

**Correctional Service Canada  
Technical Services Branch  
Electronics Systems**

---

**ES/SPEC-0103  
Revision 2  
22 January 2002**

**ELECTRONICS ENGINEERING  
SPECIFICATION**

**UNINTERRUPTABLE POWER SUPPLY  
FOR USE IN  
FEDERAL CORRECTIONAL INSTITUTIONS**

**AUTHORITY**

This Specification is approved by the Correctional Service of Canada for the procurement and Installation of Uninterruptable Power Supply (UPS) systems in Canadian federal correctional institutions.

Recommended corrections, additions or deletions should be addressed to the Design Authority at the following address: Director, Engineering Services, Correctional Service of Canada, 340 Laurier Avenue West, Ottawa, Ontario, K1A 0P9

---

**Prepared by:**

**Manager,  
Electronics Systems Research**

**Approved by:**

**Director,  
Engineering Services**

## TABLE OF CONTENTS

TABLE OF CONTENTS.....	2
ABBREVIATIONS.....	4
DEFINITIONS.....	5
1.0 INTRODUCTION.....	6
1.1 General.....	6
1.2 Purpose.....	6
1.3 Commercial-Off-The-Self Equipment.....	6
1.4 Technical Acceptability.....	6
1.5 Equipment Procurement.....	7
1.6 Quantity of Equipment.....	7
2.0 APPLICABLE DOCUMENTS.....	7
3.0 REQUIREMENTS.....	8
3.1 General.....	8
3.1.1 Period of Operation.....	8
3.1.2 Wires, Cables, Conduits, Ducts.....	8
3.1.3 Control Equipment.....	8
3.2 System Requirements.....	8
3.2.1 General.....	8
3.2.2 Output Power.....	9
3.3 Design Requirements.....	9
3.3.1 General.....	9
3.3.2 Sabotage, Tampering and Survivability.....	9
3.3.3 UPS Failure.....	9
3.3.4 Human Factors.....	9
3.3.5 Existing Equipment.....	9
3.3.6 Control Panels.....	10
3.4 Functional Requirements.....	10
3.5 Environmental Requirements.....	10
3.6 Power Requirements.....	10
3.7 Installation Requirements.....	10
3.8 Documentation Requirements.....	10
3.9 Support Requirements.....	10
3.10 Training Requirements.....	11

4.0	QUALITY ASSURANCE .....	11
4.1	General .....	11
5.0	DELIVERY.....	11
6.0	INTERFERENCE .....	11
7.0	SAFETY .....	11

### **ABBREVIATIONS**

The following abbreviations are used in this specification:

CER	Common Equipment Room
COTS	Commercial-Off-The- Shelf
CSA	Canadian Standards Association
CSC	Correctional Service Canada
DES	Director Engineering Services
EIA	Electronic Industries Association
GFE	Government Furnished Equipment
MCCP	Main Communications and Control Post
RFP	Request for Proposal
SOW	Statement of Work
TES	Terminal Equipment Space
UPS	Uninterruptable Power Supply

### **DEFINITIONS**

The following definitions are used in this specification:

Design Authority	Director, Engineering Services (DES) - Correctional Service Canada (CSC) is responsible for all technical aspects of the system design and implementation.
Contract Authority	Public Works and Government Services Canada (PW&GSC) is responsible for all contractual matters associated with the system design and implementation.
Contractor	The company selected as the successful bidder.
Project Officer	A CSC employee or a contracted person designated by DES to be responsible for the implementation of the project.
Off-the-shelf	Equipment currently on the market with available field reliability data, manuals, engineering drawings and parts price list.
Custom Equipment	Equipment designed and/or manufactured specifically for a specific contract.

## 1.0 **INTRODUCTION**

### 1.1 **General**

This specification defines the essential technical and functional requirements of the Correctional Service of Canada (CSC) for the procurement and installation of an Uninterruptable Power Supply (UPS) system for federal correctional institutions.

### 1.2 **Purpose**

The primary use of the UPS system is to provide a back up power capability to sustain operations of major electronic security systems during commercial power failures and the time required to bring the emergency power generators up to stable power conditions. Once the generators are handling the power requirements of the electronic systems, the UPS will return to the standby condition.

Through the selection of certain options or alternatives, the system described herein would be applicable to new institutions to be constructed. It could also be retrofitted into existing institutions whenever it becomes necessary to add an UPS capability or replace existing obsolete equipment.

### 1.3 **Commercial-Off-The-Shelf Equipment**

The UPS system shall use commercial off-the-shelf (COTS) equipment and proven designs to the maximum extent possible. All new equipment shall meet the specified lifespan requirements. New equipment designs shall be restricted to unique interfaces to the control console.

### 1.4 **Technical Acceptability**

The Correctional Service of Canada (CSC) operational environment is unique for its diversity of locations, climate exposures and the physical restrictive construction techniques of penal institutions. Maintaining national security, the safety of staff and offenders alike is CSC's commitment to the government and public. Electronic security systems operating in this unique environment shall maintain very high standards of dependability and reliability.

The CSC Engineering Services Division has established technical specifications and equipment standards for specific electronic security systems which are based on very specific and restrictive operational performance criteria as detailed in its Electronic Engineering Standard. Technical acceptability of these systems means that the equipment complies with the pertinent CSC specifications and standards.

The technical acceptance process shall involve system and subsystem evaluation in accordance with the applicable CSC specifications in one of CSC facilities or may be tested in a CSC facility to verify the effectiveness of the proposed technologies when subjected to the restrictive operational environment.

CSC shall also verify in depth any of the system technical specifications called up. CSC may when it deems necessary, request the supplier to arrange for a full site demonstration. CSC may rely on manufacturer's test results for specific areas of the specification where an independent test facility has conducted the test, and the facility is deemed acceptable to CSC.

It is the supplier's responsibility to make new developments in products available to CSC for evaluation.

Equipment qualification is an ongoing process and can be initiated at any time by a vendor. Any vendor can have access to the CSC specifications and standards. Any new development or products should be submitted to the CSC Engineering Services Division, Technical Authority in a suitable time frame prior to any tendering process to allow for an acceptable evaluation period. The evaluation period may take up to sixteen (16) months.

#### 1.5 **Equipment Procurement**

Any ordering of equipment/material before the approval of the UPS system design report will be undertaken at the contractor's own risk. The Design Authority may authorize the procurement of certain long lead items at, or shortly after a preliminary design review of the proposed system.

#### 1.6 **Quantity of Equipment**

The quantity and location of the UPS equipment required for CSC institutions will be contained in the specification identified in the STR.

### 2.0 **APPLICABLE DOCUMENTS**

The following documents of the issue in effect on the date of the Request for Proposal (RFP) shall form a part of this specification to the extent specified herein.

ES/SOW-0101 Statement of Work for Electronic Systems for Correctional Service of Canada Institutions.

ES/SOW-0102 Statement of Work for Quality Control for installation of Electronic Systems in Federal Correctional Institutions.

ES/STD-0804 Standard for an Uninterruptable Power Supply

EIA-310-C Electronic Industry Association Standard for Racks, Panels and Associated Equipment

### 3.0 **REQUIREMENTS**

#### 3.1 **General**

The contractor shall design, supply, install, test and provide documentation and training for an UPS system in accordance with this specification and Statement of Work, ES/SOW-0101.

##### 3.1.1 **Period of Operation**

The UPS system and all associated equipment shall be rated for and capable of 24 hours per day, seven days per week operation.

##### 3.1.2 **Wires, Cables, Conduits, Ducts**

The contractor shall supply all necessary terminations, conduits, wire and cabling and any other items that may be required for the satisfactory completion of the specified system. All installation workmanship shall be performed in accordance with ES/SOW-0102, SOW and all applicable national, provincial, and local electrical codes.

A wiring diagram shall be supplied in the Installation section of the Maintenance Manual to detail where module connections terminate and how wires are routed and terminated.

Conduits, cables, ducts, trays, etc. may be either Government Furnished Equipment (GFE) or supplied and installed by the contractor depending on the particular institution. The determination will be made by the Design Authority and will be identified in the STR.

Connectors provided on the ends of any cable must mate with the corresponding connector on the equipment. Adapters from one type of connector to another are not acceptable.

##### 3.1.3 **Control Equipment**

The maximum feasible amount of control equipment (power supplies, logic boards, etc.) shall be located in Terminal Equipment Spaces (TES) and Common Equipment Room (CER) provided for the purpose. These areas will be identified in the RFP. It is preferred that only equipment such as lights, switches, actuators, etc. which the operator must access directly should be located in the Control Posts.

#### 3.2 **System Requirements**

##### 3.2.1 **General**

The UPS shall provide a continuous, no-break source of VAC power for the load in accordance with the ES/STD-0804 Standard.



### 3.2.2 **Output Power**

The output power requirements for the UPS shall be defined in the STR.

## 3.3 **Design Requirements**

### 3.3.1 **General**

To the maximum practical extent, off-the-shelf equipment shall be selected for use in the system. New designs should be restricted to interfacing to existing control panels or unique devices for which an off-the-shelf item does not exist.

A design objective is to minimize the number of wires required between all elements of the system.

### 3.3.2 **Sabotage, Tampering and Survivability**

Elements of the UPS system shall have high resistance to damage, destruction, or conversion to other uses (including weapons). All interconnecting service must be secure against tampering or improper interference.

### 3.3.3 **UPS Failure**

A system failure shall be deemed to have occurred when any electronic security system connected to the UPS cannot sustain operations during a power switch over from commercial power to generator power or vice versa.

The UPS shall be equipped with a static bypass transfer switch so the load may be powered directly from the VAC mains in an event of an UPS failure.

### 3.3.4 **Human Factors**

Elements of the system which are used directly by staff (i.e., control panels, etc.) shall conform with accepted principles of good human factors design.

### 3.3.5 **Existing Equipment**

In most installations, switching and control elements of the system will share cabinet space with other electrical/electronic equipment. In such cases it is important that effort be made to coordinate the functional design of the system according to accepted human engineering principles to ensure a uniform appearance and commonality of a layout.

### **3.3.6 Control Panels**

Mounting space within control posts is usually limited and the problem of determining a suitable equipment mounting location is minimized if the control panels are small. Therefore, the designer should make maximum possible use of control devices which combines two or more functions into a single unit (e.g., a lighted push-button instead of a separate light and an unlit push-button).

The system may use EIA standard display and control panels or video display units. The design of either display and control method shall be in accordance with ES/STD-0802 or ES/STD-0803, Standards.

### **3.4 Functional Requirements**

The functional requirements for the system shall be in accordance with the ES/STD-0804 Standard.

### **3.5 Environmental Requirements**

The UPS system shall operate over the indoor environmental conditions in accordance with the ES/STD-0804 Standard.

### **3.6 Power Requirements**

The UPS system shall use VAC power within the limits in accordance with the ES/STD-0804 Standard.

### **3.7 Installation Requirements**

The UPS system shall be installed at the site in accordance with the ES/SOW-0101, Statement of Work and the ES/SOW-0102, Statement of Work.

### **3.8 Documentation Requirements**

All final system documentation shall be provided with a Copyright Release for the documentation delivered in support of the system. The documentation shall be in accordance with the ES/SOW-0101, Statement of Work.

### **3.9 Support Requirements**

The system maintenance and spares support shall be provided in accordance with the ES/SOW-0101, Statement of Work.

### **3.10 Training Requirements**

Operator training and maintenance training on the UPS system shall be in accordance with the ES/SOW-0101, Statement of Work.

#### 4.0 **QUALITY ASSURANCE**

##### 4.1 **General**

The system Quality Assurance programme shall be provided as detailed in the ES/SOW-0101, Statement of Work.

All on-site installation work, test plans and system acceptance testing shall be conducted in accordance with the ES/SOW-0101, Statement of Work.

#### 5.0 **DELIVERY**

Delivery requirements for the UPS system documents, drawings, plans, manuals, etc. (where applicable) shall be in accordance with the ES/SOW-0101, Statement of Work.

Delivery requirements of the system equipment shall be in accordance with the ES/SOW-0102, Statement of Work.

#### 6.0 **INTERFERENCE**

Performance of the UPS system shall not be affected by the use of standard electronic equipment used at the institution. Distance limits of standard electronic equipment shall be in accordance with ES/SOW-0101, Statement of Work

#### 7.0 **SAFETY**

All UPS system electrically powered elements shall meet the applicable Canadian Safety Association (CSA) standards.