THE UNIVERSITY OF AUCKLAND
Te Whare Wānanga o Tāmaki Makaurau
NEW ZEALAND

Property Services Design Standards and Guidelines

Section **5-a**

Uninterruptible Power Supply (UPS)

Version 1.0

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Document Control

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1.0	6 September 2019	Design Standards Steering Group	Initial version of manual.
	February 2020		(Either note which sections have changed or 'annual review – no changes')

Feedback

If you spot an error in this document, or you have a suggestion on how we can improve the document, please tell us about it by printing, completing and emailing the form in Appendix A to us at PSTechServices@auckland.ac.nz.

5a Uninterruptible Power Supply (UPS)

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5-a.1 Introduction

Introduction

This section shall be specifically read in conjunction with *Section 1 About Property Services Design Standards and Guidelines* and *Section 2 Project and Building Works Requirements* of the University of Auckland's Property Services Design Standards and Guidelines.

5-a.1.1 Purpose

The purpose of this section is to provide information about when a UPS is required, and the requirements around UPS.

5-a.1.2 Applicable standards

This table lists the standards that are applicable to UPS.

Note: The list is not exhaustive and if superseded by other standard(s), the latest version and/or amendment applies.

Table 1: UPS standards

Standard	No	Title
NZS	4219	Seismic performance of engineering systems in buildings
AS/NZS	3000	Electrical installations - Known as the Australian/New Zealand Wiring Rules

5-a.2 Abbreviations

UPS Abbreviations

Table 2: UPS abbreviations

Abbreviation	Description
BMS	Building Management System
FM	Facilities Management
NVR	Network Video Recorder
UPS	Uninterruptible Power Supplies

5-a.3 General

5-a.3.1 When is UPS required?

The requirement for providing a UPS shall be:

- Based on an evaluation of the criticality of the equipment to be supported
- In agreement with University of Auckland FM representatives.

This determination is largely dependent on the criticality of operational services required for activities conducted in the building.

A UPS is provided for one or both of these reasons:

- To provide a clean AC power supply for the equipment it supports
- To provide continuity of power supply to the equipment it supports if there was a mains power failure.

UPS are generally provided to support BMS controllers for systems and for IT switches.

Equipment for security systems (i.e. access control controllers, CCTV NVRs, etc.) are usually located in IT Comms rooms which are also supplied through UPS.

Access control controllers typically include integral battery back-up to achieve 8 hours autonomy and CCTV NVRs, if located in a building will typically require 8 hours UPS autonomy to be provided.

If it is not clear whether a UPS should be installed or not at design time the provision of a prewired UPS bypass switch will allow the inclusion of a UPS later without any downtime to the plant.

5-a.3.2 Requirements

UPS equipment including batteries shall be restrained in accordance with NZS 4219

UPS equipment shall not be used for life safety functions and operations.

The UPS rectifier shall fully charge a battery from fully discharged condition within 8 hours.

5-a.3.3 External by-pass switch

Generally, UPS installations shall be provided with an external by-pass switch with the switch designed for switching the UPS when in offline static by-pass mode. The specifics and performance of the switch shall be as agreed with the UPS equipment manufacturer such that the load shall not be interrupted when being transferred to by-pass.

5-a.3.4 Installation

UPS equipment shall be installed to be readily accessible and maintainable by the University.

5-a.3.5 Colour coding outlets

UPS supplied outlets shall be colour coded blue and/or clearly labelled to the requirements of the University.

5-a.3.6 Testing

The UPS systems shall be tested as a whole, to demonstrate the performance of all systems and communication alarms are not affected and that the required autonomy is achieved.

5-a.3.7 Ventilation

Ventilation to rooms containing UPS equipment and their associated supported loads, shall be designed with knowledge of the extended run-times where UPS support is provided in the event of a mains failure. This is of particular importance where extended 8-hour system autonomy is required.

5-a.4 UPS for BMS Controllers (for loads up to 750W)

5-a.4.1 Recommended systems

University of Auckland FM have standardised on installing Reillo manufactured 1kVA (Model SEP 1000 A3) and 3kVA (Model SEP 3000 A3).

5-a.4.2 Performance

Sizing the UPS is dependent on the load it is to satisfy which shall achieve an autonomy / duration of 45 minutes . An additional battery pack may be installed if required to achieve this. This performance is regardless of whether the mains power supply is backed up through a generator emergency supply.

5-a.4.3 Location

As the UPS has an integral cooling fan, consideration must be given to ventilation requirements.

It is also important that the display panel is visible, and its functional buttons are accessible during routine maintenance.

The UPS equipment shall be installed to meet this criteria:

- NOT be installed on plant room floors and shall be installed a minimum of 200mm AFFL.
- NOT be installed on top of MCCs and shall be installed a maximum of 1500mm AFFL.
- Shall be installed so the operational display is clearly visible and interrogable.

5-a.4.4 Monitoring

The UPS equipment shall be provided with monitoring via the BMS and the University's preference is for this to be via an SNMP ethernet connection.

5-a.4.5 Maintenance by-pass

Where disruption to the associated controllers and plant due to UPS maintenance / replacement could become untenable the UPS equipment shall be provided with an external two-position maintenance by-pass switch.

These applications / locations shall be agreed with the University in advance, but shall be predicated on this criteria:

- For central plant associated with the entire building (i.e. chillers, boilers, central ventilation plant, domestic water plant, etc.)
- Laboratory areas
- 24/7 operational areas
- Generator essential or life safety systems.
- Other areas through discussion with the University.

The supply for the external maintenance by-pass shall be derived from the same phase and circuit way as the normal UPS supply.

5-a.4.6 Labelling

The external maintenance by-pass switch shall be provided with an unambiguous Traffolyte label adjacent to it.

This shall outline the maintenance procedures to be followed to transfer to by-pass mode.

5-a.5 UPS for IT Switches (for loads up to 40kW)

5-a.5.1 Requirements

The responsibility for determining the need to provide UPS for IT switches and their sizing lies with University of Auckland ITS / Connect.

The requirement for a UPS is predicated on requirements from:

- **Faculty** - for the continued operation of their department and associated alarms.
- **Security** - for the continued operation of their systems, CCTV coverage and associated alarms.
- **Facilities** - for the continued monitoring and control of associated alarms.

5-a.5.2 UPS Autonomy

Historically and as a basis for design, the following shall be assumed until the brief above is further developed and informed:

- Typically, the Sector Switch shall be provided with 8 hours UPS autonomy.
- Typically, the Building Switch shall be provided with 8 hours UPS autonomy.
- Typically, the Network Switches shall be provided with 45 minutes UPS autonomy.

These autonomies shall be determined and informed to not be less than the downstream system UPS requirements.

5-a.5.3 Preferred systems

To meet the variance in autonomy, the University's preferred systems are Socomec's Mastersys Green Power Range

Alternative manufacturers may be considered subject to an equal and approved comparison being submitted and agreed with the University in advance.

5-a.5.4 Access control devices and CCTV NVRs

Access control devices and CCTV NVRs installed in IT Comms rooms are also to be supported by UPS where required by the security design. These may share the IT respective Network and Building Switch UPS systems.

5-a.5.5 UPS monitoring

The UPS equipment shall be provided with monitoring via the BMS and the University's preference is for this to be via an SNMP ethernet connection.

5-a.5.6 By-pass switch

The UPS equipment shall be provided with an external maintenance by-pass switch arrangement with UPS input and output isolators and with the by-pass isolator complete with an early make contact.

The early make contact shall be utilized to force the UPS system as an input signal, into internal static by-pass mode.

The external maintenance by-pass shall be located and installed to respect the requirements of AS/NZS 3000 and shall be provided with a separate alternate supply to the main UPS electrical supply.

5-a.6 Other UPS Applications

5-a.6.1 General

Other small UPS applications that may be required on a project case-by-case basis shall align with the above respective clauses.

In either case the autonomy may be reduced to 15 minutes where power conditioning only is required or determined and agreed to be not less than the downstream system UPS requirements, depending on the UPS function.

Where UPS systems are required in excess of the above sizes and standards, the specific requirements shall be agreed with the University in advance.

Appendix A Feedback Form

We love hearing from you. Please take a few moments to let us know how we can improve the *Property Services Design Standards and Guidelines*.

1.	**Name:**			
2.	Contact Details: (in case we need clarification)			
Complete this section if you have found a typo / formatting error. (If possible, attach a photo of the error)				
3.	Section No:		Page No/s:	
	Description of error:			
Complete this section if you have a suggestion about content.				
4.	Section No:		Page No/s: (if applicable)	
	Suggestion/s:			
Complete this section if you have any other suggestions for improvement.				
5.	Suggestion/s:			
6.	Email your feedback to PSTechServices@auckland.ac.nz			
Thanks for your feedback!				

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