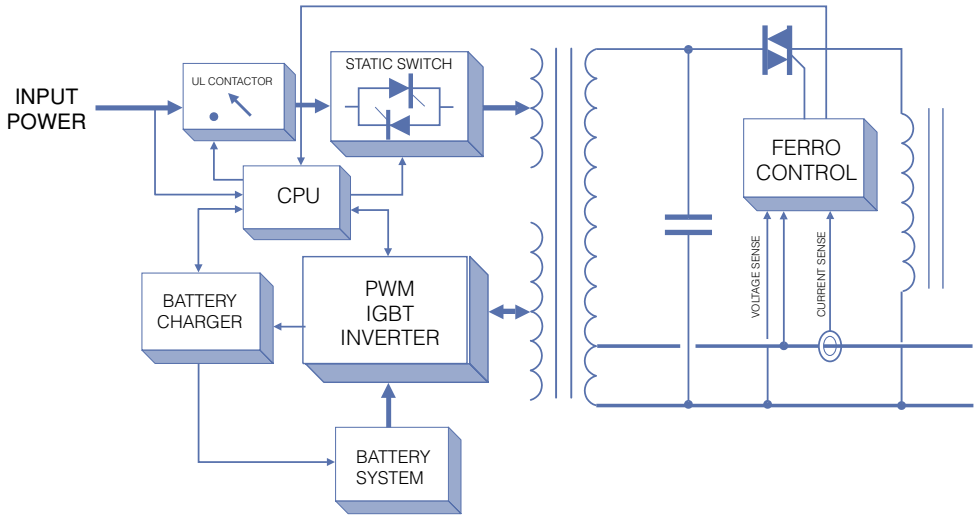
CFR Advantages



CFR Technology - Simplified Block Diagram

Basic Ferroresonant Design

To combine the benefits of both Standby and Double-Conversion designs, a ferroresonant transformer is added to filter and regulate the incoming power. When utility power drifts out of tolerance or fails completely, the batteries and tolerance or fails completely, the batteries and inverter continue to provide clean, uninterrupted power. This basic ferroresonant design is extremely reliable, but there are several inadequacies such as poor step-load response, reduced efficiency with loads less than 100%, narrow input window, additional heat output, and loud operation.

The Alpha CFR Design

Recognizing the inadequacies of earlier designs — including those using a basic ferroresonant transformer — Alpha Technologies developed the CFR Uninterruptible Power Supply. The benefits of this new hybrid design are noteworthy. Not only does the CFR offer all of the advantages of a ferroresonant transformer, but it also adds significant advance in power conversion technology previously unattainable:

- Outstanding Regulation
- Soft-Start Capabilities
- Quiet Operation
- Extremely Reliable
- Excellent Step-Load Response
- High Efficiency
- Frequency Compensation
- Communications Ready
- Improved Output Waveform

World's Largest Manufacturer of Ferroresonant Transformers

Alpha is the world's largest manufacturer of single-phase ferroresonant transformers specifically designed for uninterruptible powering solutions. The ferroresonant transformer is the backbone of many of our UPS power supplies. With over 1 million transformers installed in the field, and over 80% are still in operation after 25 years in business, the CFR Series with it's ferroresonant transformer has a reputation for being the most rugged and protective UPS solution on the market inherently providing automatic power factor correction.

CFR Advantages

The Most Cost Effective UPS on the Market

The CFR Series has the lowest demonstrated cost of ownership - total cost over 10 years - than any other UPS on the market. This includes power efficiency savings, repair costs, service costs, replacement costs, and long battery life. Simply put, higher product ruggedness = longer product life and less service. Larger high quality batteries are both more economic to buy and last twice as long as the competition. Most ferro-based UPS systems are typically high 80% efficient at full load and become less efficient as the load decreases. At æ load, the efficiency drops to as low as 75% for the average UPS on the market today. This translates directly into lower efficiency, additional heat output and higher operating costs. Alpha's CFR systems operate at 91% efficiency at full load and only drops to 89% at æ load. The temperature compensated charger ensures maximum battery life. The transformer comes with an exceptional 10 year full warranty. The batteries and components come with a standard 24 month warranty.

Heavy Duty Design Yields Industry's Best Lightning and Surge Protection

The CFR series provide the best protection against power spikes and surges from lightning strikes and brownout conditions than any other UPS. The extremely rugged transformer, coupled with industrially hardened electronics and a metal enclosure reduces a transient spike by a 2,000 to 1 ratio. The ferro transformer transient suppression properties ensure continued protection for the life of the transformer. The CFR has a demonstrated MTBF that is five times higher than our closest UPS competitor and has a reliability that exceeds 500,000 hours MTBF. The neutral is isolated to block utility transients from the load, providing power conditioning for sensitive equipment.

Input to Output Isolation

The CFR provides full input winding to secondary output winding electrical isolation. The output Neutral-to-Ground bond makes the CFR a true, separately derived power source as defined by National Electrical Code Article 250-5d. The UPS acts as a continuous line conditioner so transient voltages born by the utility power are suppressed before reaching sensitive electronic equipment. The CFR provides Galvanic Isolation, which further protects equipment from ground loops. This makes it ideal to use in medical and hazardous applications, by reducing the leakage current of off-the shelf components down to a level determined safe by current regulatory agencies.

Input Power Factor Correction

The CFR's ferroresonant transformer technology provides power factor correction. The ferro transformer has the ability to draw an input current waveform of the same shape as the voltage, creating an input power factor >.98. This reduces the current load of the electrical system and providing a more efficient use of power, eliminating or reducing surcharges from the utility.

Precise Auto Voltage Regulation

With Precise Auto Voltage Regulation, the CFR is able to accept input voltage (-25%/+10%) without drawing on vital back up power. Using "closed loop feedback circuitry" the CFR constantly monitors the incoming voltage and compares it to the output load, adjusting the output voltage, as required, to maintain ±1% regulation. Since the batteries are not required to come online as often, the battery reserves of the CFR are extended. In the event of brownouts or blackouts, the internal energy of the transformer guarantees zero transfer time from line to inverter mode.

Automatic Self-Test

The CFR comes with user definable self-test capabilities. The UPS will test all backup circuits to insure that back up power will be provided when required. The user definable controls provide the user with flexibility when scheduling ideal times to perform these diagnostic tests.

Self-Diagnostics

The user interface panel can be used to diagnose UPS problems.

Generator Compatibility

The CFR series has settings that allow it to function with a wide range of generators.

UPSmart Software

Compatible with Alpha's AC-UPS Uninterruptible Power Supplies

UPSmart software comes standard with Alpha's ALI Plus and Pinnacle UPS Series, and is an available option for Alpha's CFR Series UPS.

Smart Shutdown

In the event of a power loss, the UPSmart software Files Sharing feature automatically saves all data before safely shutting the computer down.

Easy-To-Use Interface

User-configurable interface provides a graphical representation of the UPS operating state, including texts and graphs of voltages, currents, frequency, temperatures, and remaining power of the UPS.

History and Event Log

This software function automatically archives system and power-related events that can be used to analyze potential UPS problems.

CFR Advantages

E-mail and Pager Notification
Allows the user to define and select certain parameters and choose a sending method for the preassigned warnings and event messages.

Remote Power Management
UPSmart allows multiple computers to monitor and manage the UPS status remotely through a TCP/IP, eliminating the need for an SNMP card.

UPS Scheduling
This scheduling function allows the user to set and manage specific times to automatically shutdown the output to save power.

User-Defined Warnings
This special function allows the user to define the importance of events to eliminate sending out unnecessary UPS warnings.

Single and Network Versions Available
Single Version manages one PC and one UPS. Network Version manages multiple PCs with one UPS system. (Note: this version is not available for the CFR Series).

USHA Universal SNMP/HTTP Appliance

Real-Time Comprehensive Remote UPS Management
Manage your UPS via web browser, network management software (includes custom MIB and standard RFC-1628 MIB), or Java.

E-mail and Mobile Phone Notification
Receive event messages via E-mail, Short Message (SMS), and SNMP Trap.

Check UPS Status
Network administrator can monitor UPS status at any time with a mobile phone or Personal Digital Assistant (PDA).

Easily and Safely Shutdown
In the event of power loss, the USHA system can be remotely signaled to shutdown (up to 30 terminals) to protect your valuable data.

Flexible Configuration
Configure the USHA via Web browser, Telnet, SNMP and Hyper Terminal.

Automatically Assign IP Addresses
IP addresses can be assigned automatically via DHCP and BOOTP protocols.

Remotely Schedule Shutdown, Start-up and Reboot Procedures
The USHA system allows the user to set and manage specific times to automatically shutdown, startup, or reboot.

Supports Multiple Languages
Choose between two languages for your web interface: English, and a second language of your choice.

Data Logging
The USHA system provides data logging for statistical analysis and diagnostics.

Design Comparison	Alpha CFR	Basic Ferroresonant
Regulation		
Input Window:	-25% to 10%	-15% to 15%
Output Window:	±1%	±3%
Adjustable Output Voltage:	Yes	No
Closed Loop Feedback:	Yes	No
Efficiency		
@ Full Load:	Up to 94%	Typically 85 to 92%
Step-Load Response:	1/2 Cycle	5 or more cycles
Soft-Start Capabilities:	Yes	No
Frequency Compensation:	Yes	No
Output Waveform <5% THD:	Sine Wave	Sine Wave
Communications:	Yes	Limited
Audible Noise:	32 to 39 dB	45 to 65 dB

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