	68	57	49	283	231	167	130	101	82	69	59
	48-X	86	73	54	41	0	0	0	0	93	85	66	54	0	0	0	0	108	92	74	52	0	0	0	0	
		88	74	55	41	0	0	0	0	94	87	68	55	0	0	0	0	110	94	75	51	0	0	0	0	
100	48-XL	184	59	51	45	40	36	33	31	77	75	67	60	54	50	46	92	86	84	78	71	64	60	56	52	
		80	238	186	131	97	95	60	51	44	256	230	168	130	103	84	71	61	299	255	193	152	125	101	85	73
		44-X	90	80	61	50	0	0	0	96	92	74	52	0	0	0	0	113	100	81	62	0	0	0	0	
		92	82	63	49	0	0	0	0	98	94	75	51	0	0	0	0	115	102	79	62	0	0	0	0	
	48-XL	192	163	117	90	90	57	48	41	205	197	148	117	96	79	66	57	241	205	169	135	112	95	80	69	
		80	249	209	151	116	115	73	61	53	265	255	190	150	124	101	86	74	313	266	218	174	144	122	103	89
110	44-X	93	87	68	56	0	0	0	0	98	96	80	58	0	0	0	0	117	109	85	70	0	0	0	0	
		95	88	69	0	0	0	0	0	100	98	72	0	0	0	0	0	120	111	87	0	0	0	0	0	
		199	180	132	103	107	68	57	49	210	205	165	132	110	94	79	68	250	226	187	152	127	110	95	82	
		80	258	231	170	133	137	87	73	63	272	265	212	169	141	121	102	88	324	290	241	196	164	141	123	106
	48-X	96	92	74	0	0	0	0	0	101	98	77	0	0	0	0	0	121	116	93	0	0	0	0	0	
		98	94	75	0	0	0	0	0	103	100	78	0	0	0	0	0	123	119	95	0	0	0	0	0	
120	48-XL	205	196	147	116	123	79	67	58	215	210	181	147	123	106	93	80	257	246	199	168	142	123	109	96	
		80	265	252	189	149	158	102	86	74	278	272	233	189	158	136	119	103	333	316	258	217	183	158	140	124
		98	96	80	0	0	0	0	0	102	99	83	0	0	0	0	0	123	120	100	0	0	0	0	0	
		100	97	81	0	0	0	0	0	104	101	84	0	0	0	0	0	126	123	102	0	0	0	0	0	
	48-XL	210	204	161	129	137	92	77	67	219	214	196	161	136	118	104	93	263	256	211	184	157	137	121	84	
		80	272	264	207	165	177	118	100	86	283	277	253	207	175	152	134	119	341	332	273	237	201	176	156	140
130	44-X	100	98	0	0	0	0	0	0	104	102	0	0	0	0	0	0	126	123	0	0	0	0	0	0	
		102	100	0	0	0	0	0	0	106	104	0	0	0	0	0	0	128	125	0	0	0	0	0	0	
		214	209	174	141	152	102	89	77	222	218	207	175	149	130	116	104	268	262	219	196	171	150	134	96	
		80	277	270	224	181	195	131	114	99	288	282	268	225	192	168	149	134	348	340	282	254	220	193	172	155
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
160	48-XL	217	212	187	153	166	112	99	87	226	221	215	188	162	142	127	91	273	267	235	206	184	163	124	110	
		80	281	275	241	197	213	144	127	112	293	286	279	242	208	183	163	147	354	346	303	267	237	210	188	170
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-XL	220	216	199	165	180	122	108	97	229	224	219	201	174	154	113	101	276	271	251	215	196	154	136	122	
		80	285	280	257	212	231	157	139	125	297	291	283	258	224	198	177	160	358	351	323	279	254	226	203	185
170	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-X	223	219	210	176	193	132	118	0	231	227	221	209	186	137	122	0	280	275	263	221	190	166	148	0	
		80	288	283	272	227	249	170	151	136	300	295	287	271	239	212	191	173	362	356	341	287	266	241	218	171

Note: The Reactions shown in the tables above account for reactions associated with the exterior support of a multi span condition. See Max length for Multi Span Only for corresponding span length.  
See SEAOC PV-2 2012 for definition of Roof Zones

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## K2 Systems, LLC

PV Tilt Up Kit Solar PV Mount System

Standard size 41"x 86" Portrait Orientation

**Table 1.3A Maximum Horizontal Force (lbs) Multi span only Exterior Conditions**

Exp B	Ultimate Wind Speed, V (mph)	Rail Type	Roof Wind Pressure Zone 1							Roof Wind Pressure Zone 2							Roof Wind Pressure Zone 3								
			Roof Snow Load (psf)							Roof Snow Load (psf)							Roof Snow Load (psf)								
			0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	0	10	20	30	40	50	60
90	44-X	75	64	44	31	24	0	0	0	78	71	57	43	25	0	0	0	94	80	66	51	30	0	0	0
	48-X	79	62	43	30	23	0	0	0	83	75	56	42	24	0	0	0	100	78	64	50	29	0	0	0
	48-XL	171	131	90	63	49	40	33	29	186	162	117	88	68	55	46	40	215	177	135	105	82	66	56	48
	80	215	171	122	86	66	54	45	39	234	203	155	119	92	74	63	54	270	223	173	142	111	90	75	65
	44-X	72	72	52	38	0	0	0	0	75	75	66	51	0	0	0	0	91	91	68	48	0	0	0	0
100	48-X	79	71	51	37	0	0	0	0	83	76	65	50	0	0	0	0	100	89	72	47	0	0	0	0
	48-XL	181	150	106	78	60	49	41	35	191	179	135	105	83	68	57	49	227	189	155	123	101	82	69	59
	80	227	192	144	106	81	66	56	48	244	225	175	143	113	92	77	67	286	243	194	162	137	111	93	80
	44-X	71	71	59	46	0	0	0	0	73	73	68	48	0	0	0	0	89	89	75	58	0	0	0	0
110	48-X	78	78	58	45	0	0	0	0	81	81	72	47	0	0	0	0	97	97	73	56	0	0	0	0
	48-XL	189	168	122	94	73	59	50	43	197	188	154	121	100	82	69	59	238	211	170	141	117	99	83	72
	80	238	211	162	127	99	80	67	58	250	243	194	162	135	111	94	81	299	265	213	180	156	134	113	97
	44-X	69	69	67	52	0	0	0	0	72	72	54	0	0	0	0	87	87	84	66	0	0	0	0	
120	48-X	76	76	66	0	0	0	0	0	79	79	68	0	0	0	0	96	96	83	0	0	0	0	0	0
	48-XL	190	182	137	107	87	70	59	51	198	189	169	137	114	97	82	71	239	228	183	157	132	114	99	85
	80	246	228	179	145	117	95	80	69	256	247	212	179	154	132	112	96	309	287	231	198	173	154	134	116
	44-X	68	68	68	0	0	0	0	0	71	71	51	0	0	0	0	86	86	86	0	0	0	0	0	0
130	48-X	75	75	72	0	0	0	0	0	78	78	75	0	0	0	0	94	94	91	0	0	0	0	0	0
	48-XL	188	188	153	121	100	82	69	60	195	195	181	152	128	110	97	83	236	236	192	170	148	128	113	100
	80	250	244	195	162	135	112	94	81	260	254	228	195	170	149	131	113	314	307	245	214	189	169	153	136
	44-X	68	68	68	0	0	0	0	0	70	70	50	0	0	0	0	85	85	85	0	0	0	0	0	0
140	48-X	74	74	74	0	0	0	0	0	77	77	77	0	0	0	0	93	93	93	0	0	0	0	0	0
	48-XL	186	186	167	134	111	95	80	69	193	193	182	167	142	123	109	96	233	233	210	181	162	142	126	87
	80	247	247	210	177	151	129	109	94	257	257	242	210	185	165	147	130	311	311	264	229	204	184	168	154
	44-X	67	67	0	0	0	0	0	0	70	70	0	0	0	0	0	0	84	84	0	0	0	0	0	0
150	48-X	74	74	0	0	0	0	0	0	77	77	0	0	0	0	0	0	93	93	93	0	0	0	0	0
	48-XL	184	184	178	147	123	106	92	80	191	191	185	178	155	135	120	108	231	231	224	184	173	156	139	100
	80	245	245	224	191	166	144	125	108	255	255	241	224	199	179	163	146	308	308	281	240	218	198	181	167
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
160	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	183	183	183	159	135	117	103	91	190	190	190	180	168	148	132	94	230	230	230	200	179	168	129	114
	80	243	243	237	204	179	158	139	123	253	253	246	236	212	192	175	161	306	306	297	256	231	211	194	180
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
170	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	182	182	182	171	146	127	113	101	189	189	189	179	178	160	117	105	228	228	228	215	183	160	141	127
	80	242	242	242	216	191	171	152	137	252	252	252	239	224	204	187	173	304	304	304	271	240	223	207	192
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
180	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	181	181	181	181	157	137	122	0	188	188	188	188	179	143	127	0	227	227	227	227	197	173	154	0
	80	241	241	241	227	203	183	166	149	251	251	251	238	235	216	199	185	303	303	303	286	255	235	218	187

Note: The Reactions shown in the tables above account for reactions associated with the exterior support of a multi span condition. See Max length for Multi Span Only for corresponding span length.

See SEAOC PV-2 2012 for definition of Roof Zones

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## K2 Systems, LLC

PV Tilt Up Kit Solar PV Mount System

Standard size 41"x 86" Portrait Orientation

**Table 1.4 Max Uplift Force (lbs) Multi span only Interior Conditions**

Exp B	Ultimate Wind Speed, V (mph)	Rail Type	Roof Wind Pressure Zone 1							Roof Wind Pressure Zone 2							Roof Wind Pressure Zone 3									
			Roof Snow Load (psf)							Roof Snow Load (psf)							Roof Snow Load (psf)									
			0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70
90	44-X	-135	-108	-79	-56	-43	0	0	0	-159	-139	-105	-83	0	0	0	0	-171	-157	-122	-100	0	0	0	0	0
		-138	-110	-78	-55	-42	0	0	0	-162	-141	-107	-82	0	0	0	0	-175	-160	-124	-102	0	0	0	0	0
		-288	-209	-144	-101	-78	-63	-53	-46	-339	-283	-201	-152	-117	-95	-80	-69	-365	-333	-241	-188	-146	-118	-99	-86	
		80	-374	-268	-185	-131	-100	-81	-68	-59	-440	-364	-259	-196	-150	-122	-103	-88	-474	-429	-310	-241	-187	-152	-128	-110
		-151	-127	-96	-72	0	0	0	0	-172	-159	-124	-101	0	0	0	0	-183	-176	-141	0	0	0	0	0	0
100	48-X	-154	-130	-97	-72	0	0	0	0	-176	-162	-126	-102	0	0	0	0	-187	-180	-143	0	0	0	0	0	0
		-322	-253	-179	-132	-101	-82	-69	-60	-368	-333	-243	-189	-149	-121	-102	-120	-391	-376	-287	-226	-185	-150	-126	-109	
		80	-418	-326	-230	-170	-131	-106	-89	-77	-477	-428	-312	-243	-192	-156	-132	-154	-507	-487	-369	-291	-238	-193	-163	-140
		-164	-146	-112	-90	0	0	0	0	-183	-176	-141	0	0	0	0	0	-193	-188	-158	0	0	0	0	0	0
		167	-149	-114	-89	0	0	0	0	-187	-180	-144	0	0	0	0	0	-197	-191	0	0	0	0	0	0	0
110	48-XL	-350	-296	-213	-165	-127	-103	-87	-75	-391	-376	-283	-223	-184	-151	-127	-150	-411	-400	-330	-264	-219	-186	-156	-135	
		80	-454	-381	-275	-212	-164	-133	-112	-97	-507	-488	-364	-287	-236	-194	-164	-193	-533	-519	-425	-340	-281	-239	-201	-173
		-175	-162	-127	-104	0	0	0	0	-192	-187	-156	0	0	0	0	0	-200	-196	0	0	0	0	0	0	0
		-178	-165	-130	0	0	0	0	0	-196	-191	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-373	-337	-247	-193	-156	-127	-107	-92	-410	-399	-321	-257	-214	-183	-154	-183	-427	-418	-370	-302	-252	-217	-189	-163	
120	48-XL	80	-483	-433	-318	-249	-201	-163	-137	-118	-531	-517	-414	-330	-275	-235	-198	-235	-554	-541	-478	-388	-324	-279	-243	-210
		-184	-177	-141	0	0	0	0	0	-199	-194	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-187	-181	-144	0	0	0	0	0	-203	-198	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-392	-375	-281	-222	-183	-152	-128	-110	-425	-415	-358	-290	-243	-210	-184	-218	-441	-432	-400	-338	-285	-247	-218	-194	
		80	-508	-482	-361	-286	-236	-195	-164	-142	-551	-538	-461	-373	-313	-270	-236	-281	-571	-560	-518	-435	-367	-318	-281	-249
130	48-XL	44-X	-191	-186	-155	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-195	-190	-158	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-408	-397	-313	-250	-208	-179	-151	-130	-437	-428	-392	-322	-273	-237	-209	-257	-451	-444	-427	-373	-317	-277	-246	0	
		80	-528	-514	-403	-322	-268	-230	-194	-167	-567	-555	-506	-415	-351	-304	-269	-330	-585	-575	-553	-480	-408	-356	-316	-284
		-197	-193	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
140	48-XL	44-X	-201	-196	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-421	-411	-344	-278	-233	-201	-175	-151	-448	-440	-417	-353	-302	-263	-233	-291	-460	-453	-443	-400	-348	-306	-273	0	
		80	-546	-533	-442	-358	-300	-259	-225	-194	-580	-570	-541	-454	-388	-338	-300	-374	-597	-587	-574	-518	-448	-394	-351	-317
		-432	-423	-373	-305	-258	-223	-197	-174	-457	-449	-438	-383	-329	-289	-258	0	-468	-461	-452	-423	-378	-335	0	0	
		80	-560	-548	-480	-392	-332	-287	-253	-224	-592	-582	-568	-493	-424	-372	-331	-416	-606	-598	-586	-548	-487	-430	-386	-349
160	48-XL	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		-442	-434	-401	-331	-282	-246	-217	-195	-464	-457	-447	-411	-356	-315	0	-474	-468	-460	-444	-405	0	0	0	0	
		80	-573	-562	-516	-426	-363	-316	-280	-251	-601	-593	-580	-529	-459	-405	-362	-457	-615	-607	-596	-575	-524	-466	-420	-381
		-450	-443	-424	-356	-306	-268	-238	0	-470	-464	-455	-431	-382	0	0	-480	-474	-466	-459	0	0	0	0	0	
170	48-XL	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		80	-584	-574	-550	-458	-393	-344	-306	-275	-610	-602	-590	-558	-492	-437	-548	-497	-622	-615	-605	-595	-551	-500	-452	0
180	48-XL	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		80	-584	-574	-550	-458	-393	-344	-306	-275	-610	-602	-590	-558	-492	-437	-548	-497	-622	-615	-605	-595	-551	-500	-452	0

Note: The Reactions shown in the tables above account for reactions associated with the exterior support of a multi span condition. See Max length for Multi Span Only for corresponding span length.

See SEAOC PV-2 2012 for definition of Roof Zones

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K2 Systems, LLC

PV Tilt Up Kit Solar PV Mount System

Standard size 41"x 86" Portrait Orientation

Table 1.4A Max Uplift Force (lbs) Multi span only Exterior Conditions

Exp B	Ultimate Wind Speed, V (mph)	Rail Type	Roof Wind Pressure Zone 1							Roof Wind Pressure Zone 2							Roof Wind Pressure Zone 3									
			Roof Snow Load (psf)							Roof Snow Load (psf)							Roof Snow Load (psf)									
			0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70
90	44-X	-124	-106	-73	-52	-40	0	0	0	-128	-128	-102	-77	0	0	0	0	-130	-130	-122	-95	0	0	0	0	0
		-132	-104	-72	-50	-39	0	0	0	-141	-135	-100	-76	0	0	0	0	-142	-142	-119	-93	0	0	0	0	0
		-284	-217	-150	-106	-81	-66	-55	-48	-334	-291	-209	-158	-121	-98	-83	-72	-355	-329	-251	-195	-152	-123	-103	-89	-89
	48-XL	80	-357	-284	-203	-143	-110	-89	-75	-65	-420	-366	-278	-214	-164	-133	-113	-97	-452	-413	-321	-263	-205	-167	-140	-121
		44-X	-127	-127	-91	-67	0	0	0	-130	-130	-123	-96	0	0	0	0	-131	-131	-131	0	0	0	0	0	0
		48-X	-139	-125	-89	-66	0	0	0	-142	-142	-121	-94	0	0	0	0	-144	-144	-137	0	0	0	0	0	0
100	48-XL	48-XL	-317	-263	-186	-137	-105	-86	-72	-62	-356	-333	-252	-196	-155	-126	-106	-125	-359	-359	-295	-235	-193	-156	-131	-113
		80	-399	-336	-252	-186	-143	-116	-98	-84	-455	-419	-326	-266	-210	-171	-144	-169	-478	-465	-371	-309	-261	-212	-178	-154
		44-X	-129	-129	-108	-84	0	0	0	-131	-131	-131	0	0	0	0	0	-132	-132	0	0	0	0	0	0	0
	48-X	48-X	141	-141	-106	-82	0	0	0	-144	-144	-138	0	0	0	0	0	-145	-145	0	0	0	0	0	0	0
		48-XL	-345	-306	-222	-171	-133	-108	-91	-78	-359	-359	-294	-232	-191	-157	-132	-156	-361	-361	-332	-275	-228	-193	-162	-140
		80	-433	-384	-295	-232	-180	-146	-123	-106	-478	-465	-371	-309	-259	-212	-179	-211	-482	-482	-417	-352	-305	-262	-220	-190
110	44-X	44-X	-130	-130	-126	-98	0	0	0	-132	-132	-132	0	0	0	0	0	-133	-133	0	0	0	0	0	0	0
		48-X	-143	-143	-123	0	0	0	0	-145	-145	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		48-XL	-356	-341	-257	-201	-162	-132	-111	-96	-361	-361	-329	-267	-222	-190	-160	-190	-363	-363	-312	-262	-226	-196	-170	-170
	48-XL	80	-461	-428	-335	-272	-220	-178	-150	-130	-481	-481	-413	-348	-301	-257	-217	-257	-484	-484	-458	-392	-343	-305	-266	-230
		44-X	-131	-131	-131	0	0	0	0	-132	-132	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		48-X	-144	-144	-138	0	0	0	0	-145	-145	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
120	48-XL	48-XL	-359	-359	-292	-231	-191	-158	-133	-115	-363	-363	-359	-302	-253	-218	-191	-227	-365	-365	-365	-342	-296	-257	-227	-201
		80	-478	-467	-373	-311	-259	-214	-180	-155	-484	-484	-451	-385	-337	-296	-259	-307	-486	-486	-486	-429	-379	-340	-307	-273
		44-X	-132	-132	-132	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	48-X	-145	-145	-145	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		48-XL	-361	-361	-325	-260	-217	-186	-157	-135	-364	-364	-364	-334	-284	-246	-217	-267	-366	-366	-366	-329	-288	-255	0	0
		80	-481	-481	-409	-344	-294	-252	-212	-183	-486	-486	-485	-420	-370	-331	-294	-362	-488	-488	-488	-463	-413	-373	-340	-311
130	44-X	44-X	-132	-132	-132	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		48-X	-145	-145	-138	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		48-XL	-363	-363	-351	-289	-243	-209	-182	-157	-366	-366	-366	-359	-314	-274	-243	-303	-367	-367	-367	-354	-318	-284	0	0
	80	80	-483	-483	-441	-376	-328	-283	-247	-213	-487	-487	-487	-452	-402	-361	-329	-410	-489	-489	-489	-445	-404	-370	-342	-342
		44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
140	48-XL	48-XL	-363	-363	-351	-289	-243	-209	-182	-157	-366	-366	-366	-359	-314	-274	-243	-303	-367	-367	-367	-354	-318	-284	0	0
		80	-483	-483	-441	-376	-328	-283	-247	-213	-487	-487	-487	-452	-402	-361	-329	-410	-489	-489	-489	-445	-404	-370	-342	-342
		44-X	-132	-132	-132	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	48-X	-145	-145	-145	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		48-XL	-363	-363	-351	-289	-243	-209	-182	-157	-366	-366	-366	-359	-314	-274	-243	-303	-367	-367	-367	-354	-318	-284	0	0
		80	-483	-483	-441	-376	-328	-283	-247	-213	-487	-487	-487	-452	-402	-361	-329	-410	-489	-489	-489	-445	-404	-370	-342	-342
160	44-X	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		48-XL	-364	-364	-317	-268	-232	-205	-181	-156	-366	-366	-366	-366	-343	-301	-268	0	-368	-368	-368	-368	-345	0	0	0
	48-XL	80	-485	-485	-471	-406	-357	-315	-278	-245	-488	-488	-488	-488	-481	-431	-390	-357	-455	-490	-490	-490	-474	-433	-399	-370
		44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
170	48-XL	48-XL	-365	-365	-344	-293	-255	-226	-203	-176	-367	-367	-367	-367	-327	0	0	-368	-368	-368	-368	-368	0	0	0	0
		80	-486	-486	-486	-434	-384	-344	-306	-275	-489	-489	-489	-489	-489	-459	-418	-384	-494	-491	-491	-491	-491	-491	-491	-491
		44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		48-XL	-366	-366	-366	-366	-318	-278	-247	0	-368	-368	-368	-368	-368	0	0	0	-369	-369	-369	-369	0	0	0	0
		80	-488	-488	-488	-460	-410	-370	-335	-302	-490	-490	-490	-490	-490	-484	-444	-571	-530	-491	-491	-491	-491	-491	-486	-452

Note: The Reactions shown in the tables above account for reactions associated with the exterior support of a multi span condition. See Max length for Multi Span Only for corresponding span length.

See SEAOC PV-2 2012 for definition of Roof Zones

Larson Engineering Inc

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K2 Systems, LLC

PV Tilt Up Kit Solar PV Mount System

Standard size 41"x 86" Portrait Orientation

Table 1.5 Max Length L (inches) for Single Span Interior Conditions

Exp B	Ultimate Wind Speed, V (mph)	Rail Type	Roof Wind Pressure Zone 1							Roof Wind Pressure Zone 2							Roof Wind Pressure Zone 3									
			Roof Snow Load (psf)							Roof Snow Load (psf)							Roof Snow Load (psf)									
			0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70
90	44-X	61	47	32	23	17	0	0	0	48	42	30	23	0	0	0	0	41	38	29	22	0	0	0	0	0
	48-X	59	59	42	30	23	0	0	0	58	51	39	30	0	0	0	0	50	46	36	29	0	0	0	0	0
	48-XL	124	94	65	45	35	28	24	21	98	85	60	45	35	28	24	21	84	77	58	45	35	28	24	21	21
	80	183	143	99	70	53	43	37	32	144	125	92	70	53	43	37	32	124	113	88	69	53	43	37	32	32
	44-X	52	53	40	30	0	0	0	0	48	45	35	28	0	0	0	0	42	40	32	0	0	0	0	0	0
100	48-X	51	42	29	22	0	0	0	0	40	36	27	21	0	0	0	0	34	33	26	0	0	0	0	0	0
	48-XL	107	87	62	45	35	28	24	21	83	76	57	44	35	28	24	21	71	68	54	43	35	28	24	21	21
	80	157	133	94	70	53	43	37	32	122	112	87	68	53	43	37	32	104	100	80	65	53	43	37	32	32
	44-X	45	41	29	23	0	0	0	0	35	33	27	0	0	0	0	0	29	29	24	0	0	0	0	0	0
110	48-X	44	39	28	22	0	0	0	0	34	33	25	0	0	0	0	0	29	28	0	0	0	0	0	0	0
	48-XL	92	81	58	45	35	28	24	21	71	68	53	42	35	28	24	21	60	59	49	40	33	28	24	21	21
	80	136	121	90	69	53	43	37	32	104	100	80	64	53	43	37	32	89	87	73	61	51	43	37	32	32
	44-X	39	38	28	22	0	0	0	0	30	29	24	0	0	0	0	0	24	24	0	0	0	0	0	0	0
120	48-X	38	36	26	0	0	0	0	0	29	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	80	74	55	43	35	28	24	21	61	60	50	40	33	28	24	21	52	51	45	38	32	27	24	21	21
	80	118	110	85	66	53	43	37	32	90	88	73	61	51	43	37	32	76	75	66	57	49	42	37	32	32
	44-X	34	35	26	0	0	0	0	0	25	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
130	48-X	34	33	25	0	0	0	0	0	25	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	70	68	52	41	34	28	24	21	53	52	46	38	32	27	24	21	45	44	41	35	30	26	23	21	
	80	104	100	80	63	52	43	37	32	78	77	67	57	49	42	37	32	66	65	60	52	46	40	36	32	
	44-X	30	30	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
140	48-X	30	31	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	62	60	50	40	33	28	24	21	47	46	42	36	30	26	23	21	39	39	37	33	29	25	22	0	
	80	91	89	74	61	51	43	37	32	69	67	62	53	46	40	36	32	58	57	55	48	43	39	34	31	
	44-X	26	26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
150	48-X	26	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	55	54	47	38	32	27	24	21	41	41	38	34	29	25	22	20	35	34	33	30	27	24	21	0	
	80	81	79	69	58	49	42	37	32	61	60	57	50	44	39	34	31	51	50	49	44	40	36	33	30	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
160	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	49	48	43	36	31	26	23	21	37	36	35	31	28	24	22	0	31	30	28	25	23	0	0	0	
	80	73	71	64	55	47	41	36	32	54	53	52	46	41	37	33	30	45	45	44	41	37	34	31	29	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
170	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	44	43	40	34	29	26	23	20	33	32	32	29	26	23	0	0	28	27	27	26	24	0	0	0	
	80	65	64	59	52	45	39	35	31	48	48	47	43	39	35	32	29	41	40	39	38	35	32	29	27	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
180	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	40	39	38	33	28	25	22	0	30	29	29	27	25	0	0	0	25	24	24	24	0	0	0	0	0
	80	59	58	55	49	43	38	34	30	44	43	42	40	36	33	31	28	36	36	35	35	32	30	28	0	

Note: The Length is based on use of 2 or more spans. Cantilevered ends may be used that are no greater than 1/3 of the backspan.

See SEAOC PV-2 2012 for definition of Roof Zones

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K2 Systems, LLC

PV Tilt Up Kit Solar PV Mount System

Standard size 41"x 86" Portrait Orientation

Table 1.5A Max Length L (inches) for Single Span Exterior Conditions

Exp B	Ultimate Wind Speed, V (mph)	Rail Type	Roof Wind Pressure Zone 1							Roof Wind Pressure Zone 2							Roof Wind Pressure Zone 3									
			Roof Snow Load (psf)							Roof Snow Load (psf)							Roof Snow Load (psf)									
			0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70
90	44-X	59	44	30	21	16	0	0	0	40	40	28	21	0	0	0	0	33	33	27	21	0	0	0	0	0
	48-X	59	45	31	22	17	0	0	0	43	40	29	22	0	0	0	0	35	35	28	21	0	0	0	0	0
	48-XL	124	86	60	42	32	26	22	19	93	78	56	42	32	26	22	19	75	74	53	42	32	26	22	19	19
	80	166	132	91	64	49	40	34	29	128	113	85	64	49	40	34	29	104	102	80	64	49	40	34	29	29
	44-X	46	41	29	21	0	0	0	0	32	32	27	21	0	0	0	0	26	26	25	0	0	0	0	0	0
100	48-X	49	42	29	22	0	0	0	0	34	34	27	21	0	0	0	0	28	28	26	0	0	0	0	0	0
	48-XL	106	81	57	42	32	26	22	19	73	72	52	41	32	26	22	19	60	60	50	39	32	26	22	19	19
	80	142	120	87	64	49	40	34	29	102	101	79	62	49	40	34	29	83	83	72	60	49	40	34	29	29
	44-X	37	37	27	21	0	0	0	0	26	26	25	0	0	0	0	0	21	21	21	0	0	0	0	0	0
110	48-X	40	39	28	22	0	0	0	0	28	28	25	0	0	0	0	0	23	23	0	0	0	0	0	0	0
	48-XL	85	75	54	42	32	26	22	19	60	60	49	39	32	26	22	19	49	49	47	37	31	26	22	19	19
	80	118	109	83	64	49	40	34	29	83	83	72	59	49	40	34	29	67	67	66	56	47	40	34	29	29
	44-X	31	31	26	20	0	0	0	0	22	22	22	0	0	0	0	0	18	18	0	0	0	0	0	0	0
120	48-X	33	33	26	0	0	0	0	0	23	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	70	70	51	40	32	26	22	19	49	49	46	37	31	26	22	19	40	40	40	35	29	25	22	19	19
	80	98	98	78	61	49	40	34	29	69	69	66	56	47	40	34	29	56	56	56	51	45	39	34	29	29
	44-X	26	26	25	0	0	0	0	0	18	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
130	48-X	28	28	25	0	0	0	0	0	19	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	59	59	48	38	32	26	22	19	42	42	42	35	29	25	22	19	34	34	34	33	28	24	21	19	19
	80	82	82	72	59	48	40	34	29	58	58	58	52	45	39	34	29	47	47	47	47	42	37	33	29	29
	44-X	22	22	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
140	48-X	24	24	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	50	50	46	37	30	26	22	19	36	36	36	33	28	24	21	19	29	29	29	27	23	21	21	21	21
	80	70	70	67	56	47	40	34	29	50	50	50	48	43	37	33	29	41	41	41	41	39	35	32	28	28
	44-X	19	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
150	48-X	20	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	44	44	43	35	29	25	22	19	31	31	31	27	23	21	19	25	25	25	25	25	22	20	20	20	
	80	60	60	60	53	45	39	34	29	43	43	43	40	36	32	28	35	35	35	35	35	33	30	27	27	
	44-X	0	31	26	20	0	0	0	0	22	22	22	0	0	0	0	0	18	18	0	0	0	0	0	0	0
160	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	38	38	38	33	28	24	22	19	27	27	27	25	22	20	0	22	22	22	22	21	0	0	0	0	
	80	53	53	53	50	43	37	33	29	37	37	37	37	34	30	27	31	31	31	31	31	31	31	28	26	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
170	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	33	33	33	32	27	24	21	19	24	24	24	24	21	0	0	20	20	20	20	20	20	0	0	0	
	80	46	46	46	46	41	36	32	29	33	33	33	33	32	29	27	27	27	27	27	27	27	27	27	25	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
180	48-X	0	41	41	41	41	39	35	31	28	29	29	29	29	28	26	24	24	24	24	24	24	24	24	24	
	48-XL	30	30	30	30	26	23	20	0	21	21	21	21	21	0	0	17	17	17	17	17	0	0	0	0	
	80	41	41	41	41	41	39	35	31	28	29	29	29	29	28	26	24	24	24	24	24	24	24	24	24	

Note: The Length is based on use of 2 or more spans. Cantilevered ends may be used that are no greater than 1/3 of the backspan.

See SEAOC PV-2 2012 for definition of Roof Zones

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## K2 Systems, LLC

PV Tilt Up Kit Solar PV Mount System

Standard size 41"x 86" Portrait Orientation

**Table 1.6 Maximum Downward Force (lbs) Single span only Interior Conditions**

Exp B	Ultimate Wind Speed, V (mph)	Rail Type	Roof Wind Pressure Zone 1							Roof Wind Pressure Zone 2							Roof Wind Pressure Zone 3									
			Roof Snow Load (psf)							Roof Snow Load (psf)							Roof Snow Load (psf)									
			0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70
90	44-X	100	109	84	63	42	0	0	0	100	108	83	55	0	0	0	0	101	104	71	61	0	0	0	0	0
	48-X	98	104	80	60	40	0	0	0	98	105	79	52	0	0	0	0	99	101	68	58	0	0	0	0	0
	48-XL	205	218	168	125	84	77	70	51	206	220	166	110	95	83	59	58	206	212	142	122	102	70	67	63	
	80	301	334	257	192	129	118	107	78	303	325	254	168	145	127	90	89	304	312	216	187	156	107	103	97	
	44-X	100	110	87	70	0	0	0	0	101	105	88	57	0	0	0	0	101	103	78	0	0	0	0	0	0
	48-X	98	105	83	67	0	0	0	0	99	103	84	55	0	0	0	0	99	101	75	0	0	0	0	0	0
100	48-XL	205	219	174	140	91	84	77	55	207	215	175	115	104	92	64	64	207	211	158	127	113	83	74	70	
	80	302	333	267	215	139	129	118	84	304	317	268	176	159	140	98	98	305	310	234	195	173	127	113	108	
	44-X	101	110	91	78	0	0	0	0	101	103	92	0	0	0	0	0	100	100	83	0	0	0	0	0	0
	48-X	99	105	87	75	0	0	0	0	99	101	88	0	0	0	0	0	99	98	0	0	0	0	0	0	0
	48-XL	206	220	181	157	99	93	85	60	207	211	185	123	113	102	70	71	208	204	170	139	120	98	82	78	
	80	304	327	277	240	151	142	131	92	305	311	278	188	174	156	107	108	306	301	251	212	183	149	126	120	
110	44-X	101	110	95	84	0	0	0	0	101	100	95	0	0	0	0	0	97	97	0	0	0	0	0	0	0
	48-X	99	106	91	0	0	0	0	0	99	98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-XL	207	218	191	169	107	102	95	65	208	205	194	135	119	112	81	78	208	203	180	153	128	110	96	87	
	80	304	321	292	259	164	156	145	100	306	302	286	207	183	172	125	119	307	300	265	227	196	168	147	134	
	44-X	101	111	100	0	0	0	0	97	97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-X	99	106	96	0	0	0	0	0	99	97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
120	48-XL	207	215	201	181	114	112	105	71	208	203	199	148	125	120	94	86	209	204	189	164	140	122	107	97	
	80	305	316	305	277	174	172	160	108	306	299	294	225	192	184	143	131	307	301	279	242	214	186	164	148	
	44-X	101	104	104	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-X	99	106	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-XL	208	207	210	193	119	123	115	77	208	204	204	160	135	127	103	94	209	205	197	173	153	133	118	0	
	80	306	305	314	296	182	188	177	118	307	301	300	238	207	195	158	144	308	302	291	255	228	204	181	163	
130	44-X	98	98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-X	99	108	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-XL	208	203	219	205	124	130	127	84	209	205	208	170	146	134	113	102	209	206	201	182	163	145	129	0	
	80	306	299	322	314	190	199	194	128	307	302	306	251	223	205	173	156	308	303	296	267	240	218	197	178	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
140	48-XL	208	204	224	216	129	137	136	91	209	206	211	178	157	141	123	0	209	206	202	189	171	156	0	0	
	80	307	300	330	329	198	210	208	139	308	303	311	262	235	216	188	169	308	304	298	279	252	231	212	193	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-XL	209	204	229	227	138	144	144	97	209	206	209	185	167	148	0	0	209	207	203	196	179	0	0	0	
	80	307	301	337	341	212	221	221	148	308	304	308	273	246	225	202	183	308	305	299	289	263	242	224	209	
150	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-XL	208	203	219	205	124	130	127	84	209	205	208	170	146	134	113	102	209	206	201	182	163	145	129	0	
	80	306	299	322	314	190	199	194	128	307	302	306	251	223	205	173	156	308	303	296	267	240	218	197	178	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
160	48-XL	208	204	224	216	129	137	136	91	209	206	211	178	157	141	123	0	209	206	202	189	171	156	0	0	
	80	307	300	330	329	198	210	208	139	308	303	311	262	235	216	188	169	308	304	298	279	252	231	212	193	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-XL	209	204	229	227	138	144	144	97	209	206	209	185	167	148	0	0	209	207	203	196	179	0	0	0	
	80	307	301	337	341	212	221	221	148	308	304	308	273	246	225	202	183	308	305	299	289	263	242	224	209	
170	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-XL	209	204	229	227	138	144	144	97	209	207	207	192	174	0	0	0	210	207	203	196	179	0	0	0	
	80	307	301	337	341	212	221	221	148	308	304	308	273	246	225	202	183	308	305	299	289</td					



## K2 Systems, LLC

PV Tilt Up Kit Solar PV Mount System

Standard size 41"x 86" Portrait Orientation

**Table 1.6A Maximum Downward Force (lbs) Single span only Exterior Conditions**

Exp B	Ultimate Wind Speed, V (mph)	Rail Type	Roof Wind Pressure Zone 1							Roof Wind Pressure Zone 2							Roof Wind Pressure Zone 3									
			Roof Snow Load (psf)							Roof Snow Load (psf)							Roof Snow Load (psf)									
			0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70
90	44-X	97	102	79	59	39	0	0	0	85	103	78	51	0	0	0	0	80	90	66	57	0	0	0	0	0
	48-X	98	104	80	60	40	0	0	0	91	105	79	52	0	0	0	0	86	96	68	58	0	0	0	0	0
	48-XL	205	202	155	116	78	71	64	47	195	203	153	101	87	76	54	53	184	203	131	112	94	64	62	58	
	80	272	307	237	177	119	109	98	72	271	294	235	155	134	117	83	82	255	282	195	172	144	99	95	89	
	100	273	301	247	199	129	119	109	78	254	287	244	162	147	130	1950	90	242	256	212	179	160	117	105	100	
100	44-X	89	103	82	66	0	0	0	0	80	91	82	54	0	0	0	0	76	81	74	0	0	0	0	0	0
	48-X	95	105	83	67	0	0	0	0	85	97	84	55	0	0	0	0	81	86	75	0	0	0	0	0	0
	48-XL	203	202	161	130	84	78	71	51	183	203	162	106	96	85	1273	59	174	184	146	117	104	76	68	65	
	80	273	301	247	199	129	119	109	78	254	287	244	162	147	130	1950	90	242	256	212	179	160	117	105	100	
	110	264	296	256	222	139	131	121	85	242	256	252	174	160	144	2012	100	232	235	226	191	169	138	116	111	
120	44-X	79	90	89	79	0	0	0	0	73	74	84	0	0	0	0	71	71	0	0	0	0	0	0	0	0
	48-X	84	96	91	0	0	0	0	0	78	79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	181	204	176	156	99	94	87	60	168	170	180	125	110	104	1357	72	162	162	141	118	102	88	81		
	80	251	286	267	239	151	144	134	92	233	236	259	190	169	159	2079	110	225	225	225	206	180	156	135	123	
	130	241	260	276	256	161	158	148	100	226	226	253	203	177	169	2152	121	220	220	220	219	193	172	152	137	
140	44-X	74	75	93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	79	80	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	168	172	194	178	110	113	106	71	159	159	174	147	125	117	1411	87	155	155	155	155	141	123	109	0	
	80	234	239	284	273	168	173	163	109	221	221	241	215	190	180	2161	133	215	215	215	206	186	167	150		
	150	228	228	283	287	175	183	179	118	217	217	232	217	201	190	2164	144	212	212	212	212	197	181	164		
160	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-XL	161	161	196	199	119	126	84	154	154	162	154	145	130	1414	0	151	151	151	151	144	0	0	0		
	80	223	223	272	298	183	194	192	128	213	213	224	213	212	197	2166	156	209	209	209	209	192	178			
	170	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
180	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-XL	155	155	184	215	136	140	141	0	150	150	154	150	150	0	0	0	148	148	148	148	0	0	0	0	
	80	216	216	256	299	205	214	216	146	208	208	213	208	208	208	2131	181	205	205	205	205	205	205	205		

Note: The Forces shown in the tables above account for reactions associated with the interior support of a multi-span condition. See Max length for Multi Span for corresponding span length.

See SEAOC PV-2 2012 for definition of Roof Zones

## Larson Engineering Inc

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## K2 Systems, LLC

PV Tilt Up Kit Solar PV Mount System

Standard size 41"x 86" Portrait Orientation

**Table 1.7 Maximum Horizontal Force (lbs) Single span only Interior Conditions**

Exp B	Ultimate Wind Speed, V (mph)	Rail Type	Roof Wind Pressure Zone 1							Roof Wind Pressure Zone 2							Roof Wind Pressure Zone 3								
			Roof Snow Load (psf)							Roof Snow Load (psf)							Roof Snow Load (psf)								
			0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	0	10	20	30	40	50	60
90	44-X	34	26	18	13	10	0	0	0	37	32	23	18	10	0	0	0	43	35	27	21	12	0	0	0
	48-X	33	25	17	12	9	0	0	0	36	31	22	17	10	0	0	0	42	34	26	20	12	0	0	0
	48-XL	69	52	36	25	19	16	13	11	76	65	47	35	27	22	19	16	87	72	54	42	33	26	22	19
	80	102	80	55	39	30	24	20	18	111	97	71	54	41	34	28	24	128	106	82	64	50	41	34	29
	44-X	36	30	21	16	0	0	0	0	39	35	27	21	0	0	0	0	45	38	31	20	0	0	0	0
	48-X	35	29	20	15	0	0	0	0	38	35	26	20	0	0	0	0	44	38	30	19	0	0	0	0
100	48-XL	73	60	42	31	24	20	16	14	79	73	54	42	33	27	23	20	92	79	62	49	40	33	28	24
	80	108	91	65	48	37	30	25	22	116	107	83	64	51	41	35	30	136	116	92	75	62	50	42	36
	44-X	38	34	24	19	0	0	0	0	40	38	31	20	0	0	0	0	47	42	34	24	0	0	0	0
	48-X	37	32	23	18	0	0	0	0	39	38	29	19	0	0	0	0	46	41	29	23	0	0	0	0
	48-XL	77	68	49	38	29	24	20	17	82	79	62	48	40	33	28	24	97	85	69	56	47	40	33	29
	80	113	100	75	58	45	36	30	26	120	116	93	74	61	50	42	36	142	126	102	86	71	61	51	44
110	44-X	39	37	27	21	0	0	0	0	41	40	33	22	0	0	0	0	49	47	35	27	0	0	0	0
	48-X	38	36	26	0	0	0	0	0	40	39	27	0	0	0	0	0	48	45	33	0	0	0	0	0
	48-XL	80	74	55	43	35	28	24	20	84	82	68	55	46	39	33	28	100	93	75	63	53	46	40	34
	80	117	109	84	66	53	43	36	31	124	121	101	84	70	60	50	43	147	137	110	94	81	70	61	52
	44-X	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
	48-X	39	39	29	0	0	0	0	0	41	40	30	0	0	0	0	0	49	49	37	0	0	0	0	0
120	48-XL	82	79	61	48	40	33	28	24	86	84	74	61	51	44	39	33	103	99	80	69	59	51	45	40
	80	121	116	93	74	61	51	43	37	127	124	109	93	78	68	59	51	152	146	117	102	90	78	69	61
	44-X	41	41	33	0	0	0	0	0	43	43	34	0	0	0	0	0	51	51	42	0	0	0	0	0
	48-X	40	42	32	0	0	0	0	0	42	44	33	0	0	0	0	0	50	53	40	0	0	0	0	0
	48-XL	84	82	67	54	45	38	32	28	87	86	78	67	57	49	43	39	105	103	84	74	65	57	50	35
	80	123	120	100	82	68	58	49	43	129	126	115	100	87	75	66	59	155	151	126	109	97	87	77	69
130	44-X	40	40	0	0	0	0	0	0	42	42	0	0	0	0	0	0	51	51	0	0	0	0	0	0
	48-X	41	44	0	0	0	0	0	0	42	46	0	0	0	0	0	0	51	56	0	0	0	0	0	0
	48-XL	85	83	72	59	49	42	37	32	89	87	83	72	62	54	48	43	107	105	91	78	70	62	56	40
	80	126	123	107	90	75	65	57	49	131	128	122	107	95	83	74	66	158	154	134	115	104	94	85	77
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
140	48-XL	87	85	77	64	54	47	41	36	90	88	86	76	67	59	53	38	109	107	96	82	75	68	52	46
	80	128	125	113	97	82	71	63	56	133	130	127	113	101	91	81	73	161	157	142	122	110	100	93	84
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	88	86	80	69	58	51	45	40	92	90	87	80	72	64	47	42	111	108	101	86	78	64	57	51
	80	130	127	118	103	89	78	69	62	135	132	129	118	107	97	88	79	163	160	149	129	116	106	98	92
150	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	85	83	72	59	49	42	37	32	89	87	83	72	62	54	48	43	107	105	91	78	70	62	56	40
	80	126	123	107	90	75	65	57	49	131	128	122	107	95	83	74	66	158	154	134	115	104	94	85	77
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
160	48-XL	87	85	77	64	54	47	41	36	90	88	86	76	67	59	53	38	109	107	96	82	75	68	52	46
	80	128	125	113	97	82	71	63	56	133	130	127	113	101	91	81	73	161	157	142	122	110	100	93	84
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	88	86	80	69	58	51	45	40	92	90	87	80	72	64	47	42	111	108	101	86	78	64	57	51
	80	130	127	118	103	89	78	69	62	135	132	129	118	107	97	88	79	163	160	149	129	116	106	98	92
170	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	89	87	84	73	63	55	49	0	93	91	88	84	76	57	51	0	112	110	105	92	79	69	61	0
	80	131	129	123	108	96	84	75	67	136	134	130	123	112	103	95	86	165	162	155	136	121	112	104	85
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
180	48-XL	89	87	84	7																				



## K2 Systems, LLC

PV Tilt Up Kit Solar PV Mount System

Standard size 41"x 86" Portrait Orientation

**Table 1.7A Maximum Horizontal Force (lbs) Single span only Exterior Conditions**

Exp B	Ultimate Wind Speed, V (mph)	Rail Type	Roof Wind Pressure Zone 1							Roof Wind Pressure Zone 2							Roof Wind Pressure Zone 3								
			Roof Snow Load (psf)							Roof Snow Load (psf)							Roof Snow Load (psf)								
			0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	0	10	20	30	40	50	60
90	44-X	33	24	17	12	9	0	0	0	34	31	22	16	9	0	0	0	41	31	25	20	11	0	0	0
	48-X	33	25	17	12	9	0	0	0	34	31	22	17	10	0	0	0	42	33	26	20	12	0	0	0
	48-XL	69	48	33	23	18	15	12	11	72	60	43	32	25	20	17	15	87	69	50	39	30	24	21	18
	80	92	74	51	36	28	22	19	16	99	88	66	50	38	31	26	23	116	96	75	59	46	37	32	27
	44-X	32	28	20	15	0	0	0	0	33	31	25	20	0	0	0	0	40	35	29	18	0	0	0	0
100	48-X	34	29	20	15	0	0	0	0	35	33	26	20	0	0	0	0	43	36	30	19	0	0	0	0
	48-XL	73	55	39	29	22	18	15	13	76	69	50	39	31	25	21	18	91	70	58	45	37	30	25	22
	80	98	83	60	44	34	28	23	20	102	97	75	60	47	38	32	28	123	104	84	70	57	46	39	34
	44-X	31	31	23	18	0	0	0	0	32	32	29	18	0	0	0	0	39	39	30	22	0	0	0	0
110	48-X	33	32	23	18	0	0	0	0	34	34	29	19	0	0	0	0	42	41	29	23	0	0	0	0
	48-XL	71	62	45	35	27	22	18	16	74	69	57	45	37	30	26	22	89	78	65	52	43	37	31	27
	80	99	91	69	53	41	33	28	24	102	95	84	69	57	46	39	34	124	114	92	78	66	56	47	41
	44-X	30	30	26	20	0	0	0	0	32	32	30	21	0	0	0	0	38	38	32	25	0	0	0	0
120	48-X	33	33	26	0	0	0	0	0	34	34	27	0	0	0	0	0	41	41	33	0	0	0	0	0
	48-XL	70	69	51	40	32	26	22	19	72	72	63	51	42	36	30	26	88	87	67	58	49	42	37	32
	80	97	97	77	61	49	40	33	29	101	101	91	77	64	55	47	40	122	122	97	85	75	64	56	48
	44-X	30	30	29	0	0	0	0	0	31	31	30	0	0	0	0	0	38	38	36	0	0	0	0	0
130	48-X	32	32	29	0	0	0	0	0	33	33	30	0	0	0	0	0	40	40	37	0	0	0	0	0
	48-XL	69	69	56	45	37	30	26	22	72	72	67	56	47	41	36	31	86	86	71	65	55	47	42	37
	80	95	95	84	68	56	47	39	34	99	99	93	84	72	62	55	47	120	120	105	92	81	72	64	57
	44-X	30	30	30	0	0	0	0	0	31	31	31	0	0	0	0	0	37	37	37	0	0	0	0	0
140	48-X	32	32	32	0	0	0	0	0	33	33	33	0	0	0	0	0	40	40	40	0	0	0	0	0
	48-XL	68	68	62	49	41	35	30	26	71	71	67	62	52	45	40	36	85	85	78	66	60	52	47	32
	80	94	94	90	76	63	54	46	39	98	98	94	90	80	70	61	54	119	119	114	95	88	79	71	64
	44-X	29	29	0	0	0	0	0	0	31	31	0	0	0	0	0	0	37	37	0	0	0	0	0	0
150	48-X	31	31	0	0	0	0	0	0	33	33	0	0	0	0	0	0	40	40	40	0	0	0	0	0
	48-XL	67	67	67	54	45	39	34	29	70	70	70	66	57	50	44	40	85	85	84	68	66	58	51	37
	80	94	94	94	82	70	60	52	45	97	97	92	86	77	68	61	118	118	118	103	91	85	78	71	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
160	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	67	67	67	59	50	43	38	33	70	70	70	66	62	55	49	35	84	84	74	66	63	48	42	37
	80	93	93	93	88	76	66	58	51	97	97	92	83	74	67	61	117	117	117	110	96	91	84	78	71
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
170	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	67	67	67	63	54	47	42	37	69	69	69	66	66	59	43	39	84	84	84	80	68	59	52	47
	80	92	92	92	82	72	64	57	51	96	96	96	91	88	81	73	116	116	116	116	103	91	89	83	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
180	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	66	66	66	66	58	51	45	0	69	69	69	66	53	47	0	83	83	83	73	64	57	0	0	
	80	92	92	92	92	87	78	69	62	96	96	96	91	86	79	73	116	116	116	116	110	98	91	78	

Note: The Forces shown in the tables above account for reactions associated with the interior support of a multi-span condition. See Max length for Multi Span for corresponding span length.

See SEAOC PV-2 2012 for definition of Roof Zones

### Larson Engineering Inc

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## K2 Systems, LLC

PV Tilt Up Kit Solar PV Mount System

Standard size 41"x 86" Portrait Orientation

**Table 1.8 Max Uplift Force (lbs) Single span only Interior Conditions**

Exp B	Ultimate Wind Speed, V (mph)	Rail Type	Roof Wind Pressure Zone 1							Roof Wind Pressure Zone 2							Roof Wind Pressure Zone 3									
			Roof Snow Load (psf)							Roof Snow Load (psf)							Roof Snow Load (psf)									
			0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70
90	44-X	-56	-43	-30	-21	-16	0	0	0	-105	-58	-42	-32	0	0	0	0	-71	-65	-50	-39	0	0	0	0	
		-55	-41	-29	-20	-15	0	0	0	-102	-56	-40	-30	0	0	0	0	-70	-64	-48	-37	0	0	0	0	
		-115	-87	-60	-42	-32	-26	-22	-19	-214	-118	-84	-63	-49	-39	-33	-29	-146	-134	-100	-78	-61	-49	-41	-36	
		80	-170	-133	-92	-65	-50	-40	-34	-29	-316	-174	-128	-97	-74	-60	-51	-44	-215	-197	-153	-120	-93	-75	-63	-55
		-63	-53	-37	-27	0	0	0	0	-89	-66	-50	-39	0	0	0	0	-76	-73	-59	0	0	0	0	0	0
100	48-X	-62	-50	-36	-26	0	0	0	0	-87	-65	-48	-37	0	0	0	0	-75	-72	-57	0	0	0	0	0	0
		-129	-105	-74	-55	-42	-34	-29	-25	-182	-135	-101	-78	-62	-50	-43	-37	-156	-150	-119	-94	-77	-63	-53	-45	-45
		80	-190	-160	-114	-84	-65	-52	-44	-38	-268	-199	-155	-120	-95	-77	-65	-56	-230	-221	-177	-144	-118	-96	-81	-70
		-68	-62	-44	-34	0	0	0	0	-76	-73	-59	0	0	0	0	0	-80	-78	-66	0	0	0	0	0	0
		-67	-59	-42	-33	0	0	0	0	-75	-72	-56	0	0	0	0	0	-79	-77	0	0	0	0	0	0	0
110	48-XL	-140	-123	-89	-69	-53	-43	-36	-31	-156	-150	-118	-93	-76	-63	-53	-45	-164	-160	-135	-110	-91	-77	-65	-56	-56
		80	-206	-183	-136	-105	-81	-66	-55	-48	-230	-222	-177	-142	-117	-96	-81	-70	-242	-236	-198	-168	-139	-118	-100	-86
		-73	-70	-51	-40	0	0	0	0	-80	-78	-65	0	0	0	0	0	-79	-79	0	0	0	0	0	0	0
		-71	-67	-49	0	0	0	0	0	-78	-76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-149	-138	-103	-80	-65	-53	-44	-38	-164	-160	-134	-107	-89	-76	-64	-55	-171	-167	-148	-126	-105	-90	-79	-68	
120	48-XL	80	-220	-204	-158	-123	-99	-81	-68	-59	-241	-235	-197	-164	-136	-116	-98	-84	-252	-246	-218	-187	-161	-138	-120	-104
		-77	-78	-58	0	0	0	0	0	-79	-79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-75	-74	-56	0	0	0	0	0	-81	-79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-157	-151	-117	-92	-76	-63	-53	-46	-170	-166	-146	-121	-101	-87	-76	-66	-176	-173	-160	-139	-119	-103	-91	-81	
		80	-231	-222	-178	-141	-117	-97	-81	-70	-250	-244	-215	-184	-155	-134	-117	-101	-260	-254	-235	-204	-181	-157	-139	-123
130	48-XL	44-X	-80	-80	-64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		48-X	-78	-82	-62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		48-XL	-163	-159	-130	-104	-87	-74	-63	-54	-175	-171	-157	-134	-113	-98	-87	-77	-181	-177	-171	-150	-132	-115	-102	0
		80	-240	-234	-195	-159	-133	-114	-96	-83	-258	-252	-231	-200	-174	-151	-133	-118	-266	-261	-251	-221	-197	-176	-157	-141
		-79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
140	48-XL	44-X	-81	-87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		48-X	-168	-164	-143	-116	-97	-84	-73	-63	-179	-176	-167	-146	-125	-109	-97	-87	-184	-181	-177	-160	-144	-127	-114	0
		80	-248	-242	-210	-177	-149	-128	-112	-96	-264	-259	-246	-215	-191	-168	-149	-134	-271	-267	-261	-236	-212	-192	-174	-157
		-79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
150	48-XL	44-X	-173	-169	-152	-127	-107	-93	-82	-72	-183	-180	-175	-156	-137	-120	-107	0	-187	-185	-181	-169	-153	-139	0	0
		48-X	-255	-249	-224	-193	-164	-142	-126	-111	-269	-265	-258	-229	-205	-184	-164	-148	-276	-272	-266	-249	-226	-206	-190	-173
		80	-260	-255	-238	-207	-180	-156	-139	-124	-273	-269	-264	-242	-218	-199	-179	-162	-279	-276	-271	-261	-239	-219	-203	-189
		-79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
160	48-XL	44-X	-177	-173	-161	-138	-117	-102	-90	-81	-186	-183	-179	-164	-148	-131	0	-190	-187	-184	-177	-162	0	0	0	0
		48-X	-255	-249	-224	-193	-164	-142	-126	-111	-269	-265	-258	-229	-205	-184	-164	-148	-276	-272	-266	-249	-226	-206	-190	-173
		80	-260	-255	-238	-207	-180	-156	-139	-124	-273	-269	-264	-242	-218	-199	-179	-162	-279	-276	-271	-261	-239	-219	-203	-189
		-79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
170	48-XL	44-X	-177	-173	-161	-138	-117	-102	-90	-81	-186	-183	-179	-164	-148	-131	0	-190	-187	-184	-177	-162	0	0	0	0
		48-X	-255	-249	-224	-193	-164	-142	-126	-111	-269	-265	-258	-229	-205	-184	-164	-148	-276	-272	-266	-249	-226	-206	-190	-173
		80	-260	-255	-238	-207	-180	-156	-139	-124	-273	-269	-264	-242	-218	-199	-179	-162	-279	-276	-271	-261	-239	-219	-203	-189
		-79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
180	48-XL	44-X	-180	-177	-170	-148	-127	-111	-99	0	-188	-186	-182	-172	-157	0	0	-192	-190	-187	-184	0	0	0	0	0
		48-X	-265	-261	-250	-219	-195	-170	-152	-136	-277	-273	-268	-254	-231	-211	-195	-177	-283	-279	-275	-270	-250	-231	-215	0
		80	-260	-255	-238	-207	-180	-156	-139	-124	-273	-269	-264	-242	-218	-199	-179	-162	-279	-276	-271	-261	-239	-219	-203	-189
		-79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-81	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Note: The Forces shown in the tables above account for reactions associated with the interior



## K2 Systems, LLC

PV Tilt Up Kit Solar PV Mount System

Standard size 41"x 86" Portrait Orientation

**Table 1.8A Max Uplift Force (lbs) Single span only Exterior Conditions**

Exp B	Ultimate Wind Speed, V (mph)	Rail Type	Roof Wind Pressure Zone 1							Roof Wind Pressure Zone 2							Roof Wind Pressure Zone 3										
			Roof Snow Load (psf)							Roof Snow Load (psf)							Roof Snow Load (psf)										
			0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	
90	44-X	-55	-41	-28	-20	-15	0	0	0	-56	-55	-39	-30	0	0	0	0	-57	-57	-47	-37	0	0	0	0	0	
	48-X	-55	-41	-29	-20	-15	0	0	0	-60	-56	-40	-30	0	0	0	0	-61	-61	-48	-37	0	0	0	0	0	
	48-XL	-115	-80	-55	-39	-30	-24	-20	-18	-129	-109	-77	-58	-45	-36	-31	-26	-130	-128	-93	-72	-56	-45	-38	-33	-33	
	80	-154	-122	-85	-60	-46	-37	-31	-27	-179	-157	-118	-89	-69	-56	-47	-40	-181	-178	-138	-110	-86	-70	-59	-51	-51	
	44-X	-56	-49	-35	-26	0	0	0	0	-57	-57	-47	-37	0	0	0	0	-58	-58	-56	0	0	0	0	0	0	0
100	48-X	-59	-50	-36	-26	0	0	0	0	-61	-61	-48	-37	0	0	0	0	-61	-61	-57	0	0	0	0	0	0	0
	48-XL	-128	-97	-69	-51	-39	-32	-27	-23	-130	-128	-93	-72	-57	-47	-39	-34	-132	-132	-110	-87	-71	-58	-49	-42	-42	-42
	80	-172	-145	-105	-78	-60	-48	-41	-35	-181	-180	-141	-111	-88	-71	-60	-52	-183	-183	-160	-133	-109	-88	-74	-64	-64	
	44-X	-57	-57	-42	-32	0	0	0	0	-58	-58	-55	0	0	0	0	0	-58	-58	-58	0	0	0	0	0	0	0
	48-X	-60	-59	-42	-33	0	0	0	0	-61	-61	-56	0	0	0	0	0	-62	-62	0	0	0	0	0	0	0	0
110	48-XL	-129	-114	-82	-63	-49	-40	-33	-29	-132	-132	-109	-86	-71	-58	-49	-42	-132	-132	-127	-102	-84	-71	-60	-52	-52	
	80	-179	-166	-125	-97	-75	-61	-51	-44	-183	-183	-160	-131	-108	-89	-75	-64	-184	-184	-179	-152	-129	-109	-92	-79	-79	
	44-X	-57	-57	-48	-38	0	0	0	0	-58	-58	-58	0	0	0	0	0	-58	-58	0	0	0	0	0	0	0	0
	48-X	-61	-61	-49	0	0	0	0	0	-62	-62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	-131	-129	-95	-74	-60	-49	-41	-35	-132	-132	-123	-99	-82	-70	-59	-51	-133	-133	-116	-97	-83	-73	-63	-63	-63	
120	80	-181	-181	-144	-114	-92	-74	-63	-54	-184	-184	-178	-150	-126	-107	-91	-78	-185	-185	-185	-169	-148	-128	-111	-96	-96	
	44-X	-58	-58	-55	0	0	0	0	0	-58	-58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	-61	-61	-56	0	0	0	0	0	-62	-62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	-132	-132	-108	-85	-70	-58	-49	-42	-133	-133	-133	-111	-93	-81	-71	-61	-134	-134	-134	-130	-109	-95	-84	-74	-74	
	80	-183	-183	-161	-131	-108	-89	-75	-65	-185	-185	-185	-166	-143	-123	-108	-93	-186	-186	-186	-185	-163	-145	-128	-114	-114	
130	44-X	-58	-58	-58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	-61	-61	-56	0	0	0	0	0	-62	-62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	-132	-132	-108	-85	-70	-58	-49	-42	-133	-133	-133	-111	-93	-81	-71	-61	-134	-134	-134	-130	-109	-95	-84	-74	-74	
	80	-183	-183	-161	-131	-108	-89	-75	-65	-185	-185	-185	-166	-143	-123	-108	-93	-186	-186	-186	-186	-163	-145	-128	-114	-114	
	44-X	-58	-58	-58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
140	48-X	-62	-62	-62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	-132	-132	-120	-96	-80	-69	-58	-50	-134	-134	-134	-124	-105	-91	-80	-71	-134	-134	-134	-134	-122	-106	-94	0	0	
	80	-184	-184	-176	-147	-123	-105	-89	-76	-185	-185	-185	-181	-159	-139	-123	-109	-186	-186	-186	-186	-178	-161	-144	-130	-130	
	44-X	-58	-58	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	-62	-62	-56	0	0	0	0	0	-60	-60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
150	48-XL	-133	-133	-132	-107	-90	-77	-67	-58	-134	-134	-134	-134	-116	-101	-90	-80	-135	-135	-135	-135	-134	-118	-105	0	0	
	80	-185	-185	-185	-162	-137	-118	-103	-89	-186	-186	-186	-186	-173	-155	-137	-123	-187	-187	-187	-187	-174	-159	-145	-145	-145	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	-133	-133	-132	-107	-90	-77	-67	-58	-134	-134	-134	-134	-116	-101	-90	-80	-135	-135	-135	-135	-134	-118	-105	0	0	
160	80	-185	-185	-185	-175	-152	-131	-116	-102	-187	-187	-187	-187	-186	-168	-152	-137	-187	-187	-187	-187	-187	-172	-159	-145	-145	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	-134	-134	-134	-127	-108	-94	-84	-75	-135	-135	-135	-135	-121	0	0	-135	-135	-135	-135	-135	0	0	0	0	0	
	80	-186	-186	-186	-186	-165	-144	-128	-115	-187	-187	-187	-187	-187	-180	-165	-150	-187	-187	-187	-187	-187	-187	-184	-171		
170	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	-134	-134	-134	-134	-117	-103	-91	0	-135	-135	-135	-135	0	0	0	-135	-135	-135	-135	0	0	0	0	0	0	
	80	-186	-186	-186	-186	-186	-177	-157	-140	-126	-187	-187	-187	-187	-187	-187	-176	-163	-188	-188	-188	-188	-188	-188	-188		
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
180	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	-134	-134	-134	-134	-117	-103	-91	0	-135	-135	-135	-135	0	0	0	-135	-135	-135	-135	0	0	0	0	0	0	
	80	-186	-186	-186	-186	-186	-177	-157	-140	-126	-187	-187	-187	-187	-187	-187	-176	-163	-188	-188	-188	-188	-188	-188	-188		

Note: The Forces shown in the tables above account for reactions associated with the interior support of a multi-span condition. See Max length for Multi Span for corresponding span length.

See SEAOC PV-2 2012 for definition of Roof Zones

### Larson Engineering Inc

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K2 Systems, LLC

## PV Tilt Up Kit Solar PV Mount System

**Standard size 41"x 86"**      **Portrait Orientation**

**Table 2.1 Max Length L (inches) for Multi span only Interior Conditions**

Note: The Forces shown in the tables above account for reactions associated with the interior support of a multi-span condition. See Max length for Multi Span for corresponding span length.  
See SEAOC PV-2 2012 for definition of Roof Zones

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K2 Systems, LLC

PV Tilt Up Kit Solar PV Mount System

Standard size 41"x 86" Portrait Orientation

Table 2.1A Max Length L (inches) for Multi span only Exterior Conditions

Exp C	Ultimate Wind Speed, V (mph)	Rail Type	Roof Wind Pressure Zone 1							Roof Wind Pressure Zone 2							Roof Wind Pressure Zone 3									
			Roof Snow Load (psf)							Roof Snow Load (psf)							Roof Snow Load (psf)									
			0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70
90	44-X	46	46	33	26	0	0	0	0	32	32	31	0	0	0	0	0	26	26	26	0	0	0	0	0	0
	48-X	51	48	36	27	0	0	0	0	36	36	32	0	0	0	0	0	29	29	29	0	0	0	0	0	0
	48-XL	122	104	74	56	43	35	30	26	85	85	68	53	43	35	30	26	70	70	65	51	42	35	30	26	
	80	157	137	99	76	58	47	40	34	116	115	91	71	58	47	40	34	95	95	83	69	56	47	40	34	
	44-X	37	37	31	24	0	0	0	0	26	26	26	0	0	0	0	0	21	21	0	0	0	0	0	0	0
	48-X	40	40	33	26	0	0	0	0	28	28	28	0	0	0	0	0	23	23	0	0	0	0	0	0	0
100	48-XL	97	96	70	54	43	35	30	26	68	68	63	50	42	35	30	26	56	56	56	48	40	34	30	26	
	80	132	123	93	73	58	47	40	34	93	93	82	67	56	47	40	34	76	76	74	63	53	46	40	34	
	44-X	30	30	29	0	0	0	0	0	21	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-X	33	33	31	0	0	0	0	0	23	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
110	48-XL	79	79	65	52	43	35	30	26	56	56	56	47	40	34	30	26	46	46	46	45	38	33	29	26	
	80	107	107	87	69	57	47	40	34	76	76	74	63	53	45	40	34	62	62	62	57	50	44	39	34	
	44-X	25	25	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-X	27	27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
120	48-XL	65	65	61	49	41	35	30	26	46	46	46	44	37	33	29	26	38	38	38	38	36	31	28	0	
	80	89	89	80	65	55	47	40	34	63	63	63	58	50	43	38	34	52	52	52	47	41	37	33	0	
	44-X	21	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
130	48-XL	55	55	55	46	39	34	30	26	39	39	39	39	35	31	28	0	32	32	32	32	32	29	0	0	
	80	75	75	74	62	52	45	40	34	53	53	53	53	47	41	37	33	44	44	44	43	39	35	32	0	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
140	48-XL	47	47	47	44	37	32	29	26	34	34	34	34	34	29	26	0	28	28	28	28	28	0	0	0	
	80	64	64	64	58	50	43	38	34	46	46	46	46	44	39	35	32	38	38	38	38	36	33	30	0	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
150	48-XL	41	41	41	41	36	31	28	25	29	29	29	29	29	28	0	0	24	24	24	24	24	0	0	0	
	80	56	56	56	54	47	41	37	33	40	40	40	40	37	34	30	33	33	33	33	33	33	31	0		
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
160	48-XL	36	36	36	36	34	30	27	0	25	25	25	25	25	0	0	0	0	29	29	29	29	29	29	0	
	80	49	49	49	49	45	40	35	32	35	35	35	35	35	32	29	29	29	29	29	29	29	29	0		
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
170	48-XL	32	32	32	32	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	80	43	43	43	43	42	38	34	31	31	31	31	31	31	30	0	25	25	25	25	25	25	0	0		
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
180	48-XL	28	28	28	28	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	80	38	38	38	38	38	36	33	30	27	27	27	27	27	0	0	0	0	0	0	0	0	0	0	0	

Note: The Forces shown in the tables above account for reactions associated with the exterior support of a multi-span condition. See Max length for Multi Span for corresponding span length.  
See SEAOC PV-2 2012 for definition of Roof Zones

Larson Engineering Inc

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## K2 Systems, LLC

PV Tilt Up Kit Solar PV Mount System

Standard size 41"x 86" Portrait Orientation

**Table 2.2 Maximum Downward Force (lbs) Multi Span Only Interior Conditions**

Exp C	Ultimate Wind Speed, V (mph)	Rail Type	Roof Wind Pressure Zone 1							Roof Wind Pressure Zone 2							Roof Wind Pressure Zone 3										
			Roof Snow Load (psf)							Roof Snow Load (psf)							Roof Snow Load (psf)										
			0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	
90	44-X	237	257	267	267	0	0	0	0	0	238	245	266	0	0	0	0	0	239	238	256	0	0	0	0	0	
		240	252	256	257	0	0	0	0	0	241	248	257	0	0	0	0	0	242	241	257	0	0	0	0	0	
		527	545	555	556	556	556	556	556	556	529	544	557	555	556	556	559	556	531	529	558	559	555	556	556	556	
	48-X	685	744	758	759	760	760	760	760	760	689	707	760	758	760	760	763	760	691	689	740	763	758	760	760	760	
		728	728	760	758	760	760	760	760	760	691	686	750	760	758	760	763	760	693	677	720	761	759	758	760	760	
		688	728	760	758	760	760	760	760	760	691	686	750	760	758	760	763	760	693	677	720	761	759	758	760	760	
100	44-X	238	252	267	266	0	0	0	0	0	239	237	260	0	0	0	0	0	240	234	0	0	0	0	0	0	0
		241	253	257	256	0	0	0	0	0	242	240	258	0	0	0	0	0	242	237	0	0	0	0	0	0	0
		528	547	556	555	556	556	556	556	556	531	527	558	556	555	556	559	556	532	520	553	560	556	555	556	556	
	48-X	680	688	728	760	758	760	760	760	760	691	686	750	760	758	760	763	760	693	677	720	761	759	758	760	760	
		239	247	267	0	0	0	0	0	0	240	234	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		241	250	257	0	0	0	0	0	0	242	237	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
110	48-XL	530	549	557	556	555	556	556	556	556	532	520	559	557	556	555	559	556	533	523	540	560	557	556	555	556	
		690	714	761	759	757	760	760	760	760	693	677	733	761	759	758	763	760	694	680	702	742	760	759	758	760	
		691	691	683	758	760	758	757	760	760	694	680	718	756	760	759	758	760	695	683	701	725	754	760	759	758	
	44-X	239	236	262	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		242	239	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		531	525	558	557	555	555	556	556	556	533	523	552	558	557	556	555	556	534	525	538	557	558	557	556	0	
120	48-XL	691	691	683	758	760	758	757	760	760	694	680	718	756	760	759	758	760	695	683	701	725	754	760	759	758	
		240	234	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-X	532	520	559	558	556	555	555	556	556	534	525	541	559	558	557	556	0	535	527	524	545	559	557	0	0	0
		693	677	744	761	760	758	757	760	760	695	683	705	741	762	760	759	758	696	686	682	709	738	761	760	759	
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
130	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		532	520	559	558	556	555	555	556	556	534	525	541	559	558	557	556	0	535	527	524	545	559	557	0	0	0
	48-XL	693	677	744	761	760	758	757	760	760	695	683	705	741	762	760	759	758	696	686	682	709	738	761	760	759	
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		533	522	560	558	557	556	555	555	555	535	527	529	559	558	557	0	0	536	529	518	538	556	0	0	0	
140	48-XL	694	680	732	763	761	759	758	758	758	696	685	688	727	755	761	760	759	697	688	675	701	723	746	761	760	
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		534	524	554	559	558	557	556	555	555	535	528	517	549	559	558	0	0	536	530	521	537	0	0	0	0	
	44-X	695	682	721	756	762	760	759	758	758	697	687	673	715	742	762	761	760	698	690	678	699	710	732	751	0	
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		534	526	543	560	558	557	556	0	0	536	529	520	541	0	0	0	0	0	536	530	521	537	0	0	0	0
160	48-XL	696	684	707	745	763	761	760	759	759	697	689	677	704	729	751	762	761	698	691	681	680	701	719	0	0	
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		534	527	523	561	559	558	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-XL	696	686	681	734	760	762	761	760	698	690	679	690	718	739	758	0	699	692	683	674	701	0	0	0		
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		535	528	518	557	560	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
170	44-X	697	688	674	725	750	763	762	760	698	691	681	674	708	0	0	0	0	0	0	0	0	0	0	0	0	
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
180	48-XL	697	688	674	725	750	763	762	760	698	691	681	674	708	0	0	0	0	0	0	0	0	0	0	0	0	
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		535	528	518	557	560	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Note: The Forces shown in the tables above account for reactions associated with the interior support of a multi-span condition. See Max length for Multi Span for corresponding span length.  
See SEAOC PV-2 2012 for definition of Roof Zones

### Larson Engineering Inc

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K2 Systems, LLC

PV Tilt Up Kit Solar PV Mount System

Standard size 41"x 86" Portrait Orientation

Table 2.2A Maximum Downward Force (lbs) Multi Span Only Exterior Conditions

Exp C	Ultimate Wind Speed, V (mph)	Rail Type	Roof Wind Pressure Zone 1							Roof Wind Pressure Zone 2							Roof Wind Pressure Zone 3											
			Roof Snow Load (psf)							Roof Snow Load (psf)							Roof Snow Load (psf)											
			0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70		
90	44-X	197	245	251	252	0	0	0	0	0	179	194	252	0	0	0	0	0	172	176	230	0	0	0	0	0	0	
		216	256	267	268	0	0	0	0	0	197	213	265	0	0	0	0	0	189	193	252	0	0	0	0	0	0	
		512	545	555	556	556	556	556	556	556	465	508	557	555	556	556	559	556	445	458	558	559	555	556	556	556	556	
	48-XL	667	724	745	746	746	746	747	747	747	643	689	747	745	746	746	750	747	616	632	721	750	744	746	747	747	747	
		185	212	252	251	0	0	0	0	0	171	174	230	0	0	0	0	0	165	165	0	0	0	0	0	0	0	0
		203	233	268	267	0	0	0	0	0	188	192	253	0	0	0	0	0	181	181	0	0	0	0	0	0	0	0
100	48-XL	479	547	556	555	556	556	556	556	556	443	454	558	556	555	556	559	556	427	427	523	559	556	555	556	556	556	
		663	709	746	745	746	746	747	747	747	614	626	730	746	745	746	750	747	592	592	701	741	746	744	747	747	747	
		176	189	252	0	0	0	0	0	0	165	165	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	193	208	266	0	0	0	0	0	0	181	181	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		457	494	557	555	556	556	556	556	556	427	427	532	557	556	555	559	556	415	415	466	560	557	556	555	556	556	
		632	679	748	746	744	746	747	747	747	592	592	714	748	746	745	750	747	575	575	641	722	747	746	745	747	747	
110	44-X	170	172	227	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		186	189	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		440	449	558	557	555	554	556	556	556	416	416	480	558	557	556	555	556	405	405	431	509	558	557	556	556	0	
	48-XL	609	617	738	747	745	744	747	747	747	576	576	660	736	747	746	745	747	562	562	595	699	734	747	746	745	745	
		165	165	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
120	48-XL	427	427	538	557	556	555	556	556	556	407	407	440	528	558	557	556	0	398	398	406	464	536	557	0	0	0	
		591	591	725	748	746	745	744	747	747	564	564	605	721	748	747	746	745	552	552	561	638	718	742	747	746	746	
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	44-X	417	417	493	558	557	556	555	556	556	400	400	412	484	559	557	556	0	392	392	430	490	0	0	0	0	0	
		578	578	678	748	747	746	745	745	745	555	555	569	665	735	748	747	746	544	544	594	673	726	746	747	747	747	
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
140	48-XL	409	409	458	549	558	557	556	555	556	394	394	394	449	514	558	0	0	388	388	409	0	0	0	0	0	0	
		567	567	630	736	748	747	746	745	745	547	547	547	618	707	744	748	747	538	538	538	564	623	696	731	0	0	
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	44-X	402	402	429	509	558	557	556	0	389	389	389	421	478	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		558	558	591	700	749	748	747	746	541	541	541	579	657	731	749	748	533	533	533	541	586	647	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
160	48-XL	397	397	405	476	546	558	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		551	551	559	655	740	749	747	746	536	536	536	553	616	685	737	0	529	529	529	529	561	0	0	0	0	0	
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	393	393	393	448	511	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		545	545	545	617	703	750	748	747	531	531	531	533	582	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
170	48-XL	393	393	393	448	511	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		545	545	545	617	703	750	748	747	531	531	531	533	582	0	0	0	0	0	0	0	0	0	0	0	0	0	0
180	48-XL	393	393	393	448	511	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		545	545	545	617	703	750	748	747	531	531	531	533	582	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Note: The Forces shown in the tables above account for reactions associated with the exterior support of a multi-span condition. See Max length for Multi Span for corresponding span length.

See SEAOC PV-2 2012 for definition of Roof Zones

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## K2 Systems, LLC

PV Tilt Up Kit Solar PV Mount System

Standard size 41"x 86" Portrait Orientation

**Table 2.3 Maximum Horizontal Force (lbs) Multi span only Interior Conditions**

Exp C	Ultimate Wind Speed, V (mph)	Rail Type	Roof Wind Pressure Zone 1							Roof Wind Pressure Zone 2							Roof Wind Pressure Zone 3									
			Roof Snow Load (psf)							Roof Snow Load (psf)							Roof Snow Load (psf)									
			0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70
90	44-X	87	76	55	42	0	0	0	0	93	88	70	44	0	0	0	0	110	96	77	53	0	0	0	0	0
		88	74	53	41	0	0	0	0	94	89	68	42	0	0	0	0	111	95	77	51	0	0	0	0	0
		194	161	115	88	68	55	46	40	207	196	146	115	94	76	64	55	243	208	168	134	110	92	77	67	67
		80	252	220	158	120	92	75	63	54	269	255	200	157	128	104	88	75	317	276	223	182	150	126	106	91
		91	84	64	50	0	0	0	0	96	94	78	52	0	0	0	0	115	106	81	63	0	0	0	0	0
100	48-X	92	84	62	48	0	0	0	0	98	95	77	50	0	0	0	0	116	106	78	60	0	0	0	0	0
		203	183	134	104	107	68	57	49	214	208	167	133	111	94	79	68	254	229	189	154	129	111	96	82	82
		80	264	243	183	142	146	93	78	67	279	271	225	182	151	128	108	93	331	305	245	210	176	151	130	113
		94	91	73	0	0	0	0	99	97	76	0	0	0	0	0	0	119	114	91	0	0	0	0	0	
		95	92	70	0	0	0	0	100	98	73	0	0	0	0	0	0	120	116	88	0	0	0	0	0	
110	48-XL	210	202	152	120	127	82	69	60	220	215	187	152	127	110	96	83	263	254	204	174	147	127	112	100	100
		80	273	263	207	164	173	112	94	81	286	279	246	207	174	150	131	113	343	330	265	231	200	174	153	136
		97	94	79	0	0	0	0	101	98	82	0	0	0	0	0	0	122	119	100	0	0	0	0	0	
		98	96	0	0	0	0	0	102	99	0	0	0	0	0	0	0	123	120	0	0	0	0	0	0	
		215	210	169	135	145	97	82	71	224	220	203	169	143	124	110	98	271	263	218	192	165	144	128	89	
120	80	280	273	229	185	197	132	112	97	292	286	264	229	196	170	150	134	352	343	288	249	223	196	174	157	
		99	97	0	0	0	0	0	103	101	0	0	0	0	0	0	0	125	122	0	0	0	0	0	0	
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		220	215	185	150	162	109	96	83	229	224	215	186	159	139	124	87	276	270	233	204	182	160	121	105	
		286	280	246	205	221	149	131	114	298	291	280	246	217	190	169	152	360	351	309	266	240	218	195	176	
130	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		224	219	200	165	179	122	107	96	233	228	222	201	174	153	112	100	281	276	252	216	197	153	135	121	
		291	285	262	225	245	166	147	132	303	297	289	262	236	210	187	169	366	359	329	283	256	235	215	195	
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
140	48-XL	227	223	212	179	196	134	119	107	236	232	226	212	189	167	124	111	285	280	267	226	192	168	149	134	
		296	290	276	242	268	183	162	146	307	302	294	276	250	229	205	186	371	365	347	304	270	249	232	183	
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		232	229	224	205	228	158	0	0	241	238	233	213	185	164	0	0	292	287	281	257	224	198	0	0	
		302	298	291	268	310	215	193	175	314	309	303	296	276	256	238	182	380	374	366	337	304	270	242	220	
150	48-XL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		234	231	226	215	243	0	0	0	243	240	236	224	197	0	0	0	294	290	285	270	238	0	0	0	
		305	301	295	280	326	231	208	189	317	313	307	299	288	240	216	196	383	378	370	352	320	290	261	237	
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Note: The Forces shown in the tables above account for reactions associated with the interior support of a multi-span condition. See Max length for Multi Span for corresponding span length.  
See SEAOC PV-2 2012 for definition of Roof Zones

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## K2 Systems, LLC

PV Tilt Up Kit Solar PV Mount System

Standard size 41"x 86" Portrait Orientation

**Table 2.3A Maximum Horizontal Force (lbs) Multi span only Exterior Conditions**

Exp C	Ultimate Wind Speed, V (mph)	Rail Type	Roof Wind Pressure Zone 1							Roof Wind Pressure Zone 2							Roof Wind Pressure Zone 3									
			Roof Snow Load (psf)							Roof Snow Load (psf)							Roof Snow Load (psf)									
			0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70
90	44-X	72	72	52	40	0	0	0	0	75	75	66	41	0	0	0	0	91	91	69	50	0	0	0	0	0
	48-X	80	76	56	42	0	0	0	0	83	79	70	44	0	0	0	0	100	95	76	53	0	0	0	0	0
	48-XL	187	159	114	86	66	54	45	39	195	181	144	113	92	75	63	54	235	200	166	132	108	90	76	65	65
	80	245	214	155	118	91	74	62	54	255	248	196	154	126	102	86	74	308	269	217	179	148	123	104	90	90
100	44-X	71	71	61	47	0	0	0	0	74	74	69	49	0	0	0	0	89	89	76	59	0	0	0	0	0
	48-X	92	84	62	48	0	0	0	0	98	95	77	50	0	0	0	0	116	106	78	60	0	0	0	0	0
	48-XL	183	180	132	103	82	66	56	48	190	188	165	131	109	92	78	67	230	227	176	152	127	109	94	81	81
	80	254	236	179	140	112	91	77	66	264	247	219	179	149	126	107	92	319	297	239	204	173	148	128	111	111
110	44-X	70	70	69	0	0	0	0	0	72	72	71	0	0	0	0	0	87	87	86	0	0	0	0	0	
	48-X	77	77	72	0	0	0	0	0	80	80	75	0	0	0	0	0	96	96	91	0	0	0	0	0	
	48-XL	180	180	150	118	98	80	68	58	187	187	176	150	125	108	94	81	226	226	188	172	145	125	111	98	98
	80	250	250	203	161	133	110	93	80	260	260	239	203	171	147	129	111	314	314	256	224	197	171	151	134	134
120	44-X	69	69	69	0	0	0	0	0	71	71	71	0	0	0	0	0	86	86	86	0	0	0	0	0	
	48-X	76	76	0	0	0	0	0	0	79	79	0	0	0	0	0	0	95	95	0	0	0	0	0	0	
	48-XL	178	178	167	133	111	95	80	69	185	185	174	167	141	123	108	96	223	223	210	173	162	142	126	87	
	80	247	247	223	182	151	130	110	95	257	257	242	223	192	167	148	132	310	310	280	241	217	193	171	154	154
130	44-X	68	68	0	0	0	0	0	0	71	71	0	0	0	0	0	0	86	86	86	0	0	0	0	0	
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-XL	176	176	176	148	125	108	94	82	183	183	183	173	157	137	122	85	221	221	221	186	172	158	119	102	
	80	244	244	240	202	170	147	129	112	254	254	249	240	213	187	166	149	307	307	301	253	234	213	192	173	
140	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-XL	175	175	175	163	138	120	106	95	182	182	182	172	172	151	135	98	219	219	219	205	173	151	133	119	
	80	243	243	243	221	188	163	144	129	252	252	252	240	229	206	184	166	305	305	305	277	238	228	211	192	
150	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-XL	174	174	174	174	151	132	117	105	180	180	180	180	172	165	122	109	218	218	218	218	190	166	147	132	
	80	241	241	241	235	205	180	159	143	251	251	251	245	238	223	202	183	303	303	303	296	258	237	225	180	
160	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-XL	173	173	173	173	164	144	128	0	180	180	180	180	171	150	133	0	217	217	217	217	206	181	161	0	
	80	240	240	240	240	222	196	175	158	250	250	250	238	237	219	200	302	302	302	302	280	246	219	198	198	
170	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-XL	172	172	172	172	155	0	0	0	179	179	179	179	179	162	0	0	216	216	216	216	216	195	0	0	
	80	239	239	239	239	236	211	189	172	249	249	249	249	245	237	232	179	300	300	300	300	296	266	238	216	
180	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-XL	171	171	171	171	171	0	0	0	178	178	178	178	178	0	0	0	215	215	215	215	215	0	0	0	
	80	238	238	238	238	238	227	204	186	248	248	248	248	248	236	212	193	299	299	299	299	299	285	256	233	

Note: The Forces shown in the tables above account for reactions associated with the exterior support of a multi-span condition. See Max length for Multi Span for corresponding span length.  
See SEAOC PV-2 2012 for definition of Roof Zones



## K2 Systems, LLC

PV Tilt Up Kit Solar PV Mount System

Standard size 41"x 86" Portrait Orientation

**Table 2.4 Max Uplift Force (lbs) Multi span only Interior Conditions**

Exp C	Ultimate Wind Speed, V (mph)	Rail Type	Roof Wind Pressure Zone 1							Roof Wind Pressure Zone 2							Roof Wind Pressure Zone 3										
			Roof Snow Load (psf)							Roof Snow Load (psf)							Roof Snow Load (psf)										
			0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	
90	44-X	-157	-137	-100	-76	0	0	0	0	-177	-167	-133	0	0	0	0	0	-186	-181	-149	0	0	0	0	0	0	
		-159	-134	-96	-73	0	0	0	0	-179	-169	-128	0	0	0	0	0	-189	-183	-150	0	0	0	0	0	0	
		-349	-290	-208	-159	-122	-99	-83	-72	-392	-372	-277	-218	-178	-144	-122	-105	-414	-403	-325	-259	-214	-178	-150	-130	-130	
		80	-454	-396	-284	-217	-166	-135	-114	-98	-511	-484	-379	-297	-243	-197	-167	-143	-539	-524	-432	-354	-292	-244	-205	-177	
		-44-X	-170	-157	-120	-93	0	0	0	0	-187	-182	-151	0	0	0	0	0	-196	-191	0	0	0	0	0	0	0
100	48-X	-172	-157	-115	-90	0	0	0	0	-190	-184	-150	0	0	0	0	0	-198	-193	0	0	0	0	0	0	0	0
		-378	-341	-250	-195	-156	-126	-106	-92	-416	-405	-325	-259	-215	-183	-154	-183	-435	-425	-373	-305	-254	-219	-189	-163	-163	
		80	-492	-453	-341	-266	-213	-173	-145	-125	-542	-527	-437	-354	-294	-249	-211	-249	-566	-553	-485	-415	-347	-299	-258	-223	-223
		-44-X	-181	-174	-139	0	0	0	0	-196	-191	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-183	-176	-134	0	0	0	0	0	-198	-193	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
110	48-XL	-401	-387	-290	-230	-190	-157	-132	-114	-435	-425	-370	-300	-252	-217	-190	-226	-451	-442	-409	-349	-295	-256	-226	-200	-200	
		80	-522	-503	-396	-313	-259	-214	-180	-156	-566	-553	-486	-409	-344	-296	-260	-308	-587	-575	-533	-463	-402	-349	-308	-274	-274
		-44-X	-189	-184	-155	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-191	-186	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-48-XL	-420	-409	-329	-264	-220	-189	-160	-138	-450	-441	-407	-339	-287	-250	-220	-273	-464	-456	-441	-389	-334	-292	-259	0	0
120	80	-547	-532	-447	-360	-301	-258	-219	-189	-585	-574	-529	-459	-393	-341	-301	-373	-604	-593	-574	-506	-452	-398	-354	-318	-318	
		-44-X	-196	-192	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		-48-XL	-435	-425	-366	-298	-250	-216	-190	-165	-462	-454	-436	-376	-322	-282	-250	0	-474	-467	-457	-418	-372	-327	0	0	
		80	-567	-554	-488	-406	-342	-295	-260	-225	-601	-590	-568	-498	-440	-385	-342	-427	-617	-608	-595	-544	-491	-447	-399	-361	-361
130	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-48-XL	-435	-425	-366	-298	-250	-216	-190	-165	-462	-454	-436	-376	-322	-282	-250	0	-474	-467	-457	-418	-372	-327	0	0	
		80	-567	-554	-488	-406	-342	-295	-260	-225	-601	-590	-568	-498	-440	-385	-342	-427	-617	-608	-595	-544	-491	-447	-399	-361	-361
		-48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
140	48-XL	-448	-439	-401	-330	-280	-243	-215	-193	-472	-464	-454	-411	-356	-313	0	0	-482	-476	-467	-445	-405	0	0	0	0	
		80	-583	-571	-525	-451	-383	-332	-294	-263	-614	-604	-591	-535	-481	-428	-382	-481	-628	-620	-608	-579	-527	-483	-443	-403	-403
		-44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
150	48-XL	-459	-451	-429	-361	-309	-270	-240	-216	-480	-473	-464	-436	-388	-344	0	0	-489	-484	-476	-468	0	0	0	0	0	
		80	-597	-586	-558	-489	-422	-369	-328	-295	-624	-616	-603	-567	-514	-470	-422	-534	-637	-630	-619	-609	-559	-516	-480	0	0
		-44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
160	80	-468	-460	-449	-391	-337	-297	-265	0	-486	-481	-472	-458	0	0	0	0	-545	-502	-460	-486	-644	-638	-628	-619	-589	-547
		-609	-599	-585	-520	-461	-405	-362	-327	-633	-625	-614	-597	-545	-502	-460	-486	-644	-638	-628	-619	-589	-547	0	0	0	0
		-44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-48-XL	-475	-468	-458	-419	-365	-323	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
170	80	-619	-610	-597	-549	-496	-440	-395	-358	-641	-634	-623	-614	-573	-531	-494	0	-651	-645	-636	-628	-615	0	0	0	0	0
		-627	-619	-607	-576	-524	-475	-428	-389	-647	-641	-631	-622	-599	0	0	0	0	0	0	0	0	0	0	0	0	0
		-44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-48-XL	-482	-475	-466	-443	-391	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
180	80	-627	-619	-607	-576	-524	-475	-428	-389	-647	-641	-631	-622	-599	0	0	0	0	0	0	0	0	0	0	0	0	0

Note: The Forces shown in the tables above account for reactions associated with the interior support of a multi-span condition. See Max length for Multi Span for corresponding span length.

See SEAOC PV-2 2012 for definition of Roof Zones

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## K2 Systems, LLC

PV Tilt Up Kit Solar PV Mount System

Standard size 41"x 86" Portrait Orientation

**Table 2.4A Max Uplift Force (lbs) Multi span only Exterior Conditions**

Exp C	Ultimate Wind Speed, V (mph)	Rail Type	Roof Wind Pressure Zone 1							Roof Wind Pressure Zone 2							Roof Wind Pressure Zone 3													
			Roof Snow Load (psf)							Roof Snow Load (psf)							Roof Snow Load (psf)													
			0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70				
90	44-X	-130	-130	-94	-72	0	0	0	0	-133	-133	-126	0	0	0	0	0	-134	-134	-134	0	0	0	0	0	0				
		-143	-136	-100	-76	0	0	0	0	-146	-146	-132	0	0	0	0	0	-147	-147	-147	0	0	0	0	0	0				
		-336	-286	-204	-155	-119	-96	-81	-70	-343	-343	-273	-214	-174	-141	-119	-102	-345	-345	-320	-255	-210	-174	-147	-127	-127				
		80	-442	-386	-279	-213	-163	-133	-112	-96	-477	-471	-372	-292	-239	-194	-164	-141	-481	-481	-420	-348	-287	-239	-201	-174	-174			
100	44-X	-132	-132	-113	-88	0	0	0	0	-134	-134	0	0	0	0	0	0	-135	-135	0	0	0	0	0	0	0	0			
		-145	-145	-120	-94	0	0	0	0	-147	-147	-147	0	0	0	0	0	-148	-148	0	0	0	0	0	0	0	0			
		-341	-336	-245	-191	-152	-124	-104	-90	-346	-346	-320	-255	-212	-179	-151	-178	-348	-348	-300	-250	-215	-185	-160	-160	-160	-160			
		80	-474	-441	-335	-261	-209	-170	-143	-123	-481	-481	-426	-348	-289	-245	-207	-245	-484	-484	-472	-404	-341	-294	-254	-219	-219	-219		
110	44-X	-133	-133	-131	0	0	0	0	-135	-135	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		-146	-146	-138	0	0	0	0	-148	-148	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		-344	-344	-286	-226	-186	-153	-129	-111	-348	-348	-348	-295	-248	-213	-186	-221	-349	-349	-345	-290	-251	-222	-196	-196	-196	-196	-196		
		80	-478	-478	-389	-308	-255	-211	-177	-153	-484	-484	-473	-402	-338	-291	-255	-303	-486	-486	-450	-395	-343	-303	-269	-269	-269	-269	-269	
120	44-X	-134	-134	-134	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		-147	-147	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		-346	-346	-325	-260	-216	-186	-157	-135	-349	-349	-349	-334	-283	-246	-217	-267	-351	-351	-351	-329	-287	-255	0	0	0	0	0		
		80	-482	-482	-435	-354	-295	-253	-215	-186	-486	-486	-486	-447	-386	-335	-296	-366	-488	-488	-488	-440	-391	-348	-313	-313	-313	-313	-313	
130	44-X	-135	-135	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
		-348	-348	-348	-293	-246	-213	-187	-161	-351	-351	-351	-351	-318	-278	-246	0	-352	-352	-352	-352	-352	-352	-323	0	0	0	0		
		80	-484	-484	-475	-399	-336	-290	-255	-221	-488	-488	-488	-485	-432	-378	-336	-420	-489	-489	-489	-489	-478	-435	-392	-354	-354	-354	-354	-354
140	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		-349	-349	-349	-326	-276	-240	-212	-189	-352	-352	-352	-352	-351	-309	-276	0	-353	-353	-353	-353	-353	-353	0	0	0	0	0	0	0
		80	-486	-486	-486	-442	-376	-327	-289	-259	-489	-489	-489	-489	-491	-468	-420	-376	-472	-490	-490	-490	-490	-470	-434	-396	-396	-396	-396	-396
150	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		-350	-350	-350	-350	-305	-266	-236	-212	-352	-352	-352	-352	-352	-339	0	0	-353	-353	-353	-353	-353	-353	0	0	0	0	0	0	0
		80	-487	-487	-487	-476	-415	-363	-322	-290	-490	-490	-490	-490	-491	-458	-415	-524	-491	-491	-491	-491	-491	-491	-467	0	0	0	0	0
160	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		-351	-351	-351	-351	-333	-293	-261	0	-353	-353	-353	-353	-353	-353	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		80	-489	-489	-489	-489	-453	-398	-355	-321	-491	-491	-491	-491	-491	-489	-452	-575	-492	-492	-492	-492	-492	-492	-467	0	0	0	0	0
170	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		-352	-352	-352	-352	-318	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		80	-490	-490	-490	-490	-483	-433	-388	-352	-492	-492	-492	-492	-492	-492	-492	-492	0	-493	-493	-493	-493	-493	0	0	0	0	0	0
180	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		-352	-352	-352	-352	-352	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		80	-490	-490	-490	-490	-490	-466	-420	-382	-492	-492	-492	-492	-492	-492	-492	0	0	0	0	0	0	0	0	0	0	0	0	0

Note: The Forces shown in the tables above account for reactions associated with the exterior support of a multi-span condition. See Max length for Multi Span for corresponding span length.

See SEAOC PV-2 2012 for definition of Roof Zones

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K2 Systems, LLC

#### PV Tilt Up Kit Solar PV Mount System

**Standard size 41"x 86"**      **Portrait Orientation**

**Table 2.5 Max Length L (inches) for Single Span Interior Conditions**

Note: The Forces shown in the tables above account for reactions associated with the interior support of a multi-span condition. See Max length for Multi Span for corresponding span length.  
See SEAOC PV-2 2012 for definition of Roof Zones

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K2 Systems, LLC

PV Tilt Up Kit Solar PV Mount System

Standard size 41"x 86" Portrait Orientation

Table 2.5A Max Length L (inches) for SingleSpan Exterior Conditions

Exp C	Ultimate Wind Speed, V (mph)	Rail Type	Roof Wind Pressure Zone 1							Roof Wind Pressure Zone 2							Roof Wind Pressure Zone 3									
			Roof Snow Load (psf)							Roof Snow Load (psf)							Roof Snow Load (psf)									
			0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70
90	44-X	36	36	28	21	0	0	0	0	0	25	25	25	0	0	0	0	0	21	21	21	0	0	0	0	0
	48-X	41	39	28	22	0	0	0	0	0	28	28	26	0	0	0	0	0	23	23	23	0	0	0	0	0
	48-XL	97	84	60	45	35	28	24	21	68	68	55	43	35	28	24	21	56	56	51	41	34	28	24	21	
	80	136	121	88	68	52	42	35	31	95	95	80	63	52	42	36	31	77	77	73	61	50	42	35	31	
	44-X	29	29	26	20	0	0	0	0	0	20	20	0	0	0	0	0	0	16	16	0	0	0	0	0	0
	48-X	32	32	27	21	0	0	0	0	0	23	23	23	0	0	0	0	0	19	19	0	0	0	0	0	0
100	48-XL	78	75	56	44	35	28	24	21	54	54	50	40	34	28	24	21	45	45	45	39	32	28	24	21	
	80	107	107	83	65	52	42	35	31	75	75	72	60	50	42	36	31	62	62	62	56	48	41	35	31	
	44-X	23	23	23	0	0	0	0	0	16	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
110	48-X	26	26	25	0	0	0	0	0	19	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-XL	63	63	53	42	34	28	24	21	44	44	44	38	32	27	24	21	36	36	35	30	26	23	21	21	
	80	87	87	77	62	51	42	35	31	62	62	56	47	41	36	31	50	50	50	50	45	39	34	31	31	
	44-X	19	19	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
120	48-X	22	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-XL	52	52	49	40	33	28	24	21	37	37	37	36	30	26	23	21	30	30	30	29	25	22	20	0	
	80	72	72	71	58	49	42	35	31	51	51	51	45	39	34	31	42	42	42	41	37	33	30	0	0	
	44-X	16	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
130	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-XL	44	44	44	37	31	27	24	21	31	31	31	29	25	22	0	26	26	26	26	26	24	0	0		
	80	61	61	61	55	46	40	35	31	43	43	43	42	37	33	29	36	36	36	36	36	34	31	28		
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
140	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-XL	38	38	38	35	30	26	23	21	27	27	27	27	24	21	0	22	22	22	22	22	20	0	0		
	80	52	52	52	51	44	39	34	30	37	37	37	35	31	28	31	31	31	31	31	31	29	27	27		
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
150	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-XL	33	33	33	33	29	25	22	20	23	23	23	23	23	20	0	19	19	19	19	19	0	0	0		
	80	45	45	45	45	42	37	33	29	32	32	32	32	32	30	27	27	27	27	27	27	27	27	0		
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
160	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-XL	29	29	29	29	27	24	21	0	20	20	20	20	20	0	0	0	0	0	0	0	0	0	0		
	80	40	40	40	40	35	32	28	28	28	28	28	28	28	28	26	23	23	23	23	23	23	23	0		
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
170	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-XL	25	25	25	25	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	80	35	35	35	35	34	30	27	25	25	25	25	25	25	25	0	21	21	21	21	21	21	21	0		
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
180	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-XL	22	22	22	22	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	80	31	31	31	31	31	31	29	27	22	22	22	22	22	0	0	0	0	0	0	0	0	0	0		

Note: The Forces shown in the tables above account for reactions associated with the interior support of a multi-span condition. See Max length for Multi Span for corresponding span length.  
See SEAOC PV-2 2012 for definition of Roof Zones

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K2 Systems, LLC

PV Tilt Up Kit Solar PV Mount System

Standard size 41"x 86" Portrait Orientation

Table 2.6 Maximum Downward Force (lbs) Single span only Interior Conditions

Exp C	Ultimate Wind Speed, V (mph)	Rail Type	Roof Wind Pressure Zone 1							Roof Wind Pressure Zone 2							Roof Wind Pressure Zone 3										
			Roof Snow Load (psf)							Roof Snow Load (psf)							Roof Snow Load (psf)										
			0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	
90	44-X	100	107	87	74	0	0	0	0	101	104	89	0	0	0	0	0	99	101	81	0	0	0	0	0	0	
		94	102	85	73	0	0	0	0	95	97	86	0	0	0	0	0	95	95	76	0	0	0	0	0	0	
		211	228	186	158	100	93	86	60	212	217	189	123	115	102	70	71	212	212	170	139	122	96	82	78		
		80	296	321	263	224	141	132	121	86	297	306	268	174	163	144	100	100	298	297	239	197	173	136	116	111	
100	44-X	101	108	92	82	0	0	0	0	99	101	94	0	0	0	0	0	95	95	0	0	0	0	0	0	0	0
		95	105	90	80	0	0	0	0	95	94	89	0	0	0	0	0	95	93	0	0	0	0	0	0	0	0
		211	229	196	173	110	104	97	67	212	211	198	138	123	115	82	79	213	208	183	156	130	112	97	89		
		80	297	325	279	246	155	148	137	95	298	296	278	196	174	163	117	113	299	292	257	219	185	159	137	126	
110	44-X	101	108	98	0	0	0	0	95	95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		95	106	95	0	0	0	0	95	93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		212	230	209	188	118	116	109	74	213	208	204	154	130	125	97	89	213	209	194	168	146	127	112	101		
		80	298	326	296	267	168	165	154	104	299	292	287	218	185	177	138	126	300	294	272	236	207	179	158	143	
120	44-X	98	99	104	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		95	106	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		212	231	219	203	125	129	122	81	213	209	210	167	143	133	109	100	214	210	203	179	160	141	125	0		
		80	299	327	308	288	177	183	173	115	300	294	294	235	202	189	155	141	300	295	286	252	225	200	177	159	
130	44-X	94	94	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		213	240	226	217	131	138	136	90	214	210	214	177	156	142	121	0	214	211	206	189	170	155	0	0	0	
		80	299	340	318	308	185	195	193	127	300	295	301	249	221	201	172	155	301	296	290	265	239	218	196	177	
140	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		213	251	232	231	140	146	146	98	214	211	215	186	168	151	0	0	214	211	207	198	180	0	0	0	0	
		80	300	355	326	328	198	208	207	139	301	296	302	262	235	213	188	170	301	297	291	278	252	232	214	194	
150	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		214	250	237	242	151	155	156	105	214	211	212	195	176	161	0	0	214	212	208	205	0	0	0	0	0	
		80	300	347	334	341	214	220	222	149	301	297	298	273	248	227	205	186	301	298	293	288	265	244	227	0	
160	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		214	245	241	251	161	164	166	0	214	212	211	202	0	0	0	0	0	214	210	208	205	0	0	0	0	0
		80	300	341	339	352	229	232	236	162	301	297	296	284	259	239	220	201	301	298	294	290	275	256	0	0	0
170	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		214	241	239	259	172	172	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		80	301	336	336	363	241	244	250	175	301	298	294	289	270	250	233	0	302	299	295	291	285	0	0	0	0
180	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		214	238	238	266	179	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		80	301	332	334	373	251	256	264	188	302	299	294	290	279	0	0	0	0	0	0	0	0	0	0	0	0

Note: The Forces shown in the tables above account for reactions associated with the interior support of a multi-span condition. See Max length for Multi Span for corresponding span length.  
See SEAOC PV-2 2012 for definition of Roof Zones

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## K2 Systems, LLC

PV Tilt Up Kit Solar PV Mount System

Standard size 41"x 86" Portrait Orientation

**Table 2.6A Maximum Downward Force (lbs) Single span only Exterior Conditions**

Exp C	Ultimate Wind Speed, V (mph)	Rail Type	Roof Wind Pressure Zone 1							Roof Wind Pressure Zone 2							Roof Wind Pressure Zone 3									
			Roof Snow Load (psf)							Roof Snow Load (psf)							Roof Snow Load (psf)									
			0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70
90	44-X	77	95	84	71	0	0	0	0	70	76	84	0	0	0	0	0	67	69	67	0	0	0	0	0	0
	48-X	87	102	85	73	0	0	0	0	79	85	86	0	0	0	0	0	75	77	75	0	0	0	0	0	0
	48-XL	203	220	178	150	95	89	82	58	186	203	181	117	109	97	67	67	178	183	163	132	117	91	78	75	
	80	288	319	265	225	142	133	122	86	284	267	176	164	145	100	101	251	257	237	199	174	137	117	112		
	100	44-X	72	83	89	78	0	0	0	0	67	68	77	0	0	0	0	0	64	64	0	0	0	0	0	0
100	48-X	81	93	90	80	0	0	0	0	75	77	87	0	0	0	0	0	73	73	0	0	0	0	0	0	0
	48-XL	192	216	188	166	104	99	92	64	177	182	190	132	118	109	78	76	171	171	171	149	124	107	92	85	
	80	270	310	281	248	157	149	138	95	250	255	276	198	176	164	118	114	241	241	241	218	186	160	138	127	
	110	44-X	69	74	89	0	0	0	0	64	64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	77	83	95	0	0	0	0	0	73	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
110	48-XL	183	198	200	180	113	111	103	70	171	171	192	146	125	119	92	85	166	166	166	161	139	120	106	96	
	80	257	276	296	269	169	166	155	105	241	241	269	218	186	178	139	127	234	234	234	207	181	160	144		
	120	44-X	66	67	83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	75	76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-XL	176	180	210	194	119	123	116	77	166	166	181	160	136	127	104	95	162	162	162	153	134	119	0		
120	80	248	251	306	290	178	184	174	116	235	235	255	233	204	191	156	143	229	229	229	223	201	179	161		
	44-X	64	64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-XL	171	171	211	207	125	131	129	85	163	163	173	163	149	136	115	0	159	159	159	159	147	0	0		
	80	241	241	297	310	187	197	194	128	230	230	244	230	220	203	173	156	225	225	225	225	216	197	178		
130	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-XL	171	171	211	207	125	131	129	85	163	163	173	163	149	136	115	0	159	159	159	159	147	0	0		
	80	241	241	297	310	187	197	194	128	230	230	244	230	220	203	173	156	225	225	225	225	216	197	178		
	140	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
140	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-XL	167	167	202	221	133	140	139	94	160	160	167	160	160	144	126	0	157	157	157	157	157	0	0		
	80	235	235	285	325	199	209	209	141	226	226	235	226	215	190	172	222	222	222	222	222	212	196			
	150	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
150	48-XL	164	164	195	227	143	148	149	100	158	158	162	158	158	153	0	0	155	155	155	155	155	0	0	0	
	80	231	231	275	320	215	222	223	150	223	223	229	223	223	206	187	219	219	219	219	219	219	219	219		
	160	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-XL	161	161	189	221	154	156	159	0	156	156	158	156	156	0	0	0	0	0	0	0	0	0	0		
160	80	227	227	267	312	227	234	238	164	220	220	223	220	220	219	203	217	217	217	217	217	217	217	0		
	170	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-XL	159	159	184	216	159	164	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	80	224	224	260	305	224	246	252	177	218	218	218	218	218	218	0	215	215	215	215	215	0	0	0		
170	180	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-XL	157	157	180	212	157	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	80	222	222	255	300	222	247	266	189	216	216	216	216	216	0	0	0	0	0	0	0	0	0	0	0	

Note: The Forces shown in the tables above account for reactions associated with the interior support of a multi-span condition. See Max length for Multi Span for corresponding span length.

See SEAOC PV-2 2012 for definition of Roof Zones

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K2 Systems, LLC

PV Tilt Up Kit Solar PV Mount System

Standard size 41"x 86" Portrait Orientation

Table 2.7 Maximum Horizontal Force (lbs) Single span only Interior Conditions

Exp C	Ultimate Wind Speed, V (mph)	Rail Type	Roof Wind Pressure Zone 1							Roof Wind Pressure Zone 2							Roof Wind Pressure Zone 3									
			Roof Snow Load (psf)							Roof Snow Load (psf)							Roof Snow Load (psf)									
			0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70
90	44-X	37	32	23	17	0	0	0	0	39	37	29	18	0	0	0	0	46	40	33	22	0	0	0	0	
		35	30	22	17	0	0	0	0	37	35	28	18	0	0	0	0	44	38	31	21	0	0	0	0	
		77	68	48	37	28	23	19	17	83	78	61	48	39	32	27	23	97	85	68	56	46	39	32	28	
		80	109	95	68	52	40	33	27	24	116	110	87	68	56	45	38	33	137	119	96	79	65	55	46	40
	48-X	39	36	26	21	0	0	0	0	40	40	33	21	0	0	0	0	49	45	33	26	0	0	0	0	
		36	35	26	20	0	0	0	0	38	37	31	21	0	0	0	0	46	44	32	25	0	0	0	0	
100	48-XL	81	76	56	44	35	28	24	21	86	83	69	56	46	39	33	29	102	96	75	64	54	46	40	35	
		80	114	108	79	62	50	40	34	29	120	117	97	79	66	56	47	41	143	136	106	91	76	66	57	49
		40	40	30	0	0	0	0	0	42	41	31	0	0	0	0	0	50	50	37	0	0	0	0	0	
		38	39	29	0	0	0	0	0	39	41	30	0	0	0	0	0	47	49	36	0	0	0	0	0	
	48-XL	84	85	63	50	41	34	29	25	88	88	75	63	53	46	40	35	105	106	82	71	61	53	47	42	
		80	118	120	90	71	59	49	41	35	124	125	106	90	76	65	57	49	148	151	115	100	87	76	67	59
110	44-X	40	40	33	0	0	0	0	0	41	41	35	0	0	0	0	0	50	50	42	0	0	0	0	0	
		39	42	0	0	0	0	0	0	40	44	0	0	0	0	0	0	48	53	0	0	0	0	0	0	
		86	92	70	57	47	41	34	30	90	96	81	70	60	52	46	41	108	116	88	77	68	60	53	37	
		80	121	131	99	80	67	57	49	42	126	136	114	99	85	74	65	58	152	164	124	108	96	85	76	68
	48-X	39	39	0	0	0	0	0	0	41	41	0	0	0	0	0	0	49	49	0	0	0	0	0	0	
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
120	48-XL	88	99	76	63	53	46	40	35	92	103	86	76	67	58	52	36	111	125	95	82	74	67	51	44	
		80	124	141	106	89	75	65	57	49	129	146	121	106	94	83	73	66	155	177	134	115	104	94	85	77
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		90	105	81	69	59	51	45	40	93	110	89	80	72	64	47	42	113	133	101	87	79	64	57	51	
	44-X	126	149	113	98	83	72	64	57	131	155	125	113	102	91	81	74	158	187	142	123	110	101	94	85	
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
140	48-X	91	106	85	74	64	56	50	45	94	110	90	85	77	70	52	47	114	133	107	93	81	70	63	56	
		80	128	148	119	104	91	79	71	63	133	154	127	119	108	99	89	81	160	186	150	131	117	108	100	80
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		92	105	88	79	69	61	54	0	96	110	92	89	72	63	57	0	115	132	111	99	87	77	68	0	
	48-XL	147	124	110	98	87	77	70	63	134	152	129	125	114	105	97	88	162	184	156	139	124	114	97	88	
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
160	48-X	93	105	90	82	74	66	0	0	97	109	93	86	77	69	0	0	117	132	113	104	94	83	0	0	
		80	130	146	126	116	105	94	84	76	136	152	131	128	119	110	103	79	164	183	158	146	131	118	105	95
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		94	104	91	86	78	0	0	0	97	108	94	89	81	0	0	0	118	131	114	108	98	0	0	0	
	48-XL	132	145	127	121	110	100	90	82	137	151	132	129	124	104	94	85	165	182	160	152	138	126	113	103	
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Note: The Forces shown in the tables above account for reactions associated with the interior support of a multi-span condition. See Max length for Multi Span for corresponding span length.  
See SEAOC PV-2 2012 for definition of Roof Zones

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K2 Systems, LLC

## PV Tilt Up Kit Solar PV Mount System

**Standard size 41"x 86"**      **Portrait Orientation**

**Table 2.7A Maximum Horizontal Force (lbs) Singlespan only Exterior Conditions**

		Table 2.7A Maximum Horizontal Force (lbs) Singlespan only Exterior Conditions																								
Exp C	Ultimate Wind Speed, V (mph)	Rail Type	Roof Wind Pressure Zone 1							Roof Wind Pressure Zone 2							Roof Wind Pressure Zone 3									
			Roof Snow Load (psf)							Roof Snow Load (psf)							Roof Snow Load (psf)									
			0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70
90	90	44-X	28	28	22	17	0	0	0	0	29	29	27	17	0	0	0	0	35	35	27	21	0	0	0	0
		48-X	32	30	22	17	0	0	0	0	33	31	28	18	0	0	0	0	40	38	30	21	0	0	0	0
		48-XL	74	64	46	35	27	22	18	16	77	72	58	46	37	30	25	22	93	81	65	53	44	36	31	26
		80	106	94	69	53	40	33	28	24	110	102	87	69	56	46	38	33	133	118	95	80	66	55	46	40
100	100	44-X	28	28	25	20	0	0	0	0	29	29	27	20	0	0	0	0	35	35	32	25	0	0	0	0
		48-X	31	31	26	20	0	0	0	0	32	32	30	21	0	0	0	0	39	39	32	25	0	0	0	0
		48-XL	73	71	53	41	33	27	23	19	76	74	66	53	44	37	31	27	92	89	70	61	51	44	38	33
		80	103	103	80	62	50	41	34	29	108	108	96	80	66	56	48	41	130	130	101	90	77	66	57	49
110	110	44-X	27	27	27	0	0	0	0	0	28	28	28	0	0	0	0	0	34	34	34	0	0	0	0	0
		48-X	31	31	29	0	0	0	0	0	32	32	30	0	0	0	0	0	38	38	36	0	0	0	0	0
		48-XL	72	72	60	48	39	32	27	24	75	75	70	60	51	44	38	33	90	90	76	68	58	51	45	39
		80	102	102	90	72	59	49	41	36	106	106	100	90	76	66	57	49	128	128	113	99	87	76	67	60
120	120	44-X	27	27	27	0	0	0	0	0	28	28	28	0	0	0	0	0	34	34	34	0	0	0	0	0
		48-X	30	30	0	0	0	0	0	0	31	31	0	0	0	0	0	0	38	38	38	0	0	0	0	0
		48-XL	71	71	67	54	45	38	32	28	74	74	70	67	57	49	44	39	89	89	84	69	65	57	51	35
		80	101	101	98	81	68	58	49	42	105	105	102	98	86	74	66	59	126	126	123	102	95	86	76	69
130	130	44-X	27	27	0	0	0	0	0	0	28	28	0	0	0	0	0	0	33	33	0	0	0	0	0	0
		48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		48-XL	70	70	70	60	50	43	38	33	73	73	73	69	63	55	49	34	88	88	88	75	69	64	48	41
		80	100	100	100	90	76	65	58	50	104	104	104	98	94	83	74	67	125	125	125	113	97	94	85	77
140	140	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		48-XL	70	70	70	66	56	48	43	38	73	73	73	69	69	61	54	40	88	88	88	82	70	61	54	48
		80	99	99	99	97	84	73	64	58	103	103	101	98	92	82	74	124	124	124	122	105	97	93	86	
150	150	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		48-XL	69	69	69	69	61	53	47	42	72	72	72	72	69	67	49	44	87	87	87	87	77	67	59	53
		80	98	98	98	98	92	80	71	64	102	102	102	102	97	97	90	82	123	123	123	123	115	101	97	80
160	160	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		48-XL	69	69	69	69	66	58	52	0	72	72	72	72	69	60	54	0	87	87	87	87	83	73	65	0
		80	98	98	98	98	98	87	78	70	102	102	102	102	97	96	89	123	123	123	123	123	110	98	88	
170	170	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		48-XL	69	69	69	69	69	63	0	0	72	72	72	72	65	0	0	86	86	86	86	86	79	0	0	0
		80	97	97	97	97	97	94	85	77	101	101	101	101	98	97	80	122	122	122	122	122	118	106	96	
180	180	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		48-XL	69	69	69	69	69	0	0	0	71	71	71	71	71	0	0	86	86	86	86	86	0	0	0	0
		80	97	97	97	97	97	97	91	83	101	101	101	101	101	95	86	122	122	122	122	122	114	104	0	

Note: The Forces shown in the tables above account for reactions associated with the interior support of a multi-span condition. See Max length for Multi Span for corresponding span length.  
See SEAOC PV-2 2012 for definition of Roof Zones

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## K2 Systems, LLC

PV Tilt Up Kit Solar PV Mount System

Standard size 41"x 86" Portrait Orientation

**Table 2.8 Max Uplift Force (lbs) Single span only Interior Conditions**

Exp C	Ultimate Wind Speed, V (mph)	Rail Type	Roof Wind Pressure Zone 1							Roof Wind Pressure Zone 2							Roof Wind Pressure Zone 3										
			Roof Snow Load (psf)							Roof Snow Load (psf)							Roof Snow Load (psf)										
			0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	
90	44-X	-67	-57	-41	-31	0	0	0	0	-75	-71	-55	0	0	0	0	0	-77	-77	-63	0	0	0	0	0	0	
		-62	-55	-40	-31	0	0	0	0	-70	-67	-53	0	0	0	0	0	-74	-72	-59	0	0	0	0	0	0	
		-140	-122	-87	-66	-51	-41	-35	-30	-251	-149	-116	-91	-74	-60	-51	-44	-166	-161	-133	-108	-89	-75	-63	-54		
		80	-196	-171	-123	-94	-72	-59	-49	-43	-221	-209	-165	-129	-106	-86	-72	-62	-233	-226	-186	-154	-127	-106	-89	-77	
	48-X	-72	-67	-49	-38	0	0	0	0	-77	-77	-64	0	0	0	0	0	-77	-77	0	0	0	0	0	0	0	0
		-68	-66	-48	-37	0	0	0	0	-75	-73	-60	0	0	0	0	0	-78	-76	0	0	0	0	0	0	0	0
100	48-XL	-151	-143	-104	-81	-65	-53	-45	-38	-211	-162	-134	-108	-90	-76	-65	-56	-174	-170	-149	-128	-107	-92	-79	-68		
		80	-212	-202	-148	-116	-93	-75	-63	-55	-234	-228	-189	-154	-128	-108	-92	-79	-244	-239	-210	-179	-151	-130	-112	-97	
		-77	-76	-57	0	0	0	0	0	-77	-77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-72	-75	-55	0	0	0	0	0	-78	-76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	-160	-162	-121	-96	-79	-66	-55	-48	-179	-170	-149	-125	-105	-91	-80	-68	-180	-177	-164	-142	-123	-107	-94	-84		
		80	-225	-230	-172	-136	-113	-93	-78	-68	-244	-239	-210	-178	-149	-129	-113	-97	-253	-248	-230	-200	-175	-152	-134	-119	
110	44-X	-77	-77	-65	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-75	-83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-168	-180	-137	-111	-92	-79	-67	-58	-180	-176	-163	-141	-120	-104	-92	-82	-186	-182	-177	-155	-139	-122	-108	0		
		80	-236	-255	-193	-157	-131	-112	-95	-82	-253	-248	-228	-198	-171	-148	-131	-117	-261	-256	-248	-218	-195	-173	-154	-138	
	48-X	-77	-77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
120	48-XL	-174	-196	-150	-125	-105	-91	-80	-69	-185	-181	-174	-153	-135	-118	-105	0	-190	-187	-183	-167	-151	-137	0	0		
		80	-245	-278	-211	-177	-149	-128	-113	-98	-259	-255	-245	-215	-191	-167	-149	-134	-266	-262	-257	-235	-212	-193	-174	-157	
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		-179	-211	-161	-138	-117	-102	-90	-81	-189	-186	-182	-164	-148	-131	0	-193	-190	-187	-178	-162	0	0	0	0		
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-271	-268	-263	-250	-227	-209	-193	-175		
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
140	48-XL	-184	-215	-172	-150	-129	-113	-101	-90	-192	-189	-185	-174	-158	-144	0	-196	-194	-190	-187	0	0	0	0	0		
		80	-258	-298	-241	-211	-184	-161	-143	-128	-270	-266	-261	-245	-222	-203	-183	-166	-275	-272	-267	-263	-242	-223	-207	0	
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		-187	-215	-180	-160	-141	-124	-111	0	-195	-192	-189	-183	0	0	0	0	0	0	0	0	0	0	0	0	0	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
160	48-XL	-187	-215	-180	-160	-141	-124	-111	0	-195	-192	-189	-183	0	0	0	0	0	0	0	0	0	0	0	0	0	
		80	-263	-298	-253	-225	-200	-176	-157	-142	-273	-270	-265	-258	-235	-217	-200	-182	-278	-275	-271	-267	-254	-236	0		
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		-267	-298	-258	-237	-214	-192	-172	-156	-277	-274	-269	-265	-248	-229	-213	0	-281	-278	-275	-271	-266	0	0	0		
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
170	48-XL	-190	-215	-183	-169	-152	-135	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		80	-267	-298	-258	-237	-214	-192	-172	-156	-277	-274	-269	-265	-248	-229	-213	0	-281	-278	-275	-271	-266	0	0	0	
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		-193	-215	-186	-177	-161	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
180	48-XL	-193	-215	-186	-177	-161	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		80	-271	-298	-262	-249	-226	-206	-186	-169	-279	-277	-273	-269	-259	0	0	0	0	0	0	0	0	0	0	0	
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		-271	-298	-262	-249	-226	-206	-186	-169	-279	-277	-273	-269	-259	0	0	0	0	0	0	0	0	0	0	0	0	

Note: The Forces shown in the tables above account for reactions associated with the interior support of a multi-span condition. See Max length for Multi Span for corresponding span length.

See SEAOC PV-2 2012 for definition of Roof Zones

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## K2 Systems, LLC

PV Tilt Up Kit Solar PV Mount System

Standard size 41"x 86" Portrait Orientation

**Table 2.8A Max Uplift Force (lbs) Single span only Exterior Conditions**

Exp C	Ultimate Wind Speed, V (mph)	Rail Type	Roof Wind Pressure Zone 1							Roof Wind Pressure Zone 2							Roof Wind Pressure Zone 3										
			Roof Snow Load (psf)							Roof Snow Load (psf)							Roof Snow Load (psf)										
			0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	
90	44-X	-51	-51	-39	-30	0	0	0	0	-52	-52	-52	0	0	0	0	0	-52	-52	-52	0	0	0	0	0	0	
		-57	-55	-40	-31	0	0	0	0	-58	-58	-53	0	0	0	0	0	-59	-59	-59	0	0	0	0	0	0	
		-133	-115	-82	-62	-48	-39	-33	-28	-137	-137	-110	-86	-70	-57	-48	-41	-138	-138	-126	-103	-85	-70	-59	-51		
		80	-191	-170	-124	-95	-73	-59	-50	-43	-194	-194	-164	-130	-106	-86	-73	-63	-196	-196	-185	-155	-128	-107	-90	-78	
100	44-X	-51	-51	-47	-37	0	0	0	0	-52	-52	-52	0	0	0	0	0	-52	-52	0	0	0	0	0	0	0	0
		-58	-58	-48	-37	0	0	0	0	-59	-59	-59	0	0	0	0	0	-59	-59	0	0	0	0	0	0	0	0
		-136	-132	-99	-77	-61	-50	-42	-36	-138	-138	-128	-103	-85	-72	-61	-52	-139	-139	-139	-121	-101	-87	-75	-64		
		80	-193	-193	-149	-116	-93	-76	-64	-55	-196	-196	-187	-155	-129	-109	-92	-79	-197	-197	-197	-178	-152	-131	-113	-98	
110	44-X	-52	-52	-52	0	0	0	0	0	-52	-52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-59	-59	-55	0	0	0	0	0	-59	-59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-137	-137	-115	-91	-75	-62	-52	-45	-139	-139	-139	-119	-100	-86	-75	-64	-140	-140	-140	-135	-117	-101	-89	-79		
		80	-195	-195	-172	-137	-114	-94	-79	-68	-197	-197	-197	-178	-151	-130	-114	-98	-198	-198	-198	-175	-153	-135	-120		
120	44-X	-52	-52	-52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-59	-59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-138	-138	-131	-105	-87	-75	-63	-55	-140	-140	-140	-134	-114	-99	-87	-78	-140	-140	-140	-132	-116	-103	0			
		80	-196	-196	-191	-158	-132	-113	-96	-83	-198	-198	-198	-197	-172	-149	-132	-118	-199	-199	-199	-193	-175	-155	-139		
130	44-X	-52	-52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-139	-139	-139	-118	-99	-86	-75	-65	-140	-140	-140	-140	-128	-112	-99	0	-141	-141	-141	-141	-141	-130	0	0	0	
		80	-197	-197	-197	-178	-150	-129	-114	-99	-199	-199	-199	-199	-190	-169	-150	-135	-199	-199	-199	-199	-191	-175	-158		
140	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-140	-140	-140	-131	-111	-97	-85	-76	-141	-141	-141	-141	-125	-111	0	-141	-141	-141	-141	-141	0	0	0	0	0	
		80	-198	-198	-198	-195	-168	-146	-129	-115	-199	-199	-199	-199	-199	-187	-168	-151	-200	-200	-200	-200	-191	-176			
150	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-140	-140	-140	-140	-123	-107	-95	-86	-141	-141	-141	-141	-137	0	0	-141	-141	-141	-141	-141	0	0	0	0	0	
		80	-198	-198	-198	-185	-162	-144	-129	-200	-200	-200	-200	-200	-200	-185	-168	-200	-200	-200	-200	-200	-200	-200	-200		
160	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-140	-140	-140	-140	-134	-118	-105	0	-141	-141	-141	-141	-141	0	0	0	0	0	0	0	0	0	0	0	0	0
		80	-199	-199	-199	-199	-178	-159	-143	-200	-200	-200	-200	-200	-200	-199	-184	-200	-200	-200	-200	-200	-200	-200	-200		
170	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-141	-141	-141	-141	-141	-128	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		80	-199	-199	-199	-199	-193	-173	-157	-200	-200	-200	-200	-200	-200	-200	0	-201	-201	-201	-201	-201	0	0	0	0	
180	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-141	-141	-141	-141	-141	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		80	-200	-200	-200	-200	-200	-187	-170	-200	-200	-200	-200	-200	-200	0	0	0	0	0	0	0	0	0	0	0	0

Note: The Forces shown in the tables above account for reactions associated with the interior support of a multi-span condition. See Max length for Multi Span for corresponding span length.  
See SEAOC PV-2 2012 for definition of Roof Zones

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K2 Systems, LLC

PV Tilt Up Kit Solar PV Mount System

Standard size 41"x 86" Portrait Orientation

Table 3.1 Max Length L (inches) for Multi span only Interior Conditions

Exp D	Ultimate Wind Speed, V (mph)	Rail Type	Roof Wind Pressure Zone 1							Roof Wind Pressure Zone 2							Roof Wind Pressure Zone 3									
			Roof Snow Load (psf)							Roof Snow Load (psf)							Roof Snow Load (psf)									
			0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	61
90	44-X	48	44	32	25	0	0	0	0	37	36	29	0	0	0	0	0	31	30	0	0	0	0	0	0	0
	48-X	49	44	34	26	0	0	0	0	37	36	30	0	0	0	0	0	32	31	0	0	0	0	0	0	0
	48-XL	106	97	71	55	44	35	30	26	81	79	64	51	42	35	30	26	69	67	58	49	41	35	30	26	
	80	125	114	89	72	61	49	41	36	96	93	76	64	55	48	42	36	81	79	69	59	51	45	41	36	
	44-X	41	39	30	0	0	0	0	0	31	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	41	39	31	0	0	0	0	0	31	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
100	48-XL	89	86	66	52	43	35	30	26	68	66	58	48	40	34	30	26	57	56	52	45	38	33	29	26	
	80	105	101	81	67	57	49	41	36	80	78	68	58	51	45	40	36	67	66	61	53	47	42	38	34	
	44-X	34	34	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	35	34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
110	48-XL	76	74	61	49	41	35	30	26	57	56	52	44	38	33	29	26	48	47	46	40	36	31	28	0	
	80	90	87	73	62	53	47	41	36	67	66	61	53	47	42	38	34	57	56	54	48	42	38	35	32	
	44-X	30	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
120	48-XL	65	64	56	46	39	34	30	26	49	48	46	41	35	31	28	0	41	41	40	36	33	29	0	0	
	80	77	75	67	57	50	44	40	36	58	57	55	48	43	39	35	32	48	48	47	43	39	35	32	30	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
130	48-XL	57	56	51	44	37	32	29	26	42	42	41	37	33	29	0	0	35	35	34	33	30	0	0	0	
	80	67	66	61	53	46	42	38	34	50	49	48	44	39	36	33	30	42	41	40	39	35	32	30	28	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
140	48-XL	50	49	47	41	35	31	27	0	37	36	36	34	31	0	0	0	31	31	30	30	0	0	0	0	
	80	59	58	55	48	43	39	35	33	43	43	42	40	36	33	31	28	36	36	35	35	32	30	28	0	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
150	48-XL	44	43	42	38	33	29	26	0	32	32	31	31	0	0	0	0	0	0	0	0	0	0	0	0	0
	80	52	51	50	45	40	37	33	31	38	38	37	36	33	31	29	0	32	32	31	31	30	27	0	0	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
160	48-XL	39	38	38	35	32	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	80	46	45	44	41	37	34	31	29	34	33	33	32	31	28	0	0	0	0	0	0	0	0	0	0	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
170	48-XL	35	34	34	32	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	80	41	40	40	38	35	32	30	28	30	30	29	29	28	0	0	0	0	0	0	0	0	0	0	0	0
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
180	48-XL	31	31	30	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	80	37	36	36	35	33	30	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Note: The Forces shown in the tables above account for reactions associated with the interior support of a multi-span condition. See Max length for Multi Span for corresponding span length.  
See SEAOC PV-2 2012 for definition of Roof Zones

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K2 Systems, LLC

PV Tilt Up Kit Solar PV Mount System

Standard size 41"x 86" Portrait Orientation

Table 3.1A Max Length L (inches) for Multi span only Exterior Conditions

Exp D	Ultimate Wind Speed, V (mph)	Rail Type	Roof Wind Pressure Zone 1							Roof Wind Pressure Zone 2							Roof Wind Pressure Zone 3									
			Roof Snow Load (psf)							Roof Snow Load (psf)							Roof Snow Load (psf)									
			0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	61
90	44-X	38	38	33	26	0	0	0	0	0	27	27	27	0	0	0	0	0	22	22	0	0	0	0	0	0
		42	42	32	25	0	0	0	0	0	30	30	29	0	0	0	0	0	24	24	0	0	0	0	0	0
		103	98	72	56	44	36	30	26	72	72	65	52	43	36	30	26	59	59	59	50	41	35	30	26	
		80	125	114	83	65	51	42	35	30	96	93	76	60	50	42	35	30	79	79	69	57	48	41	35	30
	48-X	31	31	0	0	0	0	0	0	22	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		34	34	30	0	0	0	0	0	24	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		82	82	67	53	44	36	30	26	58	58	58	48	40	35	30	26	47	47	47	45	39	34	30	26	
		80	105	101	78	61	51	42	35	30	77	77	68	56	47	40	35	30	63	63	61	53	45	39	34	30
	48-XL	25	25	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		27	27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		67	67	62	50	42	36	30	26	47	47	47	45	38	33	29	26	39	39	39	39	36	32	28	0	
		80	89	87	72	58	48	41	35	30	63	63	61	52	44	38	34	30	52	52	52	48	42	37	33	29
	44-X	21	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		55	55	55	47	40	34	30	26	39	39	39	39	36	31	28	0	32	32	32	32	32	30	0	0	
		80	74	74	67	55	46	40	35	30	53	53	53	48	42	36	32	29	43	43	43	39	35	31	28	
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		47	47	44	38	33	29	26	33	33	33	33	33	33	30	0	0	27	27	27	27	27	0	0	0	
		80	63	63	61	51	44	38	34	30	45	45	45	44	39	35	31	28	37	37	37	37	35	32	29	27
	48-XL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		40	40	40	40	36	31	28	0	29	29	29	29	29	0	0	0	24	24	24	24	24	0	0	0	
		80	54	54	54	48	41	36	32	29	38	38	38	38	36	33	29	27	32	32	32	32	30	28	0	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		35	35	35	35	34	30	27	0	25	25	25	25	0	0	0	0	0	0	0	0	0	0	0	0	0
		80	47	47	47	45	39	35	31	28	33	33	33	33	31	28	0	27	27	27	27	27	0	0	0	
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		30	30	30	30	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		80	41	41	41	41	37	33	30	27	29	29	29	29	28	0	0	0	0	0	0	0	0	0	0	0
	48-XL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		35	35	35	35	31	28	26	23	20	25	25	25	25	0	0	0	0	0	0	0	0	0	0	0	0
		80	36	36	36	36	35	31	28	26	26	26	26	26	0	0	0	0	0	0	0	0	0	0	0	0
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		24	24	24	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		80	32	32	32	32	30	27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		24	24	24	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		80	32	32	32	32	30	27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		24	24	24	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		80	32	32	32	32	30	27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		24	24	24	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		80	32	32	32	32	30	27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		24	24	24	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		80	32	32	32	32	30	27	0	0																



K2 Systems, LLC

#### PV Tilt Up Kit Solar PV Mount System

**Standard size 41"x 86"**      **Portrait Orientation**

**Table 3.2 Maximum Downward Force (lbs) Multi Span Only Interior Conditions**

Note: The Forces shown in the tables above account for reactions associated with the interior support of a multi-span condition. See Max length for Multi Span for corresponding span length.  
See SEAOC PV-2 2012 for definition of Roof Zones

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## K2 Systems, LLC

PV Tilt Up Kit Solar PV Mount System

Standard size 41"x 86" Portrait Orientation

**Table 3.2A Maximum Downward Force (lbs) Multi Span Only Exterior Conditions**

Exp D	Ultimate Wind Speed, V (mph)	Rail Type	Roof Wind Pressure Zone 1							Roof Wind Pressure Zone 2							Roof Wind Pressure Zone 3									
			Roof Snow Load (psf)							Roof Snow Load (psf)							Roof Snow Load (psf)									
			0	10	20	30	40	50	60	0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	
90	44-X	44-X	234	247	252	251	0	0	0	235	235	252	0	0	0	0	0	236	230	0	0	0	0	0	0	
		48-X	205	240	257	256	0	0	0	190	195	257	0	0	0	0	0	183	183	0	0	0	0	0	0	
		48-XL	499	558	569	568	569	569	569	460	474	571	569	568	569	572	569	444	444	548	572	569	568	569	569	
		80	608	647	660	659	660	661	661	611	612	662	660	659	661	663	661	597	597	641	664	660	659	661	661	
	100	44-X	177	192	260	0	0	0	0	166	166	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		48-X	194	211	257	0	0	0	0	182	182	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		48-XL	473	512	570	569	567	569	569	442	442	551	570	569	568	572	569	429	429	483	568	570	569	568	569	
		80	610	634	662	660	659	661	661	594	594	650	662	660	659	663	661	577	577	623	659	661	660	659	661	
110	44-X	44-X	170	172	228	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		48-X	187	190	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		48-XL	454	461	571	570	568	567	569	429	429	492	571	570	569	568	569	418	418	444	522	571	570	569	0	
		80	610	605	663	661	660	658	661	577	577	636	663	661	660	659	661	562	562	597	642	662	661	660	659	
	120	44-X	165	165	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		48-XL	439	439	547	571	569	568	567	569	419	419	448	536	571	570	569	0	410	410	416	472	545	570	0	0
		80	591	591	658	662	661	659	658	661	564	564	603	655	662	661	660	659	552	552	560	627	652	662	661	660
130	44-X	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		48-XL	429	429	499	572	570	569	568	568	412	412	421	489	564	571	0	0	404	404	404	438	495	0	0	0
		80	576	576	646	663	661	660	659	659	553	553	565	642	663	662	661	660	543	543	543	589	638	658	662	661
	140	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		48-XL	420	420	461	551	571	570	569	0	406	406	406	452	516	0	0	0	399	399	399	416	0	0	0	
		80	565	565	620	664	662	661	660	659	545	545	545	608	654	663	662	661	537	537	537	559	613	645	662	0
150	44-X	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		48-XL	414	414	431	509	572	571	570	0	401	401	401	423	0	0	0	0	0	0	0	0	0	0	0	
		80	556	556	580	656	663	662	661	660	539	539	539	569	642	661	663	0	532	532	532	534	577	633	0	0
	160	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		48-XL	408	408	408	475	543	571	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		80	548	548	549	639	664	663	662	661	534	534	534	544	601	650	0	0	0	0	0	0	0	0	0	
170	44-X	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		48-XL	404	404	404	447	507	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		80	542	542	542	601	660	664	663	662	530	530	530	530	567	0	0	0	0	0	0	0	0	0	0	
	180	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		48-XL	400	400	400	424	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		80	537	537	537	570	642	664	663	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Note: The Forces shown in the tables above account for reactions associated with the exterior support of a multi-span condition. See Max length for Multi Span for corresponding span length.  
See SEAOC PV-2 2012 for definition of Roof Zones

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K2 Systems, LLC

PV Tilt Up Kit Solar PV Mount System

Standard size 41"x 86" Portrait Orientation

Table 3.3 Maximum Horizontal Force (lbs) Multi span only Interior Conditions

Exp D	Ultimate Wind Speed, V (mph)	Rail Type	Roof Wind Pressure Zone 1							Roof Wind Pressure Zone 2							Roof Wind Pressure Zone 3									
			Roof Snow Load (psf)							Roof Snow Load (psf)							Roof Snow Load (psf)									
			0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70
90	44-X	89	81	59	46	0	0	0	0	94	92	74	48	0	0	0	0	112	101	74	57	0	0	0	0	0
		90	82	63	49	0	0	0	0	95	93	76	51	0	0	0	0	113	103	79	61	0	0	0	0	0
		196	179	131	102	81	66	55	48	208	202	164	130	108	91	77	66	247	225	181	151	126	108	92	80	80
		80	231	211	164	134	112	91	77	66	245	238	195	164	141	124	107	92	291	265	213	182	158	140	126	111
		92	89	68	0	0	0	0	0	97	95	70	0	0	0	0	0	116	111	85	0	0	0	0	0	0
100	48-X	93	90	71	0	0	0	0	0	98	96	74	0	0	0	0	0	117	113	90	0	0	0	0	0	0
		204	196	151	119	126	81	68	59	214	209	183	151	126	109	95	81	256	246	198	171	146	126	111	98	98
		80	240	231	184	153	168	112	95	82	252	246	215	184	160	142	128	113	302	290	233	202	178	159	144	132
		95	93	76	0	0	0	0	0	99	96	79	0	0	0	0	0	120	117	96	0	0	0	0	0	0
		96	94	0	0	0	0	0	0	100	98	0	0	0	0	0	0	121	118	0	0	0	0	0	0	0
110	48-XL	210	205	170	136	145	97	82	71	219	215	198	170	144	125	110	99	264	257	213	187	165	144	128	89	89
		80	248	241	202	171	189	130	114	99	258	253	233	202	178	160	144	132	311	303	254	220	196	177	162	149
		98	95	0	0	0	0	0	0	101	99	0	0	0	0	0	0	123	120	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		215	210	186	152	164	111	97	85	224	219	211	186	161	141	125	88	270	264	233	200	181	162	122	106	
120	80	254	248	219	187	210	146	131	118	264	258	249	219	195	176	160	147	319	311	275	236	213	194	178	165	
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		219	215	198	168	183	124	110	99	228	223	218	198	178	157	114	103	276	270	249	213	194	156	138	124	
		80	258	253	234	203	229	160	145	133	269	263	257	234	210	191	176	162	325	318	294	255	228	210	194	180
130	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		223	219	210	183	201	138	122	0	231	227	221	210	190	143	127	0	280	275	264	230	198	173	154	0	0
		80	262	258	247	217	248	174	159	146	273	268	261	247	224	206	190	176	330	324	310	272	243	224	208	183
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
140	48-XL	225	222	217	195	219	151	135	0	234	231	225	220	178	157	140	0	283	279	272	245	215	189	169	0	0
		80	266	261	255	230	265	187	172	158	276	272	266	259	237	219	203	165	334	328	321	289	259	236	216	199
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		228	224	220	205	236	163	0	0	237	233	229	213	192	170	0	0	286	282	276	258	232	205	0	0	0
		80	268	264	259	242	280	200	184	170	279	275	269	263	249	231	191	177	337	332	326	304	275	251	231	214
160	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		230	227	223	214	250	0	0	0	239	236	231	223	203	0	0	0	289	285	280	269	245	0	0	0	0
		80	271	267	262	252	295	211	196	182	281	278	273	266	259	220	203	189	340	336	329	317	289	266	246	229
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
170	48-XL	231	229	225	221	0	0	0	0	240	238	234	230	0	0	0	0	291	287	283	278	0	0	0	0	0
		80	272	269	265	261	308	222	207	0	283	280	275	271	250	231	215	0	342	339	333	327	302	279	260	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		231	229	225	221	0	0	0	0	240	238	234	230	0	0	0	0	291	287	283	278	0	0	0	0	0
		80	272	269	265	261	308	222	207	0	283	280	275	271	250	231	215	0	342	339	333	327	302	279	260	0
180	48-XL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		231	229	225	221	0	0	0	0	240	238	234	230	0	0	0	0	291	287	283	278	0	0	0	0	0
		80	272	269	265	261	308	222	207	0	283	280	275	271	250	231	215	0	342	339	333	327	302	279	260	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Note: The Forces shown in the tables above account for reactions associated with the interior support of a multi-span condition. See Max length for Multi Span for corresponding span length.

See SEAOC PV-2 2012 for definition of Roof Zones

Larson Engineering Inc

1488 Bond Street, Suite 100 Naperville, IL 60563-6503 - p (630) 357-0540 - www.larsonengr.com



K2 Systems, LLC

PV Tilt Up Kit Solar PV Mount System

Standard size 41"x 86" Portrait Orientation

Table 3.3A Maximum Horizontal Force (lbs) Multi span only Exterior Conditions

Exp D	Ultimate Wind Speed, V (mph)	Rail Type	Roof Wind Pressure Zone 1							Roof Wind Pressure Zone 2							Roof Wind Pressure Zone 3									
			Roof Snow Load (psf)							Roof Snow Load (psf)							Roof Snow Load (psf)									
			0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70
90	44-X	71	71	61	48	0	0	0	0	0	74	74	69	50	0	0	0	0	89	89	77	60	0	0	0	0
		78	78	60	47	0	0	0	0	0	81	81	75	48	0	0	0	0	98	98	75	59	0	0	0	0
		190	182	133	103	82	67	56	48	0	197	189	167	133	110	92	78	67	239	228	182	153	128	110	94	81
		80	231	211	154	120	95	77	65	56	245	238	194	154	127	107	90	78	291	265	213	178	148	127	109	94
	48-X	70	70	70	0	0	0	0	0	0	73	73	73	0	0	0	0	0	88	88	88	0	0	0	0	0
		77	77	69	0	0	0	0	0	0	80	80	72	0	0	0	0	0	96	96	87	0	0	0	0	0
		186	186	153	121	100	82	69	60	0	194	194	182	153	128	110	96	83	234	234	192	174	148	128	113	100
		80	240	231	178	140	116	95	80	69	250	245	215	177	149	128	112	96	302	290	233	202	172	149	131	116
100	44-X	69	69	69	0	0	0	0	0	0	72	72	72	0	0	0	0	0	86	86	86	0	0	0	0	0
		76	76	0	0	0	0	0	0	0	79	79	0	0	0	0	0	0	95	95	0	0	0	0	0	0
		184	184	172	138	115	99	84	72	0	191	191	180	172	146	127	112	100	231	231	216	179	168	147	130	91
		80	247	241	200	160	133	114	97	84	257	251	233	200	170	147	130	116	310	303	251	220	195	170	151	136
	48-X	68	68	0	0	0	0	0	0	0	71	71	0	0	0	0	0	0	86	86	86	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		182	182	182	155	130	112	99	86	0	189	189	189	179	164	143	127	89	228	228	228	194	178	165	124	108
		80	244	244	219	179	151	131	115	100	254	254	241	219	190	166	148	133	307	307	275	236	213	191	171	154
110	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		180	180	180	171	145	126	112	100	0	188	188	188	178	178	159	116	104	227	227	227	215	182	159	140	126
		80	242	242	234	198	168	146	130	116	252	252	243	234	209	185	165	149	305	305	294	249	228	210	190	172
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		179	179	179	179	160	140	124	0	0	186	186	186	177	145	129	0	225	225	225	225	201	176	156	0	0
		80	241	241	241	216	185	162	144	130	250	250	250	238	224	202	182	165	303	303	303	271	237	224	208	163
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
120	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		180	180	180	171	145	126	112	100	0	188	188	188	178	178	159	116	104	227	227	227	215	182	159	140	126
		80	242	242	234	198	168	146	130	116	252	252	243	234	209	185	165	149	305	305	294	249	228	210	190	172
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		178	178	178	178	174	153	137	0	0	185	185	185	185	181	159	142	0	224	224	224	224	218	192	172	0
		80	239	240	240	230	202	178	159	144	249	249	249	239	237	219	199	149	301	301	301	289	253	236	199	180
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
130	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		179	179	179	179	160	140	124	0	0	186	186	186	177	145	129	0	225	225	225	225	201	176	156	0	0
		80	242	242	234	198	168	146	130	116	252	252	243	234	209	185	165	149	305	305	294	249	228	210	190	172
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		178	178	178	178	174	153	137	0	0	185	185	185	185	181	159	142	0	224	224	224	224	218	192	172	0
		80	239	240	240	230	202	178	159	144	249	249	249	239	237	219	199	149	301	301	301	289	253	236	199	180
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
140	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		179	179	179	179	160	140	124	0	0	186	186	186	177	145	129	0	225	225	225	225	201	176	156	0	0
		80	241	241	241	216	185	162	144	130	250	250	250	238	224	202	182	165	303	303	303	271	237	224	208	163
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		178	178	178	178	174	153	137	0	0	185	185	185	185	181	159	142	0	224	224	224	224	218	192	172	0
		80	239	240	240	230	202	178	159	144	249	249	249	239	237	219	199	149	301	301	301	289	253	236	199	180
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
150	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		178	178	178	178	174	153	137	0	0	185	185	185	185												



## K2 Systems, LLC

PV Tilt Up Kit Solar PV Mount System

Standard size 41"x 86" Portrait Orientation

**Table 3.4 Max Uplift Force (lbs) Multi span only Interior Conditions**

Exp D	Ultimate Wind Speed, V (mph)	Rail Type	Roof Wind Pressure Zone 1							Roof Wind Pressure Zone 2							Roof Wind Pressure Zone 3									
			Roof Snow Load (psf)							Roof Snow Load (psf)							Roof Snow Load (psf)									
			0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70
90	44-X	-165	-150	-109	-85	0	0	0	0	-182	-177	-143	0	0	0	0	0	-191	-186	0	0	0	0	0	0	0
		-167	-152	-116	-90	0	0	0	0	-184	-179	-147	0	0	0	0	0	-193	-188	0	0	0	0	0	0	0
		-364	-332	-243	-189	-150	-121	-102	-88	-402	-391	-318	-252	-209	-176	-148	-128	-421	-411	-357	-298	-248	-213	-182	-157	
		80	-429	-391	-304	-248	-208	-169	-142	-123	-474	-461	-377	-317	-273	-240	-206	-177	-496	-484	-420	-358	-312	-276	-248	-218
	48-X	-177	-169	-129	0	0	0	0	0	-192	-187	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-178	-171	-136	0	0	0	0	0	-194	-189	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
100	48-XL	-364	-332	-243	-189	-150	-121	-102	-88	-402	-391	-318	-252	-209	-176	-148	-128	-421	-411	-357	-298	-248	-213	-182	-157	
		80	-459	-440	-351	-292	-250	-215	-181	-156	-498	-487	-425	-363	-316	-281	-252	-309	-517	-507	-467	-405	-357	-320	-289	-264
		-186	-181	-148	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-188	-183	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	-410	-399	-331	-265	-221	-189	-161	-139	-439	-430	-396	-340	-289	-250	-221	-222	-439	-430	-396	-343	-292	-253	-223	-197	
		80	-483	-470	-394	-333	-288	-254	-223	-193	-517	-507	-467	-405	-357	-320	-289	-366	-534	-525	-507	-446	-399	-360	-328	-302
110	44-X	-193	-189	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-426	-417	-368	-302	-254	-219	-193	-168	-452	-444	-428	-376	-327	-286	-254	0	-464	-457	-447	-410	-370	-332	0	0	0
		80	-502	-491	-433	-371	-325	-288	-259	-233	-532	-523	-504	-443	-395	-357	-325	-415	-547	-539	-527	-484	-436	-397	-365	-338
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
120	48-XL	-440	-431	-398	-337	-287	-249	-221	-198	-462	-455	-445	-405	-363	-320	0	0	-473	-467	-458	-438	-399	0	0	0	0
		80	-518	-508	-469	-406	-359	-321	-291	-266	-545	-536	-524	-477	-430	-391	-359	-461	-557	-550	-539	-517	-470	-432	-399	-371
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-440	-431	-398	-337	-287	-249	-221	-198	-462	-455	-445	-405	-363	-320	0	0	-473	-467	-458	-438	-399	0	0	0	0
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
130	48-XL	-451	-443	-425	-371	-318	-279	-248	0	-471	-464	-455	-431	-392	0	0	0	-480	-474	-467	-459	0	0	0	0	0
		80	-531	-522	-500	-439	-391	-353	-321	-295	-554	-547	-536	-508	-462	-423	-390	-505	-565	-559	-550	-541	-501	-463	-431	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	-460	-453	-442	-398	-349	-307	-275	0	-477	-472	-464	-455	0	0	0	0	0	0	0	0	0	0	0	0	0
		80	-542	-533	-521	-469	-421	-382	-350	-323	-562	-556	-546	-536	-491	-453	-420	0	-572	-566	-558	-550	-529	-492	0	0
160	48-XL	-467	-461	-451	-421	-378	-335	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		80	-551	-543	-532	-496	-449	-410	-378	-350	-569	-563	-555	-546	-517	-480	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	44-X	-474	-468	-459	-442	-403	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		80	-558	-551	-541	-521	-475	-436	-404	-376	-575	-570	-562	-554	-541	0	0	0	0	0	0	0	0	0	0	0
170	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	-474	-468	-459	-442	-403	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		80	-558	-551	-541	-521	-475	-436	-404	-376	-575	-570	-562	-554	-541	0	0	0	0	0	0	0	0	0	0	0
180	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	-479	-474	-466	-458	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	80	-565	-558	-549	-540	-498	-461	-428	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Note: The Forces shown in the tables above account for reactions associated with the interior support of a multi-span condition. See Max length for Multi Span for corresponding span length.

See SEAOC PV-2 2012 for definition of Roof Zones

## Larson Engineering Inc

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## K2 Systems, LLC

PV Tilt Up Kit Solar PV Mount System

Standard size 41"x 86" Portrait Orientation

**Table 3.4A Max Uplift Force (lbs) Multi span only Exterior Conditions**

Exp D	Ultimate Wind Speed, V (mph)	Rail Type	Roof Wind Pressure Zone 1							Roof Wind Pressure Zone 2							Roof Wind Pressure Zone 3									
			Roof Snow Load (psf)							Roof Snow Load (psf)							Roof Snow Load (psf)									
			0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70
90	44-X	-132	-132	-114	-88	0	0	0	0	0	-134	-134	-134	0	0	0	0	0	-135	-135	0	0	0	0	0	0
		-145	-145	-111	-86	0	0	0	0	0	-147	-147	-145	0	0	0	0	0	-148	-148	0	0	0	0	0	0
		-352	-337	-247	-192	-152	-123	-104	-90	-357	-357	-323	-256	-213	-178	-151	-130	-360	-360	-360	-303	-252	-216	-185	-159	
		80	-429	-391	-286	-222	-176	-143	-120	-104	-474	-461	-375	-297	-247	-207	-175	-150	-483	-483	-420	-351	-292	-251	-214	-185
100	44-X	-133	-133	-133	0	0	0	0	0	-135	-135	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-146	-146	-132	0	0	0	0	0	-148	-148	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-356	-356	-292	-231	-190	-157	-132	-114	-360	-360	-360	-302	-253	-218	-190	-225	-362	-362	-362	-349	-297	-257	-227	-200	
		80	-459	-440	-339	-268	-221	-182	-153	-132	-484	-484	-425	-350	-294	-253	-220	-262	-486	-486	-467	-405	-344	-298	-263	-232
110	44-X	-134	-134	-134	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-147	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-358	-358	-336	-269	-224	-192	-163	-141	-362	-362	-362	-346	-293	-254	-225	-278	-363	-363	-363	-340	-297	-264	0	0	
		80	-481	-470	-390	-312	-260	-223	-189	-163	-486	-486	-467	-401	-340	-295	-261	-322	-488	-488	-446	-395	-345	-306	-275	0
120	44-X	-135	-135	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-360	-360	-360	-306	-258	-223	-196	-170	-363	-363	-363	-363	-332	-290	-258	0	-364	-364	-364	-364	-337	0	0	0	
		80	-484	-484	-433	-356	-299	-259	-228	-197	-488	-488	-488	-443	-385	-337	-299	-374	-489	-489	-489	-484	-436	-391	-349	-316
130	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-362	-362	-362	-342	-291	-253	-224	-201	-364	-364	-364	-364	-325	0	0	-365	-365	-365	-365	-365	-365	0	0	0	
		80	-486	-486	-469	-397	-338	-294	-260	-233	-489	-489	-489	-477	-428	-377	-337	-425	-491	-491	-491	-470	-432	-391	-355	0
140	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-363	-363	-363	-363	-323	-283	-252	0	-365	-365	-365	-365	-365	0	0	-366	-366	-366	-366	0	0	0	0	0	
		80	-488	-488	-488	-437	-375	-328	-292	-263	-490	-490	-490	-490	-462	-417	-375	-475	-492	-492	-492	-492	-492	-463	-431	0
150	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-364	-364	-364	-364	-354	-312	-279	0	-365	-365	-365	-365	-365	0	0	0	0	0	0	0	0	0	0	0	0
		80	-489	-489	-489	-469	-411	-362	-324	-293	-491	-491	-491	-491	-491	-453	-411	0	-492	-492	-492	-492	-492	-492	0	0
160	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-364	-364	-364	-364	-364	-341	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		80	-490	-490	-490	-490	-446	-395	-355	-322	-492	-492	-492	-492	-492	-480	0	0	0	0	0	0	0	0	0	0
170	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-365	-365	-365	-365	-365	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		80	-491	-491	-491	-491	-475	-427	-386	-351	-493	-493	-493	-493	-493	0	0	0	0	0	0	0	0	0	0	0
180	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-366	-366	-366	-366	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		80	-491	-491	-491	-491	-491	-458	-415	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Note: The Forces shown in the tables above account for reactions associated with the exterior support of a multi-span condition. See Max length for Multi Span for corresponding span length.  
See SEAOC PV-2 2012 for definition of Roof Zones

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## K2 Systems, LLC

PV Tilt Up Kit Solar PV Mount System

Standard size 41"x 86" Portrait Orientation

**Table 3.5 Max Length L (inches) for Single Span Interior Conditions**

Exp D	Ultimate Wind Speed, V (mph)	Rail Type	Roof Wind Pressure Zone 1							Roof Wind Pressure Zone 2							Roof Wind Pressure Zone 3										
			Roof Snow Load (psf)							Roof Snow Load (psf)							Roof Snow Load (psf)										
			0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	
90	44-X	40	36	27	21	0	0	0	0	30	30	24	0	0	0	0	0	25	25	0	0	0	0	0	0	0	
	48-X	39	35	26	20	0	0	0	0	30	29	23	0	0	0	0	0	25	25	0	0	0	0	0	0	0	
	48-XL	84	77	57	44	35	28	24	21	64	63	51	41	34	28	24	21	55	53	46	39	32	28	24	21	21	
	80	122	111	83	65	51	42	35	30	93	91	74	60	50	42	35	30	79	77	67	57	48	41	35	30	30	
	44-X	34	34	25	0	0	0	0	0	25	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	33	32	24	0	0	0	0	0	25	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
100	48-XL	71	71	53	42	34	28	24	21	54	52	46	38	32	27	24	21	45	45	41	36	30	26	23	21	21	
	80	103	104	78	61	51	42	35	30	78	76	66	56	47	40	35	30	66	65	59	52	45	39	34	30	30	
	44-X	29	29	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	28	29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
110	48-XL	60	64	49	39	33	28	24	21	45	45	41	35	30	26	23	21	38	38	36	32	29	25	22	20	20	
	80	88	95	71	58	48	41	35	30	66	64	59	51	44	38	34	30	55	55	53	46	41	37	33	29	29	
	44-X	24	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
120	48-XL	52	58	45	37	31	27	24	21	39	38	37	32	28	25	22	0	33	32	31	29	26	24	0	0	0	
	80	75	86	65	55	46	40	35	30	56	55	53	47	42	36	32	29	47	47	46	42	38	34	31	28	28	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
130	48-XL	45	53	41	35	30	26	23	20	34	33	32	29	26	23	0	0	28	28	27	26	24	0	0	0	0	
	80	65	77	59	51	44	38	34	30	49	48	47	43	38	35	31	28	41	40	40	38	34	32	29	27	27	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
140	48-XL	39	45	37	33	28	25	22	0	29	29	28	27	24	0	0	0	25	24	23	0	0	0	0	0	0	
	80	57	66	54	47	41	36	32	29	42	42	41	39	35	32	29	27	36	35	35	34	31	29	27	0	0	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
150	48-XL	35	39	34	30	27	23	21	0	26	25	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	80	50	57	49	44	39	35	31	28	37	37	36	35	33	30	28	0	31	31	30	30	29	27	0	0	0	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
160	48-XL	31	34	30	28	25	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	80	45	50	43	40	37	33	30	27	33	33	32	32	30	28	0	0	0	0	0	0	0	0	0	0	0	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
170	48-XL	28	30	27	26	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	80	40	44	39	37	34	31	28	26	29	29	28	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
180	48-XL	25	27	24	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	80	36	39	35	34	32	29	27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Note: The Forces shown in the tables above account for reactions associated with the interior support of a multi-span condition. See Max length for Multi Span for corresponding span length.

See SEAOC PV-2 2012 for definition of Roof Zones

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## K2 Systems, LLC

PV Tilt Up Kit Solar PV Mount System

Standard size 41"x 86" Portrait Orientation

**Table 3.5A Max Length L (inches) for Single Span Exterior Conditions**

Exp D	Ultimate Wind Speed, V (mph)	Rail Type	Roof Wind Pressure Zone 1							Roof Wind Pressure Zone 2							Roof Wind Pressure Zone 3									
			Roof Snow Load (psf)							Roof Snow Load (psf)							Roof Snow Load (psf)									
			0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70
90	44-X	30	30	27	21	0	0	0	0	21	21	21	0	0	0	0	0	0	17	17	0	0	0	0	0	0
	48-X	34	34	27	21	0	0	0	0	24	24	24	0	0	0	0	0	0	19	19	0	0	0	0	0	0
	48-XL	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	
	80	110	110	83	65	51	42	35	30	77	77	74	60	50	42	35	30	63	63	63	57	48	41	35	30	
	44-X	24	24	24	0	0	0	0	0	17	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	27	27	25	0	0	0	0	0	19	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
100	48-XL	63	63	53	42	35	29	24	21	45	45	45	38	32	28	24	21	36	36	36	36	31	27	23	21	
	80	88	88	78	61	51	42	35	30	62	62	62	56	47	40	35	30	51	51	51	45	39	34	30	30	
	44-X	19	19	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
110	48-X	22	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	51	51	49	40	33	28	24	21	36	36	36	30	26	23	21	30	30	30	30	29	25	22	20	20	
	80	72	72	71	58	48	41	35	30	51	51	51	44	38	34	30	42	42	42	41	37	33	29	29	29	
	44-X	16	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
120	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	43	43	43	37	31	27	24	21	30	30	30	30	29	25	22	0	25	25	25	25	25	24	0	0	
	80	59	59	59	55	46	40	35	30	42	42	42	42	36	32	29	35	35	35	35	35	34	31	28	28	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
130	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	36	36	36	35	30	26	23	21	26	26	26	26	24	0	0	21	21	21	21	21	21	0	0	0	
	80	50	50	50	50	44	38	34	30	36	36	36	36	35	31	28	29	29	29	29	29	29	29	29	27	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
140	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	31	31	31	31	28	25	22	0	22	22	22	22	22	0	0	18	18	18	18	0	0	0	0	0	
	80	43	43	43	43	41	36	32	29	31	31	31	31	31	29	27	25	25	25	25	25	25	25	25	0	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
150	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	27	27	27	27	24	21	0	19	19	19	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	80	37	37	37	37	35	31	28	27	27	27	27	27	27	0	22	22	22	22	22	22	22	22	0	0	0
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
160	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	23	23	23	23	23	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	80	33	33	33	33	33	30	27	23	23	23	23	23	23	0	0	0	0	0	0	0	0	0	0	0	0
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
170	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	21	21	21	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	80	29	29	29	29	29	28	26	21	21	21	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
180	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-XL	18	18	18	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	80	26	26	26	26	26	26	27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Note: The Forces shown in the tables above account for reactions associated with the interior support of a multi-span condition. See Max length for Multi Span for corresponding span length.  
See SEAOC PV-2 2012 for definition of Roof Zones

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## K2 Systems, LLC

PV Tilt Up Kit Solar PV Mount System

Standard size 41"x 86" Portrait Orientation

**Table 3.6 Maximum Downward Force (lbs) Single span only Interior Conditions**

Exp D	Ultimate Wind Speed, V (mph)	Rail Type	Roof Wind Pressure Zone 1							Roof Wind Pressure Zone 2							Roof Wind Pressure Zone 3									
			Roof Snow Load (psf)							Roof Snow Load (psf)							Roof Snow Load (psf)									
			0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70
90	44-X	97	103	89	78	0	0	0	0	97	97	90	0	0	0	0	0	95	95	0	0	0	0	0	0	0
	48-X	95	101	85	75	0	0	0	0	95	95	87	0	0	0	0	0	95	93	0	0	0	0	0	0	0
	48-XL	205	218	187	164	103	98	91	63	206	206	191	130	117	108	77	75	206	201	175	147	124	105	90	84	
	80	297	316	275	242	152	144	134	93	298	299	276	192	172	159	113	110	299	292	253	216	182	155	132	123	
	44-X	97	105	95	0	0	0	0	0	95	95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	95	101	91	0	0	0	0	0	95	93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
100	48-XL	206	221	199	180	113	111	103	70	206	202	197	146	125	119	92	85	207	203	187	162	139	120	106	96	
	80	298	326	294	264	167	163	152	103	299	292	286	215	183	175	135	125	300	294	270	234	204	177	156	141	
	44-X	97	99	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	95	102	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
110	48-XL	206	222	212	195	120	124	117	78	207	203	203	162	137	128	105	96	207	204	197	173	155	135	120	0	
	80	299	327	308	287	176	182	172	115	300	294	294	234	202	189	155	141	300	295	285	251	224	199	177	159	
	44-X	94	94	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
120	48-XL	207	232	220	210	126	133	132	87	207	204	208	172	151	137	117	0	208	204	200	184	166	150	0	0	
	80	299	341	318	309	186	196	194	128	300	295	302	250	222	202	173	156	301	296	290	266	240	219	197	178	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
130	48-XL	207	243	226	224	136	142	142	95	207	204	208	182	164	146	0	0	208	205	201	193	176	0	0	0	
	80	300	354	327	330	200	209	209	141	301	296	301	263	237	215	191	173	301	297	292	279	254	233	216	197	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
140	48-XL	207	238	231	237	147	151	153	0	208	205	206	190	173	0	0	0	208	206	202	199	0	0	0	0	
	80	300	346	335	343	217	223	225	152	301	297	298	276	251	230	208	189	301	298	293	288	267	247	230	0	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
150	48-XL	207	233	233	246	159	160	163	0	208	205	204	198	0	0	0	0	0	0	0	0	0	0	0	0	0
	80	300	339	338	356	234	236	240	166	301	298	295	287	263	242	225	0	302	299	294	290	279	259	0	0	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
160	48-XL	208	230	231	254	169	169	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	80	301	334	335	367	245	249	256	180	301	298	294	289	274	254	0	0	0	0	0	0	0	0	0	0	0
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
170	48-XL	208	227	230	261	177	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	80	301	330	333	378	256	260	270	194	302	299	295	291	284	0	0	0	0	0	0	0	0	0	0	0	0
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
180	48-XL	208	224	229	266	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	80	301	326	331	385	266	268	285	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Note: The Forces shown in the tables above account for reactions associated with the interior support of a multi-span condition. See Max length for Multi Span for corresponding span length.

See SEAOC PV-2 2012 for definition of Roof Zones

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K2 Systems, LLC

PV Tilt Up Kit Solar PV Mount System

Standard size 41"x 86" Portrait Orientation

Table 3.6A Maximum Downward Force (lbs) Single span only Exterior Conditions

Exp D	Ultimate Wind Speed, V (mph)	Rail Type	Roof Wind Pressure Zone 1							Roof Wind Pressure Zone 2							Roof Wind Pressure Zone 3									
			Roof Snow Load (psf)							Roof Snow Load (psf)							Roof Snow Load (psf)									
			0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70
90	44-X	73	85	87	77	0	0	0	0	0	67	69	78	0	0	0	0	0	65	65	0	0	0	0	0	0
		82	96	89	78	0	0	0	0	0	76	78	88	0	0	0	0	0	73	73	0	0	0	0	0	0
		193	220	188	165	104	99	91	63	178	183	192	131	118	109	77	75	172	172	172	148	124	106	91	84	
		80	268	313	275	242	152	144	134	93	248	255	276	192	172	159	113	110	239	239	239	216	182	155	132	123
		69	75	90	0	0	0	0	0	0	64	64	0	0	0	0	0	0	0	0	0	0	0	0	0	0
100	48-X	78	84	95	0	0	0	0	0	0	73	73	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		183	198	201	181	114	112	104	71	171	171	192	147	126	120	93	85	166	166	166	163	140	121	107	96	
		80	254	275	294	264	167	163	152	103	238	238	267	215	183	175	135	125	231	231	231	231	204	177	156	141
		66	67	84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		75	76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
110	48-XL	175	178	213	196	121	125	118	79	166	166	180	163	138	129	106	96	162	162	162	162	156	136	121	0	0
		80	244	248	308	287	176	182	172	115	231	231	251	231	202	189	155	141	225	225	225	225	224	199	177	159
		64	64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		170	170	209	211	127	134	133	87	162	162	172	162	152	138	118	0	159	159	159	159	159	151	0	0	0
120	80	236	236	291	309	186	196	194	128	225	225	239	225	222	202	173	156	221	221	221	221	219	197	178	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		166	166	200	226	137	143	143	96	159	159	165	159	159	147	0	0	156	156	156	156	156	156	0	0	0
		230	230	278	323	200	209	209	141	221	221	230	221	221	215	191	173	217	217	217	217	217	217	216	197	0
130	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		162	162	193	225	149	153	154	0	157	157	160	157	157	0	0	0	154	154	154	154	154	154	0	0	0
		226	226	268	313	217	223	225	152	218	218	223	218	218	218	208	189	215	215	215	215	215	215	215	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
140	48-XL	160	160	187	219	160	162	165	0	155	155	156	155	0	0	0	0	0	0	0	0	0	0	0	0	0
		222	222	260	304	222	236	240	166	216	216	217	216	216	216	216	0	213	213	213	213	213	213	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		158	158	182	214	158	170	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		219	219	253	298	219	247	256	180	214	214	214	214	214	214	0	0	0	0	0	0	0	0	0	0	0
160	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		156	156	178	210	156	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		217	217	248	292	217	240	270	194	212	212	212	212	212	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
170	48-XL	155	155	175	207	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		215	215	243	287	215	234	285	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		155	155	175	207	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		215	215	243	287	215	234	285	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
180	48-XL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		155	155	175	207	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		215	215	243	287	215	234	285	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Note: The Forces shown in the tables above account for reactions associated with the interior support of a multi-span condition. See Max length for Multi Span for corresponding span length.

See SEAOC PV-2 2012 for definition of Roof Zones

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## K2 Systems, LLC

PV Tilt Up Kit Solar PV Mount System

Standard size 41"x 86" Portrait Orientation

**Table 3.7 Maximum Horizontal Force (lbs) Single span only Interior Conditions**

Exp D	Ultimate Wind Speed, V (mph)	Rail Type	Roof Wind Pressure Zone 1							Roof Wind Pressure Zone 2							Roof Wind Pressure Zone 3									
			Roof Snow Load (psf)							Roof Snow Load (psf)							Roof Snow Load (psf)									
			0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70
90	44-X	37	34	25	19	0	0	0	0	39	38	31	20	0	0	0	0	46	42	31	24	0	0	0	0	0
	48-X	36	33	24	19	0	0	0	0	38	37	30	19	0	0	0	0	45	41	30	23	0	0	0	0	0
	48-XL	78	71	52	41	32	26	22	19	83	80	66	52	43	36	31	26	98	89	72	60	50	43	37	32	
	80	113	103	77	60	48	39	32	28	120	116	95	77	64	54	45	39	142	129	104	89	74	64	54	47	
	44-X	38	38	29	0	0	0	0	0	40	40	30	0	0	0	0	0	48	48	36	0	0	0	0	0	0
	48-X	36	33	24	19	0	0	0	0	38	37	30	19	0	0	0	0	45	41	30	23	0	0	0	0	0
100	48-XL	81	81	60	48	39	32	27	23	85	84	72	60	50	43	38	33	102	101	78	68	58	51	45	39	
	80	117	119	89	70	58	48	40	35	123	123	105	89	74	64	56	48	147	149	114	99	86	74	66	58	
	44-X	39	40	32	0	0	0	0	0	41	41	33	0	0	0	0	0	50	50	40	0	0	0	0	0	
	48-X	39	41	0	0	0	0	0	0	40	42	0	0	0	0	0	0	48	51	0	0	0	0	0	0	
110	48-XL	83	89	68	54	45	39	33	28	87	92	79	68	58	50	44	39	105	111	85	74	66	58	51	36	
	80	121	131	99	80	67	57	48	42	126	136	114	99	85	74	65	58	152	164	124	107	96	85	76	68	
	44-X	39	39	0	0	0	0	0	0	41	41	0	0	0	0	0	0	49	49	0	0	0	0	0	0	
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
120	48-XL	85	96	74	61	51	44	39	34	89	100	84	74	64	56	50	35	107	120	93	80	72	65	49	43	
	80	124	141	107	90	76	65	57	50	129	147	121	107	95	83	74	66	156	177	134	115	104	95	85	77	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
130	48-XL	87	102	79	67	57	50	44	39	91	106	86	79	71	63	46	41	109	129	99	85	77	62	55	50	
	80	126	149	114	99	84	73	65	58	131	155	125	114	103	92	83	75	158	187	143	124	111	102	95	86	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
140	48-XL	88	101	83	73	63	55	49	0	92	105	88	83	76	57	51	0	111	127	105	92	79	69	62	0	
	80	128	147	121	106	93	81	72	65	133	153	127	121	109	100	91	83	161	185	152	133	118	109	101	82	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
150	48-XL	89	101	86	77	68	60	54	0	93	105	89	87	71	63	56	0	112	126	108	97	86	76	68	0	
	80	130	146	125	112	101	89	79	72	135	152	130	126	116	107	99	75	163	184	157	141	127	115	100	90	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
160	48-XL	90	100	87	81	74	65	0	0	94	104	91	85	77	68	0	0	114	126	110	102	93	82	0	0	
	80	131	145	126	118	107	96	86	79	136	151	131	128	121	113	90	82	164	183	159	148	134	121	109	99	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
170	48-XL	91	99	88	85	78	0	0	0	95	103	92	88	81	0	0	0	115	125	111	107	97	0	0	0	
	80	132	145	128	123	112	103	93	85	137	150	133	130	127	107	97	89	166	182	161	155	141	130	117	107	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
180	48-XL	92	99	89	88	0	0	0	0	95	103	93	91	0	0	0	0	115	124	112	110	0	0	0	0	
	80	133	144	129	127	117	108	100	0	138	150	134	132	122	113	104	0	167	181	162	160	148	136	126	0	

Note: The Forces shown in the tables above account for reactions associated with the interior support of a multi-span condition. See Max length for Multi Span for corresponding span length.

See SEAOC PV-2 2012 for definition of Roof Zones

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**K2 Systems, LLC**  
 PV Tilt Up Kit Solar PV Mount System  
 Standard size 41" x 86"      Portrait Orientation

**Table 3.7A Maximum Horizontal Force (lbs) Single span only Exterior Conditions**

Exp D	Ultimate Wind Speed, V (mph)	Rail Type	Roof Wind Pressure Zone 1							Roof Wind Pressure Zone 2							Roof Wind Pressure Zone 3										
			Roof Snow Load (psf)							Roof Snow Load (psf)							Roof Snow Load (psf)										
			0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	
90	44-X	28	28	25	19	0	0	0	0	0	29	29	27	20	0	0	0	0	35	35	31	24	0	0	0	0	
	48-X	31	31	25	19	0	0	0	0	0	32	32	30	20	0	0	0	0	39	39	31	24	0	0	0	0	
	48-XL	73	72	53	41	33	26	22	19	76	74	66	53	44	37	31	27	92	90	71	61	51	44	37	32	32	
	80	102	102	77	60	48	39	32	28	106	106	95	77	64	54	45	39	128	128	98	89	74	64	54	47	47	
	44-X	27	27	27	0	0	0	0	0	0	28	28	28	0	0	0	0	0	34	34	34	0	0	0	0	0	
	48-X	31	31	25	19	0	0	0	0	0	32	32	30	20	0	0	0	0	39	39	31	24	0	0	0	0	
	48-XL	72	72	61	48	40	33	27	24	75	75	70	61	51	44	38	33	90	90	76	69	59	51	45	40	40	
	80	100	100	89	70	58	48	40	35	104	104	98	89	74	64	56	48	126	126	112	97	86	74	66	58	58	
	44-X	27	27	27	0	0	0	0	0	0	28	28	28	0	0	0	0	0	34	34	34	0	0	0	0	0	
	48-X	30	30	0	0	0	0	0	0	0	31	31	0	0	0	0	0	0	38	38	0	0	0	0	0	0	
110	48-XL	71	71	68	55	46	39	33	29	74	74	71	68	58	50	44	40	89	89	86	69	67	58	52	36	36	
	80	99	99	99	80	67	57	48	42	103	103	103	97	85	74	65	58	124	124	124	101	96	85	76	68	68	
	44-X	27	27	0	0	0	0	0	0	0	28	28	28	0	0	0	0	0	33	33	0	0	0	0	0	0	
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
120	48-XL	70	70	70	61	52	45	39	34	73	73	73	69	65	57	51	35	88	88	88	77	69	65	49	43	43	
	80	98	98	98	90	76	65	57	50	102	102	102	96	95	83	74	66	123	123	123	113	96	95	85	77	77	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
130	48-XL	70	70	70	68	58	50	44	40	72	72	72	70	69	63	46	41	88	88	88	85	72	63	56	50	50	
	80	97	97	97	97	84	73	65	58	101	101	101	101	96	92	83	75	122	122	122	122	106	95	95	86	86	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
140	48-XL	69	69	69	69	63	55	49	0	72	72	72	72	69	58	51	0	87	87	87	87	80	70	62	0	0	
	80	96	96	96	96	93	81	72	65	100	100	100	100	96	95	91	83	121	121	121	121	116	102	95	82	82	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
150	48-XL	69	69	69	69	69	61	54	0	72	72	72	72	63	56	0	87	87	87	87	87	76	68	0	0		
	80	96	96	96	96	96	89	79	72	100	100	100	100	95	95	75	120	120	120	120	120	112	100	90	90		
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
160	48-XL	69	69	69	69	69	66	0	0	71	71	71	71	69	0	0	86	86	86	86	86	83	0	0	0		
	80	95	95	95	95	95	95	86	79	99	99	99	99	99	99	99	90	82	120	120	120	120	120	120	109	99	
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
170	48-XL	68	68	68	68	68	0	0	0	71	71	71	71	71	0	0	86	86	86	86	86	86	0	0	0		
	80	95	95	95	95	95	95	95	93	85	99	99	99	99	99	99	99	97	89	120	120	120	120	120	120	117	107
	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
180	48-XL	68	68	68	68	0	0	0	0	71	71	71	71	0	0	0	86	86	86	86	0	0	0	0	0		
	80	95	95	95	95	95	95	95	100	0	99	99	99	99	99	99	104	0	119	119	119	119	119	119	126	0	

Note: The Forces shown in the tables above account for reactions associated with the interior support of a multi-span condition. See Max length for Multi Span for corresponding span length.

See SEAOC PV-2 2012 for definition of Roof Zones

**Larson Engineering Inc**

1488 Bond Street, Suite 100 Naperville, IL 60563-6503 - p (630) 357-0540 - [www.larsonengr.com](http://www.larsonengr.com)



## K2 Systems, LLC

PV Tilt Up Kit Solar PV Mount System

Standard size 41"x 86" Portrait Orientation

**Table 3.8 Max Uplift Force (lbs) Single span only Interior Conditions**

Exp D	Ultimate Wind Speed, V (mph)	Rail Type	Roof Wind Pressure Zone 1							Roof Wind Pressure Zone 2							Roof Wind Pressure Zone 3									
			Roof Snow Load (psf)							Roof Snow Load (psf)							Roof Snow Load (psf)									
			0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70
90	44-X	-68	-62	-46	-36	0	0	0	0	-121	-73	-60	0	0	0	0	0	-77	-77	0	0	0	0	0	0	0
		-67	-61	-44	-35	0	0	0	0	-119	-72	-58	0	0	0	0	0	-77	-75	0	0	0	0	0	0	0
		-144	-132	-97	-76	-60	-49	-41	-35	-257	-155	-127	-101	-84	-70	-59	-51	-167	-163	-142	-119	-99	-85	-73	-63	
		80	-209	-191	-143	-111	-88	-72	-60	-52	-372	-225	-184	-149	-123	-104	-87	-75	-242	-236	-205	-175	-146	-125	-107	-93
	48-X	-73	-73	-55	0	0	0	0	0	-99	-77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-71	-70	-53	0	0	0	0	0	-99	-76	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-155	-154	-115	-91	-75	-62	-52	-45	-214	-164	-143	-119	-100	-86	-75	-64	-174	-171	-157	-136	-117	-101	-89	-79	
		80	-224	-227	-169	-134	-110	-91	-77	-66	-311	-237	-207	-175	-147	-126	-110	-95	-252	-247	-228	-197	-172	-149	-132	-116
100	44-X	-77	-77	-63	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-75	-79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-163	-348	-325	-293	-269	-250	-235	-220	-438	-431	-420	-393	-364	-341	-321	-305	-490	-483	-474	-454	-430	-405	-383	-364	
		80	-236	-254	-192	-156	-130	-112	-95	-82	-263	-247	-228	-198	-170	-148	-130	-116	-260	-256	-248	-218	-194	-173	-153	-138
	48-X	-77	-77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-169	-190	-146	-121	-102	-88	-77	-67	-179	-176	-170	-149	-131	-114	-102	0	-184	-181	-178	-163	-147	-133	0	0	0
		80	-245	-280	-211	-178	-150	-129	-114	-99	-260	-255	-246	-216	-192	-168	-150	-135	-267	-263	-257	-236	-213	-194	-175	-158
110	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-175	-205	-158	-135	-115	-100	-88	-79	-183	-181	-177	-161	-145	-128	0	0	-188	-185	-182	-174	-158	0	0	0	0
		80	-253	-299	-229	-198	-169	-147	-130	-116	-266	-262	-256	-233	-210	-189	-169	-153	-272	-268	-263	-252	-230	-211	-195	-178
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-179	-205	-169	-148	-127	-111	-99	0	-187	-184	-181	-171	-156	0	0	-190	-188	-185	-182	0	0	0	0	0	0
		80	-259	-298	-244	-214	-188	-164	-146	-131	-271	-267	-262	-248	-225	-206	-187	-170	-276	-273	-268	-264	-245	-226	-210	0
120	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-179	-205	-169	-148	-127	-111	-99	0	-187	-184	-181	-171	-156	0	0	-190	-188	-185	-182	0	0	0	0	0	0
		80	-245	-280	-211	-178	-150	-129	-114	-99	-260	-255	-246	-216	-192	-168	-150	-135	-267	-263	-257	-236	-213	-194	-175	-158
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-182	-205	-176	-158	-140	-123	-110	0	-189	-187	-184	-180	0	0	0	0	0	0	0	0	0	0	0	0	0
		80	-264	-298	-254	-229	-206	-181	-162	-146	-274	-271	-267	-261	-239	-221	-205	0	-279	-276	-272	-269	-258	-240	0	0
130	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-182	-205	-176	-158	-140	-123	-110	0	-189	-187	-184	-180	0	0	0	0	0	0	0	0	0	0	0	0	0
		80	-253	-299	-254	-229	-206	-181	-162	-146	-274	-271	-267	-261	-239	-221	-205	0	-279	-276	-272	-269	-258	-240	0	0
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-182	-205	-176	-158	-140	-123	-110	0	-189	-187	-184	-180	0	0	0	0	0	0	0	0	0	0	0	0	0
		80	-264	-298	-254	-229	-206	-181	-162	-146	-274	-271	-267	-261	-239	-221	-205	0	-279	-276	-272	-269	-258	-240	0	0
140	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-182	-205	-176	-158	-140	-123	-110	0	-189	-187	-184	-180	0	0	0	0	0	0	0	0	0	0	0	0	0
		80	-264	-298	-254	-229	-206	-181	-162	-146	-274	-271	-267	-261	-239	-221	-205	0	-279	-276	-272	-269	-258	-240	0	0
	48-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-182	-205	-176	-158	-140	-123	-110	0	-189	-187	-184	-180	0	0	0	0	0	0	0	0	0	0	0	0	0
		80	-264	-298	-254	-229	-206	-181	-162	-146	-274	-271	-267	-261	-239	-221	-205	0	-279	-276	-272	-269	-258	-240	0	0
150	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-182	-205	-176	-158	-140	-123	-110	0	-189	-187	-184	-180	0	0	0	0	0	0	0	0	0	0	0	0	0
		80	-264	-298	-254	-229	-206	-181	-162	-146	-274	-271	-267	-261	-2											



## K2 Systems, LLC

PV Tilt Up Kit Solar PV Mount System

Standard size 41"x 86" Portrait Orientation

Table 3.8A Max Uplift Force (lbs) Singlespan only Exterior Conditions

Exp D	Ultimate Wind Speed, V (mph)	Rail Type	Roof Wind Pressure Zone 1							Roof Wind Pressure Zone 2							Roof Wind Pressure Zone 3									
			Roof Snow Load (psf)							Roof Snow Load (psf)							Roof Snow Load (psf)									
			0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70	0	10	20	30	40	50	60	70
90	44-X	-51	-51	-46	-35	0	0	0	0	-52	-52	-52	0	0	0	0	0	-52	-52	0	0	0	0	0	0	0
		-58	-58	-46	-36	0	0	0	0	-59	-59	-59	0	0	0	0	0	-59	-59	0	0	0	0	0	0	0
		-136	-133	-98	-76	-60	-49	-41	-36	-138	-138	-128	-102	-84	-71	-60	-51	-139	-139	-139	-120	-100	-86	-73	-63	
		80	-189	-189	-143	-111	-88	-72	-60	-52	-192	-192	-184	-149	-123	-104	-87	-75	-193	-193	-193	-175	-146	-125	-107	-93
100	44-X	-52	-52	-52	0	0	0	0	0	-52	-52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-59	-59	-55	0	0	0	0	0	-59	-59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-137	-137	-116	-92	-76	-62	-52	-45	-139	-139	-139	-120	-100	-87	-75	-65	-140	-140	-140	-137	-118	-102	-90	-79	
		80	-191	-191	-169	-134	-110	-91	-77	-66	-193	-193	-193	-175	-147	-126	-110	-95	-194	-194	-194	-172	-149	-132	-116	-103
110	44-X	-52	-52	-52	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-59	-59	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-138	-138	-133	-107	-89	-76	-65	-56	-140	-140	-140	-137	-116	-101	-89	-80	-140	-140	-140	-135	-118	-105	0	0	
		80	-193	-193	-192	-156	-130	-112	-95	-82	-194	-194	-194	-170	-148	-130	-116	-105	-195	-195	-195	-194	-173	-153	-138	-128
120	44-X	-53	-53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-139	-139	-139	-122	-102	-88	-78	-68	-140	-140	-140	-140	-132	-115	-102	0	-141	-141	-141	-141	-141	-134	0	0	
		80	-194	-194	-194	-178	-150	-129	-114	-99	-195	-195	-195	-195	-192	-168	-150	-135	-196	-196	-196	-196	-194	-175	-158	-148
130	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-140	-140	-140	-136	-116	-100	-89	-80	-141	-141	-141	-141	-141	-141	-129	0	-141	-141	-141	-141	-141	-141	0	0	
		80	-194	-194	-194	-194	-169	-147	-130	-116	-196	-196	-196	-196	-196	-189	-169	-153	-196	-196	-196	-196	-196	-195	-178	-168
140	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-140	-140	-140	-140	-128	-112	-100	0	-141	-141	-141	-141	-141	-141	-129	0	-141	-141	-141	-141	-141	-141	0	0	
		80	-195	-195	-195	-195	-188	-164	-146	-131	-196	-196	-196	-196	-196	-196	-187	-170	-197	-197	-197	-197	-197	-197	0	0
150	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-141	-141	-141	-141	-141	-124	-111	0	-141	-141	-141	-141	-141	-141	-129	0	-141	-141	-141	-141	-141	-141	0	0	
		80	-196	-196	-196	-196	-181	-162	-146	-196	-196	-196	-196	-196	-196	-196	-196	0	-197	-197	-197	-197	-197	-197	0	0
160	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-141	-141	-141	-141	-141	-135	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		80	-196	-196	-196	-196	-196	-178	-161	-197	-197	-197	-197	-197	-197	-197	0	0	0	0	0	0	0	0	0	
170	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-141	-141	-141	-141	-141	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		80	-196	-196	-196	-196	-196	-193	-176	-197	-197	-197	-197	-197	-197	-197	0	0	0	0	0	0	0	0	0	
180	44-X	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		-141	-141	-141	-141	-141	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		80	-197	-197	-197	-197	-197	-197	-197	-208	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Note: The Forces shown in the tables above account for reactions associated with the interior support of a multi-span condition. See Max length for Multi Span for corresponding span length.

See SEAOC PV-2 2012 for definition of Roof Zones

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