

ISO 5474-2:2024-06 (E)

Electrically propelled road vehicles - Functional and safety requirements for power transfer between vehicle and external electric circuit - Part 2 : AC power transfer

Contents		Page
	Foreword	v
1	Scope	1
2	Normative references	1
3	Terms and definitions	2
4	System architecture	3
5	Environmental and operational conditions	6
6	Safety requirements	6
6.1	General.....	6
6.2	Protection of persons against electric shock.....	6
6.2.1	General.....	6
6.2.2	Compatibility with external safety devices.....	7
6.2.3	Insulation resistance.....	7
6.2.4	Touch current.....	7
6.2.5	Insulation coordination.....	7
6.2.6	Protective conductor.....	7
6.2.7	Basic protection when connected to an external electric circuit.....	7
6.2.8	Requirements for unmated vehicle contacts.....	7
6.3	Protection against thermal incident.....	8
6.3.1	Requirements for normal operation.....	8
6.3.2	Overcurrent protection.....	8
6.3.3	Residual energy after disconnection related to thermal incident.....	8
6.3.4	Arc protection.....	9
6.4	Vehicle movement.....	9
6.5	AC or DC electric power at the same contacts.....	9
7	Electromagnetic compatibility	9
8	Protection in case of unintended power transfer	9
9	Functional requirements	9
9.1	Voltage and frequency ranges for normal operation.....	9
9.2	Inrush current.....	9
9.3	Load current.....	10
9.4	Active factor.....	10
9.5	Phase order and number of phases in three-phase operation.....	11
9.6	Requirements for the plug and cable.....	11
9.7	Requirements for the vehicle inlet.....	12
9.8	Compatibility with self test functions of EV supply equipment.....	12
10	Additional requirements for reverse power transfer	12
10.1	General.....	12
10.2	Safety requirements.....	12
10.2.1	General.....	12
10.2.2	Reverse power transfer in grid forming mode to unearthed external circuit (vehicle to load).....	12
10.2.3	Reverse power transfer in grid following mode to earthed external circuit (vehicle to grid).....	15
10.2.4	Reverse power transfer in grid forming mode to earthed external circuit (vehicle to home).....	15
10.3	Functional requirements.....	15

10.3.1	General	15
10.3.2	Reverse power transfer in grid forming mode	15
10.3.3	Reverse power transfer in grid following mode	16
11	Requirements for power transfer to on-board standard socket-outlets	16
11.1	General	16
11.2	Protective conductor	16
11.3	Insulation resistance	16
12	Owner's manual and marking	16
13	Test procedure	16
13.1	General	16
13.2	Resistance of protective conductor	17
13.3	Insulation resistance	17
13.4	Withstand voltage test	17
13.5	Measurement of touch current	17
13.6	Inrush current test	20
13.6.1	General	20
13.6.2	Measurement	21
Annex A (informative)	Examples of circuit diagrams for different configurations of chargers on-board an electric vehicle	22
Bibliography		28