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Distributed energy resources connection with the grid -
Part 101: Gravity storage connection to the grid

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CONTENTS

FOREWORD 4
1 Scope 6
2 Normative references 6
3 Terms, definitions, and abbreviated terms 6
3.1 Terms and definitions 6
3.12 Abbreviated terms 7
4 Introduction to gravity energy storage system 8
4.1 Basic working principle 8
4.2 Relationship between shaft and mechanical power of MG and main design parameters of system 8
4.3 Energy conversion process 10
4.3.1 General 10
4.3.2 Energy conversion process in charging operation 10
4.3.3 Energy conversion in discharging process 11
4.3.4 Energy conversion efficiency of GESS 12
5 Grid connection method of GESS 12
5.1 General 12
5.2 Basis for grid connection 13
5.3 Starting method and grid connection process 13
5.3.1 Line-starting 13
5.3.2 Starting with frequency converter 14
5.3.3 Starting with prime mover 16
5.4 Shutdown of GESS 18
5.4.1 General 18
5.4.2 Shutdown under normal 18
5.4.3 Shutdown under emergency 18
6 Grid-connected characteristics of GESS 19
6.1 General 19
6.2 Characteristics of active power response 19
6.2.1 General 19
6.2.2 Grid-connected characteristics of no-load active power 19
6.2.3 Power response characteristics of vertical GESS 19
6.2.4 Power response characteristics of slope GESS 22
6.3 Characteristics of active power and frequency response 24
6.4 Reactive power and voltage response characteristics 25
6.4.1 Reactive power response characteristic 25
6.4.2 Voltage response characteristic 26
6.4.3 Voltage reactive power response 26
7 Grid-connected operation 26
7.1 Selection of switch device 26
7.2 Normal operating range 26
7.3 Anti-disturbance performance 26
7.3.1 Immunity of frequency change rate to disturbance 26
7.3.2 Immunity of fast phase angle change to disturbance 26
7.4 Electromagnetic compatibility and power quality 26
7.5 Communication and automation 27

7.6 System interface protection 27
7.7 Characteristics of SMG performance 27
7.8 AGC devices of GESS 27
7.9 AVC devices of GESS 27
8 Grid-connected testing 28
8.1 General 28
8.2 Grid-connected power quality test 28
8.3 Voltage and reactive power response test 28
8.4 Test of power generation control 28
8.5 Test of charging and discharging time 28
8.6 Rated-energy test 28
8.7 Test of energy conversion efficiency 28
Annex A (informative) Classification and working principle of GESS 29
A.1 Vertical GESS 29
A.1.1 Vertical tower GESS 29
A.1.2 Vertical matrix GESS 30
A.1.3 Vertical shaft GESS 31
A.2 Slope GESS 32
A.2.1 Rail-based slope GESS 32
A.2.2 Suspension-cable-car GESS 34
Annex B (informative) Case of GESS 36
B.1 Case of vertical tower GESS 36
B.2 Case of vertical shaft GESS 36
B.3 Case of rail-locomotive-based slope GESS 36
B.4 Case of vertical matrix GESS 37
Bibliography 38

Figure 1 – Illustration of gravity energy storage system 8
Figure 2 – Relationship between the power at the shaft end of MG, the mass of the mass blocks and the angle 9
Figure 3 – Mechanical power fluctuation of the MG shaft end caused by a single mass block 9
Figure 4 – Schematic diagram of energy conversion in the charging process of GESS 11
Figure 5 – Schematic diagram of energy conversion in the discharging process of GESS 12
Figure 6 – Schematic diagram of the GESS system directly connected to the grid 12
Figure 7 – Self-start grid connection diagram 14
Figure 8 – Grid connection diagram of variable frequency starting 15
Figure 9 – Grid connection diagram of variable frequency starting (equipped with step-up transformer) 16
Figure 10 – Grid connection diagram of the mass block reverse dragging start 17
Figure 11 – Grid connection diagram of auxiliary motor starting 17
Figure 12 – Power response curve of vertical GESS driven by one mass block 21
Figure 13 – Power response curves of vertical GESS driven by multiple mass blocks 22
Figure 14 – Power response of slope GESS based on suspension cable car driven by multiple mass blocks 23
Figure 15 – Active power and frequency response characteristics curve of GESS 24
Figure 16 – Reactive power response characteristics when loading a mass block 25
Figure 17 – Output reactive power characteristics of GESS during full power response 25

Figure A.1 – Structure of vertical tower GESS 29
Figure A.2 – Charging and discharging processes of vertical tower GESS 30
Figure A.3 – Vertical matrix GESS 31
Figure A.4 – Vertical shaft GESS 32
Figure A.5 – Rail-locomotive-based slope GESS 32
Figure A.6 – Chain-rail-based slope GESS 33
Figure A.7 – Cable-rail-based slope GESS 34
Figure A.8 – Suspension-cable-car GESS 34
Figure B.1 – Vertical matrix GESS 37

Table 1 – Frequency response of GESS 24
Table 2 – Response of GESS to voltage variation 26

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Distributed energy resources connection with the grid - Part 101: Gravity storage connection to the grid

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IEC TR 62786-101 has been prepared by IEC Technical Committee 8: System aspects of electrical energy supply. It is a Technical Report.

The text of this Technical Report is based on the following documents:

Draft	Report on voting
8/1814/DTR	8/1832/RVDTR

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

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

A list of all parts in the IEC 62786 series, published under the general title *Distributed energy resources connection with the grid*, can be found on the IEC website.

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.

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– reconfirmed,
– withdrawn, or
– revised.

1 Scope

This part of IEC TS 62786, which is a Technical Report, provides the principles and general technical characteristics of gravity energy storage systems (GESS) connected to the distribution network. It provides a reference for the planning, design, grid connection and operation of GESS. It includes an introduction to GESS, grid-connection methods, grid-connected characteristics, grid-connected operation and grid-connected testing and so on.

GESS can use liquid or solid mediums for storing or releasing energy. For example, traditional pumped storage utilizes liquid water to achieve energy storing or releasing. This document only focuses on the solid GESS, which utilize solid materials (such as concrete, slag, construction waste, etc.) for energy storage. Generally, GESS can be classified as vertical GESS and slope GESS. In the GESS, the motor-generators (MG) that are directly connected, or indirectly connected to the low voltage (LV) or medium voltage (MV) distribution network through converters, transfer the energy between the mass blocks and the grid. This document reports the grid-connection method, active power response characteristic, response of active power to frequency, response of reactive power to voltage and test of direct grid connection through synchronous motor-generator (SMG), as a supplement to IEC TS 62786-1:2023 [1].

This document describes the interface arrangement for the connection of GESS to distribution networks with the nominal frequency of 50 Hz or 60 Hz.

2 Normative references

There are no normative references in this document.

3 Terms, definitions, and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

– IEC Electropedia: available at https://www.electropedia.org/

– ISO Online browsing platform: available at https://www.iso.org/obp

3.2
gravity energy storage system
system using mass block as energy storage medium, absorbing, storing, converting and releasing electrical energy through power system, generally including motor-generator (MG), mass block, mechanical transmission device, mass block carrier device, mass block stacking device, auxiliary electrical equipment and control device, and so on

Note 1 to entry: The GESS of various structures use different mechanical devices to lift the mass blocks. In this document, GESS are generally classified into vertical GESS and slope GESS, by the moving paths of the mass blocks. A GESS is called a single-machine system if it contains only one MG, and a multi-machine system if it contains multiple MG.

3.3
motor-generator
electrical machine for GESS that can be operated in motoring mode or generating mode

3.4
motoring mode
operating mode in which the motor-generator machine operates as a motor to lift the mass block from a lower position to a higher position