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An American National Standard

Electrical Definitions

***Foreword*—**This document was canceled in 1996 and just recently reissued. It has been revised during this time.

***1. Scope*—**This SAE Standard contains the industry standard definitions for electrical equipment used in the generation of electric power onboard today's conventional road vehicles. It is intended to complement the electronic terminology that was formerly documented in SAE J1213 (canceled) and/or in other industry glossaries of electrical/electronic devices.

2. References

2.1 Applicable Publications—The following publications form a part of the specification to the extent specified herein. Unless otherwise indicated, the latest revision of SAE publications shall apply.

2.1.1 SAE PUBLICATIONS—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE J56—Electrical Generating System (Alternator Type) Performance Curve and Test Procedure
SAE J1213 (Canceled)

2.2 Related Publications—The following publications are provided for information purposes only and are not a required part of this document, they were used for reference.

2.2.1 SAE PUBLICATION—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE TSB 003—Rules For SAE Use of SI (metric) Units

2.2.2 OTHER PUBLICATIONS

IEEE Dictionary
Standard English Language Dictionaries

3. Definitions

3.1 General

3.1.1 ALTERNATING CURRENT—Electric current that reverses direction periodically, usually many times per second. Abbreviated AC.

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3.1.2 ALTERNATING VOLTAGE—Electric potential that reverses direction periodically, usually many times per second.

3.1.3 DIRECT CURRENT —Electric current that flows in one direction only, as opposed to alternating current. Abbreviated DC.

3.1.4 ELECTRIC—Containing, producing, arising from, actuated by, or carrying electricity and capable of doing so. Examples: electric motor, energy, vehicle. This was referenced from the IEEE definition. See electrical.

3.1.5 ELECTRICAL—Related to, pertaining to, or associated with electricity, but not having its properties or characteristics. Examples: electrical engineer, electrical handbook, insulator, rating, school, unit.

NOTE—Some dictionaries indicate electric and electrical as synonymous but usage in the electrical engineering field has in general been restricted to the meanings given in the definitions previously. It is recognized that there are borderline cases wherein the usage determines the selection. This was referenced from the IEEE definition. See electric.

3.1.6 ELECTRONIC—Any device or system in which electrons flow through a vacuum, gas, or semiconductor (see SAE J1213).

3.1.7 ELECTRIC CURRENT—The flow of electric charge. The preferred unit is the ampere (A).

3.1.8 ELECTRIC POWER—The rate at which electric energy is transferred, or generated from, or converted to other forms of energy. It is expressed in watts (W) and is equal to the product of the current in amperes and the voltage in volts.

3.1.9 ELECTRIC ENERGY—Electric energy is the time integral of electric power, and is expressed in joules (watt·seconds) when the voltage is in volts, the current is in amperes, and the time interval is in seconds. This was referenced from the IEEE definition.

3.2 Electric Power Generation

3.2.1 GENERATOR—A rotating electromagnetic machine that converts mechanical power into electric power, with a frequency determined by the speed of the machine.

3.2.2 DC GENERATOR—A generator that produces DC electric power. It may produce DC by any means, including the use of rectifier diodes or a commutator with brushes.

3.2.3 ALTERNATOR—In non-automotive applications, an alternator is a generator that produces AC electric power. In automotive applications, the generator is commonly referred to as an alternator because it first produces AC electric power which is converted to DC by diode rectification.

3.2.3.1 *Lundell Machine*—The type of generator used in automotive applications, otherwise known as a claw-pole type. It uses a single field coil embedded inside a claw-pole-shaped rotor to establish a multi-polar bi-directional field. The stator has a multi-phase winding which is connected to a diode bridge for full-wave rectification. The DC output voltage is controlled by regulating the field current.

3.2.3.2 *Brushless Alternator*—An alternator which does not use a brush, slip ring, or commutator to transmit electric current to it's rotating component. Electromagnetic coupling is employed with it's rotating component to generate electric power.

3.2.3.3 *Permanent Magnet Alternator*—An alternator which employs permanent magnets as the principal source of magnetic flux used to generate electric power.

3.2.4 RATED OUTPUT—Rated generator output current is the output current produced at rated voltage, temperature, and speed. See SAE J56 for more details.

3.3 Recommended Format For Commonly Used Engineering Terms

Current	ampere, A
Voltage	volt, V
Power	watt, W
Energy	joule, J
Resistance	ohm, Ω
Capacitance	farad, F
Frequency	hertz, Hz
Rotational speed	rpm
Mass	kilogram, kg
Force	newton, N
Length	meter, m
Time	second, s

4. Notes

4.1 Marginal Indicia—The change bar (l) located in the left margin is for the convenience of the user in locating areas where technical revisions have been made to the previous issue of the report. An (R) symbol to the left of the document title indicates a complete revision of the report.

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