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Environmental Engineering (EE);
Interworking between Direct Current/Isolated (DC/I) and Direct Current/Common (DC/C) electrical power systems

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Contents

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Foreword

This Technical Report (TR) has been produced by ETSI Technical Committee Environmental Engineering (EE).

Modal verbs terminology

In the present document "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

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Introduction

ETSI EN 300 253 [i.1] recognizes the Direct Current/Common (DC/C) and Direct Current /Isolated (DC/I) electrical power systems usable in telecommunication equipments.

The aim of the present document is to show the effective interconnecting possibility of the two systems and to list some engineering precautions ensuring good interworking.

1 Scope

The present document describes and establishes simplified models of the different sections of the ground distribution network constituting the DC/I and the DC/C electrical power systems.

These models are interworked to identify the common impedance where DC power supply currents can circulate (interconnection between DC/C and DC/I, DC/C and DC/C, DC/I and DC/I).

These results allow the establishment of some basic engineering advice that should be applied to guarantee the good behaviour when interconnecting two systems. These precautions are given for functionality reasons:

- the noise immunity of the pre-existing system and of the links between the system and the MDF should be conserved;

and safety aspects:

- the screens of signal cables between the pre-existing system and the Main Distribution Frame (MDF), the conductors and the connections of the pre-existing system have to withstand additional currents.

2 References

2.1 Normative references

Normative references are not applicable in the present document.

2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

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

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.1] ETSI EN 300 253 "Environmental Engineering (EE); Earthing and bonding of ICT equipment powered by -48 VDC in telecom and data centres".

3 Definition of terms, symbols and abbreviations

3.1 Terms

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

DC power return conductor: name given to the 0V power supply conductor

NOTE: It is also called "battery return".

DC/C system: system where the DC power return conductors are connected to the Common Bonding Network (CBN), ensuring simultaneously the supply and protection functions

NOTE: The DC/C system is also called a "2 wire system".

DC/I system: system where the current return function and the grounding of the equipment are separated

NOTE: The DC/I system is also called a "3 wire system".

3.2 Symbols

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

AC	Alternating Current
B1	Power source and the entry point of the system
B2	The entry-point of the system room and the system
C1	DC return conductors and CBN at MET
C2	DC return conductors and CBN at power source level
C3	DC return conductors and CBN at the SRPP of the system
C4	DC return conductors and CBN in the system (SYST)
D1	AC Mains Protective Conductor to the Power Plant
G1	Power Plant to Main Earthing Terminal
G2	Main Distribution Frame to the Main Earthing Terminal
G3	Room Grounding Terminal to Main Earthing Terminal
G4	Room Ground Terminal to SRPP
G5	System to SRPP
G6	Between 2 points of the system
RB1	equivalent impedance is called RB 1
RB2	Equivalent impedance is called RB 2
RC1	Equivalent impedance is called RC 1
RC2	Equivalent impedance is called RC 2
RC3	Equivalent impedance is called RC 3
RC4	Equivalent impedance is called RC 4
RD 1	The equivalent impedance is called RD 1
RE	For simplification reasons, the impedances RC 1, RC 2 and RG 1 (PWP grounds) have been replaced by the equivalent impedance RE 1
RG1	Equivalent impedance is called RG 1
RG2	Equivalent impedance is called RG 2
RG3	Equivalent impedance is called RG 3
RG4	Equivalent impedance is called RG 4
RG5	Equivalent impedance is called RG 5
RG6	Equivalent impedance is called RG 6
RS	equivalent impedance is called RS
S	Between the System and

3.3 Abbreviations

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

CBN	Common Bonding Network
DC/C	Direct Current/Common
DC/I	Direct Current/Isolated
MDF	Main Distribution Frame
MET	Mains Earthing Terminal
PWP	PoWer Plant.
RGT	Room Grounding Terminal.
SRPP	System Reference Potential Plane
SYST	System