



# GoHz Frequency Converter User Manual

## **50Hz, 60Hz, 400Hz Frequency Converter**

Solutions for Converting

- 110V 60Hz to 220V 50Hz,
  - 120V 60Hz to 240V 50Hz,
  - 230V 50Hz to 110V 60Hz,
  - 480V 60Hz to 400V 50Hz,
- etc...

Power Capacity from 500 VA to 600 kVA - HZ-50 series

# Catalogue

<b>I. Safety Precautions</b> .....	3
<b>II. Working Principle</b> .....	4
<b>III. Introduction</b> .....	5
• Product Features	
• Applications	
• Checklist	
• Nameplate	
<b>IV. Operation Panel and Functions</b> .....	6
<b>V. Operating Guide</b> .....	7
• Menu Selection	
• Parameter Setting Procedure	
• Specific Operation Settings	
<b>VI. Placement</b> .....	8
<b>VII. Installation</b> .....	9-12
• Wiring Precautions	
• Wiring Diagram	
• Wire Diameter Reference Table	
• Power Polarity Identification Methods	
• Grounding System	
<b>VIII. Specifications</b> .....	13
• Model Selection	
<b>IX. Troubleshooting</b> .....	15
<b>X. Maintenance</b> .....	16

## Chapter I. Safety Precautions

- ◆ Read this user manual before using GoHz frequency converters.
- ◆ Keep this user manual near the frequency converter for reading at any time.
- ◆ Handle with care when transporting the frequency converter to avoid collision.
- ◆ Do not put the frequency converter on uneven or inclined place.
- ◆ Do not block the venting holes or slits to keep the frequency converter well-cooling effect, the back of the frequency converter should keep 10 cm (4 inches) away from the wall.
- ◆ Double check the frequency converter and power supply specifications are matching and well-wired before power connection to avoid any careless damaged.
- ◆ Frequency converters have different installations according to different capacities and voltage levels, choose an appropriate configuration and wire diameter.
- ◆ Do not overload the frequency converter and wire to prevent the electric shock or cause fires.
- ◆ Please follow the implementation of electrician laws and regulations.
- ◆ In case of abnormal phenomenon happens, follow this user manual in troubleshooting or contact the manufacturer.
- ◆ Please keep frequency converter clean and do not put heavy objects on top of it.
- ◆ Prevent any liquids and sundries into the frequency converter, in order to avoid poor contact or short circuit to cause electric shock or fire.
- ◆ Better to unplug the power cord in storm, lightning or thunder days.
- ◆ Avoid placing in direct sunlight, raining or humid place.
- ◆ Keep it away from the source of ignition and heat to prevent overheat.
- ◆ Shutdown the power cord during moving or maintaining the frequency converter.

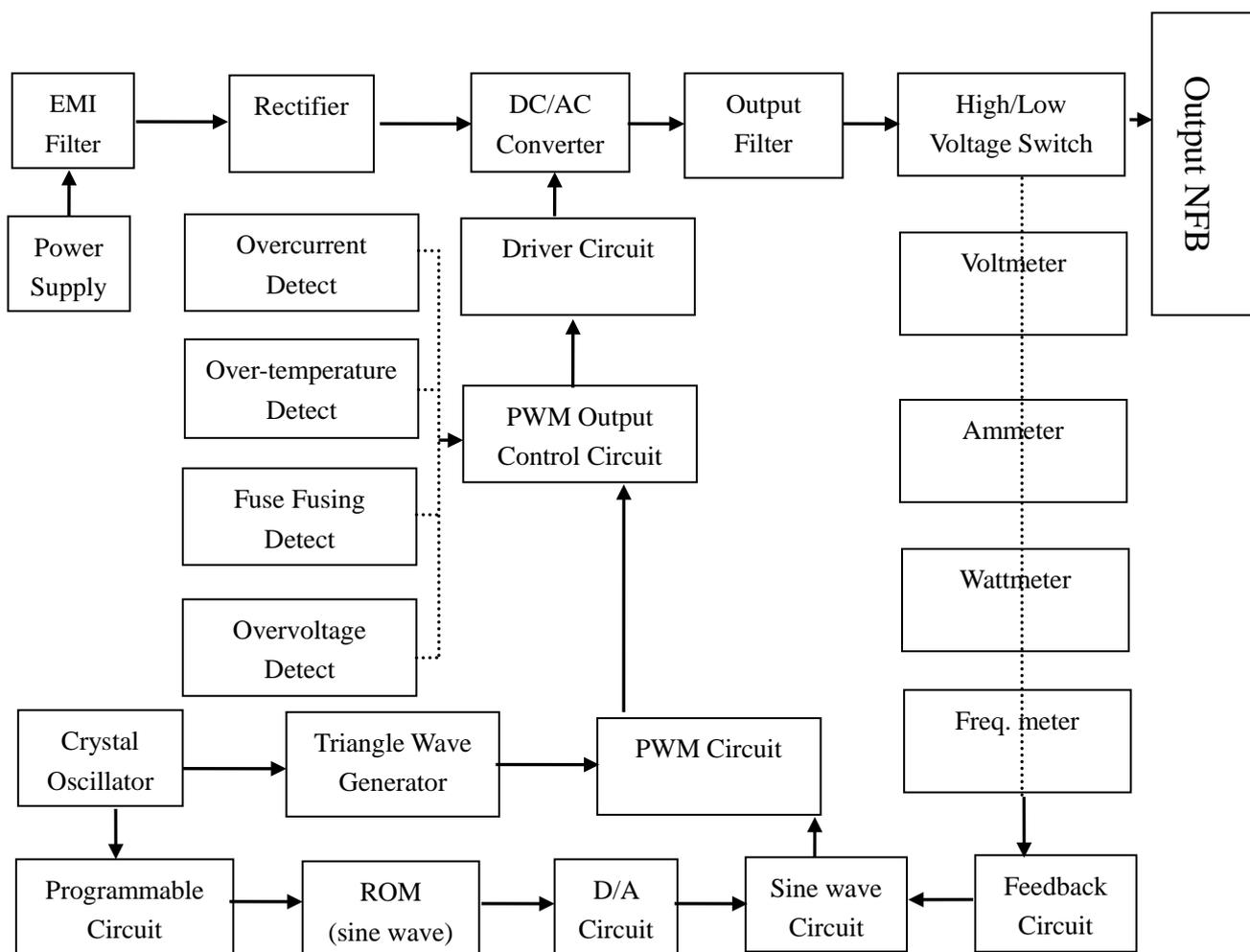
## Chapter II. Working Principle

GoHz multi-function static frequency converter is a standard AC power supply electronic device, it can simulate international standard power supplies, convert fixed AC voltage and frequency power into stable pure sine wave power by internal AC to DC, DC to AC current rectifying, with high activation current, and displays a number of parameters (Such as: voltage, frequency, current, apparent power, power factor etc.).

GoHz static frequency converters adopt advanced PWM (Pulse Width Modulation) technology with compact size, light weight and high efficiency features. Digital Signal Processor technology provides high precision measurements function of voltage, frequency, current, apparent power and power factor etc. The use of high power IGBT module design to reduce circuit complexity, enhance frequency converter stability and reduce power consumption. And the isolation transformers completely isolate the mains and the loads, in order to improve the loads stability and a variety of testing performance, to ensure the accuracy of test values for the loads.

GoHz frequency converter provides voltage (0 - 300V) and frequency (standard 40Hz - 120Hz, 120Hz to 499.9Hz is optional), suitable for general commercial electrical and electronic machines.

### Frequency Converter Circuit Block Diagram



## Chapter III. Introduction

### Product Features

- GoHz frequency converter is suitable for use with resistive, capacitive, inductive and non-linear loads.
- 50Hz, 60Hz or 400Hz input frequency.
- Adjustable 0 to 300VAC output voltage.
- Adjustable 40.0 to 499.9Hz output frequency.
- Precise 4 LED digital display output frequency, voltage, ampere and wattage.
- Full galvanically isolated, no harmonic distortion (EMI, EMC).
- Pure sine wave output.
- Fast response time.
- Sustained 300% overload capability.
- IGBT/PWM technology enhances compact size, low noise and high reliability.
- Capable to simulate global voltage, frequency power supplies.
- GoHz frequency converters are equipped with electronic circuit/instant trip breaker/buzzer alarm for over voltage, over current, over temperature, output short circuit protection.

### Applications

Laboratory standard power supply	Air compressor testing	Monitor Testing
Quality assurance / Control / lifetime testing in Manufacturers	Air conditioning equipment testing	Transformers / TRIAC / SCR and other parts testing
Switching power supply testing	Motor equipment testing	Fluorescent lamp ballast testing
All kinds of electrical machines with motors	Copiers, scanners, OA product testing	R&D departments require best power supplies

### Checklist

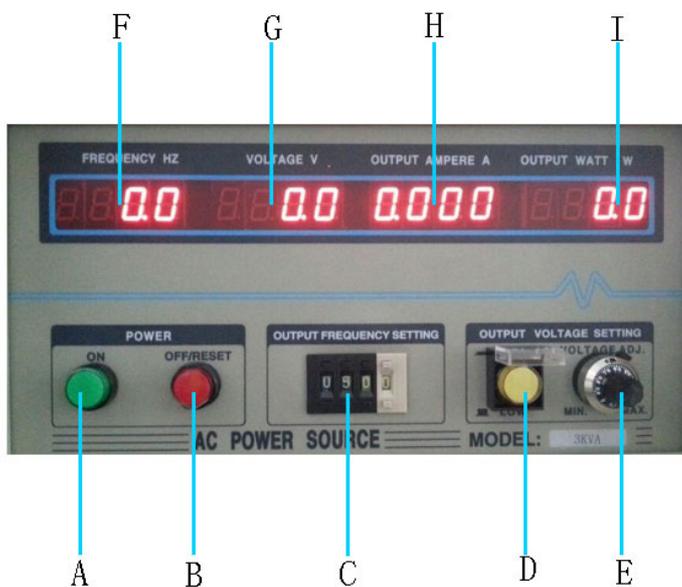
Every frequency converter has functional test before leaving factory, the frequency converter is wooden packaged, includes:

- 1 unit frequency converter
- 1 unit input power cable (only for 500VA & 1kVA)
- Operation manual

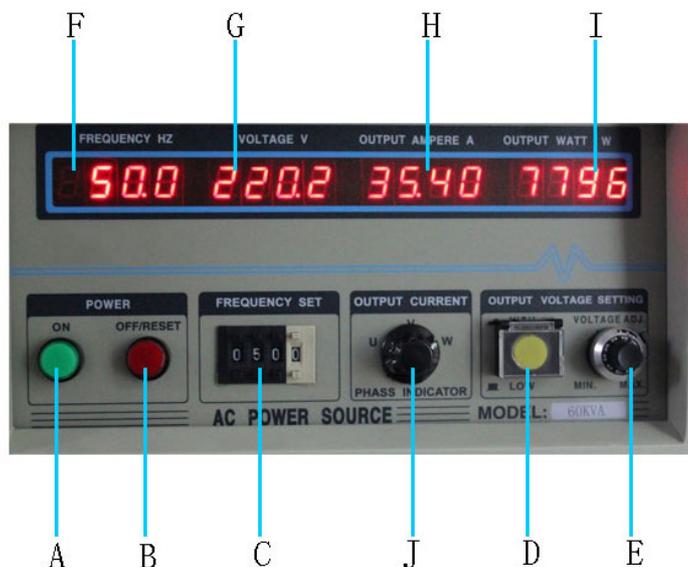
### Nameplate

GoHz Frequency Converter	
Model:	HZ-50-1101
Capacity:	1kVA
Input:	1P2W 220V 50Hz/60Hz
Output:	1P2W 0 – 300V, 40.0 – 499.9Hz
Serial Number:	GoHz-20150101010

## Chapter IV. Operation Panel and Functions



SINGLE PHASE UNITS



THREE PHASE UNITS

- A. Input power on.
- B. Off/Reset switch electronic circuit breaker instant trip and alarm when overload, short circuit, etc. press this switch to restart.
- C. Output frequency programmable setting.
- D. 0-150v (Low)/0-300V (High) output voltage button (For 30kVA and larger converters, this button is disabled, replace by switch(es) inside the front door of the frequency converter)
- E. 10 turns output voltage adjustable knob.
- F. Frequency.
- G. Voltage.
- H. Ampere.
- I. Wattage.
- J. Phase selection switch to select U.V.W phase's current & power (3-phase frequency converters only).

## Chapter V. Operating Guide

Proper operating procedures allow you to use the frequency converter more smoothly and avoid unnecessary interference.

1. Make sure the POWER ON switch is on OFF position.
2. Make sure the switches, rotary buttons, displays are not loosen or damaged.
3. Make sure the power supply is matching with the frequency converter specifications (110V, 220V etc.) before turning the input POWER ON switch to ON position.
4. Set the output frequency by "FREQUENCY SET" switch. Note, press OFF/RESET before setting hundreds frequency (1xx.x).
5. Press to POWER ON switch (ON): turn off AC OUTPUT first.
6. Adjust the output voltage: change 0-150V (low) and 0-300V (high) base on required voltage.
7. Connect loads wire and turn on the AC OUTPUT switch to obtain required standard AC power supplies.
8. GoHz frequency converter has overcurrent (overload), over temperature, short circuit, instantaneous power off protection and warning indicators. In case of above phenomenon happens, the protection circuit cut off output immediately and trigger warning buzzer.
9. Press OFF / RESET switch to cut off the output.

## Chapter VI. Placement

The environment of the frequency converter being placed has direct affect to converter's function and lifetime, the environment should follow the conditions:

### **Moving:**

- Please shut down and disconnect all wirings before moving the frequency converter.
- Do not move the frequency converter upside down.
- Handle the frequency converter with care in moving to avoid collision.

### **Placement**

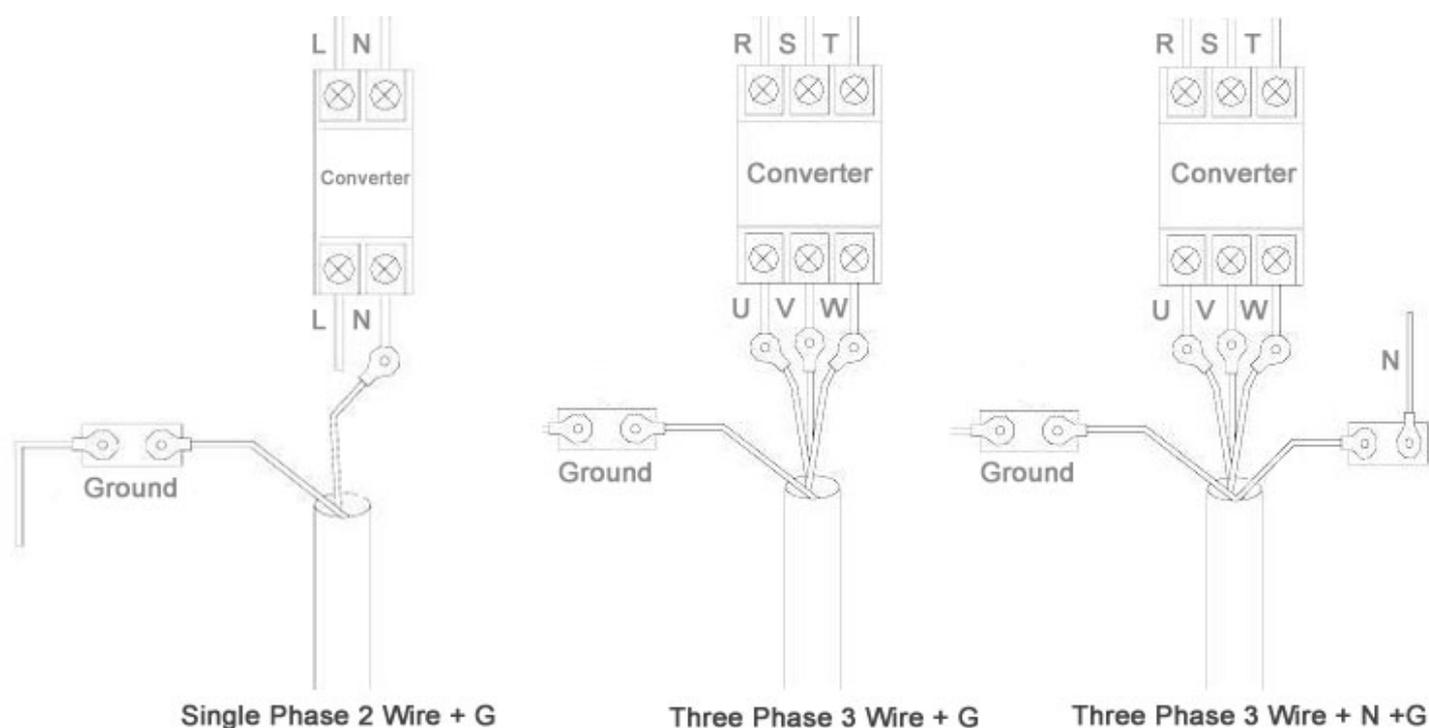
- Do not put the frequency converter on uneven or inclined place.
- Avoid direct sunlight, rain or humid place
- Keep it away from fire and high temperature place to prevent overheating.
- Avoid oil mist, salt, corrosive gases erosion.
- Avoid dust, cotton and small metal objects intrusion.
- Keep the frequency converter in a well-ventilated place, keep the frequency converter's back away from the wall at least 10cm to ensure sufficient ventilation.
- Operating temperature 0 - 40°C, humidity 0 - 90% (non-condensing).

## Chapter VII. Installation

### Wiring Precautions

- Whether the capacity of the frequency converter in accordance with your loads.
- Whether the frequency converter damaged during transportation, if so, do not connect it to power source.
- Shut down power before wiring, check the input voltage before installation.
- Make sure the specification of the wire in accordance with the frequency converter before wiring to avoid damages. The wire diameter should follow the voltage level and capacity of the frequency converter.
- Please refer to electrician wiring regulations, or following the "wire diameter reference" table.
- Avoid the switch of the frequency converter share with other appliances.
- Use O-type wiring terminals, make sure it's well-wired, tighten screws to avoid poor contact and prevent electric shock.
- Make sure the polarity is correct where it's single phase frequency converter or three phase converter.
- For grounding, please refer to page 12.
- Make sure all switches on "OFF" status before connecting the frequency converter to power source.
- Make sure the power source, frequency converter and loads are matching before power on.
- Internal semiconductor components are sensitive to static electricity, be careful in touching the metal control panel.

### Wiring Diagram



**Wire Diameter Reference Table**

<b>1Ø2W 220V/110V</b>				<b>1Ø</b>	
<b>Model</b>	<b>Input</b>			<b>Output</b>	
<b>GoHz</b>	<b>Max. I/P Current</b>	<b>Protection Breaker</b>	<b>Power Wire</b>	<b>Max. O/P Current</b>	<b>Power Wire</b>
1102 2KVA	12.6A	30.0A	2.0mm <sup>2</sup>	110V:18.2A 220V:9.1A	2.0mm <sup>2</sup>
1103 3KVA	19.0A	30.0A	3.5mm <sup>2</sup>	110V:27.2A 220V:13.6A	5.5mm <sup>2</sup>
1105 5KVA	25.5A	50.0A	3.5mm <sup>2</sup>	110V:45.4A 220V:22.7A	8.0mm <sup>2</sup>
1110 10KVA	63.1A	75.0A	22.0mm <sup>2</sup>	110V:91.0A 220V:45.5A	30.0mm <sup>2</sup>
3115 15KVA	94.7A	100.0A	30.0mm <sup>2</sup>	110V:136.4A 220V:68.2A	22.0mm <sup>2</sup>
3120 20KVA	12.6A	150.0A	38.0mm <sup>2</sup>	110V:181.8A 220V:90.9A	60.0mm <sup>2</sup>
3130 30KVA	189.4A	200.0A	80.0mm <sup>2</sup>	110V:272.8A 220V:136.4A	125.0mm <sup>2</sup>

<b>3Ø4W 220V/ 380V, 3Ø3W 380V</b>				<b>3Ø</b>	
<b>Model</b>	<b>Input</b>			<b>Output</b>	
<b>GoHz</b>	<b>Max. I/P Current</b>	<b>Protection Breaker</b>	<b>Power Wire</b>	<b>Max. O/P Current</b>	<b>Power Wire</b>
3306 6KVA	12.6A	30.0A	2.0mm <sup>2</sup>	110V:18.2A 220V:9.1A	3.5mm <sup>2</sup>
3310 10KVA	20.5A	30.0A	3.5mm <sup>2</sup>	110V:30.2A 220V:15.1A	5.5mm <sup>2</sup>
3315 15KVA	31.5A	40.0A	5.5mm <sup>2</sup>	110V:45.5A 220V:22.7A	8.0mm <sup>2</sup>
3320 20KVA	42.2A	50.0A	8.0mm <sup>2</sup>	110V:60.6A 220V:30.3A	14.0mm <sup>2</sup>
3330 30KVA	63.0A	75.0A	22.0mm <sup>2</sup>	110V:91.0A 220V:45.5A	30.0mm <sup>2</sup>
3345 45KVA	95.0A	125.0A	30.0mm <sup>2</sup>	110V:136.0A 220V:68.0A	38.0mm <sup>2</sup>
3360 60KVA	126.0A	150.0A	38.0mm <sup>2</sup>	110V:182.0A 220V:91.0A	60.0mm <sup>2</sup>
3375 75KVA	158.0A	187.5A	50.0mm <sup>2</sup>	110V:227.0A 220V:113.5A	100.0mm <sup>2</sup>
33100 100KVA	210.5A	250.0A	80.0mm <sup>2</sup>	110V:303.0A 220V:151.5A	150.0mm <sup>2</sup>
33120 120KVA	252.5A	300.0A	100.0mm <sup>2</sup>	110V:363.6A 220V:181.8A	200.0mm <sup>2</sup>

## Power Polarity Identification Methods

1. Fire Wire to Ground or Neutral (i.e. line to line voltage) Wire, there are 173V, 190V, 200V, 208V, 220V, 230V, 240V, 380V, 400V, 415V, 440V, 480V according to different specifications. This is for three-phase three-wire or three-phase four-wire system.
2. Neutral Wire to Fire Wire, there are 100V, 110V, 115V, 120V, 127V, 132V, 139V, 220V, 230V, 240V, 254V, 277V etc according to different specifications, to Ground Wire it's approx. 0.5V-2.0V. There is no Neutral Wire in three-phase three-wire system.
3. Ground Wire to ground rods. Three-phase four-wire systems are: 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 are: 173V, 190V, 200V, 208V, 220V, 230V, 240V, 380V, 400V, 415V, 440V, 480V. Two-wire systems are: 100V, 110V, 115V, 120V, 127V, 132V, 139V, 220V, 230V, 240V, 254V, 277V. If the voltage between Ground Wire and Neutral Wire is higher than 5V or the equipment has specific requirement, please find a qualified electrician to reinstall the ground wiring system for safety factors.
4. Fire Wire marks: single-phase system marked with L, L1, L2; three-phase system marked with R, S, T, U, V, W.
5. Neutral Wire marks: both single-phase and three-phase systems are marked with N.
6. Ground Wire marks: marked with "G" or "E" (Earthing), or symbol "≡".
7. Single-phase wire color distinguishes:
  - L, L1, L2 (Fire Wire): Red
  - N (Neutral Wire): Black
  - G or E (Ground Wire): Black
8. Three-phase wire color distinguishes:
  - 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 Wire): Black
  - G or E (Ground Wire): Black

**Note:** if the voltage between Neutral Wire and Ground Wire is higher than 5V or the system has specific requirement, you can short the null line and ground line, but it's not a must.

## Grounding System

1. In addition to safety consideration, well-grounded system also can avoid the power system interferes equipment normal operation.
2. Ground Wire should be separated with Neutral Wire if it's not neutral wire, unless special applications.
3. Ground Wire should be 8AWG wire at least or the diameter is basically the same.
4. Ground Wire is for specified frequency converter only, poor ground will cause interference for other machines.
5. Use ground rods in grounding for the best.

### 6. Ground Types:

Item	Applications	Resistance values
1	Low voltage power supply system or high voltage electrical equipment of three-phase four-wire multi-grounded systems grounding	10Ω or less
2	Ungrounded high-voltage electrical equipment grounding system.	25Ω or less
3	Low voltage power supply system of three-phase three-wire ungrounded system.	50Ω or less
4	1. Low voltage electrical equipment grounding 2. Inner system grounding 3. Frequency converter secondary grounding 4. Low voltage electrical equipment metal body grounding.	1. Ground voltage less than 150V is 100Ω or less. 2. Ground voltage 151V to 300V is 50Ω or less. 3. Ground voltage higher than 301V is 10Ω or less.

## Chapter VIII. Specifications

		Single Phase	Three Phase
Capacity		500VA - 45 kVA	3 kVA - 600 kVA
Methods of Making		IGBT/Pulse Width Modulation	
<b>Input</b>	Voltage (Optional)	1 Phase 2 Wire: 110V/220V/230V/240 $\pm$ 10%	
		3 Phase 4 Wire: Wye Type 190/110, 200/115, 208/120, 220/128, 230/132, 240/139V $\pm$ 10%	
		3 Phase 4 Wire: Wye Type 380/220, 400/230, 415/240, 440/254, 460/265, 480/277V $\pm$ 10%	
		3 Phase 4 Wire: Della Type 220, 230, 240, 380, 400, 415, 440V $\pm$ 10%	
	50Hz or 60Hz $\pm$ 5%	47 Hz - 63Hz or 50 Hz, 60 Hz $\pm$ 5%	
<b>Output</b>	Voltage	110V Setting (Low grade): 0-150V	1) 0-600V; 2). Rated setting voltage: -10%~-30% $\pm$ 10%~+25% preset
		220V Setting 0-300V (High grade): 0-300V	
	Load stabilization Rate	$\leq \pm 1\%$	
	Frequency	40.0Hz to 120Hz (400Hz is optional)	
	Frequency Stability	$\leq \pm 0.01\%$	
	Harmonic Distortion	Pure Sine Wave $\leq 2\%$	
	Frequency meter	4 digit, digital frequency meter, resolution 0.1Hz/Step	
	Voltmeter	4 digit, digital voltage meter, resolution 0.1V	
	Ammeter	4 digit, digital ammeter, resolution 0.1A	
Watt meter	4 digit, digital Watt meter, resolution 0.1W		
Protection		With overload, short circuit, over temperature	
		instantaneous power failure protection and alarm device	
Working Environment	Temperature	0 - 40 deg. °C	
	Humidity	0 - 90% (Non condensation)	

## Model Selection

### Single Phase Input, Single Phase Output

Capacity		500VA	1 kVA	2 kVA	3 kVA	5 kVA	10 kVA	15 kVA	20 kVA	30 kVA	45 kVA	50kVA	
Model		HZ-50-500W	HZ-50-1101	HZ-50-1102	HZ-50-1103	HZ-50-1105	HZ-50-1110	HZ-50-1115	HZ-50-1120	HZ-50-1130	HZ-50-1145	HZ-50-1150	
Output Current	Low-grade (L-N)	4.2A	8.4A	16.8A	25.0A	41.6A	83.2A	125.0A	166.4A	250A	375A	416.6A	
	High-grade: (L-N)	2.1A	4.2A	8.4A	12.5A	20.8A	41.6A	62.5A	83.2A	125A	188A	208.3A	
Weight	(Kgs)	17	21	45	60	70	120	130	150	200	265	290	
Size	(mm)	430*460*180			540*350*700			620*400*920			770*500*1100	850*660*1180	

### Three Phase Input, Single Phase Output

Capacity		10 kVA	15 kVA	20 kVA	25 kVA	30 kVA	45 kVA	50 kVA	60 kVA	75 kVA	90 kVA	100 kVA	
Model		HZ-50-3110	HZ-50-3115	HZ-50-3120	HZ-50-3125	HZ-50-3130	HZ-50-3145	HZ-50-3150	HZ-50-3160	HZ-50-3175	HZ-50-3190	HZ-50-31100	
Output Current	Low-grade (L-N)	83.2A	125A	166.6A	208.3A	250A	375A	416.6A	500A	625A	750A	833.3A	
	High-grade: (L-N)	41.6A	62.5A	83.3A	104.1A	125A	187.5A	208.3A	250A	312.5A	375A	416.6A	
Weight	(Kgs)	120	130	150	175	200	265	290	350	410	485	545	
Size	(mm)	350*630*855				500*780*1100			750*1000*1200			850*1100*1350	

### Three Phase Input, Three Phase Output

Capacity		3 kVA	10 kVA	15 kVA	20 kVA	30 kVA	45 kVA	60 kVA	75 kVA	100 kVA	
Model		HZ-50-3303	HZ-50-3310	HZ-50-3315	HZ-50-3320	HZ-50-3330	HZ-50-3345	HZ-50-3360	HZ-50-3375	HZ-50-33100	
Output Current	Low-grade (L-N)	8.4A	27.6A	41.6A	55.6A	83.2A	125.0A	166.4A	208.4A	277.6A	
	High-grade: (L-N)	4.2A	13.8A	20.8A	27.8A	41.6A	62.5A	83.2A	104.2A	138.8A	
Weight	(Kgs)	100	195	210	240	360	390	450	525	720	
Size	(mm)	540*350*700	640*460*910	770*500*1100			850*660*1180			900*800*1700	1500*860*1430

**Remark:** for higher capacity and nonstandard converters, please contact us directly.

## Chapter IX. Troubleshooting

Please pay attention to internal high voltage components, only qualified electricians can maintain the frequency converter.

Turn off the frequency converter before proceeding troubleshooting procedures if it's not necessary to do live troubleshooting.

Phenomenon	Inspection methods	Troubleshooting
No input power	<ol style="list-style-type: none"> <li>1. Input switch is turn on or not?</li> <li>2. Input voltage is right or not?</li> <li>3. The fuse is burn down or not?</li> </ol>	<ol style="list-style-type: none"> <li>1. Turn the power supply input switch.</li> <li>2. Connect to correct voltage power supply.</li> <li>3. Check the fuse and replace the fuse with same specification if necessary.</li> </ol>
Output power outage	<ol style="list-style-type: none"> <li>1. Is it power off or momentary power off?</li> <li>2. Is it overload?</li> </ol>	<ol style="list-style-type: none"> <li>1. Press the activate switch (ON) to reboot</li> <li>2. Make sure the loads are within the frequency converter's capacity.</li> </ol>
No output voltage	<ol style="list-style-type: none"> <li>1. Is the fuse burn down or not?</li> <li>2. Is it overloaded?</li> </ol>	<ol style="list-style-type: none"> <li>1. Check the fuse and replace the fuse with same specification if necessary.</li> <li>2. Replace a larger capacity frequency converter</li> </ol>
Voltmeter, ammeter and power show "0" when the output frequency is normal.		<ol style="list-style-type: none"> <li>1. Turn the power switch to "OFF" position.</li> <li>2. Change output voltage switch to zero.</li> <li>3. Turn the power switch to "ON" position.</li> </ol>
Voltmeter, ammeter and power show "0" and alarm rings when the output frequency is normal.		<ol style="list-style-type: none"> <li>1. Check and decrease the loads' current.</li> <li>2. Press the shutdown/reset button (OFF/RESET)</li> <li>3. Re-operation</li> </ol>
High temperature	<ol style="list-style-type: none"> <li>1. Is it overload?</li> <li>2. Cooling fan speed is slowdown or not to work</li> </ol>	<ol style="list-style-type: none"> <li>1. Decrease loads.</li> <li>2. Replace a new cooling fan.</li> </ol>
Emergency		<p>Please advise:</p> <ol style="list-style-type: none"> <li>1. Frequency converter model &amp; serial number.</li> <li>2. Date &amp; Time of the failure.</li> <li>3. Loads.</li> <li>4. Detailed description of the failure.</li> </ol>

## Chapter X. Maintenance

GoHz frequency converters do not require daily maintenance, a regular maintenance is benefited of longer lifetime, the maintain times is in accordance with the environmental conditions.

### **Preventive Measures:**

- Do not put any liquid objects on the top of the frequency converter.
- If the frequency converter is installed in a harsh environment, such as windy and dusty, pay more attention to make the frequency converter clean or do more frequent maintenances.

### **Maintenances:**

- Turn off the power switch
- Clean inner dusts
- Wipe the cabinet, cover and venting holes with a soft cloth and detergent.
- Visual inspection of all power lines and terminals, see if there is collision, loose, hot corrosion, moisture, insect bites or rat bites, do some repairs or replaces if necessary.

**Note:** DO NOT do any maintenance if you are not a qualified electrician, and make sure the frequency converter is discharged completely before proceeding any maintenance.