



SURFACE VEHICLE INFORMATION REPORT

J1715™

SEP2022

Issued 1994-04
Revised 2022-09

Superseding J1715 MAY2021

(R) Hybrid Electric Vehicle (HEV) and Electric Vehicle (EV) Terminology

RATIONALE

As the technology related to electrified vehicles continues to expand, new terms and definitions are being created. Some of the new terms are specific to a given technology and hence are defined in specific SAE International J-documents. New terminology with broader applicability has been incorporated into this version of SAE J1715. Most notable in this version is the inclusion of terms associated with: electric drive propulsion modules, charging vehicles via wireless power transfer (WPT), and vehicle grid integration (VGI) for electric power transfer and for reverse power flow (RPF) technologies.

This SAE Information Report does not contain terminology specifically related to vehicle propulsion batteries since this information is encompassed in SAE J1715/2.

FOREWORD

This document is an ongoing effort to provide the technical community with the terminology used most frequently in the hybrid electric vehicle (HEV), plug-in hybrid electric vehicle (PHEV), and electric vehicle (EV) industry.

1. SCOPE

This SAE Information Report contains definitions for HEV, PHEV, and EV terminology. It is intended that this document be a resource for those writing other HEV, PHEV, and EV documents, specifications, standards, or recommended practices.

1.1 Purpose

The purpose of this document is to provide a record of commonly used terminology established by the technical community involved with writing practices and information reports for HEVs, PHEVs, and EVs.

1.2 Field of Application

This document pertains to HEVs, PHEVs, and EVs.

1.3 Product Classification

Information report.

1.4 Product Description

Information report containing commonly used terminology in the HEV, PHEV, and EV industry.

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Full document details: SAE J1715_202209

For more information on this standard, visit
https://www.sae.org/standards/content/J1715_202209/

Documents

Document Sharing Hub

2. REFERENCES

2.1 Applicable Documents

The following publications form a part of this specification to the extent specified herein. Unless otherwise indicated, the latest issue of SAE publications shall apply.

2.1.1 National Fire Protection Agency Publications

Available from NFPA, 1 Batterymarch Park, Quincy, MA 02169-7471, Tel: 617-770-3000, www.nfpa.org.

NFPA 30 Flammable and Combustible Liquids Code

NFPA 70 National Electric Code

2.1.2 Code of Federal Regulations (CFR) Publications

Available from the United States Government Printing Office, 732 North Capitol Street, NW, Washington, DC 20401, Tel: 202-512-1800, www.gpo.gov.

40 CFR 86.115-78 Control of Emissions from New and in-Use Highway Vehicles and Engines

2.2 Related Publications

The following publications are provided for information purposes only and are not a required part of this SAE Technical Report.

2.2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

SAE J645 Automotive Transmission Terminology

SAE J670 Vehicle Dynamics Terminology

SAE J1634 Battery Electric Vehicle Energy Consumption and Range Test Procedure

SAE J1711 Recommended Practice for Measuring the Exhaust Emissions and Fuel Economy of Hybrid-Electric Vehicles, Including Plug-in Hybrid Vehicles

SAE J1715/2 Battery Terminology

SAE J1772 SAE Electric Vehicle and Plug-in Hybrid Electric Vehicle Conductive Charge Coupler

SAE J1773 SAE Electric Vehicle Inductively Coupled Charging

SAE J2894/1 Power Quality Requirements for Plug-in Electric Vehicle Chargers

SAE J2894/2 Power Quality Test Procedures for Plug-in Electric Vehicle Chargers

SAE J2836 Instructions for Using Plug-in Electric Vehicle (PEV) Communications, Interoperability, and Security Documents

SAE J2836/1 Use Cases for Communication Between Plug-in Vehicles and the Utility Grid

SAE J2836/2 Use Cases for Communication Between Plug-in Vehicles and Off-Board DC Charger

SAE J2836/3 Use Cases for Plug-in Vehicle Communication as a Distributed Energy Resource

SAE J2836/4	Use Cases for Diagnostic Communication for Plug-in Electric Vehicles
SAE J2836/5	Use Cases for Customer Communication for Plug-in Electric Vehicles
SAE J2836/6	Use Cases for Wireless Charging Communication for Plug-in Electric Vehicles
SAE J2847/1	Communication for Smart Charging of Plug-in Electric Vehicles Using Smart Energy Profile 2.0
SAE J2847/2	Communication Between Plug-in Vehicles and Off-Board DC Chargers
SAE J2847/3	Communication for Plug-in Vehicles as a Distributed Energy Source
SAE J2847/6	Communication for Wireless Power Transfer Between Light-Duty Plug-in Electric Vehicles and Wireless EV Charging Stations
SAE J2931/1	Digital Communications for Plug-in Electric Vehicles
SAE J2931/4	Broadband PLC Communication for Plug-in Electric Vehicles
SAE J2931/6	Signaling Communication for Wirelessly Charged Electric Vehicles
SAE J2931/7	Security for Plug-in Electric Vehicle Communications
SAE J2953/1	Plug-in Electric Vehicle (PEV) Interoperability with Electric Vehicle Supply Equipment (EVSE)
SAE J2953/2	Test Procedures for the Plug-in Electric Vehicle (PEV) Interoperability with Electric Vehicle Supply Equipment (EVSE)
SAE J2954	Wireless Power Transfer for Light-Duty Plug-in/Electric Vehicles and Alignment Methodology
SAE J3068	Electric Vehicle Power Transfer System Using a Three-Phase Capable Coupler
SAE J3072	Interconnection Requirements for Onboard, Grid Support Inverter Systems
SAE J3105	Electric Vehicle Power Transfer System Using Conductive Automated Connection Devices
SAE J3105/1	Electric Vehicle Power Transfer System Using Conductive Automated Connection Devices, Infrastructure-Mounted Pantograph (Cross-Rail) Connection
SAE J3105/2	Electric Vehicle Power Transfer System Using Conductive Automated Connection Devices, Vehicle-Mounted Pantograph (Bus-Up)
SAE J3105/3	Electric Vehicle Power Transfer System Using Conductive Automated Connection Devices (Enclosed Pin and Socket Connection)
SAE J3257	State of Health Calculation for Electrified Vehicles.

2.2.2 IEC Publications

Available from IEC Central Office, 3, rue de Varembe, P.O. Box 131, CH-1211 Geneva 20, Switzerland, Tel: +41 22 919 02 11, www.iec.ch.

IEC Electropedia

2.2.3 IEEE Publications

Available from IEEE Operations Center, 445 and 501 Hoes Lane, Piscataway, NJ 08854-4141, Tel: 732-981-0060, www.ieee.org.

ANSI/IEEE 100 Standard Dictionary of Electrical and Electronic Terms

2.2.4 NIST Publications

Available from NIST, 100 Bureau Drive, Stop 1070, Gaithersburg, MD 20899-1070, Tel: 301-975-6478, www.nist.gov.

HB44 NIST Handbook 44 - Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices.

NIST SP 330 International System of Units

2.2.5 Code of Federal Regulations (CFR) Publications

Available from the United States Government Printing Office, 732 North Capitol Street, NW, Washington, DC 20401, Tel: 202-512-1800, www.gpo.gov.

49 CFR Ch. V § 571 Federal Motor Vehicle Safety Standards

2.2.6 SANDIA Publications

Available from Sandia National Laboratories, P.O. Box 5800, Albuquerque, NM 87185, www.sandia.gov.

SAND88-2852 Distribution Category UC-212 - Glossary of Testing Terminology for Rechargeable Batteries

2.2.7 USABC Publications

United States Advanced Battery Consortium (USABC) documents available from the United States Council on Automotive Research (USCAR), 1000 Town Center Drive, Suite 300, Southfield, MI 48075, Tel: 248-223-9000, www.uscar.org.

USABC Test Procedures Manual

3. ABBREVIATIONS AND ACRONYMS

The following acronyms are commonly used in relation to hybrid and EV terminology:

A	Ampere
AC	Alternating Current
ACD	Automatic Connecting Device
APU	Auxiliary Power Unit
BAS	Belted-Alternator Starter
BEV	Battery Electric Vehicle
BMS	Battery Management System
CAN	Controller Area Network Data Bus
CCS	Combined Charging System
CFR	Code of Federal Regulations

CP	Control Pilot
CVT	Continuously-Variable Transmission
DER	Distributed Energy Resource
DC	Direct Current
DCFC	DC Fast Charger
DWPT	Dynamic Wireless Power Transfer
ECP	Electrical Connection Point
EMC	Electromagnetic Compatibility
EMF	Electromagnetic Field
EMI	Electromagnetic Interference
EMS	Energy Management System
EPS	Electric Power System
ESD	Electrostatic Discharge
EV	Electric Vehicle
EVCC	Electric Vehicle Communication Controller
EVSE	Electric Vehicle Supply Equipment
FCEV	Fuel-Cell Electric Vehicle
FLA	Four-Letter Acronym
GA	Ground Assembly (WPT)
HAN	Home Area Network
HEV	Hybrid Electric Vehicle
HPU	Hybrid Power Unit
IMN	Impedance Matching Network
ISC	Infrastructure-Side Connection
kW	Kilowatt
kW·h	Kilowatt-Hour
LAN	Local Area Network
LIN	Local Interconnect Network
NRTL	Nationally Recognized Testing Laboratory
OBC	On-Board Charger

PEV	Plug-in Electric Vehicle
PHEV	Plug-in Hybrid Electric Vehicle
RESS	Rechargeable Energy Storage System
SECC	Supply Equipment Communication Controller
SEP	Smart Energy Profile
SGIP	Smart Grid Interoperability Panel
SOC	State of Charge
SOH	State of Health
TLA	Three-Letter Acronym
UBE	Usable Battery Energy
V	Volt
V2G	Vehicle-to-Grid
V2G-AC	Vehicle-to-Grid via Alternating Current
V2G-DC	Vehicle-to-Grid via Direct Current
V2H	Vehicle-to-Home
V2I	Vehicle-to-Infrastructure
V2L	Vehicle-to-Load
V2V	Vehicle-to-Vehicle
V-A	Volt-Ampere
VA	Vehicle Assembly (WPT)
VGI	Vehicle/Grid Integration
VIN	Vehicle Identification Number
VM	Vehicle Manufacturer
VSC	Vehicle-Side Connection
VRef	Reference Voltage
VRefOfs	Reference Voltage Offset
W	Watt
WCS	Wireless Charging System
WPT	Wireless Power Transfer
xEV	“Any” Electrified Vehicle

4. HYBRID ELECTRIC (HEV) AND ELECTRIC VEHICLE (EV) TERMINOLOGY

4.1 AC (ALTERNATING CURRENT) CHARGING

The process of supplying electrical energy to the vehicle via an alternating current (AC) (sinusoidal, varying equidistant across the 0 A axis) which is then converted to direct current (DC) for charging an RESS and possibly supplying other vehicle demands.

4.2 ADEQUATE VENTILATION

As defined in NFPA 30 and NFPA 70, ventilation is adequate if it is sufficient to prevent accumulation of hydrogen vapor-air mixtures in concentrations over one-fourth of the lower flammability limit.

4.3 AIR CLEARANCE

The shortest distance through air between two conductive parts.

4.4 ALL ELECTRIC RANGE

The distance an electrified vehicle can travel without using any fuel (gas, diesel, natural gas, etc.) for propulsion or for performing any other functions of the vehicle. Note that the all-electric range must be accompanied with a reference to the drive cycle used to determine the range.

4.5 AUTOMATIC CONNECTION DEVICE (ACD)

A system that establishes without direct human intervention a conductive electrical interface between on-vehicle and off-vehicle components for the purpose of power transfer.

4.6 AUTOMATIC TRANSMISSION

A transmission in which ratio changes are effected automatically without requiring manual assist.

4.7 AUXILIARY POWER UNIT (APU)

A device used to generate propulsion power but without a direct mechanical connection to the drive wheels. Some examples of auxiliary power units are internal combustion engines connected solely to an electric generator, an engine connected solely to a hydraulic pump, or fuel cells.

4.8 BATTERY ELECTRIC VEHICLE (BEV)

A vehicle that receives its on-board propulsion power solely from batteries, unlike a hybrid vehicle that may receive a portion of its power from a separately fueled power source, such as an internal combustion engine.

4.9 BI-DIRECTIONAL INVERTER

A device that can convert from AC to DC in one direction to serve as a battery charger, and then be capable of being reversed and convert from DC to AC in the other direction to serve as an inverter. This term is generally not used if the inverter is also capable of injecting or absorbing reactive power while charging or discharging.

4.10 BREAKDOWN

The failure of the dielectric of an insulation due to the effects of an excessive electric field and/or physical or chemical deterioration of the dielectric material.

4.11 CHARGE CONNECTOR

A conductive or inductive device that establishes an electrical connection to the electric vehicle for the purpose of charging and information exchange.