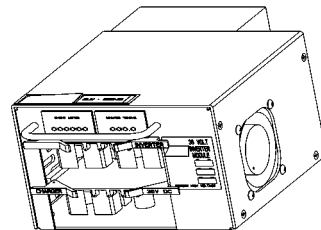
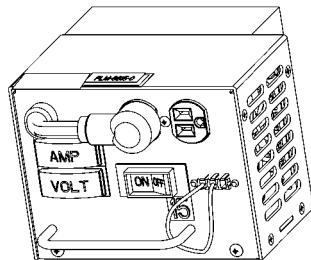




BroadBand CTFLM and CTSLM Module Series

Ferroresonant Module and Standby Module Power Supplies

User Manual



Chapter 1 General Information

The CTFLM (ferroresonant power module) Series Modules can be used as a stand-alone power supply or combined with a CTSLM Series (standby power module) Module and batteries to form an uninterruptible power supply.

Important Safety Instructions – Save These Instructions

This Safety Guide contains important instructions that should be followed during installation and maintenance of the APC equipment and batteries. It is intended for APC customers who setup, install, relocate, or maintain APC equipment.

Changes and modifications to this unit not expressly approved by APC could void the warranty.

Failure to observe these warnings may result in serious injury, death or damage to the equipment.

Electrical Warnings

Do not work alone under hazardous conditions.

Do not handle any metallic connector before the power has been disconnected.

Servicing this equipment may require working with protective covers removed and utility power connected. Use extreme caution during these procedures.

High circuit current through conductive materials could cause severe burns.

When grounding cannot be verified, disconnect the equipment from the utility power outlet before installing or connecting to other equipment. Reconnect the power cord only after all connections are made.

Check that the power cord(s), plug(s), and sockets are in good condition.

Replacement of fuses or other parts must be with identical types and ratings. Substitution of nonidentical parts may cause safety and fire hazards.

Overhead Warnings

Never stand underneath anything while it is being hoisted.

Always wear a hard hat.

Lifting Warnings

These modules are heavy. Use proper lifting techniques and equipment to avoid injury.

Specifications

CTFLM/CTSLM Environmental Specifications

Operating Temperature	-40° F to 140° F (-40° C to 60° C)
Humidity	5% to 95% noncondensing within enclosure

CTFLM Physical Specifications

Characteristic	Specification
Weight	28 lbs (13 kg)

CTFLM Electrical Specifications

<i>CTFLM6009</i> <i>CTFLM6509</i> <i>CTFLM6015</i> <i>CTFLM6515-0</i> <i>CTFLM6615</i>	Input Voltage 120 VAC 220 VAC 120 VAC 220 VAC 220 VAC	Input Current 6.5 A 6.5 A 11 A 6.5 A 11 A	Input Frequency 60 Hz ± 1 Hz 50 Hz ± 1 Hz 60 Hz ± 1 Hz 50 Hz ± 1 Hz 60 Hz ± 1 Hz
<i>CTFLM6009</i> <i>CTFLM6509</i> <i>CTFLM6015</i> <i>CTFLM6515-0</i> <i>CTFLM6615</i>	Output Voltage 60 VAC	Output Current 9 A 9 A 15 A 15 A 15 A	Output Regulation ± 3%
Efficiency	To 92%		

CTSLM Physical Specifications

Characteristic	Specification
Weight	23 lbs (10 kg)

CTSLM Electrical Specifications

<i>CTSLM601536</i> <i>CTSLM601536EH</i> <i>CTSLM6015360FIL</i> <i>CTSLM651536</i> <i>CTSLM601524</i>	Output Voltage 60 VAC	Output Current 15 A	Output Regulation Normal ± 3% Standby ± 5% (80% load)
Efficiency	To 92%		
Transfer Time	<20 milliseconds		

Chapter 2 Installation and Maintenance

Only trained service personnel should install and maintain the power supply.

Prior to installing the CTFLM module, utility line voltage must be routed to the enclosure. Local, state, federal and/or National Electric Code (NEC) regulations regarding location, permits and electrical wiring must be adhered to.

Do not operate the power supply where the temperature and humidity are outside the specified limits. See *Specifications* in this manual.

Unpacking

Inspect the unit upon receipt. Notify the carrier if there is damage.

The packaging is recyclable; save it for reuse or dispose of it properly.

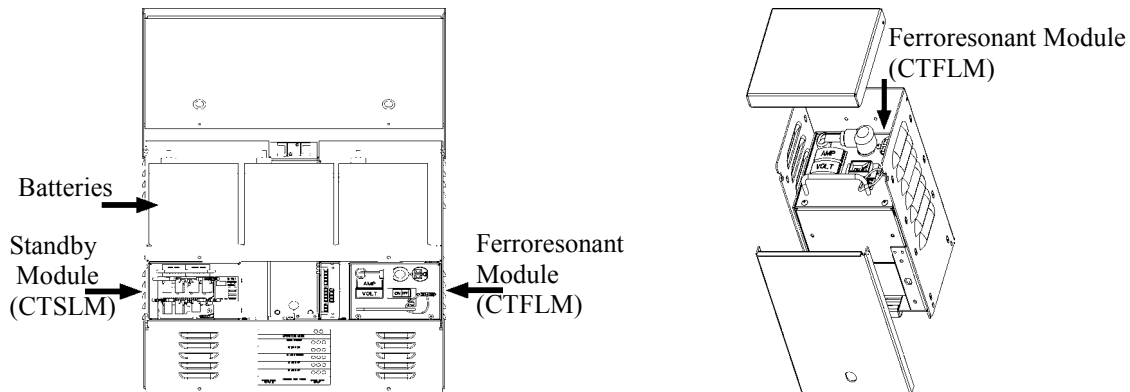
Check the package contents. The package contains the power supply module and product documentation.

Models Supported

Model Number	Description
CTFLM6009	FL Module, 120 VAC, 60 Hz, 60 VAC, 9 A
CTFLM6009A	FL Module, 120 VAC, 60 Hz, 60 VAC, 9 A with Amp/Volt Meter Option
CTFLM6509	FL Module, 220 VAC, 50 Hz, 60 VAC, 9 A, CE-EURO
CTFLM6015	FL Module, 120 VAC, 60 Hz, 60 VAC, 15 A
CTFLM6015A	FL Module, 120 VAC, 60 Hz, 60 VAC, 15 A with Amp/Volt Meter Option
CTFLM6515-0	FL Module, 220 VAC, 50 Hz, 60 VAC, 15 A
CTFLM6515	FL Module, 220 VAC, 50 Hz, 60 VAC, 15 A, CE-EURO
CTFLM6515A	FL Module, 220 VAC, 50 Hz, 60 VAC, 15 A with Amp/Volt, CE-EURO
CTFLM6515A	FL Module, 230 VAC, 50 Hz, 60 VAC, 15 A with Amp/Volt Meter Option
CTFLM6615A	FL Module, 120 VAC, 60 Hz, 60 VAC, 15 A with Amp/Volt Meter Option
CTFLM6615	FL Module, 220 VAC, 60 Hz, 60 VAC, 15 A
CTSLM601536	SL Module, 36 VDC, 60 Hz, 60 VAC
CTSLM601536EH	SL Module, 36 VDC, 60 Hz, 60 VAC, with Event/Hour Meter
CTSLM6015360FIL	SL Module, 36 VDC, 60 Hz, 60 VAC, with Filter Installed
CTSLM651536	SL Module, 36 VDC, 50 Hz, 60 VAC
CTSLM601524	SL Module, 24 VDC, 60 Hz, 60 VAC

Installing the Module

Your enclosure model may vary from the models depicted in the diagrams. The CTFLM and CTSLM installation procedures are similar for all models. Refer to your enclosure User Manual for installation details.



Ferroresonant Module (CTFLM) Installation

1. Switch the utility circuit breaker OFF.
2. Locate the pin connector on the enclosure. Slide or lower the CTFLM into the enclosure. The guide pin on the CTFLM will snap into the connector on the enclosure.
3. Switch the utility circuit breaker ON.
4. Switch the breaker located on the front of the CTFLM ON. The green status indicator lamp on the enclosure will illuminate.
5. Verify voltage at the stinger connector. Refer to *Specifications* in this manual.

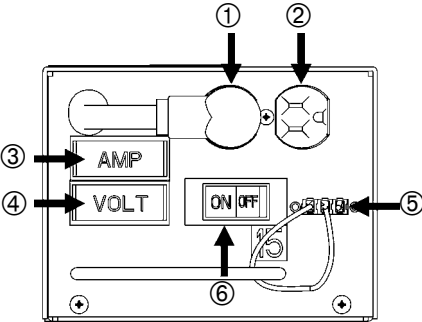
Standby Module (CTSLM) Installation

1. Ensure the batteries are connected properly and the battery circuit breaker is OFF.
2. Locate the pin connector on the enclosure. Slide or lower the CTSLM into the enclosure. The guide pin on the CTSLM will snap into the connector on the enclosure.
3. Connect the batteries using instructions in the enclosure User Manual.
4. Switch the battery circuit breaker ON.

Note: Batteries charge during normal operation.

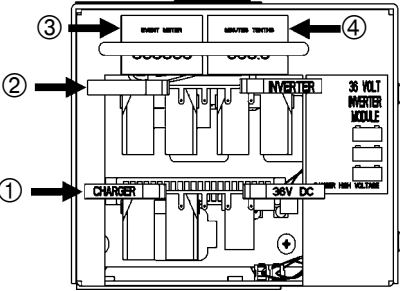
Chapter 3 Operation

CTFLM



INDEX	ITEM	DESCRIPTION
1	Line Cord Plug	Provides power to the CTFLM and an access point for auxiliary power
2	Utility Auxiliary Plug	Provides access to utility power for equipment used by field personnel
3	Ammeter (Option)	Displays output current
4	Voltmeter (Option)	Displays output voltage
5	Option Plug	Provides an interface for standard APC power supply options
6	CTFLM Circuit Breaker	Provides power to CTFLM

CTSLM



INDEX	ITEM	DESCRIPTION
1	Charger Card	Contains circuits used to: Maintain a charge on the batteries, sense input power loss and provide logic to mode of operation
2	Inverter Card	Contains circuits that receive dc input from the batteries and provide utility output during standby operation
3	Event Counter (optional)	Displays the number of transitions from normal to standby operation
4	Hour Meter (optional)	Displays the total time in standby operation

Initial Startup

1. Switch the utility circuit breaker ON.
2. Verify that the CTFLM and CTSLM circuit breakers are switched ON.
3. Allow 15 seconds for the CTSLM to run through the time delay cycle.
4. Check the battery float voltage on the charger card at TP1 and TP2.

If adjustment is necessary, switch the battery circuit breaker to the OFF position. Attach test leads to TP1 (red) and TP2 (black); adjust potentiometer R2 for correct reading. Switch the battery circuit breaker ON.

5. Measure the voltage at the coax connector ensuring that 60 VAC are present.

Verify CTSLM Operation

Allow the batteries to charge for 24 hours prior to testing.

Switch the CTFLM circuit breaker OFF. The red status indicator lamp will illuminate and the CTSLM will begin standby mode operation.

Shut Down

Switch the battery circuit breaker, the CTFLM circuit breaker, and the utility line circuit breaker OFF.

Auxiliary Power Supply

1. Set up an auxiliary utility generator and calibrate to $60 \text{ Hz} \pm 1 \text{ Hz}$.
2. Turn the utility breaker OFF.
3. Unplug the utility input cord from the CTFLM and attach it to the generator extension cord.
4. The green status indicator lamp on the enclosure will illuminate.

For details regarding available options see the APC Web site www.apc.com.

Chapter 4 Service, Contact and Warranty Information

Service

APC makes every effort to ensure parts and equipment arrive in working condition. Occasionally, it may be necessary to return parts or equipment that are not in working condition.

If the unit requires service do not return it to the dealer. Follow these steps:

1. Contact APC Customer Support through the APC Web site, www.apc.com/support.
 - Note the product model number, the serial number, and the date purchased. If you call APC Customer Support, a technician will ask you to describe the problem and try to solve it over the phone. If this is not possible the technician will issue a Returned Material Authorization Number (RMA#).
 - If the product is under warranty, repairs are free. If not, there is a repair charge.
 - Procedures for servicing or returning products may vary internationally. Refer to the APC Web site. Select the appropriate country from the country selection field. Select Support from the tab at the top of the web page.
2. Pack the product in its original packaging.
 - Pack the unit properly to avoid damage in transit. Never use Styrofoam beads for packaging. Damage sustained in transit is not covered under warranty.
3. Mark the RMA# on the outside of the package.
4. Return the unit by insured, prepaid carrier to the address given to you by Customer Support.

How to Contact APC

In the USA ...	Outside the USA ...
Refer to the APC Web site, www.apc.com/support .	Refer to the APC Web site, www.apc.com . Select the appropriate country from the country selection field. Select the <i>Support</i> tab at the top of the web page.

Limited Warranty

American Power Conversion (APC) warrants its products to be free from defects in materials and workmanship for a period of two years from the date of purchase. Its obligation under this warranty is limited to repairing or replacing, at its own sole option, any such defective products. To obtain service under warranty you must obtain a Returned Material Authorization (RMA) number from customer support. Products must be returned with transportation charges prepaid and must be accompanied by a brief description of the problem encountered and proof of date and place of purchase. This warranty does not apply to equipment that has been damaged by accident, negligence, or misapplication or has been altered or modified in any way. This warranty applies only to the original purchaser who must have properly registered the product within 10 days of purchase.

EXCEPT AS PROVIDED HEREIN, AMERICAN POWER CONVERSION MAKES NO WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Some states do not permit limitation or exclusion of implied warranties; therefore, the aforesaid limitation(s) or exclusion(s) may not apply to the purchaser.

EXCEPT AS PROVIDED ABOVE, IN NO EVENT WILL APC BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OF THIS PRODUCT, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE. Specifically, APC is not liable for any costs, such as lost profits or revenue, loss of equipment, loss of use of equipment, loss of software, loss of data, costs of substitutes, claims by third parties, or otherwise.

Regulatory Approval



2003

Date of product declaration

CE Declaration of Conformity

We, the undersigned, declare under our sole responsibility that the equipment specified below conforms to the following standards and directives:	
Standards to Which Conformity Declared:	EN 50091-1-1, 1-2, EN 55022, EN 60950-1, EN 6100-3-2, 3-3, 4-2, 4-3, 4-4, 4-5, 4-6, 4-11
Application of Council Directives:	73/23/EEC, 93/68/EEC
Type of Equipment:	Power Supply
Model Numbers:	CTFLM 6515, 6515A, 6509, CTSLM 651536
Manufacturer's Name and Address:	American Power Conversion 112 Fairgrounds Road West Kingston, Rhode Island, 02892, USA -or- American Power Conversion (A. P. C.) b. v. Ballybritt Business Park Galway, Ireland -or- American Power Conversion 2nd Street PEZA Cavite Economic Zone Rosario, Cavite Philippines -or- American Power Conversion Main Avenue, Pasa Rosario, Cavite, Philippines -or- APC (Suzhou) UPS Co., Ltd 339 Sihong Zhong Lu Suzhou Industrial Park Suzhou Jiangsu 215021 P.R. China
Importer's Name and Address:	American Power Conversion (A. P. C.) b. v. Ballybritt Business Park Galway, Ireland
Place: N. Billerica, MA U.S.A.	Richard J. Everett, Sr. Regulatory Compliance Engineer <i>Richard J. Everett</i> 5 Jan 02
Place: Galway, Ireland	Ray S. Bullard, Managing Director, Europe <i>Ray S. Bullard</i> 5 Jan 02

Entire contents copyright © 2003 by American Power Conversion Corporation. All rights reserved. Reproduction in whole or in part without permission is prohibited.

APC is a registered trademark of American Power Conversion Corporation. All other trademarks are the property of their respective owners.