

## Application Note - RMS Inverter Systems



### Benefits

- Energy Efficient – the Twin Sine Inverter (TSI) performance is unmatched in the industry
- Maximum Reliability – the TSI Technology eliminates the need for a separate Static Transfer Switch (STS), the single point of failure in a traditional inverter design
- Scalable – the TSI modules are designed to parallel with each other for additional capacity
- Power Density – the TSI inverter has the industry's highest watts per U.
- Modular – the hot swappable TSI inverter can be added and removed without exposing the critical load to unreliable utility

### The Challenge

The challenge is to provide our customers with a solution to their diverse power needs, efficiently and reliably.

### The Solution

A high density, modular, scalable, hot swappable and uninterruptable power system that connects into the DC source and AC Grid, producing reliable, uninterruptable AC power without the need for static transfer switching.

### The Application

The CE+T RMS System can be configured with one or two media shelves to provide up to 10.5 KVA single phase or 12 KVA dual phase of uninterruptable power. All RMS systems include AC and DC input circuit breakers and AC output circuit protection as well as a maintenance bypass switch.

### Why CE+T

CE+T is a solutions provider for the telecommunication, industrial, and data center markets in support of their critical power requirements. Founded in 1936, CE+T is an industrial leader in power conversion technology. The new TSI products have revolutionized the inverter market.

Creating a system to meet the varied demands of customer applications requires products that are both easily configurable and have a reliable architecture. Unpredictable short and long term power profile demands make it difficult when sizing inverter systems without compromising overall systems performance.

The RMS Inverter System is modular and scalable up to 10.5 KVA or 12 KVA dual phase while easily configured to current and future AC power demands using CE+T TSI series Media inverter modules. Media inverter modules are available in standard 1,500 VA building blocks.

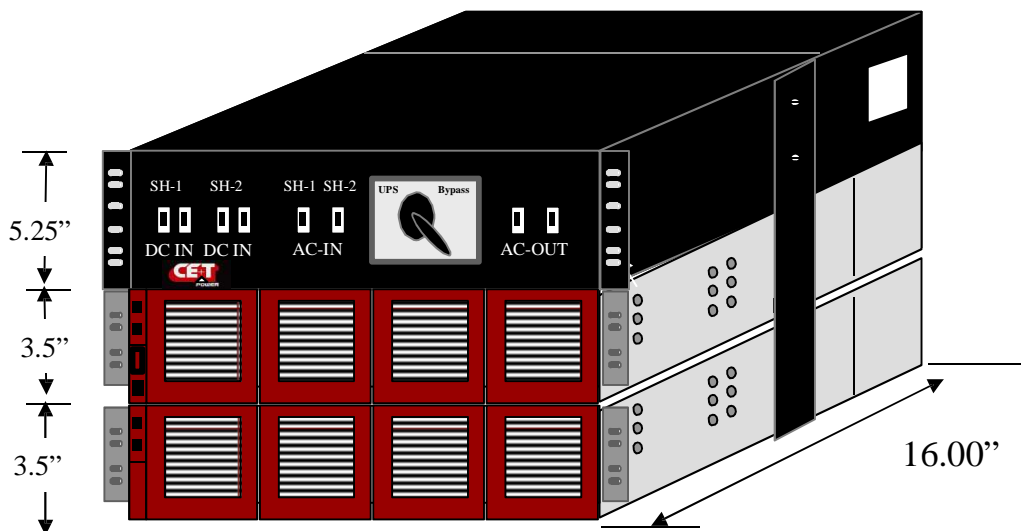
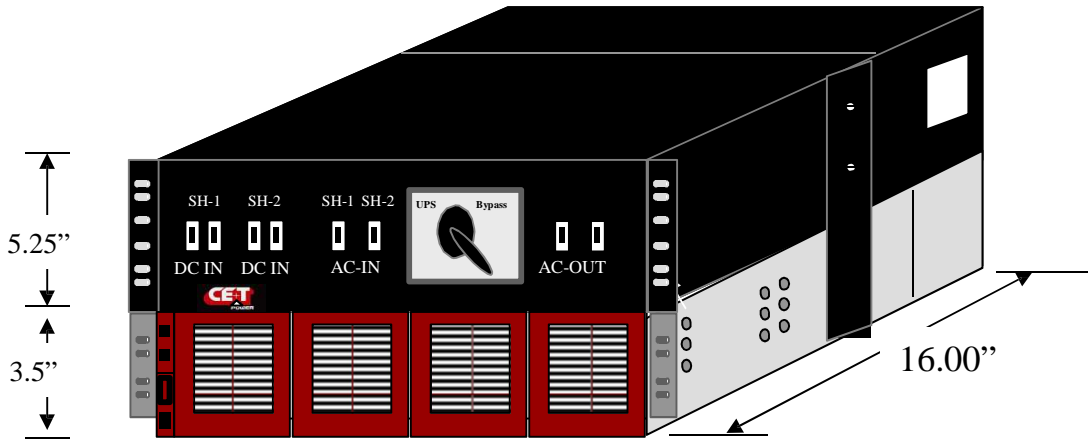
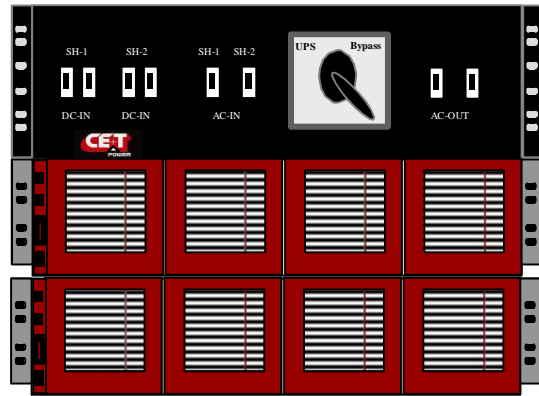
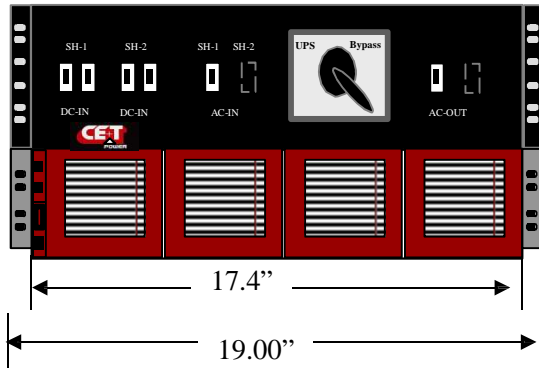
All TSI series modules utilize CE+T Enhanced Power Conversion (EPC) functionality. This technology eliminates the need for a static transfer switch in the system, thus also eliminating the single point of failure in traditional inverter system designs. Unlike hard transfer methods between energy input sources, the TSI "soft switching" method allows disturbance free switching.

RMS Systems are field upgradable and hot swappable, modular designs. Inverter modules may be added in field active systems without taking systems down to bypass mode. The RMS Inverter System is designed to reduce exposure of critical loads to an unreliable utility.

# RMS Systems

## RMS 6 kVA Single Phase

## RMS 10.5 kVA Single Phase\12 kVa Dual Phase



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# Technical Specifications

## Single Phase 6KVA

### General

EMC (Immunity)	IEC 1000-4
EMC (Emission)	FCC Part 15
Safety	uL 1778 Listed
Cooling	Forced
Isolation	Doubled
MTBF	230,000 Hours
Efficiency (Typical)	
Enhanced Power Conversion (EPC)	94%
On Line	90%
Dielectric Strength (DC\AC)	4300 Vdc
ROHS	Compliant
Connection I/O	Bulk
Reverse Polarity Protection	
Self adaptive to wide operating conditions and comprehensive table of troubleshooting codes	

### AC Output Power

Nominal Output Power	6,000 VA
Output Power (resistive load)	4,800 Watts
Instantaneous\Surge Capacity	150% 5 seconds
Overload Capacity	110%
Admissible load power factor	Full power rating from 0 inductive to 0 capacitive

### DC Input Specifications

Nominal Voltage (DC)	48 vdc
Voltage Range	42 – 58 Vdc
Nominal current (@ 48 vdc)	136 A
Max. input current (5 sec)	168 A
Voltage Ripple	2.0 mV
Input Voltage Boundaries	User selectable

### AC Input Specifications

Nominal Voltage (AC)	120 Vac L-N
Voltage Range (AC)	100 – 140 Vac (fully rated) 83 – 100 Vac (derated)
Power Factor	>99%
Frequency Range	50 – 60 Hz
Synchronization range	47 – 53 Hz 57 – 63 Hz

### AC Output Specification

Nominal Voltage (AC) (*)	120 Vac L-N
Voltage Range AC (adjustable)	90 – 130 Vac
Voltage Accuracy	2%
Frequency	50 – 60 Hz
Frequency Accuracy	0.03%
Total Harmonic Distortion (resistive load)	<1.5%
Load Impact Recovery	0.4 mS
Turn on Delay	30 s
Nominal Current	50 A
Protected against reverse current	
Crest factor at nominal power	2.2
With short circuit management & protection	
Short circuit clear up capacity	10 X in, for 20 msec
Available while AC mains are available at input	

### Transfer Performance

Maximum Voltage Interruption	0 sec
Total transient voltage duration (max)	0 sec

### Environment

Altitude above sea level	< 1.5 km (full rating) 1.5 – 5.0 km (derated 8%/km)
Operating temperature	-20 to 40 C
Storage temperature	-40 to 70 C
Relative humidity	95%, non condensing

### Signaling & Supervision

Display	Synoptic LED
Alarms	Dry contacts
Supervision	Use optional devices

### Weight & Dimensions

Width	17.4 in.
Depth	16.0 in.
Height	8.75 in.
Weight	73 lb
Material (casing)	Painted and coated steel

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# Technical Specifications

## Single Phase 10.5KVA Systems

### General

EMC (Immunity)	IEC 1000-4
EMC (Emission)	FCC Part 15
Safety	uL 1778 Listed
Cooling	Forced
Isolation	Doubled
MTBF	230,000 Hours
Efficiency (Typical)	
Enhanced Power Conversion (EPC)	94%
On Line	90%
Dielectric Strength (DC\AC)	4300 Vdc
ROHS	Compliant
Connection I/O	Bulk
Reverse Polarity Protection	
Self adaptive to wide operating conditions and comprehensive table of troubleshooting codes	

### AC Output Power

Nominal Output Power	10,500 VA
Output Power (resistive load)	8,400 Watts
Instantaneous\Surge Capacity	150% 5 seconds
Overload Capacity	110%
Admissible load power factor	Full power rating from 0 inductive to 0 capacitive

### DC Input Specifications

Nominal Voltage (DC)	48 vdc
Voltage Range	42 – 58 Vdc
Nominal current (@ 48 vdc)	195 A
Max. input current (5 sec)	292 A
Voltage Ripple	2.0 mV
Input Voltage Boundaries	User selectable

### AC Input Specifications

Nominal Voltage (AC)	120 Vac L-N
Voltage Range (AC)	100 – 140 Vac (fully rated) 83 – 100 Vac (derated)
Power Factor	>99%
Frequency Range	50 – 60 Hz
Synchronization range	47 – 53 Hz 57 – 63 Hz

### AC Output Specification

Nominal Voltage (AC) (*)	120 Vac L-N
Voltage Range AC (adjustable)	90 – 130 Vac
Voltage Accuracy	2%
Frequency	50 – 60 Hz
Frequency Accuracy	0.03%
Total Harmonic Distortion (resistive load)	<1.5%
Load Impact Recovery	0.4 mS
Turn on Delay	30 s
Nominal Current	88 A
Protected against reverse current	
Crest factor at nominal power	2.2
With short circuit management & protection	
Short circuit clear up capacity	10 X in, for 20 msec
Available while AC mains are available at input	

### Transfer Performance

Maximum Voltage Interruption	0 sec
Total transient voltage duration (max)	0 sec

### Environment

Altitude above sea level	< 1.5 km (full rating) 1.5 – 5.0 km (derated 8%/km)
Operating temperature	-20 to 40 C
Storage temperature	-40 to 70 C
Relative humidity	95%, non condensing

### Signaling & Supervision

Display	Synoptic LED
Alarms	Dry contacts
Supervision	Use optional devices

### Weight & Dimensions

Width	17.4 in.
Depth	16.0 in.
Height	12.25 in.
Weight	106 lb
Material (casing)	Painted and coated steel

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# Technical Specifications

## Dual Phase 12KVA

### General

EMC (Immunity)	IEC 1000-4
EMC (Emission)	FCC Part 15
Safety	uL 1778 Listed
Cooling	Forced
Isolation	Doubled
MTBF	230,000 Hours
Efficiency (Typical)	
Enhanced Power Conversion (EPC)	94%
On Line	90%
Dielectric Strength (DC\AC)	4300 Vdc
ROHS	Compliant
Connection I/O	Bulk
Reverse Polarity Protection	
Self adaptive to wide operating conditions and comprehensive table of troubleshooting codes	

### AC Output Power

Nominal Output Power	6,000 VA
Output Power (resistive load)	4,800 Watts
Instantaneous\Surge Capacity	150% 5 seconds
Overload Capacity	110%
Admissible load power factor	Full power rating from 0 inductive to 0 capacitive

### DC Input Specifications

Nominal Voltage (DC)	48 vdc
Voltage Range	42 – 58 Vdc
Nominal current (@ 48 vdc)	223 A
Max. input current (5 sec)	334 A
Voltage Ripple	2.0 mV
Input Voltage Boundaries	User selectable

### AC Input Specifications

Nominal Voltage (AC)	120 (L-N)/240 (L-L) Vac 120 (L-N)/208 (L-L) Vac on rqst
Voltage Range (AC)	100 – 140 Vac (fully rated) 83 – 100 Vac (derated)
Power Factor	>99%
Frequency Range	50 – 60 Hz
Synchronization range	47 – 53 Hz 57 – 63 Hz

### AC Output Specification

Nominal Voltage (AC) (*)	120 (L-N)/240 (L-L) Vac 120 (L-N)/208 (L-L) Vac on rqst
Voltage Range AC (adjustable)	90 – 130 Vac
Voltage Accuracy	2%
Frequency	50 – 60 Hz
Frequency Accuracy	0.03%
Total Harmonic Distortion (resistive load)	<1.5%
Load Impact Recovery	0.4 mS
Turn on Delay	30 s
Nominal Current	50 A per phase
Protected against reverse current	
Crest factor at nominal power	2.2
With short circuit management & protection	
Short circuit clear up capacity	10 X in, for 20 msec
Available while AC mains are available at input	

### Transfer Performance

Maximum Voltage Interruption	0 sec
Total transient voltage duration (max)	0 sec

### Environment

Altitude above sea level	< 1.5 km (full rating) 1.5 – 5.0 km (derated 8%/km)
Operating temperature	-20 to 40 C
Storage temperature	-40 to 70 C
Relative humidity	95%, non condensing

### Signaling & Supervision

Display	Synoptic LED
Alarms	Dry contacts
Supervision	Use optional devices

### Weight & Dimensions

Width	17.4 in.
Depth	16.0 in.
Height	8.75 in.
Weight	106 lb
Material (casing)	Painted and coated steel

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