

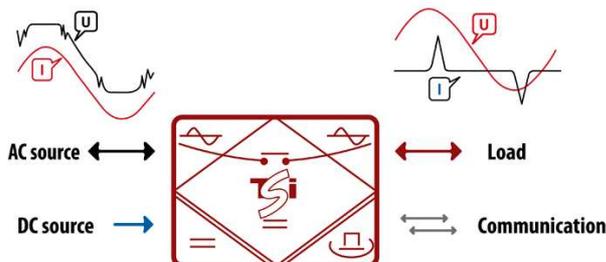
TSI MEDIA 48/230

Triple port inverter without single point of failure



The TSI is designed according to the golden rules of **True Redundant Systems**. One of the most important features is the disconnection capability. A TSI converter has at least 3 disconnecting levels in series (i.e. a relay, a fuse...) on each power port as well as an optical isolation on the double communication bus. The AC grid port is specifically designed to clean up the surges, bursts and all of the well-known disturbances met on a power network. As designed, the AC grid input has four (4) disconnecting devices in series in order to insure a higher MTBF of the DC/AC converter inside the TSI. The AC-to-AC conversion chain isolates the AC output from the AC input and features a double filtering function. Consequently, the voltage supplied to the critical load is a pure sine despite all the disturbances (harmonics, surges, glitches ...) usually carried by the grid and the input current remains sinusoidal even when the load is not linear.

Pure sine wave at the output and ideal power factor



at the input are achieved without pumping any energy from the DC source.

With the TSI concept the filtering of current and voltage is similar to a rectifier combined with an inverter (on-line mode) but with a significantly better efficiency. Compared to a UPS operating in off-line mode, the efficiency is in the same range but the rejection of grid disturbances is much higher. Furthermore, the transfer between energy input sources is disturbance free and can be considered as a "soft-switching" operation. It is so wise to consider this functioning mode as the normal operating mode and we will name it "**Enhanced Power Conversion**" (**EPC**) mode.

The AC-to-AC efficiency, which ranges to 95% up is a significant improvement compared to less than 85% overall efficiency given by the rectifier-battery-inverter chain usually in use when similar reliability performances have to be achieved. So losses are divided by 3.

The TSI is able to supply 10 times its nominal output current for a time longer than 20ms in case of downstream short-circuit in the AC distribution. Nominal performances are kept and clean AC power supply is guaranteed to any other load connected in parallel.

This short-circuit current is also controlled in magnitude to prevent tripping of the upstream breaker. Full segregation is so ensured and is an additional guaranty that loads are kept free of disturbances even after failure occurrence.

The internal switch as well as the inverter of the TSI can be paralleled up to 32 units. The "synchronization communication bus" is redundant too. The communication is therefore fault-tolerant, each bus being self-sufficient to handle synchronization, load sharing and data communication.

With the TSI, the manual bypass is no longer needed to allow the replacement of the static switch. It is just limited to cabinet maintenance purposes bearing in mind that the TSI module is hot plug and redundant.

When designing a customized system with, it is very convenient to have modules integrating inverter and switch functions to get a simplified wiring system in such a way that stacked modules are easily interconnected by means of just three (3) vertical bus bars: one for the AC input, one for the AC output and one for the DC input. Initial cabling as well as further extensions capabilities is dramatically improved.

With TSI one can talk of TOTAL MODULARITY since the static switch has not to be sized according to the eventual capacity of the AC power system, the evolution of the load consumption being likely unpredictable. With the TSI the available AC power can be gradually increased to closely follow the load requirements.

GENERAL

EMC (immunity)	IEC 61000-4
EMC (emission)	CISPR22 (Class B)
Safety	IEC 62040-1-1
Cooling	Forced
MTBF	>200 000 hrs
Efficiency (MAX)	On Line 91%
	Enhanced Power Conversion 95%
Dielectric strength DC/AC	4300Vdc
True Redundant Systems	Compliant
3 disconnection levels on AC _{out} and DC _{in} power ports	
4 disconnection levels on AC _{in} port / 2 communication bus	
RoHS	Compliant
Connection I/O	Terminal block Cable lug
Protected against inversion of polarity	
Self adaptive to wide operating conditions and comprehensive table of troubleshooting codes	

AC OUTPUT POWER

Nominal Output power (**)	n x 1500 VA
Output power (resistive load) (**)	n x 1200W
Short time overload capacity.	150% 15 sec
Permanent overload capacity	110%
Load power factor	Full power rating from 0 inductive to 0 capacitive
Internal temperature management and cut off	

DC INPUT SPECIFICATIONS

Nominal voltage (DC)	48 V
Voltage range (DC)	40 - 58 V
Nominal current (at 40Vdc) (**)	n x 34 A
Maximum input current (magnitude management) (**)	n x 48 A
Voltage ripple (resistive load @ 54Vdc)	< 2mV
Input voltage boundaries	user selectable

AC INPUT SPECIFICATIONS

Nominal voltage (AC)	230V 1P or 3P (***)
Voltage range (AC)	150 – 265 V
Brownout	150 to 185V 1056 W @ 150 V
Conformity range	Adjustable
Power Factor	> 99%
Frequency range (selectable)	50 - 60 Hz
Synchronization range	47 – 53 Hz or 57 – 63 Hz

AC OUTPUT SPECIFICATIONS

Nominal voltage (AC)(*)	230V
Voltage range (AC) (adjustable)	200 – 240 V
Voltage accuracy	2 %
Frequency	50 – 60 Hz
Frequency accuracy	0.03 %
Total harmonic distortion (resistive load)	< 3 %
Load impact recovery time	0.4 ms
Turn on delay	40 s
Nominal current (**)	n x 6.6 A
Protected against reverse current	
Crest factor at nominal power (1500VA)	2.8 In
With short circuit management and protection	
Short circuit clear up capacity	10 x I _n for 20msec
Short circuit after clear up capacity	2.1 In
Short circuit current after 15 sec	1.5 In

TRANSFER PERFORMANCES

Maximum voltage interruption (transient free)	0 ms
Total transient voltage duration (max)	0 ms

ENVIRONMENT

Altitude above sea without derating	<1500m
Derating slope upper than 1500m	0,8% by 100m
Ambient temperature	-20 to 50 °C Derating up to 65°C
Storage temperature	-40 to 70 °C
Relative humidity	95% , non condensing

SIGNALLING & SUPERVISION

Display	Synoptic LED
Alarms output (optional)	Dry contacts on shelf
Supervision	Use optional devices

WEIGHT & DIMENSIONS

Width	19" Open relay rack and box bay compatible
Depth	15-inch - 380 mm
Height	2 U (88 mm)
Weight (**)	n x 2.4 Kg Shelf without module 5,5 Kg
Material (casing)	Coated steel

(*) Operation within lower voltage networks leads to derating of power performances

(**) "n" stands for number of modules in parallel

(***) with minimum 3 shelves

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<http://www.cet.be/>

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