

Uninterruptible Power System

Frontier Power 3000C **THREE PHASE IN / THREE PHASE OUT**

CROSS T.E.C

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F-3000C MAIN CHARACTERISTICS

1. The latest technological semi-conductor component **IGBT** (Insulated Gate Bipolar Transistor) employed.
2. **Conditioned sine wave power supply** with instantaneous high-frequency controlled Pulse Width Modulation.
3. Elimination of the audible noise by raising the switching frequency of inverter **over 20 KHz**.
4. **Compact & light weight** construction.
5. Elimination of noise & cross current by facilitating the semi-conductor component for static bypass transfer switch.
6. When 100% unbalanced load condition, the voltage stability of with **individual phase controlling**.
7. **Improved input power factor** with the switch able charger.
8. Best fitting for the application in **Banking & Computer systems and Terminals**.
9. **EMI filter** for input & output employed.
10. The Quality Assurance ISO 9001 / KS A 9001 approved

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1. FOREWORD

This specification applies to the design, manufacturing, testing, and delivery of the ups system which continuously supplies the conditioned power to the critical load, independent from the commercial power condition.

2. APPLICATION STANDARDS

- Korean Industrial Standard (KS)
- National Electrical Manufacturer's Association (NEMA)
- American National Standard Institute (ANSI)
- International Electromechanical Committee (IEC)
- Manufacturer's standard

3. ENVIRONMENTAL CONDITIONS

The UPS shall meet the specified performance under the following conditions :

Ambient temperature :	20 C to 30 C	Recommended operation
	0 C to 40 C	Extreme excursion
Relative humidity :	0 to 90%	Non-condensing
Altitude :	Below 1000m	above sea level
Cooling method :	Forced air	cooling

4. SYSTEM COMPOSITION & DESCRIPTION

4.1 COMPOSITION

The UPS will consist of the following major equipment :

- Rectifier & Charger
- Inverter
- Output Transformer
- Static Switch
- Power Supply (Control)
- Digital Display
- Bypass Transformer

4.2 SYSTEM DESCRIPTION

4.2.1. Rectifier & Charger

The solid state rectifier and charger shall be phase controlled with constant voltage/constant current electronic control circuitry. It will be capable of accepting the AC input voltage as specified herein and delivering DC power within specified limits to the inverter and the battery. This unit shall automatically recharge the battery after the discharge according to the battery capacity.

4.2.2. Inverter

This unit shall contain IGBT (Insulated Gate Bipolar Transistor) module, heat dissipation board, and other relevant component. The high frequency switching and the sine wave Pulse Width Modulation are utilized in this unit. The inverter will revert the DC power obtained from the rectifier to PWM AC output, and then the AC filter will make it very similar to the balanced sine wave AC voltage to supply the critical load.

4.2.3. Output transformer

A dry type isolating power transformer will be used at the output of the inverter for isolation. The dry type isolating transformer will have class H insulation and will be so located within the equipment to insure that the hottest spot will not exceed the rated insulation temperature and to insure a low center of gravity.

4.2.4. Static Switch

This unit shall be placed at both the commercial power line and the inverter in order to transfer the power source from the inverter to the commercial power line without any interruption in case of the inverter problem or the over-load. Also, in order to avoid the cross current arised from the phase difference, it shall be composed only with semi-conductor components, not the mixture of semi-conductor components and the mechanical contactors. It shall have additional NFB for service and maintenance in case that they are required.

4.2.5. Power Supply (Control)

The power supply control unit shall employ DC/DC converter system with high performance switching with the power from the main battery in order to avoid the abnormal operation of the equipment when starting and ending of operation. It shall maintain its optimum operation though the internal voltage transient and power outage.

4.2.7. Digital Display

This unit shall be placed at upper part in the front panel of the equipment for the control and reading easiness, and shall contain the followings;

- A. Measurement
 - AC input voltage & current
 - AC output voltage, current, and frequency
 - Battery voltage
- B. Operating Condition
 - Rectifier input condition
 - Rectifier operating condition
 - Inverter input condition
 - Bypass operating condition
 - Inverter operating condition
 - Circuit breaker condition
- C. Display
 - Rectifier On / Off
 - Equalizing / float
 - Inverter On / Off
 - Synchronization
 - UPS normal
- D. Alarm
 - Rectifier alarm
 - DC alarm
 - Inverter alarm
 - Bypass alarm
- E. Selection Switch
 - Individual measurement selection
 - Inverter On / Off
 - Lamp Test
 - Reset
 - Manual Transfer

4.2.8. Bypass Transformer

This unit shall be an isolation shield transformer, so that, in case of inverter failure or bypass transfer to the commercial power source, the output power could be used independently from the input grounding.

5. OPERATION MODE

5.1. NORMAL

The rectifier and charger will get the AC commercial power and convert it to DC, and then, send it to inverter for the reverse to AC and to battery for charging. The filtered AC power from inverter will be supplied to the load without interruption.

5.2.. POWER FAILURE

When commercial power fails, the battery starts to let out the reserved DC power to inverter and it continues to feed the load during the power outage for the defined time period.

5.3. POWER RECOVERY

When the commercial power is recovered, the battery stops to feed and starts to recharge. At the same time, the commercial power passes through the normal routine.

5.4. INTERNAL FAILURE & OVER-LOAD

The output voltage and frequency of inverter are synchronized with the commercial power supply at all times. Thus, in case of internal failure or over-load, the static switch transfers power to bypass feed and the synchronized power is constantly fed to the load.

6. ELECTRICAL CHARACTERISTICS

CATEGORY	FRONTIER POWER 3000 C		
** CAPACITY	KVA		
GENERAL	COOLING METHOD		FORCED AIR COOLING
	OPERATION MOTH		100% CONTINUOUS
	RECTIFIER & CHARGER	CONTROL	PHASE CONTROLLING
		SEMI- CONDUCTOR	SCR-SCR MODUCLE
	INVERTER CONTROL		INSTANTANOUS WAVE FORM SINE WAVE PWM WITH 20 KHz
	ST/SW TRANSFER		SYNCHRONIZED POWER TRANFER BY SEMI-CONDUCTOR
	TRANSFORMER		HIGH EFFICIENCY H CLASS
INPUT	** NO. OF PHASE		3 PH 4W
	** RATED VOLTAGE		380V
	VOLTAGE VARIATION		WITCHIN 10 %
	RATED FREQUENCY		50Hz 5 %
	POWER FACTOR		OVER 0.85 LAG
OUTPUT	** NO, OF PHASE		3 PH 4 W
	** RATED VOLTAGE		380/220V
	VOLTAGE STABILITY		1 %
	RATED FREQUENCY		50Hz 0.5Hz
	** VOLTAGE REGULATION		5 %
	* RESPONSE TIME		LESS THAN 16 Ms
	* VOLTAGE ADJUSTMENT		5 %
	WAVEFORM DISTORTION		LESS THAN THD 3%(100% LINER LOAD)
	OVER-LOAD CAPACITY		120%, 10MINUTES
	POWER FACTOR		0.8 LAG

AUDIBLE NOISE		55dB(FRONT 1.5m AWAY,1.5m HIGH) to 70dB
EFFICIENCY		90 %
TRANSFER By pass	TRANSFER TIME	WITHIN 4mS
	TRANSFER CONDITION	o INVERTER FAILURE o OVER-LOAD o DC LOW VOLTAGE o MANUALTRANSFER
BATTERY	** BBATTERY TYPE	OPTION
	BATTERY CAPACITY	Depending on the back up time
	Q'TY	
	RATED VOLTAGE	240 V
	MAXIMUM VOLTAGE	270 V
	MINIMUM VOLTAGE	210 V
INSULATION	WITHSTAND	AC 1500V, 60Hz 1Min.
	INSULATION RESISTANCE	DC 500V MEGGER OVER 3M ohm
TEMPERATURE RISE	TRANSFORMER	BELOW 140 DEGREE
	SEMI-CONDUCTORS	BELOW 80 DEGREE
CASE COATING	ES-4505 (IN MUNSELL NOTATION)	

REMARK) * : 1) Power outage and input voltage change.
2) 0 - 100% load change.
** : Shall be defined when purchasing.
*** : 100% load condition at rated input/output.

7. MATERIAL AND CONSTRUCTION

7.1. This unit shall be designed for indoor use and shall be easily assessable for service and maintenance. Also, the good ventilation shall be considered.

7.2. All the electrical component in this unit shall have acceptable electrical insulation characteristics.

7.3. The front display panel including the control switches shall be manufactured as a single unit in accordance with the additional drawing and shall be fixed to the front upper corner of the equipment for control and reading easiness.

- 7.4. The major power circuitry shall be basically equipped with the protection devices such as circuit breakers, protective fuses, and auto-recharging current regulation circuitry.
- 7.5. The terminal for input, output, and battery, shall have sufficient capacity and shall be firmly fixed to the real lower side of the equipment.
- 7.6 Every cable and wire used in the main circuitry and control Circuitry shall have sufficient insulation and capacity and the pressed lug shall be used for the terminal connection.
- 7.7. The thickness of the cubicle base frame shall be at least 2.3mm, and the front and rear door 1.6 mm of the cold rolling sheet metal. The spray enamel coating is required in addition to the oxidation-free base coating.

8. TESTS

- 8.1. Power Supply Variation Test
- 8.2. Output Voltage Stability Test
- 8.3. Output Voltage Distortion Test
- 8.4. Display and Alarm Operation Inspection
- 8.5. Bypass Transfer Test
- 8.6. Output Frequency Stability Test
- 8.7. High Voltage Test
- 8.8. Sine wave PWM Test
- 8.9. Load Test & Total Efficiency Measurement
- 8.10. Measurement Accuracy Test
- 8.11. Insulation Test
- 8.12. Audible Noise Test

9. ADDITIONAL

9.1. The product shall be warranted against all defects in workmanship and material under normal use for a period of ***I*** year from the date of initial operation of our serviceman to the original user. The warranty shall not apply if the product has been subject to physical abuse, improper installation, unauthorized service, or modification. CROSS T.E.C CO., LTD. shall not be liable for any damage arising from the use or misuse of the product.

9.2. The name plate which states the name of manufacturer, production date, serial number, and the rating, shall be affixed to the equipment.

9.3. The EMI filter for the noise elimination shall be employed in the input and output line.

(SYSTEM BLOCK DIAGRAM)

