Drop N GO Stacking

TRUE NORTH

April 2012

1 Day installation with Pre-Cast concrete ballast
Minimum Site Prep
Lowest Life-Cycle-Cost of any tracker

Up to 3.8kW per tower

PS 8,10,12,15,16 or 18 panel Strongback
7-8.5ft above grade

Sunpoint2GPS Tracker Retrofit
1.5ft tall self-aware self-powered
(optional - can be added anytime)

5 ft Galvanized post (6.5ft for without SunpointGPS)

Seasonal Adjustable
Acquires >95% of dual axis with
Lower cost
Lower power
(no 120v AC)

Less maintenance

Base Mount
Galvanized

LOWER Life-Cycle Cost

Ballast 1..2- 1.65ft high
above grade

Built-in
Conduit

Mounts 15x
180-240w
PV panel
any make

Up to 18
<180w panels

Full PS3000 Drop *N* Go Stack

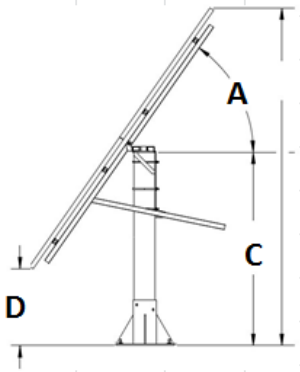
Prepared by: D Cooke, CTO

Drop N GO Stacking

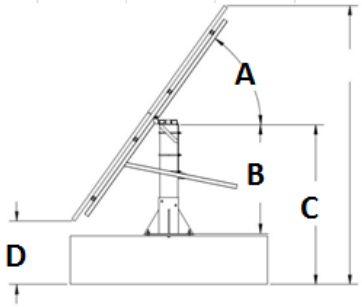
TRUE NORTH

(519) 584-5020

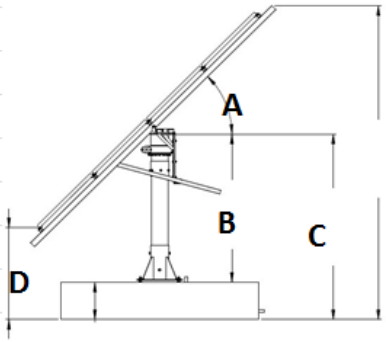
V95 Feb 2011



			10 Panel	12 Panel	15 Panel	16 Panel	18 Panel
Array Panel/Orientation			5x2 Portrait	6x2 Portrait	5x3 Portrait	4x4 Landscape	6x3 Portrait
IN-GROUND PEDESTAL			**PS2000P**	**PS2400P**	**PS3000P**	**PS3200L**	**PS3600**
Post Length			12' (3.66m)	12' (3.66m)	15' (4.6m)	15' (4.6m)	15' (4.6m)
Array Angle		A	55° Tilt From Horizontal				45° Tilt
Top Of Pole	Above Grade	C	8ft (2.44m)	8ft (2.44m)	8ft (2.44m)	8ft (2.44m)	8ft (2.44m)
Ground Clearance		D	49.6" (1.26m)	49.6" (1.26m)	25.5" (.66m)	29.9" (.76m)	25.5" (.66m)
In-ground Concrete			Local Design only				



DropNGo			**PS2000**	**PS2400**	**PS3000**	**PS3200**	**PS3600**
Post Length			5Ft	5Ft	6.5ft	6.5ft	5Ft
Array Angle		A	45° Tilt From Horizontal				45° Tilt
Array Center	Above Ballast	B	5' (1.52m)	5' (1.52m)	6.5' (2m)	6.5' (2m)	7.23' (2.21m)
	Above Grade	C	6.4' (1.95m)	6.4' (1.95m)	8.3' (2.53m)	8.3' (2.53m)	8.9' (2.7m)
Panel Ground Clearance		D	36.9" (.94m)	37.6" (.96m)	37.4" (.95m)	50.4" (1.28m)	40.84'(1.04m)
8.6ft Diameter Ballast			1.2ft thick	~10,780lbs	1.67ft thick	~14,450lbs	2ft thick ~17,400lbs



DropNGo with SunpointGPS			**PS2000**	**PS2400**	**PS3000**	**PS3200**	**PS3600**
Post Length			5Ft	5Ft	5Ft	5Ft	5Ft
Array Angle		A	45° Tilt From Horizontal				45° Tilt
Array Center	Above Ballast	B	5' (1.52m)	5' (1.52m)	5' (1.52m)	5' (1.52m)	7.6' (2.3m)
	Above Grade	C	7.8' (2.38m)	7.8' (2.38m)	8.2' (2.5m)	8.2' (2.5m)	9.6' (2.9m)
Panel Ground Clearance		D	53.4" (1.36m)	53.4" (1.36m)	35.9" (.91m)	48.9" (1.24m)	47.8'(1.2m)
8.6ft Diameter Ballast			1.2ft thick	~10,780lbs	1.67ft thick	~14,450lbs	2ft thick ~17,400lbs

Prepared by: D Cooke, CTO

Sunpoint2GPS

TRUE NORTH

Sunpoint2GPS comes STANDARD with 120vAC plug-in power source., and 12AH battery backup . An OPTIONAL larger 32AH 12v AGM battery with 20w PV solar panel is also available at a small extra charge. ***NOTE: SolarPV and battery is not an uninterruptable power source.*** However, with solar PV the unit is then self-powered, self-contained and self-aware. It uses its own small solar panel and charging system to keep a battery full. The larger battery contains enough energy for a week of operation and is STANDARD with SP3600 and SP5000 trackers that use a remote controlled tilt actuator. After long cloudy periods or in extreme cold weather below -20deg C you can expect less energy delivered. If this happens , the controller will keep the array to facing south and wait for the sun to recharge. In extreme winter operations the STANDARD 12v wall adapter plug-in may be a more reliable power source.

Each day, the SunpointGPS controller moves the array in several discrete "steps" from sunrise to sunset and when not actually moving it goes to sleep (powers down) and waits. This method means the unit uses less than 40/1000ths of a kWhr/day of it's own power to operate. Less than a penny at typical hydro rates. The drive spends over 95% of it's life in an unpowred sleep in mode. When the power is turned on initially it determines it's position and time from an internal GPS receiver. It then moves in azimuth just ahead of the sun and waits for the sun to go by, sleeping while it waits. Then, at the end of the day, it will face south and sleep. Just before sunrise it will check battery condition, move to EAST Reference Point, re-calibrates and begin tracking again at sunrise. Two emergency limit switches will stop all motion should the motor somehow ignore software commands. You can restart the program at any time to recalibrate it's position. Simply remove the fuse on the POS battery terminal wire, wait a few seconds and reconnect. NOTE: Make sure the solar panel and plug in power is also disconnected first or the unit will not actually RESET. The system will restart, recalibrate it's location and then move to face the sun again.

It is important to initially orient the Sunpoint2GPS tracker facing GRID SOUTH. Trackers come with an adjustable "NORTH PROBE" that virtually eliminates the need for precise alignment during assembly.

Annual inspection: simply check of the condition of the system to ensure nothing is loose and do a grease check of the slew drive gear itself.

Prepared by: D Cooke, CTO

Sunpoint2GPS

TRUE NORTH

PS2400 and PS3200 Strongback - Used in high wind high snow areas
Welded steel, hot dip galvanized

Tilt pivot points for vertical arms

Drive motor and
Slew assembly

Limit switches

Combiner Box Mounting Bracket (Optional)
Fits all PowerSeries mounts and most
Combiner boxes (Combiner Box and
bracket extra)

Tilt Arm support beam

Sunpoint RetroFIT Mounting Sleeve
Galvanized steel
(Clamps to any 8.625”OD Post)
Adds ~ 18inches to post height

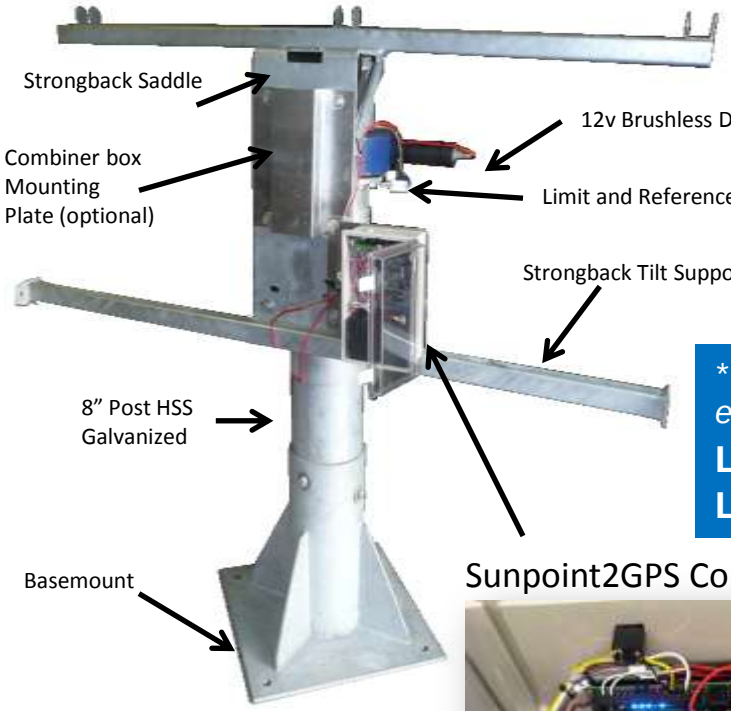
Sunpoint2GPS
Controller Box with it’s own solar panel (mounts to all PowerSeries racking)
Self-contained solar charging system (OPTIONAL)
Means no utility hook up or bills
Comes with mounting bracket that fits all PowerSeries mounts

Prepared by: D Cooke, CTO

Sunpoint2GPS

TRUE NORTH

Add a tracker in the future to any existing system

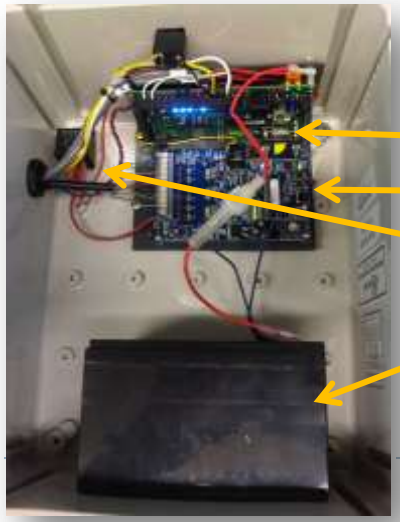


STANDARD 120v AC Power Supply w 12AH Battery backup below

OPTIONAL: 24w PV Self-contained power source **with 35AH 12v Battery**

** In Ontario Azimuth trackers produce more energy than dual-axis trackers over 20 yrs :*
Longer MTBF (Mean Time Between Failure)
Lower MTTR (Mean Time To Repair).

Sunpoint2GPS Controller



RetroFIT Mount

Prepared by: D Cooke, CTO

* See FREE Wind News and Univ Guelph Study

SunPoint2GPS 5000

TRUE NORTH

Sunpoint2GPS 5000 includes tower, mount and all hardware

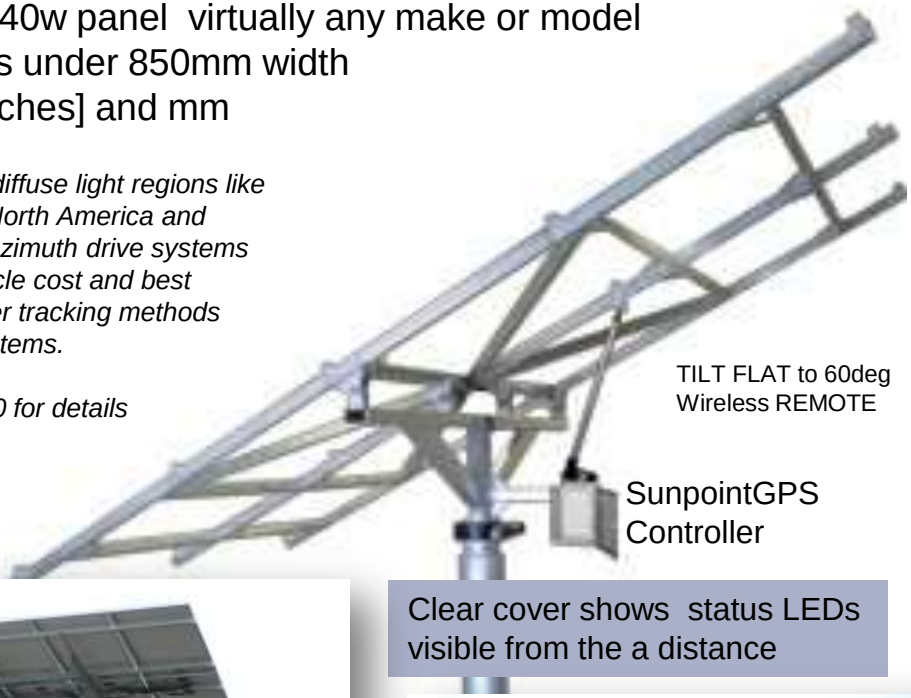
Fits 24 x 200-240w panel virtually any make or model
Up to 28 panels under 850mm width
Dimensions [inches] and mm

**Studies show that in diffuse light regions like Ontario (and most of North America and Europe) that fixed tilt azimuth drive systems offer the lowest life-cycle cost and best performance over other tracking methods including dual axis systems.*

- *Call (519) 632-8830 for details*

TITANIUM and STAINLESS Fittings – for 90mph wind
And 50lbs/sqft snow loads

SP5000 Strongback and Tower



TILT FLAT to 60deg
Wireless REMOTE

SunpointGPS Controller

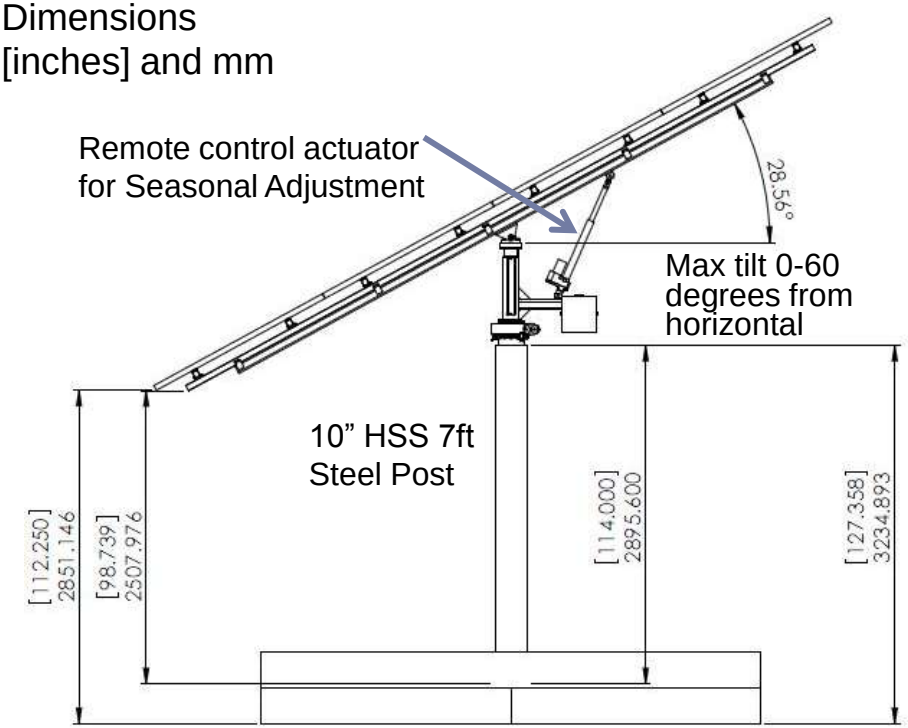
Clear cover shows status LEDs visible from the a distance

Prepared by: D Cooke, CTO

SunPoint2GPS 5000

TRUE NORTH

Dimensions
[inches] and mm



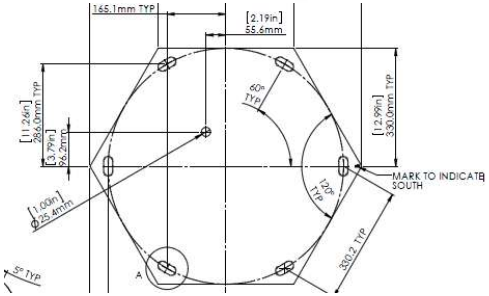
12v Rechargable

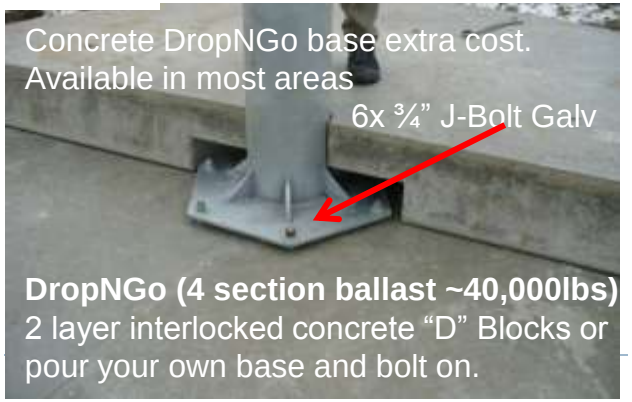
SunpointGPS (All 12v)
Controller Box with it's own solar panel (mounts to all PowerSeries racking)

Self-contained 24w charging system
Means no utility hook up or bills
Controller comes with Panel and mounting bracket that fits all mounts

FIXED TILT or
Optional Remote Tilt

Studies show adding seasonal tilt to Azimuth Tracking systems provided <1-2% additional energy and increase the Mean Time Between Failure (MTBF) of the system. More energy production is likely and lower life cycle cost is expected with azimuth drive and tilt angle optimized for summer and winter.
Visit www.truenorthpweor.com
FREE Wind News





DropNGo (4 section ballast ~40,000lbs)
2 layer interlocked concrete "D" Blocks or pour your own base and bolt on.

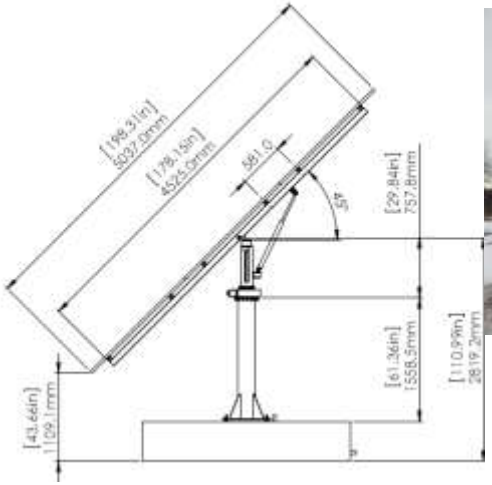
Upper strongback and AZ Drive

Prepared by: D Cooke, CTO

PowerNSeries SP-3600

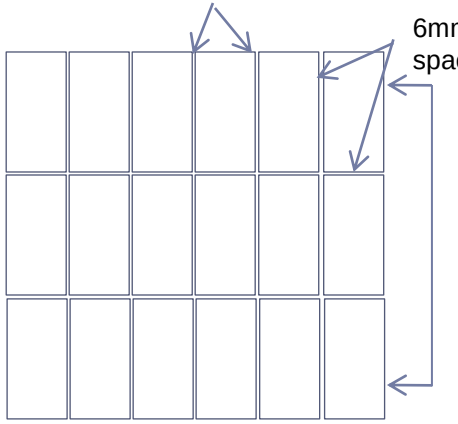
TRUE NORTH

SunpointGPS 3600 includes tower, mount and all hardware



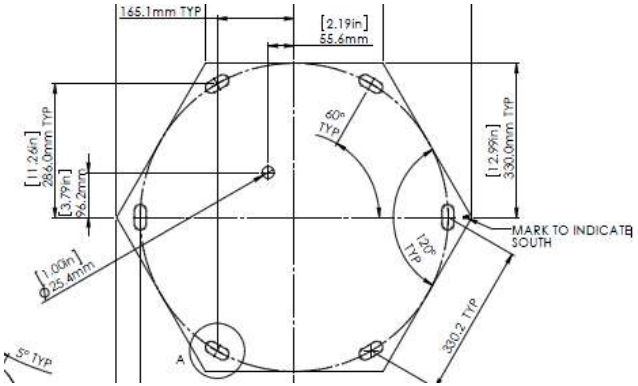
Note: 10" x 5ft Post
6 bolt Hex Base
20,000lb
Concrete (Extra)

18 Panel Max Mounting Measurements.
Max panel width+ Space=1010 mm outer edge total <6100 mm



Call for Wind and Snow load limits
Upto 90mph. Depends panel choice

18 Panel ~30 M^2
(~323 ft^2)



For 8" x 15ft (8.625OD) HSS steel Galvanized Pedestal Moment Requirements available FREE

This model uses only 3 posts to achieve 12kW Micro-FIT but has limited string and inverter matches for 2x5kW inverters. Enphase mounts on rails. Specify Enphase mounting kits if needed.

Prepared by: D Cooke, CTO

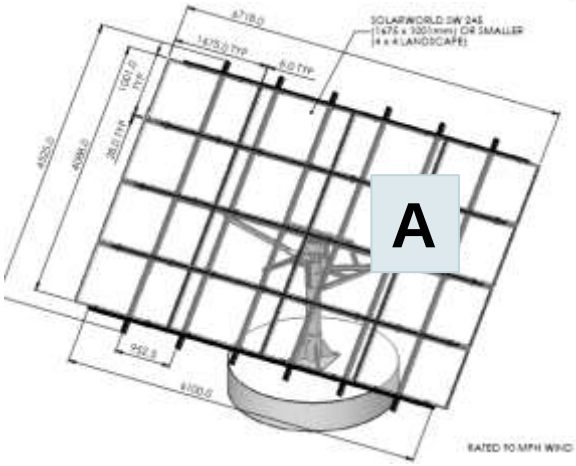
PowerNSeries PS-3200

TRUE NORTH

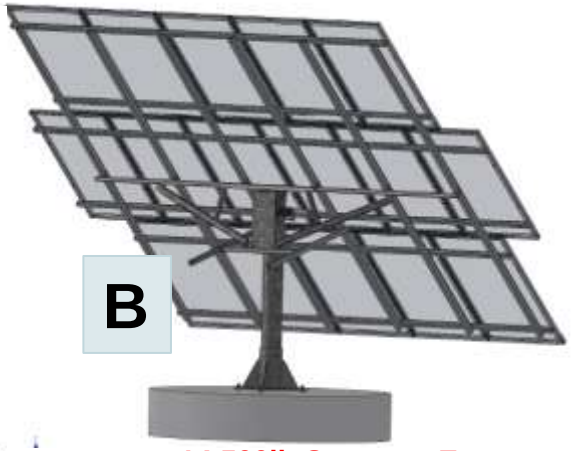
Landscape 4x4

Portrait 5-6-5 layout

Note: 240-245w panels in landscape may require 6200mm horizontal rails. Check with True North Power when ordering and specify panel choice

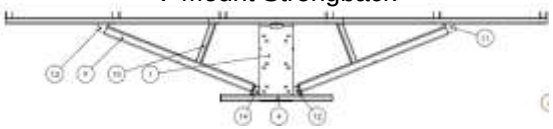


Fits 8" poles (8.625"OD) or DropNGo base mount
Tamperproof security bolt OPTION now available

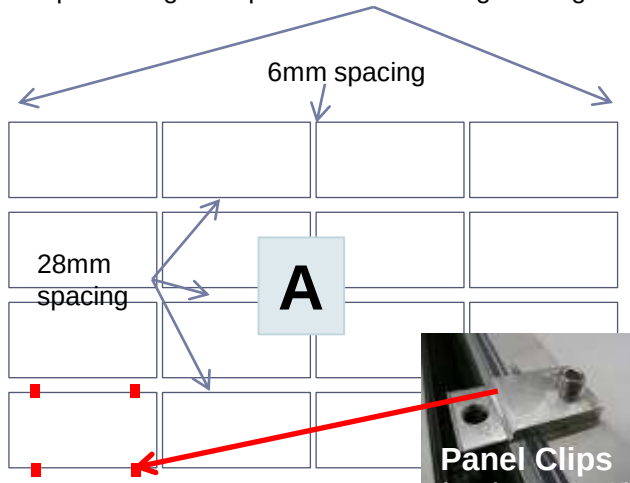


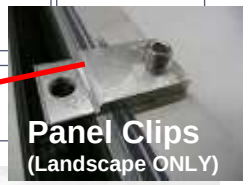
14,500lb Concrete Extra

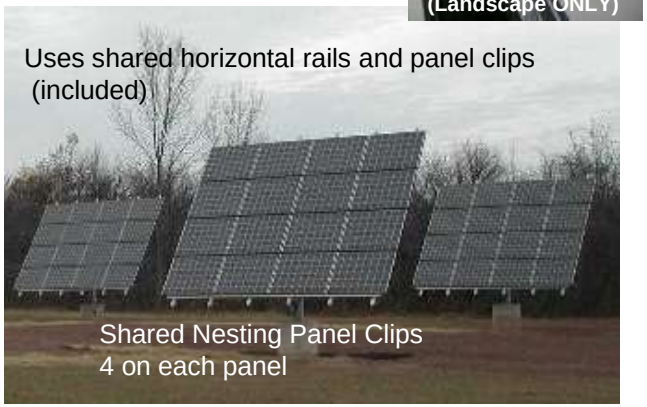
V-Mount Strongback



16 Panel 4x4 Landscape (check panel choice)
Max panel length + Space <6760mm edge to edge







Call for Wind and Snow load limits
Up to 90mph. Depends panel choice

CONFIGURATION & SOME OF THE TYPICAL PANELS THAT FIT*

A — **16 Panel ~27.3 M² (~295 ft²)**

Ecosun 230, Sharp 235, Suntech 210, CS6P200
Day4 45MC or 60MC, ES190-210, Kyocera 185-210
Ky180-210 , OPsun240-300, PWatt215 REC230,
Schott235, SolarWorld 220-230, Solgate 230 and others

For 8" x 15ft (8.625OD) HSS steel Galvanized Pedestal Moment Requirements available FREE

This model uses only 3 posts to achieve 10kW Micro-FIT but has limited string and inverter matches for 2x5kW inverters. Enphase mounts on rails. Specify Enphase mounting kits if needed.

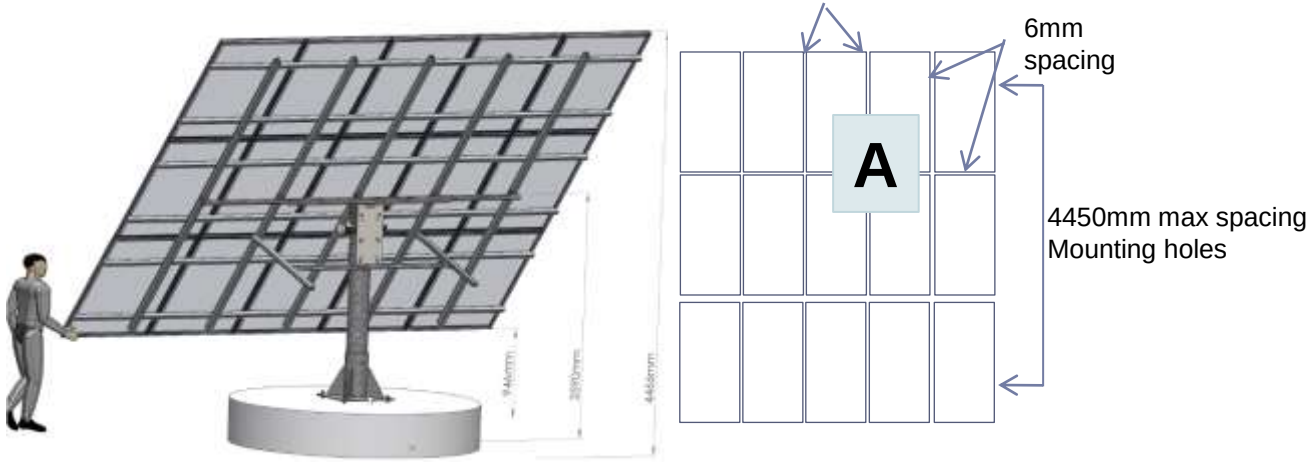
Prepared by: D Cooke, CTO

If unsure, please call and check actual panel dimensions to confirm configuration

Power N Series PS-3000

TRUE NORTH

15 Panel Max Mounting Measurements.
Max panel width+ Space=1022 mm outer edge total 4996mm



14,500lb Concrete Extra

Call for Wind and Snow load limits
Up to 90mph. Depends panel choice

CONFIGURATION & SOME OF THE TYPICAL PANELS THAT FIT*

A — **15 Panel ~30 M² (~320 ft²)**

Ecosun230, Sharp 235, Suntech 210, CS6P200 Day4 48MC, 60MC ES190-210, Holistic215-280 Kyocera 210 PhotoWatt215 REC230, Schott235, SolarWorld 230, Solgate 230 +others

For 8" x 15ft (8.625OD) HSS steel Galv. or DropNGo as shown above
Pedestal Moment Requirements available FREE

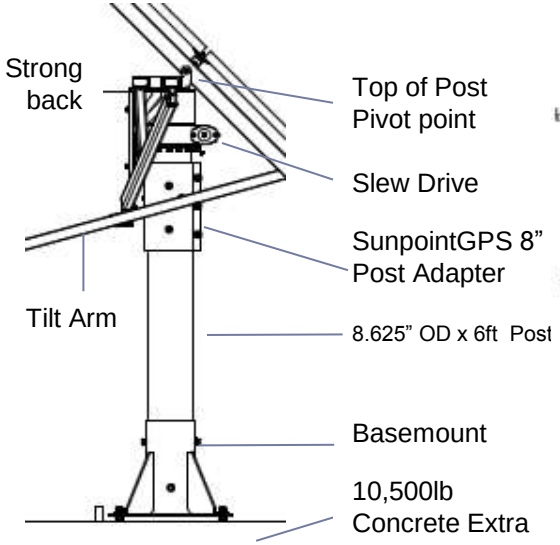
This model uses only 3 posts to achieve 10kW Micro-FIT but has limited string and inverter matches for 2x5kW inverters. Enphase mounts on rails. Specify Enphase mounting kits if needed.

Prepared by: D Cooke, CTO

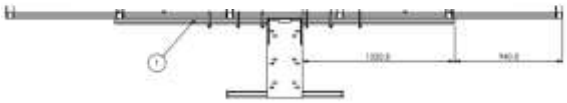
If unsure, please call and check actual panel dimensions to confirm configuration

Power N Series PS-2400F

TRUE NORTH

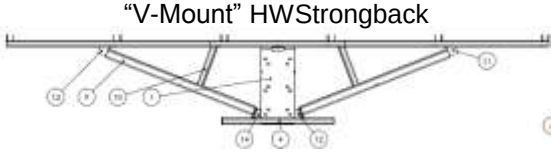


PS2400F (under 200w panels)
Standard Strongback

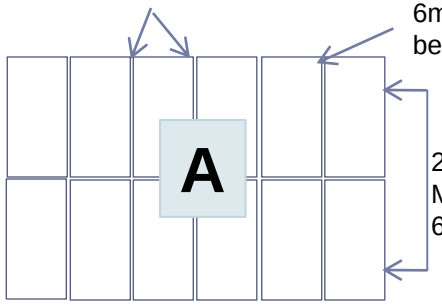


"Snow Wings" Option

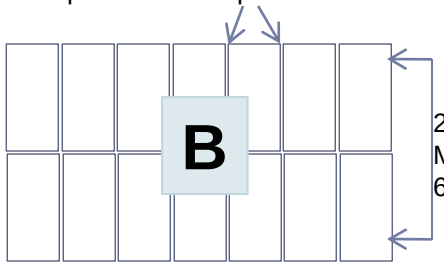
"V-Mount" HWStrongback



12 Panel Max Mounting Measurements.
Max panel width +plus space=1012mm outer edge total 6100mm



14 Panel Max Mounting Measurements.
Max panel width +space=865mm outer edge total 6100mm



This model uses 4 posts to achieve 10kW Micro-FIT and has simpler string and inverter matching for 2x5kW inverters

CONFIGURATION & SOME OF THE TYPICAL PANELS THAT FIT*

A	**12 Panel ~20 M² (~217 213 ft²)**	**Ecosun230,** Sharp 235, Suntech 210, CS6P200 Day4 48MC, 60MC ES190-210, Holistic215-280 Kyocera 210 PhotoWatt215 REC230, Schott235, SolarWorld 230, Solgate 230 +others
B	**14 Panel ~15.5 M² (~167 ft²)**	CS 160-180, Suntech 175, SG 150-180 SolarWorld 175-180, Kyocera 135, Sharp 176-198 SanyoHIT190-200-210-215N

Mount virtually any make or model of panels
Even mix string sizes on each row
No custom orders needed

Call for Wind and Snow load limits
Up to 90mph. Depends panel choice

For 8"x12ft (8.625OD) HSS Steel post Galvanized
Pedestal Moment Requirements available FREE

Prepared by: D Cooke, CTO

If unsure, please call and check actual panel dimensions to confirm configuration

Power N Series PS-2400G

TRUE NORTH

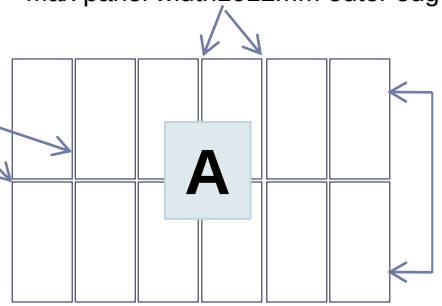
The "Big-Eh!"

Four of these units makes a10kW Micro-FIT and has simpler string and inverter matching for 2x5kW inverters

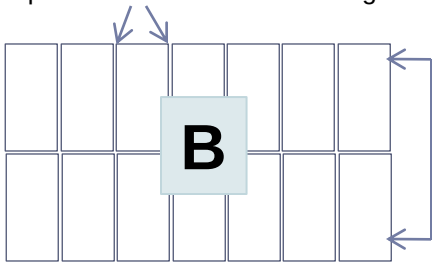
Specify Enphase mounting bolts if needed

12 Panel Max Mounting Measurements.
Max panel width1012mm outer edge total 6100mm

6mm spacing between



14 Panel Max Mounting Measurements.
Max panel width 865mm outer edge total 6100mm



CONFIGURATION & SOME OF THE TYPICAL PANELS THAT FIT*

A	**12 Panel ~20 M² (~217 213 ft²)**	**Ecosun230,** Sharp 235, Suntech 210, CS6P200 Day4 48MC, 60MC ES190-210, Holistic215-280 Kyocera 210 PhotoWatt215 REC230, Schott235, SolarWorld 230, Solgate 230 +others
B	**14 Panel ~15.5 M² (~167 ft²)**	CS 160-180, Suntech 175, SG 150-180 SolarWorld 175-180, Kyocera 135, Sharp 176-198 SanyoHIT190-200-210-215N

Mount virtually any make or model of panels
Even mix string sizes on each row
No custom orders needed

Call for Wind and Snow load limits
Up to 90mph. Depends panel choice

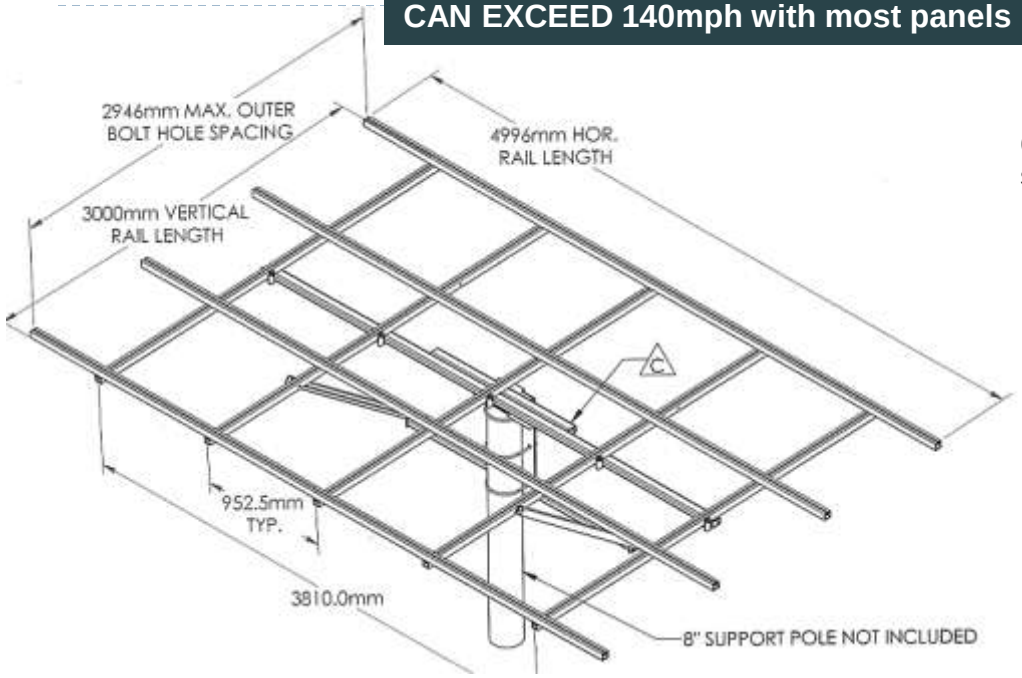
All Ontario made galvanized steel & aluminum
Anchoring Moment Requirements available FREE

Prepared by: D Cooke, CTO

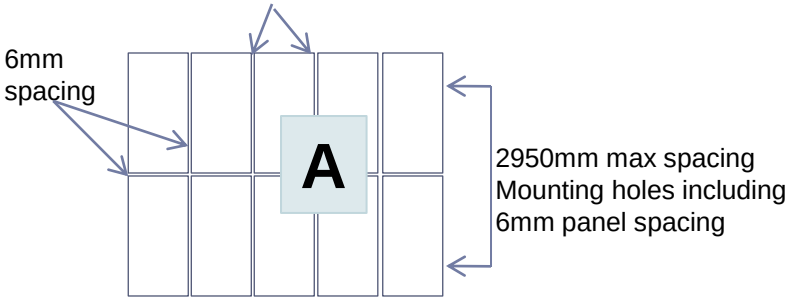
PowerNSeries PS-2000

TRUE NORTH

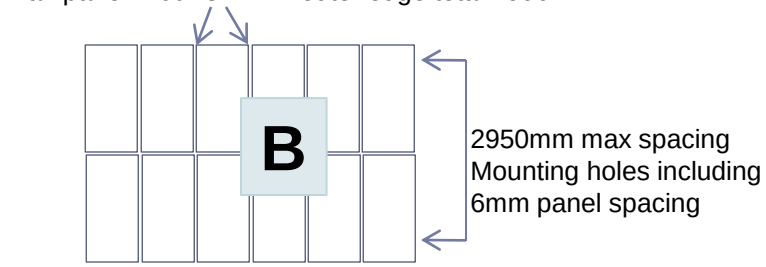
CAN EXCEED 140mph with most panels



10 Panel Max Mounting Measurements.
Max panel width 1022 mm outer edge total 4996mm



12 Panel Max Mounting Measurements.
Max panel width 827mm outer edge total 4996mm



CONFIGURATION & SOME OF THE TYPICAL PANELS THAT FIT*

A	**10 Panel ~16.5 M² (~177ft²)**	**Ecosun230,** Sharp 235, Suntech 210, CS6P200 Day4 48MC, 60MC ES190-210, Holistic215-280 Kyocera 210 PhotoWatt215 REC230, Schott235, SolarWorld 230, Solgate 230 +others
B	**12 Panel ~13 M² (~140 ft²)**	CS 160-180, Suntech 175, SG 150-180 SolarWorld 175-180, Kyocera 135, Sharp 176-198 SanyoHIT190-200-210-215N

Mount virtually any make or model of panels
Even mix string sizes on each row

Call for Wind and Snow load limits
Up to 90mph. Depends panel choice

For 8"x12-15ft (8.625OD) .322 - .5" wall HSS Steel Pedestal Moment Requirements available FREE

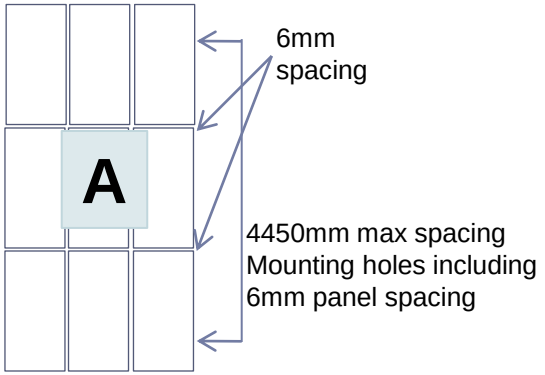
Prepared by: D Cooke, CTO

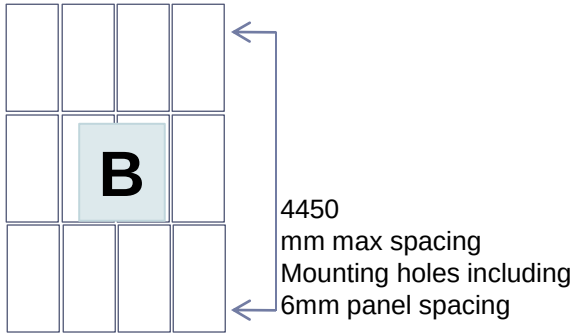
If unsure, please call and check actual panel dimensions to confirm configuration

Power N Series PS-1800

TRUE NORTH

3 x 4450x50x75mm Vertical rails
6 x 3200x 50x50Heavy Horizontal Rail





CONFIGURATION & SOME OF THE TYPICAL PANELS THAT FIT*

A	**9 Panel ~15 M² (~160ft²)**	**Ecosun230,** Sharp 235, Suntech 210, CS6P200 Day4 48MC, 60MC ES190-210, Holistic215-280 Kyocera 210 PhotoWatt215 REC230, Schott235, SolarWorld 230, Solgate 230 +others
B	**12 Panel ~15M² (~160 ft²)**	CS 160-180, Suntech 175, SG 150-180 SolarWorld 175-180, Kyocera 135, Sharp 176-198 SanyoHIT190-200-210-215N

Mount virtually any make or model of panels
Even mix string sizes on each row

Call for Wind and Snow load limits
Up to 90mph. Depends panel choice

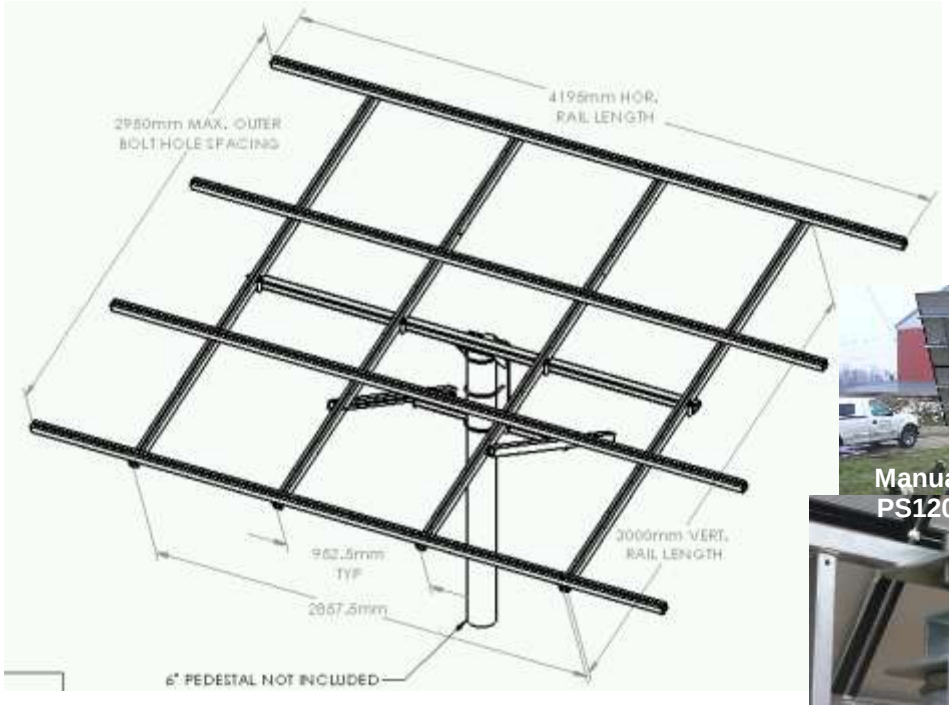
For 8"x12-15ft (8.625OD) .322 - .5" wall HSS Steel Pedestal Moment Requirements available FREE

Prepared by: D Cooke, CTO

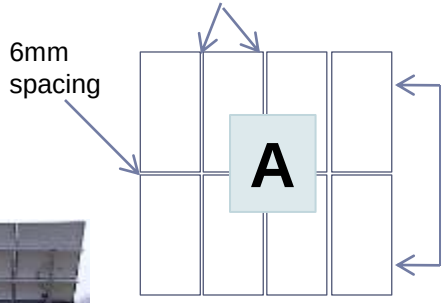
If unsure, please call and check actual panel dimensions to confirm configuration

Power N Series PS-1600

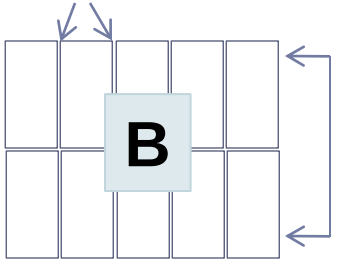
TRUE NORTH



8 Panel Max Mounting Measurements.
Max panel width 1022 mm outer edge total 4195mm



10 Panel Max Mounting Measurements.
Max panel width 827mm outer edge total 4195mm



CONFIGURATION & SOME OF THE TYPICAL PANELS THAT FIT*

A	**8 Panel 13 M² (143 ft²)**	**Ecosun230,** Sharp 235, Suntech 210, CS6P200 Day4 48MC, 60MC ES190-210, Holistic215-280 Kyocera 210 PhotoWatt215 REC230, Schott235, SolarWorld 230, Solgate 230 +others
B	**10 Panel 12.9 M² (138 ft²)**	CS 160-180, Suntech 175, SG 150-180 SolarWorld 175-180, Kyocera 135, Sharp 176-198 SanyoHIT190-200-210-215N

Mount virtually any make or model of panels
Even mix string sizes on each row

Call for Wind and Snow load limits
Up to 90mph. Depends panel choice

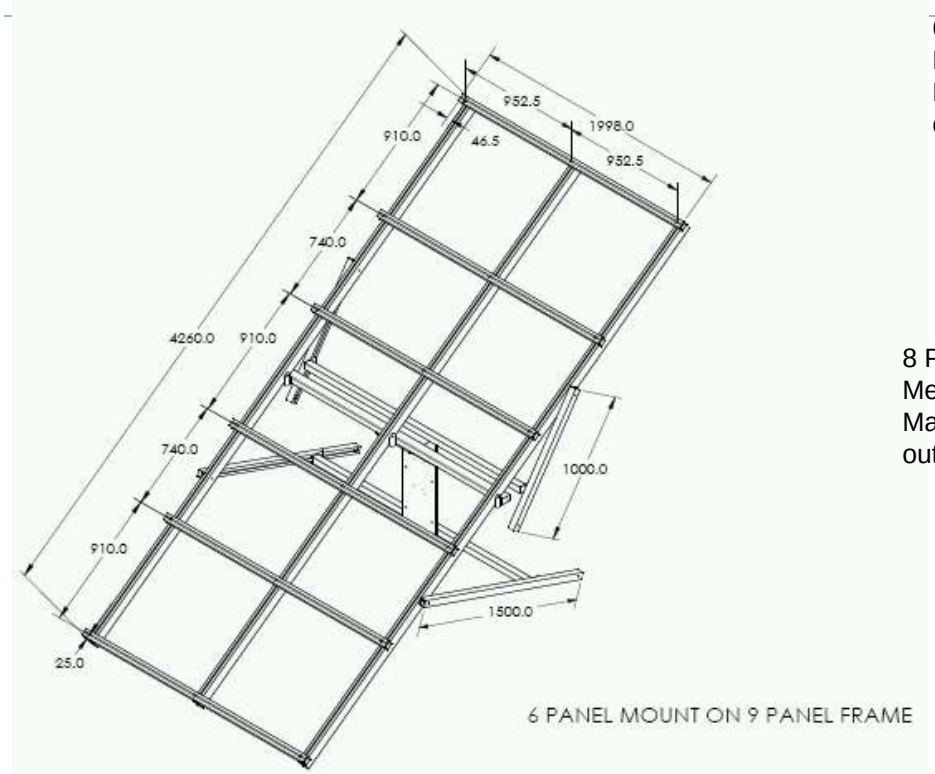
For 6"x12ft (6.625OD) .322 wall HSS Steel Galv
Pedestal Moment Requirements available FREE

Prepared by: D Cooke, CTO

If unsure, please call and check actual panel dimensions to confirm configuration

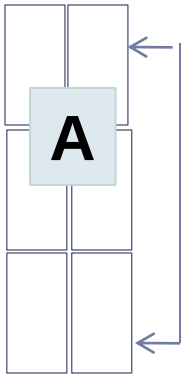
PowerNSeries PS-1200Tall

TRUE NORTH



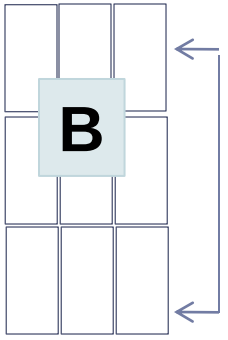
6 Panel Max Mounting Measurements.
Max panel width 1000 mm
outer edge total 2000mm

6mm spacing



4450mm max spacing
Mounting holes including 6mm panel spacing

8 Panel Max Mounting Measurements.
Max panel width 827mm
outer edge total 2000mm



4450mm max spacing
Mounting holes including 6mm panel spacing

CONFIGURATION & SOME OF THE TYPICAL PANELS THAT FIT*

A	**6 Panel 10 M² (108 ft²)**	**Ecosun230,** Sharp 235, Suntech 210, CS6P200 Day4 48MC, 60MC ES190-210, Holistic215-280 Kyocera 210 PhotoWatt215 REC230, Schott235, SolarWorld 230, Solgate 230 +others
B	**9Panel 11.6 M² (125 ft²)**	CS 160-180, Suntech 175, SG 150-180 SolarWorld 175-180, Kyocera 135, Sharp 176-198 SanyoHIT190-200-210-215N

Mount virtually any make or model of panels
Even mix string sizes on each row

Call for Wind and Snow load limits
Up to 90mph. Depends panel choice

For 6"x12ft (6.625OD) .322 wall HSS Steel Galv
Pedestal Moment Requirements available FREE

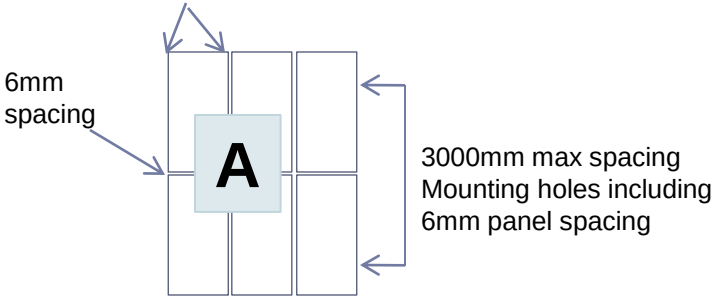
Prepared by: D Cooke, CTO

If unsure, please call and check actual panel dimensions to confirm configuration

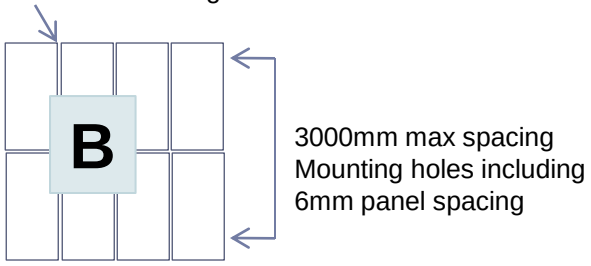
PowerNSeries PS-1200F

TRUE NORTH

6 Panel Max Mounting Measurements.
Max panel width 1022 mm outer edge total 3250mm



8 Panel Max Mounting Measurements.
Max panel width 808mm outer edge total 3250mm



CONFIGURATION & SOME OF THE TYPICAL PANELS THAT FIT*

A	**6 Panel ~10 M² (~108ft²)**	**Ecosun230,** Sharp 235, Suntech 210, CS6P200 Day4 48MC, 60MC ES190-210, Holistic215-280 Kyocera 210 PhotoWatt215 REC230, Schott235, SolarWorld 230, Solgate 230 +others
B	**8 Panel ~10.3 M² (~112 ft²)**	CS 160-180, Suntech 175, SG 150-180 SolarWorld 175-180, Kyocera 135, Sharp 176-198 SanyoHIT190-200-210-215N

Mount virtually any make or model of panels
Even mix string sizes on each row

Call for Wind and Snow load limits
Up to 90mph. Depends panel choice

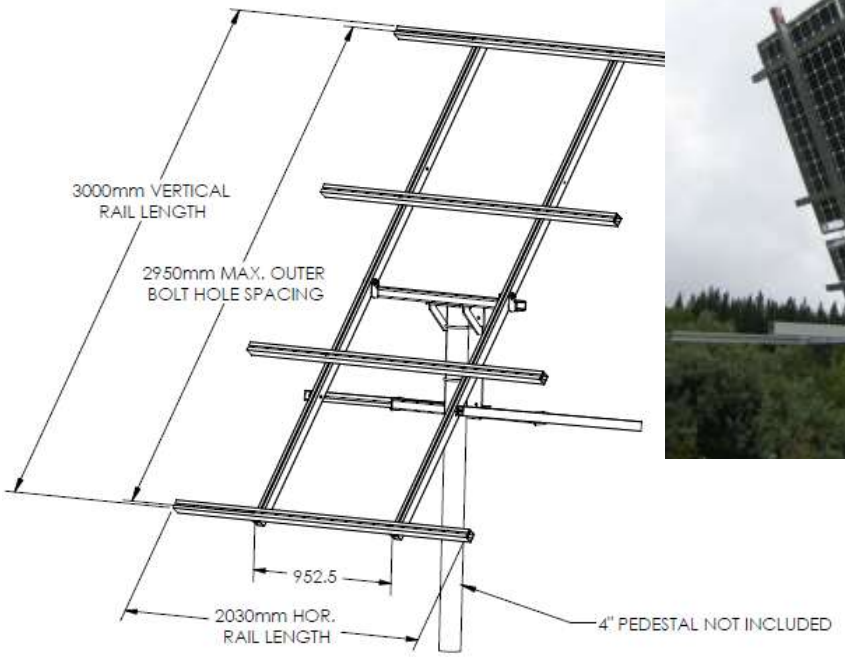
For 6"x12ft (6.625OD) .322 wall HSS Steel Galv
Pedestal Moment Requirements available FREE

Prepared by: D Cooke, CTO

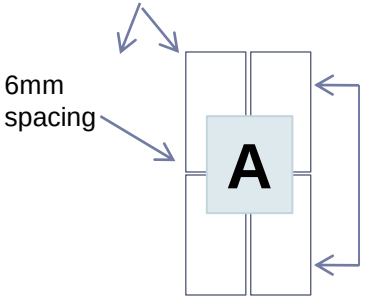
If unsure, please call and check actual panel dimensions to confirm configuration

PowerNSeries PS-800F

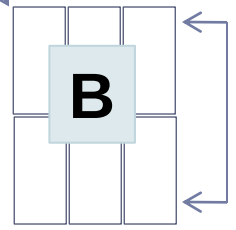
TRUE NORTH



4 Panel Max Mounting Measurements.
Max panel width 1001 mm outer edge total 2030mm



6 Panel Max Mounting Measurements.
Max panel width ~810mm outer edge total 2030mm



CONFIGURATION & SOME OF THE TYPICAL PANELS THAT FIT*

A	**4 Panel ~6.78 M² (~73ft²)**	**Ecosun230,** Sharp 235, Suntech 210, CS6P200 Day4 48MC, 60MC ES190-210, Holistic215-280 Kyocera 210 PhotoWatt215 REC230, Schott235, SolarWorld 230, Solgate 230 +others
B	**6 Panel ~8 M² (~85 ft²)**	CS 160-180, Suntech 175, SG 150-180 SolarWorld 175-180, Kyocera 135, Sharp 176-198 SanyoHIT190-200-210-215N

Mount virtually any make or model of panels
Even mix string sizes on each row

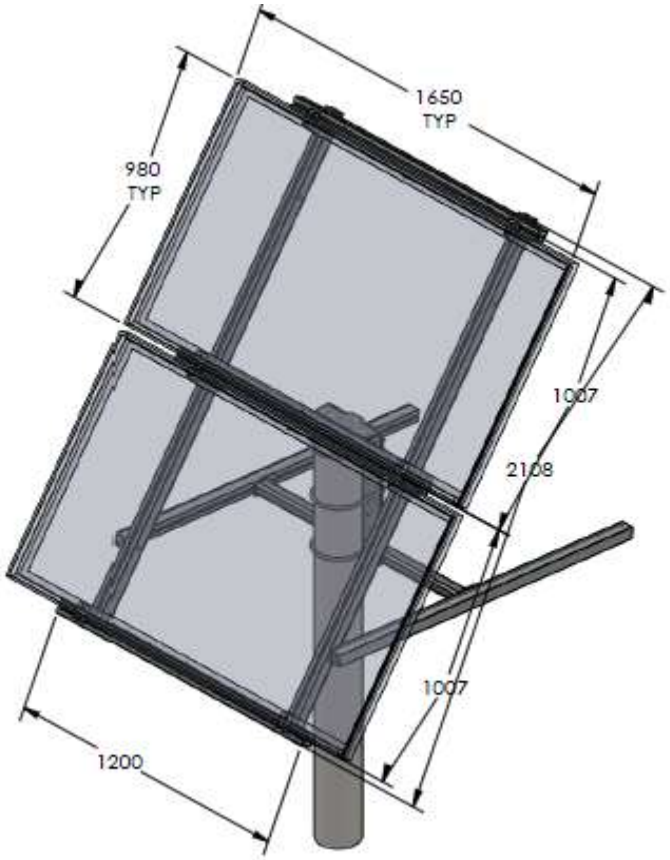
Call for Wind and Snow load limits
Up to 90mph. Depends panel choice

For 6”x12ft (6.625OD) .322 wall HSS Steel Galv
Pedestal Moment Requirements available FREE

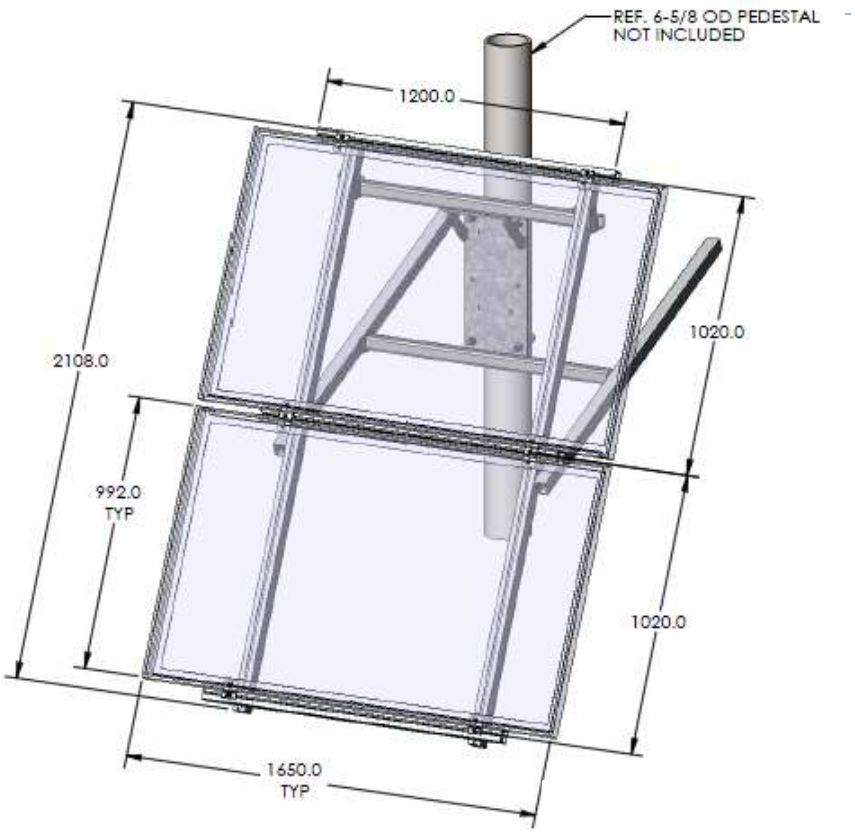
Prepared by: D Cooke, CTO

If unsure, please call and check actual panel dimensions to confirm configuration

PS400 Options



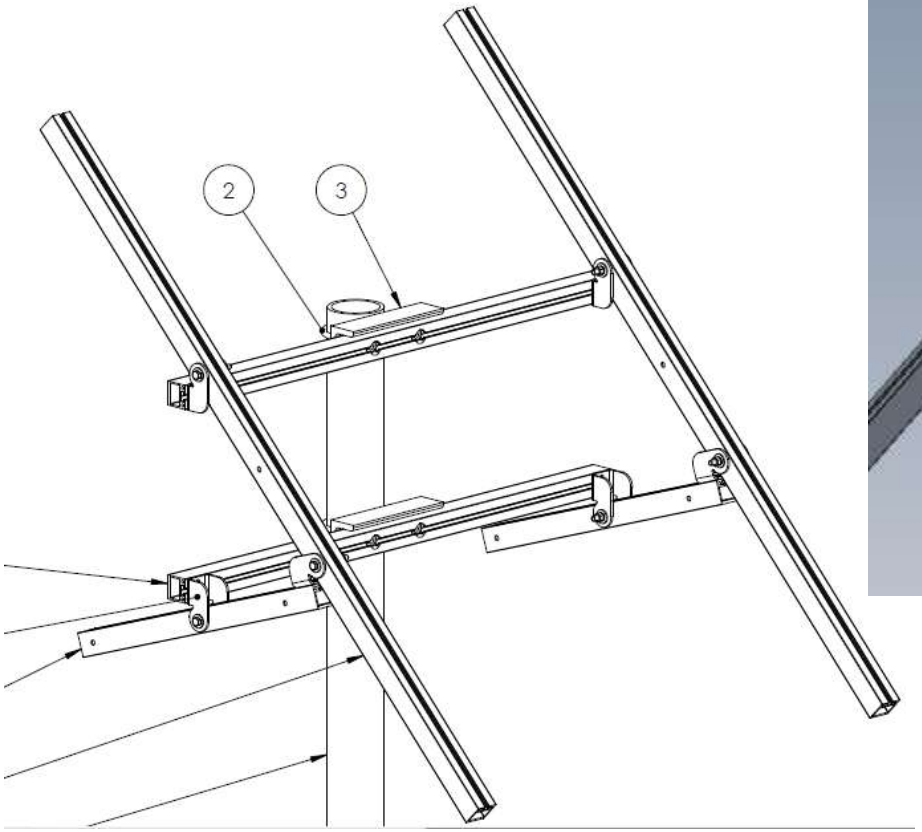
Top of Pole



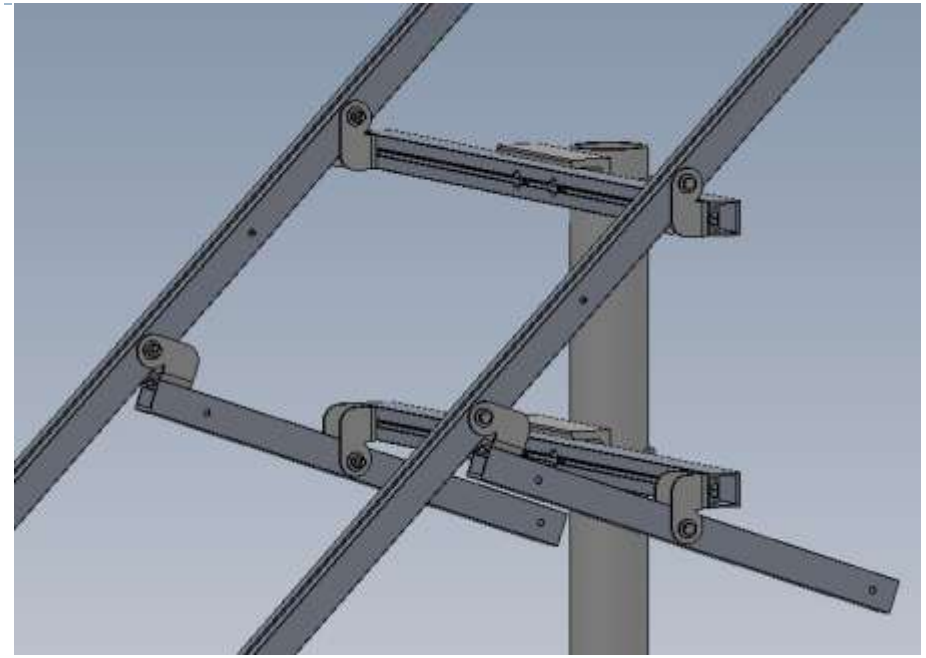
Side Mount

Prepared by: D Cooke, CTO

PS2-400 Split Mount Options



Top of Pole



Side Mount

Prepared by: D Cooke, CTO

Free Engineering Support

Wind and Snow loads generally exceed 90mph and literally over a ton of snow (>2200lbs) This depends on panel choice – Coastal areas may require 110mph certification. All larger mounts built since April 2010 exceed 90mph with virtually all panel choices. *To be CERTIFIED to EXCEED 110mph you must order 75mm verticals ($200 each post - not discounted. Stamped drawings will then also be supplied)*

Defining Pedestal support requirements takes engineering hours and final calculations depend on soil calculation and height above ground. *Always consult a Local Civil Engineer who can specify the concrete and depth to meet local building codes safety margin for the soil conditions in your area*

Send us your pedestal and panel choice, height above grade and desired wind speed and we'll send you a post specification and un-factored moment required to support your array in up to that speed. AT NO COST!

Sample output below shows 12 Sharp 235NU, on a PS2400F on an 8" Steel Post 6.5 ft above grade at 110mph. Therefore your pedestal or any method of attachment must be designed to handle a moment of 49,021Nm at it's base.

All True North Power Mounts are "100% Made in Ontario"

4 x PS2400F Shipping Package
4' x 4' x 20ft ~ 3050lbs
1.2 x 1.2 x 6 m ~ 1380kg

Panel/Array Config	PS2400F 2x6	Panels	Watts	Kg	lbs
PORTRAIT PANEL MOUNT Rows	2	12	2820	240	529.1
Panels/Row	6	each	235	20	44.1
Mounting Bolt mm	M8		P	83.44	184.0
Spacing SideSide	6	mm	Min 5mm for Sides		
Spacing EndEnd	6	mm	Min 5mm for Ends		

Sharp	Mono NU-U235F1		
Panel Size mm	1640 X 994		
Panel Area M^2	1.63		
Panel Area Ft^2	17.55		

Pedestal Loads Calc		PS2400F 2x6	
Post AGL Ft	6.5	LOADS	lb/Ft2
Wall thick in	0.322	H-Rail	119.26
OD in	8.625	V-Rail	36.78
Moment Nm	49,021	StrgBk	103.60

4 post		Portrait	
Array KW	RAIL	Horiz	Vert
11.28	AILS Required	4	6
	RAIL LENGTHS	5994	2606
Rail Approx	50H		2606
	75H		
	Array Outer Dim (Meters)	6.006	3.286
	Feet	19.70	10.78
Array Installed	Meters	19.74	sq Meter
Area	Feet	212.43	sq Feet
Wind Speed	110	mph	Array Tilt
	49.2	m/s	90