

**Environmental Engineering (EE);
Monitoring and Control Interface for Infrastructure Equipment
(Power, Cooling and Building Environment Systems
used in Telecommunication Networks);
Part 8: Remote Power Feeding System control
and monitoring information model**



Reference

DES/EE-02037-8

Keywords

control, interface, management, power, system

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Important notice

Individual copies of the present document can be downloaded from:

<http://www.etsi.org>

The present document may be made available in more than one electronic version or in print. In any case of existing or perceived difference in contents between such versions, the reference version is the Portable Document Format (PDF). In case of dispute, the reference shall be the printing on ETSI printers of the PDF version kept on a specific network drive within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status. Information on the current status of this and other ETSI documents is available at

<http://portal.etsi.org/tb/status/status.asp>

If you find errors in the present document, please send your comment to one of the following services:

http://portal.etsi.org/chaicor/ETSI_support.asp

Copyright Notification

No part may be reproduced except as authorized by written permission.
The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 2009.
All rights reserved.

DECT™, **PLUGTESTS™**, **UMTS™**, **TIPHON™**, the TIPHON logo and the ETSI logo are Trade Marks of ETSI registered for the benefit of its Members.

3GPP™ is a Trade Mark of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners.

LTE™ is a Trade Mark of ETSI currently being registered

for the benefit of its Members and of the 3GPP Organizational Partners.

GSM® and the GSM logo are Trade Marks registered and owned by the GSM Association.

Contents

Intellectual Property Rights	4
Foreword.....	4
1 Scope	5
2 References	5
2.1 Normative references	5
2.2 Informative references.....	6
3 Definitions and abbreviations.....	6
3.1 Definitions.....	6
3.2 Abbreviations	6
4 Remote Power Feeding System.....	6
Annex A (normative): Mandatory XML structure and elements.....	8
A.1 Structure of an XML document for a Remote Power Feeding system.....	8
A.2 The specific XML elements of a Remote Power Feeding system.....	9
Annex B (normative): Summary of mandatory monitoring/supervision information and functions.....	10
B.1 Remote power feeding system	10
B.2 Up converter system.....	11
B.3 Remote Site	11
Annex C (informative): Summary of non-mandatory monitoring/supervision information and functions	12
C.1 Remote power feeding system	12
C.2 Up converter system.....	12
C.3 Remote Site	12
C.4 Down converter system.....	13
Annex D (informative): Bibliography.....	14
History	15

Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: "*Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards*", which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<http://webapp.etsi.org/IPR/home.asp>).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Foreword

This ETSI Standard (ES) has been produced by ETSI Technical Committee Environmental Engineering (EE), and is now submitted for the ETSI standards Membership Approval Procedure.

The present document is part 8 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 remote power feeding systems for telecommunication equipment.

The present document defines:

- The monitored and controlled remote power feeding 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.
- Non-specific reference may be made only to a complete document or a part thereof and only in the following cases:
 - if it is accepted that it will be possible to use all future changes of the referenced document for the purposes of the referring document;
 - for informative references.

Referenced documents which are not found to be publicly available in the expected location might be found at <http://docbox.etsi.org/Reference>.

NOTE: While any hyperlinks included in this clause were valid at the time of publication ETSI cannot guarantee their long term validity.

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 300 132-2: "Environmental Engineering (EE); Power supply interface at the input to telecommunications equipment; Part 2: Operated by direct current (dc)".
- [3] 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".
- [4] ETSI EN 302 099: "Environmental Engineering (EE); Powering of equipment in access network".
- [5] IEC/TR 62102: "Electrical safety - Classification of interfaces for equipment to be connected to information and communications technology networks".
- [6] IEC 60950-21: "Information technology equipment - Safety - Part 21: Remote power feeding".

- [7] ETSI ES 202 336-6: "Environmental Engineering (EE); Monitoring and Control Interface for Infrastructure Equipment (Power, Cooling and Building Environment Systems used in Telecommunication Networks); Part 6: Air conditioning system control and monitoring information model".

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] IEC 60950-1: "Information technology equipment - Safety - Part 1: General requirements".

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 [2], EN 300 132-3 [3] for ac and dc interface and EN 302 099 [4] for access network equipment powering.

Remote Feeding Telecommunication circuit [6]: secondary circuit within the equipment, intended to supply or receive d.c. power via a telecommunication network at voltages exceeding the limits for TNV circuits, and on which overvoltages from telecommunication networks are possible

RFT-C circuit [6]: RFT circuit which is so designed and protected that under normal operating conditions and single fault conditions, the currents in the circuit do not exceed defined values

RFT-V circuit [6]: RFT circuit which is so designed and protected that under normal operating conditions and single fault conditions, the voltages are limited and the accessible area of contact is limited

TNV circuit (from IEC 60950-1 [i.1]): circuit that is in the equipment and to which the accessible area of contact is limited and that is so designed and protected that, under normal operating conditions and single fault conditions, the voltages do not exceed specified limit values

3.2 Abbreviations

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

CU	Control Unit of an equipment
DC	Direct Current
DGU	Data Gathering Unit
HTTP	HyperText Transfer Protocol
IP	Internet Protocol
RFT circuit	Remote Feeding Telecommunication Circuit
TCP	Transmission Control Protocol for IP
XCU	XML enabled CU
XML	eXtensible Markup Language (see W3C)

4 Remote Power Feeding System

A remote power feeding system is used to transfer power from a central site to a remote site over multiple copper pairs. It is composed of multiple DC/DC up converter system at office site, and of one or multiple remote DC/DC down converter system on remote sites (EN 302 099 [4], IEC/TR 62102 [5]).

A remote power feeding system is a sub-equipment of an <energy_system> defined in core ES 202 336-1 [1].

A remote power feeding system addressed by the present document is depicted in figure 1. One single control unit XCU can monitor and control several remote power feeding systems through field bus. Field bus is outside the scope of the present document.

Mandatory monitoring/supervision information and functions are given in annex A.

Non-mandatory (optional) monitoring/ supervision information and functions are given in annex B.

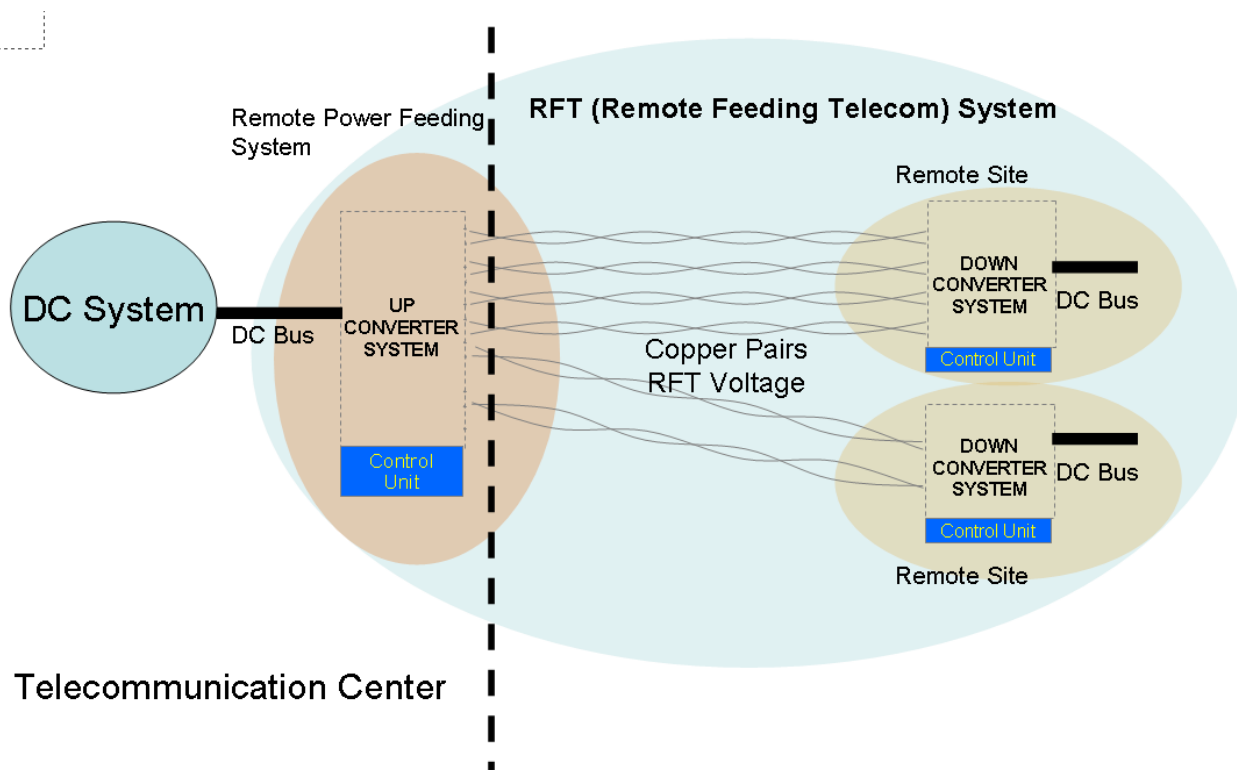


Figure 1: Example of Remote Power Feeding System

The main elements of **Remote Power Feeding System** are:

- One or more "**Up Converter system**": converts DC Bus voltage (e.g. -48V) to higher RFT (RFT-C or RFT-V) DC voltage (see standard IEC 60950-21 [6]). This voltage is applied on the copper pairs.
- One or more "**Remote Site**": which is a site (as described in ES 202 336-1 [1]) powered with a remote power feeding system.
- Multiple control unit (XCU).

A Remote Site can have subelements:

- Any equipment described in core part I, e.g. sensors and actuators, air conditioning, etc.
- On or more "**Down Converter System**": converts RFT (RFT-C or RFT-V) DC voltage on the copper pairs to DC Bus voltage (e.g. -48V).

Note that as the remote site is generally not complex in term of equipment hierarchy, all the information can be provided at the <remote_site> level.

Table TPx (tables from annex A) corresponds to mandatory data that shall be provided for a minimal Remote power feeding system, and TPx (tables from annex B) includes data that should be provided in addition to mandatory one.

Annex C standardizes XML coding structures for these data.

Annex A (normative): Mandatory XML structure and elements

A.1 Structure of an XML document for a Remote Power Feeding system

In the site DGU XML data structure as described in ES 202 036-1 [1], a remote power feeding system is always a child of a site energy system.

The XML structure shall be structured as follows:

```

<site id="23" status="normal">
  ....
  <energy_system id="1" status="normal">
    <description_table>
      ...
    </description_table>
    ...
    <dc_system id="1" status="normal">
      ....
    </dc_system>
    <remote_power_feeding id="1" status="normal">
      ...
      <up_converter_system id="1" status="normal">
        ....
      </up_converter_system>
      <up_converter_system id="2" status="normal">
        ....
      </up_converter_system>
      <remote_site id="1" status="normal">
        ...
      </remote_site>
      <remote_site id="2" status="normal">
        ...
      </remote_site>
      <remote_site id="3" status="normal">
        ...
      </remote_site>
    </remote_power_feeding>
    ...
  </energy_system>
  ...
</site>

```


A Remote Power Feeding System XCU will only generate the XML document "remote_power_feeding.xml". This file can be download by the DGU of the site and embedded in the "site.xml" document. In this case, the structure of the document is as follows:

```
<remote_power_feeding id="1" status="normal">
  ...
  <up_converter_system id="1" status="normal">
    ....
  </up_converter_system>
  <up_converter_system id="2" status="normal">
    ....
  </up_converter_system>
  <remote_site id="1" status="normal">
    ...
  </remote_site>
  <remote_site id="2" status="normal">
    ...
  </remote_site>
  <remote_site id="3" status="normal">
    ...
  </remote_site>
</remote_power_feeding>
```

A.2 The specific XML elements of a Remote Power Feeding system

Here follows the additional specific tags for XML elements that are not detailed in ES 202 336-1 [1].

The allowed child elements of <remote_power_feeding> are:

Child Element	Description	Datatype
<up_converter_system>	For detailed information about each up converter system	xs:complexType
<remote_site>	For detailed information about each powered remote site	xs:complexType

As <remote_site> can be very complex (not generally the case), the manufacturer is free to add sub-equipments in the XML structure to provide more detailed information, data, control, etc.

Child Element	Description	Datatype
<down_converter_system>	For detailed information about the down converters at the remote site	xs:complexType
<sensors_actuators>	As defined in core ES 202 336-1 [1]	xs:complexType
<air_conditioning_system>	As defined in ES 202 336-6 [7]	xs:complexType

Annex B (normative): Summary of mandatory monitoring/supervision information and functions

This annex gathers the information needed on the Remote Monitoring Application for Remote Feeding Systems. It specifies the mandatory requirements that must be provided in all cases.

NOTE 1: If there is no XCU this data should be provided by the Data Gathering Unit (DGU).

When a CU has a field databus connected to the DGU, at least, the DGU shall store data (record measurements, log files). The XCU which has the XML interface over Ethernet TCP/IP, shall store these data.

NOTE 2: The "Explanation" column provided in the following data tables has been used where necessary to further explain the statements in the "Monitored information". The "Element type" column gives the assigned name used in XML coding and the "Monitored information" provides details of the condition or state being monitored.

B.1 Remote power feeding system

Table B.1: TP1 minimum set of monitored information for remote a remote Power Feeding System

Element type	Monitored information	Explanation
description	Device description	
alarm	none	
event	none	
data	none	
data record	none	
config	none	
control	none	

NOTE: The identifiers used in the Type column of the following tables are described in ES 202 336-1 [1].

B.2 Up converter system

Table B.2: TP2 minimum set of monitored information for Up Converter System

Element type	Monitored information	Explanation
description	Device description	
alarm	One Up Converter Failure	One Up converter is defect or not connected to a down converter (and enabled)
	More Than One Up Converter Failure	More than one Up converter is defect or not connected to a down converter (and enabled)
	More Than One Up Converter Card Failure	More than one up converter card is defect or not connected to a down converter (and enabled)
	One FAN Failure	One FAN has a problem
	More Than One Fan Failure	More Than One FAN has a problem
event	Any alarm set/clear	
data	Input Voltage	The dc voltage at the input of the up converter system (e.g. -48 V)
	Temperature	Temperature of the system
	Number Of Up Converter in failure	
	Number Of Up Converter Card in failure	This is useful in order to know if multiple cards must be replaced or if all the up converters in failure are on the same card
data record	none	
config	none	
control	none	

B.3 Remote Site

Table B.3: TP3 minimum set of monitored information for a Remote Site

Element type	Monitored information	Explanation
description	Remote Site description	
alarm	One Down Converter Failure	
	More Than One Down Converter Failure	
	One Fan Failure	(If any fan in the system)
	More Than One Fan Failure	(If more than one fan in the system)
	Possible Power Feed Reduced	
	Distribution breaker open	
event	Any alarm set/clear	
data	Number of Configured Power Lines	
	Input Voltage	The RFT voltage
	Temperature	
	Output Voltage	The output DC Bus voltage (e.g. -48 V)
	Number Of Down Converter	
data record	none	
config	none	
control	none	
NOTE:	All the recommended and mandatory elements of the "site", defined in core ES 202 336-1 [1], can be used at the remote site level.	

Annex C (informative): Summary of non-mandatory monitoring/supervision information and functions

C.1 Remote power feeding system

Table C.1: TP4 additional set of monitored information fore Remote Power Feeding System

Element type	Monitored information	Explanation
description	none	
alarm	none	
event	none	
data	none	
data record	none	
config	none	
control	none	

NOTE: The identifiers used in the Type column of the following tables are described in ES 202 336-1 [1].

C.2 Up converter system

Table C.2: TP5 additional set of monitored information for Up Converter System

Element type	Monitored information	Explanation
description	none	
alarm	none	
event	none	
data	none	
data record	none	
config	none	
control	none	

C.3 Remote Site

Table C.3: TP6 additional set of monitored information for a Remote Site

Element type	Monitored information	Explanation
description	none	
alarm	none	
event	none	
data	none	
data record	none	
config	none	
control	none	

NOTE: All the recommended and mandatory elements of the "site", defined in core ES 202 336-1 [1], can be used at the remote site level.

C.4 Down converter system

Table C.4: TP7 additional set of monitored information for a down converter system

As generally, remote site have simple down converter system, the information will be available at the <remote_site> level. If detailed information can be provided, manufactures can use this child element.

Element type	Monitored information	Explanation
description	none	
alarm	none	
event	none	
data	none	
data record	none	
config	none	
control	none	

Annex D (informative): Bibliography

- ETSI TR 102 336: "Environmental Engineering (EE); Power and cooling system control and monitoring guidance".

History

Document history		
V1.1.1	July 2009	Membership Approval Procedure MV 20090904: 2009-07-07 to 2009-09-04