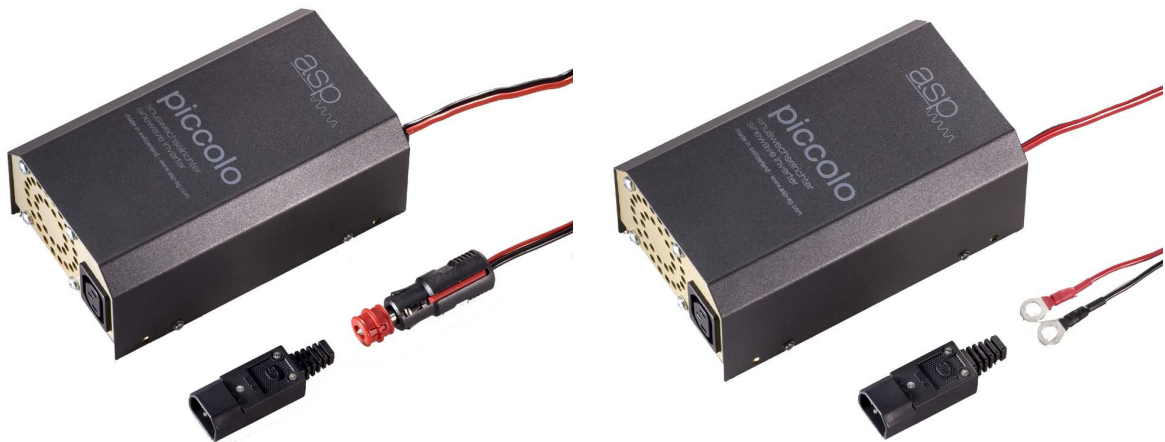


TOP CLASS „PICCOLO“

Stand alone sinewave inverter

TC1.5/12, TC2.5/24

Instructions for installation and operation



Made in Switzerland

Congratulations on your purchase of a TOP CLASS sinewave inverter. You've become the owner of the finest engineered, highest quality sinewave inverter. We have dedicated our products, our services and ourselves to the satisfaction of every customer.



This manual for installation and operation contains important information about this unit. Please familiarize yourself with all the information contained in these instructions before installing and operating this unit. This will help you to acquaint yourself properly with this unit and make full use of its advanced technical features under all operating conditions.

Should you encounter problems while installing or running this unit, please contact the dealer you purchased the unit from or a dealer authorized by ASP.

Improper assembly, installation and maintenance may impair the safety and function of this unit. For this reason make sure that you understand all the information in this manual before beginning the assembly and installation procedure.

Thank you again for choosing to become a part of the ASP family!.

Limitation of liability

Since neither the observance of these instructions for installation and operation, nor the conditions and methods of installation, operation, utilization and maintenance of the unit can be supervised by ASP, we don't assume any responsibility or liability for loss, damage or costs arising from using this unit or in any way connected with faulty installation, improper operation or incorrect utilization and maintenance.

Furthermore we don't assume any responsibility for infringement of patent rights or violations of the rights of third parties arising from the utilization of this unit.

We reserve the right to make product changes, change technical specifications or these instructions without prior notice.

Important: Please be informed that units without CE-declaration can only be used on your own liability in Europe countries. If you have an unit without CE please contact your local dealer.

WARNING! Unauthorized repairs and operation of this device for any use other than that for which it was intended will result in loss of warranty. If you have problems with the unit ASP will provide you with the authorization necessary to return or repair a unit.

Environmental protection



Recycling raw materials instead of waste disposal. This unit is built from valuable materials and is easy to recycle. The unit, accessories and packaging should be sorted for environment-friendly recycling. Please keep packaging for retransport the inverter later. To prevent damage during transport we have to use and bill you a new packaging if we receive the unit not with original packaging. Thank you.

Precautions

Warning! In this unit potential differences of up to 1000V occur during operation and can result in death or serious bodily injury. Use extreme caution while operating and always observe precautions as:

Only specially trained maintenance and service personnel are permitted to test and repair this unit. This personnel further must be familiar with this manual and all domestic regulations.



No AC-generator or power supply is allowed to connect to this unit. Connecting mains power, AC-Generator or an other inverter to AC-output will damage the unit immediately. Excess voltage applied to the inputs and outputs may result in destruction of the unit. Charging the battery with a dynamo while the inverter is connected to the battery, the inverter may be damaged.

The unit is tested by the manufacturer and it is not allowed to change anything! Without a written permission of ASP AG you will lose warranty if you repair the unit. Please refer to the warranty information.

Any work performed on this unit, its installation and electrical connection must be carried out in compliance with national electric codes and local regulations, which may deviate from those contained herein. Refer to responsible authorities for relevant information.

Operate the device only when all factory-supplied covers are available and in place.

Temperatures at the heat sink of the device may be as high as 80 degrees C during operation. Obstruction of the ventilation of the unit may result in overheating and thus in failure of the unit. Always keep the unit and the ventilation slots clean. Do not cover up or place any item on ventilation holes or cooling components.

Please note the permissible ambient conditions for operating the unit.

Automatic restart of the unit may occur after fault clearance.



Do not use any measuring equipment damaged or defective.

Contact with energized parts can result in serious or fatal injury. Please note that, even under excessively light load or in stand by operation, high voltage can be present at the AC-output.

Maintenance and Spare parts

This unit is maintenance-free.

Should malfunctions of the unit occur despite these inspections, the unit must be returned to the manufacturer for repair. Original spare parts are only available from ASP. ASP will provide you with the authorization necessary to return a unit for repair. Before you call please prepare you for the following questions: Type of unit, DC-voltage, date of purchase, kind of fault, connected loads.

1. Unpacking the unit

Please check if the unit has no visible damage. If the unit is damaged you must inform your dealer within 3 days after receiving the unit.

2. Function, technology

This inverter is designed to convert DC-battery voltage (direct voltage) to 230V AC (sinusoidal alternating voltage). Voltage controlled, the inverter provides a stabilized, crystal-accurate alternating voltage (different voltages and frequencies refer to the indication label). With a sinewave inverter almost any type of electric consumer may be connected as for example energy saving lights, fluorescent tubes, computers, Radio- and HIFI-equipment and other household appliances.

Due to a high degree built-in safety, excellent dynamic response, a surge-proof and overload-proof output, it is very simple to operate a broad range of applications.

The "heart" of the inverter is a very powerful RISC-microprocessor of the latest generation. This microprocessor is responsible for the real time computing of the output sinewave shape, for the process control of the output voltage, for the supervision of the battery (dynamic) and the inverter temperature.

The power stage features modern Power Mosfet transistors. These transistors are the key to the high partial-load efficiency and superb overload capability. The power transistors are protected by independent intelligent protection circuits. The inverter is further more protected against DC-overvoltage (static) and short circuit on AC-output.

The superb toroidal transformer has very low magnetic losses, high efficiency and a very low RFI-radiation level. The transformer design provides a high efficiency over a wide operating range. No electrical connection between DC-input and AC-output due to the transformer. It complies with the following guidelines: IEC 742, EN60742, VDE 0551 TI, SEMLO 9742.

3. General information

Always check the power draw of your appliances. Electrical equipment as motors, pumps, compressors stc. need more power while starting up. Start up power draw can be much higher than Pnom. For this applications the inverter is able to supply surge power for a short time.

If ambient temperature is higher than 20 degrees C, Pnom and overload capability of the inverter will be reduced.

4. Installation

The selection of a safe location for installing the inverter depends on the following criteria:

- ◆ Check indication label for correct DC-Voltage and AC-Voltage.
- ◆ The inverter can be used in any position.
- ◆ Protection from unauthorized access in particular of children.
- ◆ Dry, dust free surroundings (max. 95% humidity, not condensing).
- ◆ You must not remove the connector on the DC-wire or change the wire.
- ◆ Adequate ventilation. Keep min. 10cm distance to other objects (except mounting side)
- ◆ Battery capacity must be at least 50Ah. No other DC-units are allowed at the same battery

5. Connecting the inverter

Note: Inbuilt, large capacitors will hold DC-Voltage for extended periods. They still can have DC-Voltage even when you disconnected the DC-Cables from the battery!

First make AC-Connections. Use the enclosed connector. An additional AC-Circuit breaker (size refer to datasheet) has to be installed. We recommend to install a earth leakage protector for protection of personnel. Please observe domestic regulations when making connections!

The DC-Cables must not be changed!

Be sure polarity is correct:

RED = battery positive, BLACK = battery negative

Applying of wrong polarity can damage the inverter.

NOTE: Some cars have positive battery on the cabin.

If you have such a car check for correct polarity of the DC-Connector.

Negative battery cable is connected to the enclosure of the inverter. The earth pole of the inbuilt socket is internally connected to the enclosure of the unit. Nor phase or neutral is connected to the enclosure. The AC-Output is isolated from DC-Input.
Check again to make sure all cables are securely connected. The inverter is now ready to operate.

6. Information for operation



Protect your inverter from rain. The unit is not designed to be used outdoor.

The inverter is short circuit protected at the AC-Output.

DC input of the inverter is monitored for overvoltage and undervoltage.

The upper limit is static. If DC-Voltage is too high the inverter will switch off. Automatic restart follows after DC-Voltage is in the normal range.

The lower limit is dynamic (cut off voltage is lower if a big load is in use). This allows an optimal use of the battery capacity and protects your battery during small load operation.

Important: If the inverter has switched off automatically it still needs very little power from the battery!

Important: Do not connect Piccolo12 to 24V-battery. The unit will be destroyed immediately.

7. Status LED-display

A double color LED is located at the rear side of the inverter.

LED green

The inverter is ON. The output voltage is 230V/50HZ AC.

LED flashing red
circuit

The inverter has switched off because of low battery, short or overtemperature. Every 20 seconds the unit tries to restart.

Important: Each time a fault occurs the inverter restarts automatically after 20 seconds or if the parameters (for example temperature) are back in normal conditions after a fault. Time before the unit starts again can be from a few seconds to a few hours! Always disconnect the unit if you work at your system or electric consumer.

8. Warranty (short form)

Dear Customer,

Thank you for buying this ASP product.

In the event that your ASP product needs guarantee service you should return it to the retailer from whom it was purchased.

We guarantee TOP CLASS appliances in accordance with statutory/country-specific regulations (proof of purchase by invoice or delivery note).

Damage attributable to normal wear and tear, overload or improper handling will be excluded from the guarantee.

In case of complaint please send the unit with the original packaging, undismantled to your dealer or an ASP service centre for inverters. Please be aware of the information we need to repair the unit as soon as possible (page 3, Maintenance and Spare parts).

ASP AG is not responsible for costs arising for transport of the unit or damage that occur if the unit is out of service. If you wish we will send you our complete documentation about our guarantee terms.

9. Technical data

TOP CLASS "PICCOLO"	TC1.5/12	TC2.5/24
Inverter		
Rated Voltage UDC _{IN}	12V	24V
Input Voltage Range	10.5 ... 16.0V DC	21.0 ... 32.0V DC
Dynamic Low Voltage Cut Off (depending on load)	10.5 ... 9.0V DC	21.0 ... 18V DC
Rated current IDC _{IN}	14A	12A
Current IDC _{IN} max.	32A	37A
Rated Power P ₁₀ (10 min at T _A =20°C)	195VA	350VA
Rated Power P ₃₀ (30 min at T _A =20°C)	180VA	330VA
Continuous Power P _D	150VA	300VA
Rated Output Voltage UAC _{OUT}	230V AC, ± 5% (short circuit proof)	
Output Frequency	50Hz, ± 0.5% (true sinewave)	
Rated Output Current IAC _{OUT}	0.7A	1.1A
Short Circuit Current IAC _K (max. 0.5s)	2A	3A
Allowable CosPhi	0.3 ... 1	
Efficiency Factor max.	92%	93%
Consumption 230V AC OK	2.5W	3W
Reset after Short Circuit	every 60s	
Reset after Overload	every 60s	
Reset after Overtemperature	automatically after reaching semiconductor temp. +45°C	
Reset after Battery Failure	automatically after reaching UDC _{IN}	
General data		
Ambient Temperature range	-25°C ... +60°C (max. 95% rH, not condensing)	
DC- Breaker / fuse	no	no
Remote control ON / OFF	no	no
Status indication	LED	LED
Alarm contact (insulated Relay contact)	no	no
Toroidal Transformer (galvanically isolated)	IEC742, VDE0551	
Temperature and Load controlled fan	ON 55°C / OFF 45°C, P _D >80%	
RS-232 Interface	no	no
Dimensions (L x W x H)	190 x 110 x 75 mm	
IP Protection	IP20	
Included in delivery	connector for non-heating apparatus	
Weight	1.8 kg	2.5 kg
Warranty	2 years	

Technical changes reserved (02/2003)