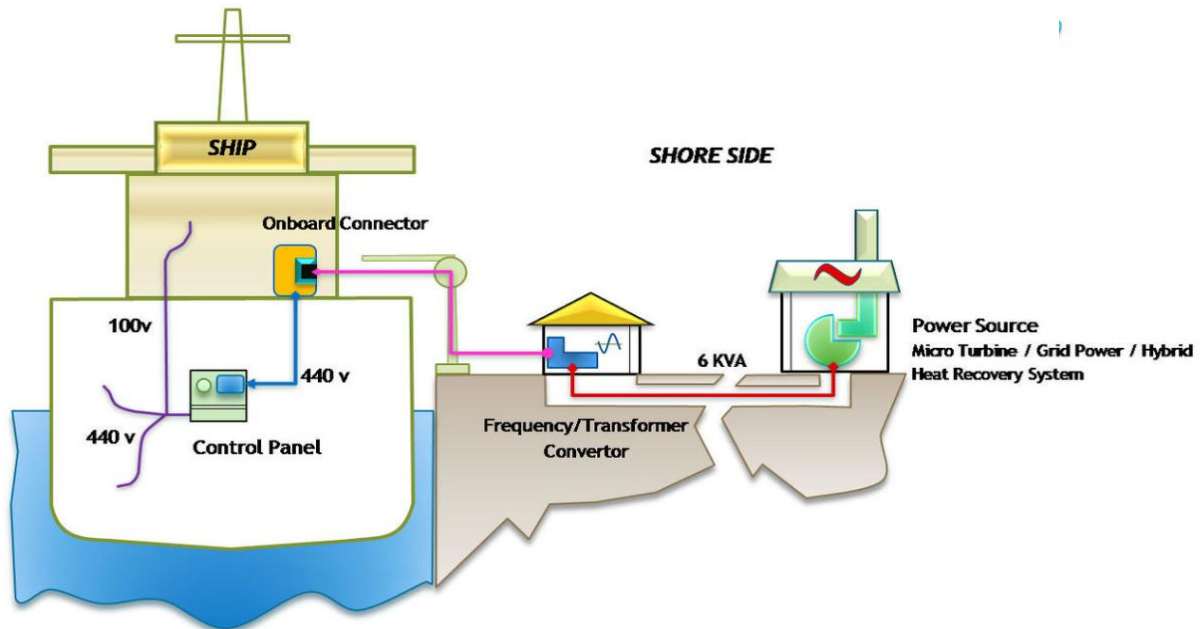


AC Shore power supply



* The rapid development of global ports for vessels.



*The IMO (International Maritime Organization) -2050 target calls for a reduction in total annual greenhouse gas (GHG) emissions of at least 50% by 2050



*Low maintenance cost to reduce the hours of auxiliary generator.

AC SHORE POWER SUPPLY

ACSOON ACF60W Series AC Shore Power Supply /Marine Static Frequency Converter is used as power source to provide clean, stable and reliable AC Power for the ship and vessel. Fully compatible with different ambient conditions of dockside power source worldwide. ACSOON as the industry leading power solution's provide, ACSOON AC Shore Power Supply has the ability to operate into a fully imbalanced load while maintaining the precise regulation of all output phases. ACSOON marine frequency converter integrates IGBT SVPWM proven technology and combines microprocessor and PLC control design together for quick response and higher reliability, controlled by digital signal processor to create a pure output sine wave. ACSOON ACF60W series marine static frequency converter complying with shore power supply regulations.

ACSOON marine static frequency converter utilizes the advanced technology to build the most cost effective shore power supply, The flickering lights, black-outs and fluctuations of voltage and frequency in the marina dockside power are not allowed, the ACF60W marine static frequency converter always delivery clean, stable and reliable power source to vessel ship. Onboard loads imbalance, input power factor and harmonics would reduce the available power from the dockside to the ship, but ACSOON ACF60W successfully resolved these problems and improves most power to be available.



Containerized Type



Indoor Type

ACF series Shore Power Supply comprises indoor and outdoor types, with max power capacity of 4MVA. It has the latest technology of shore power supply connection and control, it can be paralleled as well. It is currently a high-quality and cost-effective shore power supply equipment at home and abroad.



Containerized static frequency container



static frequency converter built inside of container



Container with air-conditioning ventilation system and lighting system



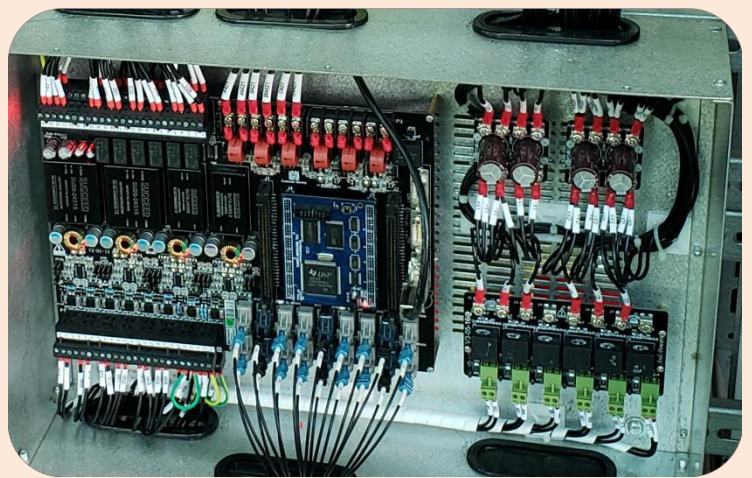
AC for heat dissipation



HV/LV cable cabinet



HMI and monitoring system



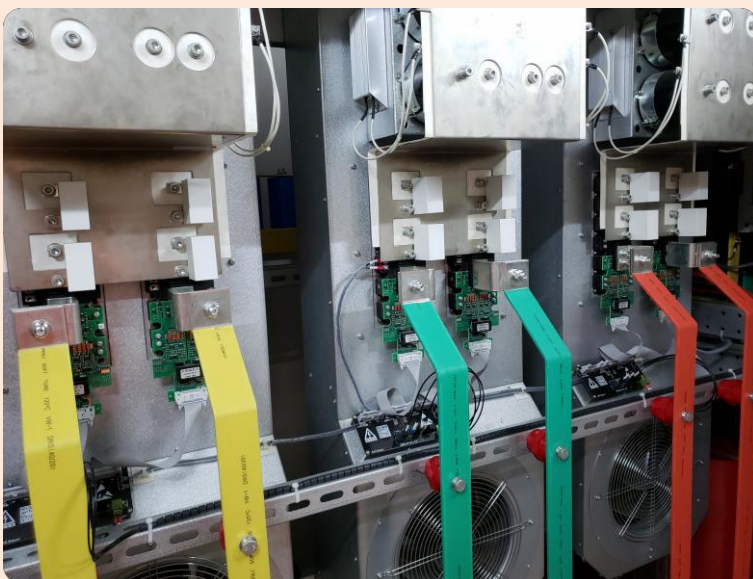
Frequency converter Main control unit



Converter Image Reference



Rectifier Module



Inverter Power Module



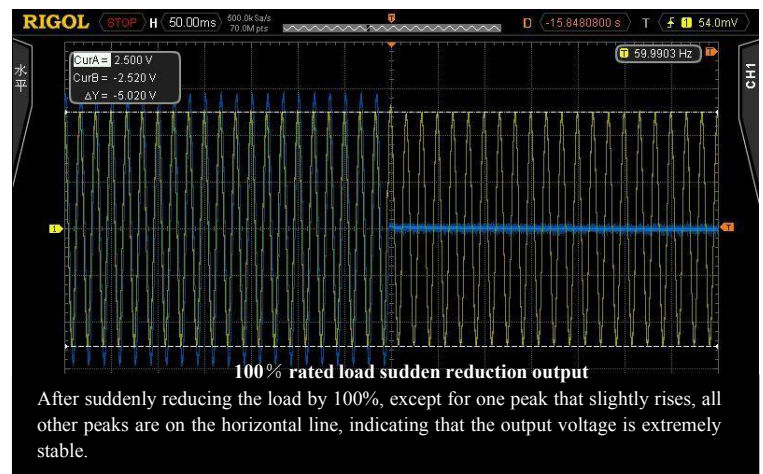
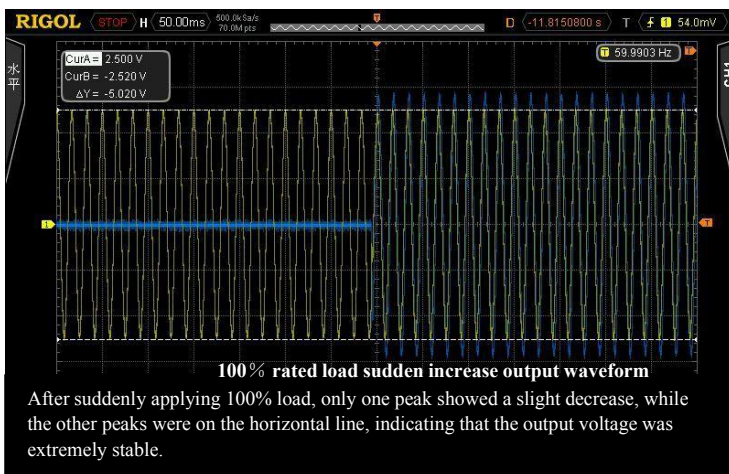
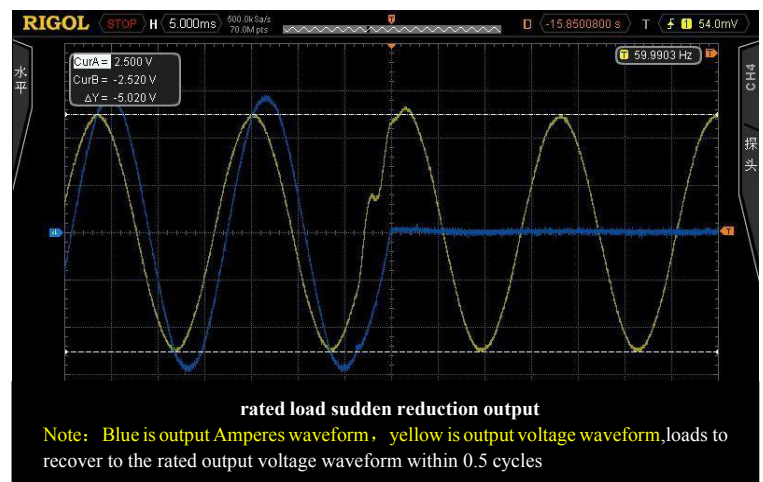
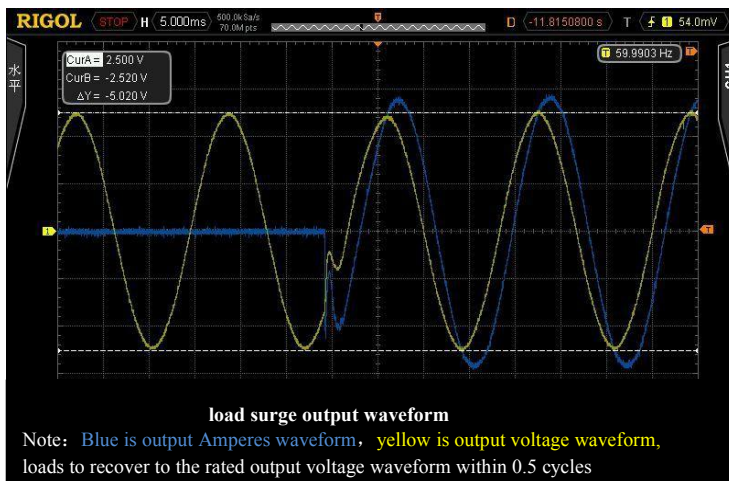
HV / LV Transformers

Instantaneous output voltage waveform control technology

The instantaneous output voltage waveform control technology is a major technical process of the output voltage regulation control technology in the industry. When the inverter switching frequency is on 3.6KHz, sinusoidal voltage waveform is adjusted up to 60 times for each fundamental wave period in circle, improves the response speed and dynamic and static voltage regulation precision of the output voltage regulation control, and improves the power quality of the output power supply. Especially for the complex load microgrid, it has the important performance characteristics of low equivalent output short-circuit impedance.

Highlights

- Output voltage fluctuation $\leq 0.5V$ under no-load and with load.
- Instantaneous change of output voltage (sags and swells) $\leq \pm 3\%$ when the 100% rated load is suddenly added/reduced by impact load, the rated output voltage is restored within 0.5 fundamental cycles (8ms). Greatly reduce the instantaneous change of output voltage and voltage flicker phenomenon.
- The output voltage adjustment response is nearly 120 times faster than the traditional best voltage RMS feedback regulator. Greatly improve the output power quality, especially when the power supply carries higher current consumption loads such as motors.
- it can effectively prevent the misoperation and voltage flicker phenomenon to instantaneous voltage fluctuations, which is important for the application of Marine power.



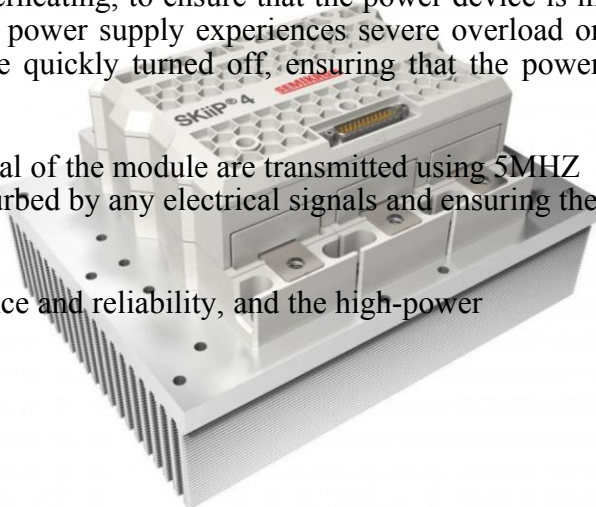
High capacity Switching Power Module Inversion: The ACF series AC shore power supply equipment uses high-power IGBT switch power modules / IPM intelligent power switch modules. Each phase only requires one or two power modules to be connected in parallel to easily form a megawatt level three-phase inverter, greatly reducing the number of power switch devices and the parallel circulation between power switch devices, and improving the reliability of high-power inverter.

The high-power switch power module is equipped with optimized driving and control circuits, as well as fault detection and protection circuits for over voltage, over current, and overheating, to ensure that the power device is in the optimal driving and protection state. When the variable frequency power supply experiences severe overload or direct short circuit at the output end, the power switch device can be quickly turned off, ensuring that the power switch device will not be damaged.

The PWM drive isolation of the power switch module and the fault signal of the module are transmitted using 5MHZ high-speed optical fiber, ensuring that the PWM drive signal is not disturbed by any electrical signals and ensuring the integrity of the PWM drive signal.

The high-power switching power module has extremely high performance and reliability, and the high-power switching power module

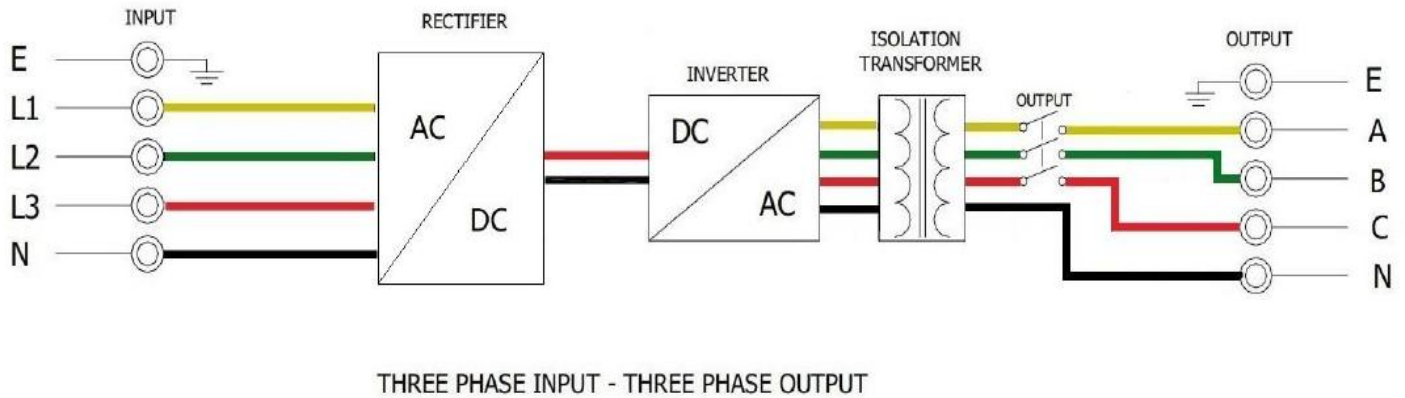
The MTBF can reach over 2 million hours.



SPECIFIED AC SHORE POWER SUPPLY INPUT & OUTPUT POWER SYSTEM

Capacity	Input Power		Rectifier	Output Power	
400kVA	380V-690V,10KV, 20KV...	50Hz/60hz	6 Pulse / 12 Pulse	440V-690V,6.6KV, 11KV...	60Hz/50hz
630kVA	380V-690V,10KV, 20KV...	50Hz/60hz	6 Pulse / 12 Pulse	440V-690V,6.6KV, 11KV...	60Hz/50hz
800kVA	380V-690V,10KV, 20KV...	50Hz/60hz	6 Pulse / 12 Pulse	440V-690V,6.6KV, 11KV...	60Hz/50hz
1000kVA	380V-690V,10KV, 20KV...	50Hz/60hz	6 Pulse / 12 Pulse	440V-690V,6.6KV, 11KV...	60Hz/50hz
1250kVA	380V-690V,10KV, 20KV...	50Hz/60hz	6 Pulse / 12 Pulse	440V-690V,6.6KV, 11KV...	60Hz/50hz
1600kVA	380V-690V,10KV, 20KV...	50Hz/60hz	6 Pulse / 12 Pulse	440V-690V,6.6KV, 11KV...	60Hz/50hz
2000kVA	380V-690V,10KV, 20KV...	50Hz/60hz	6 Pulse / 12 Pulse	440V-690V,6.6KV, 11KV...	60Hz/50hz
3000kVA	380V-690V,10KV, 20KV...	50Hz/60hz	6 Pulse / 12 Pulse	440V-690V,6.6KV, 11KV...	60Hz/50hz
4000kVA	380V-690V,10KV, 20KV...	50Hz/60hz	6 Pulse / 12 Pulse	440V-690V,6.6KV, 11KV...	60Hz/50hz

Circuit Block Diagram for ACSOON three Phase SFC



The containerized static frequency converter is to be used as Shore Power Supply. The static frequency converter shall be housed in me with IP65 protection container, the Air Conditioners, Light Systems and Ventilation systems were built in the container. The cabinet of converter shall be an upright, free standing, steel cabinet with removable side covers, The cooling fans shall be provided as per manufactures' standard and hinge mounting front door. The construction and layout shall be kept such that there is an easy access to any component in the equipment. Transformer are mounted on the bottom plate of the cabinet. The terminals for Mains Input & Output cabinet boxes are provided on the one side of the Container. Cable entry from the Mains Input & Output cabinet boxes.

General Data Sheet

INPUT	
Power System	3P3W or 3P4W
Nominal Input Voltage	380V~690V
Voltage Tolerance	$\pm 15\%$
Nominal Frequency	50Hz / 60Hz, $\pm 10\%$
Power Factor	6 -pulse rectifier ≥ 0.85 , 12 -pulse rectifier ≥ 0.9
OUTPUT	
Power System	3P4W or 3P4W+PE
Nominal Output Voltage	440V~690V
Nominal Frequency	50Hz / 60Hz
Voltage Regulation & Stability: Static: $\leq \pm 0.5\%$ FS ; Dynamic : $\leq \pm 1\%$ FS	
Voltage display accuracy	$\pm 1\%$
Frequency disp accuracy	$\pm 0.1\%$
Frequency Stability	$\pm 0.1\%$ FS
Digital Display	10" LCD displaying panel HMI (resolution : 1024*600 HD) : Display three-phase voltage, frequency, current, power, power factor and parameters setting etc.
Manual buttons on panel	Run and reset (stop), phase changeover button, power (watt)
Voltage Imbalance	Output Voltage Imbalance rate among 3 Phase $< 1\%$, Phase angel among 3 Phase 120° ($\pm 0.1^\circ$)
Overall Efficiency	$\geq 85\%$ or $\geq 90\%$
Crest Factor	1.414 ± 0.1
Protection	Phase sequence error, phase loss (three-phase imbalance), under voltage, over voltage, over current, short circuit, over heat and alarms
Distortion	THD $\leq 5\%$ @linear load
Overload Capacity	125% 60s, 150% 10s
IP Class	Standard IP20/IP21 indoor, IP65 outdoor
MTBF	50,000 Hrs
Cooling	Forced-air cooling
Humidity	10-95%
Noise	Less than 70dB within 1 meter
Operating Temperature	-10 to 45°C
Altitude	≤ 2000 m
Weight & Dimension	As per manufacturer's specific configuration