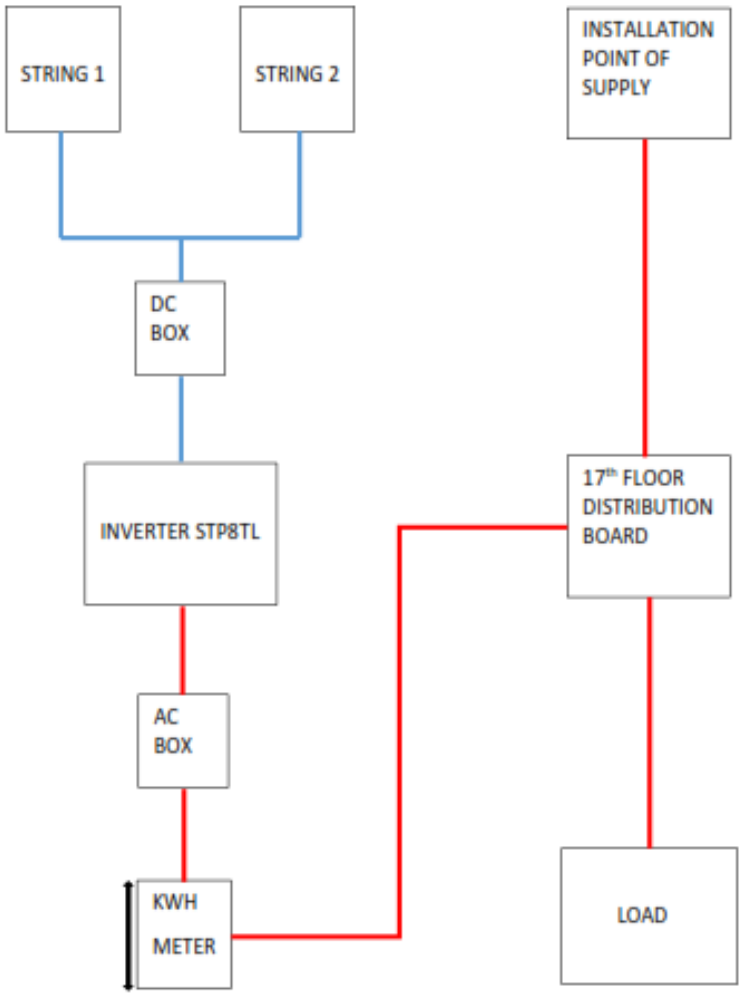
Gauteng Department of Infrastructure Development
Solar Rooftop Solution

Schedule of Work

Thursday, 15 May 2014

Contents

D I D SYSTEM BLOCK DIAGRAM



Solution configuration

Project name: **DID**
Project number: 001
Project file:

Location: South Africa / Johannesburg

Grid voltage: 3~220 V

System overview

24 x WINAICO WSP-250P6 (04/12) (PV array 1)
Azimuth angle: 180°, Inclination: 25°, Mounting type: Roof, PV peak power: 6,00 kWp

1 x STP 8000TL-10

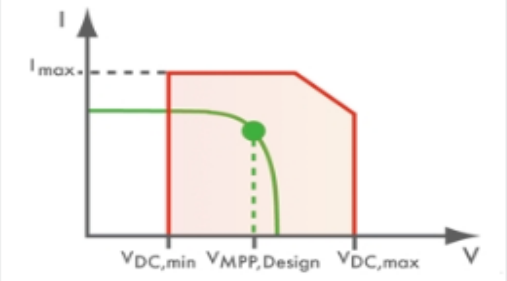
Technical data

Total number of PV modules:	24	Energy usability factor:	100 %
PV peak power:	6,00 kWp	Performance ratio (approx.)*:	86,1 %
Number of inverters:	1	Spec. energy yield (approx.)*:	1824 kWh/kWp
Nominal AC power:	8,00 kW	Line losses (in % of PV energy):	---
AC active power:	8,00 kW	Unbalanced load:	0,00 VA
Active power ratio:	133,3 %	Self-consumption:	---
Annual energy yield (approx.)*:	10943,10 kWh	Self-consumption quota:	---

Input A: PV array 1
12 x WINAICO WSP-250P6 (04/12), Azimuth angle: 180°, Inclination: 25°, Mounting type: Roof

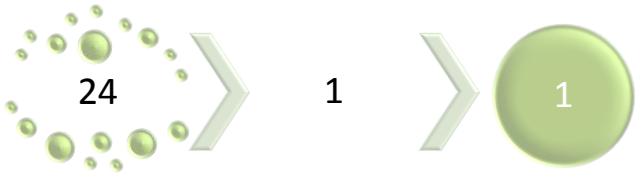
Input B: PV array 1
12 x WINAICO WSP-250P6 (04/12), Azimuth angle: 180°, Inclination: 25°, Mounting type: Roof

	Input A:	Input B:
Number of strings:	1	1
PV modules per string:	12	12
Peak power (input):	3,00 kWp	3,00 kWp
Typical PV voltage:	330 V	330 V
Min. PV voltage:	300 V	300 V
Min. DC voltage (Grid voltage 220 V):	150 V	150 V
Max. PV voltage:	504 V	504 V
Max. DC voltage (PV):	1000 V	1000 V
Max. current of PV array:	8,2 A	8,2 A
Max. DC current:	22,0 A	11,0 A
Max. short-circuit current:	33,0 A	12,5 A



PV/Inverter conditionally compatible

Supply



WINAICO 250P Polycrystalline Solar Panels:

SMA STP 8000 Inverter

SMA Webbox

Solar PV panel specifications

WINAICO

Power to Perform

Manufactured with the newest automated manufacturing technology, the polycrystalline WINAICO WSP solar panel series combines the highest quality finish and stability of yield with a functional and aesthetic design of the highest quality. The WINAICO high performance photovoltaic panels are each fitted with 60 highly efficient 156 x 156 mm solar cells and through the application of high-grade semiconductor silicon, achieve outstanding energy yields. With efficiencies of up to 15.65 % and nominal power capacity of 245 to 260 Wp, they guarantee optimal usage of space and a high annual output of energy. Even under weak illumination, solar current will still be generated. Exclusively positive power tolerances insure that the invoice you send as operator of the panels will go up will go up – and that your investment will pay off.

All models have the innovative WINAICO frame design available, which serves to increase stabilitv.

WINAICO
Power to Perform

Advantages of the WINAICO high performance modules

- Use of top quality brand components exclusively
- Linear performance guarantee over 25 years
- 12-year product warranty
- Plus tolerances of 0/+5 Wp
- Anti-PID technology

The use of high-quality encapsulation material and most modern equipment secure a permanent production of PID-resistant modules.

Hot-Spot protection
A 100% proof of all cells, using an applied back current, enables us to sort out defective Hot-Spot cells.

Light induced degradation (LID)
The use of high-quality raw materials leads to a low degradation of the nominal power of a panel at the beginning of its lifetime.

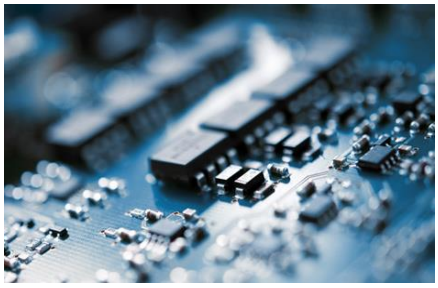
WINAICO triumphs in Desert Knowledge testing facility

Creglingen, 08.08.2013 – PV module manufacturer WINAICO's focus on perfection has proven to make their modules one of the most efficient currently on the market, as shown in real world conditions by their performance at the Desert Knowledge Australia Solar Centre demonstration facility. Sitting in the harsh conditions of the Australian outback, the Solar Centre in Alice Springs is an independent demonstration facility that compares the solar panel performance of leading manufacturers with real time results.
WINAICO's assessment of the publicly available data from the Solar Centre indicate that their panels are more efficient than some of their competitors' by up to 12 %, meaning that each panel produces a higher yield for better value.

Inverter Technology

The Optiflex, Optiprotect and SUNCLIX are all impressive new features, however the Sunny Tripower has much more to offer. Take for example its peak efficiency rate of more than 98 percent, which is a further boost to productivity and helps to lower system costs. It also means a better rate of return for plant operator's providing an additional incentive to continue investing in solar energy and the future. -

Optiflex is the first of our new features.
Its outstanding flexibility opens up endless possibilities.
How? Through an asymmetrically dimensioned multistring input combined with a broad input voltage range and a maximum DC voltage of 1,000 V, as well as an extremely large MPP voltage range of 150 to 800 V.
With just one inverter you get a high degree of module compatibility and seamless construction that exactly meets the required number of modules.



Thanks to the integrable Type II overvoltage protection.

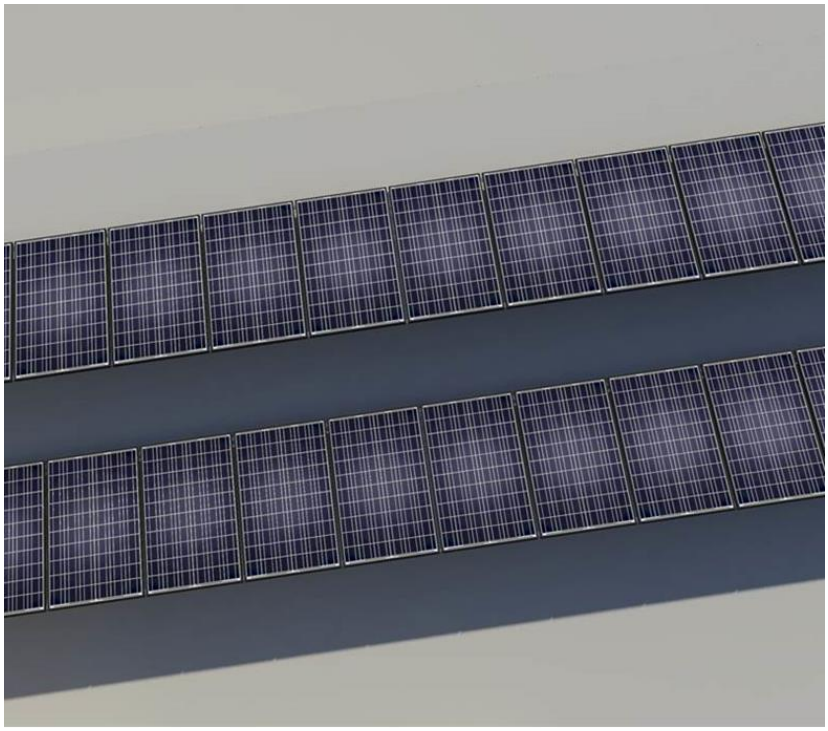
You benefit from intelligent protection against unexpected electrical surges.
It enables the Sunny Tripower to easily integrate into lightning protection concepts, such as those mandatory for public buildings or those often required by insurance companies. All without any additional effort during installation. Enjoy the advantages of seamless monitoring for your inverter.
It is affordable, easy to install and perfect for lowering the total costs of ownership.

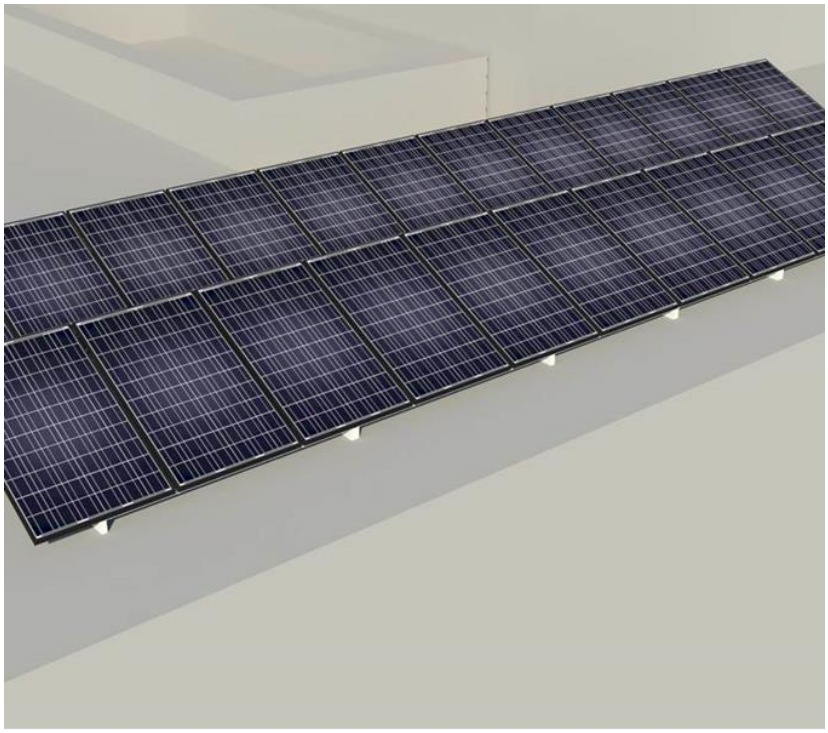
SUNCLIX is the first ever built-in DC connection system.
Regardless of which module you are using you have everything connected and completely under control.
It is fast, simple and standardized. There is no need for an adapter or a selection of plugs, or even a tool – and each cable should only take you a maximum of 15 seconds to install. It is easily the best connection for a simple plug-in.

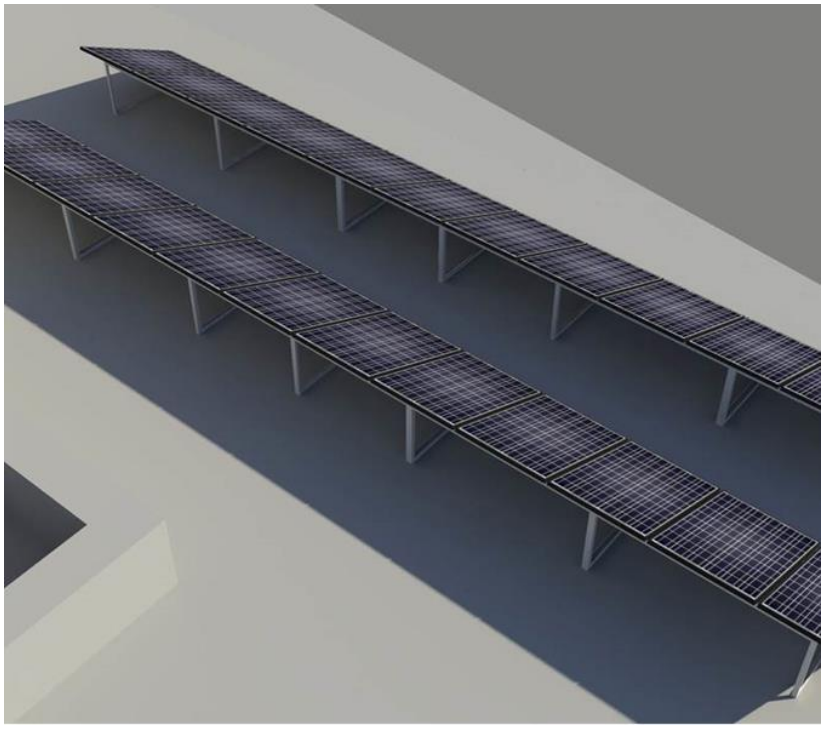
- See more at: http://www.sma.de/en/products/solar-inverter-without-transformer/sunny-tripower-10000tl-12000tl-15000tl-17000tl.html#Overview-9516

The Sunny WebBox is the ideal monitoring solution for medium-sized PV plants. It receives and stores current measured values and transmits data via RS485. This means you can stay updated on the status of your plant around the clock. In the event of a problem, you can react quickly and secure your yields. Parameters can be changed and a variety of measured values can be depicted, analyzed and downloaded via a web browser. All data from the connected devices is stored and automatically transmitted to Sunny Portal, if desired. The Sunny WebBox allows central access to your plant data on the Internet via Sunny Portal. ReliableRemote PV plant monitoring, diagnosis and configurationData logger for all key plant dataRapid detection of operation failuresEasy to use Automatic monitoring of up to 50 inverters via RS485Quick set-up thanks to the Sunny WebBox Assistant and quick reference guideUser-friendly Includes free standard access to Sunny Portal for the entire service life of the plantFlexible display, evaluation, yield and event reports via Sunny Portal - See more at: http://www.sma.de/en/products/monitoring-systems/sunny-webbox.html#sthash.MjosIHrG.dpuf

3D Render:





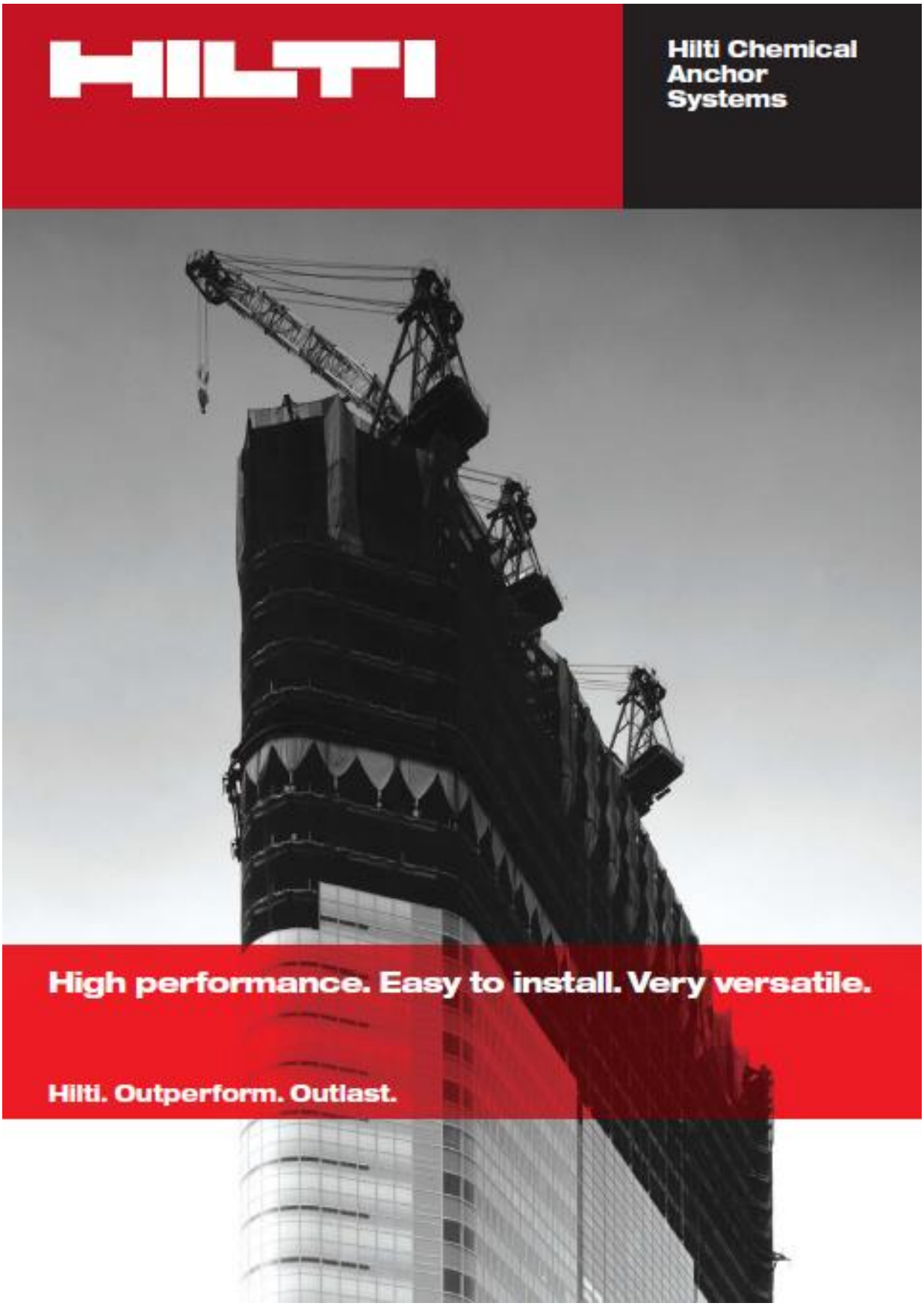



22.7 m
9 m
5.3 m
13 m
36 m

Frame anchoring system:

We will be using a chemical anchor bolt:

Previous project NUMSA (National Union of Metal Workers) nationals head office in Johannesburg:


HILTI
Hilti Chemical Anchor Systems
High performance. Easy to install. Very versatile.
Hilti. Outperform. Outlast.

- Fast curing.
- Virtually odourless resin.
- Ideal for cored & drilled holes.
- High load capacity.
- Ideal for dynamic loads.
- Easy installation.
- Overhead applications.
- Fire rated.
- High bond strength.
- Elimination of expansion force in the base material.
- Good resistance to chemicals.
- Minimising work related injury due to absence of glass.
- Ideal for wet or damp applications.
- Minimum product damage in transport and storage due to foil packaging of capsules.
- No wastage, one capsule per hole.
- Wide installation temps (-5 to +40 deg C).

HVU adhesive capsules can be used with HAS (external threaded rod) and HIS (internal threaded rod).

* Natural stone applications subject to suitability and site testings.

Curing time				
Base material temperature	≥ + 20°C	≥ + 10°C	≥ + 0°C	≥ - 5°C
Time between setting and loading	20 min.	30 min.	1 hour	5 hours

Fire rating can provide more versatility.

Very easy to install in vertical, horizontal and even in irregular holes.

Very high load capacity.

Funding:

The project gets funded between Green Habitat and Mustek Ltd

Transport:

All goods will be delivered to site

Obligations:

Mustek is the product supplier

Green Habitat is the EPC contractor (Engineering, Procurement, and Construction)

Security and Maintenance will be provided by Green Habitat