BY ORDER OF THE COMMANDER
SIXTEENTH AIR FORCE (ACC)

SIXTEENTH AIR FORCE
INSTRUCTION

21-101

18 JUNE 2025

Maintenance

UNINTERRUPTIBLE POWER SUPPLIES (UPS)

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

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RELEASABILITY: There are no releasability restrictions on this publication.

OPR: 16 AF/A4CC

Certified by: 16 AF/A4
(Col Tyrone C. Manegdeg)
Pages: 12

This publication implements Department of the Air Force (AF) Policy Directive (DAFPD) 21-1, *Maintenance of Military Material*. This instruction provides insight to Sixteenth Air Force (16 AF) UPS program management and assigns responsibility to 16 AF and subordinate organizations to ensure UPS system acquisitions and sustainment are in compliance with 16 AF standards. This publication applies to all military and civilian personnel assigned to the 16 AF and subordinate organizations. This instruction does not apply to 16 AF-gained/attached Air National Guard and Air Force Reserve units and personnel. Refer recommended changes and questions about this publication to the Office of Primary Responsibility listed above using the Department of the Air Force (DAF) Form 847, Recommendation for Change of Publication; route AF Forms 847 from the field through the appropriate chain of command. The authorities to waive wing/unit level requirements in this publication are identified with a Tier ("T-0, T-1, T-2, T-3") number following the compliance statement. See Department of the Air Force Manual (DAFMAN) 90-161, *Publishing Processes and Procedures*, Table A10.1. for a description of the authorities associated with the Tier numbers. Submit requests for waivers through the chain of command to the appropriate Tier waiver approval authority, or alternately, to the Publication OPR for non-tiered compliance items. Ensure all records created as a result of processes prescribed in this publication are maintained in accordance with AFI 33-322, *Records Management and Information Governance Program*, and disposed of in accordance with the Air Force Records Disposition Schedule (RDS) located at https://www.my.af.mil/afrims/afrims/afrims/rims.cfm. Contact your supporting Records Manager as required. This publication does not generate information

collection and reports as outlined in AFI 33-324, *The Air Force Information Collections and Reports Management Program*.

1. PROGRAM OVERVIEW

1.1. Facility UPS systems are integral to technical power management for 16 AF mission-critical assets. They provide battery backup during commercial power/emergency generator transitions and protect critical data center communications, mission systems, computer–applications and network devices from damage or data loss in the event of electrical anomalies, brown-outs and black-outs. It is vital that 16 AF supports its missions with reliable conditioned electrical power through effective and efficient maintenance and timely replacement of UPS/battery systems and/or its components.

1.2. The AF UPS program is centrally managed by the Power Conditioning and Continuation Interfacing Equipment (PCCIE) Product Group Manager (PGM) assigned to the Air Force Life Cycle Management Center (AFLCMC) located at Hill Air Force Base (AFB), Utah, and is responsible for providing power quality solutions to AF sensitive electronics equipment/systems worldwide. The PCCIE Program office was established to acquire a standard family of centrally procured, managed, and supported PCCIE that keeps critical systems operational and serves as the single focal point for United States Air Force (USAF) power conditioning equipment. The PCCIE office manages two contracts for use by AF customers to execute UPS acquisition and maintenance requirements. PCCIE, which includes UPS, is classified as Equipment Authorized Inventory Data (EAID) equipment and must be owned and maintained by the mission owner and not the Base Civil Engineer (BCE).

1.2.1. UPS Acquisition Contract: The PCCIE office manages a Multiple Award Contract (MAC) for online or double conversion; single or three-phase UPS systems sized from 3 to 1100 kilovolt-amperes (kVA) and above (max single-phase size is 17kVA). Services provided by the PCCIE-MAC include, but are not limited to, engineering and technical services, accomplishing reconfiguration, upgrading and expansion of an existing UPS System, removing and disposing of decommissioned UPS systems, and installation of new UPS systems. New and replacement UPS system acquisitions must be procured IAW DAFMAN 65-604*, Appropriation Symbols and Budget Codes* (Fiscal Year 2024) and DAFMAN 65-605V1, *Budget Guidance and Technical Procedures*. Common services (non-procurement) received via this contract vehicle are funded by the mission owner/end user (customer).

1.2.2. UPS Emergency Maintenance/Preventive Maintenance (EM/PM) Contract: This is a services contract to provide EM/PM, and unscheduled maintenance/repairs on various configurations, technologies and manufacturers of PCCIE, ancillary equipment and associated "UPS system" equipment for the AF and other government agencies worldwide. Maintenance of these systems is critical to ensure that they will function as designed for operations and provide increased availability of critical mission systems. EM/PM is an annual/recurring operations and maintenance (O&M) requirement with a twelve-month period of performance "after receipt of order" (ARO) and funded mission owner/end user (customer).

2. PROGRAM RESPONSIBILITIES

2.1. 16 AF Operations & Infrastructure (A4CC) shall:

2.1.1. Serve as the primary focal point for UPS system acquisition and life cycle support issues impacting 16 AF missions. **(T-3)**

2.1.2. Build a fiscal year prioritized list of projected UPS acquisitions and submit the prioritized list to the PCCIE PGM organizational email AFLCMC.HBDZD.PCCIE@us.af.mil no later than 30 September for the upcoming fiscal year. The prioritized list for planned UPS system replacements is determined by age of equipment, supportability, increased capacity requirement and mission performance, utility and reliability. **(T-3)**

2.1.3. Submit out-of-cycle UPS acquisition requirements to the PCCIE PGM in the event of an urgent need for UPS acquisition or upon receipt of PCCIE PGM out-of-cycle data calls. **(T-3)**

2.1.4. Assist mission owner/end user in identifying and executing UPS acquisition and sustainment requirements. **(T-3)**

2.1.4.1. Provide guidelines for owner/end user to properly scope requirement. **(T-3)**

2.1.4.2. Evaluate requirements to ensure consistency with strategic objectives for mission-critical assets. **(T-3)**

2.1.5. Maintain current file copies of UPS system site sheets provided by the mission owner/end user designated UPS Point of Contact (POC) **(See Figure A2.1)**. **(T-3)**

2.1.6. Coordinate UPS requirements with other government organizations when 16 AF missions are housed inside of their facilities. In these circumstances, funding for UPS procurement and maintenance responsibilities will be determined on a case-by-case basis. **(T-3)**

2.2. Mission Owner/End User shall:

2.2.1. Assign primary and alternate UPS POC to serve focal point for UPS system acquisition and life cycle sustainment requirements. **(T-3)**

2.2.2. Submit acquisition requirements for new, replacement or expansion of UPS systems via email to 16.AF.A4CC.UPSManager@us.af.mil. **(T-3)**

2.2.2.1. Requirements may be submitted at any time. Upon receipt of requirement, 16 AF/A4CC will provide the most current UPS pre-site survey questionnaire to be filled out by the mission owner/end user. The questionnaire identifies existing UPS system assets and the proposed required UPS system size and configuration. **(T-3)**

2.2.2.2. Submit funding requests for UPS acquisitions (procurement) via the organization's standard processes. **(T-3)**

2.2.3. Obtain BCE (or equivalent) approval prior to executing a new UPS installation, UPS expansion or UPS replacement project. This is necessary because UPS systems are integrated into the facility electrical distribution system. **(T-3)**

2.2.4. If purchasing real property or incorporating real property modifications/alterations into the UPS acquisition requirement (i.e. emergency backup generators; heating, ventilation and air conditioning; electrical switchboards; automatic transfer switches; fire suppression; etc.), coordinate and receive approval through Base Civil Engineering IAW 32- Series Air Force Departmental Instructions. **(T-0)**

2.2.5. Maintain UPS site information and meet reporting requirements as defined by 16 AF/A4CC. **(T-3)**

2.2.6. Plan, program and budget for the replacement of time-change items, emergency maintenance, preventive maintenance, unscheduled maintenance/repairs and UPS operator training. Time change items include batteries, AC/DC capacitors, and cooling fans. **(T-3)**

2.2.7. Notify 16 AF/A4CC of any UPS malfunctions or failures that have impacted mission availability and reliability within 24 hours of the occurrence. **(T-3)**

2.2.8. Schedule UPS system operator training for designated UPS POCs; training to be completed within 90 days of appointment. Training can be acquired from the Original Equipment Manufacturer (OEM) of the UPS system in use. **NOTE**: UPS system operator training is available as part of a new UPS procurement project, but once the project is complete and the contract is closed any newly appointed UPS POCs will need to acquire training directly from the OEM via other methods (i.e. maintenance contract, government purchase card, etc.). **(T-3)**

2.2.9. Never operate electrical circuit breakers unless properly trained/certified and required rated Personal Protective Equipment (PPE) is available and properly worn. **(T-0)**

2.2.10. Account for UPS end item assets IAW DoDI 5000.64 as they are classified as Equipment Authorization Inventory Data (EAID) equipment. **(T-0)**

2.2.11. Dispose of UPS system assets IAW DoDI 5000.64. UPS systems shall not be abandoned in place. **(T-0)**

2.2.12. Be responsible for acquisition, installation and maintenance of single-phase UPS systems below 17 kVA. **(T-3)**

2.2.13. Coordinate all UPS requirements with 16 AF/A4CC when the supported mission is housed inside of facilities owned/managed by other (non-16 AF) government organizations. In these circumstances, funding for UPS procurement and maintenance responsibilities will be determined on a case-by-case basis. **(T-3)**

2.3. Designated UPS POC shall:

2.3.1. Complete UPS system operator training within 90 days of appointment as designated UPS POC. **(T-3)**

2.3.2. Perform “first responder” duties. Respond to UPS system failures and/or alarms for first-look evaluation of UPS system status. When faults cannot be cleared, take necessary action to coordinate fix action/repair. **(T-3)**

2.3.3. Coordinate scheduled semi-annual UPS/battery preventive maintenance inspections, unscheduled maintenance and repairs with the vendor to ensure the contracted technician(s) meets base/facility access requirements and can complete the inspections in a timely manner. **(T-3)**

2.3.4. Review maintenance inspection reports and take action to correct identified discrepancies. **(T-3)**

2.3.5. Verify warranty status prior to performing UPS system repairs. Coordinate repairs under warranty agreement if applicable. If the system is under warranty, verify with the OEM that the warranty remains valid if the maintenance/repairs are to be performed by a third-party vendor. **(T-3)**

2.3.6. Provide updated UPS site sheet (**Figure A2.1**) to 16 AF/A4CC, 16.AF.A4CC.UPSManager@us.af.mil, within 30 days of UPS primary/alternate POC change or when there is a significant change to UPS configuration, i.e. battery/capacitor replacement, UPS replacement, UPS expansion, etc. **(T-3)**

2.3.7. Ensure new, expansion and replacement of UPS systems are configured IAW with 16 AF Mission Critical Facility Engineering Standard (MCFES) 20-01 and comply with Intelligence Community Directive (ICD) 705. 16 AF Civil Engineering Division (A4C) manages MCFES 20-01 and can provide copies or instructions to access the document on-line. **(T-3)**

2.3.8. Coordinate with 16 AF/A4CC and the PCCIE PGM to schedule site visits or surveys required prior to procurement of UPS systems via the PCCIE-MAC. **(T-3)**

2.3.9. Review contractor UPS acquisition design proposals against user requirements for accuracy and provide feedback to 16 AF/A4CC. The review should be conducted in coordination with BCE (or equivalent) and 16 AF/A4C (electrical engineer). **(T-3)**

2.3.10. Submit requirement for full battery replacement to 16 AF/A4CC (**Figure A3.1**). Full battery, AC/DC capacitor and fan replacements should be accomplished as one initiative if practical. **(T-3)**

2.3.11. Never operate electrical circuit breakers unless properly trained/certified and required rated PPE is available and properly worn. **(T-0)**

2.3.12. Monitor the UPS system during coordinated emergency back-up generator and switchgear system tests to ensure the UPS operates as designed. **(T-3)**

LARRY R. BROADWELL JR,

Major General, USAF

Deputy Commander

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

DoDI 5000.64, *Accountability and Management of DoD Equipment and Other Accountable Property*, 27 April 2017 (Change 3, 10 June 2019)

DoDI 8320.04, *Item Unique Identification (IUID) Standards for Tangible Personal Property*, 3 September 2015 (Change 3, 27 August 2019)

DAFPD 21-1, *Maintenance of Military Materials*, 20 February 2024

AFI 32-9001, *Acquisition of Real Property,* 27 September 2017

DAFI 32-9005, *Real Property Accountability*, 13 September 2022

AFI 33-322, *Records Management and Information Governance Program*, 22 March 2020

AFI 33-324, *The Air Force Information Collections and Reports Management Program*, 21 July 2019

DAFMAN 90-161, *Publishing Processes and Procedures*, 18 October 2023

AFMAN 32-1062, *Electrical Systems, Power Plants and Generators*, 19 October 2020

AFMAN 65-604, *Appropriation Symbols and Budget Codes (Fiscal Year 2024)*, 25 September 2023

AFMAN 65-605V1, *Budget Guidance and Technical Procedures*, 30 March 2021

16 AF Mission Critical Facility Engineering Standard (MCFES) 20-01, *Facility Electrical and Mechanical Infrastructure Redundancy Requirements*

Intelligence Community Directive (ICD) 705, *Sensitive Compartmented Information Facilities,* 26 May 2010

UFC 3-520-01, *Unified Facilities Criteria, Interior Electrical Systems,* 6 October 2015 (Change 2, 12 April 2021)

UFC 3-520-05, *Unified Facilities Criteria, Stationary Battery Areas,* 1 May 2015 (Change 2, 9 January 2020)

Adopted Forms

DAF Form 847, *Recommendation for Change of Publication*

AF Form 1768, *Staff Summary Sheet*

Abbreviations and Acronyms

16 AF—Sixteenth Air Force

A4C—Civil Engineering Division

A4CC—Operations & Infrastructure Branch

AC—Alternating Current

AFLCMC—Air Force Life Cycle Management Center

AFPD—Air Force Policy Directive

AFRIMS—Air Force Records Information Management System

ARO—After Receipt of Order

BCE—Base Civil Engineer

DC—Direct Current

DISS-–Defense Information System for Security

DOD—Department of Defense

EM—Emergency Maintenance

EAID—Equipment Authorized Inventory Data

IAW—In Accordance With

kVA—Kilovolt-ampere

MAC—Multiple Award Contract

MBP—Maintenance Bypass Panel

MCFES—Mission Critical Facility Engineering Standard

OEM—Original Equipment Manufacturer

OPR—Office of Primary Responsibility

PCCIE—Power Conditioning and Continuation Interfacing Equipment

PGM—Product Group Manager

PM—Preventive Maintenance

PPE—Personal Protective Equipment

RDS—Records Disposition Schedule

SSBM—Switchboard System Bypass Module

UPS—Uninterruptible Power Supply

VRLA—Valve-Regulated Lead-Acid

Terms

Accountable Forms—Forms that the Air Force stringently controls, and which cannot be released to unauthorized personnel, since their misuse could jeopardize DOD security or result in fraudulent financial gain or claims against the government.

Administrative Change—Change that does not affect the subject matter content, authority, purpose, application, and/or implementation of the publication (e.g., changing the POC name, office symbol(s), fixing misspellings, etc.)

Mission/End User—Entity with positive control over the UPS assets supporting mission systems within a facility (or mobile segment). Mission owner/end user may be assigned at any organizational level (i.e. Wing, Group, Center, Squadron, Detachment, Operating Location, etc.)

Time-Change Items—Includes UPS batteries, AC capacitors, DC capacitors and cooling fans. Reference the manufacturer specifications to determine life cycle replacement.

Attachment 2

16 AF UNINTERRUPTIBLE POWER SUPPLY SITE SHEET

Figure A2.1.

Format of site created sheet can vary as long as all data in example below is included.

16 AF UPS System Site Sheet				
Required for UPS SUPPORT - BATTERIES, CAPACITORS, MAINTENANCE, REPAIR, REPLACEMENT				
Current As Of: (DD/MMM/YY)				
Section 1. Mission Information	**System/Module 1**	**System/Module 2**	**System/Module 3**	**System/Module 4**
UNCLASS MISSION:				
MAJCOM:	ACC/16 AF			
DODAAC:				
Section 2. Customer Information				
Site Manager's Name:				
Commercial phone:				
DSN:				
e-mail address:				
Primary UPS POC's Name:				
Commercial phone:				
DSN:				
e-mail address:				
Alternate UPS POC's name:				
Commercial phone:				
DSN:				
e-mail address:				
Security Officer's Name:				
Commercial phone:				
DSN:				
SMO Code:				
Section 3. UPS Location				
City/Base/Camp:				
UPS Building Number:				
UPS Room Number:				
Address:				
State:				
Zip Code:				
Section 4. UPS Information	**System/Module 1**	**System/Module 2**	**System/Module 3**	**System/Module 4**
UPS manufacturer:				
UPS Model Number:				
UPS Serial Number:				
UPS Config # or CTO Number:				
UPS KVA size:				
UPS Voltage In/Out:				
UPS Date of Install (DD/MMM/YY):				
UPS Warranty Exp Date (DD/MMM/YY)				
Connected to external monitor?				
UPS Room, Laptops allowed?				
UPS Spare Parts Kit available?				
UPS Room, Telecom Line Available?				
Battery Manufacturer:				
Drawered/Internal UPS Batteries?				
External UPS Batteries?				
External UPS Battery Model Number:				
Battery Date of Install (DD/MMM/YY):				
Battery Type (sealed or flooded):				
Number of Jars (Batteries):				
Voltage per Jar (Battery):				
Battery Monitoring (Yes or No):				
Generator Backup (Yes or No):				
Generator size in KVA:				
Ancilliary Equip (i.e. SSBM, MBP)				

Attachment 3

16 AF UPS BATTERY REPLACEMENT SURVEY

Figure A3.1. 16 AF UPS BATTERY REPLACEMENT SURVEY

Section 1. Location Information
Site: _____ Bldg./Room: _____ UPS S/N (s): _____
Section 2: Point(s) of Contact
Primary POC Name: _____ Phone DSN/Comm: _____
Primary Email: _____
Alternate POC Name: _____ Phone DSN/Comm: _____
Alternate POC Email: _____
Section 3: Current Battery Information
- Make/Model: _____
- Battery Type (i.e. VRLA, Flooded-Cell): _____
- Battery Voltage (i.e. 2V, 6V, 12V, 16V): _____
- Total Count of Batteries: _____
Battery Monitoring Systems (If applicable)
- Make/Model: _____
- Functional Status: _____
- Remove or Reconnect: _____
Section 4: Miscellaneous Information
Is temporary battery storage available at site? Must be an environmentally controlled area maintained at 70 to 78 degrees Fahrenheit. If so, square footage available: _____
Address where batteries will be installed: _____
Address where batteries can be shipped and stored if necessary (more information may be required): Address for commercial delivery access point: _____
Hours of operation for commercial delivery access point: _____
Battery shipping method (Commericial or Secure): _____
Is a loading dock available at site? Yes No (circle one)
- If yes, distance between loading dock and battery room: _____
- If no, describe receiving point of delivery: _____
- Delivery vehicle restrictions for truck/trailer size/length/weight: _____
Are escorts required? (If so, escorts must be provided by on-site personnel) _____
Security requirements for installation contractors (i.e. US citizen, no felonies, possess valid driver's license/ID, security clearance level): _____
What are the requirements for vendor to get access to the base and facility? (i.e. EAL, VAR, DISS)? If your site has a specific format, please provide as an attachment: _____

Section 5: Installation Schedule
- Normal Working Hours: _____
- Is work outside of normal hours permitted or desired? _____
Section 6: Battery Room Location
- Ground level or other (describe): _____
- Stair access - identify floor(s) and # of stairs: _____
- Is a freight elevator available? If so, load capacity: _____
- Will batteries need to be moved across a raised floor or installed on a raised floor? If so, provide load rating. _____
- Type of floor (if not raised): _____
- Floor covering (i.e. carpet/tile): _____
- Is floor protection required? _____
- Are laptops allowed in thr UPS/Battery room: _____
- Battery room dimensions: _____
- Dimensions of any doors leading to the battery room: _____
- Describe any obstructions that may inhibit removal of old batteries and installation of new batteries: _____
- If possible, provide photos of batteries, UPS/battery room and egress routes. Also, provide a battery room floor plan, if available.
For Legacy Telephone Switch Batteries (Nortel DMS-100 Series):
Please provide photos of the batteries with the covers off; up close to show the terminal polarities, further away to show the battery strap configuration (this is necessary to ensure the correct strapping kit is provided for your battery configuration). Provide the battery configuration "as-installed" drawing if available.