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Energy Storage Systems Using Fuel Cell Modules in Reverse Mode—Part
3: Test Procedures for the Performance of Energy Storage Systems

储能系统用可逆模式燃料电池模块
第3部分：电能储存系统性能测试方法

(IEC 62282-8-201:2020, Fuel cell technologies - Part 8-201: Energy storage systems using fuel cell modules in reverse mode - Test procedures for the performance of power-to-power systems, IDT)

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CONTENTS

Foreword	I
Introduction	II
1 Scope	1
2 Normative References	2
3 Terms, Definitions and Symbols	3
3.1 Terms and definitions	3
3.2 Symbols	7
4 Measurement Instruments and Measurement Methods	8
4.1 General	8
4.2 Instrument uncertainty	8
4.3 Measurement plan	8
4.4 Environmental conditions	9
4.5 Maximum permissible deviation for operating conditions	9
5 System Parameters	10
5.1 General	10
5.2 Electric energy storage (EES) capacity	10
5.3 Rated electric power input	10
5.4 Rated net electric power output	11
5.5 Roundtrip electrical efficiency	11
5.6 System response (step response time and ramp rate)	11
5.7 Minimum switchover time	13
5.8 Quiescent state loss rate	13
5.9 Heat input rate	13
5.10 Recovered heat output rate	13
5.11 Acoustic noise level	13
5.12 Total harmonic distortion	13
5.13 Discharge water quality	14
6 Test Methods and Procedures	14
6.1 General	14
6.2 Electric energy storage (EES) capacity test	14
6.3 Rated electric power input test	15
6.4 Rated net electric power output test	15
6.5 Roundtrip electrical efficiency test	15
6.6 Other system performance test	16
6.7 Component performance test	19
7 Test Reports	21
7.1 General	21
7.2 Report items	22
7.3 Tested system data description	22
7.4 Test condition description	22
7.5 Test data description	22
7.6 Uncertainty evaluation	23
Bibliography	24

FOREWORD

This document is drafted in accordance with the rules given in GB/T 1.1-2020 “*Directives for standardization - Part 1: Rules for the structure and drafting of standardizing documents*”.

This document is Part 3 of GB/T 42847 “Energy storage systems using fuel cell modules in reverse mode”. The following parts of GB/T 42847 have been issued:

- Part 2: Test procedures for the performance of single cells and stacks with proton exchange membranes, including reversible operation;
- Part 3: Test procedures for the performance of energy storage systems.

This document is identical to IEC 62282-8-201:2020, *Fuel cell technologies - Part 8-201: Energy storage systems using fuel cell modules in reverse mode - Test procedures for the performance of power-to-power systems*.

The following editorial changes have been made to this document to a minimum extent:

- To coordinate with the existing standard, the standard name was changed into “Energy Storage Systems Using Fuel Cell Modules in Reverse Mode—Part 3: Test Procedures for the Performance of Energy Storage Systems”.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. The organizations issuing this document shall not be held responsible for identifying any or all such patent rights.

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INTRODUCTION

The energy storage systems in reverse mode can effectively utilize the excess electric energy to facilitate electric power regulation/control and renewable energy utilization. GB/T 42847 focuses on the performance test methods for energy storage systems based on electrochemical modules (combining fuel cells with electrolyser, or reversible fuel cells).

GB/T 42847 "Energy Storage Systems Using Fuel Cell Modules in Reverse Mode" aims to establish the performance test methods for energy storage systems using fuel cell modules in reverse mode, and is intended to be composed of three parts:

- Part 1: Test procedures for the performance of solid oxide single cells and stacks, which is intended to give the testing systems, instruments and measuring methods, and test methods to test the performance of solid oxide cells and stacks in fuel cell mode, electrolysis and/or reversible mode.
- Part 2: Test procedures for the performance of single cells and stacks with proton exchange membranes, including reversible operation, which is intended to give the testing systems, instruments and measuring methods, and test methods to test the performance of proton exchange membrane cells and stacks in fuel cell mode, electrolysis and/or reversible mode.
- Part 3: Test procedures for the performance of energy storage systems, which is intended to give the test procedures for the performance of electrical energy storage systems using hydrogen.

Energy Storage Systems Using Fuel Cell Modules in Reverse Mode—Part 3: Test Procedures for the Performance of Energy Storage Systems

1 SCOPE

This document specifies the evaluation methods of typical performances for electric energy storage (EES) systems using hydrogen. This document is applicable to the electrochemical reaction devices that have **charging (electrolysis) and discharging (power generating)** functions. This document applies to systems that are designed, used and operated in stationary (indoor and outdoor) scenarios.

The conceptual configurations of the EES systems using hydrogen are shown in Figure 1 and Figure 2. Figure 1 shows the system independently equipped with an electrolyser module and a fuel cell module. Figure 2 shows the system equipped with a reversible cell module. The indispensable components include an electrolyser, a hydrogen storage and a fuel cell, or a reversible cell, a hydrogen storage and an overall management system (which may include a pressure management). The optional components include a battery, an oxygen storage, a heat management system (which may include a heat storage) and a water management system (which may include a water storage). The performance test is executed in the area surrounded by the outside thick solid line square (system boundary).

Note: In this document, the term "reversible" does not refer to the thermodynamic meaning of an ideal process. It is common practice in the fuel cell community to call the operation mode of a cell that alternates between fuel cell mode and electrolysis mode "reversible".

This document is intended to be used for data exchanges in commercial transactions between the system manufacturers and customers. Users of this document can selectively execute test items suitable for their purposes from those described in this document.

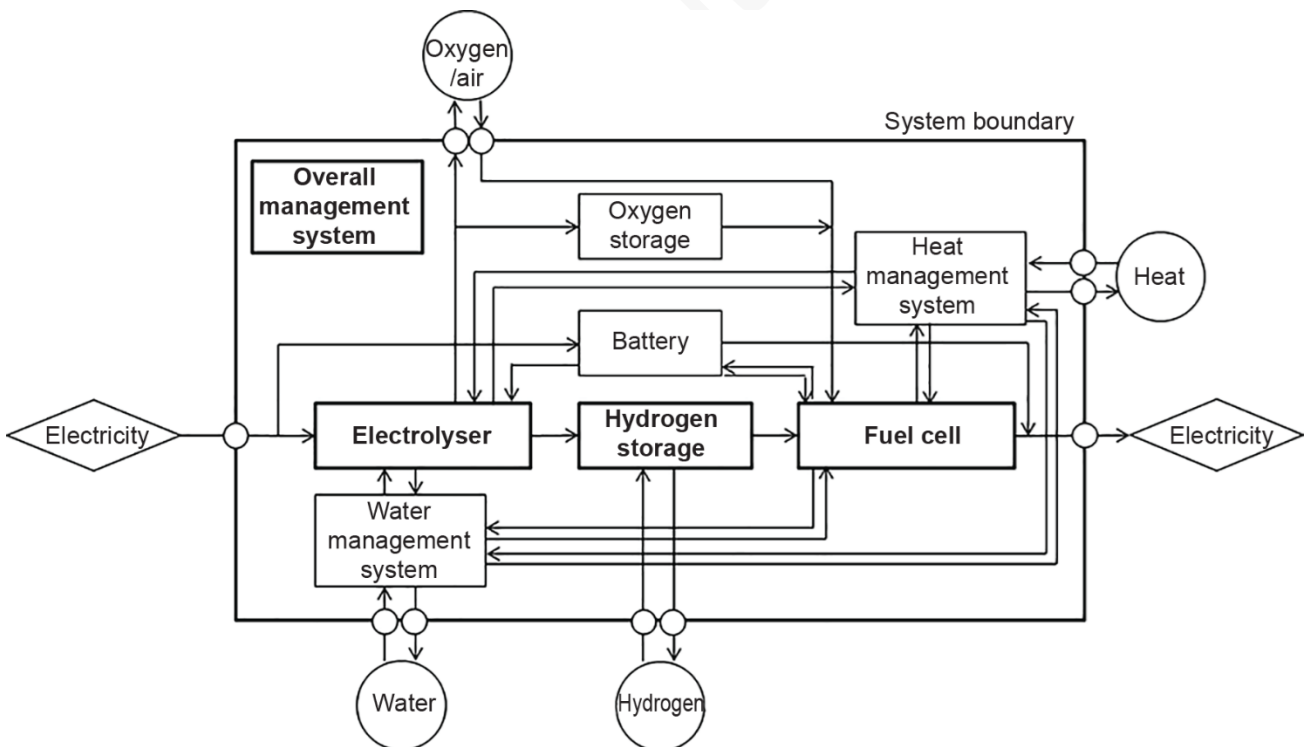


Figure 1 System configuration of EES system using hydrogen - Type with electrolyser and fuel cell

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