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ETSI Standard

**Environmental Engineering (EE);
Monitoring and Control Interface for Infrastructure Equipment
(Power, Cooling and Building Environment Systems used in
Telecommunication Networks);
Part 3: AC UPS power system control and
monitoring information model**

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Foreword

This ETSI Standard (ES) has been produced by ETSI Technical Committee Environmental Engineering (EE).

The present document is part 3 of a multi-part deliverable covering Monitoring and Control Interface for Infrastructure Equipment (Power, Cooling and Building Environment Systems used in Telecommunication Networks), as identified below:

- Part 1: "Generic Interface";
- Part 2: "DC power system control and monitoring information model";
- Part 3: "AC UPS power system control and monitoring information model";**
- Part 4: "AC distribution power system control and monitoring information model";
- Part 5: "AC diesel back-up generator system control and monitoring information model";
- Part 6: "Air conditioning system control and monitoring information model";
- Part 7: "Other utilities system control and monitoring information model";
- Part 8: "Remote Power Feeding System control and monitoring information model".

1 Scope

The present document applies to monitoring and control of AC UPS power systems for telecommunication equipment.

The document defines :

- The monitored and controlled AC UPS power system architectures.
- The minimum set of exchanged information required at the interface, described in "natural language" in text tables.
- The XML files with tags and variables corresponding to the data in the tables.

2 References

References are either specific (identified by date of publication and/or edition number or version number) or non-specific.

- For a specific reference, subsequent revisions do not apply.
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2.1 Normative references

The following referenced documents are indispensable for the application of the present document. For dated references, only the edition cited applies. For non-specific references, the latest edition of the referenced document (including any amendments) applies.

- [1] ETSI ES 202 336-1: "Environmental Engineering (EE); Monitoring and Control Interface for Infrastructure Equipment (Power, Cooling and Building Environment Systems used in Telecommunication Networks) Part 1: Generic Interface".
- [2] ETSI EN 300 132-3: "Environmental Engineering (EE); Power supply interface at the input to telecommunications equipment; Part 3: Operated by rectified current source, alternating current source or direct current source up to 400 V".

2.2 Informative references

The following referenced documents are not essential to the use of the present document but they assist the user with regard to a particular subject area. For non-specific references, the latest version of the referenced document (including any amendments) applies.

- [i.1] IEEE 802.1 to 802.11: "IEEE Standard for Local & Metropolitan Area Network".
- [i.2] ISO/IEC 10164: " Information technology -- Open Systems Interconnection -- Systems Management: Objects and attributes for access control".

- [i.3] ISO/IEC 8879: " Information processing -- Text and office systems -- Standard Generalized Markup Language (SGML)".
- [i.4] ETSI EN 300 132-2: "Environmental Engineering (EE); Power supply interface at the input to telecommunications equipment; Part 2: Operated by direct current (dc)".
- [i.5] ETSI EN 302 099: "Environmental Engineering (EE); Powering of equipment in access network".
- [i.6] ETSI TR 102 121: "Environmental Engineering (EE); Guidance for power distribution to telecommunication and datacom equipment".
- [i.7] ETSI ES 202 336-2: " Environmental Engineering (EE); Monitoring and Control Interface for Infrastructure Equipment (Power, Cooling and Building Environment Systems used in Telecommunication Networks); Part 2: DC power system control and monitoring information model".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

NOTE: Terms referring to energy interface, equipment and distribution are described in power distribution standards EN 300 132-2 [i.4], EN 300 132-3 [2] for ac and dc interface and EN 302 099 [i.5] for access network equipment powering.

alarm: any information signalling abnormal state, i.e. different to specified normal state of hardware, software, environment condition (temperature, humidity, etc.)

NOTE: The alarm signal should be understood by itself by an operator and should always have at least one severity qualification or codification (colour, level, etc.).

EXAMPLE: Rectifier failure, battery low voltage, etc.

alarm loop: electrical loop which open or closed state correspond to alarm start (set) or end (clear) state

alarm message: text parts of the alarm structure

alarm structure: organized set of information fields in an alarm data frame (time stamp, set/clear, text, etc.)

battery: complete arrangement of battery cells or blocks in one string or more in parallel

battery cell: basic electrochemical element (e.g. a 2 V nominal cell for a high capacity lead acid battery)

battery string: a number of serially interconnected battery blocks or cells

client post: any device (laptop, PDA, console, etc.) connected to servers via the operation system networks to perform maintenance or supervision operations

Control form Style Sheet (CSS): simple mechanism for adding style (e.g. fonts, colors, spacing) to Web documents. Tutorials, books, mailing lists for users, etc.

Control Unit (CU): integrated unit in an equipment to monitor and control this equipment through sensors and actuators

Data Gathering Unit (DGU): functional unit used for several functions:

- collect serial, digital, and analog data from several equipment;
- option to send (output) serial or digital commands;
- forward/receive information to/from the Local/Remote Management Application via agreed protocols;
- mediation between interfaces and protocols.

NOTE: This function may be integrated as part of specific equipment.

Dynamic Host Control Protocol (DHCP): protocol used for self configuration of TCP/IP parameters of a workstation assigning IP address and a subnetwork mask

NOTE: DHCP may also configure DNS.

Dynamic Name Server (DNS): associates a single domain name to an IP address

dynamic synoptic: dynamic display of geographical maps, networks, installations and equipment

ethernet: LAN protocol

NOTE: Equivalent to IEEE 802.1 to IEEE 802.11 [i.1].

event: any information signalling a change of state which is not an alarm: e.g. battery test, change of state of battery charge

NOTE: The event signal should be understood by itself by an operator and should always have at least one severity qualification or codification (color, level, etc.). It should be transmitted in a formatted structure with text message and other fields like for alarm, e.g. an event can be coded as an alarm with severity "0".

eXtensible Style sheet Language (XSL): language for expressing style sheets

NOTE: It consists of two parts, a language for transforming XML documents, and an XML vocabulary for specifying formatting semantics. An XSL style sheet specifies the presentation of a class of XML documents by describing how an instance of the class is transformed into an XML document that uses the formatting vocabulary.

infrastructure equipment: power, cooling and building environment systems used in telecommunications centres and Access Networks locations

EXAMPLE: Cabinets, shelters, underground locations, etc.

intranet: internal company network generally using Ethernet protocol and extended IP addresses

logbook: chronological file that contains alarm and event messages may be paper or electronic

Management Information Base (MIB): dynamic data base that gathers all objects and should evolve to include automatic and manual configuration tools with self coherence tests

menu: list of possible input command choices that may be presented in different ways on a display

NOTE: Selection is normally made by a keyboard, a pointing device, a mouse or directly by finger on a sensitive screen.

object: class description of items that accept a set of properties or functions

NOTE: Generic objects can include more specific items and inherit from their properties. If correctly structured, object programming can allow the system to evolve, i.e. be more future-proof. The code should intrinsically be open and structured.

PHP: powerful tool for making dynamic and interactive Web pages

pop-up: information or command screen that appears when a menu choice is selected

NOTE: For example this may be a pop-up menu when the pointer is on a title button.

REpresentational State Transfer (REST): way to build an application for distributed system as www

Simple Object Access Protocol (SOAP): way to communicate between applications running on different operating systems, with different technologies and programming languages

NOTE: SOAP communicates over HTTP, because HTTP is supported by all Internet browsers and servers, SOAP traffic is not blocked by firewalls and proxy servers (see W3C).

Systems Management Function (SMF): object properties or classes with projection on CMIS application context communication

NOTE: Set of ISO system management functions according to ISO/IEC 10164 [i.2].

Uninterruptible Power Supply (UPS): device or system that provides electrical power without interruption in the event that commercial power drops to an unacceptable voltage level

warning: low severity alarm

web: common name for the Internet or Intranet

windows: virtual area on the display that corresponds to a specific application

World Wide Web Consortium (W3C): consortium founded in October 1994 to develop common interoperable protocols and promote World Wide Web

NOTE: See <http://www.w3c.org>.

XCUI: CU enabled to communicate using XML interface as defined in the present document

XHTML: stricter and cleaner version of HTML. XHTML consists of all the elements in HTML 4.01 combined with the syntax of XML. It can be read by all XML browser (see W3C)

eXtensible Mark-up Language (XML): application profile or restricted form of SGML

NOTE: By construction, XML documents are conforming SGML the Standard Generalized Markup Language (ISO/IEC 8879 [i.3]). documents.XML is designed to describe data and focus on what data is. XML should be discerned from the well known Hypertext Transfer Mark-up Language (HTML) which was designed to display data and to focus on how data looks.

XML Schema Definition (XSD): new more detailed XML description compared to the previous one, the DTD

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

AC	Alternating Current
CU	Control Unit of an equipment
CSS	Control form Style Sheet
DC	Direct Current
DGU	Data Gathering Unit
DHCP	Dynamic Host Control Protocol
DNS	Dynamic Name Server
HTML	Hypertex Transfer Make-up Language
HTTP	HyperTex Transfer Protocol
IP	Internet Protocol
LAN	Local Array Network
LVD	Low Voltage Disconnection
MIB	Mnagement Information Base
MN	Management Network
REST	REpresentational State Transfer
RMA	Remote Management Application
SBS	Static Bypass Switch
SMF	Systems Management Function
SOAP	Simple Object Access Protocol

TCP	Transmission Control Protocol for IP
UPS	Uninterruptible Power Supply
W3C	World Wide Web Consortium
XCU	XML enabled CU
XML	eXtensible Mark-up Language (see W3C)
XSD	XML Schema Definition
XSL	eXtensible Style sheet Language

4 AC UPS power systems

The AC UPS power systems subset described in ES 202 336-1 [1] and TR 102 121 [i.6] provides electrical power without interruption in the event that commercial power drops to an unacceptable voltage level.

The AC UPS power system provide uninterruptible 230V/400V; 50 Hz voltage according EN 300 132-3 [2], in period defined by capacity of installed back-up battery.

The AC UPS power systems addressed by the present document can be single phase input/single phase output, three phases input/single phase output and three phases input/three phases output.

The following configurations of static AC UPS power system will be under the scope of the present document: On-line AC UPS, Modular On-line AC UPS, Off-line AC UPS and Line-interactive AC UPS, which are depicted in figures 1 to figure 4.

In the case of paralleled AC UPS systems there can be an additional control unit (device) which controls parallel operation of the AC UPS systems. Parallel operation of UPS systems is outside the scope of the present document.

Mandatory and non-mandatory monitoring/supervision information and functions for On-line AC UPS and Modular On-line AC UPS are given in annex A.

Mandatory and non-mandatory monitoring/supervision information and functions for Off-line AC UPS are given in annex B.

Mandatory and non-mandatory monitoring/supervision information and functions for Line-interactive AC UPS are given in annex C.

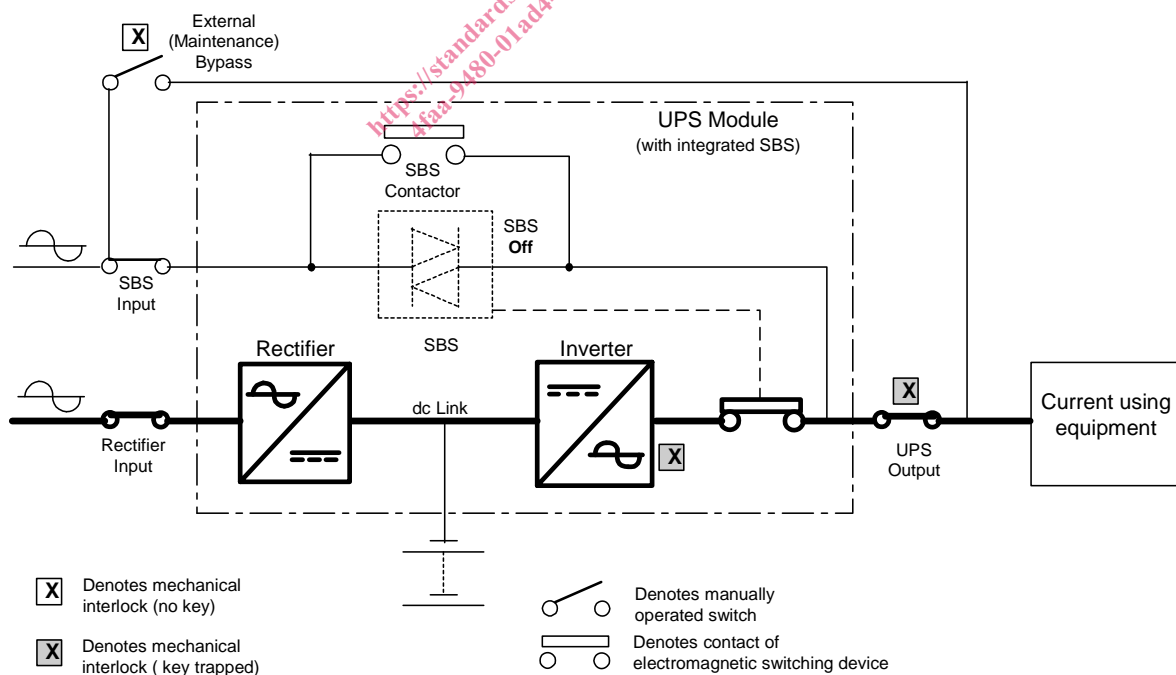


Figure 1: On-line AC UPS - normal operation

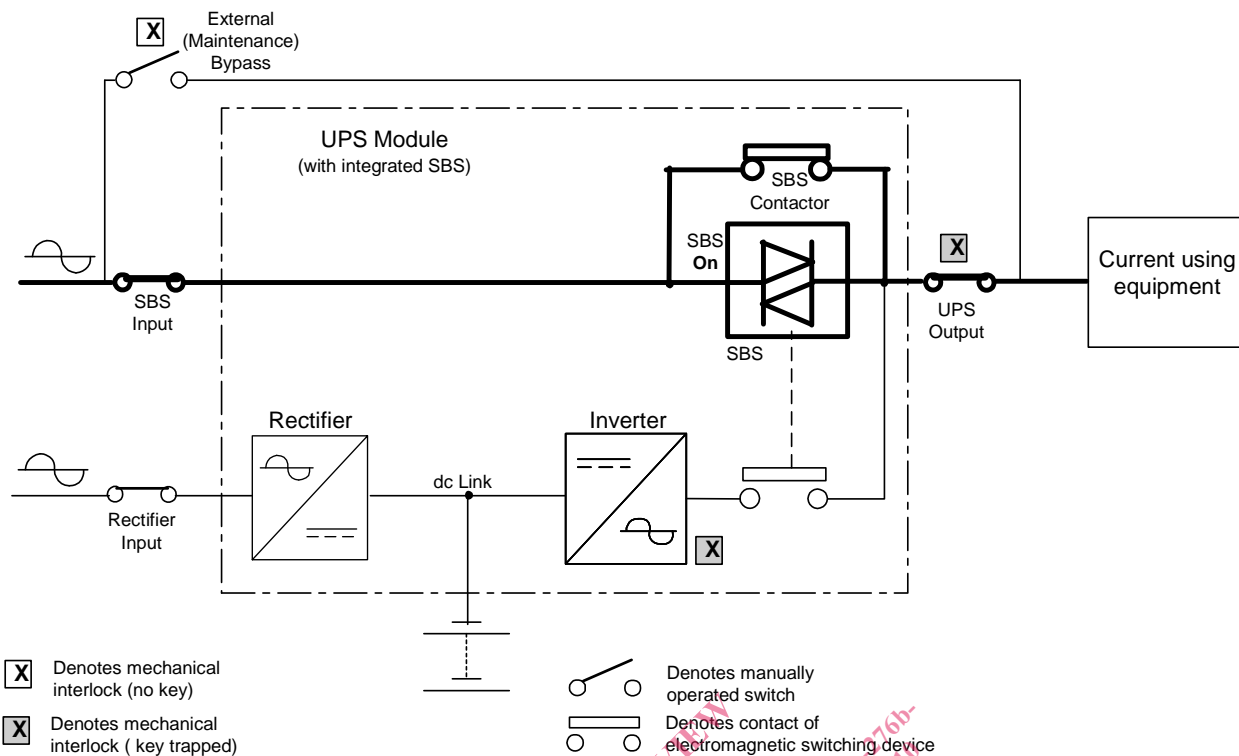
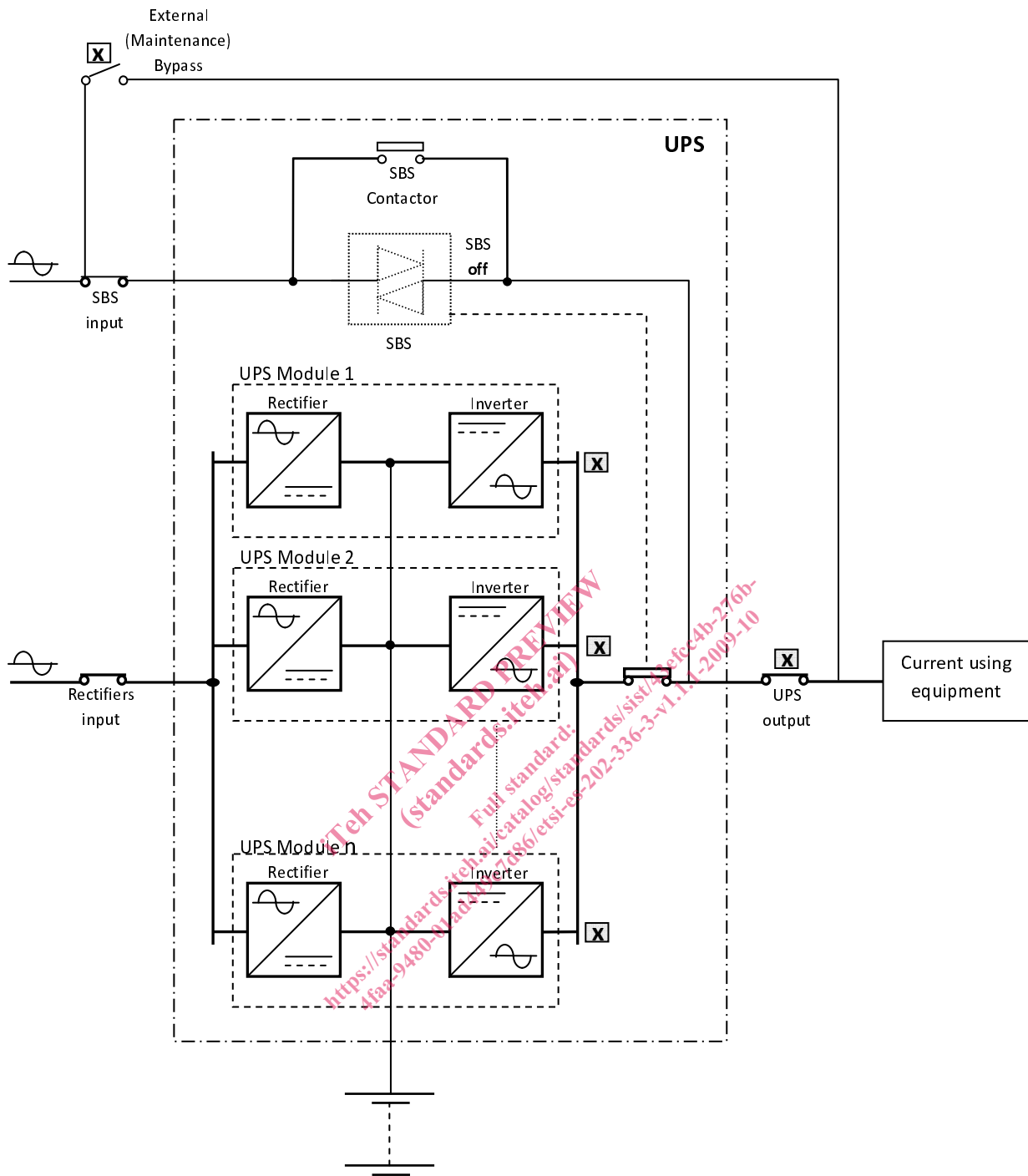


Figure 2: Off-line AC UPS - normal operation

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- | | | | |
|---------------------------------------|--|--|---|
| <input checked="" type="checkbox"/> X | Denotes mechanical Interlock (no key) | | Denotes manually operated switch |
| <input checked="" type="checkbox"/> X | Denotes mechanical Interlock (key trapped) | | Denotes contact of electromagnetic switching device |

NOTE 1: Battery can be central, or each module can have own battery.

NOTE 2: SBS can be central, or each module can have own SBS.

Figure 3: Modular On-line AC UPS - normal operation