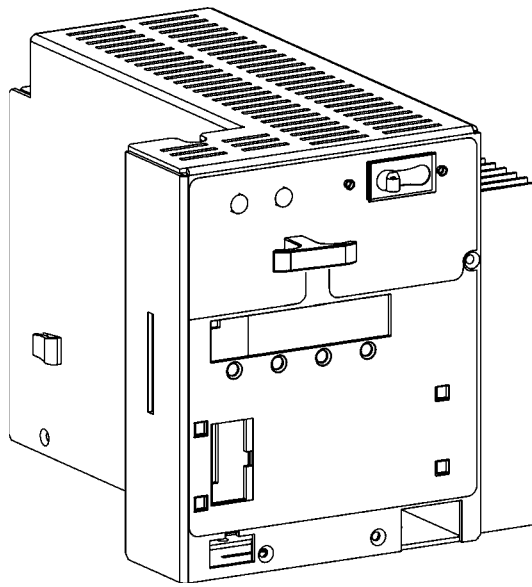




Broadband CTSP-EM48 Series

Total System Power Electronics Module

User Manual



Chapter 1 General Information

The CTSP Electronics Module (CTSP-EM) is compatible with all CTSP Transformer Modules (CTSP-TM). An Electronics Module and a Transformer Module together create an uninterruptible power supply.

U.S. Patent No. 6,400,043

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 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.

BATTERY WARNINGS

Danger of explosion if battery is incorrectly connected or replaced. Replace batteries with same or equivalent type recommended by the manufacturer.

OVERHEAD WARNINGS

Never stand below anything while it is being hoisted.
Always wear a hard hat.

LIFTING WARNINGS

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

Unpacking

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

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

The package contents include:

- ✓ the CTSP-EM
- ✓ the enclosure interface cable
- ✓ the temperature sensor
- ✓ product documentation

Models Supported

CTSP-EM48	CTSP Elec Mod 15/22 A, 36/48 VDC
CTSP-EM48-1	CTSP Elec Mod 15/22 A, 36/48 VDC, DC breaker

Specifications

Environmental Specifications

OPERATING TEMPERATURE	-40° F to 158° F (-40° C to 70° C)
HUMIDITY	5% to 95% noncondensing within enclosure

Physical Specifications

CHARACTERISTIC	SPECIFICATION
Height	<i>CTSP-EM48</i> : 8" (20 cm) <i>CTSP-EM48-1</i> : 9.25" (23.5 cm)
Width	9.5" (24 cm)
Depth	11" (28 cm)
Weight	11 lbs (5 kg)

Electrical Specifications

INPUT CHARACTERISTIC	INPUT SPECIFICATION
Battery Voltage	36 VDC or 48 VDC
Battery Cutoff (VDC)	31.5 (36 V), 42 (48 V)
OUTPUT CHARACTERISTIC	OUTPUT SPECIFICATION
Output Voltage Regulation	±5%
CTSP Electronics Module Frequency Stability	± 0.1%
<i>CTSP-EM48-1</i> : DC Breaker Series Current and Trip Voltage	90 A, 80 VDC

Chapter 2 Installation and Maintenance

Only trained service personnel should install and maintain the CTSP-EM.

Prior to installing the CTSP-EM, an enclosure must be installed, utility line voltage must be routed to the enclosure, and a CTSP-TM must be installed. Local, state, federal and/or National Electric Code (NEC) regulations regarding location, permits and electrical wiring must be adhered to.

It is recommended that an optional APC CTSP-SP be added to this system for increased surge protection. Refer to the Web site www.apc.com, for ordering details.

Before placing the CTSP-EM on the enclosure shelf, ensure that the input utility circuit breaker is OFF.

Failure to adhere to this warning may result in death, serious injury or equipment damage.

When positioning the CTSP-EM ensure adequate space for proper airflow. APC recommends that there be at least 3 inches of clearance on all sides and above the module.

Failure to adhere to this warning may result in equipment damage.

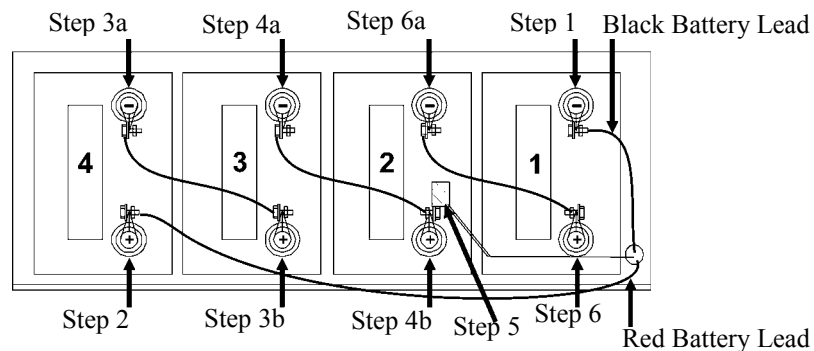
Do not operate this unit where the temperature and humidity are outside the specified limits. See *Specifications* in this manual.

Installing Batteries

The battery circuit breaker must be OFF prior to battery installation.

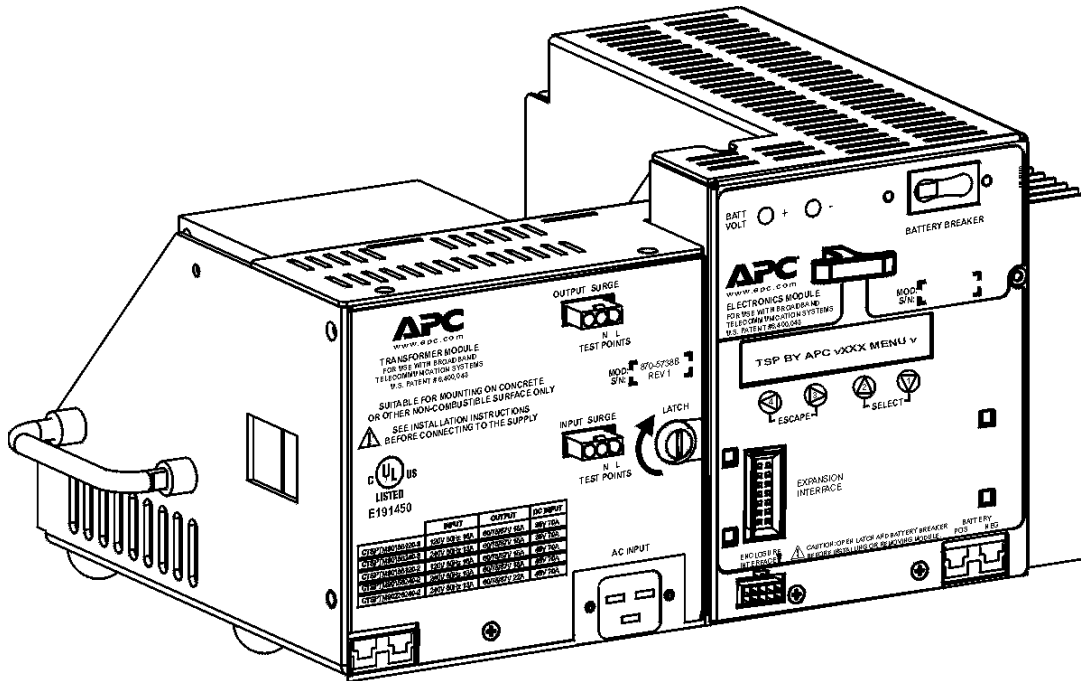
The temperature sensor should be attached to the positive terminal post on either battery # 2 or # 3, (Step 5 below).

This figure shows a basic battery string configuration.



Installing the Electronics Module

Read the entire installation and operation section of this manual prior to installing and connecting the module.



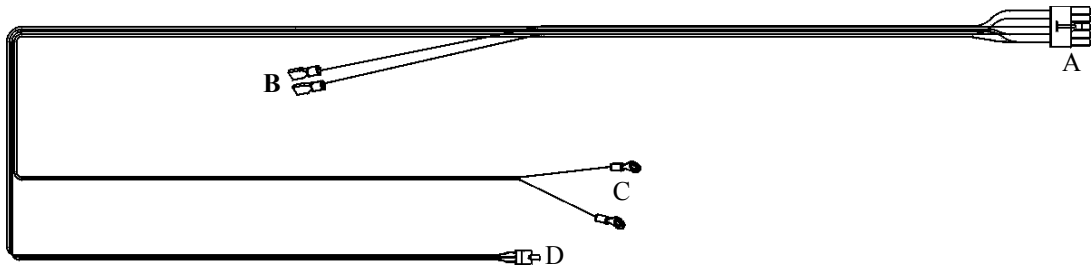
1. Place the CTSP-EM close to and in front of the CTSP-TM.
2. Slide the CTSP-EM back so that the mounting tabs on the side engage firmly with the mounting slots on the side of the CTSP-TM. Failure to lock the modules firmly together will result in an alarm display on the Operator Interface Display.
3. Using a screwdriver, turn the latch on the CTSP-TM clockwise to the locked position.

Always transport the CTSP-TM and CTSP-EM modules individually.

The latch is not designed to support the weight of the modules.

Failure to adhere to this warning may result in damage to equipment.

4. Plug the enclosure interface cable connector (A), into the enclosure interface receptacle on the front of the CTSP-EM.



Depending on the enclosure configuration, connect the following:

- B -power supply status indicator lamp connector
- C -enclosure tamper switch connector
- D -battery temperature sensor probe connector

- The requirement when using two CTSP systems in one cabinet is to utilize both temperature probes. One probe connected to each CTSP-EM. Adequate isolation exists so that the probes can be connected to the same battery terminal.

Any modification of the system wiring (connecting one temperature probe to more than one CTSP-EM), can cause irreparable damage to the CTSP-EM.

5. Where applicable plug the CTSP-SM2, CTSP-SM4, CTSP-SM5 or CTSP-SM7 option into the CTSP-EM. Refer to the User Manual for the CTSP-SM option used.
6. Plug the battery cable into the battery connector on the front of the CTSP-EM.
7. Switch the utility circuit breaker ON. If the unit fails to respond wait one minute, then switch the utility circuit breaker OFF and ON again.
5. Switch the battery circuit breaker ON.
6. Verify operation. Refer to *Chapter 3 Operation*, in this manual.
7. Close and secure the enclosure.

Chapter 3 Operation

Configuration Verification

The CTSP-EM will test and display the unit configuration during power-up or reset. The CTSP-EM will automatically determine and display the configured utility input and output range, and the DC battery voltage.

Once the utility and battery circuit breakers are switched ON, three messages will flash in the CTSP-EM display window, AC TEST, DC TEST, and OUT TEST. When the testing process is complete the CTSP-EM will begin scrolling the unit configuration in the message display window. This information will be repeated if the CTSP-EM is reset or restarted.

During initial power-up or after a new CTSP-TM installation the unit may ask you to confirm that the installed battery is 36 or 48 volts as displayed. Press the left or right arrow respectively to verify the battery installation.

The user can cold start the module when the following conditions exist:

- ✓ the CTSP-EM is not on standby mode operation
- ✓ there is no utility power
- ✓ the batteries are charged

Refer to *Setup/Cold Start* in the *Status Display and Menu Navigation* section of this manual for details.

Performance Verification of CTSP-EM Battery Operation

Performance verification should be performed at the time of initial installation and at least semiannually thereafter.

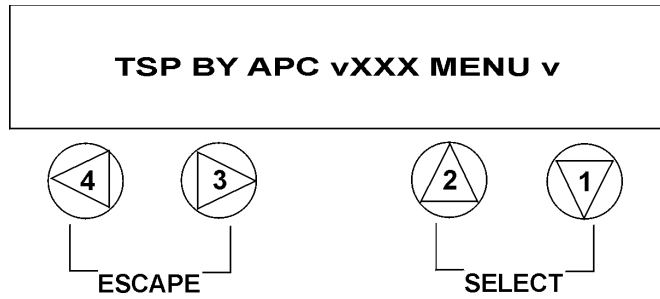
1. Perform a visual check of the CTSP-TM and CTSP-EM modules. Verify that the status indicator lamp is not blinking.
2. Using a voltmeter, verify the voltage at the output connector on the CTSP-TM module. Refer to the attached label on the CTSP-TM or the CTSP-TM User Manual for specifications. The user manual can be found on the APC Web site, www.apc.com/support.
3. Turn the utility line circuit breaker OFF. The CTSP-EM will go on Standby operation.
4. Using a voltmeter or visually observing the Operator Interface Display, verify the voltage at the output connector on the CTSP-TM module. Refer to the attached label on the CTSP-TM or the CTSP-TM User Manual for specifications. The user manual can be found on the APC Web site, www.apc.com/support.
5. If the CTSP-TM voltage output is correct, turn the utility line circuit breaker ON.

Wait approximately 20 seconds to ensure the CTSP-EM system is operating on utility power.

Status Display and Menu Navigation

The following information describes the steps necessary to determine the setup options and status of the CTSP-EM and the alarms and parameters that are programmed into the CTSP-EM.

The CTSP-EM menu is navigated using the four keys located below the status display window.



To view the CTSP-EM status display SETUP menu, press the down arrow key once.

Refer to the *User Configurable Menu Selections* diagram below for available menu options.

Setup/Address

When the CTSP-EM is configured with a CTSP-SM status monitor interface module, each CTSP-EM connected will default to an automatic address assignment.

The user has the option of creating a fixed device address. The address provides unique identification for each CTSP-EM to remote monitoring equipment.

Use the setup menu, and follow these steps:

- Press the down arrow once. **SETUP** appears in the display window.
- Press the right arrow key once. **ADDRESS** appears in the display window.
- Press the right arrow key once. **UNIT # >** appears in the display window.
 - Use the up and down arrow keys to select the desired CTSP-EM address.
 - Press the right arrow key to save and store the selected address.
- To initiate the above address change the system must be reset. Simultaneously press the left and down arrow keys; **SW RESET** will appear in the display window and the reset process will begin.

NOTE: Power to connected equipment will be interrupted when a software reset is initiated during standby mode operation. Refer to *Troubleshooting* in this manual.

Setup/Charger

The CTSP-EM supports both Cycle and Float Charge modes.

Cycle Charge Mode: This mode allows the CTSP-EM to reduce the battery float voltage for 24 hours after every 48 hours of float charge operation.

To enable Cycle charge mode:

- Cycle Charge must be enabled through the SETUP menu.
- Both a CTSP-SM4 status monitor interface module and an APC Battery Management System or a CTSP-SM5 module must be installed.

Float Charge Mode: This mode charges and maintains the batteries at 13.5 V per battery at 25° C.

To select either Cycle or Float Charge modes follow the steps:

- Press the down arrow once. **SETUP** appears in the display window.
- Press the right arrow key once. **ADDRESS** appears in the display window.
- Press the down arrow key once. **CHARGER** appears in the display window.
- Press the right arrow key once. The active charger mode will appear in the display window, **CYCLE >** or **FLOAT >**.
 - Use the up and down arrow keys to select the desired CTSP-EM charger mode.
 - Press the right arrow key to save and store the selected charger mode.

NOTE: The selected configuration will take effect immediately.

Setup/Cold Start

The CTSP-EM performs an automatic battery verification test:

- After the system has been reset or has gone through a power OFF/ON cycle.
- Utility power is at an acceptable level.

While battery verification is being tested **CHECKING BATTERY – STANBY INHIBIT** will appear in the display window on the CTSP-EM.

If the CTSP-EM detects an unacceptable utility power level, and system configuration has been previously established, **BAD AC IN – STANDBY INHIBIT** will appear in the CTSP-EM display window. Cold Start can be used.

To enable Cold Start follow the steps:

- Press the down arrow once. **SETUP** appears in the display window.
- Press the right arrow key once. **ADDRESS** appears in the display window.
- Press the down arrow key twice. **COLDSTRT** appears in the display window.
- Press the right arrow key once. **EXECUTE >** appears in the display window.
 - Press the right arrow key again to execute a cold start. **VERIFIED** appears in the display window and standby operation will begin immediately.

Setup/Overload

The CTSP-EM supports user configured output overload protection. Selections are based on a cycle of 10 seconds (10%), to 100 seconds (100%) for every 100 seconds of runtime.

The CTSP-EM default setting for the output overload cycle is 100%. This effectively disables output overload protection.

To enable overload protection follow the steps:

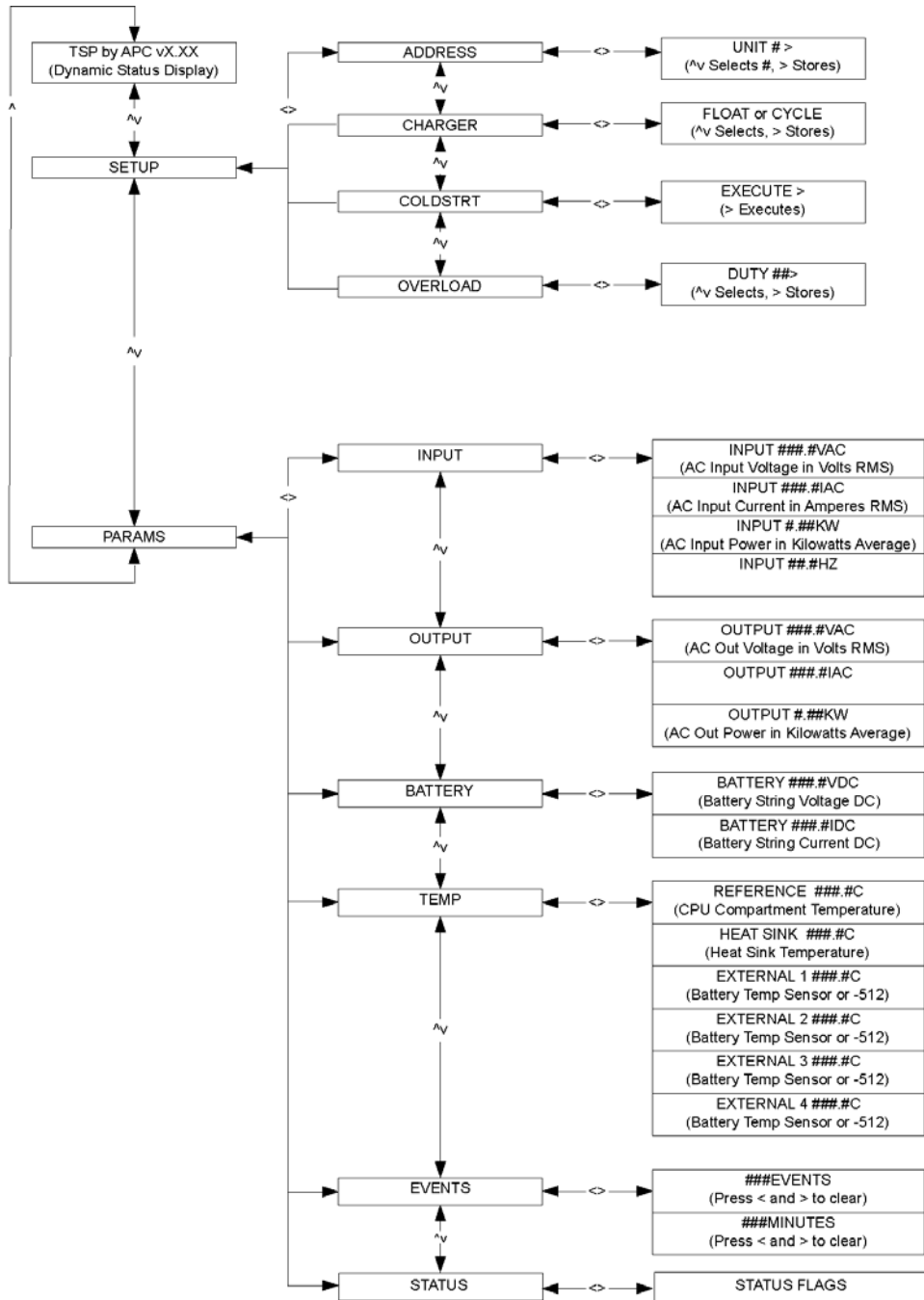
- Press the down arrow once. **SETUP** appears in the display window.
- Press the right arrow key once. **ADDRESS** appears in the display window.
- Press the down arrow key three times. **OVERLOAD** appears in the display window.
- Press the right arrow key once. **OCP 100>** appears in the display window.
 - Use the up and down arrow keys to select the desired overload protection cycle.
 - Press the right arrow key to save and store the selection.

NOTE: The selected configuration will take effect immediately.

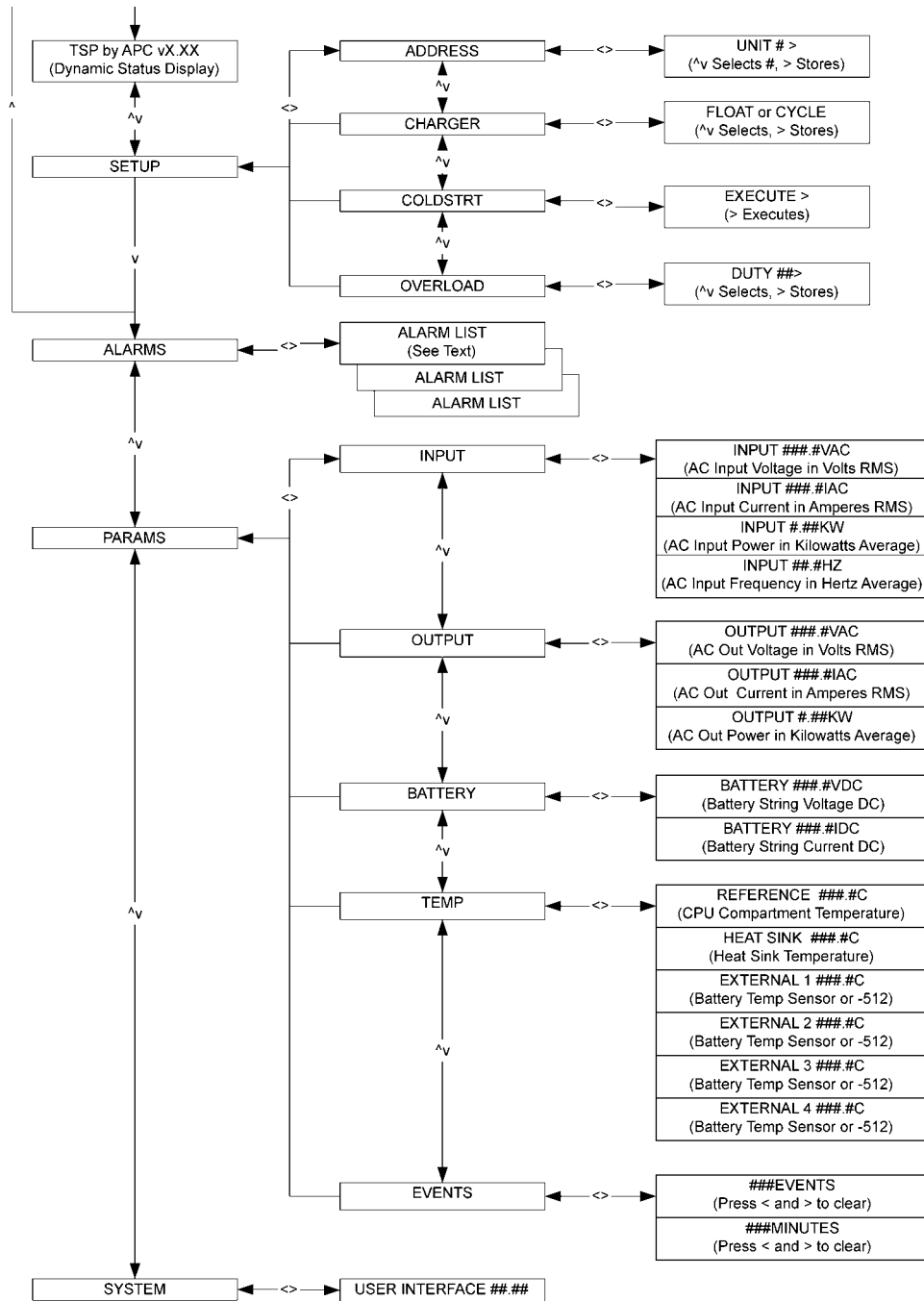
NOTE: Activation of overload protection begins 255 seconds following an overload situation.

NOTE: If the battery weakens to less than 11.4 V per battery and overload protection is enabled, the cycle will become fixed at 9 seconds on and 591 seconds off.

User Configuration Menu Selections for V2.1X



User Configuration Menu Selections for V2.0X



Dynamic Status Display

Status messages:

STATUS MESSAGE	MEANING
NORMAL	Normal operation
NORMAL CHARGING	-Normal operation -The battery is charging at greater than .8 A.
AC TEST	CTSP-EM is checking the AC configuration
DC TEST	CTSP-EM is checking the DC configuration
OUT TEST	CTSP-EM is checking the Output configuration
VERIFIED	CTSP-EM has verified the system configuration, or the COLDSTART command has been accepted
CHECKING BATTERY – STANDBY INHIBIT	-System is checking the batteries -Automatic standby operation is not available
BAD AC IN – STANDBY INHIBIT	-Utility power input is unacceptable or absent -Automatic standby operation is not available
ON STANBY TRANSFER	Transferring from standby to utility power
ON STANDBY SELF TEST	Manual or automatic Self Test in progress
ON STANDBY AC FAIL	Standby is enabled due to unacceptable or absent utility power input
ALARM COM BUS FAILURE	Unable to communicate due to bus failure (repair bus)
ALARM ADDRESS CONFLICT	Two or more CTSP-EM modules have the same address
ALARM STANDBY INHIBIT	Automatic Standby operation is not available
ALARM HIGH TEMP	Standby is unavailable due to high heat sink temperature
ALARM HIGH BATTERY	-Battery voltage is too high for present configuration -Automatic standby operation not available
ALARM DEAD BATTERY	-Battery voltage is too low to reliably support standby -Battery voltage is low, unit is recharging batteries -Automatic standby operation not available
ALARM NO BATTERY	-Battery has unacceptably low voltage -Battery is disconnected or circuit breaker is OFF
ALARM OVERLOAD	Output current exceeds the specified rating for the CTSP-TM
ALARM LOCK OPEN	-Close module Interlock -Standby is unavailable when lock is open
ALARM BAD TM RELAY	Replace the Transformer Module
SLEEPING	Displayed every 60 seconds while unit is without utility power and battery is below 1.9 V per cell
SHUTDOWN	Displayed momentarily before entering sleep mode
POWER UP	Displayed momentarily when returning from sleep mode

Firmware Messages

Bad AC In	Input is too low (<100 VAC) or frequency is too far off for input range determination
Bad AC Out	The output is less than 50 volts RMS. CTSP-TM output tap selector may be disconnected
Confirm 36V<	If the battery string is 36 VDC, press the left arrow key
Confirm >48V	If the battery string is 48 VDC, press the right arrow key
EM/TM Incompatible	Upgrade the CTSP-EM
Unrecognized EM	Upgrade the CTSP-EM
49400-49463	The installed firmware revision does not support the installed hardware. Replace CTSP-EM module with later revision or upgrade Firmware.
49500-49554 50630-50664 50520-50534	Personality Card EEPROM is failed or initialized incorrectly – replace CTSP-EM.
50610	-Transfer Module ID Checksum is incorrect -Replacement of either the CTSP-TM or the CTSP-EM is necessary
50620	Transformer Module ID Missing or Incorrect (replace CTSP-TM).
50510	CTSP-EM Module Revision is Incompatible with attached Transformer Module.
KEY 1	The number 1(down arrow) keypad button on the CTSP-EM is stuck (closed)
KEY 2	The number 2 (up arrow) keypad button on the CTSP-EM is stuck (closed)
KEY 3	The number 3 (right arrow) keypad button on the CTSP-EM is stuck (closed)
KEY 4	The number 4 (left arrow) keypad button on the CTSP-EM is stuck (closed)

V2.1X Firmware

Dynamic Status Flag List

The system flags are useful only for diagnostics since they require careful interpretation and certain combinations of flags might appear to be contradictory. Starting with version 2.11, information that was once in the “ALARMS” menu is now available in the “STATUS” sub-menu of “PARAMS”. Only the active (or true) system flags in the list are displayed and the display is continually updated. The table below lists the messages that may be observed in the status display and their general meaning.

FLAG	MEANING
DEAD BATTERY	The battery is too weak to attempt standby operation. This state is always true at system reset, and will be cleared if the charger is enabled and the battery string is above 1.9 volts per cell.
NO BATTERY	The battery is absent or below 1.25 volts per cell. This could also mean that the battery circuit breaker or wiring is open.
SLEEPING	The battery is depleted and the unit is entering sleep mode. (Note: this message will be displayed regardless of the user interface location). When the battery or AC power recovers, the unit will display “POWER UP” momentarily before returning to the user interface.
DOOR OPEN	The tamper alarm circuit is open.
CHARGING	The battery charger is enabled to charge the batteries.
LOCK OPEN	The module interlock is unlatched (open).
HIGH BATTERY	The battery voltage is above acceptable limits. (2.6V per cell).
RELAY TEST FAIL OPEN	The CTSP-TM module relay armature is in the de-energized position, but should be in the energized position. This could indicate welded relay contacts or an open relay circuit.
COM BUS FAIL	CTSP is unable to communicate due to bus errors preventing transmission or reception of valid data.
STANDBY INHIBIT	Standby operation is inhibited.
LOW OUTPUT	Indicates the output is below approximately 25 V rms.
ON STANDBY	Unit is in standby mode.
ADDRESS CONFLICT	More than one CTSP is attempting to claim the same CAN bus address.
AC FAIL	Mains voltage or frequency is outside of operating limits.
OVERLOAD	CTSP detects an output current overload.
SOFT AC LINE	Mains impedance appears to be abnormally high and at least one attempt to transfer from standby to mains was aborted.
RELAY TEST FAIL CLOSED	The CTSP-TM module relay armature is in the energized position, but should be in the de-energized position. This could indicate a mechanical relay failure or a relay contact failure or a shorted relay driver.
AC LINE INHIBIT	Operation from AC input is inhibited. This does not necessarily mean that the AC line has failed or that the TSP is in standby mode.
INITIALIZING	The unit is powered from mains. This can occur even if mains are inhibited.
ON LINE	Unit is in power-on self test mode. This also occurs if the battery circuit is opened.
CHARGER INHIBIT	Battery charging is not enabled. Causes could be temperature or bad AC line or missing/defective battery.

Alarm List for V2.0X

The following list of alarms and alarm definitions is for diagnostic use only.

Use the up and down arrow keys to select an alarm.

ALARM	STATE	DEFINITION
Dead Battery State is	False	Normal
	True	The battery is too weak to attempt standby operation. This state is always true at reset, and will be cleared if the charger is enabled and the battery string is above 12.6 V per battery.
No Battery State is	False	Normal
	True	The battery is absent or below 7.5 V per battery.
LVCO State is	False	Normal
	True	The battery is below 10.5 V per battery. If utility power is absent the CTSP-EM is entering sleep mode.
Enclosure Door State is	False	The tamper alarm circuit is closed.
	True	The tamper alarm circuit is open.
Module Interlock State is	False	Normal - The interlock is latched.
	True	The interlock is unlatched.
Energize Time State is	False	Normal
	True	The CTSP-TM module relay has failed to open.
Inhibit Reserve State is	False	Normal
	True	Standby operation is inhibited.
On Reserve State is	False	Normal
	True	The CTSP-EM is in standby mode.
Mains Fail State is	False	Normal
	True	Utility voltage or frequency is outside acceptable limits.
Mains Soft State is	False	Normal
	True	Utility power line impedance appears to be abnormally high: at least one attempt to transfer from standby to utility power has been aborted.
Period Fail State is	False	Normal
	True	Utility frequency is outside acceptable limits.
Release Time State is	False	Normal
	True	The CTSP-TM module relay has failed to close.
Inhibit Mains State is	False	Normal
	True	Operation from utility power is inhibited.
On Mains State is	False	The unit is NOT on utility power.
	True	The unit is on utility power.

Troubleshooting

PROBLEM AND POSSIBLE CAUSE	SOLUTION
CTSP-EM WILL NOT TURN ON	
Utility power is not connected. Having performed the above, and the CTSP-EM is not responding:	<ul style="list-style-type: none"> -Check that the utility circuit breaker is ON. -Check that the utility power cable is fully engaged. -Switch the battery circuit breaker OFF. Wait five seconds and switch the battery circuit breaker ON.
UTILITY POWER FAILS AND STANDBY MODE OPERATION DOES NOT START	
If the utility power fails and the CTSP-EM is not ON, power to all connected equipment will be interrupted.	<ul style="list-style-type: none"> -Reestablish utility power connection. -A Cold Start may be initiated to start standby mode operation.
SOFTWARE RESET IS INITIATED DURING STANDBY MODE OPERATION	
If the system is on standby power and a software reset is initiated, the CTSP-EM will shutdown and power to all connected equipment will be interrupted.	<ul style="list-style-type: none"> -Reestablish a utility power connection. -A Cold Start may be initiated to restart standby mode function.
AT INITIAL STARTUP CTSP-EM DISPLAY WINDOW READS BAD AC IN	
The CTSP-TM is operating with incorrect utility input voltage and/or frequency.	<ul style="list-style-type: none"> -Check the specifications on the label attached to the CTSP-TM or refer to <i>Specifications</i> in the CTSP-TM User Manual. The user manual can be found on the APC Web site, www.apc.com/support. -Check that the CTSP-TM output voltage Tap is connected properly.
AT INITIAL STARTUP CTSP-EM DISPLAY WINDOW READS BAD AC OUT	
The CTSP-TM is operating with incorrect utility input voltage and/or frequency.	<ul style="list-style-type: none"> -Check the specifications on the label attached to the CTSP-TM or refer to <i>Specifications</i> in the CTSP-TM User Manual. The user manual can be found on the APC Web site, www.apc.com/support. -Check that the CTSP-TM output voltage Tap is connected properly.
CTSP-EM DISPLAY WINDOW READS CONFIRM 36V	
Normal operation. At initial startup for a new CTSP-TM installation, the CTSP system may see a fully charged three battery string as a discharged four battery string. The CTSP system will request confirmation on the correct battery configuration.	<ul style="list-style-type: none"> -If the battery string is 36 VDC, press the left arrow key -If the battery string is 48 VDC, press the right arrow key
CTSP-EM DISPLAY WINDOW READS ALARM NO BATTERY	
The batteries are connected to the CTSP-EM. The CTSP-EM display window indicates that battery connections are missing.	<ul style="list-style-type: none"> -Check that the battery circuit breaker is ON. -Check that the battery cable connector on the CTSP-EM is fully engaged. -Check the battery terminals are free from corrosion. -Check that the battery terminal connections are secure. -Check battery voltage as measured by the CTSP-EM. <p>Refer to the <i>User Configuration Menu Selections</i> diagram in this manual.</p> <p>Voltage readings below 21.5 V (three battery string), 30 V (four battery string) indicate severely discharged batteries.</p> <p>Replace batteries with voltage readings below 7.5 V. The CTSP-EM will not recharge batteries with very low voltage readings.</p>

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 for country specific instructions.
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.



Be sure to deliver spent batteries to one of the recycling facilities listed on the Used Battery Return Facilities sheet included with the replacement battery.

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 five 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



EC Declaration of Conformity

Date of product declaration **2005**

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:

EN55022; EN55024; EN50091-1, -1; EN60950-1;
EN61000-3-2, 3-3, -3, 4-2, 4-4, 4-5, 4-6, 4-11;
EN60950; IEC60950

Application of Council Directives:

73/23/EEC; 89/336/EEC

Type of Equipment:

Power Supply

Model Numbers:

CTSP-EM48

Importer:

American Power Conversion
Ballybritt Business Park
Galway, Ireland

Place: **Ray S. Ballard Managing Director, Europe**
Galway, Ireland *Ray S. Ballard* **5 Jan 05**

Place: **Richard J. Everett Sr. Regulatory Compliance Engineer**
N. Billerica, MA *Richard J. Everett* **5 Jan 05**
USA

Manufacturers:

American Power Conversion
Ballybritt Business Park
Galway, Ireland

American Power Conversion
Breaffy Rd
Castelbar
Co Mayo, Ireland

American Power Conversion
132 Fairgrounds Rd
West Kingston, RI 02892 USA

American Power Conversion
1600 Division Rd
West Warwick, RI 02893 USA

American Power Conversion
40 Catamore Blvd
East Providence, RI 02914 USA

APC India Pvt. Ltd.
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Bangalore, 562106
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American Power Conversion
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PEZA, Rosario, Cavite
Philippines

American Power Conversion
2nd Street
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Rosario, Cavite
Philippines

American Power Conversion
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