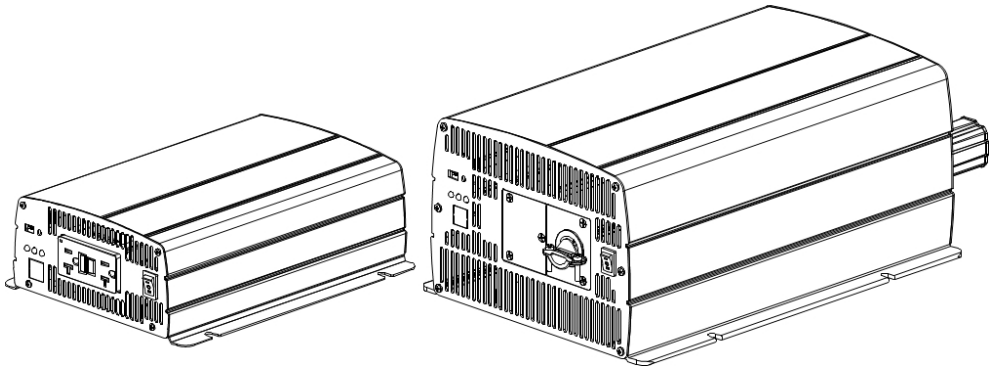
TS Series
700 - 4000 Watt
Pure Sine Wave Inverter



Models

TS12-700 TS24-700

TS12-1000 TS24-1000

TS12-1500 TS24-1500

TS12-2000 TS24-2000

TS12-3000 TS24-3000

TS24-4000

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1. Safety Instructions

1-1. General Safety Precautions

Warning! Before using the Inverter, read the safety instructions.

- Do not expose the inverter to rain, snow, spray or dust. To reduce the risk of fire hazard, do not cover or obstruct the ventilation openings and do not install the inverter in a zero-clearance compartment.
- To avoid the risk of fire and electric shock, make sure that the existing wiring is in good electrical condition, and the wire size is not undersized.
- This equipment contains components which can produce arcs or sparks. To prevent fire or explosion do not install in compartment containing batteries or flammable materials or in location which require ignition protected equipment. This includes any space containing gasoline-powered machinery, fuel tanks, or joints, fittings, or other connection between components of the fuel system.
- Depending on the user scenario, the AC output of the inverter may require user installed breaker or fuse. In AC output hardwire application, AC socket will not been provided. The inverter incorporates standard AC short circuit protection.
- An over current protection at the time of installation shall be provided by others for the AC output circuit.
- Additional breakers suitable for 20 A branch circuit protection shall be provided for the GFCI receptacles.
- The following precautions should be taken when working on the inverter:
  Step 1 Remove watches, rings, or other metal objects
  Step 2 Use tools with insulated handles
  Step 3 Wear rubber gloves and boots

1-2. Other Safety Notes

- Upon receipt, examine the carton box for damage. If you have found any damage on the carton box please notify Vanner.
- Do not operate near water or in excessive humidity.
- Do not open or disassemble the inverter, and warranty may be voided.
- The DC side connections should be firm and tight.
- Grounding: Reliable grounding should be maintained.
- Do not drop a metal tool on the battery. The resulting spark or short-circuit on the battery or on the other electrical part may cause an explosion.
- Install the inverter in a well-ventilated area. Do not block the front air vents, or the rear air exhausts of the unit.
- Wiring: Adequate input power must be supplied to the inverter for proper use; correct wiring sizes must be ensured.
- Mount the inverter such that the fan axis is horizontal.
- Do not operate the inverter close to combustible gas or open fire.
- Do not operate appliances that may feed power back into the inverter.
- Temperature: The inverter should be operated in an ambient temperature range of -25° to 40° otherwise the output efficiency may be affected. Air flow to the inverter must not be blocked.

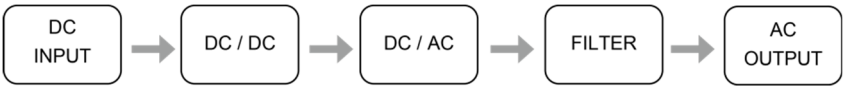
2. Functional Characteristics Introduction

2-1. System

The unit is a highly reliable DC-AC inverter system, designed with advanced power electronic and microprocessor technology offering the following features:

- Pure sine wave output waveform O/P voltage THD < 5 %
- Intelligent software for power management
- Loading and temperature controlled cooling fan
- Dry contact terminal
- Advanced Protection Features
  - Input over/under voltage protection
  - Internal over temperature protection
  - Input reverse polarity protection (Fuse)
  - Output overload protection
  - Output short circuit protection

2-2. Block Diagram



2-3. Electrical Specification

2-3-1. TS12-700, TS24-700 Specification

Electrical	Specification Item	Model No. TS12-700	TS24-700
Input Characteristics	Voltage	12VDC	24VDC
	Input Over-Voltage Protection①	16.5 ± 0.3VDC	33 ± 0.5VDC
	Input Under-Voltage Protection	10.5 ± 0.3VDC	21 ± 0.5VDC
	Voltage Range	10.5~16.5VDC	21~33VDC
	No Load Current	≦1.5A @12VDC	≦0.8A @24VDC
	Power Saving Mode	<0.1A @12VDC	<0.06A @24VDC
Output Characteristics	Continuous Output Power	700 W (± 3%)	
	Maximum output Power (1Min)	> 700 W~810 W (100%~115%)	
	Surge Power (3Sec)	< 1050 W	
	Frequency	50 / 60 Hz ± 0.5% (Dip Switch Selectable)	
	Output Voltage	100 / 110 / 115 / 120 VAC (± 5%) (Dip Switch Selectable)	
	Efficiency max.	91%	93%
	Short-Circuit Protection	1 Sec Shutdown	
	Output Waveform	Pure Sine Wave (THD < 5%@ Normal Load)②	
Signal and Control	LED Indicator	Red / Orange / Green LED	
	Remote Control Terminal	3-port Black terminal (for inverter ON / OFF)	
Protection	Input Protection	Over / Under Voltage, Reverse Polarity (Internal Fuse)	
	AC Output Protection	Short-Circuit, Overload	
	Others	Over / Under Temperature Protection (by Heat sink Temperature +80℃/-25℃)	
Environment	Operating Temp.	-25°C ~40°C③	
	Storage Temp.	-30°C~70°C	
	Storage Temp. & Humidity	10 ~95% RH	
Safety & EMC	Safety Standards	Certified UL 458 (UL only for GFCI receptacles)	
	EMC standards	Certified FCC class B	
Dimension(WxHxD)		8.27 X 3.50 X 12.35 inch	
Weight		5.73 lb	
Cooling		Temperature & Load Controlled cooling Fan	

Table 1. TS12-700/TS24-700 Specification.

Note：

① Voltage range：Please refer to Figure 1

② Normal load Condition：Vin =12.5V/25V/50V, Vo=100/110/115/120 VAC 80% Full load (PF=1.0)

③ Operating temperature：Please refer to Figure 2

2-3-2. TS12-1000, TS24-1000 Specification

Electrical	Specification Item	Model No. TS12-1000	Model No. TS24-1000
Input Characteristics	Voltage	12VDC	24VDC
	Input Over-Voltage Protection①	16.5 ± 0.3VDC	33 ± 0.5VDC
	Input Under-Voltage Protection	10.5 ± 0.3VDC	21 ± 0.5VDC
	Voltage Range	10.5~16.5 VDC	21~33 VDC
	No Load Current	≦1.5A @12VDC	≦0.8A @24VDC
	Power Saving Mode	<0.1A @12VDC	<0.06A @24VDC
Output Characteristics	Continuous Output Power	1000 W (± 3%)	
	Maximum output Power (1Min)	> 1000 W~1150 W (100%~115%)	
	Surge Power (3Sec)	< 1500 W	
	Frequency	50 / 60 Hz ± 0.5% (Dip Switch Selectable)	
	Output Voltage	100 / 110 / 115 / 120 VAC (± 5%) (Dip Switch Selectable)	
	Efficiency max.	92%	93%
	Short-Circuit Protection	1 Sec Shutdown	
	Output Waveform	Pure Sine Wave (THD < 5%@ Normal Load)②	
Signal and Control	LED Indicator	Red / Orange / Green LED	
	Remote Control Terminal	3-port Black terminal (for inverter ON / OFF)	
Protection	Input Protection	Over / Under Voltage, Reverse Polarity (Internal Fuse)	
	AC Output Protection	Short-Circuit, Overload	
	Others	Over / Under Temperature Protection (by Heat sink Temperature +80℃/-25℃)	
Environment	Operating Temp.	-25°C ~40°C ③	
	Storage Temp.	-30°C ~70°C	
	Storage Temp. & Humidity	10 ~95% RH	
Safety & EMC	Safety Standards	Certified UL 458 (UL only for GFCI receptacles)	
	EMC standards	Certified FCC class B	
Dimension(WxHxD)		8.27 X 3.50 X 14.01 inch	
Weight		7.19 lb	
Cooling		Temperature & Load Controlled cooling Fan	

Table 2. TS12-1000/TS24-1000 Specification.

Note：

① Voltage range：Please refer to Figure 1

② Normal load Condition：Vin =12.5V/25V/50V, Vo=100/110/115/120 VAC 80% Full load (PF=1.0)

③ Operating temperature：Please refer to Figure 2

2-3-3. TS12-1500, TS24-1500 Specification

Electrical	Specification Item	Model No. TS12-1500	Model No. TS24-1500
Input Characteristics	Voltage	12VDC	24VDC
	Input Over-Voltage Protection①	16.5 ± 0.3VDC	33 ± 0.5VDC
	Input Under-Voltage Protection	10.5 ± 0.3VDC	21 ± 0.5VDC
	Voltage Range	10.5~16.5 VDC	21~33 VDC
	No Load Current	≦1.8A @12VDC	≦1.0A @24VDC
	Power Saving Mode	<0.1A @12VDC	<0.05A @24VDC
Output Characteristics	Continuous Output Power	1500 W (± 3%)	
	Maximum output Power (1Min)	> 1500 W~1730 W (100%~115%)	
	Surge Power (3Sec)	<2250 W	
	Frequency	50 / 60 Hz ± 0.5% (Dip Switch Selectable)	
	Output Voltage	100 / 110 / 115 / 120 VAC (± 5%) (Dip Switch Selectable)	
	Efficiency max.	91%	92%
	Short-Circuit Protection	1 Sec Shutdown	
	Output Waveform	Pure Sine Wave (THD < 5%@ Normal Load)②	
Signal and Control	LED Indicator	Red / Orange / Green LED	
	Remote Control Terminal	3-port Blackn terminal (for inverter ON / OFF)	
Protection	Input Protection	Over / Under Voltage, Reverse Polarity (Internal Fuse)	
	AC Output Protection	Short-Circuit, Overload	
	Others	Over / Under Temperature Protection (by Heat sink Temperature +80℃/-25℃)	
Environment	Operating Temp.	-25°C ~40°C ③	
	Storage Temp.	-30°C ~70°C	
	Storage Temp. & Humidity	10 ~95% RH	
Safety & EMC	Safety Standards	Certified UL 458 (UL only for GFCI receptacles)	
	EMC standards	Certified FCC class B	
Dimension(WxHxD)		9.76 X 3.50 X 16.00 inch	
Weight		9.13 lb	
Cooling		Temperature & Load Controlled cooling Fan	

Table 3. TS12-1500/TS24-1500 Specification.

Note：

① Voltage range：Please refer to Figure 1

② Normal load Condition：Vin =12.5V/25V/50V, Vo=100/110/115/120VAC 80% Full load (PF=1.0)

③ Operating temperature：Please refer to Figure 2

2-3-4. TS12-2000, TS24-2000 Specification

Electrical	Specification Item	Model No. TS12-2000	Model No. TS24-2000
Input Characteristics	Voltage	12VDC	24VDC
	Input Over-Voltage Protection①	16.5 ± 0.3VDC	33 ± 0.5VDC
	Input Under-Voltage Protection	10.5 ± 0.3VDC	21 ± 0.5VDC
	Voltage Range	10.5~16.5 VDC	21~33 VDC
	No Load Current	≦1.8A @12VDC	≦1.0A @24VDC
	Power Saving Mode	<0.1A @12VDC	<0.05A @24VDC
Output Characteristics	Continuous Output Power	2000 W (± 3%)	
	Maximum output Power (1Min)	> 2000 W~2300 W (100%~115%)	
	Surge Power (3Sec)	< 3000 W	
	Frequency	50 / 60 Hz ± 0.5% (Dip Switch Selectable)	
	Output Voltage	100 / 110 / 115 / 120 VAC (± 5%) (Dip Switch Selectable)	
	Efficiency max.	92%	93%
	Short-Circuit Protection	1 Sec Shutdown	
	Output Waveform	Pure Sine Wave (THD < 5%@ Normal Load)②	
Signal and Control	LED Indicator	Red / Orange / Green LED	
	Remote Control Terminal	3-port Black terminal (for inverter ON / OFF)	
Protection	Input Protection	Over / Under Voltage, Reverse Polarity (Internal Fuse)	
	AC Output Protection	Short-Circuit, Overload	
	Others	Over / Under Temperature Protection (by Heat sink Temperature +80℃/-25℃)	
Environment	Operating Temp.	-25°C ~40°C ③	
	Storage Temp.	-30°C ~70°C	
	Storage Temp. & Humidity	10 ~95% RH	
Safety & EMC	Safety Standards	Certified UL 458 (UL only for GFCI receptacles)	
	EMC standards	Certified FCC class A④	
Dimension(WxHxD)		9.76 X 3.50 X 16.87 inch	
Weight		11.55 lb	
Cooling		Temperature & Load Controlled cooling Fan	

Table 4. TS12-2000/TS24-2000 Specification.

Note：

① Voltage range：Please refer to Figure 1

② Normal load Condition：Vin =12.5V/25V/50V, Vo=100/110/115/120 VAC 80% Full load (PF=1.0)

③ Operating temperature：Please refer to Figure 2

④ **Warning：**This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

2-3-5. TS12-3000, TS24-3000 Specification

Electrical	Specification Item	Model No. TS12-3000	Model No. TS24-3000
Input Characteristics	Voltage	12VDC	24VDC
	Input Over-Voltage Protection①	16.5 ± 0.3VDC	33 ± 0.5VDC
	Input Under-Voltage Protection	10.5 ± 0.3VDC	21 ± 0.5VDC
	Voltage Range	10.5~16.5 VDC	21~33 VDC
	No Load Current	≦3.8A @12VDC	≦2.0A @24VDC
	Power Saving Mode	<0.4A @12VDC	<0.2A @24VDC
Output Characteristics	Continuous Output Power	3000 W (± 3%)	
	Maximum output Power (1Min)	> 3000 W~3450 W (100%~115%)	
	Surge Power (3Sec)	< 4500 W	
	Frequency	50 / 60 Hz ± 0.5% (Dip Switch Selectable)	
	Output Voltage	100 / 110 / 115 / 120 VAC (± 5%) (Dip Switch Selectable)	
	Efficiency max.	90%	91%
	Short-Circuit Protection	1 Sec Shutdown	
	Output Waveform	Pure Sine Wave (THD < 5%@ Normal Load)②	
Signal and Control	LED Indicator	Red / Orange / Green LED	
	Dry Contact Terminal	By a relay	
	Remote Control Terminal	3-port Green terminal (for inverter ON / OFF)	
Protection	Input Protection	Over / Under Voltage, Reverse Polarity (Internal Fuse)	
	Others	Over / Under Temperature Protection (by Heat sink Temperature +80℃/-25℃)	
Environment	Operating Temp.	-25°C ~40°C ③	
	Storage Temp.	-30°C ~70°C	
	Storage Temp. & Humidity	10 ~95% RH	
Safety & EMC	Safety Standards	Certified UL 458	
	EMC standards	Certified FCC class A④	
Dimension(WxHxD)		10.12 X 6.30 X 16.02 inch	
Weight		18.08 lb	
Cooling		Temperature & Load Controlled cooling Fan	

Table 5. TS12-3000/TS24-3000 Specification.

Note：

① Voltage range：Please refer to Figure 3

② Normal load Condition：Vin =12.5V/25V/50V, Vo=100/110/115/120 VAC 80% Full load (PF=1.0)

③ Operating temperature：Please refer to Figure 4

④ **Warning：** This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

2-3-6. TS24-4000 Specification

Electrical	Specification Item	Model No. TS24-4000
Input Characteristics	Voltage	24VDC
	Input Over-Voltage Protection①	33 ± 0.5VDC
	Input Under-Voltage Protection	21 ± 0.5VDC
	Voltage Range	21~33 VDC
	No Load Current	≦2.0A @24VDC
	Power Saving Mode	<0.2A @24VDC
Output Characteristics	Continuous Output Power	4000 W (± 3%)
	Maximum output Power (1Min)	> 4000 W~4600 W (100%~115%)
	Surge Power (3Sec)	< 6000 W
	Frequency	50 / 60 Hz ± 0.5% (Dip Switch Selectable)
	Output Voltage	100 / 110 / 115 / 120 VAC (± 5%) (Dip Switch Selectable)
	Efficiency max.	91%
	Short-Circuit Protection	1 Sec Shutdown
	Output Waveform	Pure Sine Wave (THD < 5%@ Normal Load)②
Signal and Control	LED Indicator	Red / Orange / Green LED
	Remote Control Terminal	3-port Black terminal (for inverter ON / OFF)
Protection	Input Protection	Over / Under Voltage, Reverse Polarity (Internal Fuse)
	AC Output Protection	Short-Circuit, Overload
	Others	Over / Under Temperature Protection (by Heat sink Temperature +80℃/-25℃)
Environment	Operating Temp.	-25°C ~40°C ③
	Storage Temp.	-30°C ~70°C
	Storage Temp. & Humidity	10 ~95% RH
Safety & EMC	Safety Standards	Certified UL 458
	EMC standards	Certified FCC class A④
Dimension(WxHxD)		10.12 X 6.30 X 16.81 inch
Weight		22.05 lb
Cooling		Temperature & Load Controlled cooling Fan

Table 6. TS24-3000 Specification.

Note：

① Voltage range：Please refer to Figure 3

② Normal load Condition：Vin =12.5V/25V/50V, Vo=100/110/115/120 VAC 80% Full load (PF=1.0)

③ Operating temperature：Please refer to Figure 4

④ **Warning :** This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

2-3-7. Voltage & temperature performance

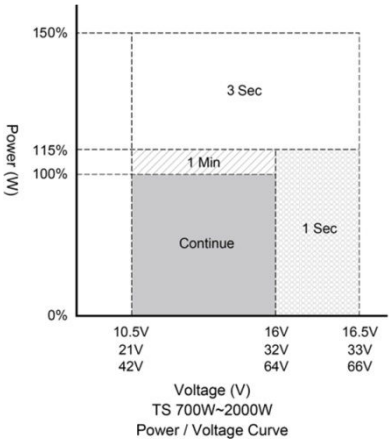


Figure 1. TS 700W~2000W Output power vs. input

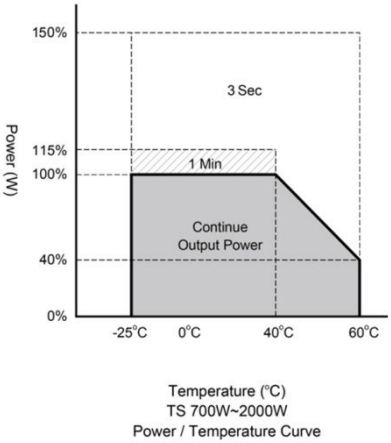


Figure 2. TS 700W~2000W Output power vs. temperature

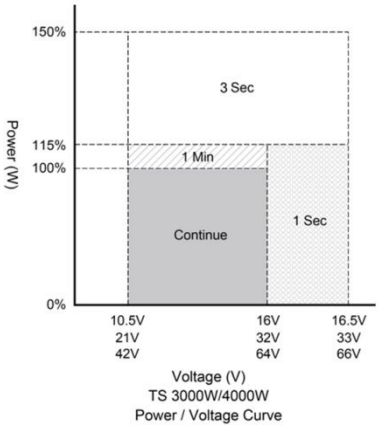


Figure 3. TS 3000W/4000W Output power vs. input

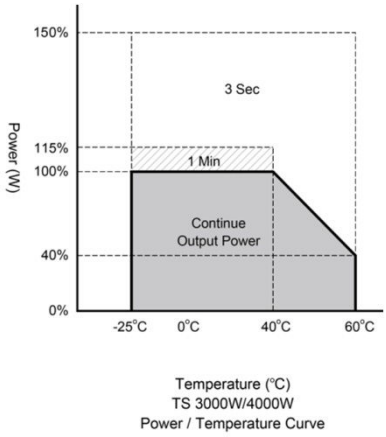


Figure 4. TS 3000W/4000W Output power vs. temperature

2-4. Mechanical Drawings

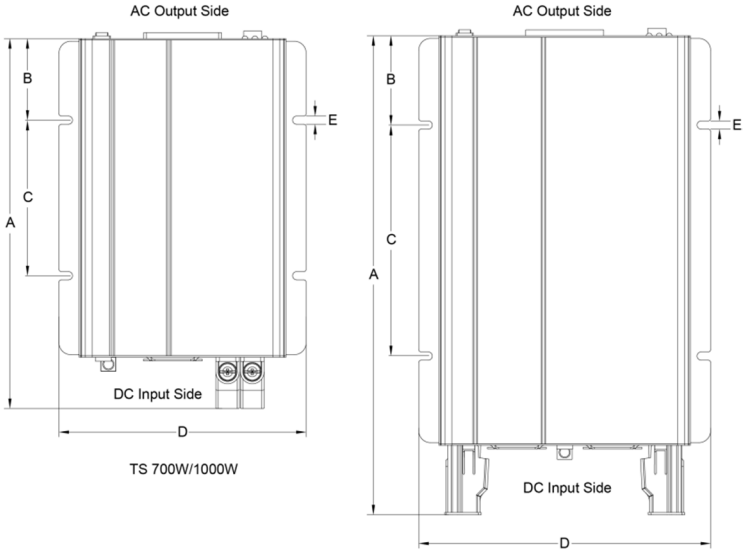


Figure 5. TS series drawing (Top View)

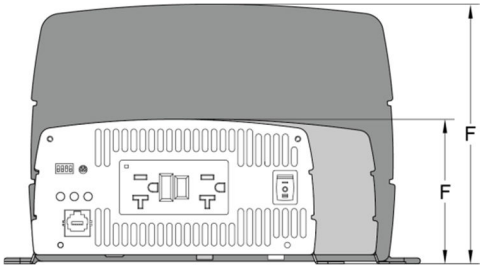


Figure 6. TS series drawing (AC output/Front View)

Model	A (inch)	B (inch)	C (inch)	D (inch)	E (inch)	F (inch)
TS 700W	12.35	1.46	7.72	8.27	0.28	3.50
TS 1000W	14.01	2.29	7.72	8.27	0.28	3.50
TS 1500W	16.00	2.98	7.72	9.76	0.28	3.50
TS 2000W	16.87	3.41	7.72	9.76	0.28	3.50
TS 3000W	16.02	2.99	7.72	10.12	0.28	6.30
TS 4000W	16.81	3.39	7.72	10.12	0.28	6.30

Table 7. TS Series Dimension

3. Installation and Maintenance

3-1. AC Output Side (Front Panel) Introduction

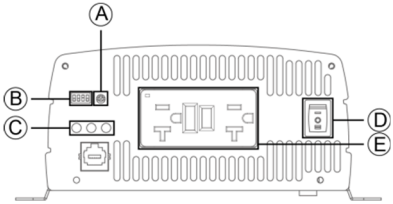


Figure 7. TS 700W/1000W AC output panel view

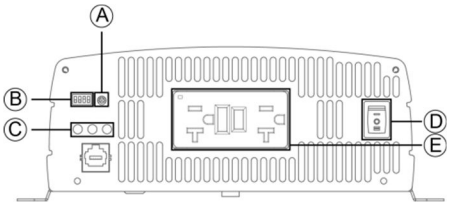


Figure 8. TS 1500W/2000W AC output panel view

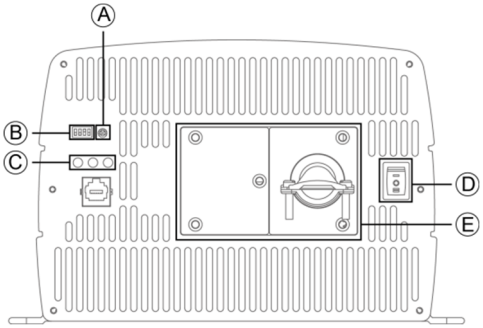


Figure 9. TS 300W/4000W AC output panel view

Model	TS Series	
Ⓐ	Saving power adjustment	
Ⓑ	Function switch	
Ⓒ	Function LED	
Ⓓ	Main switch	
Ⓔ	AC output socket	AC output terminal

Table 8. TS Series AC output side introduction

3-1-1. Main Switch

The 3-stage switch Ⓓ is for turning on, turning off and remote mode.

3-1-2. LED Indicator

3-1-2-1. Input voltage level: to display Input Voltages

LED status Ⓒ	DC 12V	DC 24V
Red	< 11.0V	< 22.0V
Orange	11.0 ~ 11.5V	22.0 ~ 23.0V
Green	11.5 ~ 15.0V	23.0 ~ 30.0V
Orange	15.0 ~ 15.5V	30.0 ~ 31.0V
Red	>15.5V	>31.0V

Table 9. Input Voltage Level LED Indicator

3-1-2-2. Output Load Level to display AC Loads

LED status Ⓒ	Green	Orange	Red
TS 700W	0 ~ 700 W	700 ~ 805 W	> 805 W
TS 1000W	0 ~ 1000 W	1000 ~ 1150 W	> 1150 W
TS 1500W	0 ~ 1500 W	1500 ~ 1725 W	> 1725 W
TS 2000W	0 ~ 2000 W	2000 ~ 2300 W	> 2300 W
TS 3000W	0 ~ 3000 W	3000 ~ 3450 W	> 3450 W
TS 4000W	0 ~ 4000 W	4000 ~ 4600 W	> 4600 W

Table 10. Output Load Level LED Indicator

3-1-2-3. Inverter Status to display Fault condition

LED status Ⓒ	Status	Recovery point
Green	Normal	
Red	Over Current Protection / Over Load Protection (AC output short-circuit and over load)	
Red Blink	Under Voltage Protection (Input DC voltage under spec)	12.5V @ DC12V system 25V @ DC24V system
Red Fast Blink	Over Voltage Protection (Input DC voltage over spec)	14.5V @ DC12V system 29V @ DC24V system

LED status Ⓒ	Status	Recovery point
Orange	Device startup process abnormal	—
Orange Fast Blink	Under Temperature Protection (Heat sink temp. under -25℃)	> 0°C
Orange Slow Blink	Over Temperature Protection (Heat sink temp. over 80℃)	< 60°C (heat sink temperature)

Table 11. Inverter LED Status Indicator

3-1-3. Function Switch Introduction

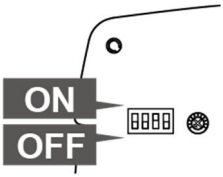


Figure 10. DIP switch ON/OFF position

3-1-3-1. Function Switch Definition

Dip Switch Ⓑ	Function
S1	Voltage select
S2	Voltage select
S3	Frequency Select
S4	Power saving ON/OFF

Table 12. Function Switch Definition

3-1-3-2. Output voltage selection (S1&S2)

Output voltage	S1	S2
100V	OFF	OFF
110V	ON	OFF
115V	OFF	ON
120V	ON	ON

Table 13. Function Switch definition: output voltage selection

Note! 100V series can be selected between 100/110/115/120VAC

3-1-3-3. Output Frequency Selection (S3)

Frequency	S3
50Hz	OFF
60Hz	ON

Table 14. Function Switch definition: Output Frequency selection

3-1-3-4. Power Saving Selection (S4)

Saving function	S4
Power Saving OFF	OFF
Power Saving ON	ON

Table 15. Function Switch definition: Power Saving selection

3-1-3-5. Power Saving Load Adjustment

User can use variable resistor (VR) to set the input and wake up power saving threshold according to the load condition, and the setting range shows below:

Ⓐ	Input Saving Power (Min)	Saving Wake up Power (Min)
TS 700W	<20 W	>40 W
TS 1000W	<20 W	>40 W
TS 1500W	<20 W	>40 W
TS 2000W	<20 W	>40 W
TS 3000W	<40 W	>60 W
TS 4000W	<40 W	>60 W

Table 16. Power saving setting range (Min)

Ⓐ	Input Saving Power (Max)	Saving Wake up Power (Max)
TS 700W	<110 W	>160 W
TS 1000W	<110 W	>160 W
TS 1500W	<110 W	>160 W
TS 2000W	<110 W	>160 W
TS 3000W	<240 W	>280 W
TS 4000W	<240 W	>280 W

Table 17. Power saving setting range (Max)

3-1-5. AC output Interface

3-1-5-1. TS Series AC output interface

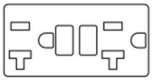
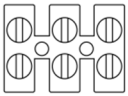
Socket Type Ⓔ	Applicable Model
 North America (GFCI)	TS12-700, TS24-700 TS12-1000, TS24-1000 TS12-1500, TS24-1500 TS12-2000, TS24-2000
 Hard Wire	TS12-3000, TS24-3000 TS24-4000

Table 18. TS Series AC Socket vs. Model

3-1-5-2. TS Series 3000W/4000W AC output interface

Terminal Ⓔ		Wire color	Wire length / gauge
AC terminal	Line (L)	Black	Within 6 feet / AWG# 100-120VAC: AWG8
	Neutral (N)	White	
FG (Ground)		Green / Yellow or Bare copper	26~32 feet / AWG# 10 ~ 8

Table 19. TS 3000W/4000W AC output wiring

3-1-5-3. GFCI connector

Recommend GFCI connector：

- HUBBELL INC WIRING DEVICE DIV, Type GF20 and GFRST20. Rated 125V, 20A
- COOPER WIRING DEVICES, Type VGF20 and SGF20. Rated 125V, 20A
- LEVITON MFG CO INC, Type 7899-W and GFNT2. Rated 125V, 20A
- PASS & SEYMOUR INC, Type 2097. Rated 125V, 20A

3-2. DC Input Side (Rear Panel) Introduction

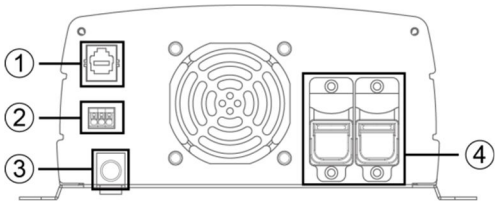


Figure 11. TS 700W/1000W DC input panel view

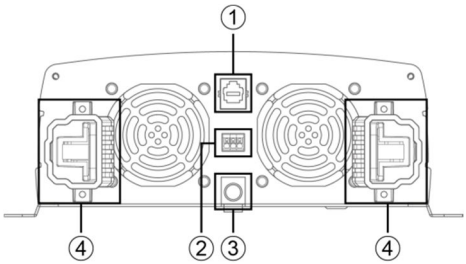


Figure 12. TS 1500W/2000W DC input panel view

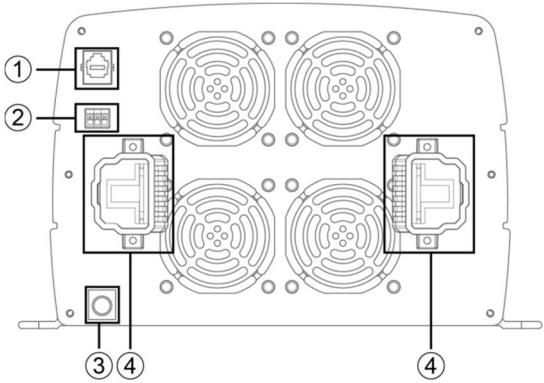


Figure 13. TS 3000W/4000W DC input panel view

Model	TS Series
①	Factory Port
②	Remote control black terminal
③	Chassis ground
④	DC input connector

Table 20. TS Series DC input side introduction

3-2-2. Remote Control Black Terminal

Remote inverter control black terminal ② may be used to control the inverter from a remote switch or source, either a POS or NEG signal can be used as shown in Figure 15.

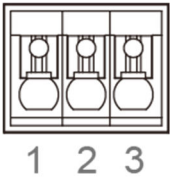


Figure 14. Remote control terminal

Item	Description
1	Enable+ (ENB)
2	Enable- ($\overline{\text{ENB}}$)
3	Ground

Table 21. Dry contact terminal definition

Note! Pin-3 is the same polarity with battery negative electrode.

Caution! Please follow the following steps for the installation

- Before installing the inverter, make sure the main switch is at "OFF" position.
- Before using the remote function, make sure the main switch pressed toward "REMOTE"
- Use 18~ 24 #AWG wire to connect the remote control terminals

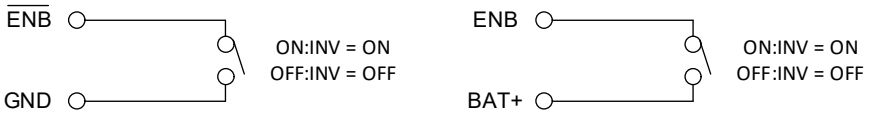


Figure 15. Wiring for control

3-2-3. General instruction before DC Input ④

3-2-3-1 Before installation:

The DC cables should be as short as possible (less than 6 feet / 1.8 meters ideally)

The size of the cable should be thick enough to limit the voltage drop to less than 2% when carrying the maximum input current to prevent frequent low-input voltage warnings, and shutdown.

The following sizes of cables and fuses are recommended distance (<6 ft.) between the batteries and the inverter.

Model	Wire AWG	Inline fuse
TS12-700	#6	≧150A
TS24-700	#10	≧80 A
TS12-1000	#4	≧225A
TS24-1000	#8	≧125A
TS12-1500	#1	≧350A
TS24-1500	#6	≧175A
TS12-2000	#1/0	≧500A
TS24-2000	#4	≧225A
TS12-3000	#4/0	≧700A
TS24-3000	#1	≧350A
TS24-4000	#1/0	≧500A

Table 22. TS Series Wiring Cable diameter and Inline Fuse

Note! Batteries are capable of providing very large currents in case of short circuit. The fuse should be as close to the positive battery terminal as possible.

3-2-4. Chassis Ground ③

Must be connected to earth ground prior to making any other connections to the equipment.

3-3. Maintenance

Make sure that the fan vents are not blocked.

Use a vacuum cleaner to remove any dust from the fan area
When cleaning the case or front panel, use a soft, dry cloth, only. If the case or front panel is very dirty, use a neutral, non-abrasive detergent. Do not use alcohol or ammonia based solutions.

Regular service, and relocation of the inverter, should be performed by a qualified service technician. Avoid spilling liquid on the inverter.

4. Operation

4-1. Connecting the DC cable

Connect DC input terminals to 12V / 24V battery or other DC power source [+] is positive, [-] is negative. Reverse polarity connection can blow the internal fuse and may damage the inverter permanently.

Warning! Make sure that all the DC connections are tight (torque to 9 – 10 ft-lbs, 11.7 – 13 Nm). Loose connections could result in overheating and can be a potential hazard.

Warning! The recommended inline fuse should be installed as close to the battery positive terminal as possible (within 18.0") failure to use a fuse on the "+" cable running between the inverter and battery may cause damage to the cable / inverter and will void warranty.

Also, only use high quality copper wire and keep the cable length short which is a maximum of 3 - 6 feet.

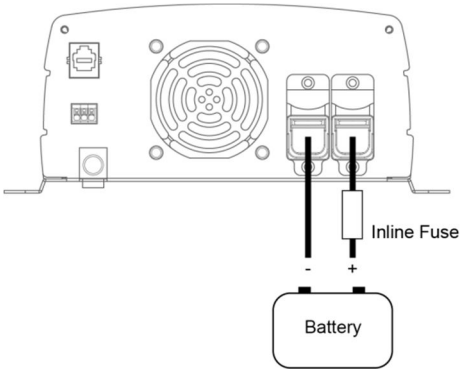


Figure 16. Battery cabling

4-2. Connecting the input power

Before making the DC input side connections ④, the main switch Ⓔ must be at "OFF".

4-3. Connecting the loads

Calculate the total power consumption of the output load. Make sure that the total power consumption does not exceed the rated power.

If the total power consumption over the rated power of the inverter, remove the non-critical: loads until the total power consumption is below the rated power.

4-4. Switch ON Inverter

Set the power switch to the "ON" position Ⓔ. The inverter will carry out self-diagnosis and, the LED's will also appear various colors. Set the power switch to the "OFF" position Ⓔ. The inverter stops and all the lights that are on will go off.

4-5. Protection Mechanism

Model	Over Voltage (DC)		Under Voltage Alarm	Under Voltage	
	Shutdown	Restart		Shutdown	Restart
12V	16.5V ± 0.3V	14.5V± 0.3V	10.5V ± 0.3V	10.5V ± 0.3V	12.5V± 0.3V
24V	33V ± 0.5V	29V ± 0.5V	21V± 0.5V	21V ± 0.5V	25V ± 0.5V

Table 23. Protection Mechanism

Model	Over temperature protection	
	Shutdown	Restart
12V	80°C	60°C
24V		

Table 24. Over Temperature Protection Mechanism

Vanner Incorporated
4282 Reynolds Drive
Hilliard, Ohio 43026
Ph: 800-AC POWER
Ph: 614-771-2718
Fax: 614-771-4904
www.vanner.com

Manual P/N: D917962-A
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