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Electrically propelled road vehicles — Test specification for electric propulsion components —

Part 2: Performance testing of the motor system

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Foreword

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This document was prepared by Technical Committee ISO/TC 22, *Road Vehicles*, Subcommittee SC 37, *Electrically propelled vehicles.*

A list of all parts in the ISO 21782 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Electrically propelled road vehicles — Test specification for electric propulsion components —

Part 2: Performance testing of the motor system

1 Scope

This document specifies the performance tests for the motor system designed as a voltage class B electric propulsion system for electrically propelled road vehicles.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 21782-1, *Electrically propelled road vehicles — Test specification for electric propulsion components — Part 1: General test conditions and definitions*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 21782-1 apply.

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

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

— IEC Electropedia: available at http://www.electropedia.org/

4 Abbreviated terms

For the purposes of this document, the abbreviated terms given in ISO 21782-1 apply.

5 Tests

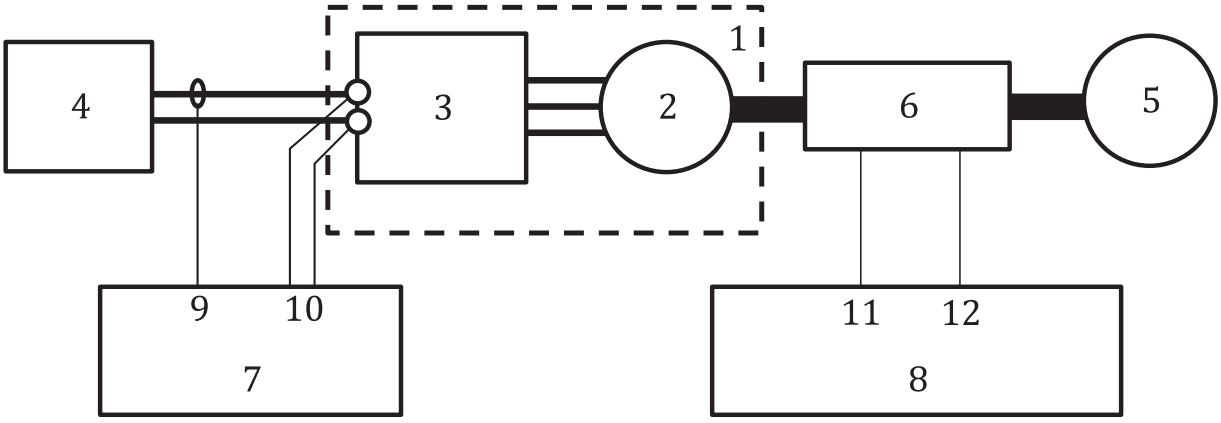
5.1 Measurement of total loss and total efficiency

5.1.1 General

Under the conditions of the paired inverter and motor combination, this test measures total loss and total efficiency between the input power of the inverter and the output power of the motor in order to ensure that the performance of the motor system is as designed.

5.1.2 Test diagram

The test diagram is shown in Figure 1.



Key

1 DUT
2 test motor
3 test inverter
4 DC power supply
5 load
6 torque/speed detector
7 spectrum analyser/power meter
8 torque/speed meter
9 inverter input current (in A)
10 inverter input voltage (in V)
11 motor torque (in Nm)
12 motor speed (in min^{-1})

Figure 1 — Diagram for total loss and total efficiency test of the motor system

5.1.3 Test conditions

The test conditions are shown in Table 1.

Table 1 — Conditions for total loss and total efficiency test of the motor system

Test conditions	Value	Remark
DC input voltage	Rated voltage as defined in ISO 21782-1:2019, 3.22.	For the DC input voltage tolerance, see ISO 21782-1:2019, 5.3.
Ambient conditions	Room temperature (RT) and humidity as defined in ISO 21782-1:2019, 5.4.	
Coolant temperature	Maximum temperature for unlimited operating capability	— In case of liquid cooling — Ethylene glycol and propylene glycol as examples of coolant — If technically feasible, the tests shall be performed at coolant temperature of 65 °C. Otherwise the deviation shall be documented in the test report.
Coolant flow rate	Minimum flow rate for unlimited operating capability	In case of liquid cooling
Cooling air flow rate	Minimum flow rate for unlimited operating capability	In case of air cooling