

SOLARWARE® SERIES

Utility Scale PV Inverter Solution

PVL-L0750E, PVL-L1000E, PVL-L1833ERM



Photovoltaic generation offers a powerful alternative to secure our energy supplies. Photovoltaic generation is **clean** and ultimate **environment-friendly** technology since it does not emit CO₂.

TMEIC is the world's leading brand in manufacturing and supplying energy efficient, sustainable and reliable advanced multi-level PV inverters. TMEIC's SolarWare® Inverters deliver high energy efficiency (98.7%), lower switching losses by 56%, lower equipment footprint and weight thus leading to unparalleled yield on customer investment.



SolarWare® Features

Key Features

- ▶ Advanced multi-level system
- ▶ High Efficiency: 98.6% (750 kW), 98.7% (1000 kW)
- ▶ Smallest footprint
- ▶ Integrated multi-input DC Interface Cabinet
- ▶ Latest generation IGBT
- ▶ Widest MPPT window of 550V to 950V
- ▶ IEC compliance
- ▶ Communication: Ethernet (Socket / Modbus TCP) Serial (RS485 / RS232C)
- ▶ Fault event log
- ▶ Waveform acquisition (SDcard 2GB)
- ▶ LCD touchscreen
- ▶ Lower OPEX: Lowest heat dissipation due to multi-level switching

High Efficiency ⇒ **98.7%**

SolarWare® 1000kW



- ▶ SolarWare® 1000 is an advanced PV utility scale solar multi-level inverter system with an operating range of 550~950 V
- ▶ It brings flat efficiency characteristics providing huge benefit to high DC/AC ratio
- ▶ With this advanced inverter design, the size has also been significantly reduced, achieving the smallest 1000kW inverter

SolarWare® 1833-2000kW



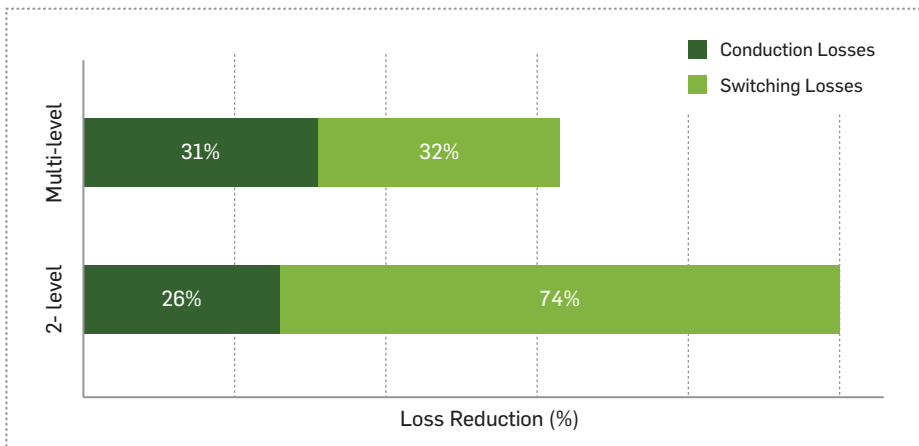
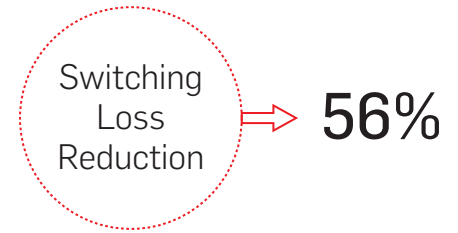
- ▶ The award-winning central inverter
- ▶ Advanced multilevel inverter - 56% of switching loss reduction
- ▶ Maximum optimized efficiency at high load
- ▶ Wide MPPT range allowing for best in class DC/AC ratios
- ▶ Flexible DC-input configuration to meet complex array configuration

Special Features

The Advanced Multi-level Inverter

SolarWare® 750/1000/1833 redefines the PV utility scale solar inverter solution in reliability, efficiency, and productivity. TMEIC sets the standard of utility scale installation with its own proprietary and the most advanced multi-level inverter system by reducing the switching loss by 56%.

The Advanced Multi-level Inverter uses a new circuit topology to create 3 output voltage levels. With this new design, the inverter size has also been significantly reduced, achieving the world's smallest 1000kW inverter.

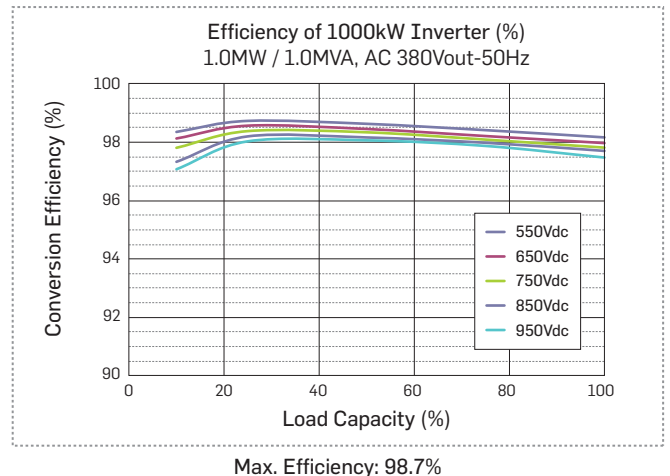
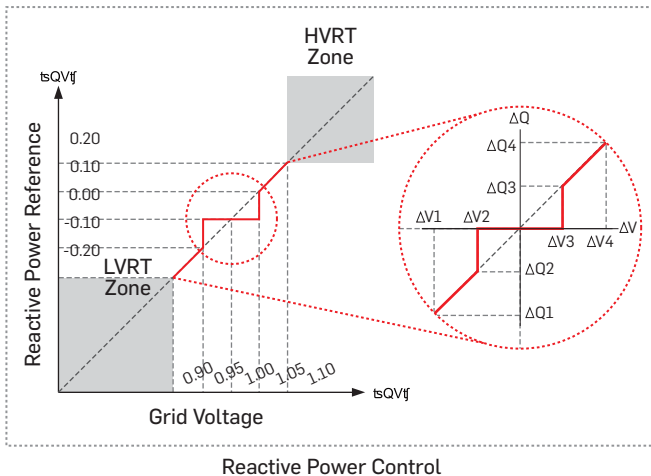


Grid Connection Features

TMEIC has long history working with power companies and have developed the grid connection features together. All of TMEIC's utility scale inverters come with the latest interconnection technology enhanced by most skilled engineers and scientists.

High Efficiency in this Class

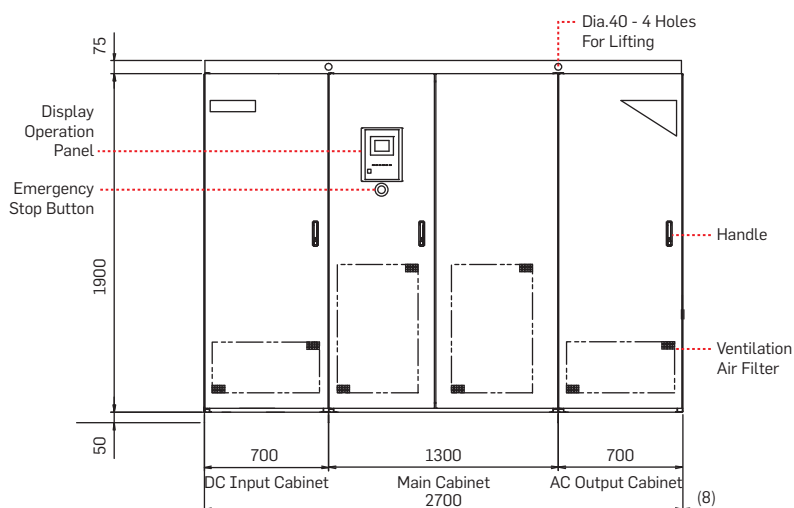
TMEIC's most advanced inverter design allows SolarWare® 750/1000/1833 to operate at amazing 98.7% maximum efficiency. With high efficiency and the robust design, TMEIC can significantly maximize array performance and uptime.



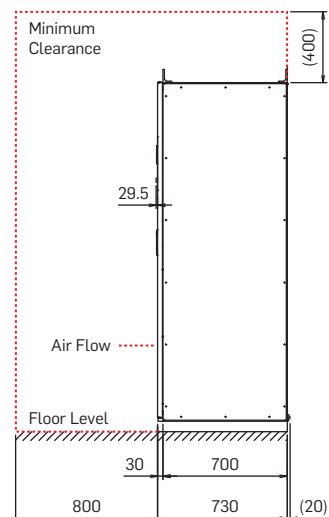
Specifications and Dimensions

TYPE		INDOOR		OUTDOOR
MODEL		PVL L0750E-S	PVL L1000E	PVL L1833ERM
Input side (DC)	Maximum voltage	1000V		
	MPPT operation range	550-950Vdc		605-950Vdc
	Max. DC current	1390A	1855A	3091A
Output side (AC)	Nominal AC output power	750kW/750kVA	1000kW/1000kVA	1833kW/2000kVA
	Nominal AC voltage	380V, 3 Phase, 3 wire system		418V, 3 Phase 3 wire system
	Nominal AC frequency	50/60Hz		
	Nominal AC current	1140A	1519A	2762A
	Power factor	+0.85 (capacitive) to -0.85 (inductive)		
	Harmonic distortion	<3% THD (rated power)		
Maximum efficiency		98.6%	98.7%	98.8%
Environmental conditions	Enclosure protection class	IP20 (indoor use)		IP44/IP54 (outdoor)
	Relative humidity	15 to 95% (non condensation)		
	Ambient temp. range	-20 to 50°C (-4 to 122F)		
	Max. altitude from sea level	2000m		
Protective functions	Input (DC) side	Ground fault		
		DC reverse current		
		Over voltage		
		Over current		
		Anti islanding		
		Over current		
		Over/under voltage		
		Over/under frequency		
		Reactive/active power control		
		Power factor control		
Fault ride through (optional)				
Communication type		Modbus/TCP		
Fault analysis		Fault event log		
		Waveform acquisition via SD card		
Compliance		IEC standard		
Cooling system		Forced air cooling		Advanced hybrid cooling
Inverter dimension (mm)		W1900 x H2025 x D730	W2700 x H2025 x D730	W5000 x H2286 x D1150
Unit weight		1300kG	2000kG	6000kG

Front Side View



Side View



* Dimensions of 1000 kW only.

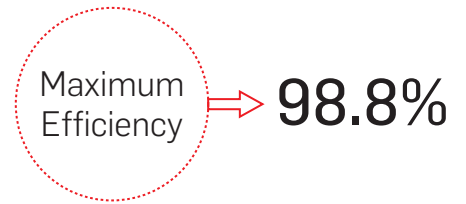
New 1500Vdc Series

Capacity of 2500kW

CAPEX reduction of site installation works:

Number of cables, combiner boxes and inverters

OPEX reduction: High efficiency and low loss with reduced DC current

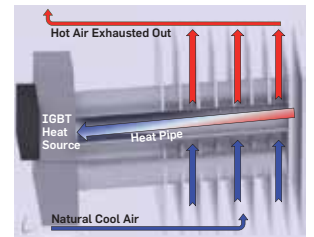


Maximize Revenues and Improve CAPEX

- ▶ High-yield power generation
- ▶ High efficiency in any weather conditions
- ▶ Realize large capacity with less number of inverters
- ▶ Reduce site work and BOS investment

Hybrid Cooling System

- ▶ Simple and robust
- ▶ High reliability
- ▶ Significant reduction in O&M
- ▶ Less operation noise
- ▶ Reduced footprint



Fan-less Mode

TYPE	PVH-L2500ER (IEC)
Input side (DC) Maximum power Maximum voltage MPPT operation range	2551kWp@98% Efficiency 1500Vdc 800Vdc ~ 1300Vdc
Output side (AC) Rated power Rated voltage Rated frequency Rated current Maximum current Rated power factor	2500kW / 2500kVA 550V + 10%, -12% 50 / 60Hz 2624 Arms 2624 Arms Over 0.99
Maximum efficiency CEC efficiency	98.8% 98.5%
Environmental conditions Enclosure protection Installation Ambient temperature range	IP44 / IP54 (Electronic Circuit) Outdoor -20° ~ 50°C* (-4 ~ 122F)
Protective functions Input (DC) side Grid (AC) side Grid assistance	Ground fault, DC reverse current, Over voltage, Over current Anti islanding, Over current, Over/under voltage, Over/under frequency Reactive/active power control, Power factor control, Fault ride through (optional)
User interface	LCD (3.8 inch, QVGA) with Touch-screen
Communication	Modbus / TCP
Fault analysis	Fault Event Log, Waveform Acquisition via Memory Card
Compliance	IEC-standard
Cooling system	Advanced Hybrid Cooling
Std. no. of inputs	1
Std. control power supply	From Inverter Output and Capacitor Backup Circuit (3 Sec. Compensation)
Inverter dimensions (mm)	W5000 x H2286 x D1150
Floor space	5.75m ²

Notice: Please consider surface temperature of PV module, string and array configuration and operating voltage when you structure systems.

* Power derating over 40°C

SCADA Monitoring System

Key Features

- ▶ Intuitive visualization
- ▶ Remote and real time diagnostics to minimize the downtime
- ▶ Remote user access using web browser
- ▶ Real-time data acquisition and role based supervisory control
- ▶ Historical data collection & analysis and user-configurable security mode
- ▶ Communication using all industry standard protocols

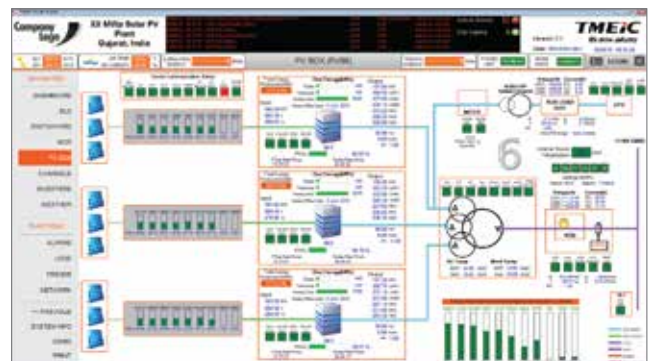
Key Benefits

- ▶ Preconfigured application database and graphics reduce application engineering deployment and testing effort
- ▶ System accepts industry leading and standard communications interface (Modbus TCP, DNP3, etc.)
- ▶ High-resolution historical data storage facilitates diagnostic analysis and troubleshooting
- ▶ Comprehensive security model allows personalized access based on user login
- ▶ Modular and scalable to support easy expansion with minimal engineering effort

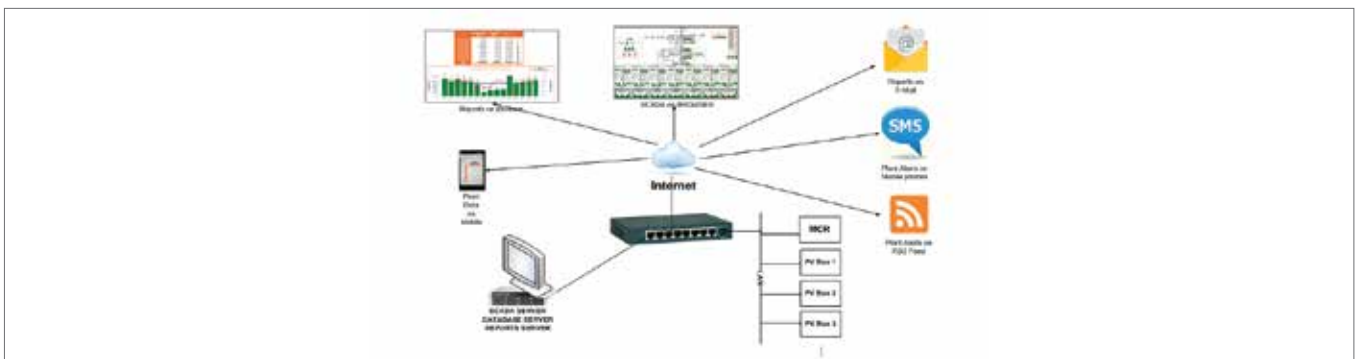
PLANT OVERVIEW



PV BOX OVERVIEW



REMOTE CONNECTIVITY



All Inverter Status
and Faults at a Glance

Alarms and
Diagnostics

Historical and
Real-time Trends

Reports



Prestigious Installations

"TMEIC is known for their excellent product range and after sales services since years."

Being a pioneer in the PV inverters, this statement by our esteemed customers is being consistently proven by our prestigious installations.

California, USA



1985
1 MW Inverter
Largest PV Inverter in the world

Arizona, USA



1985
150kW PV Inverter
Running satisfactorily till date

Japan



2010
4 MW Electric Power Company
Micro-grid Verification Facility

Italy



2010
8 MW Solar Power Plant

New Mexico, USA



2011
20 MW Power Plant
(2 Installations)
630 kW Inverters in the Package

India



2015
20 MW Solar Power Plant

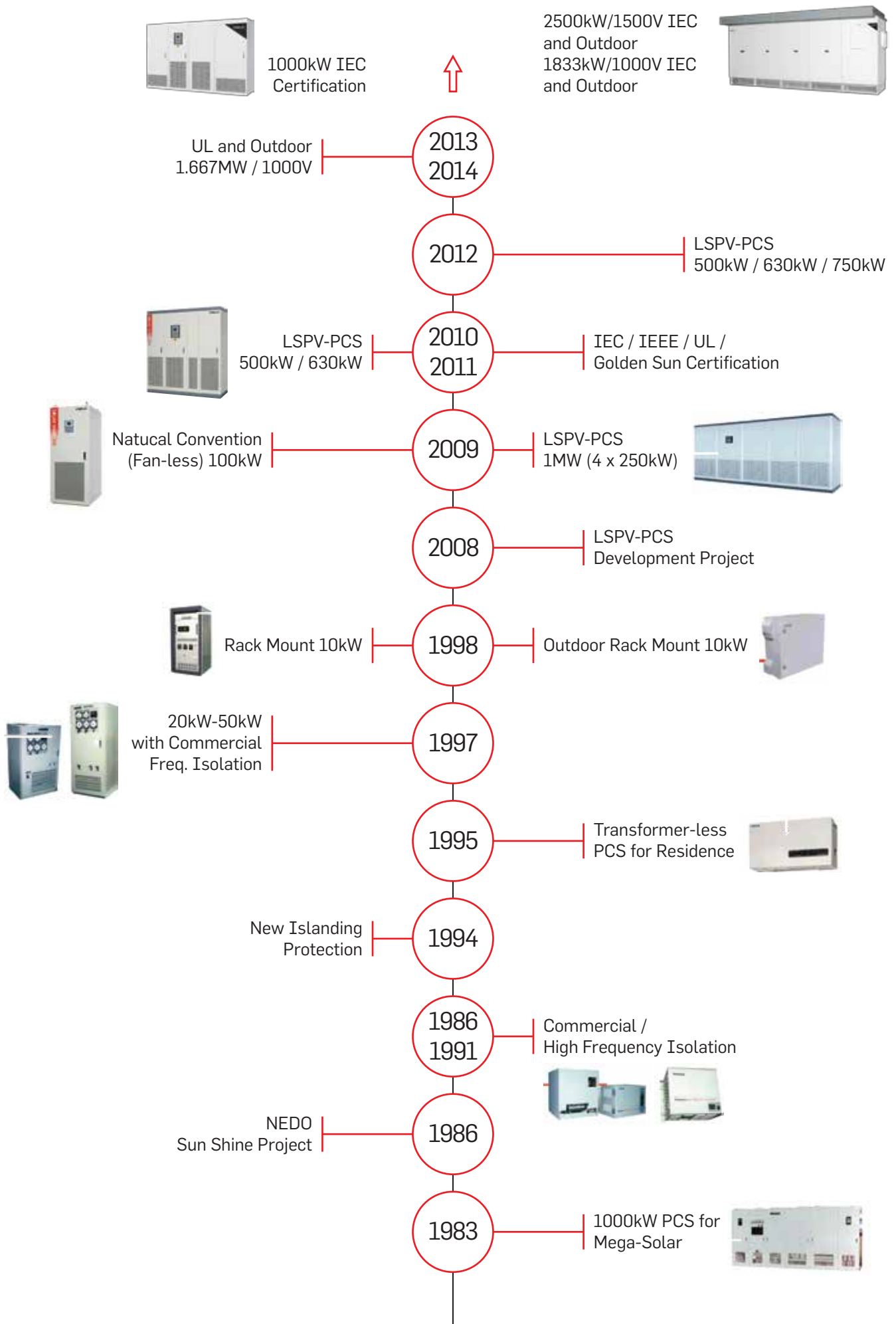
Over 9GW installed worldwide



2016

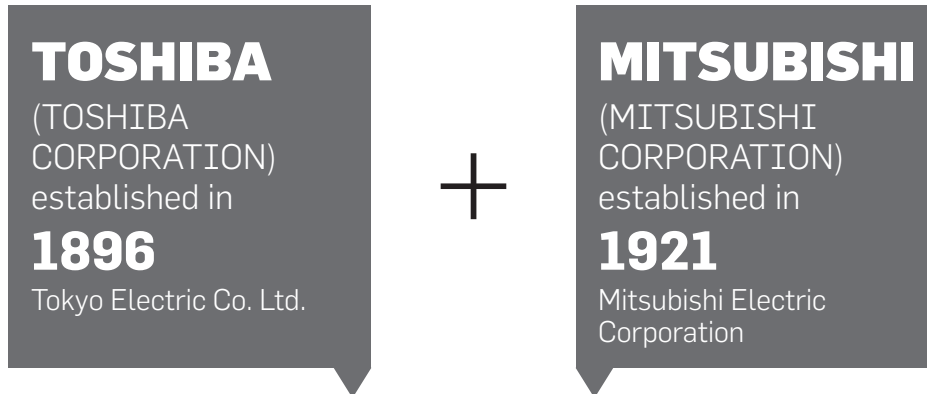
More than
660 MW
installed
within India

Development History



TMEIC History

Built on the proud history of **Toshiba** and **Mitsubishi - Electric**, TMEIC continues their legacy of providing high performance and high power solutions to customers around the world.



POWER ELECTRONICS & INDUSTRIAL SYSTEMS DEPARTMENT

TMEIC
(TOSHIBA MITSUBISHI ELECTRIC INDUSTRIAL SYSTEMS CORPORATION)
established in **2003**

The industrial systems departments of Toshiba Corporation and Mitsubishi Electric Corporation were merged to create Toshiba Mitsubishi-Electric Industrial Systems Corporation (TMEIC).

TMEIC is a world-class leader in industrial systems integration, contributing to production technology and management of the environment with cutting-edge technology.

As an industrial system integrator, we are focused on the future of "industry", "society", and "environment" in order to respond to the on-site needs of production, and to facilitate the harmonization of social development and beautiful global environment.

Our core technologies lie in the power electronics which transforms and control the required electric power, and the engineering that extends from planning to operations of the plant as a whole. Our cutting edge technology in these core areas contributes to production and environment management. "We make production possible". We are TMEIC.

Manufacturing Facility



Power Electronics Factory (Mysore Road, Bengaluru)



Rotating Machine Factory (Tumkur, Bengaluru)

50+ years of manufacturing experience

in pioneering cutting edge inverter and converter technology allows us to give our customers the best performing, energy-efficient and the most reliable products.

Our world-class manufacturing plant has the state-of-the-art production, testing facility, quality, SCM capabilities and products that meet IEC standards. It has well trained employees having expertise in development of UPS systems, PV inverters and M V drives.

It is our endeavour to bring full capabilities of our Japanese operations to India as we take on the new challenge of building a better tomorrow for India.



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