

TECHNICAL REPORT

**LVDC systems -
Part 102: Low-voltage DC electric island power supply systems**



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CONTENTS

FOREWORD	5
INTRODUCTION	7
1 Scope	8
2 Normative references	8
3 Terms and definitions	8
4 Characteristics of electric island LVDC systems	8
4.1 General	8
4.2 Rural or remote areas without access to the grid	9
4.3 LVDC auxiliary power supply system for ships	10
5 Composition and technical description of electric island LVDC system	11
5.1 General	11
5.2 Voltage levels	12
5.2.1 General	12
5.2.2 Rural or remote areas without access to the grid	12
5.2.3 LVDC auxiliary power supply system in a ship	12
5.3 Topology	13
5.3.1 General	13
5.3.2 Household-level installation	13
5.3.3 County-level installation	14
5.3.4 LVDC auxiliary power supply systems for ship	16
5.4 Protection and operation	17
5.4.1 Earthing configuration	17
5.4.2 Protection	18
5.4.3 System operation and control	19
6 Application cases	21
6.1 Application case 1- A county-level electric island LVDC system in rural Africa	21
6.1.1 General	21
6.1.2 Structure and composition	21
6.1.3 Voltage level	24
6.1.4 Power quality	24
6.1.5 Control and protection configuration	26
6.2 Application case 2 - A household-level electric island LVDC system in rural China	27
6.2.1 General	27
6.2.2 Topology and composition	27
6.2.3 Voltage level	30
6.2.4 Power quality	30
6.2.5 Operation mode control and protection configuration	31
6.2.6 System earthing arrangement	31
6.3 Application case 3 - An electric island LVDC system situated in rural Algeria	31
6.3.1 General	31
6.3.2 Structure and composition	31
6.3.3 Voltage level	33
6.3.4 Power quality	34
6.3.5 Control and protection configuration	35

6.4	Application case 4 - Experimental test platforms	35
6.4.1	General.....	35
6.4.2	Structure and composition	35
6.4.3	Voltage level	36
6.4.4	Power quality.....	36
6.4.5	Control and protection configuration.....	39
6.5	Application Case 5 - LVDC powered ship	40
6.5.1	General.....	40
6.5.2	Structure and composition	40
6.5.3	Voltage level	41
6.5.4	Power quality.....	41
6.5.5	Control and Protection configuration	42
6.6	Application Case 6 - A solar powered electrical recreational ship in Indonesian waters.....	42
6.6.1	General.....	42
6.6.2	Structure and composition	42
6.6.3	Voltage level	45
6.6.4	Power quality.....	45
6.6.5	Control and protection configuration.....	45
Annex A	(informative) System composition.....	46
A.1	General	46
A.2	Power sources	46
A.2.1	General.....	46
A.2.2	Types of sources	46
A.2.3	Control modes	47
A.3	Loads	48
A.4	Storage system	48
A.5	Wiring system	50
A.6	DC breaker and fuses	51
A.7	Connectors and socket.....	52
A.8	Energy control and management system	52
Annex B	(informative) Design and configuration.....	54
Annex C	(informative) System installation	57
C.1	General	57
C.2	PV array mounting structures.....	57
C.3	Battery installations	57
C.4	Electrical cables and electrical connections.....	58
Bibliography		59
Figure 1	- Multi-tier matrix for measuring access to household electricity supply	10
Figure 2	- Guideline to select system voltage	12
Figure 3	- A household installation	14
Figure 4	- A single line diagram of radial configuration	15
Figure 5	- A single line diagram of ring configuration.....	16
Figure 6	- Radial configuration diagram of auxiliary power supply system of ship	17
Figure 7	- Ring configuration diagram of auxiliary power supply system of ship.....	17
Figure 8	- Control mode of passive DC systems.....	20

Figure 9 - Control mode of active DC systems	20
Figure 10 - Schematic of a PV-based nano-grid installation	21
Figure 11 - Geographical distribution of the nano-grids in Ambohimena	22
Figure 12 - Schematic of the LVDC system installation	23
Figure 13 - Configuration and structure of the LVDC system in Ambohimena	23
Figure 14 - Voltage band when configured with DC/DC converters.....	24
Figure 15 - Long-term exchanged currents on the LVDC system.....	25
Figure 16 - Long-term evolution of the DC bus voltage	25
Figure 17 - Exchanged currents during a rainy period.....	26
Figure 18 - Evolution of the DC bus voltage during a rainy period	26
Figure 19 - Initial inrush current (in green) and DC bus voltage (in pink) without and with smooth start-up procedure	27
Figure 20 - The topology of the LVDC power distribution system in Yuanqu Village	28
Figure 21 - PV modules mounted on the roof and DC loads in the house.....	28
Figure 22 - Schematic diagram and real photo of the energy router in household-level installation	29
Figure 23 - The variation of ripple coefficient of the peak-to-peak voltages	31
Figure 24 - The topology scheme of the LVDC power distribution system	32
Figure 25 - Voltage band when configured with household electrical devices	34
Figure 26 - System topology of the experimental test platform.....	36
Figure 27 - 36 V steady-state DC voltage waveforms	36
Figure 28 - 36 V steady state DC voltage waveform expansion.....	37
Figure 29 - 400 V steady state DC voltage waveforms.....	37
Figure 30 - 650 V steady state DC voltage waveforms.....	37
Figure 31 - Voltage ripple analysis with different time window	38
Figure 32 - 36 V transient DC voltage waveforms.....	38
Figure 33 - 400 V transient DC voltage waveforms.....	39
Figure 34 - 650 V transient DC voltage waveforms.....	39
Figure 35 - LVDC powered ship in the Alleppey backwaters	40
Figure 36 - Electrical line diagram of LVDC powered ship hotel loads	41
Figure 37 - A solar powered electrical recreational ship in Indonesian water	42
Figure 38 - Electrical line diagram of solar powered electrical recreational ship	43
Figure 39 - Total loads in different conditions	44
Figure A.1 - System composition.....	46
Figure A.2 - Topology of Dual Active Bridge Converter	47
Figure A.3 - Topology of PMSG connecting to DC grid through rectifier	47
Figure A.4 - Discharge curves of different current rates of lithium cell	49
Figure A.5 - Typical battery management system diagram of lithium battery and lead- acid battery.....	50
Figure A.6 - Centralized energy management system	52
Figure A.7 - Examples of EMS functions and their relationships	53
Figure B.1 - Design process	54
Table 1 - Voltages for different applications (IEC 60092-201).....	13

Table 2 - Generic requirements for ESMAP tiers and attributes	13
Table 3 - Daily load profile for single household in Yuanqu village	29
Table 4 - Loads characteristics in the application case	32
Table 5 - Photovoltaic module technical data sheet.....	33
Table 6 - Lead acid battery specifications	33
Table 7 - Generic requirements for voltage ripple/noise	35
Table 8 - Common hotel loads of LVDC powered ship	41
Table 9 - Loads of solar powered electrical recreational ship	43
Table 10 - Daily power output on different weather conditions (kWh)	44
Table 11 - Power system summary.....	44
Table A.1 - Load level.....	48
Table A.2 - Economic comparison of energy storage	49

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**LVDC systems -
Part 102: Low-voltage DC electric island power supply systems****FOREWORD**

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Full information on the voting for its approval can be found in the report on voting indicated in the above table.

This document is to be used in conjunction with and as a supplement to IEC TR 63282 up to 1 500 V DC.

The language used for the development of this Technical Report is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts in the IEC 63282 series, published under the general title *LVDC systems*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

INTRODUCTION

The vast majority of global population lives in the developing countries, and a significant portion of the developing countries have no, or poor, access to electricity. According to the United Nations Foundation, there are still around 1,2 billion people who do not have access to electricity and around 1 billion more who depend on unreliable electric networks. Energy access is a complex task in rural areas as most of the villages/hamlets are located at remote and/or hilly terrain. Barriers to energy access include uneconomic grid expansion and high transportation costs for fuel. However, these remote areas are rich in availability of locally available resources such as waste from agricultural field, solar intensity, wind utilization, etc., so how to use local resources to provide electricity supply has become a challenge in remote rural areas.

Electric island LVDC (Low voltage direct current) systems have recently been recognized by a number of stakeholders as an alternative solution for energy access in rural area. Several countries have already shown interest in the development of DC systems in order to improve the quality of their inhabitants' life together with the development of the local economy.

This document defines electric island LVDC systems for rural or remote areas, and on ships which normally operate with no connections to a national grid infrastructure. The purpose of this document is to provide some effective technical information to support the construction of electric island LVDC systems. It provides the unique characteristics of electric island power supply system and the key elements such as optional voltage level, topology and operation control, and provides some cases.

This document harmonizes with IEC TR 63282 for voltage level and power quality, and as a supplement to IEC TR 63282, but the application scenarios are slightly different and the power quality in this document are more prominent because there is no connection to a nation's primary grid.

This document mainly consists of three parts. The first part (Clause 4) gives the characteristics of the system, and describes the characteristics of the power source, load and the power quality of the electric island LVDC systems. These characteristics are designed to inform a number of stakeholders of the information to be aware of when building electric island LVDC systems. The second part (Clause 5) gives the system composition and technical description, and describes the load requirements, power source requirements, protection and operation of the electric island LVDC systems. Finally, five typical cases are given (Clause 6).

1 Scope

The scope of this document is to assess the existing technical requirements (by TC 64, TC 82, SyC LVDC) and close any gaps related to electric island LVDC power supply systems in rural or remote areas without electricity up to a maximum of 1 500 V only. Additionally, it covers the case of LVDC auxiliary power supply systems for ships.

Specific technical items for electric island LVDC systems are explained in this document. Rationale for the proposed voltage level, topology, power quality, etc. are given.

This document gives inputs to several TCs in charge of the standardization of different issues and coordinated by SyC LVDC.

2 Normative references

There are no normative references in this document.