

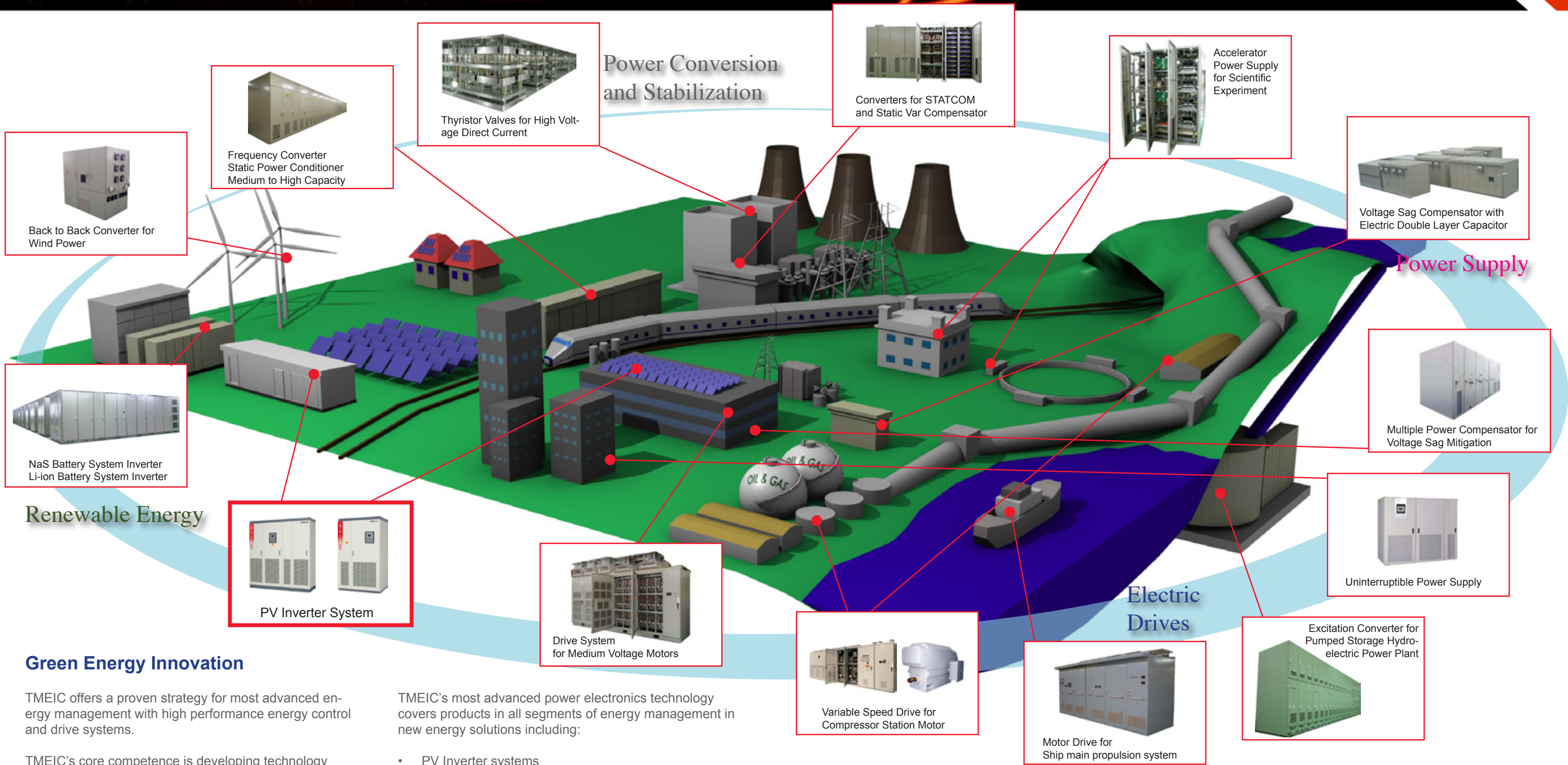
TMEiC

Green Energy Solution



Power Electronics for
Photovoltaic Inverter Systems

Energy Management Product Line-up



Renewable Energy

Green Energy Innovation

TMEIC offers a proven strategy for most advanced energy management with high performance energy control and drive systems.

TMEIC's core competence is developing technology and products that suit the industrial system needs.

TMEIC's vast history of expertise and experience throughout the entire energy conversion technology provides the best and proven solution for the customer needs.

TMEIC's most advanced power electronics technology covers products in all segments of energy management in new energy solutions including:

- PV Inverter systems
- High capacity UPS systems
- SVC, STATCOM for Voltage Stabilization
- Battery & Capacitor Energy storage systems
- MV Inverter systems
- High capacity motor and drive systems
- Back to Back Converter for Wind Power
- Plant Automation systems
- etc.

Solar Energy Solutions

Industry's most highest reliability

TMEIC's unique experience in PV inverters go back to the dawn of solar farm era in 1985, when it first introduced MW sized inverter which was installed in Carrizo Plain, CA for MW-scale solar project. With over 25 years of research and development, customers can take advantage of TMEIC's full potential of advanced technology and make the best of an investment in solar power generation plants.

With the highest knowledge of energy conversion and power electronics along with years of experience in PV inverter development and manufacturing, there is no doubt that TMEIC is capable of providing maximum profitability and industry's best solution for PV inverter needs.

The comprehensive system

TMEIC enables a robust centralized management of the entire PV plant system. Having the best in the industry inverter and monitoring system, we can lower the levelized cost of energy (LCOE) and comprehensively cover PM (Preventive Maintenance) and O&M (Operations and Maintenance) for your entire PV site.





SOLAR WARE 500

Features

- Advanced multi-level system
- Maximum 98.5% efficiency
- Smallest footprint: 1.33m²
- Integrated multi-input DC Interface Cabinet
- Latest generation IGBT
- High voltage MPPT window: up to 950V
- IEC compliance
- Ethernet / RS485 communication
- Fault event log
- Waveform acquisition
- LCD touchscreen



SOLAR WARE 250

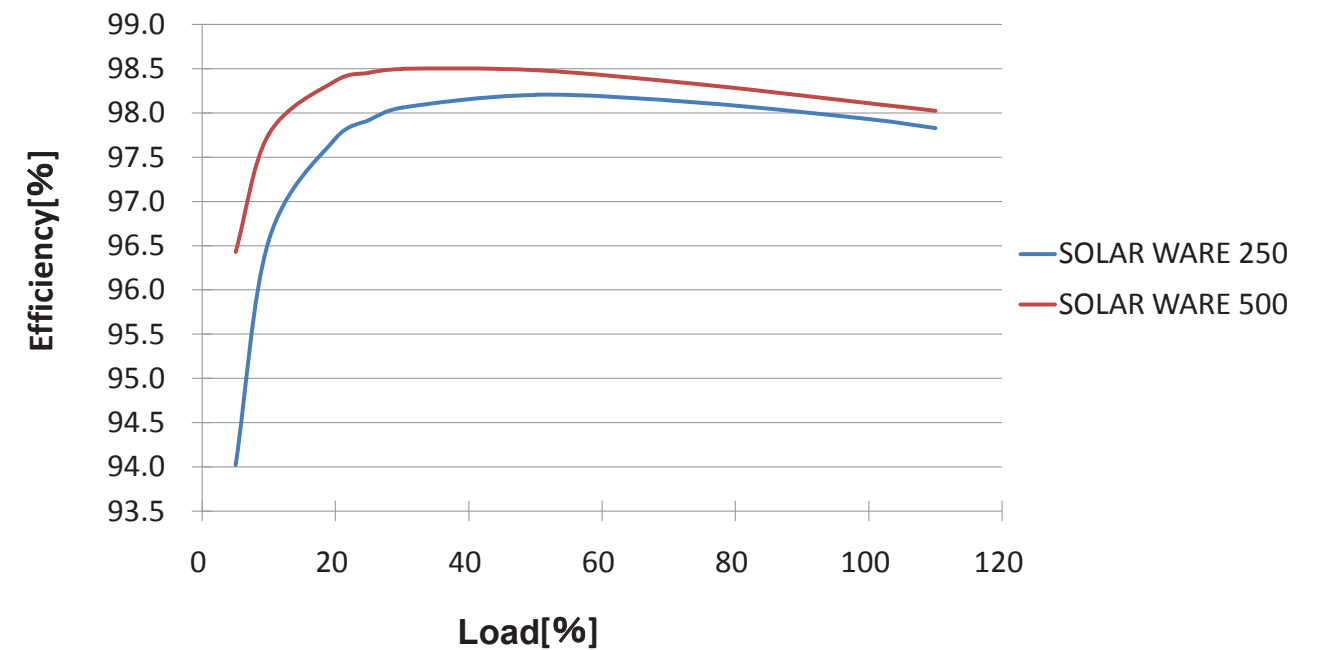
Features

- High efficiency in the class: 98.2%
- Featuring compact footprint: 1.08m²
- High efficiency at low-load conditions
- IEC compliance
- Ethernet / RS485 communication
- Fault event log
- Waveform acquisition
- LCD touchscreen

Specifications

Type	PVG-L0250	PVL-L0500
Maximum DC Power	275kW	600kW
Maximum DC Voltage	1000V	1000V
MPPT Operating Range	450-850V	450~950V
Maximum DC Current	580A	1155A
Maximum # of Input	1	16
Nominal AC Output Power	250kW	500kW
Nominal AC Voltage	300V 3-phase, 3-wire system	300V 3-phase, 3-wire system
Nominal AC Frequency	50/60Hz	50/60Hz
Nominal AC Current	481A	962A
Maximum Efficiency	98.2%	98.5%
CEC Efficiency	98.0%	98.3%
European Efficiency	97.8%	98.3%
Enclosure Protection Ratings	IP2X (Indoors)	IP2X (Indoors)
Dimensions (HXWXD)	1900mm X 1200mm X 900mm	1900mm x 1900mm x 700mm

Efficiency Curve



Environment

- Ambient temperature range: -20°C to +50°C
- Altitude: Up to 2000m
- Note): Need optional heater below -10°C, Power de-rating over +40°C

Protective Functions

DC-side (Input)

- Ground Fault
- DC Reverse Current
- Over Voltage
- Over Current

AC-side (Output)

- Anti-islanding
- Over / Under Voltage
- Over / Under Frequency
- Over Current

Grid Assistance

- Reactive / Active Power Control
- Fault Ride Through
- Power Factor Control

PV Substation

Solar Ware 500 or Solar Ware 250

- Configurable with 2x500kW or 4x250kW for 1MW PV substation

Energy Meter and UPS

- UPS for monitoring system, MV switchgear control power, and inverter control power.

Low Voltage Panel

- Low voltage panel for air conditioners, UPS, inverter fans, lighting, service socket, and power for monitoring devices in combiner boxes for String Monitor option.

Medium Voltage Switchgear

MV switchgear easily configurable for customer requirement for safe operation.

Includes:

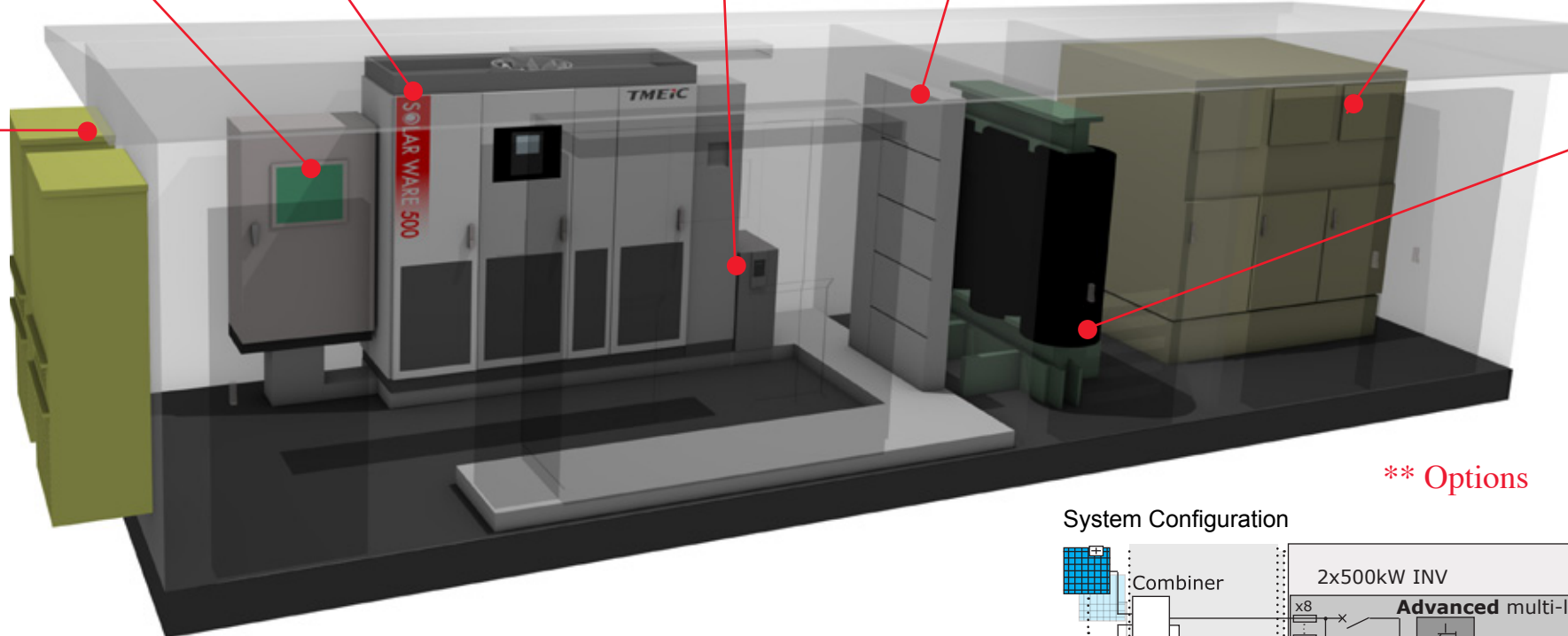
- Vacuum or gas circuit breakers
- Switch-disconnectors
- Isolators
- Protection relays

Monitoring System Panel**

- LCD for Solar Ware View and String Group Viewer**
- Monitoring system for entire PV substation. Includes intrusion alarm records.

Cooling System

- Forced air cooling ventilation or closed air conditioning are available depending on customer requirement.
- Integrated forced air cooling system for transformer room and MV switchgear room



Dry-type Transformer

- 1MVA three-winding transformer step-up to required grid voltage
- Configurable low-voltage transformer for operation and auxiliary power source

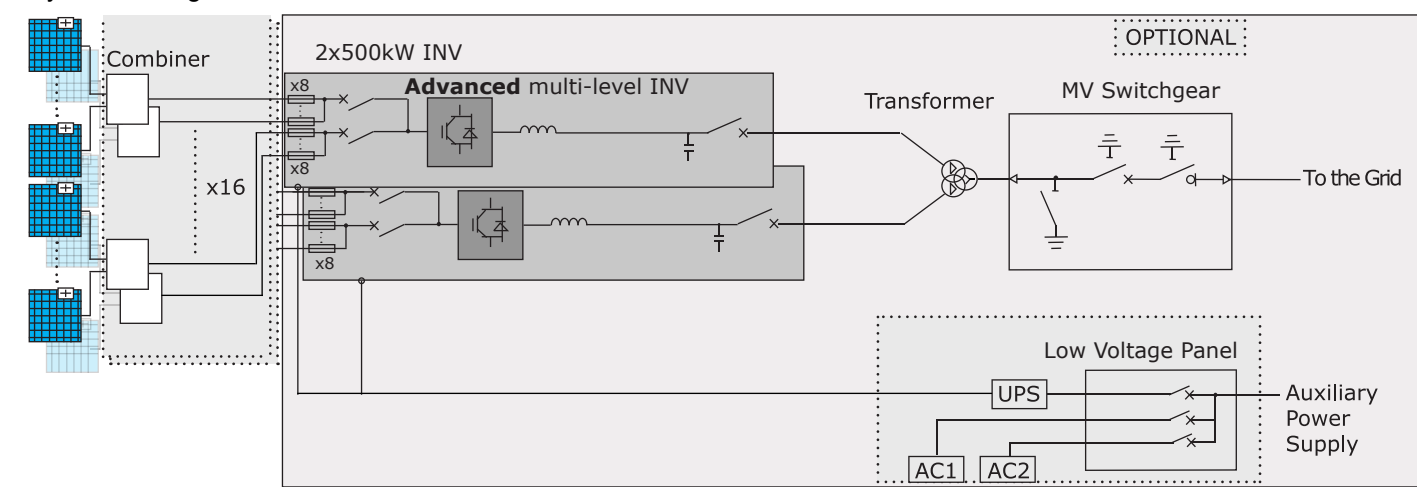
** Options

A New Standard for 1 MW block PV inverters

TMEIC offers 1MW PV Substation with either 500kW inverter or 250kW inverter configurations. This small-sized and all weather resistive PV substation is highly cost effective and most robust solution for utility scale PV plant.

TMEIC's PV Substation consists of SOLAR WARE 500 or SOLAR WARE 250, DC re-combiner boxes (integrated for SOLAR WARE 500), and integrated MV transformer prefabricated in a small sized container for a quick and cost effective installation for utility scale PV plants. This pre-packaged substations have been intelligently engineered for stable and most reliable operation in harsh conditions such as heavy snow area and high heat desert zones.

System Configuration



Solar Ware View

Comprehensive monitoring and intelligent loss-analysis

The central management and consistent and most reliable monitoring system is a key factor in maintaining large scale PV plant. Solar Ware View is TMEIC's original monitoring system that is fully engineered for MW class PV system. Users gain control of their plant by having access to most complete information regarding their PV plant power production. This intelligent platform is designed to bring real-time and wide-scale plant data, loss analysis, and data storage for optimal PV plant production and enhancing O&M (Operation and Maintenance) structure. In order to meet variety of customer needs, TMEIC Solar Ware View consists of standard medium scale PV plant version of 20MW and ultra-scale 500MW PV plant version. Compatible with string monitoring and TMEIC's String Group Viewer (SGV).

Sophisticated Verification Method

Sophisticated Verification Method or SV Method** is a TMEIC's proprietary and intelligent software that allows the users to identify the type of power of loss. Types of classified losses are as follows:

1. Loss by load mismatch
2. Loss by inverter efficiency
3. Inverter standby loss
4. DC circuit loss
5. Other losses (Dirt and Detioration)
6. Loss due to rise in module temperature
7. Loss due to incident angle
8. Loss by shading effect

**The SV Method is developed with cooperation from Professor Kousuke Kurosawa Laboratory (Tokyo Institute of Technology)

I-V Scan

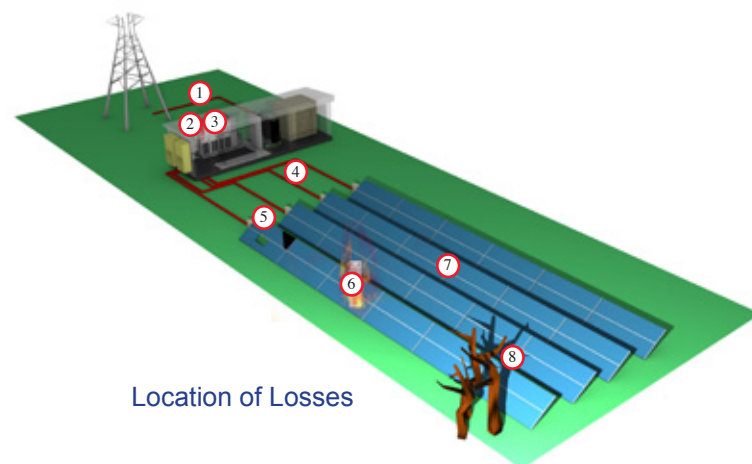
TMEIC's monitoring system comes with integrated IV scanning function. All strings are IV scanned during commissioning and can be IV scanned during maintenance and services.

Monitor, Alarm, and Data Storage

All monitored data including transformer temperature, transformer medium voltage side voltage, ambient temperature, PV substation internal temperature, can be easily viewed online.

During failures or incidents, buzzer and alarm can be outputted, and they can be forwarded to the user through e-mail.

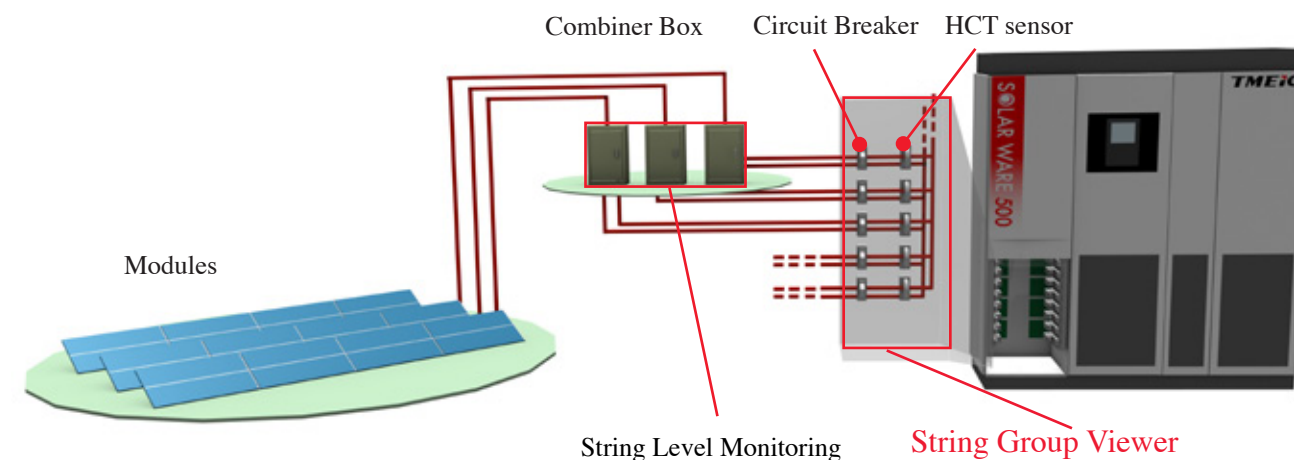
The data storage cycle is once every second, and maximum data of 2 years can be stored. The data beyond 2 years is automatically stored seperately.



Location of Losses

Innovative String Level Monitoring System - SGV (String Group Viewer)

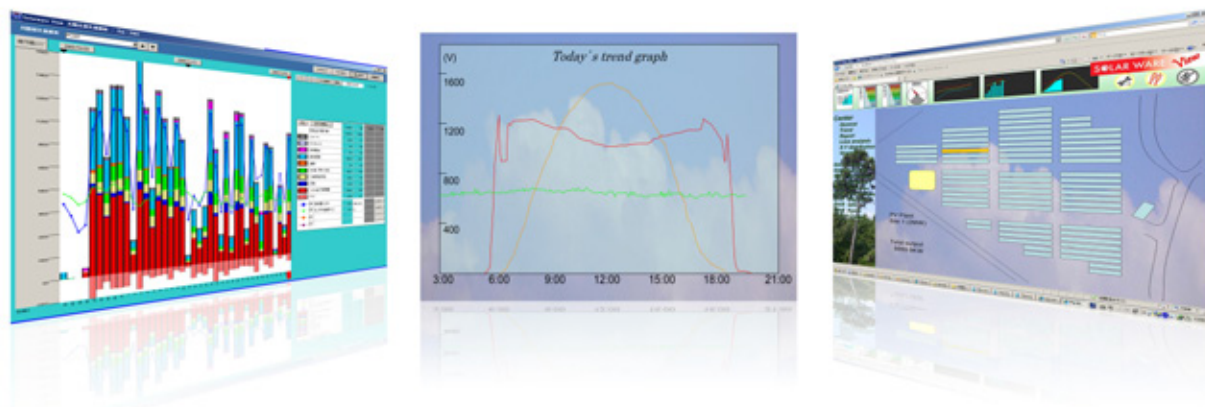
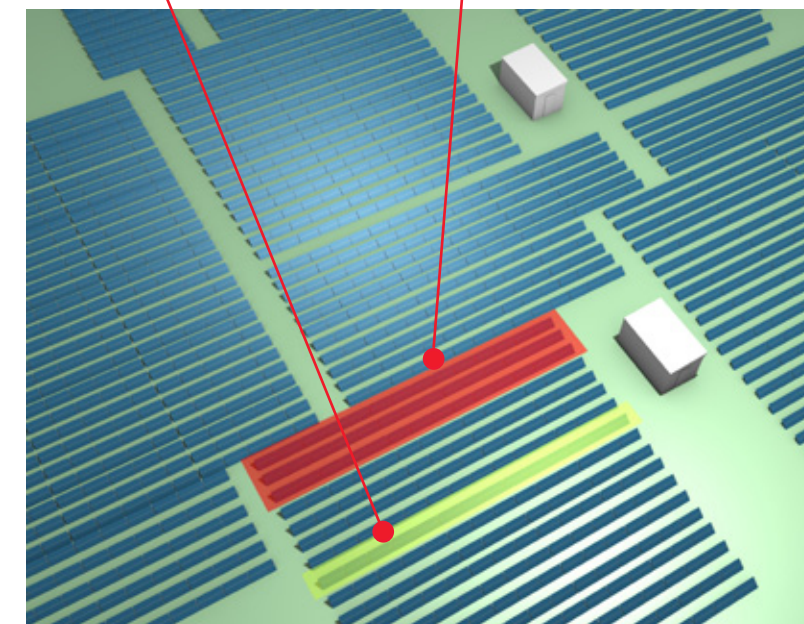
- More affordable solution for monitoring module level failures
- Integrated current sensor (HCT) for String Group Viewer in DC Interface Cabinet
- No need for combiner box level monitoring sensors
- Integrated circuit breaker allows easy shutdown of individual string groups



What is SGV?

TMEIC's SGV (String Group Viewer) is a more affordable and intelligent way to keep your eyes on your PV plant production. This system allows the customers to easily detect poorly performing factors at a string group level, and exactly know how much the plant is producing at any given time.

Having integrated DC Interface Cabinet (available only for SOLAR WARE 500) in the inverter and intelligently pre-installed circuit breakers, maintenance and service structure can be significantly boosted with easy shutdown of string groups at 32kW level.





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