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Introduction

Pandja's TRIU is a rugged tripod for portrait module installation. TRIU can be supplied with inclination angles of 15°, 20°, 25°, 30° and 35°. Entirely made of Aluminium with stainless steel hardware, it is a durable solution withstanding high wind and snow loads. TRIU is designed according to DIN EN 1991-1 Eurocode 1. Our mounting solution is engineered in Germany and manufactured in Europe.

Disclaimer

This manual describes the proper installation procedures required for product reliability and warranty. All installers must thoroughly read this manual and have a clear understanding of the installation steps and procedures prior to installation. Failure to follow these guidelines may result in damage, loss of warranty, injury or even death.

Parts and Hardware

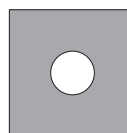
Scope of delivery

Pre-assembled tripod



Accessories

Base plate



Required Tools

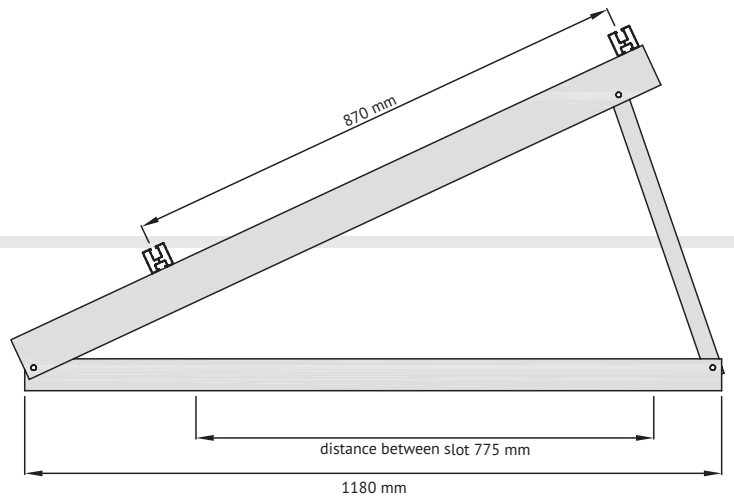
Ratchet handle WS 17 mm
with extension



Wrench WS 13 mm



Installation



Mounting

Unfold the pre-assembled tripod and fix the rear support with enclosed M8 screw and M8 nut. Tighten carefully and flush with belts (max 5 Nm).

For ground/roof attachment use slots $\varnothing 11 \times 30$ mm with screws M10, nuts M10 ISO 4032 and washers M10 ISO 7089. For ground/roof attachment with screws M8 use nuts M8 ISO 4032, washers M8 ISO

7089 and Aluminium base plates $25 \times 25 \times 5$ mm additionally (see Accessories). Use holes $\varnothing 11$ mm and screws M10 to attach module mounting rails.

WARNING: Diagonal supports may have to be installed due to site specific requirements (not scope of delivery and static calculations).

Array Layout

The maximum mounting distance between TRIU tripods in a row is dependent on

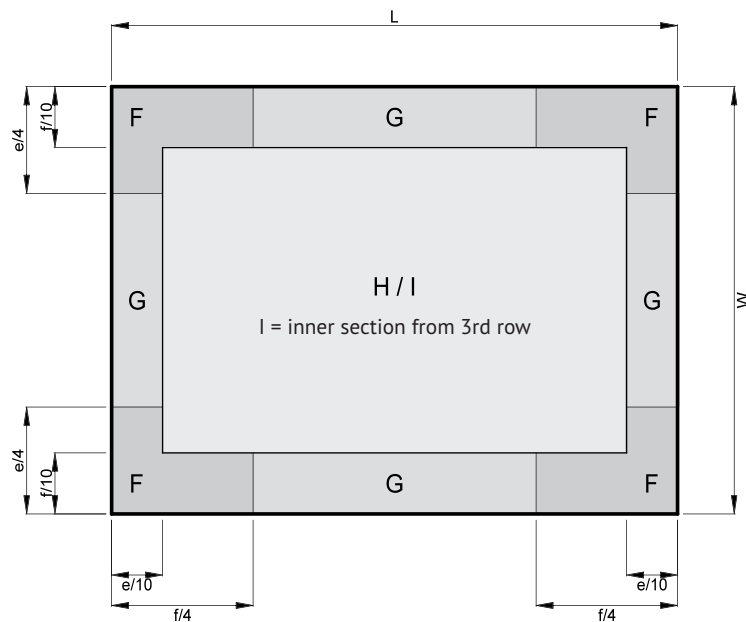
- building dimensions
- position of PV generator on the roof
- module inclination angle
- wind and snow loads

Determine projected area on flat roof (see Flat Roof Sections). Determine permissible mounting distance between tripods, based on chosen module inclination angle, wind and snow loads (see Permissible Mounting Distances, page 4-8).

Flat Roof sections

$e = W$ or $2 \times$ roof height, lower figure applies

$f = L$ or $2 \times$ roof height, lower figure applies



Permissible Mounting Distances [m]

15° Module Inclination

value of basic wind speed $v_{b,0}$ [m/s]	basic wind speed pressure $q_{b,0}$ [kN/m ²]	wind gust pressure q_p [kN/m ²]	top wind speed [m/s]	roof sections	snow load (based on horizontal plane) s_k [kN/m ²]						
					0.00	0.65	0.85	1.10	1.65	2.00	3.10
22.5	0.32	0.50	28.28	H	2.00	2.00	2.00	2.00	1.68	1.46	1.04
				I	2.00	2.00	2.00	2.00	1.86	1.60	1.10
				G	1.49	1.49	1.49	1.49	1.49	1.46	1.04
				F	1.25	1.25	1.25	1.25	1.25	1.25	1.04
25.00	0.39	0.65	32.25	H	1.59	1.59	1.59	1.59	1.57	1.38	1.00
				I	2.00	2.00	2.00	2.00	1.77	1.53	1.08
				G	1.15	1.15	1.15	1.15	1.15	1.15	1.00
				F	0.96	0.96	0.96	0.96	0.96	0.96	0.96
25.00	0.39	0.85	36.88	H	1.21	1.21	1.21	1.21	1.21	1.21	0.94
				I	2.00	2.00	2.00	2.00	1.67	1.46	1.04
				G	0.88	0.88	0.88	0.88	0.88	0.88	0.88
				F	0.74	0.74	0.74	0.74	0.74	0.74	0.74
27.50	0.47	0.80	35.78	H	1.29	1.29	1.29	1.29	1.29	1.28	0.96
				I	2.00	2.00	2.00	2.00	1.70	1.48	1.05
				G	0.93	0.93	0.93	0.93	0.93	0.93	0.93
				F	0.78	0.78	0.78	0.78	0.78	0.78	0.78
27.50	0.47	1.05	40.99	H	0.98	0.98	0.98	0.98	0.98	0.98	0.89
				I	1.64	1.64	1.64	1.64	1.58	1.39	1.00
				G	0.71	0.71	0.71	0.71	0.71	0.71	0.71
				F	0.60	0.60	0.60	0.60	0.60	0.60	0.60
30.00	0.56	0.95	38.99	H	1.09	1.09	1.09	1.09	1.09	1.09	0.92
				I	2.00	2.00	2.00	2.00	1.62	1.42	1.02
				G	0.79	0.79	0.79	0.79	0.79	0.79	0.79
				F	0.66	0.66	0.66	0.66	0.66	0.66	0.66
30.00	0.56	1.25	44.72	H	0.83	0.83	0.83	0.83	0.83	0.83	0.83
				I	1.38	1.38	1.38	1.38	1.38	1.32	0.97
				G	0.60	0.60	0.60	0.60	0.60	0.60	0.60
				F	0.50	0.50	0.50	0.50	0.50	0.50	0.50
30.00	0.56	1.40	47.33	H	0.74	0.74	0.74	0.74	0.74	0.74	0.74
				I	1.23	1.23	1.23	1.23	1.23	1.23	0.94
				G	0.53	0.53	0.53	0.53	0.53	0.53	0.53
				F	0.45	0.45	0.45	0.45	0.45	0.45	0.45

WARNING: The indicated loads and distances between tripods are permissible for TRIU and may not coincide with the permissible span widths of the mounting rails. Follow requirements of the module mounting rail manufacturer.

WARNING: Diagonal supports may have to be installed due to site specific requirements (not scope of delivery and static calculations).

20° Module Inclination

value of basic wind speed $v_{b,0}$ [m/s]	basic wind speed pressure $q_{b,0}$ [kN/m ²]	wind gust pressure q_p [kN/m ²]	top wind speed [m/s]	roof sections	snow load (based on horizontal plane) s_k [kN/m ²]						
					0.00	0.65	0.85	1.10	1.65	2.00	3.10
22.5	0.32	0.50	28.28	H	2.00	2.00	2.00	2.00	1.73	1.51	1.06
				I	2.00	2.00	2.00	2.00	1.90	1.62	1.11
				G	1.49	1.49	1.49	1.49	1.49	1.34	1.06
				F	1.25	1.25	1.25	1.25	1.25	1.25	1.06
25.00	0.39	0.65	32.25	H	1.59	1.59	1.59	1.59	1.56	1.42	1.02
				I	2.00	2.00	2.00	2.00	1.83	1.57	1.09
				G	1.15	1.15	1.15	1.15	1.15	1.15	1.02
				F	0.96	0.96	0.96	0.96	0.96	0.96	0.96
25.00	0.39	0.85	36.88	H	1.21	1.21	1.21	1.21	1.21	1.21	0.97
				I	2.00	2.00	2.00	2.00	1.73	1.50	1.06
				G	0.88	0.88	0.88	0.88	0.88	0.88	0.88
				F	0.74	0.74	0.74	0.74	0.74	0.74	0.74
27.50	0.47	0.80	35.78	H	1.29	1.29	1.29	1.29	1.29	1.29	0.98
				I	2.00	2.00	2.00	2.00	1.75	1.52	1.06
				G	0.93	0.93	0.93	0.93	0.93	0.93	0.93
				F	0.78	0.78	0.78	0.78	0.78	0.78	0.78
27.50	0.47	1.05	40.99	H	0.98	0.98	0.98	0.98	0.98	0.98	0.92
				I	1.64	1.64	1.64	1.64	1.63	1.43	1.03
				G	0.71	0.71	0.71	0.71	0.71	0.71	0.71
				F	0.60	0.60	0.60	0.60	0.60	0.60	0.60
30.00	0.56	0.95	38.99	H	1.09	1.09	1.09	1.09	1.09	1.09	0.95
				I	2.00	2.00	2.00	2.00	1.68	1.47	1.04
				G	0.79	0.79	0.79	0.79	0.79	0.79	0.79
				F	0.66	0.66	0.66	0.66	0.66	0.66	0.66
30.00	0.56	1.25	44.72	H	0.83	0.83	0.83	0.83	0.83	0.83	0.83
				I	1.38	1.38	1.38	1.38	1.38	1.37	1.00
				G	0.60	0.60	0.60	0.60	0.60	0.60	0.60
				F	0.50	0.50	0.50	0.50	0.50	0.50	0.50
30.00	0.56	1.40	47.33	H	0.74	0.74	0.74	0.74	0.74	0.74	0.74
				I	1.23	1.23	1.23	1.23	1.23	1.23	0.97
				G	0.53	0.53	0.53	0.53	0.53	0.53	0.53
				F	0.45	0.45	0.45	0.45	0.45	0.45	0.45

WARNING: The indicated loads and distances between tripods are permissible for TRIU and may not coincide with the permissible span widths of the mounting rails. Follow requirements of the module mounting rail manufacturer.

WARNING: Diagonal supports may have to be installed due to site specific requirements (not scope of delivery and static calculations).

25° Module Inclination

value of basic wind speed $v_{b,0}$ [m/s]	basic wind speed pressure $q_{b,0}$ [kN/m ²]	wind gust pressure q_p [kN/m ²]	top wind speed [m/s]	roof sections	snow load (based on horizontal plane) s_k [kN/m ²]						
					0.00	0.65	0.85	1.10	1.65	2.00	3.10
22.5	0.32	0.50	28.28	H	2.00	2.00	2.00	2.00	1.69	1.45	1.02
				I	2.00	2.00	2.00	2.00	1.82	1.57	1.09
				G	1.49	1.49	1.49	1.49	1.49	1.45	1.02
				F	1.25	1.25	1.25	1.25	1.25	1.25	1.02
25.00	0.39	0.65	32.25	H	1.66	1.66	1.66	1.66	1.60	1.39	0.98
				I	2.00	2.00	2.00	2.00	1.76	1.50	1.06
				G	1.15	1.15	1.15	1.15	1.15	1.15	0.98
				F	0.96	0.96	0.96	0.96	0.96	0.96	0.96
25.00	0.39	0.85	36.88	H	1.27	1.27	1.27	1.27	1.27	1.27	0.94
				I	2.00	2.00	2.00	2.00	1.68	1.45	1.02
				G	0.88	0.88	0.88	0.88	0.88	0.88	0.88
				F	0.74	0.74	0.74	0.74	0.74	0.74	0.74
27.50	0.47	0.80	35.78	H	1.35	1.35	1.35	1.35	1.35	1.32	0.95
				I	2.00	2.00	2.00	2.00	1.70	1.46	1.03
				G	0.93	0.93	0.93	0.93	0.93	0.93	0.93
				F	0.78	0.78	0.78	0.78	0.78	0.78	0.78
27.50	0.47	1.05	40.99	H	1.03	1.03	1.03	1.03	1.03	1.03	0.90
				I	1.71	1.71	1.71	1.71	1.61	1.40	0.98
				G	0.71	0.71	0.71	0.71	0.71	0.71	0.71
				F	0.60	0.60	0.60	0.60	0.60	0.60	0.60
30.00	0.56	0.95	38.99	H	1.13	1.13	1.13	1.13	1.13	1.13	0.92
				I	2.00	2.00	2.00	2.00	1.64	1.42	1.00
				G	0.79	0.79	0.79	0.79	0.79	0.79	0.79
				F	0.66	0.66	0.66	0.66	0.66	0.66	0.66
30.00	0.56	1.25	44.72	H	0.86	0.86	0.86	0.86	0.86	0.86	0.86
				I	1.44	1.44	1.44	1.44	1.44	1.34	0.96
				G	0.60	0.60	0.60	0.60	0.60	0.60	0.60
				F	0.50	0.50	0.50	0.50	0.50	0.50	0.50
30.00	0.56	1.40	47.33	H	0.77	0.77	0.77	0.77	0.77	0.77	0.77
				I	1.28	1.28	1.28	1.28	1.28	1.28	0.94
				G	0.53	0.53	0.53	0.53	0.53	0.53	0.53
				F	0.45	0.45	0.45	0.45	0.45	0.45	0.45

WARNING: The indicated loads and distances between tripods are permissible for TRIU and may not coincide with the permissible span widths of the mounting rails. Follow requirements of the module mounting rail manufacturer.

WARNING: Diagonal supports may have to be installed due to site specific requirements (not scope of delivery and static calculations).

30° Module Inclination

value of basic wind speed $v_{b,0}$ [m/s]	basic wind speed pressure $q_{b,0}$ [kN/m ²]	wind gust pressure q_p [kN/m ²]	top wind speed [m/s]	roof sections	snow load (based on horizontal plane) s_k [kN/m ²]						
					0.00	0.65	0.85	1.10	1.65	2.00	3.10
22.5	0.32	0.50	28.28	H	2.00	2.00	2.00	2.00	1.74	1.50	1.04
				I	2.00	2.00	2.00	2.00	2.00	1.60	1.10
				G	1.49	1.49	1.49	1.49	1.49	1.49	1.04
				F	1.25	1.25	1.25	1.25	1.25	1.25	1.04
25.00	0.39	0.65	32.25	H	1.66	1.66	1.66	1.66	1.64	1.43	1.01
				I	2.00	2.00	2.00	2.00	1.81	1.55	1.07
				G	1.15	1.15	1.15	1.15	1.15	1.15	1.01
				F	0.96	0.96	0.96	0.96	0.96	0.96	0.96
25.00	0.39	0.85	36.88	H	1.27	1.27	1.27	1.27	1.27	1.27	0.97
				I	2.00	2.00	2.00	2.00	1.73	1.49	1.04
				G	0.88	0.88	0.88	0.88	0.88	0.88	0.88
				F	0.74	0.74	0.74	0.74	0.74	0.74	0.74
27.50	0.47	0.80	35.78	H	1.35	1.35	1.35	1.35	1.35	1.34	0.98
				I	2.00	2.00	2.00	2.00	1.75	1.51	1.05
				G	0.93	0.93	0.93	0.93	0.93	0.93	0.93
				F	0.78	0.78	0.78	0.78	0.78	0.78	0.78
27.50	0.47	1.05	40.99	H	1.03	1.03	1.03	1.03	1.03	1.03	0.93
				I	1.71	1.71	1.71	1.71	1.65	1.44	1.01
				G	0.71	0.71	0.71	0.71	0.71	0.71	0.71
				F	0.60	0.60	0.60	0.60	0.60	0.60	0.60
30.00	0.56	0.95	38.99	H	1.13	1.13	1.13	1.13	1.13	1.13	0.95
				I	2.00	2.00	2.00	2.00	1.69	1.46	1.03
				G	0.79	0.79	0.79	0.79	0.79	0.79	0.79
				F	0.66	0.66	0.66	0.66	0.66	0.66	0.66
30.00	0.56	1.25	44.72	H	0.86	0.86	0.86	0.86	0.86	0.86	0.86
				I	1.44	1.44	1.44	1.44	1.44	1.38	0.99
				G	0.60	0.60	0.60	0.60	0.60	0.60	0.60
				F	0.50	0.50	0.50	0.50	0.50	0.50	0.50
30.00	0.56	1.40	47.33	H	0.77	0.77	0.77	0.77	0.77	0.77	0.77
				I	1.28	1.28	1.28	1.28	1.28	1.28	0.97
				G	0.53	0.53	0.53	0.53	0.53	0.53	0.53
				F	0.45	0.45	0.45	0.45	0.45	0.45	0.45

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WARNING: Diagonal supports may have to be installed due to site specific requirements (not scope of delivery and static calculations).

35° Module Inclination

value of basic wind speed $v_{b,0}$ [m/s]	basic wind speed pressure $q_{b,0}$ [kN/m ²]	wind gust pressure q_p [kN/m ²]	top wind speed [m/s]	roof sections	snow load (based on horizontal plane) s_k [kN/m ²]						
					0.00	0.65	0.85	1.10	1.65	2.00	3.10
22.5	0.32	0.50	28.28	H	2.00	2.00	2.00	2.00	1.75	1.49	1.00
				I	2.00	2.00	2.00	2.00	1.82	1.54	1.06
				G	1.40	1.40	1.40	1.40	1.40	1.40	1.00
				F	1.17	1.17	1.17	1.17	1.17	1.17	1.00
25.00	0.39	0.65	32.25	H	1.55	1.55	1.55	1.55	1.55	1.44	0.99
				I	2.00	2.00	2.00	2.00	1.79	1.51	1.03
				G	1.08	1.08	1.08	1.08	1.08	1.08	0.99
				F	0.90	0.90	0.90	0.90	0.90	0.90	0.90
25.00	0.39	0.85	36.88	H	1.19	1.19	1.19	1.19	1.19	1.19	0.97
				I	2.00	2.00	2.00	2.00	1.75	1.49	1.00
				G	0.82	0.82	0.82	0.82	0.82	0.82	0.82
				F	0.69	0.69	0.69	0.69	0.69	0.69	0.69
27.50	0.47	0.80	35.78	H	1.26	1.26	1.26	1.26	1.26	1.26	0.98
				I	2.00	2.00	2.00	2.00	1.76	1.49	1.01
				G	0.87	0.87	0.87	0.87	0.87	0.87	0.87
				F	0.73	0.73	0.73	0.73	0.73	0.73	0.73
27.50	0.47	1.05	40.99	H	0.96	0.96	0.96	0.96	0.96	0.96	0.94
				I	1.60	1.60	1.60	1.60	1.60	1.45	0.99
				G	0.67	0.67	0.67	0.67	0.67	0.67	0.67
				F	0.56	0.56	0.56	0.56	0.56	0.56	0.56
30.00	0.56	0.95	38.99	H	1.06	1.06	1.06	1.06	1.06	1.06	0.96
				I	2.00	2.00	2.00	2.00	1.72	1.47	1.00
				G	0.74	0.74	0.74	0.79	0.74	0.74	0.74
				F	0.62	0.62	0.62	0.62	0.62	0.62	0.62
30.00	0.56	1.25	44.72	H	0.81	0.81	0.81	0.81	0.81	0.81	0.81
				I	1.35	1.35	1.35	1.35	1.35	1.35	0.98
				G	0.56	0.56	0.56	0.56	0.56	0.56	0.56
				F	0.47	0.47	0.47	0.47	0.47	0.47	0.47
30.00	0.56	1.40	47.33	H	0.72	0.72	0.72	0.72	0.72	0.72	0.72
				I	1.20	1.20	1.20	1.20	1.20	1.20	0.97
				G	0.50	0.50	0.50	0.50	0.50	0.50	0.50
				F	0.42	0.42	0.42	0.42	0.42	0.42	0.42

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WARNING: Diagonal supports may have to be installed due to site specific requirements (not scope of delivery and static calculations).

Code Compliance

The installer has to assure that any installation complies with the following codes but not excluding any national code or practice not indicated here:

- National or International Building Code
- National Electric Code
- National or International Fire Protection Code

Safety and General Provisions

- All work must comply with all national, state and local installation procedures, product and safety (OHSA) standards.
- All electrical installation and procedures should be conducted by skilled, licensed and bonded electricians.
- Remove all loose debris or gravel prior to installation.
- Avoid concentrated loads on the roof. Never drag Pandja's TRIU components or ballast into place. Elevate the component, and then move it manually or with a cart. To ensure roofing system warranty continuation, work with roofing system installation contractors to ensure compatibility between roofing system and mounting structure components.
- At the end of every work day ensure all components are securely attached. Temporary ballast may be required to secure the system to the roof during the installation process to prevent movement or damage due to wind.

- As soon as modules are installed an electrical shock hazard is present.
- Proper fall protection should be in place at all work sites. These may include personal fall arrest systems, safety nets, guardrails, and other as outlined in OHSA regulations.
- Make sure to pick up and not drag your feet when working on site, and always pay attention to your path of movement to note any obstructions that could create a trip hazard.
- The installation process of a PV system with Pandja's TRIU involves lifting of heavy items that could lead to personal injury and damage to property.
- Metal components may have sharp edges, so be sure to handle with care and utilize proper personal protection equipment, especially gloves, during handling.
- All personnel should utilize and implement proper Personal Protective Equipment (PPE) per OSHA requirements.