

# SKT Type Low Level Support Structure

*Installation & Users  
Manual*

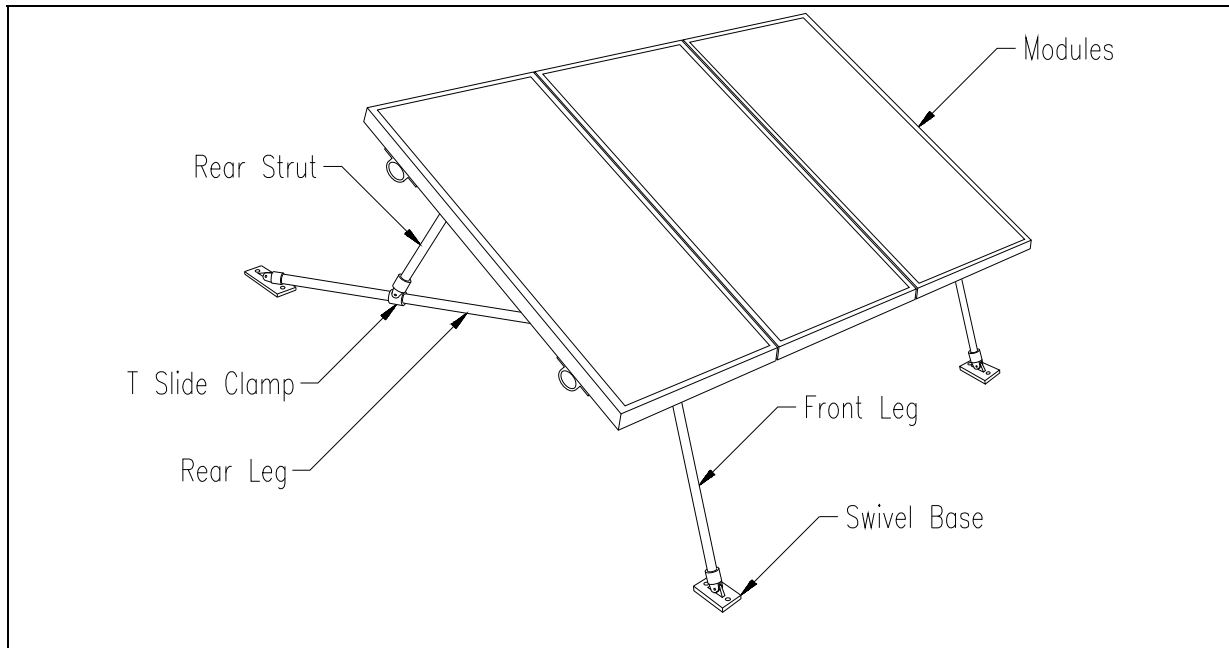
*Structures to support  
2 to 5 solar modules*

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## INTRODUCTION

This manual provides a basic guide to the assembly of the low level support structure, it is recommended that you read through the manual before attempting to assemble the structure taking note of the health & safety issues detailed below.



*Typical three module solar array on a T3 type structure*

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## HEALTH & SAFETY

### Structure Assembly

Construction must not be attempted in high winds. Care must be taken in lifting structural members and in working at high levels. Protective headgear should be worn.

### Electrical Interconnection

Potentially lethal voltages can be developed from arrays. Take the following precautions;

Electrically isolate the array from the rest of the system.

The modules should be shaded from the sun by opaque sheeting, before any electrical connections are made to the sub-array junction boxes or at the control unit.

**INSTALLATION SEQUENCE****Part Identification**

Refer to the drawings and photographs within this manual to familiarize yourself with the components of this structure prior to attempting assembly.

**What's Involved ?**

Concrete foundations are required for this structure, see the foundation details at the back of this manual.

Preparation of tools (Table 6.1) and checking that all components are present.

Assembly of sub array (if not supplied pre assembled), and assembly of supports to the sub-array.

Compass	To ensure correct orientation
Tape measure (5 metres long)	Measure out mounting points etc.
Hammer drill	To drill the footings
10mm masonry bits	To drill the footings
Hammer	To tap in the parabolts
Allen key (1/4" or 6.25mm) <b>(SUPPLIED)</b>	General structure assembly
Chalk/felt marking pen	Mark out correct mounting positions
Half round file	To clear bolt holes of excess zinc
Zinc touch up paint and brush (Galvafruid)	For touching up transit damage
13mm A/F spanners	Module to structure assembly
Sponge, cloth and clean water	For cleaning the modules
Opaque sheeting	To shade the modules as required
Inclinometer (angle setter)	To ensure the correct tilt angle is set

*Table 6.1 : Recommended tools for structure assembly.*



*Right angle clamp*



*End cap*



*Ground anchor bolt*



*Short tee clamp*



*Swivel base clamp*



*Slide clamp*



*Module clamp*

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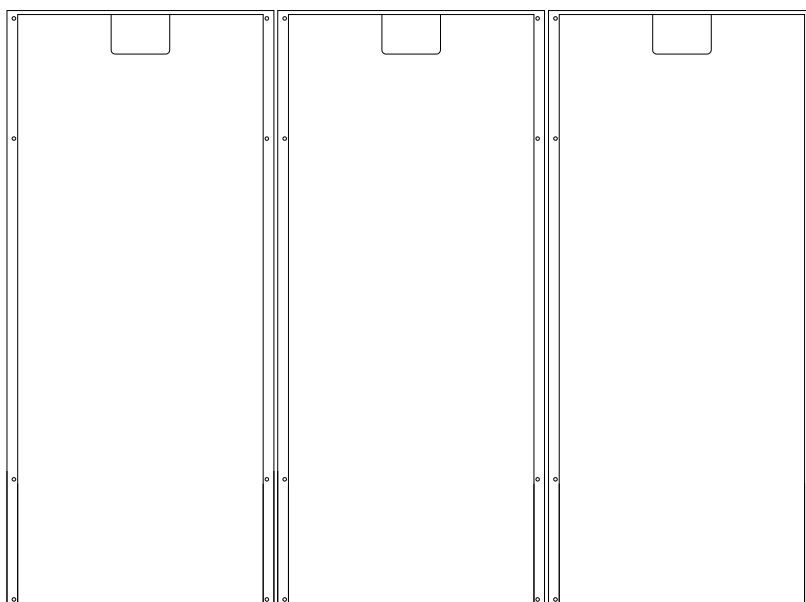
## ASSEMBLY OF SUB ARRAYS

**Assembly of the Sub-Array - (If the modules have been supplied pre-arrayed, then this section may be omitted - move on to Section 6 Assembly of Support Legs to the Sub-Array).**

The modules must first be mechanically assembled to the support tubes, and then electrically connected as for the required voltage. The illustrations depict assembly of a three module array - however, exactly the same principles apply to larger sub-arrays.

### Module Preparation

Lay the solar modules face down on a smooth flat surface that will not damage the glass as shown in Figure 6.1. Ensure all the module junction boxes are grouped together on one side. Note - it is important to protect the back of the modules during assembly, use sheets of cardboard so that any components dropped on the back of the module do not damage the tedlar backing material.



*Figure 6.1 : Lay modules face down on a smooth surface*

### Sub Array Tube Preparation

Locate the sub-array tubes. They can be identified by measuring their length and comparing it with the values in the Table 6.1. Figure 6.2 depicts typical tube preparation.

**Upper Sub array Tube** - Slide the Tee clamps and module clamps onto one length of tube. The upper tube is fitted to the junction box end of the modules. Push on two plastic end caps into the end of the tube. Position the clamps as shown in the Figure 6.3 (see also the foundation drawing for distance between clamps) and pinch up using a 1/4" Allen key in the grub screw.

**Lower Sub Array Tube** - Slide the right-angle clamps and module clamps onto the other tube in same positions as for the Tee clamps on the upper sub array tube, pinch up, and fit two plastic end caps.

**Note** - Only tighten the clamps sufficiently to stop them sliding on the tube, they will need to be adjusted when the support legs are fitted later.

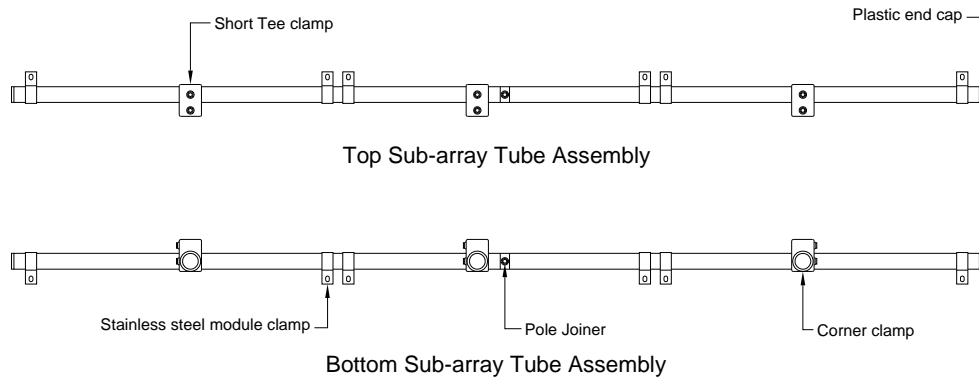


Figure 6.2 : Fitting components onto the upper and lower sub array tubes.

**Sub Array Assembly**

Lay the tube assemblies on to the back of the solar modules with the Tee clamps at the module junction box end and the right angle clamps at the bottom.

Position the module clamps so as to line up with the module mounting holes.

Using the M8 fastener kits, bolt the module clamps onto the modules (Figure 6.4).

Mount the junction box (if supplied) as required.

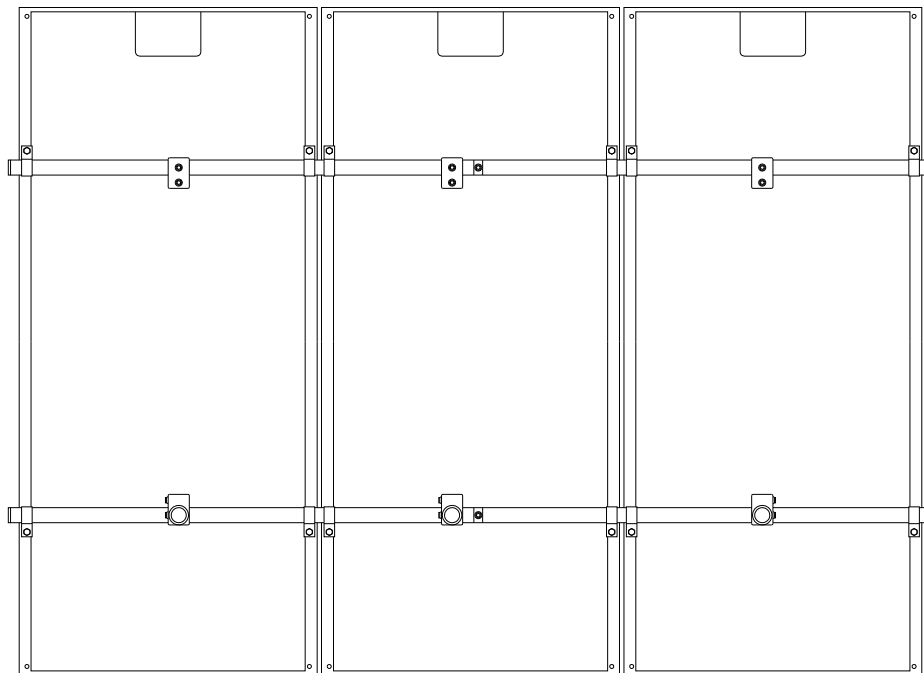


Figure 6.3 : Place tubes across modules back and clip the module clamps over the tubes in the positions shown.

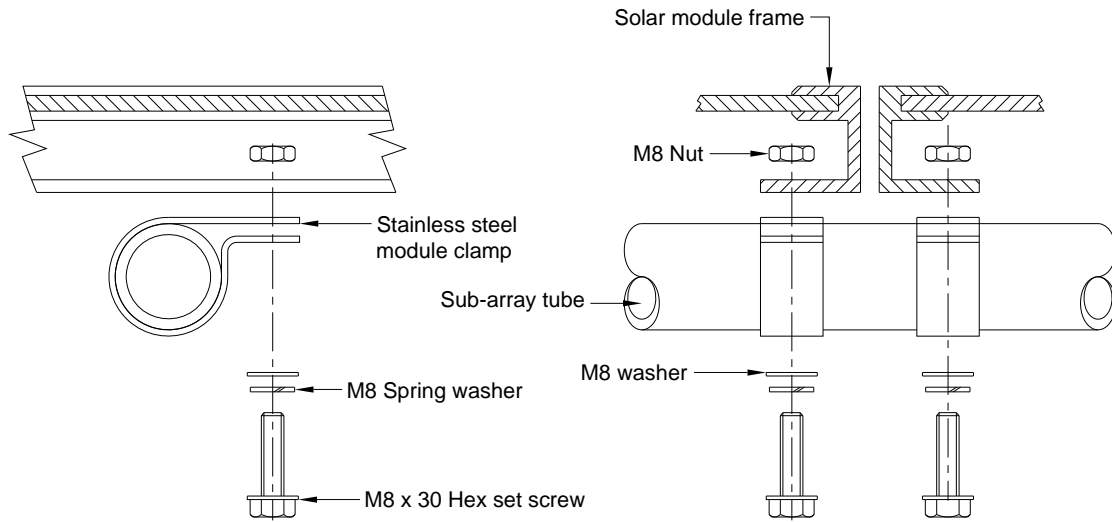


Figure 6.4 : Upper tube assembly detail.

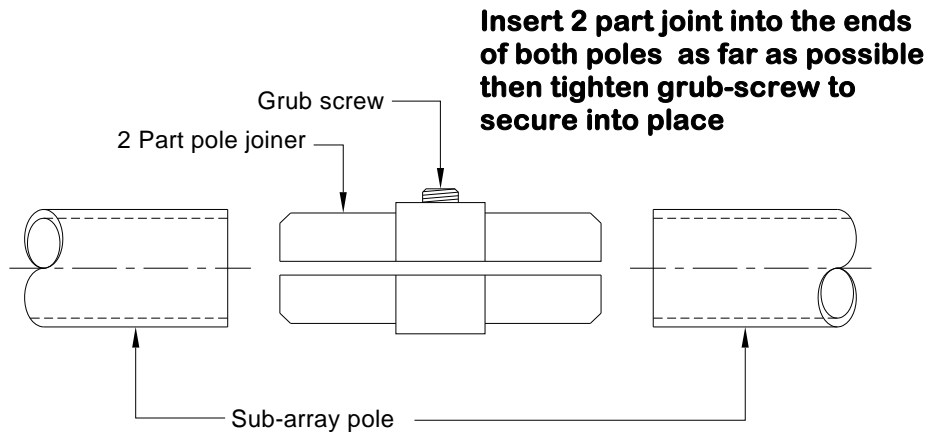


Figure 6.5 : Pole joint details 3 module to 7 module kits only

**Earthing**

The module frames are earthed to one another through the stainless steel module clamps and the structure tubes.

When the structure assembly is completed the array structure should be earthed to ground using a suitable earth. Use earth rods as required.

**Assembly of the support legs to the sub-array**

Ensure that the Tee clamps on the back of the array are in the correct position as shown in the detailed drawing at the back of this manual. Their separation must correspond to the separation of the foundation points for the structure. The position of the clamps is easily adjusted by loosening the grub screw using the Allen key supplied, moving the clamp and then re-tightening the grub screw. Figure 6.6 depicts the positions of components after assembly.

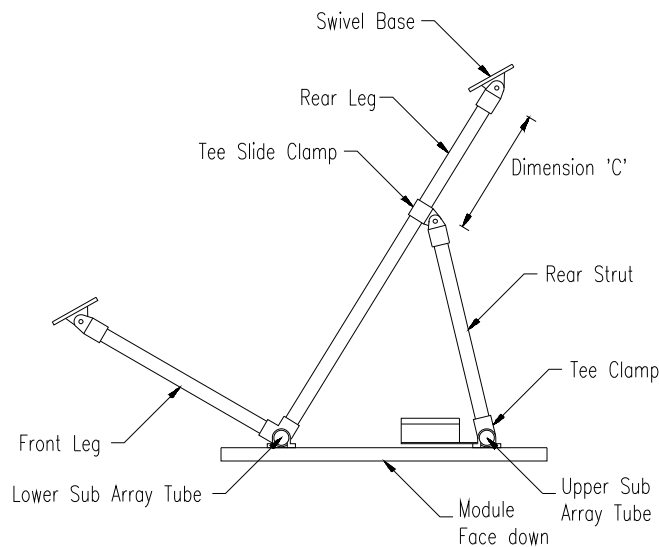


Figure 6.6 : T structure final assembly.



### Front legs

Fit the front legs into each of the right angle clamps on the lower sub array tube. Tighten the grub screws using the Allen key to secure the tubes.

### Rear legs

Fit the rear legs into the right angle clamps on the lower sub array tube. Again, the grub screws should be tightened with the Allen key to secure.

### Slide Clamps

Now add the slide clamps to the rear legs and set to approximate tilt angle required, the tilt angle must be checked when in position.

### Rear Struts

Insert each rear strut between the slide clamp and the corresponding tee clamp on the upper sub array tube. Tighten the grub screws using the Allen key.

### Feet

Secure the four swivel bases (feet) to the ends of the front and rear legs.

### Placing the array

Turn the array over and place it on its feet, as depicted on page 3

### Installation of the Array onto a Bolted Foundation.

The array must be secured to foundations.

Parabolts (expanding) are fitted as illustrated in Figure 6.7 following steps 1 to 4. It is best to drill and fit only one parabolts in each foot (preferably the one that will be difficult to get at when the assembly is finally positioned). Drill the holes 80mm deep with a 10mm masonry bit.

Place the sub array in position and mark out the other holes.

Remove the sub array, drill the remaining holes and fit the parabolts.

Replace the sub array over the parabolts and fix down..

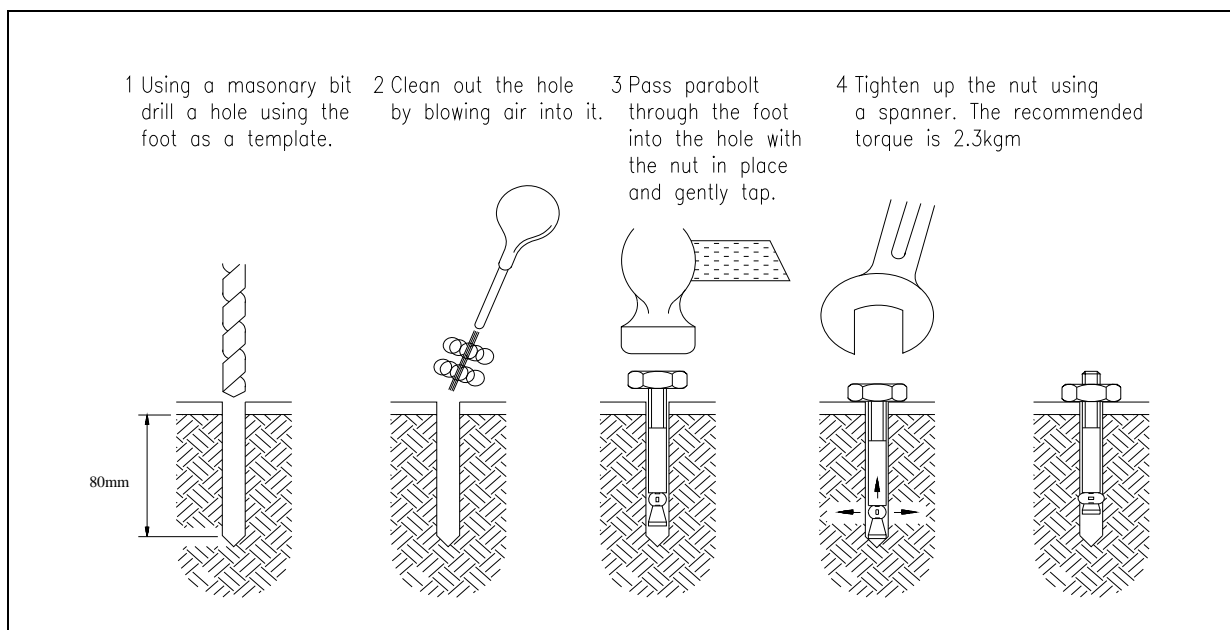


Figure 6.7 : Fixing of parabolts.

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**COMMISSIONING TESTS**

In order to ensure that the system has been properly installed and will function correctly, the following tests should be performed immediately after installation.

**Support Structure**

Check module fasteners are tight.

Check all structure fasteners are tight.

Check tilt angle is correct to within  $\pm 2^\circ$

Ensure array is within  $\pm 5^\circ$  of the azimuth specified.

Inspect for any damage to the galvanised steel work; touch up with Galvafroid (or similar) zinc paint as required.

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**MAINTENANCE**

The following maintenance schedule should be followed at 12 monthly intervals. However, in some areas prone to excessive dust or bird deposits, module cleaning could be necessary more frequently and can only be determined taking local conditions into account.

**Solar Modules**

Check that modules are clean; wash down glass and frames with water. Do not use detergents or solvents.

Inspect modules for damage; ensure glass is undamaged, and that there are no tears in plastic on back of modules.

Inspect module junction boxes; check seal is in place.

**Array Structure**

Inspect for rusting; brush off any rust. Paint affected area with zinc paint.

Ensure all nuts and bolts are tight.

**Site**

Ensure that arrays are not shadowed by growing vegetation; trim vegetation as necessary.

# SKT PARTS LIST      REC 240PE MODULES

1

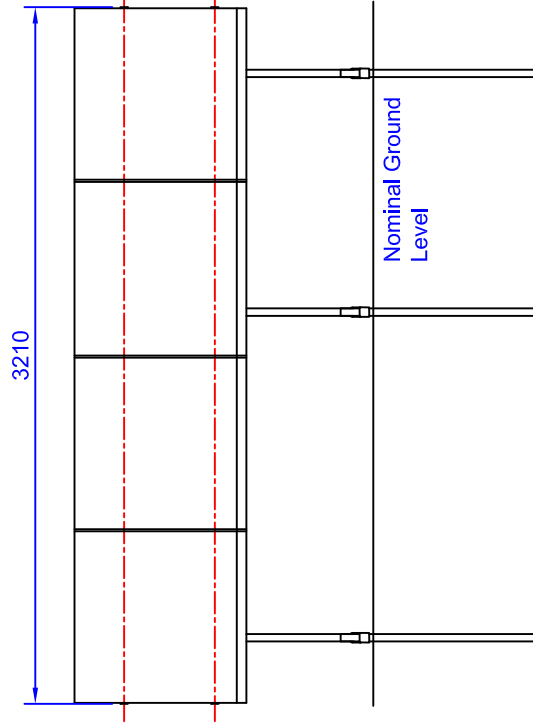
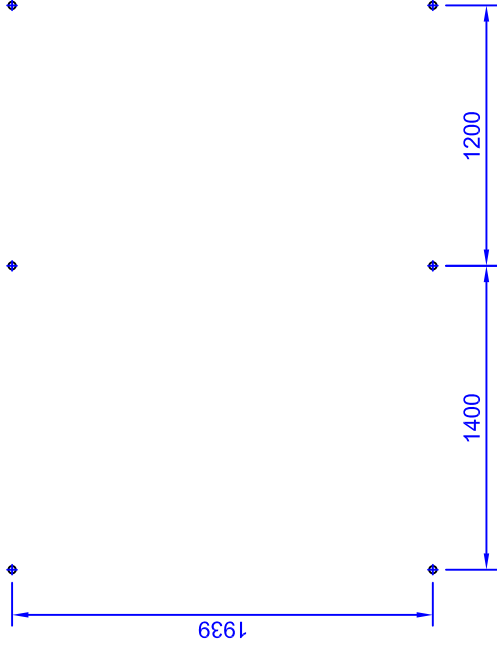
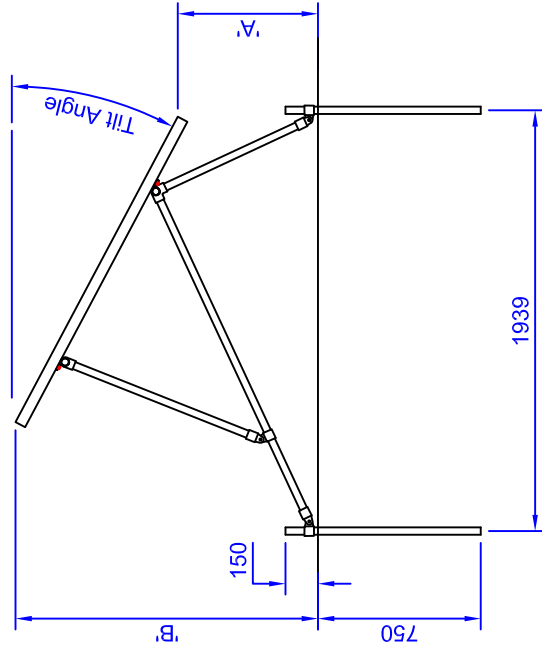
Item	Description	Length (mm)	2 mod F	2 mod P	3 mod F	3 mod P	4 mod F	4 mod P	5 mod F	5 mod P
			Qty	Qty	Qty	Qty	Qty	Qty	Qty	Qty
1	Front leg	720	2	2	2	2	3	3	3	3
2	Rear leg	1630	2	2	2	2	3	3	3	3
3	Rear strut	920	2	2	2	2	3	3	3	3
4	2 Module rail	2020	2	2	0	0	0	0	0	0
5	3 module rail	1500	0	0	4	4	0	0	0	0
6	4 module rail	2000	0	0	0	0	4	4	0	0
7	5 module rail	2490	0	0	0	0	0	0	4	4
8	Ground pole	900	0	4	0	0	0	6	0	6
9	Swivel base		4	0	6	0	6	0	6	0
10	Swivel Combination		2	6	3	9	3	9	3	9
11	Short Tee		2	2	3	3	3	3	3	3
12	Corner clamp		2	2	3	3	3	3	3	3
13	Pole joiner		0	0	2	2	2	2	2	2
14	1/4" Allen Key		1	1	1	1	1	1	1	1
15	Plastic end caps		4	8	4	10	4	10	4	10
16	Module clamp stainless steel		8	8	12	12	16	16	20	20
17	M6 x 30 hex set screw		8	8	12	12	16	16	20	20
18	M6 Washer (FORM C)		16	16	24	24	32	32	40	40
19	M6 Nyloc Nut		8	8	12	12	16	16	20	20
20	M10 x 80mm ground anchor bolt		8	0	12	0	12	0	12	0

Tilt Angle	'A'	'B'
10°	743	1020
20°	683	1230
30°	626	1422
40°	570	1595
50°	522	1742
60°	480	1860

**Design Data.**

- Material: mild & Carbon steel
- Finish: Galvanised BS EN ISO1461
- Fasteners: A4 Stainless steel
- Mod, fixings: A4 stainless steel
- Wind loading: 55metres per second
- Foundation: Not required.

Ground fixing poles supplied.



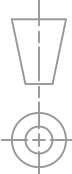
Tolerances.  
 NO D.Point ±1mm  
 1 D.Point ±0.5mm  
 2 D.Points ±0.2mm



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DO NOT SCALE

1	T Brooks	27.01.2011	Production Issue
ISSUE DRAWN BY		DATE	CHANGE

SKT Type low level		Product Type
Ground Mount Structure Kit		SKT Type
4 x BP3160/70 BP4175/80		No.
NON-FOUNDATION VERSION		001 020

## Ground Anchor poles

If your structure is supplied with ground anchor poles in place of the feet and concrete foundation, you will need to follow these instructions for the final placement of the structure.

1. Your kit will consist of additional swivel combination clamps in place of the feet, these are to be fitted onto the ends of each leg so that the clamps swivel front to back.
2. Turn the complete structure the correct way up and position as required.
3. Making sure the grub screws in the swivel combination clamps allow the tubes to pass through the clamps, position a pole through each clamp in turn.
4. Depending upon ground conditions etc, the tubes can either be driven into the ground through the swivel base clamps or by marking the location of each tube, you can then remove the complete structure and drive the tubes into the ground making sure that you leave around 150mm above ground level. If the ground level is uneven longer tubes may be required to allow for difference in ground levels.
5. Fit a plastic end cap onto the top of each ground tube and re-position the array if required. Now raise the structure so that the swivel base clamps are not resting on the ground level. Tighten the grub screws.

