

Chapter 1. Safety Precautions

- ◆ Before use, carefully read this manual and follow the instructions step by step.
- ◆ Keep this manual in a safe location near the machine for easy reference.
- ◆ Do not use accessories not recommended by the manufacturer to avoid hazards.
- ◆ Handle the machine with care during transport to avoid collisions.
- ◆ Do not place the machine on uneven or sloped surfaces.
- ◆ To maintain proper heat dissipation and normal operation, do not block any vents or openings. Keep the rear of the machine at least 10 cm (4 inches) away from walls to ensure unobstructed airflow.
- ◆ Before connecting the power cord to the power source, verify the power specifications to prevent damage to the machine. When connecting the power cord to the input and output terminals, ensure it is securely fastened to avoid poor contact and prevent electric shock.
- ◆ Installation standards vary depending on the machine's capacity and input voltage. Select the appropriate configuration based on capacity and input voltage, and ensure the wire gauge meets specifications.
- ◆ Do not place heavy objects on the power cord. Secure the cord properly to prevent tripping hazards.
- ◆ Do not overload the power cord to prevent electric shock or fire hazards.
- ◆ During installation, strictly adhere to electrical regulations.
- ◆ Avoid overloading to prevent machine malfunction.
- ◆ If the machine exhibits abnormal behavior, follow the troubleshooting procedures.
- ◆ Keep the machine clean and free of debris.
- ◆ Prevent any liquids or foreign objects from entering the machine to avoid electric shock or fire due to poor contact or short circuits.

● Avoid using the machine in the following environments:

- ❖ During storms, lightning, or thunder, it is best to unplug the power cord.
- ❖ Avoid placing the machine in direct sunlight, rain, or humid areas.
- ❖ Keep away from fire sources and high temperatures to prevent the machine from overheating.

- ❖ When moving or servicing the machine, turn it off and disconnect the power cord first.

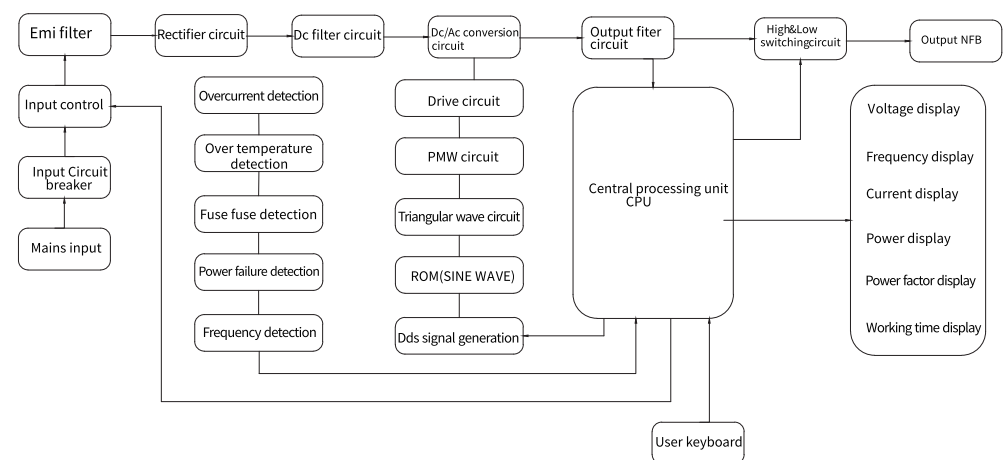
Chapter 2. Working Principle

The multifunctional static frequency converter is a standard AC power supply device capable of simulating power standards from countries worldwide. It accepts a single AC voltage and frequency input, which undergoes AC-to-DC and DC-to-AC conversion internally. It then generates a highly stable, pure sine wave output, providing a high-performance power source capable of displaying multiple parameters (e.g., voltage, frequency, current, apparent power, power factor, etc.).

This series of products employs advanced PWM (Pulse Width Modulation) technology, enabling compact size, lightweight design, and high efficiency. Digital signal processing technology delivers high-precision, high-speed measurement capabilities for voltage, frequency, current, apparent power, and power factor. Utilizing high-power IGBT modules reduces circuit complexity, enhances product stability, and minimizes power loss. Multiple ultra-isolation transformers completely isolate mains power from the load, boosting overall functionality and superior testing performance while ensuring measurement accuracy.

The series offers voltage settings from 0-300V and frequency ranges from 40-120Hz (120Hz-499.9Hz optional), with programmable dial settings suitable for testing general commercial electronic appliances.

Product Schematic Diagram



Chapter 3. Product Introduction

Product Features

- Provides standard voltages and frequencies from around the world for simulating tests on various electrical products.
- Utilizes advanced Direct Digital Frequency Synthesis (DDS) waveform generation technology for high frequency stability, excellent continuity, and more accurate measurements.
- Simultaneously displays voltage (V), frequency (Hz), current (A), active power (kW), power factor (PF), apparent power (S), and total power.
- Input and output are constructed using isolation technology.
- High overload capacity, capable of withstanding 300% of rated current for short durations. Features overcurrent, overtemperature, short-circuit, and instantaneous power failure protection with warning devices.
- Suitable for resistive, capacitive, inductive, and other mixed loads.
- Display and control via a 7-inch full-color touchscreen.
- Visual real-time monitoring automatically identifies and records fault causes during alarms, facilitating test analysis and providing real-time observation of operating curves.
- Configurable current and power upper limits with corresponding alarm functions.
- 50Hz/60Hz/110V/120V/220V/240V -quick free combination function.
- Voltage and frequency modification during output operation with power-off memory function.
- Program variable settings: 30 memory groups, configurable for different voltage, frequency, voltage rise time, and test duration requirements, supporting up to 999 continuous cycles.
- For life testing of test subjects, set test execution time units in seconds, minutes, or hours as needed.
- Time pause function: Can pause during a set cycle output state; restarting the power supply continues the cycle as set.
- Features soft-start capability with configurable voltage ramp-up time to prevent damage from inrush currents during load startup (e.g., motors).
- Standard RS485/232 communication interface and analog control methods are provided. Custom output voltage is available, adjustable from 0-1000V, with output frequency ranging from 5-1000Hz.

Application Areas:

1. Export product testing:
 - A. Simulates power conditions at the product's intended export destination.
 - B. Standardized specification verification.
 - C. Interference-free operation enables product functionality upgrades.
 - D. A valuable R&D tool, enabling effortless international power testing.
 - E. Standardized product specifications with flawless manufacturing processes.
2. Quality Certification:
 - A. Standardized product specifications drive industrial advancement.
 - B. Certified standard power supplies compliant with global standards.
 - C. Pure sine wave—the essential tool for establishing power supply standards.
3. Specialized power supplies for precision instruments:
 - A. High-precision instruments require dedicated power supplies to fully realize all functionalities.
 - B. Factory-wide equipment output and pre-simulation promote full functionality of equipment.
 - C. Dedicated power supply for barrier-free manufacturing equipment.

Application Areas:

Laboratory standard power supplies	Air conditioner/compressor testing.	Monitor testing
Manufacturing plants (quality assurance/control /Lifetime Testing) units.	Air conditioning equipment testing.	Transformer/TRIAC/SCR , and other component testing.
Switching Power Supply Test Dedicated Power Supply	Motor equipment testing.	Fluorescent ballast testing.
Testing of various motor products	Copier, scanner, and OA product testing	
Ideal power supply for R&D units.	Calculator equipment testing	

IV. Product Inspection

Each static frequency converter undergoes functional testing prior to shipment. Upon receiving the static frequency converter, please unpack it and perform the following inspection steps:

■ Unpacking:

The static frequency converter is packaged in a wooden crate containing:
One static frequency converter

One input power cord (for 500VA & 1KVA models only) Operating manual and warranty card

■ Visual Inspection:

Verify that the model and capacity of the static frequency converter match the ordered specifications. Record the information here.

Inspect the static frequency converter for any external damage. Improper handling during transportation may cause damage. If any defects are found, do not apply power. Contact your local service center or dealer immediately for assistance.

Nameplate Specifications:

Product Name:

Model:

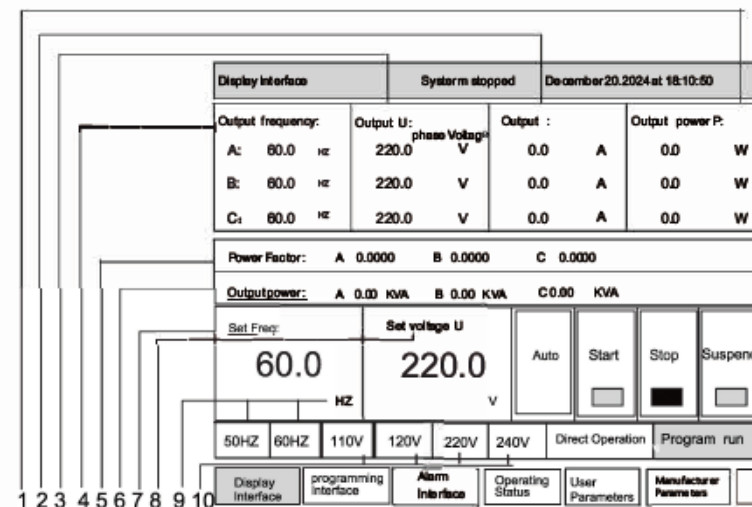
Capacity:

Input:

Output:

Serial Number:

Chapter 4. Panel and Function Description



- 1): Power Display Window: Shows current active power;
- 2): Current Display Window: Shows the current load current;
- 3): Voltage display window, showing the current output voltage;
- 4): Frequency display window, showing the current output frequency;
- 5): Power factor window, displaying the current load power factor;
- 6): Power display window, showing the current apparent power;
- 7): Output Frequency Setting Window: Click to set the output frequency;
- 8): Output voltage setting window, click to set output voltage;
- 9): Output frequency quick-change key;
- 10): Output voltage quick-switch key;

- ◆: High/Low/Auto Switch—Quickly toggles between high and low output voltage in standby mode;
- ◆: Start key—Activate the power supply from standby mode;
- ◆: Stop Key—Stops output during operation;
- ◆: Pause button—Stops output during cycle mode;
- ◆: Operating Mode: ► Programmed Operation—Output voltage/frequency set by program, 30 groups of arbitrary cycles
► Set Operation --- Continuous fixed output at preset voltage/frequency

Chapter 5. Operation Procedure

I. Setting the Operating Mode

1. Turn on the power input circuit breaker; the power supply enters standby mode.

- 1) Press the "Direct Set Operation" key to enter constant-value output mode.
- 2) Modifying Output Frequency in Standby Mode: Press the "Set Frequency" key to modify any output frequency within the range. As shown below, press Enter to save after setting.

Please Enter: 40. 0-400			
			60.0
7	8	9	Clr
4	5	6	←
1	2	3	Esc
.	0	-	Enter

3) Modifying Output Voltage in Standby Mode: Press the "Set Voltage" key to modify any output voltage within the range. As shown below, press Enter to save after setting.

Please Enter: 0. 0-300			
			220.0
7	8	9	Clr
4	5	6	←
1	2	3	Esc
.	0	-	Enter

- 4) 50Hz/60Hz Quick Switch: Rapidly toggle frequency while the power supply is in standby mode.
- 5) 110V/120V/220V/240V Shortcut Keys: Quickly switch output voltage while the power supply is in standby mode.

2. After setting completion, powering on the unit will output the voltage and frequency at the fixed set values.

II. Programmed Operation Mode

1. Turn on the power supply input circuit breaker to enter standby mode. Press the "Program Run" key to enter cyclic output mode, where output voltage and frequency cycle through preset parameters. Press the "Program Interface" key to access the built-in 30 memory groups, as shown below.

Programming Interface		The system has stopped.		December 20, 2024 18:09:52	
1, voltage:	120.0 V	Frequency	50.0 HZ	voltage slew Rate:	100 v/second
				Number of cycles	0
Jump direction	Now to the next step	Jump condition	Latency	Latency:	0 Hours 0 Minutes 10 seconds
2, voltage:	220.0 V	Frequency	60.0 HZ	voltage slew Rate:	100 v/second
				Number of cycles	0
Jump direction	Now to the next step	Jump condition	Latency	Latency:	0 Hours 0 Minutes 10 seconds
3, voltage:	110.0 V	Frequency	70.0 HZ	voltage slew Rate:	100 v/second
				Number of cycles	0
Jump direction	Now to the next step	Jump condition	Latency	Latency:	0 Hours 0 Minutes 10 seconds
4, voltage:	230.0 V	Frequency	80.0 HZ	voltage slew Rate:	100 v/second
				Number of cycles	0
Jump direction	Now to the next step	Jump condition	Latency	Latency:	0 Hours 0 Minutes 10 seconds
5, voltage:	120.0 V	Frequency	0.00 HZ	voltage slew Rate:	100 v/second
				Number of cycles	0
Jump direction	Now to the next step	Jump condition	Latency	Latency:	0 Hours 0 Minutes 10 seconds
Display Interface	Programming Interface	Alarm Interface	Main Menu	Permission	Next page

2. Memory Group Settings
 - 1) Press the voltage key to modify the output voltage.
 - 2) Press the frequency key to modify the output frequency.
 - 3) Voltage Ramp Rate: Represents the time required to rise to the set output voltage within the specified time, measured in "seconds".
 - 4) Cycle Count: Sets the number of program cycles, with a maximum of 999 cycles. Setting to 0 enables infinite cycling.
 - 5) Jump Direction: "Go to Next" indicates sequential downward cycling. One click on "Go to Next" switches to "Return to First Segment Cycle". Double-clicking switches to "End," indicating the cycle stops at this segment.
 - 6) Delay: Sets the dwell time per segment. Maximum values: 99 hours, 59 minutes, 59 seconds.
Clicking "Delay" switches to "Output Terminal" mode, enabling external switch control.
 - 7) Pause: During programming or operation, press the "Pause" button on the display to halt output. After powering on, the cycle resumes according to the preset program.
3. After completing settings, return to the display interface and turn on the power to start cyclic output.

Chapter 6. Main Menu

- I. Display Interface: Click to return to the display interface.
- II. Programming Interface: Click to enter programming mode.
- III. Run Curve: Click to view the output run curve.
- IV. Operating Status: Tap to view device ID, factory date, control program version, interface version, device runtime, device loading time input status, and output status.
- V. Alarm Interface:
 - 1) When an alarm occurs during power supply operation, this interface displays the current alarm cause and historical alarm records.
 - 2) If the power supply triggers an alarm due to overcurrent, it cannot be started from the display interface. Click the "Alarm Reset" button to start the power supply.
 - 3) Click the "Clear Alarm Log" button to erase all historical records at once.
- VI. User Parameters:
 - 1) Direct Voltage Ramp Slope Setting: Configure the voltage increase per second during operation.
 - 1) High/Low Speed Mode Selection: Choose from three modes: Auto Switching / Forced High Speed / Forced Low Speed.
 - 3) Voltage Display Option: Not configurable for single-phase products.
 - 4) Frequency Display Selection: Not configurable.
 - 5) Current Alarm Upper Limit (High Range): The power supply will alarm when the current reaches the set value during loading.
 - 6) Capacity Alarm Upper Limit (Single-Phase): When the power reaches the set power during loading, the power supply will alarm.
 - 7) Current Upper Limit Alarm (Delayed): When the load reaches the set current value during power loading, an alarm sounds after the preset delay time.
 - 8) Capacity Upper Limit Alarm (Delayed): When the load reaches the preset capacity value during power loading, an alarm will sound after the preset time.
 - 9) System Date: Displays the current date.
 - 10) System Time: Displays the current time.
 - 11) Communication Address: Configurable.
 - 12) Communication Format: Not configurable.

Remarks: After setting completion, return to display desktop and enter power supply standby state.
- VII. Manufacturer Parameters: Used by the manufacturer for debugging and modifying device parameters. Not user-configurable.
- VIII. Permission Management: Used by the manufacturer for debugging and modifying device parameters. Not user-configurable.

Chapter 7. Installation

The installation environment of the static frequency converter directly impacts its normal functionality and service life. Therefore, the operating environment must meet the following conditions:

1. Handling/Relocation:

- Power off the unit first and disconnect all power cables.
- Do not move the machine upside down.
- Handle with care during transport; avoid impacts.

2. Placement

- Do not place on uneven or sloped surfaces.
- Avoid direct sunlight, rain exposure, or humid environments.
- Keep away from fire sources and high temperatures to prevent overheating.
- Prevent exposure to oil mist and salt corrosion.
- Prevent dust, lint, and fine metal particles from entering.
- Place the static frequency converter in a well-ventilated location with at least 10 cm clearance from the wall at the rear to maintain airflow through the intake vents.
- Operating environment temperature: 0°C to 40°C, humidity: 0% to 90% (non-condensing).
- Avoid placement in areas containing corrosive gases.

Chapter 8. Installation Instructions

I. Wiring Precautions:

- Verify that the model and capacity of the static frequency converter match your ordered specifications.
- Check if the static frequency converter has been damaged during transportation. If damaged, do not connect it to the power supply.
- Before connecting the power cord to the input power source, verify the power specifications to prevent damage to the static frequency converter. Refer to the specifications on the rear panel before installation.
- Installation standards vary based on the static frequency converter's capacity and input voltage. Select wiring methods according to capacity and input voltage, paying particular attention to ensuring the wire gauge meets specifications.
- Verify the input voltage before use.
- Follow electrical code regulations when wiring. Refer to the "Wire Gauge Reference Table" for guidance. Avoid connecting the static frequency converter's input terminals to the same circuit breaker as other equipment. should not share the same switch with other equipment and should be located as close as possible to the mains power supply.
- Use O-type terminals for wiring connections. When wiring input and output terminal blocks, ensure power cables are securely connected and screws are tightened to prevent poor contact and electric shock.
- For both single-phase and three-phase static frequency converters, ensure correct power polarity during wiring.
- Turn off the power supply before wiring. Never work on live circuits to ensure safety.
- Refer to page 13 for grounding system requirements.
- Turn the 10-turn output voltage knob to its minimum setting by rotating it counterclockwise to the lowest position.
- Before connecting the power supply, set all switches to the "OFF" position to ensure the equipment is not damaged.

- During wiring, check all plugs and sockets at the terminals for looseness to prevent electrical hazards due to poor conductivity.
- After installation, ensure the equipment specifications fully match the power supply system specifications before connecting the power source. Verify the wiring is correct before turning on the power.
- Do not reverse the input and output power connections.
- The semiconductor components on the internal control board are susceptible to damage from static electricity. Do not touch the control board.
- The operating environment and wiring practices for static frequency converters directly impact their normal functionality, service life, and even safety. Therefore, installation and wiring must strictly follow the above requirements and instructions.

II. Power Polarity Identification Method:

1. **Live Wire Line:** Voltage between the line and either the ground wire or neutral wire (i.e., line-to-line voltage). Depending on specifications, this may include 173V, 190V, 200V, 208V, 220V, 230V, 240V, 380V, 400V, 415V, 440V, 480V. This applies to three-phase three-wire or three-phase four-wire systems.
2. **Neutral Line:** Also known as the neutral wire. The neutral line voltage relative to the live wire includes specifications such as 100V, 110V, 115V, 120V, 127V, 132V, 139V, 220V, 230V, 240V, 254V, 277V, etc., with a voltage relative to the ground wire of approximately 0.5V–2.0V. (The neutral wire carries load current.) Three-phase three-wire systems lack a neutral wire. (The neutral wire carries load current.) It has a voltage of 0.5–2V relative to the ground wire.
3. **Grounding wire:** Connect to a grounding rod or the actual grounding point on the distribution panel. If the voltage difference between the neutral wire and ground wire exceeds 5V, or if the equipment system has special requirements, consult a qualified electrician to reinstall a proper grounding system to ensure system safety. Typical voltages for three-phase four-wire systems: 173V/100V, 190V/110V, 200V/115V, 208V/120V, 220V/127V, 230V/132V, 240V/139V, 380V/220V, 400V/230V, 415V/240V, 440V/254V, 480V/277V. Three-phase three-wire systems typically operate at: 173V, 190V, 200V, 208V, 220V, 230V, 240V, 380V, 400V, 415V, 440V, 480V. Single-phase two-wire systems typically operate at: 100V, 110V, 115V, 120V, 127V, 132V, 139V, 220V, 230V, 240V, 254V, 277V.
4. **Live wire labeling:** Single-phase systems use L, L1, L2; three-phase systems use R, S, T, U, V, W.
5. **Neutral wire labeling (i.e., neutral conductor):** Designated as N for both single-phase and three-phase systems.

6. Ground wire designation: Designated as "G" or "E". or " $\pm$ " as the symbol.
7. Single-phase bushing color coding: L, L1, L2 (live wires or phase wires): red N (neutral wire or neutral conductor): black
G or E (Ground wire): Black
8. Three-phase sleeve color coding:
R-phase (input) and U-phase (output): Red
S-phase (input) and V-phase (output): Green
T-phase (input) and W-phase (output): Yellow N (neutral or water line): Black
G or E (Ground): Black

Precautions – If the voltage difference between the neutral wire and ground wire exceeds 5V, or if required by the computer system, the output neutral wire and ground wire may be shorted to ensure computer safety. However, this is not mandatory.

III. Grounding System:

1. A well-designed grounding system not only addresses safety concerns but also prevents power supply interference from disrupting equipment operation.
2. The ground wire is not the power supply neutral wire and must be kept separate from the neutral wire, except in special applications.
3. The ground wire gauge must be at least 8 AWG or equivalent to the static frequency converter ground wire.
4. The ground wire serves only as a reference for this unit. A faulty ground wire may cause interference to the user's equipment.
5. The ground wire should be connected to the grounding point at the grounding rod or the starting point within the distribution panel.
6. Grounding Types:

Type	Applicable Location	Resistance Value
Special Grounding	Low-voltage power system grounding for user transformers in three-phase four-wire multiple grounding system supply areas, or high-voltage electrical equipment grounding	Below 10Ω
First Type Grounding	Grounding for high-voltage electrical equipment in non-grounded systems.	Below 25Ω
Second type of grounding	Grounding for low-voltage power systems of user transformers in areas supplied by three-phase, three-wire, non-grounded systems.	Below 50Ω
Third Type of Grounding	1. Grounding of low-voltage electrical equipment. 2. Grounding of internal wiring systems. 3. Grounding of transformer secondary windings. 4. Grounding of metal parts supporting low-voltage electrical equipment.	1. Ground voltage: 150V or less - 100 Ω or less. 2. Ground voltage 151V to 300V - 50Ω or less. 3. Ground voltage 301V and above - 10Ω and below.

Precautions – Pay attention to usage volume and avoid overloading. For construction-related issues, consult a professional or contact our company.

Chapter 9. Electrical Specifications Table

◆ Characteristics

PHASE		SINGLE		THREE				
MODEL		2KVA-150KVA		10KVA-500KVA				
2KVA-500KVA		IGBT /Pulse Width Modulation Type						
INPUT	VOLTAGE (Select One)	1Phase 2Wire: 110V (2 to 5KVA)/220V/230V/240V + 10%						
		3Phase 4Wire: Wye Type 190/110; 200/115; 208/120; 220/128; 230/132; 240/139V +10%						
		3Phase 4Wire: Wye Type 380/220; 400/230; 415/240; 440/254; 460/265; 480/277V +10%						
		3Phase 3Wire: Delta Type 220; 230; 240/380; 400; 415/440V + 10%						
	FREQUENCY (Select One)	47 -63Hz or 400Hz ±5%						
OUTPUT	Voltage		110v Setting (Low Range): 0-150V			(Option:0~520V)		
			220V Selling(High Range)0-300V					
	7-inch color screen		Voltage	Current	Frequency	Power	Power	Factor
	Power Supply Regulation Rate		0.10%					
	Load Regulation		0.50%					
	Total Harmonic Distortion		1% (Pure Resistive Load)					
	Frequency Stability		0.01%					
	Voltage Resolution		0.1V					
	Frequency Resolution		Resolution 0.1Hz					
	Current resolution		0.01A					
	Measurement Accuracy	Voltage	0.5% FS + 5 dgt					
		Current	0.5% of full scale + 5 digits					
		Power	0.5% of full scale + 5 digits					
		Frequency	0.01% of full scale + 5 digits					
	Setting Accuracy	Voltage	0.5% FS					
		Frequency	0.1%FS					
	Number of Storage Groups		30 groups total; each group can store voltage and frequency values for easy recall					
Communication Interface		RS485						

PROTECTION		Electronic Circuit / Circuit Breaker for Overload, Over Temperature, Instant Cut of, Short Circuit
WORKING ENVIRONMENT	AMB.TEMP.	0-40 deg.C
	HUMIDITY	0-90%(Non-condensing)

◆ 1-Phase Specifications

MODEL&CAPACITY	2KVA	3KVA	5KVA	10KVA	15KVA	20KVA	30KVA	45KVA	60KVA	100KVA	150KVA
TYPE		IGBT/Pulse Width Modulation Type									
Current Limit	L-N (Low)	16.8A	25A	42A	84A	125A	168A	250A	375A	500A	1250A
	L-N (High)	8.4A	12.5A	21A	42A	62.5A	84A	125A	187.5A	250A	625A
Weight	(Kgs)	32	60	75	100	120	140	220	280	330	700
	(Lbs)	70	132	165	220	264	308	485	617	727	1543
Dimension (WxDxH)	(mm)	430*482*177	350*540*700	420*640*920		500*770*1130		600*920*1200		700*1200*1300	860*1435*1500
	(inch)	17*19*7	13.8*21*28	17*25*36		22*30*44		24*37*48		28*48*58	34*56*59

◆ 3-Phase input 1-Phase output Specifications

MODEL&CAPACITY	10KVA	15KVA	20KVA	30KVA	45KVA	50KVA	60KVA	75KVA	90KVA	100KVA	150KVA
TYPE		IGBT/Pulse Width Modulation Type									
Current Limit	L-N (Low)	84A	125.0A	168A	250A	375A	416.6A	500A	625A	750A	1250A
	L-N (High)	42A	62.5A	84A	125A	187.5A	208.3A	250A	312.5A	375A	625A
Weight	(Kgs)	100	120	140	220	280	300	330	380	480	700
	(Lbs)	220.4	264.5	308	485	617	661	727	837	1058	1543
Dimension (WxDxH)	(mm)	420*640*920		500*770*1130		600*920*1200		700*1200*1300		860*1435*1500	
	(inch)	17*25*36		22*30*44		24*37*48		28*48*58		34*56*59	

◆ 3-Phase Specifications

MODEL&CAPACITY	10KVA	15KVA	30KVA	45KVA	60KVA	100KVA	120KVA	150KVA	200KVA	300KVA	500KVA
TYPE		IGBT/ Pulse Width Modulation Type									
Current Limit	L-N (Low)	27.6A	41.6A	83.2A	125.0A	166.4A	275A	336A	416A	555A	1388A
	L-N (High)	13.8A	20.8A	41.6A	62.5A	83.2A	137.5A	168A	H:208A	277A	694A
Weight	(Kgs)	140	210	280	350	400	600	650	720	900	2000
	(Lbs)	308	463	617	771	881	1322	1433	1587	1984	4409
Dimension (WxDxH)	(mm)	460*640*920	500*770*1130	600*920*1200		700*1200*1300		860*1435*1500		960*1600*1650	1100*1600*1800
	(inch)	17*25*36	22*30*44	24*37*48		28*48*58		34*56*59		38*63*65	44*63*71

*All specifications are subject to change without prior notice.

*Custom-made specifications are acceptable.

Chapter 10. Troubleshooting

This machine may only be serviced by qualified electricians. Caution: Internal high voltage. Unauthorized personnel must not open the machine door for inspection. Shut down the machine first and follow these steps:

Symptom	Inspection Method	Troubleshooting
Nopower input	1. Is the mains power switch turned on? 2. Is the input power cord properly plugged in and locked? 3. Is the input voltage within the rated specifications? 4. Check if the fuse is blown.	1. Turn on the mains input switch. 2. Reconnect and secure the input power supply. 3. Modify or reinstall the correct voltage specification. 4. Inspect the machine and replace the fuse with one of the same rating.
Output power interruption	1. Was there a power outage or momentary power interruption? 2. Is there an overload condition?	1. Press the ON switch to restart the machine. 2. If tripped due to overload, reduce the load.
Nooutputvoltage	1. Check if the fuse is blown? 2. Check for overload. 3. Check if the voltage is normal.	1. Inspect the machine and replace with a fuse of the same rating . 2. Install a higher-capacity static frequency converter.
Output frequency display isnormal, but the voltmeter, ammeter, and power display "0" _		1. Turn the power switch to the "OFF" position. 2. Adjusttheoutputvoltage to zero. 3. Switchthepowerswitch to the "ON" position.
Output frequency displays normally, but voltmeter, ammeter, and wattmeter show "0" while a warning tone sounds.		1. Checkandreduce the load current. 2. Press the OFF/RESET button 3. Wait for the machine to delay activation. 4. Restart operation.
Overheating	1. Overloaded? 2. Is the fan speed reduced or not spinning?	1. Reduce load. 2. Replace the fan.
Request emergency repair		Please provide: 1. Machine model & serial number. 2. Date & time of failure. 3. Load name. 4. Detailed description of the situation.

Chapter 11. Maintenance & Repair of the

This static frequency converter does not require daily maintenance. However, regular maintenance can extend its service life. Preventive Measures:

- Do not place any liquid items on the machine to prevent accidental spills from entering the housing and causing damage.
- If the machine is placed (or used) in extremely harsh environments, such as factories or areas with high dust or sand content, take special care during maintenance. Regular Maintenance:
- Regular inspection, cleaning, and maintenance are crucial for extending the machine's lifespan. Cleaning frequency depends on environmental conditions. Simple steps are as follows:

- Turn off the power switch.
- Gently wipe the casing, top cover, and ventilation openings with a soft cloth and mild detergent.
- Visually inspect all power cords and terminals for impact damage, loose connections, thermal corrosion, moisture, insect damage, or rodent bites. If any damage is found,
- immediately replace the power cord or terminals with ones of the same specifications and dimensions.
- Clean dust from inside the machine.
- Precautions: Never perform maintenance while the machine is energized. Ensure all power sources are completely disconnected before proceeding.

●

Maintenance and Care During Extended Downtime

- If the power supply has been stored in a humid environment for an extended period, first place it in a dry, well-ventilated area to remove moisture from the interior before powering it on.
- When the power supply is idle for extended periods, power it on for 5 minutes every 1-2 months to ensure stable operation when needed later.

Communication Protocol for IND-SFC Series Static Frequency Converters

I. Communication Method

Communication Protocol V1.1

a) Interface: RS-232/RS-485

b) Baud Rate: 9600bps

c) Parity: None

d) Data bits: 8 bits

e) Stop bits: 1 bit

The communication mechanism between both parties is designated as query-response. The slave device (Static Frequency Converter) only responds with data when it receives a request from the master device (PC software or other equipment).

II. Communication Format

Address	Command Code	Register Address (2 bytes)		Value (2 bytes)		Check Word (2 bytes)	
1 byte	1 byte	Low Byte	High Byte	High Byte	Low Byte	Low Byte	High Byte

Examples are as follows:

Function	Command	Description
Power On Command One	01 05 00 64 FF 00 CD E5	To power on, Command One must be sent first, followed by Command Two after a 100ms interval
Power On Command Two	01 05 00 64 00 00 8C 15	
Power Off Command One	01 05 00 65 FF 00 9C 25	To power off, Command One must be sent first, followed by Command Two after a 100ms interval
Power Off Command Two	01 05 00 65 00 00 DD D5	
Set Voltage	01 06 01 2C 04 4C 4A CA	Set the voltage to 110 V
Set Frequency	01 06 01 2D 01 F4 18 28	Set the frequency to 50 Hz
Set Slope	01 06 01 2E 01 F4 E8 28	Set the slope to 50 V/s.
Set Low Range	01 06 01 30 00 02 09 F8	
Set High Range	01 06 01 30 00 01 49 F9	
Free Mode	01 06 01 30 00 00 88 39	

III. Data Request PC -> ADS

1. Request Current Setting Parameters

Command: 01 03 01 2C 00 05 45 FC

Slave device response 15 bytes (example): 01 03 0A 08 98 01 F4 00 64 05 DC 00 01 6B A7

Comments on some bytes are as follows:

01 Address

03 Command Code

0A Data Length

08 98 Voltage 220V **08** is the high byte, **98** is the low byte

01 F4 Frequency 50Hz **01** is the high byte, **F4** is the low byte

00 64 Slope 10V/S **00** is the high byte, **64** is the low byte

05 DC Bytes 9 and 10

00 01 Bytes 11 and 12

6B A7 Checksum**2. Request Current Device Data**

Command: 01 03 00 02 00 18 E4 00

Slave device response 53 bytes (example): 01 03 30 01 F4 01 F4 01 F4 08 9E 08 9B 08 9A 00 C9 D8

Comments on some bytes are as follows:

01 Address Byte 0

03 Command Code Byte 1

30 Data Length Byte 2

01 F4 01 F4 01 F4 Bytes 3 and 4 are A-phase frequency, Bytes 5 and 6 are B-phase frequency, Bytes 7 and 8 are C-phase frequency (High byte first, low byte second. Note: The calculated frequency value is 10 times the actual value.)

08 9E 08 9B 08 9A Bytes 9 and 10 are A-phase voltage, Bytes 11 and 12 are B-phase voltage, Bytes 13 and 14 are C-phase voltage (High byte first, low byte second. Note: The calculated voltage value is 10 times the actual value.)

00 00 00 00 00 00 Bytes 15 and 16 are A-phase current, Bytes 17 and 18 are B-phase current, Bytes 19 and 20 are C-phase current (High byte first, low byte second. Note: The calculated current value is 100 times the actual value.)

00 00 00 00 00 00 Bytes 21 and 22 are A-phase power factor, Bytes 23 and 24 are B-phase power factor, Bytes 25 and 26 are C-phase power factor (High byte first, low byte second. Note: The calculated power factor value is 10000 times the actual value.)

00 00 Bytes 27 and 28

00 00 00 00 00 00 Bytes 29 and 30 are A-phase active power, Bytes 31 and 32 are B-phase active power, Bytes 33 and 34 are C-phase active power (High byte first, low byte second. Note: The calculated active power value is 100 times the actual value.)

00 00 00 00 Bytes 35, 36, 37, and 38

00 00 00 00 00 00 Bytes 39, 40, 41, 42, 43, and 44

00 00 00 00 00 00 Bytes 45, 46, 47, 48, 49, and 50

C9 D8 Checksum (Bytes 51 and 52)